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BOLETIM OFICIAL DA REGIÃO ADMINISTRATIVA ESPECIAL DE MACAU

第 二 副 刊
2.º SUPLEMENTO

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印務局，澳門官印局街。電話：2857 3822 • 傳真：2859 6802 • 電子郵件：info@io.gov.mo

Imprensa Oficial, Rua da Imprensa Nacional — Macau. *Tel.:* 2857 3822 • *Fax:* 2859 6802 • *E-mail:* info@io.gov.mo
網址*Website*: http://www.io.gov.mo

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澳門特別行政區

行 政 長 官 辦 公 室

第 30/2016 號行政長官公告

國際海事組織大會於二零零五年十二月一日透過第A.972（24）號決議通過了《1966年國際船舶載重線公約》的修正案，該修正案自二零一零年二月三日起適用於澳門特別行政區；

基於此，行政長官根據第3/1999號法律《法規的公佈與格式》第六條第一款的規定，命令公佈包含上指修正案的第A.972（24）號決議的中文及英文文本。

二零一六年四月十八日發佈。

行政長官　崔世安

REGIÃO ADMINISTRATIVA ESPECIAL DE MACAU

GABINETE DO CHEFE DO EXECUTIVO

Aviso do Chefe do Executivo n.º 30/2016

Considerando que, em 1 de Dezembro de 2005, a Assembleia da Organização Marítima Internacional, através da resolução A.972(24), adoptou emendas à Convenção Internacional das Linhas de Carga, 1966, e que tais emendas são aplicáveis na Região Administrativa Especial de Macau desde 3 de Fevereiro de 2010;

O Chefe do Executivo manda publicar, nos termos do n.º 1 do artigo 6.º da Lei n.º 3/1999 (Publicação e formulário dos diplomas), a resolução A.972(24) que contém as referidas emendas, nos seus textos em línguas chinesa e inglesa.

Promulgado em 18 de Abril de 2016.

O Chefe do Executivo, *Chui Sai On*.

第 A.972（24）號決議

2005 年 12 月 1 日通過

通過《1966 年國際船舶載重線公約》的修正案

大會，

憶及《國際海事組織公約》有關大會在海上安全和防止和控制船舶造成海洋污染的規則和指南方面的職責的第 15（j）條，

注意到旨在列入作為證書依據的檢驗的完成日期的建議證書修正案，

還注意到海上安全委員會第七十九次會議按照《1966 年國際載重線公約》（《1966 年載重線公約》）第 29（3）（a）條通過了該建議修正案，

審議了“國際載重線證書（1966 年）”和“國際載重線豁免證書”的建議修正案，

1. 按照《1966 年載重線公約》第 29（3）（b）條**通過**本決議附件中所載的該公約的“國際載重線證書（1966 年）”和“國際載重線豁免證書”的修正案；

2. **要求**秘書長按《1966 年載重線公約》第 29（3）（b）條將本決議及其附件的核證無誤的副本發送給該公約的所有締約政府供審議和接受，也將副本發送給本組織的所有會員；

3. **敦促**所有有關政府儘早接受這些修正案；

4. **決定**：如在本決議要求的以接受為基礎的生效日期前，上述修正案在按照《1966 年載重線公約》第 29（2）條獲一致接受後生效，本決議則無效。

附件

《1966 年國際船舶載重線公約》的修正案

附則 III

證書

國際載重線證書（1966 年）

1 在“國際載重線證書（1966 年）”的格式中，在以“本證書有效期限至”等詞開始的段落與以“發證地點”等詞開頭的段落間加入以下新段落：

“本證書基於的檢驗完成日期：.....”

（年/月/日）

國際載重線豁免證書

2 在“國際載重線豁免證書”的格式中，在以“本證書有效期限至”等詞開頭的段落與以“發證地點”等詞開頭的段落間加入以下新段落：

“本證書基於的檢驗完成日期：.....”

（年/月/日）

Resolution A.972(24)

Adopted on 1 December 2005

ADOPTION OF AMENDMENTS TO THE INTERNATIONAL CONVENTION ON LOAD LINES, 1966

THE ASSEMBLY,

RECALLING Article 15(j) of the Convention on the International Maritime Organization concerning the functions of the Assembly in relation to regulations and guidelines concerning maritime safety,

NOTING proposed amendments to certificates to include the date of completion of the survey on which the certificates are based,

NOTING ALSO that the Maritime Safety Committee, at its seventy-ninth session, adopted the proposed amendments in accordance with article 29(3)(a) of the International Convention on Load Lines, 1966 (1966 LL Convention),

HAVING CONSIDERED the proposed amendments to the International Load Line Certificate (1966) and the International Load Line Exemption Certificate,

1. ADOPTS, in accordance with article 29(3)(b) of the 1966 LL Convention, the amendments to the International Load Line Certificate (1966) and the International Load Line Exemption Certificate of the said Convention, set out in the annex to the present resolution;

2. REQUESTS the Secretary-General, in accordance with article 29(3)(b) of the 1966 LL Convention, to transmit certified copies of the present resolution and its annex to all Contracting Governments to the said Convention, for consideration and acceptance, and also to transmit copies to all Members of the Organization;

3. URGES all Governments concerned to accept the amendments at the earliest possible date;

4. RESOLVES that, should entry into force of the aforementioned amendments take place following their unanimous acceptance in accordance with article 29(2) of the 1966 LL Convention, prior to entry into force based on their acceptance as requested by this resolution, this resolution shall become invalid.

ANNEX

AMENDMENTS TO THE INTERNATIONAL CONVENTION ON LOAD LINES, 1966

ANNEX III

CERTIFICATES

International Load Line Certificate (1966)

1 In the form of the International Load Line Certificate (1966), the following new section is inserted between the section commencing with the words "This certificate is valid until" and the section commencing with the words "Issued at":

"Completion date of the survey on which this certificate is based: ....."
(dd/mm/yyyy)

International Load Line Exemption Certificate

2 In the form of the International Load Line Exemption Certificate, the following new section is inserted between the section commencing with the words "This certificate is valid until" and the section commencing with the words "Issued at":

"Completion date of the survey on which this certificate is based: ....."
(dd/mm/yyyy)

第 31/2016 號行政長官公告

中華人民共和國於一九九九年十二月十三日以照會通知聯合國秘書長，經修訂的《1974年國際海上人命安全公約》自一九九九年十二月二十日起適用於澳門特別行政區；

國際海事組織海上安全委員會於二零零八年十二月四日透過第MSC.268（85）號決議通過了《國際海運固體散貨規則》（《固體散貨規則》），該規則自二零一一年一月一日起適用於澳門特別行政區；

基於此，行政長官根據第3/1999號法律《法規的公佈與格式》第六條第一款的規定，命令公佈包含上指規則的第MSC.268（85）號決議的中文及英文文本。

二零一六年四月二十六日發佈。

行政長官　崔世安

Aviso do Chefe do Executivo n.º 31/2016

Considerando que a República Popular da China, por nota datada de 13 de Dezembro de 1999, notificou o Secretário-Geral das Nações Unidas sobre a aplicação da Convenção Internacional para a Salvaguarda da Vida Humana no Mar de 1974, tal como emendada, na Região Administrativa Especial de Macau a partir de 20 de Dezembro de 1999;

Considerando ainda que, em 4 de Dezembro de 2008, o Comité de Segurança Marítima da Organização Marítima Internacional, através da resolução MSC.268(85), adoptou o Código Marítimo Internacional de Cargas Sólidas a Granel (Código IMSBC), e que tal Código é aplicável na Região Administrativa Especial de Macau desde 1 de Janeiro de 2011;

O Chefe do Executivo manda publicar, nos termos do n.º 1 do artigo 6.º da Lei n.º 3/1999 (Publicação e formulário dos diplomas), a resolução MSC.268(85), que contém o referido Código, nos seus textos em línguas chinesa e inglesa.

Promulgado em 26 de Abril de 2016.

O Chefe do Executivo, *Chui Sai On*.

第 MSC.268（85）號決議

（2008 年 12 月 4 日通過）

通過《國際海運固體散貨規則》（《固體散貨規則》）

海上安全委員會，

憶及《國際海事組織公約》關於本委員會職能的第 28（b）條，

注意到本委員會通過了關於《2004 年固體散貨安全操作規則》的第 MSC.193（79）號決議，

認識到強制適用統一的海運固體散貨國際標準的需要，

還注意到本委員會以第 MSC.269（85）號決議通過的經修正的《1974 年海上人命安全公約》（下文稱《公約》）第 VI 和 VII 章修正案，以使《國際海運固體散貨規則》依據《公約》成為強制性規則。

在其第 85 屆會議上**審議了**建議的《國際海運固體散貨規則》文本，

1. **通過**《國際海運固體散貨規則》（《固體散貨規則》），其文本載於本決議的附件中；

2. **注意到**根據上述《公約》第 VI 章的修正案，《固體散貨規則》將來的修正案須按照有關《公約》附則除第 I 章外的適用修正案程序的《公約》第 VIII 條規定予以通過、實施和生效，

3. 請《公約》締約國政府注意，一旦《公約》第 VI 和 VII 章的修正案生效，《固體散貨規則》將於 2011 年 1 月 1 日生效；

4. 同意《公約》締約國政府在自願的基礎上自 2009 年 1 月 1 日起全部或部分實施《固體散貨規則》；

5. 要求秘書長向《公約》所有締約國政府送發本決議及其附件的核證無誤副本；

6. 進一步要求秘書長向所有非《公約》締約國政府的本組織會員國送發本決議及其附件；

7. 注意到附件中的《固體散貨規則》取代以第 MSC.193（79）號決議通過的《2004 年固體散貨安全實用規則》。

附件

《國際海運固體散貨規則》(《固體散貨規則》)

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前言

經修正的《1974 年國際海上人命安全公約》（簡稱《安全公約》）涉及海上安全的各個方面，並在第 VI 章 A 和 B 部分以及第 VII 章 A-1 部分中分別包括了固體散裝貨物的裝運和散裝固體危險貨物裝運的強制性規定。《國際海運固體散貨規則》對這些規定作了詳述。

固體散貨運輸船的消防的具體安排以第 10 和 19 條納入了《安全公約》第 II-2 章中。請注意經修正的《安全公約》第 II-2/19.4 條。它規定，為 2002 年 7 月 1 日或以後建造的、裝運《公約》第 VII/7 條界定的散裝固體危險貨物（第 6.2 和 7 類除外）的船舶簽發一份適當文書，作為船舶構造和設備符合第 II-2/19 條要求的證明。

對於：

— 在 1984 年 9 月 1 日以後但在 2002 年 7 月 1 日之前建造的 500 總噸或以上的貨船；或

— 1992 年 2 月 1 日以後但在 2002 年 7 月 1 日之前建造的低於 500 總噸的貨船，

適用經第 MSC.1（XLV）、MSC.6（48）、MSC.13（57）、MSC.22（59）、MSC.24（60）、MSC.27（61）、MSC.31（63）和 MSC.57（67）號決議修正的《1974 年安全公約》第 II-2/54 條的要求，（見《安全公約》第 II-2/1.2 條）。

對於在 1984 年 9 月 1 日以後但在 1992 年 2 月 1 日之前建造的 500 總噸或以下的貨船，建議締約國政府儘可能將該適用擴大至這些船舶。

參加 1960 年國際人命安全會議的代表認識到裝運散貨的有關問題，但除散裝穀物除外，當時不可能形成詳細要求。不過，會議在公約 D 附則第 55 條建議在國際海事組織的幫助下起草一套國際上接受的散貨運輸安全實用規則。該工作由該組織的集裝箱和貨物分委會承擔，自 1965 年初版以來，《國際固體散貨安全適用規則》（《散貨規則》）已數度改版。該分委會曾擴大，以包括危險貨物，現在它被稱作危險貨物、固體散貨和集裝箱分委會。

船運固體散貨的主要危險是貨物分佈不均引起的結構損壞、航行期間失去或減小穩性以及貨物化學反應的有關危險。因此，該《規則》的主要目的是通過提供船運某些種類的固體散貨的危險的相關資料和在完成固體散貨船運時採用的程序的有關說明，便利固體散貨的安全積載和船運。運輸散裝穀物的要求載於《國際散裝穀物安全運輸規則》（《1991 年國際穀物規則》）中。

以第 MSC.268（85）號決議通過的《固體散貨規則》曾被推薦給各會員國政府，以在履行經修正的《安全公約》規定的義務時採納並用作國內法規的基本文件。從 2011 年 1 月 1 日起，本規則根據《公約》的規定具有強制性。但是，規則中的某些部分仍然為建議性或資料性的。需要強調的是，就本規則的文字而言，“Shall”、“Should”和“May”等詞用於《規則》時，係指其有關規定分別為“強制性”、“建議性”和“選擇性”的。遵守本規則將協調有待遵循的操作做法程序以及在裝載、平艙、裝運和卸載海上運輸的固體散貨時將採取的適當預防措施，從而確保符合《安全公約》的強制性規定。

本規則已在結構和內容方面歷經修改，以跟上行業的發展和進步。本組織大會授權海安會通過本規則修正案，使海事組織能夠對運輸發展迅速作出響應。

海安會在第 85 屆會議上同意，為便利固體散貨的安全運輸，在本規則於 2011 年 1 月 1 日正式生效前，可在自願的基礎上從 2009 年 1 月 1 日起實施，沒有任何過渡時期。第 MSC.268（85）號決議對此作了詳述。

第 1 節

一般規定

1.1 註釋

1.1.1 應注意到，存在其他國際和國家規則，那些規則可能承認本規則的全部或部分。此外，港口當局和其他機構和組織應承認本規則，可把它用作其裝卸區內的存放和裝卸細則的基本文件。

1.2 列入本規則的貨物

1.2.1 目前散貨運輸的典型貨物以及關於它們的特性和裝卸方法的建議列於各個貨物明細表。但是，這些明細表並非詳盡無遺，所列出的貨物性質僅供作指導用。因此，裝貨前需從託運人那裏獲得交運貨物的物理和化學性質的最新而有效的資料。託運人須提供關於裝船貨物的充分信息（見第 4.2 節）。

1.2.2 如一種固體散貨詳細列於本規則附錄 1（固體散貨明細表）中，除本規則第 1 至 10 節和第 11.1.1 節的規定外，它還須按照其明細表的規定予以運輸。必要時，船長須就有效並適用的裝運要求諮詢裝貨港和卸貨港主管機關。

1.3 未列入本規則的貨物

1.3.1 如果一種未列入本規則附錄 1 的固體貨物擬交付散裝運輸，託運人須在裝貨前按照本規則第 4 節要求向裝貨港主管機關提供該貨物特性資料。基於所收到的資料，主管機關將對安全運輸的可能性進行評估。

1.3.1.1 當估計擬裝運的固體散裝貨物會呈現出第 1.7 節定議的本規則 A 或 B 組界定的那些危險時，需尋求卸貨港和船旗國主管機關的建議。三個主管機關將共商裝運該貨物的合適條件。

1.3.1.2 當估計擬裝運的固體散裝貨物不會呈現出運輸危險時，須批准裝運該貨物。並將此種批准通知該卸貨港和船旗國主管機關。

1.3.2 裝貨港主管機關須向船長簽發一份陳述該貨物特性以及要求的該貨物裝運和裝卸條件的證書。裝貨港主管機關還須在簽發證書後一年內將一份申請提交本組織，以便將該種固體散裝貨物納入本規則附錄 1 中。該種申請表格式須如第 1.3.3 節所列。

1.3.3 未列入本規則貨物的特性及裝運條件格式

臨時性散裝貨物船運名（用大寫字母）

描述（說明貨物）

特性（填寫下列表格）

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
尺寸	**類別**	**組別**

危險性（澄清裝運該種貨物的危險性）

（確定下列各類要求，如無要求的話，請註明“沒有特別要求”。）

積載和隔離

貨艙清潔程度

天氣注意事項

裝載

注意事項

通風

裝運

卸貨

清掃

（說明對該種貨物發生事故時的應急程序，如必要的話。）

應急程序

配備特殊的應急設備
應急程序 發生火災事故時的應急行動 醫療急救

1.4 本規則的適用和實施

1.4.1 本規則中的規定適用於經修正的《安全公約》適用的、裝運《公約》第 VI 章 A 部分第 1-1 條界定的固體散裝貨物的所有船舶。

1.4.2 雖然本規則在法律上根據《安全公約》被視為強制性文書，但本規則中的下列規定仍然為建議性或資料性的。

第 11 節　保安規定（第 11.1.1 小節除外）；

第 12 節　積載因數換算表；

第 13 節　參考相關資料和建議；

除附錄 1“固體散裝貨物明細表”以外的附錄；和

附錄 1 中各固體散貨明細表的“**描述**”、“**特性**”、“**危險性**”和“**應急程序**”各節的文字。

1.4.3　在本規則的某些部分，規定了具體的行動，但貫徹行動的責任沒有具體劃給任何特定的人。此類責任可依不同國家的法律和習慣及它們參加的國際公約而異。就本規則而言，不必作者以劃定，但僅需要明確行動本身。劃定該責任依然是每一政府的特權。

1.5　免除和等效措施

1.5.1　如果本規則要求遵守固體散裝貨物運輸的某一特殊規定，一個或多個主管機關（始發港港口國、抵達港港口國或船旗國）在認為這樣的規定最起碼與本規則的要求具有同等的效果及安全時，可通過免除批准任何其他的規定。對沒參予該規定的主管機關接受根據本節批准的免除，由該主管機關自行決定。所以，在此種免除涵蓋的任何運輸之前，獲得此種免除的一方須通知其他有關的主管機關。

1.5.2　就有關免除採取主動行動的一個或多個主管機關：

.1　須向本組織提交一份此種免除規定的副本，以由它提請《安全公約》締約國注意；和

.2　須採取行動修改本規則，以酌情列入該免除條款。

1.5.3 免除的有效期限自批准免除之日起不得超過 5 年。第 1.5.2.2 節未包括的免除可根據本節規定予以續期。

1.5.4 免除規定的副本或電子副本須酌情按照免除規定留存在運輸固體散裝貨物的船舶上。

1.5.5 有關的主要被指定國家主管機關的聯繫資料載於本組織分發的另一文件中。

1.6 公約

經修正的《安全公約》第 VI 章 A 和 B 部分以及第 VII 章 A-1 部分分別涉及固體散裝貨物的裝運以及散裝固體危險貨物的裝運，並全文重述如下。本摘錄包括預計於 2011 年 1 月 1 日生效的修正案。

第 VI 章

貨物的裝運

A 部分

一般規定

第 1 條

適用範圍

1 本章適用於因其對船舶或船上人員的特別危險性而需在本規則所適用的一切船舶上及在小於 500 總噸的貨船上採取特別預防措施的貨物的裝運（散裝液體、散裝氣體和其他章節已作出裝運規定者除外）。但是，對小於 500 總噸的貨船，如果主管機關認為因航行的遮蔽性和條件，適用本章 A 部分或 B 部分的任何具體

要求為不合理或不必要，則可採取其他有效措施確保這些船舶的所需安全。

2 為補充本章 A 部分和 B 部分的規定，每一締約國政府須保證提供有關貨物及其積載和繫固的有關資料，特別說明安全裝運此類貨物所需的預防措施。

第 1-1 條

定義

就本章而言，除另有明文規定外：

1 *《固體散貨規則》*係指本組織海安會以第 MSC.268（85）號決議通過的《國際海運固體散貨規則》，該規則可由本組織修正，但此類修正案須按照有關《公約》附則除第 I 章外的適用修正案程序的《公約》第 VIII 條規定予以通過、實施和生效。

2 *固體散裝貨物*係指除液體和氣體外的、直接裝入船舶裝貨處所而不需任何中間容器的、由成分大體一致的微粒、顆粒或較大塊碎片組成的任何物質。

第 1-2 條

裝運除穀物以外的固體散裝貨物的要求

1 裝運除穀物以外的固體散裝貨物須符合《固體散貨規則》的有關規定。

第 2 條

貨物資料

1 託運人須在裝貨前及早向船長或其代表提供關於該貨物的有關資料，以使為此類貨物的適當積載和安全裝運所必需的預防措施得以付諸實施。此類資料須在貨物裝船前以書面形式和適當的運輸單證予以確認。

2 貨物資料須包括：

.1 對於雜貨和以貨物單元運輸的貨物，應有貨物的一般說明、貨物或貨物單元的毛重和貨物的任何有關特性。就本條而言，須提供本組織以第 A.714（17）決議通過並可能經修正的《貨物積載和繫固安全實用規則》第 1.9 節所要求的貨物資料。第 1.9 節的任何修正案須按照有關《公約》附則除第 I 章外的適用修正案程序的《公約》第 VIII 條規定予以通過、實施和生效；

.2 對於固體散貨，應有《國際海運固體散貨規則》第 4 節要求的資料。

3 在貨物單元裝船前，託運人須確保這類貨物單元的毛重與運輸單證中表明的毛重是一致的。

第 3 條

氧氣分析和氣體探測設備

1 在運輸可能釋放有毒或易燃氣體或可能在貨物處所中造成氧氣耗盡的固體散裝貨物時，須備有測量空氣中這類氣體或氧氣濃度的適當儀器，及其詳細使用說明書。這種儀器須令主管機關滿意。

2 主管機關須採取措施，確保船員在上述儀器使用方面受到培訓。

第 4 條

船上使用殺蟲劑

在船上使用殺蟲劑，尤其是為熏艙而使用殺蟲劑時，須採取適當預防措施。

第 5 條

積載和繫固

1 在甲板上和甲板下裝運貨物、貨物單元和貨物運輸單元，其裝載、積載和繫固須儘可能防止在整個航程中對船舶和船上人員造成損害或危險，以及防止貨物落水滅失。

2 貨物、貨物單元和貨物運輸單元，其在單元中的包裝和繫固須能防止在整個航程中對船舶和船上人員造成損害或危險。

3 在重型貨物或異常外形尺寸貨物的裝載和運輸過程中，須採取適當的預防措施，確保不發生船舶結構性損壞，並在整個航程中保持足夠的穩性。

4 在滾裝船上貨物單元或貨物運輸單元的裝載和運輸過程中，須採取適當的預防措施，特別是注意這種船上和貨物單元和貨物運輸單元上的繫固裝置，以及繫固點和捆索的強度。

5 貨運集裝箱的裝載須不超過經修正的《國際集裝箱安全公約》（CSC）規定的安全認可牌上註明的最大總重量。

6 在整個航程中，除固體散裝和液體貨物以外的所有貨物、貨物單元和貨物運輸單元，須按照主管機關認可的《貨物繫固手冊》進行裝載、積載和繫固。對於具有第 II-2/3.41 條界定的滾裝處所

的船舶，須在離開泊位之前按照《貨物繫固手冊》完成所有這些貨物、貨物單元和貨物運輸單元的繫固。《貨物繫固手冊》的編製標準須至少與本組織制定的相關指南相當。

第 5-1 條

物質安全資料單

1 裝運《1973 年防止船舶造成污染國際公約的 1978 年議定書》附則 I 附錄 I 中定義的 MARPOL 附則 I 貨物和船用燃油的船舶，應在載運這些物質之前，按本組織制定的建議案提供一份物質安全資料單。

B 部分

固體散裝貨物的特別規定

第 6 條

裝運的可接受性

1 在固體散裝貨物裝船前，船長須得到有關船舶穩性和標準裝載條件下貨物分佈的綜合資料。提供此類資料的方法須令主管機關滿意。

第 7 條

散裝貨物的裝卸和積載

1 就本條而言，**碼頭代表**係指船舶裝卸貨物的碼頭或其他設施使用方指定的人員，他負責該碼頭或設施為特定船舶執行的作業。

2 為使船長能防止船體結構中產生過大應力，須給船舶配備一本小冊，它須以負責貨物作業的高級船員所熟悉的語言寫成。如該語言文字不是英文，則船上也須配備一本以英文寫成的小冊。該小冊須至少包括下列內容：

.1 第 II-1/5-1 條所要求的穩性數據；

.2 加壓載和減壓載的速率和能力；

.3 內底板上單位表面積的最大許用載荷；

.4 每艙最大許用載荷；

.5 有關船體結構強度的一般裝卸須知，包括對裝卸貨物、壓載作業及航行期間的最不利作業狀態的任何限制；

.6 任何特別的限制，例如主管機關或由其認可的組織所施加的最不利作業狀態的限制（如適用）；和

.7 如要求強度計算，在裝卸貨物及航行期間船體上的最大許用載荷和力矩。

3 在裝或卸固體散裝貨物之前，船長和碼頭代表須商定一項計劃，該計劃須確保在裝卸貨物期間不超過船上的許用應力和力矩，同時還須包括裝卸貨物的次序、數量及速率，同時應考慮到裝卸貨物的速度、船上添注口的數量及減壓載或加壓載的能力。該計劃及其後的任何修改，須提交給港口國的有關當局。

4 船長和碼頭代表須確保裝卸貨物作業按照商定的計劃進行。

5 如果在裝或卸貨物期間，本條第 2 款所述的對船舶的任一限制已經超出或者如果裝卸繼續進行下去可能導致超出，則船長有

權中止裝卸作業並有責任將此通知給批准這個計劃的港口國有關當局。船長和碼頭代表須確保採取糾正措施。當卸貨時，船長和碼頭代表須確保卸貨方法不損壞船體結構。

6 船長須確保船上人員連續不斷地監視貨物裝卸作業。如有可能，在裝卸貨物期間須定期校核吃水以確認提供的噸位數。每次測得的吃水和噸位數須記入貨物日誌。如發現與商定的計劃有顯著的偏差，則須調整貨物裝卸或壓載作業，或兩者，以確保偏差得到糾正。

第 VII 章

危險貨物的裝運

A-1 部分

固體散裝危險貨物的裝運

第 7 條

定義

*固體散裝危險貨物*係指《國際危規》涵蓋的除液體或氣體以外的、直接裝入船舶裝貨處所而不需任何中間容器的、由成分大體一致的微粒、顆粒或任何較大塊碎片組成的任何物質，包括裝入載駁船上的駁船內的此類物質。

第 7-1 條

適用範圍

1 除另有明文規定外，本部分適用於《公約》規則所適用的所有船舶和小於 500 總噸的貨船裝運固體散裝危險貨物。

2 除按照本部分的規定外，禁止裝運固體散裝危險貨物。

3 為了補充本部分的規定，各締約國政府須參考本組織制定的指南，頒佈或促使頒佈涉及固體散裝危險貨物事故的應急反應和醫療急救的細則。

第 7-2 條

單證

1 在有關海運固體散裝危險貨物的所有單證中，貨物的名稱須使用適當的船運名（不應單獨使用商品名）。

2 每艘裝運固體散裝危險貨物的船舶須具有一份特別清單或艙單，列出船上危險貨物及其位置。標明所有危險貨物的類別並表明其在船上位置的詳細的配載圖，可用來代替上述特別清單或艙單。船舶駛離前應備有一份這些單證的副本，以供港口國當局指定人員或組織使用。

第 7-3 條

積載和隔離要求

1 固體散裝危險貨物須按其性質安全和適當地予以裝載和積載。對於互不相容的貨物，應將其彼此分開。

2 不得裝運易於自熱或自燃的固體散貨危險貨物，除非已採取了適當的預防措施以使發生火災的可能性減至最小。

3 會產生危險蒸氣的固體散裝危險貨物須積載在良好通風的貨物處所內。

第 7-4 條

涉及危險貨物事故的報告

1 在發生涉及固體散裝危險貨物從船上落入海中滅失或可能滅失的事故時，船長或該船的其他負責人須立即將此類事故的詳細情況儘可能全面地向最近的沿海國報告，該報告須根據本組織制定的一般原則和指南擬寫。

2 當本條第 1 款所述的船舶棄船時，或從該船發出的報告不完整或不能得到時，由第 IX/1.2 條中所界定的公司須在最大可能的範圍內承擔本條對船長規定的義務。

第 7-5 條

固體散裝危險貨物的裝運要求

固體散裝危險貨物的裝運須符合第 VI/1-1.1 條界定的《固體散貨規則》的相關規定。

1.7 定義

就本規則而言，除另有明文規定外，下列定義須適用：

1.7.1 *靜止角*係指非黏性（即自由流動）顆粒狀物質的最大斜坡角。它是該物質的錐體斜面與水平面的夾角。

靜止角

1.7.2 *散裝貨物船運名（BCSN）*用於在海上運輸中識別一種散貨。如果一種貨物被列於本規則中，該貨物的“散裝貨物船運名”由各明細表或索引中的大寫字母來識別。如果該貨物為《安全公約》第 VII/1.1 條界定的危險貨物，該貨物的“正確船運名”即為其“散裝貨物船運名”。

1.7.3 *散裝密度*係指單位體積內的固體、空氣和水的重量，散裝密度以千克每立方米（kg/m^3）計。貨物的空隙可充滿空氣和水。

1.7.4 *貨物處所*係指船上適於裝載貨物的任何處所。

1.7.5 *易流態化貨物*係指至少含有部分細顆粒和一定量水份的貨物。在運輸中，如果這些貨物的水分含量超過其適運水分極限，會流態化。

1.7.6 *黏性物質*係指除非黏性物質以外的物質。

1.7.7 *主管當局*係指就本規則任何相關目的指定或認可的任何國家法規機構或當局。

1.7.8 *精礦*係指通過濃縮或精選過程，利用物理或化學的方法從原礦中分離並去除不需要的成分而得到的物質。

1.7.9 *交運貨物*係指託運人委託運輸的固體散裝貨物。

1.7.10 *流動水分點*係指使物質的代表性樣品在規定的試驗過程中（見附錄 2 第 1 段）產生流態的含水百分比（按濕重計）。

1.7.11 *流態*係指顆粒狀物質內飽含液體時，由於振動、撞擊或船舶搖擺等外部因素的影響，喪失其內部抗剪強度而呈現出如同液體一樣的狀態。

1.7.12 *A 組*包括在超出適運水分極限進行船運時可能會流態化的貨物。

1.7.13 *B 組*包括會使船舶產生危險局面的具有化學危險的貨物。

1.7.14 *C 組*包括既不易液化（A 組）也不具有化學危險（B 組）的貨物。

1.7.15 *高密度固體散裝貨物*係指積載因數為 0.56 立方米/噸或以下的一種固體散裝貨物。

1.7.16 *國際危規*係指國際海事組織以第 MSC.122（75）號決議通過的《國際海運危險貨物規則》。

1.7.17 *不相容貨物*係指混合在一起會發生危險反應的物質。這些貨物需滿足第 9.3 節和 B 組中經分類的具體貨物明細表中的隔離要求。

1.7.18 *國際船舶和港口設施保安（ISPS）規則*係指國際船舶和港口設施保安規則，由 A 部分（該部分規定為強制性）和 B 部分（該部分規定為建議性）構成，並於 2002 年 12 月 12 日由《1974 年國際海上人命安全公約》締約國會議以第 2 號決議通過，它可由國際海事組織修正。

1.7.19 *僅在散裝時具有危險的物質（MHB）*係指散裝運輸時具有化學危險的物質，被歸類為《國際海運危險貨物規則》(《國際危規》)中的危險貨物者除外。

1.7.20 *水分含量*係指代表性樣品中由水分、冰或其他液體構成的部分，按樣品濕重總量的百分比計。

1.7.21 *水分滲移*係指由於振動和船舶搖擺，貨物中的水分因沉澱和沉積所發生的移動。水分逐漸滲出，導致部分或全部貨物出現流態。

1.7.22 *非粘性物質*係指在運輸期間，由於船舶運動，易於轉移的乾燥物質，如附錄 3 第 1 段中所列出的“乾散貨的特性”。

1.7.23 *代表性試樣*係指為了測出貨物的物理性質和化學性質以判斷其是否達到規定要求的足夠數量的貨物樣品。

1.7.24 *託運人*係指其本人或以其名義，或代表其與承運人簽定了海上貨物運輸合同者；或者其本人或以其名義，或代表其將與該海上運輸合同有關的貨物實際交付給承運人者。

1.7.25 *固體散裝貨物*係指除液體和氣體外的、直接裝入船舶裝貨處所而不需任何中間容器的、由成分大體一致的微粒、顆粒或較大塊碎片組成的任何物質。

1.7.26 *積載因數*係指每公噸貨物所佔用的立方米數。

1.7.27 *易流態化貨物的適運水分極限*係指此類貨物的最大含水量，該量表示貨物可在不滿足第 7.3.2 節中特別規定的船舶中安全運輸。其值可按附錄 2 第 1 段中詳細說明的試驗程序等經有關主管當局認可的試驗程序確定。

1.7.28 *平艙*係指在貨艙內對部分貨物或全部貨物進行平整。

1.7.29 *通風*係指從貨物處所外向內交換空氣。

.1 *持續通風*係指在所有時間不斷進行通風。

.2 *機械通風*係指通過動力產生的通風。

.3 *自然通風*係指不需要動力產生的通風。

.4 *表面通風*係指在貨物表面進行通風。

第 2 節

一般裝載、裝運和卸載預防措施

2.1 貨物的分佈

2.1.1 概述

一些事故的發生是因為不當裝載和卸載固體散裝貨物而造成的。為使船舶具備足夠的穩性和使其結構不超過其強度負荷能力，須注意確保固體散裝貨物在全船的合理分佈。此外，託運人須向船長提供第 4 節中所要求的所運貨物的充分信息，以確保船舶的適當裝載。

2.1.2 防止結構超負荷

雜貨船的構造一般在滿載時積載因數約為 1.39m^3/t 至 1.67m^3/t 的貨物。當裝載高密度固體散貨時，須特別注意貨物重量的分佈，以免產生過度應力；要考慮到由於某些貨物的密度較大，不合理的重量分佈可能會使承載貨物的局部結構或整個船體的應力過大。由於每艘船舶結構佈置千差萬別，為所有船舶的荷載分佈作出確切的規定是不實際的。因此，可向船長提供穩性資料手冊中提及的貨物適當分佈信息和使用配載計算機所得出的結果（如有的話）。

2.1.3 維護船舶穩性

2.1.3.1 考慮到經修正的《1974 年國際海上人命安全公約》第 II-1/22.1 條，在受公約約束的所有船舶上須配備穩性資料手冊。船長須能夠計算出預期航程中最惡劣狀態下以及離港時的船舶穩性，計算結果應表明有足夠穩性。

2.1.3.2 當將有可能產生移動的散貨裝載在二層艙處所中或貨物處所只有部分裝滿時，則須設置具有足夠強度的防移板或防移箱。

2.1.3.3 高密度貨物須儘可能裝載在底艙而不是二層艙處所中。

2.1.3.4 如果需要將高密度貨物裝載在二層艙或較高的貨物處所內，須充分注意保證其下的甲板不得超負荷，並且船舶的穩性不得小於提供給船長的船舶穩性信息手冊中規定的最小允許值。

2.2 裝載和卸載

2.2.1 裝貨前須檢查和準備貨物處所，使其適於擬裝的特定貨物。

2.2.2 應充分注意保持污水井和濾板暢通無阻，做好特殊準備很有必要，以防止貨物落入污水排放系統。

2.2.3 污水管、測深管和貨物處所內的其他管系須處於良好狀態。

2.2.4 考慮到高密度散貨的裝載速度，可能有必要採取特別措施以防貨物處所設備受到損壞。在完成裝載後，測量污水可能是查出貨物處所設備損壞的有效辦法。

2.2.5 若可能，為最大限度地減少粉塵進入船舶生活區或其他艙室，在裝載或卸貨期間須關閉或遮蓋通風系統並將空調系統（如有的話）調為內部循環。

2.2.6 須充分注意儘可能減少粉塵與甲板機械及室外助航儀器的活動部件的接觸。

第 3 節

人員與船舶安全

3.1 一般要求

3.1.1 在裝載、裝運和卸載散裝固體散貨之前和期間，須遵守所有必要的安全預防措施。

3.1.2 每艘船舶須配備一套處理散裝固體危險貨物事故的應急反應和醫療急救指南。

3.2 中毒、腐蝕和窒息危險

3.2.1 某些散裝固體貨物易於氧化，從而造成缺氧、散發毒氣或煙霧及自熱。某些貨物不易於氧化，但可能散發毒性氣體，尤其是在潮濕時。還有一些貨物潮濕時對皮膚、眼睛、黏膜或對船舶結構具有腐蝕性。在裝運這些貨物時，須特別注意人身防護以及在裝載前或卸載後採取必要的特別預防措施。

3.2.2 須適當注意貨物處所及其毗鄰處所可能缺氧或存在毒性或窒息性氣體，而且曾在一段時間內保持關閉狀態的空貨物處所或液艙中的氧氣可能不足以維持生命。

3.2.3 很多固體散裝貨物容易在貨物處所或液體艙內造成缺氧。這類貨物包括但不限於大多數植物和林木製品、黑色金屬、硫金屬礦和貨煤等。

3.2.4 進入船上封閉處所之前，須遵守適當的程序，同時考慮國際海事組織制訂的建議案。需要注意，經測試發現可安全進入的貨物處所或液艙中，仍可能存在缺氧或存在有毒氣體的局部區域。

3.2.5 在運輸易散發有毒氣體或易燃氣體和（或）易造成貨物處所缺氧的散貨時，須配備可測量貨物處所內氣體或氧氣濃度的合適儀器。

3.2.6 在緊急情況下進入貨物處所時，須配戴自給式呼吸器和防護服，總是在負責高級船員的監督下由經過訓練的人員進入。

3.3 粉塵對健康的危險性

為了將因人體暴露於某些固體散貨粉塵中所造成的慢性和急性危險減小到最低程度，那些暴露於粉塵中的人員需要高標準的個人衛生，這一點無論怎樣強調也不過分。須根據需要採取預防措施，包括使用合適的呼吸保護裝置、穿防護服和塗抹護膚膏、充分的人體沖洗和外衣洗滌。

3.4 易燃空氣

3.4.1 某些固體散裝貨物產生的粉塵會構成爆炸危險，特別是在裝載、卸載和清掃時。通風以防止形成充滿粉塵的空氣以及用水嘴頭沖洗而不用掃把清掃，會使爆炸危險減至最小。

3.4.2 某些貨物可能放出大量的可燃氣體，足以構成火災或爆炸危險。若貨物的這一性質列明在本規則貨物明細表中或者託運人提供貨物信息中，則貨物處所須根據需要進行有效通風。須使用適當氣體探測器對貨物處所內的空氣進行監測。須充分注意通風和監測貨物處所的毗鄰封閉處所中的空氣。

3.5 通風

3.5.1 除非另有明文規定，在所裝運的貨物可能釋放有毒氣體時，須為貨物處所提供機械或自然通風；在所裝運的貨物可能釋放易燃氣體時，須為貨物處所提供機械通風。

3.5.2 如果保持通風會危及船舶或貨物安全，則可以中斷通風，除非中斷通風會造成爆炸危險。

3.5.3 如本規則明細表或託運人提供的貨物信息要求對某貨物保持通風，當貨物在艙內時，則須保持通風，除非出現通風將危及船舶的情況。

3.5.4 擬裝載需要持續通風的貨物的貨物處所須裝有在需要時能保持開啟狀態的通風口。這種開口須滿足經修訂的《載重線公約》關於無關閉裝置的開口的要求。

3.5.5 通風系統須防止任何泄漏的危險氣體、蒸氣或粉塵到達生活艙室或有危險濃度的其他內部處所。須充分注意防止任何泄漏的危險氣體、蒸氣或粉塵飄到工作處所。採取充分預防措施保護那些工作處所人員的安全。

3.5.6 如貨物會發生自熱，不得採用表面通風以外的通風。絕不能將空氣送入貨物堆中。

3.6 正在途中熏蒸的貨物

須按照本組織制訂的建議案進行熏蒸。

第 4 節

評定貨物的安全適運性

4.1 識別和分類

4.1.1 本規則中的各種固體散貨均被指定一個散貨船運名（BCSN）。如果某種散貨經海上運輸，須通過其散貨船運名在其運輸單證上對其予以識別。如果該貨物是危險貨物，散貨船運名須用聯合國（UN）編號加以補充。

4.1.2 如果廢棄貨物是為處置或為處置前加工而運輸，該貨物名稱前須標有“廢物”字樣。

4.1.3 散裝貨物的正確識別有利於確定安全裝運該貨物的必要條件和適用的應急程序。

4.1.4 固體散貨須酌情根據聯合國試驗和標準手冊第 III 部分的要求進行分類。若存在原產地國主管當局認可的試驗程序，本規則要求的固體散貨的各種特性須按照此種程序以適合該貨物的方式予以測定。若不存在此種試驗程序，固體散貨的那些特性須按照本規則附錄 2 所述的試驗程序以適合該貨物的方式予以測定。

4.2 提供信息

4.2.1 在裝載前託運人須充分提前向船長或其代表提供貨物的適當信息，以便能夠採取必要的措施對貨物進行妥善積載和安全運輸。

4.2.2 這些信息須在貨物裝船前以書面形式和通過運輸單證予以確認。貨物信息須包括：

.1 若該貨物已列入本規則，散裝貨物船運名。除散裝貨物船運名之外，還可使用第二名稱；

.2 貨物組別（A 和 B、A、B 或 C）；

.3 該貨物的海事組織類別，如適用；

.4 該類貨物的聯合國編號，以字母 UN 開頭，如適用；

.5 交運貨物的總量；

.6 積載因數；

.7 平艙的需要和平艙程序，必要時；

.8 移動的可能性，包括靜止角（如適用）；

.9 以證書形式提供的關於貨物水分含量及精礦或其他易流態化貨物的適運水分極限的附加信息；

.10 形成濕底的可能性（見本規則第 7.2.3 節）；

.11 貨物可能產生的有毒或易燃氣體，如適用；

.12 貨物的易燃性、毒性、腐蝕性以及耗氧傾向，如適用；

.13 貨物自熱的特性，以及平艙的需要，如適用；

.14 與水接觸釋放出易燃氣體的特性，如適用；

.15 放射特性，如適用；和

.16 國家主管當局要求的任何其他相關信息。

4.2.3 託運人提供的信息須隨附一份聲明。貨物聲明表格的樣本見下一頁。貨物聲明可用其他表格。可使用電子數據處理（EDP）或電子數據交換（EDI）技術，作為紙頭單證的輔助手段。

貨物信息表

適用於固體散裝貨物

<table>
<tr><td colspan="2">散裝貨物船運名</td></tr>
<tr><td>託運人</td><td>運輸單證編號</td></tr>
<tr><td>收貨人</td><td>承運人</td></tr>
<tr><td>名稱/運輸工具
出發港/出發地點</td><td rowspan="2">指南或其他事項</td></tr>
<tr><td>到達港/目的地</td></tr>
<tr><td>貨物一般性描述
（物質種類/顆粒大小）</td><td>總重（千克/噸）</td></tr>
<tr><td colspan="2">散裝貨物說明，如適用：
積載因素：
靜止角，如適用：
平艙程序：
如有潛在危險的，化學特性*：
* 例如：類別和聯合國編號或者僅在散裝運輸時具有化學危險的物質</td></tr>
<tr><td>貨物組別
☐ A 組和 B 組*
☐ A 組*
☐ B 組
☐ C 組
* 易流態化貨物（A 組和 A 及 B 組貨物）</td><td>適運水分極限

運輸時水分含量</td></tr>
<tr><td>貨物的相關特殊性質
（如：可快速溶於水）</td><td>補充證書*
☐ 水份含量和適運水份限制證書
☐ 風化證書
☐ 免除證書
☐ 其他（需要說明）
* 如有要求的話。</td></tr>
</table>

聲明	簽字人姓名/身份，公司/組織名稱
本人特此聲明：對託運貨物的說明全面而準確。據我所知，所給出的實驗結果和其他說明準確無誤，我也相信如此，該批貨物可視為對擬裝貨物具有代表性。	地點和日期 代表託運人簽字

4.3 測試證書

4.3.1 為獲得第 4.2.1 節所要求的信息，託運人須安排貨物的妥善取樣和試驗。如本規則有要求，託運人須向船長或其代表提供適當的測試證書。

4.3.2 當船舶裝運精礦或其他貨物時，託運人須向船長或其代表提供一份經簽字的適運水分極限證書和一份經簽字的水分含量證書或聲明。該適運水份極限證書須包括或另附測定適運水份極限的試驗結果。該水分含量聲明須包括或附有託運人的聲明：就其所知和看法，在將該聲明提交船長時，貨物的水分含量是當時貨物的平均水分含量。

4.3.3 如果易流態化精礦或其他貨物擬裝入船上一個以上貨艙，則水分含量證書或聲明須證明裝入各艙中的每一種細顆粒貨物的水分含量。儘管有此規定，如果按國際或國家認可的標準程序進行的採樣表明貨物的水分含量對於整批貨物是均勻的，則可接受一份關於所有貨物處所平均水分含量的證書。

4.3.4 如果具有化學危險的貨物的明細表要求提交證書，該證書須包括或另附託運人聲明：就其所知，船舶裝貨當時的貨物化學性質即為證書中所列者。

4.4 採樣程序

4.4.1 除非在裝貨前對真正有代表性的試樣進行試驗，否則對貨物的任何物理特性的測定都將毫無意義。

4.4.2 試樣的採集只能由受過採樣程序訓練的人員進行，並應在熟悉託運貨物特性以及適用的採樣原則和實踐的人員的監督下進行。

4.4.3 在採樣前，如果可行，須對將要裝船的託運貨物進行外觀檢查。對看上去受到沾染或者性質或水分含量與大部分散貨明顯不同的部分應予分別採樣和分析。根據這些測試所取得的結果，可能需要拒絕裝運不適合運輸的特定部分貨物。

4.4.4 試樣的採集所用技術須考慮到以下因素：

.1 貨物的種類；

.2 顆粒尺寸的分佈；

.3 貨物的成分及其差異；

.4 貨物的儲存方式，如堆積、裝在鐵路貨車或其他容器內；貨物的轉運或裝載方式，如利用傳送帶、裝貨滑槽、抓斗起重機等；

.5 化學危險（毒性、腐蝕性等）；

.6 需測定的特性：水分含量、適運水分極限、散貨密度/積載因數、靜止角等；

.7 由於天氣和自然排水條件等，在整批貨物中水分分佈的差異，如水分向貨堆或容器底部的滲移或其他形式的移動；

.8 因貨物凍結而產生的差異。

4.4.5 在採樣過程中，須特別注意防止品質和特性的變化。採樣後，試樣須立即存放在合適的密封容器中，並妥善作出標記。

4.4.6 除另有明文規定外，本規則要求的用於試驗採樣須按照國際或國家認可的標準程序進行。

4.5 確定“適運水分極限”和“水分含量”的採樣/試驗與裝載的間隔期

4.5.1 固體散裝貨物的適運水分極限的測定試驗須在裝貨之日前 6 個月內進行。儘管有此規定，如果貨物成分或性質因某種原因發生了變化，在有理由認為此種變化已經發生的情況下，須再次進行試驗以測定適運水分極限。

4.5.2 測定水分含量的採樣和試驗時間應儘可能與裝貨時間接近。若從試驗到裝貨期間遇到大的雨雪，則須進行核對試驗，以確保貨物水分含量仍低於適運水分極限。採樣/試驗與裝貨的間隔期不得超過 7 天。

4.5.3 凍結貨物的試樣，須在全部解凍後測定其適運水分極限或水分含量。

4.6 精礦貨堆的採樣程序

4.6.1 因為物質的性質及其狀態會影響採樣程序的選擇，目前對所有貨物規定單一的採樣方法是不切實際的。如果沒有國際或國家承認的採樣程序，可使用下述精礦採樣程序來測定適運水分極限和水分含

量。這些程序無意取代可得出相等或更準確適運水分極限和水分含量的採樣方法，如使用自動採樣法。

4.6.2 如果從平整的貨堆中取樣，則子樣應在基本均佈的格點上採集。

4.6.3 畫出貨堆平面圖，劃分成區，根據待運精礦的數量，每區約包括 125 噸、250 噸或 500 噸。此平面圖將為採樣人員指出所需子樣的數量以及每一子樣的採集點。每一子樣應從指定區域的表面下約 50cm 處提取。

4.6.4 所需子樣的數量及試樣的重量應由主管當局確定，或按下述比例確定：

貨重在 15,000 噸以下時：

每 125 噸貨物應取子樣 200 克。

貨重超過 15,000 但少於 60,000 噸時：

每 250 噸貨物應取子樣 200 克。

貨重在 60,000 噸以上時：

每 500 噸貨物應取子樣 200 克。

4.6.5 用於測定水分含量的子樣，提取後應立即裝入密封的容器中（如塑料袋、罐、或小型金屬桶），以便運往試驗室。應在試驗室將子樣充分混合，以得到一份具有充分代表性的試樣。如果試驗場所沒有試驗設施，則子樣應在貨堆處在控制條件下混合，然後將代表性試樣裝入密封容器中運往試驗室。

4.6.6 基本採樣步驟包括：

.1 確定擬採樣的貨物；

.2 按第 4.6.4 節確定所需子樣和代表性試樣的數量；

.3 確定子樣的採樣點和混合這些子樣以取得代表性試樣的方法；

.4 收集各子樣並將它們封裝在密封容器中；

.5 充分混合各子樣，以得到代表性試樣；和

.6 如果需將試樣運往試驗室，則將代表性試樣封裝在密封容器中。

4.7 標準化採樣程序範例，供參考

ISO 3082：1998 — 鐵礦－採樣和試樣準備程序

ISO 1988：1975 — 硬煤－採樣

ASTMD2234-99 — 煤的總體採樣標準做法

澳大利亞標準

AS 4264.1 — 煤和焦炭－採樣

— 第 1 部分：高品級煤－採樣程序

AS 1141－系列 — 粒料採樣和測試方法

BS 1017：1989 — 煤和焦炭採樣方法

BS 1017 — 英國標準第 1 部分：1989 煤的採樣方法

BS 1017 — 英國標準第 2 部分：1994 煤的採樣方法

加拿大精礦堆標準採樣程序

歐洲共同體化肥控制採樣方法

JIS M 8100 — 日本散貨物質採樣方法總則

JIS M 8100：1992 － 顆粒貨物－採樣方法總則

波蘭標準採樣程序：

鐵和錳礦 － 參考資料編號 PN-67/H-04000

有色金屬 － 參考資料編號 PN-70/H-04900

俄羅斯聯邦測定精礦水分含量標準採樣程序。

4.8 裝運危險貨物的船舶上要求配備的文件

4.8.1 每條裝運散裝固體危險貨物的船舶須持有一份符合《安全公約》第 VII/7-2.2 條的特殊清單或艙單，列明危險貨物及其位置。標明船載危險貨物類別及其所在位置的詳細積載圖可用來代替此特殊清單或艙單。

4.8.2 船上裝運散裝固體危險貨物時須隨船配備危險貨物事故或事件應急反應的適當說明。

4.8.3 需滿足《安全公約》第 II-2/19.4 條（或第 II-2/54.3 條）的 1984 年 9 月 1 日或以後建造的 500 總噸以上的貨船和 1992 年 2 月 1 日或以後建造的 500 總噸以下的貨船，在裝運散裝固體危險貨物（第 6.2 類和第 7 類除外）時，須持有《符合證明》。

第 5 節

平艙程序

5.1 平艙的一般規定

5.1.1 對貨物平艙可減少貨物移動的可能性並能最大限度減少可能導致自熱的空氣進入貨物。為降低風險，必要時，對貨物須進行合理平艙。

5.1.2 為防止固體散貨移動，貨物處所須儘量裝滿，但不超過底艙或二層艙甲板強度。在考慮到貨物移動、縱向運動以及船舶應力的同時，適當考慮各貨物處所的固體散貨的總量。貨物應儘可能合理地散佈到貨物處所邊界。也可能需要考慮到《安全公約》第 XII 章所要求的隔艙裝載限制。

5.1.3 考慮到船舶特性及預定航程，若基於所提供的信息而對船舶穩性存在任何擔心，船長有權要求對貨物進行平艙。

5.2 多層甲板船的特殊規定

5.2.1 如果固體散貨僅裝入底艙處所，則須進行充分平艙以使貨物重量均勻分佈在艙底結構上。

5.2.2 在二層艙中裝載固體散貨時，如果裝載資料載明，敞開二層艙蓋會使艙底結構的應力超負荷，則須關閉二層艙蓋。貨物須予以合理平艙並將貨面平至兩舷，或者利用具有足夠強度的縱向隔板進行穩定。須注意二層甲板的安全荷載能力，保證甲板結構不超載。

5.2.3 如果在二層艙中裝載貨煤，艙口須緊緊封閉以阻止空氣從艙口進入到二層艙中的煤體。

5.3 黏性散貨的特殊規定

5.3.1 所有潮濕貨物及某些乾散貨均具有黏性。第 5.1 節中的一般性規定適用於黏性散貨。

5.3.2 靜止角並非黏性散貨穩定性的可靠指標。因此，靜止角沒有被納入黏性貨物的各明細表中。

5.4 非黏性散貨的特殊規定

5.4.1 非黏性散貨為列於附錄 3 第 1 段的貨物以及顯示出非黏性物質特性的未列入該附錄的任何其他貨物。

5.4.2 從平艙的角度出發，固體散裝貨物可分為黏性和非黏性兩類。靜止角是表示非黏性散貨穩定性的一種特性並已包括在非黏性貨物各明細表中。貨物的靜止角決定適用本節哪些規定。確定靜止角的方法見第 6 節。

5.4.3 靜止角小於或等於 30º 的非黏性散貨

這類貨物會像穀物一樣自由流動，須按適用於穀物積載的規定進行運輸。在確定下述各項時應考慮到散貨的密度：

.1 隔板和漏斗型艙壁的尺寸和穩固佈置；和

.2 自由流動的貨物面對穩性的影響。

5.4.4 靜止角大於 30º 至並包括 35º 的非黏性散貨

這些貨物須按下述衡準平艙：

.1 貨物表面的不平整程度即貨物表面最高點與最低點間的垂直距離（Δh）不得超過 B/10，其中 B 為船寬（m），Δh 的最大允許值為 1.5 m；或

.2 裝貨中使用經主管當局認可的平艙設備。

5.4.5 靜止角大於 35°的非黏性散貨

這些貨物須按下述衡準平艙：

.1 貨物表面的不平整程度即貨物表面最高點與最低點間的垂直距離（Δh）須不超過 B/10，其中 B 為船寬（m），Δh 的最大允許值為 2 m；或

.2 裝貨中使用經主管當局認可的平艙設備。

第 6 節

確定靜止角的方法

6.1 概述

非黏性貨物的靜止角須通過本規則第 4.1.4 節要求的經有關當局認可的方法予以測定。

6.2 建議性測定法

用於測定非黏性固體散貨物質靜止角的方法多種多樣。該建議性測定法羅列如下：

6.2.1 傾箱法。

這種試驗室測試方法適合粒度不大於 10 mm 的非黏性粒狀物質。在附錄 2 的第 2.1 段中詳細說明了該方法使用的設備和程序。

6.2.2 船上測定法。

在沒有傾箱測量儀時，附錄 2 的第 2.2 段中給出了一種測定近似靜止角的替代方法。

第 7 節

易流態化貨物

7.1 引言

7.1.1 本節旨在提請船長和其他負責散貨裝載和運輸的人員注意貨物移動的潛在危險以及最大限度降低此危險的預防措施。這類貨物在裝載時可能呈乾燥的顆粒狀，但卻可能含有相當的水分，由於航行中出現的沉積和振動作用使之流態化。

7.1.2 船舶運動可能引起的貨物移動足以使船舶傾覆。貨物移動可以分為兩種類型，即滑動危險或流態影響。根據第 5 節進行平艙可防止滑動危險。

7.1.3 某些易流態化貨物也可能發生自熱。

7.2 危險性條件

7.2.1 A 組貨物含一定比例的小顆粒和一定水分。A 組貨物在航行中易流態化，即使貨物具有黏性並已平艙。流態化會導致貨物移動。這種現象可描述如下：

.1 由於船舶運動使貨物密實，從而顆粒之間的空隙體積減小；

.2 顆粒間的空隙減小引起水壓的增加；

.3 水壓的增加減小了顆粒間的摩擦，造成貨物抗剪強度的減小。

7.2.2 如果滿足以下條件則不會出現流態化：

.1 貨物含有非常細的顆粒。在這種情形裏，顆粒的運動受到黏性的限制，貨物顆粒間的空隙的水壓不會增加；

.2 貨物由大顆粒和塊體組成。水通過顆粒間的空隙，不導致水壓的增加。完全由大顆粒組成的貨物不會流態化；

.3 貨物內含空氣的百分比高，水分含量低。抑制了任何水壓的增加。乾燥貨物不易流態化。

7.2.3 當水分含量超過適運水分極限（TML）時，可能出現流態化造成的貨物移動。即使平均水分含量低於適運水分極限，有些貨物也易於出現水分滲移，形成危險的濕底。儘管貨物表面可能呈乾燥狀，導致貨物移動的不被察覺的流態化也可能出現。高水分含量的貨物易於滑動，尤其是當貨物很淺且遇到較大傾斜角時。

7.2.4 在形成的黏性流體狀態中，當船舶往一側傾斜時貨物可能流向船舶的一舷，但船舶往另一側傾斜時不一定完全回流。這樣，船舶可能會達到一個危險的傾斜角而突然傾覆。

7.3 易流態化貨物的規定

7.3.1 概述

7.3.1.1 只有在實際含水量少於適運水分極限時，方可裝載易流態化的精礦或其他貨物。儘管有本規定，在專門建造或裝有專用設備的船舶上，即使貨物的含水量超出適運水分極限，也可裝載此類貨物。

7.3.1.2 除罐裝或類似包裝的貨物外的含液體貨物，不得裝在同一貨物處所中這些固體散裝貨物的上方或相鄰處。

7.3.1.3 在航行期間，須採取適當措施，防止液體進入載有固體散裝貨物的處所。

7.3.1.4 須警告船長，當船舶在海上時，用水冷卻這類貨物會產生危險。進水會使這類貨物的水分含量極易達到流動狀態。在必要時，須適當注意以噴灑的方式用水。

7.3.2 專門建造的或裝有專門設備的貨船

7.3.2.1 水分含量超過適運水分極限的貨物只能以專門建造的或裝有專門設備的船舶運輸。

7.3.2.2 專門建造的貨船設有永久性結構限界，其佈置可將貨物的移動限制在允許的範圍內。這種船舶須攜帶其經主管當局批准的證明。

7.3.2.3 裝有專門設備的貨船須裝有專門設計的可拆卸的分隔，以將貨物的移動限制在允許的範圍內。裝有專門設備的船舶須符合下列要求：

.1 這種專門設備的設計和安裝，須不僅能充分抵禦高密度散貨的流動所產生的強大衝力，而且能滿足將貨物在艙內流動所產生的潛在橫傾力矩減小到允許的安全水平內的要求。滿足這些要求的防移分隔不得用木材製作。

.2 必要時須加強船舶結構中圍閉這種貨物的構造。

.3 專門設備的佈置圖及設計所基於的穩性條件，須經船舶登記國的主管機關認可。有關船舶須攜帶經主管當局認可的證明。

7.3.2.4 向主管機關申請認可時提交的資料須包括：

.1 有關結構圖，包括按比例的縱、橫剖面圖；

.2 穩性計算書，其中應考慮到裝載設備及貨物的可能移動，並標明艙內貨物和液體以及易流態化貨物的分佈；和

.3 有助於主管當局評審所提交資料的其他信息。

第 8 節

易流態貨物的測試程序

8.1 概述

對於 A 組貨物，除非由專門建造的或裝有專門設備的貨船裝運，其實際水分含量和適運水分極限須按照本規則第 4.1.4 節要求，根據有關當局認可的測試程序測定。

8.2 測量水分含量的測試程序

有一些測量各種物質水分含量的被承認的國際和國家方法。見附錄 2 第 1.1.4.4 段。

8.3 確定適運水分極限的方法

測定適運水分極限的推薦方法見附錄 2。

8.4 確定流態化可能性的補充測試程序

船長可以利用下述輔助方法在船上或岸邊近似確定貨物的流動可能性：

取一圓筒或類似容器（0.5 至 1 升容量），將物質的試樣盛到容器的一半。用一隻手提起容器，從高度約 0.2 m 處砸向一硬表面，如硬桌面。以 1 至 2 秒為間隔，重複 25 次。觀察貨樣表面是否出現游離水分或流動狀態。如果出現游離水分或流動狀態，則應在裝貨前安排對物質的附加實驗室試驗。

第 9 節

具有化學危險的貨物

9.1 綜述

由於其化學性質而在運輸中可能產生危險的固體散裝物質均在 B 組內。其中一些物質被歸類為危險貨物，其他為僅在散裝運輸時會造成危險的貨物（MHB）。在裝運擬以散裝形式運輸的固體散貨前，最重要的是取得其最新和有效的物理性質和化學性質的數據。

9.2 危險的分類

9.2.1 具有化學危險並擬按本規則的要求以散裝形式運輸的貨物，須按第 9.2.2 節和第 9.2.3 節分類。

9.2.2 危險貨物的分類

《安全公約》第 VII/7 條對固體散裝運輸的危險貨物下了定義。就本規則而言，危險貨物須按《國際海運危險貨物規則》第 2 部分進行分類。

9.2.2.1 第 4.1 類：易燃固體

該類物質係指易燃固體和受磨擦時可能造成起火的固體。

9.2.2.2 第 4.2 類：易自燃的物質

該類物質係指除發火材料以外的物質。它在遇空氣而沒有能源供給時易發生自熱。

9.2.2.3 第 4.3 類：遇水釋放出可燃氣體的物質

該類物質係指在與水產發生反應時易產生自燃或釋放出危險量可燃氣體的固體物質。

9.2.2.4 第 5.1 類：氧化物質

該類物質係指本身不一定可燃、但通過產生氧氣可能造成或有助於其他物質燃燒的物質。

9.2.2.5 第 6.1 類：毒性物質

該類物質係指如被吞咽、被吸入或與皮膚接觸易造成死亡或嚴重損傷或危害人身健康的物質。

9.2.2.6 第 7 類：放射性物質

該類物質係指含有放射性核素的任何物質，只要託運貨物的放射性強度和總量大於《國際海運危險貨物規則》第 2.7.7.2.1 至 2.7.7.2.6 段所述的數值。

9.2.2.7 第 8 類：腐蝕性物質

該類物質係指能通過化學反應嚴重地傷害與之接觸的生物組織，或能嚴重損壞甚至毀壞其他貨物或運輸工具的物質。

9.2.2.8 第 9 類：雜類危險物質和物品。

該類物質係指在運輸期間具有其他類別未包括的危險的物質和物品。

9.2.3 僅在散裝時有危險的物質（MHB）

這些物質係指在散裝運輸時具有化學危險的、除《國際危規》列為危險品的物質以外的物質。

9.3 積載與隔離要求

9.3.1 一般要求

9.3.1.1 由於列入 B 組和屬於第 9.2.2 和 9.2.3 段所述類別的物質具有潛在危險性，因而其中的不相容的貨物須進行隔離。隔離還須考慮到所確定的任何次危險。

9.3.1.2 除整類物質之間的一般隔離之外，某一具體貨物也可能需要與其他貨物隔離。就與易燃物質的隔離而言，須理解為不包括包裝材料、天花板和墊艙材料；在這些情況下，後者的數量應控制在最少量。

9.3.1.3 就不相容物質的隔離而言，“貨艙”和“艙室”被視為係指由鋼質艙壁或船殼板及鋼質甲板圍蔽的貨物處所。這種圍壁應為防火和防液的。

9.3.1.4 當裝運兩種或兩種以上不同的 B 組固體散貨時，它們之間的隔離須符合第 9.3.4 節要求。

9.3.1.5 如果同一貨艙中裝有不同隔離等級的貨物，則適用於任何不同等級的最嚴格的規定須適用於所有貨物。

9.3.1.6 當裝運 B 組固體散貨與包裝危險貨物時，它們之間的隔離須符合第 9.3.3 節要求。

9.3.1.7 不相容貨物不得同時裝卸。裝完一種此類貨物後須關閉各貨物處所的艙蓋，在開始裝載其他貨物之前須清除甲板上的殘渣。在卸貨時也須採取同樣步驟。

9.3.1.8 為防止沾染，一切食品須按下列要求積載：

.1 與標明有毒的物質“隔離”；

.2 與感染性物質“用一整個艙室或貨艙隔離”；

.3 與放射性物質“隔離”；和

.4 與腐蝕性物質“遠離”。

9.3.1.9 可能產生的毒氣足以危害健康的物質，不得裝載在使毒氣能滲入起居處所或與起居處所相連的通風系統的處所。

9.3.1.10 其腐蝕強度足以損害人體組織或船舶結構的物質，須在採取充分的預防措施和保護措施之後方可裝船。

9.3.1.11 卸下有毒或氧化物質後，須對裝運這些物質的貨物處所作沾染狀況檢查，然後才能用於裝運其他物質。在用於裝運其他貨物之前，須對受到沾染的貨艙進行嚴格清洗和檢查。

9.3.1.12 卸貨後，須仔細檢查船舶是否存有任何殘留物；在船舶裝運其他貨物之前，須將殘餘物清除。

9.3.1.13 對於在緊急情況下須打開艙蓋的貨物，貨艙的艙蓋須保持隨時能夠打開的狀態。

9.3.2 特殊要求

9.3.2.1 第 4.1、4.2 和 4.3 類物質

9.3.2.1.1 這些類別的物質須切實可行地儘量保持涼爽和乾燥，而且除非另有明文規定，須在“遠離”一切熱源和火源的處所積載。

9.3.2.1.2 電器設備和電纜須處於良好狀態，並有妥善的保護，避免短路和產生電火花。如果要求艙壁適合於隔離用途，則穿過甲板和艙壁的電纜及導管處須作密封處理，以防氣體和蒸氣通過。

9.3.2.1.3 散發出的氣體能與空氣形成可爆混合物的貨物，須在有機械通風的處所積載。

9.3.2.1.4 應嚴格禁止在危險區內吸煙，並須顯著標示“**嚴禁吸煙**”字樣。

9.3.2.2 第 5.1 類物質

9.3.2.2.1 該類貨物須切實可行地儘量保持涼爽和乾燥，而且除非另有明文規定，須在“遠離”一切熱源和火源的處所積載。它們還須與其他可燃物質“隔離”積載。

9.3.2.2.2 在裝載此類貨物之前，須特別注意清潔擬裝載這類貨物的貨艙。須切實可行地儘量使用不燃的固定和防護材料，並儘量少用乾燥墊艙木。

9.3.2.2.3 須採取防護措施，防止氧化物質滲入其他貨物處所或污水溝和含有可燃物質的其他貨物處所。

9.3.2.3 第 7 類物質

9.3.2.3.1 用於裝運低比度放射性物質（LSA-I）和表面受到放射沾染的物體（SCO-I）的貨物處所，不得用於裝載其他貨物，除非經過合格人員消除了放射性沾染，使任何表面上非固定沾染平均每 300 cm^2 不超過下述水平：

4Bq/cm^2（10^{-4} $\mu Ci/cm^2$）	β 和 γ 放射源和低毒性的 α 放射源；天然鈾；天然釷；鈾－235 或鈾－238；釷－232；含有的釷－228 和釷－230 的礦石、物理或化學精礦；半衰期低於 10 天的放射性核素；和
0.4Bq/cm^2（10^{-5} $\mu Ci/cm^2$）	所有其他 α 放射源。

9.3.2.4 第 8 類物質或具有類似特性的物質

9.3.2.4.1 該類物質須切實可行地儘量保持乾燥。

9.3.2.4.2 在裝載該類貨物前，須注意清潔擬裝載此類貨物的貨艙，特別要確保貨艙乾燥。

9.3.2.4.3 須防止該類物質漏入其他貨艙、污水溝、污水井及艙壁護板間的縫隙。

9.3.2.4.4 卸貨後須特別注意清潔貨物處所，因為這類貨物的殘渣可能對船體結構具有極強的腐蝕性。須考慮用水管沖洗貨艙後仔細進行乾燥處理。

9.3.3 具有化學危險的散裝物質與包裝危險貨物的隔離

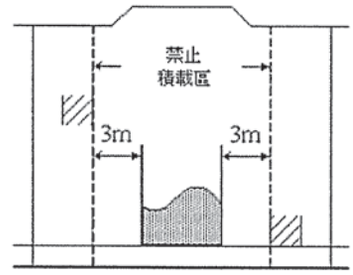
9.3.3.1 除非本節或明細表中另有明文要求，否則，B 組中的散裝貨物與包裝危險貨物須按下表隔離。

對於包裝危險貨物積載和隔離的附加要求，須參照《國際海運危險貨物規則》中的危險貨物清單。

	包裝危險貨物																
散裝貨物（屬危險品類）	**類別**	**1.1 1.2 1.5**	**1.3**	**1.4**	**2.1**	**2.2 2.3**	**3**	**4.1**	**4.2**	**4.3**	**5.1**	**5.2**	**6.1**	**6.2**	**7**	**8**	**9**
易燃固體	**4.1**	4	3	2	2	2	2	X	1	X	1	2	X	3	2	1	X
易自燃物質	**4.2**	4	3	2	2	2	2	1	X	1	2	2	1	3	2	1	X
遇水釋放出易燃氣體的物質	**4.3**	4	4	2	1	X	2	X	1	X	2	2	X	2	2	1	X
氧化物質（氧化劑）	**5.1**	4	4	2	2	X	2	1	2	2	X	2	1	3	1	2	X
毒性物質	**6.1**	2	2	X	X	X	X	X	1	X	1	1	X	1	X	X	X
放射性物質	**7**	2	2	2	2	2	2	2	2	2	1	2	X	3	X	2	X
腐蝕性物質	**8**	4	2	2	1	X	1	1	1	1	2	2	X	3	2	X	X
雜類危險物質和物品	**9**	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
僅在散裝時有危險的物質（MHB）	MHB	X	X	X	X	X	X	X	X	X	X	X	X	3	X	X	X

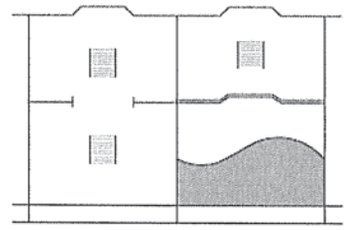
編號指的是下列隔離術語：

1 “遠離”：



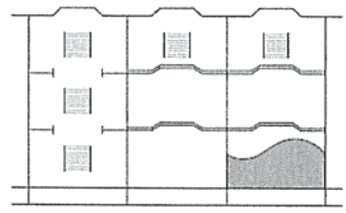
有效的隔離從而使互不相容的物質在萬一發生意外事故時不致於互相起危險反應，但只要在垂直投影的水平距離不小於 3m，仍可在同一艙室或貨艙內或艙面上積載。

2 “隔離”：



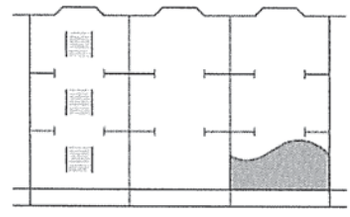
在艙內積載時，裝於不同的貨艙中。如果中間甲板是防火和防液的，垂向隔離，即在不同的艙室積載，可以看成是等效隔離。

3 “用一整個艙室或貨艙隔離”：



係指垂向的或水平的隔離。如果甲板不是防火和防液的，可以接受只用一縱向隔離，即用介於中間的整個艙室隔離。

4 “用一介於中間的整個艙室或貨艙作縱向隔離”：

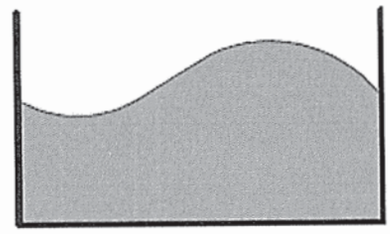


僅垂向隔離不符合這一要求。

X 如有，隔離要求應查閱《國際海運危險貨物規則》的危險貨物名錄和本規則中的明細表。

圖例

參考的散裝貨物



不相容的包裝貨物

防火防液甲板

註：垂直線表示貨艙間的橫向水密艙壁。

9.3.4 具有化學危險的固體散貨的隔離

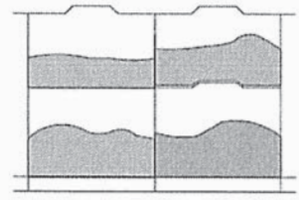
除非本節或 B 組中的具體條目有其他要求，否則具有化學危險的固體散貨須按下表隔離：

固體散裝物質										
	類別	4.1	4.2	4.3	5.1	6.1	7	8	9	MHB
易燃固體	4.1	X								
易自燃物質	4.2	2	X							
遇水釋放出易燃氣體的物質	4.3	3	3	X						
氧化物質（氧化劑）	5.1	3	3	3	X					
毒性物質	6.1	X	X	X	2	X				
放射性物質	7	2	2	2	2	2	X			
腐蝕性物質	8	2	2	2	2	X	2	X		
雜類危險物質和物品	9	X	X	X	X	X	2	X	X	
僅在散裝時有危險的物質（MHB）	MHB	X	X	X	X	X	2	X	X	X

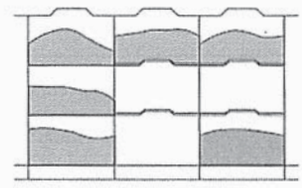
表中數字表示下列隔離要求：

2 “隔離”：

在艙內積載時，裝於不同的貨艙中。如果中間甲板是防火和防液的，垂向隔離，即可接受在不同的艙室積載為等效隔離。



3 “用一個整艙或貨艙隔離”：



垂向的或水平的隔離。如果甲板不是防火和防液的，可以接受只用一縱向隔離，即用介於中間的整個艙室隔離。

X 隔離（如有）列於本規則中的明細表。

圖例

參考的散裝貨物

不相容的散裝貨物

防火防液甲板

註：垂直線表示貨艙間的橫向水密艙壁。

第 10 節

固體散裝廢物運輸

10.1 序言

10.1.1 廢物的越境轉移對人類健康和環境安全具有威脅。

10.1.2 因此，廢物須按有關的國際建議和公約進行運輸；若是進行海上運輸，則須特別遵守本規則的規定。

10.2 定義

10.2.1 就本節而言，*廢物*係指一些固體散裝貨物，含有受本規則適用於第 4.1、4.2、4.3、5.1、6.1、8 或 9 類物質的規定約束的一種或多種成分或受其沾染，而且預料其運輸是為了傾倒、焚燒或其他處置，無其他直接用途。

10.2.2 *越境轉移*係指將廢物從一個國家管轄的區域運抵或運經另一個國家管轄的區域，或運抵或運經不屬於任何國家管轄的區域，但運輸中至少應涉及兩個國家。

10.3 適用性

10.3.1 本節的規定適用於船舶裝運廢物的散裝運輸，並且須與本規則的其他規定一併考慮。

10.3.2 含有放射性質或受到放射性物質沾染的固體貨物的運輸受關於放射性物質運輸的適用規定約束，而就本節而言不被視為廢物。

10.4 《巴塞爾公約》規定的越境轉移

僅在滿足下述規定時方可進行廢物的越境轉移：

.1 起運國主管機關或生產者或出口者經起運國主管機關向目的地國的主管機關發出了通知；並且

.2 起運國主管機關在收到目的地國主管機關說明廢物將被安全焚燒或作其他處置的書面同意之後，批准了此項轉移。

10.5 文件

所有廢物越境轉移，除了須備妥必要的固體散貨運輸文件之外，均須自始發地至處置地都攜帶一份越境轉移文件。該文件須隨時可供有關主管機關和所有參與廢物運輸管理的人員檢查。

10.6 廢物的分類

10.6.1 僅含有一種應受本規則適用於第 4.1、4.2、4.3、5.1、6.1、8 或 9 類貨物的規定約束的物質成分的廢物須被視為屬於該種貨物。如果該種成分的濃度使廢物持續具有該種成分的危險，它須被列為適用于該成分的危險貨物種類。

10.6.2 含有兩種或兩種以上受本規則適用於第 4.1、4.2、4.3、5.1、6.1、8 或 9 類貨物的規定約束的物質成分的廢物，須依據其危險特性和性質按第 10.6.3 和 10.6.4 段進行分類。

10.6.3 依據危險特性和性質進行分類須按以下方法進行：

.1 通過測量或計算確定物理特性、化學特性和生理特性，然後以適用於其成分的衡準進行分類；或

.2 若確定上述特性為不切實際，該廢物須按構成的主要危險的成分進行分類。

10.6.4 確定主要危險時須考慮到下述衡準：

.1 若一種或以上的成分屬於某一危險類別而且廢物具有這些成分所具有的危險，則該廢物屬於該類危險物質；或

.2 若所含成分屬於兩個或兩個以上危險類別，則廢物的分類須考慮到《國際海運危險貨物規則》(《國際危規》) 所述的適用於多項危險貨物的危險主次順序。

10.7 廢物的積載與裝卸

廢物的積載與裝卸須按本規則第 1 至 9 節的規定進行，並須符合適用於構成主要危險的成分的 B 組具體條目中的附加規定。

10.8 隔離

廢物須按第 9.3.3 和 9.3.4 段的適用要求進行隔離。

10.9 事故處理程序

在運輸中，如果廢物發生了危及船舶或環境的危險，該船長則須立即通知起運國和目的國的主管機關，並取得他們關於應採取行動的建議。

第 11 節

保安規定

註釋

本節規定針對海上運輸散裝貨物的保安問題。應當考慮到，作為散裝貨物運輸的一些物質，通過其固有的性質，或與其他物質混合運輸時，可能會被用作從事違法行為時使用的武器的成分或用以提高武器的效力。（還應考慮到，通常裝運散裝貨物的船舶還可能被用來運輸經批准的武器、燃燒裝置或爆炸品，不管其裝運的貨物特徵如何。）國家主管機關可制定額外的保安規定，以在提供或運輸散裝貨物時考慮採用。除了第 11.1.1 小節外，該節規定仍然是建議性的。

11.1 對公司、船舶和港口設施的一般規定

11.1.1 經修正的《1974 年安全公約》第 XI-2 章和國際船舶和港口設施保安（ISPS）規則 A 部分的相關規定須適用於從事散裝貨物裝卸運輸的公司、船舶和港口設施，並且考慮到 ISPS 規則 B 部分給出的指南，經修正的《1974 年安全公約》第 XI-2 的規定亦適用。

11.1.2 應酌情關注與保安有關的 ILO/IMO 港口保安實用規則和《國際海運危險貨物規則》。

11.1.3 任何從事散裝貨物裝卸和運輸的岸上公司人員、船上人員和港口設施人員，除了掌握 ISPS 規則規定的與其職責相應的保安要求外，還應了解這些貨物的任何保安要求。

11.1.4 對從事散裝貨物裝卸和運輸的公司保安員、承擔具體保安任務的岸上公司人員、港口設施保安員和承擔具體保安任務的港口設施

人員的培訓還應包括與這些貨物特性相關的保安知識，例如在何情況下這些貨物僅在散裝運輸時具有危險性。

11.1.5 第 11.1.4 節中未提及而又從事散裝貨物運輸的所有船上人員和港口設施人員均應熟悉與這些貨物相關的並與其職責相應的有關保安計劃的規定。

11.2 對岸上人員的一般規定

11.2.1 就本小節而言，岸上人員包括負責以下工作各方人員：

— 製作散裝貨物運輸單證；

— 將散裝貨物託付運輸；

— 接收運輸的散裝貨物；

— 裝卸散裝貨物；

— 編製散裝貨物裝載/積載計劃；

— 裝載/卸載船舶裝運的散裝貨物；和

— 實施或檢驗或檢查符合適用規則和規定；或

— 參與裝卸和運輸經主管機關確定的散裝貨物。

但是，第 11.2 小節的規定不適用於：

— ISPS 規則第 A/13.1 提及的公司保安員和有關岸上公司人員；

— ISPS 規則第 A/13.2 和 A/13.3 節提及的船舶保安員和船上人員；

— ISPS 規則第 A/18.1 和 A/18.2 節提及的港口設施保安員、有關港口設施保安人員和承擔具體保安任務的港口設施人員。

對這些保安員和人員的培訓，見《國際船舶和港口設施保安（ISPS）規則》。

11.2.2 從事海運散裝貨物的岸上人員應遵守與其職責相應的有關散裝貨物運輸的保安規定。

11.2.3 保安培訓

11.2.3.1 岸上人員的培訓還應包括保安知識、控制接近貨物和船舶的必要性、以及各種散裝貨物保安重要性的一般性指南。

11.2.3.2 保安知識培訓應針對保安危險性質、對保安危險（風險）的認識、處理和減少危險的方法以及發生保安違章事件時應採取的行動。它應包括了解與各自職責相應的保安計劃（如適當，參見第 11.3 節）和他們在實施保安計劃時的作用。

11.2.3.3 應為招聘涉及散裝貨物運輸的崗位人員提供培訓或確認受過培訓，並應定期提供再培訓。

11.2.3.4 僱主應保存所進行的所有保安培訓記錄並應在需要時提供給被僱人員。

11.3 對可產生嚴重後果的散裝貨物的規定

11.3.1 就本小節而言，具有潛在保安問題的、可產生嚴重後果的散裝貨物是指在違法行為中可能被濫用而產生諸如大量人員傷亡或大

規模毀滅的嚴重後果的散裝貨物，例如：第 5.1 類硝酸銨 UN1942 和硝酸胺化肥 UN2067。

11.3.2 本小節規定不適用於船舶和港口設施（見有關船舶保安計劃和港口設施保安計劃的 ISPS 規則）。

11.3.3 發貨人和運輸具有潛在保安問題的、會造成嚴重後果的散裝貨物的其他人應採用、實施和符合至少包含第 11.3.4 節中所述內容的保安計劃。

11.3.4 保安計劃應至少包含下列內容：

.1 將保安職責具體分配給適任和稱職的人員，並為履行其職責賦予適當授權；

.2 具有潛在的嚴重保安問題的散裝貨物的記錄或所運輸的具有潛在的嚴重保安問題的散裝貨物的種類；

.3 對當前作業的審查和對易受破壞性的評估，視情包括多式聯運、臨時中轉儲存、裝卸和分送。

.4 對各種措施的清晰表述，包括培訓、方針政策（包括對較高度威脅情況的反應、新僱員/招聘審核等）、操作方法（如已知路徑的選擇/使用，控制接近船舶、散裝貨物儲存和裝載區域，與易受破壞的基礎設施的接近程度等）、擬用於降低保安風險的設備和資源；

.5 對保安威脅、保安違章或相關事件報告和處理的有效和最新的程序；

.6 保安計劃的評估和測試程序以及對該計劃進行定期審查和更新的程序；

.7 確保保安計劃所含運輸信息的安全的措施；

.8 確保儘可能限制運輸信息傳播的措施。

第 12 節

積載因數換算表

12.1 立方米/噸換算成立方英尺/長噸（2240 磅或 1016 千克）。

換算因數：$1m^3/t = 35.87ft^3/ton$（精確到 ft^3/ton 的百分位）

m^3/t	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	—	0.36	0.72	1.08	1.43	1.79	2.15	2.51	2.87	3.23
0.1	3.59	3.95	4.30	4.66	5.02	5.38	5.74	6.10	6.46	6.82
0.2	7.17	7.53	7.89	8.25	8.61	8.97	9.33	9.68	10.04	10.40
0.3	10.76	11.12	11.48	11.84	12.20	12.55	12.91	13.27	13.63	13.99
0.4	14.35	14.71	15.07	15.42	15.78	16.14	16.50	16.86	17.22	17.58
0.5	17.94	18.29	18.65	19.01	19.37	19.73	20.09	20.45	20.80	21.16
0.6	21.52	21.88	22.24	22.60	22.96	23.32	23.67	24.03	24.39	24.75
0.7	25.11	25.47	25.83	26.19	26.54	26.90	27.26	27.62	27.98	28.34
0.8	28.70	29.05	29.41	29.77	30.13	30.49	30.85	31.21	31.57	31.92
0.9	32.28	32.64	33.00	33.36	33.72	34.08	34.44	34.79	35.15	35.51
1.0	35.87	36.23	36.59	36.95	37.31	37.66	38.02	38.38	38.74	39.10
1.1	39.46	39.82	40.17	40.53	40.89	41.25	41.61	41.97	42.33	42.69
1.2	43.04	43.40	43.76	44.12	44.48	44.84	45.20	45.56	45.91	46.27
1.3	46.63	46.90	47.35	47.71	48.07	48.43	48.78	49.14	49.50	49.86
1.4	50.22	50.58	50.94	51.29	51.65	52.01	52.37	52.73	53.09	53.45
1.5	53.81	54.16	54.52	54.88	55.24	55.60	55.96	56.32	56.67	57.03
1.6	57.39	57.75	58.11	58.47	58.83	59.19	59.54	59.90	60.26	60.62

ft^3/ton

12.2 立方英尺/長噸（ft^3/ton）（2240 磅或 1016 千克）換算成立方米/噸（m^3/t）（2204 磅或 1000 千克）

換算因數：$1ft^3/ton = 0.02788m^3/t$（精確到 m^3/t 的萬分位）

ft^3/ton	0	1	2	3	4	5	6	7	8	9
0	—	0.0279	0.0558	0.0836	0.1115	0.1394	0.1676	0.1952	0.2230	0.2509
10	0.2788	0.3067	0.3346	0.3624	0.3903	0.4182	0.4461	0.4740	0.5018	0.5297
20	0.5576	0.5855	0.6134	0.6412	0.6691	0.6970	0.7249	0.7528	0.7806	0.8085
30	0.8364	0.8643	0.8922	0.9200	0.9479	0.9758	1.0037	1.0316	1.0594	1.0873
40	1.1152	1.1431	1.1710	1.1988	1.2267	1.2546	1.2825	1.3104	1.3382	1.3661
50	1.3940	1.4219	1.4498	1.4776	1.5055	1.5334	1.5613	1.5892	1.6170	1.6449
60	1.6728	1.7007	1.7286	1.7564	1.7843	1.8122	1.8401	1.8680	1.8958	1.9237
70	1.9516	1.9795	2.0074	2.0352	2.0631	2.0910	2.1189	2.1468	2.1746	2.2025
80	2.2304	2.2583	2.2862	2.3140	2.3419	2.3698	2.3977	2.4256	2.4534	2.4818
90	2.5092	2.5371	2.5650	2.5928	2.6207	2.6486	2.6765	2.7044	2.7322	2.7601
100	2.7880	2.8159	2.8438	2.8716	2.8995	2.9274	2.9553	2.9832	3.0110	3.0389

m^3/t

第 13 節

相關信息和建議的參考條目

13.1 概述

本節列出了與本規則要求相關的國際海事組織文書參考條目，應注意到該清單並非詳盡無遺。

13.2 參考條目清單

本規則各小節的參考條目、國際海事組織相關文書的參考條目和題目列於下表。第 1 欄列出本規則各小節號碼的參考條目、第 2 欄列出國際海事組織相關文書的參考條目，第 3 欄列出相關題目。

本規則各小節號碼的參考條目（1）	國際海事組織相關文書的參考條目（2）	題目（3）

13.2.1 危險貨物和分類

9.2	《國際海運危險貨物規則》（《安全公約》第 VII/1.1 條）、《安全公約》第 VII/1.2 條	危險貨物的分類

13.2.2 穩性

2.1.3	《安全公約》第 II-1/22 條	穩性資料
2.1.3	《安全公約》第 VI/6.1 條	穩性資料
2.1.3	《安全公約》第 VI/7.2.1 條	穩性資料
2.1.3	《安全公約》第 VI/7.4 條	散裝貨物裝載和平艙
2.1.3	《安全公約》第 XII/8 條	穩性資料

13.2.3 滅火佈置

B 組概述	《安全公約》第 II-2/10.7 條	貨物處所的滅火佈置。
概述	《國際消防安全系統規則》第 9 章	固定式火災探測和報警系統。
概述	《國際消防安全系統規則》第 10 章	取樣探煙系統。
B 組	《安全公約》第 II-2/19 條	船舶裝運危險貨物的特殊要求。
A、B 和 C 組	第 MSC/Circ.1146 號通函	可以免除固定式滅火系統的固體散貨的清單。

13.2.4 通風

B 組概述	《1966 年國際載重線公約》附則 I，第 19 條	通風開口。
B 組概述	《安全公約》第 II-2/9.7 條	通風系統。
B 組概述	《安全公約》第 II-2/19.3.4 條	裝運危險貨物船舶的通風。

13.2.5 人員防護

B 組概述	國際海事組織/國際衛生組織/國際勞工組織《涉及危險貨物的事故中使用的醫療急救指南》（MFAG）	急救措施。
B 組概述	《安全公約》第 II-2/10.10 條和《國際消防安全系統規則》第 3 章	滅火人員的裝備。
B 組概述	《安全公約》第 II-2/19.3.6.1 條和《國際消防安全系統規則》第 3 章	防護服。
B 組概述	《安全公約》第 II-2/19.3.6.2 條和《國際消防安全系統規則》第 3 章	自給式呼吸器。

13.2.6 氣體探測

概述	《安全公約》第 VI/3 條	氧氣分析和氣體探測設備。
概述	適用於貨艙熏蒸的《船上安全使用殺蟲劑的建議》（MSC·1/Circ.1264）第 3 節。	熏蒸氣體探測設備。

13.2.7 最低限度資料/文件

4.8.3	《安全公約》第 II-2/19.4 條	裝運危險貨物符合證明
4.2	《安全公約》第 VI/2 條	貨物資料
4.2	《安全公約》第 XII/10 條 《安全公約》第 XII/8 條	散裝貨物的密度 貨物的限制和其他資料
4.2	《安全公約》第 VI/7.2 條	穩性和其他貨物資料
4.2	《安全公約》第 VII/7-2 條	固體散裝危險貨物單證

13.2.8 機器處所邊界的隔熱

B 組	《安全公約》第 II-2/3.2、3.4、3.10 條	“A”，“B”和“C”類分隔的定義
B 組	《安全公約》第 II-2/9.2 條	艙壁和甲板耐火完整性
B 組	《安全公約》第 II-2/19.3.8 條	隔熱標準（“A－60”）

13.2.9 熏蒸

3.6	適用於貨艙熏蒸的《船上安全使用殺蟲劑的建議》（MSC.1/Circ.1264）第 3 節	熏蒸、熏蒸的申請、熏蒸劑、安全措施
3.6	《安全公約》第 VI/4 條	船上使用殺蟲劑

13.2.10 隔離

9.3	《安全公約》第 VII/7-3 條	積載和隔離要求
9.3.3	《國際海運危險貨物規則》第 7.2.6 章	具有化學危險的散裝物質和包裝形式的危險貨物間的隔離

13.2.11 散裝固體廢物的運輸

10.4	《控制有害廢物越境轉移及其處置的巴塞爾公約》(1989)	允許的廢物越境轉移
10.6	《國際海運危險貨物規則》第 7.8.4 章	廢棄物質的分類

13.2.12 進入封閉處所

3.2.4	第 A.864 (20) 號決議， 1997 年 12 月 5 日	關於進入船上封閉處所的建議

13.2.13 避免過度應力

2.1.2	《安全公約》第 XII/5 條和 6 條	結構強度
2.1.2	《安全公約》第 XII/11 條	裝載儀

附錄 1

各固體散裝貨物明細表

苜蓿

描述

源自乾苜蓿草的物質。以粗粉、丸粒等形式運輸。

特性

靜止角	散貨密度（kg/m³）	積載因數（m³/t）
不適用	508 至 719	1.39 至 1.97
尺寸	**類別**	**組別**
細粉	不適用	C

危險性

沒有特別危險性。

該貨物為非易燃或具有低失火危險。

積載和隔離

沒有特別要求。

貨艙清潔程度

沒有特別要求。

天氣注意事項

該貨物須儘可能保持乾燥。該貨物不得在降水期間裝卸。在裝卸該貨物期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

在裝載該貨物之前，須由主管機關或託運人提供一份證書，說明所運輸的物質不符合對種子餅的要求。滿足種子餅的油性和濕度指標的託運貨物應符合種子餅（a）UN 1386、種子餅（b）UN 1386 或種子餅 UN 2217 的要求。

注意事項

沒有特別要求。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

沒有特別要求。

氧化鋁

描述

氧化鋁是一種幾乎沒有或無水份的白色無味粉末。不溶於有機液體。水份含量：0%至 5%。如受潮氧化鋁不可泵送。此貨物不溶於水。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	781 至 1087	0.92 至 1.28
尺寸	**類別**	**組別**
細粉	不適用	C

危險性

氧化鋁粉塵具有很強的腐蝕性和穿透性，對眼睛和黏膜有刺激性。

該貨物為非易燃或具有低失火危險。

積載和隔離

沒有特別要求。

貨艙清潔程度

沒有特別要求。

天氣注意事項

該貨物須儘可能保持乾燥。該貨物不得在降水期間裝卸。在裝卸該貨物期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

注意事項

污水井須保持清潔、乾燥並適當加以遮蓋以防貨物進入。須採取適當預防措施以防該貨物的粉塵進入機器處所和起居處所。須防止貨物進入其處所的艙底污水井。須適當考慮設備的貨物粉塵防護。可能接觸該貨物粉塵的人員須佩戴護目鏡或其他等效的防塵護目用品和防塵的過濾面罩。那些人員須根據需要穿戴防護服。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

卸貨後，不得用固定式污水泵吸排艙內積水。須根據需要使用便攜泵清除艙內洗艙水。

氧化鋁，經煅燒的

描述

顏色由淺至深灰，不含水份，此貨物不溶於水。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	1639	0.61
尺寸	**類別**	**組別**
小顆粒和塊	不適用	C

危險性

沒有特別危險性。

該貨物為非易燃或具有低失火危險。

積載和隔離

沒有特別要求。

貨艙清潔程度

沒有特別要求。

天氣注意事項

該貨物須儘可能保持乾燥。該貨物不得在降水期間裝卸。在裝卸該貨物期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

注意事項

須採取適當預防措施以防該貨物的粉塵進入機器處所和起居處所。須防止貨物進入其處所的艙底污水井。須適當考慮設備的貨物粉塵防護。可能接觸該貨物粉塵的人員須根據需要穿戴防護服、護目鏡或其他等效的眼睛防塵保護用品和防塵口罩。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

卸貨後，不得用固定式污水泵吸排艙內積水。須根據需要使用便攜泵清除艙內洗艙水。

硅酸鋁

描述

白色，含氧化鋁和二氧化硅晶體。水份含量低（1%至 5%）。

結塊 60%。

粗粒粉末－40%。該貨物不溶於水。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	1429	0.70
尺寸	**類別**	**組別**
不適用	不適用	C

危險性

沒有特別危險性。

該貨物為非易燃或具有低失火危險。

積載和隔離

沒有特別要求。

貨艙清潔程度

沒有特別要求。

天氣注意事項

該貨物須儘可能保持乾燥。該貨物不得在降水期間裝卸。在裝卸該貨物期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

注意事項

須採取適當預防措施以防該貨物的粉塵進入機器處所和起居處所。須防止貨物進入其處所的艙底污水井。須適當考慮設備的貨物粉塵防護。可能接觸該貨物粉塵的人員須根據需要穿戴防護服、護目鏡或其他等效的眼睛防塵保護用品和防塵口罩。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

卸貨後，不得用固定式污水泵吸排艙內積水。須根據需要使用便攜泵清除艙內洗艙水。

硅酸鋁，粒狀

描述

白色至灰白色。不含水份。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	1190 至 1282	0.78 至 0.84
尺寸	**類別**	**組別**
長度：6.4 毫米至 25.4 毫米 直徑：6.4 毫米	不適用	C

危險性

沒有特別危險性。

該貨物為非易燃或具有低失火危險。

積載和隔離

沒有特別要求。

貨艙清潔程度

沒有特別要求。

天氣注意事項

該貨物須儘可能保持乾燥。該貨物不得在降水期間裝卸。在裝卸該貨物期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

注意事項

須採取適當預防措施以防該貨物的粉塵進入機器處所和起居處所。須防止貨物進入其處所的艙底污水井。須適當考慮設備的貨物粉塵防護。可能接觸該貨物粉塵的人員須根據需要穿戴防護服、護目鏡或其他等效的眼睛防塵保護用品和防塵口罩。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

沒有特別要求。

硅鋁鐵粉末 UN 1395

描述

細粉或磚塊狀。

特性

靜止角	散貨密度（kg/m^3）		積載因數（m^3/t）
不適用	—		—
尺寸	**類別**	**副危險性**	**組別**
不適用	**4.3**	6.1	B

危險性

遇水會釋放出氫氣，一種易燃氣體，在空氣中會形成一種爆炸性的混合氣體。在類似情況下，如含雜質可產生磷化氫和胂，是高度毒性氣體。

該貨物為非易燃或具有低失火危險。

積載和隔離

與食品和所有第 8 類液體“隔離”。

貨艙清潔程度

按貨物的危險性保持清潔和乾燥狀態。

天氣注意事項

該貨物須儘可能保持乾燥。該貨物不得在降水期間裝卸。在裝卸該貨物期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

注意事項

在裝載前，廠商或託運人須提供一份證書，說明該物質在生產以後曾在有遮蓋的條件下存放，在其將被運輸的顆粒尺寸狀態下，裝船前暴露在空氣中不少於 3 天。機艙的艙壁須達到氣密，並須由主管機關檢驗和核准。在貨物裝卸期間，須在甲板上和貨艙附近區域張貼“禁止吸煙”標誌，並且在這些處所禁止明火。除須配備《安全公約》第 II-2/10.10 條所要求者外，還須至少配備兩套自給式呼吸器。

通風

在航行期間，須為運載該貨物的貨物處所持續進行機械通風。如果保持通風會威脅到船舶或貨物，可以中斷，除非中斷通風會帶來爆炸或其他危險。無論在任何情況下，卸貨前均須在一段合理時間內保持通風。

裝運

為測量氫氣、磷化氫和肿和硅烷的含量，在裝運貨物期間須在船上裝有每種氣體或混合氣體的探測器。此種探測器須通過認證，屬可在可爆氣體中使用的安全型。須在航行期間定期測量裝運該貨物的處所中這些氣體的含量，並須記錄和在船上保存測量結果。

卸貨

沒有特別要求。

清掃

卸貨後，貨艙須經兩次清掃。鑑於氣體危險，不得使用水清洗存有此種貨物的貨艙。

應急程序

需配備的專用應急設備 自給式呼吸器。
應急程序 佩戴自給式呼吸器。 火災時的應急行動 封艙並使用二氧化碳（如果裝有的話）。不要用水。 醫療急救 參考經修訂的《危險貨物事故醫療急救指南（MFAG）》。

硝酸鋁 UN 1438

描述

無色或白色晶體。溶解於水。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	—	—
尺寸	**類別**	**組別**
不適用	5.1	B

危險性

如果遇火將大大加劇可燃物質的燃燒並且產生有毒的亞硝煙。儘管不燃，與可燃物質的混合物容易被點燃並且會猛烈燃燒。

積載和隔離

與食品“隔離”。

貨艙清潔程度

按貨物的危險性保持清潔和乾燥狀態。

天氣注意事項

該貨物須儘可能保持乾燥。該貨物不得在降水期間裝卸。在裝卸該貨物期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

注意事項

適當注意避免此種貨物與可燃物質接觸。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

沒有特別要求。

應急程序

需配備的專用應急設備 防護服（手套、工作服、防護帽）。 自給式呼吸器。 噴霧嘴。
應急程序 穿防護服及佩戴自給式呼吸器。 火災時的應急行動 用大量的水，最好使用噴霧的形式以避免擾動物質表面。物質可能熔化或溶化；在該條件下使用水可以導致溶化的物質大範圍的散落。氣封或用二氧化碳不能控制火勢。應充分考慮到由於積水而對船舶穩性的影響。 醫療急救 參考經修訂的《危險貨物事故醫療急救指南（MFAG）》。

無保護層的鋁硅粉，UN 1398

描述

粉末

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	—	—
尺寸	**類別**	**組別**
不適用	4.3	B

危險性

遇水會釋放出氫氣，一種易燃氣體，在空氣中會形成一種爆炸性的混合氣體。在類似情況下，如含雜質可產生磷化氫和胂，是高度有毒氣體。還會釋放有毒並會自燃的硅烷類物質。

該貨物為非易燃或具有低失火危險。

積載和隔離

與食品和所有第 8 類液體“隔離”。

貨艙清潔程度

按貨物的危險性保持清潔和乾燥狀態。

天氣注意事項

該貨物須儘可能保持乾燥。該貨物不得在降水期間裝卸。在裝卸該貨物期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

注意事項

在裝載前，廠商或託運人須提供一份證書，證明該物質在生產以後曾在有遮蓋的條件下存放，在其將被運輸的顆粒尺寸狀態下，裝船前暴露在空氣中不少於 3 天。貨艙與機艙之間的艙壁須達到氣密，並須由主管機關檢驗和核准。在貨物裝卸期間，須在甲板上和貨艙附近區域張貼“禁止吸煙”標誌，並且在這些處所禁止明火。貨物須裝載於起碼由兩台獨立的風扇進行通風的處所。總通風量須根據空處所的容積，每小時換氣六次。除須配備《安全公約》第 II-2/10.10 條所要求者外，還須至少配備兩套自給式呼吸器。

通風

在航行期間，須為運載該貨物的貨物處所持續進行機械通風。如果保持通風會威脅到船舶或貨物，可以中斷，除非中斷通風會帶來爆炸或其他危險。無論在任何情況下，卸貨前均須在一段合理時間內保持通風。通風的佈置須儘量減少排出氣體進入甲板上面或下面的起居艙室。

裝運

為測量氫氣、磷化氫和肿的含量，在裝運貨物期間須在船上裝有每種氣體或混合氣體的探測器。此種探測器須通過認證，屬可在可爆氣體中使用的安全型。須在航行期間定期測量裝運該貨物的處所中這些氣體的含量，並須記錄和在船上保存測量結果。

卸貨

沒有特別要求。

清掃

卸貨後，貨艙須經兩次清掃。

鑑於氣體危險，不得使用水清洗存有此種貨物的貨艙。

應急程序

需配備的專用應急設備 自給式呼吸器。
應急程序 佩戴自給式呼吸器。 火災時的應急行動 封艙並使用二氧化碳（如果裝有的話）。不要用水。 醫療急救 參考經修訂的《危險貨物事故醫療急救指南（MFAG）》。

鋁熔煉副產品或

鋁再熔煉副產品 UN 3170

描述

鋁熔煉副產品是生產鋁過程中的廢物。含有一些金屬雜質的灰色或黑色粉末或塊狀物。該名稱包含各種不同的廢材料，包括但不限於：

鋁渣 **廢陰極**

鋁鹽殘渣 **電解鋁廢襯材料**

鋁浮渣

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	1220	0.82
尺寸	**類別**	**組別**
不適用	4.3	B

危險性

遇水會產生熱量並可能放出易燃和有毒氣體，如氫、氨和乙炔。

該貨物為非易燃或具有低失火危險。

不易發生火災，但易燃氣體爆炸後可能失火並難以熄滅。在港口可考慮噴水，但應充分考慮到穩性。

積載和隔離

與食品“隔離”。

與所有第 8 類液體“隔離”。

貨艙清潔程度

按貨物的危險性保持清潔和乾燥狀態。

天氣注意事項

該貨物須儘可能保持乾燥。該貨物不得在降水期間裝卸。在裝卸該貨物期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

注意事項

在裝載前，廠商或託運人須提供一份證書，證明該物質在生產以後曾在有遮蓋的條件下存放，在其將被運輸的顆粒尺寸狀態下，裝船前暴露在空氣中不少於 3 天。當船舶停靠碼頭且裝有鋁產生副產品的貨艙口關閉時，如果天氣允許，須保持連續的機械通風。在貨物裝卸期間，須在甲板上和貨艙附近區域張貼“禁止吸煙”標誌，並且在這些處所禁止明火。除須配備《安全公約》第 II-2/10.10 條所要求者外，還須至少配備兩套自給式呼吸器。貨物處所與機艙之間的艙壁須達到氣密。須避免通過機器處所錯誤抽吸。

通風

在航行期間，須為運載該貨物的貨物處所持續進行機械通風。如果保持通風會威脅到船舶或貨物，可以中斷，除非中斷通風會帶來爆炸或其他危險。無論在任何情況下，卸貨前均須在一段合理時間內保持通風。通風的佈置須儘量減少排出氣體進入甲板上面或下面的起居艙室。

裝運

為測量氫氣、氨和乙炔的含量，在裝運貨物期間須在船上裝有每種氣體或混合氣體的探測器。此種探測器須通過認證，屬可在可爆氣體中使用的安全型。須在航行期間定期測量裝運該貨物的處所中這些氣體的含量，並須記錄和在船上保存測量結果。

卸貨

沒有特別要求。

清掃

鑑於氣體的危險性，不得用水清潔含有該貨物的貨艙。

應急程序

需配備的專用應急設備 無
應急程序 無 火災時的應急行動 封艙並使用二氧化碳（如果裝有的話）。**不要用水**。如果表明無效，盡力制止火勢蔓延並向最近的合適港口航行。 醫療急救 參考經修訂的《危險貨物事故醫療急救指南（MFAG）》。

硝酸銨 UN 1942

可燃物質總數不超過 0.2%，包括任何以碳計算的有機物質，不計其他添加物質。

描述

白色晶體、丸粒或顆粒。全部或部分溶於水。助燃物。有吸濕性。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
27° 至 42°	1000	1.00
尺寸	**類別**	**組別**
1 至 4 毫米	5.1	B

危險性

如果該物質受到污染（例如：燃油）或處於牢固密封狀態，則在船舶發生重大火災時有爆炸危險。鄰近的爆燃也有引起爆炸的危險。如果大量加熱，該貨物將會分解，釋放出有毒氣體和助燃氣體。

硝酸銨粉塵可能會對皮膚和黏膜有刺激性。

該貨物有吸濕性，受潮會結塊。

積載和隔離

貨物處所內不應有熱源或火源。

“用完整艙室或船艙隔離”易燃物質（特別是液體）、氯酸鹽、氯化物、亞氯酸鹽、次氯酸鹽、亞硝酸鹽、高錳酸鹽和纖維材料（例如：棉、黃麻、西沙爾麻，等）。

與其他物品“隔離”。

如果貨艙和機艙之間的艙壁達不到 A-60 級分隔標準，該貨物須“遠離”該艙壁。

貨艙清潔程度

按貨物的危險性保持清潔和乾燥狀態。

天氣注意事項

該貨物須儘可能保持乾燥。該貨物不得在降水期間裝卸。在裝卸該貨物期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

裝載前，須符合以下規定：

- 當貨物溫度高於 40°C 時，不得接收貨物裝載。
- 裝載前，託運人須交給船長一份由託運人簽署的證書，說明已滿足本規則要求的該貨物的相關條件，包括已滿足本明細表中的要求。
- 位於將用以運輸該貨物的貨物處所下方的燃油艙須經過壓力試驗，確保通往這些處所的人孔和管系沒有泄漏。
- 用以裝載該貨物的處所內的、除內在安全型電氣設備以外的電器設備，須通過除保險絲以外的合適手段在該處所外部的位置切斷電源。只要貨物還在船上，就須保持這種狀態。

- 須考慮到在出現火災時可能需要儘量打開艙蓋以提供最大通風量和在緊急情況下供水，以及貨物流態化給船舶穩性帶來的風險。

裝載期間，須遵守以下規定：

- 在甲板上和貨物處所須禁止吸煙。貨物在船上期間，須張貼“禁止吸煙”標誌。
- 不允許加燃油。除機艙外，在鄰近貨艙的處所不得泵送燃油。
- 儘實際可能不使用易燃的穩固和保護材料。如需要使用墊艙木板，須儘量少用。

注意事項

只有在主管機關對基於試驗的該物質的阻爆性表示滿意時，方可裝載該貨物。在裝貨前，託運人須向船長提供一份證書，證明該物質的阻爆性符合這一要求。船長和高級船員須注意到固定式氣體滅火系統對該貨物失火無消防功效，而且可能需要用水。須維持消防總管的壓力，安好或備好消防水嚨帶並隨時可用。除非在緊急情況下，不得在貨物處所附近從事焊接、燃燒、切割或其他涉及使用火、明火、發出火花或電弧的設備作業。須採取預防措施以避免該貨物滲透到其他貨物處所、底艙污水艙和其他封閉處所。甲板上及貨艙嚴禁吸煙，貨物在船上時，須在甲板上張貼“禁止吸煙”標誌。只要該物質在船上，不得上緊貨艙蓋，以在緊急情況下能夠打開。如果貨艙和機艙之間的艙壁達不到 A-60 級分隔標準，不得在該貨艙中裝載該貨物，除非主管當局認可其佈置是等效的。

須採取適當預防措施以防該貨物的粉塵進入機器處所和起居處所。須防止貨物進入其處所的艙底污水井。須適當考慮設備的貨物粉塵防護。可能接觸該貨物粉塵的人員須戴護目鏡或其他等效的眼睛防塵保護用品和防塵口罩。那些人員須根據需要穿戴防護服。

通風

在航行期間，不得對裝運該貨物的貨物處所進行通風。

裝運

裝運該貨物的貨物處所的艙蓋須達到水密，以防水滲入。

卸貨

如果貨物已變硬，則須根據需要進行平艙以避免形成懸空表面。不得泵吸或加裝燃油。

清掃

卸貨後，須檢查污水井和貨艙排水孔，須清除污水井和貨艙排水孔的任何堵塞物。

應急程序

需配備的專用應急設備

防護服（靴子、手套、工作服和防護帽）。

自給式呼吸器。

應急程序

穿防護服和佩戴自給式呼吸器。

火災時的應急行動

含有這種物質的貨物處所中的火災：打開艙口提供最大限度的通風。船舶的固定式氣體滅火將不夠用。使用大量的水。可以考慮水淹貨物處所，但應充分考慮到船舶的穩性。

鄰近貨物處所中的火災：打開艙口提供最大限度的通風。從鄰近處所傳遞來的熱量會引起物質分解並隨之生成毒煙。應為分隔艙壁降溫。

醫療急救

參考經修訂《危險貨物事故醫療急救指南（MFAG）》。

硝酸銨化肥 UN 2067

描述

晶體、顆粒或丸粒。全部或部分溶於水。有吸濕性。

被歸類為 UN 2067 的硝酸銨化肥為勻質混合物，其中硝酸銨為其主要成分，其成分限度如下：

.1 含硝酸銨不少於 90%，並且含不超過 0.2%的以碳計算的可燃物/有機物，及含有其他任何無機並對硝酸銨為惰性的添加物；或

.2 含硝酸銨不超過 90%但高於 70%並含有其他無機物質，或超過 80%但低於 90%的硝酸銨與碳酸鈣和（或）白雲岩以及以碳計算不超過 0.4%的可燃/有機物質混合；或

.3 硝酸銨化肥包含硝酸銨和硫酸銨的混合物，含有超過 45%但低於 70%的硝酸銨，以碳計算的總可燃有機物質不超過 0.4%，從而使硝酸銨和硫酸銨成分的百分比之和超過 70%。

註：

1. 對混合物中存在硝酸銨分子當量的所有硝酸根離子，應作為硝酸銨計算。

2. 禁止運輸易於自熱以致引起分解反應的硝酸銨物質。

3. 此明細表只可用於在按照第 1 類的試驗系列 1 和 2 進行試驗時不顯示第 1 類爆炸特徵的物質（見《聯合國試驗和標準手冊》第 I 部分）。

特性

靜止角	散貨密度（kg/m³）	積載因數（m³/t）
27° 至 42°	900 至 1200	0.83 至 1.11
尺寸	**類別**	**組別**
1 至 5 毫米	5.1	B

危險性

助燃物。如果該物質受到污染（例如：燃油）或處於牢固密封狀態，則在船舶發生重大火災時有爆炸危險。鄰近的爆燃也有引起爆炸的危險。

如果大量加熱，該貨物將會分解，在貨物處所和甲板上出現有毒氣體和助燃氣體的危險。

化肥粉塵可能對皮膚和黏膜有刺激性。

此貨物有吸濕性，受潮會結塊。

積載和隔離

“用一整個艙室或貨艙隔離”易燃物質（特別是液體）、溴酸鹽、氯酸鹽、氯化物、亞氯酸鹽、次氯酸鹽、高氯酸鹽、亞硝酸鹽、金屬粉末和植物纖維（例如：棉、黃麻、西沙爾麻，等）；

與所有其他貨物“隔離”；

與熱源或火源“隔離”（另見裝載）；

不得積載於鄰近任何含有加熱至 50° 以上燃油的液艙和雙層底艙。

如果貨物處所和機艙之間的艙壁不能達到 A－60 級分隔，此貨物須與該艙壁“隔離”。

貨艙清潔程度

按貨物的危險性保持清潔和乾燥狀態。

天氣注意事項

該貨物須儘可能保持乾燥。該貨物不得在降水期間裝卸。在裝卸該貨物期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

裝載前，須遵守以下規定：

- 當貨物溫度高於 40°C 時，不得接收貨物裝載。
- 裝載前，託運人須交給船長一份由託運人簽署的證書，說明已滿足本規則要求的該貨物的相關條件，包括已滿足本明細表中的要求。
- 位於將用以運輸該貨物的貨物處所下方的燃油艙須經過壓力試驗，確保通往這些處所的人孔和管系沒有泄漏。
- 用以裝載該貨物的處所內的、除內在安全型電氣設備以外的電器設備，須通過除保險絲以外的合適手段在該處所外部的位置切斷電源。只要貨物還在船上，就須保持這種狀態。
- 須考慮到在出現火災時可能需要儘量打開艙蓋以提供最大通風量和在緊急情況下供水，以及貨物流態化給船舶穩性帶來的風險。

裝載期間，須遵守以下規定：

不允許加燃油。除機艙外，在鄰近貨艙的處所不得泵送燃油。

- 儘實際可能不使用易燃的穩固和保護材料。如需要使用墊艙木板，須儘量少用。

注意事項

只有在主管機關對基於試驗的該物質的阻爆性表示滿意時，方可裝載該貨物。在裝貨前，託運人須向船長提供一份證書，說明該物質的阻爆性符合這一要求。須維持消防總管的壓力，安好或備好消防水嘴帶並隨時可用。除非在緊急情況下，不得在貨物處所附近從事焊接、燃燒、切割或其他涉及使用火、明火、發出火花或電弧的設備作業。甲板上及貨艙嚴禁吸煙，貨物在船上時，須在甲板上張貼“禁止吸煙”標誌。須採取預防措施以避免該貨物滲透到其他貨物處所、底艙污水艙和其他封閉處所。只要該物質在船上，不得上緊貨艙蓋，以在緊急情況下能夠打開。

須採取適當預防措施以防該貨物的粉塵進入機器處所和起居處所。須防止貨物進入其處所的艙底污水井。須適當考慮設備的貨物粉塵防護。可能接觸該貨物粉塵的人員須戴護目鏡或其他等效的眼睛防塵保護用品和防塵口罩。那些人員須根據需要穿戴防護服。

通風

在航行期間，不得對裝運該貨物的貨物處所進行通風。

裝運

裝運該貨物的貨物處所的艙蓋須達到水密，以防水滲入。在航行期間，須每天監測該貨物溫度並做好記錄，以發現導致自熱和缺氧的分解現象。

卸貨

不得泵吸或加裝燃油。如果貨物已變硬，必要時須平艙以避免形成懸空表面。

清掃

卸貨後，須檢查污水井和貨艙排水孔，須清除污水井和貨艙排水孔的任何堵塞物。

應急程序

需配備的專用應急設備 防護服（靴子、手套、工作服和防護帽）。 自給式呼吸器。
應急程序 穿防護服和佩戴自給式呼吸器。 火災時的應急行動 含有這種物質的貨物處所中的火災：打開艙口提供最大限度的通風。船舶的固定式氣體滅火將不夠用。使用大量的水。當考慮水淹貨物處所時，應充分考慮到船舶的穩性。 鄰近貨物處所中的火災：打開艙口提供最大限度的通風。從鄰近處所傳遞來的熱量會引起物質分解並隨之生成毒煙。應為分隔艙壁降溫。 醫療急救 參考經修訂《危險貨物事故醫療急救指南（MFAG）》。

硝酸銨基化肥 UN 2071

描述

通常為顆粒。全部或部分溶於水。有吸濕性。

被歸類為 UN 2071 的硝酸銨基化肥為勻質的硝酸銨基化肥混合物，包含氮、磷酸鹽或鉀鹼，含有不超過 70%的硝酸銨和以碳計算不超過 0.4%的可燃有機物質，或含有不超過 45%的硝酸銨和不限數量的可燃物質。在這些成分限度內的化肥，如果通過試驗槽試驗（參見《聯合國試驗和標準手冊》第 III 部分，第 38.2 小節）表明不易自續分解，則不受本明細表的約束。

註：

1. 對混合物中存在硝酸銨分子當量的所有硝酸根離子，應作為硝酸銨計算。

2. 禁止運輸易於自熱以致引起分解反應的硝酸銨物質。

3. 化肥的氮磷鉀比例不得用作判斷其發生自續分解能力的準則，因為它取決於所含的化學品種類（參見《聯合國試驗和標準手冊》第 III 部分，第 38.2 小節）。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
27° 至 42°	900 至 1200	0.83 至 1.11
尺寸	**類別**	**組別**
1 至 5 毫米	9	B

危險性

若受熱，這些混合物會發生自續分解。溫度在這樣一種反應時能達到500°C。自續分解一旦發生，可能遍及其餘混合物，產生有毒氣體。這些混合物沒有一種是有爆炸危險的。

化肥粉塵可能會對眼睛和黏膜有刺激性。

此貨物具有吸濕性，受潮會結塊。

積載和隔離

與易燃物質（特別是液體）、溴酸鹽、氯酸鹽、氯化物、亞氯酸鹽、次氯酸鹽、高氯酸鹽、亞硝酸鹽、金屬粉末和植物纖維（例如：棉、黃麻、西沙爾麻，等）“用一整個艙室或貨艙隔離”；

與其他物品“隔離”；

與熱源或火源“隔離”（亦見**裝載**一節）；

不得積載於鄰近任何含有加熱至 50°C 以上燃油的液艙和雙層底艙。

如果貨物處所和機艙之間的艙壁不能達到 A－60 級分隔，此貨物需與艙壁“隔離”。

貨艙清潔程度

按貨物的危險性保持清潔和乾燥狀態。

天氣注意事項

該貨物須儘可能保持乾燥。該貨物不得在降水期間裝卸。在裝卸該貨物期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

裝載前，須遵守下列規定：

- 用以裝載該貨物的處所內的、除內在安全型電氣設備以外的電器設備，須通過除保險絲以外的合適手段在該處所外部的位置切斷電源。只要貨物還在船上，就須保持這種狀態。

- 須考慮到在出現火災時可能需要儘量打開艙蓋以提供最大通風量和在緊急情況下供水，以及貨物流態化給船舶穩性帶來的風險。

- 此外，如果發生分解，分解後剩餘的殘渣可能只有原貨物質量的一半。須充分考慮到質量損失對船舶穩性造成的影響。

裝載期間，須遵守下列規定：

不允許加燃油。除機艙外，在鄰近貨艙的處所不得泵送燃油。

注意事項

只有在經過嚴格試驗後，該貨物自身持續分解能力表明分解率不超過 0.25m/h，方可裝載該貨物。須維持消防總管的壓力，安好或備好消防水喉帶並隨時可用。除非在緊急情況下，不得在貨物處所附近從事焊接、燃燒、切割或其他涉及使用火、明火、發出火花或電弧的設備作業。甲板上及貨艙嚴禁吸煙，貨物在船上時，須在甲板上張貼“禁止吸煙”標誌。須採取預防措施以避免該貨物滲透到其他貨物處所、底艙污水艙和其他封閉處所。只要該物質在船上，不得上緊貨艙蓋，以在緊急情況下能夠打開。

須採取適當預防措施以防該貨物的粉塵進入機器處所和起居處所。須防止貨物進入其處所的艙底污水井。須適當考慮設備的貨物粉塵防護。可能接觸該貨物粉塵的人員須戴護目鏡或其他等效的眼睛防塵保護用品和防塵口罩。那些人員須根據需要穿戴防護服。

通風

在航行期間，不得對裝運該貨物的貨物處所進行通風。

裝運

裝運該貨物的貨物處所的艙蓋須達到水密，以防水滲入。

在航行期間，須每天監測該貨物溫度並做好記錄，以發現導致自熱和缺氧的分解現象。

卸貨

不得泵吸或加裝燃油。如果貨物已變硬，必要時須平艙以避免形成懸空表面。

清掃

卸貨後，須檢查污水井和貨艙排水孔，須清除污水井和貨艙排水孔的任何堵塞物。

應急程序

需配備的專用應急設備 防護服（靴子、手套、工作服和防護帽）。 自給式呼吸器。
應急程序 穿防護服和佩戴自給式呼吸器。 火災時的應急行動 含有這種物質的貨物處所中的火災：打開艙口提供最大限度的通風。船舶的固定式氣體滅火將不夠用。使用大量的水。可以考慮水淹貨艙，但應充分考慮到船舶的穩性。 鄰近貨艙的火災：打開艙口提供最大限度的通風。從鄰近處所傳遞來的熱量會引起物質分解並隨之生成毒煙。應為分隔艙壁降溫。 醫療急救 參考經修訂《危險貨物事故醫療急救指南（MFAG）》。

硝酸銨基化肥（無危險的）

描述

乾時無黏性的晶體、顆粒或丸粒。全部或部分溶於水。

在本明細表中所述的條件下運輸的硝酸銨基化肥為勻質混合物，硝酸銨為其主要成分，其成分限度如下：

.1 硝酸銨不超過 70%，夾帶其他無機物質；

.2 硝酸銨不超過 80%，與碳酸鈣和（或）白雲石混合，以碳計算的可燃有機物質總量不超過 0.4%；

.3 氮類硝酸銨基化肥含硝酸銨和硫酸銨混合物，硝酸銨不超過 45%，以碳計算的可燃有機物質總量不超過 0.4%；和

.4 氮、磷酸鹽或鉀鹼的勻質硝酸銨化肥混合物，硝酸銨不超過 70%，以碳計算的可燃有機物質總量不超過 0.4%，或硝酸銨不超過 45%和不限量的可燃物質。在這些成分限度內的化肥，如果通過試驗槽試驗（參見《聯合國試驗和標準手冊》第 III 部分，第 38.2 小節）表明易於自續分解或按質量計硝酸鹽超量大於 10%，則不受本明細表的約束。

註：

1. 對混合物中存在硝酸銨分子當量的所有硝酸根離子，應作為硝酸銨計算。

2. 禁止運輸易於自熱以致引起分解反應的硝酸銨物質。

3. 化肥的氮磷鉀比例不得用作判斷其發生自續分解能力的準則，因為它取決於所含的化學品種類（參見《聯合國試驗和標準手冊》第 III 部分，第 38.2 小節）。

4. 此明細表只可用於在按照第 1 類的試驗系列 1 和 2 進行試驗時不顯示第 1 類爆炸特徵的物質（見《聯合國試驗和標準手冊》第 I 部分）。

5. 只有試驗證明硝酸銨化肥的化學和物理特性不符合任何類別的定義衡準時才可使用本明細表。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
27° 至 42°	1000 至 1200	0.83 至 1.00
尺寸	**類別**	**組別**
1 至 4 毫米	不適用	C

危險性

該貨物為非易燃或具有低失火危險。

儘管這種貨物被歸為無危險類，在遇到強熱時，它產生的現象與被歸為第 9 類的 UN 2071 硝酸銨化肥相同，分解並釋放有毒氣體。

分解反應速度較慢，但如果貨物遇到強熱，在貨物處所和甲板上會有出現毒煙的危險。

化肥粉塵可能對眼睛和黏膜有刺激性。

此貨物有吸濕性，受潮會結塊。

積載和隔離

在裝載前，應考慮無危險的硝酸銨基化肥與其他物質配載於同一貨物處所的兼容性。

與熱源或火源“隔離”（參考**裝載**一節）；

不得積載於鄰近任何含有加熱至 50°C 以上燃油的液艙和雙層底艙。

此類化肥應積載於不能直接接觸金屬機房限界面之處。例如，可以通過使用含有惰性材料的阻燃劑袋或經主管機關核准的等效隔板來做到。此要求不必適用於短途國際航行。

貨艙清潔程度

按貨物的危險性保持清潔和乾燥狀態。

天氣注意事項

該貨物須儘可能保持乾燥。該貨物不得在降水期間裝卸。在裝卸該貨物期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

裝載前，須遵守下列規定：

- 用以裝載該貨物的處所內的、除經認可的內在安全型電氣設備以外的電器設備，須通過除保險絲以外的合適手段在該處所外部的位置切斷電源。只要貨物還在船上，就須保持這種狀態。

- 須考慮到在出現火災時可能需要儘量打開艙蓋以提供最大通風量和在緊急情況下供水，以及貨物流態化給船舶穩性帶來的風險。

- 此外，如果發生分解，分解後剩餘的殘渣可能只有原貨物質量的一半。須充分考慮到質量損失對船舶穩性造成的影響。

裝載期間，須遵守下列規定：

不允許加燃油。除機艙外，在鄰近貨艙的處所不得泵送燃油。

注意事項

除非在緊急情況下，不得在貨物處所附近從事焊接、燃燒、切割或其他涉及使用火、明火、發出火花或電弧的設備作業。甲板上及貨艙嚴禁吸煙，貨物在船上時，須在甲板上張貼“禁止吸煙”標誌。只要該物質在船上，不得上緊貨艙蓋，以在緊急情況下能夠打開。

須採取適當預防措施以防該貨物的粉塵進入機器處所和起居處所。須防止貨物進入其處所的艙底污水井。須適當考慮設備的貨物粉塵防護。可能接觸該貨物粉塵的人員須戴護目鏡或其他等效的眼睛防塵保護用品和防塵口罩。那些人員須根據需要穿戴防護服。

通風

在航行期間，不得對裝運該貨物的貨物處所進行通風。

裝運

裝運該貨物的貨物處所的艙蓋須達到水密，以防水滲入。

在航行期間，須每天監測該貨物溫度並做好記錄，以發現導致自熱和缺氧的分解現象。

卸貨

不得泵吸或加裝燃油。如果貨物已變硬，必要時須平艙以避免形成懸空表面。

清掃

卸貨後，須檢查污水井和貨艙排水孔，須清除污水井和貨艙排水孔的任何堵塞物。

應急程序

需配備的專用應急設備 防護服（靴子、手套、工作服和防護帽）。 自給式呼吸器。
應急程序 穿防護服和佩戴自給式呼吸器。 火災時的應急行動 含有這種物質的貨物處所中的火災：打開艙口提供最大限度的通風。船舶的固定式氣體滅火將不夠用。使用大量的水。可以考慮水淹貨艙，並應充分考慮到船舶的穩性。 鄰近貨艙中的火災：打開艙口提供最大限度的通風。從鄰近處所傳遞來的熱量會引起物質分解並隨之生成毒煙。應為分隔艙壁降溫。 醫療急救 參考經修訂《危險貨物事故醫療急救指南（MFAG）》。

硫酸銨

描述

灰褐色至白色晶體。溶解於水。易流動。吸潮。水分含量 0.04%至 0.5%。具有氨味。重量易自然損耗。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
28° 至 35°	943 至 1052	0.95 至 1.06
尺寸	**類別**	**組別**
2 毫米至 4 毫米	不適用	C

危險性

粉塵對皮膚和眼睛有刺激性。吞咽有害。雖然該貨物被列入無危險性類別，但如果貨物處所結水珠，它可對構架、船殼板、艙壁等造成嚴重腐蝕。

該貨物為非易燃或具有低失火危險。

積載和隔離

沒有特別要求。

貨艙清潔程度

按貨物的危險性保持清潔和乾燥狀態。

天氣注意事項

該貨物須儘可能保持乾燥。該貨物不得在降水期間裝卸。在裝卸該貨物期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋。

裝載

裝卸時避免產生粉塵。裝卸期間適當考慮儘量減少粉塵的產生。按照《規則》第 4 和 5 節要求的有關規定進行平艙。

注意事項

須採取適當預防措施以防該貨物的粉塵進入機器處所和起居處所。須防止貨物進入其處所的艙底污水井。須適當考慮設備的貨物粉塵防護。可能接觸該貨物粉塵的人員須戴護目鏡或其他等效的眼睛防塵保護用品和防塵口罩。那些人員須根據需要穿戴防護服。

通風

在航行期間，不得對裝運該貨物的貨物處所進行通風。

裝運

沒有特別要求。

卸貨

如果貨物已變硬，須根據需要進行平艙以避免形成懸空表面。

清掃

卸下該貨物後，船艙應徹底清掃和沖洗，以消除所有貨物痕跡並乾燥，但擬裝貨物與所卸貨物硫酸銨有相同的散裝貨物船運名者除外。

銻礦和銻礦渣

描述

鉛灰色金屬，黑色無光澤。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	2381 至 2941	0.34 至 0.42
尺寸	**類別**	**組別**
不適用	不適用	C

危險性

該貨物為非易燃或具有低失火危險。

如果遇火，會釋放危險的銻和硫磺氧化物煙霧。

積載和隔離

沒有特別要求。

貨艙清潔程度

沒有特別要求。

天氣注意事項

沒有特別要求。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

由於該貨物密度極高，除非貨物在艙底均勻鋪開以使重量平均分佈，否則艙底可能會受力過度。在航行和裝載期間，須適當注意確保不要把貨物堆起而使艙底受力過度。

注意事項

須採取適當預防措施以防該貨物的粉塵進入機器處所和起居處所。須防止貨物進入其處所的艙底污水井。須適當考慮設備的貨物粉塵防護。可能接觸該貨物粉塵的人員須根據需要穿戴防護服、護目鏡或其他等效的眼睛防塵保護用品和防塵口罩。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

沒有特別要求。

亞硝酸鋇 UN 1446

描述

有光澤的白色晶體或粉末。溶解於水。

特性

靜止角	散貨密度（kg/m³）		積載因數（m³/t）
不適用	—		—
尺寸	類別	副風險	組別
細粉	**5.1**	6.1	B

危險性

吞咽或吸入粉塵有毒。如受易燃物質混合物失火的株連，容易被點燃並猛烈燃燒。

積載和隔離

與食品“隔離”。

貨艙清潔程度

按貨物的危險性保持清潔和乾燥狀態。

天氣注意事項

沒有特別要求。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

注意事項

須採取適當預防措施以防該貨物的粉塵進入機器處所和起居處所。須防止貨物進入其處所的艙底污水井。須適當考慮設備的貨物粉塵防護。可能接觸該貨物粉塵的人員須戴護目鏡或其他等效的眼睛防塵保護用品和防塵口罩。那些人員須根據需要穿戴防護服。

污水井須保持清潔、乾燥並適當遮蓋以防止貨物進入。

通風

在航行期間，須根據需要僅對貨物表面進行自然或機械通風。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

沒有特別要求。

應急程序

需配備的專用應急設備 防護服（手套、靴子、工作服和防護帽）。自給式呼吸器。 噴嘴。
應急程序 穿防護服和佩戴自給式呼吸器。 **火災時的應急行動** 用大量的水，最好使用噴霧的形式以避免擾動物質表面。物質可能熔化或溶化；在該條件下使用水可以導致溶化的物質大範圍的散落。氣封或用二氧化碳不能控制火勢。應充分考慮到由於積水而對船舶穩性的影響。 **醫療急救** 參考經修訂的《危險貨物事故醫療急救指南（MFAG）》。

重晶石

描述

結晶狀礦石。鋇的硫酸鹽。水分 1%至 6%。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	2941	0.34
尺寸	**類別**	**組別**
80%塊：6.4 毫米至 101.6 毫米 20%細粉：小於 6.4 毫米	不適用	C

危險性

沒有特別危險性。

該貨物為非易燃或具有低失火危險。

積載和隔離

沒有特別要求。

貨艙清潔程度

沒有特別要求。

天氣注意事項

沒有特別要求。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

由於該貨物密度極高，除非貨物在艙底均勻鋪開以使重量平均分佈，否則艙底可能會受力過度。在航行和裝載期間，須適當注意確保不要把貨物堆起而使艙底受力過度。

注意事項

須採取適當預防措施以防該貨物的粉塵進入機器處所和起居處所。須防止貨物進入其處所的艙底污水井。須適當考慮設備的貨物粉塵防護。可能接觸該貨物粉塵的人員須根據需要穿戴防護服、護目鏡或其他等效的眼睛防塵保護用品和防塵口罩。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

沒有特別要求。

鋁土礦

描述

一種棕黃色黏土狀及土狀礦物。水分含量：0%至 10%。不溶解於水。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	1190 至 1389	0.72 至 0.84
尺寸	**類別**	**組別**
塊佔 70%至 90%，粒徑為： 2.5 毫米至 500 毫米 粉末佔 10%至 30%	不適用	C

危險性

沒有特別危險性。

該貨物為非易燃或具有低失火危險。

積載和隔離

沒有特別要求。

貨艙清潔程度

沒有特別要求。

天氣注意事項

沒有特別要求。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

注意事項

污水井須保持清潔、乾燥並適當遮蓋以防貨物進入。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

沒有特別要求。

生物淤泥

描述

烘乾的活性淤泥。非常細的顆粒。水分：3%至 5%。顏色：間雜黑色。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	654	1.53
尺寸	**類別**	**組別**
不適用	不適用	C

危險性

沒有特別危險性。

該貨物為非易燃或具有低失火危險。

積載和隔離

沒有特別要求。

貨艙清潔程度

沒有特別要求。

天氣注意事項

沒有特別要求。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

注意事項

須採取適當預防措施以防該貨物的粉塵進入機器處所和起居處所。須防止貨物進入其處所的艙底污水井。須適當考慮設備的貨物粉塵防護。可能接觸該貨物粉塵的人員須根據需要穿戴防護服、護目鏡或其他等效的眼睛防塵保護用品和防塵口罩。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

沒有特別要求。

硼砂（五水合物原礦）

描述

一種硼酸和碳酸鈉的化合物。易流動粉末或顆粒。灰色。易生粉塵。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	1087	0.92
尺寸	**類別**	**組別**
最大 2.36 毫米	不適用	C

危險性

沒有特別危險性。

該貨物為非易燃或具有低失火危險。

該貨物具有吸濕性，受潮會結塊。

積載和隔離

沒有特別要求。

貨艙清潔程度

沒有特別要求。

天氣注意事項

該貨物須儘可能保持乾燥。該貨物不得在降水期間裝卸。在裝卸該貨物期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

注意事項

須採取適當預防措施以防該貨物的粉塵進入機器處所和起居處所。須防止貨物進入其處所的艙底污水井。須適當考慮設備的貨物粉塵防護。可能接觸該貨物粉塵的人員須根據需要穿戴防護服、護目鏡或其他等效的眼睛防塵保護用品和防塵口罩。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

如果貨物已變硬，須根據需要進行平艙以避免形成懸空表面。

清掃

沒有特別要求。

無水硼砂（原礦或經提純的）

描述

原礦一般為黃白色。經高度提純後呈白色晶狀。易揚塵和吸濕。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
35°	1282	0.78
尺寸	**類別**	**組別**
顆粒小於 1.4 毫米	不適用	C

危險性

粉塵的腐蝕性強及有刺激性，但吸入後無毒。

該貨物為非易燃或具有低失火危險。

該貨物具有吸濕性，受潮會結塊。

積載和隔離

沒有特別要求。

貨艙清潔程度

沒有特別要求。

天氣注意事項

沒有特別要求。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

注意事項

須採取適當預防措施以防該貨物的粉塵進入機器處所和起居處所。須防止貨物進入其處所的艙底污水井。須適當考慮設備的貨物粉塵防護。可能接觸該貨物粉塵的人員戴護目鏡或其他等效的眼睛防塵保護用品和防塵口罩。那些人員須根據需要穿着防護服。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

如果貨物已變硬，須根據需要進行平艙以避免形成懸空表面。

清掃

沒有特別要求。

褐煤磚

描述

褐煤（Lignite）磚的製造過程是把乾煤粒壓入壓縮磚體中。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	750	1.34
尺寸	**類別**	**組別**
主要部分小於 50 毫米	MHB	B

危險性

褐煤磚易點燃，易自燃並將消耗貨物處所的氧氣。

積載和隔離

參見本明細表的附錄。

貨艙清潔程度

按貨物的危險性保持清潔和乾燥狀態。先前貨物板條須清除出貨艙。

天氣注意事項

沒有特別要求。

裝載

參見本明細表的附錄。

注意事項

須採取適當預防措施以防該貨物的粉塵進入機器處所和起居處所。須防止貨物進入其處所的艙底污水井。須適當考慮設備的貨物粉塵防護。可能接觸該貨物粉塵的人員須根據需要穿戴防護服、護目鏡或其他等效的眼睛防塵保護用品和防塵口罩。

通風

在航行期間，不得對裝運該貨物的貨物處所進行通風。參見本明細表的附錄。

裝運

參見本明細表的附錄

卸貨

參見本明細表的附錄。

清掃

卸貨後，須檢查污水井和貨艙排水孔，須清除污水井和貨艙排水孔的任何堵塞物。

應急程序

需配備的專用應急設備 無
應急程序 無 火災時的應急行動 封艙。排出空氣也許足夠能控制火災。**不要用水**。向專家請教並考慮向最近的合適港口航行。 醫療急救 參考經修訂的《危險貨物事故醫療急救指南（MFAG）》。

備註：

只有火災明顯時才能使用二氧化碳或惰性氣體（如果裝有的話）。

附錄

褐煤磚

危險性

1. 該貨物易於點燃，易自燃並消耗貨艙中的氧氣。

2. 該貨物易於氧化，因而能消耗貨物處所中的氧氣並增加貨艙的二氧化碳含量（亦見第 3 節）。

3. 該貨物易於自熱，從而導致貨物在貨艙中自燃。在發生自燃時，會釋放出包括一氧化碳在內的易燃和有毒氣體。一氧化碳是一種無味氣體，比空氣略輕，在空氣中的燃燒極限為 12%至 75%（體積）。吸入該氣體後會中毒，它與血紅蛋白的親和力要比氧高出 200 倍。暴露在一氧化碳內的建議閾值（TLV）為 50 ppm。

積載和隔離

1. 裝載這些貨物的貨物處所艙壁須防火和防液。

2. 該貨物須與第 1（第 1.4 分類）、2、3、4 和 5 類包裝貨物“隔離”（見《國際海運危險貨物規則》）並與第 4 和 5.1 類固體散裝貨物“隔離”。

3. 禁止在該貨物上方或下方積載第 5.1 類包裝貨物或者第 5.1 類固體散裝貨物。

4. 該貨物須與除 1.4 類以外的第 1 類貨物“用一整個艙室或貨艙縱向隔離”。

5. 該貨物不得靠近熱區域積載。

註：有關隔離術語的解釋見第 9 節。

裝載

1. 裝載前，託運人或其指定的代理須以書面形式向船長提供貨物的特性和建議性的貨物安全裝載及運輸程序。在貨物合同中須至少列明水分含量、含硫量及型號。

2. 在裝載前，該貨物須存放 7 天。這樣能大大降低其在以後運輸、積載和裝卸過程中發生自燃的危險性。

3. 在裝載該貨物前，船長須確保做到：

   3.1 對貨物處所的露天甲板封閉裝置進行檢查以確保其完好。該裝置在開始裝載前應關閉並密封；

   3.2 貨艙和毗鄰的圍閉貨物處所內的所有電纜和電器設備應無缺陷，電纜和電器設備在易燃和（或）粉塵環境下或在完全隔離時能夠安全使用；若機艙與貨物處所是由一氣密艙壁分隔並無直接通道，本款規定不必適用於機艙。

4. 在貨物區域及毗鄰的處所內禁止吸煙和使用明火，並在明顯的位置張貼適當的警告標識。禁止在貨艙附近或其他毗鄰的處所進行燃燒、切割、鏟鑿、焊接或其他構成火源的作業。

5. 為了儘量減少灰塵和粉塵的產生，在裝載期間不得在超過一米高處向下投放該貨物。

6. 如果可能，須在獨立貨艙中進行連續的裝卸作業。艙口敞開超過六天（或在 30°C 以上的天氣裏少於六天），艙內有可能形成熱點。

7. 離港開航前，須對貨物表面進行合理平艙至貨物處所邊界，並達到船長的滿意的水平，以免產生氣穴並防止空氣滲入磚體。進入

貨物處所的通道應充分密封。託運人須確保船長能得到裝貨碼頭的必要合作。

8. 各自獨立的貨艙在裝載後須儘快關閉並密封。

注意事項

1. 船舶須有適當裝備並配備適當的儀器以便不需進入貨物處所就能測定下列數據：

.1 在貨物和敞開的貨物處所圍閉處，甲烷的濃度；

.2 在貨物上方的氧氣濃度；

.3 在貨物上方空氣中的一氧化碳濃度；

.4 貨艙艙底水樣的 pH 值。

這些儀器須定期檢修和校準。船上人員須接受使用這些儀器的培訓。

2. 建議船舶配備貨物溫度測量儀，量程為 0°C 至 100°C，以便在航行過程中不需進入貨物處所就可以監測貨物的溫度。

裝運

1. 須儘可能確保貨物產生的任何氣體不會積聚在毗鄰的封閉處所內，例如：儲藏室、木工房、通道、軸隧等。這些處所須充分通風並定期監測甲烷、氧氣和一氧化碳的含量。

2. 在航行途中，除非在緊急情況下，絕對不可打開艙蓋或進行貨艙通風。

3. 須對每個貨艙中貨物上方空間的空氣中甲烷、氧氣及一氧化碳的含量進行定期監測。

4. 監測的頻率須根據託運人提供的數據及對貨物處所內空氣的分析獲得的數據確定。至少每天須記錄測定值，而且每天測定的時間須儘可能相同。託運人可以要求測定數據的次數更加頻繁，尤其是在有證據表明，航行途中貨物出現了明顯的自熱時。

5. 下列問題須予以考慮：

5.1 在封閉的艙內，氧氣濃度在幾天內將從最初的 21%下降並穩定在 6%至 15%的水平上。如果氧氣濃度沒有降到 20%以下，或者最初下降之後又迅速上升，則貨艙可能沒有充分密封並且存在自燃的危險。

5.2 在一個安全、封閉良好的艙室內，一氧化碳將會上升到一定的濃度並在 200 至 2000 ppm 之間波動。如果在 24 小時內，褐煤磚貨艙內一氧化碳的含量迅速增加約 1000 ppm，尤其是伴有甲烷含量的增加，則表明可能發生了自燃。

5.3 甲烷成分在褐煤磚貨物中所佔比例通常很低，不到 5 ppm 且不會構成危險。但是，如果出現甲烷含量突然增加，濃度高於 10 ppm，則表明艙內發生了自燃。

5.4 在封閉完好的貨艙中的褐煤磚貨物溫度通常保持高出海水溫度 5 至 10°C，這一溫度的增加是由於通常貨艙內吸入少量的空氣，使褐煤磚產生一定的熱量而致。關鍵的是檢查貨艙密封條以儘量減少空氣滲入。在 24 小時內溫度迅速增加大約 20°C 可證明貨物已自燃。

6. 通常須系統地對艙底水進行定期試驗，如果 pH 值監測表明存在腐蝕性危險，船長須確保在航行途中所有的艙底保持乾燥，以避免內底和艙底污水系統內可能積聚酸液。

7. 如果航行途中貨物的某些變化情況與貨物申報單上所列內容不同，則船長須將不同之處通知託運人。這些報告將使託運人能夠對該貨物的變化情況作好記錄，從而根據運輸經驗，重新審查向船長提供的有關信息。

8. 如果船長擔心貨物有自熱或自燃的跡象，例如上述甲烷、一氧化碳或氧氣的濃度增加或溫度升高，則須採取下列措施：

8.1. 諮詢裝貨港船方的代理人。立即通知公司指定的岸上負責人。

8.2. 查驗貨艙封條，必要時重新加封。

8.3. 除非船長認為事關船舶及人員性命，否則禁止人員進入貨艙內以及打開艙蓋。在人員從貨艙出來後，應立即將貨艙重新加封。

8.4. 在可行時，增加氣體成分及貨物溫度的監測次數。

8.5. 儘快將下列信息送達船舶所有人或裝貨港代理，以便獲得專家的建議：

.1 所涉及艙室的數目；

.2 一氧化碳、甲烷和氧氣含量的監測結果；

.3 如果可能，貨物的溫度、位置和取得結果所用的測量方法；

.4 進行氣體分析的時間（日常監測）；

.5 所涉及的貨艙內褐煤磚的數量；

.6 託運人的申報單中提供的貨物描述及申報單中列明的任何特別注意事項；

.7 裝載日期及在預計到達下一個預定卸貨港口（須具體指定）的時間（ETA）；和

.8 船長認為必要的其他評論或意見。

卸貨

在卸貨前及卸貨過程中：

1. 貨物艙蓋須在卸貨開始前一直保持關閉。可用細霧狀水噴灑貨物以減少粉塵。

2. 在未檢測貨艙中空氣之前，人員不得進入貨艙。如果空氣中的含氧量低於 21%，須佩戴自給式呼吸器。還須測試貨艙中二氧化碳和一氧化碳的含量。一氧化碳的建議閾限值（TLV）為 50 ppm。

3. 在卸貨過程中，須注意貨物中出現的熱點跡象（例如蒸汽），如果發現熱點，須用細霧狀水噴射熱點，以便立即除去熱點，以防止其擴散。將產生熱點的貨物在碼頭上遠離其他貨物鋪散開。

4. 如果卸貨間隔超過八小時，須關閉艙蓋和所有其他通風設備。

褐煤磚貨物的氣體監測程序

1 注意事項

1.1 如果根據以下程序對一氧化碳進行監測，將會及早測定出該貨物自熱的可靠情況。這樣就可以及時考慮預防措施。如果在貨艙內

探測出其一氧化碳含量急速上升，特別是如果伴隨甲烷含量的增加，這是正在發生自熱的確證。

1.2 從事該貨物運輸的所有船舶均須攜帶監測甲烷、氧氣和一氧化碳氣體濃度的測試儀器，從而能夠監測貨艙中的空氣。這類儀器須按照製造商的規定進行定期保養和校準。在未進行通風的貨艙中常出現的含氧量較低的貨物處所中測定甲烷含量時，須注意對測定值的解釋。通常用於測定甲烷含量的催化傳感器的精度有賴充分的氧氣含量。這一現象不影響一氧化碳含量的測定，也不影響利用紅外線傳感器測定甲烷含量。可從儀器生產廠家取得進一步的指導。

2 採樣和測試程序

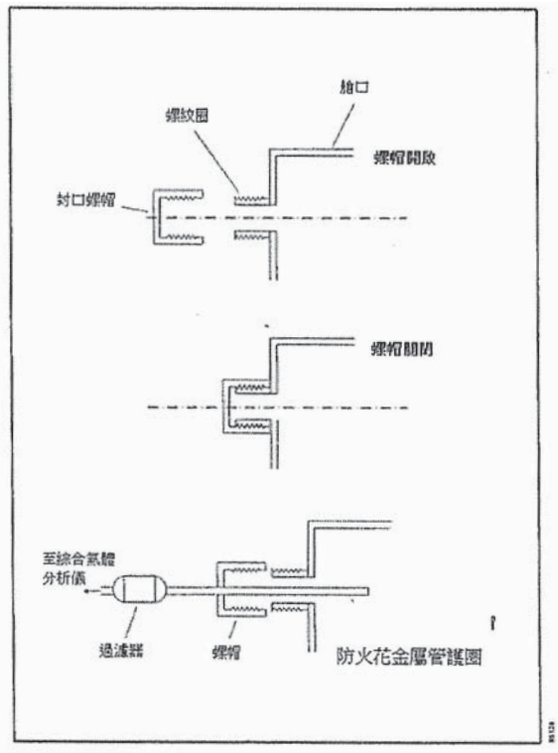
2.1 設備

2.1.1 要求船上裝配一部能測定甲烷、氧氣和一氧化碳含量的儀器。該儀器須裝有吸氣管、軟管和一節防火花金屬管，以便能從艙內採集出具有代表性的樣本。

2.1.2 如製造商的建議，須使用過濾器防止水汽進入儀器中。即使小量水汽存在也會影響測量精度。

2.2 採樣點的確定

2.2.1 為了得到艙內貨煤狀態的有意義資料，各貨艙的每次測量須在同一點處進行。但是，為了保證在惡劣天氣中進行測量的靈活性，每一艙內均須設兩個測量點，一個在艙蓋的左側，另一個在艙蓋的右側（參見氣體測量點的示意圖）。測量可在兩個測量點中的任何一個進行。



氣體採樣點的示意圖

2.2.2 每一採樣點須為直徑約 12 毫米的測量孔構成，並且儘可能靠近艙口圍板的頂部。測量孔螺帽須封緊以防海水和空氣進入。關鍵的是每次測量後，須將螺帽及時更換，以保持貨物處所密封。

2.2.3 任何採樣點的提供不得損害船舶適航性。

2.3 測量

測量程序的解釋如下：

.1 擰下密封螺帽，將剛性管子插入取樣點，上緊連接帽並確保充分密封；

.2 將測量儀與取樣管子連接好；

.3 用吸氣管從測量孔中吸出貨艙空氣樣品，直到獲得穩定讀數；

.4 將測量結果填入表中，並記錄每次測量的相應艙號、日期和時間。

.5 擰緊密封螺帽。

硝酸鈣 UN 1454

描述

白色吸濕的固體，溶解於水。本規則的規定不適用於主要由複鹽（硝酸鈣和硝酸銨）組成並且含硝酸銨不超過 10%和結晶水至少 12%的商品級硝酸鈣化肥。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	893 至 1099	0.91 至 1.12
尺寸	**類別**	**組別**
不適用	5.1	B

危險性

非易燃物質。如果遇到火，會強烈加劇易燃物的燃燒。儘管本身不易燃，但與易燃物質形成的混合物易於點燃並猛烈燃燒。

該貨物易吸濕，受潮會結塊。

該貨物吞咽有害。

積載和隔離

與食品“隔離”。

貨艙清潔程度

按貨物的危險性保持清潔和乾燥狀態。

天氣注意事項

該貨物須儘可能保持乾燥。該貨物不得在降水期間裝卸。在裝卸該貨物期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋。

裝載

須採取適當措施以防貨物與易燃物質接觸。

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

注意事項

污水井須保持清潔、乾燥和適當遮蓋以防止貨物進入。

通風

在航行期間，不得對裝運該貨物的貨物處所進行通風。

裝運

沒有特別要求。

卸貨

如果貨物已變硬，須根據需要進行平艙以避免形成懸空表面。

清掃

沒有特別要求。

應急程序

需配備的專用應急設備 防護服（手套、靴子、工作服和防護帽）。自給式呼吸器。 噴嘴。
應急程序 穿防護服和佩戴自給式呼吸器。 火災時的應急行動 用大量的水，最好使用噴霧的形式以避免擾動物質表面。物質可能熔化或溶化；在該條件下使用水可以導致溶化的物質大範圍的散落。氣封或用二氧化碳不能控制火勢。應充分考慮到由於積水而對船舶穩性的影響。 醫療急救 參考經修訂的《危險貨物事故醫療急救指南（MFAG）》。

硝酸鈣化肥

描述

呈粒狀，主要由複鹽（硝酸鈣和硝酸銨）構成，總含氮量不超過15.5%，含水量至少 12%。總含氮量超過 15.5%或含水量低於 12%以下時，參考硝酸鈣 UN 1454。

特性

靜止角	散貨密度（kg/m³）	積載因數（m³/t）
34°	1053 至 1111	0.90 至 0.95
尺寸	**類別**	**組別**
1 毫米至 4 毫米	不適用	C

危險性

沒有特別要求。

該貨物為非易燃或具有低失火危險。

積載和隔離

與食品“隔離”。

貨艙清潔程度

按貨物的危險性保持清潔和乾燥狀態。

天氣注意事項

該貨物須儘可能保持乾燥。該貨物不得在降水期間裝卸。在裝卸該貨物期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

注意事項

沒有特別要求。

通風

在航行期間，不得對裝運該貨物的貨物處所進行通風。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

沒有特別要求。

碳化硅

描述

一種碳和硅的堅硬黑色晶體化合物。無味。無水分含量。

特性

靜止角	散貨密度（kg/m³）	積載因數（m³/t）
不適用	1786	0.56
尺寸	**類別**	**組別**
大塊佔 75%：203.2 毫米以下 小塊佔 25%：12.7 毫米以下	不適用	C

危險性

吸入會輕微中毒。

該貨物為非易燃或具有低失火危險。

積載和隔離

沒有特別要求。

貨艙清潔程度

沒有特別要求。

天氣注意事項

沒有特別要求。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

注意事項

對機器、起居處所和設備作防塵保護。參與貨物裝卸的人員應穿戴防護服和防塵過濾口罩。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

沒有特別要求。

蓖麻籽或

蓖麻粉或

蓖麻油渣或

蓖麻片 UN 2969

描述

榨過油的蓖麻籽。

特性

靜止角	散貨密度（kg/m³）	積載因數（m³/t）
不適用	—	—
尺寸	**類別**	**組別**
不適用	9	B

危險性

含有能引起強烈過敏的物質，某些人吸入粉塵或與碎蓖麻籽接觸會對皮膚、眼睛和黏膜引起強烈的刺激。攝入也會中毒。

積載和隔離

與食品和氧化物（有包裝的貨物及固體散裝物質）“隔離”。

貨艙清潔程度

沒有特別要求。

天氣注意事項

沒有特別要求。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

注意事項

須適當注意防止粉塵進入起居處所和工作區。蓖麻粉、蓖麻油渣和蓖麻片不得散裝運輸。

須採取適當預防措施以防該貨物的粉塵進入機器處所和起居處所。須防止貨物進入其處所的艙底污水井。須適當考慮設備的貨物粉塵防護。可能接觸該貨物粉塵的人員須戴護目鏡或其他等效的眼睛防塵保護用品和防塵口罩。那些人員須根據需要穿戴防護服。

通風

在航行期間，須根據需要僅對貨物表面進行自然或機械通風。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

卸貨後，貨艙須徹底清潔並沖洗掉所有貨物殘餘。

應急程序

需配備的專用應急設備 防護服（手套、靴子、工作服、防護帽）。自給式呼吸器。噴霧嘴。
應急程序 穿防護服及佩戴自給式呼吸器。 火災時的應急行動 封艙。使用船上固定式滅火裝置（如果適用）。氣封能有效地控制火勢。 醫療急救 參考經修訂的《危險貨物事故醫療急救指南（MFAG）》。

水泥

描述

水泥是一種在含空氣或受到嚴重擾動時幾乎具有流動性的粉末，因此使其具有非常小的靜止角。在裝載完成之後幾乎立刻出現脫氣，該貨品沉降後穩定成堆。如果船舶不是專門設計的水泥運輸船，或者岸上設備沒有安裝專門的粉塵控制設備，水泥粉塵是裝載和卸貨期間關心的主要問題。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	1000 至 1493	0.67 至 1.00
尺寸	**類別**	**組別**
達 0.1 毫米	不適用	C

危險性

含空氣時會流動。

該貨物為非易燃或具有低失火危險。

積載和隔離

沒有特別要求。

貨艙清潔程度

按貨物的危險性保持清潔和乾燥狀態。

天氣注意事項

該貨物須儘可能保持乾燥。該貨物不得在降水期間裝卸。在裝卸該貨物期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋。

裝載

在裝載此貨物時，船舶須保持垂直。貨物須平艙至貨艙邊緣，使其貨物表面角度與水平面的夾角不超過 25 度。水泥的比重和靜止角均取決於貨物的空氣含量。水泥從含空氣到不含空氣體積收縮約 12%。在沉降前，該貨物體現出流動狀態。運載該貨物的船舶不得在貨物沉降前啟航。水泥沉降後，若其表面與水平面的夾角不超過 30º，則不太可能發生移動。

注意事項

須採取適當預防措施以防該貨物的粉塵進入機器處所和起居處所。須防止貨物進入其處所的艙底污水井。須適當考慮設備的貨物粉塵防護。可能接觸該貨物粉塵的人員須根據需要穿戴防護服、護目鏡或其他等效的眼睛防塵保護用品和防塵口罩。污水井須保持清潔、乾燥和適當遮蓋以防止貨物進入。

通風

在航行期間，不得對裝運該貨物的貨物處所進行通風。

裝運

貨物裝完後，必要時須密封貨艙蓋。在航行期間，須關閉所有排氣孔和貨艙進出通道。不得在沒有採取特別措施時泵排水泥艙的污水。

卸貨

沒有特別要求。

清掃

就清洗貨物殘留物來說，在沖洗前，貨艙和與貨物接觸的其他結構及設備須徹底清掃並且清除所有粉塵。須特別注意污水井和艙內框架。不得使用固定式污水泵沖洗貨艙，因為水泥將會使污水系統無法使用。

水泥燒結塊

描述

水泥是由含黏土的石灰岩焙燒而成的。焙燒產生粗糙的渣塊隨後壓碎成細粉生產出水泥。粗糙的渣塊叫做熔碴並以此種狀態運輸，從而避免運載水泥粉的困難。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	1190 至 1639	0.61 至 0.84
尺寸	**類別**	**組別**
0 毫米至 40 毫米	不適用	C

危險性

沒有特別危險性。

該貨物為非易燃或具有低失火危險。

積載和隔離

沒有特別要求。

貨艙清潔程度

按貨物的危險性保持清潔和乾燥狀態。

天氣注意事項

該貨物須儘可能保持乾燥。該貨物不得在降水期間裝卸。在裝卸該貨物期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

注意事項

須採取適當預防措施以防該貨物的粉塵進入機器處所和起居處所。須防止貨物進入其處所的艙底污水井。須適當考慮設備的貨物粉塵防護。可能接觸該貨物粉塵的人員須根據需要穿戴防護服、護目鏡或其他等效的眼睛防塵保護用品和防塵口罩。污水井須保持清潔、乾燥和適當遮蓋以防止貨物進入。

通風

在航行期間，不得對裝運該貨物的貨物處所進行通風。

裝運

卸貨完成後，須密封貨艙蓋。在航行期間，須關閉所有排氣孔和通向貨艙的進出通道。不得在沒有採取特別措施前泵排水泥艙的污水。

卸貨

沒有特別要求。

清掃

就清洗貨物殘留物而言，在沖洗前，貨艙和與貨物接觸的其他結構及設備須徹底清掃並且清除所有粉塵。

耐火黏土

描述

經焙燒的黏土。灰色。運輸時呈碎石狀。用於煉鋅及製造耐火磚（鋪路碎石）。有粉塵。

特性

靜止角	散貨密度（kg/m³）	積載因數（m³/t）
不適用	667	1.50
尺寸	**類別**	**組別**
達 10 毫米	不適用	C

危險性

沒有特別危險性。

該貨物為非易燃或具有低失火危險。

積載和隔離

沒有特別要求。

貨艙清潔程度

沒有特別要求。

天氣注意事項

沒有特別要求。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

注意事項

須採取適當預防措施以防該貨物的粉塵進入機器處所和起居處所。須防止貨物進入其處所的艙底污水井。須適當考慮設備的貨物粉塵防護。可能接觸該貨物粉塵的人員須根據需要穿戴防護服、護目鏡或其他等效的眼睛防塵保護用品和防塵口罩。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

沒有特別要求。

木炭

描述

木材在儘可能缺少空氣的狀態下經高溫燃燒。非常易產生粉塵的輕貨物。能吸收自身重量 18%至 70%的水分。黑色粉末或顆粒。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	199	5.02
尺寸	**類別**	**組別**
—	MHB	B

危險性

可能自燃。與水接觸會自熱。可造成貨物處所缺氧。超過 55°C 的熱木炭篩屑不應裝船。

積載和隔離

隔離要求同第 4.1 類危險品。與含油類物質“隔離”。

貨艙清潔程度

按貨物的危險性保持清潔和乾燥狀態。

天氣注意事項

該貨物須儘可能保持乾燥。該貨物不得在降水期間裝卸。在裝卸該貨物期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

注意事項

不得散裝運輸屬於第 4.2 類的木炭。在裝運前，木炭須在露天存放不少於 13 天。在裝載前，廠商或託運人須向船長提供一份證書，證明根據主管機關認可的試驗結果，所託運的貨物不屬於第 4.2 類危險貨物。此證書還須說明木炭已在露天存放不少於 13 天。僅在木炭的水分含量不高於 10%時才可接收裝貨。

須採取適當預防措施以防該貨物的粉塵進入機器處所和起居處所。須防止貨物進入其處所的艙底污水井。須適當考慮設備的貨物粉塵防護。可能接觸該貨物粉塵的人員須根據需要穿戴防護服、護目鏡或其他等效的眼睛防塵保護用品和防塵口罩。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

沒有特別要求。

應急程序

需配備的專用應急設備 無
應急程序 無 火災時的應急行動 封艙。使用船上的固定式滅火裝置（如果裝有的話）。氣封能有效地控制火勢。 醫療急救 參考經修訂的《危險貨物事故醫療急救指南（MFAG）》。

塊狀橡膠和塑料絕緣體

描述

塑料和橡膠絕緣材料，清潔，不含其他材質，成顆粒狀。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	500-570	1.76-1.97
尺寸	**類別**	**組別**
顆粒 1 至 4 毫米	不適用	C

危險性

沒有特別危險性。

該貨物為非易燃或具有低失火危險。

積載和隔離

沒有特別要求。

貨艙清潔程度

沒有特別要求。

天氣注意事項

沒有特別要求。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

注意事項

在裝卸和裝運期間，不允許在裝有該貨物的處所附近做熱工、燃燒和吸煙。在船運前，須由託運人向船長提交一份證書，證明該貨物僅由乾淨的橡膠材料構成。若開始裝載與完成卸貨之間的預定間隔期超過5天，除非在配備固定式氣體滅火系統的貨物處所中裝載該貨物，否則不得裝運。如果主管機關認為從開始裝載到完成卸貨的計劃航程不超過5天，它可免除在裝運該貨物的處所中配備固定式氣體滅火系統的要求。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

沒有特別要求。

鉻礦顆粒

描述

顆粒狀。水分含量：最大可達 2%。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	1667	0.6
尺寸	**類別**	**組別**
8 至 25 毫米	不適用	C

危險性

沒有特別危險性。

該貨物為非易燃或具有低失火危險。

積載和隔離

沒有特別要求。

貨艙清潔程度

沒有特別要求。

天氣注意事項

沒有特別要求。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

注意事項

沒有特別要求。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

沒有特別要求。

鉻礦石

描述

精礦或塊狀的，深灰色。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	2222 至 3030	0.33 至 0.45
尺寸	**類別**	**組別**
最大達 254 毫米	不適用	C

危險性

吸入粉塵有毒。

該貨物為非易燃或具有低失火危險。

積載和隔離

沒有特別要求。

貨艙清潔程度

沒有特別要求。

天氣注意事項

沒有特別要求。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

由於該貨物密度極高，除非貨物在艙底均勻鋪開以使重量平均分佈，否則艙底可能會受力過度。在航行和裝載期間，須適當注意確保不要把貨物堆起而使艙底受力過度。

注意事項

須採取適當預防措施以防該貨物的粉塵進入機器處所和起居處所。須防止貨物進入其處所的艙底污水井。須適當考慮設備的貨物粉塵防護。可能接觸該貨物粉塵的人員須戴護目鏡或其他等效的眼睛防塵保護用品和防塵口罩。那些人員須根據需要穿着防護服。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

沒有特別要求。

黏土

描述

黏土通常為淺灰至深灰色，並包含 10%軟塊和 90%軟晶粒。此類物質經常是潮濕的但接觸並不濕。水分含量可達 25%。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	746 至 1515	0.66 至 1.34
尺寸	**類別**	**組別**
最大達 150 毫米	不適用	C

危險性

沒有特別危險性。

該貨物為非易燃或具有低失火危險。

積載和隔離

沒有特別要求。

貨艙清潔程度

沒有特別要求。

天氣注意事項

該貨物須儘可能保持乾燥。不得在降水期間裝卸。在裝卸該貨物期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

注意事項

該貨物的水分含量須儘可能保持在低水平，以防止貨物變黏並因此極難裝卸。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

沖洗貨物殘留物之前，須清理貨物處所的污水井。

煤

（亦見本表的附錄）

描述

煤（瀝青質的及無煙的）是一種包含非晶質碳和碳氫化合物的天然、固體、易燃物質。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	654 至 1266	0.79 至 1.53
尺寸	**類別**	**組別**
最大達 50 毫米	MHB	B（和 A）

危險性

煤會產生易燃的氣體，會自熱，會消耗氧氣濃度，會腐蝕金屬結構。如果小於 5 毫米的細粉煤佔 75%，能流態化。

積載和隔離

參考此表的附錄。

貨艙清潔程度

按貨物的危險性保持清潔和乾燥狀態。

天氣注意事項

如果貨物的水分含量超過運輸含水量極限，而且不是在專門建造或配備的、符合《規則》第 7.3.2 小節要求的船舶中運輸，該貨物可能在航行途中流態化。所以，須遵守以下規定：

.1 航行期間須將貨物的含水量保持在運輸含水量極限以下；

.2 除非在本明細表中有明確規定，不得在降水期間裝卸；

.3 除非在本明細表中有明確規定，在貨物裝卸期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋；

.4 如果貨物的實際含水量小於運輸含水量極限，足以使實際含水量不會由於降水而可能超過運輸含水量極限，則可以在降水期間裝卸；

.5 如果貨艙中的全部貨物將在一個港口中卸完，可以在降水期間卸下貨艙中的貨物。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

如果不進行合理平艙，煤體中會形成垂直裂縫，使氧氣可以循環並可能自熱。

注意事項

確保污水井清潔、乾燥並適當蓋好，以防止貨物進入。參考此表的附錄。

通風

參考本表附件的特別注意事項。

裝運

參考本表的附錄。

卸貨

沒有特別要求。

清掃

沒有特別要求。

應急程序

需配備的專用應急設備 無
應急程序 無 火災時的應急行動 封艙。氣封可以足夠控制火災。**不要用水。**徵求專家意見並考慮向最近港口航行。 醫療急救 參考經修訂的《危險貨物事故醫療急救指南（MFAG）》。

備註：

只有火災明顯時才能使用二氧化碳或惰性氣體（如果裝有的話）。

附錄

煤

特性和特點

1. 煤會產生可燃氣體甲烷。甲烷含量在 5%至 16%的甲烷/空氣混合氣體即為可爆氣體，能被火花或明火點燃，例如電火花、摩擦火花、燃着的火柴或香煙。甲烷比空氣輕，因此會積存於貨物處所或其他封閉處所上方。如果貨物處所艙壁不氣密，則甲烷可滲入鄰近貨物處所內。

2. 煤會發生氧化，導致貨物處所內缺氧和二氧化碳或一氧化碳濃度增加。一氧化碳為無味氣體，比空氣略輕，在空氣中的燃燒極限體積比為 12%至 75%。吸入一氧化碳會中毒，因其與血紅蛋白的親和力比氧大 200 倍。

3. 某些煤易於自熱並在貨艙內引起自燃。可產生一氧化碳等易燃和有毒的氣體。

4. 某些煤會與水發生反應，並產生具有腐蝕性的酸液。還可以產生氫氣等易燃和有毒的氣體。氫氣為無味氣體，比空氣輕得多，在空氣中的燃燒極限體積比為 4%至 75%。

隔離和積載要求

1. 除非另有明確規定，裝煤的貨物處所艙壁須能阻火和阻液體。

2. 該貨物須與第 1（第 1.4 類）、2、3、4 和 5 類包裝貨物“隔離”（見《國際海運危險貨物規則》）並與第 4 和 5.1 類固體散裝貨物“隔離”。

3. 禁止在該貨物的上方或下方積載第 5.1 類包裝貨物或者第 5.1 類固體散裝貨物。

4. 船長須確保不將該貨物積載在熱的區域附近。

5. 該貨物須與除第 1.4 類以外的第 1 類貨物“用一個完整艙室或船艙縱向隔離”。

註：對這些名詞解釋，見第 9 節。

對所有種類的這些貨物的一般要求

1. 裝載前，託運人或其指定的代理須以書面形式向船長提供關於貨物特性的材料，以及裝載及運輸該貨物的、推薦的安全裝卸程序。貨物合同須至少列明水分含量、含硫量及尺寸，並須特別說明是否會釋放甲烷或自熱。

2. 在裝載前，船長須確保：

2.1 所有貨物處所和艙底污水井清潔和乾燥。除去任何廢物殘留物或原先的貨物，包括可拆卸的貨物壓條；和

2.2 貨物處所及毗鄰圍閉處所內的全部電纜及電器組件應無缺陷。這些電纜及電器組件可在爆氣體中安全使用或做好陽極隔離。如機艙與貨物處所以沒有直接通道的氣密艙壁分隔，本款規定不必適用於機艙。

3. 船舶須適當配備有關儀器設備，以便不進入貨物處所即可測得下列數據：

.1 空氣中的甲烷濃度；

.2 空氣中的氧氣濃度；

.3 空氣中的一氧化碳濃度；及

.4 貨物處所艙底污水樣品的 pH 值。

4. 這些儀器設備須進行定期維修和校準。船上人員須經過使用這些儀器的培訓。氣體測量儀的使用方法列於本附錄末尾。

5. 建議船舶配備溫度測量儀，量程為 0° 至 100°，以便在裝載和航行途中不進入貨艙就可以測得煤的溫度。

6. 在貨區和毗鄰處所內禁止吸煙和使用明火，並須在顯著位置張貼相應的告示。除非貨艙已經完全通風並且甲烷氣體含量經測量表明安全，否則不得在靠近貨物處所或其他毗鄰處所進行燃燒、切割、鏟鑿、焊接或其他產生火源的作業。

7. 離港前，應對貨物表面進行合理平艙直至延伸到艙壁並應令船長滿意，以防形成積存氣體的坑窪及空氣滲入煤磚中。進入貨物處所的通道須充分密封。託運人須確保船長得到裝貨碼頭的必要合作。

8. 須對每個貨艙內貨物上方空間氣體中的甲烷、氧氣和一氧化碳的含量進行定期監測。詳細的氣體監測程序列於本附錄的末尾。監測結果須做記錄。測量頻率取決於託運人提供的資料及通過艙內氣體分析所取得的信息。

9. 除非另有明文規定，否則各貨物處所裝完貨離港後 24 小時之內須進行表面通風。在此期間，每一貨艙須選定一點進行一次測量，而且就該氣體檢測而言，須在氣體監測之前在適當時間內停止通風。

10. 如果離港 24 小時之後測得的甲烷含量處於可接受的較低水平，則須關閉通風口並須監測貨物處所中的氣體。如果離港 24 小時之後測得的甲烷含量不是處於可接受的較低水平，須維持表面通風，只有監測氣體的適當時段除外，並須監測貨物處所中的氣體。在甲烷含量低至可接受的水平之前，須遵循這一程序。在兩種情況下，均須每天進行甲烷含量的測量。

11. 如果在未通風的艙內後來產生了相當濃度的甲烷，則須對煤炭釋放甲烷採取適當的特別措施。

12. 船長須儘可能保證貨物釋放出的氣體不在臨近封閉處所中積聚。

13. 船長須確保定時監測物料間、木工間、通道、軸隧等圍閉處所中的甲烷、氧氣和一氧化碳的含量。這些處所須充分通風。

14. 在裝運該貨物期間，須定期系統地對貨艙的艙底污水進行檢測。如果監測的 pH 值表明存在腐蝕危險，須在航行途中經常泵排艙底污水，以防內底和污水系統中積存酸性物質。

15. 在航行途中，如果貨物的特性與申報值有差異，船長須將差異報告託運人。這種報告有助於託運人保持對貨物性質的記錄，以便能根據運輸經驗複議提供給船長的資料。

特別注意事項

1 會釋放甲烷的煤

如果託運人已經說明貨物會釋放甲烷，或貨物處所內氣體分析表明甲烷含量超過其爆炸下限（LEL）20%，須採取以下附加措施：

.1 須保持對貨物表面的通風，只有監測氣體的適當時段除外。

.2 由於包括卸貨在內的任何原因而開啟艙蓋或其他開口之前，須注意將積存的氣體排出。艙蓋或其他開口須小心開啟，以免產生火花。禁止吸煙和使用明火。

.3 除非貨物處所或附近封閉處所已經通風且測試表明不存在有害氣體，並且含有足以支持生命的氧氣，否則人員不得進入。儘管有上述規定，在負責的高級船員的監督下，由受過訓練的人員配戴自給式呼吸器，以及採取特別預防措施以保證不將火源帶入處所內，則可在緊急情況下進入貨物處所。

.4 船長須確保定時監測物料間、木工間、通道、軸隧等圍閉處所中的甲烷含量。這些處所須經充分通風，而且在使用機械通風時，只能使用可以在可爆氣體中安全使用的設備。

2 自熱煤

如果託運人已經告知貨物可能發生自熱，或貨物處所內氣體分析表明一氧化碳含量增加，則須採取以下附加措施：

.1 裝載完畢後須立即將各艙口關閉。艙口蓋還可以用密封膠帶進行附加密封。只允許使用自然表面通風，而且通風時間須以排除積存的甲烷氣體所需的絕對最少時間為限。

.2 除非配戴自給式呼吸器且進入貨物處所對保障船舶或人命安全非常必要，否則不允許人員進入貨物處所。

.3 在裝載前，須監測該貨物的溫度。只有在該貨物的溫度不超過 55°C 時，方能裝載。

.4 如果艙內一氧化碳含量穩定上升，則可能將發生自熱。在這種情形裏，須將貨物處所完全封閉，停止一切通風。船長須

立即徵求專家意見。在海上，不得用水冷卻貨煤或用水撲救煤火，但可以用水冷卻貨物處所邊界。

.5 如果任何貨物處所的一氧化碳水平達到 50 ppm，或連續三天穩定上升，則可能正在發生自熱，船長須在準確評估形勢之後最少將以下信息告知託運人和公司：

（1） 明確所涉及的貨艙，一氧化碳、甲烷和氧氣含量的監測記錄；

（2） 如有可能還應提供貨煤的溫度、位置和取得測量結果的方法；

（3） 艙內氣體的採樣時間（監測常規）；

（4） 通風機的開/關時間；

（5） 艙內載煤的數量；

（6） 託運人申報的貨煤種類及申報時說明的特殊注意事項；

（7） 裝載日期和及在預定到達擬卸貨港口的時間（須具體說明）；以及

（8） 船長的意見或看法。

3 重力裝填式自卸散貨船

3.1 重力裝填式自卸散貨船係指具有貨艙底部重力裝填系統的船舶，使用可以開啟或關閉的門，將貨物送到傳送帶上。這些傳送帶在貨艙底下往船首或船尾方向運行；貨物通過傳送帶系統從那兒運至甲

板和卸到岸上，它有可以延伸到岸上並配備傳送帶的自卸臂。這不適用於配備起重機和抓斗的船舶。

3.2 當該貨物在重力裝填式自卸散貨船上運輸時，本附錄的以下要求不必適用：

- “隔離和積載要求”的第 1 款；和
- “對所有種類的這些貨物的一般要求”的第 9 款。

3.3 載貨航行的貨物空氣監測程序

3.3.1 煤散貨安全程序

3.3.1.1 當這些裝載於重力裝填式自卸散貨船時，適用這些要求。建議船舶經營人為船舶提供一份文件，諸如流程圖等，說明貨物作業和裝運程序。

3.4 通風

3.4.1 在通風時，須保證不會有過量的空氣進入煤貨體，因為這最終會促進自熱。

3.4.2 由於在緊靠隧道上方的開底貨艙底部裝有非氣密卸貨門，須使用以下通風方法：

- 如果在隧道中測出甲烷，須對它進行“正壓”通風（隧道中的供氣量大於廢氣，以除去甲烷氣體）；和
- 如果在隧道中測出一氧化碳，須對它進行“負壓”通風（隧道中的廢氣量大於供氣，以除去一氧化碳）。釋放出一氧化碳可能表示出現自燃。

貨煤的氣體監測程序

1 注意事項

1.1 如果按照以下程序對一氧化碳進行監測，將會及早測定出貨煤自熱的可靠情況。這樣就可以及時採取預防措施。

如果在貨艙內探測出其一氧化碳含量穩定上升，則肯定正在發生自熱。

1.2 從事煤運輸的船舶均須攜帶甲烷、氧氣和一氧化碳含量測試儀器，從而能夠監測貨物處所中的空氣。這類儀器須按照製造商的須知進行定期保養和校準。對在未進行通風的貨艙中經常出現的低含氧量情況中的甲烷測量，須謹慎做出解釋。通常用於測定甲烷含量的催化傳感器的測量精度依賴於充足的氧氣含量。這一現象不影響一氧化碳含量的測定，也不影響利用紅外線傳感器測定甲烷含量。可向儀器生產廠家獲取進一步的指導。

2 採樣和測量程序

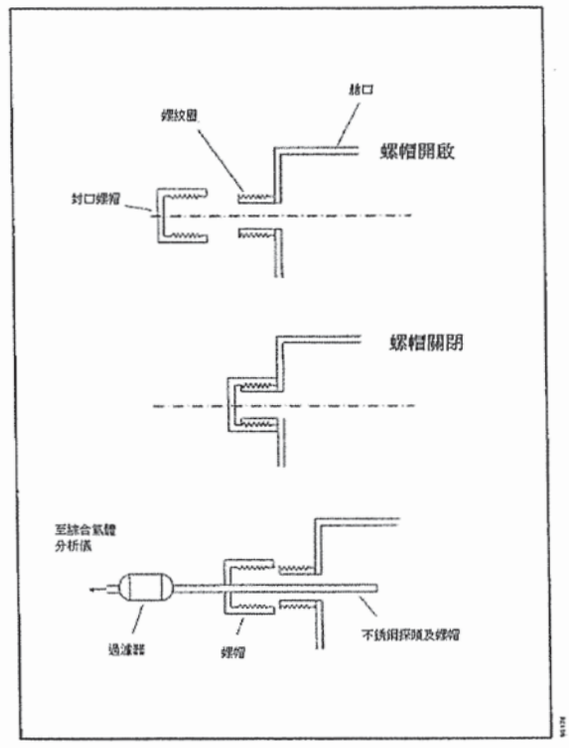
2.1 儀器

2.1.1 運輸該貨物的船上須配備一部能測定甲烷、氧氣和一氧化碳含量的儀器。該儀器須裝有吸氣管、軟管和一節防火花的金屬管，以便能從艙內方形空間採集出具有代表性的氣樣。

2.1.2 須按製造商的建議使用過濾器防止潮氣進入儀器中。即使小量潮氣存在也會影響測量精度。

2.2 採樣點的確定

2.2.1 為了得到艙內貨煤狀態的有意義的信息，氣體測量須通過每一貨艙的一個取樣點進行。但是，為了保證在惡劣天氣中仍能進行測量，每一艙內須設兩個測量點，一個在艙蓋或艙口圍欄的左側，另一個在其右側（見下面的取樣點示意圖）。測量可在兩個測量點中的任何一個進行。



氣體採樣點的示意圖

2.2.2 每一採樣點須包含直徑約 12 毫米的一個測量孔，並且儘可能靠近艙口圍欄的頂部。測量孔螺帽須封緊以防水和空氣進入。每次測量後，須將螺帽蓋緊，以保持貨物處所密封。

2.2.3 任何測量孔的設置均不得降低船舶的適航性。

2.3 測量

對測量程序的解釋如下：

.1 打開密封螺帽，將防火花金屬管插入取樣點，上緊連接帽以確保適當密封;

.2 將測量儀與探頭連接好;

.3 用吸氣管從測量孔中吸出貨艙空氣樣品，直到獲得穩定讀數；

.4 將測量結果填入表中，並記錄每次測量的相應艙號、日期和時間；以及

.5 上緊密封螺帽。

2.4 測量策略

在未通風的狀態下，更容易利用測量數據識別初始自熱。但不一定在什麼時候均有必要採用這種做法，因為甲烷的積聚可能達到危險的程度。這種情況主要在航行開始階段發生，但也不排除其他階段。所以，建議開始時先對貨物處所進行通風，直到測定的甲烷含量達到可接受的低水平。

2.5 在未進行通風的貨艙內測量

作為預防措施，一般每天測量一次即可。但是，如果一氧化碳含量超過 30 ppm，則測量頻率須增至每天至少兩次，中間適當間隔。任何額外的測量結果須記錄在航海日誌中。

2.6 在通風後的貨艙內進行測量

2.6.1 如果因甲烷的存在需要通風口保持開啟狀態，則須採取不同的程序以探測艙內的初始自熱。

2.6.2 為了得到有意義的數據，在進行測量之前須將通風口關閉一段時間。這個期間可按船舶操作性要求確定，但建議不少於四小時。為做好數據解釋，關鍵是無論選定多長時間，關閉通風口的時間須固定。測量須每天進行。

2.7 在重力裝填式自卸散貨船的貨物和自卸處所中的測量

2.7.1 未經通風的貨物和自卸處所中的測量

2.7.1.1 如託運人已經聲稱煤貨具有或可能具有自熱特點，除非本節另有說明，不得對貨艙進行通風。

2.7.1.2 在正常條件下，作為預防措施，每天測量一次即可。如果一氧化碳含量超過 30 ppm，則測量頻率須增至每天至少兩次，中間適當間隔。任何額外的測量結果須記錄在航海日誌中。

2.7.1.3 如果任何貨艙中的一氧化碳表明穩定上升，或達到 50 ppm，可能正在形成自熱條件，須按本程序所述通知船舶所有人。超過這一水平時，船舶須採用“負壓”通風，以減少一氧化碳量。須繼續定期監測一氧化碳量。

2.7.1.4 除非配帶自給式呼吸器，否則任何人不得進入一氧化碳量大於 30 ppm 的貨艙或卸貨處所。

2.7.2 已通風的貨物和自卸處所中的測量

2.7.2.1 如果監測器表明存在甲烷，而且需要通風，則須適用不同的程序，以發現可能開始的任何自熱。須採用“正壓”或“過流式通風”，以除去甲烷。

2.7.2.2 為取得有用的數據，通風口和（或）通風須關閉一段時間，然後再測量。可根據船舶的作業要求選擇這段時間，但建議不少於四小時。不管選擇什麼樣的時間段，關閉的時間要始終如一，這對解釋數據至關重要。須每天進行這樣的測量。如果任何一天的一氧化碳的結果表明穩定上升，或超過 50 ppm，須通知船舶所有人。

2.7.2.3 此外，須考慮以下各點：

- 當船員在自卸處所中時，任何時候均不得關閉通風；
- 船舶可能需要特殊消防設備和（或）程序；和
- 為重力裝填式自卸散貨船進行具體的船員培訓。

煤泥

描述

煤泥是一種細顆粒的煤水混合物。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	870 至 1020	0.98 至 1.15
尺寸	**類別**	**組別**
小於 1 毫米	不適用	A

危險性

煤泥在海上運輸期間易於流態化。如果煤乾透可能自燃，但在一般條件下不會。

該貨物為非易燃或具有低失火危險。

積載和隔離

沒有特別要求。

貨艙清潔程度

按貨物的危險性保持清潔和乾燥狀態。

天氣注意事項

如果貨物不是在專門建造或配備的、符合《規則》第 7.3.2 小節要求的船舶中運輸，須遵守以下規定：

.1 航行期間須將貨物的含水量保持在可運輸含水量極限以下；

.2 除非在本明細表中另有明確規定，不得在降水期間裝卸；

.3 除非在本明細表中另有明確規定，在貨物裝卸期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋；

.4 如果貨物的實際含水量小於可運輸含水量極限，足以使實際含水量不會由於降水而可能超過可運輸含水量極限，則可以在降水期間裝卸；和

.5 如果貨艙中的全部貨物將在一港口中卸完，可以在降水期間卸下貨艙中的貨物。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

注意事項

污水井須保持清潔、乾燥並適當蓋好，以防止貨物進入。

通風

因為煤一般會釋放甲烷，貨艙處所須用適當的氣體探測器定期測試並且在必要時對貨物表面進行自然通風。

裝運

在航行期間，須定期檢查貨物的外表。如在航行期間觀測到貨物上面的自由液體或流態貨物，船長須採取適當行動以防貨物移動和船舶的可能傾覆，並考慮尋求緊急進入避難地。

卸貨

沒有特別要求。

清掃

沒有特別要求。

輪胎粗碎塊

描述

剁成或切成的舊輪胎粗碎塊。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	555	1.8
尺寸	**類別**	**組別**
約為 15X20 厘米	不適用	C

危險性

如果裝運前沒有適當陳化而且以小於“特性”中所示的尺寸託運，受含油殘留物沾染時會慢慢自熱。

該貨物為非易燃或具有低失火危險。

積載和隔離

沒有特別要求。

貨艙清潔程度

按貨物的危險性保持清潔和乾燥狀態。

天氣注意事項

該貨物須在裝載前、裝載期間和航行期間儘可能保持乾燥。該貨物不得在降水期間裝載。在裝載該貨物期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

注意事項

在裝卸和裝運該貨物期間，不允許在裝有該貨物的處所附近做熱工、燃燒和吸煙。在船運前，須由託運人向船長提交一份證書，證明該貨物沒有油產品或含油殘留物，並在船運前在戶外有遮蓋的地方存放不少於 15 天。

若開始裝載與完成卸貨之間的預定間隔期超過 5 天，除非在配備固定式氣體滅火系統的貨物處所中裝載該貨物，否則不得裝運。如果主管機關認為從開始裝載到完成卸貨的計劃航程不超過 5 天，它可免除在裝運該貨物的處所中配備固定式氣體滅火系統的要求。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

沒有特別要求。

焦炭

描述

灰色塊，可能含有粉末（碳渣）。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	341 至 800	1.25 至 2.93
尺寸	**類別**	**組別**
最大達 200 毫米	不適用	C

危險性

沒有特別危險性。

該貨物為非易燃或具有低失火危險。

積載和隔離

沒有特別要求。

貨艙清潔程度

沒有特別要求。

天氣注意事項

沒有特別要求。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

注意事項

確保污水井清潔、乾燥並適當蓋好，以防貨物進入。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

卸貨後，須檢查艙底污水井和貨物處所排水管，並須清理艙底污水井和貨物處所排水管中的任何堵塞。

焦炭渣

描述

灰色粉末。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	556	1.8
尺寸	**類別**	**組別**
小於 10 毫米	不適用	A

危險性

如果水分含量足夠高，焦炭渣會流動。

該貨物為非易燃或具有低失火危險。

積載和隔離

沒有特別要求。

貨艙清潔程度

沒有特別要求。

天氣注意事項

如果貨物不是在專門建造或配備的、符合《規則》第 7.3.2 小節要求的船舶中運輸，須遵守以下規定：

.1 航行期間須將貨物的含水量保持在可運輸含水量極限以下；

.2 除非在本明細表中另有明確規定，不得在降水期間裝卸；

.3 除非在本明細表中另有明確規定，在貨物裝卸期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋；

.4 如果貨物的實際含水量小於可運輸含水量極限，足以使實際含水量不會由於降水而可能超過可運輸含水量極限，則可以在降水期間裝卸；和

.5 如果貨艙中的全部貨物將在一港口中卸完，可以在降水期間卸下貨艙中的貨物。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

注意事項

確保污水井清潔、乾燥並適當蓋好，以防止貨物進入。

通風

裝運該貨物的處所不得在航行期間通風。

裝運

在航行期間，須定期檢查貨物的外表。如在航行期間觀測到貨物上面的自由液體或流態貨物，船長須採取適當行動以防貨物移動和船舶的可能傾覆，並考慮尋求緊急進入避難地。

卸貨

沒有特別要求。

清掃

卸貨後，須檢查艙底污水井和貨物處所排水管，並須清理艙底污水井和貨物處所排水管中的任何堵塞。

硬硼酸鈣石

描述

一種天然水合式硼酸鈣。細粉至塊狀，外表與黏土相似，呈淺灰色。水分含量約 7%。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	1639	0.61
尺寸	**類別**	**組別**
最大達 300 毫米	不適用	C

危險性

沒有特別危險性。

該貨物為非易燃或具有低失火危險。

積載和隔離

沒有特別要求。

貨艙清潔程度

沒有特別要求。

天氣注意事項

沒有特別要求。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

注意事項

沒有特別要求。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

沒有特別要求。

銅礫

描述

球形卵塊。含銅 75%，另含鉛、錫、鋅及少量其他雜質。水分含量約 1.5%。乾燥時呈淺灰色，潮濕時呈深綠色。無味。

特性

靜止角	散貨密度（kg/m³）	積載因數（m³/t）
不適用	4000 至 4545	0.22 至 0.25
尺寸	**類別**	**組別**
碎末最大達 10 毫米 渣塊最大達 50 毫米	不適用	C

危險性

沒有特別危險性。

該貨物為非易燃或具有低失火危險。

積載和隔離

沒有特別要求。

貨艙清潔程度

沒有特別要求。

天氣注意事項

沒有特別要求。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙

由於該貨物密度極高，除非貨物在艙底均勻鋪開以使重量平均分佈，否則艙底可能會受力過度。在航行和裝載期間，須適當注意確保不要把貨物堆起而使艙底受力過度。

注意事項

沒有特別要求。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

沒有特別要求。

冰銅

描述

天然黑色銅礦。由 75%的銅和 25%的雜質構成。含金屬小圓石或小圓球。無味。

特性

靜止角	散貨密度（kg/m³）	積載因數（m³/t）
不適用	2857 至 4000	0.25 至 0.35
尺寸	**類別**	**組別**
3 毫米至 25 毫米	不適用	C

危險性

沒有特別危險性。

該貨物為非易燃或具有低失火危險。

積載和隔離

沒有特別要求。

貨艙清潔程度

沒有特別要求。

天氣注意事項

沒有特別要求。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

由於該貨物密度極高，除非貨物在艙底均勻鋪開以使重量平均分佈，否則艙底可能會受力過度。在航行和裝載期間，須適當注意確保不要把貨物堆起而使艙底受力過度。

注意事項

沒有特別要求。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

沒有特別要求。

椰子肉（乾的）UN 1363

描述

經乾燥的椰子肉，帶有滲透性的陳腐脂肪臭味，可沾污其他貨物。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	500	2.0
尺寸	**類別**	**組別**
不適用	4.2	B

危險性

易自熱和自燃，特別是在遇到水時。易引起貨物處所缺氧。

積載和隔離

積載時不要與受熱的表面，包括需加熱的燃油艙櫃接觸。

貨艙清潔程度

按貨物的危險性保持清潔和乾燥狀態。

天氣注意事項

該貨物須儘可能保持乾燥。該貨物不得在降水期間裝卸。在裝卸該貨物期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

禁止裝載濕的椰子肉。

注意事項

只有在裝運前風乾至少一個月，或由託運人向船長提供一份由原產國主管機關認可的人員簽發的證書，證明該貨物的最大水分含量不超過5%，才能裝運該貨物。禁止在貨物處所和臨近區域吸煙和使用明火。在對貨物處所進行通風並測試氧氣含量前，不許進入。

通風

在航行期間，須根據需要僅對貨物表面進行自然或機械通風。

裝運

在航行期間，須定期測量和記錄貨物溫度以監測自熱。

卸貨

沒有特別要求。

清掃

沒有特別要求。

應急程序

需配備的專用應急設備 無
應急程序 無 火災時的應急行動 封艙。使用船上固定式滅火裝置（如果配備）。氣封可以足夠控制火災。 醫療急救 參考經修訂的《危險貨物事故醫療急救指南（MFAG）》。

水晶石

描述

一種含有鈉和鋁的氟化物，用於製鋁和用作陶瓷的釉面。呈灰色球團狀。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	1429	0.70
尺寸	**類別**	**組別**
6.4 毫米至 12.7 毫米	不適用	C

危險性

長時間接觸可以引起皮膚和神經系統的嚴重損傷。

該貨物為非易燃或具有低失火危險。

積載和隔離

沒有特別要求。

貨艙清潔程度

沒有特別要求。

天氣注意事項

沒有特別要求。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

注意事項

須採取適當預防措施以防該貨物的粉塵進入機器處所和起居處所。須防止貨物進入其處所的艙底污水井。須適當考慮設備的貨物粉塵防護。可能接觸該貨物粉塵的人員須戴護目鏡或其他等效的眼睛防塵保護用品和防塵口罩。那些人員須根據需要穿戴防護服。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

沒有特別要求。

磷酸二銨（D.A.P）

描述

無味白色晶體或粉末。能否成粉末狀取決於來源。吸濕。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
30° 至 40°	833 至 999	1.10 至 1.20
尺寸	**類別**	**組別**
直徑：2.54 毫米	不適用	C

危險性

沒有特別危險性。

該貨物為非易燃或具有低失火危險。

該貨物吸濕，在貨物處所內如受潮可能硬化。

積載和隔離

沒有特別要求。

貨艙清潔程度

按貨物的危險性保持清潔和乾燥狀態。

天氣注意事項

該貨物須儘可能保持乾燥。該貨物不得在降水期間裝卸。在裝卸該貨物期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

注意事項

須採取適當預防措施以防該貨物的粉塵進入機器處所和起居處所。須防止貨物進入其處所的艙底污水井。須適當考慮設備的貨物粉塵防護。可能接觸該貨物粉塵的人員須根據需要穿戴防護服、護目鏡或其他等效的眼睛防塵保護用品和防塵口罩。

通風

裝運該貨物的處所不得在航行期間通風。

裝運

在航行期間，須仔細觀察凝聚、貨物表面凝結水珠和從艙口遮蓋物進水。密切注意貨物處所艙口的密封。

卸貨

如果貨物已變硬，須根據需要平艙以避免形成懸空表面。

清掃

卸貨後，須特別注意貨物處所艙底污水井。

直接還原鐵（A）

塊狀，熱鑄的

描述

直接還原鐵（A）是由直接還原鐵（DRI）填料在成型溫度高於 650°C 時的稠化過程中產生的灰色膠質塊狀金屬物質，密度大於 5,000 kg/m^3。碎末（6.35 毫米以下）不超過 5%。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	2,500-3,300	0.3 至 0.4 有待託運人核實
尺寸	**類別**	**組別**
尺寸約值： 長 50 毫米至 140 毫米 寬 40 毫米至 100 毫米 厚 20 毫米至 50 毫米 磚重 0.2 至 3.0 千克 碎末：小於 6.35 毫米	MHB	B

危險性

散裝貨物裝卸後暫時自熱可達 30°C。該物質與水（尤其是鹹水）接觸後會緩慢釋放出氫氣。氫氣是一種可燃氣體，與（按體積算）濃度為 4%以上的空氣混合時會形成爆炸物。它會造成貨物處所缺氧。該貨物為非易燃或具有低失火危險。

積載和隔離

與包裝形式的第 1（第 1.4S 分類）、2、3、4 和 5 類及第 8 類中的酸類貨物“隔離”（見《國際危規》）。

與第 4 和 5 類固體散裝貨物“隔離”。

與除第 1.4S 類以外的第 1 類貨物“用一個完整艙室或貨艙縱向隔離”。

裝載直接還原鐵的貨艙艙壁應能阻火和阻止液體通過。

貨艙清潔程度

貨物處所須保持清潔和乾燥，沒有鹽和先前貨物的殘留物。在裝載前，須卸掉諸如壓條等木質裝置、不固定的襯墊料、碎片和可燃物質。

天氣注意事項

該貨物須在裝載和航行期間儘可能保持乾燥。在裝載前可露天存放。該貨物不得在降水期間裝卸或在船或駁船之間駁運。在裝載該貨物期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋。只有在天氣允許時，方可在每次倒入貨物後將不使用的艙蓋打開最少一小時，以讓散貨在裝卸後冷卻。

裝載

在裝載該貨物之前，託運人須向船長提供由裝貨港國家主管機關認可的主管人員簽發的證明，說明所託運的貨物在裝載時適合於船運並且符合本規則的要求；碎末和小顆粒（尺寸最大達 6.35 毫米）按重量計含量不超過 5%；含水量小於 1.0%和溫度不超過 65°C。

如果溫度超過 65°C，如果含水量超過 1.0%，如果碎末和小顆粒（尺寸最大達 6.35 毫米）按重量計含量大於 5%，不得裝載該貨物。

在裝貨期間，須採取適當預防措施，以裝載主要由整塊構成的貨物。貨物的裝載方式須儘量減少塊體破碎、產生更多的碎末和小顆粒以及碎末在貨物的任何地方聚集。須禁止在同質的塊體貨物中增加碎末和小於 6.35 毫米的顆粒或粉末。

按照《規則》第 4 和 5 節要求的有關規定進行平艙。須適當注意將貨物均勻地分佈在艙底，以儘量減少碎末聚集。

在裝貨期間，須監測貨物溫度，並記入航海日誌，詳細說明所裝的每批貨物的溫度。向船長提供一份記錄副本。在裝載後，須由裝貨港國家主管當局認可的適任人員簽發一份證書，證實整票貨的碎末和小顆粒（尺寸小於 6.35 毫米）按重量計含量小於 5%。

注意事項

承運人指定的技術人員或其他代表須可以合理地查看貨堆和裝貨設備。

託運人須提供關於貨物和在緊急情況中採用的安全程序的全面資料。託運人也可以提供詳述本規則的建議，但這樣的建議不得與其安全建議相左。

若有可能，除雙層底艙以外的該貨物的處所毗鄰的壓載艙須排空。露天甲板上的封閉裝置應經檢查和測試，以確保在整個航程必須維持的完整性和風雨密。

須採取適當預防措施以防該貨物的粉塵進入機器處所和起居處所。須為雷達和外露的無線電通信設備做好貨物粉塵防護。貨物處所的污水井須保持清潔、乾燥並使用不燃材料防止貨物進入。可能接觸該貨物粉塵的人員須根據需要穿戴防護服、護目鏡或其他等效的眼睛防塵保護用品和防塵口罩。

貨物裝卸期間，須在甲板上和貨物處所毗鄰區域張貼“嚴禁吸煙”的告示牌；不允許使用明火。

裝載該貨物的處所的氧氣可能被耗盡。可燃氣體也可能在這些區域聚集。進入貨物處所和相鄰處所時須採取一切預防措施。

通風

在航行期間，只能根據需要僅對貨物表面進行自然或機械通風。絕對不能將空氣導入貨物體內。如使用機械通風，須使用經認證的防爆型風機，並須防止產生火花，從而避免點燃氫氣和空氣混合氣體的可能性。進風和出風開口應設有合適的金屬絲網。通風應使進入生活區的逸出氣體不會達到有害濃度。

裝運

為測量氧氣含量，在裝運貨物期間須在船上裝有合適的探測器。探測器須適合在無氧氣的空氣中使用，並通過認證，可在可爆氣體中使用。在航行期間，須定期測量裝運這些貨物的處所中的氫氣濃度，並須記錄測量結果和起碼在船上保存兩年。如監測到的氫氣濃度按體積算大於 1%（>25%LEL），須按照託運人提供的應急程序採取適當的安全措施。如有疑問，須徵詢專家意見。

須定期檢查污水井是否有水。若發現有水，須將其從污水井中泵或排掉。

在航行期間，須定期測量貨物溫度，其記錄起碼在船上保存兩年。如貨物處所的溫度高於 65°C，須按照託運人提供的應急程序採取適當的安全措施。如有疑問，須徵求專家意見。

卸貨

在打開艙蓋的任何行動之前的一刻，須測量貨物處所中的氫氣濃度。如氫氣濃度按體積算大於 1%（>25%LEL），須按照託運人提供的程序

或主管當局的建議採取一切適當的安全措施。如有疑問，須徵詢專家意見。

在卸貨期間，只有在貨物將存放於露天場所時，方可在貨物表面噴灑清水以防粉塵。若貨物將存放於圍閉場所或將要轉運，建議不要在貨物表面噴灑清水。

清掃

須儘快清除在甲板上或在貨物處所周圍聚集的貨物粉塵。須考慮仔細清潔可能沾上貨物粉塵的外露的無線電通信設備，如雷達、電台天線、甚高頻設備、自動識別系統和全球定位系統。應避免用海水沖洗。

應急程序

需配備的專用應急設備 無
應急程序 無 火災時的應急行動 **不要用水。不要用蒸汽。不要用二氧化碳。** 封艙。 須根據情況查閱和採用託運人提供的應急程序。如有疑問，須儘快徵詢專家意見。 如果發生嚴重升溫，須準備利用抓斗卸貨。 醫療急救 參考經修訂的《危險貨物事故醫療急救指南（MFAG）》。

直接還原鐵（B）

為塊、顆粒和冷模磚等形狀

描述

直接還原鐵（DRI）（B）係在低於鐵的熔點以下溫度時對氧化鐵進行直接還原（除氧）的過程形成的多孔的黑/灰色金屬物質。冷模磚係指溫度在 650°C 以下形成的或密度在 5,000 千克/m^3 以下的磚坯。尺寸小於 6.35 毫米的碎末和小塊不得超過重量的 5%。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	1750 至 2000	0.5 至 0.57
尺寸	**類別**	**組別**
塊與球粒：平均粒度為 6.35 毫米至 25 毫米。冷模塊：最大尺寸約 35 毫米至 40 毫米。尺寸小於 6.35 毫米的碎末和小塊不得超過重量的 5%。	MHB	B

危險性

散裝貨物裝卸後暫時自熱可達 30°C。

在運輸期間，有過熱、着火和爆炸的危險。該貨物與空氣或水或海水發生反應產生熱和氫氣。氫氣是一種可燃氣體，與（按體積算）濃度為 4%以上的空氣混合時會形成爆炸氣體。該貨物的反應活動取決於礦的來源、還原的過程和溫度，以及隨後的陳化程序。貨物發熱會產生足以使貨物起火的很高的溫度。粉末的積聚也會導致自熱、自動着火和爆炸。貨物和圍閉處所的氧氣可能被耗掉。

積載和隔離

與包裝形式的第 1（第 1.4S 類）、2、3、4 和 5 類及第 8 類中的酸類貨物“隔離”（見《國際危規》）。

與第 4 和 5 類固體散裝貨物“隔離”。

除第 1.4S 類外，第 1 類物質不得與該貨物同船運輸。

裝載直接還原鐵的貨艙艙壁應能阻火和阻止液體通過。

貨艙清潔程度

貨物處所須保持清潔和乾燥，沒有鹽和先前貨物的殘留物。在裝載前，須卸掉諸如壓條等木質裝置、不固定的襯墊料、碎片和可燃物質。

天氣注意事項

在裝載前、裝載期間和航行期間，該貨物須儘可能保持乾燥。該貨物不得在降水期間裝卸或在船或駁船之間駁運。在貨物裝卸期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋。

裝載

在裝載前，碼頭須確保用於裝貨的傳送帶沒有積水或其他物質。每次開始或重新啟動作業時，尤其是在雨後或沖洗後，任何裝貨傳送帶均須空載運行和避開船舶貨物處所上方。

在裝載前，須進行超聲波測試或以使用合適儀器的另一種方法確保艙蓋和關閉裝置的風雨密，而且所有讀數均證實風雨密。

在裝載該貨物之前，託運人須向船長提供由裝貨港國家主管機關認可的主管人員簽發的證明，說明所託運的貨物在裝載時適合於船運並且符合本規則的要求；碎末和小顆粒按重量計含量不超過 5%；含水量

低於 0.3%和溫度不超過 65°C。該證書須說明每批待裝載貨物的生產日期，以滿足陳化和物質溫度方面的裝載標準。

如果溫度超過 65°C，如果含水量超過 0.3%，如果碎末和小顆粒按重量計含量大於 5%，不得裝載該貨物。濕過或已知濕過的任何貨物不得裝入任何貨物處所。

在裝載前，須採取措施，將乾惰氣輸入艙頂部，以讓惰氣除去貨物產生的空氣並充滿貨物上方的空間。最好使用氮氣。須關閉和密封可能讓惰氣從裝運該貨物的貨物處所逸走的所有透氣口、通道和其他諸如圍板排水孔等開口。

貨物的裝載方式須儘量減少冷模磚、小球、塊的破碎和增加碎末及碎末在任何貨物區域的積聚。該貨物須同質，沒有添加的廢物。須禁止在同質的塊體貨物中增加碎末和顆粒或粉末。

須適當注意將貨物均勻地分佈在艙底，以儘量減少碎末聚集。按照《規則》第 4 和 5 節要求的有關規定進行平艙。

在裝貨期間，須監測貨物的溫度和濕度，並記入航海日記，詳細記明裝載的每批貨物的溫度，並向船長提供一份副本。在裝載後，須由裝貨港國家主管當局認可的適任人員簽發一份證書，證實整票貨的碎末和小顆粒（尺寸小於 6.35 毫米）按重量計含量小於 5%，含水量不超過 0.3%，溫度不超過 65°C。

完成一艙的裝貨時，須立即關閉和密封。然後輸入足夠的惰氣，使整個貨艙的氧氣濃度小於 5%。

注意事項

為避免裝濕貨或部分濕貨，須適當考慮到貨堆內濕氣的可能性，認識到儘管貨堆表面似乎乾燥，貨堆底部可能濕。承運人指定的技術人員或代表可合理檢查貨堆或裝貨設備。

在裝船前，貨物須陳化最少 3 天，或經過空氣鈍化技術或另一種等效方法的處理，將反應能力降到陳化產品的同等水平。這種陳化過程須得到主管當局的批准，主管當局也須簽發批准證書。

船運人須提供有關貨物的完整資料和緊急情況中使用的程序。該建議可以是本規則的進一步說明，但不得與安全方面的建議相左。

在可能的情況下，除雙層底貨艙外，與裝有該貨物的貨物處所相鄰的壓載水處所須保持空置。在整個航程中，須保持風雨密。貨物處所的污水井須保持清潔、乾燥和使用不燃材料防止貨物進入。

須適當考慮防止該貨物的粉塵進入設備、機器和起居處所。須為運載該貨物的船舶的雷達和外露的無線電通信設備做好貨物粉塵防護。可能接觸該貨物粉塵的人員須根據需要穿戴防護服、護目鏡或其他等效的眼睛防塵保護用品和防塵口罩。

貨物裝卸期間，須在甲板上和貨物處所毗鄰區域張貼“嚴禁吸煙”的告示牌；不允許使用明火。在裝有該貨物處所附近，任何時候均禁止吸煙、燃燒、切割、鏟鑿、打磨或其他產生火源的作業。

裝載該貨物的處所和毗鄰的氧氣可能被耗盡。可燃氣體也可能在這些區域聚集。進入貨物處所時須採取一切預防措施。

須為船舶配備設備，以確保滿足本規則關於使整個航程的氧氣濃度保持在 5%以下的要求。船舶的固定式二氧化碳系統不得用於此目的。

須計及整個航程，適當考慮為船舶提供手段，為貨艙添加額外的惰氣供應。

須為船舶提供手段，以在船首數處可靠地測量溫度，和確定貨物處所內空氣的氫氣和氧氣濃度，同時儘量減少惰性氣體的損失。

已經裝入貨物處所但隨後變濕或已經開始反應的任何貨物，須及時卸下。

在船長和裝貨港的國家主管當局認可的主管人員對以下情況感到滿意之前，船舶不得排開航：

.1 全部已裝貨的處所均適當密封和惰化；

.2 所有測量點的貨物溫度已經穩定，而且溫度不超過 65°C；和

.3 在惰化過程結束時，貨艙中自由空間的氫氣含量已經穩定，而且按體積算不超過 0.2%。

通風

在航行期間，裝運該貨物的處所須保持密封和惰化狀態。

裝運

為測量氧氣和氫氣含量，在裝運貨物期間，須在船上裝有適用的探測器。探測器須適合在無氧氣的空氣中使用，並通過認證，可在可爆氣體中使用。須定期測量裝運這些貨物的處所中的氫氣和氧氣含量，並須記錄測量結果和在船上保存最少兩年。

在整個航行期間，裝運這些貨物的處所中的氧氣濃度須保持在 5%以下。如監測到的氫氣濃度按體積算大於 1%（>25%LEL），須按照託運人提供的應急程序採取適當的安全措施。如有疑問，須徵詢專家意見。

在航行期間，須按固定間隔測量貨物溫度，並須記錄測量結果和在船上保存最少兩年。如貨物處所的溫度超過 65°C，須按照託運人提供的應急程序採取適當的安全措施。如有疑問，須徵詢專家意見。

須定期檢查污水井是否有水。如發現有水，須泵或排乾污水井的水。在不良天氣過後，須考慮增加貨物監測的頻率。須採取一切措施，以儘量減少貨艙處所的惰氣損失。

卸貨

在打開艙蓋的任何行動之前的一刻，須測量貨物處所中的氫氣濃度。如氫氣濃度按體積算大於 1%（>25%LEL），須按照託運人提供的程序或主管當局的建議採取一切適當的安全措施。如有疑問，須徵詢專家意見。

在降水期間，須停止一切裝卸貨作業，關閉裝有貨物的艙室。須繼續監測裝有貨物的貨艙中的氫氣。

清掃

須儘快清除在甲板上或在貨物處所周圍聚集的貨物粉塵。應避免用海水沖洗。須考慮仔細清潔可能沾上貨物粉塵的外露的無線電通信設備，如雷達、電台天線、甚高頻設備、自動識別系統和全球定位系統。

應急程序

要配備的專用應急設備

無

應急程序

無

火災時的應急行動

出現緊急情況時，應視情查閱和採用託運人提供的應急程序。

不要用二氧化碳。不要用水。不要用蒸汽。

封艙；如船上有供應或設備，以它們恢復惰性氣體。加快監測頻率。如溫度和（或）氫氣濃度持續上升，儘快徵詢專家意見。

如貨物處所的溫度超過 120°C，船舶應駛往最近的合適港口，卸下受影響的貨物。須準備利用抓斗卸貨。

如有額外的氮氣，使用該氣體可有助於保持較低氧氣濃度並可以抑制火災和防止產生氫氣時的爆炸氣體。

往受影響的貨艙注水只能作為最後一種手段，任何時候均應考慮到船舶的穩性和強度。

醫療急救

參考經修訂的《危險貨物事故醫療急救指南（MFAG）》。

直接還原鐵（C）

（副產品碎末）

描述

直接還原鐵（DRI）（C）係多孔的黑/灰色金屬物質，是生產和裝卸直接還原鐵（DRI）（A）和（或）直接還原鐵（DRI）（B）的副產品。直接還原鐵（DRI）（C）的密度小於 5,000 千克/m^3。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	1850 至 3300	0.30 至 0.54
尺寸	**類別**	**組別**
碎末和小顆粒，平均尺寸小於 6.35 毫米，沒有超過 12 毫米的小顆粒	MHB	B

危險性

散裝貨物裝卸後暫時自熱可達 30°C。

在運輸期間，有過熱、着火和爆炸的危險。該貨物與空氣或水或海水發生反應產生熱和氫氣。氫氣是一種可燃氣體，與（按體積算）濃度為 4%以上的空氣混合時會形成爆炸氣體。貨物發熱會產生足以導致貨物自熱、自動着火和爆炸起火的很高的溫度。

貨物和圍閉處所的氧氣可能被耗掉。可燃氣體也可能在這些區域聚集。進入貨物處所和相鄰處所時，須採取一切預防措施。

由於可列入該種類的物質的性質，該貨物的反應能力極難評估。因此，應時時假設最壞的假設情況。

積載和隔離

與包裝形式的第 1（第 1.4S 類）、2、3、4 和 5 類及第 8 類中的酸類貨物“隔離”（見《國際危規》）。

與第 4 和 5 類固體散裝貨物“隔離”。

除第 1.4S 類外，第 1 類物質不得與該貨物同船運輸。裝載直接還原鐵的貨艙艙壁應能阻火和阻止液體通過。

貨艙清潔程度

貨物處所須保持清潔和乾燥，沒有鹽和先前貨物的殘留物。在裝載前，須卸掉諸如壓條等木質裝置、不固定的襯墊料、碎片和可燃物質。

天氣注意事項

在裝載期間和運輸期間，該貨物須保持在本明細表所示的允許含水量之內。

該貨物不得在**任何**降水期間裝卸或在船或駁船之間駁運。在裝載該貨物期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋。

裝載

在裝載前，碼頭須確保用於裝貨的傳送帶沒有積水或其他物質。每次開始或重新啟動作業時，尤其是在雨後或沖洗後，任何裝貨傳送帶均須空載運行和避開船舶貨物處所上方。

在裝載前，須進行超聲波測試或以使用合適儀器的另一種方法確保艙蓋和關閉裝置的風雨密，而且所有讀數均證實風雨密。

在裝載該貨物之前，託運人須向船長提供由裝貨港國家主管機關認可的主管人員簽發的證明，說明所託運的貨物在裝載時適合於船運，並且符合本規則的要求；含水量低於 0.3%；溫度不超過 65°C。該證書須說明貨物滿足陳化和物質溫度方面的裝載標準。

如果溫度超過 65°C，或如果含水量超過 0.3%，不得裝載該貨物。濕過或已知濕過的任何貨物不得裝入任何貨物處所。

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

在裝貨期間，須監測貨物的溫度，並記入航海日記，詳細記明裝載的每批貨物的溫度，並向船長提供一份副本。在裝載後，須由裝貨港國家主管當局認可的適任人員簽發一份證書，證實整票碎末和小顆粒貨物的含水量不超過 0.3%，溫度不超過 65°C。

完成一艙的裝貨時，須立即關閉和密封。然後輸入足夠的惰氣，使整個貨艙的氧氣濃度小於 5%。

注意事項

為避免裝濕貨或部分濕貨，須適當考慮到貨堆內濕氣的可能性，認識到儘管貨堆表面似乎乾燥，貨堆底部可能濕。承運人指定的技術人員或代表可合理檢查貨堆或裝貨設備。

在裝船前，貨物須陳化最少 30 天，並由裝貨港國家主管當局認可的適任人員簽發一份證書證實這一點。

船運人須提供有關貨物的完整資料和緊急情況中使用的程序。該建議可以是本規則的進一步說明，但不得與安全方面的建議相左。

在可能的情況下，除雙層底貨艙外，與裝有該貨物的貨物處所相鄰的壓載水處所須保持空置。在整個航程中，須保持風雨密。貨物處所的污水井須保持清潔、乾燥和使用不燃材料防止貨物進入。須避免貨物處所吸入潮氣和冷凝積聚。

須採取適當防護措施，防止該貨物的粉塵進入設備、機器和起居處所。須為運載該貨物的船舶的雷達和外露的無線電通信設備做好貨物粉塵防護。可能接觸該貨物粉塵的人員須根據需要穿戴防護服、護目鏡或其他等效的眼睛防塵保護用品和防塵口罩。

該貨物的任何裝卸作業期間，須在甲板上和貨物處所毗鄰區域張貼“嚴禁吸煙”的告示牌；不允許使用明火。在裝有該貨物處所附近，任何時候均禁止吸煙、燃燒、切割、鏟鑿、打磨或其他產生火源的作業。

裝載該貨物的處所和毗鄰的氧氣可能被耗盡。除非裝貨處所經過通風，空氣經過測試並證實無氣體，而且有足夠的氧氣支持生命，否則任何人不得進入該處所。儘管有此規定，可允許在緊急情況中，在未通風或測試或兩項均無的情況下進入，但只有配帶自給式呼吸器的經過訓練的人員，在負責人員的監護下和不會將火源帶入貨艙的請況下，進入該處所。

在裝載前，須採取措施，將乾惰氣輸入艙頂部，以讓惰氣除去貨物產生的空氣並充滿貨物上方的空間。最好使用氮氣。須關閉和密封可能讓惰氣從裝運該貨物的貨物處所逸走的所有透氣口、通道和其他諸如圍板排水孔等開口。

須為船舶配備設備，以確保滿足本規則關於使整個航程的氧氣濃度保持在 5%以下的要求。船舶的固定式二氧化碳系統不得用於此目的。須計及整個航程，適當考慮為船舶提供手段，為貨艙添加額外的惰氣供應。

須為船舶提供手段，以在船首數處可靠地測量溫度，和確定貨物處所內空氣的氫氣和氧氣濃度。應採取合適措施儘量減少惰性氣體的損失。

已經裝入貨物處所但隨後暴露於超過自然含水量的另外的淡水或海水而變濕，或已經開始反應的任何貨物而且溫度超過 120°C，須及時卸下。

完成一艙的裝貨時，須立即關閉和密封。然後輸入足夠的惰氣，使整個貨艙的氧氣濃度小於 5%。

在船長和裝貨港的國家主管當局認可的主管人員對以下情況感到滿意之前，船舶不得排開航：

.1 全部已裝貨的處所均適當密封和惰化；

.2 所有測量點的貨物溫度已經穩定，而且溫度不超過 65°C；和

.3 在惰化過程結束時，貨艙中自由空間的氫氣含量已經穩定，而且按體積算不超過 0.2%。

通風

在航行期間，裝運該貨物的處所須保持密封和惰化狀態。

裝運

為測量氧氣和氫氣含量，在裝運貨物期間，須在船上裝有適用的探測器。探測器須適合在無氧氣的空氣中使用，並通過認證，可在可爆氣體中使用。須定期測量裝運這些貨物的處所中的氫氣和氧氣含量，並須記錄測量結果和在船上保存最少兩年。

在整個航行期間，須通過加裝惰氣使裝運這些貨物的處所中的氧氣濃度保持在 5%以下。

在航行期間，須按固定間隔測量貨物溫度，並須記錄測量結果和在船上保存最少兩年。如貨物處所的溫度超過 65°C，或監測到的氫氣濃度按體積算超過 1%（>25%LEL），須按照託運人提供的應急程序採取適當的安全措施。如有疑問，須徵詢專家意見。

須定期檢查污水井是否有水。如發現有水，須泵或排乾污水井的水。在不良天氣過後，須考慮增加貨物監測的頻率。須採取一切措施，以儘量減少貨艙處所的惰氣損失。

卸貨

在打開艙蓋的任何行動之前的一刻，須測量貨物處所中的氫氣濃度。如氫氣濃度按體積算大於 1%（>25%LEL），須按照託運人提供的程序或主管當局的建議採取一切適當的安全措施。如有疑問，須徵詢專家意見。

在降水期間，須停止一切裝卸貨作業，關閉裝有貨物的艙室。須繼續監測裝有貨物的貨艙中的氫氣。

清掃

須儘快清除在甲板上或在貨物處所周圍聚集的貨物粉塵。應避免用海水沖洗。須考慮仔細清潔可能沾上貨物粉塵的外露的無線電通信設備，如雷達、電台天線、甚高頻設備、自動識別系統和全球定位系統。

應急程序

要配備的專用應急設備 無
應急程序 無 火災時的應急行動 出現緊急情況時，應視情查閱和採用託運人提供的應急程序。 **不要用二氧化碳。不要用水。不要用蒸汽。** 封艙；如船上有供應或設備，以它們恢復惰性氣體。加快監測頻率。如溫度和（或）氫氣濃度持續上升，儘快徵詢專家意見。 如貨物處所的溫度超過 120°C，船舶應駛往最近的合適港口，卸下受影響的貨物。須準備利用抓斗卸貨。 如有額外的氮氣，使用該氣體可有助於保持較低氧氣濃度並可以抑制火災和防止產生氫氣時的爆炸氣體 往受影響的貨艙注水只能作為最後一種手段，任何時候均應考慮到船舶的穩性和強度。 醫療急救 參考經修訂的《危險貨物事故醫療急救指南（MFAG）》。

白雲石

描述

白雲石是一種呈淺黃色/棕色、非常堅硬並密實的礦石。

有時錯誤地將由氧化鈣和氧化鎂構成的物質（鎂石灰）稱為“白雲石”。在這種情況下，請見“石灰（未熟化的）”。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	1429 至 1667	0.6 至 0.7
尺寸	**類別**	**組別**
最大達 32 毫米	不適用	C

危險性

沒有特別危險性。

該貨物為非易燃或具有低失火危險。

積載和隔離

沒有特別要求。

貨艙清潔程度

沒有特別要求。

天氣注意事項

沒有特別要求。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

注意事項

沒有特別要求。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

沒有特別要求。

長石塊

描述

由硅酸鋁、硅酸鈉、硅酸鉀、硅酸鈣和硅酸鋇構成的晶體物質。呈白色或淡紅色。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	1667	0.60
尺寸	**類別**	**組別**
0.1 毫米至 300 毫米	不適用	C

危險性

沒有特別危險性。

該貨物為非易燃或具有低失火危險。

積載和隔離

沒有特別要求。

貨艙清潔程度

沒有特別要求。

天氣注意事項

沒有特別要求。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

注意事項

沒有特別要求。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

沒有特別要求。

鐵鉻合金

描述

鐵與鉻混合的原料。極重的貨物。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	3571 至 5556	0.18 至 0.26
尺寸	**類別**	**組別**
最大達 300 毫米	不適用	C

危險性

沒有特別危險性。

該貨物為非易燃或具有低失火危險。

積載和隔離

沒有特別要求。

貨艙清潔程度

沒有特別要求。

天氣注意事項

沒有特別要求。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

由於該貨物密度極高，除非貨物在艙底均勻鋪開以使重量平均分佈，否則艙底可能會受力過度。在航行和裝載期間，須適當注意確保不要把貨物堆起而使艙底受力過度。

注意事項

沒有特別要求。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

沒有特別要求。

鐵鉻合金，放熱的

描述

鐵與鉻的合金。極重的貨物。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	3571 至 5556	0.18 至 0.28
尺寸	**類別**	**組別**
最大達 300 毫米	不適用	C

危險性

沒有特別危險性。

該貨物為非易燃或具有低失火危險。

積載和隔離

沒有特別要求。

貨艙清潔程度

沒有特別要求。

天氣注意事項

沒有特別要求。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

由於該貨物密度極高，除非貨物在艙底均勻鋪開以使重量平均分佈，否則艙底可能會受力過度。在航行和裝載期間，須適當注意確保不要把貨物堆起而使艙底受力過度。

注意事項

在裝載、運輸和卸貨期間，禁止在裝載該貨物的處所周圍進行焊接和其他熱工作業。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

沒有特別要求。

鐵錳合金

描述

鐵與錳混合的原料。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	3571 至 5556	0.18 至 0.28
尺寸	**類別**	**組別**
達 300 毫米	不適用	C

危險性

沒有特別危險性。

該貨物為非易燃或具有低失火危險。

積載和隔離

沒有特別要求。

貨艙清潔程度

沒有特別要求。

天氣注意事項

沒有特別要求。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

由於該貨物密度極高，除非貨物在艙底均勻鋪開以使重量平均分佈，否則艙底可能會受力過度。在航行和裝載期間，須適當注意確保不要把貨物堆起而使艙底受力過度。

注意事項

沒有特別要求。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

沒有特別要求。

鎳鐵合金

描述

鐵與鎳的合金。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	4167	0.24
尺寸	**類別**	**組別**
最大達 300 毫米	不適用	C

危險性

沒有特別危險性。

該貨物為非易燃或具有低失火危險。

積載和隔離

沒有特別要求。

貨艙清潔程度

沒有特別要求。

天氣注意事項

沒有特別要求。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

由於該貨物密度極高，除非貨物在艙底均勻鋪開以使重量平均分佈，否則艙底可能會受力過度。在航行和裝載期間，須適當注意確保不要把貨物堆起而使艙底受力過度。

注意事項

沒有特別要求。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

沒有特別要求。

磷鐵合金（包括磷鐵合金錠）

描述

磷與鐵的合金，用於鋼鐵工業。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	5000	（磷鐵合金錠 0.2）
尺寸	**類別**	**組別**
直徑：2.54 毫米	MHB	B

危險性

與水接觸會產生易燃有毒氣體（如磷化氫）。

該貨物為非易燃或具有低失火危險。

積載和隔離

按第 4.3 類物質隔離。與食品和第 8 類液體“隔離”。

貨艙清潔程度

按貨物的危險性保持清潔和乾燥狀態。

天氣注意事項

該貨物須儘實際可能保持乾燥。不得在降水期間裝卸貨物。在貨物裝卸期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

由於該貨物密度極高，除非貨物在艙底均勻鋪開以使重量平均分佈，否則艙底可能會受力過度。在航行和裝載期間，須適當注意確保不要把貨物堆起而使艙底受力過度。

注意事項

該貨物須儘實際可能保持乾燥。

通風

在航行期間須為運載這些貨物的處所進行機械通風。通風機須經過驗證，可安全用於易燃空氣中。貨物在船上時，通風機通常須持續不斷地運轉。如不可行，通風機須在天氣允許的情況下運行，無論如何須在卸貨前運行一段合理的時間。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

卸貨後須將貨物處所清掃乾淨。

因為氣體危險，不得用水清洗曾裝該貨物的處所。

應急程序

需配備的專用應急設備 自給式呼吸器。
應急程序 佩戴自給式呼吸器。 **火災時的應急行動** 封艙並使用二氧化碳（如果有的話）。**不要用水。** **醫療急救** 參考經修訂的《危險貨物事故醫療急救指南（MFAG）》。

硅鐵 UN 1408

含硅 30%或以上，但低於 90%

（包括硅鐵錠）（見此表附錄）

描述

硅鐵是一種極重的貨物。

特性

靜止角	散貨密度（kg/m³）		積載因數（m³/t）
不適用	1389 至 2083 （硅鐵錠：1111 至 1538）		0.48 至 0.72 （硅鐵錠：0.65 至 0.90）
尺寸	**類別**		**組別**
最大達 300 毫米 硅鐵錠	4.3	6.1	B

危險性

遇潮濕或與水接觸，會產生能與空氣形成可爆混合氣體的易燃氣體氫氣，並在類似情況下產生劇毒氣體磷化氫和胂。

該貨物為非易燃或具有低失火危險。

積載和隔離

與食品和第 8 類物質中的液體“隔離”。

貨艙清潔程度

按貨物的危險性保持清潔和乾燥狀態。

天氣注意事項

該貨物須在裝載前、裝載期間和航行期間儘可能保持乾燥。不得在降水期間裝卸貨物。在貨物裝卸期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

由於該貨物密度極高，除非貨物在艙底均勻鋪開以使重量平均分佈，否則艙底可能會受力過度。在航行和裝載期間，須適當注意確保不要把貨物堆起而使艙底受力過度。參考本明細表的附錄。

注意事項

生產廠家或託運人須向船長提供一份證書，證明該貨物在生產後曾在有遮蓋的條件下存放，並在裝船前暴露於乾燥天氣至少 3 天。

通風

在航行期間須為運載這些貨物的處所連續進行機械通風。如果保持通風會威脅到船舶或貨物，可以中斷，除非中斷通風會帶來爆炸或其他危險。但在任何情況下，卸貨前都須保持一段合理時間的通風。參考此明細表的附錄。

裝運

為測量氫氣、磷化氫和肿的含量，在裝運貨物期間須在船上裝有每種氣體或混合氣體的探測器。探測器須通過認證，可在可爆氣體中使用。須在航行中定期測量裝運該貨物的處所中這些氣體的含量，並須記錄和在船上保存測量結果。

卸貨

參考本明細表的附錄。

清掃

卸貨後須將貨物處所清掃兩次。

因為氣體危險，不得用水清洗曾裝該貨物的處所。

應急程序

需配備的專用應急設備 自給式呼吸器。
應急程序 佩戴自給式呼吸器。 火災時的應急行動 封艙並使用二氧化碳（如果有的話）。不要用水。 醫療急救 參考經修訂的《危險貨物事故醫療急救指南（MFAG）》。

附錄

運輸硅鐵的一般要求

1. 《安全公約》第 II-2 章要求船上隨時準備好消防員裝備、全套化學防護服和自給式呼吸器。

2. 在航行期間，至少須每八小時在每個通風口和毗鄰裝運硅鐵的貨艙的可進入處所測量一次氣體含量，並將結果記錄在航海日誌中。須提供設施，以在不危及船員的情況下精確確定每個通風口的氣體含量。

3. 通風機須從裝載開始一直運轉到貨艙沒有硅鐵。

4. 在裝載開始前，艙底污水井須保持清潔、乾燥狀態。艙底木構件須處於良好狀態並用雙層粗麻布遮蓋。

5. 在卸貨之後，須打開污水井並且清潔貨艙。在開始清潔前，須進行氣體檢測。

詳細要求

在裝載前，須檢查機艙艙壁的氣密性並經主管機關認可，污水排放設備的安全性也須經令主管機關認可。須避免無意中通過機器處所排放污水。

（i） 如果貨艙的污水吸入閥位於機器處所，則須檢查閥門並在必要時將閥蓋和底座扣接密合。在重新安裝後，須鎖閉閥門，並在閥門旁邊貼上提示，警告須經船長允許才能打開。

（ii） 所有穿過貨艙的管道均須處於良好狀態。貨艙空氣取樣設備須有效地封好。

（iii）不適合在爆炸性氣體中使用的貨物處所設備的電路須隔離，去掉該系統中除保險絲外的連接。

（iv）貨物處所須至少由兩部獨立的風機進行通風，風機須屬防爆型，其佈置須使排出的氣體與電纜和電器設備隔離。總通風量按空艙每小時換氣 6 次確定。

（v） 通風機管道須處於良好狀態，其佈置須防止貨艙內空氣與其他貨物處所、起居處所或工作區連通。

操作要求

（i） 在裝載或卸貨期間，在貨物處所附近的甲板上或貨物處所中禁止吸煙或使用明火。

（ii）任何便攜式照明器具須能夠在爆炸氣體中安全使用。

（iii）貨物須保持乾燥，在潮濕的天氣裏須停止作業並關閉貨物處所。

（iv）須存放好數套自給式呼吸器，能立即與救生索和一個氣體探測儀同時使用。

（v） 開始卸貨前，須檢測有關貨物處所中的空氣是否存在毒性和易燃氣體。

（vi）當有人員在貨物處所時，須每隔 30 分鐘檢測一次污染氣體。

（vii）當氣體含量超過建議閾值時，即磷化氫含量（0.3 ppm）胂含量（0.05 ppm）或氧氣含量低於 18%，禁止進入貨物處所。

硅鐵雜質在加入水時釋放的氣體

（i）胂

胂是一種有類似大蒜味的無色有毒氣體。

毒性

胂是一種神經和血液毒劑。通常要過一段時間（有時是一天左右）才出現癥狀。這些在一開始是不確定的。

癥狀

1. 感覺不適、呼吸困難、劇烈頭痛、頭暈眼花、暈厥、噁心、嘔吐及腸胃紊亂。

2. 在嚴重情況下，嘔吐可能顯著，黏膜可能變成淡藍色，尿液變成深色並含血。一天至兩天后將出現嚴重的貧血和黃疸。

濃度

在濃度為 500 ppm 的胂中暴露幾分鐘後，對人類是致命的；在濃度為 250 ppm 的胂中暴露 30 分鐘後，有生命危險。在濃度為 6.25 至 15.5 ppm 的胂中暴露 30 至 60 分鐘後有危險。人可以長期暴露的濃度閾值為 0.05 ppm。

（ii）磷化氫

磷化氫無色、易燃、劇毒並有爛魚氣味。

毒性

磷化氫作用於中樞神經系統和血液。

癥狀

磷化氫中毒的癥狀表現為胸部有壓迫感、頭痛、眩暈、全身無力、厭食和特別口渴。在濃度為 2000 ppm 的磷化氫中暴露幾分鐘和在 400 至 600 ppm 中都會有生命危險。能夠忍受幾個小時而不出現癥狀的最大濃度為 0.3 ppm。

禁止長期暴露於該氣體。

硅鐵

含硅量 25%至 30%，或含硅量 90%或以上（包括硅鐵錠）（見本表附錄）

描述

硅鐵是一種相當重的貨物。

特性

靜止角	散貨密度（kg/m³）	積載因數（m³/t）
不適用	1389 至 2083 （硅鐵錠：1111 至 1538）	0.48 至 0.72 （硅鐵錠：0.65 至 0.90）
尺寸	**類別**	**組別**
直徑：2.54 毫米	MHB	B

危險性

遇潮濕或與水接觸，會產生能與空氣形成可爆混合氣體的易燃氣體氫氣，在類似情況下產生劇毒氣體：磷化氫和胂。

該貨物為非易燃或具有低失火危險。

積載和隔離

按第 4.3 類物質隔離。與食品和所有第 8 類物質中的液體“隔離”。

貨艙清潔程度

按貨物的危險性保持清潔和乾燥狀態。

天氣注意事項

該貨物須在裝載前、裝載期間和航行期間儘可能保持乾燥。不得在降水期間裝卸貨物。在貨物裝卸期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。在內底面上均勻積載。參考本明細表的附錄。

注意事項

生產廠家或託運人須向船長提供一份證書，證明該貨物在生產後曾在有遮蓋的條件下存放，並在裝船前暴露於乾燥天氣至少 3 天。

通風

在航行期間須為運載這些貨物的處所連續進行機械通風。如果保持通風會威脅到船舶或貨物，可以中斷，除非中斷通風會帶來爆炸或其他危險。但在任何情況下，卸貨前都須保持一段合理時間的通風。參考此明細表的附錄。

裝運

為測量氫氣、磷化氫和肿的含量，在裝運貨物期間須在船上裝有每種氣體或混合氣體的探測器。探測器須通過認證，可在可爆氣體中使用。須在航行中定期測量裝運該貨物的處所中這些氣體的含量，並須記錄和在船上保存測量結果。

卸貨

參考此表的附錄。

清掃

卸貨後須將貨物處所清掃兩次。

因為氣體危險，不得用水清洗曾裝該貨物的處所。

應急程序

需配備的專用應急設備 自給式呼吸器。
應急程序 佩戴自給式呼吸器。 火災時的應急行動 封艙並使用二氧化碳（如果有的話）。不要用水。 醫療急救 參考經修訂的《危險貨物事故醫療急救指南（MFAG）》。

附錄

運輸硅鐵的一般要求

1. 除正常的消防員裝備以外，船上還須配備兩套自給式呼吸器。

2. 在航行期間，至少須每八小時在每個通風口和毗鄰裝運硅鐵的貨艙的可進入處所測量一次氣體含量，並將結果記錄在航海日誌中。須提供設施，以精確確定每個通風口的氣體含量而不對船員造成危險。

3. 通風機須從裝載開始一直運轉到貨艙沒有硅鐵。

4. 在裝載開始前，艙底污水井須保持清潔、乾燥狀態。艙底船骨須處於良好狀態並用雙層粗麻布遮蓋。

5. 在卸貨之後，須打開污水井並且清潔貨艙。在開始清潔前，須進行氣體檢測。

詳細要求

在裝載前，須檢查機艙艙壁的氣密性並經主管機關認可。污水排放設備的安全性也須經主管機關認可。須避免無意中通過機器處所排放污水。

（i） 如果貨艙的污水吸入閥位於機器處所，則須檢查閥門並在必要時將閥蓋和底座扣接密合。在重新安裝後，須鎖閉閥門，並在閥門旁邊貼上提示，警告須經船長允許才能打開。

（ii） 所有穿過貨艙的管道均須處於良好狀態。貨艙空氣取樣設備須有效地封好。

（iii） 不適合在爆炸性氣體中使用的貨物處所設備的電路須隔離，去掉該系統中除保險絲外的連接。

（iv）貨物處所須至少由兩部獨立的風機進行通風，風機須屬防爆型，其佈置須使排出的氣體與電纜和電器設備隔離。總通風量按空艙每小時換氣 6 次確定。

（v） 通風機管道須處於良好狀態，其佈置須防止貨艙內空氣與其他貨物處所、起居處所或工作區連通。

操作要求

（i） 在裝載或卸貨期間，在貨物處所附近的甲板上或貨物處所中禁止吸煙或使用明火。

（ii） 任何便攜式照明器具須能夠在爆炸氣體中安全使用。

（iii）貨物須保持乾燥，在潮濕的天氣裏須停止作業並關閉貨物處所。

（iv）須存放好數套自給式呼吸器，能立即與救生索和一個氣體探測儀同時使用。

（v） 開始卸貨前，須檢測有關貨物處所中的空氣是否存在毒性和易燃氣體。

（vi）當有人員在貨物處所時，須每隔 30 分鐘檢測一次污染氣體。

（vii）當氣體含量超過建議閾值時，即磷化氫含量（0.3 ppm）胂含量（0.05 ppm）或氧氣含量低於 18%，禁止進入貨物處所。

硅鐵雜質在加入水時釋放的氣體

（i）胂

胂是一種有類似大蒜味的無色有毒氣體。

毒性

胂是一種神經和血液毒劑。通常要過一段時間（有時是一天左右）才出現癥狀。這些在一開始是不確定的。

癥狀

1. 感覺不適，呼吸困難，劇烈頭痛、頭暈眼花、暈厥、噁心、嘔吐及腸胃紊亂。

2. 在嚴重情況下，嘔吐可能顯著，黏膜可能變成淡藍色，尿液變成深色並含血。一天至兩天后將出現嚴重的貧血和黃疸。

濃度

在濃度為 500 ppm 的肿中暴露幾分鐘後，對人類是致命的；在濃度為 250 ppm 的肿中暴露 30 分鐘後，有生命危險。在濃度為 6.25 至 15.5 ppm 的肿中暴露 30 至 60 分鐘後有危險。人可以長期暴露的濃度閾值為 0.05 ppm。

（ii）磷化氫

磷化氫無色、易燃、劇毒並有爛魚氣味。

毒性

磷化氫作用於中樞神經系統和血液。

癥狀

磷化氫中毒的癥狀表現為胸部有壓迫感、頭痛、眩暈、全身無力、厭食和特別口渴。在濃度為 2000 ppm 的磷化氫中暴露幾分鐘和在 400 至 600 ppm 中都會有生命危險。能夠忍受幾個小時而不出現癥狀的最大濃度為 0.3 ppm。

禁止長期暴露於該氣體。

黑色金屬鑽屑、削屑、旋屑或切屑 UN 2793

呈易自熱狀態

描述

金屬鑽屑常處於潮濕或沾染不飽和切削油、含油抹布和其他易燃物質的狀態。

如果託運人為託運的貨物提交了證明，說明其在散裝運輸時無自熱性，則本表不適用。

特性

靜止角	散貨密度（kg/m³）	積載因數（m³/t）
不適用	各種各樣	各種各樣
尺寸	**類別**	**組別**
不適用	4.2	B

危險性

這些物質易自熱和自燃，特別是當它們處於細碎狀態、潮濕狀態和沾染了不飽和切削油、含油抹布和其他易燃物質時尤其如此。

大量的鑄鐵鑽屑或有機物會助長發熱。自熱或通風不足會引起貨物處所嚴重缺氧。

積載和隔離

與食品“隔離”。

貨艙清潔程度

按貨物的危險性保持清潔和乾燥狀態。

天氣注意事項

該貨物須儘可能保持乾燥。不得在降水期間裝卸貨物。在貨物裝卸期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋。

裝載

在裝載期間，須儘可能頻繁地使用滾壓機或其他手段將貨物壓實。裝載貨物的每個貨物處所的艙底須儘可能保持乾燥。裝貨後須平艙，消除堆尖並壓實。貨物裝載前，須將貨物處所內的木質防潮護板和襯墊料清除。

注意事項

裝載前和裝載期間均須測量貨物溫度。須在貨堆內 200 毫米至 350 毫米深處測量溫度。裝載前，貨物的溫度不得超過 55°C。裝載期間，如果任何貨物處所的溫度超過 90°C，須停止裝貨，在溫度下降到 85°C 以下之前不得繼續裝貨。除非貨物溫度在 65°C 以下並保持穩定或至少在八個小時內呈下降趨勢，否則船舶不得開航。

通風

在航行期間，不得對裝運該貨物的處所進行通風。

裝運

在航行期間，須每天監測和記錄貨物表面溫度。溫度的讀取須不進入貨物處所即可進行，或者，如果為此目的需要進入，除了《安全公約》第 II-2/10.10 條所要求提供的安全設備外，還須提供至少兩套自給式呼吸器。

卸貨

將主艙口打開並經充分通風後，才允許佩戴自給式呼吸器的、經過培訓的人員進入裝有該貨物的處所，或允許使用合適的呼吸器的人員進入。

清掃

在沖洗該貨物的殘留物之前，須清除艙底和貨物處所艙底污水井的任何溢油。

應急程序

需配備的專用應急設備 自給式呼吸器
應急程序 無 火災時的應急行動 在航行期間，任何貨物表面溫升均表明存在自熱反應問題。如果溫度達到80°C，可能引起火災，船舶應駛往最近合適港口。封艙。**在海上不應用水。**在僅有煙霧的情況下早些使用惰性氣體會有效。 醫療急救 參考經修訂的《危險貨物事故醫療急救指南（MFAG）》。

備註

在港內可以使用大量的水滅火，但應充分考慮到影響船舶穩性的因素。

不含硝酸鹽的化肥

（無危險性的）

描述

呈粉末狀和顆粒狀。微綠色、棕色或米黃色。無味。水分含量很低（0%至 1%）。吸濕。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	714 至 1111	0.90 至 1.40
尺寸	**類別**	**組別**
1 毫米至 3 毫米	不適用	C

危險性

沒有特別危險性。

該貨物為非易燃或具有低失火危險。

該貨物易吸濕，潮濕後會結塊。

積載和隔離

沒有特別要求。

貨艙清潔程度

沒有特別要求。

天氣注意事項

該貨物須儘可能保持乾燥。不得在降水期間裝卸貨物。在貨物裝卸期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

注意事項

沒有特別要求。

通風

在航行期間，不得對裝運該貨物的處所進行通風。

裝運

沒有特別要求。

卸貨

如果貨物已變硬，須根據需要進行平艙，以避免形成懸空表面。

清掃

沒有特別要求。

魚（散貨）

描述

冷凍後散裝運輸的魚。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	-	-
尺寸	**類別**	**組別**
各種各樣	不適用	A

危險性

散裝運輸的魚可能流態化。

該貨物為非易燃或具有低失火危險。

積載和隔離

沒有特別要求。

貨艙清潔程度

沒有特別要求。

天氣注意事項

沒有特別要求。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

注意事項

在裝運該貨物之前，須適當注意與主管機關協商。對此種貨物，可免除《規則》第 7 章中關於確定可運輸含水量極限和含水量申報的要求。

艙底污水井須保持清潔、乾燥並酌情遮蓋以防貨物進入。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

卸載完成後，須注意貨物殘留物。貨物殘留物易於分解並釋放有毒氣體，並可消耗氧氣。

魚粉（魚渣），穩定的 UN 2216

經抗氧劑處理

若貨物有託運所在國家的主管機關簽發的證書，說明其在散裝運輸時無自熱性質，則本條目的要求不適用於 C 組魚粉的託運。

描述

通過加熱和烘乾含油魚類製成，呈棕色至暗棕色。水分含量：按質量計大於 5%但不超過 12%。強烈氣味可影響到其他貨物。脂肪含量：按質量計不超過 15%。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	300 至 700	1.5 至 3.0
尺寸	**類別**	**組別**
不適用	9	B

危險性

除非脂肪含量較低或經抗氧化處理，否則易自熱。易引起貨物處所內缺氧。

積載和隔離

按第 4.2 類物質的隔離要求進行隔離。

貨艙清潔程度

按貨物危險性保持清潔和乾燥狀態。

天氣注意事項

該貨物須儘可能保持乾燥。不得在降水期間裝卸貨物。在貨物裝卸期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

裝貨時，貨物溫度不得超過 35°C 或高於環境溫度 5°C，取較高者。裝載前，不一定要風化/加工處理。

注意事項

1. 只有在生產時或在裝運前 12 個月內，通過有效施用以下物質，對貨物進行穩定性處理以防止自燃，而且裝運時剩餘抗氧劑濃度不得小於 100 mg/kg（ppm），才可裝運該貨物：

   .1 400 至 1000 mg/kg（ppm）乙氧基喹，或

   .2 1000 至 4000 mg/kg（ppm）丁烯化的羥基甲苯對魚粉進行處理。

2. 託運人須向船長提供託運所在國家的主管當局認可的人員簽發證書，詳細說明：

   - 水分含量；
   - 脂肪含量；
   - 存放超過六個月魚粉的抗氧化處理詳細情況；
   - 運輸時剩餘抗氧劑的濃度應不超過 100 mg/kg（ppm）；
   - 貨物總重量；

- 魚粉出廠時的溫度；及
- 生產日期。

船上須配備測量貨物處所內氧氣含量的一套合適儀器。

通風

在航行期間，須根據需要僅對運載該貨物的處所進行自然或機械表面通風。如果貨物溫度超過 55°C 並且繼續升高，則須停止貨物處所的通風。如果繼續自熱，須對貨物除所施用二氧化碳或惰性氣體。

裝運

該貨物須儘實際可能保持冷卻和乾燥。航行期間須每隔八小時測量一次貨物溫度。測量讀數須作記錄並保持在船上。

卸貨

沒有特別要求。

清掃

沒有特別要求。

應急程序

需配備的專用應急設備 自給式呼吸器。
應急程序 佩戴自給式呼吸器。 火災時的應急行動 封艙；使用船上固定式滅火裝置（如果配備有的話）。 醫療急救 參考經修訂的《危險貨物事故醫療急救指南（MFAG）》。

氟石

描述

呈黃色、綠色或紫色的晶體。粗粉末。

特性

靜止角	散貨密度（kg/m³）	積載因數（m³/t）
不適用	乾：1429 至 1786 濕：1786 至 2128	乾：0.56 至 0.70 濕：0.47 至 0.56
尺寸	**類別**	**組別**
不適用	MHB	A 和 B

危險性

如果裝運時水分含量超過可運輸含水量極限，貨物可能流態化。見《規則》第 7 節。吸入粉塵有害並有刺激性。

積載和隔離

與食品和所有第 8 類物質（包括包裝和固體散裝貨物）“隔離”。

貨艙清潔程度

沒有特別要求。

天氣注意事項

如果貨物不是在專門建造或配備的、符合《規則》第 7.3.2 小節要求的船舶中運輸，須遵守以下規定：

.1 航行期間須將貨物的含水量保持在可運輸含水量極限以下；

.2 除非在本明細表中有明確規定，不得在降水期間裝卸；

.3 除非在本明細表中有明確規定，在貨物裝卸期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋；

.4 如果貨物的實際含水量小於可運輸含水量極限，足以使實際含水量不會由於降水而可能超過可運輸含水量極限，則可以在降水期間裝卸；和

.5 如果貨艙中的全部貨物將在一港口中卸完，可以在降水期間卸下貨艙中的貨物。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

注意事項

須採取適當預防措施以防該貨物的粉塵進入機器處所和起居處所。須防止貨物進入其處所的艙底污水井。須適當考慮設備的貨物粉塵防護。可能接觸該貨物粉塵的人員須戴護目鏡或其他等效的眼睛防塵保護用品和防塵口罩。那些人員須根據需要穿戴防護服。防止粉塵進入機器處所、起居處所及艙底污水井。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

沒有特別要求。

應急程序

需配備的專用應急設備 無
應急程序 無 火災時的應急行動 無 醫療急救 參考經修訂的《危險貨物事故醫療急救指南（MFAG）》。

飄塵

描述

飄塵是燃煤或燃油電廠產生的輕粉末灰渣。不要與煙灰混淆。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	794	1.26
尺寸	**類別**	**組別**
不適用	不適用	C

危險性

暴露於空氣中時可移動。

該貨物為非易燃或具有低失火危險。

積載和隔離

與食品“隔離”。

貨艙清潔程度

按貨物危險性保持清潔和乾燥狀態。

天氣注意事項

該貨物須儘可能保持乾燥。不得在降水期間裝卸貨物。在貨物裝卸期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

在貨物穩定前，裝運該貨物的船舶不得啟航。

注意事項

艙底污水井須保持清潔、乾燥、並酌情蓋好以防止貨物進入。須採取適當預防措施以防該貨物的粉塵進入機器處所和起居處所。須防止貨物進入其處所的艙底污水井。須適當考慮設備的貨物粉塵防護。可能接觸該貨物粉塵的人員須根據需要穿戴防護服、護目鏡或其他等效的眼睛防塵保護用品和防塵口罩。

通風

沒有特別要求。

裝運

在完成貨物裝載後，須密封貨物處所的艙口。在航行期間，關閉貨物處所的所有通風口和通道。除非絕對必要，不要抽取裝有飄塵的貨艙的艙底污水。

卸貨

沒有特別要求。

清掃

如需要沖洗該貨物的殘留物，須在開始沖洗前徹底清掃貨艙和其他可能與該貨物或其粉塵接觸的結構與設備。特別注意貨艙的艙底污水井和框架。在滿足前述要求後，須清洗貨物處所並以適當的方式排出清洗水，但卸貨後擬裝載的貨物的散貨船運名為飄塵除外。

粒狀爐渣

描述

由鋼廠高爐產生的髒灰色粒狀殘渣。含鐵：0.5%。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	1111	0.90
尺寸	**類別**	**組別**
最大達 5 毫米	不適用	C

危險性

沒有特別危險性。渣塵精細並有腐蝕性。

該貨物為非易燃或具有低失火危險。

積載和隔離

沒有特別要求。

貨艙清潔程度

沒有特別要求。

天氣注意事項

沒有特別要求。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

如貨物溫度超過 50°C，不得裝運。

注意事項

須採取適當預防措施以防該貨物的粉塵進入機器處所和起居處所。須防止貨物進入其處所的艙底污水井。須適當考慮設備的貨物粉塵防護。可能接觸該貨物粉塵的人員須根據需要穿戴防護服、護目鏡或其他等效的眼睛防塵保護用品和防塵口罩。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

沒有特別要求。

顆粒輪胎橡膠

描述

切碎的橡膠輪胎材料，經過清潔，不含其他物質。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	555	1.8
尺寸	**類別**	**組別**
顆粒狀，最大達 10 毫米	不適用	C

危險性

沒有特別危險性。

該貨物為非易燃或具有低失火危險。

積載和隔離

沒有特別要求。

貨艙清潔程度

沒有特別要求。

天氣注意事項

沒有特別要求。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

注意事項

在裝卸和裝運期間，不允許在裝有該貨物的處所附近做熱工、燃燒和吸煙。在船運前，須由託運人向船長提交一份證書，證明該貨物僅由乾淨的橡膠材料構成。若開始裝載與完成卸貨之間的預定間隔期超過5天，除非在配備固定式氣體滅火系統的貨物處所中裝載該貨物，否則不得裝運。如果主管機關認為從開始裝載到完成卸貨的計劃航程不超過5天，它可免除在裝運該貨物的處所中配備固定式氣體滅火系統的要求。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

沒有特別要求。

石膏

描述

一種天然的水合硫酸鈣。不溶於水。裝載時呈粉末狀，積聚成塊。石膏不是水溶性物質。平均水分含量為 1%至 2%。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	1282 至 1493	0.67 至 0.78
尺寸	**類別**	**組別**
最大達 100 毫米	不適用	C

危險性

沒有特別危險性。

該貨物為非易燃或具有低失火危險。

積載和隔離

沒有特別要求。

貨艙清潔程度

沒有特別要求。

天氣注意事項

該貨物須儘可能保持乾燥。不得在降水期間裝卸貨物。在貨物裝卸期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

注意事項

沒有特別要求。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

由於很難沖洗，在沖洗貨物殘留物之前，鏟淨和掃淨甲板和貨艙。

鈦鐵礦黏土

描述

非常重的黑色黏土。有磨蝕性，可能產生粉塵。從鈦鐵礦黏土中可製得鈦、硅酸鹽和氧化鐵。水分含量為 10%至 20%。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	2000 至 2500	0.4 至 0.5
尺寸	**類別**	**組別**
最大達 0.15 毫米	不適用	A

危險性

如果裝運時含水量超過可運輸含水量極限（TML），貨物可能流態化。

該貨物為非易燃或具有低失火危險。

積載和隔離

沒有特別要求。

貨艙清潔程度

沒有特別要求。

天氣注意事項

如果貨物不是在專門建造或配備的、符合《規則》第 7.3.2 小節要求的船舶中運輸，須遵守以下規定：

.1 航行期間須將貨物的含水量保持在可運輸含水量極限以下；

.2 除非在本明細表中有明確規定，不得在降水期間裝卸；

.3 除非在本明細表中有明確規定，在貨物裝卸期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋；

.4 如果貨物的實際含水量小於可運輸含水量極限，足以使實際含水量不會由於降水而可能超過可運輸含水量極限，則可以在降水期間裝卸；和

.5 如果貨艙中的全部貨物將在一港口中卸完，可以在降水期間卸下貨艙中的貨物。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

由於該貨物密度極高，除非貨物在艙底均勻鋪開以使重量平均分佈，否則艙底可能會受力過度。在航行和裝載期間，須適當注意確保不要把貨物堆起而使艙底受力過度。

注意事項

艙底污水井須保持乾淨、乾燥並適當遮蓋以防止貨物進入。

通風

沒有特別要求。

裝運

在航行期間，須定期檢查貨物表面的情況。若在航行期間觀察到貨物上面有自由液面或流態貨物，船長須採取適當行動以防止貨物移動和船舶的可能傾覆，並考慮尋求緊急進入避難地。

卸貨

沒有特別要求。

清掃

沒有特別要求。

鈦鐵礦砂

此類貨物可歸類在 A 或 C 組中。

描述

非常重的黑色砂。有磨蝕性。可能產生粉塵。從鈦鐵礦砂中可製得鈦、獨居石和鋅礦。C 組貨物的含水量為 1%至 2%。若含水量超過 2%，該貨物須歸類在 A 組。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	2380 至 3225	0.31 至 0.42
尺寸	**類別**	**組別**
最大達 0.15 毫米	不適用	A 或 C

危險性

C 組中的該類貨物沒有特別危險性。如果裝運時含水量超過可運輸含水量極限（TML），A 組中的該類貨物可能流態化。參閱《規則》第 7 節。

該貨物為非易燃或具有低失火危險。

積載和隔離

沒有特別要求。

貨艙清潔程度

沒有特別要求。

天氣注意事項

在裝載前、裝載期間和航行期間，該貨物須儘可能保持乾燥。不得在降水期間裝載貨物。在裝載貨物期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

由於該貨物密度極高，除非貨物在艙底均勻鋪開以使重量平均分佈，否則艙底可能會受力過度。在航行和裝載期間，須適當注意確保不要把貨物堆起而使艙底受力過度。

注意事項

艙底污水井須保持乾淨、乾燥並適當遮蓋以防止貨物進入。

通風

沒有特別要求。

裝運

在航行期間，須定期檢查貨物表面的情況。若在航行期間觀察到貨物上面有自由液面或流態貨物，船長須採取適當行動以防止貨物移動和船舶的可能傾覆，並考慮尋求緊急進入避難地。

卸貨

沒有特別要求。

清掃

沒有特別要求。

鐵礦

描述

鐵礦的顏色呈深灰色至鐵鏽紅色不等。鐵含量各異，從赤鐵礦（高品質鐵）到較低商業品次的褐鐵礦。含水量為 0%至 16%。精礦屬不同貨物（見鐵精礦）。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	1250 至 3448	0.29 至 0.80
尺寸	**類別**	**組別**
最大達 250 毫米	不適用	C

危險性

沒有特別危險性。

該貨物為非易燃或具有低失火危險。

鐵礦貨物可影響磁羅經。

積載和隔離

沒有特別要求。

貨艙清潔程度

沒有特別要求。

天氣注意事項

沒有特別要求。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

由於該貨物密度極高，除非貨物在艙底均勻鋪開以使重量平均分佈，否則艙底可能會受力過度。在航行和裝載期間，須適當注意確保不要把貨物堆起而使艙底受力過度。

注意事項

在正常情況下，裝載速率可以非常高。在擬定《安全公約》第 VI/9.3 條要求的裝載計劃時，須適當注意壓載作業。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

沒有特別要求。

鐵礦小球

描述

鐵礦小球大約是球形塊，在將鐵礦壓碎成粉末時形成。這種氧化鐵是通過使用黏土作為黏合劑形成球團、然後在 1315°C 的窯中用火燒硬得來。含水量：0%至 2%。

特性

靜止角	散貨密度（kg/m³）	積載因數（m³/t）
不適用	1900 至 2400	0.45 至 0.52
尺寸	**類別**	**組別**
最大達 20 毫米	不適用	C

危險性

沒有特別危險性。

該貨物為非易燃或具有低失火危險。

積載和隔離

沒有特別要求。

貨艙清潔程度

沒有特別要求。

天氣注意事項

沒有特別要求。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

由於該貨物密度極高，除非貨物在艙底均勻鋪開以使重量平均分佈，否則艙底可能會受力過度。在航行和裝載期間，須適當注意確保不要把貨物堆起而使艙底受力過度。

注意事項

沒有特別要求。

艙底污水井須保持乾淨、乾燥並適當遮蓋以防止貨物進入。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

沒有特別要求。

廢氧化鐵 或 廢海綿鐵 UN 1376

在煤氣提純中製得

描述

粉末狀物質，呈黑色、棕色、紅色或黃色。氣味強烈可沾染其他貨物。

特性

靜止角	散貨密度（kg/m³）	積載因數（m³/t）
不適用	2222	0.45
尺寸	**類別**	**組別**
最大達 20 毫米	4.2	B

危險性

易於自熱和自燃，尤其是沾染了油類或潮氣時。會產生有毒氣體：硫化氫、二氧化硫和氰化氫。粉塵可引起爆炸危險。在貨物處所內易造成缺氧。

積載和隔離

與食品“隔離”。

貨艙清潔程度

按貨物危險性保持清潔和乾燥狀態。

天氣注意事項

該貨物須儘可能保持乾燥。不得在降水期間裝卸貨物。在貨物裝卸期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

由於該貨物密度極高，除非貨物在艙底均勻鋪開以使重量平均分佈，否則艙底可能會受力過度。在航行和裝載期間，須適當注意確保不要把貨物堆起而使艙底受力過度。

注意事項

裝運前，託運人或廠家須向船長出具證書，證明所託運的貨物已經冷卻，並在裝船前已風化不少於 8 個星期。

通風

對這些貨物，在航行期間須根據需要僅對貨物表面進行自然或機械通風。

裝運

為測量氧氣和氰化氫含量，在裝運貨物期間須在船上裝有每種氣體或混合氣體的探測器。探測器須適合在無氧氣的空氣中使用，並通過認證，可在可爆氣體中使用。在航行期間，須定期測量裝運這些貨物的處所中這些氣體的含量，並須記錄和在船上保存測量結果。

卸貨

沒有特別要求。

清掃

沒有特別要求。

應急程序

需配備的專用應急設備 防護服（手套、靴子、工作服、安全帽）。 自給式呼吸器。 噴霧嘴。
應急程序 穿防護服及佩戴自給式呼吸器。 火災時的應急行動 封艙；使用船上固定式滅火裝置（如果裝有的話）。氣封能有效地控制火勢。 醫療急救 查閱經修訂的《危險貨物事故醫療急救指南（MFAG）》。

鐵礦石

描述

礦石。水分含量：1%至 2%

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	2564	0.39
尺寸	**類別**	**組別**
75 毫米	不適用	C

危險性

沒有特別危險性。

該貨物為非易燃或具有低失火危險。

積載和隔離

沒有特別要求。

貨艙清潔程度

沒有特別要求。

天氣注意事項

沒有特別要求。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。如果存在疑問，合理地進行平艙至貨物處所的邊界，以便最大限度地降低貨物移動的風險並確保在航行過程中保持足夠的穩性。

由於該貨物密度極高，除非貨物在艙底均勻鋪開以使重量平均分佈，否則艙底可能會受力過度。在航行和裝載期間，須適當注意確保不要把貨物堆起而使艙底受力過度。

注意事項

須採取適當預防措施以防該貨物的粉塵進入機器處所和起居處所。須防止貨物進入其處所的艙底污水井。須適當考慮設備的貨物粉塵防護。可能接觸該貨物粉塵的人員須根據需要穿戴防護服、護目鏡或其他等效的眼睛防塵保護用品和防塵口罩。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

沒有特別要求。

拉長石

描述

一種鈣鈉鹽長石。會產生粉塵。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	1667	0.60
尺寸	**類別**	**組別**
塊：50 毫米至 300 毫米	不適用	C

危險性

沒有特別危險性。

該貨物為非易燃或具有低失火危險。

積載和隔離

沒有特別要求。

貨艙清潔程度

按貨物危險性保持清潔和乾燥狀態。

天氣注意事項

在裝載前、裝載期間和航行期間，該貨物須儘可能保持乾燥。不得在降水期間裝載貨物。在裝載貨物期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

注意事項

須採取適當預防措施以防該貨物的粉塵進入機器處所和起居處所。須防止貨物進入其處所的艙底污水井。須適當考慮設備的貨物粉塵防護。可能接觸該貨物粉塵的人員須根據需要穿戴防護服、護目鏡或其他等效的眼睛防塵保護用品和防塵口罩。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

沒有特別要求。

硝酸鉛 UN 1469

描述

白色晶體。溶解於水。產生於硝酸對鉛的反應。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	-	-

尺寸	類別	副危險性	組別
不適用	5.1	6.1	B

危險性

吞咽或吸入粉塵有毒。

自身不可燃，但與可燃物質形成的混合物則易被點燃並會猛烈燃燒。

積載和隔離

與食品“隔離”。

貨艙清潔程度

按貨物危險性保持清潔和乾燥狀態。

天氣注意事項

在裝載前、裝載期間和航行期間，該貨物須儘可能保持乾燥。不得在降水期間裝載貨物。在裝載貨物期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

注意事項

艙底污水井須保持乾淨、乾燥和酌情遮蓋以防止貨物進入。須採取適當預防措施以防該貨物的粉塵進入機器處所和起居處所。須防止貨物進入其處所的艙底污水井。須適當考慮設備的貨物粉塵防護。可能接觸該貨物粉塵的人員須戴護目鏡或其他等效的眼睛防塵保護用品和防塵口罩。那些人員須根據需要穿戴防護服。

通風

航行期間，須根據需要為運載該貨物的處所進行表面自然通風。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

沒有特別要求。

應急程序

需配備的專用應急設備 防護服（手套、工作服、安全帽）。 自給式呼吸器。 噴霧嘴。
應急程序 穿防護服及佩戴自給式呼吸器。 **火災時的應急行動** 用大量的水，最好使用噴霧的形式以避免擾動物質表面。物質可能熔化或溶化；在該條件下使用水可以導致溶化的物質大範圍的散落。氣封或用二氧化碳不能控制火勢。應充分考慮到由於積水而對船舶穩性的影響。 **醫療急救** 查閱經修訂的《危險貨物事故醫療急救指南（MFAG）》。

鉛礦

描述

重、軟的灰色固體物質。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	1493 至 4167	0.24 至 0.67
尺寸	**類別**	**組別**
粉末	不適用	C

危險性

有毒，與酸類接觸產生劇毒蒸氣。

該貨物為非易燃或具有低失火危險。

積載和隔離

與第 8 類所有液體物質隔離。

貨艙清潔程度

按貨物危險性保持清潔和乾燥狀態。

天氣注意事項

在裝載前、裝載期間和航行期間，該貨物須儘可能保持乾燥。不得在降水期間裝載貨物。在裝載貨物期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

由於該貨物密度極高，除非貨物在艙底均勻鋪開以使重量平均分佈，否則艙底可能會受力過度。在航行和裝載期間，須適當注意確保不要把貨物堆起而使艙底受力過度。

注意事項

沒有特別要求。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

沒有特別要求。

石灰（未熟化的）

描述

顏色呈白色或灰白色。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	-	-
尺寸	**類別**	**組別**
塊	MHB	B

危險性

生石灰與水結合形成氫氧化鈣（熟石灰）或氫氧化鎂。這一反應會產生大量的熱，足以引起附近的可燃物質燃燒。此類貨物非易燃或具有低失火危險，對眼睛和黏膜有腐蝕性。

積載和隔離

與所有 B 組包裝危險貨物和固體散裝貨物“隔離”。

貨艙清潔程度

按貨物危險性保持清潔和乾燥狀態。

天氣注意事項

該貨物須儘可能保持乾燥。不得在降水期間裝卸貨物。在貨物裝卸期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

注意事項

該貨物須儘可能保持乾燥。艙底污水井須保持乾淨、乾燥和適當遮蓋以防止貨物進入。須採取適當預防措施以防該貨物的粉塵進入機器處所和起居處所。須防止貨物進入其處所的艙底污水井。須適當考慮設備的貨物粉塵防護。可能接觸該貨物粉塵的人員須戴護目鏡或其他等效的眼睛防塵保護用品和防塵口罩。那些人員須根據需要穿戴防護服。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

不要在降水期間卸貨。

清掃

沒有特別要求。

應急程序

需配備的專用應急設備 無
應急程序 無 火災時的應急行動 無（非易燃）。 如果發生火災，不要用水。 醫療急救 查閱經修訂的《危險貨物事故醫療急救指南（MFAG）》。

石灰石

描述

顏色各異，從乳白色至中度深灰色（剛破碎時）。

水分含量：最高達 4%。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	1190 至 1493	0.67 至 0.84
尺寸	**類別**	**組別**
微粒至 90 毫米	不適用	C

危險性

沒有特別危險性。

該貨物為非易燃或具有低失火危險。

積載和隔離

沒有特別要求。

貨艙清潔程度

沒有特別要求。

天氣注意事項

沒有特別要求。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

注意事項

艙底污水井須保持乾淨、乾燥和適當遮蓋以防止貨物進入。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

沒有特別要求。

帶棉絨的棉籽

含水量不超過 9%，含油量不超過 20.5%。

描述

經機器脫棉大約 90% – 98%後，附有短棉纖維的棉籽。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	490	2.02
尺寸	**類別**	**組別**
-	MHB	B

危險性

可能自熱和消耗貨艙的氧氣。

積載和隔離

沒有特別要求。

貨艙清潔程度

按貨物的危險性保持乾淨和乾燥。

天氣注意事項

該貨物須儘可能保持乾燥。該貨物不得在降水期間裝卸。在裝卸該貨物期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

注意事項

在對貨物處所通風和測試空氣含氧量之前，不得進入貨物處所。

通風

沒有特別要求。

裝運

艙蓋應為風雨密的，以防進水。

卸貨

若該貨物已硬化，應根據需要進行平倉，以防形成表面懸空。

清掃

沒有特別要求。

應急程序

需配備的專用應急設備 自給式呼吸器
應急程序 佩戴自給式呼吸器 火災時的應急行動 封艙；使用船上的固定式滅火設施（如裝有的話）。 醫療急救 查閱經修訂的《危險貨物事故醫療急救指南（MFAG）》。

氧化鎂（僵燒的）

描述

製成塊狀並通常呈白色、棕色或灰色。尺寸、外表、和裝卸方式與砂礫類似，而且乾燥並易產生粉塵。僵燒的氧化鎂為高溫焙燒過的天然菱鎂礦，從而產生無反應作用的氧化鎂，它不會發生水合或產生自熱。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	2000	0.5
尺寸	**類別**	**組別**
細粉至約 30 毫米	不適用	C

危險性

沒有特別危險性。

該貨物為非易燃或具有低失火危險。

積載和隔離

沒有特別要求。

貨艙清潔程度

沒有特別要求。

天氣注意事項

沒有特別要求。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

注意事項

裝運前，託運人或生產廠家須向船長提供一份聲明，說明所託運貨物經充分熱處理並且適於裝運。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

沒有特別要求。

氧化鎂（未熟化的）

描述

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	1250	0.80
尺寸	**類別**	**組別**
細粉至 90 毫米	MHB	B

危險性

與水結合形成氫氧化鎂，體積發生膨脹並放出熱量。可引起低燃點物質的燃燒。與石灰（未熟化的）相似，但反應作用較弱。對眼睛和黏膜有腐蝕性。

該貨物為非易燃或具有低失火危險。

積載和隔離

與所有包裝的危險貨物和 B 組固體散裝貨物“隔離”。

貨艙清潔程度

根據貨物危險性保持清潔和乾燥狀態。

天氣注意事項

該貨物須儘可能保持乾燥。不得在降水期間裝卸貨物。在貨物裝卸期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

注意事項

須採取適當預防措施以防該貨物的粉塵進入機器處所和起居處所。須防止貨物進入其處所的艙底污水井。須適當考慮設備的貨物粉塵防護。可能接觸該貨物粉塵的人員須戴護目鏡或其他等效的眼睛防塵保護用品和防塵口罩。那些人員須根據需要穿戴防護服。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

不要在降水期間卸貨。

清掃

沒有特別要求。

應急程序

需配備的專用應急設備 無
應急程序 無 火災時的應急行動 無（非易燃）。 如果發生火災，不要用水。 醫療急救 查閱經修訂的《危險貨物事故醫療急救指南（MFAG）》。

菱鎂礦，天然的

描述

菱鎂礦顏色呈白色至黃色。

特性

靜止角	散貨密度（kg/m³）	積載因數（m³/t）
不適用	1429	0.7
尺寸	**類別**	**組別**
3 毫米至 30 毫米	不適用	C

危險性

沒有特別危險性。

該貨物為非易燃或具有低失火危險。

積載和隔離

沒有特別要求。

貨艙清潔程度

沒有特別要求。

天氣注意事項

沒有特別要求。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

注意事項

沒有特別要求。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

沒有特別要求。

硝酸鎂 UN 1474

描述

白色晶體，溶解於水。有吸濕性。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	-	-
尺寸	類別	組別
不適用	5.1	B

危險性

儘管本身不易燃，但與可燃物質形成的混合物易被點燃並且會劇烈燃燒。

該貨物易吸濕並且潮濕後會結塊。

積載和隔離

與食品“隔離”。

貨艙清潔程度

按貨物危險性保持清潔和乾燥狀態。

天氣注意事項

沒有特別要求。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

注意事項

沒有特別要求。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

如果貨物已變硬，須根據需要平艙以避免形成懸空表面。

清掃

沒有特別要求。

應急程序

需配備的專用應急設備 防護服（手套、靴子、工作服、防護帽）。 自給式呼吸器。 噴霧嘴。
應急程序 穿防護服及佩戴自給式呼吸器。 火災時的應急行動 用大量的水，最好使用噴霧的形式以避免擾動物質表面。物質可能熔化或溶化；在該條件下使用水可以導致溶化的物質大範圍的散落。氣封或用二氧化碳不能控制火勢。應充分考慮到由於積水而對船舶穩性造成的影響。 醫療急救 查閱經修訂的《危險貨物事故醫療急救指南（MFAG）》。

備註

除非受到污染，該物質不易燃。

錳礦

描述

錳礦顏色呈黑色至棕黑色。是一種非常硬的貨物。

水分含量：最高達 15%。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	1429 至 3125	細粉至 0.32 塊狀至 0.70
尺寸	**類別**	**組別**
細粉塵至 250 毫米	不適用	C

危險性

沒有特別危險性。

該貨物為非易燃或具有低失火危險。

積載和隔離

沒有特別要求。

貨艙清潔程度

沒有特別要求。

天氣注意事項

沒有特別要求。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

由於該貨物密度極高，除非貨物在艙底均勻鋪開以使重量平均分佈，否則艙底可能會受力過度。在航行和裝載期間，須適當注意確保不要把貨物堆起而使艙底受力過度。

注意事項

須採取適當預防措施以防該貨物的粉塵進入機器處所和起居處所。須防止貨物進入其處所的艙底污水井。須適當考慮設備的貨物粉塵防護。可能接觸該貨物粉塵的人員須根據需要穿戴防護服、護目鏡或其他等效的眼睛防塵保護用品和防塵口罩。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

沒有特別要求。

大理石碎片

描述

乾燥、揚塵，呈白色至灰色塊、顆粒或粉末，混有少量礫石和卵石。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	654	1.53
尺寸	**類別**	**組別**
不適用	不適用	C

危險性

沒有特別危險性。

該貨物為非易燃或具有低失火危險。

積載和隔離

沒有特別要求。

貨艙清潔程度

沒有特別要求。

天氣注意事項

沒有特別要求。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

注意事項

須採取適當預防措施以防該貨物的粉塵進入機器處所和起居處所。須防止貨物進入其處所的艙底污水井。須適當考慮設備的貨物粉塵防護。可能接觸該貨物粉塵的人員須根據需要穿戴防護服、護目鏡或其他等效的眼睛防塵保護用品和防塵口罩。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

沒有特別要求。

硫化金屬精礦

（另見精礦明細表）

描述

精礦是精煉礦石，有價值的成分已通過清除大部分廢料而增加。通常顆粒較小，儘管在非剛生產出的精礦中有時存在結塊。

此類中最常見的精礦有：鋅精礦、鉛精礦、銅精礦和低等級中檔精礦。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	1790 至 3230	0.31 至 0.56
尺寸	**類別**	**組別**
各種各樣	MHB	A 和 B

危險性

一些含硫化物的精礦易於氧化並有自熱的趨勢，同時引起缺氧並產生毒氣。某些物質可產生腐蝕問題。

如果認為硫化金屬精礦具有低失火危險，在沒有安裝固定式氣體滅火系統的船舶上運輸此類貨物應根據《安全公約》第 II-2/10.7.1.4 條得到主管機關的批准。

積載和隔離

除非由主管機關作出決定，否則應按要求與第 4.2 類物質隔離。

與食品和第 8 類所有酸類物質“隔離”。

貨艙清潔程度

按貨物的危險性保持清潔和乾燥狀態。

天氣注意事項

如果貨物不是在專門建造或配備的、符合《規則》第 7.3.2 小節要求的船舶中運輸，須遵守以下規定：

.1 航行期間須將貨物的含水量保持在可運輸含水量極限以下；

.2 除非在本明細表中有明確規定，不得在降水期間裝卸；

.3 除非在本明細表中有明確規定，在貨物裝卸期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋；

.4 如果貨物的實際含水量小於可運輸含水量極限，足以使實際含水量不會由於降水而可能超過可運輸含水量極限，則可以在降水期間裝卸；和

.5 如果貨艙中的全部貨物將在一港口中卸完，可以在降水期間卸下貨艙中的貨物。

裝載

須對該貨物進行平艙，從而使貨物表面峰穀間的高度差不超過船舶寬度的 5%，而且貨物從艙口的邊界均勻坡向艙壁，在航行途中不出現陡面坍塌現象，尤其是小船，即長度為 100 米或以下的船舶上。

由於該貨物密度極高，除非貨物在艙底均勻鋪開以使重量平均分佈，否則艙底可能會受力過度。在航行和裝載期間，須適當注意確保不要把貨物堆起而使艙底受力過度。

注意事項

在對貨物處所通風和測試空氣含氧量之前，不得進入貨物處所。須採取適當預防措施以防該貨物的粉塵進入機器處所和起居處所。須防止貨物進入其處所的艙底污水井。須適當考慮設備的貨物粉塵防護。可能接觸該貨物粉塵的人員須戴護目鏡或其他等效的眼睛防塵保護用品和防塵口罩。那些人員須根據需要穿戴防護服。

通風

裝運該貨物的貨艙處所不得在航行期間通風。

裝運

在航行期間，須定期檢查貨物表面的情況。若在航行期間觀察到貨物上面有自由液面或流態貨物，船長須採取適當行動以防止貨物移動和船舶的可能傾覆，並考慮尋求緊急進入避難地。為測量氧氣和該貨物可能散發的有毒氣體，在裝運貨物期間須在船上裝有每種氣體或混合氣體的探測器。探測器須適合在無氧氣的空氣中使用。在航行期間，須定期測量裝運這些貨物的處所中這些氣體的含量，並須記錄和在船上保存測量結果。

卸貨

沒有特別要求。

清掃

沒有特別要求。

應急程序

需配備的專用應急設備 自給式呼吸器。
應急程序 佩戴自給式呼吸器。 火災時的應急行動 封艙；使用船上固定式滅火裝置。 氣封能有效地控制火勢。不要用水。 醫療急救 查閱經修訂的《危險貨物事故醫療急救指南（MFAG）》。

備註

如有二氧化硫氣味，可能表明有火災發生。

精礦

（見以下散貨船運名）

沉積銅	鉛礦渣	黃鐵礦渣
銅精礦	鉛銀精礦	銀鉛精礦
鐵精礦	錳精礦	斯利格礦（鐵礦）
鐵精礦（顆粒原料，燒結原料）	霞石正長岩（礦物）	鋅鉛煅砂（混合的）
鐵精礦（燒結原料）	鎳精砂	鋅鉛中礦
鉛鋅煅砂（混合的）	五水合物原礦	鋅精砂
鉛鋅中等礦	黃鐵礦	鋅燒結礦
鉛精礦	黃鐵礦灰（含鐵）	鋅淤渣

所有已知的精礦的散貨船運名（BCSN）均列在上面，但名單不是詳盡無遺的。另見金屬硫化物精礦條目。

描述

精礦是精煉礦石，有價值的成分已通過清除大部分廢料而增加。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	1754 至 3030	0.33 至 0.57
尺寸	**類別**	**組別**
不同	不適用	A

危險性

如果裝運時含水量超過可運輸含水量極限（TML），貨物可能流態化。見本規則第 7 節。這些貨物為非易燃或具有低失火危險。

這些貨物會使遮蓋艙底污水井的粗麻布或帆布腐爛。長期連續運載這些貨物可能會對結構有破壞作用。

積載和隔離

沒有特別要求。

貨艙清潔程度

沒有特別要求。

天氣注意事項

如果貨物不是在專門建造或配備的、符合《規則》第 7.3.2 小節要求的船舶中運輸，須遵守以下規定：

.1 航行期間須將貨物的含水量保持在可運輸含水量極限以下；

.2 除非在本明細表中有明確規定，不得在降水期間裝卸；

.3 除非在本明細表中有明確規定，在貨物裝卸期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋；

.4 如果貨物的實際含水量小於可運輸含水量極限，足以使實際含水量不會由於降水而可能超過可運輸含水量極限，則可以在降水期間裝卸；和

.5 如果貨艙中的全部貨物將在一港口中卸完，可以在降水期間卸下貨艙中的貨物。

裝載

須對該貨物進行平艙，從而使貨物表面峰穀間的高度差不超過船舶寬度的 5%，而且貨物從艙口的邊界均勻坡向艙壁，在航行途中不出現陡面坍塌現象，尤其是小船，即長度為 100 米或以下的船舶上。

由於該貨物密度極高，除非貨物在艙底均勻鋪開以使重量平均分佈，否則艙底可能會受力過度。在航行和裝載期間，須適當注意確保不要把貨物堆起而使艙底受力過度。

注意事項

艙底污水井須保持清潔、乾燥、並酌情蓋好以防止貨物進入。測試裝載該貨物的貨物處所的污水系統，以確保其工作正常。

通風

裝運該貨物的貨艙處所不得在航行期間通風。

裝運

在航行期間，須定期檢查貨物表面的情況。若在航行期間觀察到貨物上面有自由液面或流態貨物，船長須採取適當行動以防止貨物移動和船舶的可能傾覆，並考慮尋求緊急進入避難地。

卸貨

沒有特別要求。

清掃

沒有特別要求。

磷酸一銨（M.A.P.）

描述

磷酸一銨是無味並呈棕灰色的晶體。極易揚塵。吸濕。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
35° 至 40°	826 至 1000	1.0 至 1.21
尺寸	**類別**	**組別**
不適用	不適用	C

危險性

散裝磷酸一銨的 pH 值為 4.5，含有水分時會有高度腐蝕性。

該貨物為非易燃或具有低失火危險。

該貨物易吸濕並且受潮後會結塊。

該貨物會使遮蓋艙底污水井的粗麻布或帆布腐爛。長期連續運載該貨物可能會對結構有破壞作用。

積載和隔離

沒有特別要求。

貨艙清潔程度

按貨物的危險性保持清潔和乾燥狀態。

天氣注意事項

該貨物須儘可能保持乾燥。不得在降水期間裝卸貨物。在貨物裝卸期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

注意事項

須採取適當預防措施以防該貨物的粉塵進入機器處所和起居處所。須防止貨物進入其處所的艙底污水井。須適當考慮設備的貨物粉塵防護。可能接觸該貨物粉塵的人員須佩戴護目鏡或其他等效的防塵護目用品和防塵的過濾面罩。那些人員須根據需要穿戴防護服。

通風

裝運該貨物的貨艙處所不得在航行期間通風。

裝運

在航行期間，須定期檢查貨物處所中的冷凝、貨物結水珠和貨物處所艙口蓋滲漏。充分注意貨物處所的艙口密封。

卸貨

如果貨物已變硬，須根據需要進行平艙以避免形成懸空表面。

清掃

卸貨後，須特別注意貨物處所的艙底污水井。

花生（帶殼）

描述

一種可食用的棕黃色堅果。水分含量不定。極易揚塵。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	304	3.29
尺寸	**類別**	**組別**
不適用	不適用	C

危險性

會發生自熱。

該貨物為非易燃或具有低失火危險。

積載和隔離

“遠離”熱源。

貨艙清潔程度

按貨物的危險性保持清潔和乾燥狀態。

天氣注意事項

沒有特別要求。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

注意事項

須採取適當預防措施以防該貨物的粉塵進入機器處所和起居處所。須防止貨物進入其處所的艙底污水井。須適當考慮設備的貨物粉塵防護。可能接觸該貨物粉塵的人員須根據需要穿戴防護服、護目鏡或其他等效的眼睛防塵保護用品和防塵口罩。

通風

裝運該貨物的貨艙處所不得在航行期間通風。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

沒有特別要求。

草泥

描述

從淤泥、泥塘、沼澤、泥苔沼澤和沼澤地帶開採出來的表層物質。類型包括：藻類泥苔、蘆葦泥苔和草本泥苔。物理性質取決於有機物質、水和空氣含量、植物的分解和分解程度。

範圍可包括在自然狀態擠壓時流出清水至略帶顏色水的植物殘留物的高纖維黏合體，至在擠壓時幾乎不流出液體或分離不出液體的充分分解的泥團物質。

典型的風乾泥苔密度低、可壓縮性大和水分含量高；在其自然狀態下，飽和時水分含量按重量計算可達 90%以上。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	80 至 500	2 至 12.5
尺寸	**類別**	**組別**
細粉	MHB	A 和 B

危險性

在貨物處所和鄰近處所造成缺氧和二氧化碳增加。

裝載時有粉塵爆炸的危險。在未經壓縮的草泥表面走動或停放重機械時應小心。

按重量計水分含量超過 80%的草泥只能用裝有特殊設備或專門建造的船舶運輸（見本規則第 7.2.2 至 7.2.4 段）。

粉塵會刺激眼睛、鼻子和呼吸器官。

積載和隔離

沒有特別要求。

貨艙清潔程度

按貨物的危險性保持清潔和乾燥狀態。

天氣注意事項

裝載前，貨物須在遮蓋下堆存以方便排水和減少水分。該貨物須儘可能保持乾燥。不得在降水期間裝卸貨物。在貨物裝卸期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

注意事項

艙底污水井須保持乾淨、乾燥並適當遮蓋以防止貨物進入。

須採取適當預防措施以防該貨物的粉塵進入機器處所和起居處所。須防止貨物進入其處所的艙底污水井。須適當考慮設備的貨物粉塵防護。可能接觸該貨物粉塵的人員須穿戴防護服、護目鏡和防塵口罩。那些人須根據需要穿戴保護服。須提醒運載該貨物的船舶上的所有人員以及參與該貨物裝卸的所有人員，在吃東西和吸煙前洗手，需要迅速處理接觸過該貨物粉塵的劃傷和擦傷。在完成測試並確定氧含量已恢復到正常水平之前，不許人員進入貨物處所。

通風

在航行期間，須根據需要僅對運載該貨物的處所進行自然或機械表面通風。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

沒有特別要求。

應急程序

需配備的專用應急設備 無
應急程序 無 火災時的應急行動 封艙；使用船上固定式滅火裝置（如果有的話）。 氣封可有效地控制火勢。 醫療急救 查閱經修訂的《危險貨物事故醫療急救指南（MFAG）》。

卵石（海中）

描述

圓形卵石。極易滾動。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	1695	0.59
尺寸	**類別**	**組別**
30 毫米至 110 毫米	不適用	C

危險性

沒有特別危險性。

該貨物為非易燃或具有低失火危險。

積載和隔離

沒有特別要求。

貨艙清潔程度

沒有特別要求。

天氣注意事項

沒有特別要求。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

注意事項

須小心裝載該貨物，以防止艙底受損。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

沒有特別要求。

礦粒（精礦）

描述

已經加工成顆粒的精礦。水分含量：最高達 6%。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	2128	0.47
尺寸	**類別**	**組別**
約 10 毫米	不適用	C

危險性

沒有特別危險性。

該貨物為非易燃或具有低失火危險。

積載和隔離

沒有特別要求。

貨艙清潔程度

按貨物的危險性保持清潔和乾燥狀態。

天氣注意事項

沒有特別要求。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

注意事項

沒有特別要求。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

沒有特別要求。

珍珠岩

描述

黏土狀，易揚塵。淺灰色。無味。水分含量：0.5%至 1%。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	943 至 1020	0.98 至 1.06
尺寸	**類別**	**組別**
不適用	不適用	C

危險性

沒有特別危險性。

該貨物為非易燃或具有低失火危險。

積載和隔離

沒有特別要求。

貨艙清潔程度

沒有特別要求。

天氣注意事項

沒有特別要求。

裝載

按照《規則》第 4 和 5 節要求的有關規定進行平艙。

注意事項

須採取適當預防措施以防該貨物的粉塵進入機器處所和起居處所。須防止貨物進入其處所的艙底污水井。須適當考慮設備的貨物粉塵防護。可能接觸該貨物粉塵的人員須根據需要穿戴防護服、護目鏡或其他等效的眼睛防塵保護用品和防塵的過濾面罩。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

沒有特別要求。

石油焦炭（煅燒的或未煅燒的）

描述

煉油產生的黑色細碎殘渣，呈粉末狀和碎塊狀。對裝載時溫度低於55°C 的貨物，本表不適用。

特性

靜止角	散貨密度（kg/m³）	積載因數（m³/t）
不適用	599 至 800	1.25 至 1.67
尺寸	**類別**	**組別**
粉末至小片	MHB	B

危險性

如果不按本條目的規定裝載和運輸，未煅燒的石油焦炭易於變熱和自燃。

該貨物為非易燃或具有低失火危險。

積載和隔離

與食品“隔離”。

與第 1 類、第 1.1 和 1.5 分類的所有貨物“用一個完整艙室或船艙縱向隔離”。

與其他有害物質和危險物品（包裝形式貨物和固體散裝物質）“用一個完整艙室或船艙隔離”。

貨艙清潔度

按貨物的危險性保持清潔和乾燥狀態。

天氣注意事項

沒有特別要求。

裝載

1. 在裝有燃油或其他閃點低於 93°C 的物質的液貨艙之上貨物處所裝貨時，應先向整個貨物處所裝入一層厚 0.6 米，溫度不超過 44°C 的貨物。然後才可以向處所內裝入溫度為 55°C 或以上的貨物。

2. 按照上述要求裝載溫度為 55°C 或以上的貨物而且裝入的貨物厚度大於 1.0 米時，須先裝入一層厚 0.6 米至 1.0 米的貨物。

3. 以上所述的裝載作業結束後，裝載作業才可以繼續下去。

須按照《規則》第 4 節的要求對貨物進行平艙。

注意事項

如果貨物溫度超過 107°C，則不得裝載。船長須在貨物處所附近張貼貨物高溫警告。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

沒有特別要求。

應急程序

需配備的專用應急設備 防護服（手套、靴子、工作服、防護帽）。 自給式呼吸器。 噴霧嘴。
應急程序 穿防護服及佩戴自給式呼吸器。 火災時的應急行動 封艙；使用船上的固定式滅火裝置（如果裝有的話）。氣封可有效地控制火勢。 醫療急救 查閱經修訂的《危險貨物事故醫療急救指南（MFAG）》。

磷酸鹽（脫氟的）

描述

顆粒狀，類似細沙。乾燥運輸。深灰色，無水分含量。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	893	1.12
尺寸	**類別**	**組別**
不適用	不適用	C

危險性

沒有特別危險性。

該貨物為非易燃或具有低失火危險。

積載和隔離

沒有特別要求。

貨艙清潔度

沒有特別要求。

天氣注意事項

沒有特別要求。

裝載

按照《規則》第 4 和 5 節的有關要求進行平艙。

注意事項

須採取適當預防措施以防該貨物的粉塵進入機器處所和起居處所。須防止貨物進入其處所的艙底污水井。須適當考慮設備的貨物粉塵防護。可能接觸該貨物粉塵的人員須根據需要穿戴防護服、護目鏡或其他等效的眼睛防塵保護用品和防塵的過濾面罩。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

沒有特別要求。

磷酸鹽岩石（煅燒的）

描述

一般呈碎石或小球狀。極易揚塵。吸濕。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	794 至 1563	0.64 至 1.26
尺寸	**類別**	**組別**
不適用	不適用	C

危險性

沒有特別危險性。

該貨物為非易燃或具有低失火危險。

該貨物易吸濕，潮濕後會結塊。

積載和隔離

沒有特別要求。

貨艙清潔度

沒有特別要求。

天氣注意事項

在裝載前、裝載期間和航行期間，該貨物須儘可能保持乾燥。不得在降水期間裝載貨物。在裝載貨物期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋。

裝載

按照《規則》第 4 節和 5 節的有關要求進行平艙。

注意事項

須採取適當預防措施以防該貨物的粉塵進入機器處所和起居處所。須防止貨物進入其處所的艙底污水井。須適當考慮設備的貨物粉塵防護。可能接觸該貨物粉塵的人員須根據需要穿戴防護服、護目鏡或其他等效的眼睛防塵保護用品和防塵的過濾面罩。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

如果貨物變硬，須平艙以避免形成懸空表面。

清掃

沒有特別要求。

磷酸鹽岩石（未煅燒的）

描述

磷酸鹽岩石是磷和氧化合而成的礦石。根據其產地不同，呈棕褐色至深灰色，乾燥並易揚塵。水分含量：0%至 2%。根據其產地不同，該貨物具有流動特性，一旦穩定，就不易移動。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	1250 至 1429	0.70 至 0.80
尺寸	**類別**	**組別**
粉末至塊狀	不適用	C

危險性

沒有特別危險性。

該貨物為非易燃或具有低失火危險。

積載和隔離

沒有特別要求。

貨艙清潔度

沒有特別要求。

天氣注意事項

沒有特別要求。

裝載

按照《規則》第 4 節和 5 節的有關要求進行平艙。

注意事項

須採取適當預防措施以防該貨物的粉塵進入機器處所和起居處所。須防止貨物進入其處所的艙底污水井。須適當考慮設備的貨物粉塵防護。可能接觸該貨物粉塵的人員須根據需要穿戴防護服、護目鏡或其他等效的眼睛防塵保護用品和防塵的過濾面罩。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

沒有特別要求。

生鐵

描述

鑄造生鐵是在 28 級被鑄成 20 千克生鐵。在不規則的堆中，生鐵約佔外形體積的 50%。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	3333 至 3571	0.28 至 0.30
尺寸	**類別**	**組別**
550 毫米×90 毫米×80 毫米	不適用	C

危險性

沒有特別危險性。

該貨物為非易燃或具有低失火危險。

積載和隔離

沒有特別要求。

貨艙清潔度

沒有特別要求。

天氣注意事項

沒有特別要求。

裝載

生鐵通常用礦車裝載。用起重機把礦車放進船艙然後倒出生鐵。當用礦車裝載該貨物時，最初幾車須鋪放在艙底上以免造成損壞。

按照《規則》第 4 節和 5 節的有關要求進行平艙。

由於該貨物密度極高，除非貨物在艙底均勻鋪開以使重量平均分佈，否則艙底可能會受力過度。在航行和裝載期間，須適當注意確保不要把貨物堆起而使艙底受力過度。

注意事項

沒有特別要求。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

在清洗該貨物的殘留物之前，須清理該貨物處所的艙底污水井。

瀝青球

描述

瀝青球在煤焦化過程中從焦油中生產出。呈黑色並且氣味特別。壓製成特有的鉛筆形狀以方便運輸。

貨物在 40°C 至 50°C 變軟。熔點：105°C 至 107°C。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	500 至 800	1.25 至 2.0
尺寸	**類別**	**組別**
直徑 9 毫米及 長度最長達 0.7 厘米	MHB	B

危險性

受熱熔化。易燃，燃燒時產生黑色濃煙。粉塵會刺激皮膚和眼睛。該貨物一般具有低失火危險。但是，貨物粉末易點燃並且可以引起火災和爆炸。在裝載和卸貨期間應特別注意防火。

積載和隔離

按要求與第 4.1 類物質進行隔離。

貨艙清潔度

沒有特別要求。

天氣注意事項

查閱本表附錄。

裝載

按照《規則》第 4 節和第 5 節的有關要求進行平艙。

為避免該貨物的軟化和溶化，不應堆放在臨近加熱貨艙的貨物處所中。

注意事項

查閱本表附錄。

通風

對這些貨物，在航行期間須根據需要僅對貨物表面進行自然或機械通風。

裝運

在該貨物的裝卸完成後，用封條把艙口黏牢。在航行期間須定時檢查運載該貨物的貨物處所中的冷凝。

卸貨

須採取充分措施來防止揚塵。

清掃

沒有特別要求。

應急程序

需配備的專用應急設備 防護服、手套、靴子、工作服、防護帽。自給式呼吸器，噴霧嘴。
應急程序 穿防護服及佩戴自給式呼吸器。 火災時的應急行動 封艙；使用船上的固定式滅火裝置（如果裝有的話）。氣封可有效地控制火勢。 醫療急救 查閱經修訂的《危險貨物事故醫療急救指南（MFAG）》。

附錄

瀝青球

一般預防措施：

1. 須為參與裝載的人員提供手套、防塵口罩、經認可的防護服和護目鏡。

2. 須隨時可取用沖洗眼睛的設施和防曬霜。

3. 儘量減少裝載區的人員。裝載區的人員須意識到所有相關危險性。

4. 從事鉛筆狀瀝青裝卸的人員須徹底沖洗並防曬幾天。

5. 裝載或卸貨停止後，須關閉艙口，並用膠皮管沖洗船舶，去除所有粉塵。

6. 如果風將粉塵吹起，須適當考慮停止裝載或卸貨。

7. 完成卸貨後，須清除甲板上所有散落物。

8. 在裝卸貨物時，不管裝或卸，須關閉起居處所的通風，起居處所的空調系統須處於內循環模式。

9. 貨物粉塵易於點燃並可引起火災和爆炸。裝載和卸貨期間須採取特別措施以防火災。

鉀鹼

描述

呈棕色、粉紅色或白色，鉀鹼產品為顆粒狀晶體。無味並吸濕。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
32° 至 35°	971 至 1299	0.77 至 1.03
尺寸	**類別**	**組別**
細粉至 4 毫米	不適用	C

危險性

沒有特別危險性。

該貨物為非易燃或具有低失火危險。該貨物易吸濕，潮濕後會結塊。

積載和隔離

沒有特別要求。

貨艙清潔度

沒有特別要求。

天氣注意事項

在裝載前、裝載期間和航行期間，該貨物須儘可能保持乾燥。不得在降水期間裝載貨物。在裝載貨物期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋。

裝載

按照《規則》第 4 節和 5 節的有關要求進行平艙。

注意事項

沒有特別要求。

通風

在航行期間，不得對運載該貨物的貨艙處所通風。

裝運

在對該貨物的裝卸完成以後，貨物處所艙蓋須根據需要進行密封以防止進水。

卸貨

如果貨物變硬，須平艙以避免形成懸空表面。

清掃

該貨物有輕微腐蝕性。卸貨以後，應清掃並徹底沖洗船艙和污水井，清除所有的貨物殘留物，除非在卸載鉀鹼後將要裝載同樣的散貨船運名的貨物。

氯化鉀

描述

呈棕色、粉紅色或白色，粉末狀。氯化鉀產品為顆粒晶體。無味並溶解於水。吸濕。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
30° 至 47°	893 至 1235	0.81 至 1.12
尺寸	**類別**	**組別**
最大達 4 毫米	不適用	C

危險性

儘管氯化鉀被列為無害物質，一旦潮濕可造成嚴重的腐蝕。

該貨物為非易燃或具有低失火危險。

該貨物易吸濕，潮濕後會結塊。

積載和隔離

沒有特別要求。

貨艙清潔程度

按貨物的危險性保持清潔和乾燥狀態。

天氣注意事項

該貨物須儘可能保持乾燥。不得在降水期間裝卸貨物。在貨物裝卸期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋。

裝載

根據《規則》第 4 節和第 5 節的有關要求進行平艙。

注意事項

沒有特別要求。

通風

在航行期間，不得對運載該貨物的貨艙處所通風。

裝運

在該貨物的裝卸完成以後，貨物處所艙蓋須根據需要進行密封以防止進水。

卸貨

如果貨物變硬須平艙以避免形成懸空表面。

清掃

卸貨以後，應清掃並徹底沖洗船艙和污水井。

硝酸鉀 UN 1486

描述

透明、無色或白色晶瑩的粉末或晶體。吸濕。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
30° 至 31°	1136	0.88
尺寸	**類別**	**組別**
晶體或粉末	5.1	B

危險性

潮濕時會氧化。與易燃物質形成的混合物易被點燃並可以劇烈燃燒。

該貨物易吸濕，潮濕後會結塊。

積載和隔離

與食品“隔離”。

貨艙清潔度

按貨物的危險性保持清潔和乾燥狀態。

天氣注意事項

該貨物須儘可能保持乾燥。不得在降水期間裝卸貨物。在貨物裝卸期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋。

裝載

按照《規則》第 4 節和第 5 節的有關要求進行平艙。

注意事項

適當注意避免接觸易燃物質。

通風

在航行期間，不得對運載該貨物的貨艙處所進行通風。

裝運

沒有特別要求。

卸貨

如果貨物變硬，須平艙以避免形成懸空表面。

清掃

沒有特別要求。

應急程序

需配備的專用應急設備 防護服（手套、靴子、工作服和防護帽）。 自給式呼吸器。 噴嘴。
應急程序 穿防護服和佩戴自給式呼吸器。 火災時的應急行動 用大量的水，最好使用噴霧的形式以避免擾動物質表面。 物質可能熔化或溶化；在該條件下使用水可以導致溶化的物質大範圍的散落。 氣封或用二氧化碳不能控制火勢。 應充分考慮到由於積水而對船舶穩性的影響。 醫療急救 查閱經修訂的《危險貨物事故醫療急救指南（MFAG）》。

備註

除非受到污染，此物質不易燃。

硫酸鉀

描述

堅硬晶體或粉末。無色或白色。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
31°	1111	0.90
尺寸	**類別**	**組別**
不適用	不適用	C

危險性

沒有特別危險性。

該貨物為非易燃或具有低失火危險。

積載和隔離

沒有特別要求。

貨艙清潔度

沒有特別要求。

天氣注意事項

沒有特別要求。

裝載

按照《規則》第 4 節和第 5 節的有關要求進行平艙。

注意事項

沒有特別要求。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

沒有特別要求。

浮石

描述

產自火山的非常多孔的岩石。灰白色。

特性

靜止角	散貨密度（kg/m3）	積載因數（m3/t）
不適用	308 至 526	1.90 至 3.25
尺寸	**類別**	**組別**
粉末至塊狀	不適用	C

危險性

沒有特別危險性。

該貨物為非易燃或具有低失火危險。

積載和隔離

沒有特別要求。

貨艙清潔度

沒有特別要求。

天氣注意事項

沒有特別要求。

裝載

按照《規則》第 4 節和第 5 節的有關要求進行平艙。

注意事項

沒有特別要求。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

沒有特別要求。

黃鐵礦（含銅和鐵）

此貨物可被歸為 A 或 C 組。此貨物條目用於 C 組中的貨物。

描述

二硫化鐵，含銅和鐵。水分含量：0%至 7%。極易揚塵。

特性

靜止角	散貨密度（kg/m³）	積載因數（m³/t）
不適用	2000 至 3030	0.33 至 0.50
尺寸	**類別**	**組別**
細粉至 300 毫米塊	不適用	C

危險性

沒有特別危險性。

該貨物為非易燃或具有低失火危險。

積載和隔離

沒有特別要求。

貨艙清潔度

沒有特別要求。

天氣注意事項

沒有特別要求。

裝載

按照《規則》第 4 節和第 5 節的有關要求進行平艙。

由於該貨物密度極高，除非貨物在艙底均勻鋪開以使重量平均分佈，否則艙底可能會受力過度。在航行和裝載期間，須適當注意確保不要把貨物堆起而使艙底受力過度。

注意事項

須採取適當預防措施以防該貨物的粉塵進入機器處所和起居處所。須防止貨物進入其處所的艙底污水井。須適當考慮設備的貨物粉塵防護。可能接觸該貨物粉塵的人員須根據需要穿戴防護服、護目鏡或其他等效的眼睛防塵保護用品和防塵的過濾面罩。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

沒有特別要求。

黃鐵礦，煅燒的（煅燒的黃鐵礦）

描述

形態為粉塵至粉末的煅燒黃鐵礦是化學工業的殘餘產品，在該過程中所有金屬硫化物類均用於生產硫酸或進行處理以提煉金屬元素－銅、鉛、鋅等。殘餘物的酸性可能相當強，特別是在水或潮濕的空氣中時，此時的 pH 值經常會在 1.3 至 2.1 之間。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	2326	0.43
尺寸	**類別**	**組別**
不適用	MHB	A 和 B

危險性

潮濕時對鋼鐵有強烈腐蝕性。吸入粉塵有刺激性並有害。貨物可流態化。

該貨物為非易燃或具有低失火危險。

積載和隔離

與食品“隔離”。

貨艙清潔度

應注意保持貨艙清潔和乾燥。

天氣注意事項

在裝載前、裝載期間和航行期間，該貨物須儘可能保持乾燥。不得在降水期間裝載貨物。在裝載貨物期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋。

裝載

根據《規則》第 4 節和第 5 節的有關要求進行平艙。

由於該貨物密度極高，除非貨物在艙底均勻鋪開以使重量平均分佈，否則艙底可能會受力過度。在航行和裝載期間，須適當注意確保不要把貨物堆起而使艙底受力過度。

注意事項

污水井須保持清潔、乾燥並加以遮蓋，以防貨物進入。拆除艙內襯板或予以密封以防止貨物滲透。在裝載前在內底鋪上石灰。

須採取適當預防措施以防該貨物的粉塵進入機器處所和起居處所。須防止貨物進入其處所的艙底污水井。須適當考慮設備的貨物粉塵防護。可能接觸該貨物粉塵的人員須穿戴防護服、護目鏡或其他等效的眼睛防塵保護用品和防塵的過濾面罩。那些人員須根據需要穿戴防護服。

通風

沒有特別要求。

裝運

在該貨物的裝卸完成以後，貨物處所艙蓋須根據需要全部密封以防止水進入貨艙。

卸貨

沒有特別要求。

清掃

沒有特別要求。

應急程序

需配備的專用應急設備 無
應急程序 無 火災時的應急行動 無（非易燃）。 醫療急救 查閱經修訂的《危險貨物事故醫療急救指南（MFAG）》。

葉蠟石

描述

天然水合的硅酸鋁。呈白堊色。可能揚塵。

塊佔 75%，碎石佔 20%，細粉佔 5%。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	2000	0.50
尺寸	**類別**	**組別**
塊至細粉	不適用	C

危險性

沒有特別危險性。

該貨物為非易燃或具有低失火危險。

積載和隔離

沒有特別要求。

貨艙清潔度

沒有特別要求。

天氣注意事項

沒有特別要求。

裝載

按照《規則》第 4 節和第 5 節的有關要求進行平艙。

注意事項

須採取適當預防措施以防該貨物的粉塵進入機器處所和起居處所。須防止貨物進入其處所的艙底污水井。須適當考慮設備的貨物粉塵防護。可能接觸該貨物粉塵的人員須根據需要穿戴防護服、護目鏡或其他等效的眼睛防塵保護用品和防塵的過濾面罩。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

沒有特別要求。

石英

描述

晶體塊狀。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	1667	0.60
尺寸	**類別**	**組別**
塊：50 毫米至 300 毫米	不適用	C

危險性

沒有特別危險性。

該貨物為非易燃或具有低失火危險。

積載和隔離

沒有特別要求。

貨艙清潔度

沒有特別要求。

天氣注意事項

沒有特別要求。

裝載

按照《規則》第 4 節和第 5 節的有關要求進行平艙。

注意事項

沒有特別要求。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

沒有特別要求。

石英岩

描述

石英岩是一種包含石英的堅實的、顆粒狀變質沙岩。呈白色、紅色、棕色或灰色，尺寸不一，從大的岩石至卵石。可以半碎和按尺寸分級形式運輸。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	1563	0.64
尺寸	**類別**	**組別**
10 毫米至 200 毫米	不適用	C

危險性

沒有特別危險性。

該貨物的粉塵具有磨蝕性。該貨物為非易燃或具有低失火危險。

積載和隔離

沒有特別要求。

貨艙清潔度

沒有特別要求。

天氣注意事項

沒有特別要求。

裝載

按照《規則》第 4 節和第 5 節的有關要求進行平艙。

注意事項

做好機器和設備防塵。須採取適當預防措施以防該貨物的粉塵進入機器處所和起居處所。須防止貨物進入其處所的艙底污水井。須適當考慮設備的貨物粉塵防護。可能接觸該貨物粉塵的人員須穿戴防護服、護目鏡或其他等效的眼睛防塵保護用品和防塵的過濾面罩。那些人員須根據需要穿戴防護服。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

沒有特別要求。

放射性物質，低比活度的（LSA-1）非裂變的或預計裂變的 UN 2912

描述

本表包括了含天然放射性核素（如：鈾、釷）的礦石及天然或貧化的鈾精礦或釷精礦，包括金屬、混合物和化合物。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	-	-
尺寸	**類別**	**組別**
不適用	7	B

危險性

低放射性。有些物質可能有化學危險性。

該貨物為非易燃或具有低失火危險。

積載和隔離

與食品“隔離”。

貨艙清潔度

按貨物的危險性保持清潔和乾燥狀態。

天氣注意事項

該貨物須儘可能保持乾燥。不得在降水期間裝卸貨物。在貨物裝卸期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋。

裝載

按照《規則》第 4 節和第 5 節的有關要求進行平艙。

注意事項

須避免人員無謂暴露於粉塵中。可能接觸該貨物粉塵的人員須穿戴防護服、護目鏡或其他等效的眼睛防塵保護用品和面罩。存放此類物質的貨物處所之外不得有滲漏。

通風

在航行期間，不得對運載該類貨物的貨艙進行通風。

裝運

裝運該貨物須遵守發貨人提供的所有須知。

卸貨

卸載該貨物須遵守發貨人提供的所有須知。

清掃

裝載過此類物質的貨物處所，未經消除污染，不得裝載其他貨物。見本規則第 9.3.2.3 段。

應急程序

需配備的專用應急設備 防護服（手套、靴子、工作服、防護帽）。 自給式呼吸器。
應急程序 穿防護服及佩戴自給式呼吸器。 **火災時的應急行動** 封艙；使用船上的固定式滅火裝置（如果裝有的話）。 若有必要，可用噴水控制粉塵擴散。 **醫療急救** 查閱經修訂的《危險貨物事故醫療急救指南（MFAG）》。 用無線電進行醫療諮詢。

備註

大多數物質不易燃。迅速將可能受到污染的設備和遮蓋物集中起來並加以隔離。

徵詢專家指導。

表面受到放射性物質污染的物品（SCO-1）

非裂變的或預計裂變的 UN 2913

描述

表面受到放射性物質污染的物品的放射性較低。本表包括的表面分佈了放射性物質的非放射性固體物品如下：

1. 在平均 300 cm^2 以上的可接觸表面上（若小於 300 cm^2 時取整個表面積）的非固定污染平均放射強度：β－射線和 γ－射線放射體及低毒性的 α－射線放射體不超過 4 Bq/cm^2，或所有其他 α－射線放射體不超過 0.4 Bq/cm^2；

2. 在平均 300 cm^2 以上的可接觸表面上（若小於 300 cm^2 時取整個表面積）的固定污染平均放射強度：β－射線和 γ－射線放射體及低毒性的 α－射線放射體不超過 4×10^4 Bq/cm^2，或所有其他 α－射線放射體不超過 4×10^3 Bq/cm^2；和

3. 在平均 300 cm^2 以上的可接觸表面上（若小於 300 cm^2 時取整個表面積）的非固定污染與固定污染的平均放射強度之和：β－射線和 γ－射線放射體及低毒性的 α－射線放射體不超過 4×10^4 Bq/cm^2，或所有其他 α－射線放射體不超過 4×10^3 Bq/cm^2。

特性

靜止角	散貨密度（kg/m³）	積載因數（m³/t）
不適用	-	-
尺寸	類別	組別
不適用	7	B

危險性

低放射性。

該貨物為非易燃或具有低失火危險。

積載和隔離

與食品“隔離”。

貨艙清潔度

按貨物的危險性保持清潔和乾燥狀態。

天氣注意事項

該貨物須儘可能保持乾燥。不得在降水期間裝卸貨物。在貨物裝卸期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋。

裝載

按照《規則》第 4 節和第 5 節的有關要求進行平艙。

注意事項

須避免人員無謂暴露於粉塵中。可能接觸該貨物粉塵的人員須穿戴防護服、護目鏡或其他等效的眼睛防塵保護用品和面罩。存放此類物質的貨物處所之外不得有滲漏。

通風

在航行期間，不得對運載該類貨物的貨艙進行通風。

裝運

裝運該貨物須遵守發貨人提供的所有須知。

卸貨

卸載該貨物須遵守發貨人提供的所有須知。

清掃

裝載過此類物質的貨物處所未經消除污染不得裝載其他貨物。見本規則第 9.3.2.3 段。

應急程序

需配備的專用應急設備 防護服（手套、靴子、工作服、防護帽）。 自給式呼吸器。
應急程序 穿防護服及佩戴自給式呼吸器。 **火災時的應急行動** 封艙；使用船上固定式滅火裝置（如果裝有的話）。 若有必要，可用噴水控制粉塵擴散。 **醫療急救** 查閱經修訂的《危險貨物事故醫療急救指南（MFAG）》。 用無線電進行醫療諮詢。

備註

大多數物質不易燃。迅速將可能受到污染的設備和遮蓋物集中起來並加以隔離。

徵詢專家指導。

斜方硼砂（無水的）

描述

顆粒狀、黃白色晶體物質，輕微或無粉塵。有磨蝕性。吸濕。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	1282 至 1493	0.67 至 0.78
尺寸	**類別**	**組別**
小於 2.36 毫米	不適用	C

危險性

沒有特別危險性。

該貨物為非易燃或具有低失火危險。

該貨物吸濕，潮濕易結塊。

積載和隔離

沒有特別要求。

貨艙清潔度

沒有特別要求。

天氣注意事項

沒有特別要求。

裝載

按照《規則》第 4 節和第 5 節的有關要求進行平艙。

注意事項

沒有特別要求。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

如果貨物變硬，須平艙以避免形成懸空表面。

清掃

沒有特別要求。

金紅石砂

描述

細顆粒狀棕色至黑色的沙粒。有磨蝕性。乾燥運輸。可能揚塵。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	2500 至 2700	0.37 至 0.40
尺寸	**類別**	**組別**
0.15 毫米或更小	不適用	C

危險性

沒有特別危險性。

該貨物為非易燃或具有低失火危險。

積載和隔離

沒有特別要求。

貨艙清潔度

沒有特別要求。

天氣注意事項

在裝載前、裝載期間和航行期間，該貨物須儘可能保持乾燥。不得在降水期間裝載貨物。在裝載貨物期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋。

裝載

按照《規則》第 4 節和 5 節的有關要求進行平艙。

由於該貨物密度極高，除非貨物在艙底均勻鋪開以使重量平均分佈，否則艙底可能會受力過度。在航行和裝載期間，須適當注意確保不要把貨物堆起而使艙底受力過度。

注意事項

污水井須保持清潔、乾燥並適當遮蓋以防貨物進入。

須採取適當預防措施以防該貨物的粉塵進入機器處所和起居處所。須防止貨物進入其處所的艙底污水井。須適當考慮設備的貨物粉塵防護。可能接觸該貨物粉塵的人員須穿戴防護服、護目鏡或其他等效的眼睛防塵保護用品和防塵的過濾面罩。那些人員須根據需要穿戴防護服。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

沒有特別要求。

鹽

描述

白色細晶粒。水分含量各異，可達 5.5%。該貨物易溶解。萬一水進入貨艙，通過鹽的溶解（形成液體基礎和貨物移動），船舶有失去穩性的危險。

特性

靜止角	散貨密度（kg/m³）	積載因數（m3/t）
不適用	893 至 1235	0.81 至 1.12
尺寸	**類別**	**組別**
晶粒最大達 12 毫米	不適用	C

危險性

沒有特別危險性。

該貨物為非易燃或具有低失火危險。

積載和隔離

沒有特別要求。

貨艙清潔度

按貨物的危險性保持清潔和乾燥狀態。

天氣注意事項

該貨物須儘可能保持乾燥。不得在降水期間裝卸貨物。在貨物裝卸期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋。

裝載

按照《規則》第 4 節和第 5 節的有關要求進行平艙。

注意事項

貨物處所諸如內底、漏斗、側板和艙壁等接觸貨物的部分須用石灰沖洗或塗上油漆以防腐蝕。

通風

在航行期間，不得對運載該種貨物的貨物處所進行通風。

裝運

在該貨物的裝卸完成以後，貨物處所艙蓋須密封。

卸貨

沒有特別要求。

清掃

沒有特別要求。

芒硝

描述

非純淨的硫酸鈉。呈白色。顆粒狀，乾燥運輸。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	1052 至 1124	0.89 至 0.95
尺寸	**類別**	**組別**
10 毫米至 200 毫米	不適用	C

危險性

沒有特別危險性。

該貨物為非易燃或具有低失火危險。

積載和隔離

沒有特別要求。

貨艙清潔度

沒有特別要求。

天氣注意事項

沒有特別要求。

裝載

按照《規則》第 4 節和第 5 節的有關要求進行平艙。

注意事項

沒有特別要求。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

沒有特別要求。

鹽岩

描述

呈白色。水分含量：0.02%。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	943 至 1020	0.98 至 1.06
尺寸	**類別**	**組別**
小顆粒	不適用	C

危險性

沒有特別危險性。

該貨物為非易燃或具有低失火危險。

積載和隔離

沒有特別要求。

貨艙清潔度

沒有特別要求。

天氣注意事項

沒有特別要求。

裝載

按照《規則》第 4 節和第 5 節的有關要求進行平艙。

注意事項

沒有特別要求。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

沒有特別要求。

砂

描述

通常為細顆粒。有磨蝕性並易揚塵。

本明細表的砂粒包括：

鑄造砂 **硅質砂**

鉀長石砂 **鈉長石砂**

石英砂

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	1020 至 2000	0.50 至 0.98
尺寸	**類別**	**組別**
0.1 毫米至 5 毫米	不適用	C

危險性

吸入硅砂粉塵能導致呼吸系統疾病。硅砂顆粒易被空氣夾帶並被吸入。

工業用砂可塗樹脂，如果暴露在熱環境（55°C 至 60°C）中將結塊。

該貨物為非易燃或具有低失火危險。

積載和隔離

須將塗有樹脂的工業用砂與熱源“隔開”。

貨艙清潔度

按貨物的危險性保持清潔和乾燥狀態。

天氣注意事項

在裝載前、裝載期間和航行期間，該貨物須儘可能保持乾燥。不得在降水期間裝載貨物。在裝載貨物期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋。

裝載

按照《規則》第 4 節和第 5 節的有關要求進行平艙。

注意事項

須採取適當預防措施以防該貨物的粉塵進入機器處所和起居處所。須防止貨物進入其處所的艙底污水井。須適當考慮設備的貨物粉塵防護。可能接觸該貨物粉塵的人員須穿戴防護服、護目鏡或其他等效的眼睛防塵保護用品和防塵的過濾面罩。那些人員須根據需要穿戴防護服。

通風

沒有特別要求。

裝運

運載該貨物的貨物處所中的艙底污水井須保持乾燥。

卸貨

沒有特別要求。

清掃

卸貨之後，須特別注意貨物處所中的污水井。

鋸屑

描述

木頭的細顆粒。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	-	-
尺寸	**類別**	**組別**
不適用	MHB	B

危險性

在不清潔、不乾燥和有油污時易自燃。易引起貨物處所內缺氧。

積載和隔離

按對第 4.1 類物質的要求隔離。

與所有第 5.1 類液體和所有第 8 類液體“隔離”。

貨艙清潔度

按貨物的危險性保持清潔和乾燥狀態。

天氣注意事項

該貨物須儘可能保持乾燥。不得在降水期間裝卸貨物。在貨物裝卸期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋。

裝載

按照《規則》第 4 節和第 5 節的有關要求進行平艙。

注意事項

污水井須保持清潔、乾燥並適當遮蓋以防貨物進入。在裝載貨物之前，託運人應向船長提供一份證書來說明該貨物是清潔的、乾燥的和無油污的。

通風

在航行期間，須根據需要僅對運載該貨物的處所進行自然或機械表面通風。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

沒有特別要求。

應急程序

需配備的專用應急設備 無
應急程序 無 火災時的應急行動 封艙；使用船上的固定式滅火裝置（如果裝有的話）。氣封可有效地控制火勢。 醫療急救 查閱經修訂的《危險貨物事故醫療急救指南（MFAG）》。

廢金屬

描述

“廢”鐵或“廢”鋼包括了很多種類的主要用於回收的鐵金屬。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	各種各樣	各種各樣
尺寸	**類別**	**組別**
各種各樣	不適用	C

危險性

沒有特別危險性。

該貨物為非易燃或具有低失火危險，除非貨物含有本規則的鐵金屬鑽屑、切屑、鏇屑或切削屑條目中所述的細鐵屑（金屬細末易自燃）。

積載和隔離

沒有特別要求。

貨艙清潔度

沒有特別要求。

天氣注意事項

在裝載前、裝載期間和航行期間，該貨物須儘可能保持乾燥。不得在降水期間裝載貨物。在裝載貨物期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋。

裝載

見本表附錄。

注意事項

見此表附錄。

通風

在航行期間，須根據需要僅對運載該貨物的處所進行自然或機械表面通風。

裝運

除非絕對必要，不要泵排運載該貨物的貨物處所的艙底污水井。該貨物的艙底污水可能會含一定量的舊機器污垢和油。見本明細表附錄。

卸貨

當用磁鐵或抓斗卸貨時：

1. 防止甲板和甲板機械等受貨物掉落損壞；和

2. 卸貨完成以後，仔細檢查對船舶的損壞。

清掃

在清掃運載該貨物的貨物處所之前，須告知船員碎玻璃和鋒利邊緣的危險性。在清洗該貨物的殘留物之前，須清除貨物處所艙底和艙底污水井的溢油。

附錄

廢金屬

裝卸廢金屬的方式通常取決於貨物的尺寸而採用磁鐵或抓斗。該貨物包括的物品尺寸可大到車身，小到細碎金屬削屑（鐵屑）。單件的重量也有很大的差別，大到重型機械小到易開罐。

裝載

在裝載前，應針對每一次裝載操作對貨艙進行準備。容易被掉落的廢金屬砸壞的區域應使用墊艙木加以保護。這包括將貨物送往貨艙途中的甲板和艙口圍板。建議拆除船側的護欄。

艙口下區域的內底上應仔細鋪上一層廢金屬以緩衝任何掉落貨物的衝擊。應向磁鐵或抓斗的操作員說明，不要在離貨堆太高的位置釋放貨物。

通常的裝載方法是在船舶的中心線堆成一堆，然後利用坡度使貨物滾入兩端和兩側。須盡最大努力使兩舷和前後端的貨物重量均勻分佈。如果沒有這樣做，體積大、重量輕的物品將向兩側滾動，重量大、體積小的貨物將集中在艙口以下。

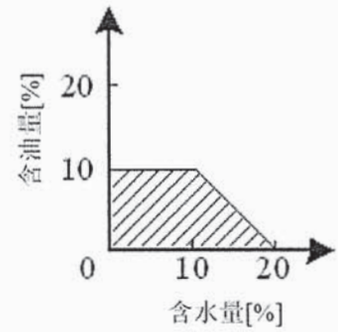
當抽排污水井的水時，船長須意識到舊機器中可能會有一定數量的污垢和廢油。可能會有碎玻璃和鋒利的鋸齒狀邊緣，在廢金屬附近工作的人員應小心注意。

在艙蓋關閉以前進行檢查，不要有可能刺破船側的鋒利突出物。

種子餅，含植物油 UN 1386

（a）經機械壓榨的種子，含油 10%以上或油和水分含量合計超過 20%。

此表顯示了含油量和水分含量。



只有在主管機關特別允許時才可散裝。

描述

用機械將含油種子的油榨出後所剩的殘渣。本條目中所包含的穀物或穀物產品為源自以下所列者：

焙烤物質
麥芽顆粒
甜菜
穀糠顆粒
酒糟顆粒
檸檬粕顆粒
椰子
椰子仁
穀蛋白玉米
棉籽
種子餅渣
穀蛋白玉米顆粒
花生，粕
玉米糝
亞麻籽
玉米
餅，含油的
穀粕顆粒
尼日爾種子，渣
油餅
棕櫚仁粕
花生
顆粒狀物，穀物製品
細麩皮顆粒
油菜籽
碎米
米糠
紅花籽
種子餅渣，含油的
大豆
斯特拉瑟顆粒
向日葵籽
烤製粕

以上貨物可以粕、粉、餅、顆粒及餅渣的形式運輸。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	478 至 719	1.39 至 2.09
尺寸	**類別**	**組別**
不適用	4.2	B

危險性

可緩慢自熱，並且，如果潮濕或含有未經氧化的油比例過高，會自燃。易發生氧化，隨後引起貨物處所內缺氧。可能產生二氧化碳。

積載和隔離

除本規則第 9.3 節所述外，沒有特別要求。

貨艙清潔度

按貨物的危險性保持清潔和乾燥狀態。

天氣注意事項

該貨物須儘可能保持乾燥。不得在降水期間裝卸貨物。在貨物裝卸期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋。

裝載

按照《規則》第 4 節和第 5 節的有關要求進行平艙。

注意事項

當貨物的溫度不高於周圍溫度加 10°C 或 55°C（以低者為準）時，才可裝載該種貨物。裝運前，該類貨物須經適當陳放，所需陳放時間取決於含油量。若經試驗證明本條目所述的種子餅可按種子餅（b）（見

下個條目）的條件運輸，主管機關可予批准這種放寬。主管機關簽發的許可證書中須說明貨物的含油量和含水量。航行期間，須定期測定艙內不同深度處的溫度並記錄。如果貨物溫度達到 55°C 並持續增高，須停止貨物的通風。如果繼續自熱，須向貨物處所輸入二氧化碳或惰性氣體。除非經過測試並確定氧氣含量已恢復到正常水平，否則禁止人員進入貨物處所。

通風

為防止貨物自熱，航行期間不得對運載該貨物的貨物處所進行機械通風。

裝運

為防止進水，須使運載該貨物的貨物處所的艙口實現風雨密。

卸貨

沒有特別要求。

清掃

沒有特別要求。

應急程序

需配備的專用應急設備 自給式呼吸器。
應急程序 佩戴自給式呼吸器。 火災時的應急行動 封艙；使用船上固定式滅火裝置（如果裝有的話）。 醫療急救 查閱經修訂的《危險貨物事故醫療急救指南（MFAG）》。

種子餅，含植物油 UN 1386

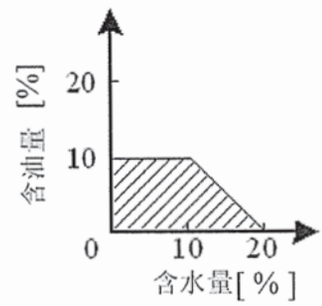
（b） 經溶劑萃取和機械壓榨的種子，含油不超過 10%；
且當水分含量高於 10%時，油和水分含量合計不超過 20%。

註：該條目包括下列：

.1 所有經溶劑萃取和機械壓榨的種子餅，含油量不超過 10%，含水量不超過 10%；和

.2 所有經溶劑萃取的和機械壓榨的種子餅，含油量不超過 10%，含水量不高於 10%，合計油和水的總含量不應超過 20%。

該圖表顯示了油和水的含量：



當溶劑萃取的種子餅的油或油和水分的含量超過以上的百分比時，應向主管機關尋求指導。

描述

含油的種子經溶劑萃取法或機械壓榨法將油榨出後所剩的殘渣。本條目中所包含的穀物或穀物產品為源自以下所列者：

焙烤物質
麥芽顆粒
甜菜
穀糠顆粒
酒糟顆粒
檸檬粕顆粒
椰子
椰子仁
穀蛋白玉米
棉籽
種子餅渣
穀蛋白玉米顆粒
花生，粕
玉米糝
亞麻籽
玉米
餅，含油的
穀粕顆粒
尼日爾種子，渣
油餅
棕櫚仁粕
花生
顆粒狀物，穀物製品
細麩皮顆粒
油菜籽
碎米
米糠
紅花籽
種子餅渣，含油的
大豆
斯特拉瑟顆粒
向日葵籽
烤製粕

以上貨物可以粕、粉、餅、顆粒及餅渣的形式運輸。

本條目的規定不適用於含油量低於 4%和油和水分的含量合計低於15%的經溶劑萃取的油菜籽餅、顆粒、大豆粕、棉花籽粕和葵花籽粕。在裝載前，託運人應提交由裝運國主管機關認可的人員簽發的證書，證明免除條件已經得到滿足。

特性

靜止角	散貨密度（kg/m³）	積載因數（m³/t）
不適用	478 至 719	1.39 至 2.09
尺寸	類別	組別
不適用	4.2	B

危險性

可緩慢自熱，並且，如果潮濕或含有未經氧化的油比例過高，會自燃。易發生氧化，隨後引起貨物處所內缺氧。還可能產生二氧化碳。

積載和隔離

除本規則第 9.3 節的說明外，沒有特殊的要求。

如貨物處所和機艙之間艙壁的絕緣不能達到 A-60 級標準，經溶劑萃取的種子的積載應“遠離”艙壁。

貨艙清潔度

按貨物的危險性保持清潔和乾燥狀態。

天氣注意事項

該貨物須儘可能保持乾燥。不得在降水期間裝卸貨物。在貨物裝卸期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋。

裝載

只有在該貨物基本不含可燃溶劑，而且由裝運國主管機關認可的人員簽發了說明含油量和含水量的證書後，才能夠裝載。

按照《規則》第 4 節和第 5 節的有關要求進行平艙。

注意事項

在裝運前，該類貨物須經適當陳放，所需陳放時間取決於含油量。在航行期間，須定時測量艙內不同深度處的溫度並作記錄。如果貨物溫度超過 55°C 並繼續上升，則須停止貨艙的通風。如果繼續自熱，則須輸入二氧化碳或其他惰性氣體。對於經溶劑萃取的種子餅，先確定貨物處所中明顯不會出現着火的可能性，才能使用二氧化碳或惰性氣體，以避免將溶劑蒸氣點燃的可能性。除非經過測試並確定氧氣含量

已恢復到正常水平，否則禁止人員進入貨物處所。如計劃的貨物開始裝載和完成卸載間隔時間超過 5 天，則船舶應裝設將二氧化碳或其他惰性氣體輸入艙內的設備，否則不能裝載該貨物。在裝載和卸貨期間並在其他任何時間進入貨物處所時，禁止吸煙和使用明火。貨物處所內不適合用於爆炸性空氣中的電路，須通過拆除系統內保險絲以外的連接予以絕緣。通風機上須裝設防火星網。

通風

在必要時，應通過自然或機械進行表面通風，以驅除殘存溶劑的蒸氣。為防止貨物自熱，在使用機械通風時應謹慎。

裝運

運載該貨物的貨物處所的艙口須達到風雨密，以防止水進入。

卸貨

沒有特別要求。

清掃

沒有特別要求。

應急程序

需配備的專用應急設備 自給式呼吸器。
應急程序 佩戴自給式呼吸器。 火災時的應急行動 封艙；使用船上固定式滅火裝置（如果裝有的話）。 醫療急救 查閱經修訂的《危險貨物事故醫療急救指南（MFAG）》。

備註

對於溶劑萃取的種子餅，在未見明火前，不得使用二氧化碳。

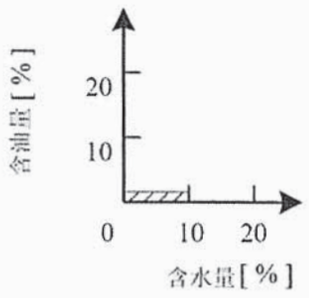
二氧化碳僅限用於控制火勢，當船舶在海上航行期間，可能需要不時輸入更多的二氧化碳量，以減少艙內氧氣含量。到達港口後，需要將貨物挖出以便到達火底。

種子餅 UN 2217

含油量低於 1.5%

且水分含量不超過 11%。

本圖表顯示了油含量和水含量。



描述

含油的種子經溶劑萃取法將油榨出後所剩的殘渣。本條目中所包含的穀物或穀物產品為源自以下所列者：

焙烤物質
麥芽顆粒
甜菜
穀糠顆粒
酒糟顆粒
檸檬粕顆粒
椰子
椰子仁
穀蛋白玉米
棉籽
種子餅渣
穀蛋白玉米顆粒
花生，粕
玉米糝
亞麻籽
玉米
餅，含油的
穀粕顆粒
尼日爾種子，渣
油餅
棕櫚仁粕
花生
顆粒狀物，穀物製品
細麩皮顆粒
油菜籽
碎米
米糠
紅花籽
種子餅渣，含油的
大豆
斯特拉瑟顆粒
向日葵籽

以上貨物可以粕、粉、餅、顆粒及餅渣的形式運輸。

本條目的規定不適用於含油量低於 1.5%和水分含量低於 11%且基本不含可燃溶劑的經溶劑萃取的油菜籽粕顆粒、大豆粕、棉花籽粕和葵花籽粕。在裝載前，託運人應提交由裝運國主管機關認可的人員簽發的證書，證明免除條件已經得到滿足。

特性

靜止角	散貨密度（kg/m³）	積載因數（m³/t）
不適用	478 至 719	1.39 至 2.09
尺寸	**類別**	**組別**
0.1 毫米至 5 毫米	4.2	B

危險性

可緩慢自熱，並且，如果潮濕或含有未經氧化的油比例過高，會自燃。易發生氧化，隨後引起貨物處所內缺氧。還可能產生二氧化碳。

積載和隔離

除本規則 9.3 段中的說明之外，沒有特殊的要求。

如貨物處所和機艙之間艙壁的絕緣不能達到 A-60 級的標準，經溶劑萃取的種子的積載應“遠離”艙壁。

貨艙清潔度

按貨物的危險性保持清潔和乾燥狀態。

天氣注意事項

該貨物須儘可能保持乾燥。不得在降水期間裝卸貨物。在貨物裝卸期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋。

裝載

只有在該貨物基本不含可燃溶劑，而且由裝運國主管機關認可的人員簽發了說明含油量和含水量的證書後，才能夠裝載。

按照《規則》第 4 節和第 5 節的有關要求進行平艙。

注意事項

在航行期間，須定時測量艙內不同深度處的溫度並作記錄。如果貨物溫度超過 55°C 並繼續上升，則須停止貨艙的通風。如果繼續自熱，則須輸入二氧化碳或其他惰性氣體。對於經溶劑萃取的種子餅，先確定貨物處所中明顯不會出現着火的可能性，才能使用二氧化碳，以避免將溶劑蒸氣點燃的可能性。除非經過測試並確定氧氣含量已恢復到正常水平，否則禁止人員進入貨物處所。如計劃的貨物開始裝載和完成卸載間隔時間超過 5 天，則船舶應裝設將二氧化碳或其他惰性氣體導入艙內的設備，否則不能裝載該貨物。在裝載和卸貨期間並在其他任何時間進入貨物處所時，禁止吸煙和使用明火。貨物處所內不適合用於爆炸性空氣中的電路，須通過拆除系統內保險絲以外的連接予以絕緣。通風機上須裝設防火星網。

通風

在必要時，應根據需要對表面進行自然或機械通風，以驅除殘存溶劑的蒸氣。為防止貨物自熱，在使用機械通風時應謹慎。

裝運

運載該貨物的貨物處所的艙口須達到風雨密，以防止水進入。

卸貨

沒有特別要求。

清掃

沒有特別要求。

應急程序

需配備的專用應急設備 自給式呼吸器。
應急程序 佩戴自給式呼吸器。 火災時的應急行動 封艙；使用船上固定式滅火裝置（如果裝有的話）。 醫療急救 查閱經修訂的《危險貨物事故醫療急救指南（MFAG）》。

備註

對於溶劑萃取的種子餅，在未見明火前，不得使用二氧化碳。

二氧化碳僅限用於控制火勢，當船舶在海上航行期間，可能需要不時輸入更多的二氧化碳量，以減少艙內氧氣含量。到達港口後，需要將貨物挖出以便到達火底。

種子餅

（無危險性的）

描述

本條目的規定不適用於含油量不超過 4%和油和水分的含量合計不超過 15%且基本不含可燃溶劑的經溶劑萃取的油菜籽粕顆粒、大豆粕、棉花籽粕和葵花籽粕。

在裝載前，託運人應提交由裝運國主管機關認可的人員簽發的證書，證明種子餅 UN 1386（b）和種子餅 UN 2217 表中的免除條件已經得到滿足。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	478 至 719	1.39 至 2.09
尺寸	**類別**	**組別**
不適用	不適用	C

危險性

沒有特別危險性。

該貨物為非易燃或具有低失火危險。

積載和隔離

沒有特別要求。

貨艙清潔度

按貨物的危險性保持清潔和乾燥狀態。

天氣注意事項

該貨物須儘可能保持乾燥。不得在降水期間裝卸貨物。在貨物裝卸期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋。

裝載

按照《規則》第 4 節和第 5 節的有關要求進行平艙。

注意事項

沒有特別要求。

通風

沒有特別要求。

裝運

運載該貨物的貨物處所的艙口須達到風雨密，以防止水進入。

卸貨

沒有特別要求。

清掃

沒有特別要求。

硅錳合金（低碳）

（具有已知危險性或已知會產生有害氣體）

（含硅量 25%或上）

描述

硅錳合金是一種極重的貨物，有灰色氧化層的銀色金屬性物質。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	約 3000	0.18 至 0.26
尺寸	**類別**	**組別**
約 10 至 100 毫米	MHB	B

危險性

遇水可放出可燃氫氣，氫氣為一種可燃氣體，可與空氣形成爆炸混合氣體，在類似情況下產生劇毒氣體磷化氫和胂。

貨物可能會減少貨物處所中的氧氣含量。

該貨物為非易燃或具有低失火危險。

積載和隔離

按第 4.3 類物質的要求隔離。

與食品和所有第 8 類液體“隔離”。

貨艙清潔度

按貨物的危險性保持清潔和乾燥狀態。

天氣注意事項

在裝載前、裝載期間和航行期間，該貨物須儘可能保持乾燥。不得在降水期間裝載貨物。在裝載貨物期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋。

裝載

按照《規則》第 4 節和第 5 節的有關要求進行平艙。

由於該貨物密度極高，除非貨物在艙底均勻鋪開以使重量平均分佈，否則艙底可能會受力過度。在航行和裝載期間，須適當注意確保不要把貨物堆起而使艙底受力過度。

注意事項

裝載前，須由生產廠家或託運人向船長出具證書，證明該貨物生產後在遮蓋下存放，但在裝運前露天存放不少於三天。船上只要裝有該種貨物時，須嚴禁在甲板上和貨物處所內吸煙，並在甲板上張貼“禁止吸煙”的明顯標誌。電器設備和電纜須處於良好狀態，並有妥善的保護，避免短路和產生電火花。如果要求艙壁適合於用作隔離的目的，則穿過甲板和艙壁的電纜及導管處須作密封處理，以防有害氣體和蒸汽通過。在可能時，在裝載和卸貨期間，須關閉或遮蔽居住處所的通風系統，並將空調系統（如果有的話）調至內循環模式，以便最大限度地減少粉塵進入起居處所或船舶的其他內部處所。須採取措施最大限度地降低粉塵可與甲板機械可移動部分及外部航行設備（例如航行燈）接觸的程度。

除非經過測試證明所有處所內的氧氣含量已恢復到正常水平，不存在有毒氣體，且貨物上面的空餘處所進行了足夠通風和空氣循環，否則禁止人員進入封閉的處所。

應嚴禁在危險區內吸煙，並在張貼“禁止吸煙”的明顯標誌。

電器設備和電纜應處於良好狀態，並有妥善的保護，避免短路和產生電火花。如果要求艙壁適合於用作隔離的目的，則穿過甲板和艙壁的電纜及導管處須作密封處理，以防有害氣體和蒸汽通過。

在可能時，在裝載和卸貨期間，須關閉或遮蔽居住處所的通風系統，並將空調系統（如果有的話）調至內循環模式，以便最大限度地減少粉塵進入起居艙室或船舶的其他內部處所。

應採取措施最大限度地減少粉塵可與甲板機械可移動部分及外部航行設備（例如航行燈）接觸的程度。

通風

在航行期間，須根據需要對運載該種貨物的貨物處所進行表面機械通風。

裝運

為了測量貨物產生的氧氣和易燃氣體的含量，須配備測量貨物處所內每種氣體或混合氣體的適當設備。該設備須適合在無氧的空氣下使用，屬經鑑定的可以在爆炸氣體中使用的安全型設備。在航行期間，須定時測量貨物處所中的氣體濃度，須記錄測量的結果並將其保存在船上。

卸貨

沒有特別要求。

清掃

沒有特別要求。

應急程序

需配備的專用應急設備 自給式呼吸器。
應急程序 佩戴自給式呼吸器。 火災時的應急行動 封艙並使用二氧化碳（如果裝有的話）。不要用水。 醫療急救 查閱經修訂的《危險貨物事故醫療急救指南（MFAG）》。

備註：乾燥時，該物質實際上不易燃。

純鹼

（重質和輕質的）

描述

粉末狀；由白色、無味細粒和粉塵組成。由鹽和石灰岩燒製而成。溶解於水。純鹼遇到油則損毀。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	599 至 1053	0.95 至 1.67
尺寸	**類別**	**組別**
粉末狀	不適用	C

危險性

沒有特別危險性。

該貨物為非易燃或具有低失火危險。

積載和隔離

沒有特別要求。

貨艙清潔度

沒有特別要求。

天氣注意事項

該貨物須儘可能保持乾燥。不得在降水期間裝卸貨物。在貨物裝卸期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋。

裝載

按照《規則》第 4 節和第 5 節要求的有關規定進行平艙。

注意事項

須採取適當預防措施以防該貨物的粉塵進入機器處所和起居處所。須防止貨物進入其處所的艙底污水井。須適當考慮設備的貨物粉塵防護。可能接觸該貨物粉塵的人員須根據需要穿戴防護服、護目鏡和其他等效的防塵護目用品和防塵過濾面罩。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

卸貨以後，須清掃貨物處所，除非卸下純鹼後將要裝載的貨物具有同樣的散貨船運名。在清洗中，該貨物的殘留物應作為泥漿泵出。

硝酸鈉 UN 1498

描述

無色、透明、無味結晶體。有吸濕性並溶解於水。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	508 至 719	1.39 至 1.97
尺寸	**類別**	**組別**
不適用	5.1	B

危險性

儘管不易燃，但與可燃物形成的混合物則易被點燃並會劇烈燃燒。

該貨物吸濕，受潮後會結塊。

積載和隔離

與食品“隔離”。

貨艙清潔度

按貨物的危險性保持清潔和乾燥狀態。

天氣注意事項

該貨物須儘可能保持乾燥。不得在降水期間裝卸貨物。在貨物裝卸期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋。

裝載

按照《規則》第 4 節和第 5 節要求的有關規定進行平艙。

注意事項

確保污水井乾燥並適當遮蓋以防貨物進入。

通風

在航行期間，不得對運載該貨物的貨物處所進行通風。

裝運

沒有特別要求。

卸貨

如果貨物變硬，須平艙以避免形成懸空表面。

清掃

沒有特別要求。

應急程序

需配備的專用應急設備 防護服（手套、靴子、工作服、防護帽）。 自給式呼吸器。 噴霧嘴。
應急程序 穿防護服及佩戴自給式呼吸器。 火災時的應急行動 用大量的水，最好使用噴霧的形式以避免擾動物質表面。物質可能熔化或溶化；在該狀態下使用水可導致溶化的物質大範圍的散落。氣封或用二氧化碳不能控制火勢。須充分考慮到由於積水而對船舶穩性的影響。 醫療急救 查閱經修訂的《危險貨物事故醫療急救指南（MFAG）》。

備註:

除非受到污染，否則該物質不易燃。

硝酸鈉和硝酸鉀混合物 UN 1499

描述

吸濕的混合物，溶解於水。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
30°	1136	0.88
尺寸	**類別**	**組別**
不適用	5.1	B

危險性

儘管本身不可燃，但與可燃物形成的混合物則易被點燃並會劇烈燃燒。

該貨物吸濕，受潮後會結塊。

積載和隔離

與食品“隔離”。

貨艙清潔度

按貨物的危險性保持清潔和乾燥狀態。

天氣注意事項

該貨物須儘可能保持乾燥。不得在降水期間裝卸貨物。在貨物裝卸期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋。

裝載

按照《規則》第 4 節和第 5 節要求的有關規定進行平艙。

注意事項

應注意避免該貨物與可燃物質接觸。

確保污水井保持清潔、乾燥並遮蓋以防貨物進入。

通風

在航行期間，不得對運載該貨物的貨物處所進行通風。

裝運

沒有特別要求。

卸貨

如果貨物變硬，須平艙以避免形成懸空表面。

清掃

沒有特別要求。

應急程序

需配備的專用應急設備 防護服（手套、靴子、工作服、防護帽）。 自給式呼吸器。 噴霧嘴。
應急程序 穿防護服及佩戴自給式呼吸器。 火災時的應急行動 用大量的水，最好使用噴霧的形式以避免擾動物質表面。物質可能熔化或溶化；在該狀態下使用水可導致溶化的物質大範圍的散落。氣封或用二氧化碳不能控制火勢。應充分考慮到由於積水而對船舶穩性的影響。 醫療急救 查閱經修訂的《危險貨物事故醫療急救指南（MFAG）》。

備註

除非受到污染，否則該物質不易燃。

不鏽鋼研磨粉

描述

棕色塊狀：含水量 1%至 3%。可能釋放粉塵。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	2381	0.42
尺寸	**類別**	**組別**
塊：75 毫米至 380 毫米	不適用	C

危險性

沒有特別危險性。

該貨物為非易燃或具有低失火危險。

積載和隔離

沒有特別要求。

貨艙清潔度

沒有特別要求。

天氣注意事項

沒有特別要求。

裝載

按照《規則》第 4 節和第 5 節要求的有關規定進行平艙。

由於該貨物密度極高，除非貨物在艙底均勻鋪開以使重量平均分佈，否則艙底可能會受力過度。在航行和裝載期間，須適當注意確保不要把貨物堆起而使艙底受力過度。

注意事項

須採取適當預防措施以防該貨物的粉塵進入機器處所和起居處所。須防止貨物進入其處所的艙底污水井。須適當考慮設備的貨物粉塵防護。可能接觸該貨物粉塵的人員須根據需要穿戴防護服、護目鏡和其他等效的防塵護目用品和防塵過濾面罩。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

沒有特別要求。

碎石塊

描述

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	1408	0.71
尺寸	**類別**	**組別**
粉末至 25 毫米	不適用	C

危險性

沒有特別危險性。

該貨物為非易燃或具有低失火危險。

積載和隔離

沒有特別要求。

貨艙清潔度

沒有特別要求。

天氣注意事項

沒有特別要求。

裝載

按照《規則》第 4 節和第 5 節要求的有關規定進行平艙。

注意事項

沒有特別要求。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

沒有特別要求。

糖

描述

糖可依其種類分為綜色或白色顆粒，含水量很低，約在 0%至 0.05%之間。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	625 至 1000	1.00 至 1.60
尺寸	**類別**	**組別**
顆粒，最大可達 3 毫米	不適用	C

危險性

因為糖溶解於水，隨着船舶的移動，水的進入可能會在貨物體內造成氣囊。因此，該危險性類似於可能會流態化的貨物構成的危險性。萬一出現水進入貨艙的情況，應認識到因糖的溶解（形成液體基礎和貨物移動）而導致的船舶穩性方面的風險。該貨物易溶解。

積載和隔離

沒有特別要求。

貨艙清潔度

沒有特別要求。

天氣注意事項

該貨物須儘可能保持乾燥。不得在降水期間裝卸貨物。在貨物裝卸期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋。

裝載

按照《規則》第 4 節和第 5 節要求的有關規定進行平艙。

注意事項

沒有特別要求。

通風

沒有特別要求。

裝運

在完成貨物裝載後，須根據需要密封所有貨物處所的艙蓋，以防止水進入貨艙。

卸貨

沒有特別要求。

清掃

沒有特別要求。

硫酸鉀和硫酸鎂

描述

顆粒狀，淡棕色物質。水溶液幾乎為中性。依生產工藝不同而可能稍有氣味。熔點：72°C，含水量：0.02%。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	1000 至 1124	0.89 至 1.00
尺寸	**類別**	**組別**
不適用	不適用	C

危險性

沒有特別危險性。

該貨物極易於溶於水。該貨物為非易燃或具有低失火危險。

積載和隔離

沒有特別要求。

貨艙清潔度

按貨物的危險性保持清潔和乾燥狀態。

天氣注意事項

該貨物須儘可能保持乾燥。不得在降水期間裝卸貨物。在貨物裝卸期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋。

裝載

根據《規則》第 4 節要求的貨物資料進行平艙。如果存在任何疑問，合理地進行平艙至貨物處所的邊界，以便最大限度地降低貨物移動的風險並確保在航行過程中維持充足的穩性。

注意事項

沒有特別要求。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

沒有特別要求。

硫磺

（成形的、固態的）

描述

一種從酸氣處理或煉油作業中回收的共生物，它經過將熔化的硫磺轉換成特定固態形狀（如小球、顆粒、球、錠、片）的一個成形過程。呈鮮黃色，無味。本明細表不適用於破碎的、塊狀和粗顆粒的硫磺（見**硫磺 UN 1350**），或**沒有**經過上述成形過程的從酸氣處理或煉油作業中回收的共生物。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	900 至 1350	0.74 至 1.11
尺寸	**類別**	**組別**
約 1 至 10 毫米	不適用	C

危險性

該貨物為非易燃或具有低失火危險。遇火時，該貨物可產生有害氣體。

在按照本明細表的規定裝卸和船運時，該貨物不會對人體組織和船舶造成腐蝕或粉塵危險性。

積載和隔離

與氟、氯、氯酸鹽、硝酸鹽（硝酸）、過氧化物、液氧、高錳酸、重鉻酸鹽或諸如此類強氧化劑“隔離”。

貨艙清潔度

按貨物的危險性保持清潔和乾燥狀態。不得用海水沖洗貨艙。

天氣注意事項

沒有特別要求。

裝載

按照《規則》第 4 節和第 5 節要求的有關規定進行平艙。裝卸時，為防止形成粉塵，須採取適當預防措施，儘量減少碰撞、磨損和壓紮。常規性施用表面活性劑抑制空氣中粉塵的形成。

注意事項

如形成了小顆粒或任何粉塵，對機器、起居和設備處所做好防塵保護。參與裝卸的人員須穿着保護服、戴護目鏡和粉塵過濾器。貨物處所（包括平艙板在內）和內底須塗上有效的市場上供應的油漆或塗刷石灰水，以防止硫磺、水和鋼之間的任何潛在腐蝕反應。上部須完整塗漆。須封嚴艙蓋。

通風

在運載該貨物的航行期間，須根據需要僅對貨物表面進行自然或機械通風。

裝運

由於裝載期間添加淡水細霧或表面活性劑，須在整個航行期間測量污水並根據需要予以泵排。

卸貨

進入貨艙時，須考慮到本組織制訂的建議案，採取適當安全措施，尤其是在船艙中硫磺底層一帶。

裝卸時，為防止形成粉塵，須採取適當預防措施，儘量減少碰撞、磨損和壓紮。

清掃

參與清掃的人員須戴安全帽、護目鏡、長袖襯衫、長褲和防滲透手套。

須考慮使用經認可的呼吸器。卸貨後，只能用淡水清洗貨物處所。

進入貨艙時，須考慮到本組織制訂的建議，採取適當安全措施。

硫磺 UN 1350

（破碎的塊體及粗顆粒）

說明：精細研磨的硫磺（硫花）不得散裝運輸。

描述

一種在火山地區發現的游離態礦物質。呈黃色，易碎，不溶解於水，遇熱易熔化。硫磺在潮或濕的狀態下運輸。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	1053 至 1176	0.85 至 0.95
尺寸	**類別**	**組別**
任何尺寸的顆粒或塊體	4.1	B

危險性

易燃性和粉塵爆炸，特別是在裝載和卸貨期間和在卸貨後和掃艙時。

該貨物易於着火。

該貨物為非易燃或具有低失火危險。

積載和隔離

與食品“隔離”。

貨艙清潔度

按貨物的危險性保持清潔和乾燥狀態。

須徹底清掃並用清水沖洗。

天氣注意事項

沒有特別要求。

裝載

按照《規則》第 4 節和第 5 節要求的有關規定進行平艙。

注意事項

遇到火時會產生有毒、強烈刺激性和窒息性的氣體。與大多數氧化劑形成具有爆炸性和敏感性的混合氣體。該貨物易於發生粉塵爆炸，特別是在卸載後和掃艙中。貨物處所的平艙板和內底須塗刷石灰水或塗上油漆以防止腐蝕。上部須完整塗漆。貨物處所內不適合用於爆炸性空氣中的電路，須通過拆除系統內保險絲以外的連接予以絕緣。須注意隔離貨物處所的相鄰處所內不適合用於爆炸性空氣中的設備電路。任何通風機上均須裝設防火星網。

精細研磨的硫磺（硫花）**不得**散裝運輸。

通風

在運載該貨物的航行期間，須根據需要僅對貨物表面進行自然或機械通風。

裝運

須定期泵排污水以防水（酸）溶液聚集。

卸貨

沒有特別要求。

清掃

與該貨物或粉塵接觸過的貨物處所和其他結構不能清掃。卸貨後，貨物處所和必要時的其他結構須用淡水清洗，除去所有貨物的殘留物。

然後，須使貨物處所徹底乾燥。濕粉塵或殘餘物將形成高度腐蝕的硫磺酸，對人極度危險並腐蝕鋼板。參與清洗的人員須穿戴防護服、護目鏡和口罩。

應急程序

需配備的專用應急設備 自給式呼吸器。
應急程序 佩戴自給式呼吸器。 火災時的應急行動 封艙；使用船上的固定式滅火裝置（如果裝有的話）。氣封可有效地控制火勢。 不要用水。 醫療急救 查閱經修訂的《危險貨物事故醫療急救指南（MFAG）》。

過磷酸鹽

描述

呈灰白色。含水量：0%至 7%。有吸濕性。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
30° 至 40°	1000 至 1190	0.81 至 1.00
尺寸	**類別**	**組別**
顆粒、細粉和粉末，直徑可達 0.15 毫米	不適用	C

危險性

沒有特別危險性。

該貨物為非易燃或具有低失火危險。該貨物吸濕，受潮後會結塊。

積載和隔離

沒有特別要求。

貨艙清潔度

按貨物的危險性保持清潔和乾燥狀態。

天氣注意事項

該貨物須儘可能保持乾燥。不得在降水期間裝卸貨物。在貨物裝卸期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋。

裝載

按照《規則》第 4 節和第 5 節要求的有關規定進行平艙。

注意事項

貨物處所的平艙板和內底須塗刷石灰水或塗上油漆以防止腐蝕。

通風

在航行期間，不得對運載該貨物的貨物處所進行通風。

裝運

冷凝、貨物發熱或艙口蓋滲透產生的水分會產生磷或磷酸，造成鋼材腐蝕。在完成裝載後，須根據需要密封艙口。此類貨物會分解遮蓋污水井的粗麻布或帆布。

卸貨

如果貨物變硬，須平艙以避免形成懸空表面。

清掃

卸貨後，應特別注意貨物處所的污水井。

過磷酸鹽（三重晶體）

描述

呈顆粒狀，黑灰色，取決於其產地，易於揚塵。有吸濕性。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	813 至 909	1.10 至 1.23
尺寸	**類別**	**組別**
2 毫米至 4 毫米	不適用	C

危險性

沒有特別危險性。

該貨物為非易燃或具有低失火危險。該貨物吸濕，受潮後會結塊。

積載和隔離

沒有特別要求。

貨艙清潔度

按貨物的危險性保持清潔和乾燥狀態。

天氣注意事項

該貨物須儘可能保持乾燥。不得在降水期間裝卸貨物。在貨物裝卸期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋。

裝載

按照《規則》第 4 節和第 5 節要求的有關規定進行平艙。

注意事項

貨物處所的平艙板和內底須塗刷石灰水以防止腐蝕。

通風

在航行期間，不得對運載該貨物的貨物處所進行通風。

裝運

冷凝、貨物發熱或艙口蓋滲透產生的水分會產生磷或磷酸，造成鋼材腐蝕。在完成裝載後，須根據需要密封艙口。此類貨物會分解遮蓋污水井的粗麻布或帆布。

卸貨

如果貨物變硬，須平艙以避免形成懸空表面。

清掃

卸貨後，應特別注意貨物處所的污水井。

鐵燧岩顆粒

描述

礦石。灰色，圓形鋼顆粒。含水量：2%。

特性

靜止角	散貨密度（kg/m³）	積載因數（m³/t）
不適用	599 至 654	1.53 至 1.67
尺寸	**類別**	**組別**
顆粒最大直徑 可達 15 毫米	不適用	C

危險性

沒有特別危險性。

該貨物為非易燃或具有低失火危險。

積載和隔離

沒有特別要求。

貨艙清潔度

沒有特別要求。

天氣注意事項

沒有特別要求。

裝載

按照《規則》第 4 節和第 5 節要求的有關規定進行平艙。

注意事項

沒有特別要求。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

沒有特別要求。

滑石

描述

滑石是極軟、帶白色的、綠色或帶灰色的天然水合硅酸鎂。其特徵是具有滑膩或油膩感。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	1370 至 1563	0.64 至 0.73
尺寸	**類別**	**組別**
粉末至 100 毫米塊	不適用	C

危險性

沒有特別危險性。

該貨物為非易燃或具有低失火危險。

積載和隔離

沒有特別要求。

貨艙清潔度

沒有特別要求。

天氣注意事項

沒有特別要求。

裝載

按照《規則》第 4 節和第 5 節要求的有關規定進行平艙。

注意事項

沒有特別要求。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

沒有特別要求。

動物下腳肥料（或飼料）

描述

從屠宰場地清掃出的動物屠宰拋棄物，乾燥後。極易揚塵。

特性

靜止角	散貨密度（kg/m³）	積載因數（m³/t）
不適用	-	-
尺寸	類別	組別
不適用	MHB	B

危險性

會自熱並可能着火。可能有傳染性。

積載和隔離

按第 4.2 類物質的隔離要求進行隔離。

與食品“用一個完整貨物處所或船艙隔離”。

貨艙清潔度

按貨物的危險性保持清潔和乾燥狀態。

天氣注意事項

沒有特別要求。

裝載

按照《規則》第 4 節和第 5 節要求的有關規定進行平艙。

注意事項

確保污水井清潔、乾燥並適當遮蓋以防貨物進入。

貨溫高於 38°C 時不要裝載。

須採取適當預防措施以防該貨物的粉塵進入機器處所和起居處所。須防止貨物進入其處所的艙底污水井。須適當考慮設備的貨物粉塵防護。可能接觸該貨物粉塵的人員須佩戴護目鏡或其他等效的防塵護目用品和防塵過濾面罩。那些人員須根據需要穿着保護服。

通風

沒有特別要求。

裝運

在航行期間，每天定期測量貨物溫度。記錄測量的結果，以便檢查可能產生自燃的溫度。

卸貨

沒有特別要求。

清掃

沒有特別要求。

應急程序

需配備的專用應急設備 自給式呼吸器。
應急程序 佩戴自給式呼吸器。 火災時的應急行動 封艙；使用船上固定式滅火裝置（如果適用）。 如果發生火災，使用全套防護服 醫療急救 查閱經修訂的《危險貨物事故醫療急救指南（MFAG）》。

木薯澱粉

描述

由粉末和顆粒構成的乾燥、揚塵的混合物。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
32°	735	1.36
尺寸	**類別**	**組別**
粉末和顆粒	不適用	C

危險性

會自熱並能引起貨物處所缺氧。

該貨物為非易燃或具有低失火危險。

積載和隔離

沒有特別要求。

貨艙清潔度

沒有特別要求。

天氣注意事項

沒有特別要求。

裝載

按照《規則》第 4 節和第 5 節要求的有關規定進行平艙。

注意事項

須採取適當預防措施以防該貨物的粉塵進入機器處所和起居處所。須防止貨物進入其處所的艙底污水井。須適當考慮設備的貨物粉塵防護。可能接觸該貨物粉塵的人員須根據需要穿戴防護服、護目鏡和其他等效的防塵護目用品和防塵過濾面罩。

通風

在航行期間，不得對運載該貨物的貨物處所進行通風。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

沒有特別要求。

尿素

描述

白色、顆粒、無味的貨品。含水量小於 1%。有吸濕性。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
28° 至 45°	645 至 855	1.17 至 1.56
尺寸	**類別**	**組別**
1 至 4 毫米	不適用	C

危險性

沒有特別危險性。

該貨物為非易燃或具有低失火危險。

該貨物有吸濕性，受潮後會結塊。

含有水分的尿素（純的或不純的）將損壞油漆或腐蝕鋼板。

積載和隔離

沒有特別要求。

貨艙清潔度

沒有特別要求。

天氣注意事項

該貨物須儘可能保持乾燥。不得在降水期間裝卸貨物。在貨物裝卸期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋。

裝載

按照《規則》第 4 節和第 5 節要求的有關規定進行平艙。

注意事項

沒有特別要求。

通風

在航行期間，不得對運載該貨物的貨物處所進行通風。

裝運

沒有特別要求。

卸貨

如果貨物變硬，須平艙以避免形成懸空表面。

清掃

在卸貨後，對貨艙進行清掃、沖洗並乾燥。

釩礦

描述

特性

靜止角	散貨密度（kg/m³）	積載因數（m³/t）
不適用	1786	0.560
尺寸	**類別**	**組別**
不適用	MHB	B

危險性

粉塵可能有毒。

該貨物為非易燃或具有低失火危險。

積載和隔離

按第 6.1 類物質的隔離要求進行隔離。

與食品“隔離”。

貨艙清潔度

沒有特別要求。

天氣注意事項

沒有特別要求。

裝載

按照《規則》第 4 節和第 5 節要求的有關規定進行平艙。

注意事項

儘量減少人體暴露在粉塵中。

須採取適當預防措施以防該貨物的粉塵進入機器處所和起居處所。須防止貨物進入其處所的艙底污水井。須適當考慮設備的貨物粉塵防護。可能接觸該貨物粉塵的人員須佩戴護目鏡或其他等效的防塵護目用品和防塵過濾面罩。那些人員須根據需要穿着保護服。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

沒有特別要求。

應急程序

需配備的專用應急設備 自給式呼吸器。
應急程序 佩戴自給式呼吸器。 火災時的應急行動 封艙；使用船上的固定式滅火裝置（如果裝有的話）。 氣封可有效地控制火勢。 醫療急救 查閱經修訂的《危險貨物事故醫療急救指南（MFAG）》。

蛭石

描述

一種雲母類礦石。灰色。平均含水量：6%至 10%。會散發粉塵。

特性

靜止角	散貨密度（kg/m³）	積載因數（m³/t）
不適用	730	1.37
尺寸	**類別**	**組別**
3 毫米	不適用	C

危險性

沒有特別危險性。

該貨物為非易燃或具有低失火危險。

積載和隔離

沒有特別要求。

貨艙清潔度

沒有特別要求。

天氣注意事項

沒有特別要求。

裝載

按照《規則》第 4 節和第 5 節要求的有關規定進行平艙。

注意事項

須採取適當預防措施以防該貨物的粉塵進入機器處所和起居處所。須防止貨物進入其處所的艙底污水井。須適當考慮設備的貨物粉塵防護。可能接觸該貨物粉塵的人員須根據需要穿戴防護服、護目鏡和其他等效的防塵護目用品和防塵過濾面罩。

在裝載之前，廠商或託運人須提供試驗證書，說明石棉含量低於 1%。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

沒有特別要求。

白石英

描述

硅石含量為 99.6%。

特性

靜止角	散貨密度（kg/m3）	積載因數（m3/t）
不適用	1639	0.61
尺寸	**類別**	**組別**
塊，最大達 150 毫米	不適用	C

危險性

沒有特別危險性。

該貨物為非易燃或具有低失火危險。

積載和隔離

沒有特別要求。

貨艙清潔度

沒有特別要求。

天氣注意事項

沒有特別要求。

裝載

按照《規則》第 4 節和第 5 節要求的有關規定進行平艙。

注意事項

沒有特別要求。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

沒有特別要求。

木片

描述

天然木材，用機械削成大約名片大小。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	326	3.07
尺寸	**類別**	**組別**
同上	MHB	B

危險性

該物質有化學危險性。某些貨物會發生氧化，導致貨物處所和相鄰處所缺氧和增加二氧化碳。

含水量為 15%或以上的此類貨物有低失火危險。隨着含水量減少，失火危險性增大。當乾燥時，木片能輕易被外部火源點燃；易燃並能被摩擦點燃。可在 48 小時內出現缺氧狀態。

積載和隔離

按第 4.1 類物質進行隔離。

貨艙清潔度

沒有特別要求。

天氣注意事項

沒有特別要求。

裝載

按照《規則》第 4 節和第 5 節要求的有關規定進行平艙。

注意事項

除非經過測試並確定氧氣含量為 20.7%，否則禁止人員進入貨物處所。如達不到這一條件，應對貨艙或相鄰的圍閉處所進行通風，並在合適時間段之後重新測量。

進入貨物處所和相鄰處所時，須佩帶和啟動氧分計。

在乾燥的天氣裏，落到甲板上的粉塵會迅速乾透並易點燃。須採取適當措施以防火災。

通風

即使貨物處所的相鄰圍閉處所似乎與貨艙以密封相隔，也可能有必要在進入前對這些處所進行通風。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

沒有特別要求。

應急程序

需配備的專用應急設備 宜備有自給式呼吸器和測氧計。
應急程序 無 火災時的應急行動 封艙；使用船上的固定式滅火裝置（如裝有的話）。 氣封可有效地控制火勢。 醫療急救 查閱經修訂的《危險貨物事故醫療急救指南（MFAG）》。

木球團

描述

木球團呈淺亞麻色至巧克力棕色，非常堅硬並且不易被壓扁。木球團的典型密度為 1,100 至 1,700 kg/m^3，散貨密度為 600 至 750 kg/m^3。木球團由木材加工過程中產生的木屑、刨花和木材加工過程中產生的樹皮等其他木廢物製成。除非有具體說明，通常木球團中沒有添加劑或黏合劑。原材料被粉碎、乾燥的並擠壓成球團狀。原材料被壓縮約 3.5 倍，最後的典型木球團成品含水量為 4%至 8%。木球團在社區供暖或發電廠中用作燃料，或用作小空間供暖的燃料，例如火爐或壁爐。

由於其吸收的特性，木球團也用於動物的墊舍物。此類木球團的典型含水量為 8%至 10%。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
約 30°	600 至 750	1.4 至 1.6
尺寸	**類別**	**組別**
圓柱體 3 毫米至 12 毫米 直徑：10 毫米至 20 毫米	MHB	B

危險性

貨物會發生氧化，導致貨物和互通處所缺氧及增加一氧化碳和二氧化碳。

遇水會膨脹。如果含水量超過 15%，木球團在一段時間後會發酵，導致產生窒息和易燃氣體，這些氣體會引起自燃。

木球團的裝卸會引起粉塵的形成。粉塵密度高時有爆炸危險。

積載和隔離

按第 4.1 類物質進行隔離。

貨艙清潔度

根據貨物的危險性保持清潔和乾燥狀態。

天氣注意事項

該貨物須儘可能保持乾燥。不得在降水期間裝卸貨物。在貨物裝卸期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋。關閉這些艙口後，先前通過風的相鄰處所重又缺氧並形成一氧化碳的風險很高。

裝載

按照《規則》第 4 節和第 5 節要求的有關規定進行平艙。

注意事項

除非經過測試並確定氧氣和一氧化碳含量已恢復到以下水平：氧氣 20.7%，一氧化碳<100 ppm，否則禁止人員進入貨物處所。如達不到這一條件，應對貨艙或相鄰的圍閉處所進行通風，並在合適時間段之後重新測量。

進入貨物處所和相鄰處所時，須佩帶和啟動氧分計。

通風

即使貨物處所的相鄰圍閉處所似乎與貨艙以密封相隔，也可能有必要在進入前對這些處所進行通風。

裝運

運載該貨物的貨物處所的所有艙蓋須達到風雨密，以避免水進入貨艙。

卸貨

沒有特別要求。

清掃

沒有特別要求。

應急程序

需配備的專用應急設備 應備妥自給式呼吸器和組合式或獨立式氧氣和一氧化碳測量儀。
應急程序 無 火災時的應急行動 封艙；使用船上固定式滅火裝置（如果裝有的話）。 氣封可有效地控制火勢。用二氧化碳、泡沫或水滅火。 醫療急救 查閱經修訂的《危險貨物事故醫療急救指南（MFAG）》。

木漿球團

描述

球團呈棕色；非常堅硬，不易壓碎。質輕，尺寸大約是軟木瓶塞的一半。球團由壓縮的木屑製成。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	326	3.07
尺寸	**類別**	**組別**
約 15 毫米 x 20 毫米	MHB	B

危險性

該貨物有化學危險性。某些貨物會發生氧化，導致貨物處所和鄰近處所缺氧和增加二氧化碳。

若含水量為 15%或以上，此類貨物有低失火危險。隨着含水量減少，失火危險性增大。

積載和隔離

按第 4.1 類物質進行隔離。

貨艙清潔度

根據貨物的危險性保持清潔和乾燥狀態。

天氣注意事項

沒有特別要求。

裝載

按照《規則》第 4 節和第 5 節要求的有關規定進行平艙。

注意事項

除非經過測試並確定氧氣含量已恢復到正常水平，否則禁止人員進入貨物處所。在乾燥的天氣裏，落到甲板上的粉塵會迅速乾透並易點燃。須採取適當措施以防火災。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

沒有特別要求。

應急程序

需配備的專用應急設備 無
應急程序 無 火災時的應急行動 封艙；使用船上固定式滅火裝置（如果裝有的話）。 氣封可有效地控制火勢。 醫療急救 查閱經修訂的《危險貨物事故醫療急救指南（MFAG）》。

鋅粉 UN 1435

該類貨物的運輸須經裝船國和船旗國主管機關批准。

描述

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	900	1.11
尺寸	**類別**	**組別**
不適用	4.3	B

危險性

遇潮濕或遇水易於釋放氫氣，氫氣為一種易燃、有毒氣體。

該貨物為非易燃或具有低失火危險。

積載和隔離

與食品和第 8 類所有液體“隔離”。

貨艙清潔度

根據貨物的危險性保持清潔和乾燥狀態。

天氣注意事項

在裝載前、裝載期間和航行期間，該貨物須儘可能保持乾燥。不得在降水期間裝載貨物。在裝載貨物期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋。

裝載

按照《規則》第 4 節和第 5 節要求的有關規定進行平艙。

潮濕或已知沾水的貨物不得裝載。

注意事項

拒載潮濕或明知已濕的貨物。在裝卸和運輸期間，消除在裝載該貨物的貨物處所周圍的所有可能的火源，包括熱工作業、燃燒、吸煙、電火花等。

通風

在航行期間，需要對裝運該貨物的貨物處所進行連續機械通風。如果保持通風會威脅到船舶或貨物，可以中斷，除非中斷通風會帶來爆炸或其他危險。在任何情況下，卸貨前均須保持一段合理時間的通風。

裝運

為測量氫氣含量，在裝運該貨物的船上須配有合適的探測器。該探測器屬經認證的可在爆炸性氣體中使用的安全型。在航行期間，須定期監測裝運該貨物的貨物處所中的氫氣濃度，對測量結果作記錄並在船上保存。

卸貨

沒有特別要求。

清掃

卸貨後，兩次清掃貨物處所。

因為氣體危險，不得用水清洗曾裝該貨物的貨物處所。

應急程序

需配備的專用應急設備 防護服（手套、靴子、工作服、防護帽） 自給式呼吸器。
應急程序 穿防護服及佩戴自給式呼吸器。 火災時的應急行動 封艙；使用船上的固定式滅火裝置（如果裝有的話）。 不要用水。 醫療急救 查閱經修訂的《危險貨物事故醫療急救指南（MFAG）》。

鋯砂

描述

一般為細粉，呈白色至黃色，從鈦鐵砂中提取，磨蝕性強。會揚塵。乾燥運輸。

特性

靜止角	散貨密度（kg/m^3）	積載因數（m^3/t）
不適用	2600 至 3000	0.33 至 0.36
尺寸	**類別**	**組別**
0.15 毫米或更小	不適用	C

危險性

沒有特別危險性。

該貨物為非易燃或具有低失火危險。

積載和隔離

沒有特別要求。

貨艙清潔度

沒有特別要求。

天氣注意事項

在裝載前、裝載期間和航行期間，該貨物須儘可能保持乾燥。不得在降水期間裝載貨物。在裝載貨物期間，須關閉裝載或擬裝載該貨物的處所的不在使用中的所有艙蓋。

裝載

按照《規則》第 4 節和第 5 節要求的有關規定進行平艙。

由於該貨物密度極高，除非貨物在艙底均勻鋪開以使重量平均分佈，否則艙底可能會受力過度。在航行和裝載期間，須適當注意確保不要把貨物堆起而使艙底受力過度。

注意事項

污水井須保持清潔、乾燥並適當加以遮蓋，以防貨物進入。

須採取適當預防措施以防該貨物的粉塵進入機器處所和起居處所。須防止貨物進入其處所的艙底污水井。須適當考慮設備的貨物粉塵防護。可能接觸該貨物粉塵的人員須佩戴護目鏡或其他等效的防塵護目用品和防塵過濾面罩。那些人員須根據需要穿着保護服。

通風

沒有特別要求。

裝運

沒有特別要求。

卸貨

沒有特別要求。

清掃

沒有特別要求。

附錄 2

實驗室測試程序、使用的儀器和標準

1 易流態化貨物的測試程序及有關儀器

目前測試適運水分極限（TML）有三種通用方法：

.1 流盤試驗；

.2 插入度試驗；

.3 葡氏/樊氏試驗。

由於各方法各有優點，應按當地實際情況或由主管機關確定測試方法。

1.1 流盤試驗程序

1.1.1 *適用範圍*

流盤一般適用於最大粒度為 1 毫米的精礦或其他顆粒物質。最大粒度達到 7 毫米時也可以使用。顆粒大於此限的物質不適用，對於含黏土比例較高的同類物質，測試結果也不理想。如果貨物不適於用流盤測試，則採用的測試程序應由港口國主管機關批准。

下述試驗用於測試：

.1 貨樣的含水量，下文將貨樣稱為試驗物質；

.2 試驗物質在流盤振動力或周期力作用下的流動水分點（FMP）；和

.3 試驗物質的適運水分極限。

1.1.2 *儀器（見圖 1.1.2）*

.1 標準流盤及框架（ASTM 代號（C230-68）－見 3）。

圖 1.1.2 流盤及附屬裝置

.2 流盤的安裝（ASTM 代號（C230-68）－見 3）。

.3 圓模（ASTM 代號（C230-68）－見 3）。

.4 搗棒（見圖 1.1.2.4）：利用裝有彈簧並經校核的搗棒（示例見圖 1.1.2.4）或其他構造的搗棒可達到所要求的捶搗壓力。這種搗捧可以通過直徑為 30 毫米的搗棒頭施加可控壓力。

.5 天平與法碼（ASTM 代號（C109-73）－見 3）及適用的貨樣容器。

.6 容量分別為 100－200 m*l* 和 10 m*l* 的帶有刻度的玻璃量筒和量管。

.7 直徑約為 30 厘米的半球形攪拌容器、膠皮手套及烘乾盤或鍋。也可用相當大小的自動攪拌器進行攪拌操作，但這時應注意確保機械攪拌器不會降低試驗物質的粒度和均勻性。

.8 能使溫度控制在 110°C 左右的烘乾爐，其內應無空氣循環。

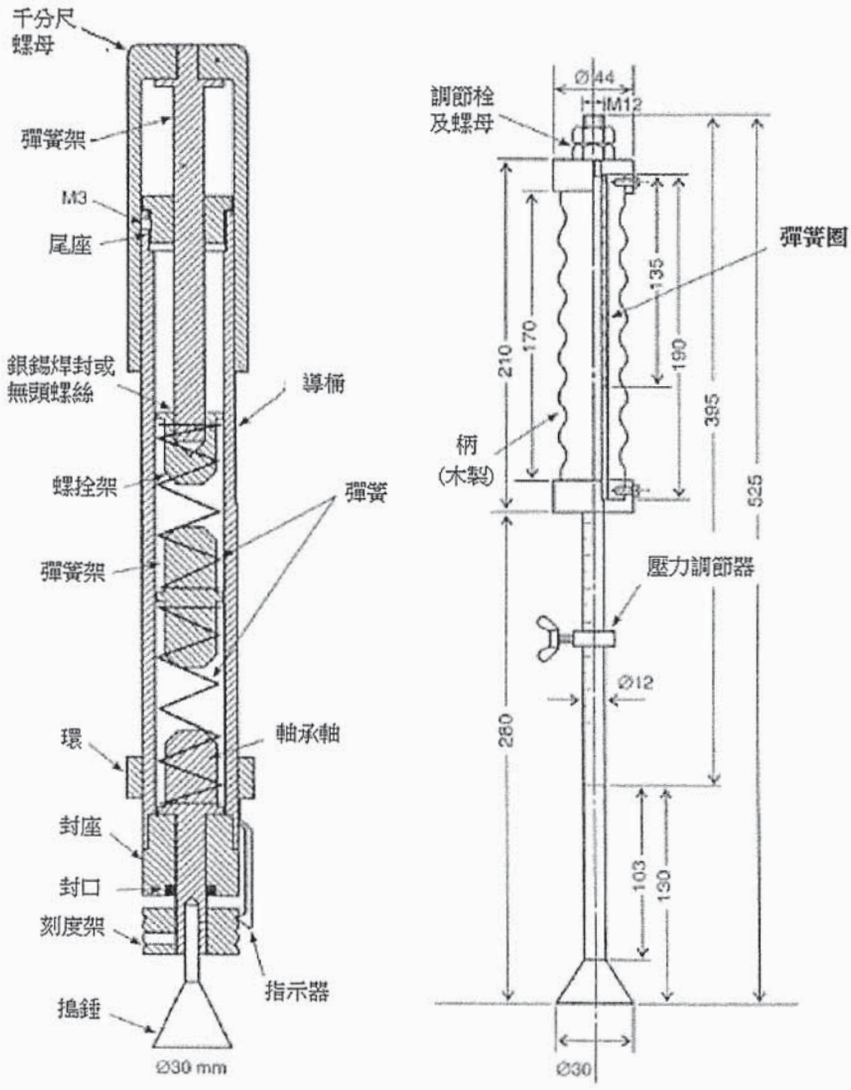


圖 1.1.2.4 裝有彈簧的搗棒樣本

1.1.3 *溫度與濕度*

最好在試樣不受溫度、氣流和濕度變化影響的房間中進行試驗。試樣的準備和試驗過程的各階段應在合理時間間隔內完成，以使水分損失最小，而且無論在任何情況下，試驗須當天完成。若可能，試樣容器應用塑料薄膜或其他蓋子蓋上。

1.1.4 試驗程序

測定流動水分點的試樣數量依試驗物質的比重不同而不同。煤約需 2 千克，而精礦需 3 千克。採集的試樣應能代表所運輸的物質。經驗表明，使試樣的水分漸增至流動水分點所得結果比漸減時所得結果準確。

因此，建議在流動水分點的主試驗開始前，按以下步驟進行流動水分預備試驗，以確定試樣的狀態，即試樣的含水量及在進行主試驗之前向試樣中加水的速率或試樣是否需經空氣乾燥以減少其水分。

1.1.4.1 試樣的準備

將試驗物質的代表性試樣盛入攪拌容器中進行充分攪拌。按下述步驟將試樣分成三個子樣（A）、（B）和（C）：（A）為試樣的五分之一，對其立即稱重，並置於烘乾爐中烘乾，以確定試樣“收到時”的含水量。另兩份子樣各約為試樣的五分之二，其中一份（B）用於預備試驗，另一份（C）用作主試驗。

.1 *裝填圓模*。將圓模置於流盤中心，用攪拌器中的試樣分三層裝填。經搗實後的第一層應約佔圓模深度的三分之一。為此而需要的試樣數量依試驗物質的不同而不同，

但對試驗物質的填密性取得某些經驗之後就能很容易地確定。

經搗實後的第二層應約達到圓模深度的三分之二，最後一層試樣經搗實後應剛好達到圓模頂邊的下部（見圖1.1.4.2）。

.2 *搗實程序*。搗實的目的是將試樣壓實到類似在船舶艙底積載時的程度。相應的壓力應為：

搗捧壓力（Pa）＝散貨密度（kg/m^3）

× 最大貨物深度（m）

× 重力加速度（m/s^2）

含水量為裝載時數值的貨樣的散貨密度可利用ASTM 標準 D-698 或 JIS-A-1210 中所述的葡氏 C 儀器一次測出。

計算搗棒的壓力時，若無貨物深度的資料，則應用貨物的最大可能深度。

壓力亦可以從表 1.1.4.1 中估算出。

底層應用搗棒捶搗 35 次，中層 25 次，上層 20 次（每次應用平穩而適當的壓力）。每一層均應在全部表面上連續捶搗至邊緣，以形成均勻的平整表面。

.3 *撤去圓模*。輕拍圓模四周至其鬆動，取去圓模，將截錐狀試樣留在流盤上。

表 1.1.4.1

典型貨物	散貨密度（kg/m³）	貨物最大深度			
		2m	5m	10m	20m
		←————搗棒壓力（kPa）————→			
煤	1000	20〔1.4〕	50〔3.5〕	100〔7.1〕	200〔14.1〕
	2000	40〔2.8〕	100〔7.1〕	200〔14.1〕	400〔28.3〕
鐵礦	3000	60〔4.2〕	150〔10.6〕	300〔21.2〕	600〔42.4〕
鐵精礦	4000	80〔5.7〕	200〔14.1〕	400〔28.3〕	800〔56.5〕
鉛精礦	5000	100〔7.1〕	250〔17.7〕	500〔35.3〕	1000〔70.7〕
（方括號內為用直徑為 30 毫米的搗棒頭產生的等效值 kgf）					

1.1.4.2 流動水分點的預備試驗

.1 撤去圓模後，將流盤以 25 次/分的速率自 12.5 毫米高處升落 50 次。如果試樣的含水量低於流動水分點，則會隨連續的顛振而散落並顛成碎塊（見圖 1.1.4-3）。

.2 到這一步，停止流盤的顛振，將試樣重新裝回攪拌容器中並在試樣表面噴灑 5-10 m*l* 或更多的水，用戴膠皮套的手指或自動攪拌器攪拌均勻。

重新填裝圓模，按第 1.1.4.2.1 段所述方法將流盤升落 50 次。若未出現流態，則再加水重複上述步驟，直到達到流態。

.3 流態的識別。流盤的顛振使顆粒間重新鑲嵌，形成緊湊狀態。結果，試祥在某一狀態下所含水分體積佔總體積的百分數增加了。如果水分在緊湊的試樣中達到飽和並且試樣產生塑性變形，則認為試樣的含水量達到了流動

水分點。這時，截錐體會產生變形，形成凸面或凹面（見圖 1.1.4-4）。

隨着流盤的反複顛振，試樣會繼續滑動並向外流動，某些材料的頂面還可能出現裂縫。但是，裂縫中含有自由水分並非表明已達到流態。大多數情況下，測量變形有助於確定是否發生了塑性流動。例如，用卡規可測出在截錐任何部分的直徑增加 3 毫米以上，這是一個有用的特徵。觀察另外一些現象也很有用。例如：當含水量（漸增）接近流動水分點時，截錐體會有黏在圓模中的趨勢；此外，將截錐體推出流盤時會在流盤上留下濕痕（條跡），如果濕痕可見，則表明含水量可能超過了流動水分點，但濕痕（條跡）不可見並不表明含水量低於流動水分點。

測量截錐體底部或中部尺寸總是有用的。加水 0.4% 至 0.5%，顛振流盤 25 次，第一次直徑會增加 1 毫米至 5 毫米；再加一次水，底部直徑會增加 5 毫米至 10 毫米。

.4 對於許多精礦來說，除上述方法外還可用下述方法快速測出其近似流動水分點：

當含水量肯定超過流動水分點時，顛振流盤 25 次，測出截錐體的直徑；加入一次水後重複上述步驟，再測量截錐體的直徑；畫出表示直徑增加量和含水量的兩個點，見圖 1.1.4-1；通過此二點的直線與含水量軸的交點即是近似的流動水分點。

完成了流動水分點的預備試驗後，將用作主試驗的試樣的含水量調至略低於流動水分點（約低 1%至 2%）。

1.1.4.3 流動水分點的主試驗

在預備試驗中達到流動狀態之後，將子樣（C）的含水量調成比預備試驗中未引起流態化的最後一個含水量低 1%至 2%（此項建議只是為了避免主試驗時的含水量與流動水分點過於接近而需進行乾燥並重新開始）。利用含水量經調整的試樣進行最後的試驗，方法與預備試驗相同，但每次加水的量不超過 0.5%（預備試驗的流動水分點越低，加水量應越小）。每一步完成後，可將圓模中的試樣置於容器中並立即稱重，以備測試含水量。若試樣開始塑性流動或稍加水後開始塑性流動，這樣作就非常必要了。如果不要求，可將其放回攪拌容器中。

達到流動狀態後，應測試兩份試樣的含水量，一份是含水量略高於流動水分點的試樣，另一份為含水量略低於流動水分點的試樣。兩個含水量的差值應小於 0.5%，並將流動水分點取為該兩個含水量的平均值。

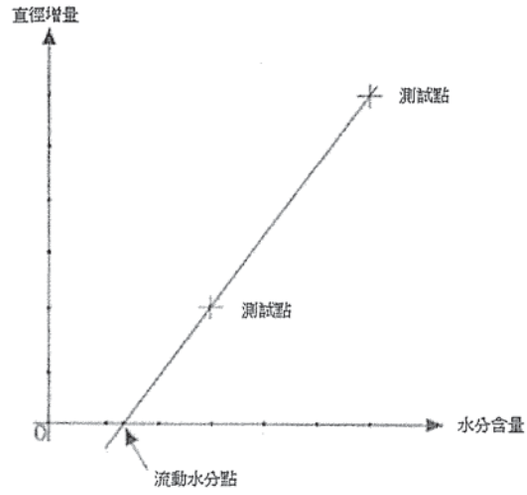


圖 1.1.4-1

圖 1.1.4-2

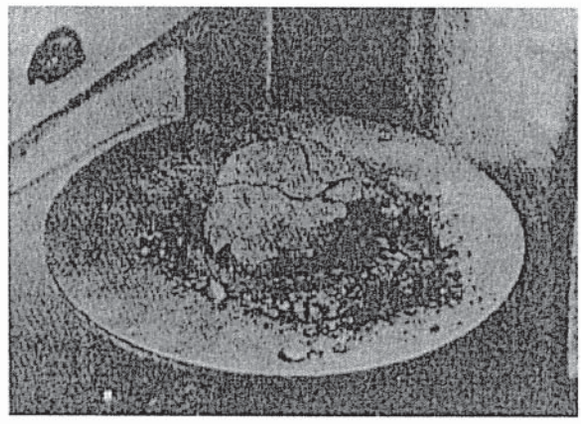


圖 1.1.4-3

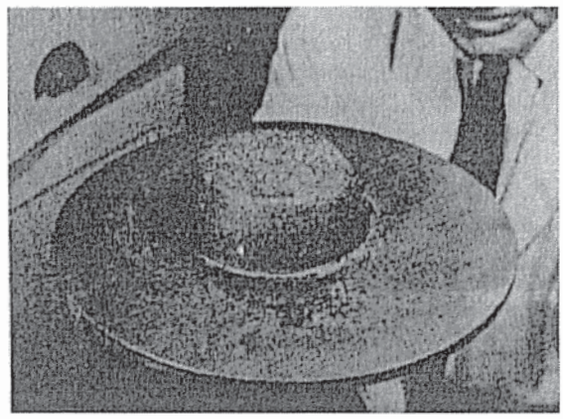


圖 1.1.4-4

1.1.4.4 含水量的確定

簡述

應注意，對於許多物質都有國際上或國家認可的測定含水量的方法。應按這些方法或按已證明能得出相同結果的方法測定含水量。

精礦及類似物質

將精礦的試樣乾燥到恒定質量十分重要。實踐中，將試樣在 105°C 的溫度下乾燥數小時後稱重，連續進行數次以確定這一狀態。若質量不再變化，表明乾燥過程已完成，如果質量仍有減小，則應繼續進行乾燥。

乾燥時間的長短受多種因素影響，如試樣在烘乾爐中的放置、使用的容器、顆粒的大小、傳熱效率等。5 小時對一種精礦試樣可能足夠，而對另一種則可能過短。硫化物精礦易於氧化，因而建議不要使用有空氣循環的烘乾爐，也不要使試樣在爐中的時間超過 4 小時。

煤

測定含水量的推薦方法為 ISO 589-1974“硬煤－總含水量的確定”中所述的方法。應按這一方法或按已證明能給出相同結果的方法測定含水量。

含水量、流動水分點和適運水分極限的計算：

設 m_1 是“收到時”子樣的精確質量（見 1.1.4.1），

設 m_2 是“收到時”子樣乾燥後的精確質量，

設 m_3 是試樣剛達到流態後的精確質量（見 1.1.4.3），

設 m_4 是試樣剛達到流態後的經乾燥後的精確質量，

設 m_5 是試樣剛達到流態前的精確質量（見 1.1.4.3），

設 m_6 是試樣剛達到流態前的經乾燥後的精確質量，

那麼：

.1 精礦“收到時”含水量為

$$\frac{(m_1 - m_2)}{m_1} \times 100, \% \qquad (1.1.4.4.1)$$

.2 該物質的動水分點為

$$\frac{\frac{(m_3 - m_4)}{m_3} + \frac{m_5 - m_6}{m_5}}{2} \times 100, \% \qquad (1.1.4.4.2)$$

.3 適運水分極限為流動水分點的 90%。

泥煤

對所有泥煤，使用 ASTM 方法或使用 CEN（20 升）方法確定散裝密度。

為了獲得正確的適運水分極限（TML），泥煤在乾燥時的密度應為 90 kg/m^3 左右。

按第 1.1.1 段所示，應測定以下值：

.1 貨物樣品（MC）的含水量。

.2 流動水分點（FMP）。

.3 適運水分極限（TML），通過以下方法測定：

.3.1 當泥煤的乾燥散裝密度大於 90 kg/m^3 時，適運水分極限取為流動水分點的 85%。

.3.2 當泥煤的乾燥散裝密度為 90 kg/m^3 或以下時，適運水分極限取為流動水分點的 90%。

1.2 插入度試驗程序

插入度試驗是使試驗物質在圓缸中進行振動，根據其上標尺的插入深度確定流動水分點。

1.2.1 *適用範圍*

.1 插入度試驗一般適用於精礦、類似物質及最大顆粒為 25 毫米的煤。

.2 試驗中，圓缸中試樣以 2*g rms*±10%（g 為重力加速度）振動 6 分鐘。如果試樣表面上的標尺插入深度大於 50 毫米，則表明試樣的含水量大於流動水分點。

.3 本試驗由粗測流動水分點的預備試驗和精測流動水分點的主試驗構成。若已知流動水分點的概值，則可不進行預備試驗。

.4 對試樣進行測試的試驗室應按第 1.1.3 段備妥。

1.2.2 *儀器（見圖 1.2.2）*

.1 試驗儀器包括：

.1 振動台；

.2 圓缸；

.3 標尺（插入棒及托架）；

.4 搗棒（見第 1.1.2.4 段）；和

.5 輔助設備（見第 1.1.2.5 至.8 段）。

.2 可將圓缸卡在其上的台式振動器（見圖 1.2.2.2）應能使 30 kg 物質的振動頻率達到 50 Hz 或 60 Hz，加速度為 3*g* rms 以上，而且加速度的大小可以控制。

.3 圓缸的尺寸如下（見圖 1.2.2.3-1 和 1.2.2.3-2）：

圓缸大小	內徑	深度	壁厚
小型	146 毫米	202 毫米	9.6 毫米或以上
大型	194 毫米	252 毫米	10.3 毫米或以上

圓缸應有足夠的剛性，無磁性，由不可滲透的輕型材料製成，如丙烯酸或氯乙烯。

小型圓缸用於最大顆粒不超過 10 毫米的物質；大型圓缸用於最大顆粒不超過 25 毫米的物質。

.4 插入棒（見圖 1.2.2.4）由銅製成。對於煤，應將插入棒的質量調為 88 g（5 kPa）；對於精礦，應將其調為 177 g（10 kPa）。若試樣中含有粗粒，建議在貨樣表面上採用二支同樣質量的插入棒，以免判斷錯誤。

.5 托架（見圖 1.2.2.5）應置於圓缸中部，並以最小的摩擦力導引插入棒。使用二支插入棒時，其放置應按圖 1.2.2 進行。

.6 應按試樣的性質和狀況即粒度和比重選擇圓缸和插入棒。

1.2.3 *試驗程序*

1.2.3.1 試驗及振動台的準備

.1 所需試樣的數量不少於所用圓缸容積的 6 倍。圓缸中所裝試樣的數量應為：小型圓缸約為 1700 cm^3，大型圓缸約為 4700 cm^3。

.2 將試樣混合均勻，分成大約相等的（A）、（B）和（C）三個子樣。子樣（A）應立即稱重並置入烘乾爐中以確定試樣“收到時”的含水量。

子樣（B）和（C）分別用作預備試驗和主試驗。

.3 在進行試驗前，應使用加速度儀對振動台的振動進行校準。當台上放有裝滿試樣的圓缸時，振動台的加速度應調為 2*g* rms±10%。

1.2.3.2 流動水分點的預備試驗

本試驗旨在用子樣（B）快速測定流動水分點。每一次插入度試驗後均加入一定數量的水。達到流態時，所測得的試樣含水量略高於流動水分點。略低於流動水分點的含水量可由試樣質量中扣除前次加水量算得。

.1 用子樣（B）分四步填裝圓缸，裝入每一層後均用專用的搗棒搗實。精礦的搗實壓力應按第 1.1.4.1 段確定，煤的搗實壓力為 40 kPa。整個試樣的表面上應均勻施壓，直到產生均勻的平面。

.2 穿過托架，將插入棒置於試樣表面上。

.3 以頻率為 50 Hz 或 60 Hz，加速度為 2*g* rms±10%振動 6 分鐘。如果必要，應核對裝在振動台上的加速度儀的讀數。

.4 振動 6 分鐘後，讀取插入深度。

.5 若插入深度小於 50 毫米，則認為未達到流態化。這時應：

.1 將試樣從圓缸中取出，放回混合容器中與原有試樣混合。

.2 混合後稱量混合容器中試樣重量。

.3 噴灑一定量的水，但不應超過混合容器中試樣重量的 1%，並均勻攪拌。

.4 重複第 1.2.3.2.1 至 1.2.3.2.5 段所述步驟。

.6 若插入深度大於 50 毫米，則認為已達到流態化。這時應：

.1 將試樣從圓缸中取出，放入混合容器中。

.2 按第 1.1.4.4 段所述方法測定含水量。

.3 根據最後一次加水量，計算出略低於流動水分點的含水量。

.7 若第一次試驗的插入深度大於 50 毫米，亦即試樣收到時便已達到流態化，則應將子樣（B）和子樣（C）混合，在室溫下進行乾燥以減小試樣中的含水量。之後再將試樣分成子樣（B）和子樣（C），重作預備試驗。

1.2.3.3 流動水分點的主試驗

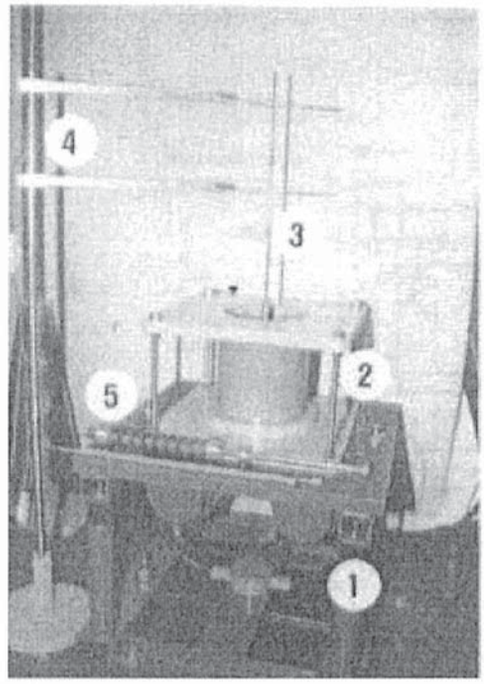
.1 在預備試驗的基礎上進行主試驗，以精確確定流動水分點。

.2 將子樣（C）的含水量調為預備試驗中最後一個低於流動水分點的數值。

.3 按第 1.2.3.2 段，用經調製的子樣（C）進行流動水分點主試驗的第一次試驗。但是，這裏每次加水的數量不得超過試樣總重量的 0.5%。

.4 若事先已知流動水分點的大約值，則應將子樣（C）的含水量調為該值的 90%左右。

.5 達到流態時，按第 1.1.4.3 段的方法確定流動水分點。



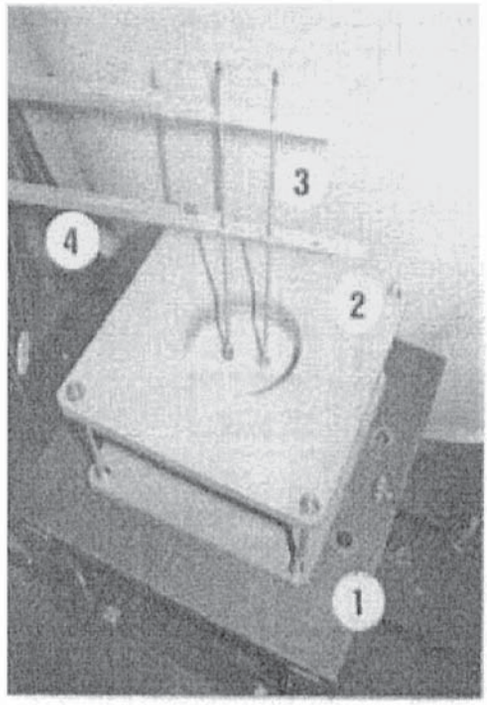
① 振動台

② 圓缸
(直徑150毫米)

③ 插入棒(10kPa)

④ 插入棒托架

⑤ 搗棒



① 振動台

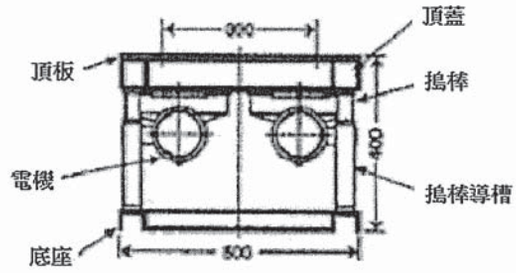
② 圓缸
(直徑150毫米)

③ 插入棒((5kPa)

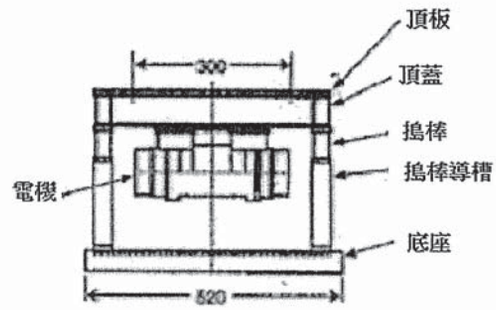
④ 插入棒托架

圖 1.2.2 測試儀器

正視圖



側視圖



仰視圖

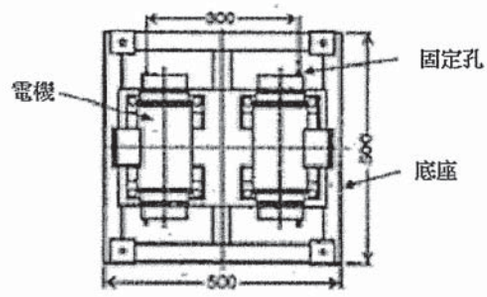
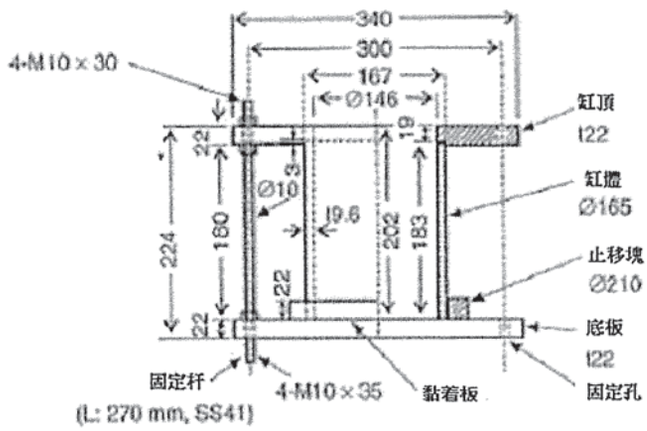


圖 1.2.2.2 振動台

側視圖



俯視圖

移去缸頂和缸體之後

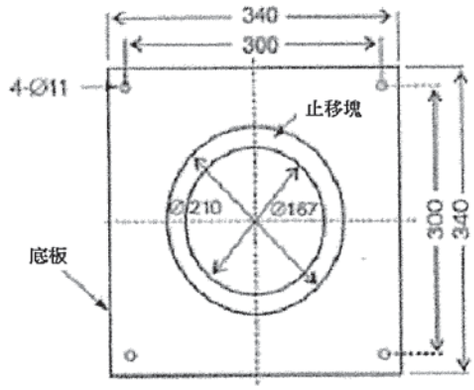
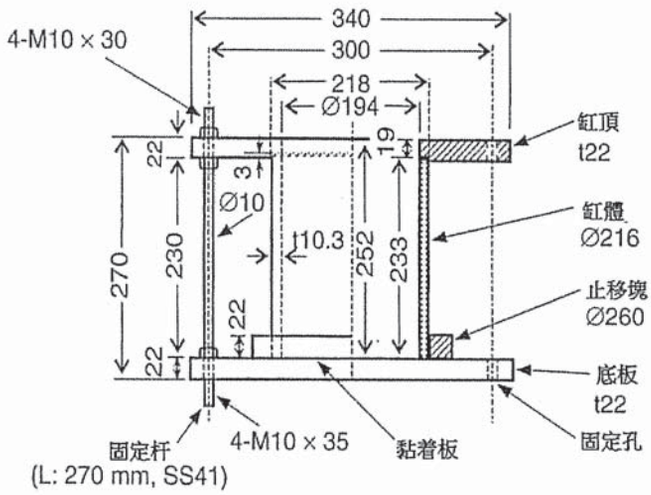


圖 1.2.2.3-1 直徑 150 毫米圓缸

側視圖



府視圖

移去缸頂和缸體之後

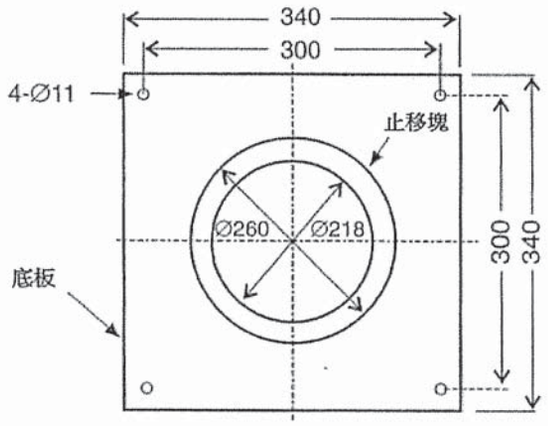
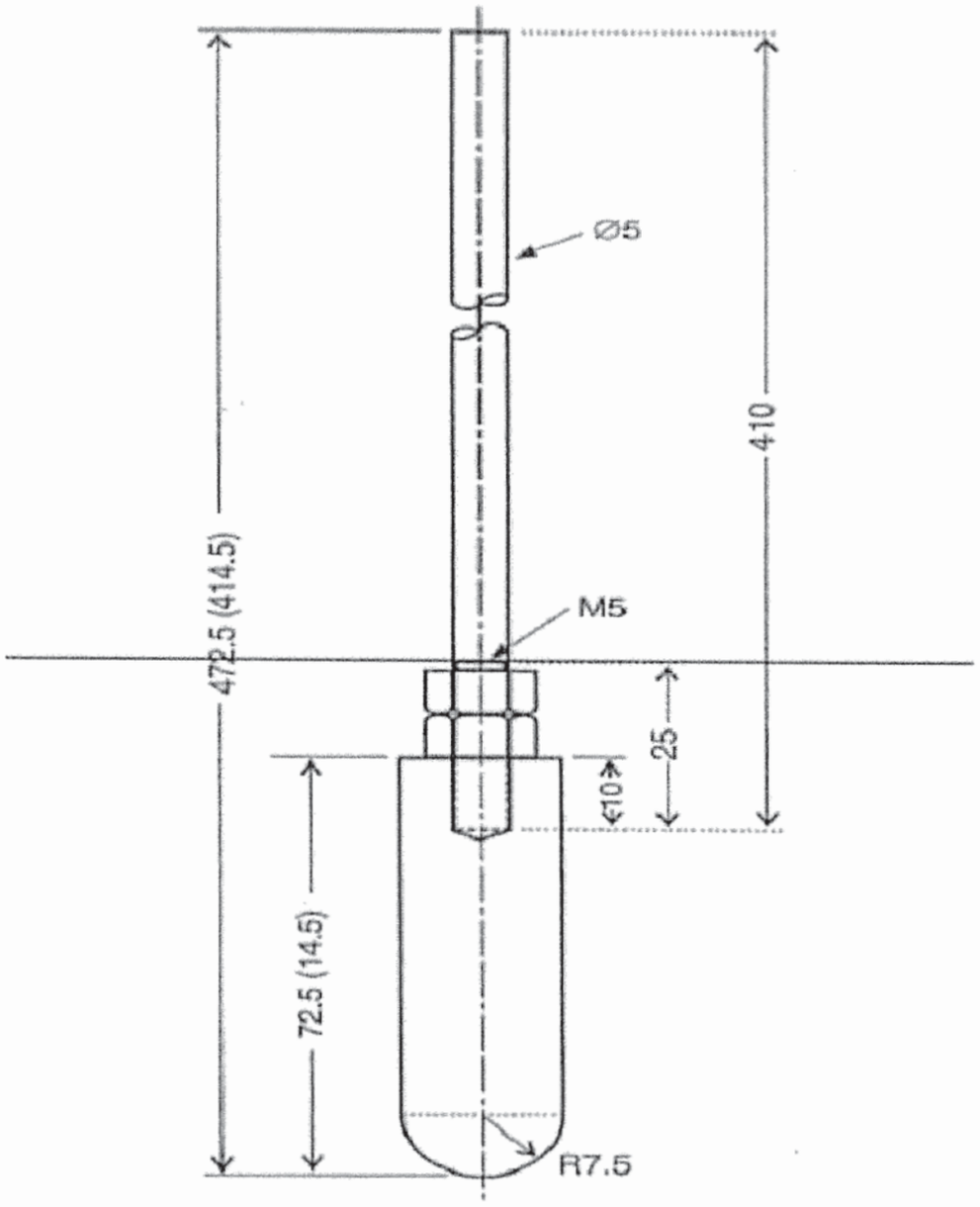


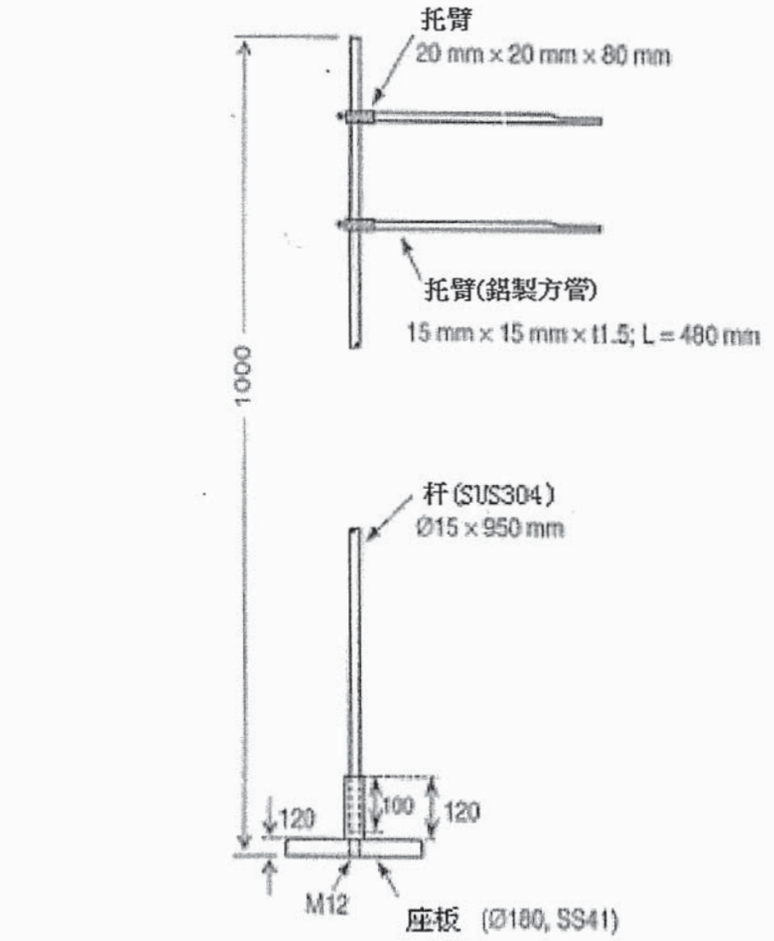
圖 1.2.2.3-2 直徑 200 毫米圓缸



（括號內的尺寸為 5 kPa 的插入棒）

（單位：mm）

圖 1.2.2.4 插入棒


托臂
20 mm × 20 mm × 80 mm
托臂(鋁製方管)
15 mm × 15 mm × t1.5; L = 480 mm
1000
杆(SUS304)
Ø15 × 950 mm
120
100
120
M12
座板 (Ø180, SS41)

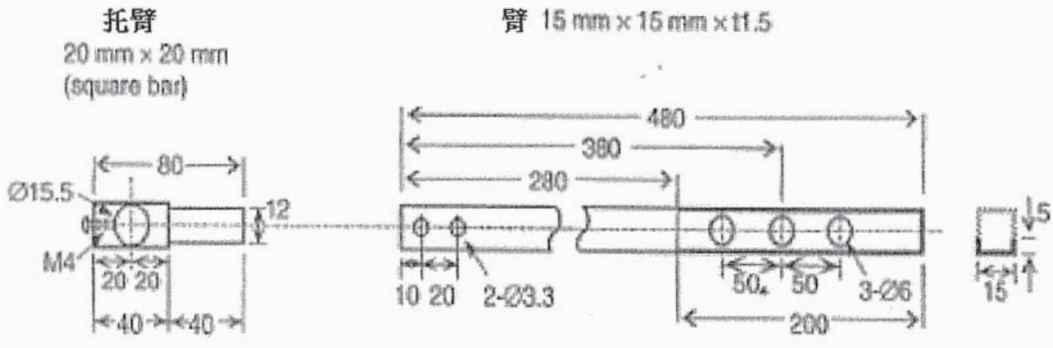

托臂
20 mm × 20 mm
(square bar)
臂 15 mm × 15 mm × t1.5
480
380
280
80
Ø15.5
12
M4
20 20
40 40
10 20
2-Ø3.3
50 50
3-Ø6
200
5
15

圖 1.2.2.5 插入棒托架

1.3 葡氏/樊氏測試法

1.3.1 *適用範圍*

.1 本方法可用於細粒和相對較粗粒精礦或最大顆粒為 5 毫米的類似物質的試驗。本方法不得用於煤或其他多孔物質。

.2 在對最大顆粒為 5 毫米以上的較粗物質應用葡氏/樊氏測試法方法之前，應對本方法進行仔細研究和改進。

.3 按葡氏/樊氏測試法，適運水分極限（TML）的取值為臨界水分限制，取為飽和含水量的 70%。

1.3.2 *葡氏/樊氏測試法的設備*

.1 葡氏測試儀（見圖 1.3.2）包括一個柱形鐵模和一個可拆卸的加長部分（衝壓圓筒）以及在底端開口的可在導筒中滑動的衝壓器（衝壓錘）。

.2 天平與砝碼（見第 3.2 段）及相應的貨樣容器。

.3 能使溫度控制在 100°C 至 105°C 之間的烘乾爐，其內應無空氣循環。

.4 一隻適當的攪拌器。注意，攪拌器的使用應不降低試驗物質的粒度和均勻性。

.5 測定固體密度的儀器，如比重瓶。

1.3.3 溫度和濕度（見第 1.1.3 段）

1.3.4 *試驗程序*

.1 *確定衝壓曲線*。按有關標準（見第 20 頁 4.7 節）將具代表性的試樣在約 100°C 溫度下進行乾燥。試樣的總量至少為進行一次完整試驗所需試樣的 3 倍。應利用衝壓試驗測定 5 至 10 個不同含水量（即進行 5 至 10 次不同試驗）。試樣的含水量應從乾燥調製到接近飽和。每次衝壓試驗約需 2000 cm^3 精礦試樣。

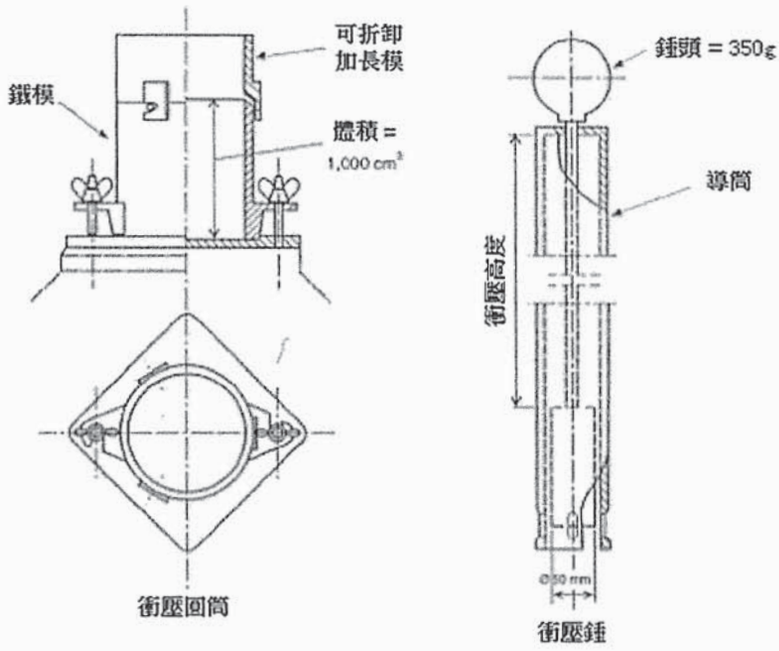


圖 1.3.2 葡氏測試儀

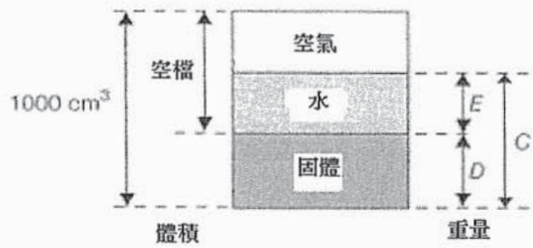


圖 1.3.4.2

每次進行衝壓試驗時應向乾燥的試樣中加入適量的水，充分攪拌約 5 分鐘。取約五分之一的試樣裝入鐵模中並鏟平、然後在增加的試樣表面均勻搗實。搗實用帶有導筒的衝壓器進行，捶搗 25 次，每次的升落高度為 0.2 米。全部五層試樣均應用此法搗實。最後一層試樣搗實後，移去加長模，這時試樣與鐵模頂部平齊。將鐵模與搗實的試樣一同稱重之後取出試樣。將試樣進行乾燥和稱重。

對其他不同含水量的試樣重複進行上述試驗。

.2 定義和計算數據（見圖 1.3.4.2）

— 空模質量（g）：A

— 圓筒與搗實試樣總質量（g）：B

— 濕試樣的質量（g）：C

$$C = B - A$$

— 乾樣的質量（g）：D

— 水的質量（g）（等於體積 cm^3 數值）：E

$$E = C - D$$

圓筒的容積：1000 cm^3

.3 主要參數的計算

— 固體貨物的密度，g/cm^3（t/m^3）：d

— 乾散貨的密度，g/cm^3（t/m^3）：γ

$$\gamma = \frac{D}{1000}$$

— 淨水含量，體積%：e_v

$$e_v = \frac{E}{D} \times 100 \times d$$

— 空隙比：e（空隙體積除以固體體積）

$$e = \frac{1000 - D}{D} = \frac{d}{\lambda} = -1$$

— 飽和度，體積百分比：S

$$S = \frac{e_v}{e}$$

— 總水含量（質量百分比）：W^1

$$W^1 = \frac{E}{C} \times 100$$

— 淨水含量（質量百分比）：W

$$W = \frac{E}{D} \times 100$$

.4 衝壓試驗圖的繪製

將每次衝壓試驗後，將計算出的空隙比（e）作為縱坐標，將淨含水體積比（e_v）和飽和度（S）分別作為橫坐標參數，畫在圖上。

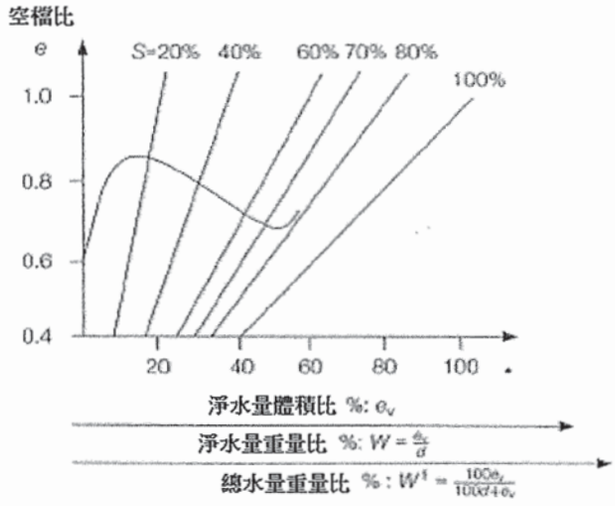


圖 1.3.4.5

.5 衝壓曲線

全部試驗構成一條具體的衝壓曲線（見圖 1.3.4.5）。

衝壓曲線與飽和度線 S=70%的交點即為臨界含水量。該含水量即為適運水分極限。

2 測定靜止角的程序及有關儀器

2.1 *細顆粒物質（尺寸小於 10 mm）靜止角的測定：“傾箱試驗”。在實驗室或裝貨港使用*

2.1.1 *適用範圍*

本試驗用於測定非黏性細顆粒物質（尺寸小於 10 mm）的靜止角。在對有關物質解釋本規則第 5 節和第 6 節時可應用本試驗結果。

2.1.2 *定義*

本試驗測定的靜止角是試驗箱中的散裝物質剛剛開始滑動時試驗箱的頂面與水平面的夾角。

2.1.3 *試驗的原則*

在利用本試驗測定靜止角時，試驗箱中物質的表面最初應平整並和箱底平行。試驗箱的傾斜時應無振動，並且在箱中物質剛剛開始散滑時停止。

2.1.4 *儀器（見圖 2.1.4）*

所需儀器如下：

.1 一隻支架，其上裝有一開口試驗箱。試驗箱與支架由固定在箱底邊和支架上的橫軸及軸承鉸接起來，使試驗箱能進行可控傾斜。

.2 試驗箱的尺寸為：長 600 mm，寬 400 mm，高 200 mm。

.3 為防止試樣在傾斜時沿箱底滑動，在填裝物質前將一格板（格的尺寸為 30 mm ×30 mm ×25 mm）固定在箱底。

.4 試驗箱由裝在支架與箱底之間的液壓缸驅動。也可利用其他方法達到所要求的傾斜，但在所有情況下須消除振動。

.5 給液壓缸加壓，可用一液壓氣動蓄能器，其內的空氣或其他氣體的壓力應為 5 kp/cm^2。

.6 傾斜速度應為 0.3°/s。

.7 試驗箱的傾角範圍應至少為 50°。

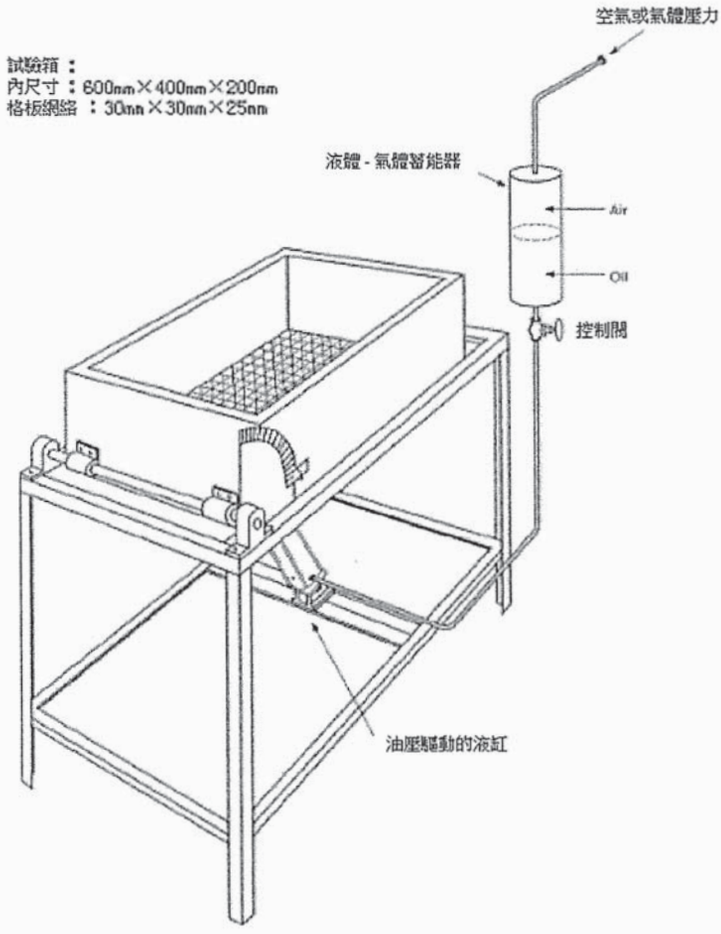


圖 2.1.4 試驗箱基本結構圖

.8 在固定軸的一端裝有量角器。量角器的一邊是固定的，可用螺絲調至水平。

.9 量角器用以測定試驗箱頂邊與水平線的夾角，精度應在 0.5° 以內。

.10 應備有一氣泡式水準儀或其他水準儀，以將量角器調至零位。

2.1.5 *試驗程序*

向試驗箱內裝填試驗物質時，應從儘可能低的高度上小心緩慢地將試驗物質倒入箱中，保證裝填均勻。

多餘的試樣應用直邊鏟刮掉。鏟刮時，應將其朝着鏟刮的方向傾斜 45°。

驅動傾斜系統，在箱中物質剛剛開始散滑時停止。

用量角器測出試驗箱頂邊與水平線的夾角，並作出記錄。

2.1.6 *評定*

靜止角取從三次測量值中計算出的平均值，在試驗報告中的記錄應精確到半度以內。

備註： 試驗最好用三份試樣分別進行。

試驗前應將試驗箱上的橫軸調為水平。

2.2 ***無試驗箱時，測定靜止角的替代方法或船用方法***

2.2.1 *定義*

按本方法，靜止角為從試樣圓錐體半高處量起的斜面與底平面的夾角。

2.2.2 *試驗原理*

將一定數量的試樣從砂斗中輕輕地倒在一張粗質紙上，形成對稱的錐形，以測定靜止角。

2.2.3 *設備*

進行該試驗所需設備如下：

— 一張不受振動影響的水平桌；

— 一張堆試樣用的粗質紙；

— 一部量角器；

— 一隻容量為 3 升的錐筒形砂斗。

2.2.4 *試驗程序*

將粗質紙鋪在桌上。將 10 升將要測試的物質分成三個子樣，每份按下述方法進行試驗：

將一份子樣的 2/3(即 2 升)倒在粗質紙上，形成一初始錐形。將子樣剩下的部分從距錐頂約幾毫米高處特別仔細地倒在錐頂。注意使錐形形狀對稱，為此可在傾倒時在錐頂近周緩慢轉動砂斗。

測量時應注意量角器不要接觸錐形，否則試樣會滑動而破壞試驗。

應在錐形四周間隔約 90° 的四個位置上測出角度。

其餘二份子樣的試驗應以同樣方法進行。

2.2.5 *計算*

靜止角取 12 個測量值的平均值，報告結果應精確到半度以內。該角度可按下式換算成試驗箱測出的數值：

$$a_t = a_s + 3° \qquad (2.2.5)$$

式中 a_t = 傾箱試驗測得的靜止角

a_s = 觀測試驗法測得的靜止角

3 試驗儀器的標準

3.1 標準流盤與座架

3.1.1 *流盤與座架*

3.1.1.1 流盤各部件應按圖 3 製造。流盤由剛性整鑄鐵質座架、直徑為 10 英寸±0.1 英寸（254 mm±2.5 mm）剛性圓盤及用螺栓與盤底垂直相連的豎向軸構成。與圓盤連接在一起的軸上鑲有接觸肩，其與座架的連接應能使之在凸輪的驅動下垂直升落規定的高度。新流盤的高度允許誤差為±0.005 英寸（0.13 mm），舊流盤的高度允許誤差為±0.015 英寸（0.39 mm）。圓盤面應為光車磨光平面，無砂眼，無表面瑕疵，並切出如圖 3 所示的盤面線。圓盤應用黃銅或青銅鑄製，其洛氏硬度不應小於 HRB 25，邊緣厚度應為 0.3 英寸（8 mm），並有 6 根徑向加強骨。盤面及與之相連的軸重量應為 9 磅±0.1 磅（4 kg±0.05 kg），並且重量應在軸心周圍對稱分佈。

3.1.1.2 凸輪及豎向軸應以中碳機件鋼製成，並應在圖 3 所標出的部位進行硬化處理。軸應為直杆，新流盤的軸直徑與座架腔筒內徑之差應不小於 0.002 英寸（0.05 mm），不大於 0.003 英寸（0.08 mm）；舊流盤的這一差值應保持在 0.002 英寸至 0.010 英寸（0.26 mm）之間。軸的底端在下落時不應落在凸輪上。而且從下落點到與凸輪接觸點應不小於 120°。凸輪邊的曲率半徑應為在 360° 中由 0.50 英寸（13 mm）均勻變到 1.25 英寸（32 mm）的平滑螺線，而且豎軸與凸輪接觸時應無顯著振動。凸輪的固定、凸輪與豎軸相互接觸的表面應使流盤在

25 次下落中旋轉不超過一周。流盤下落時與座架接觸的表面應保持平滑、水平，並與流盤上表面平行，在整個 360° 間相互完全接觸。

3.1.1.3 流盤的座架應由高級鑄鐵製成。座架的鑄製中應加有三根整體加強骨，與座架同高，相互位置間隔 120°。座架的頂部應淬火到 1/4 英寸（6.4 mm）深，表面應經研磨和拋光，使之與腔筒垂直，和軸的接觸肩有 360° 的接觸。座架底部的外表面應經研磨，使之與下面的鋼板完全接觸。

3.1.1.4 流盤可由一馬達驅動，該馬達通過一個蝸輪減速器和撓性耦合器與凸輪軸相連。凸輪軸的轉速為每分鐘 100 轉。馬達驅動設備不應繫縛或安裝在流盤底部的鋼板或座架上。

在校準試驗中，如果流盤測出的流動水分點與校準試樣的流動水分點相差不超過 5 個百分點，則應認為流盤的性能滿足要求。

3.1.2 *流盤的安裝*

3.1.2.1 流盤座架應用螺栓緊固在一塊鑄鐵或鋼板上，其尺寸至少應為 1 英寸（25 mm）厚，10 英寸（250 mm）見方。該鋼板表面應加工成光滑平面，用 4 個 1/2 英寸（13 mm）的螺栓固定在水泥座上；螺栓應穿過鋼板，嵌入水泥至少 6 英寸（150 mm）。水泥座應反鑄在鋼板上，使鋼板與水泥座各點完全接觸。不得在鋼板與水泥座之間設螺栓作水平調整裝置。應將適當的水平調整裝置裝在水泥座的底部。

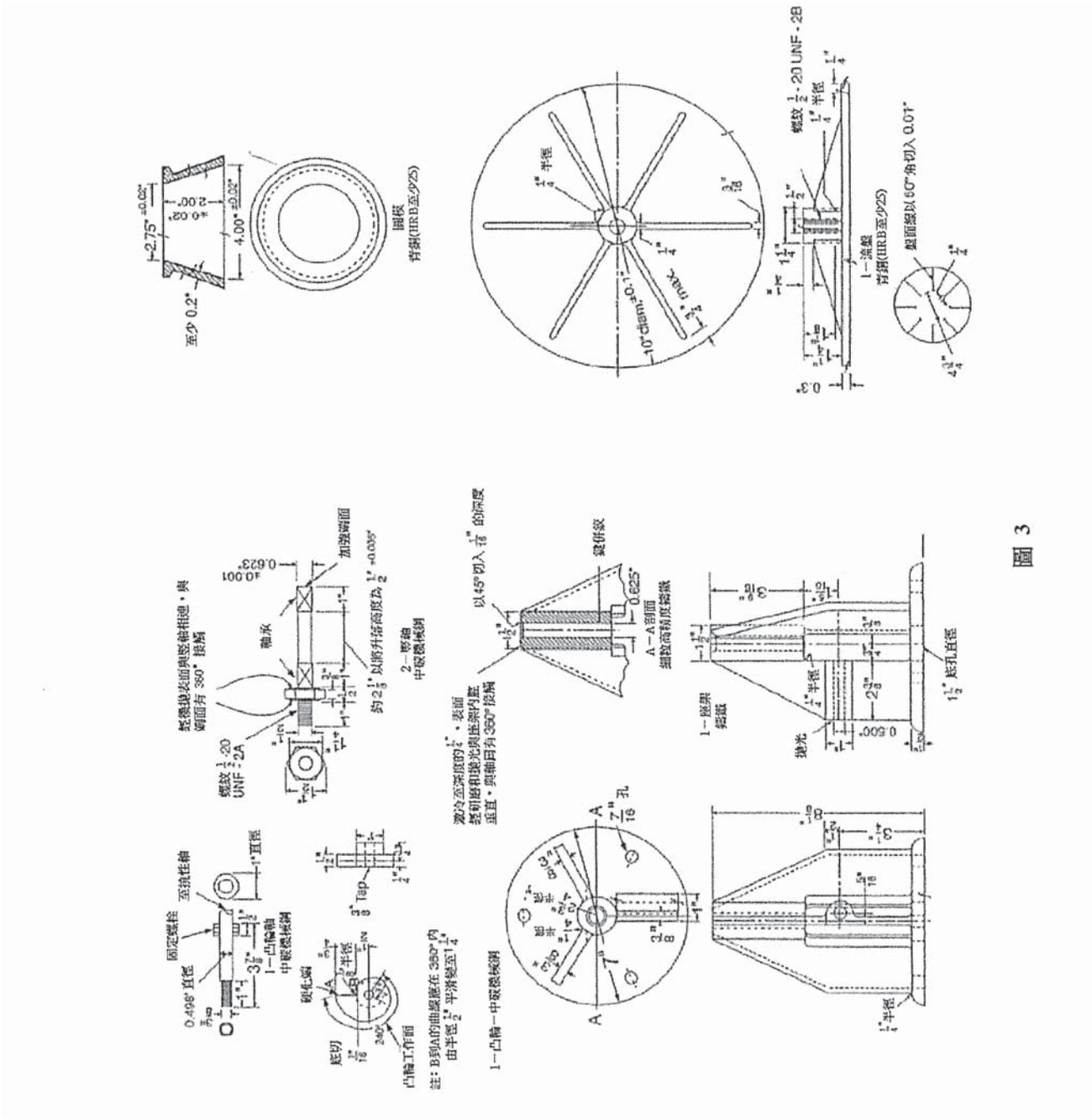


圖 3

3.1.2.2 水泥座應用比重不小於 140 磅/平方英尺（2240 kg/m^2）的水泥整塊鑄成，其頂部應為 10 英寸至 11 英寸（250 mm 至 275 mm）見方，底部為 15 英寸至 16 英寸（375 mm 至 400 mm）見方，高為 25 英寸至 30 英寸（625 mm 至 750 mm）。水泥座底部四角應各嵌入 0.5 英寸（13 mm）厚、4 英寸（102 mm）見方的軟木墊。流盤盤面的水平性、鋼板與水泥間螺栓及螺母的緊固性應經常進行檢查（扭緊這些螺母時建議用 20 磅英尺（27 Nm）的扭矩。

3.1.2.3 流盤安裝在水泥座架上之後，盤面無論升起或落下，兩條互相垂直的直徑均應保持水平。

3.1.3 *流盤的潤滑*

3.1.3.1 流盤的豎向軸應保持清潔，並應以輕質油（SEA－10）作輕度潤滑。盤面與座架的相互接觸面上不應塗油。在凸輪接觸面上塗油有助於減輕磨損和提高運行平穩性。若流盤較長時間未使用，則使用前應升落十幾次或更多次。

3.1.4 *圓模*

3.1.4.1 模制試樣的圓模應由生青銅或黃銅鑄成，其構造如圖 3 所示。所用金屬的洛氏硬度應不小於 HRB25。新圓模頂口的直徑應為 2.75 英寸±0.02 英寸（69.8 mm±0.5 mm），舊圓模頂口的直徑應為 2.75 英寸+0.05 英寸（+1.3 mm）至－0.02 英寸。頂部和底部的平面應相互平行，並與錐體的豎向中心軸垂直。圓模壁厚至少應為 0.2 英寸（5 mm）。圓模頂邊的外緣應製成凸緣，以便於將其提起。所有表面均應進行光面修整。圓模應與一環形防護板一起使用，以防止灰漿濺灑在

盤頂上。該防護板應由不易與水黏附的非吸收性材料製成，其直徑應約為 10 英寸（254 mm），中心開口直徑應約為 4 英寸（102 mm）。

3.2 *天平與砝碼*

3.2.1 *天平*

3.2.1.1 所使用的天平應滿足下述要求：舊天平稱量 2000 克重量的允許誤差應在±2.0 克以內，新天平的允許誤差應為上述數值的一半。靈敏度倒數應不超過允許誤差的兩倍。

3.2.2 *砝碼*

3.2.2.1 舊砝碼的允許誤差如下表所示。新砝碼的允許誤差為表中各對應值的一半。

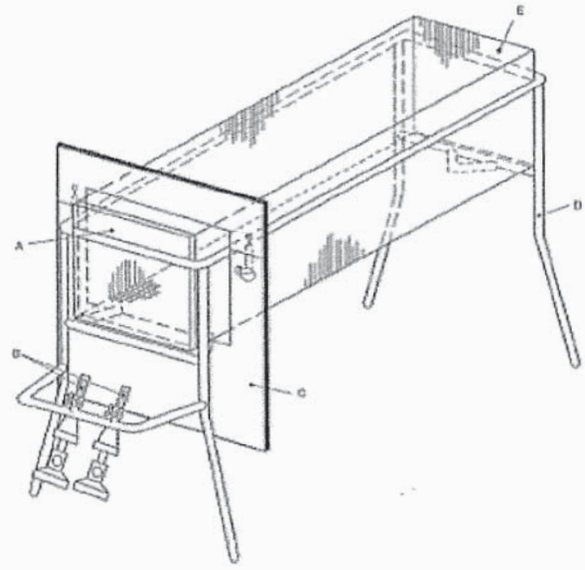
砝碼的允許誤差

砝碼（g）		舊砝碼的允許誤差 加或減（g）
1000	·····	0.50
900	·····	0.45
750	·····	0.40
500	·····	0.35
300	·····	0.30
250	·····	0.25
200	·····	0.20
100	·····	0.15
50	·····	0.10
20	·····	0.05
10	·····	0.04
5	·····	0.03
2	·····	0.02
1	·····	0.01

4 測定含硝酸鹽化肥自續放熱分解的試驗槽試驗

4.1 *定義*

能自續分解的化肥係指在其中局部開始的分解將擴散至其全部的化肥。交運的化肥會發生此類分解傾向可用試驗槽的方法來測定。試驗中，將擬交付運輸的化肥盛入水平試驗槽中，使分解從局部開始。移去熱源後，測出其分解的擴散速度。



A 鋼板（規格 150 mm×150 mm，厚 1 mm 至 3 mm）

B 氣體燃燒器（如：Teclu 或 Bunsen）

C 防熱屏（厚 2 mm）

D 支架（如：由 15 mm 寬，厚 2 mm 的鋼板製成）

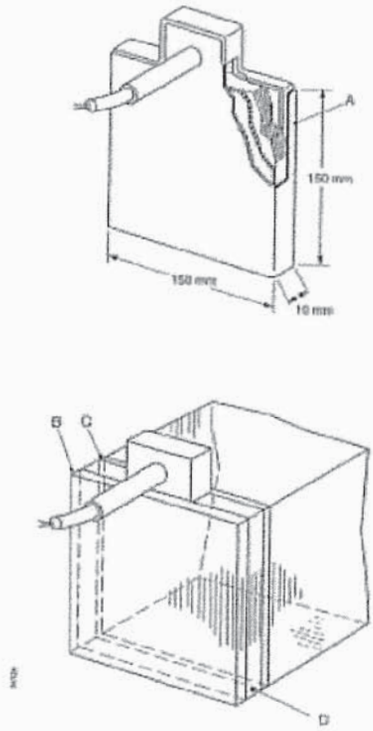
E 網狀試驗槽（150×150×500 mm）

圖 4-1 帶支架和燃燒器的網狀試驗槽

4.2 *儀器與材料*

該儀器（如圖 4-1）由一個內尺寸為 150 mm×150 mm ×500 mm、頂部開口試驗槽構成。試驗槽由方孔鋼絲網（最好為不鏽鋼鋼絲）製成，網孔寬為 1.5 mm，鋼絲直徑為 1.0 mm，其支架應為 15 mm 寬，2 mm 厚的鋼架。試驗槽的兩端可用厚 1.5 mm、150 mm ×150 mm 見方的不鏽鋼板代替鋼絲網。試驗槽應有合適的支撐。若化肥的粒度分佈會使大量化肥從網孔中漏出，則應使用網孔較小的試驗槽進行試驗，或用襯有較小網孔鋼絲網的試驗槽進行試驗。在開始階段，應持

續供足量熱量以形成一個均勻的分解鋒。這裏推薦以下兩種可供選擇的供熱方法，即：



A 鋁或不鏽鋼防護板（厚 3 mm）

B 隔熱板（厚 5 mm）

C 鋁箔或不鏽鋼板（厚 3 mm）

D 槽中加熱器位置

圖 4-2 電加熱器（250W）

4.2.1 *電加熱器*

將一個裝在不鏽鋼盒內的電熱器（250W）置於試驗槽一端內側（如圖 4-2）。不鏽鋼盒的尺寸為 145 mm×145 mm×10 mm、壁厚為 3 mm。不鏽鋼盒不與化肥接觸的一側應裝有一隔熱板（隔熱板厚應為 5 mm），加熱一側應用鋁箔或不鏽鋼板防護。

4.2.2 *氣體燃燒器*

在試驗槽一端的內側置一鋼板（厚為 1 mm 至 3 mm），使之與絲網相接觸（如圖 4-1），用兩個氣體燃燒器加熱。這兩個燃燒器應固定在支架上，並能將不鏽鋼板的溫度保持在 400°C 至 600°C 之間，即處於暗紅熱狀態。

4.2.3 為了防止熱量沿試驗槽外邊傳導，在裝有加熱器一端距端邊 50 mm 處應裝設不鏽鋼板（厚為 2 mm）。

4.2.4 如果全部用不鏽鋼製成，則該設備的壽命會延長。這對網狀試驗槽來說特別重要。

4.2.5 測定擴散速度時，可將熱電耦置入試驗物質中，當分解鋒到達熱電耦並使之溫度達到某一數值時將時間記下。

4.3 *試驗程序*

4.3.1 該儀器應置於吸煙罩下以將分解時產生的毒氣排出，或置於開敞空間以使產生的煙霧可及時散盡。儘管沒有爆炸危險，但建議進行試驗時在觀測者和儀器之間設置防護屏，如透明塑料板。

4.3.2 在試驗槽中盛滿擬交付運輸的化肥，在一端用上述電加熱器或氣體燃燒器加熱，使之開始分解。加熱應持續到化肥分解已充分展開，能觀察到分解鋒已開始擴展（約超過 30 mm 至 50 mm）為止。對具有較高熱穩定性的化肥可能需連續加熱 2 小時。如果化肥有易熔傾向，則加熱應謹慎進行，即用小火加熱。

4.3.3 停止加熱後約 20 分鐘，記下分解鋒的位置。分解鋒可根據化肥顏色的差別來識別，例如棕色（未分解的化肥）對白色（已分解的

化肥）；也可利用分解鋒兩端的熱電耦所指示的溫度來識別。擴展速度可通過觀測和計時或從熱電耦的記錄來確定。應注意停止加熱後是否未發生擴展，或是否擴展到了所有化肥。

4.4 ***試驗衡準和結果的評價方法***

4.4.1 如果分解擴展到了所有化肥，則表明該化肥能自續分解。

4.4.2 如果分解未擴展到所有化肥，則表明這種化肥無自續分解的危險。

5 抗爆試驗的介紹

5.1 ***原理***

5.1.1 將試樣裝入鋼管，以經受助爆藥的爆炸振動。試驗期間，鋼管平置在鉛柱上，以鉛柱受到擠壓的程度來確定爆炸的蔓延度。

5.2 ***試樣的準備***

5.2.1 該試驗須在貨物的代表性試樣上進行。進行抗爆試驗前，全部試樣應在封閉的鋼管中以 25°C 和 50°C（±1°C）的溫度至少循環預熱五次。應保持試樣處於預熱期間的最高溫度至少一小時，而且在試驗前完成預熱時的溫度至少應為 20°C（±3°C），該溫度應從試樣的中心測得。

5.3 ***材料***

不鏽鋼管應達到 ISO 65-1981-Heavy 或與之相當的標準：

管長	1000 mm
標稱外徑	114 mm
標稱壁厚	5－6.5 mm

座板（160×160 mm）應由具有良好焊接性能的鋼板製成，厚為 5 至 6 mm，與鋼管的一端全周對接焊。

起爆系統和引爆劑

電雷管或非金屬外皮的點火索（10 至 13 g/m）。

壓製的助爆藥球團，如旋風炸藥/臘 95/5 或三硝基苯甲硝胺，中心壓有凹穴以裝起爆藥。

含 83 至 86%季戊炸藥的塑料炸藥 500±1 克，用紙板或塑料管作出柱形，爆炸速度為 7300 至 7700 m/s。

六個用於檢測爆振的精煉鑄鉛鉛柱

直徑 50 mm×高100 mm，由精煉鉛製成，含鉛純度至少為 99.5%。

5.4 ***試驗程序***

試驗溫度：15 至 20°C。試驗裝置如圖 1 和 2 所示。

將試樣填充至測試管 1/3 處，在離地 10 cm 處垂直跌落五次。在跌落之間用錘子輕敲管壁以增加壓力。應向管內繼續添裝試樣，經

過 20 次提起和跌落及 20 次的敲擊和壓實，直至裝填的試樣離管口的距離為 70 mm。

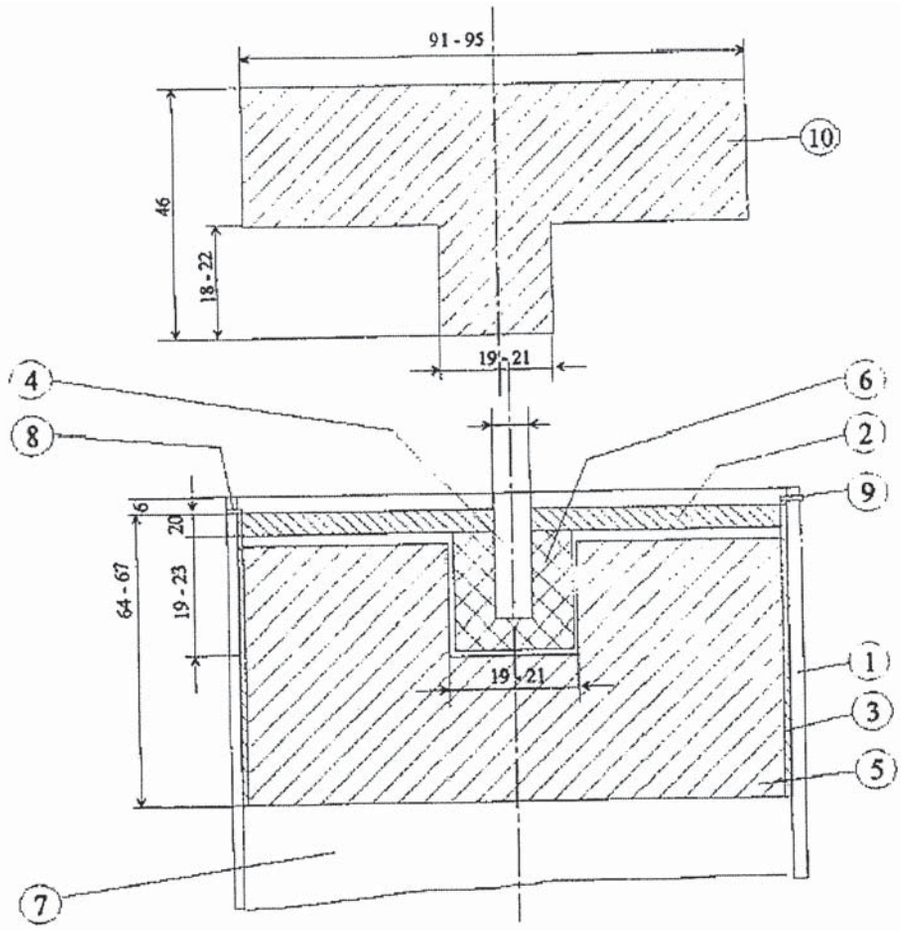
將塑料炸藥填入鋼管中，並用一個凸形木模壓緊。將壓製的助爆藥球團置於塑料炸藥中的凹處。將鋼管用木盤封妥，以保證該裝置與試樣的完全接觸。將鋼管平放在 6 個中心間距為 150 mm 的鉛柱上，最後一個鉛柱的中心距管底板的距離應為 75 mm。鉛柱應放置在不會發生變形、不會發生移動的水平硬質平面上。將電雷管或點火索插入助爆藥中。

採取一切必要的安全措施後，連接和引爆炸藥。

記錄每一根鉛柱被壓縮的高度佔原高度 100 mm 的百分比。由於壓縮不均勻，所取變形應為最大值和最小值的平均值。

5.5 ***結論***

該試驗應進行 2 次，若每次試驗中有一個或一個以上鉛柱的壓縮量小於 5%，則可認為該試驗物質符合抗爆性要求。



單位：毫米

① 鋼管

② 木製圓盤

③ 塑料或紙板圓筒

④ 木杆

⑤ 塑料炸藥

⑥ 壓製的球團

⑦ 試樣

⑧ 4 毫米直徑孔容納分離銷（9）

⑨ 分離銷

⑩ （5）的木製壓模，直徑與起爆器相同

圖 1：助爆藥

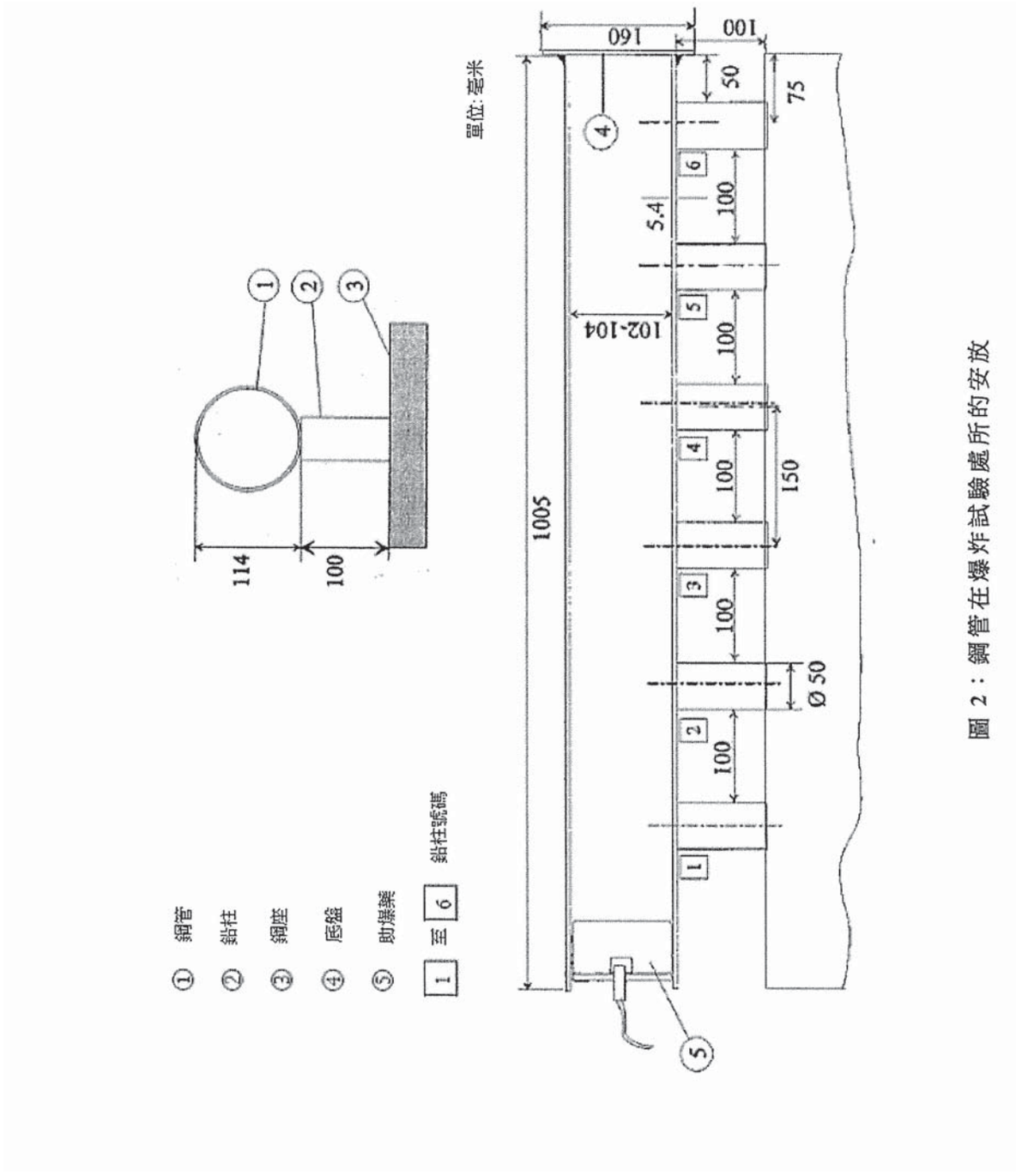


圖 2：鋼管在爆炸試驗處所的安放

6 木炭自熱試驗

6.1 *儀器*

6.1.1 烘乾爐。裝有內部空氣循環裝置並可使溫度控制在 140°C±2°C 的實驗室烘乾爐。

6.1.2 金屬網箱。頂部開口、邊高 100 毫米、用磷青銅紗製成，每平方厘米 18000 網眼（350×350 網眼）。將這一網箱置入磷青銅紗製成的每平方厘米 11 網眼（8×8 網眼）、稍大而適宜的網箱內。在外部裝上把柄和鉤，使之可以懸掛起來。

6.1.3 溫度的測量。一個測量和記錄烘乾爐和網箱中心溫度的系統。用直徑 0.27 mm 的電線製成的鎳鋁溫差電耦即適合測量預定範圍內的溫度。

6.2 *程序*

6.2.1 在網箱中裝上木炭，邊加炭邊輕拍直至裝滿。將烘乾爐溫度預熱到 140°C±2°C，將網箱懸掛其內。在試樣中心插入一個溫差電耦，另一個在網箱和爐腔之間。將烘乾爐的溫度在 140°C±2°C 保持 12 個小時，記錄爐內溫度和試樣溫度。

6.3 *結果*

6.3.1 如果非活性炭、非活性木炭、炭黑、炭塊在 12 小時內的任何時間溫度超過 200°C，則試樣有自熱性。

6.3.2 如果活性炭、活性木炭在 12 小時內的任何時間溫度超過 400°C，則試樣有自熱性。

附錄 3

固體散貨的特性

1 非黏性貨物

1.1 以下貨物乾燥時不具有黏性：

硝酸銨

硝酸銨基化肥

硫酸胺

無水硼砂

硝酸鈣化肥

蓖麻籽

磷酸二銨

磷酸一銨

氯化鉀

鉀鹼

硝酸鉀

硫酸鉀

硝酸鈉

硝酸鈉與硝酸鉀混合物

過磷酸鹽

尿素

1.2 裝載貨物完成前，應測出擬裝貨物的靜止角（見第 6 節），以便決定適用本規則中有關平艙的哪些條款（見第 5 節）。

1.3 除本附錄所列貨物以外的所有其他貨物均有黏性，因此，不適合使用靜止角。除另有說明外，未列出的貨物應按黏性貨物對待。

2 易流態化貨物

2.1 許多細顆粒狀的貨物，如果含水量足夠高，則易於流動。因此，在裝載前，應對含有一定比例細顆粒的潮濕或濕貨物的流動特性進行測試。

3 可能具有化學危險性貨物的注意事項

3.1 在乾散貨物裝運前需請示主管當局的情形裏，向裝貨港和卸貨港當局諮詢可能有效的相關要求也同等重要。

3.2 如果有要求，應在裝貨前查閱《危險貨物事故醫療急救指南（MFAG）》。

附錄 4

索引

物質	組別	參考條目
苜蓿	C	
氧化鋁	C	
氧化鋁，經焙燒的	C	
硅酸鋁	C	
硅酸鋁，粒狀	C	
鋁渣	B	見鋁熔煉副產品或 鋁再熔煉副產品 UN 3170
硅鋁鐵粉末 UN 1395	B	
硝酸鋁 UN 1438	B	
鋁再熔煉副產品 UN 3170	B	
鋁鹽渣	B	見鋁熔煉副產品或 鋁再熔煉副產品 UN 3170
無保護層的鋁硅粉 UN 1398	B	
鋁浮渣	B	見鋁熔煉副產品或 鋁再熔煉副產品 UN 3170
鋁再熔煉副產品 UN 3170	B	
硝酸銨 UN 1942	B	
硝酸銨基化肥 UN 2067	B	
硝酸銨基化肥 UN 2071	B	
硝酸銨基化肥（無危險性的）	C	
硫酸銨	C	
銻礦和銻礦渣	C	
銻礦渣	C	見銻礦和銻礦渣
焙烤物質	B 或 C	見種子餅
亞硝酸銀 UN 1446	B	
麥芽顆粒	B 或 C	見種子餅
重晶石	C	
鋁土礦	C	
甜菜，榨取過的	B 或 C	見種子餅
甜菜，萃取過的	B 或 C	見種子餅
生物淤泥	C	

物質	組別	參考條目
閃鋅礦（硫化鋅）	A	見鋅精砂
硼砂（五水合物原礦）	C	
無水硼砂，原礦	C	
無水硼砂，經提純的	C	
穀糠顆粒	B 或 C	見種子餅
酒糟顆粒	B 或 C	見種子餅
褐煤磚	B	
煅燒黏土	C	見氧化鋁，經焙燒的
煅燒黃鐵礦	A 和 B	見黃鐵礦，煅燒的
氟化鈣	B	見氟石
硝酸鈣 UN 1454	B	
硝酸鈣化肥	C	
氧化鈣	B	見石灰（未熟化的）
芥菜籽顆粒	B 或 C	見種子餅
碳化硅	C	
蓖麻籽 UN 2969	B	
蓖麻片 UN 2969	B	
蓖麻餅 UN 2969	B	
蓖麻油渣 UN 2969	B	
水泥	C	
水泥燒塊	C	
沉澱銅	A	見精礦
黃銅礦	A	見銅精礦
耐火黏土	C	
木炭	B	
塊狀橡膠或塑料絕緣材料	C	
智利硝石	B	見硝酸鈉
智利天然硝石	B	見硝酸鈉
智利天然鉀硝石	B	見硝酸鈉和硝酸鉀混合物
鉻礦石	C	見鉻鐵礦
鉻礦顆粒	C	
鉻鐵礦	C	
鉻礦	C	見鉻鐵礦
檸檬粕顆粒	B 或 C	見種子餅
黏土	C	

物質	組別	參考條目
煤	B（和 A）	
煤泥	A	
輪胎粗碎塊	C	
椰子	B 或 C	見種子餅
焦碳	C	
焦碳粉	A	
硬硼酸鈣石	C	
銅精礦	A	見精礦
銅礫	C	
冰銅	C	
銅鎳礦	A	見鎳精礦
銅礦石精礦	A	見銅精礦
銅泥	A	見沉積銅
椰子仁（乾的）UN 1363	B	
椰子仁，榨取過的	B 或 C	見種子餅
椰子仁，萃取過的	B 或 C	見種子餅
穀蛋白玉米	B 或 C	見種子餅
棉籽渣	B 或 C	見種子餅
冰晶石	C	
僵燒鎂砂	C	見氧化鎂（僵燒的）
磷酸二銨	C	
直接還原鐵（A） （塊狀，熱鑄的）	B	
直接還原鐵（B） （塊、顆粒和冷模磚）	B	
直接還原鐵（C） （副產品粉末）	B	
白雲石	C	
鎂石灰	B	見石灰（未熟化的）
直接還原鐵	B	見直接還原鐵 A 或 B 或 C
油渣	B	見種子餅
長石塊	C	
鐵鉻合金	C	
鐵鉻合金，放熱的	C	
鐵錳合金	C	

物質	組別	參考條目
鐵錳合金，放熱的	C	見鐵錳合金
鎳鐵合金	C	
磷鐵合金	B	
磷鐵合金金屬錠	B	見磷鐵合金
硅鐵 UN 1408	B	
硅鐵	B	
黑色金屬鑽屑 UN 2793	B	
黑色金屬切屑 UN 2793	B	
黑色金屬削屑 UN 2793	B	
黑色金屬旋屑 UN 2793	B	
不含硝酸鹽的化肥	C	
魚（散貨）	A	
魚粉，穩定的 UN 2216	B	
魚渣，穩定的 UN 2216	B	
氟石	A 和 B	
飄塵	C	
方鉛礦（硫化鉛）	A	見鉛精礦
廢料動物下腳肥料	B	見動物下腳肥料
穀蛋白玉米顆粒	B 或 C	見種子餅
粒狀爐渣	C	
顆粒輪胎橡膠	C	
花生，粕	B 或 C	見種子餅
石膏	C	
玉米片	B 或 C	見種子餅
鈦鐵礦黏土	A	
鈦鐵礦砂	A 或 C	
鐵精礦	A	見精礦
鐵精礦（顆粒原料）	A	見精礦
鐵精礦（燒結原料）	A	見精礦
二硫化鐵	C	見黃鐵礦
鐵礦	C	
鐵礦（精礦、顆粒原料、燒結原料）	A	見鐵精礦 （顆粒原料或燒結原料）
鐵礦顆粒	C	
廢氧化鐵 UN 1376	B	

物質	組別	參考條目
鐵屑	B	見黑色金屬鑽屑、削屑、旋屑或切屑 2793
廢海綿鐵 1376	B	
褐鐵礦	C	
拉長石	C	
鉛鋅煅砂（混合的）	A	見精礦
鉛鋅中礦	A	見精礦
鉛精礦	A	見精礦
硝酸鉛 UN 1469	B	
鉛礦	C	
鉛礦精礦	A	見鉛精礦
鉛礦渣	A	見精礦
鉛銀精礦	A	見精礦
鉛銀礦	A	見鉛銀精礦
硫化鉛	A	見鉛精礦
硫化鉛（方鉛礦）	A	見鉛精礦
褐煤	B	見褐煤塊
石灰（未熟化的）	B	
石灰岩	C	
軟絨棉花籽	B	
亞麻籽，榨取過的	B 或 C	見種子餅
亞麻籽，萃取過的	B 或 C	見種子餅
氧化鎂（僵燒的）	C	
氧化鎂（未熟化的）	B	
氧化鎂礦，重燒的	C	見氧化鎂（僵燒的）
氧化鎂礦，電熔的	C	見氧化鎂（僵燒的）
氧化鎂礦，輕燒的	B	見氧化鎂（未熟化的）
氧化鎂礦，煅燒的	B	見氧化鎂（未熟化的）
氧化鎂礦，鹼性煅燒的	B	見氧化鎂（未熟化的）
菱鎂礦，重燒的	C	見氧化鎂（僵燒的）
菱鎂礦，天然的	C	
碳酸鎂	C	見菱鎂礦，天然的
硝酸鎂 UN 1474	B	
玉米，榨取過的	B 或 C	見種子餅
玉米，萃取過的	B 或 C	見種子餅

物質	組別	參考條目
錳精礦	A	見精礦
錳礦	C	
磷酸一銨	C	見磷酸一氫銨
大理石碎片	C	
餅，含油的	B 或 C	見種子餅
硫化金屬精礦粉	A 和 B	
穀粕顆粒	B 或 C	見種子餅
活性淤泥肥料	C	見生物淤泥
精礦	A	
磷酸一氫銨	C	
氯化鉀	C	見氯化鉀
霞石正長岩（礦物）	A	見精礦
鎳精礦	A	見精礦
鎳礦精礦	A	見鎳精礦
尼日爾種籽，榨取過的	B 或 C	見種子餅
尼日爾種籽，萃取過的	B 或 C	見種子餅
油餅	B 或 C	見種子餅
棕櫚仁，榨取過的	B 或 C	見種子餅
棕櫚仁，萃取過的	B 或 C	見種子餅
花生，榨取過的	B 或 C	見種子餅
花生，萃取過的	B 或 C	見種子餅
花生（帶殼）	C	
草泥	A 和 B	
卵石（海中）	C	
礦粒（精礦）	C	
顆粒狀物（穀物）	B 或 C	見種子餅
球團，木漿的	B	見木漿球團
瀝青條	B	見瀝青球
五水合物原礦	A	見精礦
珍珠岩	C	
石油焦炭，煅燒的	B	
石油焦炭，未煅燒的	B	
磷酸鹽岩石，煅燒的	C	
磷酸鹽岩石，未煅燒的	C	
磷酸鹽，脫氟的	C	

物質	組別	參考條目
生鐵	C	
瀝青球	B	
細麩皮顆粒	B 或 C	見種子餅
鉀鹼	C	
氧化鉀	C	見氯化鉀
氯化鉀	C	
硝酸鉀 UN 1486	B	
硝酸鉀/硝酸鈉（混合物）	B	見硝酸鉀和硝酸鈉混合物 UN 1499
硫酸鉀	C	
球狀煤焦油	B	見瀝青球
浮石	C	
黃鐵礦（含銅和鐵）	C	
黃鐵礦，煅燒的	A 和 B	
黃鐵礦	A	見精礦
黃鐵礦（含銅、細粉、浮選或含硫）	A	見黃鐵礦
黃鐵礦灰	A 和 B	見黃鐵礦，煅燒的
黃鐵礦粉（鐵）	A	見精礦
黃鐵礦渣	A	見精礦
葉蠟石	C	
石英	C	
石英岩	C	
生石灰	B	見石灰（未熟化的）
放射性物質，低比活度的（LSA-1） UN 2912	B	
表面受到放射性物質污染的物品（SCO-1）UN 2913	B	
油菜籽，榨取過的	B 或 C	見種子餅
油菜籽，萃取過的	B 或 C	見種子餅
斜方硼砂（無水的）	C	
米糠	B 或 C	見種子餅
碎米	B 或 C	見種子餅
粗製含氨動物肥料	B	見動物下腳肥料
金紅石砂	C	
紅花籽，榨取過的	B 或 C	見種子餅

物質	組別	參考條目
紅花籽，萃取過的	B 或 C	見種子餅
鹽	C	
芒硝	C	
鹽岩	C	
硝石	B	見硝酸鉀
砂	C	
砂，鈦鐵礦	C	見鈦鐵礦砂
砂，鋯石	C	見鋯砂
鋸屑	B	
廢金屬	C	
種子餅，含植物油 UN 1386（a）機榨過的種子餅，含油 10%以上，或含油和水共 20%以上	B	
種子餅，含植物油 UN 1386（b）溶劑萃取和機榨過的種子餅，含油不超過 10%，在含水量超過 10%時，含油和水不超過 20%	B	
種子餅 UN 2217	B	
種子餅（無危險性的）	C	
種子餅渣，含油的	B 或 C	見種子餅
硅錳合金	B	
銀鉛精礦	A	見精礦
銀鉛礦精礦	A	見銀鉛精礦
燒結礦		見鋅和鉛煅砂（混合的）
爐渣，粒狀	C	見粒狀爐渣
斯利格礦，鐵礦	A	見精礦
純鹼	C	
硝酸鈉 UN 1498	B	
硝酸鈉和硝酸鉀混合物 UN 1499	B	
大豆，榨取過的	B 或 C	見種子餅
大豆，萃取過的	B 或 C	見種子餅
廢陰電極	B	見鋁熔煉副產品 或鋁再熔煉副產品 UN 3170
廢電解電池列	B	見鋁熔煉副產品 或鋁再熔煉副產品 UN 3170

物質	組別	參考條目
不鏽鋼屑	C	
鋼屑	B	見黑色金屬鑽屑、削屑、旋屑或切屑
輝銻礦	C	見銻礦和銻礦渣
碎石塊	C	
斯特拉瑟顆粒	B 或 C	見種子餅
糖	C	
硫酸鉀和硫酸鎂	C	
硫化精礦	B	見硫化金屬精礦
硫磺 UN 1350（破碎的塊體及粗顆粒）	B	
硫磺（成形的、固態的）	C	
向日葵籽，榨取過的	B 或 C	見種子餅
向日葵籽，萃取過的	B 或 C	見種子餅
過磷酸鹽	C	
過磷酸鹽（三重晶體）	C	
金屬屑	B	見黑色金屬鑽屑、削屑、旋屑或切屑
鐵燧岩顆粒	C	
滑石	C	
動物下腳肥料（或飼料）	B	
動物下腳肥料	B	見動物下腳肥料（或飼料）
木薯澱粉	C	
烤製粕	B 或 C	見種子餅
三過磷酸鹽	C	見過磷酸鹽，三重晶體
尿素	C	
釩礦	B	
蛭石	C	
白石英	C	
木片	B	
木球團	B	
木漿球團	B	
鋅鉛煅砂	A	見精礦
鋅鉛中礦	A	見精礦
鋅灰 UN 1435	B	

物質	組別	參考條目
鋅精礦	A	見精礦
鋅，熔渣、廢渣或浮渣	B	見鋅灰 UN 1435
鋅礦，煅燒的	A	見鋅精礦
鋅礦，菱鋅礦	A	見鋅精礦
鋅礦，精礦	A	見鋅精礦
鋅礦，原礦	A	見鋅精礦
鋅燒結礦	A	見精礦
鋅淤渣	A	見精礦
硫化鋅	A	見鋅精礦
硫化鋅（閃鋅礦）	A	見鋅精礦
鋯砂	C	

RESOLUTION MSC.268(85)
(adopted on 4 December 2008)

ADOPTION OF THE INTERNATIONAL MARITIME SOLID BULK CARGOES (IMSBC) CODE

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

NOTING the adoption by the Committee of resolution MSC.193(79) on the Code of Safe Practice for Solid Bulk Cargoes, 2004,

RECOGNIZING the need to provide a mandatory application of the agreed international standards for the carriage of solid bulk cargoes by sea,

NOTING ALSO resolution MSC.269(85) by which it adopted amendments to chapters VI and VII of the International Convention for the Safety of Life at Sea (SOLAS) 1974, as amended (hereinafter referred to as "the Convention"), to make the provisions of the International Maritime Solid Bulk Cargoes (IMSBC) Code mandatory under the Convention,

HAVING CONSIDERED, at its eighty-fifth session, the text of the proposed International Maritime Solid Bulk Cargoes (IMSBC) Code,

1. ADOPTS the International Maritime Solid Bulk Cargoes (IMSBC) Code, the text of which is set out in the annex to the present resolution;

2. NOTES that, under the aforementioned amendments to chapter VI of the Convention, future amendments to the IMSBC Code shall be adopted, brought into force and shall take effect in accordance with the provisions of article VIII of the Convention concerning the amendments procedures applicable to the Annex to the Convention other than chapter I thereof;

3. INVITES Contracting Governments to the Convention to note that the IMSBC Code will take effect on 1 January 2011 upon entry into force of amendments to chapters VI and VII of the Convention;

4. AGREES that Contracting Governments to the Convention may apply the IMSBC Code in whole or in part on a voluntary basis as from 1 January 2009;

5. REQUESTS the Secretary-General to transmit certified copies of this resolution and its annex to all Contracting Governments to the Convention;

6. FURTHER REQUESTS the Secretary-General to transmit copies of this resolution and its annex to all Members of the Organization which are not Contracting Governments to the Convention;

7. RESOLVES that the annexed IMSBC Code supersedes the Code of Safe Practice for Solid Bulk Cargoes, 2004, adopted by resolution MSC.193(79).

ANNEX

INTERNATIONAL MARITIME SOLID BULK CARGOES (IMSBC) CODE

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FOREWORD

The International Convention for the Safety of Life at Sea, 1974 (SOLAS Convention), as amended, deals with various aspects of maritime safety and contains, in parts A and B of chapter VI and part A-1 of chapter VII, the mandatory provisions governing the carriage of solid bulk cargoes and the carriage of dangerous goods in solid form in bulk, respectively. These provisions are amplified in the International Maritime Solid Bulk Cargoes Code (IMSBC Code).

Detailed fire protection arrangements for ships carrying solid bulk cargoes are incorporated into chapter II-2 of the SOLAS Convention by regulations 10 and 19. Attention is drawn to regulation II-2/19.4 of the SOLAS Convention as amended. This provides for an appropriate document as evidence of compliance of construction and equipment with the requirements of regulation II-2/19 to be issued to ships constructed on or after 1 July 2002 and carrying dangerous goods in solid form in bulk as defined in regulation VII/7 of the Convention, except class 6.2 and class 7.

For:

- cargo ships of 500 gross tonnage or over constructed on or after 1 September 1984 but before 1 July 2002; or

- cargo ships of less than 500 gross tonnage constructed on or after 1 February 1992 but before 1 July 2002,

the requirements of regulation II-2/54 of SOLAS, 1974, as amended by resolutions MSC.1(XLV), MSC.6(48), MSC.13(57), MSC.22(59), MSC.24(60), MSC.27(61), MSC.31(63) and MSC.57(67), apply (see SOLAS regulation II-2/1.2).

For cargo ships of less than 500 gross tonnage constructed on or after 1 September 1984 and before 1 February 1992, it is recommended that Contracting Parties extend such application to these cargo ships as far as possible.

The problems involved in the carriage of bulk cargoes were recognized by the delegates to the 1960 International Conference on Safety of Life at Sea, but at that time it was not possible to frame detailed requirements, except for the carriage of grain. The Conference did recommend, however, in paragraph 55 of Annex D to the Convention, that an internationally acceptable code of safe practice for the shipment of bulk cargoes should be drawn up under the sponsorship of the International Maritime Organization (IMO). This work was undertaken by the Organization's Sub-Committee on Containers and Cargoes and several editions of the Code of Safe Practice for Solid Bulk Cargoes (BC Code) have been published, since the first edition in 1965. The Sub-Committee was expanded to include dangerous goods and is now called the Sub-Committee on Dangerous Goods, Solid Cargoes and Containers (DSC Sub-Committee).

The prime hazards associated with the shipment of solid bulk cargoes are those relating to structural damage due to improper cargo distribution, loss or reduction of stability during a voyage and chemical reactions of cargoes. Therefore the primary aim of this Code is to facilitate the safe stowage and shipment of solid bulk cargoes by providing information on the dangers associated with the shipment of certain types of solid bulk cargoes and instructions

on the procedures to be adopted when the shipment of solid bulk cargoes is contemplated. The requirements for the transport of grain are covered by the International Code for the Safe Carriage of Grain in Bulk (International Grain Code, 1991).

The IMSBC Code that was adopted by resolution MSC.268(85) was recommended to Governments for adoption or for use as the basis for national regulations in pursuance of their obligations under regulation of the SOLAS Convention, as amended. The Code is mandatory under the provision of the SOLAS Convention from 1 January 2011. However, some parts of the Code continue to be recommendatory or informative. It needs to be emphasized that, in the context of the language of the Code: the words "shall", "should" and "may", when used in the Code, mean that the relevant provisions are "mandatory", "recommendatory" and "optional", respectively. Observance of the Code harmonizes the practices and procedures to be followed and the appropriate precautions to be taken in the loading, trimming, carriage and discharge of solid bulk cargoes when transported by sea, ensuring compliance with the mandatory provisions of the SOLAS Convention.

The Code has undergone many changes, both in layout and content, in order to keep pace with the expansion and progress of industry. The Maritime Safety Committee (MSC) is authorized by the Organization's Assembly to adopt amendments to the Code, thus enabling the IMO to respond promptly to developments in transport.

The MSC, at its eighty-fifth session, agreed that, in order to facilitate the safe transport of solid bulk cargoes, the provisions of the Code may be applied as from 1 January 2009 on a voluntary basis, pending their official entry into force on 1 January 2011 without any transitional period. This is described in resolution MSC.268(85).

Section 1

General provisions

1.1 Introductory note

1.1.1 It should be noted that other international and national regulations exist and that those regulations may recognize all or part of the provisions of this Code. In addition, port authorities and other bodies and organizations should recognize the Code and may use it as a basis for their storage and handling bye-laws within loading and discharge areas.

1.2 Cargoes listed in this Code

1.2.1 Typical cargoes currently shipped in bulk, together with advice on their properties and methods of handling, are given in the schedules for individual cargoes. However, these schedules are not exhaustive and the properties attributed to the cargoes are given only for guidance. Consequently, before loading, it is essential to obtain current valid information from the shipper on the physical and chemical properties of the cargoes presented for shipment. The shipper shall provide appropriate information about the cargo to be shipped (see section 4.2).

1.2.2 Where a solid bulk cargo is specifically listed in appendix 1 to this Code (individual schedules for solid bulk cargoes), it shall be transported in accordance with the provisions in its schedule in addition to the provisions in sections 1 to 10 and 11.1.1 of this Code. The master shall consider to consult the authorities at the ports of loading and discharge, as necessary, concerning the requirements which may be in force and applicable for the carriage.

1.3 Cargoes not listed in this Code

1.3.1 If a solid cargo which is not listed in appendix 1 to this Code is proposed for carriage in bulk, the shipper shall, prior to loading, provide the competent authority of the port of loading with the characteristics and properties of the cargo in accordance with section 4 of this Code. Based on the information received, the competent authority will assess the acceptability of the cargo for safe shipment.

1.3.1.1 When it is assessed that the solid bulk cargo proposed for carriage may present hazards as those defined by group A or B of this Code as defined in 1.7, advice is to be sought from the competent authorities of the port of unloading and of the flag State. The three competent authorities will set the preliminary suitable conditions for the carriage of this cargo.

1.3.1.2 When it is assessed that the solid bulk cargo proposed for carriage presents no specific hazards for transportation, the carriage of this cargo shall be authorized. The competent authorities of the port of unloading and of the flag State shall be advised of that authorization.

1.3.2 The competent authority of the port of loading shall provide to the master a certificate stating the characteristics of the cargo and the required conditions for carriage and handling of this shipment. The competent authority of the port of loading shall also submit an application to the Organization, within one year from the issue of the certificate, to incorporate this solid bulk cargo into appendix 1 of this Code. The format of this application shall be as outlined in subsection 1.3.3.

1.3.3 Format for the properties of cargoes not listed in this Code and conditions of the carriage

Tentative bulk cargo shipping name (in capital letters)

DESCRIPTION (Describe the cargo)

CHARACTERISTICS (Fill the following table)

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
SIZE	**CLASS**	**GROUP**

HAZARD (Clarify the hazard of carriage of the cargo.)

(Determine the following types of requirements. If no requirement is necessary, write "No special requirements".)

STOWAGE & SEGREGATION

HOLD CLEANLINESS

WEATHER PRECAUTIONS

LOADING

PRECAUTIONS

VENTILATION

CARRIAGE

DISCHARGE

CLEAN-UP

(Specify the emergency procedures for the cargo, if necessary.)

EMERGENCY PROCEDURES

SPECIAL EMERGENCY EQUIPMENT TO BE CARRIED
EMERGENCY PROCEDURES EMERGENCY ACTION IN THE EVENT OF FIRE MEDICAL FIRST AID

1.4 Application and implementation of this Code

1.4.1 The provisions contained in this Code apply to all ships to which the SOLAS Convention, as amended, applies and that are carrying solid bulk cargoes as defined in regulation 1-1 of part A of chapter VI of the Convention.

1.4.2 Although this Code is legally treated as a mandatory instrument under the SOLAS Convention the following provisions of this Code remain recommendatory or informative:

Section 11 Security provisions (except subsection 11.1.1);

Section 12 Stowage factor conversion tables;

Section 13 References to related information and recommendations;

Appendices other than appendix 1 Individual schedules of solid bulk cargoes; and

The texts in the sections for "DESCRIPTION", "CHARACTERISTICS", "HAZARD" and "EMERGENCY PROCEDURES" of individual schedules of solid bulk cargoes in appendix 1.

1.4.3 In certain parts of this Code, a particular action is prescribed, but the responsibility for carrying out the action has not been specifically assigned to any particular person. Such responsibility may vary according to the laws and customs of different countries and the international conventions into which these countries have entered. For the purpose of this Code, it is not necessary to make this assignment, but only to identify the action itself. It remains the prerogative of each Government to assign this responsibility.

1.5 Exemptions and equivalent measures

1.5.1 Where this Code requires that a particular provision for the transport of solid bulk cargoes shall be complied with, a competent authority or competent authorities (port State of departure, port State of arrival or flag State) may authorize any other provision by exemption if satisfied that such provision is at least as effective and safe as that required by this Code. Acceptance of an exemption authorized under this section by a competent authority not party to it is subject to the discretion of that competent authority. Accordingly, prior to any shipment covered by the exemption, the recipient of the exemption shall notify other competent authorities concerned.

1.5.2 Competent authority or competent authorities which have taken the initiative with respect to the exemption:

.1 shall send a copy of such exemption to the Organization, which shall bring it to the attention of the Contracting Parties to SOLAS; and

.2 shall take action to amend this Code to include the provisions covered by the exemption, as appropriate.

1.5.3 The period of validity of the exemption shall be not more than five years from the date of authorization. An exemption that is not covered under 1.5.2.2 may be renewed in accordance with the provisions of this section.

1.5.4 A copy of the exemption or an electronic copy thereof shall be maintained on board each ship transporting solid bulk cargoes in accordance with the exemption, as appropriate.

1.5.5 Contact information for the main designated national competent authorities concerned is given in the separate document issued by the Organization.

1.6 Conventions

Parts A and B of chapter VI and part A-1 of chapter VII of the SOLAS Convention, as amended, deal with the carriage of solid bulk cargoes and the carriage of dangerous goods in solid form in bulk, respectively, and are reproduced in full. This extract incorporates amendments envisaged to enter into force from 1 January 2011.

CHAPTER VI

CARRIAGE OF CARGOES

Part A

General provisions

Regulation 1
Application

1 This chapter applies to the carriage of cargoes (except liquids in bulk, gases in bulk and those aspects of carriage covered by other chapters) which, owing to their particular hazards to ships or persons on board, may require special precautions in all ships to which the present regulations apply and in cargo ships of less than 500 gross tonnage. However, for cargo ships of less than 500 gross tonnage, the Administration, if it considers that the sheltered nature and conditions of voyage are such as to render the application of any specific requirements of part A or B of this chapter unreasonable or unnecessary, may take other effective measures to ensure the required safety for these ships.

2 To supplement the provisions of parts A and B of this chapter, each Contracting Government shall ensure that appropriate information on cargo and its stowage and securing is provided, specifying, in particular, precautions necessary for the safe carriage of such cargoes.

Regulation 1-1
Definitions

For the purpose of this chapter, unless expressly provided otherwise:

1 *IMSBC Code* means the International Maritime Solid Bulk Cargoes (IMSBC) Code adopted by the Maritime Safety Committee of the Organization by resolution MSC.268(85), as may be amended by the Organization, provided that such amendments are adopted, brought into force and take effect in accordance with the provisions of article VIII of the present Convention concerning the amendment procedures applicable to the annex other than chapter I.

2 *Solid bulk cargo* means any cargo, other than liquid or gas, consisting of a combination of particles, granules or any larger pieces of material generally uniform in composition, which is loaded directly into the cargo spaces of a ship without any intermediate form of containment.

Regulation 1-2
Requirements for the carriage of solid bulk cargoes other than grain

1 The carriage of solid bulk cargoes other than grain shall be in compliance with the relevant provisions of the IMSBC Code.

Regulation 2
Cargo information

1 The shipper shall provide the master or his representative with appropriate information on the cargo sufficiently in advance of loading to enable the precautions which may be necessary for proper stowage and safe carriage of the cargo to be put into effect. Such information shall be confirmed in writing and by appropriate shipping documents prior to loading the cargo on the ship.

2 The cargo information shall include:

.1 in the case of general cargo, and of cargo carried in cargo units, a general description of the cargo, the gross mass of the cargo or of the cargo units, and any relevant special properties of the cargo. For the purpose of this regulation the cargo information required in sub-chapter 1.9 of the Code of Safe Practice for Cargo Stowage and Securing, adopted by the Organization by resolution A.714(17), as may be amended, shall be provided. Any such amendment to sub-chapter 1.9 shall be adopted, brought into force and take effect in accordance with the provisions of article VIII of the present Convention concerning the amendment procedures applicable to the annex other than chapter I;

.2 in the case of solid bulk cargo, information as required by section 4 of the IMSBC Code.

3 Prior to loading cargo units on board ships, the shipper shall ensure that the gross mass of such units is in accordance with the gross mass declared on the shipping documents.

Regulation 3
Oxygen analysis and gas detection equipment

1 When transporting a solid bulk cargo which is liable to emit a toxic or flammable gas, or cause oxygen depletion in the cargo space, an appropriate instrument for measuring the concentration of gas or oxygen in the air shall be provided together with detailed instructions for its use. Such an instrument shall be to the satisfaction of the Administration.

2 The Administration shall take steps to ensure that crews of ships are trained in the use of such instruments.

Regulation 4
The use of pesticides in ships

Appropriate precautions shall be taken in the use of pesticides in ships, in particular for the purposes of fumigation.

Regulation 5
Stowage and securing

1 Cargo, cargo units and cargo transport units carried on or under deck shall be so loaded, stowed and secured as to prevent as far as is practicable, throughout the voyage, damage or hazard to the ship and the persons on board, and loss of cargo overboard.

2 Cargo, cargo units and cargo transport units shall be so packed and secured within the unit as to prevent, throughout the voyage, damage or hazard to the ship and the persons on board.

3 Appropriate precautions shall be taken during loading and transport of heavy cargoes or cargoes with abnormal physical dimensions to ensure that no structural damage to the ship occurs and to maintain adequate stability throughout the voyage.

4 Appropriate precautions shall be taken during loading and transport of cargo units and cargo transport units on board ro-ro ships, especially with regard to the securing arrangements on board such ships and on the cargo units and cargo transport units and with regard to the strength of the securing points and lashings.

5 Freight containers shall not be loaded to more than the maximum gross weight indicated on the Safety Approval Plate under the International Convention for Safe Containers (CSC), as amended.

6 All cargoes, other than solid and liquid bulk cargoes, cargo units and cargo transport units, shall be loaded, stowed and secured throughout the voyage in accordance with the Cargo Securing Manual approved by the Administration. In ships with ro-ro spaces, as defined in regulation II-2/3.41, all securing of such cargoes, cargo units, and cargo transport units, in accordance with the Cargo Securing Manual, shall be completed before the ship leaves the berth. The Cargo Securing Manual shall be drawn up to a standard at least equivalent to relevant guidelines developed by the Organization.

Regulation 5-1
Material safety data sheets

1 Ships carrying MARPOL Annex I cargoes, as defined in Appendix I to Annex I of the Protocol of 1978 relating to the International Convention for the Prevention of Pollution from Ships, 1973, and marine fuel oils shall be provided with a material safety data sheet prior to the loading of such cargoes based on the recommendations developed by the Organization.

Part B

Special provisions for solid bulk cargoes

Regulation 6
Acceptability for shipment

1 Prior to loading a solid bulk cargo, the master shall be in possession of comprehensive information on the ship's stability and on the distribution of cargo for the standard loading conditions. The method of providing such information shall be to the satisfaction of the Administration.

Regulation 7
Loading, unloading and stowage of solid bulk cargoes

1 For the purpose of this regulation, terminal representative means a person appointed by the terminal or other facility, where the ship is loading or unloading, who has responsibility for operations conducted by that terminal or facility with regard to the particular ship.

2 To enable the master to prevent excessive stresses in the ship's structure, the ship shall be provided with a booklet, which shall be written in a language with which the ship's officers responsible for cargo operations are familiar. If this language is not English, the ship shall be provided with a booklet written also in the English language. The booklet shall, as a minimum, include:

.1 stability data, as required by regulation II-1/5-1;

.2 ballasting and deballasting rates and capacities;

.3 maximum allowable load per unit surface area of the tanktop plating;

.4 maximum allowable load per hold;

.5 general loading and unloading instructions with regard to the strength of the ship's structure including any limitations on the most adverse operating conditions during loading, unloading, ballasting operations and the voyage;

.6 any special restrictions such as limitations on the most adverse operating conditions imposed by the Administration or organization recognized by it, if applicable; and

.7 where strength calculations are required, maximum permissible forces and moments on the ship's hull during loading, unloading and the voyage.

3 Before a solid bulk cargo is loaded or unloaded, the master and the terminal representative shall agree on a plan which shall ensure that the permissible forces and moments on the ship are not exceeded during loading or unloading, and shall include the sequence, quantity and rate of loading or unloading, taking into consideration the speed of loading or unloading, the number of pours and the deballasting or ballasting capability of the ship. The plan and any subsequent amendments thereto shall be lodged with the appropriate authority of the port State.

4 The master and terminal representative shall ensure that loading and unloading operations are conducted in accordance with the agreed plan.

5 If during loading or unloading any of the limits of the ship referred to in paragraph 2 are exceeded or are likely to become so if the loading or unloading continues, the master has the right to suspend operation and the obligation to notify accordingly the appropriate authority of the port State with which the plan has been lodged. The master and the terminal representative shall ensure that corrective action is taken. When unloading cargo, the master and terminal representative shall ensure that the unloading method does not damage the ship's structure.

6 The master shall ensure that ship's personnel continuously monitor cargo operations. Where possible, the ship's draught shall be checked regularly during loading or unloading to confirm the tonnage figures supplied. Each draught and tonnage observation shall be recorded in a cargo log-book. If significant deviations from the agreed plan are detected, cargo or ballast operations or both shall be adjusted to ensure that the deviations are corrected.

CHAPTER VII

Carriage of dangerous goods

Part A-1

Carriage of dangerous goods in solid form in bulk

Regulation 7
Definitions

Dangerous goods in solid form in bulk means any material, other than liquid or gas, consisting of a combination of particles, granules or any larger pieces of material, generally uniform in composition, which is covered by the IMDG Code and is loaded directly into the cargo spaces of a ship without any intermediate form of containment, and includes such materials loaded in a barge on a barge-carrying ship.

Regulation 7-1
Application

1 Unless expressly provided otherwise, this part applies to the carriage of dangerous goods in solid form in bulk in all ships to which the present regulations apply and in cargo ships of less than 500 gross tonnage.

2 The carriage of dangerous goods in solid form in bulk is prohibited except in accordance with the provisions of this part.

3 To supplement the provisions of this part, each Contracting Government shall issue, or cause to be issued, instructions on emergency response and medical first aid relevant to incidents involving dangerous goods in solid form in bulk, taking into account the guidelines developed by the Organization.

Regulation 7-2
Documents

1 In all documents relating to the carriage of dangerous goods in solid form in bulk by sea, the bulk cargo shipping name of the goods shall be used (trade names alone shall not be used).

2 Each ship carrying dangerous goods in solid form in bulk shall have a special list or manifest setting forth the dangerous goods on board and the location thereof. A detailed stowage plan, which identifies by class and sets out the location of all dangerous goods on board, may be used in place of such a special list or manifest. A copy of one of these documents shall be made available before departure to the person or organization designated by the port State authority.

Regulation 7-3
Stowage and segregation requirements

1 Dangerous goods in solid form in bulk shall be loaded and stowed safely and appropriately in accordance with the nature of the goods. Incompatible goods shall be segregated from one another.

2 Dangerous goods in solid form in bulk, which are liable to spontaneous heating or combustion, shall not be carried unless adequate precautions have been taken to minimize the likelihood of the outbreak of fire.

3 Dangerous goods in solid form in bulk, which give off dangerous vapours, shall be stowed in a well ventilated cargo space.

Regulation 7-4
Reporting of incidents involving dangerous goods

1 When an incident takes place involving the loss or likely loss overboard of dangerous goods in solid form in bulk into the sea, the master, or other person having charge of the ship, shall report the particulars of such an incident without delay and to the fullest extent possible to the nearest coastal State. The report shall be drawn up based on general principles and guidelines developed by the Organization.

2 In the event of the ship referred to in paragraph 1 being abandoned, or in the event of a report from such a ship being incomplete or unobtainable, the company, as defined in regulation IX/1.2, shall, to the fullest extent possible, assume the obligations placed upon the master by this regulation.

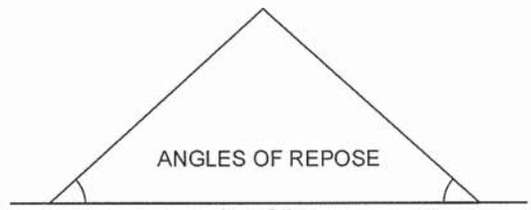
Regulation 7-5
Requirements for the carriage of dangerous goods in solid form in bulk

1 The carriage of dangerous goods in solid form in bulk shall be in compliance with the relevant provisions of the IMSBC Code, as defined in regulation VI/1-1.1.

1.7 Definitions

For the purpose of this Code, unless expressly provided otherwise, the following definitions shall apply:

1.7.1 *Angle of repose* means the maximum slope angle of non-cohesive (i.e. free-flowing) granular material. It is measured as the angle between a horizontal plane and the cone slope of such material.



Angle of Repose

1.7.2 *Bulk Cargo Shipping Name (BCSN)* identifies a bulk cargo during transport by sea. When a cargo is listed in this Code, the Bulk Cargo Shipping Name of the cargo is identified by capital letters in the individual schedules or in the index. When the cargo is a dangerous good, as defined in the IMDG Code, as defined in regulation VII/1.1 of the SOLAS Convention, the Proper Shipping Name of that cargo is the Bulk Cargo Shipping Name.

1.7.3 *Bulk density* means the weight of solids, air and water per unit volume. Bulk density is expressed in kilograms per cubic metre (kg/m^3), in general. The void spaces in the cargo may be filled with air and water.

1.7.4 *Cargo space* means any space in a ship designated for carriage of cargoes.

1.7.5 *Cargoes which may liquefy* means cargoes which contain a certain proportion of fine particles and a certain amount of moisture. They may liquefy if shipped with a moisture content in excess of their transportable moisture limit.

1.7.6 *Cohesive material* means materials other than non-cohesive materials.

1.7.7 *Competent Authority* means any national regulatory body or authority designated or otherwise recognized as such for any purpose in connection with this Code.

1.7.8 *Concentrates* means materials obtained from a natural ore by a process of enrichment or beneficiation by physical or chemical separation and removal of unwanted constituents.

1.7.9 *Consignment* means a solid bulk cargo presented by a shipper for transport.

1.7.10 *Flow moisture point* means the percentage moisture content (wet mass basis) at which a flow state develops under the prescribed method of test in a representative sample of the material (see paragraph 1 of appendix 2).

1.7.11 *Flow state* means a state occurring when a mass of granular material is saturated with liquid to an extent that, under the influence of prevailing external forces such as vibration, impaction or ships motion, it loses its internal shear strength and behaves as a liquid.

1.7.12 *Group A* consists of cargoes which may liquefy if shipped at a moisture content in excess of their transportable moisture limit.

1.7.13 *Group B* consists of cargoes which possess a chemical hazard which could give rise to a dangerous situation on a ship.

1.7.14 *Group C* consists of cargoes which are neither liable to liquefy (Group A) nor to possess chemical hazards (Group B).

1.7.15 *High-density solid bulk cargo* means a solid bulk cargo with a stowage factor of 0.56 m^3/t or less.

1.7.16 *IMDG Code* means the International Maritime Dangerous Goods (IMDG) Code adopted by the Maritime Safety Committee of the Organization by resolution MSC.122(75), as may be amended by the Organization.

1.7.17 *Incompatible materials* means materials that may react dangerously when mixed. They are subject to the segregation requirements of subsection 9.3 and the schedules for individual cargoes classified in Group B.

1.7.18 *International Ship and Port Facility Security (ISPS) Code* means the International Code for the Security of Ships and of Port Facilities consisting of Part A (the provisions of which shall be treated as mandatory) and part B (the provisions of which shall be treated as recommendatory), as adopted, on 12 December 2002, by resolution 2 of the Conference of Contracting Governments to the International Convention for the Safety of Life at Sea, 1974 as may be amended by the Organization.

1.7.19 *Materials hazardous only in bulk (MHB)* means materials which may possess chemical hazards when carried in bulk other than materials classified as dangerous goods in the IMDG Code.

1.7.20 *Moisture content* means that portion of a representative sample consisting of water, ice or other liquid expressed as a percentage of the total wet mass of that sample.

1.7.21 *Moisture migration* means the movement of moisture contained in a cargo by settling and consolidation of the cargo due to vibration and ship's motion. Water is progressively displaced, which may result in some portions or all of the cargo developing a flow state.

1.7.22 *Non-cohesive material* means dry materials that readily shift due to sliding during transport, as listed in appendix 3, paragraph 1, "Properties of solid bulk cargoes".

1.7.23 *Representative test sample* means a sample of sufficient quantity for the purpose of testing the physical and chemical properties of the consignment to meet specified requirements.

1.7.24 *Shipper* means any person by whom or in whose name, or on whose behalf, a contract of carriage of goods by sea has been concluded with a carrier, or any person by whom or in whose name, or on whose behalf, the goods are actually delivered to the carrier in relation to the contract of carriage by sea.

1.7.25 *Solid bulk cargo* means any cargo, other than a liquid or a gas, consisting of a combination of particles, granules or any larger pieces of material generally uniform in composition which is loaded directly into the cargo spaces of a ship without any intermediate form of containment.

1.7.26 *Stowage factor* means the figure which expresses the number of cubic metres which one tonne of cargo will occupy.

1.7.27 *Transportable Moisture Limit (TML)* of a cargo which may liquefy means the maximum moisture content of the cargo which is considered safe for carriage in ships not complying with the special provisions of subsection 7.3.2. It is determined by the test procedures, approved by a competent authority, such as those specified in paragraph 1 of appendix 2.

1.7.28 *Trimming* means any levelling of a cargo within a cargo space, either partial or total.

1.7.29 *Ventilation* means exchange of air from outside to inside a cargo space.

.1 *Continuous Ventilation* means ventilation that is operating at all times.

.2 *Mechanical Ventilation* means power-generated ventilation.

.3 *Natural Ventilation* means ventilation that is not power-generated.

.4 *Surface Ventilation* means ventilation of the space above the cargo.

Section 2

General loading, carriage and unloading precautions

2.1 Cargo distribution

2.1.1 General

A number of accidents have occurred as a result of improper loading and unloading of solid bulk cargoes. It shall be noted that solid bulk cargoes have to be properly distributed throughout the ship to provide adequate stability and to ensure that the ship's structure is never overstressed. Furthermore, the shipper shall provide the master with adequate information about the cargo, as specified in section 4, to ensure that the ship is properly loaded.

2.1.2 To prevent the structure being overstressed

A general cargo ship is normally constructed to carry cargoes in the range of 1.39 to 1.67 cubic metres per tonne when loaded to full bale and deadweight capacities. When loading a high-density solid bulk cargo, particular attention shall be paid to the distribution of weights to avoid excessive stresses, taking into account that the loading conditions may be different from those found normally and that improper distribution of such cargo may be capable of stressing either the structure under the load or the entire hull. To set out exact rules for the distribution of loading is not practicable for all ships because the structural arrangements of each vessel may vary greatly. The information on proper distribution of cargo may be provided in the ship's stability information booklet or may be obtained by the use of loading calculators, if available.

2.1.3 To aid stability

2.1.3.1 Having regard to regulation II-1/22.1 of SOLAS Convention, a stability information booklet shall be provided aboard all ships subject to the Convention. The master shall be able to calculate the stability for the anticipated worst conditions during the voyage as well as that on departure and demonstrate that the stability is adequate.

2.1.3.2 Shifting divisions and bins, of adequate strength, shall be erected whenever solid bulk cargoes, which are suspected of readily shifting, are carried in 'tween-deck cargo spaces or in only partially filled cargo spaces.

2.1.3.3 As far as practicable, high-density cargoes shall be loaded in the lower hold cargo spaces in preference to 'tween-deck cargo spaces.

2.1.3.4 When it is necessary to carry high-density cargoes in 'tween-decks or higher cargo spaces, due consideration shall be paid to ensure that the deck area is not overstressed and that the ship's stability is not reduced below the minimum acceptable level specified in the ship's stability data.

2.2 Loading and unloading

2.2.1 Cargo spaces shall be inspected and prepared for the particular cargo which is to be loaded.

2.2.2 Due consideration shall be paid to bilge wells and strainer plates, for which special preparation is necessary, to facilitate drainage and to prevent entry of the cargoes into the bilge system.

2.2.3 Bilge lines, sounding pipes and other service lines within the cargo space shall be in good order.

2.2.4 Because of the velocity at which some high-density solid bulk cargoes are loaded, special care may be necessary to protect cargo space fittings from damage. To sound bilges after the completion of loading may be effective to detect damage on cargo space fittings.

2.2.5 As far as practicable, ventilation systems shall be shut down or screened and air conditioning systems placed on recirculation during loading or discharge, to minimize dust ingress into the living quarters or other interior spaces.

2.2.6 Due consideration shall be paid to minimize the extent to which dust may come into contact with moving parts of deck machinery and external navigational aids.

Section 3

Safety of personnel and ship

3.1 General requirements

3.1.1 Prior to and during loading, carriage and discharge of a solid bulk cargo, all necessary safety precautions shall be observed.

3.1.2 A copy of the instructions on emergency response and medical first aid relevant to incidents involving dangerous goods in solid form in bulk shall be on board.

3.2 Poisoning, corrosive and asphyxiation hazards

3.2.1 Some solid bulk cargoes are susceptible to oxidation, which may result in oxygen depletion, emission of toxic gases or fumes and self-heating. Some cargoes are not liable to oxidize but may emit toxic fumes, particularly when wet. There are also cargoes which, when wetted, are corrosive to skin, eyes and mucous membranes or to the ship's structure. When these cargoes are carried particular attention shall be paid to protection of personnel and the need for special precautions to be taken prior to loading and after unloading.

3.2.2 Appropriate attention shall be paid that cargo spaces and adjacent spaces may be depleted in oxygen or may contain toxic or asphyxiating gases, and that an empty cargo space or tank which has remained closed for some time may have insufficient oxygen to support life.

3.2.3 Many solid bulk cargoes are liable to cause oxygen depletion in a cargo space or tank. These include, but are not limited to, most vegetable products and forest products, ferrous metals, metal sulphide concentrates and coal cargoes.

3.2.4 Prior to entry into an enclosed space aboard a ship, appropriate procedures shall be followed taking into account the recommendations developed by the Organization. It is to be noted that, after a cargo space or tank has been tested and generally found to be safe for entry, small areas may exist where oxygen is deficient or toxic fumes are still present.

3.2.5 When carrying a solid bulk cargo that is liable to emit a toxic or flammable gas, and/or cause oxygen depletion in the cargo space, the appropriate instrument(s) for measuring the concentration of gas and oxygen in the cargo space shall be provided.

3.2.6 Emergency entry into a cargo space shall be undertaken only by trained personnel wearing self-contained breathing apparatus and protective clothing and always under the supervision of a responsible officer.

3.3 Health hazards due to dust

To minimize the chronic and acute risks associated with exposure to the dust of some solid bulk cargoes, the need for a high standard of personal hygiene of those exposed to the dust cannot be overemphasized. Precautions, including the use of appropriate breathing protection, protective clothing, protective skin creams, adequate personal washing and laundering of outer clothing, shall be taken as necessary.

3.4 Flammable atmosphere

3.4.1 Dust of some solid bulk cargoes may constitute an explosion hazard, especially while loading, unloading and cleaning. This risk can be minimized by ventilating to prevent the formation of a dust-laden atmosphere and by hosing down rather than sweeping.

3.4.2 Some cargoes may emit flammable gases in sufficient quantities to constitute a fire or explosion hazard. Where this is indicated in the cargo schedule in this Code or by the cargo information provided by the shipper, the cargo spaces shall be effectively ventilated as necessary. The atmosphere in the cargo spaces shall be monitored by means of an appropriate gas detector. Due consideration shall be paid to the ventilation and monitoring of the atmosphere in the enclosed spaces adjacent to the cargo spaces.

3.5 Ventilation

3.5.1 Unless expressly provided otherwise, when cargoes which may emit toxic gases are carried, the cargo spaces shall be provided with mechanical or natural ventilation; and, when cargoes which may emit flammable gases are carried, the cargo spaces shall be provided with mechanical ventilation.

3.5.2 If maintaining ventilation would endanger the ship or the cargo, it may be interrupted unless this would produce a risk of explosion.

3.5.3 When continuous ventilation is required by the schedule for the cargo in this Code or by the cargo information provided by the shipper, ventilation shall be maintained while the cargo is on board, unless a situation develops where ventilation would endanger the ship.

3.5.4 Ventilation openings shall be provided in holds intended for the carriage of cargoes that require continuous ventilation. Such openings shall comply with the requirements of the Load Line Convention as amended for openings not fitted with means of closure.

3.5.5 Ventilation shall be such that any escaping hazardous gases, vapours or dust cannot enter the accommodation or other interior spaces in hazardous concentrations. Due consideration shall be given to prevent escaping hazardous gases, vapours or dust from reaching enclosed work areas. Adequate precautions shall be taken to protect the personnel in these work areas.

3.5.6 When a cargo may heat spontaneously, ventilation other than surface ventilation shall not be applied. On no account shall air be directed into the body of the cargo.

3.6 Cargo under in-transit fumigation

Fumigation shall be performed based on the recommendations developed by the Organization.

Section 4

Assessment of acceptability of consignments for safe shipment

4.1 Identification and classification

4.1.1 Each solid bulk cargo in this Code has been assigned a Bulk Cargo Shipping Name (BCSN). When a solid bulk cargo is carried by sea it shall be identified in the transport documentation by the BCSN. The BCSN shall be supplemented with the United Nations (UN) number when the cargo is dangerous goods.

4.1.2 If waste cargoes are being transported for disposal, or for processing for disposal, the name of the cargoes shall be preceded by the word "WASTE".

4.1.3 Correct identification of a solid bulk cargo facilitates identification of the conditions necessary to safely carry the cargo and the emergency procedures, if applicable.

4.1.4 Solid bulk cargoes shall be classified, where appropriate, in accordance with the UN Manual of Tests and Criteria, part III. The various properties of a solid bulk cargo required by this Code shall be determined, as appropriate to that cargo, in accordance with the test procedures approved by a competent authority in the country of origin, when such test procedures exist. In the absence of such test procedures, those properties of a solid bulk cargo shall be determined, as appropriate to that cargo, in accordance with the test procedures prescribed in appendix 2 to this Code.

4.2 Provision of information

4.2.1 The shipper shall provide the master or his representative with appropriate information on the cargo sufficiently in advance of loading to enable the precautions which may be necessary for proper stowage and safe carriage of the cargo to be put into effect.

4.2.2 Cargo information shall be confirmed in writing and by appropriate shipping documents prior to loading. The cargo information shall include:

.1 the BCSN when the cargo is listed in this Code. Secondary names may be used in addition to the BCSN;

.2 the cargo group (A and B, A, B or C);

.3 the IMO Class of the cargo, if applicable;

.4 the UN number preceded by letters UN for the cargo, if applicable;

.5 the total quantity of the cargo offered;

.6 the stowage factor;

.7 the need for trimming and the trimming procedures, as necessary;

.8 the likelihood of shifting, including angle of repose, if applicable;

.9 additional information in the form of a certificate on the moisture content of the cargo and its transportable moisture limit in the case of a concentrate or other cargo which may liquefy;

.10 likelihood of formation of a wet base (see subsection 7.2.3 of this Code);

.11 toxic or flammable gases which may be generated by cargo, if applicable;

.12 flammability, toxicity, corrosiveness and propensity to oxygen depletion of the cargo, if applicable;

.13 self-heating properties of the cargo, and the need for trimming, if applicable;

.14 properties on emission of flammable gases in contact with water, if applicable;

.15 radioactive properties, if applicable; and

.16 any other information required by national authorities.

4.2.3 Information provided by the shipper shall be accompanied by a declaration. An example of a cargo declaration form is set out in the next page. Another form may be used for cargo declaration. As an aid to paper documentation, Electronic Data Processing (EDP) or Electronic Data Interchange (EDI) techniques may be used.

FORM FOR CARGO INFORMATION
for Solid Bulk Cargoes

<table>
<tr><td colspan="2">BCSN</td></tr>
<tr><td>Shipper</td><td>Transport document number</td></tr>
<tr><td>Consignee</td><td>Carrier</td></tr>
<tr><td>Name/means of transport
Port/place of departure</td><td rowspan="2">Instructions or other matters</td></tr>
<tr><td>Port/place of destination</td></tr>
<tr><td>General description of the cargo
(Type of material/particle size)</td><td>Gross mass (kg/tonnes)</td></tr>
<tr><td colspan="2">Specifications of bulk cargo, if applicable:
Stowage factor:
Angle of repose, if applicable:
Trimming procedures:
Chemical properties if potential hazard*:
* e.g., Class & UN No. or “MHB”</td></tr>
<tr><td>Group of the cargo
☐ Group A and B*
☐ Group A*
☐ Group B
☐ Group C
* For cargoes which may liquefy (Group A and Group A and B cargoes)</td><td>Transportable moisture limit

Moisture content at shipment</td></tr>
<tr><td>Relevant special properties of the cargo
(e.g., highly soluble in water)</td><td>Additional certificate(s)*
☐ Certificate of moisture content and transportable moisture limit
☐ Weathering certificate
☐ Exemption certificate
☐ Other (specify)
* If required</td></tr>
<tr><td>DECLARATION
I hereby declare that the consignment is fully and accurately described and that the given test results and other specifications are correct to the best of my knowledge and belief and can be considered as representative for the cargo to be loaded.</td><td>Name/status, company/organization of signatory

Place and date

Signature on behalf of shipper</td></tr>
</table>

4.3 Certificates of test

4.3.1 To obtain the information required in 4.2.1 the shipper shall arrange for the cargo to be properly sampled and tested. The shipper shall provide the ship's master or his representative with the appropriate certificates of test, if required in this Code.

4.3.2 When a concentrate or other cargo which may liquefy is carried, the shipper shall provide the ship's master or his representative with a signed certificate of the TML, and a signed certificate or declaration of the moisture content. The certificate of TML shall contain, or be accompanied by the result of the test for determining the TML. The declaration of moisture content shall contain, or be accompanied by, a statement by the shipper that the moisture content is, to the best of his knowledge and belief, the average moisture content of the cargo at the time the declaration is presented to the master.

4.3.3 When a concentrate or other cargo which may liquefy is to be loaded into more than one cargo space of a ship, the certificate or the declaration of moisture content shall certify the moisture content of each type of finely grained material loaded into each cargo space. Notwithstanding this requirement, if sampling according to internationally or nationally accepted standard procedures indicates that the moisture content is uniform throughout the consignment, then one certificate or declaration of average moisture content for all cargo spaces is acceptable.

4.3.4 Where certification is required by the individual schedules for cargoes possessing chemical hazards, the certificate shall contain, or be accompanied by, a statement from the shipper that the chemical characteristics of the cargo are, to the best of his knowledge, those present at the time of the ship's loading.

4.4 Sampling procedures

4.4.1 Physical property tests on the consignment are meaningless unless they are conducted prior to loading on truly representative test samples.

4.4.2 Sampling shall be conducted only by persons who have been suitably trained in sampling procedures and who are under the supervision of someone who is fully aware of the properties of the consignment and also the applicable principles and practices of sampling.

4.4.3 Prior to taking samples, and within the limits of practicability, a visual inspection of the consignment which is to form the ship's cargo shall be carried out. Any substantial portions of material which appear to be contaminated or significantly different in characteristics or moisture content from the bulk of the consignment shall be sampled and analysed separately. Depending upon the results obtained in these tests, it may be necessary to reject those particular portions as unfit for shipment.

4.4.4 Representative samples shall be obtained by employing techniques which take the following factors into account:

.1 the type of material;

.2 the particle size distribution;

.3 composition of the material and its variability;

.4 the manner in which the material is stored, in stockpiles, rail wagons or other containers, and transferred or loaded by material-handling systems such as conveyors, loading chutes, crane grabs, etc.;

.5 the chemical hazards (toxicity, corrosivity, etc.);

.6 the characteristics which have to be determined: moisture content, TML, bulk density/stowage factor, angle of repose, etc.;

.7 variations in moisture distribution throughout the consignment which may occur due to weather conditions, natural drainage, e.g., to lower levels of stockpiles or containers, or other forms of moisture migration; and

.8 variations which may occur following freezing of the material.

4.4.5 Throughout the sampling procedures, utmost care shall be taken to prevent changes in quality and characteristics. Samples shall be immediately placed in suitable sealed containers which are properly marked.

4.4.6 Unless expressly provided otherwise, sampling for the test required by this Code shall follow an internationally or nationally accepted standard procedure.

4.5 Interval between sampling/testing and loading for TML and moisture content determination

4.5.1 A test to determine the TML of a solid bulk cargo shall be conducted within six months to the date of loading the cargo. Notwithstanding this provision, where the composition or characteristics of the cargo are variable for any reason, a test to determine the TML shall be conducted again after it is reasonably assumed that such variation has taken place.

4.5.2 Sampling and testing for moisture content shall be conducted as near as practicable to the time of loading. If there has been significant rain or snow between the time of testing and loading, check tests shall be conducted to ensure that the moisture content of the cargo is still less than its TML. The interval between sampling/testing and loading shall never be more than seven days.

4.5.3 Samples of frozen cargo shall be tested for the TML or the moisture content after the free moisture has completely thawed.

4.6 Sampling procedures for concentrate stockpiles

4.6.1 It is not practicable to specify a single method of sampling for all consignments since the character of the material and the form in which it is available will affect the selection of the procedure to be used. In the absence of internationally or nationally accepted standard sampling procedures, the following sampling procedures for concentrate stockpiles may be used to determine the moisture content and the TML of mineral concentrates. These procedures are not intended to replace sampling procedures, such as the use of automatic sampling, that achieve equal or superior accuracy of either moisture content or TML.

4.6.2 Sub-samples are taken in a reasonably uniform pattern, where possible from a levelled stockpile.

4.6.3 A plan of the stockpile is drawn and divided into areas, each of which contains approximately 125 t, 250 t or 500 t depending on the amount of concentrate to be shipped. Such a plan will indicate the number of sub-samples required and where each is to be taken. Each sub-sample taken is drawn from approximately 50 cm below the surface of the designated area.

4.6.4 The number of sub-samples and sample size are given by the competent authority or determined in accordance with the following scale:

Consignments of not more than 15,000 t:

One 200 g sub-sample is taken for each 125 t to be shipped.

Consignments of more than 15,000 but not more than 60,000 t:

One 200 g sub-sample is taken for each 250 t to be shipped.

Consignments of more than 60,000 t:

One 200 g sub-sample is taken for each 500 t to be shipped.

4.6.5 Sub-samples for moisture content determination are placed in sealed containers (such as plastic bags, cans or small metallic drums) immediately on withdrawal for conveyance to the testing laboratory, where they are thoroughly mixed in order to obtain a fully representative sample. Where testing facilities are not available at the testing site, such mixing is done under controlled conditions at the stockpile and the representative sample placed in a sealed container and shipped to the test laboratory.

4.6.6 Basic procedural steps include:

.1 identification of consignment to be sampled;

.2 determination of the number of individual sub-samples and representative samples, as described in 4.6.4, which are required;

.3 determination of the positions from which to obtain sub-samples and the method of combining such sub-samples to arrive at a representative sample;

.4 gathering of individual sub-samples and placing them in sealed containers;

.5 thorough mixing of sub-samples to obtain the representative sample; and

.6 placing the representative sample in a sealed container if it has to be shipped to a test laboratory.

4.7 Examples of standardized sampling procedures, for information

ISO 3082: 1998	-	Iron ores – Sampling and sample preparation procedures
ISO 1988: 1975	-	Hard coal – Sampling
ASTMD 2234-99	-	Standard Practice for Collection of a Gross Sample of Coal

Australian Standards

AS 4264.1	-	Coal and Coke-Sampling
	-	Part 1: Higher rank coal – Sampling Procedures
AS 1141 – Series	-	Methods of sampling and testing aggregates
BS.1017:1989	-	Methods of sampling coal and coke
BS 1017	-	British Standard Part 1: 1989 methods of sampling of coal
BS 1017	-	British Standard Part 2: 1994 methods of sampling of coal

Canadian Standard Sampling Procedure for Concentrate Stockpiles
European Communities Method of Sampling for the Control of Fertilizers

JIS M 8100	-	Japanese General Rules for Methods of Sampling Bulk Materials
JIS M 8100: 1992	-	Particulate cargoes – General Rules for Methods of Sampling

Polish Standard Sampling Procedure for:

Iron and Manganese Ores – Ref. No. PN-67/H-04000

Non-ferrous Metals – Ref. No. PN-70/H-04900

Russian Federation Standard Sampling Procedure for the Determination of Moisture Content in Ore Concentrates.

4.8 Documentation required on board the ship carrying dangerous goods

4.8.1 Each ship carrying dangerous goods in solid form in bulk shall have a special list or manifest setting forth the dangerous goods on board and the location thereof, in accordance with SOLAS regulation VII/7-2.2. A detailed stowage plan, which identifies by class and sets out the location of all dangerous goods on board, may be used in place of such a special list or manifest.

4.8.2 When dangerous goods in solid form in bulk are carried appropriate instructions on emergency response to incidents involving the cargoes shall be on board.

4.8.3 Cargo ships of 500 gross tonnage and over constructed on or after 1 September 1984 and cargo ships of less than 500 gross tonnage constructed on or after 1 February 1992, subject to SOLAS regulation II-2/19.4 (or II-2/54.3), shall have a Document of compliance when carrying dangerous goods in solid form in bulk except class 6.2 and class 7.

Section 5

Trimming procedures

5.1 General provisions for trimming

5.1.1 Trimming a cargo reduces the likelihood of the cargo shifting and minimizes the air entering the cargo. Air entering the cargo could lead to spontaneous heating. To minimize these risks, cargoes shall be trimmed reasonably level, as necessary.

5.1.2 Cargo spaces shall be as full as practicable without resulting in excessive loading on the bottom structure or 'tween-deck to prevent sliding of a solid bulk cargo. Due consideration shall be given to the amount of a solid bulk cargo in each cargo space, taking into account the possibility of shifting and longitudinal moments and forces of the ship. Cargo shall be spread as widely as practicable to the boundary of the cargo space. Alternate hold loading restrictions, as required by SOLAS chapter XII, may also need to be taken into account.

5.1.3 The master has the right to require that the cargo be trimmed level, where there is any concern regarding stability based upon the information available, taking into account the characteristics of the ship and the intended voyage.

5.2 Special provisions for multi-deck ships

5.2.1 When a solid bulk cargo is loaded only in lower cargo spaces, it shall be trimmed sufficiently to equalize the mass distribution on the bottom structure.

5.2.2 When solid bulk cargoes are carried in 'tween-decks, the hatchways of such 'tween-decks shall be closed in those cases where the loading information indicates an unacceptable level of stress of the bottom structure if the hatchways are left open. The cargo shall be trimmed reasonably level and shall either extend from side to side or be secured by additional longitudinal divisions of sufficient strength. The safe load-carrying capacity of the 'tween-decks shall be observed to ensure that the deck structure is not overloaded.

5.2.3 If coal cargoes are carried in 'tween decks, the hatchways of such 'tween-decks shall be tightly sealed to prevent air moving up through the body of the cargo in the 'tween decks.

5.3 Special provisions for cohesive bulk cargoes

5.3.1 All damp cargoes and some dry ones possess cohesion. For cohesive cargoes, the general provisions in subsection 5.1 shall apply.

5.3.2 The angle of repose is not an indicator of the stability of a cohesive bulk cargo and it is not included in the individual schedules for cohesive cargoes.

5.4 Special provisions for non-cohesive bulk cargoes

5.4.1 Non-cohesive bulk cargoes are those listed in paragraph 1 in appendix 3 and any other cargo not listed in the appendix, exhibiting the properties of a non-cohesive material.

5.4.2 For trimming purposes, solid bulk cargoes can be categorized as cohesive or non-cohesive. The angle of repose is a characteristic of non-cohesive bulk cargoes which is indicative of cargo stability and has been included in the individual schedules for non-cohesive cargoes. The angle of repose of the cargoes shall establish which provisions of this section apply. Methods for determining the angle of repose are given in section 6.

5.4.3 Non-cohesive bulk cargoes having an angle of repose less than or equal to 30°

These cargoes, which flow freely like grain, shall be carried according to the provisions applicable to the stowage of grain cargoes. The bulk density of the cargo shall be taken into account when determining:

.1 the scantlings and securing arrangements of divisions and bin bulkheads; and

.2 the stability effect of free cargo surfaces.

5.4.4 Non-cohesive bulk cargoes having an angle of repose greater than 30° to 35° inclusive

These cargoes shall be trimmed according to the following criteria:

.1 the unevenness of the cargo surface measured as the vertical distance (Δh) between the highest and lowest levels of the cargo surface shall not exceed B/10, where B is the beam of the ship in metres, with a maximum allowable $\Delta h = 1.5$ m; or

.2 loading is carried out using trimming equipment approved by the competent authority.

5.4.5 Non-cohesive bulk cargoes having an angle of repose greater than 35°

These cargoes shall be trimmed according to the following criteria:

.1 the unevenness of the cargo surface measured as the vertical distance (Δh) between the highest and lowest levels of the cargo surface shall not exceed B/10, where B is the beam of the ship in metres, with a maximum allowable $\Delta h = 2$ m; or

.2 loading is carried out using trimming equipment approved by the competent authority.

Section 6

Methods of determining the angle of repose

6.1 General

An angle of repose of a non-cohesive solid bulk material shall be measured by a method approved by the appropriate authority as required by section 4.1.4 of this Code.

6.2 Recommended test methods

There are various methods in use to determine the angle of repose for non-cohesive solid bulk materials. The recommended test methods are listed below:

6.2.1 Tilting box method

This laboratory test method is suitable for non-cohesive granular materials with a grain size not greater than 10 mm. A full description of the equipment and procedure is given in subsection 2.1 of appendix 2.

6.2.2 Shipboard test method

In the absence of a tilting box apparatus, an alternative procedure for determining the approximate angle of repose is given in subsection 2.2 of appendix 2.

Section 7

Cargoes which may liquefy

7.1 Introduction

7.1.1 The purpose of this section is to bring to the attention of masters and others with responsibilities for the loading and carriage of bulk cargoes, the risks associated with liquefaction and the precautions to minimize the risk. Such cargoes may appear to be in a relatively dry granular state when loaded, and yet may contain sufficient moisture to become fluid under the stimulus of compaction and the vibration which occurs during a voyage.

7.1.2 A ship's motion may cause a cargo to shift sufficiently to capsize the vessel. Cargo shift can be divided into two types, namely, sliding failure or liquefaction consequence. Trimming the cargo in accordance with section 5 can prevent sliding failure.

7.1.3 Some cargoes which may liquefy may also heat spontaneously.

7.2 Conditions for hazards

7.2.1 Group A cargoes contain a certain proportion of small particles and a certain amount of moisture. Group A cargoes may liquefy during a voyage even when they are cohesive and trimmed level. Liquefaction can result in cargo shift. This phenomenon may be described as follows:

.1 the volume of the spaces between the particles reduces as the cargo is compacted owing to the ship motion, etc.;

.2 the reduction in space between cargo particles causes an increase in water pressure in the space; and

.3 the increase in water pressure reduces the friction between cargo particles resulting in a reduction in the shear strength of the cargo.

7.2.2 Liquefaction does not occur when one of the following conditions is satisfied:

.1 the cargo contains very small particles. In this case particle movement is restricted by cohesion and the water pressure in spaces between cargo particles does not increase;

.2 the cargo consists of large particles or lumps. Water passes through the spaces between the particles and there is no increase in the water pressure. Cargoes which consist entirely of large particles will not liquefy; and

.3 the cargo contains a high percentage of air and low moisture content. Any increase in the water pressure is inhibited. Dry cargoes are not liable to liquefy.

7.2.3 A cargo shift caused by liquefaction may occur when the moisture content exceeds the TML. Some cargoes are susceptible to moisture migration and may develop a dangerous wet base even if the average moisture content is less than the TML. Although the cargo surface may appear dry, undetected liquefaction may take place resulting in shifting of the cargo. Cargoes with high moisture content are prone to sliding, particularly when the cargo is shallow and subject to large heel angles.

7.2.4 In the resulting viscous fluid state cargo may flow to one side of the ship with a roll but not completely return with a roll the other way. Consequently the ship may progressively reach a dangerous heel and capsize quite suddenly.

7.3 Provisions for cargoes which may liquefy

7.3.1 General

7.3.1.1 Concentrates or other cargoes which may liquefy shall only be accepted for loading when the actual moisture content of the cargo is less than its TML. Notwithstanding this provision, such cargoes may be accepted for loading on specially constructed or fitted cargo ships even when their moisture content exceeds the TML.

7.3.1.2 Cargoes which contain liquids other than packaged canned goods or the like shall not be stowed in the same cargo space above or adjacent to these solid bulk cargoes.

7.3.1.3 Adequate measures shall be taken to prevent liquids entering the cargo space in which these solid bulk cargoes are stowed during the voyage.

7.3.1.4 Masters shall be cautioned about the possible danger of using water to cool these cargoes while the ship is at sea. Introducing water may bring the moisture content of these cargoes to a flow state. When necessary, due regard shall be paid to apply water in the form of a spray.

7.3.2 Specially constructed or fitted cargo ships

7.3.2.1 Cargoes having a moisture content in excess of the TML shall only be carried in specially constructed cargo ships or in specially fitted cargo ships.

7.3.2.2 Specially constructed cargo ships shall have permanent structural boundaries, so arranged as to confine any shift of cargo to an acceptable limit. The ship concerned shall carry evidence of approval by the Administration.

7.3.2.3 Specially fitted cargo ships shall be fitted with specially designed portable divisions to confine any shift of cargo to an acceptable limit. Specially fitted cargo ships shall be in compliance with the following requirements:

.1 The design and positioning of such special arrangements shall adequately provide not only the restraint of the immense forces generated by the flow movement of high-density bulk cargoes, but also for the need to reduce to an acceptable safe level the potential heeling movements arising out of a transverse cargo flow across the cargo space. Divisions provided to meet these requirements shall not be constructed of wood.

.2 The elements of the ship's structure bounding such cargo shall be strengthened, as necessary.

.3 The plan of special arrangements and details of the stability conditions on which the design has been based shall have been approved by the Administration. The ship concerned shall carry evidence of approval by the Administration.

7.3.2.4 A submission made to an Administration for approval of such a ship shall include:

.1 relevant structural drawings, including scaled longitudinal and transverse sections;

.2 stability calculations, taking into account loading arrangements and possible cargo shift, showing the distribution of cargo and liquids in tanks, and of cargo which may become fluid; and

.3 any other information which may assist the Administration in the assessment of the submission.

Section 8

Test procedures for cargoes which may liquefy

8.1 General

For a Group A cargo, the actual moisture content and transportable moisture limit shall be determined in accordance with a procedure determined by the appropriate authority as required by section 4.1.4 of this Code, unless the cargo is carried in a specially constructed or fitted ship.

8.2 Test procedures for measurement of moisture content

There are recognized international and national methods for determining moisture content for various materials. Reference is made to paragraph 1.1.4.4 of appendix 2.

8.3 Methods for determining transportable moisture limit

The recommended methods for determining transportable moisture limit are given in appendix 2.

8.4 Complementary test procedure for determining the possibility of liquefaction

A ship's master may carry out a check test for approximately determining the possibility of flow on board ship or at the dockside by the following auxiliary method:

Half fill a cylindrical can or similar container (0.5 to 1 litre capacity) with a sample of the material. Take the can in one hand and bring it down sharply to strike a hard surface such as a solid table from a height of about 0.2 m. Repeat the procedure 25 times at one- or two-second intervals. Examine the surface for free moisture or fluid conditions. If free moisture or a fluid condition appears, arrangements should be made to have additional laboratory tests conducted on the material before it is accepted for loading.

Section 9

Materials possessing chemical hazards

9.1 General

Solid bulk cargoes which may possess a chemical hazard during transport, because of their chemical nature or properties, are in Group B. Some of these materials are classified as dangerous goods and others are materials hazardous only in bulk (MHB). It is essential to obtain current, valid information about the physical and chemical properties of the cargoes to be shipped in bulk, prior to loading.

9.2 Hazard classification

9.2.1 The classification of materials possessing chemical hazards and intended to be shipped in bulk under the requirements of this Code shall be in accordance with 9.2.2 and 9.2.3.

9.2.2 Classification of dangerous goods

SOLAS regulation VII/7 defines dangerous goods in solid form in bulk. For the purpose of this Code, dangerous goods shall be classified in accordance with part 2 of the IMDG Code.

9.2.2.1 Class 4.1: Flammable solids

The materials in this class are readily combustible solids and solids which may cause fire through friction.

9.2.2.2 Class 4.2: Substances liable to spontaneous combustion

The materials in this class are materials, other than pyrophoric materials, which, in contact with air without energy supply, are liable to self-heating.

9.2.2.3 Class 4.3: Substances which, in contact with water, emit flammable gases

The materials in this class are solids which, by interaction with water, are liable to become spontaneously flammable or to give off flammable gases in dangerous quantities.

9.2.2.4 Class 5.1: Oxidizing substances

The materials in this class are materials while in themselves not necessarily combustible, may, generally by yielding oxygen, cause, or contribute to, the combustion of other material.

9.2.2.5 Class 6.1: Toxic substances

The materials in this class are materials liable either to cause death or serious injury or to harm human health if swallowed or inhaled, or by skin contact.

9.2.2.6 Class 7: Radioactive material

The materials in this class are any materials containing radionuclides where both the activity concentration and the total activity in the consignment exceed the values specified in 2.7.7.2.1 to 2.7.7.2.6 of the IMDG Code.

9.2.2.7 Class 8: Corrosive substances

The materials in this class are materials which, by chemical action, will cause severe damage when in contact with living tissue or will materially damage, or even destroy, other goods or the means of transport.

9.2.2.8 Class 9: Miscellaneous dangerous substances and articles

The materials in this class are materials and articles which, during transport, present a danger not covered by other classes.

9.2.3 Materials hazardous only in bulk (MHB)

These are materials which may possess chemical hazards when transported in bulk other than materials classified as dangerous goods in the IMDG Code.

9.3 Stowage and segregation requirements

9.3.1 General requirements

9.3.1.1 The potential hazards of the cargoes in Group B and falling within the classification of 9.2.2 and 9.2.3 entail the need for segregation of incompatible cargoes. Segregation shall also take account of any identified subsidiary risk.

9.3.1.2 In addition to general segregation as between whole classes of materials there may be a need to segregate a particular material from others. In the case of segregation from combustible materials this shall be understood not to include packaging material, ceiling or dunnage; the latter shall in these circumstances be kept to a minimum.

9.3.1.3 For the purpose of segregating incompatible materials, the words "hold" and "compartment" are deemed to mean a cargo space enclosed by steel bulkheads or shell plating and by steel decks. The boundaries of such a space shall be resistant to fire and liquid.

9.3.1.4 When two or more different solid bulk cargoes of Group B are to be carried, the segregation between them shall be in accordance with 9.3.4.

9.3.1.5 Where different grades of a solid bulk cargo are carried in the same cargo space, the most stringent segregation provisions applicable to any of the different grades shall apply to all of them.

9.3.1.6 When solid bulk cargoes of Group B and dangerous goods in packaged form are to be carried, the segregation between them shall be in accordance with 9.3.3.

9.3.1.7 Incompatible materials shall not be handled simultaneously. Upon completion of loading one cargo, the hatch covers of every cargo space shall be closed and the decks cleaned of residue before the loading of other material is commenced. When discharging, the same procedures shall be followed.

9.3.1.8 To avoid contamination, all foodstuffs shall be stowed:

.1 "separated from" a material which is indicated as toxic;

.2 "separated by a complete compartment or hold from" all infectious materials;

.3 "separated from" radioactive materials; and

.4 "away from" corrosive materials.

The terms are defined in 9.3.3 and 9.3.4, as appropriate.

9.3.1.9 Materials which may evolve toxic gases in sufficient quantities to affect health shall not be stowed in those spaces from where such gases may penetrate into living quarters or ventilation systems connecting to living quarters.

9.3.1.10 Materials which present corrosive hazards of such intensity as to affect either human tissue or the ship's structure shall only be loaded after adequate precautions and protective measures have been taken.

9.3.1.11 After discharge of toxic or oxidizing cargoes, the spaces used for their carriage shall be inspected for contamination before being used for other cargoes. A space which has been contaminated shall be properly cleaned and examined before being used for other cargoes.

9.3.1.12 After discharge of cargoes, a close inspection shall be made for any residue, which shall be removed before the ship is presented for other cargoes.

9.3.1.13 For cargoes for which in case of an emergency the hatches shall be opened, these hatches shall be kept free to be capable of being opened up.

9.3.2 Special requirements

9.3.2.1 Materials of classes 4.1, 4.2 and 4.3

9.3.2.1.1 Materials of these classes shall be kept as cool and dry as reasonably practicable and, unless expressly provided otherwise in this Code, shall be stowed "away from" all sources of heat or ignition.

9.3.2.1.2 Electrical fittings and cables shall be in good condition and properly safeguarded against short circuits and sparking. Where a bulkhead is required to be suitable for segregation purposes, cable and conduit penetrations of the decks and bulkheads shall be sealed against the passage of gas and vapour.

9.3.2.1.3 Cargoes liable to give off vapours or gases which can form an explosive mixture with air shall be stowed in a mechanically ventilated space.

9.3.2.1.4 Prohibition of smoking in dangerous areas shall be enforced, and clearly legible "NO SMOKING" signs shall be displayed.

9.3.2.2 Materials of class 5.1

9.3.2.2.1 Cargoes of this class shall be kept as cool and dry as reasonably practicable and, unless expressly provided otherwise in this Code, shall be stowed "away from" all sources of heat or ignition. They shall also be stowed "separated from" other combustible materials.

9.3.2.2.2 Before loading cargoes of this class, particular attention shall be paid to the cleaning of the cargo spaces into which they will be loaded. As far as reasonably practicable, non-combustible securing and protecting materials shall be used and only a minimum of dry wooden dunnage shall be used.

9.3.2.2.3 Precautions shall be taken to avoid the penetration of oxidizing materials into other cargo spaces, bilges and other spaces which may contain a combustible material.

9.3.2.3 Materials of class 7

9.3.2.3.1 Cargo spaces used for the transport of Low Specific Activity Materials (LSA-I) and Surface Contaminated Objects (SCO-I) shall not be used for other cargoes until decontaminated by a qualified person so that the non-fixed contamination on any surface when averaged over an area of 300 cm^2 does not exceed the following levels:

4 Bq/cm^2 (10^{-4} $\mu Ci/cm^2$)	for beta and gamma emitters and the low-toxicity alpha emitters; natural uranium; natural thorium; uranium-235 or uranium-238; thorium-232; thorium-228 and thorium-230 when contained in ores, physical or chemical concentrates; radionuclides with a half-life of less than 10 days; and
0.4 Bq/cm^2 (10^{-5} $\mu Ci/cm^2$)	for all other alpha emitters.

9.3.2.4 Materials of class 8 or materials having similar properties

9.3.2.4.1 These cargoes shall be kept as dry as reasonably practicable.

9.3.2.4.2 Prior to loading these cargoes attention shall be paid to the cleaning of the cargo spaces into which they will be loaded particularly to ensure that these spaces are dry.

9.3.2.4.3 Penetration of these materials into other cargo spaces, bilges, wells and between the ceiling boards shall be prevented.

9.3.2.4.4 Particular attention shall be paid to the cleaning of the cargo spaces after unloading, as residues of these cargoes may be highly corrosive to the ship's structure. Hosing down of the cargo spaces followed by careful drying shall be considered.

9.3.3 Segregation between bulk materials possessing chemical hazards and dangerous goods in packaged form

9.3.3.1 Unless otherwise required in this section or in the individual schedules, segregation between solid bulk cargoes of Group B and dangerous goods in packaged form shall be in accordance with the following table.

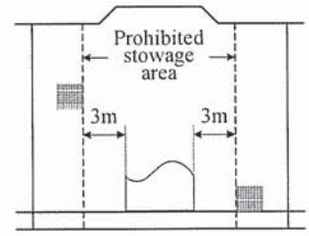
The Dangerous Goods List of the IMDG Code shall be consulted for additional requirements with regard to stowage and segregation of packaged dangerous goods.

	Dangerous goods in packaged form																
Bulk cargo (classified as dangerous goods)	Class/ division	1.1 1.2 1.5	1.3	1.4	2.1	2.2 2.3	3	4.1	4.2	4.3	5.1	5.2	6.1	6.2	7	8	9
Flammable solids	4.1	4	3	2	2	2	2	X	1	X	1	2	X	3	2	1	X
Substances liable to spontaneous combustion	4.2	4	3	2	2	2	2	1	X	1	2	2	1	3	2	1	X
Substances which, in contact with water, emit flammable gases	4.3	4	4	2	1	X	2	X	1	X	2	2	X	2	2	1	X
Oxidizing substances (agents)	5.1	4	4	2	2	X	2	1	2	2	X	2	1	3	1	2	X
Toxic substances	6.1	2	2	X	X	X	X	X	1	X	1	1	X	1	X	X	X
Radioactive materials	7	2	2	2	2	2	2	2	2	2	1	2	X	3	X	2	X
Corrosive substances	8	4	2	2	1	X	1	1	1	1	2	2	X	3	2	X	X
Miscellaneous dangerous substances and articles	9	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Materials hazardous only in bulk (MHB)	MHB	X	X	X	X	X	X	X	X	X	X	X	X	3	X	X	X

Numbers relate to the following segregation terms:

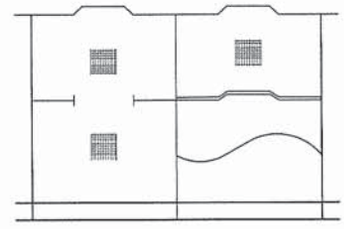
1 "Away from":

Effectively segregated so that incompatible materials cannot interact dangerously in the event of an accident but may be carried in the same hold or compartment or on deck provided a minimum horizontal separation of 3 metres, projected vertically, is provided.



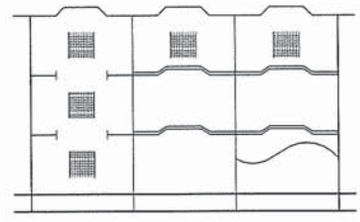
2 "Separated from":

In different holds when stowed under deck. Provided an intervening deck is resistant to fire and liquid, a vertical separation, i.e. in different compartments, may be accepted as equivalent to this segregation.



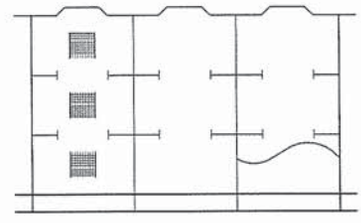
3 "Separated by a complete compartment or hold from":

Means either a vertical or a horizontal separation. If the decks are not resistant to fire and liquid, then only a longitudinal separation, i.e. by an intervening complete compartment, is acceptable.



4 "Separated longitudinally by an intervening complete compartment or hold from":

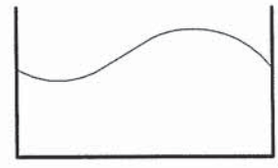
Vertical separation alone does not meet this requirement.



X Segregation, if any, is shown in the Dangerous Goods List of the IMDG Code or in the individual schedules in this Code.

Legend

Reference bulk material



Packages containing incompatible goods

Deck resistant to liquid and fire

NOTE: Vertical lines represent transverse watertight bulkheads between cargo spaces.

9.3.4 Segregation between solid bulk cargoes possessing chemical hazards

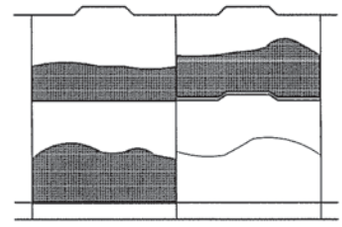
Unless otherwise required in this section or in the individual schedules for cargoes of Group B, segregation between solid bulk cargoes possessing chemical hazards shall be according to the following table:

Solid bulk materials	Class/ division	4.1	4.2	4.3	5.1	6.1	7	8	9	MHB
Flammable solids	4.1	X								
Substances liable to spontaneous combustion	4.2	2	X							
Substances which, in contact with water, emit flammable gases	4.3	3	3	X						
Oxidizing substances	5.1	3	3	3	X					
Toxic substances	6.1	X	X	X	2	X				
Radioactive materials	7	2	2	2	2	2	X			
Corrosive substances	8	2	2	2	2	X	2	X		
Miscellaneous dangerous substances and articles	9	X	X	X	X	X	2	X	X	
Materials hazardous only in bulk (MHB)	MHB	X	X	X	X	X	2	X	X	X

Numbers relate to the following segregation terms:

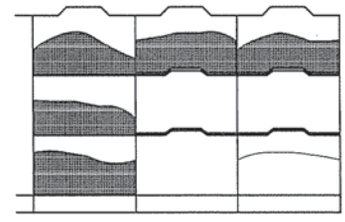
2 "Separated from":

In different holds when stowed under deck. Provided an intervening deck is resistant to fire and liquid, a vertical separation, i.e. in different compartments, may be accepted as equivalent to this segregation.



3 "Separated by a complete compartment or hold from":

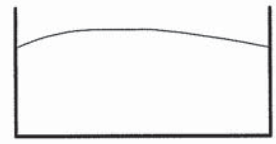
Either a vertical or a horizontal separation. If the decks are not resistant to fire and liquid, then only a longitudinal separation, i.e. by an intervening complete compartment, is acceptable.



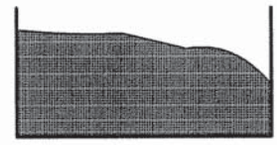
X Segregation, if any, is shown in the individual schedules in this Code.

Legend

Reference bulk material



Incompatible bulk material



Deck resistant to liquid and fire

NOTE: Vertical lines represent transverse watertight bulkheads between cargo spaces.

Section 10

Carriage of solid wastes in bulk

10.1 Preamble

10.1.1 The transboundary movement of wastes represents a threat to human health and to the environment.

10.1.2 Wastes shall be carried in accordance with the relevant international recommendations and conventions and in particular, where it concerns transport in bulk by sea, with the provisions of this Code.

10.2 Definitions

10.2.1 *Wastes*, for the purpose of this section, means solid bulk cargoes containing or contaminated with one or more constituents which are subject to the provisions of this Code applicable to cargoes of classes 4.1, 4.2, 4.3, 5.1, 6.1, 8 or 9 for which no direct use is envisaged but which are carried for dumping, incineration or other methods of disposal.

10.2.2 *Transboundary movement of waste* means any shipment of wastes from an area under the national jurisdiction of one country to or through an area under the national jurisdiction of another country, or to or through an area not under the national jurisdiction of any country provided at least two countries are involved in the movement.

10.3 Applicability

10.3.1 The provisions of this section are applicable to the transport of wastes in bulk by ships and shall be considered in conjunction with all other provisions of this Code.

10.3.2 Solid cargoes containing or contaminated with radioactive materials shall be subject to the provisions applicable to the transport of radioactive materials and shall not be considered as wastes for the purposes of this section.

10.4 Transboundary movements under the Basel Convention

Transboundary movement of wastes shall be permitted to commence only when:

.1 notification has been sent by the competent authority of the country of origin, or by the generator or exporter through the channel of the competent authority of the country of origin, to the country of final destination; and

.2 the competent authority of the country of origin, having received the written consent of the country of final destination stating that the wastes will be safely incinerated or treated by other methods of disposal, has given authorization for the movement.

10.5 Documentation

In addition to the required documentation for the transport of solid bulk cargoes all transboundary movements of wastes shall be accompanied by a waste movement document from the point at which a transboundary movement commences to the point of disposal. This document shall be available at all times to the competent authorities and to all persons involved in the management of waste transport operations.

10.6 Classification of wastes

10.6.1 A waste containing only one constituent which is a cargo subject to the provisions of this Code applicable to cargoes of classes 4.1, 4.2, 4.3, 5.1, 6.1, 8 or 9 shall be regarded as being that particular cargo. If the concentration of the constituent is such that the waste continues to present a hazard inherent in the constituent itself, it shall be classified as the class applicable to that constituent.

10.6.2 A waste containing two or more constituents which are cargoes subject to the provisions of this Code applicable to cargoes of classes 4.1, 4.2, 4.3, 5.1, 6.1, 8 or 9 shall be classified under the applicable class in accordance with their dangerous characteristics and properties as described in 10.6.3 and 10.6.4.

10.6.3 The classification according to dangerous characteristics and properties shall be carried out as follows:

.1 determination of the physical and chemical characteristics and physiological properties by measurement or calculation followed by classification according to the criteria applicable to the constituents; or

.2 if the determination is not practicable, the waste shall be classified according to the constituent presenting the predominant hazard.

10.6.4 In determining the predominant hazard, the following criteria shall be taken into account:

.1 if one or more constituents fall within a certain class and the waste presents a hazard inherent in these constituents, the waste shall be included in that class; or

.2 if there are constituents falling under two or more classes, the classification of the waste shall take into account the order of precedence applicable to cargoes with multiple hazards set out in the IMDG Code.

10.7 Stowage and handling of wastes

Wastes shall be stowed and handled in accordance with the provisions of sections 1 to 9 of this Code and with any additional provisions included in the individual schedules for cargoes in Group B applicable to the constituents presenting the hazards.

10.8 Segregation

Wastes shall be segregated in accordance with the provisions of 9.3.3 and 9.3.4, as appropriate.

10.9 Accident procedures

In the event that, during transport, a waste will constitute a danger for the carrying ship or the environment, the master shall immediately inform the competent authorities of the countries of origin and destination and receive advice on the action to be taken.

Section 11

Security provisions

Introductory note

The provisions of this section address the security of bulk cargoes in transport by sea. It should be borne in mind that some substances shipped as bulk cargo may, through their intrinsic nature, or when shipped in combination with other substances, be used as constituents for, or enhance the effect of, weapons used in the commission of unlawful acts. (It should also be borne in mind that ships used to carry bulk cargoes may also be used as a means to transport unauthorized weapons, incendiary devices or explosives, irrespective of the nature of the cargo carried.) National competent authorities may apply additional security provisions, which should be considered when offering or transporting bulk cargoes. The provisions of this chapter remain recommendatory except subsection 11.1.1.

11.1 General provisions for companies, ships and port facilities

11.1.1 The relevant provisions of chapter XI-2 of SOLAS 74, as amended, and of part A of the ISPS Code shall apply to companies, ships and port facilities both engaged in the handling and transport of solid bulk cargoes and to which regulation XI-2 of SOLAS 74, as amended, applies, taking into account the guidance given in part B of the ISPS Code.

11.1.2 Due regard should be given to the security-related provisions of the ILO/IMO Code of practice on security in ports and the IMDG Code, as appropriate.

11.1.3 Any shore-based company personnel, ship-based personnel and port facility personnel engaged in the handling and transport of bulk cargoes should be aware of any security requirements for such cargoes, in addition to those specified in the ISPS Code, and commensurate with their responsibilities.

11.1.4 The training of the company security officer, shore-based company personnel having specific security duties, port facility security officer and port facility personnel having specific duties, engaged in the handling and transport of bulk cargoes, should also include elements of security awareness related to the nature of those cargoes, for example where such cargoes are materials hazardous only in bulk.

11.1.5 All shipboard personnel and port facility personnel who are not mentioned in subsection 11.1.4 and are engaged in the transport of bulk cargoes should be familiar with the provisions of the relevant security plans related to those cargoes, commensurate with their responsibilities.

11.2 General provisions for shore-side personnel

11.2.1 For the purpose of this subsection, shore-side personnel covers individuals such as those who:

- prepare transport documents for bulk cargoes;
- offer bulk cargoes for transport;
- accept bulk cargoes for transport;
- handle bulk cargoes;
- prepare bulk cargoes' loading/stowage plans;
- load/unload bulk cargoes into/from ships; and
- enforce or survey or inspect for compliance with applicable rules and regulations; or
- are otherwise involved in the handling and transport of bulk cargoes as determined by the competent authority.

However, the provisions of subsection 11.2 do not apply to:

- the company security officer and appropriate shore-based personnel mentioned in section A/13.1 of the ISPS Code;
- the ship security officer and the shipboard personnel mentioned in sections A/13.2 and A/13.3 of the ISPS Code; and
- the port facility security officer, the appropriate port facility security personnel and the port facility personnel having specific security duties mentioned in sections A/18.1 and A/18.2 of the ISPS Code.

For the training of those officers and personnel, refer to the ISPS Code.

11.2.2 Shore-side personnel engaged in transport by sea of bulk cargoes should consider security provisions for the transport of bulk cargoes commensurate with their responsibilities.

11.2.3 Security training

11.2.3.1 The training of shore-side personnel should also include elements of security awareness, the need to control access to cargoes and ships, and general guidance on the types of bulk cargoes of security significance.

11.2.3.2 Security awareness training should address the nature of security risks, recognizing security risks, methods to address and reduce risks and actions to be taken in the event of a security breach. It should include awareness of security plans (if appropriate, refer to subsection 11.3), commensurate with the responsibilities of individuals and their part in implementing security plans.

11.2.3.3 Such training should be provided or verified upon employment in a position involving transport of bulk cargoes by sea and should be periodically supplemented with retraining.

11.2.3.4 Records of all security training undertaken should be kept by the employer and made available to the employee if requested.

11.3 Provisions for high consequence solid bulk cargoes

11.3.1 For the purposes of this subsection, high consequence solid bulk cargoes with high potential security implications are those which have the potential for misuse in an unlawful act and which may, as a result, produce serious consequences such as mass casualties or mass destruction, for example, Class 5.1 ammonium nitrate UN 1942 and ammonium nitrate fertilizers UN 2067.

11.3.2 The provisions of this subsection do not apply to ships and to port facilities (see the ISPS Code for ship security plan and for port security plan).

11.3.3 Consignors and others engaged in the transport of solid bulk cargoes with high potential security implications should adopt, implement and comply with a security plan that addresses at least the elements specified in subsection 11.3.4.

11.3.4 The security plan should comprise at least the following elements:

.1 specific allocation of responsibilities for security to competent and qualified persons with appropriate authority to carry out their responsibilities;

.2 records of bulk cargoes with high potential security implications or types of bulk cargoes with high potential security implications transported;

.3 review of current operations and assessment of vulnerabilities, including intermodal transfer, temporary transit storage, handling and distribution, as appropriate;

.4 clear statements of measures, including training, policies (including response to higher threat conditions, new employee/employment verification, etc.), operating practices (e.g., choice/use of routes where known, control of access to ships, bulk cargo storage and loading areas, proximity to vulnerable infrastructure, etc.), equipment and resources that are to be used to reduce security risks;

.5 effective and up-to-date procedures for reporting and dealing with security threats, breaches of security or security-related incidents;

.6 procedures for the evaluation and testing of security plans and procedures for periodic review and update of the plans;

.7 measures to ensure the security of transport information contained in the plan; and

.8 measures to ensure that the distribution of transport information is limited as far as possible.

Section 12

Stowage factor conversion tables

12.1 Cubic metres per metric tonne to cubic feet per long ton (2240 lb, 1016 kg)

Factor: 1 m^3/t = 35.87 ft^3/ton (rounded to the nearest hundredth of a ft^3/ton)

m^3/t	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	-	0.36	0.72	1.08	1.43	1.79	2.15	2.51	2.87	3.23
0.1	3.59	3.95	4.30	4.66	5.02	5.38	5.74	6.10	6.46	6.82
0.2	7.17	7.53	7.89	8.25	8.61	8.97	9.33	9.68	10.04	10.40
0.3	10.76	11.12	11.48	11.84	12.20	12.55	12.91	13.27	13.63	13.99
0.4	14.35	14.71	15.07	15.42	15.78	16.14	16.50	16.86	17.22	17.58
0.5	17.94	18.29	18.65	19.01	19.37	19.73	20.09	20.45	20.80	21.16
0.6	21.52	21.88	22.24	22.60	22.96	23.32	23.67	24.03	24.39	24.75
0.7	25.11	25.47	25.83	26.19	26.54	26.90	27.26	27.62	27.98	28.34
0.8	28.70	29.05	29.41	29.77	30.13	30.49	30.85	31.21	31.57	31.92
0.9	32.28	32.64	33.00	33.36	33.72	34.08	34.44	34.79	35.15	35.51
1.0	35.87	36.23	36.59	36.95	37.31	37.66	38.02	38.38	38.74	39.10
1.1	39.46	39.82	40.17	40.53	40.89	41.25	41.61	41.97	42.33	42.69
1.2	43.04	43.40	43.76	44.12	44.48	44.84	45.20	45.56	45.91	46.27
1.3	46.63	46.90	47.35	47.71	48.07	48.43	48.78	49.14	49.50	49.86
1.4	50.22	50.58	50.94	51.29	51.65	52.01	52.37	52.73	53.09	53.45
1.5	53.81	54.16	54.52	54.88	55.24	55.60	55.96	56.32	56.67	57.03
1.6	57.39	57.75	58.11	58.47	58.83	59.19	59.54	59.90	60.26	60.62

ft^3/ton

12.2 Cubic feet per long ton (ft^3/ton) (2240 lb, 1016 kg) to cubic metres per metric tonne (m^3/t) (2204 lb, 1000 kg)

Factor: 1 ft^3/ton = 0.02788 m^3/t (rounded to the nearest ten thousandth of a m^3/t)

ft^3/ton	0	1	2	3	4	5	6	7	8	9
0	-	0.0279	0.0558	0.0836	0.1115	0.1394	0.1676	0.1952	0.2230	0.2509
10	0.2788	0.3067	0.3346	0.3624	0.3903	0.4182	0.4461	0.4740	0.5018	0.5297
20	0.5576	0.5855	0.6134	0.6412	0.6691	0.6970	0.7249	0.7528	0.7806	0.8085
30	0.8364	0.8643	0.8922	0.9200	0.9479	0.9758	1.0037	1.0316	1.0594	1.0873
40	1.1152	1.1431	1.1710	1.1988	1.2267	1.2546	1.2825	1.3104	1.3382	1.3661
50	1.3940	1.4219	1.4498	1.4776	1.5055	1.5334	1.5613	1.5892	1.6170	1.6449
60	1.6728	1.7007	1.7286	1.7564	1.7843	1.8122	1.8401	1.8680	1.8958	1.9237
70	1.9516	1.9795	2.0074	2.0352	2.0631	2.0910	2.1189	2.1468	2.1746	2.2025
80	2.2304	2.2583	2.2862	2.3140	2.3419	2.3698	2.3977	2.4256	2.4534	2.4818
90	2.5092	2.5371	2.5650	2.5928	2.6207	2.6486	2.6765	2.7044	2.7322	2.7601
100	2.7880	2.8159	2.8438	2.8716	2.8995	2.9274	2.9553	2.9832	3.0110	3.0389

m^3/t

Section 13

References to related information and recommendations

13.1 General

This section lists the references to the IMO instruments relevant to the requirements in this Code. It should be noted that this listing is not exhaustive.

13.2 Reference list

The references to the subsections in this Code, references to the relevant IMO instruments and subjects are in the following tables. Column 1 contains the references to the subsection numbers in this Code. Column 2 contains the references to the relevant IMO Instruments. Column 3 identifies the relevant subjects.

Reference to subsections in this Code (1)	Reference to the relevant IMO instruments (2)	Subject (3)

13.2.1 Dangerous goods and classification

9.2	IMDG Code (SOLAS VII/1.1) SOLAS VII/1.2	Classification of dangerous goods

13.2.2 Stability

2.1.3	SOLAS II-1/22	Stability information
2.1.3	SOLAS VI/6.1	Stability information
2.1.3	SOLAS VI/7.2.1	Stability information
2.1.3	SOLAS VI/7.4	Loading and trimming of bulk cargoes
2.1.3	SOLAS XII/8	Stability information

13.2.3 Fire-extinguishing arrangements

General Group B	SOLAS II-2/10.7	Fire-extinguishing arrangements in cargo spaces
General	FSS Code, chapter 9	Fixed fire detection and fire alarm systems
General	FSS Code, chapter 10	Sample extraction smoke detection systems
Group B	SOLAS II-2/19	Special requirements for ships carrying dangerous goods
Group A, B and C	MSC/Circ.1146	List of solid bulk cargoes for which a fixed gas fire-extinguishing system may be exempted

13.2.4 Ventilation

General Group B	International Convention on Load Lines 1966, Annex I, regulation 19	Ventilation openings
General Group B	SOLAS II-2/9.7	Ventilation systems
General Group B	SOLAS II-2/19.3.4	Ventilation for ships carrying dangerous goods

13.2.5 Personnel protection

General Group B	IMO/WHO/ILO Medical First Aid Guide for Use in Accidents Involving Dangerous Goods (MFAG)	First aid measures
General Group B	SOLAS II-2/10.10 and FSS Code, chapter 3	Fire-fighter's outfits
General Group B	SOLAS II-2/19.3.6.1 and FSS Code, chapter 3	Protective clothing
General Group B	SOLAS II-2/19.3.6.2 and FSS Code, chapter 3	Self-contained breathing apparatus

13.2.6 Gas detection

General	SOLAS VI/3	Oxygen analysis and gas detection equipment
General	Recommendations on the safe use of pesticides in ships applicable to the fumigation of cargo holds (MSC.1/Circ.1264), section 3	Gas detection equipment for fumigation

13.2.7 Minimum information/documentation

4.8.3	SOLAS II-2/19.4	Document of compliance for carriage of dangerous goods
4.2	SOLAS VI/2	Cargo information
4.2	SOLAS XII/10 SOLAS XII/8	Density of bulk cargoes Cargo restrictions and other information
4.2	SOLAS VI/7.2	Stability and other information on ships
4.2	SOLAS VII/7-2	Documentation for solid bulk dangerous goods

13.2.8 Insulation of machinery space boundaries

Group B	SOLAS II-2/3.2, 3.4, 3.10	Definitions of "A", "B" and "C" class divisions
Group B	SOLAS II-2/9.2	Fire integrity of bulkheads and decks
Group B	SOLAS II-2/19.3.8	Insulation requirement ("A-60")

13.2.9 Fumigation

3.6	Recommendations on the safe use of pesticides in ships applicable to the fumigation of cargo holds (MSC.1/Circ.1264), section 3	Fumigation, application of fumigation, fumigants, safety precautions
3.6	SOLAS VI/4	Use of pesticides in ships

13.2.10 Segregation

9.3	SOLAS VII/7-3	Stowage and segregation requirement
9.3.3	IMDG Code, chapter 7.2.6	Segregation between bulk materials possessing chemical hazards and dangerous goods in packaged form

13.2.11 Transport of solid wastes in bulk

10.4	Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (1989)	Permitted transboundary movement of wastes
10.6	IMDG Code, chapter 7.8.4	Classification of wastes

13.2.12 Entering enclosed spaces

3.2.4	Resolution A.864(20), 5 December 1997	Recommendations for entering enclosed spaces aboard ships

13.2.13 Avoidance of excessive stresses

2.1.2	SOLAS XII/5 and 6	Structural strength
2.1.2	SOLAS XII/11	Loading instrument

APPENDIX 1

INDIVIDUAL SCHEDULES OF SOLID BULK CARGOES

ALFALFA

DESCRIPTION
Material derived from dried alfalfa grass. Shipped in the form of meal, pellets, etc.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	508 to 719	1.39 to 1.97
SIZE	**CLASS**	**GROUP**
Fine powder	Not applicable	C

HAZARD
No special hazards.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
This cargo shall be kept as dry as practicable. This cargo shall not be handled during precipitation. During handling of this cargo all non-working hatches of the cargo spaces into which this cargo is loaded or to be loaded shall be closed.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

Prior to loading of this cargo, a certificate shall be provided by a competent authority or shipper stating that the material as shipped does not meet the requirements for seed cake. Shipments which do meet the oil and moisture criteria for SEED CAKE shall comply with the requirements for SEED CAKE (a) UN 1386, SEED CAKE (b) UN 1386 or SEED CAKE UN 2217.

PRECAUTIONS
No special requirements.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

ALUMINA

DESCRIPTION
Alumina is a fine, white odourless powder with little or no moisture. Insoluble in organic liquids. Moisture content: 0% to 5%. If wet, alumina is unpumpable. This cargo is insoluble in water.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	781 to 1087	0.92 to 1.28
SIZE	**CLASS**	**GROUP**
Fine Powder	Not applicable	C

HAZARD
Alumina dust is very abrasive and penetrating. Irritating to eyes and mucous membranes.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
This cargo shall be kept as dry as practicable. This cargo shall not be handled during precipitation. During handling of this cargo all non-working hatches of the cargo spaces into which this cargo is loaded or to be loaded shall be closed.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
Bilge wells shall be clean, dry and covered as appropriate, to prevent ingress of the cargo. Appropriate precautions shall be taken to protect machinery and accommodation spaces from the dust of the cargo. Bilge wells of the cargo spaces shall be protected from ingress of the cargo. Due consideration shall be paid to protect equipment from the dust of the cargo. Persons who may be exposed to the dust of the cargo shall wear goggles or other equivalent dust eye-protection and dust filter masks. Those persons shall wear protective clothing, as necessary.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE

No special requirements.

CLEAN-UP

The water used for the cleaning of the cargo spaces, after discharge of this cargo, shall not be pumped by the fixed bilge pumps. A portable pump shall be used, as necessary, to clear the cargo spaces of the water.

ALUMINA, CALCINED

DESCRIPTION
Light to dark grey in colour. No moisture content. This cargo is insoluble in water.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	1639	0.61
SIZE	**CLASS**	**GROUP**
Small particles and lumps	Not applicable	C

HAZARD
No special hazards.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
This cargo shall be kept as dry as practicable. This cargo shall not be handled during precipitation. During handling of this cargo all non-working hatches of the cargo spaces into which this cargo is loaded or to be loaded shall be closed.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
Appropriate precautions shall be taken to protect machinery and accommodation spaces from the dust of the cargo. Bilge wells of the cargo spaces shall be protected from ingress of the cargo. Due consideration shall be paid to protect equipment from the dust of the cargo. Persons who may be exposed to the dust of the cargo shall wear protective clothing, goggles or other equivalent dust eye-protection and dust filter masks, as necessary.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP

The water used for the cleaning of the cargo spaces, after discharge of this cargo, shall not be pumped by the fixed bilge pumps. A portable pump shall be used, as necessary, to clear the cargo spaces of the water.

ALUMINA SILICA

DESCRIPTION
White, consists of alumina and silica crystals. Low moisture content (1% to 5%).
Lumps 60%.
Coarse grained powder – 40%. This cargo is insoluble in water.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	1429	0.70
SIZE	**CLASS**	**GROUP**
Not applicable	Not applicable	C

HAZARD
No special hazards.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
This cargo shall be kept as dry as practicable. This cargo shall not be handled during precipitation. During handling of this cargo all non-working hatches of the cargo spaces into which this cargo is loaded or to be loaded shall be closed.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
Appropriate precautions shall be taken to protect machinery and accommodation spaces from the dust of the cargo. Bilge wells of the cargo spaces shall be protected from ingress of the cargo. Due consideration shall be paid to protect equipment from the dust of the cargo. Persons who may be exposed to the dust of the cargo shall wear protective clothing, goggles or other equivalent dust eye-protection and dust filter masks, as necessary.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP
The water used for the cleaning of the cargo spaces, after discharge of this cargo, shall not be pumped by the fixed bilge pumps. A portable pump shall be used, as necessary, to clear the cargo spaces of the water.

ALUMINA SILICA, Pellets

DESCRIPTION
White to off-white. No moisture content.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	1190 to 1282	0.78 to 0.84
SIZE	**CLASS**	**GROUP**
Length: 6.4 mm to 25.4 mm Diameter: 6.4 mm	Not applicable	C

HAZARD
No special hazards.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
This cargo shall be kept as dry as practicable. This cargo shall not be handled during precipitation. During handling of this cargo all non-working hatches of the cargo spaces into which this cargo is loaded or to be loaded shall be closed.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
Appropriate precautions shall be taken to protect machinery and accommodation spaces from the dust of the cargo. Bilge wells of the cargo spaces shall be protected from ingress of the cargo. Due consideration shall be paid to protect equipment from the dust of the cargo. Persons who may be exposed to the dust of the cargo shall wear protective clothing, goggles or other equivalent dust eye-protection and dust filter masks, as necessary.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

ALUMINIUM FERROSILICON POWDER UN 1395

DESCRIPTION
Fine powder or briquettes.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)		STOWAGE FACTOR (m^3/t)
Not applicable	-		-
SIZE	**CLASS**	**SUBSIDIARY RISK**	**GROUP**
Not applicable	4.3	6.1	B

HAZARD
In contact with water may evolve hydrogen, a flammable gas which may form an explosive mixture in air. Impurities may, under similar conditions, produce phosphine and arsine, which are highly toxic gases.

This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
"Separated from" foodstuffs and all class 8 liquids.

HOLD CLEANLINESS
Clean and dry as relevant to the hazards of the cargo.

WEATHER PRECAUTIONS
This cargo shall be kept as dry as practicable. This cargo shall not be handled during precipitation. During handling of this cargo all non-working hatches of the cargo spaces into which this cargo is loaded or to be loaded shall be closed.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
Prior to loading this cargo, a certificate shall be provided by the manufacturer or shipper stating that the material was stored under cover, but exposed to the weather in the particle size to be shipped, for not less than 3 days prior to shipment. The bulkheads between the cargo spaces and the engine-room shall be gastight and shall be inspected and approved by the competent authority. During handling of this cargo, "NO SMOKING" signs shall be posted on decks and in areas adjacent to cargo spaces and no naked lights shall be permitted in these areas. At least two sets of self-contained breathing apparatus, in addition to those required by SOLAS regulation II-2/10.10, shall be provided on board.

VENTILATION

Continuous mechanical ventilation shall be conducted during the voyage for the cargo spaces carrying this cargo. If maintaining ventilation endangers the ship or the cargo, it may be interrupted unless there is a risk of explosion or other danger due to interruption of the ventilation. In any case mechanical ventilation shall be maintained for a reasonable period prior to discharge.

CARRIAGE

For quantitative measurements of hydrogen, phosphine and arsine and silane, suitable detectors for each gas or combination of gases shall be on board while this cargo is carried. The detectors shall be of certified safe type for use in explosive atmosphere. The concentrations of these gases in the cargo spaces carrying this cargo shall be measured regularly, during the voyage, and the results of the measurements shall be recorded and kept on board.

DISCHARGE

No special requirements.

CLEAN-UP

After discharge of this cargo, the cargo spaces shall be swept clean twice. Water shall not be used for cleaning of the cargo space which has contained this cargo, because of danger of gas.

EMERGENCY PROCEDURES

SPECIAL EMERGENCY EQUIPMENT TO BE CARRIED Self-contained breathing apparatus.
EMERGENCY PROCEDURES Wear self-contained breathing apparatus. **EMERGENCY ACTION IN THE EVENT OF FIRE** Batten down and use CO_2 if available. **Do not use water**. **MEDICAL FIRST AID** Refer to the Medical First Aid Guide (MFAG), as amended.

ALUMINIUM NITRATE UN 1438

DESCRIPTION
Colourless or white crystals. Soluble in water.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	-	-
SIZE	**CLASS**	**GROUP**
Not applicable	5.1	B

HAZARD
If involved in a fire will greatly intensify the burning of combustible materials and yield toxic nitrous fumes. Although non-combustible, mixtures with combustible material are easily ignited and may burn fiercely.

STOWAGE & SEGREGATION
"Separated from" foodstuffs.

HOLD CLEANLINESS
Clean and dry as relevant to the hazards of the cargo.

WEATHER PRECAUTIONS
This cargo shall be kept as dry as practicable. This cargo shall not be handled during precipitation. During handling of this cargo all non-working hatches of the cargo spaces into which this cargo is loaded or to be loaded shall be closed.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
Due regard shall be paid to prevent contact of the cargo and combustible materials.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP

No special requirements.

EMERGENCY PROCEDURES

SPECIAL EMERGENCY EQUIPMENT TO BE CARRIED Protective clothing (gloves, overalls, headgear). Self-contained breathing apparatus. Spray nozzles.
EMERGENCY PROCEDURES Wear protective clothing and self-contained breathing apparatus. **EMERGENCY ACTION IN THE EVENT OF FIRE** Use copious quantities of water, which is best applied in the form of a spray to avoid disturbing the surface of the material. The material may fuse or melt; in which condition application of water may result in extensive scattering of the molten materials. Exclusion of air or the use of CO_2 will not control the fire. Due consideration should be given to the effect on the stability of the ship due to accumulated water. **MEDICAL FIRST AID** Refer to the Medical First Aid Guide (MFAG), as amended.

ALUMINIUM SILICON POWDER, UNCOATED UN 1398

DESCRIPTION
Powder

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	-	-
SIZE	**CLASS**	**GROUP**
Not applicable	4.3	B

HAZARD
In contact with water may evolve hydrogen, a flammable gas which may form explosive mixtures with air. Impurities may, under similar circumstances, produce phosphine and arsine, which are highly toxic gases. May also evolve silanes, which are toxic and may ignite spontaneously.

This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
"Separated from" foodstuffs and all class 8 liquids.

HOLD CLEANLINESS
Clean and dry as relevant to the hazards of the cargo.

WEATHER PRECAUTIONS
This cargo shall be kept as dry as practicable before loading, during loading and during voyage. This cargo shall not be loaded during precipitation. During loading of this cargo all non-working hatches of the cargo spaces to which this cargo is loaded or to be loaded shall be closed.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
Prior to loading this cargo, a certificate shall be provided by the manufacturer or shipper stating that the material was stored under cover, but exposed to the weather in the particle size to be shipped, for not less than 3 days prior to shipment. The bulkheads between the cargo spaces and the engine-room shall be gastight and shall be inspected and approved by the competent authority. During handling of this cargo, "NO SMOKING" signs shall be posted on decks and in areas adjacent to cargo spaces and no naked lights shall be permitted in these areas. This cargo shall be loaded in cargo spaces fitted with mechanical ventilation having at least two separate fans. The total ventilation shall be at least six air changes per hour, based on the empty space. At least two sets of self-contained breathing apparatus, in addition to those required by SOLAS regulation II-2/10.10, shall be provided on board.

VENTILATION

Continuous mechanical ventilation shall be conducted during the voyage for the cargo spaces carrying this cargo. If maintaining ventilation endangers the ship or the cargo, it may be interrupted unless there is a risk of explosion or other danger due to interruption of the ventilation. In any case mechanical ventilation shall be maintained for a reasonable period prior to discharge. Ventilation shall be arranged such that any escaping gases are minimized from reaching living quarters on or under the deck.

CARRIAGE

For quantitative measurements of hydrogen, phosphine, arsine, suitable detectors for each gas or combination of gases shall be on board while this cargo is carried. The detectors shall be of certified safe type for use in explosive atmosphere. The concentrations of these gases in the cargo spaces carrying this cargo shall be measured regularly, during the voyage, and the results of the measurements shall be recorded and kept on board.

DISCHARGE

No special requirements.

CLEAN-UP

After discharge of this cargo, the cargo spaces shall be swept clean twice.
Water shall not be used for cleaning of the cargo space which has contained this cargo, because of danger of gas.

EMERGENCY PROCEDURES

SPECIAL EMERGENCY EQUIPMENT TO BE CARRIED Self-contained breathing apparatus.
EMERGENCY PROCEDURES Wear self-contained breathing apparatus. **EMERGENCY ACTION IN THE EVENT OF FIRE** Batten down and use CO_2 if available. **Do not use water.** **MEDICAL FIRST AID** Refer to the Medical First Aid Guide (MFAG), as amended.

ALUMINIUM SMELTING BY-PRODUCTS or
ALUMINIUM REMELTING BY-PRODUCTS UN 3170

DESCRIPTION
Aluminium smelting by-products are wastes from the aluminium manufacturing process. Grey or black powder or lumps with some metallic inclusions. The term encompasses various different waste materials, which include but are not limited to:

ALUMINIUM DROSS
ALUMINIUM SALT SLAGS
ALUMINIUM SKIMMINGS
SPENT CATHODES
SPENT POTLINER

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	1220	0.82
SIZE	**CLASS**	**GROUP**
Not applicable	4.3	B

HAZARD
Contact with water may cause heating with possible evolution of flammable and toxic gases such as hydrogen, ammonia and acetylene.
This cargo is non-combustible or has a low fire-risk.
Fire is unlikely but may follow an explosion of flammable gas and will be difficult to extinguish.
In port, flooding may be considered, but due consideration should be given to stability.

STOWAGE & SEGREGATION
"Separated from" foodstuffs and all class 8 liquids.

HOLD CLEANLINESS
Clean and dry as relevant to the hazards of the cargo.

WEATHER PRECAUTIONS
This cargo shall be kept as dry as practicable. This cargo shall not be handled during precipitation. During handling of this cargo all non-working hatches of the cargo spaces into which this cargo is loaded or to be loaded shall be closed.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS

Prior to loading this cargo, a certificate shall be provided by the manufacturer or shipper stating that, after manufacture, the material was stored under cover, but exposed to the weather in the particle size to be shipped, for not less than 3 days prior to shipment. Whilst the ship is alongside and the hatches of the cargo spaces containing this cargo are closed, the mechanical ventilation shall be operated continuously as weather permits. During handling of this cargo, "NO SMOKING" signs shall be posted on decks and in areas adjacent to cargo spaces and no naked lights shall be permitted in these areas. At least two self-contained breathing apparatus, in addition to those required by SOLAS regulation II-2/10.10, shall be provided on board. Bulkheads between the cargo spaces and the engine-room shall be gastight. Inadvertent pumping through machinery spaces shall be avoided.

VENTILATION

Continuous mechanical ventilation shall be conducted during the voyage for the cargo spaces carrying this cargo. If maintaining ventilation endangers the ship or the cargo, it may be interrupted unless there is a risk of explosion or other danger due to interruption of the ventilation. In any case mechanical ventilation shall be maintained for a reasonable period prior to discharge. Ventilation shall be arranged such that any escaping gases are minimized from reaching living quarters on or under the deck.

CARRIAGE

For quantitative measurements of hydrogen, ammonia and acetylene, suitable detectors for each gas or combination of gases shall be on board while this cargo is carried. The detectors shall be of certified safe type for use in explosive atmosphere. The concentrations of these gases in the cargo spaces carrying this cargo shall be measured regularly, during voyage, and the results of the measurements shall be recorded and kept on board.

DISCHARGE

No special requirements.

CLEAN-UP

Water shall not be used for cleaning of the cargo space which has contained this cargo, because of danger of gas.

EMERGENCY PROCEDURES

SPECIAL EMERGENCY EQUIPMENT TO BE CARRIED

Nil

EMERGENCY PROCEDURES

Nil

EMERGENCY ACTION IN THE EVENT OF FIRE

Batten down and use CO_2 if available. **Do not use water**. If this proves ineffective, endeavour to stop fire from spreading and head for the nearest suitable port.

MEDICAL FIRST AID

Refer to the Medical First Aid Guide (MFAG), as amended.

AMMONIUM NITRATE UN 1942
with not more than 0.2% total combustible material, including any organic substance, calculated as carbon to the exclusion of any other added substance

DESCRIPTION
White crystals, prills or granules. Wholly or partly soluble in water. Supporter of combustion. Hygroscopic.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
27^o to 42^o	1000	1.00
SIZE	**CLASS**	**GROUP**
1 to 4 mm	5.1	B

HAZARD
A major fire aboard a ship carrying these materials may involve a risk of explosion in the event of contamination (e.g., by fuel oil) or strong confinement. An adjacent detonation may also involve a risk of explosion. If heated strongly, this cargo decomposes, giving off toxic gases and gases which support combustion.
Ammonium nitrate dust might be irritating to skin and mucous membranes.
This cargo is hygroscopic and will cake if wet.

STOWAGE & SEGREGATION
There should be no sources of heat or ignition in the cargo space.
"Separated by a complete compartment or hold from" combustible materials (particularly liquids), chlorates, chlorides, chlorites, hypochlorites, nitrites, permanganates and fibrous materials (e.g., cotton, jute, sisal, etc.).
"Separated from" all other goods.
If the bulkhead between the cargo space and the engine-room is not insulated to class A-60 standard, this cargo shall be stowed "away from" the bulkhead.

HOLD CLEANLINESS
Clean and dry as relevant to the hazards of the cargo.

WEATHER PRECAUTIONS
This cargo shall be kept as dry as practicable. This cargo shall not be handled during precipitation. During handling of this cargo all non-working hatches of the cargo spaces into which this cargo is loaded or to be loaded shall be closed.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

Prior to loading, the following provisions shall be complied with:

- This cargo shall not be accepted for loading when the temperature of the cargo is above 40°C.
- Prior to loading, the shipper shall provide the master with a certificate signed by the shipper stating that all the relevant conditions of the cargo required by this Code including this individual schedule have been met.
- The fuel tanks situated under the cargo spaces to be used for the transport of this cargo shall be pressure tested to ensure that there is no leakage of manholes and piping systems leading to the tanks.
- All electrical equipment, other than those of approved intrinsically safe type, in the cargo spaces to be used for this cargo shall be electrically disconnected from the power source, by appropriate means other than a fuse, at a point external to the space. This situation shall be maintained while the cargo is on board.
- Due consideration shall be paid to the possible need to open hatches in case of fire to provide maximum ventilation and to apply water in an emergency, and the consequent risk to the stability of the ship through fluidization of the cargo.

During loading, the following provisions shall be complied with:

- Smoking shall not be allowed on deck and in the cargo spaces and "NO SMOKING" signs shall be displayed while this cargo is on board.
- Bunkering of fuel oil shall not be allowed. Pumping of fuel oil in spaces adjacent to the cargo spaces for this cargo, other than the engine-room, shall not be allowed.
- As far as reasonably practicable, combustible securing and protecting materials shall not be used. When wooden dunnage is necessary, only a minimum shall be used.

PRECAUTIONS

This cargo shall only be accepted for loading when the competent authority is satisfied in regard to the resistance to detonation of this material based on the test. Prior to loading, the shipper shall provide the master with a certificate stating that the resistance to detonation of this material is in compliance with this requirement. The master and officers shall note that a fixed gas fire-extinguishing system is ineffective on the fire involving this cargo and that applying water may be necessary. Pressure on the fire mains shall be maintained for fire-fighting and fire hoses shall be laid out or be in position and ready for immediate use during loading and discharging of this cargo. No welding, burning, cutting or other operations involving the use of fire, open flame, spark- or arc-producing equipment shall be carried out in the vicinity of the cargo spaces containing this cargo except in an emergency. Precautions shall be taken to avoid the penetration of this cargo into other cargo spaces, bilges and other enclosed spaces. Smoking shall not be allowed on deck and in the cargo spaces and "NO SMOKING" signs shall be displayed on deck whenever this cargo is on board. The hatches of the cargo spaces, whenever this material is on board, shall be kept free to be capable of being opened in case of an emergency. When the bulkhead between the cargo space and the engine-room is not insulated to class A-60 standard, this cargo shall not be accepted for loading unless the competent authority approves that the arrangement is equivalent.

Appropriate precautions shall be taken to protect machinery and accommodation spaces from the dust of the cargo. Bilge wells of the cargo spaces shall be protected from ingress of the cargo. Due consideration shall be paid to protect equipment from the dust of the cargo. Persons who may be exposed to the dust of the cargo shall wear goggles or other equivalent dust eye-protection and dust filter masks. Those persons shall wear protective clothing, as necessary.

VENTILATION

The cargo spaces carrying this cargo shall not be ventilated during voyage.

CARRIAGE

Hatches of the cargo spaces carrying this cargo shall be weathertight to prevent the ingress of water.

DISCHARGE

If this cargo has hardened, it shall be trimmed to avoid the formation of overhangs, as necessary. Bunkering or pumping of fuel oil shall not be allowed.

CLEAN-UP

After discharge of this cargo, the bilge wells and the scuppers of the cargo spaces shall be checked and any blockage in the bilge wells and the scuppers shall be removed.

EMERGENCY PROCEDURES

SPECIAL EMERGENCY EQUIPMENT TO BE CARRIED

Protective clothing (boots, gloves, coveralls, and headgear).
Self-contained breathing apparatus.

EMERGENCY PROCEDURES

Wear protective clothing and self-contained breathing apparatus.

EMERGENCY ACTION IN THE EVENT OF FIRE

Fire in a cargo space containing this material: Open hatches to provide maximum ventilation. Ship's fixed gas fire extinguishing will be inadequate. Use copious quantities of water. Flooding of the cargo space may be considered but due consideration should be given to stability.

Fire in an adjacent cargo space: Open hatches to provide maximum ventilation. Heat transferred from fire in an adjacent space can cause the material to decompose with consequent evolution of toxic fumes. Dividing bulkheads should be cooled.

MEDICAL FIRST AID

Refer to the Medical First Aid Guide (MFAG), as amended.

AMMONIUM NITRATE BASED FERTILIZER UN 2067

DESCRIPTION

Crystals, granules or prills. Wholly or partly soluble in water. Hygroscopic.
Ammonium nitrate-based fertilizers classified as UN 2067 are uniform mixtures containing ammonium nitrate as the main ingredient within the following composition limits:

.1 not less than 90% ammonium nitrate with not more than 0.2% total combustible/organic material calculated as carbon and with added matter, if any, which is inorganic and inert towards ammonium nitrate; or

.2 less than 90% but more than 70% ammonium nitrate with other inorganic materials or more than 80% but less than 90% ammonium nitrate mixed with calcium carbonate and/or dolomite and not more than 0.4% total combustible/organic material calculated as carbon; or

.3 ammonium nitrate-based fertilizers containing mixtures of ammonium nitrate and ammonium sulphate with more than 45% but less than 70% ammonium nitrate and not more than 0.4% total combustible organic material calculated as carbon such that the sum of the percentage compositions of ammonium nitrate and ammonium sulphate exceeds 70%.

Notes:

1. All nitrate ions for which there is present in the mixture a molecular equivalent of ammonium ions should be calculated as ammonium nitrate.
2. The transport of ammonium nitrate materials which are liable to self-heating sufficient to initiate decomposition is prohibited.
3. This entry may only be used for substances that do not exhibit explosive properties of class 1 when tested in accordance to Test Series 1 and 2 of class 1 (see UN Manual of Tests and Criteria, part I).

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
27° to 42°	900 to 1200	0.83 to 1.11
SIZE	**CLASS**	**GROUP**
1 to 5 mm	5.1	B

HAZARD

Supports combustion. A major fire aboard a ship carrying these substances may involve a risk of explosion in the event of contamination (e.g., by fuel oil) or strong confinement. An adjacent detonation may involve a risk of explosion.
If heated strongly decomposes, risk of toxic fumes and gases which support combustion, in the cargo space and on deck.
Fertilizer dust might be irritating to skin and mucous membranes.
This cargo is hygroscopic and will cake if wet.

STOWAGE & SEGREGATION

"Separated by a complete compartment or hold from" combustible materials (particularly liquid), bromates, chlorates, chlorites, hypochlorites, nitrites, perchlorates, permanganates, powdered metals and vegetable fibres (e.g., cotton, jute, sisal, etc.).

"Separated from" all other goods.

"Separated from" sources of heat or ignition (see also Loading).

Not to be stowed immediately adjacent to any tank or double bottom containing fuel oil heated to more than 50°C.

If the bulkhead between the cargo space and the engine-room is not insulated to class A-60 standard, this cargo shall be stowed "away from" the bulkhead.

HOLD CLEANLINESS

Clean and dry as relevant to the hazards of the cargo.

WEATHER PRECAUTIONS

This cargo shall be kept as dry as practicable. This cargo shall not be handled during precipitation. During handling of this cargo all non-working hatches of the cargo spaces into which this cargo is loaded or to be loaded shall be closed.

LOADING

Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

Prior to loading, the following provisions shall be complied with:

- This cargo shall not be accepted for loading when the temperature of the cargo is above 40°C.
- Prior to loading, the shipper shall provide the master with a certificate signed by the shipper stating that all the relevant conditions of the cargo required by this Code including this individual schedule have been met.
- The fuel tanks situated under the cargo spaces to be used for the transport of this cargo shall be pressure tested to ensure that there is no leakage of manholes and piping systems leading to the tanks.
- All electrical equipment, other than those of approved intrinsically safe type, in the cargo spaces to be used for this cargo shall be electrically disconnected from the power source, by appropriate means other than a fuse, at a point external to the space. This situation shall be maintained while the cargo is on board.
- Due consideration shall be paid to the possible need to open hatches in case of fire to provide maximum ventilation and to apply water in an emergency and the consequent risk to the stability of the ship through fluidization of the cargo.

During loading, the following provisions shall be complied with:

Bunkering of fuel oil shall not be allowed. Pumping of fuel oil in spaces adjacent to the cargo spaces for this cargo, other than the engine-room, shall not be allowed.

- As far as reasonably practicable, combustible securing and protecting materials shall not be used. When wooden dunnage is necessary, only a minimum shall be used.

PRECAUTIONS

This cargo shall only be accepted for loading when the competent authority is satisfied in regard to the resistance to detonation of this material based on the test. Prior to loading, the shipper shall provide the master with a certificate stating that the resistance to detonation of this material is in compliance with this requirement. Pressure on the fire mains shall be maintained for fire-fighting and fire hoses shall be laid out or be in position and ready for immediate use during loading and discharging of this cargo. No welding, burning, cutting or other operations involving the use of fire, open flame, spark- or arc-producing equipment shall be carried out in the vicinity of the cargo spaces containing this cargo except in an emergency. Smoking shall not be allowed on deck and in the cargo spaces and "NO SMOKING" signs shall be displayed on deck whenever this cargo is on board. Precautions shall be taken to avoid the penetration of this cargo into other cargo spaces, bilges and other enclosed spaces. The hatches of the cargo spaces, whenever this material is on board, shall be kept free to be capable of being opened in case of an emergency.

Appropriate precautions shall be taken to protect machinery and accommodation spaces from the dust of the cargo. Bilge wells of the cargo spaces shall be protected from ingress of the cargo. Due consideration shall be paid to protect equipment from the dust of the cargo. Persons who may be exposed to the dust of the cargo shall wear goggles or other equivalent dust eye-protection and dust filter masks. Those persons shall wear protective clothing, as necessary.

VENTILATION

The cargo spaces carrying this cargo shall not be ventilated during voyage.

CARRIAGE

Hatches of the cargo spaces carrying this cargo shall be weathertight to prevent the ingress of water. The temperature of this cargo shall be monitored and recorded daily during the voyage to detect decomposition resulting in spontaneous heating and oxygen depletion.

DISCHARGE

Bunkering or pumping of fuel oil shall not be allowed. If this cargo has hardened, it shall be trimmed to avoid the formation of overhangs, as necessary.

CLEAN-UP

After discharge of this cargo, the bilge wells and the scuppers of the cargo spaces shall be checked and any blockage in the bilge wells and the scuppers shall be removed.

EMERGENCY PROCEDURES

SPECIAL EMERGENCY EQUIPMENT TO BE CARRIED

Protective clothing (boots, gloves, coveralls, and headgear).
Self-contained breathing apparatus.

EMERGENCY PROCEDURES

Wear protective clothing and self-contained breathing apparatus.

EMERGENCY ACTION IN THE EVENT OF FIRE

Fire in a cargo space containing this material: Open hatches to provide maximum ventilation. Ship's fixed fire-fighting installation will be inadequate. Use copious quantities of water. Flooding of the cargo space may be considered but due consideration should be given to stability.

Fire in an adjacent cargo space: Open hatches to provide maximum ventilation. Heat transferred from fire in an adjacent space can cause the material to decompose with consequent evolution of toxic fumes. Dividing bulkheads should be cooled.

MEDICAL FIRST AID

Refer to the Medical First Aid Guide (MFAG), as amended.

AMMONIUM NITRATE BASED FERTILIZER UN 2071

DESCRIPTION

Usually granules. Wholly or partly soluble in water. Hygroscopic.
Ammonium nitrate-based fertilizers classified as UN 2071 are uniform ammonium nitrate based fertilizer mixtures of the nitrogen, phosphate or potash, containing not more than 70% ammonium nitrate and not more than 0.4% total combustible organic material calculated as carbon or with not more than 45% ammonium nitrate and unrestricted combustible material. Fertilizers within these composition limits are not subject to the provisions of this schedule when shown by a trough test (see UN Manual of Tests and Criteria, part III, subsection 38.2) that they are not liable to self-sustaining decomposition.

Notes:

1. All nitrate ions for which there is present in the mixture a molecular equivalent of ammonium ions should be calculated as ammonium nitrate.
2. The transport of ammonium nitrate materials which are liable to self-heating sufficient to initiate a decomposition is prohibited.
3. The NPK proportions for a fertilizer should not be used as a guide to its ability to undergo self-sustaining decomposition as this depends on the chemical species present (refer to UN Manual of Tests and Criteria, part III, subsection 38.2).

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
27° to 42°	900 to 1200	0.83 to 1.11
SIZE	**CLASS**	**GROUP**
1 to 5 mm	9	B

HAZARD

These mixtures may be subject to self-sustaining decomposition if heated. The temperature in such a reaction can reach 500°C. Decomposition, once initiated, may spread throughout the remainder, producing gases which are toxic. None of these mixtures is subject to the explosion hazard.
Fertilizer dust might be irritating to skin and mucous membranes.
This cargo is hygroscopic and will cake if wet.

STOWAGE & SEGREGATION

"Separated by a complete compartment or hold from" combustible materials (particularly liquid), bromates, chlorates, chlorites, hypochlorites, nitrites, perchlorates, permanganates, powdered metals and vegetable fibres (e.g., cotton, jute, sisal, etc.).
"Separated from" all other goods.
"Separated from" sources of heat or ignition (see also Loading).
Not to be stowed immediately adjacent to any tank or double bottom containing fuel oil heated to more than 50°C.
If the bulkhead between the cargo space and the engine-room is not insulated to class A-60 standard, "away from" the bulkhead.

HOLD CLEANLINESS
Clean and dry as relevant to the hazards of the cargo.

WEATHER PRECAUTIONS
This cargo shall be kept as dry as practicable. This cargo shall not be handled during precipitation. During handling of this cargo all non-working hatches of the cargo spaces into which this cargo is loaded or to be loaded shall be closed.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

Prior to loading, the following provisions shall be complied with:

- All electrical equipment, other than that of approved intrinsically safe type, in the cargo spaces to be used for this cargo shall be electrically disconnected from the power source, by appropriate means other than fuse, at a point external to the space. This situation shall be maintained while the cargo is on board.
- Due consideration shall be paid to the possible need to open hatches in case of fire to provide maximum ventilation and to apply water in an emergency and the consequent risk to the stability of the ship through fluidization of the cargo.
- In addition, if decomposition occurs, the residue left after decomposition may have only half the mass of the original cargo. Due consideration shall be paid to the effect of the loss of mass on the stability of the ship.

During loading, the following provisions shall be complied with:

Bunkering of fuel oil shall not be allowed. Pumping of fuel oil in spaces adjacent to the cargo spaces for this cargo, other than the engine-room, shall not be allowed.

PRECAUTIONS
This cargo shall only be accepted for loading when, as a result of testing in the trough test, its liability to self-sustaining decomposition shows decomposition rate not greater than 0.25 m/h. Pressure on the fire mains shall be maintained for fire-fighting and fire hoses shall be laid out or be in position and ready for immediate use during loading and discharging of this cargo. No welding, burning, cutting or other operations involving the use of fire, open flame, spark- or arc-producing equipment shall be carried out in the vicinity of the cargo spaces containing this cargo except in an emergency. Smoking shall not be allowed on deck and in the cargo spaces and "NO SMOKING" signs shall be displayed on deck whenever this cargo is on board. Precautions shall be taken to avoid the penetration of this cargo into other cargo spaces, bilges and other enclosed spaces. The hatches of the cargo spaces, whenever this material is on board, shall be kept free to be capable of being opened in case of an emergency.
Appropriate precautions shall be taken to protect machinery and accommodation spaces from the dust of the cargo. Bilge wells of the cargo spaces shall be protected from ingress of the cargo. Due consideration shall be paid to protect equipment from the dust of the cargo. Persons who may be exposed to the dust of the cargo shall wear goggles or other equivalent dust eye-protection and dust filter masks. Those persons shall wear protective clothing, as necessary.

VENTILATION
The cargo spaces carrying this cargo shall not be ventilated during voyage.

CARRIAGE
Hatches of the cargo spaces carrying this cargo shall be weathertight to prevent the ingress of water.
The temperature of this cargo shall be monitored and recorded daily during the voyage to detect decomposition resulting in spontaneous heating and oxygen depletion.

DISCHARGE
Bunkering or pumping of fuel oil shall not be allowed. If this cargo has hardened, it shall be trimmed to avoid the formation of overhangs, as necessary.

CLEAN-UP
After discharge of this cargo, the bilge wells and the scuppers of the cargo spaces shall be checked and any blockage in the bilge wells and the scuppers shall be removed.

EMERGENCY PROCEDURES

SPECIAL EMERGENCY EQUIPMENT TO BE CARRIED

Protective clothing (boots, gloves, coveralls, and headgear).
Self-contained breathing apparatus.

EMERGENCY PROCEDURES

Wear protective clothing and self-contained breathing apparatus.

EMERGENCY ACTION IN THE EVENT OF FIRE

Fire in a cargo space containing this material: Open hatches to provide maximum ventilation. Ship's fixed fire-fighting installation will be inadequate. Use copious quantities of water. Flooding of the cargo space may be considered but due consideration should be given to stability.

Fire in an adjacent cargo space: Open hatches to provide maximum ventilation. Heat transferred from fire in an adjacent space can cause the material to decompose with consequent evolution of toxic fumes. Dividing bulkheads should be cooled.

MEDICAL FIRST AID

Refer to the Medical First Aid Guide (MFAG), as amended.

AMMONIUM NITRATE BASED FERTILIZER (non-hazardous)

DESCRIPTION

Crystals, granules or prills non-cohesive when dry. Wholly or partly soluble in water.
Ammonium nitrate based fertilizers transported in conditions mentioned in this schedule are uniform mixtures containing ammonium nitrate as the main ingredient within the following composition limits:

.1 not more than 70% ammonium nitrate with other inorganic materials;

.2 not more than 80% ammonium nitrate mixed with calcium carbonate and/or dolomite and not more than 0.4% total combustible organic material calculated as carbon;

.3 nitrogen type ammonium nitrate based fertilizers containing mixtures of ammonium nitrate and ammonium sulphate with not more than 45% ammonium nitrate and not more than 0.4% total combustible organic material calculated as carbon; and

.4 uniform ammonium nitrate based fertilizer mixtures of the nitrogen, phosphate or potash, containing not more than 70% ammonium nitrate and not more than 0.4% total combustible organic material calculated as carbon or with not more than 45% ammonium nitrate and unrestricted combustible material. Fertilizers within these composition limits are not subject to the provisions of this schedule when shown by a trough test (see UN Manual of Tests and Criteria, part III, subsection 38.2) that they are liable to self-sustaining decomposition or if they contain an excess of nitrate greater than 10% by mass.

Notes:

1. All nitrate ions for which there is present in the mixture a molecular equivalent of ammonium ions should be calculated as ammonium nitrate.
2. The transport of ammonium nitrate materials which are liable to self-heating sufficient to initiate decomposition is prohibited.
3. The NPK proportions for a fertilizer should not be used as a guide to its ability to undergo self-sustaining decomposition as this depends on the chemical species present (refer to UN Manual of Tests and Criteria, part III, subsection 38.2).
4. This schedule may only be used for substances that do not exhibit explosive properties of class 1 when tested in accordance to Test Series 1 and 2 of class 1 (see UN Manual of Tests and Criteria, part I).
5. This schedule may only be used if the chemical or physical properties of an ammonium nitrate based fertilizer are such that when tested it does not meet the established defining criteria of any class.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
27° to 42°	1000 to 1200	0.83 to 1.00
SIZE	**CLASS**	**GROUP**
1 to 4 mm	Not applicable	C

HAZARD

This cargo is non-combustible or with a low fire-risk.
Even though this cargo is classified as non-hazardous, it will behave in the same way as the ammonium nitrate based fertilizers classified in class 9 under UN 2071 when heated strongly, by decomposing and giving off toxic gases.
The speed of the decomposition reaction is lower, but there will be a risk of toxic fumes in the cargo space and on deck if the cargo is strongly heated.
Fertilizer dust might be irritating to skin and mucous membranes.
This cargo is hygroscopic and will cake if wet.

STOWAGE & SEGREGATION

The compatibility of non-hazardous ammonium nitrate based fertilizers with other materials which may be stowed in the same cargo space should be considered before loading.
"Separated from" sources of heat or ignition (see also Loading).
Not to be stowed immediately adjacent to any tank or double bottom containing fuel oil heated to more than 50°C.
Fertilizers of this type should be stowed out of direct contact with a metal engine-room boundary. This may be done, for example, by using flame-retardant bags containing inert materials or by any equivalent barrier approved by the competent authority. This requirement need not apply to short international voyages.

HOLD CLEANLINESS

Clean and dry as relevant to the hazards of the cargo.

WEATHER PRECAUTIONS

This cargo shall be kept as dry as practicable. This cargo shall not be handled during precipitation. During handling of this cargo all non-working hatches of the cargo spaces into which this cargo is loaded or to be loaded shall be closed.

LOADING

Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

Prior to loading, the following provisions shall be complied with:

- All electrical equipment, other than that of approved intrinsically safe type, in the cargo spaces to be used for this cargo shall be electrically disconnected from the power source, by appropriate means other than a fuse, at a point external to the space. This situation shall be maintained while the cargo is on board.
- Due consideration shall be paid to the possible need to open hatches in case of fire to provide maximum ventilation and to apply water in an emergency and the consequent risk to the stability of the ship through fluidization of the cargo.
- In addition, if decomposition occurs, the residue left after decomposition may have only half the mass of the original cargo. Due consideration shall be paid to the effect of the loss of mass on the stability of the ship.

During loading, the following provisions shall be complied with:

Bunkering of fuel oil shall not be allowed. Pumping of fuel oil in spaces adjacent to the cargo spaces for this cargo, other than the engine-room, shall not be allowed.

PRECAUTIONS

No welding, burning, cutting or other operations involving the use of fire, open flame, spark- or arc-producing equipment shall be carried out in the vicinity of the cargo spaces containing this cargo except in an emergency. Smoking shall not be allowed on deck and in the cargo spaces and "NO SMOKING" signs shall be displayed on deck whenever this cargo is on board. The hatches of the cargo spaces, whenever this material is on board, shall be kept free to be capable of being opened in case of an emergency.

Appropriate precautions shall be taken to protect machinery and accommodation spaces from the dust of the cargo. Bilge wells of the cargo spaces shall be protected from ingress of the cargo. Due consideration shall be paid to protect equipment from the dust of the cargo. Persons who may be exposed to the dust of the cargo shall wear goggles or other equivalent dust eye-protection and dust filter masks. Those persons shall wear protective clothing, as necessary.

VENTILATION

The cargo spaces carrying this cargo shall not be ventilated during voyage.

CARRIAGE

Hatches of the cargo spaces carrying this cargo shall be weathertight to prevent the ingress of water.

The temperature of this cargo shall be monitored and recorded daily during the voyage to detect decomposition resulting in spontaneous heating and oxygen depletion.

DISCHARGE

Bunkering or pumping of fuel oil shall not be allowed. If this cargo has hardened, it shall be trimmed to avoid the formation of overhangs, as necessary.

CLEAN-UP

After discharge of this cargo, the bilge wells and the scuppers of the cargo spaces shall be checked and any blockage in the bilge wells and the scuppers shall be removed.

EMERGENCY PROCEDURES

SPECIAL EMERGENCY EQUIPMENT TO BE CARRIED

Protective clothing (boots, gloves, coveralls, and headgear).
Self-contained breathing apparatus.

EMERGENCY PROCEDURES

Wear protective clothing and self-contained breathing apparatus.

EMERGENCY ACTION IN THE EVENT OF FIRE

Fire in a cargo space containing this material: Open hatches to provide maximum ventilation. Ship's fixed fire-fighting installation will be inadequate. Use copious quantities of water. Flooding of the cargo space may be considered but due consideration should be given to stability.

Fire in an adjacent cargo space: Open hatches to provide maximum ventilation. Heat transferred from fire in an adjacent space can cause the material to decompose with consequent evolution of toxic fumes. Dividing bulkheads should be cooled.

MEDICAL FIRST AID

Refer to the Medical First Aid Guide (MFAG), as amended.

AMMONIUM SULPHATE

DESCRIPTION
Brownish grey to white crystals. Soluble in water. Free flowing. Absorbs moisture. Moisture content 0.04% to 0.5%. Ammonia odour. Subject to natural loss in weight.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
28° to 35°	943 to 1052	0.95 to 1.06
SIZE	**CLASS**	**GROUP**
2 mm to 4 mm	Not applicable	C

HAZARD
Dust may cause skin and eye irritation. Harmful if swallowed. Even though this cargo is classified as non-hazardous, it may cause heavy corrosion of framing, side shell, bulkhead, etc., if sweating of cargo space occurs.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
Clean and dry as relevant to the hazards of the cargo.

WEATHER PRECAUTIONS
This cargo shall be kept as dry as practicable. This cargo shall not be handled during precipitation. During handling of this cargo all non-working hatches of the cargo spaces into which this cargo is loaded or to be loaded shall be closed.

LOADING
Avoid generating dust when loading. During loading, due consideration shall be paid to minimize dust generation. Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
Appropriate precautions shall be taken to protect machinery and accommodation spaces from the dust of the cargo. Bilge wells of the cargo spaces shall be protected from ingress of the cargo. Due consideration shall be paid to protect equipment from the dust of the cargo. Persons who may be exposed to the dust of the cargo shall wear goggles or other equivalent dust eye-protection and dust filter masks. Those persons shall wear protective clothing, as necessary.

VENTILATION
The cargo spaces carrying this cargo shall not be ventilated during voyage.

CARRIAGE
No special requirements.

DISCHARGE
If this cargo has hardened, it shall be trimmed to avoid the formation of overhangs, as necessary.

CLEAN-UP
After discharge of this cargo, the cargo spaces shall be thoroughly cleaned and washed out to remove all traces of the cargo and dried, except in the case that the cargo to be loaded subsequent to discharge is AMMONIUM SULPHATE.

ANTIMONY ORE AND RESIDUE

DESCRIPTION
Lead grey mineral, subject to black tarnish.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	2381 to 2941	0.34 to 0.42
SIZE	**CLASS**	**GROUP**
Not applicable	Not applicable	C

HAZARD
This cargo is non-combustible or has a low fire-risk.
If involved in a fire, dangerous fumes of antimony and sulphur oxides can evolve.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
No special requirements.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

As the density of the cargo is extremely high, the tanktop may be overstressed unless the cargo is evenly spread across the tanktop to equalize the weight distribution. Due consideration shall be paid to ensure that tanktop is not overstressed during voyage and during loading by a pile of the cargo.

PRECAUTIONS
Appropriate precautions shall be taken to protect machinery and accommodation spaces from the dust of the cargo. Bilge wells of the cargo spaces shall be protected from ingress of the cargo. Due consideration shall be paid to protect equipment from the dust of the cargo. Persons who may be exposed to the dust of the cargo shall wear protective clothing, goggles or other equivalent dust eye-protection and dust filter masks, as necessary.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

BARIUM NITRATE UN 1446

DESCRIPTION
Glossy white crystals or powder. Soluble in water.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)		STOWAGE FACTOR (m^3/t)
Not applicable	-		-
SIZE	**CLASS**	**SUBSIDIARY RISK**	**GROUP**
Fine powder	5.1	6.1	B

HAZARD
Toxic if swallowed or by dust inhalation. If involved in a fire mixture with combustible materials is readily ignited and may burn fiercely.

STOWAGE & SEGREGATION
"Separated from" foodstuffs.

HOLD CLEANLINESS
Clean and dry as relevant to the hazards of the cargo.

WEATHER PRECAUTIONS
No special requirements.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
Appropriate precautions shall be taken to protect machinery and accommodation spaces from the dust of the cargo. Bilge wells of the cargo spaces shall be protected from ingress of the cargo. Due consideration shall be paid to protect equipment from the dust of the cargo. Persons who may be exposed to the dust of the cargo shall wear goggles or other equivalent dust eye-protection and dust filter masks. Those persons shall wear protective clothing, as necessary. Bilge wells shall be clean, dry and covered as appropriate, to prevent ingress of the cargo.

VENTILATION
Surface ventilation only, either natural or mechanical, shall be conducted, as necessary, during the voyage for this cargo.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP

No special requirements.

EMERGENCY PROCEDURES

SPECIAL EMERGENCY EQUIPMENT TO BE CARRIED

Protective clothing (gloves, boots, overalls, headgear). Self-contained breathing apparatus. Spray nozzles.

EMERGENCY PROCEDURES

Wear protective clothing and self-contained breathing apparatus.

EMERGENCY ACTION IN THE EVENT OF FIRE

Use copious amounts of water, which is best applied in the form of a spray to avoid disturbing the surface of the material. The material may fuse or melt, in which condition application of water may result in excessive scattering of molten materials. Exclusion of air or the use of CO_2 will not control the fire. Due consideration should be given to the stability of the ship due to the effect of accumulated water.

MEDICAL FIRST AID

Refer to the Medical First Aid Guide (MFAG), as amended.

BARYTES

DESCRIPTION
Crystalline ore mineral. A sulphate of barium. Moisture 1% to 6%.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	2941	0.34
SIZE	**CLASS**	**GROUP**
80% lumps: 6.4 to 101.6 mm 20% fines: less than 6.4 mm	Not applicable	C

HAZARD
No special hazards.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
No special requirements.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

As the density of the cargo is extremely high, the tanktop may be overstressed unless the cargo is evenly spread across the tanktop to equalize the weight distribution. Due consideration shall be paid to ensure that tanktop is not overstressed during voyage and during loading by a pile of the cargo.

PRECAUTIONS
Appropriate precautions shall be taken to protect machinery and accommodation spaces from the dust of the cargo. Bilge wells of the cargo spaces shall be protected from ingress of the cargo. Due consideration shall be paid to protect equipment from the dust of the cargo. Persons who may be exposed to the dust of the cargo shall wear protective clothing, goggles or other equivalent dust eye-protection and dust filter masks, as necessary.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

BAUXITE

DESCRIPTION
A brownish, yellow claylike and earthy mineral. Moisture content: 0% to 10%. Insoluble in water.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	1190 to 1389	0.72 to 0.84
SIZE	**CLASS**	**GROUP**
70% to 90% lumps: 2.5 mm to 500 mm 10% to 30% powder	Not applicable	C

HAZARD
No special hazards.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
No special requirements.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
Bilge wells shall be clean, dry and covered as appropriate, to prevent ingress of the cargo.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

BIOSLUDGE

DESCRIPTION
Heat-dried activated sludge. Very fine granular product. Moisture: 3% to 5%. Black speckled colour.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	654	1.53
SIZE	**CLASS**	**GROUP**
Not applicable	Not applicable	C

HAZARD
No special hazards.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
No special requirements.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
Appropriate precautions shall be taken to protect machinery and accommodation spaces from the dust of the cargo. Bilge wells of the cargo spaces shall be protected from ingress of the cargo. Due consideration shall be paid to protect equipment from the dust of the cargo. Persons who may be exposed to the dust of the cargo shall wear protective clothing, goggles or other equivalent dust eye-protection and dust filter masks, as necessary.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

BORAX (PENTAHYDRATE CRUDE)

DESCRIPTION
A chemical compound of boracic acid and soda. Free flowing powder or granules. Grey colour. Dusty.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	1087	0.92
SIZE	**CLASS**	**GROUP**
Up to 2.36 mm	Not applicable	C

HAZARD
No special hazards.
This cargo is non-combustible or has a low fire-risk.
This cargo is hygroscopic and will cake if wet.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
This cargo shall be kept as dry as practicable. This cargo shall not be handled during precipitation. During handling of this cargo all non-working hatches of the cargo spaces into which this cargo is loaded or to be loaded shall be closed.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
Appropriate precautions shall be taken to protect machinery and accommodation spaces from the dust of the cargo. Bilge wells of the cargo spaces shall be protected from ingress of the cargo. Due consideration shall be paid to protect equipment from the dust of the cargo. Persons who may be exposed to the dust of the cargo shall wear protective clothing, goggles or other equivalent dust eye-protection and dust filter masks, as necessary.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE
If this cargo has hardened, it shall be trimmed to avoid the formation of overhangs, as necessary.

CLEAN-UP
No special requirements.

BORAX, ANHYDROUS
(crude or refined)

DESCRIPTION
Crude is normally of yellow white appearance. When highly refined becomes white crystalline. Dusty and hygroscopic.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
35°	1282	0.78
SIZE	**CLASS**	**GROUP**
Granules less than 1.4 mm	Not applicable	C

HAZARD
Dust is very abrasive and irritating, but not toxic, if inhaled.
This cargo is non-combustible or has a low fire-risk.
This cargo is hygroscopic and will cake if wet.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
No special requirements.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
Appropriate precautions shall be taken to protect machinery and accommodation spaces from the dust of the cargo. Bilge wells of the cargo spaces shall be protected from ingress of the cargo. Due consideration shall be paid to protect equipment from the dust of the cargo. Persons who may be exposed to the dust of the cargo shall wear goggles or other equivalent dust eye-protection and dust filter masks. Those persons shall wear protective clothing, as necessary.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE
If this cargo has hardened, it shall be trimmed to avoid the formation of overhangs, as necessary.

CLEAN-UP
No special requirements.

BROWN COAL BRIQUETTES

DESCRIPTION
Brown coal (lignite) briquettes are manufactured by pressing dried brown coal particles into compressed blocks.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	750	1.34
SIZE	**CLASS**	**GROUP**
Mainly up to 50 mm	MHB	B

HAZARD
Briquettes are easily ignited, liable to spontaneous combustion and will deplete oxygen in cargo space.

STOWAGE & SEGREGATION
Refer to the appendix to this schedule.

HOLD CLEANLINESS
Clean and dry as relevant to the hazards of the cargo. Previous cargo battens shall be removed from the cargo spaces.

WEATHER PRECAUTIONS
No special requirements.

LOADING
Refer to the appendix to this schedule.

PRECAUTIONS
Appropriate precautions shall be taken to protect machinery and accommodation spaces from the dust of the cargo. Bilge wells of the cargo spaces shall be protected from ingress of the cargo. Due consideration shall be paid to protect equipment from the dust of the cargo. Persons who may be exposed to the dust of the cargo shall wear protective clothing, goggles or other equivalent dust eye-protection and dust filter masks, as necessary.

VENTILATION
The cargo spaces carrying this cargo shall not be ventilated during voyage. Refer to the appendix to this schedule.

CARRIAGE
Refer to the appendix to this schedule.

DISCHARGE
Refer to the appendix to this schedule.

CLEAN-UP

After discharge of this cargo, the bilge wells and the scuppers of the cargo spaces shall be checked and any blockage in the bilge wells and the scuppers shall be removed.

EMERGENCY PROCEDURES

SPECIAL EMERGENCY EQUIPMENT TO BE CARRIED Nil
EMERGENCY PROCEDURES Nil **EMERGENCY ACTION IN THE EVENT OF FIRE** Batten down. Exclusion of air may be sufficient to control fire. **Do not use water**. Seek expert advice and consider heading for the nearest suitable port. **MEDICAL FIRST AID** Refer to the Medical First Aid Guide (MFAG), as amended.

REMARKS

The use of CO_2 or inert gas, if available, should be withheld until fire is apparent.

APPENDIX

BROWN COAL BRIQUETTES

HAZARD

1. This cargo is easily ignited, liable to heat spontaneously and deplete oxygen in the cargo space.
2. This cargo is subject to oxidation, leading to depletion of oxygen and an increase in carbon dioxide in the cargo space (see also section 3).
3. This cargo is liable to heat spontaneously and may ignite spontaneously in the cargo space. When spontaneous heating occurs, flammable and toxic gases, including carbon monoxide, may be produced. Carbon monoxide is an odourless gas, slightly lighter than air, and has flammable limits in air of 12% to 75% by volume. It is toxic by inhalation, with an affinity for blood haemoglobin over 200 times that of oxygen. The recommended threshold limit value (TLV) for carbon monoxide exposure is 50 ppm.

STOWAGE & SEGREGATION

1. Boundaries of cargo spaces where these cargoes are carried shall be resistant to fire and liquids.
2. This cargo shall be "separated from" goods of classes 1 (division 1.4), 2, 3, 4 and 5 in packaged form (see IMDG Code) and "separated from" solid bulk material of classes 4 and 5.1.
3. Stowage of goods of class 5.1 in packaged form or solid bulk materials of class 5.1 above or below this cargo shall be prohibited.
4. This cargo shall be "separated longitudinally by an intervening complete compartment or hold from" goods of class 1 other than division 1.4.

5 This cargo shall not be stowed adjacent to hot areas.

Note: For interpretation of these terms, see section 9.

LOADING

1. Prior to loading, the shipper, or their appointed agent, shall provide in writing to the master the characteristics of the cargo and the recommended safe handling procedures for loading and transport of the cargo. As a minimum, the cargo's contract specifications for moisture content, sulphur content and size shall be stated.
2. This cargo shall be stored for 7 days prior to loading. This substantially reduces the risk of spontaneous combustion in subsequent transport, storage and handling.
3. Before loading this cargo, the master shall ensure the following:
   - 3.1 weather deck enclosures to the cargo space have been inspected to ensure their integrity. Such closures are closed and sealed;
   - 3.2 all electrical cables and components situated in cargo spaces and adjacent enclosed spaces are free from defects. Such cables and electrical components are safe to be used in a flammable and/or dusty atmosphere or positively isolated. The provisions of this clause need not apply to engine-rooms where the engine-room is separated from the cargo space by a gastight bulkhead with no direct access.

4. Smoking and the use of naked flames shall not be permitted in the cargo areas and adjacent spaces and appropriate warning notices shall be posted in conspicuous places. Burning, cutting, chipping, welding or other sources of ignition shall not be permitted in the vicinity of cargo spaces or in other adjacent spaces.
5. This cargo shall not be dropped more than one metre during loading to minimize the production of dust and fines.
6. Individual cargo spaces shall be loaded without interruption, where possible. Hot spots may develop in a cargo space that has been kept open for more than six days (or less in weather over 30°C).
7. Prior to departure, the master shall be satisfied that the surface of the material has been trimmed reasonably level to the boundaries of the cargo space to avoid the formation of gas pockets and to prevent air from permeating the body of the briquettes. Casing leading into the cargo space shall be adequately sealed. The shipper shall ensure that the master receives the necessary cooperation from the loading terminal.
8. Individual cargo spaces shall be closed and sealed as soon as practicable after the cargo has been loaded into each cargo space.

PRECAUTIONS

1. The ship shall be suitably fitted and carry on board appropriate instruments for measuring the following without requiring entry into the cargo space:
   .1 concentration of methane in the atmosphere above the cargo and opening cargo space enclosures;
   .2 concentration of oxygen in the atmosphere above the cargo;
   .3 concentration of carbon monoxide in the atmosphere above the cargo;
   .4 pH value of cargo hold bilge samples.

   These instruments shall be regularly serviced and calibrated. Ship personnel shall be trained in the use of such instruments.
2. It is recommended that means be provided for monitoring the temperature of the cargo in the range of 0°C to 100°C to enable the measurement of temperature of the cargo during the voyage without requiring entry into the cargo space.

CARRIAGE

1. As far as practicable, any gases which may be emitted from the cargo shall not be allowed to accumulate in adjacent enclosed spaces, such as store-rooms, carpenter's shop, passageways, tunnels, etc. Such spaces shall be adequately ventilated and regularly monitored for methane, oxygen and carbon monoxide.
2. Under no circumstances, except in emergency, shall the hatches be opened or the cargo space be ventilated or entered during the voyage.
3. The atmosphere in the space above the cargo in each cargo space shall be regularly monitored for the concentrations of methane, oxygen and carbon monoxide.
4. The frequency of the monitoring shall be determined based upon the information provided by the shipper and the information obtained through the analysis of the atmosphere in the cargo space. The monitoring shall be conducted at least daily and as close as practical to the same time of day. The results of monitoring shall be recorded. The shipper may request more frequent monitoring, particularly if there is evidence of significant self-heating during the voyage.

5. The following issues shall be taken into account:
   5.1 The oxygen level in the sealed cargo space will fall from an initial 21% over a period of days to stabilize at levels of the order of 6 to 15%. If the oxygen level does not fall below 20%, or rapidly increases after an initial fall, it is possible that the cargo space is inadequately sealed and is at risk of spontaneous combustion.
   5.2 Carbon monoxide levels will build up to concentrations which fluctuate in the 200 to 2000 parts per million (ppm) range in a safe, well-sealed cargo space. A rapid increase of approximately 1000 ppm in carbon monoxide levels in this cargo over a 24-hour period is a possible indicator of spontaneous combustion, particularly if accompanied by an increase in methane levels.
   5.3 The methane composition in briquette cargo is normally low, less than 5 ppm and does not constitute a hazard. However, a sudden and continuing rise in methane levels, to concentrations above 10 ppm, is an indicator of the occurrence of spontaneous combustion in the hold.
   5.4 The temperature in this cargo in a well-sealed cargo space normally remains at 5 to 10°C above seawater temperature, the increase being due to normal diurnal breathing of small quantities of air into the cargo space. Checking of the cargo space seals to minimize air leakage is essential. A rapid increase in temperature of approximately 20°C over 24 hours is evidence of spontaneous combustion.
6. Regular hold bilge testing shall be systematically carried out. If the pH monitoring indicates that a corrosion risk exists, the master shall ensure that all bilges are kept dry during the voyage in order to avoid possible accumulation of acids on tanktops and in the bilge system.
7. When the behaviour of the cargo during the voyage differs from that specified in the cargo information, the master shall report such differences to the shipper. Such reports will enable the shipper to maintain records on the behaviour of this cargo, so that the information being provided to the master can be reviewed in the light of the transport experience.
8. When the master is concerned that the cargo is showing any signs of self-heating or spontaneous combustion, such as an increase in the concentration of methane or carbon monoxide or an increase in temperature, as described above, the following actions shall be taken:
   8.1 Consult with the ship's agent at the loading port. The company's designated person ashore shall be advised immediately.
   8.2 Check the seal of the cargo space and re-seal the cargo space, as necessary.
   8.3 Do not enter the cargo space and do not open the hatches, unless the master considers access is necessary for the safety of the ship or safety of life. When any ship's personnel have entered into a cargo space, re-seal the cargo space immediately after the personnel vacate the cargo space.
   8.4 Increase the frequency of monitoring the gas composition, and temperature when practicable, of the cargo.
   8.5 Send the following information, as soon as possible, to the ship's owner or agent at the loading port to obtain expert advice:
      .1 the number of cargo spaces involved;
      .2 monitoring results of the carbon monoxide, methane and oxygen concentrations;
      .3 if available, temperature of the cargo, location and method used to obtain results;

.4 the time the gas analyses were taken (monitoring routine);
.5 the quantity of the cargo in the cargo space(s) involved;
.6 the description of the cargo as per the shipper's declaration, and any special precautions indicated on the declaration;
.7 the date of loading, and Estimated Time of Arrival (ETA) at the intended discharge port (which shall be specified); and
.8 any other comments or observations the master may consider relevant.

DISCHARGE

Prior to, and during, discharge:

1. The cargo space shall be kept closed until just before the commencement of discharge of that space. The cargo may be sprayed with a fine water spray to reduce dust.
2. Personnel shall not enter the cargo space without having tested the atmosphere above the cargo. The personnel entering into a cargo space in which the atmosphere contains oxygen levels below 21% shall wear self-contained breathing apparatus. Carbon dioxide and carbon monoxide gas levels shall also be tested prior to entry into the cargo spaces. The recommended threshold limit value (TLV) for carbon monoxide is 50 ppm.
3. During discharge, attention shall be paid to the cargo for signs of hot spots (i.e. steaming). If a hot spot is detected, the area shall be sprayed with fine water spray and the hot spot shall be removed immediately to prevent spreading. The hot spot cargo shall be spread out on the wharf away from the remainder of the cargo.
4. Prior to suspending the discharge of this cargo for more than eight hours, the hatch covers and all other ventilation for the cargo space shall be closed.

PROCEDURES FOR GAS MONITORING OF BROWN COAL BRIQUETTE CARGOES

1 Observations

1.1 Carbon monoxide monitoring, when conducted in accordance with the following procedures, will provide a reliable early indication of self-heating within this cargo. This allows preventive action to be considered without delay. A sudden rapid rise in carbon monoxide detected within a cargo space, particularly if accompanied by an increase in methane levels, is a conclusive indication that self-heating is taking place.

1.2 All vessels engaged in the carriage of this cargo shall carry on board an instrument for measuring methane, oxygen and carbon monoxide gas concentrations, to enable the monitoring of the atmosphere within the cargo space. This instrument shall be regularly serviced and calibrated in accordance with the manufacturer's instructions. Care shall be exercised in interpreting methane measurements carried out in the low oxygen concentrations often found in unventilated cargo holds. The catalytic sensors normally used for the detection of methane rely on the presence of sufficient oxygen for accurate measurement. This phenomenon does not affect the measurement of carbon monoxide, or measurement of methane by infrared sensor. Further guidance may be obtained from the instrument manufacturer.

2 Sampling and measurement procedure

2.1 Equipment

2.1.1 An instrument which is capable of measuring methane, oxygen and carbon monoxide concentrations shall be provided on board a ship carrying this cargo. The instrument shall be fitted with an aspirator, flexible connection and a length of spark-proof metal tubing to enable a representative sample to be obtained from within the square of the hatch.

2.1.2 When recommended by the manufacturer, a suitable filter shall be used to protect the instrument against the ingress of moisture. The presence of even a small amount of water will compromise the accuracy of the measurement.

2.2 Siting of sampling points

2.2.1 In order to obtain meaningful information about the behaviour of this cargo in a cargo space, gas measurements shall be made via one sample point per cargo space. To ensure flexibility of measurement in adverse weather, however, two sample points shall be provided per cargo space, one on the port side and one on the starboard side of the hatch cover or hatch coaming (refer to diagram of gas sampling point). Measurement from either of these locations is satisfactory.

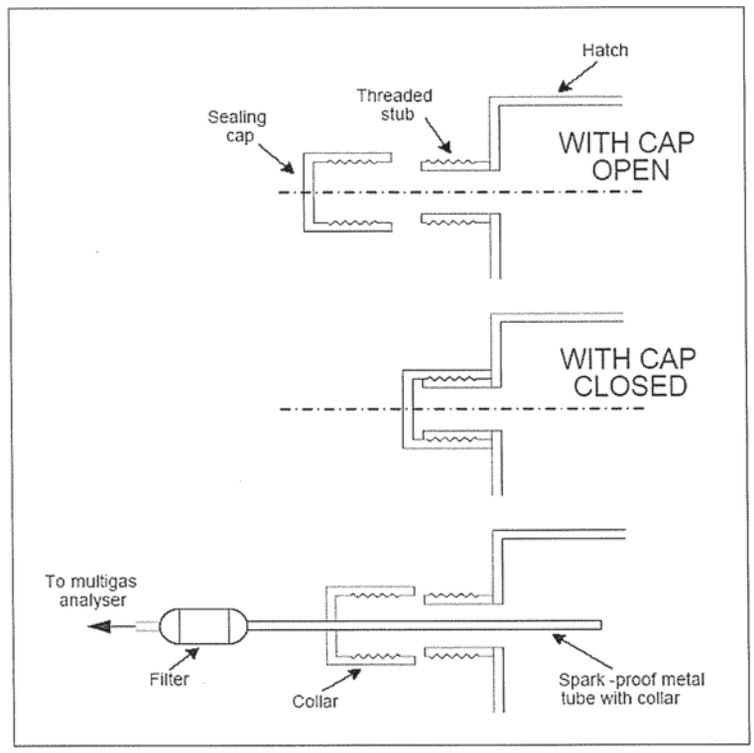


Diagram of gas sampling point

2.2.2 Each sample point shall comprise a hole of diameter approximately 12 mm positioned as near to the top of the hatch coaming as possible. It shall be sealed with a sealing cap to prevent ingress of water and air. It is essential this cap be securely replaced after each measurement to maintain a tight seal.

2.2.3 The provision of any sample point shall not compromise the seaworthiness of the vessel.

2.3 Measurement

The explanation on procedures for measurement is as follows:

.1 remove the sealing cap, insert the rigid tube into the sampling point and tighten the integral cap to ensure an adequate seal;

.2 connect the instrument to the sampling tube;

.3 draw a sample of the atmosphere through the tube, using the aspirator, until steady readings are obtained;

.4 log the results on a form which records cargo hold, date and time for each measurement; and

.5 put back the sealing cap.

CALCIUM NITRATE UN 1454

DESCRIPTION
White deliquescent solid soluble in water. The provisions of this Code should not apply to the commercial grades of calcium nitrate fertilizers consisting mainly of a double salt (calcium nitrate and ammonium nitrate) and containing not more than 10% ammonium nitrate and at least 12% water of crystallization.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	893 to 1099	0.91 to 1.12
SIZE	**CLASS**	**GROUP**
Not applicable	5.1	B

HAZARD
Non-combustible materials. If involved in a fire, will greatly intensify the burning of combustible materials. Although non-combustible, mixtures with combustible material are easily ignited and may burn fiercely.
This cargo is hygroscopic and will cake if wet.
This cargo is harmful if swallowed.

STOWAGE & SEGREGATION
"Separated from" foodstuffs.

HOLD CLEANLINESS
Clean and dry as relevant to the hazards of the cargo.

WEATHER PRECAUTIONS
This cargo shall be kept as dry as practicable. This cargo shall not be handled during precipitation. During handling of this cargo all non-working hatches of the cargo spaces into which this cargo is loaded or to be loaded shall be closed.

LOADING
Appropriate measures shall be taken to prevent the cargo from contact with combustible materials.
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
Bilge wells shall be clean, dry and covered as appropriate, to prevent ingress of the cargo.

VENTILATION
The cargo spaces carrying this cargo shall not be ventilated during voyage.

CARRIAGE
No special requirements.

DISCHARGE
If this cargo has hardened, it shall be trimmed to avoid the formation of overhangs, as necessary.

CLEAN-UP
No special requirements.

EMERGENCY PROCEDURES

SPECIAL EMERGENCY EQUIPMENT TO BE CARRIED

Protective clothing (gloves, boots, coveralls, headgear). Self-contained breathing apparatus. Spray nozzles.

EMERGENCY PROCEDURES

Wear protective clothing and self-contained breathing apparatus.

EMERGENCY ACTION IN THE EVENT OF FIRE

Use copious quantities of water, which is best applied in the form of a spray to avoid disturbing the surface of the material. The material may fuse or melt, in which condition application of water may result in extensive scattering of the molten materials. Exclusion of air or the use of CO_2 will not control the fire. Due consideration should be given to the stability of the ship due to the effect of accumulated water.

MEDICAL FIRST AID

Refer to the Medical First Aid Guide (MFAG), as amended.

CALCIUM NITRATE FERTILIZER

DESCRIPTION
Granules mainly of a double salt (calcium nitrate and ammonium nitrate) and containing not more than 15.5% total nitrogen and at least 12% water. Refer to the schedule for Calcium Nitrate UN 1454 where the total nitrogen content exceeds 15.5%, or where the water content is less than 12%.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
34°	1053 to 1111	0.90 to 0.95
SIZE	**CLASS**	**GROUP**
1 mm to 4 mm	Not applicable	C

HAZARD
No special hazards.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
"Separated from" foodstuffs.

HOLD CLEANLINESS
Clean and dry as relevant to the hazards of the cargo.

WEATHER PRECAUTIONS
This cargo shall be kept as dry as practicable. This cargo shall not be handled during precipitation. During handling of this cargo all non-working hatches of the cargo spaces into which this cargo is loaded or to be loaded shall be closed.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
No special requirements.

VENTILATION
The cargo spaces carrying this cargo shall not be ventilated during voyage.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

CARBORUNDUM

DESCRIPTION
A hard black crystalline compound of carbon and silicon. Odourless. No moisture content.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	1786	0.56
SIZE	**CLASS**	**GROUP**
75% lumps: under 203.2 mm 25% lumps: under 12.7 mm	Not applicable	C

HAZARD
Slightly toxic by inhalation.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
No special requirements.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
Protect machinery, accommodation and equipment from dust. Personnel involved in cargo handling should wear protective clothing and dust filter masks.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

CASTOR BEANS or
CASTOR MEAL or
CASTOR POMACE or
CASTOR FLAKE UN 2969

DESCRIPTION
The beans from which castor oil is obtained.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	-	-
SIZE	**CLASS**	**GROUP**
Not applicable	9	B

HAZARD
Contain a powerful allergen which, by inhalation of dust or by skin contact with crushed bean products, can give rise to severe irritation of the skin, eyes, and mucous membranes in some persons. They are also toxic by ingestion.

STOWAGE & SEGREGATION
"Separated from" foodstuffs and oxidizing materials (goods in packages and solid bulk materials).

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
No special requirements.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
Due consideration shall be paid to prevent dust entering living quarters and working areas. Castor meal, castor pomace and castor flakes shall not be carried in bulk.
Appropriate precautions shall be taken to protect machinery and accommodation spaces from the dust of the cargo. Bilge wells of the cargo spaces shall be protected from ingress of the cargo. Due consideration shall be paid to protect equipment from the dust of the cargo. Persons who may be exposed to the dust of the cargo shall wear goggles or other equivalent dust eye-protection and dust filter masks. Those persons shall wear protective clothing, as necessary.

VENTILATION
Surface ventilation only, either natural or mechanical, shall be conducted, as necessary, during the voyage for this cargo.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP
After discharge of this cargo, the cargo spaces shall be thoroughly cleaned and washed out to remove all traces of the cargo.

EMERGENCY PROCEDURES

SPECIAL EMERGENCY EQUIPMENT TO BE CARRIED Protective clothing (gloves, boots, coveralls, headgear). Self-contained breathing apparatus. Spray nozzles.
EMERGENCY PROCEDURES Wear protective clothing and self-contained breathing apparatus. **EMERGENCY ACTION IN THE EVENT OF FIRE** Batten down. Use ship's fixed fire-fighting installation if available. Exclusion of air may be sufficient to control fire. **MEDICAL FIRST AID** Refer to the Medical First Aid Guide (MFAG), as amended.

CEMENT

DESCRIPTION

Cement is a finely ground powder which becomes almost fluid in nature when aerated or significantly disturbed thereby creating a very minimal angle of repose. After loading is completed de-aeration occurs almost immediately and the product settles into a stable mass. Cement dust can be a major concern during loading and discharge if the vessel is not specially designed as a cement carrier or shore equipment is not fitted with special dust control equipment.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	1000 to 1493	0.67 to 1.00
SIZE	**CLASS**	**GROUP**
Up to 0.1 mm	Not applicable	C

HAZARD

It may shift when aerated.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION

No special requirements.

HOLD CLEANLINESS

Clean and dry as relevant to the hazards of the cargo.

WEATHER PRECAUTIONS

This cargo shall be kept as dry as practicable. This cargo shall not be handled during precipitation. During handling of this cargo all non-working hatches of the cargo spaces into which this cargo is loaded or to be loaded shall be closed.

LOADING

The ship shall be kept upright during loading of this cargo. This cargo shall be so trimmed to the boundaries of the cargo space that the angle of the surface of the cargo with the horizontal plane does not exceed 25 degrees. Both the specific gravity and the flow characteristics of this cargo are dependent on the volume of air in the cargo. The volume of air in this cargo may be up to 12%. This cargo shows fluid state prior to settlement. The ship carrying this cargo shall not depart until the cargo has settled. After the settlement, shifting of the cargo is not liable to occur unless the angle of the surface with the horizontal plane exceeds 30 degrees.

PRECAUTIONS

Appropriate precautions shall be taken to protect machinery and accommodation spaces from the dust of the cargo. Bilge wells of the cargo spaces shall be protected from ingress of the cargo. Due consideration shall be paid to protect equipment from the dust of the cargo. Persons who may be exposed to the dust of the cargo shall wear protective clothing, goggles or other equivalent dust eye-protection and dust filter masks, as necessary. Bilge wells shall be clean, dry and covered as appropriate, to prevent ingress of the cargo.

VENTILATION
The cargo spaces carrying this cargo shall not be ventilated during voyage.

CARRIAGE
After the completion of loading of this cargo, the hatches of the cargo spaces shall be sealed, as necessary. All vents and access ways to the cargo spaces shall be shut during the voyage. Bilges in the cargo spaces carrying this cargo shall not be pumped unless special precautions are taken.

DISCHARGE
No special requirements.

CLEAN-UP
In the case that the residues of this cargo are to be washed out, the cargo spaces and the other structures and equipment which may have been in contact with this cargo or its dust shall be thoroughly swept prior to washing out. Particular attention shall be paid to bilge wells and framework in the cargo spaces. The fixed bilge pumps shall not be used to pump the cargo spaces, because this cargo may make the bilge systems inoperative.

CEMENT CLINKERS

DESCRIPTION
Cement is formed by burning limestone with clay. This burning produces rough cinder lumps that are later crushed to a fine powder to produce cement. The rough cinder lumps are called clinkers and are shipped in this form to avoid the difficulties of carrying cement powder.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	1190 to 1639	0.61 to 0.84
SIZE	**CLASS**	**GROUP**
0 mm to 40 mm	Not applicable	C

HAZARD
No special hazards.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
Clean and dry as relevant to the hazards of the cargo.

WEATHER PRECAUTIONS
This cargo shall be kept as dry as practicable. This cargo shall not be handled during precipitation. During handling of this cargo all non-working hatches of the cargo spaces into which this cargo is loaded or to be loaded shall be closed.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
Appropriate precautions shall be taken to protect machinery and accommodation spaces from the dust of the cargo. Bilge wells of the cargo spaces shall be protected from ingress of the cargo. Due consideration shall be paid to protect equipment from the dust of the cargo. Persons who may be exposed to the dust of the cargo shall wear protective clothing, goggles or other equivalent dust eye-protection and dust filter masks, as necessary. Bilge wells shall be clean, dry and covered as appropriate, to prevent ingress of the cargo.

VENTILATION
The cargo spaces carrying this cargo shall not be ventilated during voyage.

CARRIAGE

After the completion of loading of this cargo, the hatches of the cargo spaces shall be sealed. All vents and access ways to the cargo spaces shall be shut during the voyage. Bilges in the cargo spaces carrying this cargo shall not be pumped unless special precautions are taken.

DISCHARGE

No special requirements.

CLEAN-UP

In the case that the residues of this cargo are to be washed out, the cargo spaces and the other structures and equipment which may have been in contact with this cargo or its dust shall be thoroughly swept prior to washing out.

CHAMOTTE

DESCRIPTION
Burned clay. Grey. Shipped in the form of fine crushed stone. Used by zinc smelters and in manufacture of firebrick (road metal). Dusty.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	667	1.50
SIZE	**CLASS**	**GROUP**
Up to 10 mm	Not applicable	C

HAZARD
No special hazards.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
No special requirements.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
Appropriate precautions shall be taken to protect machinery and accommodation spaces from the dust of the cargo. Bilge wells of the cargo spaces shall be protected from ingress of the cargo. Due consideration shall be paid to protect equipment from the dust of the cargo. Persons who may be exposed to the dust of the cargo shall wear protective clothing, goggles or other equivalent dust eye-protection and dust filter masks, as necessary.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

CHARCOAL

DESCRIPTION
Wood burnt at a high temperature with as little exposure to air as possible. Very dusty, light cargo. Can absorb moisture to about 18 to 70% of its weight. Black powder or granules.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	199	5.02
SIZE	**CLASS**	**GROUP**
–	MHB	B

HAZARD
May ignite spontaneously. Contact with water may cause self-heating. Liable to cause oxygen depletion in the cargo space. Hot charcoal screenings in excess of 55°C should not be loaded.

STOWAGE & SEGREGATION
Segregation as required for class 4.1 materials. "Separated from" oily materials.

HOLD CLEANLINESS
Clean and dry as relevant to the hazards of the cargo.

WEATHER PRECAUTIONS
This cargo shall be kept as dry as practicable. This cargo shall not be handled during precipitation. During handling of this cargo all non-working hatches of the cargo spaces into which this cargo is loaded or to be loaded shall be closed.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
Charcoal in class 4.2 shall not be carried in bulk. This cargo shall be exposed to the weather for not less than 13 days prior to shipment. Prior to loading, the manufacturer or shipper shall give the master a certificate stating that the cargo is not class 4.2 in accordance with the result of the test approved by the competent authority. The certificate shall also state that this cargo has been weathered for not less than 13 days. This cargo shall only be accepted for loading when the actual moisture content of the cargo is not more than 10%.

Appropriate precautions shall be taken to protect machinery and accommodation spaces from the dust of the cargo. Bilge wells of the cargo spaces shall be protected from ingress of the cargo. Due consideration shall be paid to protect equipment from the dust of the cargo. Persons who may be exposed to the dust of the cargo shall wear protective clothing, goggles or other equivalent dust eye-protection and dust filter masks, as necessary.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

EMERGENCY PROCEDURES

SPECIAL EMERGENCY EQUIPMENT TO BE CARRIED Nil
EMERGENCY PROCEDURES Nil **EMERGENCY ACTION IN THE EVENT OF FIRE** Batten down; use ship's fixed fire-fighting installation if fitted. Exclusion of air may be sufficient to control fire. **MEDICAL FIRST AID** Refer to the Medical First Aid Guide (MFAG), as amended.

CHOPPED RUBBER AND PLASTIC INSULATION

DESCRIPTION
Plastic and rubber insulation material, clean and free from other materials, in granular form.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	500 to 570	1.76 to 1.97
SIZE	**CLASS**	**GROUP**
Granular 1 to 4 mm	Not applicable	C

HAZARD
No special hazards.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
No special requirements.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
During handling and carriage no hotwork, burning and smoking shall be permitted in the vicinity of the cargo spaces containing this cargo. Prior to shipment, a certificate shall be given to the master by the shipper stating that this cargo consists of clean plastic and rubber material only. When the planned interval between the commencement of loading and the completion of discharge of this cargo exceeds 5 days, the cargo shall not be accepted for loading unless the cargo is to be carried in cargo spaces fitted with a fixed gas fire-extinguishing system. The administration may, if it considers that the planned voyage does not exceed 5 days from the commencement of loading to the completion of discharge, exempt from the requirements of a fitted fixed gas fire-extinguishing system in the cargo spaces for the carriage of this cargo.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

CHROME PELLETS

DESCRIPTION
Pellets. Moisture: up to 2% maximum.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	1667	0.6
SIZE	**CLASS**	**GROUP**
8 to 25 mm	Not applicable	C

HAZARD
No special hazards.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
No special requirements.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
No special requirements.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

CHROMITE ORE

DESCRIPTION
Concentrates or lumpy, dark grey in colour.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	2222 to 3030	0.33 to 0.45
SIZE	**CLASS**	**GROUP**
Up to 254 mm	Not applicable	C

HAZARD
Toxic by dust inhalation.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
No special requirements.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

As the density of the cargo is extremely high, the tanktop may be overstressed unless the cargo is evenly spread across the tanktop to equalize the weight distribution. Due consideration shall be paid to ensure that tanktop is not overstressed during voyage and during loading by a pile of the cargo.

PRECAUTIONS
Appropriate precautions shall be taken to protect machinery and accommodation spaces from the dust of the cargo. Bilge wells of the cargo spaces shall be protected from ingress of the cargo. Due consideration shall be paid to protect equipment from the dust of the cargo. Persons who may be exposed to the dust of the cargo shall wear goggles or other equivalent dust eye-protection and dust filter masks. Those persons shall wear protective clothing, as necessary.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

CLAY

DESCRIPTION
Clay is usually light to dark grey and comprises 10% soft lumps and 90% soft grains. The material is usually moist but not wet to the touch. Moisture is up to 25%.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	746 to 1515	0.66 to 1.34
SIZE	**CLASS**	**GROUP**
Up to 150 mm	Not applicable	C

HAZARD
No special hazards.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
This cargo shall be kept as dry as practicable. This cargo shall not be handled during precipitation. During handling of this cargo all non-working hatches of the cargo spaces into which this cargo is loaded or to be loaded shall be closed.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
The moisture content of this cargo shall be kept as low as practicable to prevent the cargo becoming glutinous and handling of the cargo becoming extremely difficult.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP
Prior to washing out the residues of this cargo, the bilge wells of the cargo spaces shall be cleaned.

COAL
(See also the appendix to this schedule)

DESCRIPTION
Coal (bituminous and anthracite) is a natural, solid, combustible material consisting of amorphous carbon and hydrocarbons.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	654 to 1266	0.79 to 1.53
SIZE	**CLASS**	**GROUP**
Up to 50 mm	MHB	B (and A)

HAZARDS
Coal may create flammable atmospheres, may heat spontaneously, may deplete the oxygen concentration, may corrode metal structures. Can liquefy if predominantly fine 75% less than 5 mm coal.

STOWAGE & SEGREGATION
Refer to the appendix to this schedule.

HOLD CLEANLINESS
Clean and dry as relevant to the hazards of the cargo.

WEATHER PRECAUTIONS
When a cargo may liquefy during voyage in case that the moisture content of the cargo is in excess of its TML and the cargo is carried in a ship other than a specially constructed or fitted cargo ship complying with the requirements in subsection 7.3.2 of this Code, the following provisions shall be complied with:

.1 the moisture content of the cargo shall be kept less than its TML during voyage;
.2 unless expressly provided otherwise in this individual schedule, the cargo shall not be handled during precipitation;
.3 unless expressly provided otherwise in this individual schedule, during handling of the cargo, all non-working hatches of the cargo spaces into which the cargo is loaded or to be loaded shall be closed;
.4 the cargo may be handled during precipitation provided that the actual moisture content of the cargo is sufficiently less than its TML so that the actual moisture content is not liable to be increased beyond the TML by the precipitation; and
.5 the cargo in a cargo space may be discharged during precipitation provided that the total amount of the cargo in the cargo space is to be discharged in the port.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

Without reasonable trimming, vertical cracks into the body of the coal may form permitting oxygen circulation and possible self-heating.

PRECAUTIONS
Bilge wells shall be clean, dry and covered as appropriate, to prevent ingress of the cargo. Refer to the appendix to this schedule.

VENTILATION
Refer to Special precautions in the appendix to this schedule.

CARRIAGE
Refer to the appendix to this schedule.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

EMERGENCY PROCEDURES

SPECIAL EMERGENCY EQUIPMENT TO BE CARRIED

Nil

EMERGENCY PROCEDURES

Nil

EMERGENCY ACTION IN THE EVENT OF FIRE

Batten down. Exclusion of air may be sufficient to control the fire. **Do not use water**. Seek expert advice and consider heading to the nearest port.

MEDICAL FIRST AID

Refer to the Medical First Aid Guide (MFAG), as amended.

REMARKS
The use of CO_2 or inert gas, if available, should be withheld until fire is apparent.

APPENDIX

COAL

Properties and characteristics

1. Coals may emit methane, a flammable gas. A methane/air mixture containing between 5% and 16% methane constitutes an explosive atmosphere which can be ignited by sparks or naked flame, e.g., electrical or frictional sparks, a match or lighted cigarette. Methane is lighter than air and may, therefore, accumulate in the upper region of the cargo space or other enclosed spaces. If the cargo space boundaries are not tight, methane can seep through into spaces adjacent to the cargo space.
2. Coals may be subject to oxidation, leading to depletion of oxygen and an increase in carbon dioxide or carbon monoxide concentrations in the cargo space. Carbon monoxide is an odourless gas, slightly lighter than air, and has flammable limits in air of 12% to 75% by volume. It is toxic by inhalation with an affinity for blood haemoglobin over 200 times that of oxygen.
3. Some coals may heat spontaneously and the spontaneous heating may lead to spontaneous combustion in the cargo space. Flammable and toxic gases, including carbon monoxide, may be produced.
4. Some coals may be liable to react with water and produce acids which may cause corrosion. Flammable and toxic gases, including hydrogen, may be produced. Hydrogen is an odourless gas, much lighter than air, and has flammable limits in air of 4% to 75% by volume.

Segregation and stowage requirements

1. Unless expressly provided otherwise, boundaries of cargo spaces where this cargo is carried shall be resistant to fire and liquids.
2. This cargo shall be "separated from" goods of classes 1 (division 1.4), 2, 3, 4 and 5 in packaged form (see IMDG Code) and "separated from" solid bulk materials of classes 4 and 5.1.
3. Stowage of goods of class 5.1 in packaged form or solid bulk materials of class 5.1 above or below this cargo shall be prohibited.
4. The master shall ensure that this cargo is not stowed adjacent to hot areas.
5. This cargo shall be "separated longitudinally by an intervening complete compartment or hold from" goods of class 1 other than division 1.4.

Note: For interpretation of these terms, see section 9.

General requirements for all types of these cargoes

1. Prior to loading, the shipper or his appointed agent shall provide in writing to the master the characteristics of the cargo and the recommended safe handling procedures for loading and transport of the cargo. As a minimum, the cargo's contract specifications for moisture content, sulphur content and size shall be stated, and especially whether the cargo may be liable to emit methane or self-heat.
2. Before loading, the master shall ensure the following:

2.1 All cargo spaces and bilge wells are clean and dry. Any residue of waste material or previous cargo is removed, including removable cargo battens; and

2.2 All electrical cables and components situated in cargo spaces and adjacent enclosed spaces are free from defects. Such cables and electrical components are safe for use in an explosive atmosphere or positively isolated. The provisions of this clause need not apply to engine-rooms where the engine-room is separated from the cargo space by a gastight bulkhead with no direct access.

3. The ship shall be suitably fitted and carry on board appropriate instruments for measuring the following without requiring entry in the cargo space:
.1 concentration of methane in the atmosphere;
.2 concentration of oxygen in the atmosphere;
.3 concentration of carbon monoxide in the atmosphere; and
.4 pH value of cargo space bilge samples.

4. These instruments shall be regularly serviced and calibrated. Ship personnel shall be trained in the use of such instruments. Details of gas measurement procedures are given at the end of this appendix.

5. It is recommended that means be provided for measuring the temperature of the cargo in the range 0°C to 100°C to enable the measurement of temperature of the cargo while being loaded and during voyage without requiring entry into the cargo space.

6. Smoking and the use of naked flames shall not be permitted in the cargo areas and adjacent spaces and appropriate warning notices shall be posted in conspicuous places. Burning, cutting, chipping, welding or other sources of ignition shall not be permitted in the vicinity of cargo spaces or in other adjacent spaces, unless the space has been properly ventilated and the methane gas measurements indicate it is safe to do so.

7. Prior to departure, the master shall be satisfied that the surface of the material has been trimmed reasonably level to the boundaries of the cargo space to avoid the formation of gas pockets and to prevent air from permeating the body of the briquettes. Casings leading into the cargo space shall be adequately sealed. The shipper shall ensure that the master receives the necessary co-operation from the loading terminal.

8. The atmosphere in the space above the cargo in each space shall be regularly monitored for the concentration of methane, oxygen and carbon monoxide. Details of gas monitoring procedures are given at the end of this appendix. The results of monitoring shall be recorded. The frequency of the monitoring shall be determined based upon the information provided by the shipper and the information obtained through the analysis of the atmosphere in the cargo space.

9. Unless expressly provided otherwise, surface ventilation shall be conducted in all cargo spaces carrying this cargo for the first 24 hours after departure from the loading port. During this period, the atmosphere in the cargo spaces shall be monitored once from one sample point per cargo space and for the purpose of the gas monitoring, the ventilation shall be stopped for an appropriate period prior to the gas monitoring.

10. When the methane concentrations monitored within 24 hours after departure are at an acceptably low level, the ventilation openings shall be closed and the atmosphere in the cargo spaces shall be monitored. When the methane concentrations monitored within 24 hours after departure are not at an acceptably low level, surface ventilation shall be maintained, except for an appropriate period for gas monitoring, and the atmosphere in the cargo spaces shall be monitored. This procedure shall be followed until the methane concentrations become acceptably low level. In any event, the atmosphere in the cargo spaces shall be monitored on a daily basis.

11. When significant concentrations of methane are subsequently observed in unventilated cargo spaces, the appropriate special precautions for coals emitting methane shall apply.

12. The master shall ensure, as far as practicable, that any gases which may be emitted from this cargo do not accumulate in adjacent enclosed spaces.
13. The master shall ensure that enclosed working spaces such as storerooms, carpenter's shop, passageways, tunnels, etc., are regularly monitored for the presence of methane, oxygen and carbon monoxide. Such spaces shall be adequately ventilated.
14. Regular hold bilge testing shall be systematically carried out during voyage carrying this cargo. If the pH monitoring indicates that a corrosion risk exists, bilges shall be frequently pumped out during the voyage in order to avoid possible accumulation of acids on tanktops and in the bilge system.
15. If the behaviour of the cargo during the voyage differs from that specified in the cargo declaration, the master shall report such differences to the shipper. Such reports will enable the shipper to maintain records on the behaviour of the coal cargoes, so that the information provided to the master can be reviewed in the light of transport experience.

Special precautions

1 Coals emitting methane

When the shipper has informed that the cargo is liable to emit methane or analysis of the atmosphere in the cargo space indicates the presence of methane in excess of 20% of the Lower Explosion Limit (LEL), the following additional precautions shall be taken:

.1 Adequate surface ventilation shall be maintained, except for an appropriate period for the purpose of gas monitoring.
.2 Care shall be taken to remove any accumulated gases prior to operation of the hatch covers or other openings for any reason, including discharging. Care shall be taken to operate hatch covers of the cargo spaces and other openings to avoid creating sparks. Smoking and the use of naked flame shall be prohibited.
.3 Personnel shall not be permitted to enter the cargo space or enclosed adjacent spaces unless the space has been ventilated and the atmosphere tested and found to be gas-free and to have sufficient oxygen to support life. Notwithstanding these provisions, emergency entry into the cargo space may be permitted without ventilation, testing the atmosphere or the both, provided that the entry into the cargo space is undertaken only by trained personnel wearing self-contained breathing apparatus under the supervision of a responsible officer and special precautions are observed to ensure that no source of ignition is carried into the space.
.4 The master shall ensure that enclosed working spaces such as storerooms, carpenter's shops, passageways, tunnels, etc., are regularly monitored for the presence of methane. Such spaces shall be adequately ventilated and, in the case of mechanical ventilation, only equipment safe for use in an explosive atmosphere shall be used.

2 Self-heating coals

When the shipper informed that the cargo is likely to self-heat or analysis of the atmosphere in the cargo space indicates an increasing concentration of carbon monoxide, then the following additional precautions shall be taken:

.1 The cargo spaces shall be closed immediately after completion of loading in each cargo space. The hatch covers may also be additionally sealed with a suitable sealing tape. Only natural surface ventilation shall be permitted and ventilation shall be limited to the absolute minimum time necessary to remove methane which may have accumulated.

.2 Personnel shall not enter the cargo space during voyage, unless they are wearing self-contained breathing apparatus and access is critical to safety of life and the safety of the ship.

.3 Prior to loading, temperature of this cargo shall be monitored. This cargo shall only be accepted for loading when the temperature of the cargo is not higher than 55°C.

.4 When the carbon monoxide level is increasing steadily, a potential self-heating may be developing. In such a case, the cargo space shall be completely closed and all ventilation ceased, and the master shall seek expert advice immediately. Water shall not be used for cooling material or fighting coal cargo fires at sea, but may be used for cooling the boundaries of the cargo space.

.5 When the carbon monoxide level in any cargo space reaches 50 ppm or exhibits a steady rise over three consecutive days, a self-heating condition may be developing and the master shall inform the shipper and the company of, at least, the following information if an accurate assessment of the situation is to be achieved:

.1 identity of the cargo spaces involved; monitoring results covering carbon monoxide, methane and oxygen concentrations;

.2 if available, temperature of the cargo, location and method used to obtain results;

.3 time gas sample taken (monitoring routine);

.4 time ventilators opened/closed;

.5 quantity of coal in hold(s) involved;

.6 type of coal as per cargo information, and any special precautions indicated on information;

.7 date loaded, and ETA at intended discharge port (which shall be specified); and

.8 comments or observations from the ship's master.

3 Gravity fed self-unloading bulk carrier

3.1 A gravity fed self-unloading bulk carrier means a vessel that has gravity fed systems from the bottom of cargo holds, using gates that may be opened or closed to feed the cargo onto conveyor belts. Such belts run in fore and aft direction underneath the holds; from there the cargo is carried by means of conveyor systems to the deck and discharged onto shore with a self-unloading boom that can extend over the shore and has a conveyor belt. This is not applicable for the vessels with unloading systems such as cranes and grabs.

3.2 When this cargo is carried on a gravity fed self-unloading bulk carrier, the following requirements of this appendix need not apply:

- paragraph 1 of "Segregation and stowage requirements"; and

- paragraph 9 of "General requirements for all types of these cargoes".

3.3 Loaded voyage procedures for atmospheric monitoring of cargoes

3.3.1 Bulk coal cargo safety procedures

3.3.1.1 These requirements apply when these cargoes are to be carried on a gravity fed self-unloading bulk carrier. It is recommended that a document, such as a flow chart, describing cargo operations and carriage procedures for these cargoes be provided to the ship by the vessel's operator.

3.4 Ventilation

3.4.1 When ventilating, it shall be ensured that excess air does not ingress excessively into the body of the cargo of coal as this may eventually promote self-heating.

3.4.2 Due to the presence of non-airtight unloading gates at the bottom of the cargo hoppers just above the tunnels, the following methods of ventilation shall be used:

- if methane is detected in the tunnel, it shall be "positive pressure" ventilated (more supply than exhaust in the tunnels to remove methane gas); and

- if carbon monoxide is detected in the tunnel, it shall be "negative pressure" ventilated (more exhaust than supply in the tunnels to remove carbon monoxide). The release of carbon monoxide may be an indication of self-heating.

Procedures for gas monitoring of coal cargoes

1 Observations

1.1 Carbon monoxide monitoring, when conducted in accordance with the following procedures, will provide a reliable early indication of self-heating within this cargo. This allows preventive action to be considered without delay.
A steady rise in the level of carbon monoxide detected within a cargo space is a conclusive indication that self-heating is taking place.

1.2 All vessels engaged in the carriage of this cargo shall carry on board an instrument for measuring methane, oxygen and carbon monoxide gas concentrations, to enable the monitoring of the atmosphere within the cargo space. This instrument shall be regularly serviced and calibrated in accordance with the manufacturer's instructions. Care shall be exercised in interpreting methane measurements carried out in the low oxygen concentrations often found in unventilated cargo holds. The catalytic sensors normally used for the detection of methane rely on the presence of sufficient oxygen for accurate measurement. This phenomenon does not affect the measurement of carbon monoxide, or measurement of methane by infrared sensor. Further guidance may be obtained from the instrument manufacturer.

2 Sampling and measurement procedure

2.1 Equipment

2.1.1 An instrument which is capable of measuring methane, oxygen and carbon monoxide concentrations shall be provided on board a ship carrying this cargo. The instrument shall be fitted with an aspirator, flexible connection and a length of spark-proof metal tubing to enable a representative sample to be obtained from within the square of the hatch.

2.1.2 When recommended by the manufacturer, a suitable filter shall be used to protect the instrument against the ingress of moisture. The presence of even a small amount of moisture will compromise the accuracy of the measurement.

2.2 Siting of sampling points

2.2.1 In order to obtain meaningful information about the behaviour of this cargo in a cargo space, gas measurements shall be made via one sample point per cargo space. To ensure flexibility of measurement in adverse weather two sample points shall be provided per cargo space, one on the port side and one on the starboard side of the hatch cover or hatch coaming. (Refer to the diagram of gas sampling point.) Measurement from either of these locations is satisfactory.

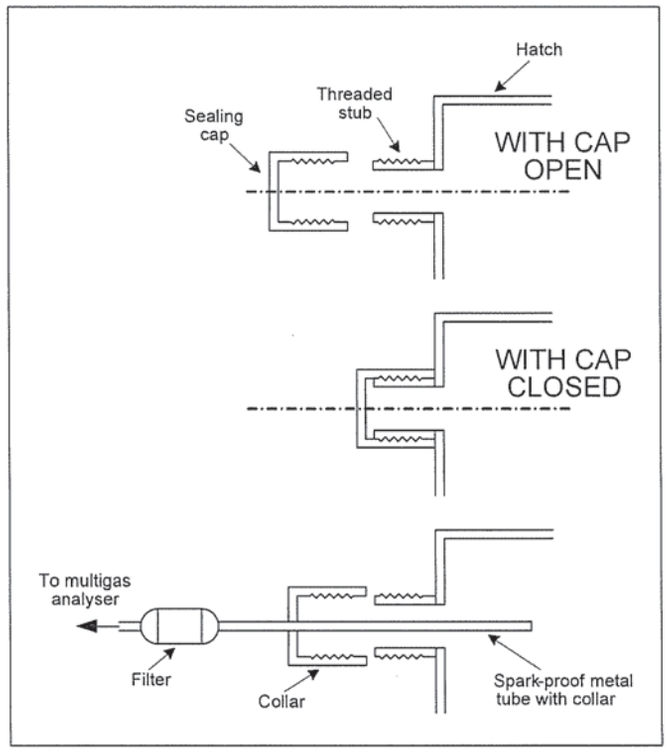


Diagram of gas sampling point

2.2.2 Each sample point shall comprise a hole of diameter approximately 12 mm positioned as near to the top of the hatch coaming as possible. It shall be sealed with a sealing cap to prevent ingress of water and air. It is essential that this cap is securely replaced after each measurement to maintain a tight seal.

2.2.3 The provisions of any sample point shall not compromise the seaworthiness of the vessel.

2.3 Measurement

The explanation on procedures for measurement is as follows:

.1 remove the sealing cap, insert the spark-proof metal tube into the sampling point and tighten the collar to ensure an adequate seal;
.2 connect the instrument to the sampling tube;
.3 draw a sample of the atmosphere through the tube, using the aspirator, until steady readings are obtained;

.4 log the results on a form which records cargo space, date and time for each measurement; and

.5 put back the sealing cap.

2.4 Measurement strategy

The identification of incipient self-heating from measurement of gas concentrations is more readily achieved under unventilated conditions. This is not always desirable because of the possibility of the accumulation of methane to dangerous concentrations. This is primarily, but not exclusively, a problem in the early stages of a voyage. Therefore it is recommended that cargo spaces are initially ventilated until measured methane concentrations are at an acceptably low level.

2.5 Measurement in unventilated holds

Under normal conditions one measurement per day is sufficient as a precautionary measure. However, if carbon monoxide levels are higher than 30 ppm then the frequency shall be increased to at least twice a day at suitably spaced intervals. Any additional results shall be logged.

2.6 Measurement in ventilated holds

2.6.1 If the presence of methane is such that the ventilators are required to remain open, then a different procedure shall be applied to enable the onset of any incipient self-heating to be detected.

2.6.2 To obtain meaningful data the ventilators shall be closed for a period before the measurements are taken. This period may be chosen to suit the operational requirements of the vessel, but it is recommended that it is not less than four hours. It is vital in the interests of data interpretation that the shutdown time is constant whichever time period is selected. These measurements shall be taken on a daily basis.

2.7 Measurement in cargo and self-unloading spaces of gravity fed self-unloading bulk carrier

2.7.1 Measurement in unventilated cargo and self-unloading spaces

2.7.1.1 When the shipper has declared that the coal cargo has or may have self-heating characteristics, the holds shall not be ventilated unless otherwise specified in this section.

2.7.1.2 Under normal conditions one measurement per day is sufficient as a precautionary measure. If carbon monoxide levels are higher than 30 ppm then the frequency of measurements shall be increased to at least twice daily, at suitable intervals. Any additional results shall be logged.

2.7.1.3 If the carbon monoxide level in any hold indicates a steady rise or reaches 50 ppm a self-heating condition may be developing and the owners of the vessel shall be notified as outlined in the procedures. Above this level, the vessel shall operate on "negative pressure" ventilation, in order to reduce the amount of carbon monoxide. Regular monitoring of carbon monoxide levels shall continue.

2.7.1.4 Persons entering cargo or unloading spaces with carbon monoxide levels higher than 30 ppm shall not do so without self-contained breathing apparatus.

2.7.2 Measurement in ventilated cargo and self-unloading spaces

2.7.2.1 If the presence of methane is indicated by monitor, and such that ventilation is required, then a different procedure shall be applied to enable the onset of any possible self-heating to be detected. "Positive pressure" or "through ventilation" shall be operated to remove the methane.

2.7.2.2 To obtain meaningful data the ventilators and/or ventilation shall be closed for a period before measurements are taken. This period may be chosen to suit the operational requirements of the vessel, but it is recommended that it is not less than four hours. It is vital in the interests of data interpretation that the shutdown time is constant whichever time period is selected. These measurements shall be taken on a daily basis. If the carbon monoxide results exhibit a steady rise, or exceed 50 ppm on any day, the owner shall be notified.

2.7.2.3 In addition the following points shall be considered:

- at no time shall ventilation be shut down when crew members are in the self-unloading spaces;

- special fire-fighting equipment and/or procedures may be necessary for the vessel; and

- establish specific crew training for gravity fed self-unloading bulk carriers.

COAL SLURRY

DESCRIPTION
Coal slurry is a mixture of fine particles of coal and water.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	870 to 1020	0.98 to 1.15
SIZE	**CLASS**	**GROUP**
Under 1 mm	Not applicable	A

HAZARD
Coal slurry is liable to liquefy during sea transport. Spontaneous combustion is possible if the coal dries out but is unlikely under normal conditions.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
Clean and dry as relevant to the hazards of the cargo.

WEATHER PRECAUTIONS
When a cargo is carried in a ship other than a specially constructed or fitted cargo ship complying with the requirements in subsection 7.3.2 of this Code, the following provisions shall be complied with:

.1 the moisture content of the cargo shall be kept less than its TML during voyage;

.2 unless expressly provided otherwise in this individual schedule, the cargo shall not be handled during precipitation;

.3 unless expressly provided otherwise in this individual schedule, during handling of the cargo, all non-working hatches of the cargo spaces into which the cargo is loaded or to be loaded shall be closed;

.4 the cargo may be handled during precipitation provided that the actual moisture content of the cargo is sufficiently less than its TML so that the actual moisture content is not liable to be increased beyond the TML by the precipitation; and

.5 the cargo in a cargo space may be discharged during precipitation provided that the total amount of the cargo in the cargo space is to be discharged in the port.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
Bilge wells shall be clean, dry and covered as appropriate, to prevent ingress of the cargo.

VENTILATION
As this cargo, in general, may emit methane, the cargo spaces carrying this cargo shall be tested regularly using a suitable gas detector and natural surface ventilation shall be conducted, as necessary.

CARRIAGE
The appearance of the surface of this cargo shall be checked regularly during voyage. If free water above the cargo or fluid state of the cargo is observed during voyage, the master shall take appropriate actions to prevent cargo shifting and potential capsize of the ship, and give consideration to seeking emergency entry into a place of refuge.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

COARSE CHOPPED TYRES

DESCRIPTION
Chopped or shredded fragments of used tyres in coarse size.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	555	1.8
SIZE	**CLASS**	**GROUP**
15 cm x 20 cm approximately	Not applicable	C

HAZARD
May self-heat slowly if contaminated by oily residual, if not properly aged before shipment and if offered to the shipment in smaller size than indicated in "Characteristics".
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
Clean and dry as relevant to the hazards of the cargo.

WEATHER PRECAUTIONS
This cargo shall be kept as dry as practicable before loading, during loading and during voyage. This cargo shall not be loaded during precipitation. During loading of this cargo all non-working hatches of the cargo spaces to which this cargo is loaded or to be loaded shall be closed.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
During handling and carriage no hotwork, burning and smoking shall be permitted in the vicinity of the cargo spaces containing this cargo. Prior to shipment, a certificate shall be given to the master by the shipper stating that this cargo is free of oily products or oily residual and has been stored under cover but in the open air for not less than 15 days prior to shipment.
When the planned interval between the commencement of loading and the completion of discharge of this cargo exceeds 5 days, the cargo shall not be accepted for loading unless the cargo is to be carried in cargo spaces fitted with a fixed gas fire-extinguishing system. The administration may, if it considers that the planned voyage does not exceed 5 days from the commencement of loading to the completion of discharge, grant exemption from the requirements of a fitted fixed gas fire-extinguishing system in the cargo spaces for the carriage of this cargo.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

COKE

DESCRIPTION
Grey lumps may contain fines (Breeze).

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	341 to 800	1.25 to 2.93
SIZE	**CLASS**	**GROUP**
Up to 200 mm	Not applicable	C

HAZARD
No special hazards.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
No special requirements.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
Bilge wells shall be clean, dry and covered as appropriate, to prevent ingress of the cargo.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP
After discharge of this cargo, the bilge wells and the scuppers of the cargo spaces shall be checked and any blockage in the bilge wells and the scuppers shall be removed.

COKE BREEZE

DESCRIPTION
Greyish powder.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	556	1.8
SIZE	**CLASS**	**GROUP**
Less than 10 mm	Not applicable	A

HAZARD
Coke breeze is liable to flow if it has sufficiently high moisture content.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
When a cargo is carried in a ship other than a specially constructed or fitted cargo ship complying with the requirements in subsection 7.3.2 of this Code, the following provisions shall be complied with:

.1 the moisture content of the cargo shall be kept less than its TML during voyage;
.2 unless expressly provided otherwise in this individual schedule, the cargo shall not be handled during precipitation;
.3 unless expressly provided otherwise in this individual schedule, during handling of the cargo, all non-working hatches of the cargo spaces into which the cargo is loaded or to be loaded shall be closed;
.4 the cargo may be handled during precipitation provided that the actual moisture content of the cargo is sufficiently less than its TML so that the actual moisture content is not liable to be increased beyond the TML by the precipitation; and
.5 the cargo in a cargo space may be discharged during precipitation provided that the total amount of the cargo in the cargo space is to be discharged in the port.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
Bilge wells shall be clean, dry and covered as appropriate, to prevent ingress of the cargo.

VENTILATION
The cargo spaces carrying this cargo shall not be ventilated during voyage.

CARRIAGE
The appearance of the surface of this cargo shall be checked regularly during voyage. If free water above the cargo or fluid state of the cargo is observed during voyage, the master shall take appropriate actions to prevent cargo shifting and potential capsize of the ship, and give consideration to seeking emergency entry into a place of refuge.

DISCHARGE
No special requirements.

CLEAN-UP
After discharge of this cargo, the bilge wells and the scuppers of the cargo spaces shall be checked and any blockage in the bilge wells and the scuppers shall be removed.

COLEMANITE

DESCRIPTION
A natural hydrated calcium borate. Fine to lumps, light grey appearance similar to clay. Moisture approximately 7%.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	1639	0.61
SIZE	**CLASS**	**GROUP**
Up to 300 mm	Not applicable	C

HAZARD
No special hazards.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
No special requirements.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
No special requirements.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

COPPER GRANULES

DESCRIPTION
Sphere shaped pebbles. 75% copper with lead, tin, zinc, traces of others. Moisture content 1.5% approximately. Light grey colour when dry, dark green when wet. Odourless.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	4000 to 4545	0.22 to 0.25
SIZE	**CLASS**	**GROUP**
Fines up to 10 mm Clinkers up to 50 mm	Not applicable	C

HAZARD
No special hazards.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
No special requirements.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

As the density of the cargo is extremely high, the tanktop may be overstressed unless the cargo is evenly spread across the tanktop to equalize the weight distribution. Due consideration shall be paid to ensure that tanktop is not overstressed during voyage and during loading by a pile of the cargo.

PRECAUTIONS
No special requirements.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

COPPER MATTE

DESCRIPTION
Crude black copper ore. Composed of 75% copper and 25% impurities. Small metallic round stones or pellets. Odourless.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	2857 to 4000	0.25 to 0.35
SIZE	**CLASS**	**GROUP**
3 mm to 25 mm	Not applicable	C

HAZARD
No special hazards.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
No special requirements.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

As the density of the cargo is extremely high, the tanktop may be overstressed unless the cargo is evenly spread across the tanktop to equalize the weight distribution. Due consideration shall be paid to ensure that tanktop is not overstressed during voyage and during loading by a pile of the cargo.

PRECAUTIONS
No special requirements.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

COPRA (dry) UN 1363

DESCRIPTION
Dried kernels of coconuts with a penetrating rancid odour which may taint other cargoes.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	500	2.0
SIZE	**CLASS**	**GROUP**
Not applicable	4.2	B

HAZARD
Liable to heat and ignite spontaneously especially when in contact with water. Liable to cause oxygen depletion in the cargo space.

STOWAGE & SEGREGATION
This cargo shall not be stowed on or adjacent to heated surfaces including fuel oil tanks.

HOLD CLEANLINESS
Clean and dry as relevant to the hazards of the cargo.

WEATHER PRECAUTIONS
This cargo shall be kept as dry as practicable. This cargo shall not be handled during precipitation. During handling of this cargo all non-working hatches of the cargo spaces into which this cargo is loaded or to be loaded shall be closed.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.
This cargo shall not be accepted for loading when wet.

PRECAUTIONS
This cargo shall only be accepted for loading when the cargo has been weathered for at least one month before shipment or when the shipper provides the master with a certificate issued by a person recognized by the competent authority of the country of origin stating that the moisture content the cargo is not more than of 5%. Smoking and the use of naked lights in cargo spaces and adjacent areas shall be prohibited. Entry into the cargo space for this cargo shall not be permitted until the cargo space has been ventilated and the atmosphere tested for concentration of oxygen.

VENTILATION
Surface ventilation only, either natural or mechanical, shall be conducted, as necessary, during the voyage for this cargo.

CARRIAGE
The temperature of this cargo shall be measured and recorded regularly during voyage to monitor for possible self-heating.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

EMERGENCY PROCEDURES

SPECIAL EMERGENCY EQUIPMENT TO BE CARRIED Nil
EMERGENCY PROCEDURES Nil **EMERGENCY ACTION IN THE EVENT OF FIRE** Batten down; use ship's fixed fire-fighting installation if fitted. Exclusion of air may be sufficient to control fire. **MEDICAL FIRST AID** Refer to the Medical First Aid Guide (MFAG), as amended.

CRYOLITE

DESCRIPTION
A fluoride of sodium and aluminium used in the production of aluminium and for ceramic glazes.
Grey pellets.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	1429	0.70
SIZE	**CLASS**	**GROUP**
6.4 mm to 12.7 mm	Not applicable	C

HAZARD
Prolonged contact may cause serious damage to the skin and nervous system.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
No special requirements.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
Appropriate precautions shall be taken to protect machinery and accommodation spaces from the dust of the cargo. Bilge wells of the cargo spaces shall be protected from ingress of the cargo. Due consideration shall be paid to protect equipment from the dust of the cargo. Persons who may be exposed to the dust of the cargo shall wear goggles or other equivalent dust eye-protection and dust filter masks. Those persons shall wear protective clothing, as necessary.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

DIAMMONIUM PHOSPHATE (D.A.P.)

DESCRIPTION
Odourless white crystals or powder. Depending on source it can be dusty. Hygroscopic.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
30° to 40°	833 to 999	1.10 to 1.20
SIZE	**CLASS**	**GROUP**
Diameter: 2.54 mm	Not applicable	C

HAZARD
No special hazards.
This cargo is non-combustible or has a low fire-risk.
This cargo is hygroscopic and may harden in the cargo space under humid conditions.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
Clean and dry as relevant to the hazards of the cargo.

WEATHER PRECAUTIONS
This cargo shall be kept as dry as practicable. This cargo shall not be handled during precipitation. During handling of this cargo all non-working hatches of the cargo spaces into which this cargo is loaded or to be loaded shall be closed.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
Appropriate precautions shall be taken to protect machinery and accommodation spaces from the dust of the cargo. Bilge wells of the cargo spaces shall be protected from ingress of the cargo. Due consideration shall be paid to protect equipment from the dust of the cargo. Persons who may be exposed to the dust of the cargo shall wear protective clothing, goggles or other equivalent dust eye-protection and dust filter masks, as necessary.

VENTILATION
The cargo spaces carrying this cargo shall not be ventilated during voyage.

CARRIAGE
Condensation in the cargo spaces carrying this cargo, sweating of this cargo and entering of water from hatch covers to the cargo spaces shall be checked regularly during the voyage. Due attention shall be paid to the sealing of hatches of the cargo spaces.

DISCHARGE

If this cargo has hardened, it shall be trimmed to avoid the formation of overhangs, as necessary.

CLEAN-UP

After discharge of this cargo, particular attention shall be paid to bilge wells of the cargo spaces.

DIRECT REDUCED IRON (A)
Briquettes, hot-moulded

DESCRIPTION
Direct reduced iron (A) is a metallic grey material, moulded in a briquette form, emanating from a densification process whereby the direct reduced iron (DRI) feed material is moulded at a temperature greater than 650°C and has a density greater than 5,000 kg/m^3. Fines and small particles (under 6.35 mm) shall not exceed 5% by weight.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	2500 to 3300	0.3 to 0.4 To be verified by the shipper
SIZE	**CLASS**	**GROUP**
Approximate size: Length 50 mm to 140 mm Width 40 mm to 100 mm Thickness 20 mm to 50 mm Briquette weight 0.2 to 3.0 kg Fines and small particles: under 6.35 mm	MHB	B

HAZARD
Temporary increase in temperature of about 30°C due to self-heating may be expected after material handling in bulk. The material may slowly evolve hydrogen after contact with water (notably saline water). Hydrogen is a flammable gas that can form an explosive mixture when mixed with air in concentration above 4% by volume. It is liable to cause oxygen depletion in cargo spaces. This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
"Separated from" goods of class 1 (division 1.4S), 2, 3, 4 and 5 and class 8 acids in packaged form (see IMDG Code).
"Separated from" solid bulk materials of classes 4 and 5.
"Separated longitudinally by an intervening complete compartment or hold from" goods of class 1 other than division 1.4S.
Boundaries of compartments where this cargo is carried shall be resistant to fire and passage of liquid.

HOLD CLEANLINESS
The cargo spaces shall be clean, dry and free from salt and residues of previous cargoes. Prior to loading, wooden fixtures such as battens, loose dunnage, debris and combustible materials shall be removed.

WEATHER PRECAUTIONS

This cargo shall be kept as dry as practicable during loading and the voyage. Open storage is acceptable prior to loading. This cargo shall not be loaded onto ships or transferred between ships or barges during precipitation. During loading of this cargo all non-working hatches of the cargo spaces into which this cargo is loaded or to be loaded shall be kept closed. Only when weather permits may non-working hatch covers be left open for a minimum of 1 hour after completion of each pour to allow cooling after cargo handling in bulk.

LOADING

Prior to loading this cargo, the shipper shall provide the master with a certificate issued by a competent person recognized by the National Administration of the port of loading stating that the cargo, at the time of loading, is suitable for shipment and that it conforms with the requirements of this Code; that the quantity of fines and small particles (up to 6.35 mm in size) is no more than 5% by weight; the moisture content is less than 1.0% and the temperature does not exceed 65°C.

This cargo shall not be loaded when the temperature is in excess of 65°C, if its moisture content is in excess of 1.0% or if the quantity of fines and small particles (up to 6.35 mm in size) exceeds 5% by weight.

Appropriate precautions shall be taken during loading in order to have a cargo composed of essentially whole briquettes. The cargo shall be loaded in such a way so as to minimize breakage of briquettes and the additional generation of fines and small particles and concentration of fines in any area of the cargo. The addition of fines and particles less than 6.35 mm or dust in homogenous cargoes of briquettes shall be prohibited.

Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code. Due consideration shall be given to evenly spreading the cargo across the tanktop to minimize the concentration of fines.

The cargo temperature shall be monitored during loading and recorded in a log detailing the temperature for each lot of cargo loaded, a copy of which shall be provided to the master. After loading, a certificate, confirming that throughout the whole consignment the fines and small particles (under 6.35 mm in size) are less than 5% by weight, shall be issued by a competent person recognized by the National Administration of the port of loading.

PRECAUTIONS

The carrier's nominated technical persons or other representatives shall have reasonable access to stockpiles and loading installations for inspection.

Shippers shall provide comprehensive information on the cargo and safety procedures to be followed in the event of emergency. The shipper may also provide advice in amplification of this Code but the advice shall not be contrary thereto in respect of safety.

Where practicable, ballast tanks adjacent to the cargo spaces containing this cargo, other than double-bottom tanks, shall be kept empty. Weather deck closures and hatch covers shall be inspected and tested to ensure integrity and weather tightness which shall be maintained throughout the voyage.

Appropriate precautions shall be taken to protect machinery, equipment and accommodation spaces from the dust of the cargo. Radars and exposed radio communication equipment of the ship shall be protected from the dust of this cargo. Bilge wells of the cargo spaces shall be clean, dry and protected from ingress of the cargo using non-combustible material. Persons who may be exposed to the dust of the cargo shall wear protective clothing, goggles or other equivalent dust eye-protection and dust filter masks, as necessary.

During handling of this cargo "NO SMOKING" signs shall be posted on decks and in areas adjacent to cargo spaces, and no naked lights shall be permitted in these areas.

Cargo spaces containing this cargo and adjacent spaces may become oxygen-depleted. Flammable gas may also build up in these spaces. All precautions shall be taken upon entering the cargo and adjacent spaces.

VENTILATION

Surface ventilation only, either natural or mechanical, shall be conducted, as necessary, during the voyage for this cargo. On no account shall air be directed into the body of the cargo. When mechanical ventilation is used, the fans shall be certified as explosion-proof and shall prevent any spark generation thereby avoiding the possibility of ignition of hydrogen air mixture. Suitable wire mesh guards shall be fitted over inlet and outlet ventilation openings. Ventilation shall be such that escaping gases cannot enter living quarters in hazardous concentrations.

CARRIAGE

For quantitative measurements of hydrogen, a suitable detector shall be on board while this cargo is carried. The detector shall be suitable for use in an oxygen depleted atmosphere and of a type certified safe for use in an explosive atmosphere. The concentrations of hydrogen in the cargo spaces carrying this cargo shall be measured regularly during the voyage, and the results of the measurements shall be recorded and kept on board for a minimum of two years. When the monitored hydrogen concentration is higher than 1% (> 25% LEL) by volume, appropriate safety precautions shall be taken in accordance with those procedures provided by the shipper in case of emergency. If in doubt, expert advice shall be sought.

Bilge wells shall be checked regularly for the presence of water. If water is found, it shall be removed by pumping or draining the bilge wells.

Temperature of the cargo shall be taken regularly during the voyage and a record kept on board for a minimum of two years. If the temperature in the cargo space exceeds 65°C, appropriate safety precautions shall be taken in accordance with the procedures provided by the shipper in case of emergency. If in doubt, expert advice shall be sought.

DISCHARGE

The hydrogen concentration in the cargo space shall be measured immediately before any opening action of the hatch covers. If the hydrogen concentration is greater than 1% (> 25% LEL) by volume, all appropriate safety precautions in conformity with the procedures provided by the shipper or the recommendations of the competent authority shall be taken. If in doubt, expert advice shall be sought.

During discharge, a fine spray of fresh water may be applied to this cargo for dust control only when the cargo will be stored in an open area. It is not recommended to apply a fine spray of fresh water to this cargo when it will be stored in an enclosed space or is to be transhipped.

CLEAN-UP

Accumulations of dust from this cargo on deck or in proximity to cargo spaces shall be removed as quickly as possible. Consideration shall be given to carefully cleaning exposed radio communications equipment to which dust from the cargo might adhere, such as radar, radio aerials, VHF installations, AIS and GPS. Hosing with seawater should be avoided.

EMERGENCY PROCEDURES

SPECIAL EMERGENCY EQUIPMENT TO BE CARRIED

Nil

EMERGENCY PROCEDURES

Nil

EMERGENCY ACTION IN THE EVENT OF FIRE

Do not use water. Do not use steam. Do not use CO_2.

Batten down.

The specific procedures in the event of emergency provided by the shipper should be consulted and followed, as appropriate. If in doubt, expert advice should be sought as quickly as possible.

Preparations should be made for grab discharge if serious heating occurs.

MEDICAL FIRST AID

Refer to the Medical First Aid Guide (MFAG), as amended.

DIRECT REDUCED IRON (B)
Lumps, pellets, cold-moulded briquettes

DESCRIPTION
Direct reduced iron (DRI) (B) is a highly porous, black/grey metallic material formed by the reduction (removal of oxygen) of iron oxide at temperatures below the fusion point of iron. Cold-moulded briquettes are defined as those which have been moulded at a temperature less than 650°C or which have a density of less than 5,000 kg/m^3. Fines and small particles under 6.35 mm in size shall not exceed 5% by weight.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	1750 to 2000	0.5 to 0.57
SIZE	**CLASS**	**GROUP**
Lumps and pellets: Average particle size 6.35 mm to 25 mm. Cold-moulded briquettes: Approximate maximum dimensions 35 mm to 40 mm. Fines and small particles under 6.35 mm up to 5% by weight.	MHB	B

HAZARD
Temporary increase in temperature of about 30°C due to self-heating may be expected after material handling in bulk.

There is a risk of overheating, fire and explosion during transport. This cargo reacts with air and with fresh water or seawater to produce heat and hydrogen. Hydrogen is a flammable gas that can form an explosive mixture when mixed with air in concentrations above 4% by volume. The reactivity of this cargo depends upon the origin of the ore, the process and temperature of reduction, and the subsequent ageing procedures. Cargo heating may generate very high temperatures that are sufficient to ignite the cargo. Build-up of fines may also lead to self-heating, auto-ignition and explosion. Oxygen in cargo spaces and enclosed spaces may be depleted.

STOWAGE & SEGREGATION
"Separated from" goods of classes 1 (division 1.4S), 2, 3, 4 and 5, and class 8 acids in packaged form (See IMDG Code).
"Separated from" solid bulk materials of classes 4 and 5.
Goods of class 1, other than division 1.4S, shall not be carried in the same ship.
Boundaries of compartments where this cargo is carried shall be resistant to fire and passage of liquid.

HOLD CLEANLINESS

The cargo spaces shall be clean, dry and free from salt and residues of previous cargoes. Prior to loading, wooden fixtures such as battens, loose dunnage, debris and combustible materials shall be removed.

WEATHER PRECAUTIONS

The cargo shall be kept dry at all times during storage, before and during loading, and during transportation. The cargo shall not be loaded onto ships, or transferred between ships or barges, during precipitation. During loading of this cargo, all non-working hatches of cargo spaces into which this cargo is loaded, or is to be loaded, shall be kept closed.

LOADING

Prior to loading, the terminal shall ensure that the conveyor belts used for loading this cargo contain no accumulation of water or other substances. Each time cargo operations are commenced or restarted, particularly after rain or washing down, any loading belt shall be operated empty and not over a ship's cargo space.

Prior to loading, an ultrasonic test or another equivalent method with a suitable instrument shall be conducted to ensure weather tightness of the hatch covers and closing arrangements and all readings shall confirm weather tightness.

Prior to loading this cargo, the shipper shall provide the master with a certificate issued by a competent person recognized by the National Administration of the port of loading stating that the cargo, at the time of loading, is suitable for shipment, and that it conforms with the requirements of this Code; that the quantity of fines and small particles is no more than 5% by weight; that the moisture content is less than 0.3%; and that the temperature does not exceed 65°C. This certificate shall state the date of manufacture for each lot of cargo to be loaded in order to meet the loading criteria in regards to ageing and material temperature.

The cargo shall not be accepted for loading when its temperature is in excess of 65°C or if its moisture content is in excess of 0.3% or if the quantity of fines and small particles exceeds 5% by weight. Any cargo that has been wetted, or is known to have been wetted, shall not be loaded into any cargo space.

Prior to loading, provision shall be made to introduce a dry, inert gas at tanktop level so that the inert gas purges the air from the cargo and fills the free volume above. Nitrogen is preferred for this purpose. All vents, accesses and other openings such as coaming drains that could allow the inert atmosphere to be lost from cargo spaces carrying this cargo shall be closed and sealed.

The cargo shall be loaded in such a way as to minimize both the breakage of the cold-moulded briquettes, pellets, lumps and the additional generation of fines and the concentrating of fines in any area of the cargo. This cargo shall be homogenous with no added waste. The addition of DRI particles, fines or dust in this cargo shall be prohibited.

Due consideration shall be given to evenly spreading the cargo across the tanktop to minimize the concentration of fines. Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

The cargo temperature and moisture shall be monitored during loading and recorded in a log detailing the temperature and moisture for each lot of cargo loaded, a copy of which shall be provided to the master. After loading, a certificate shall be issued by a competent person recognized by the National Administration of the port of loading confirming that throughout the whole consignment fines and small particles (under 6.35 mm size) are less than 5% by weight, that the moisture content has not exceeded 0.3% and the temperature does not exceed 65°C.

On completion of loading of a cargo space, it shall be immediately closed and sealed. Sufficient inert gas shall then be introduced to achieve an oxygen concentration less than 5% throughout the cargo space.

PRECAUTIONS

Due consideration shall be given to the possibility of moisture inside the cargo pile in order to avoid loading of wet cargo or a wet part of the cargo recognizing that the bottom of the pile can be wet even though the surface of cargo pile looks dry. The carrier's nominated technical persons or other representatives shall have reasonable access to stockpiles and loading installations for inspection.

Prior to shipment, the cargo shall be aged for at least 3 days, or treated with an air-passivation technique, or another equivalent method, that reduces the reactivity to the same level as the aged product. Such aging process shall be approved by the competent authority that shall also provide a certificate to that effect.

Shippers shall provide comprehensive information on the cargo and safety procedures to be followed in the event of emergency. This advice may be an amplification of this Code, but shall not be contrary thereto in respect of safety.

Where practicable, ballast tanks adjacent to the cargo spaces containing this cargo, other than double-bottom tanks, shall be kept empty. Weather tightness shall be maintained throughout the voyage. Bilge wells of the cargo spaces shall be clean, dry and protected from ingress of the cargo using non-combustible material.

Due consideration shall be given to protecting equipment, machinery and accommodation spaces from the dust of the cargo. Radars and exposed radio communication equipment of ships which carry this cargo shall be protected from the dust of this cargo. Persons who may be exposed to the dust of the cargo shall wear protective clothing, goggles or other equivalent dust eye-protection and dust filter masks, as necessary.

During any handling of this cargo "NO SMOKING" signs shall be posted on decks and in areas adjacent to cargo spaces, and no naked lights shall be permitted in these areas. Smoking, burning, cutting, chipping, grinding or other sources of ignition shall not be allowed in the vicinity of cargo spaces containing this cargo at any time.

Cargo spaces containing this cargo and adjacent spaces may become oxygen-depleted. Flammable gas may also build up in these spaces. All precautions shall be taken when entering the cargo spaces.

The ship shall be provided with the means to ensure that the requirement of this Code to maintain the oxygen concentration below 5% can be achieved throughout the voyage. The ship's fixed CO_2 fire-fighting system shall not be used for this purpose. Consideration shall be given to providing the vessel with the means to top up the cargo spaces with additional supplies of inert gas taking into account the duration of the voyage.

The ship shall be provided with the means for reliably measuring the temperatures at several points within the stow, and determining the concentrations of hydrogen and oxygen in the cargo space atmosphere on voyage whilst minimizing as far as practicable the loss of the inert atmosphere.

Any cargo that has already been loaded into a cargo space and which subsequently becomes wetted, or in which reactions have started, shall be discharged without delay.

The ship shall not sail until the master and a competent person recognized by the National Administration of the port of loading are satisfied:

.1 that all loaded cargo spaces are correctly sealed and inerted;

.2 that the temperature of the cargo has stabilized at all measuring points and that the temperature does not exceed 65°C; and

.3 that at the end of the inerting process, the concentration of hydrogen in the free space of the holds has stabilized and does not exceed 0.2% by volume.

VENTILATION

The cargo spaces carrying this cargo shall remain tightly sealed and the inert condition maintained during the voyage.

CARRIAGE

For quantitative measurements of hydrogen and oxygen, suitable detectors shall be on board while this cargo is carried. The detectors shall be suitable for use in an oxygen-depleted atmosphere and of a type certified safe for use in explosive atmospheres. The concentrations of hydrogen and oxygen in the cargo spaces carrying this cargo shall be measured at regular intervals during voyage, and the results of the measurements shall be recorded and kept on board for a minimum of two years.

The oxygen concentration in the cargo spaces carrying this cargo shall be maintained at less than 5% throughout the duration of the voyage. When the monitored hydrogen concentration is higher than 1% (> 25% LEL) by volume, appropriate safety precautions shall be taken in accordance with those procedures provided by the shipper in the event of emergency. If in doubt, expert advice shall be sought.

Cargo temperatures shall be taken at regular intervals during voyage and the results of the measurements shall be recorded and kept on board for a minimum of two years. If the temperature in the cargo space exceeds 65°C, appropriate safety precautions shall be taken in accordance with the procedures provided by the shipper in the event of emergency. If in doubt, expert advice shall be sought.

Bilge wells shall be checked regularly for the presence of water. If water is found, it shall be removed by pumping or draining the bilge wells. Consideration shall be given to increasing the frequency of cargo monitoring following periods of bad weather. All measurements shall be taken so as to minimize as far as practicable the loss of inert gas from the cargo spaces.

DISCHARGE

The hydrogen concentration in the cargo space shall be measured immediately before any opening action of the hatch covers. If the hydrogen concentration is greater than 1% (> 25% LEL) by volume, all appropriate safety precautions in conformity with the procedures provided by the shipper or the recommendations of the competent authority shall be taken. If in doubt, expert advice shall be sought.

During precipitation, all cargo operations shall be suspended and holds containing cargo shall be closed. Monitoring for hydrogen in those holds containing cargo shall be resumed.

CLEAN-UP

Accumulations of dust from this cargo on deck or in proximity to cargo spaces shall be removed as quickly as possible. Hosing with seawater should be avoided. Consideration shall be given to carefully cleaning exposed radio communications equipment to which dust from the cargo might adhere, such as radar, radio aerials, VHF installations, AIS and GPS.

EMERGENCY PROCEDURES

SPECIAL EMERGENCY EQUIPMENT TO BE CARRIED

Nil

EMERGENCY PROCEDURES

Nil

EMERGENCY ACTION IN THE EVENT OF FIRE

In the event of emergency, the specific procedures provided by the shipper should be consulted and followed, as appropriate.

Do not use CO_2. Do not use water. Do not use steam.

Batten down and reinstate the inert atmosphere using supplies or equipment if available on board. Increase the frequency of monitoring. If temperature and/or hydrogen concentration steadily rise, seek expert advice as quickly as possible.

If the temperature in the cargo space exceeds 120°C, the ship should make for the nearest appropriate port to discharge the cargo affected. Preparations should be made for grab discharge.

If additional nitrogen gas is available, the use of this gas will assist in keeping the oxygen concentration down and may contain the fire and prevent an explosive atmosphere if hydrogen is produced.

Flooding with water of the affected cargo hold should only be contemplated as a last resort, always taking the stability and strength of the ship into account.

MEDICAL FIRST AID

Refer to the Medical First Aid Guide (MFAG), as amended.

DIRECT REDUCED IRON (C)
(By-product fines)

DESCRIPTION
Direct reduced iron (DRI) (C) is a porous, black/grey metallic material generated as a by-product of the manufacturing and handling processes of DRI (A) and/or DRI (B). The density of DRI (C) is less than 5,000 kg/m^3.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	1850 to 3300	0.30 to 0.54
SIZE	**CLASS**	**GROUP**
Fines and small particles with an average size less than 6.35 mm, no particles to exceed 12 mm	MHB	B

HAZARD
Temporary increase in temperature of about 30°C due to self-heating may be expected after material handling in bulk.

There is a risk of overheating, fire and explosion during transport. This cargo reacts with air and with fresh water or seawater, to produce hydrogen and heat. Hydrogen is a flammable gas that can form an explosive mixture when mixed with air in concentrations above 4% by volume. Cargo heating may generate very high temperatures that are sufficient to lead to self-heating, auto-ignition and explosion.

Oxygen in cargo spaces and in enclosed adjacent spaces may be depleted. Flammable gas may also build up in these spaces. All precautions shall be taken when entering cargo and enclosed adjacent spaces.

The reactivity of this cargo is extremely difficult to assess due to the nature of the material that can be included in the category. A worst case scenario should therefore be assumed at all times.

STOWAGE & SEGREGATION
"Separated from" goods of classes 1 (division 1.4S), 2, 3, 4 and 5, and class 8 acids in packaged form (see IMDG Code).
"Separated from" solid bulk materials of classes 4 and 5.
Goods of class 1, other than division 1.4S, shall not be carried in the same ship. Boundaries of compartments where this cargo is carried shall be resistant to fire and passage of liquid.

HOLD CLEANLINESS
Cargo spaces shall be clean, dry and free of salt and residues of previous cargoes. Prior to loading, wooden fixtures such as battens, loose dunnage, debris and combustible materials shall be removed.

WEATHER PRECAUTIONS

The cargo shall be kept within the permissible moisture content indicated in this schedule at all times during loading, and during transportation.

This cargo shall not be loaded onto ships, or transferred between ships or barges, during ANY precipitation. During loading of this cargo, all non-working hatches of cargo spaces into which this cargo is loaded, or is to be loaded, shall be kept closed.

LOADING

Prior to loading, the terminal shall ensure that the conveyor belts and all other equipment used for loading this cargo contain no accumulation of water or other substances. Each time cargo operations are commenced or restarted, particularly after rain or washing down, any loading belt shall be operated empty and not over a ship's cargo space.

Prior to loading, an ultrasonic test or another equivalent method with a suitable instrument shall be conducted to ensure weather tightness of the hatch covers and closing arrangements and all readings shall confirm weather tightness.

Prior to loading this cargo, the shipper shall provide the master with a certificate issued by a competent person recognized by the National Administration of the port of loading stating that the cargo, at the time of loading, is suitable for shipment; that it conforms with the requirements of this Code; that the moisture content is less than 0.3%; and the temperature does not exceed 65°C. This certificate shall state that the cargo meets the loading criteria in regards to ageing and material temperature.

The cargo shall not be accepted for loading when its temperature is in excess of 65°C or if its moisture content is in excess of 0.3%. Any cargo that has been wetted, or is known to have been wetted, shall not be loaded into any cargo space.

Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

The cargo temperature shall be monitored during loading and recorded in a log detailing the temperature for each lot of cargo loaded, a copy of which shall be provided to the master. After loading, a certificate shall be issued by a competent person recognized by the National Administration of the port of loading confirming that throughout the whole consignment of fines and small particles the moisture content has not exceeded 0.3% and the temperature does not exceed 65°C.

On completion of loading of a cargo space it shall be immediately closed and sealed. Sufficient inert gas shall then be introduced to achieve an oxygen concentration less than 5% throughout the cargo space.

PRECAUTIONS

Due consideration shall be given to the possibility of moisture inside the cargo pile in order to avoid loading of wet cargo or a wet part of the cargo recognizing that the bottom of the pile can be wet even though the surface of cargo pile looks dry. The carrier's nominated technical persons or other representatives shall have reasonable access to stockpiles and loading installations for inspection.

Prior to shipment, the cargo shall be aged for at least 30 days and a certificate confirming this shall be issued by a competent person recognized by the National Administration of the port of loading.

Shippers shall provide to the master prior to loading comprehensive information on the cargo and safety procedures to be followed in the event of emergency. This advice may be an amplification of this Code, but shall not be contrary thereto in respect of safety.

Where practicable, ballast tanks adjacent to the cargo spaces containing this cargo, other than double-bottom tanks, shall be kept empty. Weather tightness shall be maintained throughout the voyage. Bilge wells of the cargo spaces shall be clean, dry and protected from ingress of the cargo using non-combustible material. The introduction of moisture and accumulation of condensation in the cargo spaces shall be avoided.

Appropriate precautions shall be taken to protect equipment, machinery and accommodation spaces from the dust of the cargo. Radars and exposed radio communication equipment of ships which carry this cargo shall be protected from the dust of this cargo. Persons who may be exposed to the dust of the cargo shall wear protective clothing, goggles or other equivalent dust eye-protection and dust filter masks, as necessary.

During any handling of this cargo "NO SMOKING" signs shall be posted on decks and in areas adjacent to cargo spaces, and no naked light shall be permitted in these areas. Smoking, burning, cutting, chipping, grinding or other sources of ignition shall not be allowed in the vicinity of cargo spaces containing this cargo at any time.

Cargo spaces containing this cargo and adjacent spaces may become oxygen-depleted. No person shall enter a loaded cargo space or an enclosed adjacent space unless the space has been ventilated and the atmosphere tested and found to be gas-free and have sufficient oxygen to support life. Notwithstanding, emergency entry may be permitted without ventilation, testing, or both provided that the entry into the space is undertaken only by trained personnel wearing self-contained breathing apparatus under the supervision of a responsible officer and no source of ignition is introduced into the space.

Prior to loading, provision shall be made to introduce a dry, inert gas at tanktop level so that the inert gas purges the air from the cargo and fills the free volume above. Nitrogen is preferred for this purpose. All vents, accesses and other openings such as coaming drains that could allow the inert atmosphere to be lost from cargo spaces carrying this cargo shall be closed and sealed.

The ship shall be provided with the means to ensure that a requirement of this Code to maintain the oxygen concentration below 5% can be achieved and maintained throughout the voyage. The ship's fixed CO_2 fire-fighting system shall not be used for this purpose. Consideration shall be given to providing the vessel with the means to top up the cargo spaces with additional supplies of inert gas taking into account the duration of the voyage.

The ship shall be provided with the means for reliably measuring the temperatures at several points within the stow and determining the concentrations of hydrogen and oxygen in the cargo space atmosphere on voyage. Appropriate precautions shall be taken to minimize as far as practicable the loss of the inert atmosphere.

Any cargo that has already been loaded into a cargo space and which subsequently is exposed to additional fresh water or seawater over its natural moisture content and becomes wetted, or in which reactions have started and its temperature has exceeded 120°C, shall be discharged without delay.

On completion of loading of a cargo space it shall be immediately closed and sealed. Sufficient inert gas shall then be introduced to achieve an oxygen concentration less than 5% thought the cargo space.

The ship shall not sail until the master and a competent person recognized by the National Administration of the port of loading are satisfied:

.1 that all loaded cargo spaces are correctly sealed and inerted;

.2 that the temperature of the cargo has stabilized at all measuring points and that the temperature does not exceed 65°C; and

.3 that at the end of the inerting process, the concentration of hydrogen in the free space of the holds has stabilized and does not exceed 0.2% by volume.

VENTILATION

The cargo spaces carrying this cargo shall remain tightly sealed and the inert condition maintained during the voyage.

CARRIAGE

For quantitative measurements of hydrogen and oxygen, suitable detectors shall be on board while this cargo is carried. The detectors shall be suitable for use in an oxygen-depleted atmosphere and of a type certified safe for use in explosive atmospheres. The concentrations of hydrogen and oxygen in the cargo spaces carrying this cargo shall be measured at regular intervals during voyage, and the results of the measurements shall be recorded and kept on board for a minimum of two years.

The oxygen concentration in the cargo spaces carrying this cargo shall be maintained at less than 5% throughout the duration of the voyage by topping up with inert gas.

Cargo temperatures shall be taken at regular intervals during the voyage and the results of the measurements shall be recorded and kept on board for a minimum of two years. If the temperature in the cargo space exceeds 65°C or the monitored hydrogen concentration exceeds 1% (> 25% LEL) by volume, appropriate safety precautions shall be taken in accordance with the procedures provided by the shipper in the event of emergency. If in doubt, expert advice shall be sought.

Bilge wells shall be checked regularly for the presence of water. If water is found, it shall be removed by pumping or draining the bilge wells. Consideration shall be given to increasing the frequency of cargo monitoring following periods of bad weather. All measurements shall be taken so as to minimize as far as practicable the loss of inert gas from the cargo spaces.

DISCHARGE

The hydrogen concentration in the cargo space shall be measured immediately before any opening action of the hatch covers. If the hydrogen concentration is greater than 1% (> 25% LEL) by volume, all appropriate safety precautions in conformity with the procedures provided by the shipper or the recommendations of the competent authority shall be taken. If in doubt, expert advice shall be sought.

During precipitation, all cargo operations shall be suspended and holds containing cargo shall be closed. Monitoring for hydrogen of those holds containing cargo shall be resumed.

CLEAN-UP

Accumulations of dust from this cargo on deck or in proximity to cargo spaces shall be removed as quickly as possible. Hosing with seawater shall be avoided. Consideration shall be given to carefully cleaning exposed radiocommunications equipment to which dust from the cargo might adhere, such as radar, radio aerials, VHF installations, AIS and GPS.

EMERGENCY PROCEDURES

SPECIAL EMERGENCY EQUIPMENT TO BE CARRIED

Nil

EMERGENCY PROCEDURES

Nil

EMERGENCY ACTION IN THE EVENT OF FIRE

In the event of emergency, the specific procedures provided by the shipper should be consulted and followed, as appropriate.

Do not use CO_2. Do not use water. Do not use steam.

Batten down and reinstate the inert atmosphere using supplies or equipment if available on board. Increase the frequency of monitoring. If temperature and/or hydrogen concentration steadily rise, seek expert advice as quickly as possible.

If the temperature in the cargo space exceeds 120°C, the ship should make for the nearest appropriate port to discharge the affected cargo. Preparations should be made for grab discharge.

If additional nitrogen gas is available, the use of this gas will assist in keeping the oxygen concentration down and may contain the fire and prevent an explosive atmosphere if hydrogen is produced.

Flooding with water of the affected cargo hold should only be contemplated as a last resort, always taking the stability and strength of the ship into account.

MEDICAL FIRST AID

Refer to the Medical First Aid Guide (MFAG), as amended.

DOLOMITE

DESCRIPTION
Dolomite is a light yellow/brown coloured mineral stone which is very hard and compact.
Dolomite may sometimes, incorrectly, be used to describe a material consisting of the oxides of calcium and magnesium (dolomitic quicklime). In this case, see "LIME (UNSLAKED)".

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	1429 to 1667	0.6 to 0.7
SIZE	**CLASS**	**GROUP**
Up to 32 mm	Not applicable	C

HAZARD
No special hazards.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
No special requirements.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
No special requirements.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

FELSPAR LUMP

DESCRIPTION
Crystalline minerals consisting of silicates of aluminium with potassium sodium, calcium and barium. White or reddish in colour.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	1667	0.60
SIZE	**CLASS**	**GROUP**
0.1 mm to 300 mm	Not applicable	C

HAZARD
No special hazards.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
No special requirements.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
No special requirements.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

FERROCHROME

DESCRIPTION
Raw material of iron mixed with chrome. Extremely heavy cargo.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	3571 to 5556	0.18 to 0.26
SIZE	**CLASS**	**GROUP**
Up to 300 mm	Not applicable	C

HAZARD
No special hazards.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
No special requirements.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

As the density of the cargo is extremely high, the tanktop may be overstressed unless the cargo is evenly spread across the tanktop to equalize the weight distribution. Due consideration shall be paid to ensure that tanktop is not overstressed during voyage and during loading by a pile of the cargo.

PRECAUTIONS
No special requirements.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

FERROCHROME, exothermic

DESCRIPTION
An alloy of iron and chromium. Extremely heavy cargo.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	3571 to 5556	0.18 to 0.28
SIZE	**CLASS**	**GROUP**
Up to 300 mm	Not applicable	C

HAZARD
No special hazards.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
No special requirements.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

As the density of the cargo is extremely high, the tanktop may be overstressed unless the cargo is evenly spread across the tanktop to equalize the weight distribution. Due consideration shall be paid to ensure that tanktop is not overstressed during voyage and during loading by a pile of the cargo.

PRECAUTIONS
During loading, carriage and discharging, welding or other hot work shall not be carried out in the vicinity of the cargo spaces containing this cargo.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

FERROMANGANESE

DESCRIPTION
Raw material or iron mixed with manganese.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	3571 to 5556	0.18 to 0.28
SIZE	**CLASS**	**GROUP**
Up to 300 mm	Not applicable	C

HAZARD
No special hazards.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
No special requirements.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

As the density of the cargo is extremely high, the tanktop may be overstressed unless the cargo is evenly spread across the tanktop to equalize the weight distribution. Due consideration shall be paid to ensure that tanktop is not overstressed during voyage and during loading by a pile of the cargo.

PRECAUTIONS
No special requirements.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

FERRONICKEL

DESCRIPTION
An alloy of iron and nickel.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	4167	0.24
SIZE	**CLASS**	**GROUP**
Up to 300 mm	Not applicable	C

HAZARD
No special hazards.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
No special requirements.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

As the density of the cargo is extremely high, the tanktop may be overstressed unless the cargo is evenly spread across the tanktop to equalize the weight distribution. Due consideration shall be paid to ensure that tanktop is not overstressed during voyage and during loading by a pile of the cargo.

PRECAUTIONS
No special requirements.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

FERROPHOSPHORUS
(including briquettes)

DESCRIPTION
An alloy of iron and phosphorus used in the steel industry.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	5000	(0.2 for briquettes)
SIZE	**CLASS**	**GROUP**
Diameter: 2.54 mm	MHB	B

HAZARD
May evolve flammable and toxic gases (e.g., phosphine) in contact with water.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
Segregation as for class 4.3 materials. "Separated from" foodstuffs and class 8 liquids.

HOLD CLEANLINESS
Clean and dry as relevant to the hazards of the cargo.

WEATHER PRECAUTIONS
This cargo shall be kept as dry as practicable. This cargo shall not be handled during precipitation. During handling of this cargo all non-working hatches of the cargo spaces into which this cargo is loaded or to be loaded shall be closed.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

As the density of the cargo is extremely high, the tanktop may be overstressed unless the cargo is evenly spread across the tanktop to equalize the weight distribution. Due consideration shall be paid to ensure that tanktop is not overstressed during voyage and during loading by a pile of the cargo.

PRECAUTIONS
This cargo shall be kept as dry as reasonably practicable.

VENTILATION
Mechanical ventilation shall be conducted during the voyage for the cargo spaces carrying this cargo. Ventilation fans shall be of certified safe type for use in a flammable atmosphere. They shall normally be run continuously whenever this cargo is on board. Where this is impracticable, they shall be operated as weather permits and in any case for a reasonable period prior to discharge.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP
After discharge of this cargo, the cargo spaces shall be swept clean.
Water shall not be used for cleaning of the cargo space which has contained this cargo, because of danger of gas.

EMERGENCY PROCEDURES

SPECIAL EMERGENCY EQUIPMENT TO BE CARRIED Self-contained breathing apparatus.
EMERGENCY PROCEDURES Wear self-contained breathing apparatus. **EMERGENCY ACTION IN THE EVENT OF FIRE** Batten down and use CO_2 if available. **Do not use water**. **MEDICAL FIRST AID** Refer to the Medical First Aid Guide (MFAG), as amended.

FERROSILICON UN 1408
with 30% or more but less than 90% silicon
(including briquettes) (see appendix to this schedule)

DESCRIPTION
Ferrosilicon is an extremely heavy cargo.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)		STOWAGE FACTOR (m^3/t)
Not applicable	1389 to 2083 (1111 to 1538 for briquettes)		0.48 to 0.72 (0.65 to 0.90 for briquettes)
SIZE	**CLASS**		**GROUP**
Up to 300 mm Briquettes	4.3	6.1	B

HAZARD
In contact with moisture or water it may evolve hydrogen, a flammable gas which may form explosive mixtures with air and may, under similar circumstances, produce phosphine and arsine, which are highly toxic gases.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
"Separated from" foodstuffs and all class 8 liquids.

HOLD CLEANLINESS
Clean and dry as relevant to the hazards of the cargo.

WEATHER PRECAUTIONS
This cargo shall be kept as dry as practicable before loading, during loading and during voyage. This cargo shall not be loaded during precipitation. During loading of this cargo all non-working hatches of the cargo spaces to which this cargo are loaded or to be loaded shall be closed.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code. As the density of the cargo is extremely high, the tanktop may be overstressed unless the cargo is evenly spread across the tanktop to equalize the weight distribution. Due consideration shall be paid to ensure that tanktop is not overstressed during voyage and during loading by a pile of the cargo. Refer to the appendix to this schedule.

PRECAUTIONS
The manufacturer or the shipper shall provide the master with a certificate stating that, after manufacture, the cargo was stored under cover, but exposed to dry weather for not less than three days prior to shipment.

VENTILATION
Continuous mechanical ventilation shall be conducted during the voyage for the cargo spaces carrying this cargo. If maintaining ventilation endangers the ship or the cargo, it may be interrupted unless there is a risk of explosion or other danger due to interruption of the ventilation. In any case mechanical ventilation shall be maintained for a reasonable period prior to discharge. Refer to the appendix to this schedule.

CARRIAGE
For quantitative measurements of hydrogen, phosphine and arsine, suitable detectors for each gas or combination of gases shall be on board while this cargo is carried. The detectors shall be of certified safe type for use in explosive atmosphere. The concentrations of these gases in the cargo spaces carrying this cargo shall be measured regularly, during voyage, and the results of the measurements shall be recorded and kept on board.

DISCHARGE
Refer to the appendix to this schedule.

CLEAN-UP
After discharge of this cargo, the cargo spaces shall be swept clean twice.
Water shall not be used for cleaning of the cargo space which has contained this cargo, because of danger of gas.

EMERGENCY PROCEDURES

SPECIAL EMERGENCY EQUIPMENT TO BE CARRIED

Self-contained breathing apparatus.

EMERGENCY PROCEDURES

Wear self-contained breathing apparatus.

EMERGENCY ACTION IN THE EVENT OF FIRE

Batten down and use CO_2 if available. **Do not use water**.

MEDICAL FIRST AID

Refer to the Medical First Aid Guide (MFAG), as amended.

APPENDIX

GENERAL REQUIREMENTS FOR CARRIAGE OF FERROSILICON

1. Chapter II-2 of SOLAS requires fire-fighter's outfits, full chemical protective suits and self-contained breathing apparatus to be readily available on board.
2. Gas concentrations shall be measured, during the voyage, at least once during every eight hours at each outlet ventilator and in any other accessible space adjacent to the cargo space carrying this cargo and the results shall be recorded in the log-book. Facilities shall be provided to make accurate determinations of the gas concentrations at each outlet ventilator without danger to the operator.
3. Ventilation fans shall be in operation at all times from commencement of loading until the cargo space is free of ferrosilicon.
4. The bilge wells shall be in a clean, dry condition before loading. The bilge timbers shall be in good condition and covered with double burlap.
5. The bilge wells shall be opened up and the cargo space cleaned up after discharging. A gas check shall be made before commencement of cleaning up.

DETAILED REQUIREMENTS

Prior to loading, the bulkheads to the engine-room shall be inspected and approved by the competent authority as gastight and the safety of the bilge pumping arrangements shall be approved by the competent authority. Inadvertent pumping through machinery spaces shall be avoided.

(i) Where the bilge suction valve of the cargo space is located in the machinery space the valve shall be checked and the valve lid and seat lapped to a fine finish, as necessary. After re-assembly the valve shall be locked shut and a notice shall be placed adjacent to the valve warning against opening without the master's permission.

(ii) All pipes passing through the cargo space shall be in good order and condition. Hold atmosphere sampling units shall be effectively blanked off.

(iii) Electrical circuits for equipment in cargo spaces which is unsuitable for use in an explosive atmosphere shall be isolated by removal of links in the system other than fuses.

(iv) The cargo spaces shall be ventilated by at least two separate fans which shall be explosion-proof and arranged so that the escaping gas flow is separated from electrical cables and components. The total ventilation shall be at least 6 air changes per hour, based on an empty cargo space.

(v) Ventilator trunkings shall be in sound condition and so arranged to preclude interconnection of the atmosphere in the cargo space with other cargo spaces, accommodation or work areas.

OPERATIONAL REQUIREMENTS

(i) Smoking and naked flame shall be prohibited on deck in the vicinity of the cargo space or in the cargo space itself during loading or discharging.

(ii) Any portable lighting shall be safe for use in an explosive atmosphere.

(iii) The cargo shall be kept dry and during wet weather conditions cargo handling shall be suspended and the cargo space shall be closed.

(iv) Sets of self-contained breathing apparatus shall be located and stored for immediate use together with lifeline and a gas detector.

(v) Prior to commencement of discharging, the atmosphere in the cargo space shall be tested for the presence of toxic and flammable gases.

(vi) Checks for contaminant gases shall be carried out at 30-minute intervals while persons are in the cargo space.

(vii) Entry into the cargo space shall be prohibited when gas concentrations exceed the Threshold Limit Values, for phosphine (0.3 ppm) for arsine (0.05 ppm) or where the oxygen level is below 18%.

GASES RELEASES FROM FERROSILICON IMPURITIES WHEN WATER IS ADDED

(i) Arsine

Arsine is a toxic, colourless gas with a garlic like odour.

Toxicity

Arsine is a nerve and blood poison. There is generally a delay before the onset of symptoms (sometimes a day or so). These are at first indefinite.

Symptoms

1 Feeling of malaise, difficulty in breathing, severe headache, giddiness, fainting fits, nausea, vomiting and gastric disturbances.

2 In severe cases, vomiting may be pronounced, the mucous membranes may have a bluish discolouration and urine is dark and bloodstained. After a day or so there is severe anaemia and jaundice.

Concentration

A concentration of 500 ppm is lethal to humans after exposure of a few minutes, while concentrations of 250 ppm are dangerous to life after 30 minutes exposure. Concentrations of 6.25 to 15.5 ppm are dangerous after exposure of 30 to 60 minutes. A concentration of 0.05 ppm is the threshold long limit to which a person may be exposed.

(ii) Phosphine

Phosphine is colourless, flammable and highly toxic and has the odour of rotting fish.

Toxicity

Phosphine acts on the central nervous system and the blood.

Symptoms

The symptoms exhibited by phosphine poisoning are an oppressed feeling in the chest, headache, vertigo, general debility, loss of appetite and great thirst. Concentrations of 2000 ppm for a few minutes and 400 to 600 ppm are dangerous to life. 0.3 ppm is the maximum concentration tolerable for several hours without symptoms.
No long-term exposures to this gas shall be permitted.

FERROSILICON

With 25% to 30% silicon, or 90% or more silicon (including briquettes) (See appendix to this schedule)

DESCRIPTION

Ferrosilicon is an extremely heavy cargo.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	1389 to 2083 (1111 to 1538 for briquettes)	0.48 to 0.72 (0.65 to 0.90 for briquettes)
SIZE	**CLASS**	**GROUP**
Diameter: 2.54 mm	MHB	B

HAZARD

In contact with moisture or water it may evolve hydrogen, a flammable gas which may form explosive mixtures with air and may, under similar circumstances, produce phosphine and arsine, which are highly toxic gases.

This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION

Segregation as required for class 4.3 materials. "Separated from" foodstuffs and all class 8 liquids.

HOLD CLEANLINESS

Clean and dry as relevant to the hazards of the cargo.

WEATHER PRECAUTIONS

This cargo shall be kept as dry as practicable before loading, during loading and during voyage. This cargo shall not be loaded during precipitation. During loading of this cargo all non-working hatches of the cargo spaces to which this cargo are loaded or to be loaded shall be closed.

LOADING

Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code. Stow evenly across tanktops. Refer to the appendix to this schedule.

PRECAUTIONS

The manufacturer or the shipper shall provide the master with a certificate stating that, after manufacture, the cargo was stored under cover, but exposed to open air for not less than three days prior to shipment.

VENTILATION

Continuous mechanical ventilation shall be conducted during the voyage for the cargo spaces carrying this cargo. If maintaining ventilation endangers the ship or the cargo, it may be interrupted unless there is a risk of explosion or other danger due to interruption of the ventilation. In any case mechanical ventilation shall be maintained for a reasonable period prior to discharge. Refer to the appendix to this schedule.

CARRIAGE

For quantitative measurements of hydrogen, phosphine and arsine, suitable detectors for each gas or combination of gases shall be on board while this cargo is carried. The detectors shall be of certified safe type for use in explosive atmosphere. The concentrations of these gases in the cargo spaces carrying this cargo shall be measured regularly, during voyage, and the results of the measurements shall be recorded and kept on board.

DISCHARGE

Refer to the appendix to this schedule.

CLEAN-UP

After discharge of this cargo, the cargo spaces shall be swept clean twice.
Water shall not be used for cleaning of the cargo space which has contained this cargo, because of danger of gas.

EMERGENCY PROCEDURES

SPECIAL EMERGENCY EQUIPMENT TO BE CARRIED Self-contained breathing apparatus.
EMERGENCY PROCEDURES Wear self-contained breathing apparatus. **EMERGENCY ACTION IN THE EVENT OF FIRE** Batten down and use CO_2 if available. **Do not use** water. **MEDICAL FIRST AID** Refer to the Medical First Aid Guide (MFAG), as amended.

APPENDIX

GENERAL REQUIREMENTS FOR CARRIAGE OF FERROSILICON

1. Two sets of self-contained breathing apparatus shall be carried in the ship in addition to normal fire-fighter's outfit.
2. Gas concentrations shall be measured, during the voyage, at least once during every eight hours at each outlet ventilator and in any other accessible space adjacent to the cargo space carrying this cargo and the results shall be recorded in the log-book. Facilities shall be provided to make accurate determinations of the gas concentrations at each outlet ventilator without danger to the operator.
3. Ventilation fans shall be in operation at all times from commencement of loading until the cargo space is free of ferrosilicon.
4. The bilge wells shall be in a clean, dry condition before loading. The bilge timbers shall be in good condition and covered with double burlap.
5. The bilge wells shall be opened up and the cargo space cleaned up after discharging. A gas check shall be made before commencement of cleaning up.

DETAILED REQUIREMENTS

Prior to loading, the bulkheads to the engine-room shall be inspected and approved by the competent authority as gastight. Satisfaction with the safety of the bilge pumping arrangements shall be approved by the competent authority. Inadvertent pumping through machinery spaces shall be avoided.

(i) Where the bilge suction valve of the cargo space is located in the machinery space the valve shall be checked and the valve lid and seat lapped to a fine finish, as necessary. After re-assembly the valve shall be locked shut and a notice shall be placed adjacent to the valve warning against opening without the master's permission.

(ii) All pipes passing through the cargo space shall be in good order and condition. Hold atmosphere sampling units shall be effectively blanked off.

(iii) Electrical circuits for equipment in cargo spaces which is unsuitable for use in an explosive atmosphere shall be isolated by removal of links in the system other than fuses.

(iv) The cargo spaces shall be ventilated by at least two separate fans which shall be explosion-proof and arranged so that the escaping gas flow is separated from electrical cables and components. The total ventilation shall be at least 6 air changes per hour, based on an empty cargo space.

(v) Ventilator trunkings shall be in sound condition and so arranged to preclude interconnection of the atmosphere in the cargo space with other cargo spaces, accommodation or work areas.

OPERATIONAL REQUIREMENTS

(i) Smoking and naked flame shall be prohibited on deck in the vicinity of the cargo space or in the cargo space itself during loading or discharging.

(ii) Any portable lighting shall be safe for use in an explosive atmosphere.

(iii) The cargo shall be kept dry and during wet weather conditions cargo handling shall be suspended and the cargo space shall be closed.

(iv) Sets of self-contained breathing apparatus shall be located and stored for immediate use together with lifeline and a gas detector.

(v) Prior to commencement of discharging, the atmosphere in the cargo space shall be tested for the presence of toxic and flammable gases.

(vi) Checks for contaminant gases shall be carried out at 30-minute intervals while persons are in the cargo space.

(vii) Entry into the cargo space shall be prohibited when gas concentrations exceed the Threshold Limit Values, for phosphine (0.3 ppm) for arsine (0.05 ppm) or where the oxygen level is below 18%.

GASES RELEASES FROM FERROSILICON IMPURITIES WHEN WATER IS ADDED

(i) Arsine

Arsine is a toxic, colourless gas with a garlic-like odour.

Toxicity

Arsine is a nerve and blood poison. There is generally a delay before the onset of symptoms (sometimes a day or so). These are at first indefinite.

Symptoms

1 Feeling of malaise, difficulty in breathing, severe headache, giddiness, fainting fits, nausea, vomiting and gastric disturbances.

2 In severe cases, vomiting may be pronounced, the mucous membranes may have a bluish discolouration and urine is dark and bloodstained. After a day or so there is severe anaemia and jaundice.

Concentration

A concentration of 500 ppm is lethal to humans after exposure of a few minutes, while concentrations of 250 ppm are dangerous to life after 30 minutes exposure. Concentrations of 6.25 to 15.5 ppm are dangerous after exposure of 30 to 60 minutes. A concentration of 0.05 ppm is the threshold long limit to which a person may be exposed.

(ii) Phosphine

Phosphine is colourless, flammable and highly toxic and has the odour of rotting fish.

Toxicity

Phosphine acts on the central nervous system and the blood.

Symptoms

The symptoms exhibited by phosphine poisoning are an oppressed feeling in the chest, headache, vertigo, general debility, loss of appetite and great thirst. Concentrations of 2000 ppm for a few minutes and 400 to 600 ppm are dangerous to life. 0.3 ppm is the maximum concentration tolerable for several hours without symptoms.
No long-term exposures to this gas shall be permitted.

FERROUS METAL BORINGS, SHAVINGS, TURNINGS or CUTTINGS UN 2793
in a form liable to self-heating

DESCRIPTION
Metal drillings usually wet or contaminated with such materials as unsaturated cutting oil, oily rags and other combustible material.
This schedule should **not** apply to consignments of materials which are accompanied by a declaration submitted prior to loading by the shipper and stating that they have no self-heating properties when transported in bulk.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	Various	Various
SIZE	**CLASS**	**GROUP**
Not applicable	4.2	B

HAZARD
These materials are liable to self-heat and ignite spontaneously, particularly when in a finely divided form, wet or contaminated with such materials, as unsaturated cutting oil, oily rags and other combustible matter.
Excessive amounts of cast iron borings or organic materials may encourage heating. Self-heating or inadequate ventilation may cause dangerous depletion of oxygen in cargo spaces.

STOWAGE & SEGREGATION
"Separated from" foodstuffs.

HOLD CLEANLINESS
Clean and dry as relevant to the hazards of the cargo.

WEATHER PRECAUTIONS
This cargo shall be kept as dry as practicable. This cargo shall not be handled during precipitation. During handling of this cargo all non-working hatches of the cargo spaces into which this cargo is loaded or to be loaded shall be closed.

LOADING
During loading the material shall be compacted in the cargo space as frequently as practicable with a bulldozer or other means. The bilge of each cargo space in which the cargo is loaded shall be kept as dry as practicable. After loading the cargo shall be trimmed to eliminate peaks and compacted. Wooden wet battens and dunnage shall be removed from the cargo space before the cargo is loaded.

PRECAUTIONS
The temperature of this cargo shall be measured prior to and during loading. The temperature of the cargo in the stockyard shall be measured at points between 200 mm and 350 mm from the surface of the cargo pile. This cargo shall only be accepted for loading when the temperature of the cargo prior to loading does not exceed 55°C. If the temperature of the cargo in any cargo space exceeds 90°C during loading, loading shall be suspended and shall not be recommenced until the temperature of the cargo in all cargo spaces has fallen below 85°C. The ship shall not depart unless the temperature of the cargo in all cargo spaces is below 65°C and has shown a steady or downward trend in temperature for at least eight hours.

VENTILATION
The cargo spaces carrying this cargo shall not be ventilated during voyage.

CARRIAGE
The surface temperature of the cargo shall be monitored and recorded daily during the voyage. Temperature readings shall be taken in such a way as not to require entry into the cargo space or, alternatively if entry is required for this purpose, at least two sets of self-contained breathing apparatus, additional to those required by SOLAS regulation II-2/10.10 shall be provided.

DISCHARGE
Entry into the cargo spaces containing this cargo shall only be permitted for trained personnel wearing self-contained breathing apparatus when the main hatches are open and after adequate ventilation is conducted or for personnel using appropriate breathing apparatus.

CLEAN-UP
Prior to washing out the residues of this cargo, any oil spillages shall be cleaned from the tanktops and the bilge wells of the cargo spaces for this cargo.

EMERGENCY PROCEDURES

SPECIAL EMERGENCY EQUIPMENT TO BE CARRIED Self-contained breathing apparatus
EMERGENCY PROCEDURES Nil **EMERGENCY ACTION IN THE EVENT OF FIRE** Whilst at sea, any rise in surface temperature of the material indicates a self-heating reaction problem. If the temperature should rise to 80°C a potential fire situation is developing and the ship should make for the nearest suitable port. Batten down. **Water should not be used at sea.** Early application of an inert gas to a smouldering situation may be effective. **MEDICAL FIRST AID** Refer to the Medical First Aid Guide (MFAG), as amended.

REMARKS
In port, copious quantities of water may be used, but due consideration should be given to factors affecting the stability of the ship.

FERTILIZERS WITHOUT NITRATES
(non-hazardous)

DESCRIPTION
Powder and granular. Greenish, brown or beige in colour. Odourless. Very low moisture content (0% to 1%). Hygroscopic.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	714 to 1111	0.90 to 1.40
SIZE	**CLASS**	**GROUP**
1 mm to 3 mm	Not applicable	C

HAZARD
No special hazards.
This cargo is non-combustible or has a low fire-risk.
This cargo is hygroscopic and will cake if wet.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
This cargo shall be kept as dry as practicable. This cargo shall not be handled during precipitation. During handling of this cargo all non-working hatches of the cargo spaces into which this cargo is loaded or to be loaded shall be closed.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
No special requirements.

VENTILATION
The cargo spaces carrying this cargo shall not be ventilated during voyage.

CARRIAGE
No special requirements.

DISCHARGE
If this cargo has hardened, it shall be trimmed to avoid the formation of overhangs, as necessary.

CLEAN-UP
No special requirements.

FISH (IN BULK)

DESCRIPTION
Fish carried in bulk after freezing.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	-	-
SIZE	**CLASS**	**GROUP**
Various	Not applicable	A

HAZARD
Fish carried in bulk may liquefy.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
No special requirements

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
Prior to the carriage of this cargo, due consideration shall be paid to consult with the competent authority. The requirement in chapter 7 of this Code, requiring a determination of TML and moisture content declaration may be dispensed with for this cargo.

Bilge wells shall be clean, dry and covered as appropriate, to prevent ingress of the cargo.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP
After completion of discharge, attention shall be paid to residues of this cargo, which are liable to decompose resulting in emission of toxic gases and depletion of oxygen.

FISHMEAL (FISHSCRAP), STABILIZED UN 2216
Anti-oxidant treated

The provisions of this entry should ***not*** *apply to consignments of fishmeal, Group C, which are accompanied by a certificate issued by the competent authority of the country of shipment, stating that the material has no self-heating properties when transported in bulk.*

DESCRIPTION
Brown to greenish-brown material obtained through heating and drying of oily fish. Moisture content: greater than 5% but not exceeding 12%, by mass. Strong odour may affect other cargo. Fat content; not more than 15%, by mass.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	300 to 700	1.5 to 3.0
SIZE	**CLASS**	**GROUP**
Not applicable	9	B

HAZARD
Liable to heat spontaneously unless has low fat content or effectively anti-oxidant treated. Liable to cause oxygen depletion in cargo space.

STOWAGE & SEGREGATION
Segregation as required for class 4.2 materials.

HOLD CLEANLINESS
Clean and dry as relevant to the hazards of the cargo.

WEATHER PRECAUTIONS
This cargo shall be kept as dry as practicable. This cargo shall not be handled during precipitation. During handling of this cargo all non-working hatches of the cargo spaces into which this cargo is loaded or to be loaded shall be closed.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

The cargo shall not be accepted for loading when the temperature of the cargo exceeds 35°C or 5°C above the ambient temperature, which ever is higher. The cargo may be loaded without weathering/curing prior to loading.

PRECAUTIONS

1 This cargo shall only be accepted for loading when the stabilization of the cargo is achieved to prevent spontaneous combustion by effective application:

.1 of between 400 and 1000 mg/kg (ppm) ethoxyquin, or

.2 of between 1000 and 4000 mg/kg (ppm) butylated hydroxytolune

at the time of production, within 12 months prior to shipment and anti-oxidant remnant concentration shall be not less than 100 mg/kg (ppm) at the time of shipment.

2 The shipper shall provide the master with a certificate issued by a person recognized by the competent authority of the country of shipment specifying:

- moisture content;
- fat content;
- details of anti-oxidant treatment for meals older than six months;
- anti-oxidant concentrations at the time of shipment, which must exceed 100 mg/kg (ppm);
- total weight of the consignment;
- temperature of fishmeal at the time of dispatch from the factory; and
- date of production.

A suitable equipment for quantitative measurement of the concentration of oxygen in the cargo space shall be provided on board the ship.

VENTILATION

Surface ventilation either natural or mechanical shall be conducted during the voyage, as necessary, for the cargo spaces carrying this cargo. If the temperature of the cargo exceeds 55°C and continues to increase, ventilation to the cargo space shall be stopped. If self-heating continues, then carbon dioxide or inert gas shall be introduced to the cargo spaces.

CARRIAGE

This cargo shall be kept as cool and dry as reasonably practicable. The temperature of this cargo shall be measured at eight-hour intervals during the voyage. The results of measurements shall be recorded and kept on board.

DISCHARGE

No special requirements.

CLEAN-UP

No special requirements.

EMERGENCY PROCEDURES

SPECIAL EMERGENCY EQUIPMENT TO BE CARRIED Self-contained breathing apparatus.
EMERGENCY PROCEDURES Wear self-contained breathing apparatus. **EMERGENCY ACTION IN THE EVENT OF FIRE** Batten down; use ship's fixed fire-fighting installation, if fitted. **MEDICAL FIRST AID** Refer to the Medical First Aid Guide (MFAG), as amended.

FLUORSPAR

DESCRIPTION
Yellow, green or purple crystals. Coarse dust.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	Dry: 1429 to 1786 Wet: 1786 to 2128	Dry: 0.56 to 0.70 Wet: 0.47 to 0.56
SIZE	**CLASS**	**GROUP**
Not applicable	MHB	A and B

HAZARD
This material may liquefy if shipped at moisture content in excess of their Transportable moisture limit. See section 7 of the Code. Harmful and irritating by dust inhalation.

STOWAGE & SEGREGATION
"Separated from" foodstuffs and all class 8 materials (goods in packaged form and solid bulk materials).

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
When a cargo is carried in a ship other than specially constructed or fitted cargo ship complying with the requirements in subsection 7.3.2 of this Code, the following provisions shall be complied with:

.1 the moisture content of the cargo shall be kept less than its TML during voyage;

.2 unless expressly provided otherwise in this individual schedule, the cargo shall not be handled during precipitation;

.3 unless expressly provided otherwise in this individual schedule, during handling of the cargo, all non-working hatches of the cargo spaces into which the cargo is loaded or to be loaded shall be closed;

.4 the cargo may be handled during precipitation provided that the actual moisture content of the cargo is sufficiently less than its TML so that the actual moisture content is not liable to be increased beyond the TML by the precipitation; and

.5 the cargo in a cargo space may be discharged during precipitation provided that the total amount of the cargo in the cargo space is to be discharged in the port.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
Appropriate precautions shall be taken to protect machinery and accommodation spaces from the dust of the cargo. Bilge wells of the cargo spaces shall be protected from ingress of the cargo. Due consideration shall be paid to protect equipment from the dust of the cargo. Persons who may be exposed to the dust of the cargo shall wear goggles or other equivalent dust eye-protection and dust filter masks. Those persons shall wear protective clothing, as necessary. Protect machinery, accommodation and bilge wells from dust.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

EMERGENCY PROCEDURES

SPECIAL EMERGENCY EQUIPMENT TO BE CARRIED Nil
EMERGENCY PROCEDURES Nil **EMERGENCY ACTION IN THE EVENT OF FIRE** Nil **MEDICAL FIRST AID** Refer to the Medical First Aid Guide (MFAG), as amended.

FLY ASH

DESCRIPTION
Fly Ash is the light, finely divided dusty fine powder residue from coal and oil fired power stations. Do not confuse with Calcined Pyrites.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	794	1.26
SIZE	**CLASS**	**GROUP**
Not applicable	Not applicable	C

HAZARD
May shift when aerated.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
"Separated from" foodstuffs.

HOLD CLEANLINESS
Clean and dry as relevant to the hazards of the cargo.

WEATHER PRECAUTIONS
This cargo shall be kept as dry as practicable. This cargo shall not be handled during precipitation. During handling of this cargo all non-working hatches of the cargo spaces into which this cargo is loaded or to be loaded shall be closed.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.
The ship carrying this cargo shall not depart until the cargo has settled.

PRECAUTIONS
Bilge wells shall be clean, dry and covered as appropriate, to prevent ingress of the cargo. Appropriate precautions shall be taken to protect machinery and accommodation spaces from the dust of the cargo. Bilge wells of the cargo spaces shall be protected from ingress of the cargo. Due consideration shall be paid to protect equipment from the dust of the cargo. Persons who may be exposed to the dust of the cargo shall wear protective clothing, goggles or other equivalent dust eye-protection and dust filter masks, as necessary.

VENTILATION
No special requirements.

CARRIAGE

After the completion of loading of this cargo, the hatches of the cargo spaces shall be sealed. All vents and access ways to the cargo spaces shall be shut during the voyage. Bilges in the cargo spaces carrying this cargo shall not be pumped unless absolutely necessary.

DISCHARGE

No special requirements.

CLEAN-UP

In the case that the residues of this cargo are to be washed out, the cargo spaces and the other structures and equipment which may have been in contact with this cargo or its dust shall be thoroughly swept prior to washing out. Particular attention shall be paid to bilge wells and framework in the cargo spaces. After complying with the foregoing requirements, the cargo spaces shall be washed out and the water for washing out shall be pumped out in an appropriate manner, except in the case that the BCSN of the cargo to be loaded subsequent to discharge is FLY ASH.

GRANULATED SLAG

DESCRIPTION
Residue from steelworks blast furnaces with a dirty grey, lumpy appearance. Iron: 0.5%.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	1111	0.90
SIZE	**CLASS**	**GROUP**
Up to 5 mm	Not applicable	C

HAZARD
No special hazards. Slag dust is fine and has abrasive characteristics.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
No special requirements.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.
This cargo shall not be accepted for loading when the temperature of the cargo exceeds 50°C.

PRECAUTIONS
Appropriate precautions shall be taken to protect machinery and accommodation spaces from the dust of the cargo. Bilge wells of the cargo spaces shall be protected from ingress of the cargo. Due consideration shall be paid to protect equipment from the dust of the cargo. Persons who may be exposed to the dust of the cargo shall wear protective clothing, goggles or other equivalent dust eye-protection and dust filter masks, as necessary.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

GRANULATE TYRE RUBBER

DESCRIPTION
Fragmented rubber tyre material cleaned and free from other materials.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	555	1.8
SIZE	**CLASS**	**GROUP**
Granular, up to 10 mm	Not applicable	C

HAZARD
No special hazards.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
No special requirements.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
During handling and carriage no hotwork, burning and smoking shall be permitted in the vicinity of the cargo spaces containing this cargo. Prior to shipment, a certificate shall be given to the master by the shipper stating that this cargo this cargo consists of clean rubber material only. When the planned interval between the commencement of loading and the completion of discharge of this cargo exceeds 5 days, the cargo shall not be accepted for loading unless the cargo is to be carried in cargo spaces fitted with a fixed gas fire extinguishing system. The administration may, if it considers that the planned voyage does not exceed 5 days from the commencement of loading to the completion of discharge, exempt from the requirements of a fitted fixed gas fire-extinguishing system in the cargo spaces for the carriage of this cargo.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

GYPSUM

DESCRIPTION
A natural Hydrated Calcium Sulphate. Insoluble in water. It is loaded as a fine powder that aggregates into lumps. Gypsum is not water soluble. Average moisture content is 1% to 2%.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	1282 to 1493	0.67 to 0.78
SIZE	**CLASS**	**GROUP**
Up to 100 mm	Not applicable	C

HAZARD
No special hazards.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
This cargo shall be kept as dry as practicable. This cargo shall not be handled during precipitation. During handling of this cargo all non-working hatches of the cargo spaces into which this cargo is loaded or to be loaded shall be closed.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
No special requirements.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP
Prior to washing out the residues of this cargo, the decks and the cargo spaces shall be shovelled and swept clean, because washing out of this cargo is difficult.

ILMENITE CLAY

DESCRIPTION
Very heavy black clay. Abrasive. May be dusty. Titanium, silicate and iron oxides are obtained from ilmenite clay. Moisture content: 10% to 20%.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	2000 to 2500	0.4 to 0.5
SIZE	**CLASS**	**GROUP**
Up to 0.15 mm	Not applicable	A

HAZARD
The material may liquefy if shipped at a moisture content in excess of its Transportable Moisture Limit (TML).
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
When a cargo is carried in a ship other than specially constructed or fitted cargo ship complying with the requirements in subsection 7.3.2 of this Code, the following provisions shall be complied with:

.1 the moisture content of the cargo shall be kept less than its TML during voyage;
.2 unless expressly provided otherwise in this individual schedule, the cargo shall not be handled during precipitation;
.3 unless expressly provided otherwise in this individual schedule, during handling of the cargo, all non-working hatches of the cargo spaces into which the cargo is loaded or to be loaded shall be closed;
.4 the cargo may be handled during precipitation provided that the actual moisture content of the cargo is sufficiently less than its TML so that the actual moisture content is not liable to be increased beyond the TML by the precipitation; and
.5 the cargo in a cargo space may be discharged during precipitation provided that the total amount of the cargo in the cargo space is to be discharged in the port.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

As the density of the cargo is extremely high, the tanktop may be overstressed unless the cargo is evenly spread across the tanktop to equalize the weight distribution. Due consideration shall be paid to ensure that tanktop is not overstressed during voyage and during loading by a pile of the cargo.

PRECAUTIONS
Bilge wells shall be clean, dry and covered as appropriate, to prevent ingress of the cargo.

VENTILATION
No special requirements.

CARRIAGE
The appearance of the surface of this cargo shall be checked regularly during voyage. If free water above the cargo or fluid state of the cargo is observed during voyage, the master shall take appropriate actions to prevent cargo shifting and potential capsize of the ship, and give consideration to seeking emergency entry into a place of refuge.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

ILMENITE SAND
This cargo can be categorized as Group A or C.

DESCRIPTION
Very heavy black sand. Abrasive. May be dusty. Titanium, monazite and zinc ore are obtained from ilmenite sand. The moisture content of this cargo in Group C is 1% to 2%. When moisture content is above 2%, this cargo is to be categorized in Group A.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	2380 to 3225	0.31 to 0.42
SIZE	**CLASS**	**GROUP**
Up to 0.15 mm	Not applicable	A or C

HAZARD
This cargo in Group C has no special hazards. This cargo in Group A may liquefy if shipped at a moisture content in excess of its TML. See section 7 of this Code.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
This cargo shall be kept as dry as practicable before loading, during loading and during voyage. This cargo shall not be loaded during precipitation. During loading of this cargo all non-working hatches of the cargo spaces to which this cargo are loaded or to be loaded shall be closed.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

As the density of the cargo is extremely high, the tanktop may be overstressed unless the cargo is evenly spread across the tanktop to equalize the weight distribution. Due consideration shall be paid to ensure that tanktop is not overstressed during voyage and during loading by a pile of the cargo.

PRECAUTIONS
Bilge wells shall be clean, dry and covered as appropriate, to prevent ingress of the cargo.

VENTILATION
No special requirements.

CARRIAGE
The appearance of the surface of this cargo shall be checked regularly during voyage. If free water above the cargo or fluid state of the cargo is observed during voyage, the master shall take appropriate actions to prevent cargo shifting and potential capsize of the ship, and give consideration to seeking emergency entry into a place of refuge.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

IRON ORE

DESCRIPTION
Iron ore varies in colour from dark grey to rusty red varies in iron content from haematite, (high grade ore) to ironstone of the lower commercial ranges. Moisture content: 0% to 16%. Mineral Concentrates are different cargoes (see IRON CONCENTRATE).

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	1250 to 3448	0.29 to 0.80
SIZE	**CLASS**	**GROUP**
Up to 250 mm	Not applicable	C

HAZARD
No special hazards.
This cargo is non-combustible or has a low fire-risk.
Iron ore cargoes may affect magnetic compasses.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
No special requirement.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

As the density of the cargo is extremely high, the tanktop may be overstressed unless the cargo is evenly spread across the tanktop to equalize the weight distribution. Due consideration shall be paid to ensure that tanktop is not overstressed during voyage and during loading by a pile of the cargo.

PRECAUTIONS
Loading rates of this cargo are normally very high. Due consideration shall be paid on the ballasting operation to develop the loading plan required by regulation VI/9.3 in SOLAS Convention.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

IRON ORE PELLETS

DESCRIPTION
Pellets are approximately spherical lumps formed by crushing iron ore into a powder. This iron oxide is formed into pellets by using clay as a binder and then hardening by firing in kilns at 1315°C. Moisture content: 0% to 2%.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	1900 to 2400	0.45 to 0.52
SIZE	**CLASS**	**GROUP**
Up to 20 mm	Not applicable	C

HAZARD
No special hazards.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
No special requirements.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

As the density of the cargo is extremely high, the tanktop may be overstressed unless the cargo is evenly spread across the tanktop to equalize the weight distribution. Due consideration shall be paid to ensure that tanktop is not overstressed during voyage and during loading by a pile of the cargo.

PRECAUTIONS
No special requirements.
Bilge wells shall be clean, dry and covered as appropriate, to prevent ingress of the cargo.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

IRON OXIDE, SPENT or
IRON SPONGE, SPENT UN 1376
obtained from coal gas purification

DESCRIPTION
Powdery material, black, brown, red or yellow. Strong odour may taint other cargo.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	2222	0.45
SIZE	**CLASS**	**GROUP**
Up to 20 mm	4.2	B

HAZARD
Liable to heat and ignite spontaneously, especially if contaminated with oil or moisture. Toxic gases: hydrogen sulphide, sulphur dioxide, and hydrogen cyanide may be produced. Dust may cause an explosion hazard. Liable to reduce the oxygen in the cargo space.

STOWAGE & SEGREGATION
"Separated from" foodstuffs.

HOLD CLEANLINESS
Clean and dry as relevant to the hazards of the cargo.

WEATHER PRECAUTIONS
This cargo shall be kept as dry as practicable. This cargo shall not be handled during precipitation. During handling of this cargo all non-working hatches of the cargo spaces into which this cargo is loaded or to be loaded shall be closed.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

As the density of the cargo is extremely high, the tanktop may be overstressed unless the cargo is evenly spread across the tanktop to equalize the weight distribution. Due consideration shall be paid to ensure that tanktop is not overstressed during voyage and during loading by a pile of the cargo.

PRECAUTIONS
Prior to loading, the shipper or the manufacturer shall provide the master with a certificate stating that the cargo has been cooled and then weathered for not less than 8 weeks prior to shipment.

VENTILATION
Surface ventilation only, either natural or mechanical, shall be conducted, as necessary, during the voyage for this cargo.

CARRIAGE

For quantitative measurements of oxygen and hydrogen cyanide, suitable detectors for each gas or combination of gases shall be on board while this cargo is carried. The detectors shall be suitable for use in an atmosphere without oxygen and of certified safe type for use in explosive atmosphere. The concentrations of these gases in the cargo spaces carrying this cargo shall be measured regularly, during voyage, and the results of the measurements shall be recorded and kept on board.

DISCHARGE

No special requirements.

CLEAN-UP

No special requirements.

EMERGENCY PROCEDURES

SPECIAL EMERGENCY EQUIPMENT TO BE CARRIED Protective clothing (gloves, boots, coveralls, headgear). Self-contained breathing apparatus. Spray nozzles.
EMERGENCY PROCEDURES Wear protective clothing and self-contained breathing apparatus. **EMERGENCY ACTION IN THE EVENT OF FIRE** Batten down; use ship's fixed fire-fighting installation if available. Exclusion of air may be sufficient to control fire. **MEDICAL FIRST AID** Refer to the Medical First Aid Guide (MFAG), as amended.

IRONSTONE

DESCRIPTION
Ore. Moisture: 1% to 2%.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	2564	0.39
SIZE	**CLASS**	**GROUP**
75 mm	Not applicable	C

HAZARD
No special hazards.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
No special requirements.

LOADING
Trim in accordance with relevant provisions required under sections 4 and 5 of the Code. If doubt exists, trim reasonably level to the boundaries of the cargo space so as to minimize the risk of shifting and to ensure that adequate stability will be maintained during the voyage.

As the density of the cargo is extremely high, the tanktop may be overstressed unless the cargo is evenly spread across the tanktop to equalize the weight distribution. Due consideration shall be paid to ensure that tanktop is not overstressed during voyage and during loading by a pile of the cargo.

PRECAUTIONS
Appropriate precautions shall be taken to protect machinery and accommodation spaces from the dust of the cargo. Bilge wells of the cargo spaces shall be protected from ingress of the cargo. Due consideration shall be paid to protect equipment from the dust of the cargo. Persons who may be exposed to the dust of the cargo shall wear protective clothing, goggles or other equivalent dust eye-protection and dust filter masks, as necessary.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

LABRADORITE

DESCRIPTION
A lime-soda rock form of felspar. May give off dust.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	1667	0.60
SIZE	**CLASS**	**GROUP**
Lumps: 50 mm to 300 mm	Not applicable	C

HAZARD
No special hazards.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
Clean and dry as relevant to the hazards of the cargo.

WEATHER PRECAUTIONS
This cargo shall be kept as dry as practicable before loading, during loading and during voyage. This cargo shall not be loaded during precipitation. During loading of this cargo all non-working hatches of the cargo spaces to which this cargo are loaded or to be loaded shall be closed.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
Appropriate precautions shall be taken to protect machinery and accommodation spaces from the dust of the cargo. Bilge wells of the cargo spaces shall be protected from ingress of the cargo. Due consideration shall be paid to protect equipment from the dust of the cargo. Persons who may be exposed to the dust of the cargo shall wear protective clothing, goggles or other equivalent dust eye-protection and dust filter masks, as necessary.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

LEAD NITRATE UN 1469

DESCRIPTION
White crystals. Soluble in water. Derived from the action of nitrate acid on lead.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)		STOWAGE FACTOR (m^3/t)
Not applicable	-		-
SIZE	**CLASS**	**SUBSIDIARY RISK**	**GROUP**
Not applicable	5.1	6.1	B

HAZARD
Toxic if swallowed or dust inhaled.
Not combustible by itself, but mixtures with combustible materials, are easily ignited and burn fiercely.

STOWAGE & SEGREGATION
"Separated from" foodstuffs.

HOLD CLEANLINESS
Clean and dry as relevant to the hazards of the cargo.

WEATHER PRECAUTIONS
This cargo shall be kept as dry as practicable before loading, during loading and during voyage. This cargo shall not be loaded during precipitation. During loading of this cargo all non-working hatches of the cargo spaces to which this cargo are loaded or to be loaded shall be closed.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
Bilge wells shall be clean, dry and covered as appropriate, to prevent ingress of the cargo. Appropriate precautions shall be taken to protect machinery and accommodation spaces from the dust of the cargo. Bilge wells of the cargo spaces shall be protected from ingress of the cargo. Due consideration shall be paid to protect equipment from the dust of the cargo. Persons who may be exposed to the dust of the cargo shall wear goggles or other equivalent dust eye-protection and dust filter masks. Those persons shall wear protective clothing, as necessary.

VENTILATION
Natural surface ventilation shall be conducted during the voyage, as necessary, for the cargo spaces carrying this cargo.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

EMERGENCY PROCEDURES

SPECIAL EMERGENCY EQUIPMENT TO BE CARRIED

Protective clothing (gloves, coveralls, headgear).
Self-contained breathing apparatus.
Spray nozzles.

EMERGENCY PROCEDURES

Wear protective clothing and self-contained breathing apparatus.

EMERGENCY ACTION IN THE EVENT OF FIRE

Use copious quantities of water, which is best applied in the form of a spray to avoid disturbing the surface of the material. The material may fuse or melt, in which condition application of water may result in extensive scattering of the molten materials. Exclusion of air or the use of CO_2 will not control the fire. Due consideration should be given to the effect on the stability of the ship due to accumulated water.

MEDICAL FIRST AID

Refer to the Medical First Aid Guide (MFAG), as amended.

LEAD ORE

DESCRIPTION
Heavy soft grey solid material.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	1493 to 4167	0.24 to 0.67
SIZE	**CLASS**	**GROUP**
Powder	Not applicable	C

HAZARD
Toxic, with acids evolves highly toxic vapour.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
"Separated from" all class 8 liquids.

HOLD CLEANLINESS
Clean and dry as relevant to the hazards of the cargo.

WEATHER PRECAUTIONS
This cargo shall be kept as dry as practicable before loading, during loading and during voyage. This cargo shall not be loaded during precipitation. During loading of this cargo all non-working hatches of the cargo spaces to which this cargo are loaded or to be loaded shall be closed.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

As the density of the cargo is extremely high, the tanktop may be overstressed unless the cargo is evenly spread across the tanktop to equalize the weight distribution. Due consideration shall be paid to ensure that tanktop is not overstressed during voyage and during loading by a pile of the cargo.

PRECAUTIONS
No special requirements.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

LIME (UNSLAKED)

DESCRIPTION
White or greyish-white in colour.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	-	-
SIZE	**CLASS**	**GROUP**
Lump	MHB	B

HAZARD
Unslaked lime combines with water to form calcium hydroxide (hydrated lime) or magnesium hydroxide. This reaction develops a great deal of heat which may be sufficient to cause ignition of nearby combustible materials. This is not combustible or has a low fire-risk corrosive to eyes and mucous membranes.

STOWAGE & SEGREGATION
"Separated from" all packaged dangerous goods and solid bulk cargoes in Group B.

HOLD CLEANLINESS
Clean and dry as relevant to the hazards of the cargo.

WEATHER PRECAUTIONS
This cargo shall be kept as dry as practicable. This cargo shall not be handled during precipitation. During handling of this cargo all non-working hatches of the cargo spaces into which this cargo is loaded or to be loaded shall be closed.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
This cargo shall be kept as dry as practicable. Bilge wells shall be clean, dry and covered as appropriate, to prevent ingress of the cargo. Appropriate precautions shall be taken to protect machinery and accommodation spaces from the dust of the cargo. Bilge wells of the cargo spaces shall be protected from ingress of the cargo. Due consideration shall be paid to protect equipment from the dust of the cargo. Persons who may be exposed to the dust of the cargo shall wear goggles or other equivalent dust eye-protection and dust filter masks. Those persons shall wear protective clothing, as necessary.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE
Do not discharge during precipitation.

CLEAN-UP
No special requirements.

EMERGENCY PROCEDURES

SPECIAL EMERGENCY EQUIPMENT TO BE CARRIED Nil
EMERGENCY PROCEDURES Nil **EMERGENCY ACTION IN THE EVENT OF FIRE** Nil (non-combustible). Do not use water, if involved in a fire. **MEDICAL FIRST AID** Refer to the Medical First Aid Guide (MFAG), as amended.

LIMESTONE

DESCRIPTION
Limestone varies in colour from cream through white to medium dark grey (when freshly broken).
Moisture: up to 4%.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	1190 to 1493	0.67 to 0.84
SIZE	**CLASS**	**GROUP**
Fines to 90 mm	Not applicable	C

HAZARD
No special hazards.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
No special requirements.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
Bilge wells shall be clean, dry and covered as appropriate, to prevent ingress of the cargo.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

LINTED COTTON SEED
with not more than 9% moisture and not more than 20.5% oil

DESCRIPTION
Cottonseed with short cotton fibres adhering to the kernel after approximately 90%-98% of the cotton has been removed by machine.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	490	2.02
SIZE	**CLASS**	**GROUP**
-	MHB	B

HAZARD
May self-heat and deplete oxygen in cargo space.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
Clean and dry as relevant to the hazards of the cargo.

WEATHER PRECAUTIONS
This cargo shall be kept as dry as practicable. This cargo shall not be handled during precipitation. During handling of this cargo all non-working hatches of the cargo spaces into which this cargo is loaded or to be loaded shall be closed.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
Entry into the cargo space for this cargo shall not be permitted until the cargo space has been ventilated and the atmosphere tested for concentration of oxygen.

VENTILATION
No special requirements.

CARRIAGE
Hatches should be weathertight to prevent the ingress of water.

DISCHARGE
If this cargo has hardened, it shall be trimmed to avoid the formation of overhanging faces, as necessary.

CLEAN-UP
No special requirements.

EMERGENCY PROCEDURES

SPECIAL EMERGENCY EQUIPMENT TO BE CARRIED Self-contained breathing apparatus.
EMERGENCY PROCEDURES Wear self-contained breathing apparatus. **EMERGENCY ACTION IN THE EVENT OF FIRE** Batten down; use ship's fixed fire-fighting installation, if fitted. **MEDICAL FIRST AID** Refer to the Medical First Aid Guide (MFAG), as amended.

MAGNESIA (DEADBURNED)

DESCRIPTION
Manufactured in briquette form and is usually white, brown or grey. It is very similar in size, appearance and handling to gravel and is dry and dusty. Deadburned magnesia is natural magnesite calcined at very high temperatures, which results in a non-reactive magnesium oxide, which does not hydrate or produce spontaneous heat.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	2000	0.5
SIZE	**CLASS**	**GROUP**
Fines to approx. 30 mm	Not applicable	C

HAZARD
No special hazards.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
No special requirements.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
Prior to loading, the shipper or the manufacturer shall provide the master with a declaration stating that the cargo has been sufficiently heat-treated and is ready for loading.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

MAGNESIA (UNSLAKED)

DESCRIPTION

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	1250	0.80
SIZE	**CLASS**	**GROUP**
Fines to 90 mm	MHB	B

HAZARD
Combines with water to form magnesium hydroxide with an expansion in volume and a release of heat. May ignite materials with low ignition temperatures. Similar to LIME (UNSLAKED) but is less reactive. Corrosive to eyes and mucous membranes.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
"Separated from" all packaged dangerous goods and solid bulk cargoes in Group B.

HOLD CLEANLINESS
Clean and dry as relevant to the hazards of the cargo.

WEATHER PRECAUTIONS
This cargo shall be kept as dry as practicable. This cargo shall not be handled during precipitation. During handling of this cargo all non-working hatches of the cargo spaces into which this cargo is loaded or to be loaded shall be closed.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
Appropriate precautions shall be taken to protect machinery and accommodation spaces from the dust of the cargo. Bilge wells of the cargo spaces shall be protected from ingress of the cargo. Due consideration shall be paid to protect equipment from the dust of the cargo. Persons who may be exposed to the dust of the cargo shall wear goggles or other equivalent dust eye-protection and dust filter masks. Those persons shall wear protective clothing, as necessary.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE
Do not discharge during precipitation.

CLEAN-UP
No special requirements.

EMERGENCY PROCEDURES

SPECIAL EMERGENCY EQUIPMENT TO BE CARRIED Nil
EMERGENCY PROCEDURES Nil **EMERGENCY ACTION IN THE EVENT OF FIRE** Nil (non-combustible). Do not use water if cargo is involved in a fire. **MEDICAL FIRST AID** Refer to the Medical First Aid Guide (MFAG), as amended.

MAGNESITE, natural

DESCRIPTION
Magnesite is white to yellow in colour.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	1429	0.7
SIZE	**CLASS**	**GROUP**
3 mm to 30 mm	Not applicable	C

HAZARD
No special hazards.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
No special requirements.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
No special requirements.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

MAGNESIUM NITRATE UN 1474

DESCRIPTION
White crystals, soluble in water. Hygroscopic.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	-	-
SIZE	**CLASS**	**GROUP**
Not applicable	5.1	B

HAZARD
Although non-combustible by itself, mixtures with combustible material are easily ignited and may burn fiercely.
This cargo is hygroscopic and will cake if wet.

STOWAGE & SEGREGATION
"Separated from" foodstuffs.

HOLD CLEANLINESS
Clean and dry as relevant to the hazards of the cargo.

WEATHER PRECAUTIONS
No special requirements.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
No special requirements.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE
If this cargo has hardened, it shall be trimmed to avoid the formation of overhangs, as necessary.

CLEAN-UP
No special requirements.

EMERGENCY PROCEDURES

SPECIAL EMERGENCY EQUIPMENT TO BE CARRIED

Protective clothing (gloves, boots, coveralls, headgear).
Self-contained breathing apparatus.
Spray nozzles.

EMERGENCY PROCEDURES

Wear protective clothing and self-contained breathing apparatus.

EMERGENCY ACTION IN THE EVENT OF FIRE

Use copious quantities of water, which is best applied in the form of a spray to avoid disturbing the surface of the material. The material may fuse or melt, in which condition application of water may result in extensive scattering of the molten materials. Exclusion of air or the use of CO_2 will not control the fire. Due consideration should be given to the effect on the stability of the ship due to the accumulated water.

MEDICAL FIRST AID

Refer to the Medical First Aid Guide (MFAG), as amended.

REMARKS
Material is non-combustible unless contaminated.

MANGANESE ORE

DESCRIPTION
Manganese ore is black to brownish black in colour. It is a very heavy cargo.
Moisture content: up to 15%.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	1429 to 3125	fines to 0.32 lumps to 0.70
SIZE	**CLASS**	**GROUP**
Fine dust to 250 mm	Not applicable	C

HAZARD
No special hazards.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
No special requirements.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

As the density of the cargo is extremely high, the tanktop may be overstressed unless the cargo is evenly spread across the tanktop to equalize the weight distribution. Due consideration shall be paid to ensure that tanktop is not overstressed during voyage and during loading by a pile of the cargo.

PRECAUTIONS
Appropriate precautions shall be taken to protect machinery and accommodation spaces from the dust of the cargo. Bilge wells of the cargo spaces shall be protected from ingress of the cargo. Due consideration shall be paid to protect equipment from the dust of the cargo. Persons who may be exposed to the dust of the cargo shall wear protective clothing, goggles or other equivalent dust eye-protection and dust filter masks, as necessary.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

MARBLE CHIPS

DESCRIPTION
Dry, dusty, white to grey lumps, particles and powder mixed with a small amount of gravel and pebbles.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	654	1.53
SIZE	**CLASS**	**GROUP**
Not applicable	Not applicable	C

HAZARD
No special hazards.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
No special requirements.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
Appropriate precautions shall be taken to protect machinery and accommodation spaces from the dust of the cargo. Bilge wells of the cargo spaces shall be protected from ingress of the cargo. Due consideration shall be paid to protect equipment from the dust of the cargo. Persons who may be exposed to the dust of the cargo shall wear protective clothing, goggles or other equivalent dust eye-protection and dust filter masks, as necessary.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

METAL SULPHIDE CONCENTRATES
(See also Mineral Concentrates schedule)

DESCRIPTION
Mineral concentrates are refined ores in which the valuable components have been enriched by eliminating the bulk of waste materials. Generally the particle size is small although agglomerates sometimes exist in concentrates which have not been freshly produced.
The most common concentrates in this category are: zinc concentrates, lead concentrates, copper concentrates and low grade middling concentrates.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	1790 to 3230	0.31 to 0.56
SIZE	**CLASS**	**GROUP**
Various	MHB	A and B

HAZARD
Some sulphide concentrates are liable to oxidation and may have a tendency to self-heat, with associated oxygen depletion and emission of toxic fumes. Some materials may present corrosion problems.
When a Metal Sulphide Concentrate is considered as presenting a low fire-risk, the carriage of such cargo on a ship not fitted with a fixed gas fire extinguishing system should be subject to the Administration's authorization as provided by SOLAS regulation II-2/10.7.1.4.

STOWAGE & SEGREGATION
Unless determined by the competent authority, segregation as required for class 4.2 materials.
"Separated from" foodstuffs and all class 8 acids.

HOLD CLEANLINESS
Clean and dry as relevant to the hazards of the cargo.

WEATHER PRECAUTIONS
When a cargo is carried in a ship other than specially constructed or fitted cargo ship complying with the requirements in subsection 7.3.2 of this Code, the following provisions shall be complied with:

.1 the moisture content of the cargo shall be kept less than its TML during voyage;
.2 unless expressly provided otherwise in this individual schedule, the cargo shall not be handled during precipitation;
.3 unless expressly provided otherwise in this individual schedule, during handling of the cargo, all non-working hatches of the cargo spaces into which the cargo is loaded or to be loaded shall be closed;
.4 the cargo may be handled during precipitation provided that the actual moisture content of the cargo is sufficiently less than its TML so that the actual moisture content is not liable to be increased beyond the TML by the precipitation; and
.5 the cargo in a cargo space may be discharged during precipitation provided that the total amount of the cargo in the cargo space is to be discharged in the port.

LOADING

This cargo shall be trimmed to ensure that the height difference between peaks and troughs does not exceed 5% of the ship's breadth and that the cargo slopes uniformly from the hatch boundaries to the bulkheads and no shearing faces remain to collapse during voyage, in particular on smaller ships, i.e. 100 m long or less.

As the density of the cargo is extremely high, the tanktop may be overstressed unless the cargo is evenly spread across the tanktop to equalize the weight distribution. Due consideration shall be paid to ensure that the tanktop is not overstressed during the voyage and during loading by a pile of the cargo.

PRECAUTIONS

Entry into the cargo space for this cargo shall not be permitted until the cargo space has been ventilated and the atmosphere tested for concentration of oxygen. Appropriate precautions shall be taken to protect machinery and accommodation spaces from the dust of the cargo. Bilge wells of the cargo spaces shall be protected from ingress of the cargo. Due consideration shall be paid to protect equipment from the dust of the cargo. Persons who may be exposed to the dust of the cargo shall wear goggles or other equivalent dust eye-protection and dust filter masks. Those persons shall wear protective clothing, as necessary.

VENTILATION

The cargo spaces carrying this cargo shall not be ventilated during voyage.

CARRIAGE

The appearance of the surface of this cargo shall be checked regularly during voyage. If free water above the cargo or fluid state of the cargo is observed during voyage, the master shall take appropriate actions to prevent cargo shifting and potential capsize of the ship, and give consideration to seeking emergency entry into a place of refuge. For quantitative measurements of oxygen and toxic fumes liable to be evolved by the cargo, suitable detectors for each gas and fume or combination of these shall be on board while this cargo is carried. The detectors shall be suitable for use in an atmosphere without oxygen. The concentrations of these gases in the cargo spaces carrying this cargo shall be measured regularly, during voyage, and the results of the measurements shall be recorded and kept on board.

DISCHARGE

No special requirements.

CLEAN-UP

No special requirements.

EMERGENCY PROCEDURES

SPECIAL EMERGENCY EQUIPMENT TO BE CARRIED

Self-contained breathing apparatus.

EMERGENCY PROCEDURES

Wear self-contained breathing apparatus.

EMERGENCY ACTION IN THE EVENT OF FIRE

Batten down; use ship's fixed fire-fighting installation.
Exclusion of air may be sufficient to control the fire. **Do not use water**.

MEDICAL FIRST AID

Refer to the Medical First Aid Guide (MFAG), as amended.

REMARKS
Fire may be indicated by the smell of sulphur dioxide.

Mineral Concentrates

(See Bulk Cargo Shipping Names below)

CEMENT COPPER
COPPER CONCENTRATE
IRON CONCENTRATE
IRON CONCENTRATE (pellet feed)
IRON CONCENTRATE (sinter feed)
LEAD AND ZINC CALCINES (mixed)
LEAD AND ZINC MIDDLINGS
LEAD CONCENTRATE
LEAD ORE RESIDUE
LEAD SILVER CONCENTRATE
MANGANESE CONCENTRATE
NEFILENE SYENITE (mineral)
NICKEL CONCENTRATE
PENTAHYDRATE CRUDE
PYRITES
PYRITIC ASHES (iron)
PYRITIC CINDERS
SILVER LEAD CONCENTRATE
SLIG (iron ore)
ZINC AND LEAD CALCINES (mixed)
ZINC AND LEAD MIDDLINGS
ZINC CONCENTRATE
ZINC SINTER
ZINC SLUDGE

All known Bulk Cargo Shipping Names (BCSN) of mineral concentrates are listed above but the list is not exhaustive. See also the entries for Metal Sulphide Concentrates.

DESCRIPTION

Mineral concentrates are refined ores in which valuable components have been enriched by eliminating the bulk of waste materials.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	1754 to 3030	0.33 to 0.57
SIZE	**CLASS**	**GROUP**
Various	Not applicable	A

HAZARD

The above materials may liquefy if shipped at moisture content in excess of their Transportable moisture limit (TML). See section 7 of the Code. These cargoes are non-combustible or have low fire-risks.

This cargo will decompose burlap or canvas cloth covering bilge wells. Continuous carriage of this cargo may have detrimental structural effects over a long period of time.

STOWAGE & SEGREGATION

No special requirements.

HOLD CLEANLINESS

No special requirements.

WEATHER PRECAUTIONS

When a cargo is carried in a ship other than specially constructed or fitted cargo ship complying with the requirements in subsection 7.3.2 of this Code, the following provisions shall be complied with:

.1 the moisture content of the cargo shall be kept less than its TML during voyage;

.2 unless expressly provided otherwise in this individual schedule, the cargo shall not be handled during precipitation;

.3 unless expressly provided otherwise in this individual schedule, during handling of the cargo, all non-working hatches of the cargo spaces into which the cargo is loaded or to be loaded shall be closed;

.4 the cargo may be handled during precipitation provided that the actual moisture content of the cargo is sufficiently less than its TML so that the actual moisture content is not liable to be increased beyond the TML by the precipitation; and

.5 the cargo in a cargo space may be discharged during precipitation provided that the total amount of the cargo in the cargo space is to be discharged in the port.

LOADING

This cargo shall be trimmed to ensure that the height difference between peaks and troughs does not exceed 5% of the ship's breadth and that the cargo slopes uniformly from the hatch boundaries to the bulkheads and no shearing faces remain to collapse during voyage, in particular on smaller ships, i.e. 100 m long or less.

As the density of the cargo is extremely high, the tanktop may be overstressed unless the cargo is evenly spread across the tanktop to equalize the weight distribution. Due consideration shall be paid to ensure that the tanktop is not overstressed during the voyage and during loading by a pile of the cargo.

PRECAUTIONS

Bilge wells shall be clean, dry and covered as appropriate, to prevent ingress of the cargo. Bilge system of a cargo space to which this cargo is to be loaded shall be tested to ensure it is working.

VENTILATION

The cargo spaces carrying this cargo shall not be ventilated during voyage.

CARRIAGE

The appearance of the surface of this cargo shall be checked regularly during voyage. If free water above the cargo or fluid state of the cargo is observed during voyage, the master shall take appropriate actions to prevent cargo shifting and potential capsize of the ship, and give consideration to seeking emergency entry into a place of refuge.

DISCHARGE

No special requirements.

CLEAN-UP

No special requirements.

MONOAMMONIUM PHOSPHATE (M.A.P.)

DESCRIPTION
MAP is odourless and comes in the form of brownish-grey granules. It can be very dusty. Hygroscopic.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
35° to 40°	826 to 1000	1.0 to 1.21
SIZE	**CLASS**	**GROUP**
Not applicable	Not applicable	C

HAZARD
Bulk MAP has a pH of 4.5 and in the presence of moisture content can be highly corrosive.
This cargo is non-combustible or has a low fire-risk.
This cargo is hygroscopic and will cake if wet.
This cargo will decompose burlap or canvas cloth covering bilge wells. Continuous carriage of this cargo may have detrimental structural effects over a long period of time.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
Clean and dry as relevant to the hazards of the cargo.

WEATHER PRECAUTIONS
This cargo shall be kept as dry as practicable. This cargo shall not be handled during precipitation. During handling of this cargo all non-working hatches of the cargo spaces into which this cargo is loaded or to be loaded shall be closed.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
Appropriate precautions shall be taken to protect machinery and accommodation spaces from the dust of the cargo. Bilge wells of the cargo spaces shall be protected from ingress of the cargo. Due consideration shall be paid to protect equipment from the dust of the cargo. Persons who may be exposed to the dust of the cargo shall wear goggles or other equivalent dust eye-protection and dust filter masks. Those persons shall wear protective clothing, as necessary.

VENTILATION
The cargo spaces carrying this cargo shall not be ventilated during voyage.

CARRIAGE
Condensation in the cargo spaces carrying this cargo, sweating of this cargo and entering of water from hatch covers to the cargo spaces shall be checked regularly during the voyage. Due attention shall be paid to the sealing of hatches of the cargo spaces.

DISCHARGE
If this cargo has hardened, it shall be trimmed to avoid the formation of overhangs, as necessary.

CLEAN-UP
After discharge of this cargo, particular attention shall be paid to bilge wells of the cargo spaces.

PEANUTS (in shell)

DESCRIPTION
An edible, tan coloured nut. Variable moisture content. Extremely dusty.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	304	3.29
SIZE	**CLASS**	**GROUP**
Not applicable	Not applicable	C

HAZARD
May heat spontaneously.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
"Away from" sources of heat.

HOLD CLEANLINESS
Clean and dry as relevant to the hazards of the cargo.

WEATHER PRECAUTIONS
No special requirements.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
Appropriate precautions shall be taken to protect machinery and accommodation spaces from the dust of the cargo. Bilge wells of the cargo spaces shall be protected from ingress of the cargo. Due consideration shall be paid to protect equipment from the dust of the cargo. Persons who may be exposed to the dust of the cargo shall wear protective clothing, goggles or other equivalent dust eye-protection and dust filter masks, as necessary.

VENTILATION
The cargo spaces carrying this cargo shall not be ventilated during voyage.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

PEAT MOSS

DESCRIPTION

Surface mined from mires, bogs, fens, muskeg and swamps. Types include moss peat, sedge peat and grass peat. Physical properties depend on organic matter, water and air content, botanical decomposition and degree of decomposition.

May range from a highly fibrous cohesive mass of plant remains which when squeezed in its natural state exudes clear to slightly coloured water, to a well decomposed, largely amorphous material with little or no separation of liquid from solids when squeezed.

Typically air-dried peat has low density, high compressibility and high water content; in its natural state it can hold 90 percent or more of water by weight of water when saturated.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	80 to 500	2 to 12.5
SIZE	**CLASS**	**GROUP**
Fine Powder	MHB	A and B

HAZARD

Oxygen depletion and an increase in carbon dioxide in cargo and adjacent spaces.

Risk of dust explosion when loading. Caution should be exercised when walking or landing heavy machinery on the surface of uncompressed Peat Moss.

Peat Moss having a moisture content of more than 80% by weight should only be carried on specially fitted or constructed ships (see paragraphs 7.2.2 to 7.2.4 of this Code).

Dust may cause eye, nose and respiratory irritation.

STOWAGE & SEGREGATION

No special requirements.

HOLD CLEANLINESS

Clean and dry as relevant to the hazards of the cargo.

WEATHER PRECAUTIONS

Prior to loading, this cargo shall be stockpiled under cover to effect drainage for reduction of moisture content. This cargo shall be kept as dry as practicable. This cargo shall not be handled during precipitation. During handling of this cargo all non-working hatches of the cargo spaces into which this cargo is loaded or to be loaded shall be closed.

LOADING

Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS

Bilge wells shall be clean, dry and covered as appropriate, to prevent ingress of the cargo.
Appropriate precautions shall be taken to protect machinery and accommodation spaces from the dust of the cargo. Bilge wells of the cargo spaces shall be protected from ingress of the cargo. Due consideration shall be paid to protect equipment from the dust of the cargo. Persons who may be exposed to the dust of the cargo shall wear goggles or other equivalent dust eye-protection and dust filter masks. Those persons shall wear protective clothing, as necessary.
All personnel of the ship carrying this cargo and all personnel involved in handling of this cargo shall be cautioned that washing hands before eating or smoking and prompt treatment of cuts and scrapes are necessary in case of contact with this cargo or its dust. Entry of personnel into cargo spaces shall not be permitted until tests have been carried out and it has been established that the oxygen content has been restored to a normal level.

VENTILATION

Surface ventilation only, either natural or mechanical, shall be conducted, as necessary, during the voyage for this cargo.

CARRIAGE

No special requirements.

DISCHARGE

No special requirements.

CLEAN-UP

No special requirements.

EMERGENCY PROCEDURES

SPECIAL EMERGENCY EQUIPMENT TO BE CARRIED Nil
EMERGENCY PROCEDURES Nil **EMERGENCY ACTION IN THE EVENT OF FIRE** Batten down; use ship's fixed fire-fighting installation if fitted. Exclusion of air may be sufficient to control fire. **MEDICAL FIRST AID** Refer to the Medical First Aid Guide (MFAG), as amended.

PEBBLES (sea)

DESCRIPTION
Round pebbles. Rolls very easily.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	1695	0.59
SIZE	**CLASS**	**GROUP**
30 mm to 110 mm	Not applicable	C

HAZARD
No special hazards.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
No special requirements.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
This cargo shall be loaded carefully to prevent damage to the tanktop.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

PELLETS (concentrates)

DESCRIPTION
Concentrate ore which has been pelletized. Moisture up to 6%.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	2128	0.47
SIZE	**CLASS**	**GROUP**
10 mm approximately	Not applicable	C

HAZARD
No special hazards.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
Clean and dry as relevant to the hazards of the cargo.

WEATHER PRECAUTIONS
No special requirements.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
No special requirements.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

PERLITE ROCK

DESCRIPTION
Clay-like and dusty. Light grey. Odourless. Moisture: 0.5% to 1%.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	943 to 1020	0.98 to 1.06
SIZE	**CLASS**	**GROUP**
Not applicable	Not applicable	C

HAZARD
No special hazards.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
No special requirements.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
Appropriate precautions shall be taken to protect machinery and accommodation spaces from the dust of the cargo. Bilge wells of the cargo spaces shall be protected from ingress of the cargo. Due consideration shall be paid to protect equipment from the dust of the cargo. Persons who may be exposed to the dust of the cargo shall wear protective clothing, goggles or other equivalent dust eye-protection and dust filter masks, as necessary.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

PETROLEUM COKE (calcined or uncalcined)

DESCRIPTION

Black, finely divided residue from petroleum refining in the form of powder and small pieces. The provisions of this schedule should not apply to materials having a temperature below 55°C when loaded.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	599 to 800	1.25 to 1.67
SIZE	**CLASS**	**GROUP**
Powder to small pieces	MHB	B

HAZARD

Uncalcined petroleum coke is liable to heat and ignite spontaneously when not loaded and transported under the provisions of this entry.

This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION

"Separated from" foodstuffs.

"Separated longitudinally by an intervening complete compartment or hold from" all goods of class 1, divisions 1.1 and 1.5.

"Separated by a complete compartment or hold from" all other hazardous materials and dangerous goods (goods in packaged form and solid bulk materials).

HOLD CLEANLINESS

Clean and dry as relevant to the hazards of the cargo.

WEATHER PRECAUTIONS

No special requirements.

LOADING

1 When the cargo is loaded in a cargo space over a tank containing fuel or other material having a flashpoint under 93°C, the cargo having temperature of 55°C or higher shall not be loaded in the cargo space, unless part of the cargo having temperature 44°C or lower is loaded in a layer of at least 0.6 m thickness throughout the cargo space prior to loading the cargo having temperature of 55°C or higher.

2 When the cargo having temperature of 55°C or higher is loaded in accordance with the above requirement and the thickness of the layer of the cargo to be loaded is bigger than 1.0 m, the cargo shall first be loaded within a layer, the thickness of which is between 0.6 m and 1.0 m.

3 After the completion of loading operation specified in the above paragraphs, the loading operation may proceed.

The cargo shall be trimmed in accordance with the cargo information required by section 4 of this Code.

PRECAUTIONS
This cargo shall not be loaded when the temperature of this cargo exceeds 107°C. The master shall post warnings about the high temperature of this cargo near the cargo spaces.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

EMERGENCY PROCEDURES

SPECIAL EMERGENCY EQUIPMENT TO BE CARRIED Protective clothing (gloves, boots, coveralls, headgear). Self-contained breathing apparatus. Spray nozzles.
EMERGENCY PROCEDURES Wear protective clothing and self-contained breathing apparatus. **EMERGENCY ACTION IN THE EVENT OF FIRE** Batten down; use of ship's fixed fire-fighting installation if available. Exclusion of air may be sufficient to control fire. **MEDICAL FIRST AID** Refer to the Medical First Aid Guide (MFAG), as amended.

PHOSPHATE (defluorinated)

DESCRIPTION
Granular, similar to fine sand. Shipped dry. Dark grey. No moisture content.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	893	1.12
SIZE	**CLASS**	**GROUP**
Not applicable	Not applicable	C

HAZARD
No special hazards.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
No special requirements.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
Appropriate precautions shall be taken to protect machinery and accommodation spaces from the dust of the cargo. Bilge wells of the cargo spaces shall be protected from ingress of the cargo. Due consideration shall be paid to protect equipment from the dust of the cargo. Persons who may be exposed to the dust of the cargo shall wear protective clothing, goggles or other equivalent dust eye-protection and dust filter masks, as necessary.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

PHOSPHATE ROCK (calcined)

DESCRIPTION
Usually in the form of fine ground rock or prills. Extremely dusty. Hygroscopic.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	794 to 1563	0.64 to 1.26
SIZE	**CLASS**	**GROUP**
Not applicable	Not applicable	C

HAZARD
No special hazards.
This cargo is non-combustible or has a low fire-risk.
This cargo is hygroscopic and will cake if wet.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
This cargo shall be kept as dry as practicable before loading, during loading and during voyage. This cargo shall not be loaded during precipitation. During loading of this cargo all non-working hatches of the cargo spaces to which this cargo are loaded or to be loaded shall be closed.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
Appropriate precautions shall be taken to protect machinery and accommodation spaces from the dust of the cargo. Bilge wells of the cargo spaces shall be protected from ingress of the cargo. Due consideration shall be paid to protect equipment from the dust of the cargo. Persons who may be exposed to the dust of the cargo shall wear protective clothing, goggles or other equivalent dust eye-protection and dust filter masks, as necessary.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE
If this cargo has hardened, it shall be trimmed to avoid the formation of overhangs, as necessary.

CLEAN-UP
No special requirements.

PHOSPHATE ROCK (uncalcined)

DESCRIPTION
Phosphate rock is an ore in which phosphorus and oxygen are chemically united. Depending on the source, it is tan to dark grey, dry and dusty. Moisture: 0% to 2%. Depending on its source this cargo may have flow characteristic, but once settled it is not liable to shift.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	1250 to 1429	0.70 to 0.80
SIZE	**CLASS**	**GROUP**
Powder to lumps	Not applicable	C

HAZARD
No special hazards.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
No special requirements.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
Appropriate precautions shall be taken to protect machinery and accommodation spaces from the dust of the cargo. Bilge wells of the cargo spaces shall be protected from ingress of the cargo. Due consideration shall be paid to protect equipment from the dust of the cargo. Persons who may be exposed to the dust of the cargo shall wear protective clothing, goggles or other equivalent dust eye-protection and dust filter masks, as necessary.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

PIG IRON

DESCRIPTION
Foundry pig iron is cast in 28 grades into 20 kg pigs. In a random heap, pig iron occupies approximately 50% of the apparent volume.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	3333 to 3571	0.28 to 0.30
SIZE	**CLASS**	**GROUP**
550 mm x 90 mm x 80 mm	Not applicable	C

HAZARD
No special hazards.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
No special requirements.

LOADING
This cargo is usually loaded using tubs. In such case, tubs are usually lowered by a crane into the hold and the contents are spilled out. When this cargo is loaded using tubs, the first few tubs shall be lowered onto the tanktop to avoid damage.

Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

As the density of the cargo is extremely high, the tanktop may be overstressed unless the cargo is evenly spread across the tanktop to equalize the weight distribution. Due consideration shall be paid to ensure that tanktop is not overstressed during voyage and during loading by a pile of the cargo.

PRECAUTIONS
No special requirements.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP
Prior to washing out the residues of this cargo, the bilge wells of the cargo spaces shall be cleaned.

PITCH PRILL

DESCRIPTION
Pitch Prill is made from tar produced during the coking of coal. It is black with a distinctive odour. It is extruded into its characteristic pencil shape to make handling easier.
Cargo softens between 40°C to 50°C. Melting point: 105°C to 107°C.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	500 to 800	1.25 to 2.0
SIZE	**CLASS**	**GROUP**
9 mm diameter and up to 0.7 cm long	MHB	B

HAZARDS
Melts when heated. Combustible, burns with a dense black smoke. Dust may cause skin and eye irritation. Normally this cargo has a low fire-risk. However powder of the cargo is easy to ignite and may cause fire and explosion. Special care should be taken for preventing fire during loading or discharging.

STOWAGE & SEGREGATION
Segregation as required for class 4.1 materials.

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
Refer to the appendix to this schedule.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

This cargo shall not be stowed in a cargo space adjacent to heated tanks to avoid softening and melting of the cargo.

PRECAUTIONS
Refer to the appendix to this schedule.

VENTILATION
Surface ventilation only, either natural or mechanical, shall be conducted, as necessary, during the voyage for this cargo.

CARRIAGE
After the completion of loading of this cargo, the hatches of the cargo spaces shall be sealed. Condensation in the cargo spaces carrying this cargo shall be checked regularly during voyage.

DISCHARGE
Adequate measures shall be taken to prevent dust generation.

CLEAN-UP
No special requirements.

EMERGENCY PROCEDURES

SPECIAL EMERGENCY EQUIPMENT TO BE CARRIED

Protective clothing, gloves, boots, overalls, and headgear.
Self-contained breathing apparatus, spray nozzles.

EMERGENCY PROCEDURES

Wear protective clothing and self contained breathing apparatus.

EMERGENCY ACTION IN THE EVENT OF A FIRE

Batten down: use ship's fixed fire-fighting installation if available.
Exclusion of air may be sufficient to control fire.

MEDICAL FIRST AID

Refer to the Medical First Aid Guide (MFAG), as amended.

APPENDIX

PITCH PRILL

General precautions:

1. Personnel engaged in loading shall be supplied with gloves, dust masks, approved protective clothing and goggles.

2. Eyewashes and sun screen creams shall be readily available.

3. Number of personnel in area of loading shall be kept to a minimum. Personnel in area of loading shall be aware of all the hazards involved.

4. Personnel engaged in the handling of this cargo shall wash well and keep out of the sun for a few days, after the cargo handling.

5. The hatch shall be closed after loading or discharge has ceased and the ship shall be washed out to remove all dust.

6. Due consideration shall be paid on suspending the cargo handling when wind is blowing dust.

7. After completion of discharging this cargo, the deck shall be cleaned up to remove all spillages.

8. Ventilation of the accommodation spaces shall be closed and the air conditioning systems for the accommodation spaces shall be on re-cycle mode when this cargo is being handled – either loading or discharging.

9. The cargo dust is easily ignited and may cause fire and explosion. Special care shall be taken to prevent fire during loading and discharging the cargo.

POTASH

DESCRIPTION
Brown, pink or white in colour, potash is produced in granular crystals. It is odourless and hygroscopic.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
32° to 35°	971 to 1299	0.77 to 1.03
SIZE	**CLASS**	**GROUP**
Powder to 4 mm	Not applicable	C

HAZARD
No special hazards.
This cargo is non-combustible or has a low fire-risk. This cargo is hygroscopic and will cake if wet.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
This cargo shall be kept as dry as practicable before loading, during loading and during voyage. This cargo shall not be loaded during precipitation. During loading of this cargo all non-working hatches of the cargo spaces to which this cargo are loaded or to be loaded shall be closed.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
No special requirements.

VENTILATION
The cargo spaces carrying this cargo shall not be ventilated during voyage.

CARRIAGE
After the completion of loading of this cargo, the hatches of the cargo spaces shall be sealed to prevent water ingress, as necessary.

DISCHARGE
If this cargo has hardened, it shall be trimmed to avoid the formation of overhangs, as necessary.

CLEAN-UP
This cargo is mildly corrosive. After discharge of this cargo, the cargo spaces and the bilge wells shall be thoroughly swept clean and washed out to remove all traces of the cargo, except in the case that the cargo to be loaded has the same BCSN of the cargo to be loaded subsequent to discharge is POTASH.

POTASSIUM CHLORIDE

DESCRIPTION
Brown, pink or white in colour, powder. Potassium Chloride is produced in granular crystals. It is odourless and is soluble in water. Hygroscopic.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
30° to 47°	893 to 1235	0.81 to 1.12
SIZE	**CLASS**	**GROUP**
Up to 4 mm	Not applicable	C

HAZARD
Even though this cargo is classified as non-hazardous, it may cause heavy corrosion when wet.
This cargo is non-combustible or has a low fire-risk.
This cargo is hygroscopic and will cake if wet.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
Clean and dry as relevant to the hazards of the cargo.

WEATHER PRECAUTIONS
This cargo shall be kept as dry as practicable. This cargo shall not be handled during precipitation. During handling of this cargo all non-working hatches of the cargo spaces into which this cargo is loaded or to be loaded shall be closed.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
No special requirements.

VENTILATION
The cargo spaces carrying this cargo shall not be ventilated during voyage.

CARRIAGE
After the completion of loading of this cargo, the hatches of the cargo spaces shall be sealed to prevent water ingress.

DISCHARGE
If this cargo has hardened, it shall be trimmed to avoid the formation of overhangs, as necessary.

CLEAN-UP
After discharge of this cargo, the cargo spaces and the bilge wells shall be swept clean and thoroughly washed out.

POTASSIUM NITRATE UN 1486

DESCRIPTION
Transparent, colourless or white crystalline powder or crystals. Hygroscopic.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
30° to 31°	1136	0.88
SIZE	**CLASS**	**GROUP**
Crystals or powder	5.1	B

HAZARD
Oxidizes when wet. Mixtures with combustible materials are readily ignited and may burn fiercely.
This cargo is hygroscopic and will cake if wet.

STOWAGE & SEGREGATION
"Separated from" foodstuffs.

HOLD CLEANLINESS
Clean and dry as relevant to the hazards of the cargo.

WEATHER PRECAUTIONS
This cargo shall be kept as dry as practicable. This cargo shall not be handled during precipitation. During handling of this cargo all non-working hatches of the cargo spaces into which this cargo is loaded or to be loaded shall be closed.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
Due regard shall be paid to prevent contact of the cargo and combustible materials.

VENTILATION
The cargo spaces carrying this cargo shall not be ventilated during voyage.

CARRIAGE
No special requirements.

DISCHARGE
If this cargo has hardened, it shall be trimmed to avoid the formation of overhangs, as necessary.

CLEAN-UP
No special requirements.

EMERGENCY PROCEDURES

SPECIAL EMERGENCY EQUIPMENT TO BE CARRIED

Protective clothing (gloves, boots, coveralls, headgear).
Self-contained breathing apparatus.
Spray nozzles.

EMERGENCY PROCEDURES

Wear protective clothing and self-contained breathing apparatus.

EMERGENCY ACTION IN THE EVENT OF FIRE

Use copious quantities of water, which is best, applied in the form of a spray to avoid disturbing the surface of the material.
The material may fuse or melt, in which condition application of water may result in extensive scattering of the molten materials.
Exclusion of air or the use of CO_2 will not control the fire.
Due consideration should be given to the effect on the stability of the ship due to accumulated water.

MEDICAL FIRST AID

Refer to the Medical First Aid Guide (MFAG), as amended.

REMARKS
This material is non-combustible unless contaminated.

POTASSIUM SULPHATE

DESCRIPTION
Hard crystals or powder. Colourless or white.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
31°	1111	0.90
SIZE	**CLASS**	**GROUP**
Not applicable	Not applicable	C

HAZARD
No special hazards.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
No special requirements.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
No special requirements.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

PUMICE

DESCRIPTION
Highly porous rock of volcanic origin. Greyish-white.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	308 to 526	1.90 to 3.25
SIZE	**CLASS**	**GROUP**
Powder to lumps	Not applicable	C

HAZARD
No special hazards.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
No special requirements.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
No special requirements.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

PYRITE (containing copper and iron)
This cargo can be categorized as Group A or C. This cargo entry is for cargo in Group C.

DESCRIPTION
Iron disulphide, containing copper and iron. Moisture 0% to 7%. Extremely dusty.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	2000 to 3030	0.33 to 0.50
SIZE	**CLASS**	**GROUP**
Fines to lumps of 300 mm	Not applicable	C

HAZARD
No special hazards.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
No special requirements.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

As the density of the cargo is extremely high, the tanktop may be overstressed unless the cargo is evenly spread across the tanktop to equalize the weight distribution. Due consideration shall be paid to ensure that tanktop is not overstressed during voyage and during loading by a pile of the cargo.

PRECAUTIONS
Appropriate precautions shall be taken to protect machinery and accommodation spaces from the dust of the cargo. Bilge wells of the cargo spaces shall be protected from ingress of the cargo. Due consideration shall be paid to protect equipment from the dust of the cargo. Persons who may be exposed to the dust of the cargo shall wear protective clothing, goggles or other equivalent dust eye-protection and dust filter masks, as necessary.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

PYRITES, CALCINED (Calcined Pyrites)

DESCRIPTION

Dust to fines, Calcined Pyrites is the residual product from the chemical industry where all types of metal sulphides are either used for the production of sulphuric acid or are processed to recover the elemental metals – copper, lead, zinc, etc. The acidity of the residue can be considerable, in particular, in the presence of water or moist air, where pH values between 1.3 and 2.1 are frequently noted.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	2326	0.43
SIZE	**CLASS**	**GROUP**
Not applicable	MHB	A and B

HAZARD

Highly corrosive to steel when wet. Inhalation of dust is irritating and harmful. Cargo may liquefy.

This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION

"Separated from" foodstuffs.

HOLD CLEANLINESS

Due consideration shall be paid to cleaning and drying of the cargo spaces.

WEATHER PRECAUTIONS

This cargo shall be kept as dry as practicable before loading, during loading and during voyage. This cargo shall not be loaded during precipitation. During loading of this cargo all non-working hatches of the cargo spaces to which this cargo are loaded or to be loaded shall be closed.

LOADING

Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

As the density of the cargo is extremely high, the tanktop may be overstressed unless the cargo is evenly spread across the tanktop to equalize the weight distribution. Due consideration shall be paid to ensure that tanktop is not overstressed during voyage and during loading by a pile of the cargo.

PRECAUTIONS

Bilge wells shall be clean, dry and covered as appropriate, to prevent ingress of the cargo. Ceiling boards shall be removed or sealed to prevent penetration by this cargo. The tanktop on which this cargo is to be loaded shall be covered with lime before loading.

Appropriate precautions shall be taken to protect machinery and accommodation spaces from the dust of the cargo. Bilge wells of the cargo spaces shall be protected from ingress of the cargo. Due consideration shall be paid to protect equipment from the dust of the cargo. Persons who may be exposed to the dust of the cargo shall wear goggles or other equivalent dust eye-protection and dust filter masks. Those persons shall wear protective clothing, as necessary.

VENTILATION
No special requirements.

CARRIAGE
After the completion of loading of this cargo, the hatches of the cargo spaces shall be sealed to prevent water ingress, as necessary.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

EMERGENCY PROCEDURES

SPECIAL EMERGENCY EQUIPMENT TO BE CARRIED Nil
EMERGENCY PROCEDURES Nil **EMERGENCY ACTION IN THE EVENT OF FIRE** Nil (non-combustible). **MEDICAL FIRST AID** Refer to the Medical First Aid Guide (MFAG), as amended.

PYROPHYLLITE

DESCRIPTION
A natural hydrous aluminum silicate. Chalk-white. May be dusty.
Lumps: 75%, Rubble: 20%, Fines: 5%.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	2000	0.50
SIZE	**CLASS**	**GROUP**
Lump to fine	Not applicable	C

HAZARD
No special hazards.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
No special requirements.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
Appropriate precautions shall be taken to protect machinery and accommodation spaces from the dust of the cargo. Bilge wells of the cargo spaces shall be protected from ingress of the cargo. Due consideration shall be paid to protect equipment from the dust of the cargo. Persons who may be exposed to the dust of the cargo shall wear protective clothing, goggles or other equivalent dust eye-protection and dust filter masks, as necessary.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

QUARTZ

DESCRIPTION
Crystalline lumps.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	1667	0.60
SIZE	**CLASS**	**GROUP**
Lumps: 50 mm to 300 mm	Not applicable	C

HAZARD
No special hazards.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
No special requirements.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
No special requirements.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

QUARTZITE

DESCRIPTION
Quartzite is a compact, granular, metamorphosed sandstone containing quartz. It is white, red, brown or grey in colour and its size varies from large rocks to pebbles. It may also be shipped in semi-crushed and graded sizes.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	1563	0.64
SIZE	**CLASS**	**GROUP**
10 mm to 200 mm	Not applicable	C

HAZARD
No special hazards.
Dust of this cargo is very abrasive. This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
No special requirements.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
Protect machinery and equipment from dust. Appropriate precautions shall be taken to protect machinery and accommodation spaces from the dust of the cargo. Bilge wells of the cargo spaces shall be protected from ingress of the cargo. Due consideration shall be paid to protect equipment from the dust of the cargo. Persons who may be exposed to the dust of the cargo shall wear goggles or other equivalent dust eye-protection and dust filter masks. Those persons shall wear protective clothing, as necessary.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-1) non-fissile or fissile-excepted UN 2912

DESCRIPTION
This schedule includes ores containing naturally occurring radionuclides (e.g., uranium, thorium) and natural or depleted uranium and thorium concentrates of such ores, including metals, mixtures and compounds.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	-	-
SIZE	**CLASS**	**GROUP**
Not applicable	7	B

HAZARD
Low radiotoxicity. Some materials may possess chemical hazards.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
"Separated from" foodstuffs.

HOLD CLEANLINESS
Clean and dry as relevant to the hazards of the cargo.

WEATHER PRECAUTIONS
This cargo shall be kept as dry as practicable. This cargo shall not be handled during precipitation. During handling of this cargo all non-working hatches of the cargo spaces into which this cargo is loaded or to be loaded shall be closed.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
Personnel shall not be unnecessarily exposed to dust of this cargo. Persons who may be exposed to the dust of the cargo shall wear protective clothing, goggles or other equivalent dust eye-protection and facemasks. There shall be no leakage outside the cargo space in which this cargo is stowed.

VENTILATION
The cargo spaces carrying this cargo shall not be ventilated during voyage.

CARRIAGE
All instructions provided by the shipper shall be followed for the carriage of this cargo.

DISCHARGE
All instructions provided by the shipper shall be followed for the discharge of this cargo.

CLEAN-UP
Cargo spaces used for this cargo shall not be used for other goods until decontaminated. Refer to subsection 9.3.2.3 of this Code.

EMERGENCY PROCEDURES

SPECIAL EMERGENCY EQUIPMENT TO BE CARRIED Protective clothing (gloves, boots, coveralls, headgear). Self-contained breathing apparatus.
EMERGENCY PROCEDURES Wear protective clothing and self-contained breathing apparatus. **EMERGENCY ACTION IN THE EVENT OF FIRE** Batten down; use ship's fixed fire-fighting installation, if fitted. Use water spray to control spread of dust, if necessary. **MEDICAL FIRST AID** Refer to the Medical First Aid Guide (MFAG), as amended. Radio for medical advice.

REMARKS
Most materials are likely to be non-combustible. Speedily collect and isolate potentially contaminated equipment and cover. Seek expert advice.

RADIOACTIVE MATERIAL SURFACE CONTAMINATED OBJECTS (SCO-1), non-fissile or fissile-excepted UN 2913

DESCRIPTION

The radioactivity of SCO-1 is low. This schedule includes solid objects of non-radioactive material having a radioactive material distributed on its surfaces which:

1. the non-fixed contamination on the accessible surface, averaged over 300 cm^2 (or the area of the surface if less than 300 cm^2), does not exceed 4 Bq/cm^2 for beta and gamma emitters and low-toxicity alpha emitter, or 0.4 Bq/cm^2 for all other alpha emitters;
2. the fixed contamination on the accessible surface, averaged over 300 cm^2 (or the area of the surface if less than 300 cm^2), does not exceed 4×10^4 Bq/cm^2 for beta and gamma emitters and low-toxicity alpha emitters, or 4×10^3 Bq/cm^2 for all other alpha emitters; and
3. the non-fixed contamination plus the fixed contamination on the inaccessible surface, averaged over 300 cm^2 (or the area of the surface if less than 300cm^2), does not exceed 4×10^4 Bq/cm^2 for beta and gamma emitters and low-toxicity alpha emitters, or 4×10^3 Bq/cm^2 for all other alpha emitters.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	-	-
SIZE	**CLASS**	**GROUP**
Not applicable	7	B

HAZARD

Low radioactivity.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION

"Separated from" foodstuffs.

HOLD CLEANLINESS

Clean and dry as relevant to the hazards of the cargo.

WEATHER PRECAUTIONS

This cargo shall be kept as dry as practicable. This cargo shall not be handled during precipitation. During handling of this cargo all non-working hatches of the cargo spaces into which this cargo is loaded or to be loaded shall be closed.

LOADING

Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
Personnel shall not be exposed to dust of this cargo. Persons who may be exposed to the dust of the cargo shall wear protective clothing, goggles and facemasks. There shall be no leakage outside the cargo space in which this cargo is stowed.

VENTILATION
The cargo spaces carrying this cargo shall not be ventilated during voyage.

CARRIAGE
All instructions provided by the shipper shall be followed for the carriage of this cargo.

DISCHARGE
All instructions provided by the shipper shall be followed for the discharge of this cargo.

CLEAN-UP
Cargo spaces used for this cargo shall not be used for other goods until decontaminated. Refer to subsection 9.3.2.3 of this Code.

EMERGENCY PROCEDURES

SPECIAL EMERGENCY EQUIPMENT TO BE CARRIED Protective clothing (gloves, boots, coveralls, headgear). Self-contained breathing apparatus.
EMERGENCY PROCEDURES Wear protective clothing and self-contained breathing apparatus. **EMERGENCY ACTION IN THE EVENT OF FIRE** Batten down; use ship's fixed fire-fighting installation, if fitted. Use water spray to control spread of dust, if necessary. **MEDICAL FIRST AID** Refer to the Medical First Aid Guide (MFAG), as amended. Radio for medical advice.

REMARKS
Most materials are likely to be non-combustible. Speedily collect and isolate potentially contaminated equipment and cover. Seek expert advice.

RASORITE (ANHYDROUS)

DESCRIPTION
A granular, yellow-white crystalline material with little or no dust. Abrasive. Hygroscopic.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	1282 to 1493	0.67 to 0.78
SIZE	**CLASS**	**GROUP**
Less than 2.36 mm	Not applicable	C

HAZARD
No special hazards.
This cargo is non-combustible or has a low fire-risk.
This cargo is hygroscopic and will cake if wet.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
No special requirements.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
No special requirements.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE
If this cargo has hardened, it shall be trimmed to avoid the formation of overhangs, as necessary.

CLEAN-UP
No special requirements.

RUTILE SAND

DESCRIPTION
Fine particled brown to black sand. Abrasive. Shipped dry. May be dusty.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	2500 to 2700	0.37 to 0.40
SIZE	**CLASS**	**GROUP**
0.15 mm or less	Not applicable	C

HAZARD
No special hazards.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
This cargo shall be kept as dry as practicable before loading, during loading and during voyage. This cargo shall not be loaded during precipitation. During loading of this cargo all non-working hatches of the cargo spaces to which this cargo are loaded or to be loaded shall be closed.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

As the density of the cargo is extremely high, the tanktop may be overstressed unless the cargo is evenly spread across the tanktop to equalize the weight distribution. Due consideration shall be paid to ensure that tanktop is not overstressed during voyage and during loading by a pile of the cargo.

PRECAUTIONS
Bilge wells shall be clean, dry and covered as appropriate, to prevent ingress of the cargo.
Appropriate precautions shall be taken to protect machinery and accommodation spaces from the dust of the cargo. Bilge wells of the cargo spaces shall be protected from ingress of the cargo. Due consideration shall be paid to protect equipment from the dust of the cargo. Persons who may be exposed to the dust of the cargo shall wear goggles or other equivalent dust eye-protection and dust filter masks. Those persons shall wear protective clothing, as necessary.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

SALT

DESCRIPTION
Fine white grains. Moisture variable to 5.5%. This cargo is highly soluble. In the case of ingress of water into the holds, there is a risk to the loss of the stability of the ship through dissolution of this cargo (formation of a wet base and shifting of cargo).

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	893 to 1235	0.81 to 1.12
SIZE	**CLASS**	**GROUP**
Grains up to 12 mm	Not applicable	C

HAZARD
No special hazards.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
Clean and dry as relevant to the hazards of the cargo.

WEATHER PRECAUTIONS
This cargo shall be kept as dry as practicable. This cargo shall not be handled during precipitation. During handling of this cargo all non-working hatches of the cargo spaces into which this cargo is loaded or to be loaded shall be closed.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
The parts of the cargo space in contact with the cargo such as tanktops, hoppers, side plating and bulkheads shall be lime-washed or coated with paint to prevent corrosion.

VENTILATION
The cargo spaces carrying this cargo shall not be ventilated during voyage.

CARRIAGE
After the completion of loading of this cargo, the hatches of the cargo spaces shall be sealed.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

SALT CAKE

DESCRIPTION
Impure sodium sulphate. White in colour. Granular, shipped dry.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	1052 to 1124	0.89 to 0.95
SIZE	**CLASS**	**GROUP**
10 mm to 200 mm	Not applicable	C

HAZARD
No special hazards.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
No special requirements.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
No special requirements.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

SALT ROCK

DESCRIPTION
White. Moisture content 0.02%.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	943 to 1020	0.98 to 1.06
SIZE	**CLASS**	**GROUP**
Small granules	Not applicable	C

HAZARD
No special hazards.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
No special requirements.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
No special requirements.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

SAND

DESCRIPTION
Usually fine particles. Abrasive and dusty.
Sands included in this schedule are:

FOUNDRY SAND
POTASSIUM FELSPAR SAND
QUARTZ SAND
SILICA SAND
SODA FELSPAR SAND

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	1020 to 2000	0.50 to 0.98
SIZE	**CLASS**	**GROUP**
0.1 mm to 5 mm	Not applicable	C

HAZARD
Inhalation of silica dust can result in respiratory disease. Silica particulates are easily transported by air and inhaled.
Industrial sand may be coated with resin and will cake if exposed to heat (55°C to 60°C).
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
Industrial sand coated with resin shall be "separated from" sources of heat.

HOLD CLEANLINESS
Clean and dry as relevant to the hazards of the cargo.

WEATHER PRECAUTIONS
This cargo shall be kept as dry as practicable before loading, during loading and during voyage. This cargo shall not be loaded during precipitation. During loading of this cargo all non-working hatches of the cargo spaces to which this cargo are loaded or to be loaded shall be closed.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
Appropriate precautions shall be taken to protect machinery and accommodation spaces from the dust of the cargo. Bilge wells of the cargo spaces shall be protected from ingress of the cargo. Due consideration shall be paid to protect equipment from the dust of the cargo. Persons who may be exposed to the dust of the cargo shall wear goggles or other equivalent dust eye-protection and dust filter masks. Those persons shall wear protective clothing, as necessary.

VENTILATION
No special requirements.

CARRIAGE
The bilge wells of the cargo spaces carrying this cargo shall be kept dry.

DISCHARGE
No special requirements.

CLEAN-UP
After discharge of this cargo, particular attention shall be paid to bilge wells of the cargo spaces.

SAWDUST

DESCRIPTION
Fine particles of wood.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	-	-
SIZE	**CLASS**	**GROUP**
Not applicable	MHB	B

HAZARD
Liable to spontaneous combustion if not clean, dry and free from oil. Liable to cause oxygen depletion within the cargo space.

STOWAGE & SEGREGATION
Segregation as required for class 4.1 materials.
"Separated from" all class 5.1 liquids and all class 8 liquids.

HOLD CLEANLINESS
Clean and dry as relevant to the hazards of the cargo.

WEATHER PRECAUTIONS
This cargo shall be kept as dry as practicable. This cargo shall not be handled during precipitation. During handling of this cargo all non-working hatches of the cargo spaces into which this cargo is loaded or to be loaded shall be closed.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
Bilge wells shall be clean, dry and covered as appropriate, to prevent ingress of the cargo. Prior to loading this cargo, the shipper shall provide the master with a certificate stating that the cargo is clean, dry and free from oil.

VENTILATION
Surface ventilation only, either natural or mechanical, shall be conducted, as necessary, during the voyage for this cargo.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

EMERGENCY PROCEDURES

SPECIAL EMERGENCY EQUIPMENT TO BE CARRIED Nil
EMERGENCY PROCEDURES Nil **EMERGENCY ACTION IN THE EVENT OF FIRE** Batten down; use ship's fixed fire-fighting installation if fitted. Exclusion of air may be sufficient to control fire. **MEDICAL FIRST AID** Refer to the Medical First Aid Guide (MFAG), as amended.

SCRAP METAL

DESCRIPTION
"Scrap" iron or steel covers an enormous range of ferrous metals, principally intended for recycling.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	Varies	Varies
SIZE	**CLASS**	**GROUP**
Varies	Not applicable	C

HAZARD
No special hazards.
This cargo is non-combustible or has a low fire-risk except when cargo contains swarf (fine metal turnings liable to spontaneous combustion) refer to the entry for ferrous metal borings, shavings turnings or cutting in this Code.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
This cargo shall be kept as dry as practicable before loading, during loading and during voyage. This cargo shall not be loaded during precipitation. During loading of this cargo all non-working hatches of the cargo spaces to which this cargo are loaded or to be loaded shall be closed.

LOADING
Refer to the appendix to this schedule.

PRECAUTIONS
Refer to the appendix to this schedule.

VENTILATION
Surface ventilation only, either natural or mechanical, shall be conducted, as necessary, during the voyage for this cargo.

CARRIAGE
Bilges in the cargo spaces carrying this cargo shall not be pumped unless absolutely necessary. Bilgewater of this cargo may contain a certain amount of dirt and oil from old machinery. Refer to the appendix to this individual schedule.

DISCHARGE

When this cargo is discharged by magnet or spider grab:

.1 the deck and deck machineries shall be protected from falling cargo; and

.2 damages to the ship shall be checked, after the completion of discharge.

CLEAN-UP

Prior to cleaning up the cargo spaces for this cargo, the crew shall be informed of danger due to broken glass and sharp edges. Prior to washing out the residues of this cargo, any oil spillages shall be cleaned from the tanktops and the bilge wells of the cargo spaces for this cargo.

APPENDIX

SCRAP METAL

Handling of this cargo varies from magnets to spider grabs, depending usually on the size of material. This cargo may include articles from the size of car bodies to fine metal turnings (swarf). The weight of individual pieces will also vary greatly, ranging from heavy machinery to tin cans.

Loading

Before loading, the cargo spaces shall be prepared as per general loading practice and any areas liable to be damaged by falling cargo shall be protected with dunnage. This includes decks and coamings in way of the material's path to the cargo spaces. Removing the ship's side rails may be advisable.

A layer of this cargo shall be carefully placed over the tanktop in the square to cushion any fall out. Magnet and grab drivers shall be instructed not to release their loads too high above the pile.

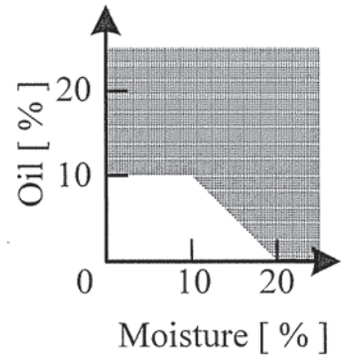
The usual method of loading is to form a pile along the ship's centre line and use the slope to roll material into the ends and sides. Every effort must be made to work the wings and ends to evenly distribute the weight. If this is not done, the light high volume pieces will roll to the wings and the small heavy pieces will concentrate in the square.

When pumping the bilge wells, the master shall be aware of that a certain amount of dirt and oil can be expected from old machinery. Broken glass and sharp jagged edges may be present and care shall be taken by personnel working near scrap.

Before hatches are closed, the cargo spaces shall be checked that no sharp projections could pierce the ship's side.

SEED CAKE, containing vegetable oil UN 1386
(a) mechanically expelled seeds, containing more than 10% of oil or more than 20% of oil and moisture combined.

The range of oil and moisture content is indicated in the figure.



To be carried in bulk only with special permission from the competent authority.

DESCRIPTION
Residue remaining after oil has been expelled mechanically from oil-bearing seeds. The cereals and cereal products included in this schedule are those derived from:

Bakery materials
Barley malt pellets
Beet
Bran pellets
Brewer's grain pellets
Citrus pulp pellets
Coconut
Copra
Corn gluten
Cotton seed
Expellers
Gluten pellets
Ground nuts, meal
Hominy chop
Linseed
Maize
Meal, oily
Mill feed pellets
Niger seed, expellers
Oil cake
Palm kernel
Peanuts
Pellets, cereal
Pollard pellets
Rape seed
Rice bran
Rice broken
Safflower seed
Seed expellers, oily
Soya bean
Strussa pellets
Sunflower seed
Toasted meals

The above may be shipped in the form of pulp, meals, cake, pellets and expellers.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	478 to 719	1.39 to 2.09
SIZE	**CLASS**	**GROUP**
Not applicable	4.2	B

HAZARD
May self-heat slowly and, if wet or containing an excessive proportion of unoxidized oil, ignite spontaneously. Liable to oxidize, causing subsequent reduction of oxygen in the cargo space. Carbon dioxide may be produced.

STOWAGE & SEGREGATION
No special requirements other than prescribed in section 9.3 of this Code.

HOLD CLEANLINESS
Clean and dry as relevant to the hazards of the cargo.

WEATHER PRECAUTIONS
This cargo shall be kept as dry as practicable. This cargo shall not be handled during precipitation. During handling of this cargo all non-working hatches of the cargo spaces into which this cargo is loaded or to be loaded shall be closed.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
This cargo shall only be accepted for loading when the temperature of the cargo is not higher than ambient temperature plus 10°C or 55°C, whichever is lower. Before shipment, this cargo shall be properly aged; the duration of ageing required varies with the oil content. The competent authority may permit seed cakes described in this schedule to be carried under conditions governing SEED CAKE (b), when satisfied, as a result of tests, that such relaxation is justified (see following schedule). Certificates from the competent authority giving such permission shall state the oil content and moisture content. The temperature of this cargo shall be measured regularly at a number of depths in the cargo spaces and recorded during the voyage. If the temperature of the cargo reaches 55°C and continues to increase, ventilation to the cargo shall be stopped. If self-heating continues, then carbon dioxide or inert gas shall be introduced to the cargo space. Entry of personnel into cargo spaces for this cargo shall not be permitted until tests have been carried out and it has been established that the oxygen content has been restored to a normal level.

VENTILATION
The cargo spaces carrying this cargo shall not be mechanically ventilated during voyage to prevent self-heating of the cargo, except in case of emergency.

CARRIAGE
Hatches of the cargo spaces carrying this cargo shall be weathertight to prevent the ingress of water.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

EMERGENCY PROCEDURES

SPECIAL EMERGENCY EQUIPMENT TO BE CARRIED Self-contained breathing apparatus.
EMERGENCY PROCEDURES Wear self-contained breathing apparatus. **EMERGENCY ACTION IN THE EVENT OF FIRE** Batten down; use ship's fixed fire-fighting installation, if fitted. **MEDICAL FIRST AID** Refer to the Medical First Aid Guide (MFAG), as amended.

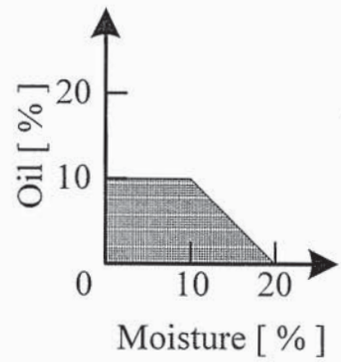
SEED CAKE, containing vegetable oil UN 1386
(b) solvent extractions and expelled seeds, containing not more than 10% of oil and when the amount of moisture is higher than 10%, not more than 20% of oil and moisture combined.

Note: This entry covers the following:

.1 all solvent extracted and expelled seed cakes containing not more than 10% oil, and not more than 10% moisture; and

.2 all solvent extracted and expelled seed cakes containing not more than 10% oil and moisture content higher than 10%, in which case, the oil and moisture combined must not exceed 20%.

The range of oil and moisture content is indicated in the figure.



When in solvent extracted seed cake, the oil or oil and moisture content exceeds the percentages stated above, guidance should be sought from the competent authorities.

DESCRIPTION
Residue remaining after oil has been extracted by a solvent process or expelled mechanically from oil-bearing seeds. The cereals and cereal products included in this schedule are those derived from:

Bakery materials
Barley malt pellets
Beet
Bran pellets
Brewer's grain pellets
Citrus pulp pellets
Coconut
Copra
Corn gluten
Cotton seed
Expellers
Gluten pellets
Ground nuts, meal
Hominy chop
Linseed
Maize
Meal, oily
Mill feed pellets
Niger seed, expellers
Oil cake
Palm kernel
Peanuts
Pellets, cereal
Pollard pellets
Rape seed
Rice bran
Rice broken
Safflower seed
Seed expellers, oily
Soya bean
Strussa pellets
Sunflower seed
Toasted meals

The above may be shipped in the form of pulp, meals, cake, pellets and expellers.
The provisions of this schedule should not apply to solvent extracted rape seed meal, pellets, soya bean meal, cotton seed meal and sunflower seed meal containing not more than 4% oil and 15% oil and moisture combined. A certificate from a person recognized by the competent authority of the country of shipment should be provided by the shipper, prior to loading, stating that the provisions for the exemption are met.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	478 to 719	1.39 to 2.09
SIZE	**CLASS**	**GROUP**
Not applicable	4.2	B

HAZARD
May self-heat slowly and, if wet or containing an excessive proportion of unoxidized oil, ignite spontaneously. Liable to oxidize, causing subsequent reduction of oxygen in the cargo space. Carbon dioxide may also be produced.

STOWAGE & SEGREGATION
No special requirements other than prescribed in section 9.3 of this Code.
If the bulkhead between the cargo space and the engine-room is not insulated to class A-60 standard, solvent extraction seed shall be stowed "away from" the bulkhead.

HOLD CLEANLINESS
Clean and dry as relevant to the hazards of the cargo.

WEATHER PRECAUTIONS
This cargo shall be kept as dry as practicable. This cargo shall not be handled during precipitation. During handling of this cargo all non-working hatches of the cargo spaces into which this cargo is loaded or to be loaded shall be closed.

LOADING
This cargo shall only be accepted for loading when the cargo is substantially free from flammable solvent and a certificate from a person recognized by the competent authority of the country of shipment specifying the oil content and moisture content is issued.
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
Before shipment, this cargo shall be properly aged; the duration of ageing required varies with the oil content. The temperature of this cargo shall be measured regularly at a number of depths in the cargo spaces and recorded during the voyage. If the temperature of the cargo reaches 55°C and continues to increase, ventilation to the cargo shall be stopped. If self-heating continues, then carbon dioxide or inert gas shall be introduced to the cargo space. In the case of solvent-extracted seed cakes the use of carbon dioxide or inert gas shall be withheld until it becomes apparent that fire is not liable to take place in the cargo space, to avoid the possibility of ignition of solvent vapours. Entry of personnel into cargo spaces for this cargo shall not be permitted until tests

have been carried out and it has been established that the oxygen content has been restored to a normal level. When the planned interval between the commencement of loading and the completion of discharge of this cargo exceeds 5 days, the cargo shall not be accepted for loading unless the cargo is to be carried in a cargo space equipped with facilities for introducing carbon dioxide or inert gas into the space. Smoking and the use of naked lights shall be prohibited in the vicinity of the cargo space during loading and unloading and on entry into the cargo spaces at any other time. Electrical circuits for equipment in cargo spaces which is unsuitable for use in an explosive atmosphere shall be isolated by removal of links in the system other than fuses. Spark-arresting screens shall be fitted to ventilators to the cargo spaces containing of this cargo.

VENTILATION

Surface ventilation either natural or mechanical should be conducted, as necessary, for removing any residual solvent vapour. To prevent self-heating of the cargo, caution is required when using mechanical ventilation.

CARRIAGE

Hatches of the cargo spaces carrying this cargo shall be weathertight to prevent the ingress of water.

DISCHARGE

No special requirements.

CLEAN-UP

No special requirements.

EMERGENCY PROCEDURES

SPECIAL EMERGENCY EQUIPMENT TO BE CARRIED Self-contained breathing apparatus.
EMERGENCY PROCEDURES Wear self-contained breathing apparatus. **EMERGENCY ACTION IN THE EVENT OF FIRE** Batten down. Use ship's fixed fire-fighting installation, if fitted. **MEDICAL FIRST AID** Refer to the Medical First Aid Guide (MFAG), as amended.

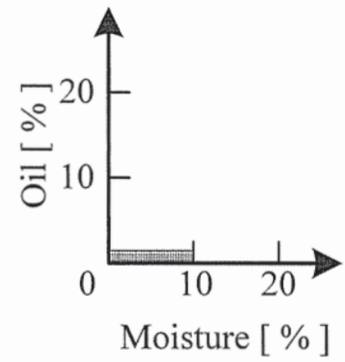
REMARKS

In the case of solvent-extracted seed cake, the use of CO_2 should be withheld until fire is apparent.

The use of CO_2 is limited to controlling the fire and further amounts may need to be injected from time to time during the sea passage to reduce the oxygen content in the hold. On arrival in port, the cargo will need to be dug out to reach the seat of the fire.

SEED CAKE UN 2217
with not more than 1.5% oil
and not more than 11% moisture.

The range of oil and moisture content is indicated in the figure.



DESCRIPTION
Residue remaining after oil has been extracted by a solvent process from oil-bearing seeds. The cereals and cereal products included in this schedule are those derived from:

Bakery materials
Barley malt pellets
Beet
Bran pellets
Brewer's grain pellets
Citrus pulp pellets
Coconut
Copra
Corn gluten
Cotton seed
Expellers
Gluten pellets
Ground nuts, meal
Hominy chop
Linseed
Maize
Meal, oily
Mill feed pellets
Niger seed, expellers
Oil cake
Palm kernel
Peanuts
Pellets, cereal
Pollard pellets
Rape seed
Rice bran
Rice broken
Safflower seed
Seed expellers, oily
Soyabean
Strussa pellets
Sunflower seed

The above may be shipped in the form of pulp, meals, cake, pellets, expellers.
The provisions of this entry should not apply to solvent-extracted rape seed meal pellets, soya bean meal, cotton seed meal and sunflower seed meal containing not more than 1.5% oil and not more than 11% moisture and being substantially free from flammable solvent. A certificate from a person recognized by the competent authority of the country of shipment should be provided by the shipper, prior to loading, stating that the provisions for the exemption are met.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	478 to 719	1.39 to 2.09
SIZE	**CLASS**	**GROUP**
0.1 mm to 5 mm	4.2	B

HAZARD

May self-heat slowly and, if wet or containing an excessive proportion of unoxidized oil, ignite spontaneously. Liable to oxidize, causing subsequent reduction of oxygen in the cargo space. Carbon dioxide may also be produced.

STOWAGE & SEGREGATION

No special requirements other than prescribed in section 9.3 of this Code.
If the bulkhead between the cargo space and the engine-room is not insulated to class A-60 standard, this cargo shall be stowed "away from" the bulkhead.

HOLD CLEANLINESS

Clean and dry as relevant to the hazards of the cargo.

WEATHER PRECAUTIONS

This cargo shall be kept as dry as practicable. This cargo shall not be handled during precipitation. During handling of this cargo all non-working hatches of the cargo spaces into which this cargo is loaded or to be loaded shall be closed.

LOADING

This cargo shall only be accepted for loading when the cargo is substantially free from flammable solvent and a certificate from a person recognized by the competent authority of the country of shipment specifying the oil content and moisture content is issued.
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS

The temperature of this cargo shall be measured regularly at a number of depths in the cargo spaces and recorded during the voyage. If the temperature of the cargo reaches 55°C and continues to increase, ventilation to the cargo shall be stopped. If self-heating continues, then carbon dioxide or inert gas shall be introduced to the cargo space. The use of carbon dioxide or inert gas shall be withheld until it becomes apparent that fire is not liable to take place in the cargo space, to avoid the possibility of ignition of solvent vapours. Entry of personnel into cargo spaces for this cargo shall not be permitted until tests have been carried out and it has been established that the oxygen content has been restored to a normal level. When the planned interval between the commencement of loading and the completion of discharge of this cargo exceeds 5 days, the cargo shall not be accepted for loading unless the cargo is to be carried in a cargo space equipped with facilities for introducing carbon dioxide or inert gas into the space. Smoking and the use of naked lights shall be prohibited in the vicinity of the cargo space during loading and unloading and on entry into the cargo spaces at any other time. Electrical circuits for equipment in cargo spaces which is unsuitable for use in an explosive atmosphere, shall be isolated by removal of links in the system other than fuses. Spark-arresting screens shall be fitted to ventilators to the cargo spaces containing of this cargo.

VENTILATION
Surface ventilation either natural or mechanical should be conducted, as necessary, for removing any residual solvent vapour. To prevent self-heating of the cargo caution is required when using mechanical ventilation.

CARRIAGE
Hatches of the cargo spaces carrying this cargo shall be weathertight to prevent the ingress of water.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

EMERGENCY PROCEDURES

SPECIAL EMERGENCY EQUIPMENT TO BE CARRIED Self-contained breathing apparatus.
EMERGENCY PROCEDURES Wear self-contained breathing apparatus. **EMERGENCY ACTION IN THE EVENT OF FIRE** Batten down. Used ship's fixed fire-fighting installation, if fitted. **MEDICAL FIRST AID** Refer to the Medical First Aid Guide (MFAG), as amended.

REMARKS
For solvent-extracted seed cake, the use of CO_2 should be withheld until fire is apparent.
The use of CO_2 is limited to controlling the fire, and further amounts may need to be injected from time to time during passage to reduce the oxygen content in the hold. On arrival in port, the cargo will need to be dug out to reach the seat of the fire.

SEED CAKE
(non-hazardous)

DESCRIPTION
The provisions of this schedule apply to solvent extracted rape seed meal, pellets, soya bean meal, cotton seed meal and sunflower seed meal, containing not more than 4% oil and 15% oil and moisture combined and being substantially free from flammable solvents.

A certificate from a person recognized by the competent authority of the country of shipment shall be provided by the shipper, prior to loading, stating that the requirements for exemption as set out either in the schedule for seed cake UN 1386 (b) or UN 2217, whichever is applicable, are met.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	478 to 719	1.39 to 2.09
SIZE	**CLASS**	**GROUP**
Not applicable	Not applicable	C

HAZARD
No special hazards.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
Clean and dry as relevant to the hazards of the cargo.

WEATHER PRECAUTIONS
This cargo shall be kept as dry as practicable. This cargo shall not be handled during precipitation. During handling of this cargo all non-working hatches of the cargo spaces into which this cargo is loaded or to be loaded shall be closed.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
No special requirements.

VENTILATION
No special requirements.

CARRIAGE
Hatches of the cargo spaces carrying this cargo shall be weathertight to prevent the ingress of water.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

SILICOMANGANESE (low carbon)
(with known hazard profile or known to evolve gases)
(with silicon content of 25% or more)

DESCRIPTION
Silicomanganese is an extremely heavy cargo, silvery metallic material with a grey oxide coating.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	Approx. 3000	0.18 to 0.26
SIZE	**CLASS**	**GROUP**
Approx. 10 mm to 100 mm	MHB	B

HAZARD
In contact with water may evolve hydrogen, a flammable gas that may form explosive mixtures with air and may, under similar conditions produce phosphine and arsine, which are highly toxic gases.
Cargo is liable to reduce oxygen content in a cargo space.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
Segregation as required for class 4.3 materials.
"Separated from" foodstuffs and all class 8 liquids.

HOLD CLEANLINESS
Clean and dry as relevant to the hazards of the cargo.

WEATHER PRECAUTIONS
This cargo shall be kept as dry as practicable before loading, during loading and during voyage. This cargo shall not be loaded during precipitation. During loading of this cargo all non-working hatches of the cargo spaces to which this cargo are loaded or to be loaded shall be closed.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

As the density of the cargo is extremely high, the tanktop may be overstressed unless the cargo is evenly spread across the tanktop to equalize the weight distribution. Due consideration shall be paid to ensure that tanktop is not overstressed during voyage and during loading by a pile of the cargo.

PRECAUTIONS

The manufacturer or the shipper shall provide the master with a certificate stating that, after manufacture, the cargo was stored under cover, but exposed to open air for not less than three days prior to shipment. Smoking shall not be allowed on deck and in the cargo spaces and "NO SMOKING" signs shall be displayed on deck whenever this cargo is on board. Electrical fittings and cables shall be in good condition and properly safeguarded against short circuits and sparking. Where a bulkhead is required to be suitable for segregation purposes, cable and conduit penetrations of the decks and bulkheads shall be sealed against the passage of gas and vapour. Whenever practicable, ventilation systems for the living quarters shall be shut down or screened and air condition systems shall be placed on recirculation during loading and discharge of this cargo, in order to minimize the entry of dust into living quarters or other interior spaces of the ship. Precautions shall be taken to minimize the extent to which dust of this cargo may come in contact with moving parts of deck machinery and external navigation aids such as navigation lights.

Entry of personnel into enclosed spaces shall not be permitted until tests have been carried out and it has been established that the oxygen content has been restored to a normal level throughout the space and that no toxic gas is present, unless adequate ventilation and air circulation throughout the free space above the material has been effected.

Prohibition of smoking in dangerous areas shall be enforced, and clearly legible "NO SMOKING" signs shall be displayed.

Electrical fittings and cables shall be in good condition and properly safeguarded against short circuits and sparking. Where a bulkhead is required to be suitable for segregation purposes, cable and conduit penetrations of the decks and bulkheads shall be sealed against the passage of gas and vapour.

Ventilation systems shall be shut down or screened and air condition systems, if any, placed on recirculation during loading or discharge, in order to minimize the entry of dust into living quarters or other interior spaces of the ship.

Precautions shall be taken to minimize the extent to which dust may come in contact with moving parts of deck machinery and external navigation aids (e.g., navigation lights).

VENTILATION

Mechanical surface ventilation shall be conducted during the voyage, as necessary, for the cargo spaces carrying this cargo.

CARRIAGE

For quantitative measurements of oxygen and flammable gases liable to be evolved by the cargo, a suitable detector for each gas or combination of gases shall be on board while this cargo is carried. The detector shall be suitable for use in an atmosphere without oxygen and of certified safe type for use in explosive atmosphere. The concentrations of these gases in the cargo spaces carrying this cargo shall be measured regularly, during voyage, and the results of the measurements shall be recorded and kept on board.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

EMERGENCY PROCEDURES

SPECIAL EMERGENCY EQUIPMENT TO BE CARRIED Self-contained breathing apparatus.
EMERGENCY PROCEDURES Wear self-contained breathing apparatus. **EMERGENCY ACTION IN THE EVENT OF FIRE** Batten down and use CO_2 if available. Do not use water. **MEDICAL FIRST AID** Refer to the Medical First Aid Guide (MFAG), as amended.

REMARKS
Material is virtually non-combustible when dry.

SODA ASH
(Dense and light)

DESCRIPTION
Powdery; composed of white, odourless grains and dust. It is made by the combustion of salt and limestone. Soluble in water. Soda ash is ruined on contact with oil.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	599 to 1053	0.95 to 1.67
SIZE	**CLASS**	**GROUP**
Powdery	Not applicable	C

HAZARD
No special hazards.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
This cargo shall be kept as dry as practicable. This cargo shall not be handled during precipitation. During handling of this cargo all non-working hatches of the cargo spaces into which this cargo is loaded or to be loaded shall be closed.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
Appropriate precautions shall be taken to protect machinery and accommodation spaces from the dust of the cargo. Bilge wells of the cargo spaces shall be protected from ingress of the cargo. Due consideration shall be paid to protect equipment from the dust of the cargo. Persons who may be exposed to the dust of the cargo shall wear protective clothing, goggles or other equivalent dust eye-protection and dust filter masks, as necessary.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP
After discharge of this cargo, the cargo spaces shall be swept clean except in cases where the cargo to be loaded has the same BCSN of the cargo to be loaded subsequent to discharge is SODA ASH. The residues of this cargo may be pumped as slurry during washing out.

SODIUM NITRATE UN 1498

DESCRIPTION
Colourless, transparent, odourless crystals. Hygroscopic and soluble in water.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	508 to 719	1.39 to 1.97
SIZE	**CLASS**	**GROUP**
Not applicable	5.1	B

HAZARD
Although non-combustible, mixtures with combustible material are readily ignited and may burn fiercely.
This cargo is hygroscopic and will cake if wet.

STOWAGE & SEGREGATION
"Separated from" foodstuffs.

HOLD CLEANLINESS
Clean and dry as relevant to the hazards of the cargo.

WEATHER PRECAUTIONS
This cargo shall be kept as dry as practicable. This cargo shall not be handled during precipitation. During handling of this cargo all non-working hatches of the cargo spaces into which this cargo is loaded or to be loaded shall be closed.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
Bilge wells shall be clean, dry and covered as appropriate, to prevent ingress of the cargo.

VENTILATION
The cargo spaces carrying this cargo shall not be ventilated during voyage.

CARRIAGE
No special requirements.

DISCHARGE
If this cargo has hardened, it shall be trimmed to avoid the formation of overhangs, as necessary.

CLEAN-UP
No special requirements.

EMERGENCY PROCEDURES

SPECIAL EMERGENCY EQUIPMENT TO BE CARRIED

Protective clothing (gloves, boots, coveralls, headgear).
Self-contained breathing apparatus.
Spray nozzles.

EMERGENCY PROCEDURES

Wear protective clothing and self-contained breathing apparatus.

EMERGENCY ACTION IN THE EVENT OF FIRE

Use copious quantities of water, which is best applied in the form of a spray to avoid disturbing the surface of the material. The material may fuse or melt, in which condition application may result in extensive scattering of the molten material. Exclusion of air or the use of CO_2 will not control the fire. Due consideration should be given to the effect on the stability of the ship due to accumulated water.

MEDICAL FIRST AID

Refer to the Medical First Aid Guide (MFAG), as amended.

REMARKS
This material is non-combustible unless contaminated.

SODIUM NITRATE AND POTASSIUM NITRATE MIXTURE UN 1499

DESCRIPTION
A hygroscopic mixture, soluble in water.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
30°	1136	0.88
SIZE	**CLASS**	**GROUP**
Not applicable	5.1	B

HAZARD
Although non-combustible, mixtures with combustible material may readily ignite and burn fiercely.
This cargo is hygroscopic and will cake if wet.

STOWAGE & SEGREGATION
"Separated from" foodstuffs.

HOLD CLEANLINESS
Clean and dry as relevant to the hazards of the cargo.

WEATHER PRECAUTIONS
This cargo shall be kept as dry as practicable. This cargo shall not be handled during precipitation. During handling of this cargo all non-working hatches of the cargo spaces into which this cargo is loaded or to be loaded shall be closed.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
Due regard shall be paid to prevent contact of the cargo and combustible materials.
Bilge wells shall be clean, dry and covered as appropriate, to prevent ingress of the cargo.

VENTILATION
The cargo spaces carrying this cargo shall not be ventilated during voyage.

CARRIAGE
No special requirements.

DISCHARGE
If this cargo has hardened, it shall be trimmed to avoid the formation of overhangs, as necessary.

CLEAN-UP
No special requirements.

EMERGENCY PROCEDURES

SPECIAL EMERGENCY EQUIPMENT TO BE CARRIED

Protective clothing (gloves, boots, coveralls, headgear).
Self-contained breathing apparatus.
Spray nozzles.

EMERGENCY PROCEDURES

Wear protective clothing and self-contained breathing apparatus.

EMERGENCY ACTION IN THE EVENT OF FIRE

Use copious quantities of water, which is best applied in the form of a spray to avoid disturbing the surface of the material. The material may fuse or melt, in which condition application of water may result in extensive scattering of the molten materials. Exclusion of air or the use of CO_2 will not control the fire. Due consideration should be given to the effect on the stability of the ship due to the accumulated water.

MEDICAL FIRST AID

Refer to the Medical First Aid Guide (MFAG), as amended.

REMARKS
Material is non-combustible unless contaminated.

STAINLESS STEEL GRINDING DUST

DESCRIPTION
Brown lumps: Moisture content 1% to 3%. May give off dust.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	2381	0.42
SIZE	**CLASS**	**GROUP**
Lumps: 75 mm to 380 mm	Not applicable	C

HAZARD
No special hazards.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
No special requirements.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

As the density of the cargo is extremely high, the tanktop may be overstressed unless the cargo is evenly spread across the tanktop to equalize the weight distribution. Due consideration shall be paid to ensure that tanktop is not overstressed during voyage and during loading by a pile of the cargo.

PRECAUTIONS
Appropriate precautions shall be taken to protect machinery and accommodation spaces from the dust of the cargo. Bilge wells of the cargo spaces shall be protected from ingress of the cargo. Due consideration shall be paid to protect equipment from the dust of the cargo. Persons who may be exposed to the dust of the cargo shall wear protective clothing, goggles or other equivalent dust eye-protection and dust filter masks, as necessary.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

STONE CHIPPINGS

DESCRIPTION

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	1408	0.71
SIZE	**CLASS**	**GROUP**
Fines to 25 mm	Not applicable	C

HAZARD
No special hazards.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
No special requirements.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
No special requirements.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

SUGAR

DESCRIPTION
Depending on type, sugar may be either brown or white granules, with a very low moisture content to the order of 0% to 0.05%.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	625 to 1000	1.00 to 1.60
SIZE	**CLASS**	**GROUP**
Granules up to 3 mm	Not applicable	C

HAZARD
As sugar dissolves in water, ingress of water may result in the creation of air pockets in the body of the cargo with the ship's motion. The hazards are then similar to the hazards presented by cargoes which may liquefy. In case of ingress of water into the holds, the risk to the stability of the ship through dissolution of sugar (formation of a liquid base and shifting of cargo), should be recognized. This cargo is highly soluble.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
This cargo shall be kept as dry as practicable. This cargo shall not be handled during precipitation. During handling of this cargo all non-working hatches of the cargo spaces into which this cargo is loaded or to be loaded shall be closed.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
No special requirements.

VENTILATION
No special requirements.

CARRIAGE
After the completion of loading of this cargo, the hatches of the cargo spaces shall be sealed to prevent water ingress, as necessary.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

SULPHATE OF POTASH AND MAGNESIUM

DESCRIPTION
Granular light brown material. Solution in water is almost neutral. May have a slight odour, depending on the process of manufacturer. Melting point: 72°C. Moisture: 0.02%.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	1000 to 1124	0.89 to 1.00
SIZE	**CLASS**	**GROUP**
Not applicable	Not applicable	C

HAZARD
No special hazards.
This cargo is highly soluble. This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
Clean and dry as relevant to the hazards of the cargo.

WEATHER PRECAUTIONS
This cargo shall be kept as dry as practicable. This cargo shall not be handled during precipitation. During handling of this cargo all non-working hatches of the cargo spaces into which this cargo is loaded or to be loaded shall be closed.

LOADING
The cargo shall be trimmed in accordance with the cargo information required by section 4 of this Code. If doubt exists, trim reasonably level to the boundaries of the cargo space so as to minimize the risk of shifting and to ensure that adequate stability will be maintained during the voyage.

PRECAUTIONS
No special requirements.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

SULPHUR (formed, solid)

DESCRIPTION

A co-product recovered from sour gas processing or oil refinery operations that has been subjected to a forming process that converts sulphur from a molten state into specific solid shapes (e.g., prills, granules, pellets, pastilles or flakes); bright yellow in colour; odourless. This schedule is not applicable to crushed, lump and coarse-grained sulphur (see **SULPHUR UN 1350**), or to co-products from sour gas processing or oil refinery operations NOT subjected to the above-described forming process.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	900 to 1350	0.74 to 1.11
SIZE	**CLASS**	**GROUP**
Approx. 1 mm to 10 mm	Not applicable	C

HAZARD

This cargo is non-combustible or has a low fire risk. If involved in a fire, cargo may generate harmful gases.

When handled and shipped in accordance with the provisions of the schedule, this cargo poses no corrosion or dust hazards for human tissue or vessel.

STOWAGE & SEGREGATION

"Separated from" strong oxidizers, such as fluorine, chlorine, chlorates, nitrates (nitric acid), peroxides, liquid oxygen, permanganates, dichromates or the like.

HOLD CLEANLINESS

Clean and dry as relevant to the hazards of the cargo. Holds shall not be washed with seawater.

WEATHER PRECAUTIONS

No special requirements.

LOADING

Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code. Appropriate precautions shall be taken to minimize impact, abrasion and crushing when handling to prevent dust from forming. Standard application of surfactants inhibits airborne dust from forming.

PRECAUTIONS

Protect machinery, accommodations and equipment from small particles or any dust if formed. Persons involved in cargo handling shall wear protective clothing, goggles and dust filter masks. Holds including trimming plates and tanktops shall be treated with effective, commercially available protective coating or lime-washed to avoid any potential corrosive reaction between sulphur, water and steel. Upper sections shall have a sound coating of paint. Hatches shall be sealed tightly.

VENTILATION

Surface ventilation only, either natural or mechanical, shall be conducted, as necessary, during the voyage for this cargo.

CARRIAGE

As a fine spray of fresh water or surfactant is added during loading, bilges shall be sounded and pumped out as necessary throughout the voyage.

DISCHARGE

Appropriate safety precautions shall be taken when entering the cargo spaces, particularly in the area of the bottom layers of sulphur in ships hold, taking into account the recommendations developed by the Organization.

Appropriate precautions shall be taken to minimize impact, abrasion and crushing when handling to prevent dust from forming.

CLEAN-UP

Persons involved in clean-up shall wear hard hats, protective goggles, long-sleeve shirts, long pants, and impervious gloves. Use of approved respirators shall be considered. Holds shall be thoroughly washed using only fresh water following discharge.

Appropriate safety precautions shall be taken when entering the cargo spaces, taking into account the recommendations developed by the Organization.†

SULPHUR UN 1350
(crushed lump and coarse grained)

Note: Fine grained sulphur (flowers of sulphur) shall not be transported in bulk.

DESCRIPTION
A mineral substance found free in volcanic countries. Yellow in colour, brittle, insoluble in water, but readily fusible by heat. Sulphur is loaded in a damp or wet condition.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	1053 to 1176	0.85 to 0.95
SIZE	**CLASS**	**GROUP**
Particles or lumps of any size	4.1	B

HAZARD
Flammability and dust explosion especially during loading and unloading and after discharge and cleaning.
This cargo may ignite readily.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
"Separated from" foodstuffs.

HOLD CLEANLINESS
Clean and dry as relevant to the hazards of the cargo.
Must be thoroughly clean and washed with fresh water.

WEATHER PRECAUTIONS
No special requirements.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
When this cargo is involved in a fire, a toxic, very irritating and suffocating gas is evolved. This cargo forms explosive and sensitive mixtures with most oxidizing material. This cargo has a liability to dust explosion, which may occur especially after discharge and during cleaning. The hold trimming plates and tanktops of the cargo spaces for this cargo shall be lime-washed or coated with paint to prevent corrosion. Upper sections shall have a sound coating of paint. Electrical circuits for the equipment in cargo spaces for this cargo which is unsuitable for use in an explosive atmosphere shall be isolated by removal of links in the system other than fuses. Due consideration shall be paid on the isolation of electrical circuits for the equipment in the adjacent spaces of the cargo spaces which is unsuitable for use in an explosive atmosphere. Any ventilators of the cargo spaces for this cargo shall be fitted with spark-arresting screens.

Fine grained sulphur (flowers of sulphur) **shall not** be transported in bulk.

VENTILATION
Surface ventilation only, either natural or mechanical, shall be conducted, as necessary, during the voyage for this cargo.

CARRIAGE
Bilges in the cargo spaces carrying this cargo shall be pumped regularly to prevent accumulation of water/acid solution.

DISCHARGE
No special requirements.

CLEAN-UP
The cargo spaces and other structures which may have been in contact with this cargo or the dust shall not be swept. After discharge of this cargo, the cargo spaces, and other structures as necessary, shall be washed out with fresh water to remove all residues of this cargo. Then the cargo spaces shall be thoroughly dried. Wet dust or residues may form highly corrosive sulphurous acid, which is extremely dangerous to personnel and corrosive to steel. Persons involved in cleaning up shall be provided with protective clothing, goggles and facemasks to wear.

EMERGENCY PROCEDURES

SPECIAL EMERGENCY EQUIPMENT TO BE CARRIED Self-contained breathing apparatus.
EMERGENCY PROCEDURES Wear self-contained breathing apparatus. **EMERGENCY ACTION IN THE EVENT OF FIRE** Batten down; use ship's fixed fire-fighting installation if available. Exclusion of air may be sufficient to control the fire. **Do not use water**. **MEDICAL FIRST AID** Refer to the Medical First Aid Guide (MFAG), as amended.

SUPERPHOSPHATE

DESCRIPTION
Greyish-white. Moisture: 0% to 7%. Hygroscopic.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
30° to 40°	1000 to 1190	0.81 to 1.00
SIZE	**CLASS**	**GROUP**
Granular, fines and powder to 0.15 mm diameter	Not applicable	C

HAZARD
No special hazards.
This cargo is non-combustible or has a low fire-risk. This cargo is hygroscopic and will cake if wet.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
Clean and dry as relevant to the hazards of the cargo.

WEATHER PRECAUTIONS
This cargo shall be kept as dry as practicable. This cargo shall not be handled during precipitation. During handling of this cargo all non-working hatches of the cargo spaces into which this cargo is loaded or to be loaded shall be closed.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
The hold trimming plates and tanktops of the cargo spaces for this cargo shall be lime-washed or coated with paint to prevent corrosion.

VENTILATION
The cargo spaces carrying this cargo shall not be ventilated during voyage.

CARRIAGE
Moisture from condensation, cargo heating or leaking hatchcovers may cause formation of phosphoric or phosphorous acid which may cause corrosion to steelwork. After the completion of loading of this cargo, the hatches of the cargo spaces shall be sealed, as necessary. This cargo will decompose burlap or canvas cloth covering bilge wells.

DISCHARGE
If this cargo has hardened, it shall be trimmed to avoid the formation of overhangs, as necessary.

CLEAN-UP
After discharge of this cargo, particular attention shall be paid to bilge wells of the cargo spaces.

SUPERPHOSPHATE (triple, granular)

DESCRIPTION
Granular in form, dark grey colour and, depending on its source, can be dusty. Hygroscopic.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	813 to 909	1.10 to 1.23
SIZE	**CLASS**	**GROUP**
2 mm to 4 mm	Not applicable	C

HAZARD
No special hazards.
This cargo is non-combustible or has a low fire-risk. This cargo is hygroscopic and will cake if wet.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
Clean and dry as relevant to the hazards of the cargo.

WEATHER PRECAUTIONS
This cargo shall be kept as dry as practicable. This cargo shall not be handled during precipitation. During handling of this cargo all non-working hatches of the cargo spaces into which this cargo is loaded or to be loaded shall be closed.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
Hold trimming plates and tanktops should be lime-washed to prevent corrosion.

VENTILATION
The cargo spaces carrying this cargo shall not be ventilated during voyage.

CARRIAGE
Moisture from condensation, cargo heating or leaking hatchcovers may cause formation of phosphoric or phosphorous acid which may cause corrosion to steelwork. After the completion of loading of this cargo, the hatches of the cargo spaces shall be sealed, as necessary. This cargo will decompose burlap or canvas cloth covering bilge wells.

DISCHARGE
If this cargo has hardened, it shall be trimmed to avoid the formation of overhangs, as necessary.

CLEAN-UP
After discharge of this cargo, particular attention should be paid to bilge wells of the cargo spaces.

TACONITE PELLETS

DESCRIPTION
Ore. Grey, round steel pellets. Moisture: 2%.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	599 to 654	1.53 to 1.67
SIZE	**CLASS**	**GROUP**
Pellets to 15 mm diameter	Not applicable	C

HAZARD
No special hazards.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
No special requirements.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
No special requirements.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

TALC

DESCRIPTION
Talc is an extremely soft, whitish, green or greyish natural hydrated magnesium silicate. It has a characteristic soapy or greasy feel.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	1370 to 1563	0.64 to 0.73
SIZE	**CLASS**	**GROUP**
Powdery to 100 mm lumps	Not applicable	C

HAZARD
No special hazards.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
No special requirements.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
No special requirements.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

TANKAGE

DESCRIPTION
The dried sweeping of animal matter from slaughterhouse floors. Very dusty.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	-	-
SIZE	**CLASS**	**GROUP**
Not applicable	MHB	B

HAZARD
Subject to spontaneous heating and possible ignition. Possibly infectious.

STOWAGE & SEGREGATION
Segregation as required for class 4.2 materials.
"Separated by a complete cargo space or hold from" foodstuffs.

HOLD CLEANLINESS
Clean and dry as relevant to the hazards of the cargo.

WEATHER PRECAUTIONS
No special requirements.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
Bilge wells shall be clean, dry and covered as appropriate, to prevent ingress of the cargo.
Do not load if the temperature is above 38°C.
Appropriate precautions shall be taken to protect machinery and accommodation spaces from the dust of the cargo. Bilge wells of the cargo spaces shall be protected from ingress of the cargo. Due consideration shall be paid to protect equipment from the dust of the cargo. Persons who may be exposed to the dust of the cargo shall wear goggles or other equivalent dust eye-protection and dust filter masks. Those persons shall wear protective clothing, as necessary.

VENTILATION
No special requirements.

CARRIAGE
The temperature of this cargo shall be measured daily during voyage. The results of measurements shall be recorded to check possible self-heating.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

EMERGENCY PROCEDURES

SPECIAL EMERGENCY EQUIPMENT TO BE CARRIED Self-contained breathing apparatus.
EMERGENCY PROCEDURES Wear self-contained breathing apparatus. **EMERGENCY ACTION IN THE EVENT OF FIRE** Batten down; use ship's fixed fire-fighting installation. Use full protective clothing in case of fire situation. **MEDICAL FIRST AID** Refer to the Medical First Aid Guide (MFAG), as amended.

TAPIOCA

DESCRIPTION
Dry, dusty mixture of powder and granules.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
32°	735	1.36
SIZE	**CLASS**	**GROUP**
Powder and granules	Not applicable	C

HAZARD
May heat spontaneously with oxygen depletion in the cargo space.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
No special requirements.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
Appropriate precautions shall be taken to protect machinery and accommodation spaces from the dust of the cargo. Bilge wells of the cargo spaces shall be protected from ingress of the cargo. Due consideration shall be paid to protect equipment from the dust of the cargo. Persons who may be exposed to the dust of the cargo shall wear protective clothing, goggles or other equivalent dust eye-protection and dust filter masks, as necessary.

VENTILATION
The cargo spaces carrying this cargo shall not be ventilated during voyage.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

UREA

DESCRIPTION
White, granular, and odourless commodity. Moisture content is less than 1%. Hygroscopic.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
28° to 45°	645 to 855	1.17 to 1.56
SIZE	**CLASS**	**GROUP**
1 mm to 4 mm	Not applicable	C

HAZARD
No special hazards.
This cargo is non-combustible or has a low fire-risk.
This cargo is hygroscopic and will cake if wet.
Urea (either pure or impure) may, in the presence of moisture, damage paintwork or corrode steel.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
This cargo shall be kept as dry as practicable. This cargo shall not be handled during precipitation. During handling of this cargo all non-working hatches of the cargo spaces into which this cargo is loaded or to be loaded shall be closed.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTION
No special requirements.

VENTILATION
The cargo spaces carrying this cargo shall not be ventilated during voyage.

CARRIAGE
No special requirements.

DISCHARGE
If this cargo has hardened, it shall be trimmed to avoid the formation of overhangs, as necessary.

CLEAN-UP
After discharge of this cargo, the cargo spaces shall be swept, washed out and dried.

VANADIUM ORE

DESCRIPTION

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	1786	0.560
SIZE	**CLASS**	**GROUP**
Not applicable	MHB	B

HAZARD
Dust may be toxic.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
Segregation as required for class 6.1 materials.
"Separated from" foodstuffs.

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
No special requirements.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
Exposure of persons to dust should be minimized.
Appropriate precautions shall be taken to protect machinery and accommodation spaces from the dust of the cargo. Bilge wells of the cargo spaces shall be protected from ingress of the cargo. Due consideration shall be paid to protect equipment from the dust of the cargo. Persons who may be exposed to the dust of the cargo shall wear goggles or other equivalent dust eye-protection and dust filter masks. Those persons shall wear protective clothing, as necessary.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

EMERGENCY PROCEDURES

SPECIAL EMERGENCY EQUIPMENT TO BE CARRIED Self-contained breathing apparatus.
EMERGENCY PROCEDURES Wear self-contained breathing apparatus. **EMERGENCY ACTION IN THE EVENT OF FIRE** Batten down; use ship's fixed fire fighting installation, if fitted. Exclusion of air may be sufficient to control fire. **MEDICAL FIRST AID** Refer to the Medical First Aid Guide (MFAG), as amended.

VERMICULITE

DESCRIPTION
A mineral of the mica group. Grey. Average moisture: 6% to 10%. May give off dust.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	730	1.37
SIZE	**CLASS**	**GROUP**
3 mm	Not applicable	C

HAZARD
No special hazards.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
No special requirements.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
Appropriate precautions shall be taken to protect machinery and accommodation spaces from the dust of the cargo. Bilge wells of the cargo spaces shall be protected from ingress of the cargo. Due consideration shall be paid to protect equipment from the dust of the cargo. Persons who may be exposed to the dust of the cargo shall wear protective clothing, goggles or other equivalent dust eye-protection and dust filter masks, as necessary.
Prior to loading, a certificate based on test shall be provided by the manufacturer or shipper stating that the asbestos content is less than 1%.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

WHITE QUARTZ

DESCRIPTION
99.6% silica content.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	1639	0.61
SIZE	**CLASS**	**GROUP**
Lumps to 150 mm	Not applicable	C

HAZARD
No special hazards.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
No special requirements.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
No special requirements.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

WOODCHIPS

DESCRIPTION
Natural timber mechanically chipped into the approximate size of a business card.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	326	3.07
SIZE	**CLASS**	**GROUP**
As above	MHB	B

HAZARD
This material possesses a chemical hazard. Some shipments may be subject to oxidation leading to depletion of oxygen and increase of carbon dioxide in cargo and adjacent spaces.
With moisture content of 15% or more this cargo has a low fire-risk. As the moisture content decreases the fire risk increases. When dry, woodchips can be easily ignited by external sources; are readily combustible and can ignite by friction. A condition with complete depletion of oxygen may be present in less than 48 hours.

STOWAGE & SEGREGATION
Segregation as for class 4.1 materials.

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
No special requirements.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
Entry of personnel into cargo and adjacent confined spaces should not be permitted until tests have been carried out and it has been established that the oxygen level is 20.7%. If this condition is not met, additional ventilation should be applied to the cargo hold or adjacent enclosed spaces and re-measuring shall be conducted after a suitable interval.

An oxygen meter shall be worn and activated by all crew when entering cargo and adjacent enclosed spaces.

In dry weather, dust which settles on deck will dry out quickly and is easily ignited. Appropriate precautions shall be taken to prevent fire.

VENTILATION
Ventilation of enclosed spaces adjacent to a cargo hold before entry may be necessary even if these spaces are apparently sealed from the cargo hold.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

EMERGENCY PROCEDURES

SPECIAL EMERGENCY EQUIPMENT TO BE CARRIED

Self-contained breathing apparatus and oxygen meters should be available.

EMERGENCY PROCEDURES

Nil

EMERGENCY ACTION IN THE EVENT OF FIRE

Batten down; use ship's fixed fire-fighting installation if fitted.
Exclusion of air may be sufficient to control fire.

MEDICAL FIRST AID

Refer to the Medical First Aid Guide (MFAG), as amended.

WOOD PELLETS

DESCRIPTION

The Wood Pellets are light blond to chocolate brown in colour; very hard and cannot be easily squashed. Wood Pellets have a typical specific density between 1,100 to 1,700 kg/m^3 and a bulk density of 600 to 750 kg/m^3. Wood Pellets are made of sawdust, planer shavings and other wood waste such as bark coming out of the lumber manufacturing processes. Normally there are no additives or binders blended into the pellet, unless specified. The raw material is fragmented, dried and extruded into pellet form. The raw material is compressed approximately 3.5 times and the finished Wood Pellets typically have a moisture content of 4 to 8%. Wood Pellets are used as a fuel in district heating and electrical power generation as well as a fuel for small space heaters such as stoves and fireplaces.

Wood Pellets are also used as animal bedding due to the absorption characteristics. Such Wood Pellets typically have a moisture content of 8 to 10%.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Approximately 30 degrees	600 to 750	1.4 to 1.6
SIZE	**CLASS**	**GROUP**
Cylindrical with 3 to 12 mm Diameter: 10 to 20 mm	MHB	B

HAZARD

Shipments may be subject to oxidation leading to depletion of oxygen and increase of carbon monoxide and carbon dioxide in cargo and communicating spaces.

Swelling if exposed to moisture. Wood Pellets may ferment over time if moisture content is over 15% leading to generation of asphyxiating and flammable gases which may cause spontaneous combustion.

Handling of Wood Pellets may cause dust to develop. Risk of explosion at high dust concentration.

STOWAGE & SEGREGATION

Segregate as for class 4.1 materials.

HOLD CLEANLINESS

Clean and dry as relevant to the hazards of the cargo.

WEATHER PRECAUTIONS

This cargo shall be kept as dry as practicable. This cargo shall not be handled during precipitation. During handling of this cargo all non-working hatches of the cargo spaces into which this cargo is loaded or to be loaded shall be closed. There is a high risk of renewed oxygen depletion and carbon-monoxide formation in previously ventilated adjacent spaces after such closure.

LOADING

Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS

Entry of personnel into cargo and adjacent confined spaces shall not be permitted until tests have been carried out and it has been established that the oxygen content and carbon monoxide levels have been restored to the following levels: oxygen 20.7% and carbon monoxide < 100 ppm. If these conditions are not met, additional ventilation shall be applied to the cargo hold or adjacent confined spaces and re-measuring shall be conducted after a suitable interval.

An oxygen and carbon monoxide meter shall be worn and activated by all crew when entering cargo and adjacent enclosed spaces.

VENTILATION

Ventilation of enclosed spaces adjacent to a cargo hold before entry may be necessary even if these spaces are apparently sealed from the cargo hold.

CARRIAGE

Hatches of the cargo spaces carrying this cargo shall be weathertight to prevent the ingress of water.

DISCHARGE

No special requirements.

CLEAN-UP

No special requirements.

EMERGENCY PROCEDURES

SPECIAL EMERGENCY EQUIPMENT TO BE CARRIED

Self-contained breathing apparatus and combined or individual oxygen and carbon monoxide meters should be available.

EMERGENCY PROCEDURES

Nil

EMERGENCY ACTION IN THE EVENT OF FIRE

Batten down; use ship's fixed fire-fighting installation.
Exclusion of air may be sufficient to control fire.
Extinguish fire with carbon dioxide, foam or water.

MEDICAL FIRST AID

Refer to the Medical First Aid Guide (MFAG), as amended.

WOOD PULP PELLETS

DESCRIPTION
The pellets are brown in colour; very hard and cannot be easily squashed. They are light and are about half the size of a bottle cork. The pellets are made of compacted woodchips.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	326	3.07
SIZE	**CLASS**	**GROUP**
Approx. 15 mm x 20 mm	MHB	B

HAZARD
This cargo possesses a chemical hazard. Some shipments may be subject to oxidation leading to depletion of oxygen and increase of carbon dioxide in cargo and adjacent spaces.
With moisture content of 15% or more this cargo has a low fire-risk. As the moisture content decreases, the fire risk increases.

STOWAGE & SEGREGATION
Segregate as for class 4.1 materials.

HOLD CLEANLINESS
Clean and dry as relevant to the hazards of the cargo.

WEATHER PRECAUTIONS
No special requirements.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

PRECAUTIONS
Entry of personnel into the cargo spaces containing this cargo shall not be permitted until tests have been carried out and it has been established that the oxygen content has been restored to a normal level. In dry weather, dust, which settles on deck, will dry out quickly and becomes readily ignitable. Appropriate precautions shall be taken to prevent fire.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

EMERGENCY PROCEDURES

SPECIAL EMERGENCY EQUIPMENT TO BE CARRIED

Nil

EMERGENCY PROCEDURES

Nil

EMERGENCY ACTION IN THE EVENT OF FIRE

Batten down; use ship's fixed fire-fighting installation if fitted.
Exclusion of air may be sufficient to control fire.

MEDICAL FIRST AID

Refer to the Medical First Aid Guide (MFAG), as amended.

ZINC ASHES UN 1435

Shipments require the approval of the competent authority of the countries of shipment and the flag State of the ship.

DESCRIPTION

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	900	1.11
SIZE	**CLASS**	**GROUP**
Not applicable	4.3	B

HAZARD
In contact with moisture or water liable to give off hydrogen, a flammable gas, and toxic gases. This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
"Separated from" foodstuffs and all class 8 liquids.

HOLD CLEANLINESS
Clean and dry as relevant to the hazards of the cargo.

WEATHER PRECAUTIONS
This cargo shall be kept as dry as practicable before loading, during loading and during voyage. This cargo shall not be loaded during precipitation. During loading of this cargo all non-working hatches of the cargo spaces to which this cargo are loaded or to be loaded shall be closed.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.
This cargo shall not be accepted for loading when the cargo is damp or known to have been wetted.

PRECAUTIONS
Reject any damp material or any material which is known to have been wetted. Possible ignition sources, including hotwork, burning, smoking, electrical sparking, shall be eliminated in the vicinity of the cargo spaces containing this cargo during handling and carriage of this cargo.

VENTILATION
Continuous mechanical ventilation shall be conducted during the voyage for the cargo spaces carrying this cargo. If maintaining ventilation endangers the ship or the cargo, it may be interrupted unless there is a risk of explosion or other danger due to interruption of the ventilation. In any case mechanical ventilation shall be maintained for a reasonable period prior to discharge.

CARRIAGE

For quantitative measurements of hydrogen, a suitable detector shall be on board while this cargo is carried. The detector shall be of certified safe type for use in explosive atmosphere. The concentration of hydrogen in the cargo spaces carrying this cargo shall be measured regularly, during voyage, and the results of the measurements shall be recorded and kept on board.

DISCHARGE

No special requirements.

CLEAN-UP

After discharge of this cargo, the cargo spaces shall be swept clean twice.
Water shall not be used for cleaning of the cargo space which has contained this cargo, because of danger of gas.

EMERGENCY PROCEDURES

SPECIAL EMERGENCY EQUIPMENT TO BE CARRIED

Protective clothing (gloves, boots, coveralls, headgear).
Self-contained breathing apparatus.

EMERGENCY PROCEDURES

Wear protective clothing and self-contained breathing apparatus.

EMERGENCY ACTION IN THE EVENT OF FIRE

Batten down; use ship's fixed fire-fighting installation if available.
Do not use water.

MEDICAL FIRST AID

Refer to the Medical First Aid Guide (MFAG), as amended.

ZIRCONSAND

DESCRIPTION
Usually fine white to yellow, very abrasive extracted from ilmenite sand. May be dusty. Shipped dry.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	2600 to 3000	0.33 to 0.36
SIZE	**CLASS**	**GROUP**
0.15 mm or less	Not applicable	C

HAZARD
No special hazards.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
No special requirements.

WEATHER PRECAUTIONS
This cargo shall be kept as dry as practicable before loading, during loading and during voyage. This cargo shall not be loaded during precipitation. During loading of this cargo all non-working hatches of the cargo spaces to which this cargo are loaded or to be loaded shall be closed.

LOADING
Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

As the density of the cargo is extremely high, the tanktop may be overstressed unless the cargo is evenly spread across the tanktop to equalize the weight distribution. Due consideration shall be paid to ensure that tanktop is not overstressed during voyage and during loading by a pile of the cargo.

PRECAUTIONS
Bilge wells shall be clean, dry and covered as appropriate, to prevent ingress of the cargo.
Appropriate precautions shall be taken to protect machinery and accommodation spaces from the dust of the cargo. Bilge wells of the cargo spaces shall be protected from ingress of the cargo. Due consideration shall be paid to protect equipment from the dust of the cargo. Persons who may be exposed to the dust of the cargo shall wear goggles or other equivalent dust eye-protection and dust filter masks. Those persons shall wear protective clothing, as necessary.

VENTILATION
No special requirements.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP
No special requirements.

APPENDIX 2

LABORATORY TEST PROCEDURES, ASSOCIATED APPARATUS AND STANDARDS

1 Test procedures for materials which may liquefy and associated apparatus

Three methods of testing for the transportable moisture limit are currently in general use:

.1 flow table test;

.2 penetration test;

.3 Proctor/Fagerberg test.

As each method has its advantages, the selection of the test method should be determined by local practices or by the appropriate authorities.

1.1 *Flow table test procedure*

1.1.1 *Scope*

The flow table is generally suitable for mineral concentrates or other fine material with a maximum grain size of 1 mm. It may also be applicable to materials with a maximum grain size up to 7 mm. It will not be suitable for materials coarser than this and may also not give satisfactory results for some materials with high clay content. If the flow table test is not suitable for the material in question, the procedures to be adopted should be those approved by the authority of the port State.

The test described below provides for determination of:

.1 the moisture content of a sample of cargo, hereinafter referred to as the test material;

.2 the flow moisture point (FMP) of the test material under impact or cyclic forces of the flow table apparatus; and

.3 the transportable moisture limit of the test material.

1.1.2 *Apparatus (see figure 1.1.2)*

.1 Standard flow table and frame (ASTM Designation (C230-68) – see 3).

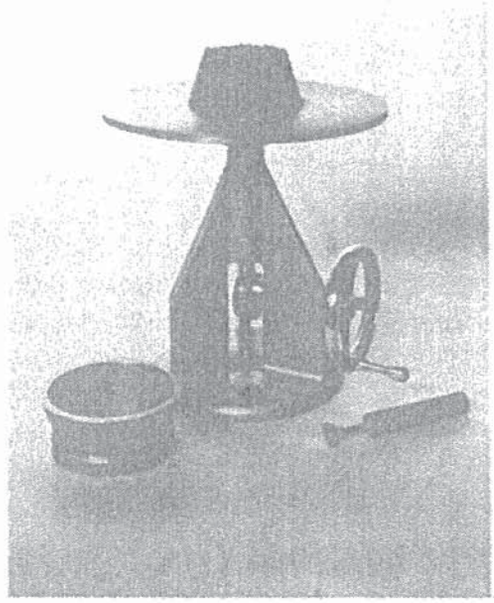


Figure 1.1.2 – *Flow table and accessory apparatus*

.2 Flow table mounting (ASTM Designation (C230-68) – see 3).

.3 Mould (ASTM Designation (C230-68) – see 3).

.4 Tamper (see figure 1.1.2.4): the required tamping pressure may be achieved by using calibrated, spring-loaded tampers (examples are included in figure 1.1.2.4) or some other suitable design of tamper that allows a controlled pressure to be applied via a 30 mm diameter tamper head.

.5 Scales and weights (ASTM Designation (C109-73) – see 3) and suitable sample containers.

.6 Glass graduated measuring cylinder and burette having capacities of 100-200 m*l* and 10 m*l*, respectively.

.7 A hemispherical mixing bowl approximately 30 cm diameter, rubber gloves and drying dishes or pans. Alternatively, an automatic mixer of similar capacity can be used for the mixing operations. In this case, care should be exercised to ensure that the use of such a mechanical mixer does not reduce the particle size or consistency of the test material.

.8 A drying oven with controlled temperature up to approximately 110°C. This oven should be without air circulation.

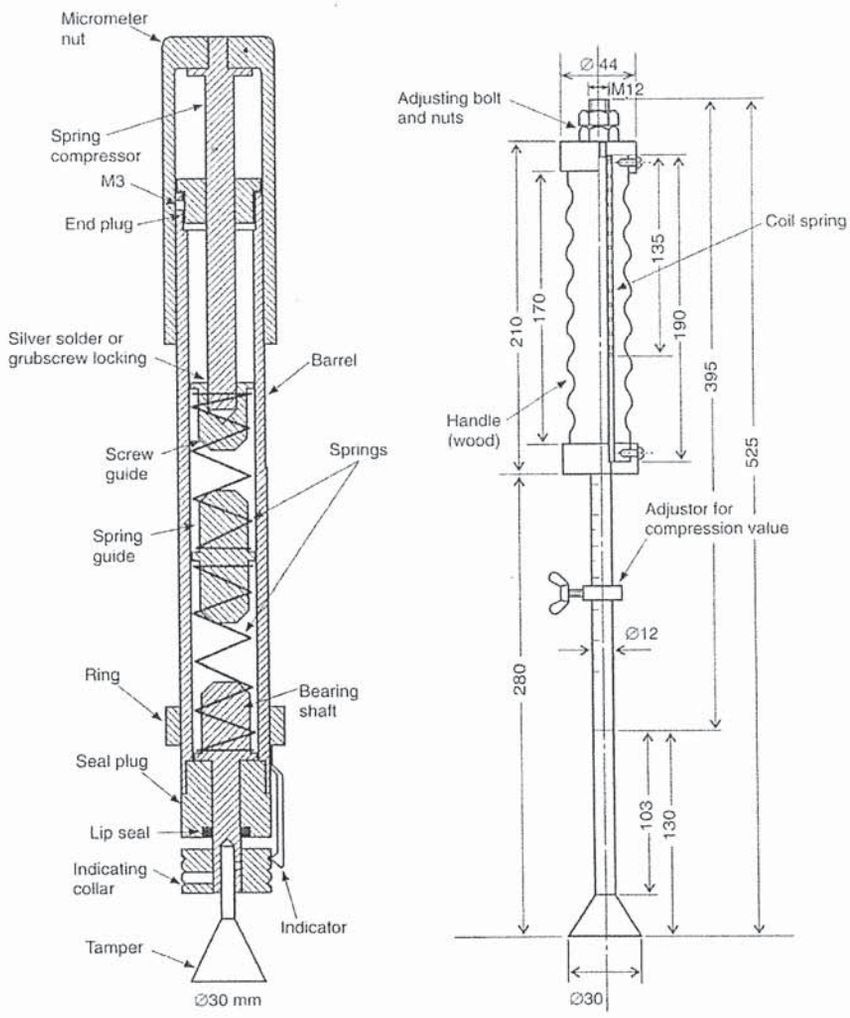


Figure 1.1.2.4 – *Examples of spring-loaded tampers*

1.1.3 *Temperature and humidity*

It is preferable to work in a room where the samples will be protected from excessive temperatures, air currents and humidity variations. All phases of the material preparation and testing procedure should be accomplished in a reasonable space of time to minimize moisture losses and, in any event, within the day of commencement. Where possible, sample containers should be covered with plastic film or other suitable cover.

1.1.4 *Procedure*

The quantity of material required for a flow moisture test will vary according to the specific gravity of the material to be tested. It will range from approximately 2 kg for coal to 3 kg for mineral concentrates. It should be collected as a representative sample of the cargo being shipped. Experience has shown that more accurate test results will be obtained by ensuring that the moisture content of the test sample is increased rather than decreased towards the FMP.

Consequently, it is recommended that a preliminary flow moisture test should be conducted, generally in accordance with the following, to indicate the condition of the test sample, i.e. the quantity of water and the rate at which it is to be added or whether the sample should be air-dried to reduce its moisture content before commencing the main flow moisture test.

1.1.4.1 Preparation of the test sample

The representative sample of test material is placed in the mixing bowl and thoroughly mixed. Three subsamples (A), (B) and (C) are removed from the mixing bowl as follows: about one fifth of the sample (A) should be immediately weighed and placed in the drying oven to determine the moisture content of the sample "as received". Two further subsamples, each of about two fifths of the gross weight, should then be taken, one (B) for the preliminary FMP test and the other (C) for the main FMP determination:

.1 *Filling the mould.* The mould is placed on the centre of the flow table and filled in three stages with the material from the mixing bowl. The first charge, after tamping, should aim to fill the mould to approximately one third of its depth. The quantity of sample required to achieve this will vary from one material to another, but can readily be established after some experience has been gained of the packing characteristics of the material being tested.

The second charge, after tamping, should fill the mould to about two thirds of its depth and the third and final charge, after tamping, should reach to just below the top of the mould (see figure 1.1.4.2).

.2 *Tamping procedure*. The aim of tamping is to attain a degree of compaction similar to that prevailing at the bottom of a shipboard cargo of the material being tested. The correct pressure to be applied is calculated from:

Tamping pressure (Pa) = Bulk density of cargo (kg/m^3)
x Maximum depth of cargo (m)
x Gravity acceleration (m/s^2)

Bulk density can be measured by a single test, using the Proctor C apparatus described in ASTM Standard D-698 or JIS-A-1210, on a sample of the cargo at the proposed moisture content of loading.

When calculating the tamping pressure, if no information concerning cargo depth is available the maximum likely depth should be used.

Alternatively, the pressure may be estimated from table 1.1.4.1.

The number of tamping actions (applying the correct, steady pressure each time) should be about 35 for the bottom layer, 25 for the middle and 20 for the top layer, tamping successively over the area completely to the edges of the sample to achieve a uniformly flat surface for each layer.

.3 *Removal of the mould.* The mould is tapped on its side until it becomes loose, leaving the sample in the shape of a truncated cone on the table.

Table 1.1.4.1

Typical cargo	Bulk density (kg/m^3)	Maximum cargo depth			
		2 m	5 m	10 m	20 m
		← Tamper pressure (kPa) →			
Coal	1000	20 (1.4)	50 (3.5)	100 (7.1)	200 (14.1)
	2000	40 (2.8)	100 (7.1)	200 (14.1)	400 (28.3)
Metal ore	3000	60 (4.2)	150 (10.6)	300 (21.2)	600 (42.4)
Iron ore conc.	4000	80 (5.7)	200 (14.1)	400 (28.3)	800 (56.5)
Lead ore conc.	5000	100 (7.1)	250 (17.7)	500 (35.3)	1000 (70.7)
(values in parenthesis are equivalent kgf when applied via a 30 mm diameter tamper head)					

1.1.4.2 The preliminary flow moisture test:

.1 Immediately after removing the mould, the flow table is raised and dropped up to 50 times through a height of 12.5 mm at a rate of 25 times per minute. If the material is below the FMP, it usually crumbles and bumps off in fragments with successive drops of the table (see figure 1.1.4-3).

.2 At this stage, the flow table is stopped and the material returned to the mixing bowl, where 5-10 m*l* of water, or possibly more, is sprinkled over the surface and thoroughly mixed into the material, either with rubber-gloved fingers or an automatic mixer.

The mould is again filled and the flow table is operated as described in 1.1.4.2.1 for up to 50 drops. If a flow state is not developed, the process is repeated with further additions of water until a flow state has been reached.

.3 *Identification of a flow state*. The impacting action of the flow table causes the grains to rearrange themselves to produce compaction of the mass. As a result, the fixed volume of moisture contained in the material at any given level increases as a percentage of the total volume. A flow state is considered to have been reached when the moisture content and compaction of the sample produce a level of saturation such that plastic deformation occurs. At this stage, the moulded sides of the sample may deform, giving a convex or concave profile (see figure 1.1.4-4).

With repeated action of the flow table, the sample continues to slump and to flow outwards. In certain materials, cracks may also develop on the top surface. Cracking, with the appearance of free moisture, is not, however, an indication of development of a flow state. In most cases, measurement of the deformation is helpful in deciding whether or not plastic flow has occurred. A template which, for example, will indicate an increase in diameter of up to 3 mm in any part of the cone is a useful guide for this purpose. Some additional observations may be useful. For example: when the (increasing) moisture content is approaching the FMP, the sample cone begins to show a tendency to stick to the mould. Further, when the sample is pushed off the table, the sample may leave tracks (stripes) of moisture on the table. If such stripes are seen, the moisture content may be above the FMP: the absence of tracks (stripes) is not necessarily an indication of being below the FMP.

Measuring the diameter of the cone, at the base or at half height, will always be useful. By addition of water in increments of 0.4% to 0.5% and applying 25 drops of the flow table, the first diameter increase will generally be between 1 and 5 mm and after a further increment of water the base diameter will have expanded by between 5 and 10 mm.

.4 As an alternative to the procedure described above, for many concentrates a fast way of finding the approximate FMP is as follows:

When the moisture content is definitely beyond the FMP, measure the diameter after 25 drops, repeat the test after adding a further increment of water, measure the diameter and draw a diagram as illustrated in figure 1.1.4-1, showing increase in diameter plotted against moisture content. A straight line drawn through the two points will cross the moisture content axis close to the FMP.

Having completed the preliminary FMP test, the sample for the main test is adjusted to the required level of moisture content (about 1% to 2%) below the flow point.

1.1.4.3 Main flow moisture test

When a flow state has been reached in the preliminary test, the moisture content of sub-sample (C) is adjusted to about 1% to 2% less than the last value which did not cause flow in the preliminary test (this is suggested simply to avoid starting the main test too close to the FMP and then having to waste time air-drying it and starting again). The final test is then carried out on this adjusted sample in the same manner as for the preliminary test, but in this case with the addition of water in increments of no more than 0.5% of the mass of the test material (the lower the "preliminary" FMP, the smaller the increments should be). After each stage, the whole moulded sample should be placed in a container, weighed immediately and retained for moisture determination if required. This will be necessary if the sample flowed or if the next, slightly wetter, sample flows. If not required it may be returned to the mixing bowl.

When a flow state has been reached, the moisture content should be determined on two samples, one with moisture content just above the FMP and the other with moisture content just below the FMP. The difference between the two values should then be 0.5% or less, and the FMP is taken as the mean of these two values.

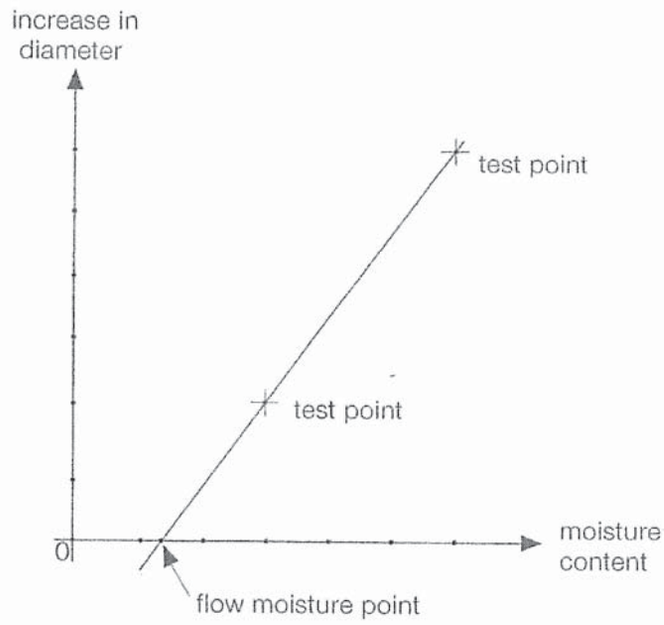


Figure 1.1.4-1

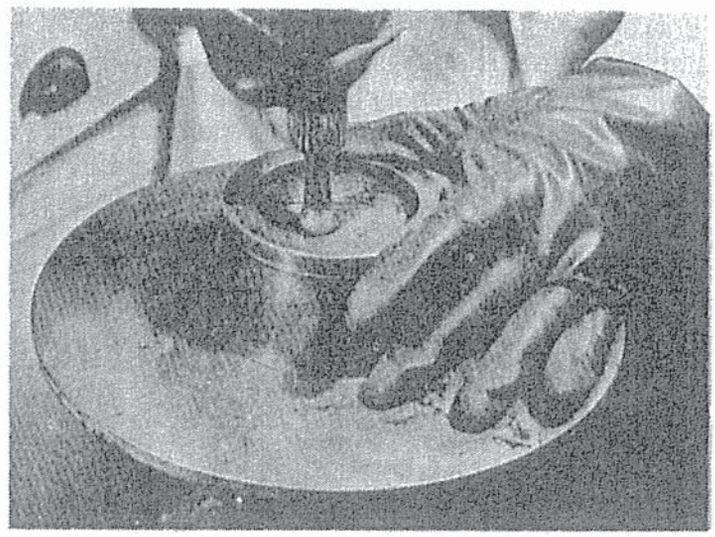


Figure 1.1.4-2

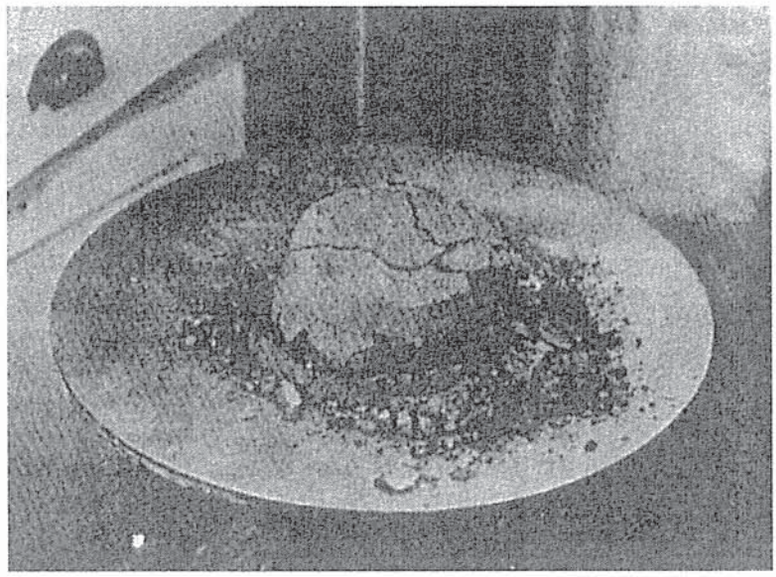


Figure 1.1.4-3

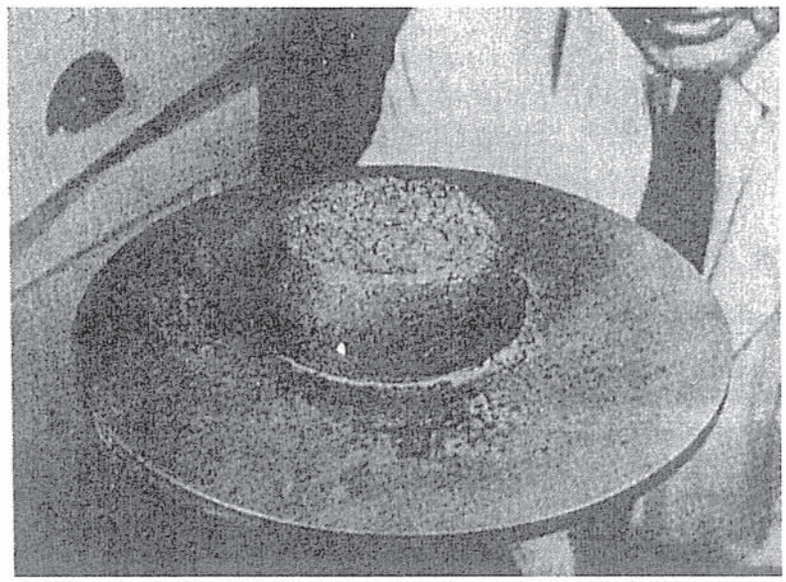


Figure 1.1.4-4

1.1.4.4 Determination of moisture content

Introduction

It should be noted that, for many materials, there are recognized international and national methods for determining moisture content. These methods, or ones that have been established to give equivalent results, should be followed.

Concentrates and similar materials

It is clearly important that the samples should be dried to a constant mass. In practice, this is ascertained after a suitable drying period at 105°C by weighing the sample successively with an interval of several hours elapsing. If the mass remains constant, drying has been completed, whereas if the mass is still decreasing, drying should be continued.

The length of the drying period depends upon many variables, such as the disposition of the material in the oven, the type of container used, the particle size, the rate of heat transfer, etc. It may be that a period of five hours is ample for one concentrate sample, whereas it is not sufficient for another. Sulphide concentrates tend to oxidize, and therefore the use of drying ovens with air circulation systems is not recommended for these materials, nor should the test sample be left in the drying oven for more than four hours.

Coal

The recommended methods for determination of the moisture content are those described in ISO 589-1974, "Hard Coal – Determination of Total Moisture". This method, or ones that have been established to give equivalent results, should be followed.

Calculation of moisture content, FMP and transportable moisture limit:

Taking m_1 as the exact mass of the subsample "as received" (see 1.1.4.1),

Taking m_2 as the exact mass of the "as received" subsample, after drying,

Taking m_3 as the exact mass of the sample just above the flow state (see 1.1.4.3),

Taking m_4 as the exact mass of the sample just above the flow state, after drying,

Taking m_5 as the exact mass of the sample just below the flow state (see 1.1.4.3),

Taking m_6 as the exact mass of the sample just below the flow state, after drying,

Then:

.1 The moisture content of the concentrate "as received" is:

$$\frac{(m_1 - m_2)}{m_1} \times 100, \textit{ in per cent} \qquad (1.1.4.4.1)$$

.2 The FMP of the material is:

$$\frac{\dfrac{(m_3 - m_4)}{m_3} + \dfrac{m_5 - m_6}{m_5}}{2} \times 100, \textit{ in per cent} \qquad (1.1.4.4.2)$$

.3 The transportable moisture limit of the material is 90% of the FMP.

Peat Moss

For all Peat Moss, determine the bulk density, using either the ASTM or CEN (20 litres) method.

Peat should be above or below 90kg/cubic metre on a dry weight basis in order to obtain the correct TML.

As indicated in 1.1.1, the following should be determined:

.1 the moisture content of a sample of cargo (MC);

.2 the flow moisture point (FMP);

.3 the transportable moisture limit (TML). The TML will be determined as follows:

.3.1 for peat with a bulk density of greater than 90 kg/cubic metre on a dry weight is 85% of the FMP; and

.3.2 for peat with a bulk density of 90 kg/cubic metre or less on a dry weight, the TML is 90% of the FMP.

1.2 ***Penetration test procedure***

The penetration test constitutes a procedure whereby a material in a cylindrical vessel is vibrated. The flow moisture point is determined on the basis of the penetration depth of an indicator.

1.2.1 *Scope*

.1 The penetration test is generally suitable for mineral concentrates, similar materials, and coals up to a top size of 25 mm.

.2 In this procedure, the sample, in a cylindrical vessel, is subjected to vertical vibration of $2g$ *rms* $\pm$ 10% (g = gravity acceleration) for 6 minutes. When the penetration depth of a bit put on the surface exceeds 50 mm, it is judged that the sample contains a moisture greater than the flow moisture point.

.3 This procedure consists of a preliminary test to get an approximate value of the flow moisture point and a main test to determine the accurate flow moisture point. When the approximate value of the flow moisture point is known, the preliminary test can be omitted.

.4 The room where the samples are tested should be prepared as mentioned in 1.1.3.

1.2.2 *Apparatus (see figure 1.2.2)*

.1 The test apparatus consists of:

.1 a vibrating table;

.2 cylindrical vessels;

.3 indicators (penetration bits and a holder);

.4 a tamper (see 1.1.2.4); and

.5 ancillary equipment (see 1.1.2.5 to .8).

.2 The vibrator (see figure 1.2.2.2), with a table on which a cylindrical vessel can be clamped, should be capable of exciting a mass of 30 kg at a frequency of either 50 Hz or 60 Hz with an acceleration of 3*g* rms or more, and it can be controlled to adjust the acceleration level.

.3 Dimensions of cylindrical vessels (see figures 1.2.2.3-1 and 1.2.2.3-2) are as follows:

Cylinder size	Inner diameter	Depth	Wall thickness
small	146 mm	202 mm	9.6 mm or more
large	194 mm	252 mm	10.3 mm or more

The vessels should be made of reasonably rigid, non-magnetic, impermeable and lightweight material such as acrylics or vinyl chloride.

The small cylindrical vessel is selected for the materials having a maximum particle size of 10 mm or less. The large cylindrical vessel is for those having a maximum particle size of 25 mm or less.

.4 Penetration bits (see figure 1.2.2.4) are made of brass. The mass of the bit for coal should be adjusted to 88 g (5 kPa), and that for concentrates to 177 g (10 kPa). When the sample contains coarse particles, it is recommended that two bits of the same pressure are put on the surface to avoid misjudgment.

.5 A holder (see figure 1.2.2.5) should be made to guide the rod of a bit with minimum friction to the centre of a cylindrical vessel. When two bits are used, they should be positioned in accordance with figure 1.2.2.

.6 A cylindrical vessel and penetration indicators should be selected in accordance with the nature and condition of the test sample, *viz.* size of particles and bulk density.

1.2.3 *Procedure*

1.2.3.1 Preparation of the test sample and the vibrating table:

.1 The quantity of the sample required is approximately six times or more the capacity of the selected cylindrical vessel. The amount of representative test sample with which each container is filled should be as follows: approximately 1,700 cm^3 for the small container, and 4,700 cm^3 for the large container.

.2 Mix the sample well and divide into three approximately equal sub-samples, namely (A), (B) and (C). The sub-sample (A) should be immediately weighed and placed in the drying oven to determine the moisture content of the sample "as received".

The sub-samples (B) and (C) are used for the preliminary test and the main test, respectively.

.3 The vibration level of the vibrating table should be calibrated, using an acceleration meter, prior to carrying out testing. The acceleration of the table should be adjusted to $2g$ rms $\pm$ 10% with a container filled with a sample mounted on the table.

1.2.3.2 Preliminary flow moisture test

This test is intended to measure quickly the approximate flow moisture point, using sub-sample (B). Water is added in increments after every penetration test. When a flow state has been reached, the moisture content of the sample just above the flow state is measured. The moisture content of the sample just below the flow state can be calculated by deducting the increment of water last added from the gross mass of the sample.

.1 Fill the appropriate cylindrical vessel with sub-sample (B) in four distinct stages and tamp after the addition of each layer using a specified tamper. Tamp to a pressure denoted in 1.1.4.1 for mineral concentrates or to 40 kPa for coals, and apply the pressure evenly over the whole surface area of the material until a uniformly flat surface is obtained.

.2 Place the penetration bit on the surface of the material through the holder.

.3 Operate the vibrator at a frequency of 50 Hz or 60 Hz with an acceleration of $2g$ rms $\pm$ 10% for 6 minutes. If necessary, the acceleration level should be checked by referring to the output of the acceleration meter attached to the vibrating table.

.4 After 6 minutes of vibration, read the depth of penetration.

.5 When the depth of penetration is less than 50 mm, it is judged that liquefaction did not take place. Then:

.1 Remove the material from the cylindrical vessel and replace in the mixing bowl with the remainder of the sample.

.2 Mix well and weigh the contents of the mixing bowl.

.3 Sprinkle an increment of water of not more than 1% of the mass of the material in the bowl and mix well.

.4 Repeat the procedure described in 1.2.3.2.1 to 1.2.3.2.5.

.6 When the depth of penetration is greater than 50 mm, it is judged that liquefaction took place. Then:

.1 Remove the material from the cylindrical vessel and replace in the mixing bowl.

.2 Measure the moisture content in accordance with the procedure described in 1.1.4.4.

.3 Calculate the moisture content of the sample just below the flow moisture point on the basis of the amount of water added.

.7 If the penetration depth in the first attempt exceeds 50 mm, i.e. the sample as received liquefied, mix sub-samples (B) and (C) and dry at room temperature to reduce the moisture. Then, divide the material into two sub-samples (B) and (C), and repeat the preliminary test.

1.2.3.3 The main flow moisture test

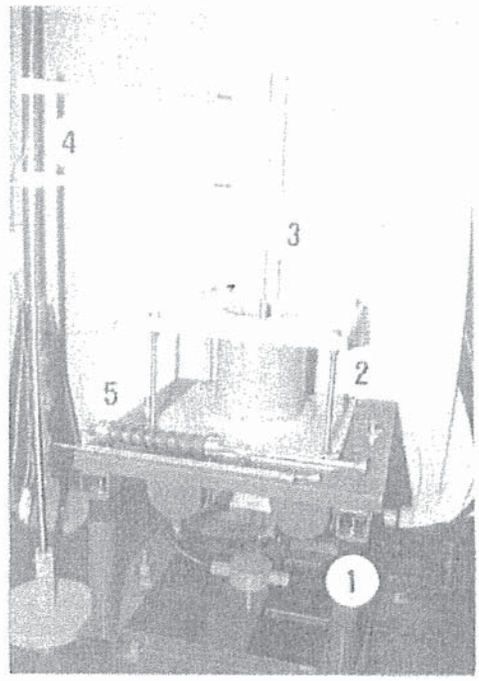
.1 On the basis of the preliminary test, the main test should be carried out to determine the flow moisture point more accurately.

.2 Adjust the moisture content of the sub-sample (C) to the last value, which did not cause flow in the preliminary flow moisture test.

.3 The first test of the main flow moisture test is carried out on this adjusted sample in the same manner as described in 1.2.3.2. In this case, however, the addition of water in increments should not be more than 0.5% of the mass of the test material.

.4 When the approximate value of the flow moisture point is known in advance, the moisture content of the sub-sample (C) is adjusted to approximately 90% of this value.

.5 When a flow state has been reached, the flow moisture point is determined as described in 1.1.4.3.



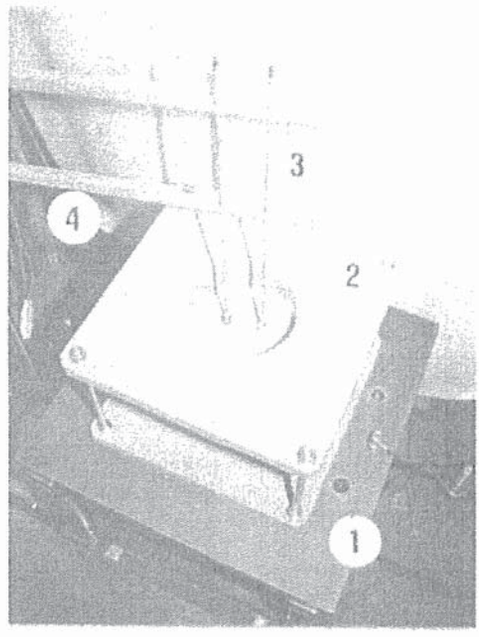
① Vibration table

② Cylindrical vessel (150 mm diameter)

③ Penetration bit (10 kPa)

④ Bit holder

⑤ Tamper



① Vibration table

② Cylindrical vessel (150 mm diameter)

③ Penetration bit (5 kPa)

④ Bit holder

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Figure 1.2.2 – *Test apparatus*

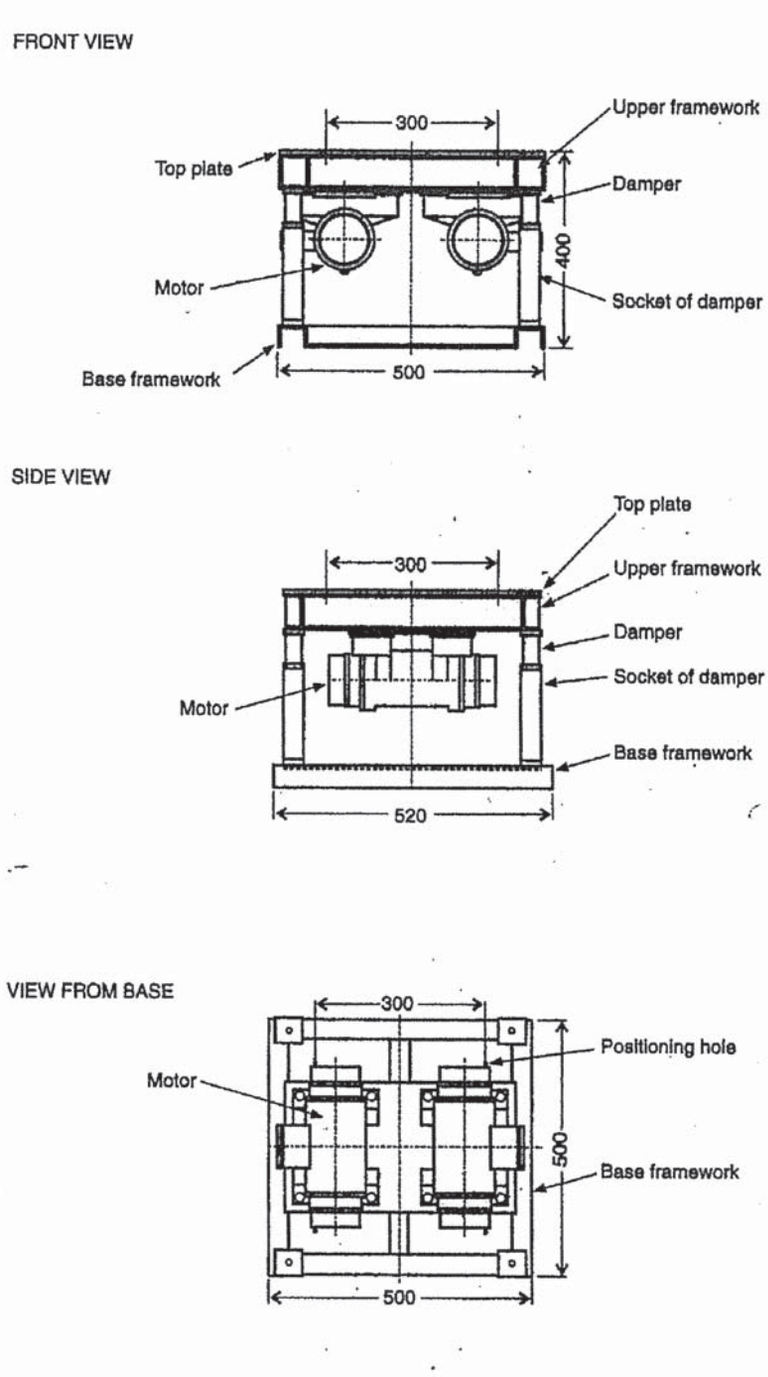
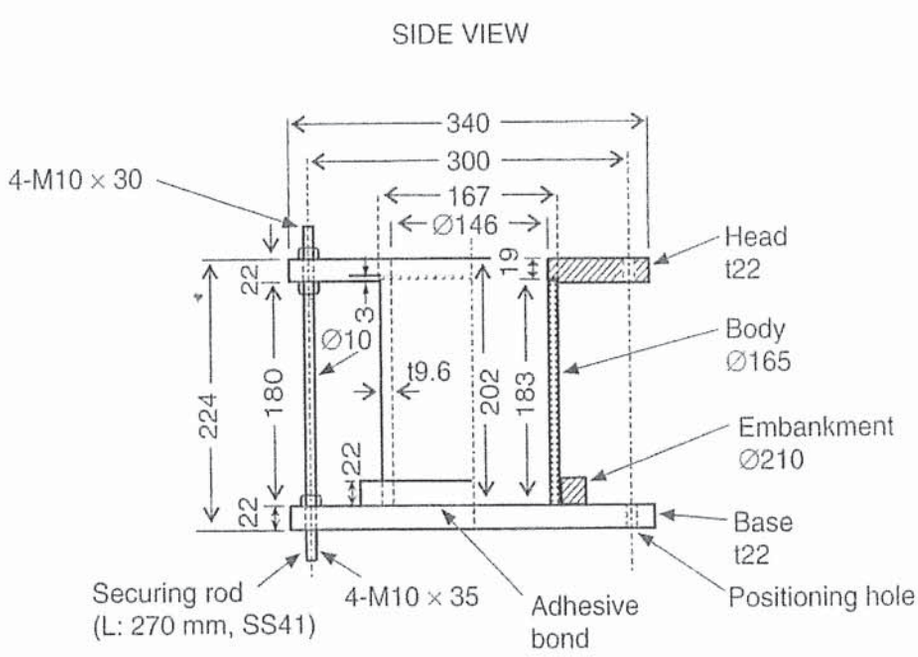


Figure 1.2.2.2 – *Vibration table*



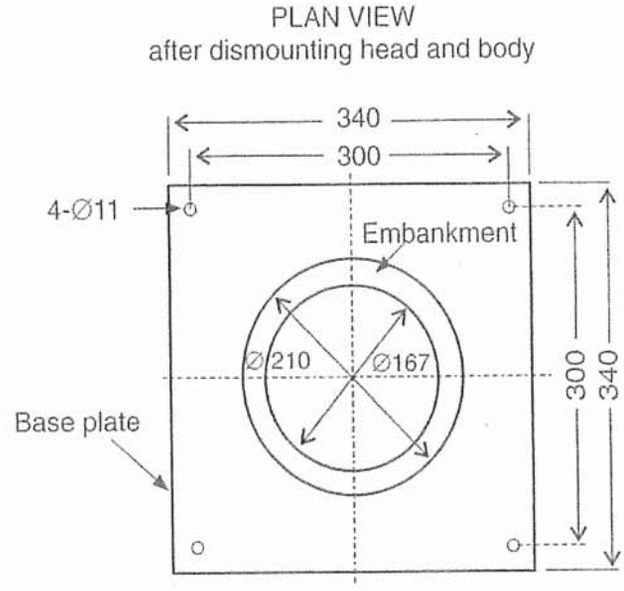
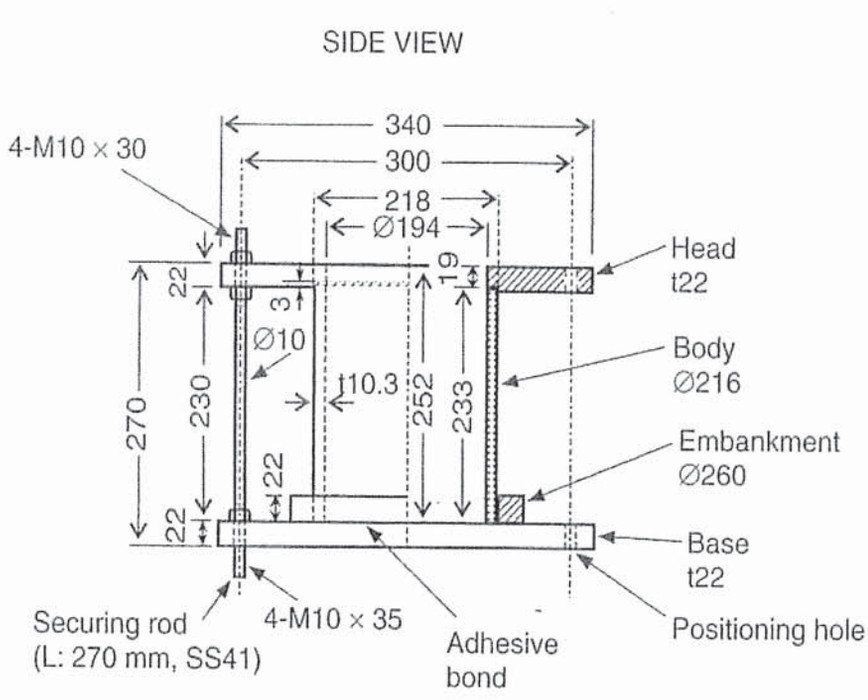


Figure 1.2.2.3-1 – *Cylindrical vessel, 150 mm diameter*



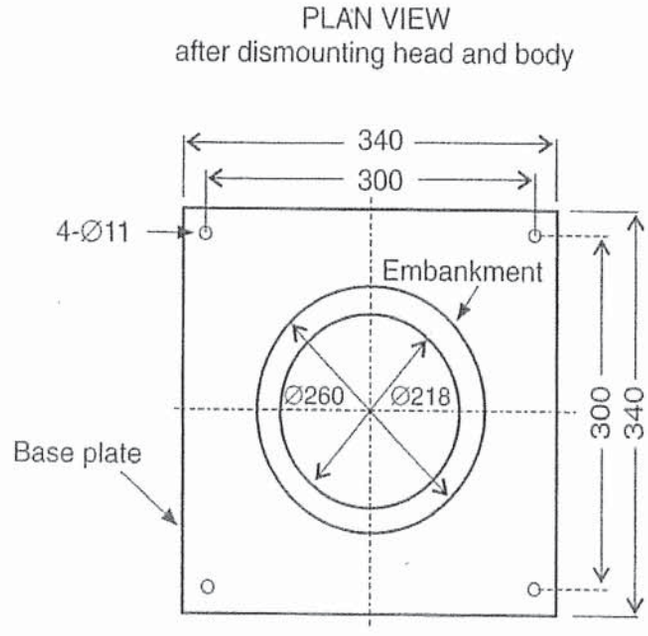
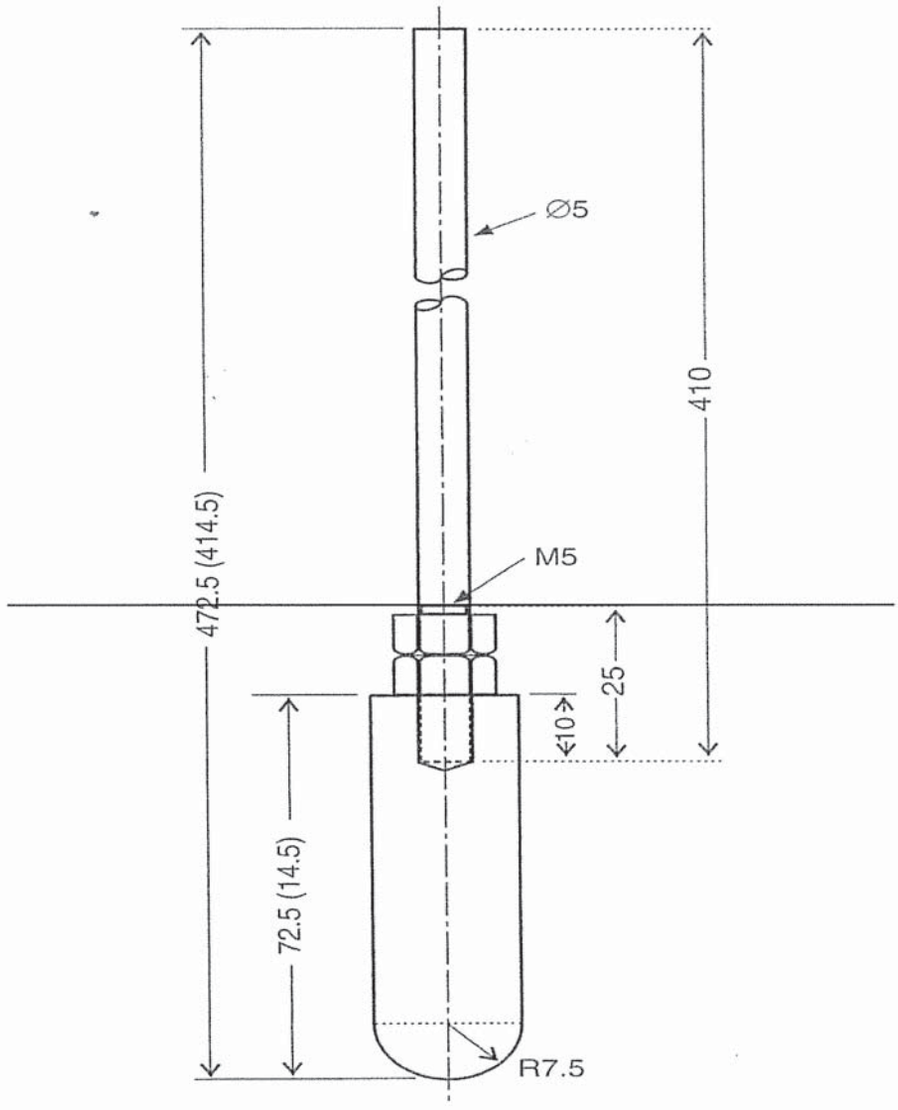
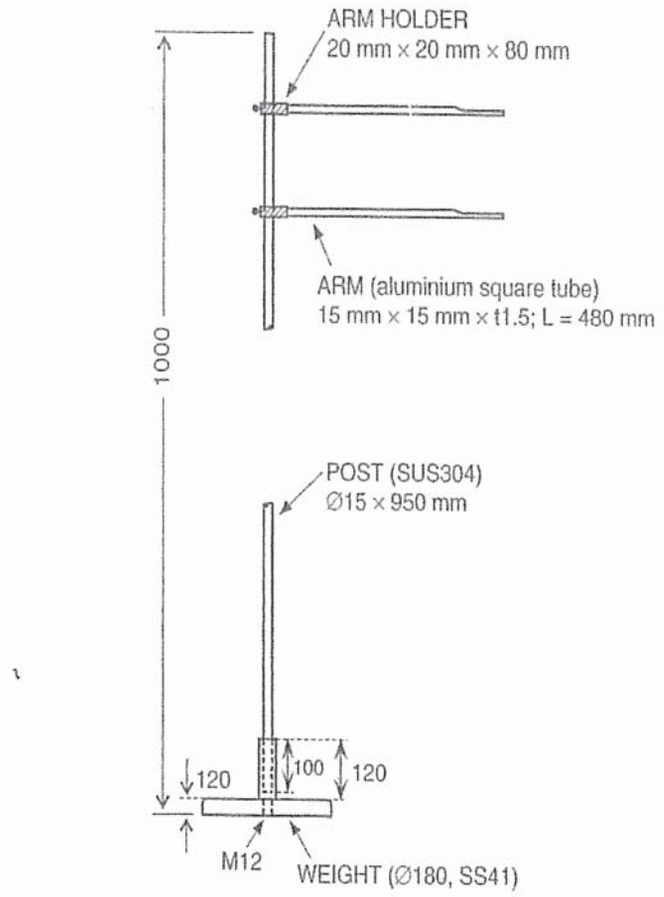


Figure 1.2.2.3-2 – *Cylindrical vessel, 200 mm diameter*



(Dimensions indicated in brackets are of the 5 kPa bit)
(unit: mm)

Figure 1.2.2.4 – *Penetration bit*



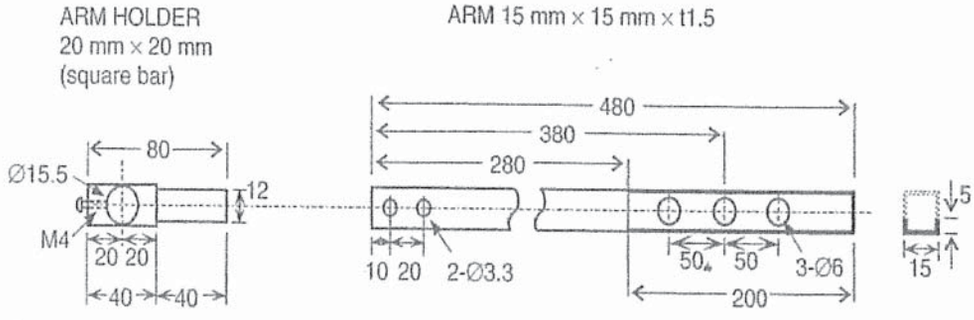


Figure 1.2.2.5 – *Bit holder*

1.3 *Proctor/Fagerberg test procedure*

1.3.1 *Scope*

.1 Test method for both fine and relatively coarse-grained ore concentrates or similar materials up to a top size of 5 mm. This method should not be used for coal or other porous materials.

.2 Before the Proctor/Fagerberg test is applied to coarser materials with a top size greater than 5 mm, an extensive investigation for adoption and improvement is required.

.3 The transportable moisture limit (TML) of a cargo is taken as equal to the critical moisture content at 70% degree of saturation according to the Proctor/Fagerberg method test.

1.3.2 *Proctor/Fagerberg test equipment*

.1 The Proctor apparatus (see figure 1.3.2) consists of a cylindrical iron mould with a removable extension piece (the compaction cylinder) and a compaction tool guided by a pipe open at its lower end (the compaction hammer).

.2 Scales and weights (see 3.2) and suitable sample containers.

.3 A drying oven with a controlled temperature interval from 100° C to maximum 105°C. This oven should be without air circulation.

.4 A suitable mixer. Care should be taken to ensure that the use of the mixer does not reduce the particle size or consistency of the test material.

.5 Equipment to determine the density of the solid material, for example a pycnometer.

1.3.3 Temperature and humidity (see 1.1.3)

1.3.4 *Procedure*

.1 *Establishment of a complete compaction curve*. A representative sample according to a relevant standard (see section 4.7, page 20) of the test material is dried at a temperature of approximately 100°C. The total quantity of the test material should be at least three times as big as required for the complete test sequence. Compaction tests are executed for five to ten different moisture contents (five to ten separate tests). The samples are adjusted in order that dry to almost saturated (plastic) samples are obtained. The required quantity per compaction test is about 2000 cm^3.

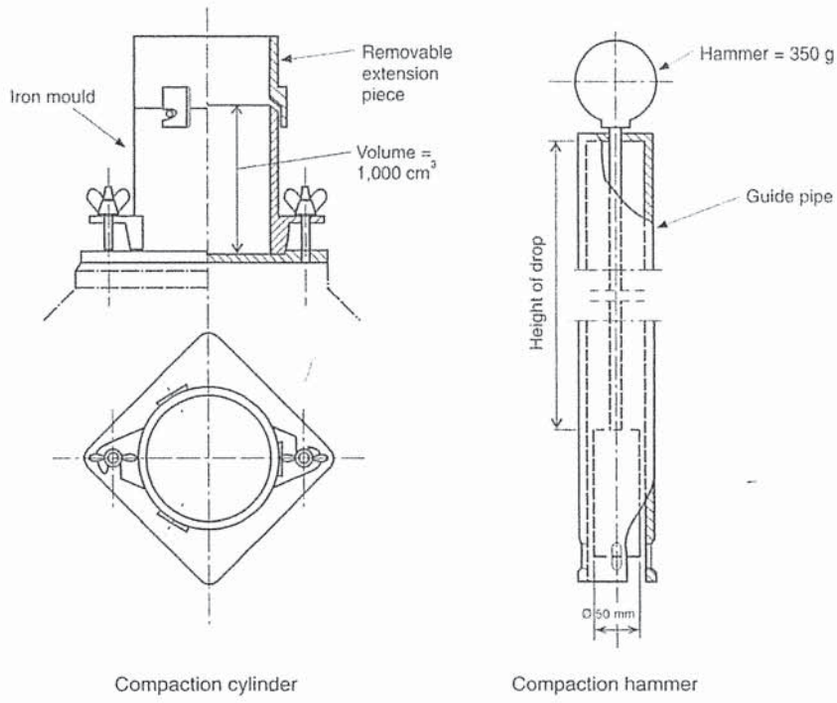


Figure 1.3.2 – *Proctor apparatus*

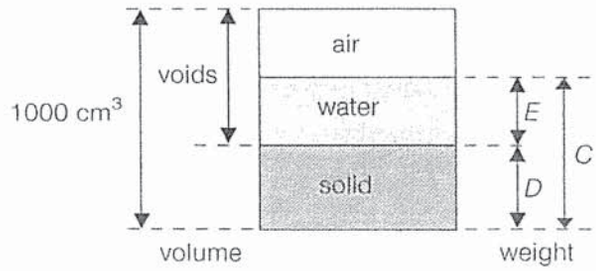


Figure 1.3.4.2

At each compaction test a suitable amount of water is added to the sample of the dried test material and mixed thoroughly for 5 minutes. Approximately one fifth of the mixed sample is filled into the mould and levelled and then the increment is tamped uniformly over the surface of the increment. Tamping is executed by dropping the hammer 25 times through the guide pipe, 0.2 m each time. The performance is repeated for all five layers. When the last layer has been tamped the extension piece is removed and the sample is levelled off along the brim of the mould. When the weight of the cylinder with the tamped sample has been determined, the cylinder is emptied, the sample is dried and the weight is determined.

The test then is repeated for the other samples with different moisture contents.

.2 *Definitions and data for calculations (see figure 1.3.4.2)*

- empty cylinder, mass in grams: A
- cylinder with tamped sample, mass in grams: B
- wet sample, mass in grams: C

$$C = B - A$$

- dry sample, mass in grams: D
- water, mass in grams (equivalent to volume in cm^3): E

$$E = C - D$$

Volume of cylinder: 1000 cm^3

.3 *Calculation of main characteristics*

- density of solid material, g/cm^3 (t/m^3): d
- dry bulk density, g/cm^3 (t/m^3): γ

$$\gamma = \frac{D}{1000}$$

- net water content, volume %: e_v

$$e_v = \frac{E}{D} \times 100 \times d$$

- void ratio: e (volume of voids divided by volume of solids)

$$e = \frac{1000 - D}{D} = \frac{d}{\lambda} = - 1$$

- degree of saturation, percentage by volume: S

$$S = \frac{e_v}{e}$$

- gross water content, percentage by mass: W^1

$$W^1 = \frac{E}{C} \times 100$$

- net water content, percentage by mass: W

$$W = \frac{E}{D} \times 100$$

.4 *Presentation of the compaction tests*

For each compaction test the calculated void ratio (e) value is plotted as the ordinate in a diagram with net water content (e_v) and degree of saturation (S) as the respective abscissa parameters.

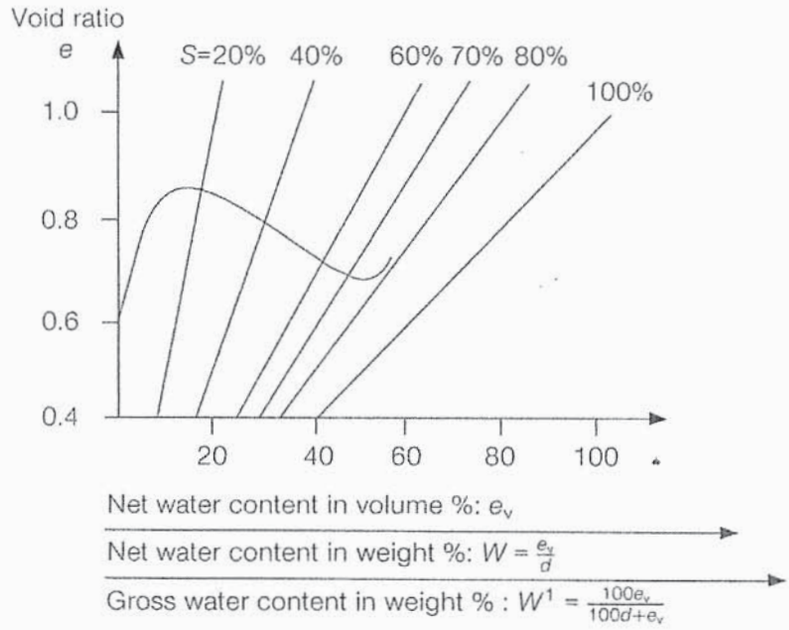


Figure 1.3.4.5

.5 *Compaction curve*

The test sequence results in a specific compaction curve (see figure 1.3.4.5).

The critical moisture content is indicated by the intersection of the compaction curve and the line S = 70% degree of saturation. The transportable moisture limit (TML) is the critical moisture content.

2 Test procedures to determine the angle of repose and associated apparatus

2.1 *Determination of angle of repose of fine-grained materials (size less than 10 mm): "tilting box test". For use in laboratory or port of loading*

2.1.1 *Scope*

The test provides for the determination of the angle of repose of fine-grained non-cohesive materials (size less than 10 mm). The results so obtained may be used when interpreting sections 5 and 6 of this Code for the materials in question.

2.1.2 *Definition*

The angle of repose obtained by this test is the angle formed between the horizontal and the top of the testbox when the material in the box just begins to slide in bulk.

2.1.3 *Principle of test*

When measuring the angle of repose by this method, the material surface should initially be level and parallel to the testbox base. The box is tilted without vibration and tilted without vibration and tilting is stopped when the product just begins to slide in bulk.

2.1.4 *Apparatus (see figure 2.1.4)*

Apparatus is as follows:

.1 A framework, on top of which is attached an open box. Attachment of the box to the frame is by means of a shaft passing through bearings affixed to both the frame and the end of the box, enabling the box to be subjected to a controlled tilt.

.2 The dimensions of the box are 600 mm long, 400 mm wide and 200 mm high.

.3 To prevent sliding of the material along the bottom of the box during tilting, a tightly fitting grating (openings 30 mm x 30 mm x 25 mm) is placed on the bottom of the box before filling.

.4 Tilting of the box is effected by a hydraulic cylinder fitted between the frame and the bottom of the box. Other means may be used to obtain the required tilting but in all cases vibration must be eliminated.

.5 To pressurize the hydraulic cylinder, a hydropneumatic accumulator may be used, pressurized by air or gas at a pressure of about 5 kp/cm^2.

.6 The rate of tilting should be approximately $0.3^o/s$.

.7 Range of tilt should be at least 50^o.

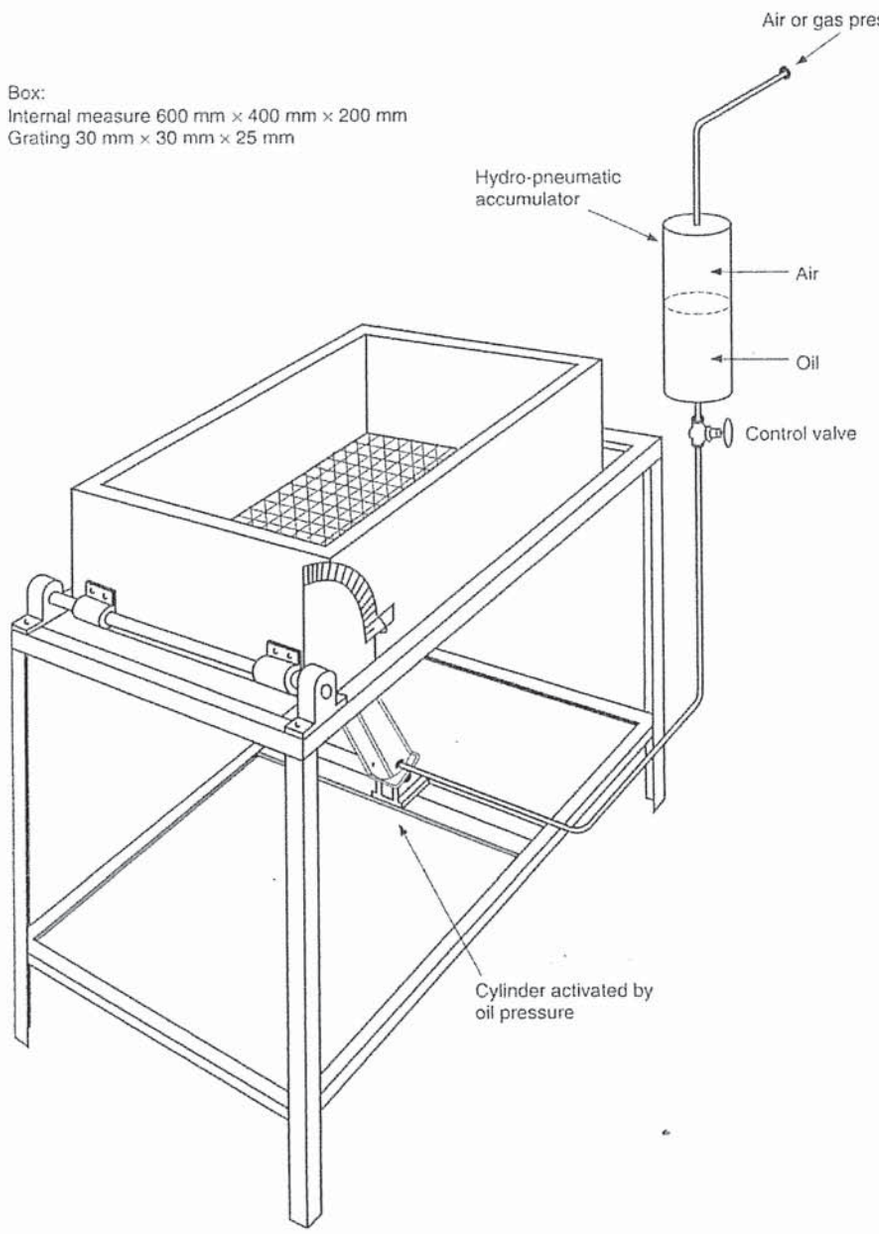


Figure 2.1.4 – *Basic sketch of tilting box*

.8 A protractor is fitted to the end of the shaft. One lever of the protractor is fitted so that it may be screw-adjusted to the horizontal.

.9 The protractor should measure the angle of the top of the box to the horizontal to within an accuracy of 0.5^{o}.

.10 A spirit level or some other levelling device should be available to zero the protractor.

2.1.5 *Procedure*

The box is filled with the material to be tested by pouring it slowly and carefully from the lowest practical height into the box in order to obtain uniformity of loading.

The excess material is scraped off with the aid of a straight edge, inclined at about 45° towards the direction of scraping.

The tilting system is then activated and stopped when the material just begins to slide in bulk.

The angle of the top of the box to the horizontal is measured by the protractor and recorded.

2.1.6 *Evaluation*

The angle of repose is calculated as the mean of three measurements and is reported to within half a degree.

Notes: Preferably the test should be carried out with three independent samples.

Care should be taken to ensure that the shaft is adjusted to be horizontal before testing.

2.2 *Alternative or shipboard test method to be used for the determination of the angle of repose when the tilting box is not available*

2.2.1 *Definition*

According to this method the angle of repose is the angle between the cone slope and the horizontal measured at half height.

2.2.2 *Principle of test*

To determine the angle of repose, a quantity of the material to be tested is poured very carefully out of a flask onto a sheet of rough-textured paper, in such a way that a symmetrical cone is formed.

2.2.3 *Equipment*

The necessary equipment to carry out this test is as follows:

- a horizontal table free from vibrations;
- a sheet of rough-textured paper onto which the material should be poured;
- a protractor; and
- a 3-litre conical flask.

2.2.4 *Procedure*

Put the sheet of paper on the table. Split 10*l* of the material to be tested into three sub-samples and test each in the following way:

Pour two thirds of the sub-sample (i.e. 2 *l*) onto the sheet, producing a starting cone. The remainder of this sub-sample is then poured very carefully from a height of a few millimetres on top of the cone. Care should be taken that the cone will be built up symmetrically. This may be achieved by revolving the flask slowly close around the top of the cone when pouring.

When measuring, care should be taken that the protractor does not touch the cone; otherwise this may result in sliding of the material and spoil the test.

The angle has to be measured at four places around the cone, about 90 degrees apart.

This test should be repeated on the other two sub-samples.

2.2.5 *Calculations*

The angle of repose is taken as the mean of the 12 measurements and is reported to half a degree. This figure can be converted to the tilting box value as follows:

$$a_t = a_s + 3^o \qquad (2.2.5)$$

Where a_t = angle of repose according to the tilting box text

a_s = angle of repose according to the survey test

3 Standards used in test procedures

3.1 *Standard flow table and frame*

3.1.1 *Flow table and frame*

3.1.1.1 The flow table apparatus shall be constructed in accordance with figure 3. The apparatus shall consist of an integrally cast rigid iron frame and a circular rigid table top, 10 inches ± 0.1 inch (254 mm ± 2.5 mm) in diameter, with a shaft attached perpendicular to the table top by means of a screw thread. The table top, to which the shaft with its integral contact shoulder is attached, shall be mounted on a frame in such a manner that it can be raised and dropped vertically through the specified height, with a tolerance in height of ± 0.005 inches (0.13 mm) for new tables and ± 0.015 inches (0.39 mm) for tables in use, by means of a rotated cam. The table top shall have a fine-machined plane surface, free of blowholes and surface defects, and shall be scribed as shown in figure 3. The table top shall be of cast brass or bronze having a Rockwell hardness number not less than HRB 25 with an edge thickness of 0.3 inches (8 mm), and shall have six integral radial stiffening ribs. The table top and attached shaft shall weigh 9 lb ± 0.1 lb (4 kg ± 0.05 kg) and the weight shall be symmetrical around the centre of the shaft.

3.1.1.2 The cam and vertical shaft shall be of medium-carbon machinery steel, hardened where indicated in figure 3. The shaft shall be straight and the difference between the diameter of the shaft and the diameter of the bore of the frame shall be not less than 0.002 inches (0.05) and not more than 0.003 inches (0.08 mm) for new tables and shall be maintained at from 0.002 inches to 0.010 inches (0.26 mm) for tables in use. The end of the shaft shall not fall upon the cam at the end of the drop, but shall make contact with the cam not less than 120° from the point of drop. The face of the cam shall be a smooth spiralled curve of uniformly increasing radius from ½ inch to 1¼ inches (13 mm to 32 mm) in 360° and there shall be no appreciable jar as the shaft comes into contact with the cam. The cam shall be so located and the contact faces of the cam and shaft shall be such that the table does not rotate more than one revolution in 25 drops. The surfaces of the frame and of the table which come into contact at the end of the drop shall be maintained smooth, plane, and horizontal and parallel with the upper surface of the table and shall make continuous contact over a full 360°.

3.1.1.3 The supporting frame of the flow table shall be integrally cast of fine-grained, high-grade cast iron. The frame casting shall have three integral stiffening ribs extending the full height of the frame and located 120° apart. The top of the frame shall be chilled to a depth of approximately ¼ inch (6.4 mm) and the face shall be ground and lapped square with the bore to give 360° contact with the shaft shoulder. The underside of the base of the frame shall be ground to secure a complete contact with the steel plate beneath.

3.1.1.4 The flow table may be driven by a motor, connected to the camshaft through an enclosed worm gear speed reducer and flexible coupling. The speed of the camshaft shall be approximately 100 rpm. The motor drive mechanism shall not be fastened or mounted on the table base plate or frame.

The performance of a flow table shall be considered satisfactory if, in calibration tests, the table gives a flow value that does not differ by more than 5 percentage points from flow values obtained with a suitable calibration material.

3.1.2 *Flow table mounting*

3.1.2.1 The flow table frame shall be tightly bolted to a cast iron or steel plate at least 1 inch (25 mm) thick and 10 inches (250 mm) square. The top surface of this plate shall be machined to a smooth plane surface. The plate shall be anchored to the top of a concrete pedestal by four ½ inch (13 mm) bolts that pass through the plate and are embedded at least 6 inches (150 mm) in the pedestal. The pedestal shall be cast inverted on the base plate. A positive contact between the base plate and the pedestal shall be obtained at all points. No nuts or other such levelling devices shall be used between the plate and the pedestal. Levelling shall be effected by suitable means under the base of the pedestal.

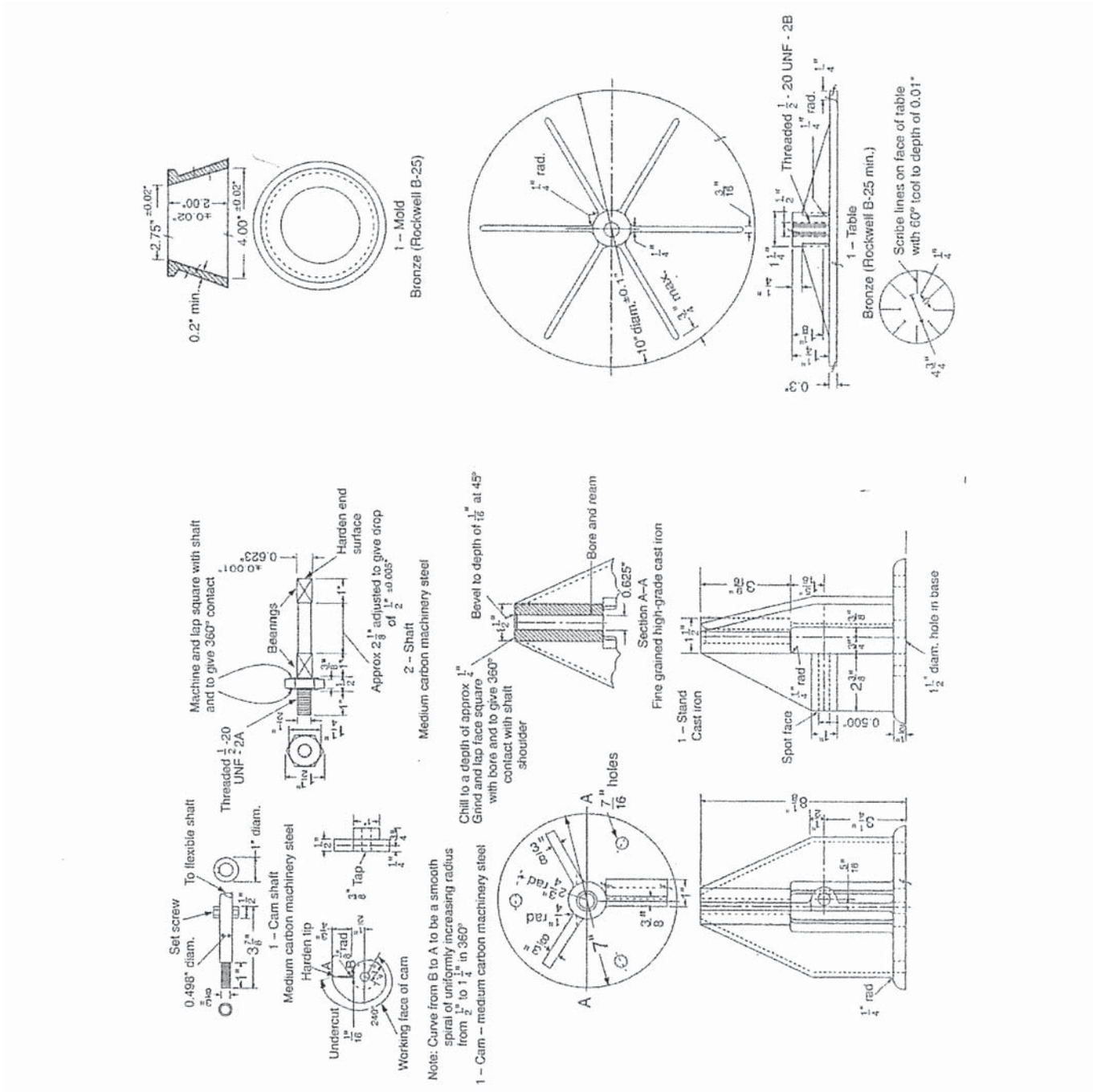

1 – Mold
Bronze (Rockwell B-25)
1 – Table
Bronze (Rockwell B-25 min.)
Scribe lines on face of table with 60° tool to depth of 0.01"
2 – Shaft
Medium carbon machinery steel
1 – Cam shaft
Medium carbon machinery steel
1 – Cam – medium carbon machinery steel
1 – Stand
Cast iron
Fine grained high-grade cast iron
Section A–A
Bore and ream
Harden end surface
Harden lip
Working face of cam
Undercut
Spot face
Note: Curve from B to A to be a smooth spiral of uniformly increasing radius from 1/2" to 1 1/2" in 360°

Figure 3

3.1.2.2 The pedestal shall be 10 inches to 11 inches (250 mm to 275 mm) square at the top, and 15 inches to 16 inches (375 mm to 400 mm) square at the bottom, 25 inches to 30 inches (625 mm to 750 mm) in height, and shall be of monolithic construction, cast from concrete weighing at least 140 lb/ft^3 (2,240 kg/m^3). A stable gasket cork pad, ½ inch (13 mm) thick and approximately 4 inches (102 mm) square, shall be inserted under each corner of the pedestal. The flow table shall be checked frequently for levelness of the table top, stability of the pedestal, and tightness of the bolts and nuts in the table base and the pedestal plate. (A torque of 20 lb ft (27 Nm) is recommended when tightening those fastenings.)

3.1.2.3 The table top, after the frame has been mounted on the pedestal, shall be level along two diameters at right angles to each other, in both the raised and lowered positions.

3.1.3 *Flow table lubrication*

3.1.3.1 The vertical shaft of the table shall be kept clean and shall be lightly lubricated with a light oil (SAE-10). Oil shall not be present between the contact faces of the table top and the supporting frame. Oil on the cam face will lessen wear and promote smoothness of operation. The table should be raised and permitted to drop a dozen or more times just prior to use if it has not been operated for some time.

3.1.4 *Mould*

3.1.4.1 The mould for casting the flow specimen shall be of cast bronze or brass, constructed as shown in figure 3. The Rockwell hardness number of the metal shall be not less than HRB 25. The diameter of the top opening shall be 2.75 inches ± 0.02 inches (69.8 mm ± 0.5 mm) for new moulds and 2.75 inches + 0.05 inches (+ 1.3 mm) and – 0.02 inches for moulds in use. The surfaces of the base and top shall be parallel and at right angles to the vertical axis of the cone. The mould shall have a minimum wall thickness of 0.2 inches (5 mm). The outside of the top edge of the mould shall be shaped so as to provide an integral collar for convenient lifting of the mould. All surfaces shall be machined to a smooth finish. A circular shield approximately 10 inches (254 mm) in diameter, with a centre opening approximately 4 inches (102 mm) in diameter, made of non-absorbing material not attacked by the cement, shall be used with the flow mould to prevent mortar from spilling on the table top.

3.2 *Scales and weights*

3.2.1 *Scales*

3.2.1.1 The scales used shall conform to the following requirements. On scales in use, the permissible variation at a load of 2000 g shall be ± 2.0 g. The permissible variation on new scales shall be one half of this value. The sensibility reciprocal shall be not greater than twice the permissible variation.

3.2.2 *Weights*

3.2.2.1 The permissible variations on weights shall be as prescribed in the table below. The permissible variations on news weights shall be one half of the values in the table below.

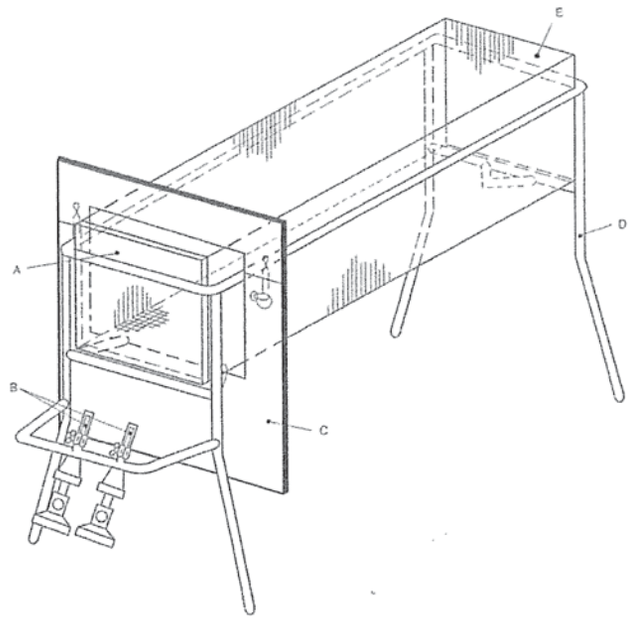
PERMISSIBLE VARIATIONS ON WEIGHTS

Weight (g)	Permissible variations on weights in use, plus or minus (g)
1000	0.50
900	0.45
750	0.40
500	0.35
300	0.30
250	0.25
200	0.20
100	0.15
50	0.10
20	0.05
10	0.04
5	0.03
2	0.02
1	0.01

4 Trough test for determination of the self-sustaining exothermic decomposition of fertilizers containing nitrates

4.1 *Definition*

A fertilizer capable of self-sustaining decomposition is defined as one in which decomposition initiated in a localized area will spread throughout the mass. The tendency of a fertilizer offered for transport to undergo this type of decomposition can be determined by means of the trough test. In this test localized decomposition is initiated in a bed of the fertilizer to be contained in a horizontally mounted trough. The amount of propagation, after removal of the initiating heat source, of decomposition through the mass is measured.



A Steel plate (150 x 150 mm and 1 to 3 mm thick)

B Gas burners (e.g., Teclu or Bunsen)

C Heat shield (2 mm thick)

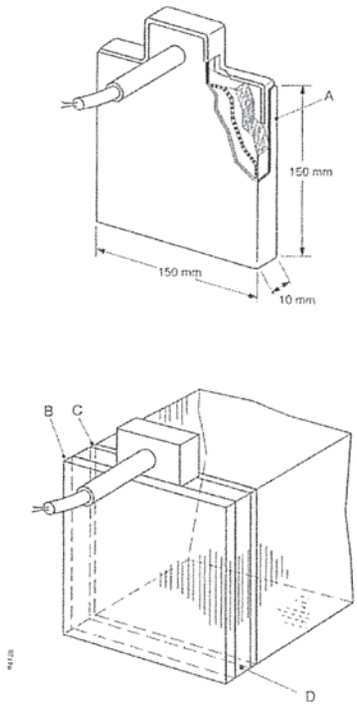
D Stand (e.g., made from 15 mm wide, 2 mm thick steel bar)

E Gauze trough (150 x 150 x 500 mm)

Figure 4-1 – *Gauze trough with support and burners*

4.2 *Apparatus and materials*

The apparatus (figure 4-1) consists of a trough of internal dimensions 150 mm x 150 mm x 500 mm, open at the top. The trough is constructed of square-meshed gauze (preferably stainless steel) with a mesh width of about 1.5 mm and a wire thickness of 1.0 mm supported on a frame made from, for example, 15 mm wide, 2 mm thick steel bars. The gauze at each end of the trough may be replaced by 1.5 mm thick, 150 mm x 150 mm stainless steel plates. The trough should be rested on a suitable support. Fertilizers with a particle size distribution such that a significant amount falls through the mesh of the trough should be tested in a trough of smaller mesh gauze, or alternatively in a trough lined with gauze of a smaller mesh. During initiation sufficient heat should be provided and maintained to establish a uniform decomposition front. Two alternative heating methods are recommended, *viz*:



A Aluminium or stainless steel sheathing (thickness 3 mm)

B Insulating plate (thickness 5 mm)

C Aluminium foil or stainless steel plate (thickness 3 mm)

D Position of heating device in trough

Figure 4-2 – *Electrical heating device (capacity 250 W)*

4.2.1 *Electrical heating*

An electrical heating element (capacity 250 W) enclosed in a stainless steel box is placed inside and at one end of the trough (figure 4-2). The dimensions of the stainless steel box are 145 mm x 145 mm x 10 mm, and the wall thickness is 3 mm. The side of the box which is not in contact with the fertilizer should be protected with a heat shield (insulation plate 5 mm thick). The heating side of the box may be protected with aluminium foil or a stainless steel plate.

4.2.2 *Gas burners*

A steel plate (thickness 1 mm to 3 mm) is placed inside one end of the trough and in contact with the wire gauze (figure 4-1). The plate is heated by means of two burners which are fixed to the trough support and are capable of maintaining the plate at temperatures between 400°C and 600° C, i.e. dull red heat.

4.2.3 To prevent heat transport along the outside of the trough, a heat shield consisting of a steel plate (2 mm thick) should be installed at about 50 mm from the end of the trough where the heating takes place.

4.2.4 The life of the apparatus may be prolonged if it is constructed of stainless steel throughout. This is particularly important in the case of the gauze trough.

4.2.5 Propagation may be measured using thermocouples in the substance and recording the time at which a sudden temperature rise occurs as the reaction front reaches the thermocouple.

4.3 ***Procedure***

4.3.1 The apparatus should be set up under a fume hood to remove toxic decomposition gases or in an open area where the fumes can be readily dispersed. Although there is no explosion risk, when performing the test it is advisable to have a protective shield, e.g., of suitable transparent plastics, between the observer and the apparatus.

4.3.2 The trough is filled with the fertilizer in the form to be offered for shipment and decomposition is initiated at one end, either electrically or by means of gas burners as described above. Heating should be continued until decomposition of the fertilizer is well established and propagation of the front (over approximately 30 mm to 50 mm) has been observed. In the case of products with high thermal stability, it may be necessary to continue heating for two hours. If fertilizers show a tendency to melt, the heating should be done with care, i.e. using a small flame.

4.3.3 About 20 minutes after the heating has been discontinued, the position of the decomposition front is noted. The position of the reaction front can be determined by difference in colour, e.g., brown (undecomposed fertilizer) to white (decomposed fertilizer), or by the temperature indicated by adjacent pairs of thermocouples which bracket the reaction front. The rate of propagation may be determined by observation and timing or from thermocouple records. It should be noted whether there is no propagation after heating is discontinued or whether propagation occurs throughout the substance.

4.4 ***Test criteria and method of assessing results***

4.4.1 If propagation of the decomposition continues throughout the substance the fertilizer is considered capable of showing self-sustaining decomposition.

4.4.2 If propagation does not continue throughout the substance, the fertilizer is considered to be free from the hazard of self-sustaining decomposition.

5 Description of the Test of Resistance to Detonation

5.1 *Principle*

5.1.1 The test sample is confined in a steel tube and subjected to detonation shock from an explosive booster charge. Propagation of the detonation is determined from the degree of compression of lead cylinders on which the tube rests horizontally during the test.

5.2 *Sample preparation*

5.2.1 The test must be carried out on a representative sample of cargo. Before being tested for resistance to detonation, the whole mass of the sample is to be thermally cycled five times between 25°C and 50°C (± 1°C) in sealed tubes. The sample shall be maintained at the extreme temperatures, measured at the centre of the sample, for at least 1 hour during each thermal cycle and at 20°C (± 3°C) after complete cycling until tested.

5.3 *Materials*

Seamless steel tube to ISO 65-1981-Heavy or equivalent

Tube length	1,000 mm
Nominal external diameter	114 mm
Nominal wall thickness	5 to 6.5 mm

Bottom plate (160 x 160 mm) of good weldable quality, thickness 5 to 6 mm to be butt-welded to one end of the tube around the entire circumference.

Initiation system and booster

Electrical blasting cap or detonating cord with non-metallic sleeve (10 to 13 g/m).

Compressed pellet of secondary explosive, such as hexogen/wax 95/5 or tetryl, with a central recess to take the detonator.

500 ± 1 gramme plastic explosive containing 83 to 86 % penthrite, formed into a cylinder in a cardboard or plastic tube. Detonation velocity 7,300 to 7,700 m/s.

Six witness cylinders of refined, cast lead for detecting detonation.

50 mm diameter x 100 mm high, refined lead of at least 99.5% purity.

5.4 *Procedure*

Test Temperature: 15 to 20°C. Figures 1 and 2 show the test arrangement.

Fill the tube about one-third of its height with the test sample and drop it 10 cm vertically five times on the floor. Improve the compression by striking the side wall with a hammer between drops. A further addition shall be made such that, after compaction or by raising and dropping the tube 20 times and a total of 20 intermittent hammer blows, the charge fills the tube to a distance of 70 mm from its orifice.

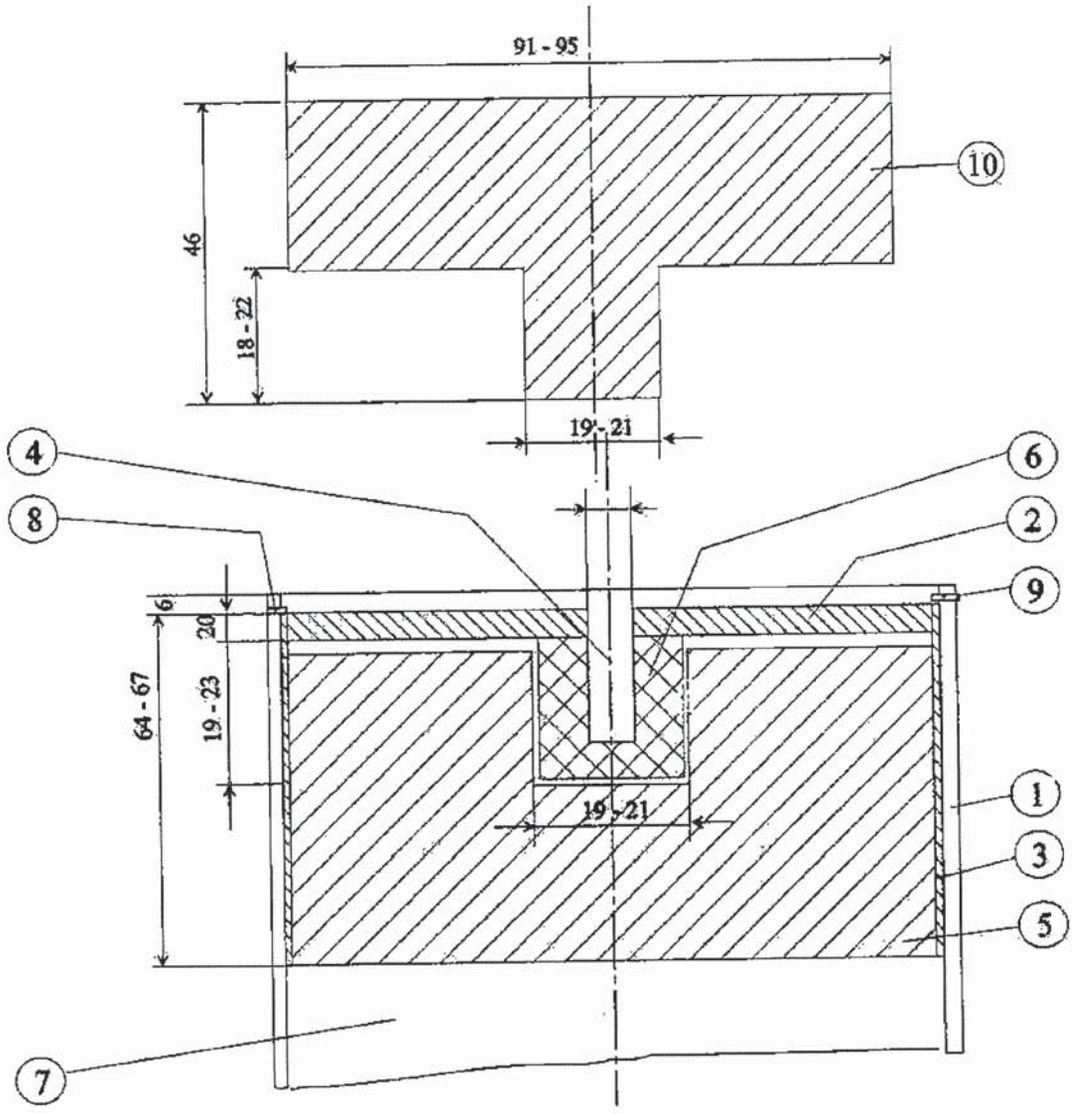
Insert the plastic explosive into the tube and press it down with a wooden die. Place the compressed pallet centrally in the recess within the plastic explosive. Close it with a wooden disc so that it remains in contact with the test sample. Lay the test tube horizontally on the 6 lead cylinders placed at 150 mm intervals (centric), with the centre of the last cylinder 75 mm from the bottom plate, on a firm, level, solid surface that is resistant to deformation or displacement. Insert the electrical blasting cap or the detonating cord.

Ensure that all necessary safety precautions are taken, connect and detonate the explosive.

Record, for each of the lead cylinders, the degree of compression expressed as a percentage of the original height of 100 mm. For oblique compression, the deformation is taken as the average of the maximum and minimum deformation.

5.5 ***Results***

The test is to be carried out twice. If in each test one or more of the supporting lead cylinders are crushed by less than 5%, the sample is deemed to satisfy the resistance to detonation requirements.



Dimensions in mm

①	Steel tube	⑥	Compressed pellet
②	Wooden disc	⑦	Test sample
③	Plastic or cardboard cylinder	⑧	4-mm diameter hole drilled to receive split pin (9)
④	Wooden rod	⑨	Split pin
⑤	Plastic explosive	⑩	Wooden die for (5) diameter as for detonator

Figure 1: ***Booster charge***

① Steel tube

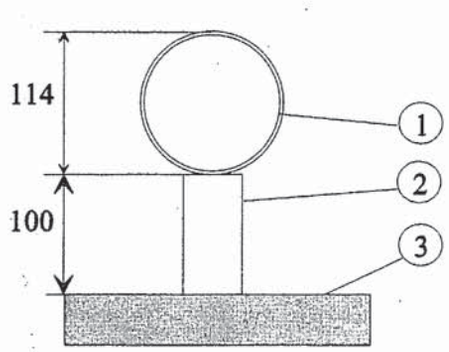
② Lead cylinders

③ Steel block

④ Bottom plate

⑤ Booster charge

[1] to [6] numbers of lead cylinders



dimensions in mm

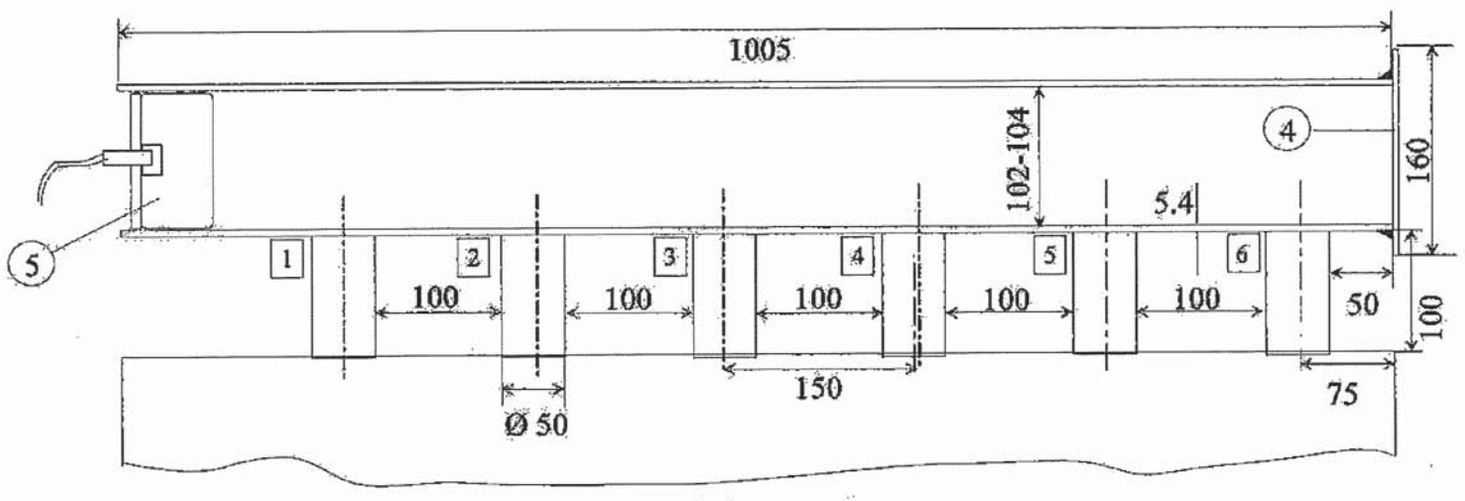


Figure 2: ***Positioning of the steel tube on the firing site***

6 Self-heating test for charcoal

6.1 *Apparatus*

6.1.1 *Oven*. A laboratory oven fitted with internal air circulation and capable of being controlled at 140°C ± 2°C.

6.1.2 *Wire mesh cube*. Construct an open-top cube, 100 mm side, from phosphor bronze gauze 18,000 mesh per square centimetre (350 x 350 mesh). Insert it inside a slightly larger, well-fitting cube, made of phosphor bronze gauze 11 mesh per square centimetre (8 x 8 mesh). Fit the outer cube with a handle or hooks so that it can be suspended from above.

6.1.3 *Temperature measurement*. A suitable system to measure and record the temperature of the oven and in the centre of the cube. "Chromel-alumel" thermocouples, made from 0.27 mm diameter wire, are suitable for measuring the temperature range expected.

6.2 *Procedure*

6.2.1 Fill the cube with carbon and tap down gently, adding carbon until the cube is full. Suspend the sample in the centre of the oven which has been preheated to 140°C ± 2°C. Insert one of the thermocouples in the centre of the sample and the other between the cube and the oven wall. Maintain the temperature of the oven at 140°C ± 2°C for 12 hours and record the oven temperature and the sample temperature.

6.3 *Results*

6.3.1 Non-activated carbon, non-activated charcoal, carbon black and lamp black fail the test if the temperature at any time during the 12 hours exceeded 200°C.

6.3.2 Activated carbon and activated charcoal fail the test if the temperature at any time during the 12 hours exceeded 400°C.

APPENDIX 3

PROPERTIES OF SOLID BULK CARGOES

1 Non-cohesive cargoes

1.1 The following cargoes are non-cohesive when dry:

AMMONIUM NITRATE
AMMONIUM NITRATE BASED FERTILIZERS
AMMONIUM SULPHATE
BORAX, ANHYDROUS
CALCIUM NITRATE FERTILIZER
CASTOR BEANS
DIAMMONIUM PHOSPHATE
MONOAMMONIUM PHOSPHATE
POTASSIUM CHLORIDE
POTASH
POTASSIUM NITRATE
POTASSIUM SULPHATE
SODIUM NITRATE
SODIUM NITRATE AND POTASSIUM NITRATE MIXTURE
SUPERPHOSPHATE
UREA

1.2 Prior to completion of loading, the angle of repose of the materials to be loaded should be determined (see section 6) so as to determine which provisions of this Code relating to trimming apply (see section 5).

1.3 All cargoes, other than those listed in this appendix, are cohesive and the use of the angle of repose is, therefore, not appropriate. Cargoes not listed should be treated as cohesive until otherwise shown.

2 Cargoes which may liquefy

2.1 Many fine-particled cargoes if possessing a sufficiently high moisture content are liable to flow. Thus any damp or wet cargo containing a proportion of fine particles should be tested for flow characteristics prior to loading.

3 Precautions for the cargoes which may possess a chemical hazard

3.1 In circumstances where consultation with the competent authority is required prior to shipment of dry bulk cargoes, it is equally important to consult authorities at the port of loading and discharge concerning requirements which may be in force.

3.2 Where required, the Medical First Aid Guide for Use in Accidents Involving Dangerous Goods (MFAG) should be consulted prior to loading.

APPENDIX 4

INDEX

MATERIAL	GROUP	REFERENCES
ALFALFA	C	
ALUMINA	C	
ALUMINA, CALCINED	C	
ALUMINA SILICA	C	
ALUMINA SILICA, pellets	C	
ALUMINIUM DROSS	B	see ALUMINIUM SMELTING BY-PRODUCTS or ALUMINIUM REMELTING BY-PRODUCTS UN 3170
ALUMINIUM FERROSILICON POWDER UN 1395	B	
ALUMINIUM NITRATE UN 1438	B	
ALUMINIUM REMELTING BY-PRODUCTS UN 3170	B	
ALUMINIUM SALT SLAGS	B	see ALUMINIUM SMELTING BY-PRODUCTS or ALUMINIUM REMELTING BY-PRODUCTS UN 3170
ALUMINIUM SILICON POWDER, UNCOATED UN 1398	B	
ALUMINIUM SKIMMINGS	B	see ALUMINIUM SMELTING BY-PRODUCTS or ALUMINIUM REMELTING BY-PRODUCTS UN 3170
ALUMINIUM SMELTING BY-PRODUCTS UN 3170	B	
AMMONIUM NITRATE UN 1942	B	
AMMONIUM NITRATE BASED FERTILIZER UN 2067	B	
AMMONIUM NITRATE BASED FERTILIZER UN 2071	B	
AMMONIUM NITRATE, BASED FERTILIZER (non-hazardous)	C	
AMMONIUM SULPHATE	C	
ANTIMONY ORE AND RESIDUE	C	
Antimony ore residue	C	see ANTIMONY ORE AND RESIDUE
Bakery materials	B or C	see SEED CAKE
BARIUM NITRATE UN 1446	B	
Barley malt pellets	B or C	see SEED CAKE
BARYTES	C	
BAUXITE	C	
Beet, expelled	B or C	see SEED CAKE
Beet, extracted	B or C	see SEED CAKE
BIOSLUDGE	C	
Blende (zinc sulphide)	A	see ZINC CONCENTRATE
BORAX (PENTAHYDRATE CRUDE)	C	
BORAX, ANHYDROUS, crude	C	
BORAX, ANHYDROUS, refined	C	
Bran pellets	B or C	see SEED CAKE

MATERIAL	GROUP	REFERENCES
Brewer's grain pellets	B or C	see SEED CAKE
BROWN COAL BRIQUETTES	B	
Calcined clay	C	see ALUMINA, CALCINED
Calcined pyrites	A and B	see PYRITES, CALCINED
Calcium fluoride	B	see FLUORSPAR
CALCIUM NITRATE UN 1454	B	
CALCIUM NITRATE FERTILIZER	C	
Calcium oxide	B	see LIME (UNSLAKED)
Canola Pellets	B or C	see SEED CAKE
CARBORUNDUM	C	
CASTOR BEANS UN 2969	B	
CASTOR FLAKE UN 2969	B	
CASTOR MEAL UN 2969	B	
CASTOR POMACE UN 2969	B	
CEMENT	C	
CEMENT CLINKERS	C	
CEMENT COPPER	A	see Mineral Concentrates schedule
Chalcopyrite	A	see COPPER CONCENTRATE
CHAMOTTE	C	
CHARCOAL	B	
CHOPPED RUBBER AND PLASTIC INSULATION	C	
Chile saltpetre	B	see SODIUM NITRATE
Chilean natural nitrate	B	see SODIUM NITRATE
Chilean natural potassic nitrate	B	see SODIUM NITRATE AND POTASSIUM NITRATE MIXTURE
Chrome ore	C	see CHROMITE ORE
CHROME PELLETS	C	
CHROMITE ORE	C	
Chromium ore	C	see CHROMITE ORE
Citrus pulp pellets	B or C	see SEED CAKE
CLAY	C	
COAL	B (and A)	
COAL SLURRY	A	
COARSE CHOPPED TYRES	C	
Coconut	B or C	see SEED CAKE
COKE	C	
COKE BREEZE	A	
COLEMANITE	C	
COPPER CONCENTRATE	A	see Mineral Concentrates schedule
COPPER GRANULES	C	
COPPER MATTE	C	
Copper nickel	A	see NICKEL CONCENTRATE
Copper ore concentrate	A	see COPPER CONCENTRATE
Copper precipitate	A	see CEMENT COPPER
COPRA (dry) UN 1363	B	
Copra, expelled	B or C	see SEED CAKE
Copra, extracted	B or C	see SEED CAKE
Corn gluten	B or C	see SEED CAKE
Cotton seed	B or C	see SEED CAKE
CRYOLITE	C	
Deadburned magnesite	C	see MAGNESIA (DEADBURNED)
DIAMMONIUM PHOSPHATE	C	

MATERIAL	GROUP	REFERENCES
DIRECT REDUCED IRON (A) Briquettes, hot-moulded	B	
DIRECT REDUCED IRON (B) Lumps, pellets, cold-moulded briquettes	B	
DIRECT REDUCED IRON (C) By-product fines	B	
DOLOMITE	C	
Dolomitic quicklime	B	see LIME (UNSLAKED)
D.R.I.	B	see DIRECT REDUCED IRON A or B or C
Expellers	B	see SEED CAKE
FELSPAR LUMP	C	
FERROCHROME	C	
FERROCHROME, exothermic	C	
FERROMANGANESE	C	
Ferromanganese, exothermic	C	see FERROMANGANESE
FERRONICKEL	C	
FERROPHOSPHORUS	B	
Ferrophosphorus briquettes	B	see FERROPHOSPHORUS
FERROSILICON UN 1408	B	
FERROSILICON	B	
FERROUS METAL BORINGS UN 2793	B	
FERROUS METAL CUTTINGS UN 2793	B	
FERROUS METAL SHAVINGS UN 2793	B	
FERROUS METAL TURNINGS UN 2793	B	
FERTILIZERS WITHOUT NITRATES	C	
FISH (IN BULK)	A	
FISHMEAL, STABILIZED UN 2216	B	
FISHSCRAP, STABILIZED UN 2216	B	
FLUORSPAR	A and B	
FLY ASH	C	
Galena (lead sulphide)	A	see LEAD CONCENTRATE
Garbage tankage	B	see TANKAGE
Gluten pellets	B or C	see SEED CAKE
GRANULATED SLAG	C	
GRANULATED TYRE RUBBER	C	
Ground nuts, meal	B or C	see SEED CAKE
GYPSUM	C	
Hominy chop	B or C	see SEED CAKE
ILMENITE CLAY	A	
ILMENITE SAND	A or C	
IRON CONCENTRATE	A	see Mineral Concentrates schedule
IRON CONCENTRATE (pellet feed)	A	see Mineral Concentrates schedule
IRON CONCENTRATE (sinter feed)	A	see Mineral Concentrates schedule
Iron disulphide	C	see PYRITE
IRON ORE	C	
Iron ore (concentrate, pellet feed, sinter feed)	A	see IRON CONCENTRATE (pellet feed or sinter feed)
IRON ORE PELLETS	C	
IRON OXIDE, SPENT UN 1376	B	
Iron swarf	B	see FERROUS METAL BORINGS, SHAVINGS, TURNINGS OR CUTTINGS UN 2793

MATERIAL	GROUP	REFERENCES
IRON SPONGE, SPENT UN 1376	B	
IRONSTONE	C	
LABRADORITE	C	
LEAD AND ZINC CALCINES (mixed)	A	see Mineral Concentrates schedule
LEAD AND ZINC MIDDLINGS	A	see Mineral Concentrates schedule
LEAD CONCENTRATE	A	see Mineral Concentrates schedule
LEAD NITRATE UN 1469	B	
LEAD ORE	C	
Lead ore concentrate	A	see LEAD CONCENTRATE
LEAD ORE RESIDUE	A	see Mineral Concentrates schedule
LEAD SILVER CONCENTRATE	A	see Mineral Concentrates schedule
Lead silver ore	A	see LEAD SILVER CONCENTRATE
Lead sulphide	A	see LEAD CONCENTRATE
Lead sulphide (galena)	A	see LEAD CONCENTRATE
Lignite	B	see BROWN COAL BRIQUETTES
LIME (UNSLAKED)	B	
LIMESTONE	C	
LINTED COTTON SEED	B	
Linseed, expelled	B or C	see SEED CAKE
Linseed, extracted	B or C	see SEED CAKE
MAGNESIA (DEADBURNED)	C	
MAGNESIA (UNSLAKED)	B	
Magnesia, clinker	C	see MAGNESIA (DEADBURNED)
Magnesia, electro-fused	C	see MAGNESIA (DEADBURNED)
Magnesia lightburned	B	see MAGNESIA (UNSLAKED)
Magnesia calcined	B	see MAGNESIA (UNSLAKED)
Magnesia caustic calcined	B	see MAGNESIA (UNSLAKED)
Magnesite clinker	C	see MAGNESIA (DEADBURNED)
MAGNESITE, natural	C	
Magnesium carbonate	C	see MAGNESITE, natural
MAGNESIUM NITRATE UN 1474	B	
Maize, expelled	B or C	see SEED CAKE
Maize, extracted	B or C	see SEED CAKE
MANGANESE CONCENTRATE	A	see Mineral Concentrates schedule
MANGANESE ORE	C	
M.A.P.	C	see MONOAMMONIUM PHOSPHATE
MARBLE CHIPS	C	
Meal, oily	B or C	see SEED CAKE
METAL SULPHIDE CONCENTRATES	A and B	
Mill feed pellets	B or C	see SEED CAKE
Milorganite	C	see BIOSLUDGE
Mineral Concentrates	A	
MONOAMMONIUM PHOSPHATE	C	
Muriate of potash	C	see POTASSIUM CHLORIDE
NEFELINE SYENITE (mineral)	A	see Mineral Concentrates schedule
NICKEL CONCENTRATE	A	see Mineral Concentrates schedule
Nickel ore concentrate	A	see NICKEL CONCENTRATE
Niger seed, expelled	B or C	see SEED CAKE
Niger seed, extracted	B or C	see SEED CAKE
Oil cake	B or C	see SEED CAKE
Palm kernel, expelled	B or C	see SEED CAKE
Palm kernel, extracted	B or C	see SEED CAKE

MATERIAL	GROUP	REFERENCES
Peanuts, expelled	B or C	see SEED CAKE
Peanuts, extracted	B or C	see SEED CAKE
PEANUTS (in shell)	C	
PEAT MOSS	A and B	
PEBBLES (sea)	C	
PELLETS (concentrates)	C	
Pellets, cereal	B or C	see SEED CAKE
Pellets, wood pulp	B	see WOOD PULP PELLETS
Pencil pitch	B	see PITCH PRILL
PENTAHYDRATE CRUDE	A	see Mineral Concentrates schedule
PERLITE ROCK	C	
PETROLEUM COKE (calcined)	B	
PETROLEUM COKE (uncalcined)	B	
PHOSPHATE ROCK (calcined)	C	
PHOSPHATE ROCK (uncalcined)	C	
PHOSPHATE (defluorinated)	C	
PIG IRON	C	
PITCH PRILL	B	
Pollard pellets	B or C	see SEED CAKE
POTASH	C	
Potash muriate	C	see POTASSIUM CHLORIDE
POTASSIUM CHLORIDE	C	
POTASSIUM NITRATE UN 1486	B	
Potassium nitrate/sodium nitrate (mixture)	B	see SODIUM NITRATE AND POTASSIUM NITRATE MIXTURE UN 1499
POTASSIUM SULPHATE	C	
Prilled coal tar	B	see PITCH PRILL
PUMICE	C	
PYRITE (containing copper and iron)	C	
PYRITES, CALCINED	A and B	
PYRITES	A	see Mineral Concentrates schedule
Pyrites (cupreous, fine, flotation or sulphur)	A	see PYRITES
Pyritic ash	A and B	see PYRITES, CALCINED
PYRITIC ASHES (iron)	A	see Mineral Concentrates schedule
PYRITIC CINDERS	A	see Mineral Concentrates schedule
PYROPHYLLITE	C	
QUARTZ	C	
QUARTZITE	C	
Quicklime	B	see LIME (UNSLAKED)
RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-1) UN 2912	B	
RADIOACTIVE MATERIAL, SURFACE CONTAMINATED OBJECTS (SCO-1) UN 2913	B	
Rape seed, expelled	B or C	see SEED CAKE
Rape seed, extracted	B or C	see SEED CAKE
RASORITE (ANHYDROUS)	C	
Rice bran	B or C	see SEED CAKE
Rice broken	B or C	see SEED CAKE
Rough ammonia tankage	B	see TANKAGE
RUTILE SAND	C	
Safflower seed, expelled	B or C	see SEED CAKE
Safflower seed, extracted	B or C	see SEED CAKE

MATERIAL	GROUP	REFERENCES
SALT	C	
SALT CAKE	C	
SALT ROCK	C	
Saltpetre	B	see POTASSIUM NITRATE
SAND	C	
Sand, ilmenite	C	see ILMENITE SAND
Sand, zircon	C	see ZIRCON SAND
SAWDUST	B	
SCRAP METAL	C	
SEED CAKE, containing vegetable oil UN 1386 (a) mechanically expelled seeds, containing more than 10% of oil or more than 20% of oil and moisture combined	B	
SEED CAKE, containing vegetable oil UN 1386 (b) solvent extraction and expelled seeds, containing not more than 10% of oil and when the amount of moisture is higher than 10%, not more than 20% of oil and moisture combined	B	
SEED CAKE UN 2217	B	
SEED CAKE (non-hazardous)	C	
Seed expellers, oily	B or C	see SEED CAKE
SILICOMANGANESE	B	
SILVER LEAD CONCENTRATE	A	see Mineral Concentrates schedule
Silver lead ore concentrate	A	see SILVER LEAD CONCENTRATE
Sinter		see ZINC AND LEAD CALCINES (mixed)
Slag, granulated	C	see GRANULATED SLAG
SLIG (iron ore)	A	see Mineral Concentrates schedule
SODA ASH	C	
SODIUM NITRATE UN 1498	B	
SODIUM NITRATE AND POTASSIUM NITRATE MIXTURE UN 1499	B	
Soyabean, expelled	B or C	see SEED CAKE
Soyabean, extracted	B or C	see SEED CAKE
SPENT CATHODES	B	see ALUMINIUM SMELTING BY-PRODUCTS or ALUMINIUM REMELTING BY-PRODUCTS UN 3170
SPENT POTLINER	B	see ALUMINIUM SMELTING BY-PRODUCTS or ALUMINIUM REMELTING BY-PRODUCTS UN 3170
STAINLESS STEEL GRINDING DUST	C	
Steel swarf	B	see FERROUS METAL BORINGS, SHAVINGS, TURNINGS OR CUTTINGS
Stibnite	C	see ANTIMONY ORE AND RESIDUE
STONE CHIPPINGS	C	
Strussa pellets	B or C	see SEED CAKE
SUGAR	C	
SULPHATE OF POTASH AND MAGNESIUM	C	
Sulphide concentrates	B	see METAL SULPHIDE CONCENTRATES

MATERIAL	GROUP	REFERENCES
SULPHUR UN 1350 (crushed lump and coarse grained)	B	
SULPHUR (formed, solid)	C	
Sunflower seed, expelled	B or C	see SEED CAKE
Sunflower seed, extracted	B or C	see SEED CAKE
SUPERPHOSPHATE	C	
SUPERPHOSPHATE (triple, granular)	C	
Swarf	B	see FERROUS METAL BORINGS, SHAVINGS, TURNINGS OR CUTTINGS
TACONITE PELLETS	C	
TALC	C	
TANKAGE	B	
Tankage fertilizer	B	see TANKAGE
TAPIOCA	C	
Toasted meals	B or C	see SEED CAKE
Triple superphosphate	C	see SUPERPHOSPHATE (triple, granular)
UREA	C	
VANADIUM ORE	B	
VERMICULITE	C	
WHITE QUARTZ	C	
WOODCHIPS	B	
WOOD PELLETS	B	
WOOD PULP PELLETS	B	
ZINC AND LEAD CALCINES (mixed)	A	see Mineral Concentrates schedule
ZINC AND LEAD MIDDLINGS	A	see Mineral Concentrates schedule
ZINC ASHES UN 1435	B	
ZINC CONCENTRATE	A	see Mineral Concentrates schedule
Zinc, dross, residue or skimmings	B	see ZINC ASHES UN 1435
Zinc ore, burnt	A	see ZINC CONCENTRATE
Zinc ore, calamine	A	see ZINC CONCENTRATE
Zinc ore, concentrates	A	see ZINC CONCENTRATE
Zinc ore, crude	A	see ZINC CONCENTRATE
ZINC SINTER	A	see Mineral Concentrates schedule
ZINC SLUDGE	A	see Mineral Concentrates schedule
Zinc sulphide	A	see ZINC CONCENTRATE
Zinc sulphide (blende)	A	see ZINC CONCENTRATE
ZIRCONSAND	C	

第 32/2016 號行政長官公告

中華人民共和國於一九九九年十二月十三日以照會通知聯合國秘書長，經修訂的《1974年國際海上人命安全公約》自一九九九年十二月二十日起適用於澳門特別行政區；

國際海事組織海上安全委員會於二零零六年十二月八日透過第MSC.220（82）號決議通過了《國際散裝運輸液化氣體船舶構造和設備規則》（IGC規則）的修正案，該修正案自二零零八年七月一日起適用於澳門特別行政區；

基於此，行政長官根據第3/1999號法律《法規的公佈與格式》第六條第一款的規定，命令公佈包含上指修正案的第MSC.220（82）號決議的中文及英文文本。

二零一六年四月二十七日發佈。

行政長官　崔世安

Aviso do Chefe do Executivo n.º 32/2016

Considerando que a República Popular da China, por nota datada de 13 de Dezembro de 1999, notificou o Secretário-Geral das Nações Unidas sobre a aplicação da Convenção Internacional para a Salvaguarda da Vida Humana no Mar de 1974, tal como emendada, na Região Administrativa Especial de Macau a partir de 20 de Dezembro de 1999;

Considerando igualmente que, em 8 de Dezembro de 2006, o Comité de Segurança Marítima da Organização Marítima Internacional, através da resolução MSC.220(82), adoptou emendas ao Código Internacional para a Construção e Equipamento de Navios que Transportam Gases Liquefeitos a Granel (Código IGC), e que tais emendas são aplicáveis na Região Administrativa Especial de Macau desde 1 de Julho de 2008;

O Chefe do Executivo manda publicar, nos termos do n.º 1 do artigo 6.º da Lei n.º 3/1999 (Publicação e formulário dos diplomas), a resolução MSC.220(82), que contém as referidas emendas, nos seus textos em línguas chinesa e inglesa.

Promulgado em 27 de Abril de 2016.

O Chefe do Executivo, *Chui Sai On*.

第 MSC.220（82）號決議

（2006 年 12 月 8 日通過）

《國際散裝運輸液化氣體船舶構造和設備規則》

（IGC 規則）的修正案

海上安全委員會，

憶及《國際海事組織公約》關於本委員會職能的第 28（b）條，

注意到海安會第 MSC.5（48）號決議，憑藉這一決議，委員會通過了《國際散裝運輸液化氣體船舶構造和設備規則》（以下簡稱《國際氣體規則》），該規則已根據《1974 年國際海上人命安全公約》（SOLAS）（以下簡稱《公約》）第 VII 章成為強制性規定，

還注意到《公約》關於《國際氣體規則》修正程序的第 VIII（b）條和第 VII/11.1 條，

在其第八十二屆會議上，**審議了**按照《公約》第 VIII（b）（i）條提出並散發的《國際氣體規則》修正案，

1. 根據《公約》第 VIII（b）（iv）條，**通過**對《國際散裝運輸液化氣體船舶構造和設備規則》的修正案，其正文列於本決議附件；

2. 根據《公約》第 VIII（b）（vi）（2）（bb）條，**決定**該修正案將在 2008 年 1 月 1 日視為已被接受，除非在此日期之前，超過三分之一的《公約》締約政府，或其合計商船隊總噸位不少於世界商船隊總噸位 50%的締約政府通知反對本修正案；

3. **請**各締約政府注意，根據《公約》第 VIII（b）（vii）（2）條，在按照上述第 2 款被接受後，該修正案將於 2008 年 7 月 1 日生效；

4. **要求**秘書長，依照《公約》第 VIII（b）（v）條，將本決議及其附件所載修正案的核證無誤副本發送至本公約各締約政府；

5. **進一步要求**秘書長將本決議及其附件的副本發送至非《公約》締約政府的本組織會員。

附　件

《國際散裝運輸液化氣體船舶構造和設備規則》

（IGC 規則）的修正案

第 1 章

通　則

1.3 定義

1　在第 1.3.2 款中，將“《安全公約》1983 年修正案第 II-2/3.3 條”改為“《安全公約》第 II-2/3.2 條”。

2　第 1.3.34 款由以下新的 1.3.34 款取代：

“1.3.34 ‘《安全公約》’係指經修正的《1974 年國際海上人命安全公約》。”

第 3 章

船舶佈置

3.3 貨泵房和貨物壓縮機房

3　在第 3.3.1.1 款中，將“《安全公約》1983 年修正案第 II-2/58 條”改為“《安全公約》第 II-2/9.2.4 條”。

第 11 章

防火和滅火

11.1 消防安全要求

4 在第 11.1.1 款中，將“《安全公約》1983 年修正案的第 II-2 章”改為“《安全公約》第 II-2 章”並將第.1 至.3 項改為以下新的各項：

“.1 第 4.5.1.6 和第 4.5.10 條不適用；

.2 適用於貨船的第 10.2 條、以及第 10.4 和 10.5 條應適用，因其適用於 2,000 總噸及以上的液貨船；

.3 第 10.5.6 條應適用於 2,000 總噸及以上的船舶；

.4 有關液貨船的《安全公約》第 II-2 章的以下條款不適用，並按如下細節由《規則》的章節取而代之：

條款	代以
第 10.10 條	第 11.6 條
第 4.5.1.1 和 4.5.1.2 條	第 3 章
第 4.5.5 和 10.8 條	第 11.3 和 11.4 條
第 10.9 條	第 11.5 條

.5 第 13.3.4 和 13.4.3 條應適用於 500 總噸及以上的船舶。”

11.2 主消防水設備

5 在第 11.2.1 款中，將“《安全公約》1983 年修正案第 II-2/4 和 II-2/7 條”改為“《安全公約》第 II-2/10.2、10.4 和 10.5 條”，將“第 4.2.1

和 4.4.1 條”改為“第 II-2/10.2.2.4.1 和 II-2/10.2.1.3 條”，並將“第 4.4.2 條”改為“第 II-2/10.2.1.6 條”。

6 在第 11.2.2 款中，將“《安全公約》1983 年修正案第 II-2/4.5.1 條和 II-2/4.8 條，具有長度不超過 33 米的水龍帶”改為“《安全公約》第 II-2/10.2.1.5.1 和 II-2/10.2.3.3 條，具有第 II-2/10.2.3.1.1 條規定長度的水龍帶”。

11.5 貨物壓縮機和泵房

7 在第 11.5.1 款中，將“經修正的《1974 年安全公約》第 II-2/5.1 和.2 條”改為“《安全公約》第 II-2/10.9.1.1 條”，將“《安全公約》1983 年修正案第 II-2/5.1.6 條”改為“《安全公約》第 II-2/10.9.1.1.1 條”。

8 在第 11.6 款中，將標題中的“Firemen's”（“消防員的”）改為“Fire-fighter's”（“消防員的”）。

9 在第 11.6.1 款中，將“Firemen's”（“消防員的”）改為“Fire-fighter's”（“消防員的”），並將“《安全公約》1983 年修正案第 II-2/17 條”改為“《安全公約》第 II-2/10.10 條”。

第 12 章

貨物區域內的機械通風

10 將標題後的文字“本章要求應替代《安全公約》1983 年修正案第 II-2/59.3 條”改為“本章要求應替代《安全公約》第 II-2/4.5.2.6 和 II-2/4.5.4 條”。

第 19 章

最低要求概要

11 將以下產品添加到第 19 章的表中：

A	b	c	d	e	f	g	h	i
產品名稱	聯合國編號	船舶類型	需要 C 類獨立液貨艙	貨艙內蒸氣處所控制	蒸氣探測	測量	醫療急救指南編號	特殊要求
二甲醚	-	2G/2PG	-	-	F+T	C	-	
二氧化碳	-	3G	是	-	-	C	-	

RESOLUTION MSC.220(82)

(adopted on 8 December 2006)

AMENDMENTS TO THE INTERNATIONAL CODE FOR THE CONSTRUCTION AND EQUIPMENT OF SHIPS CARRYING LIQUEFIED GASES IN BULK (IGC CODE)

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

NOTING resolution MSC.5(48), by which it adopted the International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (hereinafter referred to as "the IGC Code"), which has become mandatory under chapter VII of the International Convention for the Safety of Life at Sea (SOLAS), 1974 (hereinafter referred to as "the Convention"),

NOTING ALSO article VIII(b) and regulation VII/11.1 of the Convention concerning the procedure for amending the IGC Code,

HAVING CONSIDERED, at its eighty-second session, amendments to the IGC Code proposed and circulated in accordance with article VIII(b)(i) of the Convention,

1. ADOPTS, in accordance with article VIII(b)(iv) of the Convention, amendments to the International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk, the text of which is set out in the Annex to the present resolution;

2. DETERMINES, in accordance with article VIII(b)(vi)(2)(bb) of the Convention, that the amendments shall be deemed to have been accepted on 1 January 2008 unless, prior to that date, more than one third of the Contracting Governments to the Convention or Contracting Governments the combined merchant fleets of which constitute not less than 50% of the gross tonnage of the world's merchant fleet, have notified their objections to the amendments;

3. INVITES Contracting Governments to note that, in accordance with article VIII(b)(vii)(2) of the Convention, the amendments shall enter into force on 1 July 2008 upon their acceptance in accordance with paragraph 2 above;

4. REQUESTS the Secretary-General, in conformity with article VIII(b)(v) of the Convention, to transmit certified copies of the present resolution and the text of the amendments contained in the Annex to all Contracting Governments to the Convention;

5. FURTHER REQUESTS the Secretary-General to transmit copies of this resolution and its Annex to Members of the Organization, which are not Contracting Governments to the Convention.

ANNEX

AMENDMENTS TO THE INTERNATONAL CODE FOR THE CONSTRUCTION AND EQUIPMENT OF SHIPS CARRYING LIQUEFIED GASES IN BULK (IGC CODE)

CHAPTER 1
GENERAL

1.3 Definitions

1 In paragraph 1.3.2, the words "regulation II-2/3.3 of the 1983 SOLAS amendments" are replaced by "SOLAS regulation II-2/3.2".

2 Paragraph 1.3.34 is replaced by the following new paragraph 1.3.34:

"1.3.34 "SOLAS" means the International Convention for the Safety of Life at Sea, 1974, as amended."

CHAPTER 3
SHIP ARRANGEMENTS

3.3 Cargo pump-rooms and cargo compressor rooms

3 In paragraph 3.3.1.1, the words "regulation II-2/58 of the 1983 SOLAS amendments" are replaced by "SOLAS regulation II-2/9.2.4".

CHAPTER 11
FIRE PROTECTION AND FIRE EXTINCTION

11.1 Fire safety requirements

4 In paragraph 11.1.1, the words "chapter II-2 of the 1983 SOLAS amendments" are replaced by "SOLAS chapter II-2", and subparagraphs .1 to .3 are replaced by the following new subparagraphs:

".1 regulations 4.5.1.6 and 4.5.10 do not apply;

.2 regulation 10.2 as applicable to cargo ships and regulations 10.4 and 10.5 should apply as they would apply to tankers of 2,000 gross tonnage and over;

.3 regulation 10.5.6 should apply to ships of 2,000 gross tonnage and over;

.4 the following regulations of SOLAS chapter II-2 related to tankers do not apply and are replaced by chapters and sections of the Code as detailed below:

Regulation	**Replaced by**
10.10	11.6
4.5.1.1 and 4.5.1.2	chapter 3
4.5.5 and 10.8	11.3 and 11.4
10.9	11.5

.5 regulations 13.3.4 and 13.4.3 should apply to ships of 500 gross tonnage and over."

11.2 Fire water main equipment

5 In paragraph 11.2.1, the words "regulations II-2/4 and II-2/7 of the 1983 SOLAS amendments" are replaced by "SOLAS regulations II-2/10.2, 10.4 and 10.5", the words "regulations 4.2.1 and 4.4.1" are replaced by "regulations II-2/10.2.2.4.1 and II-2/10.2.1.3" and "regulation 4.4.2" is replaced by "regulation II-2/10.2.1.6".

6 In paragraph 11.2.2, the words "regulations II-2/4.5.1 and II-2/4.8 of the 1983 SOLAS amendments, with hose lengths not exceeding 33 m" are replaced by "SOLAS regulations II-2/10.2.1.5.1 and II-2/10.2.3.3, with hose lengths as specified in regulation II-2/10.2.3.1.1".

11.5 Cargo compressor and pump-rooms

7 In paragraph 11.5.1, the words "regulation II-2/5.1 and .2 of the 1974 SOLAS Convention, as amended" are replaced by "SOLAS regulation II-2/10.9.1.1", the words "regulation II-2/5.1.6 of the 1983 SOLAS amendments" are replaced by "SOLAS regulation II-2/10.9.1.1.1".

8 In paragraph 11.6, in the heading, the word "Firemen's" is replaced by the word "Fire-fighter's".

9 In paragraph 11.6.1, the word "firemen's" is replaced by the word "fire-fighter's" and the words "regulation II-2/17 of the 1983 SOLAS amendments" are replaced by "SOLAS regulation II-2/10.10".

CHAPTER 12
MECHANICAL VENTILATION IN THE CARGO AREA

10 The words after the heading "The requirements of this chapter should be substituted for regulation II-2/59.3 of the 1983 SOLAS amendments" are replaced by the words "The requirements of this chapter should be substituted for SOLAS regulations II-2/4.5.2.6 and II-2/4.5.4".

CHAPTER 19
SUMMARY OF MINIMUM REQUIREMENTS

11 The following products are added to the table in chapter 19:

a	b	c	d	e	f	g	h	i
Product name	UN number	Ship type	Independent tank type C required	Control of vapour space within cargo tanks	Vapour detection	Gauging	MFAG table No.	Special requirements
Dimethyl ether	-	2G/2PG	-	-	F+T	C	-	
Carbon dioxide	-	3G	Yes	-	-	C	-	

第 33/2016 號行政長官公告

按照中央人民政府的命令，行政長官根據第3/1999號法律《法規的公佈與格式》第六條第一款的規定，命令公佈聯合國安全理事會於二零一五年九月二日通過的關於利比里亞局勢的第2237（2015）號決議的中文及英文正式文本。

二零一六年四月二十八日發佈。

行政長官　崔世安

Aviso do Chefe do Executivo n.º 33/2016

O Chefe do Executivo manda publicar, nos termos do n.º 1 do artigo 6.º da Lei n.º 3/1999 (Publicação e formulário dos diplomas), por ordem do Governo Popular Central, a Resolução n.º 2237 (2015), adoptada pelo Conselho de Segurança das Nações Unidas em 2 de Setembro de 2015, relativa à situação na Libéria, nos seus textos autênticos em línguas chinesa e inglesa.

Promulgado em 28 de Abril de 2016.

O Chefe do Executivo, *Chui Sai On*.

第 2237（2015）號決議

安全理事會 2015 年 9 月 2 日第 7517 次會議通過

安全理事會，

回顧其以往關於利比里亞局勢的各項決議和主席聲明，

歡迎利比里亞政府在國際社會支持下，在重建利比里亞以造福全體利比里亞人方面持續取得進展，

注意到聯合國利比里亞問題專家小組的報告（S/2015/558），

還注意到秘書長 2015 年 7 月 31 日寫信（S/2015/590）向安全理事會通報利比里亞政府執行關於以下事項的建議的進展：妥善管理武器和彈藥，包括頒佈必要的立法框架；促進對利比里亞和科特迪瓦之間的邊界地區進行有效監測與管理，

讚揚利比里亞政府有效應對在利比里亞爆發的埃博拉疫情，在這方面讚賞利比里亞政府和人民、特別是利比里亞武裝部隊和利比里亞國家警察的抵禦病災能力，

歡迎會員國、雙邊夥伴和多邊組織，包括聯合國、非洲聯盟（非盟）和西非國家經濟共同體（西非經共體），支持利比里亞政府應對埃博拉疫情，還歡迎國際社會，包括建設和平委員會，協助利比里亞在埃博拉疫情結束後全面落實其發展承諾，尤其是協助利比里亞安全機構開展能力建設工作，大力鼓勵進一步在這方面採取步驟，

申明利比里亞政府負有不讓其領土內的所有民眾受暴行侵害的首要責任，強調利比里亞要實現永久穩定，利比里亞政府就要有正常運作和接受問責的政府機構，特別是在法治和安全領域，

強調利比里亞需要在安全部門改革方面進一步取得進展，以確保利比里亞的軍事、警察和邊防部隊有能力獨自擔當保護利比里亞人民的責任並為此做好充分準備，

着重指出透明和有效地管理國家資源對利比里亞的可持續和平與安全至關重要，

重申安理會願意在做出以下認定後終止第 1521（2003）號決議第 2（a）和（b）段和第 4（a）段規定的措施：利比里亞的停火得到並繼續得到全面遵守，安全部門的解除武裝、復員、重返社會、遣返和重組工作已經完成，實現和維持利比里亞和該次區域穩定的工作取得了重大進展，

還回顧安理會打算在利比里亞政府建立透明的會計和審計機制，以負責的方式使用政府的收入以造福利比里亞人民後，考慮修改第 1532（2004）號決議第 1 段規定的措施，

認定儘管已經有重大進展，但利比里亞局勢繼續對該區域的國際和平與安全構成威脅，

根據《聯合國憲章》第七章採取行動，

1. 決定自本決議通過之日起，將第 1521（2003）號決議第 2 段先前規定、並經第 1683（2006）號決議第 1 和第 2 段、第 1731（2006）號決議第 1（b）段、第 1903（2009）號決議第 3、4、5 和 6 段及第 1961（2010）號決議第 3 段和第 2128（2013）號決議第 2（b）段修訂的軍火措施，延長 9 個月；

2. 決定終止第 1521（2003）號決議第 4 段和第 1532（2004）號決議第 1 段規定的旅行和金融措施；

3. 決定將第 1903（2009）號決議第 9 段所設專家小組的任期自本決議通過之日起延長 10 個月，以便與利比里亞政府和科特迪瓦問題專家小組密切合作，執行下列任務：

（a）調查並編寫一份最後報告，說明經上文第 1 段延長的武器措施的執行情況和任何違反這些措施的情況，包括非法武器貿易的各種資金來源，安全部門和法律部門在使利比里亞政府能夠有效監測和控制軍火和邊界問題方面取得的進展；

（b）在與委員會討論後，至遲於 2016 年 5 月 1 日向安理會提交一份最後報告，說明本段列出的所有問題，並酌情在上述日期前向委員會非正式通報最新情況；

（c）與其他相關專家小組，特別是第 2153（2014）號決議第 24 段重新組建的科特迪瓦問題專家小組，積極合作；

4. 請秘書長儘快採取必要行政措施，在適當考慮任務有所減少的情況下，重新設立專家小組，成員為 1 人，自本決議通過之日起任期 10 個月；

5. 促請所有國家，包括利比里亞，在專家小組任務涉及的各個方面與專家小組通力合作；

6. 回顧根據 2006 年《西非國家經濟共同體關於小武器和輕武器的公約》的規定，控制利比里亞境內以及利比里亞與鄰國之間小武器流通的責任應由相關政府當局承擔；

7. 敦促利比里亞政府優先考慮和加快通過和實施適當的管理武器和彈藥的立法，並採取其他適當必要步驟，以建立必要的法律和行政框架，打擊非法販運武器和彈藥行為；

8. 申明安理會將願意根據利比里亞和該次區域實現穩定的情況，視需要隨時調整本決議中的措施，包括重新規定或加強措施，以及修改、暫停執行或解除措施；

9. 決定繼續積極處理此案。

Resolution 2237 (2015)

Adopted by the Security Council at its 7517th meeting, on 2 September 2015

The Security Council,

Recalling its previous resolutions and statements by its President on the situation in Liberia,

Welcoming the sustained progress made by the Government of Liberia, in rebuilding Liberia for the benefit of all Liberians, with the support of the international community,

Taking note of the report of the United Nations Panel of Experts on Liberia (S/2015/558),

Further noting the Secretary-General's letter, dated 31 July 2015 (S/2015/590), updating the Security Council on progress made by the Government of Liberia to implement the recommendations on the proper management of arms and ammunition, including enacting the necessary laws, and on facilitating the effective monitoring and management of the border regions between Liberia and Côte d'Ivoire,

Commending the Government of Liberia for responding effectively to the Ebola outbreak in Liberia and *recognizing*, in this regard, the resilience of the people and Government of Liberia, and its security institutions, especially the Armed Forces of Liberia and the Liberia National Police,

Welcoming the efforts of Member States, bilateral partners and multilateral organizations, including the United Nations, African Union (AU) and Economic Community of West African States (ECOWAS), to support the Government of Liberia in its response to the Ebola outbreak, *further welcoming* the contributions of the international community, including the Peacebuilding Commission, to assist Liberia in its comprehensive development commitment in the post-Ebola recovery period particularly through capacity-building of its security institutions and *strongly encouraging* further steps forward in this regard,

Affirming that the Government of Liberia bears primary responsibility for protecting all populations within its territory from atrocities, and *stressing* that lasting stability in Liberia will require the Government of Liberia to sustain effective and accountable government institutions, particularly in the rule of law and security sectors,

Stressing the need for increased progress on security sector reform in Liberia in particular to ensure that Liberia's military, police, and border security forces are self-sufficient, capable, and adequately prepared to protect the Liberian people,

Underlining that the transparent and effective management of natural resources is critical for Liberia's sustainable peace and security,

Recalling the Council's readiness to terminate the measures imposed by paragraphs 2 (a) and (b) and 4 (a) of Resolution 1521 (2003) upon its determination that the ceasefire in Liberia is being fully respected and maintained, disarmament, demobilization, reintegration, repatriation and restructuring of the security sector have been completed, the provisions of the Comprehensive Peace Agreement are being fully implemented, and significant progress has been made in establishing and maintaining stability in Liberia and the subregion,

Further recalling the Council's intention to consider modifying the measure imposed by paragraph 1 of resolution 1532 (2004) once the Government of Liberia established transparent accounting and auditing mechanisms to ensure the responsible use of government revenue to benefit directly the people of Liberia,

Determining that, despite significant progress, the situation in Liberia continues to constitute a threat to international peace and security in the region,

Acting under Chapter VII of the Charter of the United Nations,

1. *Decides* to renew the measures on arms, previously imposed by paragraph 2 of resolution 1521 (2003) and modified by paragraphs 1 and 2 of resolution 1683 (2006), by paragraph 1 (b) of resolution 1731 (2006), by paragraphs 3, 4, 5 and 6 of resolution 1903 (2009), by paragraph 3 of resolution 1961 (2010), and by paragraph 2 (b) of resolution 2128 (2013) for a period of 9 months from the date of adoption of this resolution;

2. *Decides* to terminate the travel and financial measures set forth in paragraph 4 of resolution 1521 (2003) and paragraph 1 of resolution 1532 (2004);

3. *Decides* to extend the mandate of the Panel of Experts appointed pursuant to paragraph 9 of resolution 1903 (2009) for a period of 10 months from the date of adoption of this resolution to undertake the following tasks in close collaboration with the Government of Liberia and the Côte d'Ivoire Group of Experts:

(a) To investigate and compile a final report on the implementation, and any violations, of the measures on arms as renewed by paragraph 1 above, including the various sources of financing for the illicit trade of arms, and on progress in the security and legal sectors with respect to the Government of Liberia's ability to effectively monitor and control arms and border issues;

(b) To provide to the Council, after discussion with the Committee, a final report no later than 1 May 2016 on all the issues listed in this paragraph, and to provide informal updates to the Committee as appropriate before that date;

(c) To cooperate actively with other relevant panels of experts, in particular that on Côte d'Ivoire re-established by paragraph 24 of resolution 2153 (2014);

4. *Requests* the Secretary-General to take the necessary administrative measures as expeditiously as possible to re-establish the Panel of Experts, having

due regard for its reduced mandate, to consist of 1 member, for a period of 10 months from the date of adoption of this resolution;

5. *Calls upon* all States, including Liberia, to cooperate fully with the Panel of Experts in all aspects of its mandate;

6. *Recalls* that responsibility for controlling the circulation of small arms within the territory of Liberia and between Liberia and neighbouring States rests with the relevant governmental authorities in accordance with the Economic Community of West African States Convention on Small Arms and Light Weapons of 2006;

7. *Urges* the Government of Liberia to prioritize and expedite the adoption and implementation of appropriate arms and ammunition management legislation and take other necessary and appropriate steps to establish the necessary legal and administrative framework to combat the illicit trafficking of arms and ammunition;

8. *Affirms* that it will be prepared to adjust the measures contained in this resolution, including by re-imposing or strengthening measures, as well as modifying, suspending or lifting measures, as may be needed at any time in light of the stability of Liberia and the subregion;

9. *Decides* to remain actively seized of the matter.

第 34/2016 號行政長官公告

中華人民共和國於二零零五年六月十七日以照會通知國際海事組織秘書長，一九六九年十一月二十九日訂於布魯塞爾的《國際干預公海油污事故公約》（下稱“公約”）適用於澳門特別行政區；

國際海事組織秘書長於二零零五年六月三十日以照會確認公約自二零零五年六月二十四日起適用於澳門特別行政區；

基於此，行政長官根據第3/1999號法律《法規的公佈與格式》第六條第一款的規定，命令公佈上指公約的中文及英文文本。

二零一六年四月二十八日發佈。

行政長官　崔世安

Aviso do Chefe do Executivo n.º 34/2016

Considerando que a República Popular da China, por nota datada de 17 de Junho de 2005, notificou o Secretário-Geral da Organização Marítima Internacional sobre a aplicação na Região Administrativa Especial de Macau da Convenção Internacional sobre a Intervenção em Alto Mar em Caso de Acidente que Provoque ou Possa Vir a Provocar a Poluição por Hidrocarbonetos, concluída em Bruxelas em 29 de Novembro de 1969, adiante designada por Convenção;

Considerando igualmente que o Secretário-Geral da Organização Marítima Internacional, por nota datada de 30 de Junho de 2005, confirmou que a Convenção é aplicável na Região Administrativa Especial de Macau desde 24 de Junho de 2005;

O Chefe do Executivo manda publicar, nos termos do n.º 1 do artigo 6.º da Lei n.º 3/1999 (Publicação e formulário dos diplomas), a referida Convenção nos seus textos em línguas chinesa e inglesa.

Promulgado em 28 de Abril de 2016.

O Chefe do Executivo, *Chui Sai On*.

國際干預公海油污事故公約

本公約各締約國，

意識到有必要保護其國民的利益，免於遭受海上事故引起的海上和沿岸油污危險的嚴重後果，

確信在這種情況下，為保護上述利益在公海上採取特別措施是必要的，並且這些措施並不影響公海自由原則，

現經商定如下：

第一條

1. 本公約各締約國，在發生海上事故或與之有關的行為之後，如能有根據地預計到會造成很大的有害後果，則可在公海上採取必要的措施，以防止、減輕或消除對其沿岸海區或有關利益產生嚴重的和緊急的油污危險或油污威脅。

2. 對於軍艦或其他屬於國家所有或經營的，且當時為政府使用，僅從事非商業性服務的船舶，不能根據本公約採取措施。

第二條

在本公約範圍內：

1. “海上事故”是指船舶碰撞、擱淺或其他航行事故，或是在船上或船舶外部發生對船舶或貨物造成物質損失或緊急威脅的事件。

2. “船舶”是指：

(1) 在海上航行的任何類型的船舶，和

(2) 任何船艇，但為勘探和開發海床、洋底和底土資源的設備或裝置除外；

3. “油”是指原油、燃料油、柴油和潤滑油。

4. “有關利益”是指直接受到海上事故影響或威脅的沿岸國的利益，例如：

(1) 在海岸、港口或河口處的活動，包括構成有關人們基本謀生手段的漁業活動；

(2) 有關地區的旅遊景點；

(3) 沿岸居民的健康與有關地區的福利，包括保護海洋生物資源和野生物。

5. “本組織”是指政府間海事協商組織。

第三條

沿岸國根據第一條行使採取措施的權利時，應依照下列各項規定：

(1) 在採取任何措施之前，沿岸國應與受到海上事故影響的其他國家進行協商，特別是與船旗國進行協商；

(2) 沿岸國應儘速將擬採取的措施，通知它所知道的或在協商期間得知的估計其利益會受到這些措施影響的任何自然人或法人。沿岸國應考慮他們提出的任何意見；

(3) 在採取任何措施以前，沿岸國可與沒有利害關係的專家們進行協商，這些專家應從本組織保存的名單中選出；

(4) 倘遇有須立即採取措施的非常緊急情況，沿岸國可不須事先通知或協商，或不繼續已開始的協商，就採取為緊急情況所必需的措施；

(5) 在採取這種措施之前和在執行過程中，沿岸國應儘最大努力避免任何生命危險，並對遇險人員提供他們需要的幫助，以及在適當情況下，提供遣返船員的便利，而不是製造障礙；

(6) 按第一條規定已經採取的措施，應儘速通知有關的各國和已知的有關自然人和法人，並通知本組織秘書長。

第四條

1. 在本組織監督之下，應設立並保存一份本公約第三條所述的專家名單，本組織還應制訂出與此有關的必要和適當的規章，包括所需專業資格的規定。

2. 對名單的提名可由本組織成員國和本公約各締約國提出。對專家的報酬應根據他們的工作，由請他們服務的國家支付。

第五條

1. 沿岸國根據第一條所採取的措施，應與實際造成的損害或似將發生的損害相適應。

2. 所採取的措施，不應超出為達到第一條所指目的而必須採取的措施的限度，並在達到此目的後立即停止行動；這些措施不應不必要地干涉有關船旗國、第三國以及有關自然人或法人的權利和利益。

3. 在考慮各項措施是否與損害相適應時，須注意到：

(1) 倘不採取上述措施，那末緊迫的損害範圍和可能性如何；

(2) 採取上述措施可能產生的效果；

(3) 由於採取上述措施可能引起損失的範圍。

第六條

任何一個締約國，由於採取違反本公約規定的措施而使他方遭受損失時，應對其超出為第一條目的所必須採取的措施限度而引起的損失，負賠償責任。

第七條

除另有特殊規定外，本公約的任何條款不得妨礙任何其他可適用的權利、責任、特權和豁免，也不剝奪任何一方或任何有利害關係的自然人或法人採用其他的補償辦法。

第八條

1. 締約國之間的任何爭議，如對於根據第一條所採取的措施是否違反本公約的規定，是否有責任按照第六條支付賠償，以及對這種賠償的數額問題，如果在有關締約國之間，或在採取措施的一方與要求賠償的自然人或法人之間，不能通過協商取得解決，而各方又不能用其他方法達成協議，則應按本公約附件的各項規定，在任何有關一方要求之下，提請調解，倘調解不成，則提請仲裁。

2. 採取措施的一方，不得僅僅以根據當地法院的法律對補償辦法尚未議定為理由，拒絕按照前款規定提請調解或仲裁。

第九條

1. 本公約開放供簽署至 1970 年 12 月 31 日，此後繼續開放。供加入。

2. 聯合國的成員國，或任何專門機構或國際原子能機構的成員國，或國際法院規約的當事國，可以按照下述辦法成為本公約的參加國：

(1) 簽署，並未對批准、接受或核准作出保留；

(2) 簽署，並對批准、接受或核准作出保留，隨後予以批准、接受或核准；或

(3) 加入。

第十條

1. 批准、接受、核准或加入，應以正式文件送交本組織秘書長收存方為有效。

2. 在本公約的修正案對現有各締約國生效之後，或在修正案對上述各締約國生效所需各項手續已告完成之後，任何交存的批准、接受、核准或加入的文件，應被認為是適用於已經修正的公約。

第十一條

1. 本公約應自有十五個國家的政府已簽字並對批准、接受或核准無保留，或已將批准、接受、核准或加入的文件送交本組織秘書長收存之後第九十天起生效。

2. 對於以後批准、接受、核准或加入的每一國家，本公約應自該國交存相應文件之後第九十天起生效。

第十二條

1. 任何締約國可以在本公約對該國生效之後隨時聲明退出本公約。

2. 聲明退出本公約應以文件送交本組織秘書長收存方為有效。

3. 聲明退出本公約，應在向本組織秘書長交存文件一年之後，或在文件中載明的較長期限之後生效。

第十三條

1. 託管某一領土的聯合國，或負責某一領土國際關係的本公約任何締約國，應儘早與該領土當局協商或採取其他適當的措施，使本公約適用於該領土，並可隨時書面通知本組織秘書長，聲明本公約擴大適用於該領土。

2. 自收到通知之日起或自通知中指定之日起，本公約即開始擴大適用於通知中所述領土。

3. 聯合國或任何締約國可根據本條第 1 款提出聲明，自本公約擴大適用於任何領土之日起，隨時書面通知本組織秘書長，聲明本公約停止擴大適用於通知中所述領土。

4. 自本組織秘書長收到上述通知之日起一年後，或通知中指定的較長期限以後，本公約應停止擴大適用於通知中所述的任何領土。

第十四條

1. 為了對本公約進行修正或修改，本組織可以召開會議。

2. 經不少於三分之一的締約國提出要求，本組織應召開修正或修改本公約的會議。

第十五條

1. 本公約應送交本組織秘書長收存。

2. 本組織秘書長應當：

(1) 將下列情況通知所有簽署或加入本公約的國家：

① 每一新的簽署或交存文件及其日期；

② 交存退出本公約的任何文件及其交存日期；

③ 按照第十三條第 1 款本公約對任何領土的擴大適用，以及按照該條第 4 款停止上述擴大適用，並分別說明本公約擴大適用或停止擴大適用的日期。

(2) 將本公約核證無誤的副本分送給所有簽署和加入本公約的國家。

第十六條

本公約一經生效，本組織秘書長應根據聯合國憲章第 102 條將本公約的文本送交聯合國秘書處，進行登記和公佈。

第十七條

本公約正本一份，用英文和法文寫成，兩種文本具有同等效力。應備有俄文和西班牙文的官方譯本，並與簽署的正本一起保存。

經各國政府正式授權的下列各代表，特簽署本公約，以昭信守。

1969 年 11 月 29 日訂於布魯塞爾。

附則

第一章

調解

第一條

如有關各方未作出其他決定，調解程序應按本章各條規則進行。

第二條

1. 經某一方根據本公約第八條向另一方提出要求，應設立一個調解委員會。

2. 某一方提出的調解要求，應包括對案情的說明以及所有證明文件。

3. 當調解程序已在兩方之間開始進行，如有任何其他一方由於同一措施使其國民或財產受到影響，或該方是曾採取類似措施的沿岸國，它可以用書面通知原開始調解的雙方，加入調解，但原開始調解中的任一方反對這種加入時除外。

第三條

1. 調解委員會由三名成員組成：一名由採取措施的沿岸國指定，一名由其國民或財產受到這種措施影響的國家指定，第三名由前述二名成員商定，並應作為調解委員會主席。

2. 調解員應按下述第四條規定的程序從事先擬定的名單中選出。

3. 如果自收到調解要求之日起六十天內，被要求一方未能將應由它負責選定的調解員通知爭議的另一方，或自調解委員會的第二名成員指定之日起三十天內，前兩名調解員未能通過共同協商指定調解委員會主席，則本組織秘書長應在任一方的請求之下，在三十天內進行所需的提名。按此提名的調解委員會的成員應從前款規定的名單中選定。

4. 不論用何種方法提名，調解委員會主席在任何情況下均不應是或曾經是原調解雙方任何一方的國民。

第四條

1. 上述第三條規定的名單應包括由各締約國指定的有資格的人員，並應由本組織保持最新名單。每一締約國可指定四人列入名單，該四人不一定需要是該國國民。任期應為六年，並可連任。

2. 如遇名單內的人員有死亡或辭職，應允許原提名此人的一方指派接替人任完此人餘下的任期。

第五條

1. 如雙方沒有其他協議，調解委員會應制定它自己的調解程序，使之在所有情況下均允許公平的申訴。在調查時，除雙方另有一致決定外委員會應遵循 1907 年 10 月 18 日關於和平解決國際爭端海牙公約第三章的各項規定。

2. 雙方應由代理人代表出席調解委員會，代理人的職責是充當該方和委員會之間的中間人。每方還可取得為此目的而由其指派的顧問和專家的協助，並可要求聽取該方認為一切證人有用的證詞。

3. 該委員會有權要求各方的代理人，顧問和專家作出解釋，同樣，當該委員會認為需要時，也可以要求經有關政府同意的任何人作出解釋。

第六條

如雙方沒有其他協議，調解委員會的決定應以多數表決通過。委員會除非其全體成員在場，否則不得對爭議的實質性問題作出宣判。

第七條

各方應對調解委員會的工作給予方便，特別是根據它們的法律，盡其所能：

(1) 向該委員會提供必要的文件和資料。

(2) 使委員會能進入雙方的領土，詢問證人或專家，以及查訪現場。

第八條

調解委員會的任務是澄清爭議事項，通過調查或其他辦法收集一切有關的信息資料，並盡力使各方取得和解。案件經過審理之後，該委員會應向各方分送一份它認為是適合於案情的建議書，並規定一個不超過九十天的期限，在此期限內各方應表明是否接受該建議書。

第九條

在建議書中應陳述理由。如果該建議書不能全部地或部分地代表該委員會的一致意見，則任一調解員有權提出單獨的意見。

第十條

如果建議書通知各方九十天之後，而任何一方均未通知另一方表示接受該建議書，即認為是調解不成功。又如在上述第三條第 3 款規定的期限內未能建立調解委員會；或者雙方未能另外達成協議時，在調解委員會主席被委任之日起一年內，委員會未能發出建議書，應同樣認為是調解不成功。

第十一條

1. 該委員會的每一成員的工作應獲得報酬，這項報酬由雙方議定，並由各方按相等的比例分攤。

2. 委員會工作中所需要的雜項費用也應以同樣方式分攤。

第十二條

爭議各方在調解期間可隨時經過協商決定採取解決爭端的其他方法。

第二章

仲裁

第十三條

1. 除雙方另有決定外，仲裁程序應按照本章所訂規則進行。

2. 如調解不成功，只能在調解宣告失敗後一百八十天內提出仲裁要求。

第十四條

仲裁庭由三名成員組成：一名由採取措施的沿岸國指定，一名由其國民或財產受到上述措施影響的國家指定，另一名由前述二名成員通過協商指定，並應擔任仲裁庭主席。

第十五條

1. 如在第二名仲裁員指定之後六十天期滿時，尚未能指定仲裁庭主席，則本組織秘書長根據任一方的請求，應在另一個六十天的期限內，按照上述第四條的規定，從事先擬定的合格人員名單中進行這種指定。這項名單應與公約第四條規定的專家名單分開，也應與本附則第四條規定的調解員名單分開。同一人員的名字可以同時在調解員名單和仲裁員名單上出現，但是，已擔任爭議調解員的人員不要再選為同一案件的仲裁員。

2. 如在接到請求之日起六十天內，雙方中的任一方尚未指定應由它負責指定的仲裁庭成員，另一方可直接報告本組織秘書長，秘書長得在六十天內指定仲裁庭主席，該主席應從本條第 1 款規定的名單中選定。

3. 仲裁庭主席經指定後，他應要求未提供仲裁員的一方用同樣方式與條件指定仲裁員。如該方仍未作出必要的指定，仲裁庭主席得請求本組織秘書長按前款規定的方式與條件加以指定。

4. 按本條規定指定的仲裁庭主席，除經對方或雙方同意外，不得是或曾經是任何有關一方的國民。

5. 如某一方負責指定的仲裁員遇有死亡或需要補缺時，該方應自該仲裁員死亡或需要補缺之日起六十天內指定一名接替人。如果該方未進行指定，則該項仲裁得在其餘的仲裁員審理下進行。如仲裁庭主席死亡或需要補缺，則應按上述第十四條指定一名接替人。如果仲裁庭成員未能在該仲裁庭主席死亡或需要補缺之日起六十天內取得協議，則按本條的各項規定指定其替代人。

第十六條

當仲裁已在兩方之間開始進行，如有任何其他一方由於同一措施使其國民或財產受到影響，或該方是曾採取類似措施的沿岸國，它可以書面通知原進行仲裁的雙方，加入仲裁程序，但原仲裁中的任一方反對這種加入時除外。

第十七條

根據本附則各條規定設立的仲裁庭，應制訂出它自己的程序規則。

第十八條

1. 仲裁庭關於仲裁程序和開庭地點的決定，以及對任何爭議事項的裁決，應由其成員投票的多數通過；如各方負責指派的仲裁庭某一成員缺席或棄權，不能構成仲裁庭作出裁決的阻礙。票數相等時，主席應投決定性一票。

2. 各方應對仲裁庭的工作給予方便，特別是根據它們的法律，儘一切可能做到：

(1) 向該仲裁庭提供必要的文件和信息；

(2) 使仲裁庭能進入雙方的領土，詢問證人和專家，以及查訪現場。

3. 一方缺席或不履行義務，不能構成對仲裁的阻礙。

第十九條

1. 仲裁庭的裁決書應陳述理由。裁決書具有最終效力，不得上訴。各方應立即按照裁決書執行。

2. 雙方在解釋和執行裁決書中可能發生的任何爭議，可由任一方提交作出該裁決的原仲裁庭判定，倘該仲裁庭已不存在，可提交為此目的按原仲裁庭同樣方式設立的另一仲裁庭來判定。

INTERNATIONAL CONVENTION RELATING TO INTERVENTION ON THE HIGH SEAS IN CASES OF OIL POLLUTION CASUALTIES

The States Parties to the present Convention,

CONSCIOUS of the need to protect the interests of their peoples against the grave consequences of a maritime casualty resulting in danger of oil pollution of sea and coastlines,

CONVINCED that under these circumstances measures of an exceptional character to protect such interests might be necessary on the high seas and that these measures do not affect the principle of freedom of the high seas,

HAVE AGREED as follows:

ARTICLE I

1. Parties to the present Convention may take such measures on the high seas as may be necessary to prevent, mitigate or eliminate grave and imminent danger to their coastline or related interests from pollution or threat of pollution of the sea by oil, following upon a maritime casualty or acts related to such a casualty, which may reasonably be expected to result in major harmful consequences.

2. However, no measures shall be taken under the present Convention against any warship or other ship owned or operated by a State and used,

for the time being, only on government non-commercial service.

ARTICLE II

For the purposes of the present Convention:

1. "maritime casualty" means a collision of ships, stranding or other incident of navigation, or other occurrence on board a ship or external to it resulting in material damage or imminent threat of material damage to a ship or cargo;

2. "ship" means:

(a) any sea-going vessel of any type whatsoever, and

(b) any floating craft, with the exception of an installation or device engaged in the exploration and exploitation of the resources of the sea-bed and the ocean floor and the subsoil thereof;

3. "oil" means crude oil, fuel oil, diesel oil and lubricating oil;

4. "related interests" means the interests of a coastal State directly affected or threatened by the maritime casualty, such as:

(a) maritime coastal, port or estuarine activities, including fisheries activities, constituting an essential means of livelihood of the persons concerned;

(b) tourist attractions of the area concerned;

(c) the health of the coastal population and the well-being of the area concerned, including conservation of living marine resources and of wildlife;

5. "Organization" means the Inter-Governmental Maritime Consultative Organization.

ARTICLE III

When a coastal State is exercising the right to take measures in accordance with Article I, the following provisions shall apply:

(a) before taking any measures, a coastal State shall proceed to consultations with other States affected by the maritime casualty, particularly with the flag State or States;

(b) the coastal State shall notify without delay the proposed measures to any persons physical or corporate known to the coastal State, or made known to it during the consultations, to have interests which can reasonably be expected to be affected by those measures. The coastal State shall take into account any views they may submit;

(c) before any measure is taken, the coastal State may proceed to a consultation with independent experts, whose names shall be chosen from a list maintained by the Organization;

(d) in cases of extreme urgency requiring measures to be taken immediately, the coastal State may take measures rendered necessary by the urgency of the situation, without prior notification or consultation or without continuing consultations already begun;

(e) a coastal State shall, before taking such measures and during their course, use its best endeavours to avoid any risk to human life, and to afford persons in distress any assistance of which they may stand in need, and in appropriate cases to facilitate the repatriation of ships' crews, and to raise no obstacle thereto;

(f) measures which have been taken in application of Article I shall be notified without delay to the States and to the known physical or corporate persons concerned, as well as to the Secretary-General of the Organization.

ARTICLE IV

1. Under the supervision of the Organization, there shall be set up and maintained the list of experts contemplated by Article III of the present Convention, and the Organization shall make necessary and appropriate regulations in connexion therewith, including the determination of the required qualifications.

2. Nominations to the list may be made by Member States of the Organization and by Parties to this Convention. The experts shall be paid on the basis of services rendered by the States utilizing those services.

ARTICLE V

1. Measures taken by the coastal State in accordance with Article I shall be proportionate to the damage actual or threatened to it.

2. Such measures shall not go beyond what is reasonably necessary to achieve the end mentioned in Article I and shall cease as soon as that end has been achieved; they shall not unnecessarily interfere with the rights and interests of the flag State, third States and of any persons, physical or corporate, concerned.

3. In considering whether the measures are proportionate to the damage, account shall be taken of:

(a) the extent and probability of imminent damage if those measures are not taken; and

(b) the likelihood of those measures being effective; and

(c) the extent of the damage which may be caused by such measures.

ARTICLE VI

Any Party which has taken measures in contravention of the provisions of the present Convention causing damage to others, shall be obliged to pay compensation to the extent of the damage caused by measures which exceed those reasonably necessary to achieve the end mentioned in Article I.

ARTICLE VII

Except as specifically provided, nothing in the present Convention shall prejudice any otherwise applicable right, duty, privilege or immunity or deprive any of the Parties or any interested physical or corporate person of any remedy otherwise applicable.

ARTICLE VIII

1. Any controversy between the Parties as to whether measures taken under Article I were in contravention of the provisions of the present Convention, to whether compensation is obliged to be paid under Article VI, and to the amount of such compensation shall, if settlement by negotiation between the Parties involved or between the Party which took the measures and the physical or corporate claimants has not been possible, and if the Parties do not otherwise agree, be submitted upon request of any of the Parties concerned to conciliation or, if conciliation does not succeed, to arbitration, as set out in the Annex to the present Convention.

2. The Party which took the measures shall not be entitled to refuse a request for conciliation or arbitration under provisions of the preceding paragraph solely on the grounds that any remedies under municipal law in its own courts have not been exhausted.

ARTICLE IX

1. The present Convention shall remain open for signature until 31 December 1970 and shall thereafter remain open for accession.

2. States Members of the United Nations or any of the Specialized Agencies or of the International Atomic Energy Agency or Parties to the Statute of the International Court of Justice may become Parties to this Convention by:

(a) signature without reservation as to ratification, acceptance or approval;

(b) signature subject to ratification, acceptance or approval followed by ratification, acceptance or approval;

or

(c) accession.

ARTICLE X

1. Ratification, acceptance, approval or accession shall be effected by the deposit of a formal instrument to that effect with the Secretary-General of the Organization.

2. Any instrument of ratification, acceptance, approval or accession deposited after the entry into force of an amendment to the present Convention with respect to all existing Parties or after the completion of all measures required for the entry into force of the amendment with respect to those Parties shall be deemed to apply to the Convention as modified by the amendment.

ARTICLE XI

1. The present Convention shall enter into force on the ninetieth day following the date on which Governments of fifteen States have either signed it without reservation as to ratification, acceptance or approval or have deposited instruments of ratification, acceptance, approval or accession with the Secretary-General of the Organization.

2. For each State which subsequently ratifies, accepts, approves or accedes to it the present Convention shall come into force on the ninetieth day after deposit by such State of the appropriate instrument.

ARTICLE XII

1. The present Convention may be denounced by any Party at any time after the date on which the Convention comes into force for that State.

2. Denunciation shall be effected by the deposit of an instrument with the Secretary-General of the Organization.

3. A denunciation shall take effect one year, or such longer period as may be specified in the instrument of denunciation, after its deposit with the Secretary-General of the Organization.

ARTICLE XIII

1. The United Nations where it is the administering authority for a territory, or any State Party to the present Convention responsible for the international relations of a territory, shall as soon as possible consult with the appropriate authorities of such territories or take such other measures as may be appropriate, in order to extend the present Convention to that territory and may at any time by notification in writing to the Secretary-General of the Organization declare that the present Convention shall extend to such territory.

2. The present Convention shall, from the date of receipt of the notification or from such other date as may be specified in the notification, extend to the territory named therein.

3. The United Nations, or any Party which has made a declaration under paragraph 1 of this Article may at any time after the date on which the Convention has been so extended to any

territory declare by notification in writing to the Secretary-General of the Organization that the present Convention shall cease to extend to any such territory named in the notification.

4. The present Convention shall cease to extend to any territory mentioned in such notification one year, or such longer period as may be specified therein, after the date of receipt of the notification by the Secretary-General of the Organization.

ARTICLE XIV

1. A Conference for the purpose of revising or amending the present Convention may be convened by the Organization.

2. The Organization shall convene a Conference of the States Parties to the present Convention for revising or amending the present Convention at the request of not less than one-third of the Parties.

ARTICLE XV

1. The present Convention shall be deposited with the Secretary-General of the Organization.

2. The Secretary-General of the Organization shall:

(a) inform all States which have signed or acceded to the Convention of:

(i) each new signature or deposit of instrument together with the date thereof;

(ii) the deposit of any instrument of denunciation of this Convention together with the date of the deposit;

(iii) the extension of the present Convention to any territory under paragraph 1 of Article XIII and of the termination of any such extension under the provisions of paragraph 4 of that Article stating in each case the date on which the present Convention has been or will cease to be so extended;

(b) transmit certified true copies of the present Convention to all Signatory States and to all States which accede to the present Convention.

ARTICLE XVI

As soon as the present Convention comes into force, the text shall be transmitted by the Secretary-General of the Organization to the Secretariat of the United Nations for registration and publication in accordance with Article 102 of the Charter of the United Nations.

ARTICLE XVII

The present Convention is established in a single copy in the English and French languages, both texts being equally authentic. Official translations in the Russian and Spanish languages shall be prepared and deposited with the signed original.

IN WITNESS WHEREOF the undersigned being duly authorized by their respective Governments for that purpose have signed the present Convention.

DONE at Brussels this twenty-ninth day of November 1969.

ANNEX

CHAPTER I

CONCILIATION

ARTICLE 1

Provided the Parties concerned do not decide otherwise, the procedure for conciliation shall be in accordance with the rules set out in this Chapter.

ARTICLE 2

1. A Conciliation Commission shall be established upon the request of one Party addressed to another in application of Article VIII of the Convention.

2. The request for conciliation submitted by a Party shall consist of a statement of the case together with any supporting documents.

3. If a procedure has been initiated between two Parties, any other Party the nationals or property of which have been affected by the same measures, or which is a coastal State having taken similar measures, may join in the conciliation procedure by giving written notice to the Parties which have originally initiated the procedure unless either of the latter Parties object to such joinder.

ARTICLE 3

1. The Conciliation Commission shall be composed of three members: one nominated by the coastal State which took the measures, one nominated by the State the nationals or property of which have been affected by those measures and a third, who shall preside over the Commission and shall be nominated by agreement between the two original members.

2. The Conciliators shall be selected from a list previously drawn up in accordance with the procedure set out in Article 4 below.

3. If within a period of 60 days from the date of receipt of the request for conciliation, the Party to which such request is made has not given notice to the other Party to the controversy of the nomination of the Conciliator for whose selection it is responsible, or if, within a period of 30 days from the date of nomination of the second of the members of the Commission to be designated by the Parties, the first two Conciliators have not been able to designate by common agreement the Chairmen of the Commission, the Secretary-General of the Organization shall upon request of either Party and within a period of 30 days, proceed to the required nomination. The members of the Commission thus nominated shall be selected from the list prescribed in the preceding paragraph.

4. In no case shall the Chairman of the Commission be or have been a national of one of the original Parties to the procedure, whatever the method of his nomination.

ARTICLE 4

1. The list prescribed in Article 3 above shall consist of qualified persons designated by the Parties and shall be kept up to date by the Organization. Each Party may designate for inclusion on the list four persons, who shall not necessarily be its nationals. The nominations shall be for periods of six years each and shall be renewable.

2. In the case of the decease or resignation of a person whose name appears on the list, the Party which nominated such person shall be permitted to nominate a replacement for the remainder of the term of office.

ARTICLE 5

1. Provided the Parties do not agree otherwise, the Conciliation Commission shall establish its own procedures, which shall in all cases permit a fair hearing. As regards examination, the Commission, unless it unanimously decides otherwise, shall conform with the provisions of Chapter III of The Hague Convention for the Peaceful Settlement of International Disputes of 18 October 1907.

2. The Parties shall be represented before the Conciliation Commission by agents whose duty shall be to act as intermediaries between the Parties and the Commission. Each of the Parties may seek also the assistance of advisers and experts nominated by it for this purpose and may request the hearing of all persons whose evidence the Party considers useful.

3. The Commission shall have the right to request explanations from agents, advisers and experts of the Parties as well as from any persons whom, with the consent of their Governments, it may deem useful to call.

ARTICLE 6

Provided the Parties do not agree otherwise, decisions of the Conciliation Commission shall be taken by a majority vote and the Commission shall not pronounce on the substance of the controversy unless all its members are present.

ARTICLE 7

The Parties shall facilitate the work of the Conciliation Commission and in particular, in accordance with their legislation, and using all means at their disposal:

(a) provide the Commission with the necessary documents and information;

(b) enable the Commission to enter their territory, to hear witnesses or experts, and to visit the scene.

ARTICLE 8

The task of the Conciliation Commission will be to clarify the matters under dispute, to assemble for this purpose all relevant information by means of examination or other means, and to endeavour to reconcile the Parties. After examining the case, the Commission shall communicate to the Parties a recommendation which appears to the Commission to be appropriate to the matter and shall fix a period of not more than 90 days within which the Parties are called upon to state whether or not they accept the recommendation.

ARTICLE 9

The recommendation shall be accompanied by a statement of reasons. If the recommendation does not represent in whole or in part the unanimous opinion of the Commission, any Conciliator shall be entitled to deliver a separate opinion.

ARTICLE 10

A conciliation shall be deemed unsuccessful if, 90 days after the Parties have been notified of the recommendation, either Party shall not have notified the other Party of its acceptance of the

recommendation. Conciliation shall likewise be deemed unsuccessful if the Commission shall not have been established within the period prescribed in the third paragraph of Article 3 above, or provided the Parties have not agreed otherwise, if the Commission shall not have issued its recommendation within one year from the date on which the Chairman of the Commission was nominated.

ARTICLE 11

1. Each member of the Commission shall receive remuneration for his work, such remuneration to be fixed by agreement between the Parties which shall each contribute an equal proportion.

2. Contributions for miscellaneous expenditure incurred by the work of the Commission shall be apportioned in the same manner.

ARTICLE 12

The parties to the controversy may at any time during the conciliation procedure decide in agreement to have recourse to a different procedure for settlement of disputes.

CHAPTER II

ARBITRATION

ARTICLE 13

1. Arbitration procedure, unless the Parties decide otherwise, shall be in accordance with the rules set out in this Chapter.

2. Where conciliation is unsuccessful, a request for arbitration may only be made within a period of 180 days following the failure of conciliation.

ARTICLE 14

The Arbitration Tribunal shall consist of three members: one Arbitrator nominated by the coastal State which took the measures, one Arbitrator nominated by the State the nationals or property of which have been affected by those measures, and another Arbitrator who shall be nominated by agreement between the two first-named, and shall act as its Chairman.

ARTICLE 15

1. If, at the end of a period of 60 days from the nomination of the second Arbitrator, the Chairman of the Tribunal shall not have been nominated, the Secretary-General of the Organization upon request of either Party shall within a further period of 60 days proceed to such nomination, selecting from a list of qualified persons previously drawn up in accordance with the provisions of Article 4 above. This list shall be separate from the list of experts prescribed in Article IV of the Convention and from the list of Conciliators prescribed in Article 4 of the present Annex; the name of the same person may, however, appear both on the list of Conciliators and on the list of Arbitrators. A person who has acted as Conciliator in a dispute may not, however, be chosen to act as Arbitrator in the same matter.

2. If, within a period of 60 days from the date of the receipt of the request, one of the Parties shall not have nominated the member of the Tribunal for whose designation it is responsible, the other Party may directly inform the Secretary-General of the Organization who shall nominate the Chairman of the Tribunal within a period of 60 days, selecting him from the list prescribed in paragraph 1 of the present Article.

3. The Chairman of the Tribunal shall, upon nomination, request the Party which has not provided an Arbitrator, to do so in the same manner and under the same conditions. If the Party does not make the required nomination, the Chairman of the Tribunal shall request the Secretary-General of the Organization to make the nomination in the form and conditions prescribed in the preceding paragraph.

4. The Chairman of the Tribunal, if nominated under the provisions of the present Article, shall not be or have been a national of one of the Parties concerned, except with the consent of the other Party or Parties.

5. In the case of the decease or default of an Arbitrator for whose nomination one of the Parties is responsible, the said Party shall nominate a replacement within a period of 60 days from the date of decease or default. Should the said Party not make the nomination, the arbitration shall proceed under the remaining Arbitrators. In the case of decease or default of the Chairman of the Tribunal, a replacement shall be nominated in accordance with the provisions of Article 14 above, or in the absence of agreement between the members of the Tribunal within a period of 60 days of the decease or default, according to the provisions of the present Article.

ARTICLE 16

If a procedure has been initiated between two Parties, any other Party, the nationals or property of which have been affected by the same measures or which is a coastal State having taken similar measures, may join in the arbitration procedure by

giving written notice to the Parties which have originally initiated the procedure unless either of the latter Parties object to such joinder.

ARTICLE 17

Any Arbitration Tribunal established under the provisions of the present Annex shall decide its own rules of procedure.

ARTICLE 18

1. Decisions of the Tribunal both as to its procedure and its place of meeting and as to any controversy laid before it, shall be taken by majority vote of its members; the absence or abstention of one of the members of the Tribunal for whose nomination the Parties were responsible shall not constitute an impediment to the Tribunal reaching a decision. In cases of equal voting, the Chairman shall cast the deciding vote.

2. The Parties shall facilitate the work of the Tribunal and in particular, in accordance with their legislation, and using all means at their disposal:

(a) provide the Tribunal with the necessary documents and information;

(b) enable the Tribunal to enter their territory, to hear witnesses or experts, and to visit the scene.

3. Absence or default of one Party shall not constitute an impediment to the procedure.

ARTICLE 19

1. The award of the Tribunal shall be accompanied by a statement of reasons. It shall be final and without appeal. The Parties shall immediately comply with the award.

2. Any controversy which may arise between the Parties as regards interpretation and execution of the award may be submitted by either Party for judgment to the Tribunal which made the award, or, if it is not available, to another Tribunal constituted for this purpose in the same manner as the original Tribunal.

二零一六年四月二十八日於行政長官辦公室

辦公室主任　柯嵐

Gabinete do Chefe do Executivo, aos 28 de Abril de 2016. — A Chefe do Gabinete, *O Lam*.

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