

7 The existing paragraph 8.2.9 is replaced by the following:

"8.2.9 Each pressure relief valve installed on a cargo tank should be connected to a venting system, which should be so constructed that the discharge of gas will be unimpeded and directed vertically upwards at the exit, and so arranged as to minimize the possibility of water or snow entering the vent system. The height of vent exits should be not less than B/3 or 6 m, whichever is the greater, above the weather deck and 6 m above the working area, the fore and aft gangway, deck storage tanks and cargo liquid lines."

8 The following sentences are added to existing paragraph 8.2.16:

"The pressure drop in the vent line from the tank to the pressure relief valve inlet should not exceed 3% of the valve set pressure. For unbalanced pressure relief valves the back pressure in the discharge line should not exceed 10% of the gauge pressure at the relief valve inlet with the vent lines under fire exposure as referred to in 8.5.2."

#### 第 52/2015 號行政長官公告

#### Aviso do Chefe do Executivo n.º 52/2015

中華人民共和國是國際海事組織的成員國及一九七四年十一月一日訂於倫敦的《國際海上人命安全公約》(下稱“公約”)的締約國;

國際海事組織海上安全委員會於一九八三年六月十七日對公約第VII章作出修正時,將有關國際散裝運輸液化氣體船舶構造和設備規則的規定作為公約的強制性規定,並透過第MSC.5(48)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);

國際海事組織海上安全委員會於一九九二年十二月十一日透過第MSC.30(61)號決議通過了上指規則的修正案,該修正案自一九九九年十二月二十日起適用於澳門特別行政區;

基於此,行政長官根據澳門特別行政區第3/1999號法律第六條第一款的規定,命令公佈包含上指修正案的MSC.30(61)號決議的中文及英文文本。

二零一五年五月六日發佈。

行政長官 崔世安

Considerando que a República Popular da China é um Estado Membro da Organização Marítima Internacional e um Estado Contratante da Convenção Internacional para a Salvaguarda da Vida Humana no Mar, concluída em Londres em 1 de Novembro de 1974, adiante designada por Convenção;

Considerando igualmente que, em 17 de Junho de 1983, o Comité de Segurança Marítima da Organização Marítima Internacional procedeu a emendas ao capítulo VII da Convenção para tornar as disposições relativas ao Código Internacional para a Construção e Equipamento de Navios que Transportam Gases Liquefeitos a Granel obrigatórias nos termos da Convenção, e que, através da sua resolução MSC. 5(48), adoptou o Código Internacional para a Construção e Equipamento de Navios que Transportam Gases Liquefeitos a Granel (Código IGC);

Considerando ainda que, em 11 de Dezembro de 1992, o Comité de Segurança Marítima da Organização Marítima Internacional, através da sua resolução MSC. 30(61), adoptou emendas ao referido Código, e que tais emendas são aplicáveis na Região Administrativa Especial de Macau desde 20 de Dezembro de 1999;

O Chefe do Executivo manda publicar, nos termos do n.º 1 do artigo 6.º da Lei n.º 3/1999 da Região Administrativa Especial de Macau, a resolução MSC. 30(61), que contém as referidas emendas, nos seus textos em línguas chinesa e inglesa.

Promulgado em 6 de Maio de 2015.

O Chefe do Executivo, *Chui Sai On*.

## 第 MSC.30 (61) 號決議

1992 年 12 月 11 日通過

### 通過國際散裝運輸液化氣體船舶構造和設備

#### 規則修正案 (IGC 規則)

海上安全委員會，

憶及國際海事衛星組織公約關於本委員會職能的第 28 (b) 條，

還憶及委員會以第 MSC.5 (48) 號決議通過了國際散裝液化氣體船舶構造與設備規則 (國際氣體規則)，

進一步憶及經修正的關於修正氣體規則的程序的 1974 年國際海上人命安全公約 (安全公約) 第 VIII (b) 條和規則 VII/11.1 條，

急切希望使氣體規則不斷更新，

在其第六十一屆會議上審議了根據安全公約第 VIII (b) (i) 條規定提出並散發的對該規則的修正案，

1. 根據安全公約第 VIII (b) (iv) 條，通過了該規則修正案，其文本載於本決議之附件；

2. 根據公約第 VIII (b) (vi) (2) (bb) 條規定，決定該修正案將被視為於 1994 年 1 月 1 日被接受除非在此日期前，多於三分之一的安全公約締約國政府或其商船隊總噸位不少於世界商船隊總噸位百分之五十的締約國政府通知海事組織表明他們反對該修正案；

3. 邀請締約國政府注意，根據安全公約第 VIII (b) (vii) (2) 條規定，該修正案在按照上述第 2 段的要求被接受後，將於 1994 年 7 月 1 日生效；

4. 要求秘書長，根據安全公約第 VIII (b) (v) 條，將本決議及所附的修正案文本的核正無誤的副本散發給安全公約的所有締約國政府；

5. 進一步要求秘書長將該決議及其附件的副本散發給非安全公約締約國政府的本組織的成員國。

## 附件

# 國際散裝運輸液化氣體船舶構造和設備規則修正案 (IGC 規則)

## (段落編號及所修正的文本援引國際 氣體規則的英文正本)

- 1.1.2 用“1994年10月1日”代替“1986年7月1日”並增加下列內容：
- “1994年10月1日前建造的船舶必須符合1983年6月17日通過的第MSC.5(48)號決議。”
- 2.7.8.1 將參考號改成2.9.1.1。
- 2.7.8.2 將參考號改成2.9.2.1。
- 2.9.2.1 第五行，用“m.rad”代替“m/rad”。
- 3.2.4 第二行，在“處所”與“和”之間加上“機器處所”。
- 第四行，在“長度”和“船舶的”之間加上“(L)”。
- 第四和五行，用“上層建築或甲板室”代替“艙室”。
- 第七行，用“上層建築或甲板室”代替“艙室”。
- 3.2.5 第二行，用“或甲板室應”代替“將”。
- 3.2.6 第三行，用“應”代替“將”。

- 3.8.4 第六行，用“上層建築或甲板室”代替“艙室”。
- 4.3.2 用“ $P_{eq}$ ”，“ $P_{gd}$ ”和“ $(P_{gd})_{max}$ ”代替“ $h_{eq}$ ”，“ $h_{gd}$ ”和“ $(h_{gd})_{max}$ ”。
- 4.3.2.1 第一行，刪除“頭”
- 4.3.2.2 第三行，在“內部”後加上“液體”。

第四行，刪除“頭”

最後一段，第二行，在“加快”和“在裏面”之間增加“組成成分”；用“需要”代替“多種需要”。

用下列文字代替 ZB 定義的最後一句：

“當決定 ZB 時應考慮將艙圓頂作為所接受的艙總容量的一部分，除非艙圓頂  $V_d$  的總容量不超過下列值：

$$V_d = V_t \left( \frac{100 - FL}{FL} \right)$$

式中：

$V_t$  = 無艙圓頂的艙容量

FL = 根據第 15 章的灌注限制

- 4.4.5.1 最後一段，在三個地方，用“分析”代替“多次分析”。
- 4.4.5.6 在  $C_w$  註解中，刪除“=”。
- 4.7.6.1 最後兩行，用“鄰近”代替“按照”。
- 4.8.1 第三行，用“設計”代替“工作”。

- 4.8.2 第四行，用“設計”代替“工作”。
- 4.9.9 最後一行，在“該”和“圍護”之間加上“貨物”。
- 4.10.9.1 將第二行改成“諸如失圓，局部偏移等工藝”。
- 4.10.9.2.1 最後一行，用“的”代替“或”。
- 4.10.18 最後一行，用“提升器”代替“提升”。
- 4.11.2 用下列文字代替 4.11.2：

“4.11.2 碳鋼或碳錳鋼製的大型受壓容器。進行熱處理有困難時，經主管機關批准並遵守下列條件，可以用充壓機械法應力消除過程代替熱處理：

- .1 焊接受壓容器的複雜部件：例如帶噴管的貯槽或氣室連同其相鄰的殼板，在被焊接到受壓容器的較大部件以前，應進行熱處理。
- .2 機械法應力消除過程最好是在 4.10.10.3 段要求的靜水壓力試驗期間採用高於 4.10.10.3.1 段要求的試驗壓力進行，加壓媒介應是水。
- .3 關於水溫，第 4.10.10.3.2 段有規定。
- .4 應力消除應在貨艙被正常的圓枕木或支撐結構保護時進行。當應力消除不能在船上進行時，使用的方法應能達到如同使用圓枕木或支撐結構時的同樣應力和壓力分佈。
- .5 最大應力消除壓力應對每 25mm 厚度保持 2 個小時，但絕不允許少於 2 個小時。

- .6 在應力消除時，所計算的應力水準的上限應為：
- 同等一般主薄膜應力： $0.9.R_e$
  - 由主彎曲應力加上薄膜應力組成的同等應力： $1.35.R_e$
- $R_e$  係指具體的較低最小屈服應力或者是對艙所使用的鋼試驗溫度時驗證應力的 0.2%。
- .7 對一系列相同的相繼建造的貨艙，通常應至少對第一個艙進行應變測量以確認這些限制。應變測量表應包括在按 4.11.2.14 規定提交的機械法應力消除程序中。
- .8 試驗程序應表明，當壓力被再次升至設計壓力時，在應力消除過程結束時，壓力和應變之間的關係應是線性的。
- .9 對諸如噴管和其他開口的幾何驟變高應力區域，應在機械法應力消除後，用染色滲透法或磁粒子檢查法檢查裂痕。應特別注意厚度超過 30mm 的板材。
- .10 對鋼材，如果它們的屈服應力與最大抗張強度之比超過 0.8 時，一般不應用機械法進行應力消除。但是，如果用一種方法使鋼具有高延展性以提高屈服應力，對具體情況而言，稍高一些的比率也是可以接受的。

- .11 如果冷成形度超過上述的熱處理所需要的限制，機械法應力消除不應被艙室的冷成形部件的熱處理代替。
- .12 殼板和艙蓋的厚度不應超過 40mm。對某些用熱應力消除的部件，較高的厚度也是可以接受的。
- .13 當艙和氣室使用環形頭時，要特別注意別出現局部彎曲。
- .14 機械法應力消除程序應事先提交主管當局批准。”

5.2.1.1 第一行，用“5.2 至 5.5 節”代替“該節”。

5.2.3.2 最後一行，用“多個系統”代替“系統”。

5.4.6 標題，用“處理”代替“多次處理”。

5.4.6.2 第一行，用“處理”代替“多次處理”。

5.4.6.3.1 第二行，用“設計”代替“工作”在現有 5.4.6.3.1 後增加下列文字：

“當管道部分的此種對接焊接頭在管道製造車間被自動焊接程序焊好時，根據主管機關的特別許可，射線檢查的程度可被逐漸減少，但無論如何不能少於每個接頭的 10%。如發現有缺陷，則應進行 100% 的檢查，其中還應包括以前已經被認可的管道。該特別許可只能在具有充分文件質量保證程序並有記錄以使主管機關能夠估計製造商生產合格的連續焊接的能力時才能授與。”

5.4.6.3.2 第一行，在“管道”後增加“未由 5.4.6.3.1 包括的”。



- 表 6.1 第 16 行，用“多塊板”代替“板”。
- 表 6.2 第 17 行，用“部件和鍛件”代替“部件”。
- 6.3.6.3 第一行，將參考條目改成“6.3.6.2.1”。
- 8.2.8.3 最後一行，在“保養”和“閥門”之間增加“備用”。
- 8.3.1.1 第一行，糾正“壓力”的拼法。
- 8.5.2 “D”的定義：用“k”代替“K”。
- 9.5.3 第四行，刪除“艙”。
- 10.2.5.2 第一和第二行：用“貨物”代替“貨物產品”。
- 11.1.1.1 將參考條目改成“56.6”。
- 11.3 在 11.3.5 後增加下列文字：
- “11.3.6 遙控起動供應灑水系統水源的泵以及遙控操作任何本系統中正常關閉的閥門應被佈置在貨物處所以外，緊靠後住處所的合適的地點，以便隨時能進入。當保護地區發生火災時應能操作。
- 11.5 用下列文字代替 11.5：
- “11.5 貨物壓縮機和泵室
- 11.5.1 任何船舶的貨物壓縮機和泵室均應根據經修正的 1974 年安全公約規則 II-2/5.1 及 .2 提供二氧化硫系統。在控制部位應展示一個提示，說明由於靜電着火危險，系統只能用於滅火，而不能用於惰化的目的。1983 年修正案規則 II-2/5.1.6 條所提及的警報應能在可燃貨物蒸氣—空氣混

合物中安全使用。就本要求而言，所配備的滅火系統應能適用於機器處所。但所攜帶的二氧化碳氣量應足以能在任何情況下提供相當於貨物壓縮機和泵室總容量的 45%。

11.5.2 船舶的貨物壓縮機和泵室，如專門用來裝載有限數量的貨物，應用一種經主管機關批准的合適的滅火系統予以保護。”

11.6.1 在表中，刪除“2,000m<sup>3</sup> 以下 2”  
用“5,000m<sup>3</sup> 及以下”代替“在 2,000m<sup>3</sup> 和 5,000m<sup>3</sup> 之間”。

第十二章 前言，用“替換”代替“代替”。

13.6.11 第六行，用“監測”代替“取樣和探測”。

14.2.3.1 第一行，在“沖入”和“空氣”之間加上“備用”。

14.3.2 用 “ \*\*14.3.2”代替規則號碼並加上下列腳註：

“  
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\*\* 請參照用於涉及危險品事故的醫療急救指南 (MFAG)。該指南包括由本規則涉及的產品的 MFAG 編號以及在發生事故時要遵循的應急程序。與由國際氣體船規則涉及的产品有關的 MFAG 編號載於最低要求一覽表 (第 19 章) ”。

14.4.2.1.1 用下列文字代替：

“.1.1 過濾器型呼吸保護是不可接受的”。

15.1.2 第一行，用“可以”代替“應”。

15.1.4.2 倒數第二行，用“釋放系統”代替“釋放閥門”。

15.2 第一行，用“裝貨”代替“灌艙”。

第十六章 第 16 章現有文字由下列內容代替：

“16.1 總則

16.1.1 甲烷（液化天然氣）是一種唯一的，其蒸氣或者蒸發氣可用於 A 類的機器處所，而且在此類處所中僅可用於鍋爐，惰氣發生器，內燃機和氣輪機。

16.1.2 這些條款並不排除對在其他地點的輔助服務設施使用汽油，但這些其他服務和地點應以主管機關的特殊考慮為條件。

16.2 A 類機器處所的佈置

16.2.1 在使用汽油的處所應裝有一機械通風系統並應防止形成有害空間。此種通風應在可能發生火花的電氣設備和機器設備或者其他設備和機器的附近極為有效。此種通風系統應與用於其他處所的系統分開。

16.2.2 氣體探測器應配在這些處所，特別在空氣流通被降低的地區。氣體探測器應符合第 13 章的要求。

16.2.3 位於第 16.3.1 規定的雙牆管道式導管的電氣設備應該是本質安全型的。

16.3 氣體燃料供應

16.3.1 氣體燃料管路不應通過居住處所、服務處所或控制站。如

能滿足下列要求之一時，則氣體管路可通過或延伸至另外一些處所；

- .1 氣體燃料管道應為氣體燃料儲存在內管中的雙層管系結構。在同心管之間的空間應用惰性氣體增壓力大於燃料壓力。應安裝適當的報警器以指示管子之間的惰性氣體壓力的損耗。
- .2 氣體燃料管道應安裝在經通風的管道或導管內。氣體燃料管道與該管道或導管的內壁之間的空間應安裝能夠至少每小時換氣 30 次的機械排風設備。通風系統的佈置，應使壓力維持低於大氣的壓力。鼓風機馬達應置於通風管道或導管外面。通風出口應位於決不會點燃易燃氣體／空氣混合物的地方。當管道有氣體燃料時，通風應始終處於工作狀態。按照 16.3.10 應設有連續氣體檢測器以顯示氣體的泄漏，並切斷向機器處所供應氣體燃料。第 16.3.7 所要求的總氣體燃料供應閥，在所要求的空氣流動不能由排風系統建立和維持時，應能自動關閉。

16.3.2 如發生氣體泄漏，只有查明泄漏之處，並予以修復才能供應氣體燃料。就此內容的告示，應張貼在機器處所顯著的地方。

16.3.3 供氣體燃料管系用的雙層壁管系或通風管道或導管，應在按 16.3.4 所要求的通風罩或通風處殼處終止。

16.3.4 對法蘭、閥門等所在的位置以及用於氣體燃料管道的諸如

鍋爐、柴油機、燃氣輪機氣體利用裝置所在地，應設有通風罩或通風外殼。如果這種通風罩或通風外殼沒有使用 16.3.1.2 所規定的供通風管或導管使用的抽風機來抽風，則應裝備抽風系統，並按照 16.3.10 的規定設有連續的氣體探測裝置，以檢測泄漏並停止向機器處所供應氣體燃料。16.3.7 所要求的總氣體燃料閥門應在所要求的空氣流動不能由抽風通風系統建立並維持時，能自動關閉。通風罩或通風外殼的安裝或架設，應使通風空氣橫掃氣體使用裝置，並在罩或外殼的頂部排出。

- 16.3.5 所要求的通風系統的通風的進／出應分別從一個安全位置吸進和排出。
- 16.3.6 每台氣體利用裝置應配備一套三隻自動閥。其中兩隻閥應串接在通向消耗燃料的設備的氣體燃料管道上。第三隻閥則應安裝在兩隻串接閥之間的氣體燃料管路的排氣管上，且應排向開敞大氣的安全位置。這些閥應佈置成當必要的強力通風失效、鍋爐燃燒器熄滅、氣體燃料供應管壓力不正常、或控制閥驅動介質失效時，能自動關閉兩隻串接的氣體燃料閥，並自動打開排氣閥。或者，兩隻串接閥中的一隻閥的功能與通風閥的功能組合成一隻閥體，其佈置應是：如發生上述情況之一時，能切斷氣體流向氣體利用裝置，並打開排氣口。這三個關閉式閥門應佈置為能人工重新調節。
- 16.3.7 應在貨物處所內裝設能在機器處所內予以關閉的氣體燃料主閥。閥的佈置應為當檢測出氣體泄漏，或是導管或通

風罩發生通風失效，或是發生雙層壁氣體燃料管系失壓時，閥門能自動關閉。

16.3.8 機器處所的氣體燃料管道應儘可能地符合 5.2-5.5 節的要求。管道應儘實際的可能焊好接口。根據 16.3.1，氣體燃料管道的這些部分不是在經通風的管內或導管內，而是位於貨物處所外的露天甲板上，它們應有完全滲透的對接焊口並應進行全面的射線檢查。

16.3.9 應對機器處所內的氣體燃料管系提供惰化和氣體清除的設施。

16.3.10 根據 16.3.1 和 16.3.4 要求提供的氣體探測系統應符合 13.6.2 和 13.6.4 至 13.6.8 的要求，它們應該在燃燒下限值的 30%時，啓動報警器並在氣體濃度達到燃燒下限值的 60%前關閉 16.3.7 所述的總氣體燃料閥門。

16.4 氣體生成設備及相關的儲存艙

16.4.1 所有製造作為燃料使用的氣體設備（加熱器、壓縮機、過濾器）及儲存氣體的艙室應按照 3.1.5.4 的規定位於貨物處所之內。如果設備位於圍蔽處所，該處所應按照規則第 12.1 節進行通風；按照 11.5 節安裝一個固定式滅火系統並根據 13.6 節裝備一個氣體探測系統。

16.4.2 壓縮機應能在一個經常並容易進去的位置，而且也能從機艙遙控關閉。此外，當吸入壓力達到基於貨艙的真空釋放閥門的一定值時，壓縮機應能自動關閉。壓縮機的自動關閉裝置應有手動重新設定功能。壓縮機應裝有排入壓縮機

吸管的壓力釋放閘門。壓力釋放閘門的規格的確認考慮，當閘門關閉時，最大壓力不能超過最大工作壓力的 10% 這個因素。

5.6.1.3 的要求適用於這些壓縮機。

- 16.4.3 如果用於氣體燃料蒸發器或加熱器的加熱媒介返回貨物處所以外的區域，媒介應首先通過一個去氣艙。去氣艙應位於貨物處所。應有設備以探測並報警艙內有氣體出現。通風出口應置於一個安全位置並裝有一個阻燃罩。
- 16.4.4 氣體燃料空調系統的管道與壓力容器應符合第 5 章的要求。
- 16.5 對主鍋爐的特別要求。
- 16.5.1 每一鍋爐必須有一個單獨的煙喉。
- 16.5.2 應提供一個合適的系統以保證鍋爐內的強力通風。此類系統的細節應滿足主管機關的要求。
- 16.5.3 鍋爐燃燒室的形式應合適，不得出現可能使氣體驟集的氣陷。
- 16.5.4 燃燒系統應是雙型的，適合於單獨燃燒油類燃料或氣體燃料或同時燃燒油和氣體燃料。當操縱船舶和進行港口操作時，只能使用油類燃料，除非有氣體至油類燃燒自動轉換性能，在這種情況下，燃燒油與氣體混合燃料或單獨燃燒氣體燃料應被許可，但此系統須滿足主管機關的要求。應該是可能既快又容易地從氣體燃料操作換成油類燃料操

作。氣體噴嘴的安裝應能使氣體燃料能被油類燃料燃燒器的火焰點燃。應安裝火焰探測器，其佈置應保證送給燃燒器的氣體流被切斷，除非已建立和維持滿意的點火。在每一氣體燃燒器管道上，應安裝一隻手動的關閉閥門。應提供設備，在這些燃燒器熄滅後，用惰性氣體或蒸氣對燃燒器的供氣管道進行淨化。

16.5.5 應安裝報警裝置以監測液態燃油壓力的可能下降或有關係泵可能出現的故障。

16.5.6 應作出安排，當所有的氣體或油類或氣和油正在工作的燃燒器不能點火，鍋爐的燃燒室在重新點火前應能自動清除氣體。還應作出安排以使鍋爐能被人工清除氣體。這些安排應符合主管機關的要求。

16.6 燃氣內燃機和燃氣渦輪機的特別要求

燃氣內燃機和燃氣渦輪機的特別規定將由主管機關酌情考慮。

17.1 用“i”代替參照條目“h”欄。

17.2 用“i”代替參照條目“h”欄。

17.3 用下列文字代替國際氣體規則的第 17.13 節：

“17.13 氨

17.13.1 無水氨可能引起用碳錳鋼或鎳鋼製作的容器和處理系統的應力腐蝕裂縫。為將發生這種危險的可能性降至最小，應酌情採取第 17.13.2 至 17.13.8 所述的措施。



- 17.13.2 當使用碳錳鋼時，貨艙、處理壓力容器和貨物管道應用優質鋼製成，其規定的最小屈服強度不應超過  $355 \text{ N/mm}^2$ ，實際屈服強度不超過  $440 \text{ N/mm}^2$ 。還應採取下列構造性或操作性措施之一種：
- .1 應使用規定最小抗拉強度不超過  $410 \text{ N/mm}^2$  的較低強度材料；或
  - .2 對貨艙等，應進行焊接後熱應力消除；或
  - .3 運載溫度最好保持在接近貨物沸點的  $-33^\circ\text{C}$  上，但決不能高於  $-20^\circ\text{C}$ ；或
  - .4 氨中應含有不少於  $0.1\% \text{ w/w}$  的水。
- 17.13.3 如果使用除 17.13.2 中規定的那些鋼材以外的具有更高屈服性質的碳錳鋼，則全部貨艙、管道等均應作焊接後的熱應力消除處理。
- 17.13.4 處理壓力容器和冷卻泵系統中冷凝部分的管道，如是用 17.13.1 提及的材料製成，則應進行焊接後熱應力消除處理。
- 17.13.5 焊接消耗材料的抗拉力和屈服性能按最小的實際數量應超過艙或管道材料的抗拉力和屈服性能。
- 17.13.6 含有高於  $5\%$  鎳的鎳鋼和不符合 17.13.2 和 17.13.3 要求的碳錳鋼特別容易受到氨應力腐蝕裂縫的影響，不應用於載運此種物質的容器和管道系統。
- 17.13.7 含有不足  $5\%$  鎳的鎳鋼可被使用，但載運溫度應符合

17.13.2.3 中的要求。

- 17.13.8 為了使氨應力腐蝕裂縫的危險減至最小，最好將溶解的氧含量保持低於 2.5 ppm/w/w。達到這個目的最好辦法是在液態氨被引入前，將艙中的平均氣氧量降至一個值。這個值與下表中運載溫度成函數關係：

T (°C)	O <sub>2</sub> (% v/v)
-30°C 和以下	0.90
-20	0.50
-10	0.28
0	0.16
10	0.10
20	0.05
30	0.03

中間溫度時的氧含量可用直接內插法求得”。

- 17.14.3.1 第一行，用“應該”代替“將”。
- 17.14.4.3.1 刪除“貨物”。
- 17.14.5.1 第四行，刪除“剩餘”。
- 17.16.5 用“17.20.5.3”代替“17.20.6.3”。
- 17.20.4 第二行，刪除“坑”。
- 17.20.13.1 第四行，用“這些產品”代替“該產品”。
- 17.20.13.3 第一行，修改成“在每一初次裝載這些貨物之前和在每次回到此種服務之前，……”。
- 17.20.17 第八行，用“環境”代替“大氣”。

在第三句後增加下列內容：

“應安排進行遙控人工操作，這樣，開啓供水灑水系統和遙控操作該系統中正常關閉的閥門能在貨物處所外，靠近居住處所的一個合適位置上進行，當保護區域發生火災時應能容易進入並進行操作”。

18.1.1.7 在“最小”和“內”之間加上“可允許的”。

18.2.1 第一行，用“特徵”代替“特性”。

最後一行，用“按照”代替“如果是這樣”。

第十九章 最低要求概述，修改最低要求一覽表以包括顯示醫療急救指南號碼的“h”新欄：

a 貨品名稱	h 醫療急救指南表號
乙醛	300
氨—無水的	725
丁二烯	310
丁烷	310
丁烷／丙烷混合物	310
丁烯	310
氯	740
乙醚	330
二甲基胺	320
乙烷	310
氯乙烷	340
乙烯	310
環氧乙烷	365

a 貨品名稱	h 醫療急救指南表號
環氧乙烷／氧化丙烯 混合物，但環氧乙烷含量 按重量計不超過 30%	365
異戊間二烯	310
異丙胺	320
甲烷（液化天燃氣）	620
甲基乙炔一	
丙二烯混合物	310
溴甲烷	345
氯甲烷	340
乙胺	320
氮	620
丙烷	310
丙烯	310
氧化丙烯	365
製冷氣體（見註釋）	350
二氧化硫	635
氯乙烯	340
乙氧基乙烯	330
亞乙烯基氯	340

特殊要求欄改成“i”欄。

增加一個新的註釋：

“醫療急救指南號碼是用來在國際氣體規則所涉及的产品一旦發生事故時提供查找應急程序的資料。對任何低溫運輸的，可引起霜凍的产品，醫療急救指南 620 號均適用”。

第十九章 最低要求一覽表，在環氧乙烷—環氧乙烷／氧化丙烯混合物，但環氧乙烷含量按重量計不超過 30%的 “a”欄加一\*。

在最低要求一覽表中增加下列內容；

a	b	c	d	e	f	g	h	i
戊烷（所有異構體）*	1265	2G/2PG	—	—	F	R	310	14.4.4, 17.10, 17.12
戊烯（所有異構體）*	1265	2G/2PG	—	—	F	R	310	14.4.4, 17.10, 17.12

刪除第 18.2.1 段後和第 13 頁頂部的對“第十九章”的參照。

附錄

證書規範格式，腳註 5，第 3 行，在“規則”和“必須”之間增加“或及其在艙設計限度內具有物理成分的可兼容的混合物”。

RESOLUTION MSC.30(61)  
(adopted on 11 December 1992)

ADOPTION OF 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,

RECALLING ALSO resolution MSC.5(48), by which the Committee adopted the International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (IGC Code),

RECALLING FURTHER article VIII(b) and regulation VII/11.1 of the International Convention for the Safety of Life at Sea, 1974 (SOLAS Convention), as amended, concerning the procedure for amending the IGC Code,

BEING DESIROUS of keeping the IGC Code up to date,

HAVING CONSIDERED, at its sixty-first session, amendments to the Code proposed and circulated in accordance with article VIII(b)(i) of the SOLAS Convention,

1. ADOPTS, in accordance with article VIII(b)(iv) of the SOLAS Convention, amendments to the Code, 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 SOLAS Convention, that the amendments shall be deemed to have been accepted on 1 January 1994 unless, prior to that date, more than one third of the Contracting Governments to the SOLAS Convention or Contracting Governments the combined merchant fleets of which constitute not less than fifty per cent 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 SOLAS Convention, the amendments shall enter into force on 1 July 1994 upon their acceptance in accordance with paragraph 2 above;
4. REQUESTS the Secretary-General, in conformity with article VIII(b)(v) of the SOLAS 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 SOLAS Convention;
5. FURTHER REQUESTS the Secretary-General to transmit copies of the resolution and its annex to Members of the Organization, which are not Contracting Governments to the SOLAS Convention.

ANNEX  
 AMENDMENTS TO THE INTERNATIONAL CODE FOR  
 THE CONSTRUCTION AND EQUIPMENT OF SHIPS CARRYING  
 LIQUEFIED GASES IN BULK (IGC CODE)

(Paragraph numbers and amended text refer to the authentic text of the IGC Code in the English language)

- 1.1.2 Replace "1 July 1986" by "1 October 1994" and add the following:  
 "Ships constructed before 1 October 1994 are to comply with resolution MSC.5(48) adopted on 17 June 1983."
  - 2.7.8.1 Amend reference to read 2.9.1.1.
  - 2.7.8.2 Amend reference to read 2.9.2.1.
  - 2.9.2.1 Fifth line, replace "m/rad." by "m.rad".
  - 3.2.4 Second line, insert ", machinery spaces" between "spaces" and "and".  
 Fourth line, insert "(L)" between "length" and "of the ship".  
 Fourth and fifth lines, replace "house" by "superstructure or deckhouse".  
 Seventh line, replace "houses" by "superstructures or deckhouses".
  - 3.2.5 Second line, replace "are to" by "or deckhouse should".
  - 3.2.6 Third line, replace "are to" by "should".
  - 3.8.4 Sixth line, replace "house" by "superstructure or deckhouse".
  - 4.3.2 Replace "h<sub>eq</sub>", "h<sub>gd</sub>" and "(h<sub>gd</sub>)<sub>max</sub>" by "p<sub>eq</sub>", "p<sub>gd</sub>" and "(p<sub>gd</sub>)<sub>max</sub>".
  - 4.3.2.1 First line, delete "head"
  - 4.3.2.2 Third line, insert "liquid" after "internal".  
 Fourth line, delete "head"  
 Last paragraph, second line, insert "components" between "acceleration" and "in"; replace "needs" with "need".
- Replace the last sentence of the definition of Z<sub>β</sub> by the following:
- "Tank domes considered to be part of the accepted total tank volume should be taken into account when determining Z<sub>β</sub> unless the total volume of tank domes V<sub>d</sub> does not exceed the following value:

$$V_d = V_t \left( \frac{100 - FL}{FL} \right)$$

where:

V<sub>t</sub> = tank volume without any domes  
 FL = filling limit according to chapter 15

- 4.4.5.1 Last paragraph, replace "analyses" by "analysis" in three places.
- 4.4.5.6 Note  $C_w$ , delete " = ".
- 4.7.6.1 Last two lines, replace "in way of" by "adjacent to".
- 4.8.1 Third line, replace "service" by "design".
- 4.8.2 Fourth line, replace "service" by "design".
- 4.9.9 Last line, insert "cargo" between "the" and "containment".
- 4.10.9.1 Amend the second line to read "and workmanship such as out-of-roundness, local deviations from the".
- 4.10.9.2.1 Last line, replace "or" by "of".
- 4.10.18 Last line, replace "rises" by "raisers".
- 4.11.2 Replace paragraph 4.11.2 by the following:
- "4.11.2 In the case of large cargo pressure vessels of carbon or carbon-manganese steel for which it is difficult to perform the heat treatment, mechanical stress relieving by pressurizing may be carried out as an alternative to the heat treatment with the approval of the Administration and subject to the following conditions:
- .1 Complicated welded pressure vessel parts, such as sumps or domes with nozzles, with adjacent shell plates should be heat treated before they are welded to larger parts of the pressure vessel.
  - .2 The mechanical stress relieving process should preferably be carried out during the hydrostatic pressure test required by 4.10.10.3, by applying a higher pressure than the test pressure required by 4.10.10.3.1. The pressurizing medium should be water.
  - .3 For the water temperature, 4.10.10.3.2 applies.
  - .4 Stress relieving should be performed while the tank is supported by its regular saddles or supporting structure or, when stress relieving cannot be carried out on board, in a manner which will give the same stresses and stress distribution as when supported by its regular saddles or supporting structure.
  - .5 The maximum stress relieving pressure should be held for two hours per 25 mm of thickness but in no case less than two hours.



- .6 The upper limits placed on the calculated stress levels during stress relieving should be the following:
- equivalent general primary membrane stress:  $0.9 \cdot R_e$
  - equivalent stress composed of primary bending stress plus membrane stress:  $1.35 \cdot R_e$
- where  $R_e$  is the specific lower minimum yield stress or 0.2% proof stress at test temperature of the steel used for the tank.
- .7 Strain measurements will normally be required to prove these limits for at least the first tank of a series of identical tanks built consecutively. The location of strain gauges should be included in the mechanical stress relieving procedure to be submitted in accordance with 4.11.2.14.
- .8 The test procedure should demonstrate that a linear relationship between pressure and strain is achieved at the end of the stress relieving process when the pressure is raised again up to the design pressure.
- .9 High stress areas in way of geometrical discontinuities such as nozzles and other openings should be checked for cracks by dye penetrant or magnetic particle inspection after mechanical stress relieving. Particular attention in this respect should be given to plates exceeding 30 mm in thickness.
- .10 Steels which have a ratio of yield stress to ultimate tensile strength greater than 0.8 should generally not be mechanically stress relieved. If, however, the yield stress is raised by a method giving high ductility of the steel, slightly higher rates may be accepted upon consideration in each case.
- .11 Mechanical stress relieving cannot be substituted for heat treatment of cold formed parts of tanks if the degree of cold forming exceeds the limit above which heat treatment is required.
- .12 The thickness of the shell and heads of the tank should not exceed 40 mm. Higher thicknesses may be accepted for parts which are thermally stress relieved.
- .13 Local buckling should be guarded against particularly when tori-spherical heads are used for tanks and domes.
- .14 The procedure for mechanical stress relieving should be submitted beforehand to the Administration for approval."

5.2.1.1 First line, replace "this section" by "sections 5.2 to 5.5".

5.2.3.2 Last line, replace "system" by "systems".

- 5.4.6 Heading, replace "treatments" by "treatment".
- 5.4.6.2 First line, replace "treatments" by "treatment".
- 5.4.6.3.1 Second line, replace "service" by "design".
- Add the following to existing paragraph 5.4.6.3.1:
- "When such butt welded joints of piping sections are made by automatic welding procedures in the pipe fabrication shop, upon special approval by the Administration, the extent of radiographic inspection may be progressively reduced but in no case to less than 10% of each joint. If defects are revealed the extent of examination should be increased to 100% and should include inspection of previously accepted welds. This special approval can only be granted if well-documented quality assurance procedures and records are available to enable the Administration to assess the ability of the manufacturer to produce satisfactory welds consistently."
- 5.4.6.3.2 First line, after "pipes" add "not covered by 5.4.6.3.1".
- Table 6.1 Line 16, replace "PLATE" by "PLATES".
- Table 6.2 Line 17, replace "SECTIONS" by "SECTIONS AND FORGINGS".
- 6.3.6.3 First line, amend the reference to read "6.3.6.2.1".
- 8.2.8.3 Last line, insert "spare" between "maintained" and "valve".
- 8.3.1.1 First line, correct the spelling of "pressure".
- 8.5.2 Definition of "D": replace "K" with "k".
- 9.5.3 Fourth line, delete "tank".
- 10.2.5.2 First and second lines: replace "cargo products" with "cargoes".
- 11.1.1.1 Amend reference to read "56.6".
- 11.3 Add the following new paragraph after 11.3.5:
- "11.3.6 Remote starting of pumps supplying the water spray system and remote operation of any normally closed valves in the system should be arranged in suitable locations outside the cargo area, adjacent to the accommodation spaces and readily accessible and operable in the event of fire in the areas protected".

- 11.5 Replace 11.5 by the following:
- "11.5 Cargo compressor and pump rooms
- 11.5.1 The cargo compressor and pump rooms of any ship should be provided with a carbon dioxide system as specified in regulation II-2/5.1 and .2 of the 1974 SOLAS Convention, as amended. A notice should be exhibited at the controls stating that the system is only to be used for fire-extinguishing and not for inerting purposes, due to the electrostatic ignition hazard. The alarms referred to in regulation II-2/5.1.6 of the 1983 SOLAS amendments should be safe for use in a flammable cargo vapour-air mixture. For the purpose of this requirement, an extinguishing system should be provided which would be suitable for machinery spaces. However, the amount of carbon dioxide gas carried should be sufficient to provide a quantity of free gas equal to 45% of the gross volume of the cargo compressor and pump-rooms in all cases.
- 11.5.2 Cargo compressor and pump-rooms of ships which are dedicated to the carriage of a restricted number of cargoes should be protected by an appropriate fire-extinguishing system approved by the Administration."
- 11.6.1 In the table, delete "below 2,000 m<sup>3</sup> 2"  
replace "between 2,000 m<sup>3</sup> and 5,000 m<sup>3</sup>" by "5,000 m<sup>3</sup> and below".
- Chapter 12 Preamble, replace "replace" with "should be substituted for".
- 13.6.11 Sixth line, replace "sampling and detecting" by "monitoring".
- 14.2.3.1 First line, insert "spare" between "charged" and "air".
- 14.3.2 Replace the regulation number by "\*\* 14.3.2" and add a reference at the foot of the page as follows:

"

\*\* Reference is made to the Medical First Aid Guide for Use in Accidents involving Dangerous Goods (MFAG) which includes the MFAG numbers of products covered by the Code and the emergency procedures to be applied in the event of an incident. MFAG numbers related to products covered by the IGC Code are given in the table of minimum requirements (chapter 19)".

14.4.2.1.1 Replace by the following:

"1.1.1 filter type respiratory protection is unacceptable".

15.1.2 First line, replace "should" by "may".

15.1.4.2 Penultimate line, replace "relief valve" by "relieving system".

15.2 First line, replace "tank filling" by "loading".

Chapter 16 The existing text of chapter 16 is replaced by the following:

"16.1 General

16.1.1 Methane (LNG) is the only cargo whose vapour or boil-off gas may be utilized in machinery spaces of category A and in such spaces may be utilized only in boilers, inert gas generators, combustion engines and gas turbines.

16.1.2 These provisions do not preclude the use of gas fuel for auxiliary services in other locations, provided that such other services and locations should be subject to special consideration by the Administration.

16.2 Arrangement of machinery spaces of category A

16.2.1 Spaces in which gas fuel is utilized should be fitted with a mechanical ventilation system and should be arranged in such a way as to prevent the formation of dead spaces. Such ventilation should be particularly effective in the vicinity of electrical equipment and machinery or of other equipment and machinery which may generate sparks. Such a ventilation system should be separated from those intended for other spaces.

16.2.2 Gas detectors should be fitted in these spaces, particularly in the zones where air circulation is reduced. The gas detection system should comply with the requirements of chapter 13.

16.2.3 Electrical equipment located in the double wall pipe or duct specified in 16.3.1 should be of the intrinsically safe type.

16.3 Gas fuel supply

16.3.1 Gas fuel piping should not pass through accommodation spaces, services spaces, or control stations. Gas fuel piping may pass through or extend into other spaces provided they fulfil one of the following:

- .1 the gas fuel piping should be a double wall piping system with the gas fuel contained in the inner pipe. The space between the concentric pipes should be pressurized with inert gas at a pressure greater than the gas fuel pressure. Suitable alarms should be provided to indicate a loss of inert gas pressure between the pipes; or

- .2 the gas fuel piping should be installed within a ventilated pipe or duct. The air space between the gas fuel piping and inner wall of this pipe or duct should be equipped with mechanical exhaust ventilation having a capacity of at least 30 air changes per hour. The ventilation system should be arranged to maintain a pressure less than the atmospheric pressure. The fan motors should be placed outside the ventilated pipe or duct. The ventilation outlet should be placed in a position where no flammable gas-air mixture may be ignited. The ventilation should always be in operation when there is gas fuel in the piping. Continuous gas detection should be provided to indicate leaks and to shut down the gas fuel supply to the machinery space in accordance with 16.3.10. The master gas fuel valve required by 16.3.7 should close automatically, if the required air flow is not established and maintained by the exhaust ventilation system.
- 16.3.2 If a gas leak occurs, the gas fuel supply should not be restored until the leak has been found and repaired. Instructions to this effect should be placed in a prominent position in the machinery spaces.
- 16.3.3 The double wall piping system or the ventilated pipe or duct provided for the gas fuel piping should terminate at the ventilation hood or casing required by 16.3.4.
- 16.3.4 A ventilation hood or casing should be provided for the areas occupied by flanges, valves, etc., and for the gas fuel piping, at the gas fuel utilization units, such as boilers, diesel engines or gas turbines. If this ventilation hood or casing is not served by the exhaust ventilation fan serving the ventilated pipe or duct as specified in 16.3.1.2, then it should be equipped with an exhaust ventilation system and continuous gas detection should be provided to indicate leaks and to shut down the gas fuel supply to the machinery space in accordance with 16.3.10. The master gas fuel valve required by 16.3.7 should close automatically if the required air flow is not established and maintained by the exhaust ventilation system. The ventilation hood or casing should be installed or mounted to permit the ventilating air to sweep across the gas utilization unit and be exhausted at the top of the ventilation hood or casing.
- 16.3.5 The ventilation inlet and discharge for the required ventilation systems should be respectively from and to a safe location.
- 16.3.6 Each gas utilization unit should be provided with a set of three automatic valves. Two of these valves should be in series in the gas fuel pipe to the consuming equipment. The third valve should be in a pipe that vents, to a safe location in the open air, that portion of the gas fuel piping that is between the two valves in series. These valves should be arranged so that failure of the necessary forced draught, loss of flame on boiler burners, abnormal pressure in the gas fuel supply line, or failure of the valve control actuating medium will cause the two gas fuel valves which are in series to close automatically and the vent valve to open automatically. Alternatively, the function of one of the valves in series and the vent valve can be incorporated into one

valve body so arranged that, when one of the above conditions occurs, flow to the gas utilization unit will be blocked and the vent opened. The three shut-off valves should be arranged for manual reset.

- 16.3.7 A master gas fuel valve that can be closed from within the machinery space should be provided within the cargo area. The valve should be arranged so as to close automatically if leakage of gas is detected, or loss of ventilation for the duct or casing or loss of pressurization of the double wall gas fuel piping occurs.
- 16.3.8 Gas fuel piping in machinery spaces should comply with sections 5.2-5.5 as far as found applicable. The piping should, as far as practicable, have welded joints. Those parts of the gas fuel piping which are not enclosed in a ventilated pipe or duct according to 16.3.1 and are on the open deck outside the cargo area should have full penetration butt welded joints and should be fully radiographed.
- 16.3.9 Provision should be made for inerting and gas-freeing that portion of the gas fuel piping system located in the machinery space.
- 16.3.10 Gas detection systems provided in accordance with the requirements of 16.3.1 and 16.3.4 should comply with 13.6.2 and 13.6.4 through 13.6.8 as applicable; they should activate the alarm at 30% of the lower flammable limit and shut down the master gas fuel valve referred to in 16.3.7 before the gas concentration reaches 60% of the lower flammable limit.
- 16.4 Gas make-up plant and related storage tanks
- 16.4.1 All equipment (heaters, compressors, filters, etc.) for making up the gas for its use as fuel, and the related storage tanks should be located in the cargo area in accordance with 3.1.5.4. If the equipment is in an enclosed space, the space should be ventilated according to section 12.1 of the Code and be equipped with a fixed fire-extinguishing system according to section 11.5 and with a gas detection system according to section 13.6, as applicable.
- 16.4.2 The compressors should be capable of being remotely stopped from a position which is always and easily accessible, and also from the engine-room. In addition, the compressors should be capable of automatically stopping when the suction pressure reaches a certain value depending on the set pressure of the vacuum relief valves of the cargo tanks. The automatic shut-down device of the compressors should have a manual resetting. Volumetric compressors should be fitted with pressure relief valves discharging into the suction line of the compressor. The size of the pressure relief valves should be determined in such a way that, with the delivery valve kept closed, the maximum pressure does not exceed by more than 10% the maximum working pressure. The requirements of 5.6.1.3 apply to these compressors.

- 16.4.3 If the heating medium for the gas fuel evaporator or heater is returned to spaces outside the cargo area it should first go through a degassing tank. The degassing tank should be located in the cargo area. Provisions should be made to detect and alarm the presence of gas in the tank. The vent outlet should be in a safe position and fitted with a flame screen.
- 16.4.4 Piping and pressure vessels in the gas fuel conditioning system should comply with chapter 5.
- 16.5 Special requirements for main boilers
- 16.5.1 Each boiler should have a separate uptake.
- 16.5.2 A system suitable to ensure the forced draught in the boilers should be provided. The particulars of such a system should be to the satisfaction of the Administration.
- 16.5.3 Combustion chambers of boilers should be of suitable form such as not to present pockets where gas may accumulate.
- 16.5.4 The burner systems should be of dual type, suitable to burn either oil fuel or gas fuel alone or oil and gas fuel simultaneously. Only oil fuel should be used during manoeuvring and port operations unless automatic transfer from gas to oil burning is provided in which case the burning of a combination of oil and gas or gas alone may be permitted provided the system is demonstrated to the satisfaction of the Administration. It should be possible to change over easily and quickly from gas fuel operation to oil fuel operation. Gas nozzles should be fitted in such a way that gas fuel is ignited by the flame of the oil fuel burner. A flame scanner should be installed and arranged to assure that gas flow to the burner is cut off unless satisfactory ignition has been established and maintained. On the pipe of each gas burner a manually operated shut-off valve should be fitted. An installation should be provided for purging the gas supply piping to the burners by means of inert gas or steam, after the extinguishing of these burners.
- 16.5.5 Alarm devices should be fitted in order to monitor a possible decrease in liquid fuel oil pressure or a possible failure of the related pumps.
- 16.5.6 Arrangements should be made such that, in case of flame failure of all operating burners for gas or oil or for a combination thereof, the combustion chambers of the boilers are automatically purged before relighting. Arrangements should also be made to enable the boilers to be manually purged and these arrangements should be to the satisfaction of the Administration.
- 16.6 Special requirements for gas-fired internal combustion engines and gas-fired turbines
- Special provisions for gas-fuelled internal combustion engines and for gas turbines will be considered by the Administration in each case".

- 17.1 Replace reference to column "h" by "i".
- 17.2 Replace reference to column "h" by "i".
- 17.3 Replace present section 17.13 of the IGC Code by the following:
- "17.13 Ammonia
- 17.13.1 Anhydrous ammonia may cause stress corrosion cracking in containment and process systems made of carbon manganese steel or nickel steel. To minimize the risk of this occurring, measures detailed in 17.13.2 to 17.13.8 should be taken as appropriate.
- 17.13.2 Where carbon manganese steel is used, cargo tanks, process pressure vessels and cargo piping should be made of fine grained steel with a specified minimum yield strength not exceeding 355 N/mm<sup>2</sup> and with an actual yield strength not exceeding 440 N/mm<sup>2</sup>. One of the following constructional or operational measures should also be taken:
- .1 lower strength material with a specified minimum tensile strength not exceeding 410 N/mm<sup>2</sup> should be used; or
  - .2 cargo tanks, etc., should be post-weld stress-relief heat treated; or
  - .3 carriage temperature should be maintained preferably at a temperature close to the product's boiling point of -33°C but in no case at a temperature above -20°C; or
  - .4 the ammonia should contain not less than 0.1% w/w water.
- 17.13.3 If carbon manganese steels with higher yield properties are used other than those specified in 17.13.2, the completed cargo tanks, piping, etc. should be given a post-weld stress-relief heat treatment.
- 17.13.4 Process pressure vessels and piping of the condensate part of the refrigeration system should be given a post-weld stress-relief heat treatment when made of materials mentioned in 17.13.1.
- 17.13.5 The tensile and yield properties of the welding consumables should exceed those of the tank or piping material by the smallest practical amount.
- 17.13.6 Nickel steel containing more than 5% nickel and carbon manganese steel not complying with the requirements of 17.13.2 and 17.13.3 are particularly susceptible to ammonia stress corrosion cracking and should not be used for containment and piping systems for the carriage of this product.
- 17.13.7 Nickel steel containing not more than 5% nickel may be used provided the carriage temperature complies with the requirements specified in 17.13.2.3.



- 17.13.8 In order to minimize the risk of ammonia stress corrosion cracking, it is advisable to keep the dissolved oxygen content below 2.5 ppm/w/w. This can best be achieved by reducing the average oxygen content in the tanks prior to the introduction of liquid ammonia to less than the values given as a function of the carriage temperature T in the table below:

T (°C)	O <sub>2</sub> (%v/v)
-30 and below	0.90
-20	0.50
-10	0.28
0	0.16
10	0.10
20	0.05
30	0.03

Oxygen percentages for intermediate temperatures may be obtained by direct interpolation".

- 17.14.3.1 First line, replace "are to" by "should".
- 17.14.4.3.1 Delete "cargo".
- 17.14.5.1 Fourth line, delete "remainder of the".
- 17.16.5 Replace "17.20.6.3" by "17.20.5.3".
- 17.20.4 Second line, delete "pit".
- 17.20.13.1 Fourth line, replace "the product" by "these products".
- 17.20.13.3 First line, amend to read "Before each initial loading of these products and before every subsequent return to such service, ...".
- 17.20.17 Eighth line, replace "atmospheric" by "ambient".
- Insert the following after the third sentence:
- "Remote manual operation should be arranged such that remote starting of pumps supplying water spray system and remote operation of any normally closed valves in the system can be carried out from a suitable location outside the cargo area, adjacent to the accommodation spaces and readily accessible and operable in the event of fire in the areas protected".
- 18.1.1.7 Insert "allowable" between "minimum" and "inner".
- 18.2.1 First line, replace "character" by "characteristics".  
Last line, replace "if so" by "as".

Chapter 19 Summary of minimum requirements, revise the table of minimum requirements to include a new column "h" showing MFAG numbers, as follows:

a Product name	h MFAG table No.
Acetaldehyde	300
Ammonia, anhydrous	725
Butadiene	310
Butane	310
Butane-propane mixtures	310
Butylenes	310
Chlorine	740
Diethyl ether	330
Dimethylamine	320
Ethane	310
Ethyl chloride	340
Ethylene	310
Ethylene oxide	365
Ethylene oxide-propylene oxide mixtures with ethylene oxide content of not more than 30% by weight	365
Isoprene	310
Isopropylamine	320
Methane (LNG)	620
Methyl acetylene-propadiene mixtures	310
Methyl bromide	345
Methyl chloride	340
Monoethylamine	320
Nitrogen	620
Propane	310
Propylene	310
Propylene oxide	365
Refrigerant gases (see notes)	350
Sulphur dioxide	635
Vinyl chloride	340
Vinyl ethyl ether	330
Vinylidene chloride	340

Special requirements column becomes "i".

Add a new explanatory note:

"MFAG numbers are provided for information on the emergency procedures to be applied in the event of an incident with the products covered by the IGC Code. Where any of the products listed are carried at low temperature from which frostbite may occur MFAG No.620 is also applicable".

**Chapter 19** Table of minimum requirements, insert an asterisk in column "a" for Ethylene oxide – propylene oxide mixtures with ethylene oxide content of not more than 30% by weight.

Add the following to the table of the summary of minimum requirements:

a	b	c	d	e	f	g	h	i
Pentanes (all isomers)*	1265	2G/2PG	-	-	F	R	310	14.4.4, 17.10, 17.12
Pentene (all isomers)*	1265	2G/2PG	-	-	F	R	310	14.4.4, 17.10, 17.12

Delete the reference to "Chapter 19" after paragraph 18.2.1 and at the top of page 13.

#### Appendix

Model form of certificate, footnote 5, third line, insert "or their compatible mixtures having physical proportions within the limitations of tank design" between "Code" and "should".

### 第 53/2015 號行政長官公告

### Aviso do Chefe do Executivo n.º 53/2015

中華人民共和國是國際海事組織的成員國及一九七四年十一月一日訂於倫敦的《國際海上人命安全公約》（下稱“公約”）的締約國；

國際海事組織大會於一九九三年十一月四日透過第A.744 (18) 號決議通過了《散貨船和油輪檢驗期間的強化檢查方案指南》；

國際海事組織海上安全委員會於一九九六年六月四日透過第MSC.49 (66) 號決議通過了上指指南的修正案，該修正案自一九九九年十二月二十日起適用於澳門特別行政區；

基於此，行政長官根據澳門特別行政區第3/1999號法律第六條第一款的規定，命令公佈包含上指修正案的MSC.49 (66) 號決議的中文及英文文本。

二零一五年五月十一日發佈。

行政長官 崔世安

Considerando que a República Popular da China é um Estado Membro da Organização Marítima Internacional e um Estado Contratante da Convenção Internacional para a Salvaguarda da Vida Humana no Mar, concluída em Londres em 1 de Novembro de 1974, adiante designada por Convenção;

Considerando igualmente que, em 4 de Novembro de 1993, a Assembleia da Organização Marítima Internacional, através da resolução A.744(18), adoptou as Directrizes relativas ao Programa Reforçado de Inspeções no âmbito das Vistorias a Graneleiros e Petroleiros;

Mais considerando que, em 4 de Junho de 1996, o Comité de Segurança Marítima da Organização Marítima Internacional, através da resolução MSC.49(66), adoptou emendas às referidas Directrizes, e que tais emendas são aplicáveis na Região Administrativa Especial de Macau desde 20 de Dezembro de 1999;

O Chefe do Executivo manda publicar, nos termos do n.º 1 do artigo 6.º da Lei n.º 3/1999 da Região Administrativa Especial de Macau, a resolução MSC.49(66), que contém as referidas emendas, nos seus textos em línguas chinesa e inglesa.

Promulgado em 11 de Maio de 2015.

O Chefe do Executivo, *Chui Sai On*.