

澳門特別行政區

REGIÃO ADMINISTRATIVA ESPECIAL
DE MACAU

行政長官辦公室

GABINETE DO CHEFE DO EXECUTIVO

第130/2015號行政長官公告

Aviso do Chefe do Executivo n.º 130/2015

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》（下稱“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；

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, adiante designada por Convenção, tal como emendada, na Região Administrativa Especial de Macau a partir de 20 de Dezembro de 1999;

國際海事組織海上安全委員會於二零零零年十二月五日透過第MSC.99(73)號決議通過了經修正的公約的修正案，該修正案自二零零二年七月一日起適用於澳門特別行政區；

Considerando igualmente que, em 5 de Dezembro de 2000, o Comité de Segurança Marítima da Organização Marítima Internacional, através da resolução MSC.99(73), adoptou emendas à Convenção, tal como emendada, e que tais emendas são aplicáveis na Região Administrativa Especial de Macau desde 1 de Julho de 2002;

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MSC.99(73)號決議的中文及英文文本。

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.99(73), que contém as referidas emendas, nos seus textos em línguas chinesa e inglesa.

二零一五年十二月二十八日發佈。

Promulgado em 28 de Dezembro de 2015.

行政長官 崔世安

O Chefe do Executivo, *Chui Sai On*.

第 MSC.99 (73) 號決議

(2000 年 12 月 5 日通過)

通過經修正的《1974 年國際海上人命安全公約》 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，

還憶及《1974 年國際海上人命安全公約(SOLAS)》(以下簡稱“本公約”)關於本公約附件(除第 I 章的規定外)修正程序的第 VIII (b) 條，

在其第 73 次會議上，審議了根據本公約第 VIII (b) (i) 條提出並散發的本公約修正案，

1. 根據本公約第 VIII (b) (iv) 條，通過了本公約修正案，其條文列於本決議的附件中；

2. 根據本公約第 VIII (b) (vi) (2) (bb) 條，決定修正案應於 2002 年 1 月 1 日視為已被接受，除非在此日期之前，有超過三分之一的本公約締約國政府或其合計商船隊總噸位不少於世界商船隊總噸位 50% 的締約國政府提出反對該修正案；

3. 請締約國政府注意，根據本公約第 VIII (b) (vii) (2) 條，若修正案依上述第 2 款被接受，應於 2002 年 7 月 1 日生效；
4. 要求秘書長按照本公約第 VIII (b) (v) 條，將本決議和附件中所列修正案正文的核證副本發送本公約所有締約國政府；
5. 還要求秘書長將本決議及其附件的副本發送不是本公約締約國的本組織會員。

附件

經修正的《1974年國際海上人命安全公約》修正案

第II-1章

構造—結構、分艙和穩性、機電設備

第3-4條—液貨船應急拖帶裝置

- 1 該條現有條文由下列內容取代：

“第3-4條

液貨船應急拖帶裝置

- 1 不小於20,000載重噸的所有液貨船都應在兩端裝有應急拖帶裝置。
- 2 對於在2002年7月1日或以後建造的液貨船：
 - .1 該裝置應能夠在被拖帶的船舶沒有主電源時隨時迅速開動，並容易連接到拖船上。應急拖帶裝置中至少應有一個事先安裝就緒，即刻可用；和
 - .2 船舶兩端的應急拖帶裝置都應在顧及船舶大小和載重量以及在惡劣氣候條件下的預期受力的情況下，具有足夠的強度。應急拖帶裝置的設計、建造和原型試驗應經主管機關根據本組織制定的指南予以認可。

3 對於2002年7月1日以前建造的液貨船，應急拖帶裝置的設計和建造應經主管機關根據本組織制定的指南予以認可。”

2 在現有第3-4條後插入如下新第3-5條：

“第3-5條

新裝含石棉的材料

1 本條適用於本公約所覆蓋的結構、機電裝置和設備所使用的材料。

2 對於所有船舶，禁止新裝含石棉的材料，但下列情況除外：

- .1 在旋轉葉片式壓縮機和旋轉葉片式真空泵中使用的葉片；
- .2 在有着火、腐蝕或毒性危險的高溫（超過350°C）或高壓（超過 7×10^6 Pa）環境下用於液體循環的水密接頭和襯墊；和
- .3 用於1,000°C以上溫度環境中的柔軟和可伸縮的隔熱組件。”

第43條—貨船應急電源

3 在第2.2.5款中，刪去“和”字。

4 在第2.2.6款中，將“馬達”一詞換成“馬達；和”。

5 在第2.2款中，在原第.6分款後新增第.7分款如下：

“.7 在2002年7月1日或以後建造的液貨船的所有貨泵艙內。”

第II-2章

構造—防火、探火和滅火

6 原第II-2章的文字由下文取代：

“A部分—通則

第1條

適用範圍

1 適用範圍

1.1 除另有明文規定外，本章適用於2002年7月1日或以後建造的船舶。

1.2 就本章而言：

- .1 術語 *建造的船舶* 係指已安放龍骨或處於相似建造階段的船舶；
- .2 術語 *所有船舶* 係指在2002年7月1日之前、之日或之後建造的船舶，無論其為何種類型；
- .3 無論何時建造的貨船，一經改裝為客船，便應被視為於此種改裝開始之日建造的客船。

1.3 就本章而言，術語處於相似建造階段係指這樣的階段：

- .1 可以認定某一具體船舶建造開始；
- .2 該船業已開始的裝配量至少為50 t或為所有結構材料估算重量的1%，以小者為準。

2 適用於現有船舶的要求

2.1 除另有明文規定外，對在2002年7月1日之前建造的船舶，主管機關應確保其符合經第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年國際海上人命安全公約》第II-2章中的適用要求。

2.2 2002年7月1日之前建造的船舶，還應：

- .1 符合本條第3、6.5和6.7款的相應要求；
- .2 不晚於2002年7月1日後的第一次檢驗日期符合第13.3.4.2至13.3.4.5條、第13.4.3條以及除第16.3.2.2和16.3.2.3條外的E部分的相應要求；
- .3 只要求新裝置符合第10.4.1.3和10.6.4條；和
- .4 對於2,000總噸及以上客船，不晚於2005年10月1日符合第10.5.6條的要求。

3 修理、改裝、改建和艙裝

3.1 進行修理、改裝、改建以及與之有關的艙裝的所有船舶，至少應繼續符合這些船舶原先適用的要求。此類船舶如建造於2002年7月

1日之前，一般應符合對在該日期或之後建造船舶的要求，至少達到其經過此種修理、改裝、改建和舾裝之前的同等程度。

3.2 實質性變更船舶尺度或乘客起居處所或大幅度增加船舶服務壽命的修理、改裝和改建以及與之有關的舾裝，應在主管機關認為合理和可行的範圍內，符合對2002年7月1日或以後建造的船舶的要求。

4 免除

4.1 主管機關如認為航行的遮蔽性和條件會使應用本章的任何特定要求不合理或不必要時，可對懸掛其國旗的個別船舶或某類船舶免除這些要求，只要該船舶在其航程中距最近陸地不超過20海里。

4.2 客船從事運載大量特殊乘客如朝聖旅客的特種業務時，如果主管機關確信實施本章要求不切實際，可對此類船舶免除這些要求，但此類船舶應完全符合下列規定：

- .1 《1971年特種業務客船協定》所附的規則；和
- .2 《1973年特種業務客船艙室要求議定書》所附的規則。

5 適用於不同船舶類型的要求

除另有明文規定外：

- .1 未提及具體船型的要求應適用於所有類型的船舶；和
- .2 提及“液貨船”的要求應適用於液貨船，但以下第6款的具體要求為準。

6 對液貨船要求的適用

6.1 本章內對液貨船的要求應適用於載運由認可的閃點儀測定的閃點不超過60°C（閉杯試驗），並且其雷特蒸氣壓力低於大氣壓的原油或石油產品和具有類似失火危險的其他液體產品的液貨船。

6.2 如擬載運第6.1款所述貨物以外的液體貨物或會引起額外失火危險的液化氣體，應要求採取補充安全措施，並視情況適當注意到第VII/8.1條定義的《國際散化規則》、《散化規則》、第VII/11.1條定義的《國際液化氣體船規則》和《液化氣體船規則》的有關規定。

6.2.1 使用符合《消防安全系統規則》的常規泡沫滅火系統無效、閃點低於60°C的液體貨物，被認為是會引起額外失火危險的貨物。要求下列補充措施：

- .1 泡沫應為抗酒精型；
- .2 用於化學品液貨船的發泡劑類型應為主管機關在考慮到本組織制定的指南的情況下所滿意；和
- .3 泡沫滅火系統的能力和噴施速度應符合《國際散化規則》第11章的規定，但可根據性能試驗情況接受較低的噴施速度。對於裝有惰性氣體系統的液貨船，足以產生20 min泡沫的發泡劑數量是可以接受的。

6.2.2 就本條而言，在37.8°C時蒸氣絕對壓力超過1.013巴的液體貨物被視為會引起額外失火危險的貨物。載運此類物質的船舶應符合《國際散化規則》第15.14款的要求。當船舶在限制區域和限制時間內營運時，有關主管機關可根據《國際散化規則》第15.14.3款同意免除對製冷系統的要求。

6.3 閃點超過60°C的非油品液體貨物或需符合《國際散化規則》要求的液體貨物被視為是具有低火災危險的貨物，不要求固定式泡沫滅火系統的保護。

6.4 載運由認可的閃點儀測定的閃點超過60°C（閉杯試驗）的石油產品的液貨船應符合第10.2.1.4.4和10.10.2.3條規定的要求以及對液貨船以外的貨船的要求，除非它們安裝了符合《消防安全系統規則》規定的固定式甲板泡沫系統代替第10.7條所要求的固定式滅火系統。

6.5 在2002年7月1日之前、之日或之後建造的混裝船，除非所有貨物處所的油已卸空且無油氣，或者每次安排都經主管機關在考慮到本組織制定的指南的情況下加以批准，否則，不得載運油類以外的其他貨物。

6.6 化學品液貨船和氣體運輸船應符合對液貨船的要求，除非在充分考慮到《國際散化規則》和《國際氣體船規則》的相應規定的情況下作出經主管機關滿意的替代和補充安排。

6.7 所有2002年7月1日之前建造的液貨船應在2002年7月1日以後的第一次計劃塢修之日，但最遲不晚於2005年7月1日，安裝第4.5.10.1.1和4.5.10.1.4條要求的設備和裝置以及一個碳氫化合物氣體濃度持續監測系統。採樣點或探測頭應佈置在適當位置，以便隨時探測到潛在的危險滲漏。一旦碳氫化合物氣體濃度達到一個預先設定的不高於可燃下限10%的水平，應在泵艙和貨物控制艙室自動激發一個連續的聲響和可視報警信號，以提起人員對潛在危險的警覺。但是，也可以接受已經安裝的預設水平不超過可燃下限30%的監測系統。

第2條

防火安全目標和功能要求

1 防火安全目標

1.1 本章的防火安全目標為：

- .1 防止火災和爆炸的發生；
- .2 減少火災造成的生命危險；
- .3 減少火災對船舶、船上貨物和環境的破壞危險；
- .4 將火災和爆炸抑制、控制和撲滅在火源艙室；和
- .5 為乘客和船員提供足夠的和易於到達的脫險通道。

2 功能要求

2.1 為了達到第1款中規定的防火安全目標，本章的規定中適當包含了下列功能要求：

- .1 以耐熱和結構性限界面，將船舶劃分為若干主豎區和主水平區；
- .2 以耐熱和結構性限界面，將起居處所與船舶其他處所隔開；
- .3 限制使用可燃材料；
- .4 探知火源區域內的任何火災；
- .5 抑制和撲滅火源處所內的任何火災；
- .6 保護脫險通道或滅火通道；

- .7 滅火設備的隨時可用性；和
- .8 將易燃貨物蒸發氣體着火的可能性降至最低。

3 防火安全目標的實現

第1款規定的防火安全目標應通過確保符合本章B、C、D、E或G部分中規定的法定要求來實現，或通過符合本章F部分的替代設計和安排來實現。在下列任一情況下，應認為船舶已符合第2款中規定的功能要求，並達到了第1款中規定的防火安全目標：

- .1 船舶的整體設計和安排，符合本章B、C、D、E或G部分的相關規定的要求；
- .2 船舶的整體設計和安排，經按本章F部分的要求審查並認可；或
- .3 船舶的部分設計和安排，經按本章F部分的要求審查並認可，而船舶的其他部分符合本章B、C、D、E和G部分的相關規定的要求。

第3條

定義

就本章而言，除另有明文規定外，應適用下列定義：

- 1 起居處所係指用作公共處所、走廊、盥洗室、住室、辦公室、醫務室、電影院、遊藝娛樂室、理髮室、無烹調設備的配膳室的處所和類似處所。

2 “A”級分隔係指由符合下列要求的艙壁和甲板所組成的分隔：

- .1 它們係以鋼或其他等效的材料製造；
- .2 它們係適當地作了防撓加強；
- .3 它們係以經認可的不燃材料隔熱，使在下列時間內，其背火一面的平均溫度較原溫度增高不超過140°C，而在包括任何接頭在內的任何一點的溫度較原溫度增高也不超過180°C；

“A-60”級 60 min

“A-30”級 30 min

“A-15”級 15 min

“A-0”級 0 min

- .4 它們的構造應為在1小時的標準耐火試驗至結束時，能夠防止煙及火焰的通過；和
- .5 主管機關要求按《耐火試驗程序規則》對原型艙壁或甲板進行一次試驗，以保證其符合上述完整性和溫升的要求。

3 天井係指跨越三層或更多甲板的單個主豎區內的公共處所。

4 “B”級分隔係指由符合下列要求的艙壁、甲板、天花板或襯板所組成的分隔：

- .1 它們應以經認可的不燃材料製成，並且“B”級分隔的製造和裝配中所用的所有材料均應為不燃材料，但並不排除可准許使用可燃裝飾板片，只要它們符合本章的其他相應要求；

- .2 它們應具有這樣的隔熱值：在下列時間內，其背火一面的平均溫度較原溫度增高不超過140°C，而在包括任何接頭在內的任何一點的溫度，較原始溫度增高也不超過225°C：

“B-15” 級 15 min

“B-0” 級 0 min

- .3 它們的構造應為在最初半小時的標準耐火試驗結束時，能夠防止火焰通過；和
- .4 主管機關要求按《耐火試驗程序規則》對原型分隔進行一次試驗，以保證符合上述完整性和溫升要求。

5 艙壁甲板係指橫向水密艙壁所通達的最高一層甲板。

6 貨物區域係指船上包含貨艙、液貨艙、污液艙和貨泵艙的部分，包括泵艙、隔離空艙、相鄰於液貨艙的壓載艙和留空處所，以及上述處所以上的整個寬度和長度的甲板區域。

7 貨船係指第I/2（g）條所定義的船舶。

8 裝貨處所係指用作裝載貨物的處所、貨油艙、裝載其他液體貨物的液貨艙和通往這種處所的圍壁通道。

9 中央控制站係指集中了下列控制器和顯示器功能的控制站：

- .1 固定式探火和失火報警系統；
- .2 自動噴水器、探火和失火報警系統；
- .3 防火門指示面板；
- .4 防火門關閉裝置；

- .5 水密門指示面板；
- .6 水密門關閉裝置；
- .7 通風機；
- .8 通用/失火報警器；
- .9 包括電話在內的通信系統；和
- .10 公共廣播系統的擴音器。

10 “C”級分隔係指由經認可的不燃材料製成的分隔。它們既不必符合防止煙和火焰通過也不必符合限制溫升的要求。如果可燃裝飾板片符合本章的要求，則其可獲准使用。

11 化學品液貨船係指建造或改建並用於散裝運輸第VII/8.1條中所定義的《國際散化規則》第17章中所列的任何易燃性液體貨品的液貨船。

12 閉式滾裝處所係指既不是開式滾裝處所，也不是露天甲板的滾裝處所。

13 閉式車輛處所係指既不是開式車輛處所，也不是露天甲板的車輛處所。

14 混裝船係指設計用來散裝運輸油類和固體貨物的貨船。

15 可燃材料係指不燃材料以外的任何材料。

16 連續“B”級天花板或襯板係指只終止於“A”級或“B”級分隔處的“B”級天花板或襯板。

17 連續有人值班的中央控制站係指有專門負責的船員連續值班的中央控制站。

18 *控制站*係指船舶無線電設備、主要航行設備或應急電源所在的處所，或者是指火警記錄器或失火控制設備集中的處所。火警記錄器或失火控制設備集中的處所亦稱為*消防控制站*。

19 *原油*係指自然呈現於地下的任何油，不論是否為適合運輸而作過處理，並包括可能已經提取或添加某些餾分的原油。

20 *危險貨物*係指本公約第VII/2條中所提及的那些貨物。

21 *載重量*係指船舶在比重為1.025的海水中，相應於所勘劃的夏季載重線的排水量與該船空載重量之差，以噸計。

22 《*消防安全系統規則*》係指本組織海上安全委員會以第MSC.98 (73)號決議通過的《*國際消防安全系統規則*》；此規則可由本組織修正，但此種修正案應根據本公約第VIII條關於適用於本公約附件除第I章外的修正程序的規定予以通過、生效和實施。

23 《*耐火試驗程序規則*》係指本組織海上安全委員會以第MSC.61 (67)號決議通過的《*國際耐火試驗程序應用規則*》；此規則可由本組織修正，但此種修正案應根據本公約第VIII條關於適用於本公約附件除第I章外的修正程序的規定予以通過、生效和實施。

24 *閃點*係指某產品放出足以被引燃的可燃蒸氣時的溫度(閉杯試驗)，以攝氏度計，由認可的閃點儀測得。

25 *氣體運輸船*係指建造或改建並用於散裝運輸第VII/11.1條中所定義的《*國際氣體運輸船規則*》第19章所列的任何液化氣體或其他易燃性物質的貨船。

26 *直升飛機甲板*係指船上專門建造的直升飛機降落區域，包括所有結構物、滅火設備和直升飛機安全操作所必需的其他設備。

27 *直升飛機設施*係指包括任何加油和機庫設施的直升飛機甲板。

28 *空載重量*係指船舶在艙內沒有貨物、燃油、潤滑油、壓載水、淡水和飲用水，無消耗物料，並且無乘客、船員及其行李物品時的排水量，以噸計。

29 *低播焰性*係指所述表面能有效地限制火焰的蔓延，按《耐火試驗程序規則》確定。

30 *機器處所*係指A類機器處所和裝有推進機械、鍋爐、燃油裝置、蒸汽機和內燃機、發電機和主要電動機、加油站、冷藏機、防搖裝置、通風機和空調機的其他處所，以及類似處所，連同通往此類處所的圍壁通道。

31 *A類機器處所*係指裝有下列設備的處所和通往此類處所的圍壁通道：

- .1 用作主推進的內燃機；
- .2 用作非主推進的合計總輸出功率不小於375 kW的內燃機；或
- .3 任何燒油的鍋爐和燃油裝置，或鍋爐以外的任何燒油的設備，如惰性氣體發生器、焚燒爐等。

32 *主豎區*係指船體、上層建築和甲板室由“A”級分隔分成的區段，其在任何一層甲板上的平均長度和寬度一般不超過40 m。

33 *不燃材料*係指加熱至約750°C時，既不燃燒，也不產生足量的造成自燃的易燃蒸氣的某種材料，按《耐火程序試驗規則》確定。

34 燃油裝置係指準備為燒油的鍋爐輸送燃油或準備為內燃機輸送加熱燃油的設備，並包括用於在超過 0.18 N/mm^2 的壓力下處理油類的任何壓力油泵、過濾器 and 加熱器。

35 開式滾裝處所係指兩端開口或一端開口的滾裝處所，該處所通過分佈在側壁或天花板或上部的固定開口，具有遍及整個長度的充分有效的自然通風；固定開口的總面積至少為處所側面總面積的10%。

36 開式車輛處所係指兩端開口或一端開口的車輛處所，該處所通過分佈在側壁或天花板或上部的固定開口，具有遍及整個長度的充分有效的自然通風。固定開口的總面積至少為處所側面總面積的10%。

37 客船係指第I/2 (f) 條中定義的船舶。

38 規定要求係指B、C、D、E或G部分規定的構造特性、限制尺度或消防安全系統。

39 公共處所係指起居處所中用作大廳、餐室、休息室以及類似的固定圍壁處所。

40 裝有限制失火危險的家具和設備的房間，就第9條而言，係指裝有限制失火危險的家具和設備的房間（無論住室、公共處所、辦公室或其他類型的起居處所），在這些房間內：

- .1 框架式家具，如書桌、衣櫥、梳妝檯、書櫃、餐具櫃，除其使用表面可採用不超過2 mm的可燃鑲片外，完全由認可的不燃材料製成；
- .2 可移動的家具，如椅子、沙發、桌子，框架由不燃材料製成；

- .3 帷幔、簾幕以及其他懸掛的紡織品材料，阻止火焰蔓延的性能均不次於質量為 0.8 kg/m^2 的毛織品，按《耐火試驗程序規則》確定；
- .4 地板覆蓋物具有低播焰性；
- .5 艙壁、襯板及天花板的外露表面均具有低播焰性；
- .6 安裝墊套的家具具有阻止着火和火焰蔓延的性能，按《耐火試驗程序規則》確定；
- .7 床具有阻止着火和火焰蔓延的性能，按《耐火試驗程序規則》確定。

41 滾裝處所係指未以任何方法正常分隔並通常延伸至船舶的大部分長度或整個長度的處所，這些處所通常能在水平方向上裝載或卸載油箱內裝有自身驅動所用燃油的機動車輛和/或貨物（包裝或散裝；在公路或鐵路車廂、車輛（包括公路或鐵路槽罐車）、拖車、集裝箱、貨盤、可拆廂櫃之內或之上；或在類似裝載單元或其他容器之內或之上）。

42 滾裝客船係指帶有滾裝處所或特種處所的客船。

43 鋼或其他等效材料係指因其本身或由於所裝隔熱物，經過標準耐火試驗的相應曝火時間後，結構性和完整性與鋼等效的任何不燃材料（例如裝有適當隔熱材料的鋁合金）。

44 桑拿房係指一溫度通常在 80°C - 120°C 之間的熱房間，其熱量係由一種熱表面提供（如電熱爐）。此類熱房間可能還包括加熱爐和臨近的浴房所處的處所。

45 服務處所係指用作廚房、設有烹調設備的配膳室、儲物間、郵件艙和貴重物品室、儲藏室、不屬於機器處所組成部分的工作間，以及類似處所和通往此類處所的圍壁通道。

46 特種處所係指在艙壁甲板以上或以下的圍蔽車輛處所。此類處所車輛能夠駛進駛出，並有乘客進出通道。只要總體上車輛的總淨空不超過10 m，特種處所可以位於超過一層甲板上。

47 標準耐火試驗係指將有關艙壁或甲板的樣品置於試驗爐內，根據《耐火試驗程序規則》規定的試驗方法加溫到大致相應於標準“時間—溫度”曲線的一種試驗。

48 液貨船係指第I/2（h）條中定義的船舶。

49 車輛處所係指準備用於裝載油箱內裝有自身驅動所用燃料的機動車的貨物處所。

50 露天甲板係指上方和至少兩個側面完全暴露於露天的甲板。

B部分—防止失火和爆炸

第4條

引燃的可能性

1 目的

本條旨在防止可燃材料或易燃液體的引燃。為此目的，應達到下列功能要求：

- .1 應提供控制易燃液體滲漏的裝置；
- .2 應提供限制易燃蒸氣聚集的裝置；
- .3 應限制可燃物質的引燃性；
- .4 應限制着火源；
- .5 應將着火源與可燃材料和易燃液體隔離開；和
- .6 應將貨艙內的空氣維持在不發生爆炸的範圍內。

2 燃油、潤滑油和其他易燃油類的佈置

2.1 燃油的使用限制

燃油的使用應受到下列限制：

- .1 除本款另有許可外，不得使用閃點低於60°C的燃油；
- .2 應急發電機可使用閃點不低於43°C的燃油；
- .3 若符合下述條件，可以使用閃點低於60°C但不低於43°C的燃油（例如為應急消防泵發動機和位於A類機器處所以外的輔機供油）：
 - .3.1 除佈置在雙層底艙內者外，其他燃油艙應位於A類機器處所以外；
 - .3.2 在燃油泵的吸油管上應設有油溫測量裝置；
 - .3.3 燃油濾淨器的進口側和出口側均設有關閉閥和/或旋塞；和
 - .3.4 儘可能使用焊接結構或圓錐型管接頭或球型管接頭；和
- .4 在貨船上，可准許使用閃點低於第2.1款規定的燃油，例如原油，條件是此種燃油不儲藏在任何機器處所，並且整套裝

置須經主管機關認可。

2.2 燃油的佈置

使用燃油的船舶，其燃油儲藏、輸送和使用的佈置應能保證船舶和船上人員的安全，並應至少符合下述規定。

2.2.1 燃油系統的位置

在燃油系統中凡含有壓力超過 0.18 N/mm^2 的加熱燃油的任何部件，應儘實際可能不佈置在隱蔽處所，以免難於察覺其缺陷和滲漏。置有燃油系統此種部件的機器處所應有充分的照明。

2.2.2 機器處所的通風

在正常情況下，機器處所應有充分的通風，以防止油氣聚集。

2.2.3 燃油艙櫃

2.2.3.1 不得在艙尖艙內裝載燃油、潤滑油和其他易燃油類。

2.2.3.2 燃油艙櫃應儘可能是船體結構的一部分，並位於A類機器處所之外。除雙層底艙外，如果其他燃油艙櫃必須鄰近或位於A類機器處所內，其垂直面中應至少有一面與該機器處所的限界面相鄰接，並最好與雙層底艙具有同一限界面，且燃油艙櫃與機器處所的共同限界面的面積應減至最小。若此種燃油艙櫃位於A類機器處所的限界面之內，則其中不得儲存閃點低於 60°C 的燃油，一般應避免使用獨立式的燃油櫃。但如果使用此種油櫃，應禁止在客船上的A類機器處所使用。在准許使用時，該油櫃應置於尺寸足夠大的油密溢油盤內，溢油盤設有通向適當尺寸溢油櫃的排泄管。

2.2.3.3 燃油艙櫃不得設在從燃油艙櫃溢出或滲漏的燃油能落於

熱表面而構成失火或爆炸危險的地方。

2.2.3.4 在損壞後會使燃油從設置在雙層底頂上的容積為500 l及以上的儲存櫃、沉澱櫃和日用櫃溢出的燃油管上，應裝有直接位於這些油櫃的旋塞或閘，一旦油櫃所在處所失火，能在有關處所以外的安全位置將其關閉。在深油艙位於軸隧、管隧或類似處所內的特殊情況下，應在這些深油艙上裝設閘門，但在失火時，可由在這種處所以外的管路上加裝的閘進行控制。如果加裝的閘位於機器處所以內，它應能夠在機器處所以外的安全位置加以操縱。應急發動機燃油艙的閘門遙控操作控制的位置應與位於機器處所的油櫃上的其他閘門的遙控操作控制的位置分隔開。

2.2.3.5 應設置確定任何燃油艙櫃內的存油量的安全有效措施。

2.2.3.5.1 如使用測量管，它們不得終止於測量管的溢油有被引燃危險的任何處所；尤其不得終止於乘客或船員處所。作為一般規則，它們不應終止於機器處所。然而，如主管機關認為後者的要求不可行，則可准許測量管終止於機器處所，但應符合下面的所有要求：

- .1 安裝了符合第2.2.3.5.2款要求的油位計；
- .2 測量管終止於遠離着火危險的位置，除非採取預防措施，例如安裝有效的防火罩，以防止從測量管終端溢出的油與着火源相接觸；和
- .3 測量管終端裝有自閉式關斷裝置並在其下面裝有一個小直徑的自閉式控制塞，用以確定該關斷裝置打開前沒有燃油存在。應採取措施確保從控制塞溢出的油沒有着火危險。

2.2.3.5.2 如符合下述條件，可使用其他的油位計代替測量管：

- .1 在客船上，不應要求此類油位計貫穿到艙櫃頂部以下，並在其損壞或艙櫃注油過量時不得允許有燃油溢出；和
- .2 在貨船上，此類油位計損壞或艙櫃注油過量時不得允許有燃油溢到處所內。禁止使用圓柱形玻璃油位計。主管機關可允許使用裝有偏形玻璃油位計並在油位計和油櫃之間設置自閉閥。

2.2.3.5.3 第2.2.3.5.2款所述的主管機關可以接受的裝置應維護至正常狀態，以確保它們在使用中的持續精確功能。

2.2.4 防止超壓

在任何油艙櫃或燃油系統的任何部分，包括由船上油泵供油的注入管在內，應設有防止超壓的設施。空氣管和溢流管以及安全閥應排向沒有由於油和蒸氣的存在而導致失火或爆炸危險的位置，並且不得排向船員處所和乘客處所，也不得排向特種處所、閉式滾裝貨物處所、機器處所或類似處所。

2.2.5 燃油管路

2.2.5.1 燃油管及其閥件和附件應用鋼材或其他認可的材料製造，但在主管機關認為必要的地方，可允許有限制地使用撓性管。這種撓性管及其端部附件應用具有足夠強度的耐火材料製成，且其構造應使主管機關滿意。對於安裝在燃油艙櫃上和承受靜壓力的閥件，可以允許用鋼材或球墨鑄鐵製成。但是，如果設計壓力低於7巴，且設計溫度低於60°C，在管系中也可使用普通鑄鐵閥。

2.2.5.2 高壓燃油泵與燃油噴射器之間的外部高壓燃油輸送管道應使用能容納因高壓管道的故障而漏出的燃油的套管系統加以保

護。這種套管包括內裝高壓燃油管的外管，為永久性組合。套管系統應包括收集漏油的裝置，並設置在燃油管故障時發出警報的裝置。

2.2.5.3 燃油管線不得位於緊靠高溫裝置的上方和附近；這些裝置包括鍋爐、蒸汽管線、尾氣總管、消音器或第2.2.6款要求加以隔熱的其他設備。應儘實際可能使燃油管線的佈置遠離熱表面、電氣裝置或其他着火源，並應設置防火網或進行其他適當保護，以避免燃油噴濺或滲漏到着火源上。應最大限度地減少這種管系的接頭數目。

2.2.5.4 柴油機燃油系統組件的設計應考慮到工作時將出現的最高峰值壓力，包括由燃油噴射泵產生並傳遞回供油和溢油管線的任何高壓脈衝。供油和溢油管線內部在製作上的結構應考慮到其在工作時和維修後防止帶有壓力的燃油的滲漏能力。

2.2.5.5 在使用同一供油來源的多個發動機裝置中，應提供隔離每個發動機供油和溢油管線的措施。隔離措施不得影響其他發動機工作，並應能夠在不曾因任何發動機失火而無法靠近的位置進行操作。

2.2.5.6 如果主管機關允許油或可燃液體穿過起居處所和服務處所輸送，油或可燃液體輸送管應為主管機關在考慮到失火危險的情況時認可的材料。

2.2.6 高溫表面的保護

2.2.6.1 因燃油系統故障而可能接觸到的溫度超過220°C的表面應進行適當的隔熱。

2.2.6.2 應採取預防措施防止在壓力作用下可能從任何油泵、過濾器或加熱器逸出的任何油類接觸熱表面。

2.3 潤滑油的佈置

2.3.1 壓力潤滑系統的滑油的儲藏、輸送和使用應佈置成能保證船舶和船上人員的安全。在A類機器處所以及凡可能時在其他機器處所內所作的佈置，應至少符合第2.2.1、2.2.3.3、2.2.3.4、2.2.3.5、2.2.4、2.2.5.1、2.2.5.3和2.2.6款的規定，但是：

- .1 不排除在潤滑油系統中使用窺流鏡，只要它們經試驗表明具有適當的耐火等級；和
- .2 在機器處所內可准許使用測量管；然而，如果測量管裝有適當的關閉裝置，則可不必符合第2.2.3.5.1.1和2.2.3.5.1.3款的要求。

2.3.2 第2.2.3.4款的規定還應適用於潤滑油艙櫃，除非艙櫃的容積小於500升、艙櫃上的閥在船舶的正常操作狀態下處於關閉或確認潤滑油艙櫃上的快速關閉閥的意外操作會危及主推進器和必要輔機安全工作。

2.4 其他易燃油類的佈置

在壓力下用於動力傳動系統、控制和驅動系統以及加熱系統中的其他易燃油類，其儲存、輸送和使用應佈置成能保證船舶和船上人員的安全。在液壓閥和汽缸下應佈置適當的漏油收集裝置。在裝有點火裝置的位置，此種佈置應至少符合第2.2.3.3、2.2.3.5、2.2.5.3和2.2.6款的規定，並且在強度和構造方面符合第2.2.4和2.2.5.1款的規定。

2.5 周期性無人值班處所中的燃油佈置

周期性無人值班處所中的燃油和潤滑油系統除應符合第2.1至2.4款的要求外，還應符合下列規定：

- .1 如日用櫃燃油以自動或遙控方式注油，則應有防止溢油的裝置。其他自動處理易燃液體的設備（如燃油淨油機），凡可行時，應安裝在專供淨油機及其加熱器使用的特殊處所內，並應有防止溢油的設備；和
- .2 如日用燃油櫃或燃油沉澱艙櫃裝有加熱裝置，且可能超過燃油的閃點，則應設置高溫警報器。

3 生活用氣體燃料的佈置

生活用氣體燃料系統應經主管機關認可。氣瓶應存放於開敞甲板或只向開敞甲板開口的通風良好的處所。

4 關於着火源和引燃性的雜項規定

4.1 電暖器

如果使用電暖器，應予固定安裝，其構造應能最大程度地減少失火危險。不得使用裝有電熱元件暴露成能使衣服、帷幔或其他類似物件因其熱度而被烤焦或失火的電暖器。

4.2 廢物箱

所有廢物箱應由四周和底部無開口的不燃材料製成。

4.3 防止油類滲透的隔熱表面

在油類產品可能滲透的處所，隔熱表面應阻止油類或油氣的滲透。

4.4 甲板基層敷料

如果在起居處所、服務處所和控制站內使用甲板基層敷料，應採用不易引燃的認可材料，按《耐火試驗程序規則》確定。

5 液貨船的裝貨區域

5.1 貨油艙的分隔

5.1.1 貨油泵艙、貨油艙、污油艙和隔離空艙應位於機器處所的前方。但燃油艙不必位於機器處所的前方。貨油艙和污油艙應通過隔離空艙、貨油泵艙、燃油艙和壓載艙與機器處所隔離開。裝有壓載相鄰於貨油艙和污油艙的處所使用的泵及其屬件的泵艙和裝有燃油駁運泵的泵艙，均應被視為等效於本條規定的貨油泵艙，但此種泵艙所具有的安全標準應與對貨油泵艙要求的安全標準相同。然而，只用於壓載或燃油駁運的泵艙不必符合第10.9條的要求。泵艙的下部可以凹入A類機器處所，以便放置泵，條件是凹入部分的頂板高度一般不超過龍骨以上型深的1/3，但不超過25,000載重噸的船舶除外；在這種船上，如能證明由於通道和妥善佈置管系的原因，要求上述深度不切實際，則主管機關可准許凹入部分超過上述高度，但不得超過龍骨以上型深的一半。

5.1.2 貨油主控制站、控制站、起居處所和服務處所（不包括獨立的起貨設備儲藏室）應位於貨油艙、污油艙以及那些使貨油艙或污油艙與機器處所隔離的處所的後方，但不必位於燃油艙或壓載艙的後方，並應佈置成任何甲板或艙壁的單個破損都不會導致從貨油艙產生的氣體或煙霧進入貨油主控制站、控制站、起居處所和服務處所。在確定這些處所的位置時，不必考慮按第5.1.1款提供的凹入部分。

5.1.3 如認為必要時，主管機關可准許貨油主控制站、控制站、起居處所和服務處所位於貨油艙、污油艙以及那些使貨油艙或污油艙與機器處所隔離的處所的前方，但不必位於燃油艙或壓載艙的前方。除A類機器處所以外的其他機器處所，可准許位於貨油艙的前方，只要

它們係通過隔離空艙、貨泵艙、燃料油艙或壓載艙與貨油艙和污油艙相隔離，且至少配備一個手提式滅火器。如果這些地方裝有內燃機，則除手提式滅火器外，還應佈置容量至少為45 l的經認可的泡沫式滅火器或等效滅火設備。如果半可攜式滅火機的操作不切實際，則可以另外兩台手提滅火機代替。貨油主控制站、控制站、起居處所和服務處所應佈置成，任何甲板或艙壁的單個破損都不會導致從貨油艙產生的氣體或煙霧進入這些處所。此外，如果認為係船舶的安全或航行所必需，主管機關可准許裝有功率大於375 kW的不作為主推動機械的內燃機的機器處所位於貨物區域的前方，但其佈置應符合本款的規定。

5.1.4 對於混裝船：

- .1 污油艙應以隔離空艙圍隔，但如限界面為船體、主貨物甲板、貨泵艙艙壁或燃油艙一部分的污油艙除外。這些隔離空艙不得設有通向雙層底、管隧、泵艙或其他封閉處所的開口，並且不得用於裝載貨物或壓載，也不得與貨油或壓載水管系相連接。應設置向隔離空艙灌水或排水的裝置。如污油艙的限界面為貨油泵艙艙壁的一部分，該泵艙不得設有通向雙層底、管隧或其他封閉處所的開口，但可以允許設有氣密螺栓蓋的開口；
- .2 應設置隔斷連接泵艙和第5.1.4.1款所述污油艙管系的裝置，該隔斷裝置應包括一個閥門，閥門後裝有一個雙環法蘭或一個具有適當盲板法蘭的捲筒。此種佈置應鄰接污油艙，但如果這種佈置不合理或不可行，也可以設置在泵艙內直接位於穿過艙壁的管路之後。應設置包括一個帶有關閉閥和盲板法蘭的總管的獨立並固定安裝的泵系和管系裝置，以便在

船舶從事乾貨運輸時，將污油艙內的污油水直接送往開敞甲板，以排放到岸上接收設施中去。當駁運系統在運載乾貨時被用於輸送污油水，該系統不得與其他系統相連接。可以接受通過拆除捲筒的方式與其他系統相分離；

- .3 污油艙的艙口和艙櫃清洗開口應只允許設在開敞甲板上，並應設置關閉佈置。這些關閉裝置應設置鎖閉裝置，並由負責的高級船員控制，但如果開口為以螺栓固定的板且螺栓間隔為水密距離則除外；和
- .4 如果設有邊貨艙，甲板下的貨油管系應設在這些邊艙內。但主管機關可允許貨油管系設在主管機關滿意的能充分清洗和通風的專門導管內。如未設邊貨艙，則甲板下的貨油管系應設在專門導管內。

5.1.5 如果證明有必要將駕駛室佈置在貨油艙區域以上，則此處所只能用於駕駛的目的，並且應用高度至少2 m的開敞空間使之與貨油艙甲板隔開。這種駕駛室的防火還應符合第9.2.4.2款對控制站的要求以及適用於液貨船的其他規定。

5.1.6 應提供使甲板上的溢油遠離起居和服務區域的措施。為此，可以通過安裝高度至少300 mm並延伸至兩舷的連續固定擋板來實現。對於與尾部裝油有關的佈置應給予特別考慮。

5.2 限界面開口的限制

5.2.1 除第5.2.2款准許的情況以外，通往起居處所、服務處所、控制站和機器處所的出入門、空氣進口和開口，均不得面向貨物區域。它們應位於不面向貨物區域的橫艙壁上，或位於上層建築或甲板

室外側，距離上層建築或甲板室面向貨物區域的端壁至少為船舶長度的4%，但不少於3 m。此距離不必超過5 m。

5.2.2 主管機關可准許在面向貨物區域的限界艙壁，或在第5.2.1款中規定的5 m範圍內設置通向貨物主控制站和諸如食品間、儲藏室及物料間這類服務處所的出入門，但是這些出入門不得直接或間接通往包括有或用於起居處所、控制站或諸如廚房、配膳室或工作間的服務處所，或含有蒸氣着火源的類似處所。這些處所的限界面應隔熱至“A-60”級標準，但面向貨物區域的限界面除外。在第5.2.1款規定的限制範圍之內可設置用於拆移機器的由螺栓緊固的板。駕駛室的門窗可以位於第5.2.1款所規定的限制範圍內，只要它們在設計上能保證駕駛室迅速而有效地達到氣密和蒸氣密。

5.2.3 面向貨物區域和在第5.2.1款規定的限制範圍內的上層建築和甲板室側壁上的窗及舷窗應為永閉（不能開啓）型。這種窗和舷窗，駕駛室的窗除外，應按“A-60”標準建造。

5.2.4 如果從管隧到主泵艙有永久性通道，應安裝符合第II-1/25-9.2條要求的水密門，此外，還應符合下列規定：

- .1 除能從駕駛室操作外，該水密門還應能從主泵艙入口外側手動關閉；和
- .2 在船舶正常操作期間，水密門應保持關閉，只有在需要進入管隧時才打開。

5.2.5 可以准許在分隔液貨泵艙和其他處所的艙壁和甲板上安裝認可的、用於液貨泵艙照明的永固式氣密照明燈圍罩，但它們應具有適當強度並能保持艙壁或甲板的完整性和氣密性。

5.2.6 通風入口和出口以及甲板室和上層建築邊界處所上的其他開口，其佈置應與第5.3和11.6款的規定相符。此種通風，尤其是機器處所的通風，應儘可能位於後部。對於尾部設有裝卸設備的船舶應予以適當考慮。諸如電器設備之類的着火源，其佈置應避免造成爆炸危險。

5.3 液貨艙透氣

5.3.1 一般要求

液貨艙的透氣系統應與船舶其他艙室的空氣管道完全隔開，凡液貨艙甲板上能散發出可燃氣體的開口，其佈置和部位應使可燃氣體進入含有着火源的圍蔽處所或聚集在可能構成着火危險的甲板機械和設備附近的可能性減至最小程度。按照這一總的原則，應符合第5.3.2至5.3.5款和第11.6條的標準。

5.3.2 透氣佈置

5.3.2.1 每一液貨艙的透氣裝置可以是獨立的，或者同其他液貨艙連在一起，還可以納入惰性氣體管系之中。

5.3.2.2 如果其佈置是與其他液貨艙連在一起的，則應裝有截止閥或其他可接受的裝置，以隔絕每一液貨艙。若安裝的是截止閥，應為其配備鎖閉裝置，由負責的高級船員控制。截止閥或其他可接受的裝置的工作情況應有清楚的可視指示。如果液貨艙已被隔離，應保證在這些液貨艙開始裝卸貨或壓載操作之前，有關隔離閥已經開啟。任何隔離措施都必須按照第11.6.1.1條的規定使由於液貨艙內溫度變化所產生的氣體等能繼續流通。

5.3.2.3 如果已被同公共透氣系統隔離的某一或某組液貨艙準備

進行裝卸貨或壓載，該液貨艙或該組液貨艙應按第11.6.3.2條的要求裝有超壓或負壓保護裝置。

5.3.2.4 透氣裝置應接至每一液貨艙的頂部，並在船舶處於縱傾或橫傾的所有正常情況下，能自行把液體排泄到液貨艙。如果不能裝設自行排泄管路，則應裝設永久性裝置，以將透氣管道中的液體排泄至液貨艙中。

5.3.3 透氣系統的安全裝置

透氣系統應設置防止火焰進入液貨艙的裝置。這些裝置的設計、試驗和安裝位置應符合主管機關根據本組織通過的指南所確定的各項要求。液面測量孔不得用於平衡壓力的目的。液面壓力測量孔應裝有自行關閉並密封的蓋。在這些開口上不允許設置阻焰器和隔屏。

5.3.4 液貨裝卸和壓載的透氣出口

5.3.4.1 第11.6.1.2條所要求的用於液貨裝卸和壓載操作的透氣出口應：

- .1.1 允許氣體混合物自由流通；或
- .1.2 使排泄氣體混合物的節流速度達到不小於30 m/s的速度；
- .2 其佈置應使氣體混合物垂直向上排出；
- .3 如採用氣體混合物自由排出的方式時，其出口應佈置在液貨艙甲板以上不少於6 m，或者，如果出口位於步橋4 m以內，則應在前後步橋以上不少於6 m，且應離開含有着火源的圍蔽處所的最近進氣口和開口以及可能構成着火危險的甲板機械（可能包括起錨機和錨鏈艙開口）和設備，其水平距離

不少於10 m；和

- .4 如採用高速排氣的方式時，則排氣出口應佈置在液貨艙甲板以上不少於2 m，且應離開含有着火源的圍蔽處所的最近進氣口和開口以及可能構成着火危險的甲板機械（可能包括起錨機和錨鏈艙開口）和設備，其水平距離不少於10 m。這些出口應設有認可型的高速裝置。

5.3.4.2 在裝載和壓載期間從液貨艙排出氣體的透氣佈置應符合第5.3款和第11.6條的規定，並應包括一個或多個桅桿透氣管或多個高速排氣口。惰性氣體總管可以用於這種排氣。

5.3.5 混裝船污油艙的隔離

對於混裝船，用於將含有油或殘油的污油艙與其他液貨艙隔離的裝置應由盲板法蘭組成，當載運第1.6.1條所述液體貨物以外的貨物時，這些法蘭應一直保持在原位。

5.4 通風

5.4.1 液貨泵艙內的通風系統

液貨泵艙應採用機械通風，從通風機排出的氣體應引至開敞甲板上的安全地點。這些艙室的通風能力應足以最大限度地降低可燃蒸氣聚集的可能性。換氣次數應根據該處所的總容積而定，至少為每小時20次。空氣管道的佈置應使該處所的所有空間均能得到有效通風。通風應為抽吸式，使用無火星型風機。

5.4.2 混裝船上的通風系統

對於混裝船，載貨處所及與其相鄰的任何圍蔽處所應能進行機械

通風。這種通風可用便攜式風機進行。在液貨泵艙、管道以及第5.1.4款所述的鄰接於污油艙的隔離空艙內，應設有認可的能監測可燃氣體的固定式氣體報警系統。還應有適當的裝置，以便測量液貨艙區域內所有其他處所的可燃蒸氣。這些測量應儘可能在開敞甲板上或易於到達的位置上進行。

5.5 惰性氣體系統

5.5.1 使用範圍

5.5.1.1 對於載重量為20,000噸及以上的液貨船，其液貨艙的保護應通過一個符合《消防安全系統規則》要求的固定式惰性氣體系統來獲得；但主管機關在考慮到船舶的佈置和設備後，可同意用根據第I/5條能提供等效保護的其他固定式裝置來代替上述裝置。該替代固定式裝置應符合第5.5.4款的要求。

5.5.1.2 在貨艙清洗工序中使用原油進行清洗的油船應裝有符合《消防安全系統規則》要求的惰性氣體系統和固定式洗艙機。

5.5.1.3 要求裝設惰性氣體系統的油船應符合下列規定：

- .1 雙層殼處所應裝有供應惰性氣體的適當的連接管；
- .2 如果雙層殼處所被接至一個永久性安裝的惰性氣體分配系統上，應採取措施防止碳氫氣體通過該系統從貨油艙進入雙層殼處所；和
- .3 如果這些處所沒有被接至一個永久性安裝的惰性氣體分配系統上，則應採取適當措施允許其與惰性氣體總管相連接。

5.5.2 化學品液貨船和氣體運輸船的惰性氣體系統

《消防安全系統規則》中關於惰性氣體系統的要求不必適用於：

- .1 載運第1.6.1條所述貨物的化學品液貨船和氣體運輸船，只要其符合主管機關根據本組織制定的指南所規定的化學品液貨船惰性氣體系統的要求；或
- .2 載運原油和石油產品以外的易燃貨物，如《國際散化規則》第17和18章中所列貨物的化學品液貨船和氣體運輸船，只要這種船舶的載貨容積不超過3,000 m³，洗艙機單個水槍的能力不超過每小時17.5 m³，且所用的幾個洗艙機在任一時刻的總噴出量不超過每小時110 m³。

5.5.3 惰性氣體系統的一般要求

5.5.3.1 惰性氣體系統應能夠對空艙進行惰化、驅氣和除氣，並將貨艙內的空氣維持所要求的氧氣含量。

5.5.3.2 第5.5.3.1款所述的惰性氣體系統應根據《防火系統安全規則》設計、建造和測試。

5.5.3.3 裝有固定式惰性氣體系統的液貨船應裝設封閉式的液位測量系統。

5.5.4 對等效系統的要求

5.5.4.1 如果裝有等效於固定式惰性氣體系統的裝置，該裝置應：

- .1 在整個正常壓載航行的全航程中以及必要在艙內作業中，能防止爆炸性混合物在完整的液貨艙內產生危險的積聚；
- .2 設計成使該系統因本身產生靜電而着火的危險性減至最小。

5.6 惰化、驅氣和除氣

5.6.1 驅氣和/或除氣系統應能使由於空氣中可燃氣體的散佈和液貨艙內可燃混合氣體造成的危險減至最低程度。

5.6.2 液貨艙的驅氣和/或除氣程序應根據第16.3.2條來進行。

5.6.3 第5.5.3.1款所要求的空液貨艙的惰化、驅氣或除氣裝置應使主管機關滿意，並應使碳氫化合物氣體在液貨艙內部構件所形成的囊中的積聚減至最小程度，並且：

- .1 如果在單個液貨艙內安裝了排氣管，該排氣管的位置應儘可能遠離惰性氣體/空氣的進口，並符合第5.3款和第11.6條的規定。這種排氣管的進口可以位於與甲板相平的高度或位於液貨艙底以上不超過1 m處；
- .2 第5.6.3.1款所述排氣管之橫截面面積應為：當同時向任何三個貨油艙供給惰性氣體時，排氣速度至少可保持為20 m/s。其出口應伸出甲板以上至少2 m；和
- .3 第5.6.3.2款所述的每一排氣口應裝有適當的盲斷裝置。

5.7 氣體測量

5.7.1 便攜式設備儀錶

液貨船應至少配備一台用於測量易燃氣體濃度的便攜式儀錶及充足的備件。應為這種儀錶提供適當的校準工具。

5.7.2 測量雙層殼和雙層底處所內氣體的設備

5.7.2.1 應配備適當的便攜式氧氣和易燃氣體濃度測量儀錶。在選

擇這些儀錶時，應適當注意其與第5.7.2.2款中提到的固定式氣體取樣管路系統的配合使用。

5.7.2.2 如果使用撓性氣體取樣軟管不能可靠地測量雙層殼處所的氣體時，此類處所應安裝固定式氣體取樣管路。取樣管路的走向應與此類處所的設計相適應。

5.7.2.3 氣體取樣管路的製造材料和尺寸應防止在管內發生節流。如使用塑料材料，則其應具有導電性。

5.8 雙層殼和雙層底處所的空氣補給

雙層殼和雙層底處所應裝有提供空氣的適當接管。

5.9 液貨區域的保護

在總管區域的管道和軟管接頭部位應設置收集液貨管路和軟管中液貨殘餘物的滴盤。液貨軟管和洗艙軟管包括接箍和法蘭（與岸連接除外），應在其整個長度上具有導電連續性，並應接地，以消除靜電荷。

5.10 液貨泵艙的保護

5.10.1 在液貨船上：

- .1 裝在液貨泵艙內並由穿過泵艙艙壁的軸驅動的液貨泵、壓載泵和掃艙泵應裝有艙壁軸套、軸承和泵殼的溫度感應裝置。這些溫度感應裝置應能夠持續自動激發貨物控制艙或泵控制艙內的聲光報警信號；
- .2 除應急照明外，液貨泵艙的照明應與通風聯動，使通風應在打開照明時工作。通風系統失靈應不使照明熄滅；

- .3 應安裝一個持續監測碳氫化合物氣體濃度的系統。取樣頭或探頭應設置在適當位置以隨時探測到潛在的危險洩漏。當碳氫化合物氣體的濃度達到一個不高於可燃下限10%的預設水平時，應在泵艙、輪機控制艙、貨物控制艙和駕駛室內自動激發連續的聲光報警信號，以使有關人員警覺潛在的危險；
和
- .4 所有泵艙應安裝艙底水位監測裝置及佈設在適當位置的報警裝置。

第5條

火勢擴大的可能性

1 目的

本條旨在限制船舶各種處所內火勢擴大的可能性。為此，應達到下列功能要求：

- .1 應提供控制處所空氣供給的措施；
- .2 應提供控制處所內易燃液體的措施；和
- .3 當限制可燃材料的使用。

2 控制處所的空氣供給和易燃液體

2.1 通風的關閉和停止裝置

2.1.1 所有通風系統的主要進口和出口都應能夠在被通風處所的

外面予以關閉。關閉裝置應易於到達，具有醒目的永久性標誌，且應指示出關閉裝置是處在開啟位置還是處在關閉位置。

2.1.2 起居處所、服務處所、貨物處所、控制站和機器處所的動力通風，應能從其所服務的處所外面易於到達的位置將其停止。此位置在其服務的處所失火時應不易被切斷。

2.1.3 對於載客超過36人的客船，除機器處所和貨物處所的通風以及根據第8.2條可能要求的任何替代系統外，動力通風應裝有如此分組的控制裝置：所有通風機可在兩個儘可能遠離的任何一個位置停止。服務於貨物處所通風系統的風機應能夠從該種處所外的安全位置予以關閉。

2.2 機器處所的控制裝置

2.2.1 應裝有天窗的開啟和關閉、正常排氣通風的煙囪開口的關閉和通風孔擋火閘的關閉的控制裝置。

2.2.2 應裝有停止通風機的控制裝置。對服務於機器處所的動力通風應設置能從兩個位置分組控制的裝置，其中之一應位於此種處所的外面。機器處所內動力通風的停止裝置，應同其他處所內通風的停止裝置完全分開。

2.2.3 應裝有停止強力通風和抽風機、燃油駁運泵、燃油裝置所用的泵、潤滑油供應泵、加熱油循環泵和油分離器（淨油器）的控制裝置。然而，第2.2.4和2.2.5款的規定不必適用於油水分離器。

2.2.4 第2.2.1至2.2.3款和第4.2.2.3.4條要求的控制裝置應位於各有關處所的外面，以便其不會在所服務的處所失火時被切斷。

2.2.5 對於客船，第2.2.1至2.2.4款和第8.3.3和9.5.2.3條所要求的

控制裝置以及任何所要求的滅火系統的控制裝置應位於一個控制點或集中在主管機關滿意的儘可能少的地點。這些地點應能從開敞甲板安全進出。

2.3 對周期性無人值班機器處所控制裝置的額外要求

2.3.1 對於周期無人值班的機器處所，主管機關應對保持機器處所的耐火完整性、滅火系統控制的位置和集中性、所要求的關閉裝置（例如通風、燃油泵等）以及可能要求的附加滅火設施和其他消防設備以及呼吸器等，予以特別考慮。

2.3.2 在客船上，這些要求應至少等效於對通常有人值班的機器處所的要求。

3 防火材料

3.1 不燃材料的使用

3.1.1 隔熱材料

除在貨物處所、郵件艙、行李室或服務處所的冷藏室外，隔熱材料應為不燃材料。與隔熱物一起使用的防潮層和黏合劑，以及冷卻系統管系裝置的隔熱物，不必為不燃材料，但應保持在實際可行的最低數量，並且它們的外露表面應具有低播焰性。

3.1.2 天花板和襯板

3.1.2.1 在客船上，除了在貨物處所、郵件艙、行李室、桑拿房或服務處所的冷藏室外，所有襯板、襯檔、風檔和天花板均應為不燃材料。為了實用或藝術處理而用作某一處所內部分隔的局部艙壁或甲板也應為不燃材料。

3.1.2.2 在貨船上，在下列處所內的所有襯板、天花板、風檔和它

們的附屬襯檔均應為不燃材料：

- .1 在第9.2.3.1條中所提及的採用IC法的船上起居處所、服務處所和控制站內；和
- .2 在第9.2.3.1條中所提及的採用IIC法和IIIC法的船上供起居處所、服務處所和控制站使用的走廊和梯道環圍內。

3.2 可燃材料的使用

3.2.1 通則

3.2.1.1 在客船上，起居處所和服務處所內表面加裝可燃材料、貼面、嵌條、裝飾物及鑲片的“A”、“B”或“C”級分隔應符合第3.2.2至3.2.4款和第6條的規定。但是，在桑拿房內允許採用傳統的木製長凳以及艙壁和天花板上的木襯板，且這些材料不必受到第3.2.2和3.2.3款中所規定的計算限制。

3.2.1.2 在貨船上，起居處所和服務處所內安裝的不燃性艙壁、天花板和襯板的表面可加裝可燃材料貼面、嵌條、裝飾物及鑲片，但這些處所應由符合第3.2.2至3.2.4款和第6條規定的不燃艙壁、天花板和襯板為限界。

3.2.2 可燃材料的最大發熱值

第3.2.1款所規定的用於表面和襯板的可燃材料，按所用厚度的面積所具有的發熱值不得超過45 MJ/m²。本款的要求不適用於固定在襯板或艙壁上的家具表面。

3.2.3 可燃材料的總體積

如果按第3.2.1款的要求使用了可燃材料，它們應符合下列要求：

- .1 起居處所和服務處所內的可燃面板、嵌條、裝飾物及鑲片的總體積，不得超過相當於各圍壁和天花板襯板合計面積上厚2.5 mm鑲片的體積。固定在襯板、艙壁或甲板上的家具不必包括在可燃材料總體積的計算之中；和
- .2 如果船舶裝有符合《消防安全系統規則》規定的自動噴水器系統，則上述體積可包含一些用於構建“C”級分隔的可燃材料。

3.2.4 外露表面的低播焰性

下列表面應具有符合《耐火試驗程序規則》的低播焰性：

3.2.4.1 對於客船：

- .1 走廊和梯道的環圍以及起居處所、服務處所（桑拿房除外）和控制站的艙壁和天花板襯板的外露表面；和
- .2 起居處所、服務處所和控制站內隱蔽或不能到達之處的表面和地面。

3.2.4.2 對於貨船：

- .1 走廊和梯道的環圍以及起居處所、服務處所（桑拿房除外）和控制站的天花板的外露表面；和
- .2 起居處所、服務處所和控制站內隱蔽或不能到達之處的表面和地面。

3.3 客船梯道環圍內的家具

梯道環圍內的家具應只限於座位。這些座位應予固定，在每一層

甲板的每一個梯道環圍的座位數量不得超過6個，符合根據《耐火試驗程序規則》確定的火災危險限制，且不得阻塞乘客脫險通道。如果座位是固定式的，由不燃材料製成且不阻塞乘客脫險通道，主管機關可允許在梯道環圍內的主接待區增加座位數。在居住處所區域內構成脫險通道的乘客和船員走廊內不准放置家具。除上述規定外，可以允許在梯道環圍內佈置有關條款所要求的由不燃材料製成的存放無害安全設備的櫥櫃。可允許在走廊設置飲水器和冰塊機，但其應為固定式且不影響脫險通道的寬度。此要求還適用於走廊和梯道內的裝飾花木佈置、塑像或其他藝術品，如畫和掛氈等。

第6條

煙氣產生的可能性和毒性

1 目的

本條旨在減少在人們通常工作或生活的處所發生火災時產生的煙氣和生成的毒性物質對生命造成的危害。為此，應限制包括表面塗料在內的可燃材料在火災中釋放出的煙和毒性物質的數量。

2 油漆、清漆和其他表面塗料

外露表面使用的油漆、清漆和其他表面塗料應不致產生過量的煙和毒性物質，按《耐火試驗程序規則》確定。

3 甲板基層敷料

如果在起居處所、服務處所和控制站使用甲板基層敷料，這些甲

板基層敷料應為在高溫下不致產生煙、毒性或爆炸危險的認可材料，按《耐火試驗程序規則》確定。

C部分—消防

第7條

探測和報警

1 目的

本條旨在探測到着火源處的火災，並發出安全脫險和滅火行動的警報。為此，應達到下列功能性要求：

- .1 固定式探火和失火報警系統裝置應適合於處所的性質、火災擴大的可能性和煙氣的可能產生；
- .2 應有效地佈置手動操作呼叫點，以確保通知方式的隨時可用；和
- .3 消防巡邏應提供一種探測和確定火災位置以及向駕駛台和消防人員發出警報的有效裝置。

2 一般要求

- 2.1 應按照本條的規定提供固定式探火和失火報警系統。
- 2.2 本條和本部分所要求的固定式探火和失火報警系統以及取樣

探煙系統應為認可型並符合《消防安全系統規則》。

2.3 如果要求固定式探火和失火報警系統對第5.1款規定的處所以外的處所提供保護，在每一此種處所內至少應安裝一個符合《消防安全系統規則》的探火裝置。

3 初始試驗和定期試驗

3.1 本章有關條款所要求的固定式探火和失火報警系統的功能應在安裝後進行各種通風條件下的試驗。

3.2 固定式探火和失火報警系統的功能應定期進行試驗，並使主管機關滿意；試驗應使用產生按探測器設計要作出反應的適當溫度的熱空氣、或適當濃度或顆粒尺寸的煙或懸浮顆粒、或與早期火災相聯繫的其他現象的設備。

4 機器處所的保護

4.1 安裝

應在下列處所安裝固定式探火和失火警報系統：

- .1 周期性無人值班的機器處所；和
- .2 下列機器處所：
 - .2.1 該處所安裝的自動和遙控系統和設備業經認可，用以代替連續的有人值班。
 - .2.2 該處所內主推進及其附屬機械，包括主電源，裝有不同程度的自動或遙控設施，並在控制室連續有人監測。

4.2 設計

第4.1.1款所要求的固定式探火和失火報警系統的設計和探測器的佈置應為，在上述處所的任何部位和在機器的任何正常工作狀況及可能溫度範圍內所需的通風變化下，能迅速地探出初起的火災。除處所的高度受到限制和特別適宜使用的情況之外，不得允許僅使用感溫探測器的探火系統。探火系統應能在充分多的地點發出聲光報警信號，這兩種信號應不同於非火災報警系統的信號，以保證駕駛室和負責的輪機員聽到和看到該報警信號。當駕駛室無人值班時，應能在負責船員的值班處發出聲響警報。

5 起居和服務處所和控制站的保護

5.1 起居處所的感煙探測器

在起居處所內的所有梯道、走廊和脫險通道內應安裝第5.2、5.3和5.4款規定的感煙探測器。還應考慮在通風管道內安裝專用的感煙探測器。

5.2 對載客超過36人客船的要求

在服務處所、控制站和起居處所，包括起居處所內的走廊、梯道和脫險通道，應安裝和佈置固定式探火和失火報警系統，以探測這些處所的煙霧。客房內的浴室和廚房無需裝設感煙探測器。極少有失火危險或沒有失火危險的處所，如空艙、公共盥洗室、二氧化碳房以及類似處所，不必安裝固定式探火和報警系統。

5.3 對載客不超過36人客船的要求

除基本上沒有失火危險的處所如空艙和衛生處所等以外，在每一獨立分隔區內無論垂直還是水平的所有起居處所和服務處所，以及如果主管機關認為必要，還有控制站，均應普遍安裝下列兩者之一：

- .1 固定式探火和失火報警系統，安裝和佈置成能夠探知此類處所的火災，探測起居處所內的走廊、梯道和脫險通道內的煙；或
- .2 符合《消防安全系統規則》相關要求的認可型式的自動噴水器、探火和失火報警系統，安裝和佈置成能夠保護此類處所；此外，還有固定式探火和失火報警系統，安裝和佈置成能夠探測走廊、梯道和起居處所內脫險通道內的煙。

5.4 客船天井的保護

內含天井的整個主豎區應全部由探煙系統加以保護。

5.5 貨船

貨船的起居處所、服務處所和控制站應按第9.2.3.1條採用的保護方法，由下列固定式探火和失火報警系統和/或自動噴水器、探火和失火報警系統加以保護：

5.5.1 IC法

應安裝和佈置固定式探火和失火報警系統，以能在起居處所內的所有走廊、梯道和脫險通道內提供感煙式探測。

5.5.2 IIC法

應安裝和佈置符合《消防安全系統規則》相關要求的認可型式的自動噴水器、探火和失火報警系統，以能保護起居處所、廚房和其他服務處所，但基本沒有失火危險的處所如空艙、衛生處所等除外。此外，還應安裝和佈置固定式失火和探火報警系統，以能在起居處所內的所有走廊、梯道和脫險通道內提供感煙式探測。

5.5.3 IIIC法

應安裝和佈置固定式探火和失火報警系統，以能探測所有起居處所和服務處所內的火災，在起居處所內的所有走廊、梯道和脫險通道內提供感煙式探測，但基本沒有失火危險的處所如空艙、衛生處所等除外。此外，還應安裝和佈置固定式失火和探火報警系統，以能在起居處所內的所有走廊、梯道和脫險通道內提供感煙式探測。

6 客船上貨物處所的保護

在主管機關認為不易到達的貨物處所應裝設固定式探火和失火報警系統或取樣探煙系統，除非主管機關認為船舶所從事的係短期航行，應用本要求為不合理。

7 手動操作呼叫點

符合《防火系統安全規則》的手動操作呼叫點應遍佈於起居處所、服務處所和控制站。每一出口都應裝有手動操作呼叫點。在每一層甲板的走廊內，手動操作呼叫點的位置應便於到達，且走廊的任何位置距手動操作呼叫點的距離都不超過20 m。

8 客船上的消防巡邏

8.1 消防巡邏

在載客超過36人的客船上應保持有效的巡邏制度，以便迅速探知任何火災的發生。應訓練每一消防巡邏人員熟悉船舶的佈置以及可能要他使用的任何設備的位置和操作方法。

8.2 艙口檢查

天花板和艙壁的構造應為，在不降低其防火效能的情況下，能使

消防巡邏人員探知隱蔽和不易到達之處的煙源，但主管機關認為不致產生火災危險的地方可以除外。

8.3 雙向便攜式無線電話機

應為每個消防巡邏人員配備雙向便攜式無線電話機。

9 客船上失火報警信號系統

9.1 客船在海上或在港口的所有時間內（非運營時除外）的船員配備或設備配置應為，保證負責船員能立即接到任何初始火警。

9.2 固定式探火和失火報警系統的控制屏應根據自動防止故障原理（例如開式探測器回路將引起報警）設計。

9.3 載客超過36人的客船應將第5.2款要求的系統所使用的探火報警裝置集中於一個持續有人值班的中央控制站。此外，遙控關閉防火門和遙控停止風機的控制裝置也應集中於上述處所。風機應能由船員在連續有人值班的控制站重新啟動。中央控制站的控制屏應能夠顯示防火門處於開啟或關閉狀態和探測器、報警器和風扇處於接通或斷開狀態。控制屏應為連續供電，並在正常供電電路一旦失電時自動切換到備用供電電路。除非有相應的規定允許其他佈置，控制屏應由主電源或第II-1/42條規定的應急電源供電。

9.4 應設置一個由駕駛室或防火控制站操縱的召集船員的專用報警器。此種報警器可以是船上通用報警系統的一部分，並應能夠與乘客處所的報警系統分開而單獨報警。

第8條

防止煙氣的蔓延

1 目的

本條旨在控制煙氣的蔓延從而最大限度地減少煙氣的危害。為此，應提供控制天井、控制站、機器處所和隱蔽處所內煙氣的措施。

2 機器處所外面的控制站的保護

應採取實際可行的措施保證機器處所外面的控制站的通風和能見度得以維持且不受煙氣妨礙，以便在失火時，位於其中的機械和設備可以受到監管並繼續有效地運轉。應設置分開的替代供氣裝置，並且兩個供氣源的進口應佈置成使兩個進氣口同時吸進煙氣的危險性減至最小。主管機關可自行決定，此類要求不必適用於位於開敞甲板上且開口通向開敞甲板的控制站，或位於具有同等效用的局部關閉裝置的控制站。

3 機器處所煙氣的排出

3.1 本款的規定應適用A類機器處所，同時，如果主管機關認為合適，亦可適用於其他機器處所。

3.2 應作出適當安排，以第9.5.2.1條為前提，在一旦失火時，允許煙氣從被保護的處所排出。通常的通風系統可用於此目的。

3.3 應提供允許煙氣排出的控制裝置，這種控制裝置應位於有關處所的外面，以便一旦發生火災時，它們不致同其所服務的處所隔斷。

3.4 在客船上，第3.3款所要求的控制裝置應位於一個控制站，或集中於能使主管機關滿意的儘可能少的幾個位置。這種處所應能夠從開敞甲板安全到達。

4 擋風條

封閉在天花板、鑲板或襯板後面的空隙應以緊密安裝且間距不超過14 m的擋風條作適當分隔。在垂直方向上，此類封閉空隙，包括梯道、圍壁通道等襯板後空隙在內，應在每層甲板處加以封堵。

5 客船天井內的抽煙系統

天井應裝設抽煙系統。該抽煙系統應由要求的探煙系統啟動，並能夠手動控制。風機的規格應能夠在10 min或更短的時間內將該處所中整個容積的煙氣排出。

第9條

火災的抑制

1 目的

本條旨在將火災抑制在火源處所。為此，應達到下列功能性要求：

- .1 船舶應由耐熱和結構限界面劃分成若干分區；
- .2 限界面的隔熱應充分考慮到處所及其相鄰處所的失火危險；和
- .3 在開口和貫穿處應保持分區的耐火完整性。

2 耐熱和結構限界面

2.1 耐熱和結構分區

所有各種類型的船舶，都應在考慮到處所失火危險的情況下，用耐熱和結構分隔劃分為若干處所。

2.2 客船

2.2.1 主豎區和水平區

2.2.1.1.1 載客超過36人的客船，其船體、上層建築和甲板室應以“A-60”級分隔分為若干主豎區。階層和壁龕應保持至最少，但如其為必需時，則亦應為“A-60”級分隔。如果在主豎區分隔一側的處所為第2.2.3.2.2款所定義的(5)、(9)或(10)類處所，或在分隔的兩側均為燃油艙，則該主豎區分隔標準可降為“A-0”級。

2.2.1.1.2 載客不超過36人的客船，在起居處所和服務處所的船體、上層建築和甲板室應以“A”級分隔分為若干主豎區。這些分隔的隔熱值應符合第2.2.4款中相應的表列的規定。

2.2.1.2 只要實際可行，艙壁甲板以上的形成主豎區限界面的艙壁，應與直接在艙壁甲板以下的水密分艙艙壁位於同一直線上。為了使主豎區的端部與水密分艙艙壁相一致，或者在任一層甲板上主豎區的總面積不大於1,600 m²時，為了提供一個長度伸及主豎區全長的大型公共處所，主豎區的長度和寬度最大可延伸到48 m。主豎區的長度或寬度為主豎區艙壁的最遠點之間的最大距離。

2.2.1.3 這種艙壁應由甲板延伸至甲板，並延伸至船殼或其他限界面。

2.2.1.4 如果某一主豎區由水平“A”級分隔分為若干水平區，用

以在船上噴水器系統區域與非噴水器系統區域之間提供一適當的屏障時，此項水平分隔應延伸至相鄰兩個主豎區艙壁、並延伸至該船的殼板或外部限界面，同時，應按表9.4所列的耐火隔熱性和完整性的等級予以隔熱。

2.2.1.5.1 設計為特殊用途的船舶，例如汽車或鐵路車輛渡船，如設置主豎區艙壁將影響船舶預期的用途，應以能控制和限制火災的等效並經主管機關專門認可的方式來代替。除非根據相應規定予以保護，服務處所和船舶儲物艙不得位於滾裝甲板。

2.2.1.5.2 但在設有特種處所的船上，此種處所應符合第20條的相應規定，並且在該規定與本章關於客船的其他要求有不一致時，應以第20條的規定為準。

2.2.2 主豎區內的艙壁

2.2.2.1 在載客超過36人的客船上，那些不要求為“A”級分隔的艙壁應至少為第2.2.3款表列中規定的“B”級或“C”級分隔。

2.2.2.2 在載客不超過36人的客船上，那些在起居處所和服務處所內不要求為“A”級分隔的艙壁應至少為第2.2.4款表列中規定的“B”級或“C”級分隔。此外，走廊艙壁若不要求為“A”級分隔，則其應為從甲板延伸至另一甲板的“B”級分隔，但下列情況除外：

- .1 當在艙壁的兩側設置連續“B”級天花板或襯板時，連續天花板或襯板後面的艙壁部分所用的材料，其厚度和構成應適於“B”級分隔結構，但是，如果主管機關認為合理和可行時，此部分艙壁才應要求達到“B”級完整性標準；和
- .2 在由符合《消防安全系統規則》的規定的自動噴水系統所保

護的船舶上，只要走廊艙壁和天花板以符合第2.2.4款規定的“B”級標準建造，走廊艙壁可在走廊內天花板處終止。這些艙壁上的所有門和門框均應為不燃材料，並與其所安裝處的艙壁具有同樣的耐火完整性。

2.2.2.3 除第2.2.2.2款規定的走廊艙壁外，要求為“B”級分隔的艙壁應由甲板延伸至另一層甲板，並延伸至船體殼板或其他限界面。但如在艙壁兩側均設有至少與鄰接艙壁具有同樣耐火性能的連續“B”級天花板或襯板，該艙壁可終止於連續的天花板或襯板。

2.2.3 載客超過36人客船的艙壁和甲板的耐火完整性

2.2.3.1 除應符合關於客船艙壁和甲板耐火完整性的具體規定外，所有艙壁和甲板的最低耐火完整性還應符合表9.1和9.2的規定。如因船舶的任何特殊結構佈置，致使分隔的最低耐火完整性等級難於根據這些表確定時，則任何此種等級的確定應使主管機關滿意。

2.2.3.2 下列要求應決定各表適用的範圍：

- .1 表9.1適用於不作為主豎區或不作為水平區限界面的艙壁。
表9.2適用於既不在主豎區內形成階層也不構成水平區限界面的甲板。
- .2 為確定相鄰處所限界面的耐火完整性標準，此類處所按其失火危險程度分為下列（1）至（14）類。如果某一處所的內容和用途使得在按本條規定進行分類存在疑問，或有可能對某一處所指定兩個或以上類別時，則該處所應按有關類別中具有最嚴格的限界面要求的處所來對待。處所內較小的圍閉艙室，若其與該處所相通的開口小於30%時，應視為單獨的

處所。此種較小艙室的限界面艙壁和甲板的耐火完整性應符合表9.1和9.2的規定。每一類別的名稱只是典型舉例，而不是限制性的。每類前面括號內的序號是指表內相應的列或行。

(1) 控制站

容納應急電源和應急照明電源的處所。

駕駛室和海圖室。

容納船舶無線電設備的處所。

消防控制站。

位於推進機械處所外面的推進機械控制室。

容納集中失火報警設備的處所。

容納集中應急廣播系統站和設備的處所。

(2) 梯道

乘客和船員用的內部梯道、升降機、完全封閉的緊急脫險圍阱、自動扶梯（完全設在機器處所內者除外），以及通往上述處所等的範圍。

至於僅圍繞於一層甲板的梯道，應被視為未被防火門隔開的處所的一部分。

(3) 走廊

乘客和船員的走廊和大廳。

(4) 撤離站和外部脫險通道

救生艇筏存放區。

作為救生艇和救生筏登乘與降放站的開敞甲板處所和圍蔽游步甲板處所。

內部和外部集合站。

用作脫險通道的外部梯道和開敞甲板。

位於船側最輕載航行水線以上，救生艇筏和撤離滑道的登乘區下方和臨近的上層建築和甲板室外側。

(5) 開敞甲板處所

救生艇和救生筏登乘與降放站以外的開敞甲板處所和圍蔽游步甲板處所。如將圍蔽游步甲板處所歸為此類，則其應無顯著失火危險，意即其陳設僅應限於甲板家具。此外，此類處所應通過固定開口自然通風。

露天處所（上層建築和甲板室外的處所）。

(6) 較小失火危險的起居處所

容納限制失火危險的家具和陳設的住室。

容納限制失火危險的家具和陳設的辦公室和診療室。

容納限制失火危險的家具和陳設的公共處所，且其甲板面積小於50 m²。

(7) 中等失火危險的起居處所

上述第(6)類的處所中置有未限制失火危險的家具和陳設的處所。

容納限制失火危險的家具和陳設的公共處所，且其甲板面積等於或大於50 m²。

起居處所內面積小於4 m²的獨立儲物櫃及小儲物間（不儲存易燃液體）。

小賣部。電影放映室和影片儲藏室。廚房（沒有明火者）。

清潔用具儲物櫃（不存放易燃液體）。

實驗室（不存放易燃液體）。

藥房。

小乾燥間（甲板上面積等於或小於4 m²）。

貴重物品保管室。

操作間。

(8) 較大失火危險的起居處所

容納未限制失火危險的家具和陳設的公共處所，且其甲板面積等於或大於50 m²。

理髮間和美容室。

桑拿房。

(9) 衛生間及類似處所

公共盥洗設施、淋浴室、浴室、廁所等。

小洗衣間。

室內游泳池區域。

起居處所內沒有烹調設備的單獨配膳室。

個人盥洗設施應視為所在處所的一部分。

(10) 極少或沒有失火危險的艙櫃、空艙和輔機處所

構成船體結構部分的水艙。

空艙和隔離空艙。

不設置具有壓力潤滑系統的機器的且禁止儲存易燃物品輔機處所，例如

通風機和空調機室；

錨機室；

舵機室；

減搖裝置室；

電力推進電動機艙；

置有分區配電板和除浸油式電力變壓器(10 kVA以上)以外的純電氣設備的艙室；

軸隧和管隧；和

泵和製冷機處所(不處置或使用易燃液體)。

為上述處所服務的封閉圍阱。

其他封閉圍阱如管道和電纜圍阱。

(11) 具有中等失火危險的輔機處所、貨物處所、貨油艙和其他油艙及其他類似處所

貨油艙。

貨艙、貨艙圍壁通道和艙口。

冷藏室。

燃油艙（設在沒有機器的獨立處所內）。

允許儲存易燃物的軸隧和管隧。

第（10）類中所述的輔機處所，在該處所內允許設置壓力潤滑系統的機器或儲藏易燃物。

燃油加油站。

容納浸油式電力變壓器（10 kVA以上）的處所。

容納由氣輪機及往復式蒸汽機驅動的輔機發電機處所，以及輸出功率為110 kW及以下由小內燃機驅動的發電機、噴水器、灑水器或消防泵、艙底泵等。

用於上述處所的封閉圍阱。

(12) 機器處所和主廚房

主推進機艙（電力推進電動機艙除外）和鍋爐艙。

第(10)和(11)類以外的容納內燃機或其他燃油、加熱或泵裝置的輔機處所。

主廚房及其附屬間。

上述處所的圍阱及艙棚。

(13) 儲藏室、工作間、配膳室等

不附屬於廚房的主配膳室。

主洗衣間。

大乾燥間（甲板面積大於4 m²）。

雜物間。

郵件和行李室。

垃圾間。

工作間（不是機器處所、廚房等的一部分）。

面積大於4 m²的儲物櫃和儲物間，存放易燃液體的處所除外。

(14) 儲藏易燃液體的其他處所

油漆間。

內裝易燃液體的儲藏室（包括染料、藥品等）。

實驗室（室內存放易燃液體）。

- .3 如果兩個處所之間的限界面的耐火完整性在表中為單一級值，則此級值應適用於各種情況；

- .4 儘管有第2.2.2款的規定，如表中只標有“—”時，則對限界面的材料或完整性沒有特殊要求。
- .5 對於第（5）類處所，主管機關應確定表9.1的隔熱值是否適用於甲板室和上層建築的末端，以及表9.2的隔熱值是否適用於露天甲板。如主管機關認為不必要圍蔽時，表9.1或9.2中的第（5）類處所在任何情況下均不需圍蔽。

表 9.1—不作為主豎區或不作為水平區限界面的艙壁

處所	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
控制站	B-0 ^a	A-0	A-0	A-0	A-0	A-60	A-60	A-60	A-0	A-0	A-60	A-60	A-60	A-60
梯道		A-0 ^a	A-0	A-0	A-0	A-0	A-15	A-15	A-0 ^c	A-0	A-15	A-30	A-15	A-30
走廊			B-15	A-60	A-0	B-15	B-15	B-15	B-15	A-0	A-15	A-30	A-0	A-30
撤離站和外部脫險通道					A-0	A-60 ^{b,d}	A-60 ^{b,d}	A-60 ^{b,d}	A-0 ^d	A-0	A-60 ^b	A-60 ^b	A-60 ^b	A-60 ^b
開敞甲板處所						A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0
較小失火危險的起居處所						B-0	B-0	B-0	C	A-0	A-0	A-30	A-0	A-30
中等失火危險的起居處所							B-0	B-0	C	A-0	A-15	A-60	A-15	A-60
較大失火危險的起居處所								B-0	C	A-0	A-30	A-60	A-15	A-60
衛生間和類似處所									C	A-0	A-0	A-0	A-0	A-0
極少或沒有失火危險的艙櫃、空艙和輔機處所										A-0 ^a	A-0	A-0	A-0	A-0
中等失火危險的輔機處所、貨物處所、貨油艙和其他油艙及其他類似處所											A-0 ^a	A-0	A-0	A-15
機器處所和主廚房												A-0 ^a	A-0	A-60
儲藏室、工作間、配膳間等													A-0 ^a	A-0
儲藏易燃液體的其他處所														A-30

見表 9.2 後的註。

註：適用於表 9.1 和 9.2。

- a 當相鄰處所為同一序號類別且右上角註有“a”時，如果主管機關認為沒有必要，則在此類處所之間不必設置艙壁和甲板。例如，在第（12）類中的廚房及其所屬配膳間之間，只要配膳間的艙壁和甲板能保持廚房限界面的完整性，則不必要求設置艙壁。但是，廚房和機器處所之間要求設置艙壁，即使這兩個處所都屬於第（12）類。
 - b 舷側至最輕載航行水線處、低於和相鄰於救生筏和撤離滑道的上層建築和甲板室外側可降低至“A-30”級。
 - c 如整個公共盥洗室位於梯道圍壁內，在梯道圍壁內的公共盥洗室的艙壁可為“B”級完整性。
 - d 如果第（6）、（7）、（8）和（9）類處所完全位於集合站的外邊界之內，這些處所的艙壁允許為“B-0”級完整性。聲、視和光裝置的控制位置可以被看作集合站的一部分。
-

2.2.3.3 連續“B”級天花板或襯板連同有關的甲板和艙壁，可以被認為全部或部分地起到某一分隔所要求的隔熱性和完整性的作用。

2.2.3.4 桑拿房的構造和佈置

2.2.3.4.1 桑拿房的外邊界應為“A”級限界面，並可能包括更衣室、淋浴室和洗手間。桑拿房應同其他處所隔熱至“A-60”級標準，但外邊界以內的處所和第（5）、（9）和（10）類處所除外。

2.2.3.4.2 直接通向桑拿房的浴室可視為其一部分。在這種情況下，桑拿房和浴室之間的門不必符合防火安全要求。

2.2.3.4.3 在桑拿房內允許艙壁和天花板上使用傳統的木襯板。蒸

汽爐上方的天花板應襯有不燃襯板，並留出至少30 mm厚的縫隙。從熱表面到可燃材料之間的距離至少應為500 mm，或應將可燃材料保護起來（例如採用距可燃材料至少有30 mm空氣間隙的不燃板）。

2.2.3.4.4 在桑拿房內允許使用傳統的木製長凳。

2.2.3.4.5 桑拿房的門應向外推開。

2.2.3.4.6 電加熱蒸汽爐應配備定時器。

2.2.4 載客不超過36人的客船艙壁和甲板的耐火完整性

2.2.4.1 除應符合關於客船艙壁和甲板耐火完整性的具體規定外，所有艙壁和甲板的最低耐火完整性還應符合表9.3和9.4的規定。

2.2.4.2 下列要求為各表適用的範圍：

- .1 表9.3和9.4分別適用於分隔相鄰處所的艙壁和甲板。
- .2 為確定相鄰處所限界面的耐火完整性標準，此類處所按其失火危險程度分為下列（1）至（11）類。如果某一處所的內容和用途使得在按本條規定進行分類存在疑問，或有可能對某一處所指定兩個或更多類別時，則該處所應按有關類別中具有最嚴格的限界面要求的處所來對待。某一處所內較小的圍閉艙室，若其與該處所相通的開口小於30%時，應視為單獨的處所。此種較小艙室的限界面艙壁和甲板的耐火完整性應符合表9.3和9.4的規定。每一類別的名稱只是典型舉例，而不是限制性的。每類前面括號內的序號是指表內相應的列或行。

（1） 控制站

容納應急電源和應急照明電源的處所。

駕駛室和海圖室。

容納船舶無線電設備的處所。

消防控制站。

位於推進機械處所外面的推進機械控制室。

容納集中失火報警設備的處所。

(2) 走廊

乘客和船員的走廊和大廳。

(3) 起居處所

第3.1條所定義的處所，不包括走廊。

(4) 梯道

內部梯道、升降機、完全封閉的緊急脫險圍阱和自動扶梯（完全設置於機器處所內者除外），以及通往上述處所的環圍。

至於僅環圍於一層甲板的梯道，應被視為未被防火門隔開的處所的一部分。

(5) 服務處所（低失火危險）

不儲存非易燃性液體且面積小於4 m²的儲物櫃和儲物間，以及乾燥室和洗衣間。

(6) A類機器處所

第3.31條定義的處所。

(7) 其他機器處所

電氣設備間（自動電話交換、空調管道處所）。

第3.30條定義的處所，不包括A類機器處所。

(8) 貨物處所

所有用於裝運貨物的處所（包括貨油艙）以及通往這些處所的圍壁通道和艙口，特種處所除外。

(9) 服務處所（高失火危險）

廚房、容納烹調設備的配膳室、油漆間和燈具間、面積為4 m²及以上的儲物櫃和儲物間、儲存易燃液體的處所、桑拿房和不構成機器處所部分的工作間。

(10) 開敞甲板

開敞甲板處所和極少或無失火危險的圍蔽游步甲板處所。圍蔽的游步甲板應無顯著失火危險，意即其陳設僅應限於甲板家具。此外，此類處所應通過固定開口自然通風。

露天處所（上層建築和甲板室外的處所）。

(11) 特種處所和滾裝處所

第3.41和第3.46條定義的處所。

- 3 對位於未受到符合《消防安全系統規則》規定的自動噴水器系統保護的主豎區或水平區內的兩個處所之間的限界面，或位於兩個均無此種保護的主豎區或水平區之間的限界面，在確定其所適用的耐火完整性標準時，應採用表列兩個等級中的較高等級。
- 4 對位於受到符合《消防安全系統規則》規定的自動噴水器系統保護的主豎區或水平區內的兩個處所之間的限界面，或位於兩個均受到此種保護的主豎區或水平區之間的限界面，在確定其所適用的耐火完整性標準時，應採用表列兩個等級中

的較低等級。如果在起居處所和服務處所內，一個裝有噴水器系統區域鄰接一個未裝有噴水器系統區域，這兩個區域之間的分隔應採用表列兩個等級中的較高等級。

2.2.4.3 連續“B”級天花板或襯板連同有關的甲板和艙壁，可以被認為全部或部分地起到某一分隔所要求的隔熱性和完整性的作用。

2.2.4.4 第11.2條所要求的需為鋼或其他等效材料的外部限界面，可為安裝窗和舷窗的目的而開孔，只要不要求客船的此類限界面具有“A”級完整性。同樣，在不要求具有“A”級完整性的此類限界面上，門可以使用主管機關滿意的材料製造。

2.2.4.5 桑拿房應符合第2.2.3.4款。

表 9.4—分隔相鄰處所甲板的耐火完整性

甲板下 甲板上 處所↓ 處所→	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
控制站 (1)	A-0	A-0	A-0	A-0	A-0	A-60	A-0	A-0	A-0	*	A-30
走廊 (2)	A-0	*	*	A-0	*	A-60	A-0	A-0	A-0	*	A-0
起居處所 (3)	A-60	A-0	*	A-0	*	A-60	A-0	A-0	A-0	*	A-30 A-0 ^d
梯道 (4)	A-0	A-0	A-0	*	A-0	A-60	A-0	A-0	A-0	*	A-0
服務處所 (5) (低失火危險)	A-15	A-0	A-0	A-0	*	A-60	A-0	A-0	A-0	*	A-0
A 類機器處所 (6)	A-60	A-60	A-60	A-60	A-60	*	A-60 ^f	A-30	A-60	*	A-60
其他機器處所 (7)	A-15	A-0	A-0	A-0	A-0	A-0	*	A-0	A-0	*	A-0
貨物處所 (8)	A-60	A-0	A-0	A-0	A-0	A-0	A-0	*	A-0	*	A-0
服務處所 (9) (高失火危險)	A-60	A-30 A-0 ^d	A-30 A-0 ^d	A-30 A-0 ^d	A-0	A-60	A-0	A-0	A-0	*	A-30
開敞甲板 (10)	*	*	*	*	*	*	*	*	*	—	A-0
特種處所和滾裝 處所 (11)	A-60	A-15	A-30 A-0 ^d	A-15	A-0	A-30	A-0	A-0	A-30	A-0	A-0

註：視情適用於表 9.3 和 9.4。

- a 至於適用哪一等級，參閱第 2.2.2 和 2.2.5 款。
- b 如處所為同一序號類別且右上角註有 b，則只有當相鄰處所用途不同時，才要求表中所列等級的艙壁或甲板（例如在第（9）類中）。在兩個廚房之間不要求用艙壁分隔，但油漆間和廚房之間要求有“A-0”級艙壁分隔。
- c 分隔駕駛室和海圖室的艙壁可以為“B-0”級。
- d 參閱第 2.2.4.2.3 和 2.2.4.2.4 款。

- e 對於第2.2.1.1.2款的適用，表9.3中出現的“B-0”和“C”級應理解為“A-0”級。
- f 如主管機關認為第（7）類中的機器處所極少或沒有失火危險時，可不必設置耐火隔熱。

* 表中有*號時，要求該分隔用鋼或其他等效材料建造，但不要求為“A”級標準。然而，除第（10）類的處所以外，如果甲板被穿透以使電纜、管線和通風管道通過，應對此種穿透處進行密封，以防止火焰和煙的通過。除非安裝了固定式氣體滅火系統，控制站（應急發電機）和開敞甲板間的分隔可以設置不帶封閉裝置空氣進口開口。

對於第2.2.1.1.2款的適用，表9.4中出現*號時應理解為“A-0”級，但第（8）和（10）類除外。

2.2.5 起居處所內梯道和電梯的保護

2.2.5.1 梯道應位於“A”級分隔形成的環圍之內，並在所有開口處設有可靠的關閉裝置，但下列情況除外：

- .1 僅連接兩層甲板的梯道，若在一個甲板間處所具有適當的艙壁或自閉門使甲板的完整性得以保持，則不必環圍。當梯道在一個甲板間處所被環圍時，其梯道環圍應按照第2.2.3或2.2.4款的表中對甲板的要求加以保護；和
- .2 梯道可設於公共處所的開敞部位，但應完全位於公共處所內。

2.2.5.2 電梯圍阱應設置成能防止煙和火焰從一個甲板間通至另一個甲板間，並應設置關閉裝置，以便能控制氣流和煙氣的流通。位於梯道環圍內的升降機械應佈置在一個獨立的室內，由鋼質限界面環圍，只允許升降機電纜使用的小通道。開向除走廊、公共處所、特種處所、梯道和外部區域以外的處所的電梯，不得開向脫險通道內的梯道。

2.3 液貨船以外的貨船

2.3.1 起居區域的保護方法

2.3.1.1 在起居處所、服務處所和控制站內應採取下列保護方法之一：

.1 IC法

除第7.5.5.1條的要求外，在起居處所和服務處所內以不燃的“B”級或“C”級分隔作內部分隔艙壁，一般不設自動噴水器、探火和失火報警系統；

.2 IIC法

在可能引起失火的所有處所，按第7.5.5.2條的要求裝設用於探火和滅火的自動噴水器、探火和失火報警系統，一般對內部分隔艙壁的形式不予限制；或

.3 IIIC法

在可能引起失火的所有處所，按第7.5.5.3條的要求裝設固定式探火和失火報警系統，一般對內部分隔艙壁的形式不予限制，但無論在何種情況下任一起居處所或用“A”級或“B”

級分隔的各個處所的面積不得超過50 m²。然而，對於公共處所，主管機關可考慮增加這一面積。

2.3.1.2 第2.3.1.1款所列的三種方法，對機器處所、控制站、服務處所等限界艙壁的構造和隔熱使用不燃材料的要求，和對以上梯道環圍和走廊的保護要求是通用的。

2.3.2 起居處所內的艙壁

2.3.2.1 要求為“B”級分隔的艙壁，應由甲板延伸至甲板，並延伸至船殼或其他限界面。但是，如果在艙壁的兩側均裝有連續“B”級天花板或襯板，這種艙壁可終止於連續天花板或襯板。

2.3.2.2 IC法

本條或其他關於貨船的條款未規定為“A”級或“B”級分隔的艙壁，至少應為“C”級構造。

2.3.2.3 IIC法

除在個別情況下根據表9.5要求為“C”級的艙壁外，本條或其他關於貨船的條文未規定為“A”級或“B”級分隔的艙壁的構造應不受限制。

2.3.2.4 IIIC法

除在個別情況下根據表9.5要求為“C”級艙壁外，凡對貨船不要求為“A”級或“B”級分隔的艙壁的構造應不受限制，但無論在任何情況下，由連續“A”級或“B”級分隔的任何起居處所或相鄰處所的面積不得超過50 m²。然而，對於公共處所，主管機關可以考慮增加這一面積。

2.3.3 艙壁和甲板的耐火完整性

2.3.3.1 除應符合關於貨船艙壁和甲板耐火完整性的具體規定外，所有艙壁和甲板的最低耐火完整性還應符合表9.5和9.6的規定。

2.3.3.2 下列要求應決定各表適用的範圍：

- .1 表9.5和9.6應分別適用於分隔相鄰處所的艙壁和甲板。
- .2 為確定相鄰處所限界面的耐火完整性標準，此類處所按其失火危險程度分為下列（1）至（11）類。如果某一處所的內内容和用途使得在按本條規定進行分類存在疑問，或有可能對某一處所指定兩個或以上類別時，則該處所應按有關類別中具有最嚴格的限界面要求的處所來對待。處所內較小的圍閉艙室，若其與該處所相通的開口小於30%時，應視為單獨的處所。此種較小艙室的限界面艙壁和甲板的耐火完整性應符合表9.5和9.6的規定。每一類別的名稱只是典型舉例，而不是限制性的。每類前面括號內的序號是指表內相應的列或行。

（1） 控制站

容納應急電源和應急照明電源的處所。

駕駛室和海圖室。

容納船舶無線電設備的處所。

消防控制站。

位於推進機械處所外面的推進機械控制室。

容納集中失火報警設備的處所。

(2) 走廊

走廊和大廳。

(3) 起居處所

第3.1條所定義的處所，不包括走廊。

(4) 梯道

內部梯道、升降機、完全封閉的緊急脫險圍阱和自動扶梯（完全置於機器處所內者除外），以及通往上述處所的環圍。

至於僅環圍於一層甲板的梯道，應被視為未被防火門隔開的處所的一部分。

(5) 服務處所（低失火危險）

不儲存易燃性液體且面積小於4 m²的儲物櫃和儲物間，以及乾燥室和洗衣間。

(6) A類機器處所

第3.31條定義的處所。

(7) 其他機器處所

電氣設備間（自動電話交換、空調管道處所）。

第3.30條定義的處所，不包括A類機器處所。

(8) 貨物處所

所有用於裝運貨物的處所（包括貨油艙）以及通往這些處所的圍壁通道和艙口。

(9) 服務處所（高失火危險）

廚房、容納烹調設備的配膳室、桑拿房、油漆間、面積為4 m²及以上的儲物櫃和儲物間、儲存易燃液體的處所和不構成機器處所部分的工作間。

(10) 開敞甲板

開敞甲板處所和極少或沒有失火危險的圍蔽游步甲板處所。如將圍蔽的游步甲板歸為此類，則其應無顯著失火危險，意即其陳設僅應限於甲板家具。此外，此類處所應通過固定開口自然通風。

露天處所（上層建築和甲板室外的處所）。

(11) 滾裝和車輛處所

第3.41條定義的滾裝處所。

第3.49條定義的車輛處所。

表 9.6—分隔相鄰處所甲板的耐火完整性

甲板下 處所↓	甲板上 處所→	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
控制站	(1)	A-0	A-0	A-0	A-0	A-0	A-60	A-0	A-0	A-0	*	A-60
走廊	(2)	A-0	*	*	A-0	*	A-60	A-0	A-0	A-0	*	A-30
起居處所	(3)	A-60	A-0	*	A-0	*	A-60	A-0	A-0	A-0	*	A-30
梯道	(4)	A-0	A-0	A-0	*	A-0	A-60	A-0	A-0	A-0	*	A-30
服務處所 (低失火危險)	(5)	A-15	A-0	A-0	A-0	*	A-60	A-0	A-0	A-0	*	A-0
A類機器處所	(6)	A-60	A-60	A-60	A-60	A-60	*	A-60 ⁱ	A-30	A-60	*	A-60
其他機器處所	(7)	A-15	A-0	A-0	A-0	A-0	A-0	*	A-0	A-0	*	A-0
貨物處所	(8)	A-60	A-0	A-0	A-0	A-0	A-0	A-0	*	A-0	*	A-0
服務處所 (高失火危險)	(9)	A-60	A-0	A-0	A-0	A-0	A-60	A-0	A-0	A-0 ^d	*	A-30
露天甲板	(10)	*	*	*	*	*	*	*	*	*	—	*
滾裝和車輛處所	(11)	A-60	A-30	A-30	A-30	A-0	A-60	A-0	A-0	A-30	*	* ^h

註：視情適用於表9.5和9.6。

a 在IIC和IIIC防火法中，對艙壁沒有特別要求。

b 在IIIC法中，面積為50 m²及以上的處所或處所群之間應裝設“B-0”級的“B”級艙壁。

c 至於適用哪一等級，參閱第2.3.2和2.3.4款。

d 如處所為同一序號類別且右上角註有d，則只有當相鄰處所用途不同時，才要求表中所列等級的艙壁或甲板（例如在第（9）類中）。在兩個廚房之間不要求用艙壁分隔，但油漆間和廚房之間要求有“A-0”級艙壁分隔。

- e 分隔駕駛室、海圖室和無線電室的艙壁可以為“B-0”級。
 - f 如果不擬載運危險貨物，或危險貨物的堆存離開艙壁的水平距離不少於3 m，該艙壁可為“A-0”級。
 - g 擬載運危險貨物的貨物處所應符合第19.3.8條。
 - h 分隔滾裝貨物處所的艙壁和甲板應能適當氣密關閉；如果主管機關認為此類分隔極少或沒有失火危險，則其應在儘可能合理和可行的情況下具有“A”級完整性標準。
 - i 如主管機關認為第（7）類中的機器處所極少或沒有失火危險，可不必設置耐火隔熱。
-

* 表中有*號時，要求該分隔用鋼或其他等效材料建造，但不要求為“A”級標準。然而，除開敞甲板以外，如果甲板被穿透以使電纜、管線和通風管道通過，應對此種穿透處進行密封，以防止火焰和煙的通過。除非安裝了固定式氣體滅火系統，控制站（應急發電機）和開敞甲板間的分隔上可以設置不帶封閉裝置空氣進口的開口。

2.3.3.3 連續“B”級天花板或襯板連同有關的甲板和艙壁，可以被認為全部或部分地起到某一分隔所要求的隔熱性和完整性的作用。

2.3.3.4 第11.2條所要求的需為鋼或其他等效材料的外部限界面，可為安裝窗和舷窗的目的而開孔，只要不要求貨船的此類限界面具有“A”級完整性。同樣，在不要求具有“A”級完整性的此類限界面上，門可以使用主管機關滿意的材料製造。

2.3.3.5 桑拿房應符合第2.2.3.4款。

2.3.4 起居處所、服務處所和控制站內的梯道和電梯圍阱的保護

2.3.4.1 僅穿過一層甲板的梯道應至少在一個水平面上用至少為“B-0”級分隔及自閉式門予以保護。僅穿過一層甲板的升降機應在兩層上均用裝有鋼質門的“A-0”級分隔來環圍。穿過多於一層甲板的梯道和升降機圍阱應在每層上至少用“A-0”級分隔環圍，並用自閉式門予以保護。

2.3.4.2 在具有容納12人或少於12人的船上，如梯道穿過多於一層甲板，且每層起居處所甲板上至少有兩個直接通往開敞甲板的脫險通道，則可將第2.3.4.1款的“A-0”級要求降為“B-0”級。

2.4 液貨船

2.4.1 適用範圍

對於液貨船，只能採用第2.3.1.1款定義的IC法。

2.4.2 艙壁和甲板的耐火完整性

2.4.2.1 作為第2.3款的替代，並且除應符合關於液貨船艙壁和甲板耐火完整性的具體規定外，所有艙壁和甲板的最低耐火完整性還應符合表9.7和9.8的規定。

2.4.2.2 下列要求應決定各表適用的範圍：

- .1 表9.7和9.8應分別適用於分隔相鄰處所的艙壁和甲板。
- .2 為確定相鄰處所限界面的耐火完整性標準，此類處所按其失火危險程度分為下列（1）至（10）類。如果某一處所的內容和用途使得在按本條規定進行分類存在疑問，或有可能對

某一處所指定兩個或以上類別時，則該處所應按有關類別中具有最嚴格的限界面要求的處所來對待。處所內較小的圍閉區域，若其與該處所相通的開口小於30%時，應視為單獨的區域。此種較小艙室的限界面艙壁和甲板的耐火完整性應符合表9.7和9.8的規定。每一類別的名稱只是典型舉例，而不是限制性的。每類前面括號內的序號是指表內相應的列或行。

(1) 控制站

容納應急電源和應急照明電源的處所。

駕駛室和海圖室。

容納船舶無線電設備的處所。

消防控制站。

位於推進機械處所外面的推進機械控制室。

容納集中失火報警設備的處所。

(2) 走廊

走廊和大廳。

(3) 起居處所

第3.1條所定義的處所，不包括走廊。

(4) 梯道

內部梯道、升降機、完全封閉的緊急脫險圍阱、自動扶梯（完全置於機器處所內者除外），以及通往上述處所的環圍。

至於僅環圍於一層甲板的梯道，應被視為未被防火門隔開的處所的一部分。

(5) 服務處所（低失火危險）

不儲存易燃性液體且面積小於4 m²的儲物櫃和儲物間，以及乾燥室和洗衣間。

(6) A類機器處所

第3.31條定義的處所。

(7) 其他機器處所

電氣設備間（自動電話交換、空調管道處所）。

第3.30條定義的處所，A類機器處所除外。

(8) 液貨泵艙

容納液貨泵艙的處所以及通往這些處所的入口和圍壁通道。

(9) 服務處所（高失火危險）

廚房、容納烹調設備的配膳室、桑拿房、油漆間、面積為4 m²及以上的儲物櫃和儲物間、儲存易燃液體的處所和不構成機器處所部分的工作間。

(10) 開敞甲板

開敞甲板處所和極少或沒有失火危險的圍蔽游步甲板處所。如將圍蔽的游步甲板歸為此類，則其應無顯著失火危險，意即其陳設僅應限於甲板家具。此外，此類處所應通過固定開口自然通風。

露天處所（上層建築和甲板室外的處所）。

2.4.2.3 連續“B”級天花板或襯板連同有關的甲板和艙壁，可以被認為全部或部分地起到某一分隔所要求的隔熱性和完整性的作用。

2.4.2.4 第11.2條所要求的需為鋼或其他等效材料的外部限界面，可為安裝窗和舷窗的目的而開孔，只要不要求液貨船的此類限界面具有“A”級完整性。同樣，在不要求具有“A”級完整性的限界面上，門可以使用主管機關滿意的材料製造。

2.4.2.5 環圍起居處所的上層建築和甲板室的外部限界面，以及包括支承這些起居處所的懸臂甲板面向貨物區域的全部限界面，以及面向貨物的邊界端部之後3 m之內的外表面，應用鋼製造並隔熱至“A-60”級標準。3 m的距離應為在每層甲板上從面向貨物區域的限界面水平地並平行於船舶中線量取。對於這種上層建築和甲板室的各個側面，此種隔熱應延伸到駕駛室甲板的下側。

2.4.2.6 液貨泵艙的天窗應用鋼製造，不得鑲有玻璃，並應能在泵艙外部予以關閉。

2.4.2.7 桑拿房的構造和佈置應符合第2.2.3.4款。

表 9.8—分隔相鄰處所甲板的耐火完整性

甲板下 處所↓	甲板上 處所→	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
控制站	(1)	A-0	A-0	A-0	A-0	A-0	A-60	A-0	—	A-0	*
走廊	(2)	A-0	*	*	A-0	*	A-60	A-0	—	A-0	*
起居處所	(3)	A-60	A-0	*	A-0	*	A-60	A-0	—	A-0	*
梯道	(4)	A-0	A-0	A-0	*	A-0	A-60	A-0	—	A-0	*
服務處所 (低失火危險)	(5)	A-15	A-0	A-0	A-0	*	A-60	A-0	—	A-0	*
A類機器處所(6)	(6)	A-60	A-60	A-60	A-60	A-60	*	A-60 ^e	A-0	A-60	*
其他機器處所(7)	(7)	A-15	A-0	A-0	A-0	A-0	A-0	*	A-0	A-0	*
液貨泵艙	(8)	—	—	—	—	—	A-0 ^d	A-0	*	—	*
服務處所 (高失火危險)	(9)	A-60	A-0	A-0	A-0	A-0	A-60	A-0	—	A-0 ^b	*
開敞甲板	(10)	*	*	*	*	*	*	*	*	*	—

註：視情適用於表9.7和9.8。

- a 至於適用哪一等級，參閱第2.3.2和2.3.4款。
- b 如處所為同一序號類別且右上角註有b，則只有當相鄰處所用途不同時，才要求表中所列等級的艙壁或甲板（例如在第（9）類中）。在兩個廚房之間不要求用艙壁分隔，但油漆間和廚房之間要求有“A-0”級艙壁分隔。
- c 分隔駕駛室、海圖室和無線電室的艙壁可以為“B-0”級。
- d 在液貨泵艙和A類機器處所之間的艙壁和甲板可以讓液貨泵軸的填料涵蓋以及有填料的類似裝置穿過，但應在艙壁或甲板的貫穿處採用有效潤滑氣密封或採取其他措施來保證永久性氣密的裝置。

- e 如主管機關認為第（7）類中的機器處所極少或沒有失火危險，可不必設置耐火隔熱。

* 表中有*號時，要求該分隔用鋼或其他等效材料建造，但不要求為“A”級標準。然而，除開敞甲板以外，如果甲板被穿透以使電纜、管線和通風管道通過，應對此種穿透處進行密封，以防止火焰和煙的通過。除非安裝了固定式氣體滅火系統，控制站（應急發電機）和開敞甲板間的分隔上可以設置不帶封閉裝置空氣進口的開口。

3 耐火分隔中的貫穿及防止熱傳遞

3.1 如果“A”級分隔被貫穿，這種貫穿應在符合第4.1.1.5款規定的前提下，根據《耐火試驗程序規則》進行試驗。對於通風管道，應適用第7.1.2和第7.3.1款。但是，如果貫穿套管係由厚度3 mm或以上，長度不小於900 mm（最好是分隔兩側各450 mm）的鋼或等效材料製造，且其上面無開口，則不需要試驗。這種貫穿應通過該分隔相同水平面上的隔熱材料的延伸來加以適當隔熱。

3.2 如果“B”級分隔的貫穿係為電纜、管道、圍蔽通道、導管等通過，或安裝通風端口、照明燈具和類似裝置，則應在以第7.3.2款的規定為前提下作出適當佈置，以保證其耐火性不被破壞。應通過下列二者之一對貫穿“B”級分隔的鋼管或銅管以外的管道加以保護：

- .1 一個經過耐火試驗的貫穿裝置，適合於被穿透的分隔和所用管道類型的耐火性；或

.2 厚度不小於1.8 mm的鋼質套管，對於直徑為150 mm及以上的管道，長度不短於900 mm，對於直徑低於150 mm的管道，長度不短於600 mm（最好在分隔的兩側長度相等）。管道應通過法蘭或管箍與套管端部連接，套管與管道之間的間隙不得超過2.5 mm；或者，管道和套管之間的任何間隙都應使用不燃或其他合適的材料填實。

3.3 貫穿“A”級或“B”級分隔的未經隔熱的金屬管，其材料的熔點對“A-0”級分隔應超過950°C，對“B-0”級分隔應超過850°C。

3.4 在對構造防火的細節進行認可時，主管機關應考慮到所要求的隔熱物的接頭處和終止點的熱傳遞危險。對於鋼或鋁結構的甲板或艙壁，其隔熱應至少延續至超過貫穿處、接頭處或終止點450 mm處。如果由“A”級標準的甲板或艙壁所分隔的某處所的隔熱有不同的等級，等級較高的隔熱應在等級較低的隔熱的甲板或艙壁上至少延續450 mm的距離。

4 耐火分隔上開口的保護

4.1 客船艙壁和甲板上的開口

4.1.1 “A”級分隔上的開口

4.1.1.1 除貨物處所、特種處所、儲藏間和行李室之間的艙口以及這些處所與露天甲板之間的艙口外，開口應裝有永久附連於其上的關閉裝置，其耐火效能至少應與其所在的分隔相等。

4.1.1.2 “A”級分隔上所有的門、門框結構及其在關閉時的鎖閉裝置，應具有等效於其所在艙壁的耐火性和阻止煙和火焰通過的性能，按《耐火試驗程序規則》確定。這些門和門框應由鋼或其他等效材料建造。水密門不必隔熱。

4.1.1.3 每扇門應能在艙壁的每一側僅由一人即能將其開啟或關閉。

4.1.1.4 除電動水密門和那些通常鎖閉的門外，主豎區艙壁、廚房限界面和梯道圍壁上的防火門應達到下列要求：

- .1 防火門應為自閉型，並在門朝關閉的反方向傾斜 3.5° 時仍能自動關閉；
- .2 在船舶處於正浮狀態時，鉸鏈式防火門的大致關閉時間從動作開始至關閉應不大於40秒但不少於10秒。在船舶處於正浮狀態時，滑動式防火門的大致平均關閉速率應不大於0.2 m/s，但不小於0.1 m/s；
- .3 除緊急脫險通道的門以外，所有防火門應能夠從持續有人值班的中央控制站同時或成組地遙控釋放，也能從門的內外兩側單獨地釋放關閉。釋放開關應具有通—斷功能，以防止系統自動復位；
- .4 禁止使用不能由中央控制站脫開的門背鉤；
- .5 從中央控制站遙控關閉的門應能夠從門的內外兩側通過現場控制重新打開。現場開啟以後，門應能夠再次自動關閉；
- .6 持續有人值班的中央控制站內的防火門顯示屏上應顯示出每扇門是否都已關閉；
- .7 防火門的釋放裝置應設計成在控制系統或主電源出現故障時，門將自動關閉；

- .8 對於動力操縱的防火門，應在緊靠門的附近裝有現場蓄電裝置，使門能夠在控制系統或主電源出現故障後用現場控制器至少可動作（全開和關閉）10次；
- .9 某一處門的控制系統或主電源故障不得妨害其他門的安全運作；
- .10 遙控釋放關閉的滑動門或動力操縱門應裝有聲響報警裝置，在門由中央控制站釋放後和門開始動作前至少鳴響5秒，但不超過10秒，並持續鳴響，直至門完全關閉；
- .11 被設計成在關閉過程中遇到障礙時重新開啟的門，其重新開啟度從接觸點開始不得超過1 m；
- .12 裝有耐火完整性所必需的壓緊裝置的雙葉門在被控制系統釋放時，其壓緊裝置應隨門的動作而自動工作；
- .13 直接通向特種處所的動力操縱和自動關閉門，不需裝設第4.1.1.4.3和4.1.1.4.10款要求的報警裝置和遙控釋放裝置；
- .14 現場控制系統的組件應易於進行維護和調整；
- .15 動力操縱門應裝有按《耐火試驗程序規則》得到型式認可的控制系統，它能夠在發生火災時動作。該系統應達到下列要求：
 - .15.1 在有電力供應時，控制系統應能使門在至少200°C的溫度中至少動作60 min；
 - .15.2 所有未受火災影響的其他門的供電不得受到妨害；和
 - .15.3 在溫度超過200°C時，控制系統應自動從供電電源斷開並能夠在至少945°C時使門保持關閉。

4.1.1.5 在載客不超過36人的客船上，如某一處所由符合《消防安全系統規則》規定的自動噴水器、探火和失火報警系統保護，或裝有連續“B”級天花板，則在主豎區內未形成階層亦不作為水平區限界面的甲板上的開口，應能適度地緊密關閉，並且在主管機關認為合理和實際可行的範圍內，這類甲板應符合“A”級完整性要求。

4.1.1.6 如果第4.1.3.3款對玻璃隔板、窗和舷窗不要求有“A”級耐火完整性，則船舶外部限界面的“A”級完整性要求應不適用於此類限界面。船舶外部限界面的“A”級完整性要求應不適用於外部的門，但面向救生設備、登乘和外部集合區域、外部梯道和用作脫險通道的開敞甲板的上層建築和甲板室的門除外。梯道圍蔽的門不需符合這一要求。

4.1.1.7 除水密門、風雨密門（半水密門）、通往開敞甲板的門和需要適度氣密的門以外，所有位於梯道、公共處所和脫險通道內主豎區艙壁上的“A”級門，均應裝有一個自閉式消防水帶孔。消防水帶孔所用的材料、結構和耐火性能應與其所在的門相當，在門處於關閉狀態下開口淨尺寸應為150 mm × 150 mm，並應嵌入於門的下邊緣遠離鉸鏈的一側，或者，如係滑動式門，則應位於與門開口最接近之處。

4.1.1.8 如果通風導管必需通過主豎區分隔，應在分隔鄰近處裝設故障安全型自動關閉擋火閘。此種擋火閘還應能從分隔的每一側手動關閉。其操作位置應易於到達，並用紅的反光顏色標出。分隔與擋火閘之間的導管應為鋼質或其他等效材料，並在必要時隔熱至符合第3.1款的要求。擋火閘應至少在分隔的一側裝設可見的指示器，指明擋火閘是否處於開啟的位置。

4.1.2 “B”級分隔上的開口

4.1.2.1 “B”級分隔的門和門框以及它們的固定裝置，應提供等效於這些分隔耐火性能的封閉方法，按《耐火試驗程序規則》確定。但允許在門的下部設置通風開口。如果此種通風開口是開在門上或門以下時，則任何一個或幾個此種開口的總淨面積不得超過 0.05 m^2 。作為替代辦法，允許在客艙和走廊之間和在衛生設施之下佈設不燃空氣平衡導管，但這種導管的截面積不得超 0.05 m^2 。所有通風開口必須裝有不燃材料製成的百葉柵。這些門應是不燃性的。

4.1.2.2 “B”級分隔上的客艙門應為自閉型。禁止使用門背鉤。

4.1.2.3 船舶外部限界面的“B”級完整性要求應不適用於玻璃隔板、窗和舷窗。同樣，“B”級完整性要求也應不適用於上層建築和甲板室的外側門。對載客不超過36人的客船，主管機關可允許分隔艙室與諸如沐浴間的單獨內部衛生處所的門使用可燃材料。

4.1.2.4 在載客不超過36人的客船上，如裝有符合《消防安全系統規則》規定的自動噴水器系統時：

- .1 在主豎區內未形成階層亦不作為水平區限界面的甲板上的開口應能適度緊密關閉，並且在主管機關認為合理和實際可行的範圍內，這類甲板應符合“B”級完整性要求；和
- .2 “B”級材料的走廊艙壁上的開口應按第2.2.2款的規定加以保護。

4.1.3 窗和舷窗

4.1.3.1 起居處所、服務處所和控制站上的窗和舷窗，除那些符合

第4.1.1.6和4.1.2.3款者以外，其構造應能保持其所在處艙壁完整性的要求，按《耐火試驗程序規則》確定。

4.1.3.2 儘管有表9.1至9.4的要求，分隔起居處所、服務處所和控制站與露天的艙壁上的窗和舷窗，應配有用鋼材或其他適宜材料建造的框架。窗的玻璃應用金屬鑲邊或鑲角加以固定。

4.1.3.3 面向救生設備、登乘和集合地點、外部梯道和用作脫險通道的開敞甲板以及位於救生筏和撤離滑道登乘區域以下的窗，應具有表9.1中所要求的耐火完整性。如果這些窗配有專用的自動噴水器噴頭，則可以接受“A-0”級窗作為替代。按本款予以考慮，噴水器噴頭應為下列二者之一：

- .1 除安裝常規的天花板噴水器外，在窗的上部再安裝專用噴頭；或
- .2 常規天花板噴水器噴頭佈置成使窗受到至少 5 l/m^2 的平均噴水率的保護，並在計算噴水覆蓋面積時窗的面積。

位於救生艇登乘區以下的舷側窗至少應具有“A-0”級耐火完整性。

4.2 貨船耐火分隔上的門

4.2.1 門的耐火性能應等效於與其所裝配處所的分隔的耐火性能，按《耐火試驗程序規則》確定。在“A”級分隔上的門和門框應為鋼質結構。在“B”級分隔上的門應為不燃材料。裝設在A類機器處所限界面艙壁上的門應適當氣密和能夠自閉。對按IC法建造的船舶，主管機關可允許分隔住室與諸如沐浴間的單獨內部衛生間的門使用可燃材料。

4.2.2 要求為自閉的門不得裝設門背鉤。但是，可以使用裝有故障安全型遙控釋放設備的門背鉤裝置。

4.2.3 在走廊艙壁上，允許在住室和公共處所的門上和門之下開設通風開口。在通往盥洗室、辦公室、配膳室、儲物櫃和儲藏室的“B”級門上也允許設置通風開口。除如下列的許可外，開口應只設在門的下半部。如此種開口是開在門上或門之下時，則一個或幾個此種開口的總淨面積不得超過 0.05 m^2 。作為替代，允許在客艙和走廊之間和位於衛生設施之下佈設不燃空氣平衡導管，但這種導管的截面積不得超過 0.05 m^2 。除門之下的通風口外，通風開口必須裝有不燃材料製成的百葉柵。

4.2.4 水密門不需隔熱。

5 機器處所限界面上開口的保護

5.1 適用範圍

5.1.1 本款的規定應適用於A類機器處所以及主管機關認為需要的其他機器處所。

5.2 機器處所限界面上開口的保護

5.2.1 天窗、門、通風筒、煙囪上供排氣通風用的開口和機器處所的其他開口的數量應減少到與通風和船舶正常安全工作需要相符的最低數。

5.2.2 天窗應為鋼質，且不得含有玻璃嵌板。

5.2.3 應設置關閉動力操縱門或啟動動力操縱水密門以外的門的釋放裝置的控制設施。該控制設施應位於有關處所的外面，且在其所服務的處所失火時不致被切斷。

5.2.4 在客船上，第5.2.3款所要求的控制設施應位於一個控制位置或集中於主管機關認為滿意的儘可能少的位置內。此種位置應具有通往開敞甲板的安全通道。

5.2.5 在客船上，除動力操縱的水密門外，門應佈置成當所在處所失火時，能夠由動力操縱的關閉裝置，或由能在門朝關閉的反方向傾斜3.5°時關閉的裝有帶遙控釋放裝置的故障安全型門背鈎的自閉門，保證其確實正向關閉。緊急脫險通道的門不必安裝故障安全型門背鈎裝置和遙控釋放裝置。

5.2.6 在機器處所的限界面上不得設窗。但是，這並不排除在機器處所的控制室使用玻璃。

6 貨物處所限界面的保護

6.1 在載客超過36人的客船上，特種處所和滾裝處所的限界面艙壁和甲板應隔熱至“A-60”級標準。但是，如果分隔的一側為第2.2.3款所定義的第(5)、(9)和(10)類處所，則該標準可降至“A-0”級。如果燃油艙位於特種處所的下面，則兩處所間甲板的完整性可降至“A-0”級標準。

6.2 在載客不超過36人的客船上，特種處所的限界面艙壁應按表9.3中對第(11)類處所的要求予以隔熱，而水平限界面應按表9.4中對第(11)類處所的要求予以隔熱。

6.3 在載客不超過36人的客船上，閉式和開式滾裝處所的限界面艙壁和甲板應具有表9.3中對第(8)類處所要求的耐火完整性，其水平限界面應具有表9.4中對第(8)類處所要求的耐火完整性。

6.4 在客船上，應在駕駛室內設置指示器，該指示器應能指示出任何通往特種處所的門是否關閉。

6.5 在液貨船上，為保護裝載閃點不超過60°C的原油和石油產品的液貨艙，閥門、裝置、液艙開口蓋、貨物透氣管道和液貨管道不得使用隨時會發生遇熱失效的材料，以防止火災蔓延到貨物。

7 通風系統

7.1 導管和擋火閘

7.1.1 通風導管應由不燃材料製造。但一般長度不超過2 m且有效截面積不超過0.02 m²的短節導管，如符合下列條件，則不必使用不燃材料：

- 1 導管由低播焰性材料製成；
- 2 導管只用在通風裝置的末端；和
- 3 導管的敷設位置，縱向距“A”或“B”級分隔包括連續“B”級天花板上的開口不小於600 mm。

7.1.2 下列佈置應按《耐火試驗程序規則》進行試驗：

- 1 擋火閘，包括其相關操作裝置；和
- 2 貫穿“A”級分隔的導管穿透。但是，如果鋼套管通過鉚接、栓接法蘭或焊接直接與通風導管連在一起，則不要求進行試驗。

7.2 導管的佈置

7.2.1 A類機器處所、車輛處所、滾裝處所、廚房、特種處所和貨物處所的通風系統一般應彼此獨立並與服務於其他處所的通風系統

分開。但小於4,000總噸的貨船和載客不超過36人的客船的廚房通風系統不必完全獨立，而可以利用服務於其他處所的通風裝置通過分開的通風導管加以通風。無論哪種情況，在廚房通風導管靠近通風裝置處應裝設自動擋火閘。服務於A類機器處所、廚房、車輛處所、滾裝處所或特種處所的通風導管不得穿過起居處所、服務處所或控制站，除非其符合下列第7.2.1.1.1至7.2.1.1.4款或第7.2.1.2.1和7.2.1.2.2款規定的條件：

- .1.1 導管為鋼質，如其寬度或直徑為300 mm及以下，管壁厚度至少為3 mm，如其寬度或直徑為760 mm及以上，管壁厚度至少為5 mm；如導管寬度或直徑在300 mm和760 mm之間，則管壁厚度由內插法求得；
- .1.2 導管有適當的支承和加強；
- .1.3 導管在靠近穿過限界面處設有自動擋火閘；和
- .1.4 通風導管從機器處所、廚房、車輛處所、滾裝處所或特種處所到每一擋火閘以外至少5 m處隔熱至“A-60”級標準；

或

- .2.1 導管係以符合第7.2.1.1.1和7.2.1.1.2款的鋼材製造；和
- .2.2 整個起居處所、服務處所或控制站內的導管均隔熱至“A-60”級標準；

但主區分隔上的貫穿還應符合第4.1.1.8款的要求。

7.2.2 用於起居處所、服務處所或控制站的通風導管不得穿過A類

機器處所、廚房、車輛處所、滾裝處所或特種處所，除非其符合下列第7.2.2.1.1至7.2.2.1.3款或第7.2.2.2.1和7.2.2.2.2款規定的條件：

- .1.1 穿過A類機器處所、廚房、車輛處所、滾裝處所或特種處所的通風導管係以符合第7.2.1.1.1和7.2.1.1.2款的鋼材製造；
- .1.2 在靠近穿透限界面位置安裝自動擋火閘；和
- .1.3 機器處所、廚房、車輛處所、滾裝處所或特種處所的耐火完整性在貫穿處得以保持；或
- .2.1 穿過A類機器處所、廚房、車輛處所、滾裝處所或特種處所的通風導管係以符合第7.2.1.1.1和7.2.1.1.2款的鋼材製造；和
- .2.2 機器處所、廚房、車輛處所滾裝處所或特種處所內的通風導管隔熱至“A-60”級標準；

但主區分隔上的貫穿還應符合第4.1.1.8款的要求。

7.3 導管貫穿的細節

7.3.1 如果有效截面積等於或小於 0.02 m^2 的薄板導管穿過“A”級艙壁或甲板，開口應襯有厚度至少為3 mm，長度至少為200 mm的鋼套管，該套管在艙壁的兩側各100 mm為佳，或者，如果穿過甲板，完全位於被穿甲板的底側。如果有效截面積超過 0.02 m^2 的通風導管穿過“A”級艙壁或甲板，開口應襯有鋼套管。但是，如果這種導管為鋼結構並穿過甲板或艙壁，導管和套管應符合下列要求：

- .1 導管應至少厚3 mm，長900 mm。當穿過艙壁時，此長度應以在艙壁兩側各450 mm為佳。這些導管或所襯套管應加以隔熱。該隔熱應至少與導管所穿艙壁或甲板具有相同的耐火完整性；和
- .2 有效截面積超過0.075 m²的導管除應符合第7.3.1.1款的要求外，還應裝設擋火閘。擋火閘應自動工作，但亦應能從艙壁或甲板的兩側手動關閉。擋火閘應裝有能指示擋火閘開閉的指示器。如果導管穿過由“A”級分隔所環圍的處所，但不服務於這些處所，只要這些導管具有與其所穿透的分隔相同的耐火完整性，則不要求設擋火閘。擋火閘應易於接近。如果擋火閘位於天花板或襯板的後面，這些天花板或襯板上應設置檢修門，在門上設置標明擋火閘識別號的標牌。擋火閘的識別號還應置於所要求的任何遙控裝置上。

7.3.2 穿過“B”級艙壁的有效截面積超過0.02 m²的通風導管應襯有長度至少為900 mm的鋼套管，除非此套管整個長度上均為鋼質，其在艙壁的兩側的長度以各450 mm為佳。

7.4 載客超過36人的客船上的通風系統

7.4.1 載客超過36人的客船上的通風系統應符合下列附加要求。

7.4.2 通風機的分佈，一般應使通往各處的通風導管保持在同一主豎區內。

7.4.3 如果通風系統穿過甲板，除應採取與第3.1和4.1.1.5款所要求的甲板耐火完整性有關的預防措施外，還應採取預防措施減少煙及熾熱氣體通過該系統從一甲板間處所流至另一甲板間處所的可能

性。除第7.4款中的隔熱要求外，垂直導管在必要時還應按表9.1和9.2的要求進行隔熱。

7.4.4 除貨物處所外，通風導管應用下列材料製造：

- .1 有效截面積不小於 0.075 m^2 的導管和用於超過一個甲板間處的所有垂直導管，應用鋼或其他等效材料製造；
- .2 除第7.4.4.1款所述的垂直導管外的有效截面積小於 0.075 m^2 的導管，應用不燃材料製造。如果這些導管穿過“A”級或“B”級分隔，應充分考慮保證該分隔的耐火完整性；和
- .3 有效截面積不超過 0.02 m^2 ，長度不超過2 m的短節導管，如符合下列所有條件，則不必使用不燃材料：
 - .3.1 導管由低播焰性材料製造；
 - .3.2 導管只用作通風系統的末端；和
 - .3.3 導管的敷設位置，縱向距“A”級或“B”級分隔包括連續“B”級天花板上的開口不小於600 mm。

7.4.5 梯道環圍應由獨立的風扇和不服務於通風系統中任何其他處所的導管系統進行通風。

7.4.6 排氣導管應設置檢查和清潔孔。檢查和清潔孔的位置應靠近擋火閘。

7.5 廚房爐灶的排氣管道

7.5.1 對載客超過36人的客船的要求

廚房爐灶的排氣管道應符合第7.2.1.2.1和7.2.1.2.2款的要求，並應安裝：

- .1 一個易於拆下清洗的集油器，除非裝有認可的油垢清除裝置作為替代；
- .2 一個位於排氣導管下端的自動和遙控操作的擋火閘，此外，還應有一個遙控操作的擋火閘位於排氣導管上端；
- .3 用於撲滅排氣導管內火災的固定裝置；
- .4 用於切斷排氣風機和供氣風機、用於操作第7.5.1.2款所述的擋火閘和用於操作滅火系統的遙控裝置，這些裝置應佈置在接近廚房入口的位置。如果所安裝的排氣系統具有若干分支，則應設置能在滅火劑施放到該系統前將通向同一主排氣導管的所有分支管道封閉的遙控裝置，與上述控制裝置安排於同一位置；和
- .5 適當分佈的檢查和清潔孔。

7.5.2 對貨船和載客不超過36人的客船的要求

7.5.2.1 如果廚房爐灶的排氣導管穿過起居處所或內含可燃材料的處所，該導管應按“A”級分隔製造。每一排氣導管應裝有：

- .1 一個易於拆下清洗的集油器；
- .2 一個位於導管下端的擋火閘；
- .3 能夠在廚房內操縱的關閉抽風機的裝置；和
- .4 用於撲滅排氣導管內火災的固定裝置。

第10條

滅火

1 目的

本條旨在抑制火災並將火災迅速撲滅在火源處。為此，應符合下列功能要求：

- .1 應安裝固定式滅火系統，並充分考慮到受保護處所火災的可能蔓延；和
- .2 滅火器材應隨時可用。

2 供水系統

船舶應配備符合本條所適用要求的消防泵、消防總管、消火栓和消防水帶。

2.1 消防總管和消火栓

2.1.1 總則

遇熱易於失效的材料，除非有充分的保護，不得用作消防總管和消火栓。管子和消火栓的位置應便於連接消防水帶。管子和消火栓的佈置應防止凍結的可能性。消防總管應配有適當的排水設施。用於消防以外目的的所有開敞甲板消防總管的支管應裝有隔離閥。在可能載運甲板貨物的船上，消火栓的位置應隨時易於接近，消防管的佈置應儘實際可能避免被甲板貨物損壞的危險。

2.1.2 保障隨時供水

保障隨時供水的佈置應為：

- .1 對於下列客船：
 - .1.1 1,000總噸及以上的客船，至少從內部位置的任何消火栓上立即獲得一股有效的水柱，並保證由一台所要求的自動啟動的消防泵持續出水；
 - .1.2 1,000總噸以下的客船，至少有一台自動啟動的消防泵或至少有一台由駕駛室遙控啟動的消防泵。如果消防泵為自動啟動，或消防泵的底閥不能在遙控啟動的位置開啟，底閥應保持在常開的位置；和
 - .1.3 如果按第II-1/54條設置有周期無人值班機器處所，主管機關應對這些處所按等效於通常有人值班機器處所的要求，確定配備固定式噴水滅火系統；
- .2 對於貨船：
 - .2.1 使主管機關滿意；和
 - .2.2 在設置有周期無人值班機器處所或僅要求一人值班的貨船上，應通過遙控啟動一台能由駕駛室或消防控制站（如有）遙控啟動的主消防泵，或通過由主消防泵之一對消防總管系統給予永久性增壓的方法，從消防總管系統在適當壓力下立即供水；但對1,600總噸以下的貨船，如消防泵在機器處所的啟動裝置的位置易於到達，主管機關可免除此要求。

2.1.3 消防總管的直徑

消防總管和消防水管的直徑應足以有效地從兩台同時工作的消防泵輸送所需的最大水量；但如係貨船，其直徑僅需足以輸送 $140 \text{ m}^3/\text{h}$ 的水量。

2.1.4 隔離閥和減壓閥

2.1.4.1 用於將內設主消防泵或泵組的機器處所中的消防總管部分與消防總管其他部分分開的隔離閥，應設於機器處所之外易於到達並站得住的位置。消防總管應佈置成，當隔離閥關閉時，船上除上述機器處所內的消防栓以外的所有消火栓能由另一消防泵或一台應急消防泵供水。應急消防泵、其海水入口、吸水和輸水管及隔離閥應位於機器處所的外面。如果這種佈置無法做到，並且該閥門係從與應急泵在同一艙室的位置遙控，同時吸水管是儘可能的短，則可在機器處所安裝通海吸水箱。吸水管或排水管的一小部分長度可以貫穿機器處所，但它們必須絕大部分由鋼外套包裹，或隔熱至“A-60”級標準。管子應有相當的壁厚，無論如何不得低於 11 mm ，並且，除與海水進口閥門的連接採用法蘭外，應焊接而成。

2.1.4.2 應為每一消火栓裝設閥門，以便當消防泵工作時可以拆卸任何消防水帶。

2.1.4.3 如果消防泵能夠產生超出消防水管、消火栓和水帶設計壓力的壓力，應在消防泵上附設減壓閥。這些減壓閥的佈置和調節應能避免在消防總管系統的任何部分出現過度的壓力。

2.1.4.4 在液貨船上，隔離閥應裝設在尾樓前端消防總管上的受保護位置並以不超過 40 m 的間距分佈於液貨艙甲板上，以在發生火災或爆炸時維持消防總管系統的完整性。

2.1.5 消火栓的數量和位置

2.1.5.1 消火栓的數目和位置應為，至少能有兩股從不同消火栓噴射出的水柱，其中一股僅靠一根消防水帶的長度可射至船舶在航行時乘客或船員經常到達的任何部分、任何貨物處所空艙時的任何部分、任何滾裝處所或任何車輛處所，在後者的情況下，兩股水柱中每股應均能靠一根消防水帶射至處所的任何部分。此外，上述消防栓應位於靠近被保護處所的出入口處。

2.1.5.2 除第2.1.5.1款的要求以外，客船還應符合下列要求：

- .1 在起居處所、服務處所和機器處所，當所有水密門和所有主豎區艙壁上的門均關閉時，消防栓的數目和位置應符合第2.1.5.1款的要求；和
- .2 如從與A類處所相鄰的軸隧至A類機器處所在下層位置設有通道，則應在該機器處所出入口之外但在其附近設置兩支消火栓。如從其他處所至A類機器處所設有此類通道，則應在那些處所中的一個處所靠近A類機器處所出入口之處設置兩支消火栓。若軸隧或相鄰處所不屬於脫險通道部分，則不必考慮上述措施。

2.1.6 消火栓的壓力

在兩泵同時通過第2.3.3款規定的水槍從任何相鄰的消火栓輸送第2.1.3款所規定的水量時，在所有消火栓內應維持下述最低壓力：

- .1 對於客船：

4,000總噸及以上 0.40 N/mm²

4,000總噸以下 0.30 N/mm² ;

.2 對於貨船：

6,000總噸及以上 0.27 N/mm²

6,000總噸以下 0.25 N/mm² ; 和

.3 任何消火栓內的最大壓力不得超過有效控制消防水帶時所能顯示的壓力。

2.1.7 國際通岸接頭

2.1.7.1 500總噸及以上的船舶應設有至少一個符合《消防安全系統規則》的國際通岸接頭。

2.1.7.2 應備有使此種接頭能用於船舶任何一舷的設施。

2.2 消防泵

2.2.1 可接受作為消防泵的泵

衛生泵、壓載泵、艙底泵或通用泵均可接受作為消防泵，條件是它們通常不用來泵送油類，如果它們偶爾用於駁運或泵送燃油，則要裝有適合的轉換裝置。

2.2.2 消防泵的數目

船舶應按下述要求配備獨立驅動的消防泵：

.1 對於客船：

4,000總噸及以上 至少3台

4,000總噸以下 至少2台

.2 對於貨船：

1,000總噸及以上 至少2台

1,000總噸以下 至少2台電動泵，其中之一應為獨立
驅動。

2.2.3 消防泵和消防總管的佈置

2.2.3.1 消防泵

通海連接件、消防泵及其電源的佈置應保證：

- .1 在1,000總噸及以上的客船上，在任何一個艙室失火時，不使所有消防泵失去作用；和
- .2 在1,000總噸以下的客船和在貨船上，如果任何一個艙室失火時可能使所有消防泵失去作用，應配備由符合《消防安全系統規則》規定的應急消防泵組成的替代措施，其電源和通海連接件位於主消防泵或其電源處所之外。

2.2.3.2 對應急消防泵所在處所的要求

2.2.3.2.1 處所的位置

應急消防泵所在處所不得鄰接A類機器處所或內有主消防泵的處所的限界面。如此種佈置不可行時，兩個處所間共用的艙壁應隔熱至相當於對控制站所要求的結構防火標準。

2.2.3.2.2 通往應急消防泵的通道

在機器處所與應急消防泵及其電源所在處所之間，不允許有直接通道。如果這樣不可行，主管機關可以接受這樣的佈置：通道有一個

帶氣鎖的裝置，機器處所的門為“A-60”級標準，而另一門至少為鋼質，兩門均應適度氣密、自閉且不設門背鉤。作為替代，通道可設有能從遠離機器處所和應急消防泵所在處所的位置操作的水密門，且在這些處所失火時該位置不易被切斷。在此種情況下，應急消防泵及其電源所在處所應設有第二個通道。

2.2.3.2.3 應急消防泵處所的通風

應急消防泵獨立電源所在處所的通風應佈置成儘可能避免機器處所失火時產生的煙進入或被吸入該處所的可能性。

2.2.3.3 貨船的附加泵

此外，在貨船上，如機器處所設置有其他泵，如通用泵、艙底泵和壓載泵等，其佈置應保證這些具有第2.1.6.2和2.2.4.2款所要求的排量和壓力的泵中，有一台泵能夠向消防總管供水。

2.2.4 消防泵的排量

2.2.4.1 所要求消防泵的總排量

所要求的消防泵應能夠按第2.1.6款所規定的壓力輸送以下數量的消防用水：

- .1 在客船上的泵，其總排量不少於各艙底泵用於艙底抽水時所需排量的三分之二；和
- .2 在貨船上的泵，除應急泵外，其總排量不少於按第II-1/21條對同樣尺度的客船每一獨立艙底泵用於艙底抽水時所需排量的四分之三；但任何貨船的消防泵的總排量不必超過180 m³/h。

2.2.4.2 每台消防泵的排量

所要求的每台消防泵(按第2.2.3.1.2款對貨船要求的任何應急泵除外)，其排量應不少於所要求總排量的80%除以所要求的最少消防泵數，但在任何情況下不得少於25 m³/h，並且每台此種消防泵至少應能在任何情況下提供所要求的兩股水柱。這些消防泵應能夠按所要求的條件向消防總管系統供水。如安裝的泵數多於所要求的最低數量，則這些額外的泵的排量應至少為25 m³/h，並且至少應能夠提供第2.1.5.1款所要求的兩股水柱。

2.3 消防水帶和水槍

2.3.1 一般規格

2.3.1.1 消防水帶應由經主管機關認可的不腐蝕材料製成，並應具有足夠的長度將水柱噴射到可能需要使用的任何處所。每條消防水帶應配有一支水槍和必要的接頭。在本章中明確為“消防水帶”的水帶，應與其必要的配件和工具一起，存放在其供水消火栓或接頭附近的明顯位置，以備隨時取用。此外，在載客超過36人的客船上的各內部處所，消防水帶應一直保持與消火栓相連接。消防水帶的長度應至少為10 m，但不超過下列長度：

- .1 機器處所，15 m；
- .2 其他處所和開敞甲板，20 m；和
- .3 最大型寬超過30 m船舶的開敞甲板，25 m。

2.3.1.2 除非船上每一消火栓備有一根消防水帶和一支水槍，否則各消防水帶接頭與各水槍應能完全互換使用。

2.3.2 消防水帶的數量和直徑

2.3.2.1 船舶應備有消防水帶，其數量和直徑應使主管機關滿意。

2.3.2.2 在客船上，第2.1.5款所要求的每個消火栓應至少配有一根消防水帶，並且這些水帶應只用於滅火或在消防演習和檢驗時試驗滅火設備。

2.3.2.3 在貨船上：

.1 對於1,000總噸或以上的貨船，需配備的消防水帶數量應為每30 m船長配備一根和一根備用，但是無論如何總數不得少於5根。這一數量不包括任何機艙或鍋爐艙所要求的任何水帶。考慮到船舶類型和船舶所從事貿易的性質，主管機關可以增加所要求消防水帶的數量，以保證隨時能夠使用足夠數量的消防水帶。按照第19條要求載運危險貨物的船舶除應符合上述要求外，還應備有3組水帶和水槍；和

.2 對於1,000總噸以下的貨船，需配備消防水帶的數量應按第2.3.2.3.1款的規定進行計算。但是，無論如何水帶的數量不得少於3根。

2.3.3 水槍的尺寸和類型

2.3.3.1 就本章而言，標準水槍的尺寸應為12 mm、16 mm和19 mm或儘可能與之相近。主管機關可自行決定允許使用更大直徑的水槍。

2.3.3.2 在起居處所和服務處所，不必使用尺寸大於12 mm的水槍。

2.3.3.3 在機器處所和外部處所，水槍的尺寸應能從最小的泵在第2.1.6款所述的壓力下的兩股水柱中獲得最大限度的出水量，但不必使用大於19 mm的水槍。

2.3.3.4 水槍應為經認可的設有關閉裝置的兩用型（即水霧/水柱型）。

3 手提式滅火器

3.1 型式和設計

手提式滅火器應符合《消防安全系統規則》的要求。

3.2 滅火器的佈置

3.2.1 起居處所、服務處所和控制站內應配備使主管機關滿意的適當型式和足夠數量的手提式滅火器。1,000總噸及以上的船舶應至少備有5隻手提式滅火器。

3.2.2 擬用於任何處所的手提式滅火器，其中應有一隻存放在該處所的入口附近。

3.2.3 不得在起居處所內安放二氧化碳滅火器。控制站和船舶安全所必需的電氣或電子設備或裝置所在的其他處所，所配備的滅火器應使用既不導電也不對設備和裝置產生危害的滅火劑。

3.2.4 滅火器應位於易於看到的位置，以便隨時可用；這些位置應能在一旦失火時迅速和易於到達，且滅火器的可用性不會受到天氣、震動或其他外部因素的妨礙。手提式滅火器應裝有指示其是否已被用過的裝置。

3.3 備用滅火劑

3.3.1 對能夠在船上進行再充的滅火器，備用滅火劑的數量應按前10個滅火器的100%和其他滅火器的50%進行配備。備用滅火劑的總數不必超過60份。船上應攜帶充劑說明。

3.3.2 對於不能在船上加充滅火劑的滅火器，應額外配備上述第3.3.1款所確定的相同總量、型式、能力和數量的手提式滅火器以代替備用滅火劑。

4 固定式滅火系統

4.1 固定式滅火系統的類型

4.1.1 本條第5款所要求的固定式滅火系統可為下列任何系統：

- .1 符合《消防安全系統規則》規定的固定式氣體滅火系統；
- .2 符合《消防安全系統規則》規定的固定式高倍泡沫滅火系統；和
- .3 符合《消防安全系統規則》規定的固定式壓力水霧滅火系統。

4.1.2 如果裝有非本章要求的固定式滅火系統，則其應符合本章有關條款和《消防安全系統規則》的要求。

4.1.3 禁止使用以鹵代烴1211、1301和2402以及全氟化碳為滅火劑的滅火系統。

4.1.4 一般而言，主管機關應不允許在固定式滅火系統中使用蒸汽作為滅火劑。如果主管機關允許使用蒸汽，應只用於限定區域內作為所要求滅火系統的附加滅火措施，並應符合《消防安全系統規則》的要求。

4.2 固定式滅火系統的關閉裝置

如使用固定式滅火系統，可以允許空氣進入或允許氣體排出的受保護處所的開口應能夠從該處所外部予以關閉。

4.3 滅火劑儲存室

如果滅火劑儲存在受保護處所的外面，則應儲存在前防撞艙壁後面的艙室內，且該艙室不作其他用途。此種儲存室的任何入口最好應開向開敞甲板，並獨立於受保護處所。如果儲存室位於甲板以下，則儲存室的位置不得低於開敞甲板下一層甲板，並應能由梯道或梯子從開敞甲板直接進出。位於甲板下的處所或未設置從甲板出入的處所，應設置機械通風系統，用於排出該處所底部的廢氣，並且通風系統的大小應能做到至少每小時換氣6次。出入口的門應向外開啟，並且在這種儲存室和毗連圍蔽處所之間構成限界面的艙壁和甲板，包括門和關閉其任何開口的其他措施，均應為氣密。在應用表9.1至9.8時，此類儲存室應作為防火控制站對待。

4.4 其他滅火系統的水泵

除那些服務於消防總管的泵外，要求為本章所要求的滅火系統供水的泵、其電源及其控制裝置應安裝在該系統所保護的處所的外部，且應佈置成在所保護的處所失火時，不會造成任何此種系統停止工作。

5 機器處所的滅火佈置

5.1 內置燃油鍋爐或燃料油裝置的機器處所

5.1.1 固定式滅火系統

內置燃油鍋爐或燃油裝置的A類機器處所，應設置第4.1款中的任何固定式滅火系統之一。在每種情況下，若機艙和鍋爐艙沒有完全分隔，或燃油能從鍋爐艙流入機艙，則機艙和鍋爐艙應作為一個艙室加以考慮。

5.1.2 附加滅火佈置

5.1.2.1 每一鍋爐艙內或鍋爐艙入口外側至少應設置一套符合《消防安全系統規則》規定的手提式泡沫噴施裝置。

5.1.2.2 每一鍋爐艙內的每一生火處所和部分燃油裝置所在的每一處所，至少應設置2具泡沫型手提式滅火器或其等效物。在每一鍋爐艙內應設置不少於一具容量至少為135升的經認可的泡沫型或與之等效的滅火器。這些滅火器應備有繞在捲筒上足以到達鍋爐艙任何部位的軟管。對於船上小於175 kW的生活用鍋爐，可不要求容量至少為135升的經認可的泡沫型滅火器。

5.1.2.3 每一生活處所應置有一個容器，內裝至少0.1 m³的沙、浸透蘇打的鋸屑或其他認可的乾燥物，並配有一把合適的鍬用於揚撒這些乾燥物。亦可由一具經認可的手提式滅火器作為替代。

5.2 置有內燃機的處所

5.2.1 固定式滅火系統

內部置有內燃機的A類處所應配有第4.1款中規定的固定式滅火系統之一。

5.2.2 附加滅火佈置

5.2.2.1 至少應配有一套符合《消防安全系統規則》規定的手提式泡沫噴施裝置。

5.2.2.2 在每一此種處所內，應配有每隻容量至少45升的經認可的泡沫滅火器或等效設備，其數量足以使泡沫或等效物能射到燃油和潤滑油壓力系統、傳動裝置和其他有失火危險的任何部分。此外，還應

配有足夠數量的手提式泡沫滅火器或等效設備，其佈置應使該處所內任何一點到達1具滅火器的步行距離不大於10 m，並且每一此種處所至少應有2具此種滅火器。對於貨船的較小處所，主管機關可以考慮放寬此項要求。

5.3 置有氣輪機或閉式蒸汽機的處所

5.3.1 固定式滅火系統

置有總輸出功率不少於375 kW的氣輪機或閉式蒸汽機的處所，不論此項機器用於主推進或用於其他目的，如果此種處所周期性無人值班，應配有第4.1款規定的固定式滅火系統之一。

5.3.2 附加滅火佈置

5.3.2.1 應配有每隻容量至少為45升的經認可的泡沫滅火器或等效設備，其數量足以使泡沫或其等效物能射到壓力潤滑系統的任何部分、氣輪機、發動機或其傳動裝置的壓力潤滑部分的封閉罩殼以及其他有失火危險的任何部分。但是，如果按第4.1款安裝的固定式滅火系統對上述處所提供的保護至少等效於本款所提供的保護，則應不再要求上述滅火器。

5.3.2.2 應配有足夠數量的手提式泡沫滅火器或等效裝置，其佈置應使該處所的任何一點到達一具滅火器的步行距離不大於10 m，並且每一此種處所至少應有2具此種滅火器，但若安裝的滅火器符合第5.1.2.2款的要求，則不必要求增配上述滅火器。

5.4 其他機器處所

如果主管機關認為存在失火危險的任何機器處所，其滅火設備在

第5.1、5.2和5.3款無明確規定，則應在該處所或其相鄰處所設置主管機關認為數量足夠的經認可的手提滅火器或其他滅火裝置。

5.5 對客船的附加要求

在載客超過36人的客船上，其每一A類機器處所應至少設有2隻適宜的細水霧槍。

5.6 固定式局部滅火系統

5.6.1 第5.6款應適用於500總噸及以上客船和2,000總噸及以上貨船。

5.6.2 容積超過500 m³的A類機器處所，除應裝設第5.1.1款要求的固定式滅火系統外，還應由一個根據本組織制定的指南認可的型式的固定局部滅火系統或等效局部滅火系統加以保護。如係周期性無人值班機器處所，該滅火系統應能夠自動和手動釋放。如係持續有人值班的機器處所，只要求該滅火系統能夠手動釋放。

5.6.3 固定式局部滅火系統是為了保護以下處所，無需關閉發動機、撒離人員或對這些處所進行封艙：

- .1 船舶主推進和發電所用的內燃機上有火災危險的部分；
- .2 鍋爐前部；
- .3 焚燒爐有失火危險的部分；和
- .4 加熱燃油淨化器。

5.6.4 任何局部滅火系統啟動時應在所保護的處所和持續有人值班的處所發出可視和特殊的聲響報警信號。該警報應指明所啟動的具

體系統。本款規定的系統報警要求是對本章其他部分要求的探火和失火報警系統的附加，而不是替代。

6 控制站、起居處所和服務處所的滅火佈置

6.1 客船上的噴水器系統

6.1.1 載客超過36人的客船應在所有控制站、起居處所和服務處所，包括走廊和梯道，裝備符合《消防安全系統規則》要求的認可型式的自動噴水器、探火和失火報警系統。作為替代，在水可能對關鍵設備造成損壞的控制站，可以安裝其他類型的認可型式的滅火系統。在較小失火危險的處所，如空艙、公共衛生間、二氧化碳間和類似處所，不必安裝自動噴水器系統。

6.1.2 在載客不超過36人的客船上，當僅在起居處所的走廊、梯道和脫險通道設有符合《消防安全系統規則》規定的固定式探煙和失火報警系統時，應根據第7.5.3.2條安裝自動噴水器系統。

6.2 貨船的噴水器系統

在採用第9.2.3.1.1.2條規定的IIC法的貨船上，應根據第7.5.5.2條的要求安裝自動噴水器、探火和失火報警系統。

6.3 置有易燃液體的處所

6.3.1 油漆間應由下列系統保護：

- .1 二氧化碳系統，設計成能至少放出相當於所保護處所總容積40%的自由氣體；
- .2 乾粉系統，設計能力至少為0.5 kg乾粉/m³；

- .3 灑水或噴水系統，設計能力為每分鐘5 l/m²。灑水系統可連接在船舶消防總管上；或
- .4 主管機關認為能提供等效保護的系統。

在任何情況下，上述系統均應能從所保護的處所外部進行操作。

6.3.2 易燃液體儲藏室應由經主管機關認可的適當滅火佈置予以保護。

6.3.3 對於不通往起居處所的甲板面積小於4 m²的易燃液體儲藏室，可以接受用手提式二氧化碳滅火器代替固定式滅火系統，滅火器應能至少放出相當於所保護處所總容積40%的自由氣體。在儲藏室上應設置噴施孔，以便不進入受保護處所就可用滅火器向內噴施。所要求的手提滅火器應存放在噴施孔附近。作為替代，可以佈設噴施孔或水帶接頭，以便於使用消防總管的水。

6.4 深油烹調設備

深油烹調設備應裝有下列裝置：

- .1 經按本組織所接受的國際標準試驗的自動或手動滅火系統；
- .2 一個主恆溫器和一個後備恆溫器，兩個恆溫器上裝有在故障時向操作人員報警的裝置；
- .3 在滅火系統啟動後自動關閉電源的裝置；
- .4 一個報警裝置，指示在安裝了該設備的廚房內滅火系統的工作情況；和

- .5 滅火系統的手動操作控制器，其上清晰標明船員可隨即使
用。

7 貨物處所的滅火佈置

7.1 用於普通貨物的固定式氣體滅火系統

7.1.1 除第7.2款所規定外，1,000總噸及以上的客船的貨物處所應由符合《消防安全系統規則》規定的固定式二氧化碳滅火系統或固定式惰性氣體滅火系統加以保護，或由能提供等效保護的固定式高倍泡沫滅火系統予以保護。

7.1.2 如果主管機關認為某客船的航程短，致使適用第7.1.1款的要求不合理，以及在1,000總噸以下的船舶上，貨物處所滅火系統的佈置應使主管機關滿意，條件是該船安裝有鋼質艙口蓋和關閉所有通風口及其他通往貨物處所的開口的有效裝置。

7.1.3 除滾裝處所和車輛處所外，2,000總噸及以上的貨船上的貨物處所應由符合《消防安全系統規則》規定的固定式二氧化碳滅火系統或固定式惰性氣體滅火系統加以保護，或由能提供等效保護的滅火系統予以保護。

7.1.4 對於建造用於和擬專門用作載運礦砂、煤、糧食、未乾燥的木材、非易燃貨物或主管機關認為具有低失火危險的貨物的任何貨船，主管機關可免除第7.1.3和第7.2款對其貨物處所的要求。只有在船舶安裝有鋼質艙口蓋和關閉所有通風口及其他通往貨物處所的開口的有效裝置時方可准予上述免除。當准予此種免除時，主管機關應根據第I/12(a)(vi)條簽發《免除證書》，不管有關船舶何時建造，並應保證《免除證書》附有船舶准許載運貨物種類的清單。

7.2 危險貨物的固定式氣體滅火系統

在任何貨物處所載運危險貨物的船舶應置有符合《消防安全系統規則》規定的固定式二氧化碳滅火系統或固定式惰性氣體滅火系統，或置有主管機關認為能為所載運貨物提供等效保護的滅火系統。

8 液貨艙保護

8.1 固定式甲板泡沫滅火系統

8.1.1 20,000載重噸及以上的液貨船應安裝符合《消防安全系統規則》要求的固定式甲板泡沫滅火系統，但主管機關在對船舶的佈置和設備給予考慮後，可以根據第I/5條接受其他固定裝置以代替上述要求，只要這些裝置能提供與上述系統等效的保護。對替代固定裝置的要求應符合第8.1.2款的要求。

8.1.2 如果主管機關根據第8.1.1款接受使用等效固定裝置代替固定式甲板泡沫滅火系統，該裝置應：

- .1 能夠撲滅溢油失火，並能防止尚未着火的溢油着火；和
- .2 能夠撲滅破裂液貨艙內的火災。

8.1.3 低於20,000載重噸的液貨船應安裝符合《消防安全系統規則》要求的固定式甲板泡沫滅火系統。

9 液貨船上的液貨泵艙的保護

9.1 固定式滅火系統

每一液貨泵艙應裝有下列固定式滅火系統之一，且可以在液貨泵艙外部的一個隨時可到達位置進行操作。液貨泵艙應裝有一個適合於A類機器處所的滅火系統。

9.1.1 一個符合《消防安全系統規則》規定的二氧化碳滅火系統，並連同下列要求：

- .1 釋放滅火劑時發出聲響的報警裝置應能安全用於易燃貨物蒸氣/空氣混合物中；和
- .2 在控制器上應標有提示，說明由於靜電着火危險，本系統只能用於滅火而不能用於惰化的目的。

9.1.2 一個符合《消防安全系統規則》規定的高倍泡沫滅火系統，條件是泡沫濃縮劑的供給應適合撲滅所載貨物的火災。

9.1.3 一個符合《消防安全系統規則》規定的固定式壓力噴水滅火系統。

9.2 滅火劑的數量

如果用於液貨泵艙系統的滅火劑也用於為其他處所服務的系統，則所配備的滅火劑數量或其施放率不必超過最大艙室所需的最大量。

10 消防員裝備

10.1 消防員裝備的型式

消防員裝備應符合《消防安全系統規則》。

10.2 消防員裝備的數量

10.2.1 船舶應攜帶至少兩套消防員裝備。

10.2.2 此外，在客船上：

- .1 對設有乘客處所和服務處所的甲板，按其乘客處所和服務處所的合計長度，或如果這種甲板多於一層，按其甲板乘客處

所和服務處所合計長度最大一層的長度，每80 m（不足80 m以80 m計）應備有兩套消防員裝備和兩套個人配備，每套個人配備都包括《消防安全系統規則》中所規定的項目。對載客超過36人的客船，每一主豎區內應增配兩套消防員裝備。

但對於構成獨立主豎區的梯道環圍和不含第9.2.2.3條所定義的第（6）、（7）、（8）或（12）類處所的船艙或船艙上的主豎區，不要求增配消防員裝備；和

- .2 在載客超過36人的客船上，應為每副呼吸器配有一枝水霧槍，水霧槍應存放在呼吸器鄰近。

10.2.3 此外，在液貨船上，應配備兩套消防員裝備。

10.2.4 主管機關在充分考慮到船舶的大小和類型後，可以要求增加個人配備和呼吸器的數量。

10.2.5 每副所要求的呼吸器應配備兩個備用充氣瓶。載客不超過36人的客船以及在適當的位置裝有用於無污染加充全部氣瓶的設備的貨船，每副所要求的呼吸器只應配備一個備用充氣瓶。在載客超過36人的客船上，每副呼吸器應至少配備兩個備用充氣瓶。

10.3 消防員裝備的存放

10.3.1 消防員裝備和個人配備應存放於易於到達的位置，隨時可用；該位置應有永久和清晰的標誌；如所配備的消防員裝備或個人配備不止一套或一副，應將其遠隔分開存放。

10.3.2 在客船上，應在任一位置上可以獲得至少兩套消防員裝備外加一副個人配備。在每一主豎區內應至少存放兩套消防員裝備。

第11條

結構完整性

1 目的

本條旨在保持船舶的結構完整性，防止由於熱量造成的強度降低而使船舶結構部分或全部破壞。為此，船舶結構中使用的材料應保證結構完整性不會由於失火而削弱。

2 船體、上層建築、結構艙壁、甲板和甲板室的材料

船體、上層建築、結構艙壁、甲板和甲板室應以鋼或其他等效材料建造。在應用第3.43條所給出的鋼或其他等效材料的定義時，“適用的曝火時間”應符合表9.1至9.4給出的完整性和隔熱標準。例如，如果甲板或甲板室側壁和端壁的分隔允許為“B-0”級耐火完整性，則“適用的曝火時間”應為半小時。

3 鋁合金結構

除非第2款中另有規定，若結構的任一部分為鋁合金結構，應符合下列要求：

- .1 “A”級或“B”級分隔的鋁合金部件的隔熱，在標準耐火試驗的任何適用的曝火時間內，應能使結構芯材的溫度升高不超過環境溫度以上200°C，主管機關認為屬於無負荷的結構除外；和
- .2 應特別注意用於支承救生艇筏的存放、降落和登乘區域以及“A”級和“B”級分隔的鋁合金柱、支柱和其他結構部件的隔熱要求，以保證：

.2.1 對用於支承救生艇筏區域和“A”級分隔的構件，3.1款規定的溫升限制應在標準耐火試驗的1小時結束時適用；和

.2.2 對用於支承“B”級分隔的構件，3.1款規定的溫升限制應在標準耐火試驗的半小時結束時適用。

4 A類機器處所

4.1 頂蓋和艙棚

A類機器處所的頂蓋和艙棚應為鋼結構，並應視情按表9.5和9.7的要求予以隔熱。

4.2 地板

A類機器處所的普通通道的地板應由鋼建造。

5 舷外裝置的材料

遇熱易於失效的材料不得用於在火災時由於材料失效可能會造成浸水危險的舷外排水口、衛生間排泄口和其他接近水線的出口。

6 液貨船上承受壓力和真空的液貨艙結構的保護

6.1 通則

透氣裝置的設計和操作應能保證液貨艙內壓力和真空都不超過設計參數，並能使：

- .1 在任何情況下，由於液貨艙內溫度變化所產生的少量蒸氣、空氣或惰性氣體混物流經壓力/真空閥；和
- .2 在液貨裝載和壓載或卸載過程中，大量的蒸氣、空氣或惰性氣體混合物通過。

6.2 用於溫度變化產生的小量氣流的開口

第6.1.1款所要求的壓力釋放口應：

- .1 設在液貨艙甲板以上儘可能高的位置，以獲得易燃氣體的最大擴散，但無論如何，不得低於液貨艙甲板以上2 m；和
- .2 佈置於距含有火源的圍蔽處所的最近進氣口和開口以及可能構成着火危險的甲板機械和設備儘可能遠的地方，但不得小於5 m。錨機和錨鏈艙的開口為構成失火危險處所。

6.3 液貨艙內的安全措施

6.3.1 預防透氣系統中液體上升的措施

應採取預防措施，以防止透氣系統中液體上升至可能超過液貨艙設計壓頭的高度。此事應通過採用高液位報警器、溢流控制系統或其他等效措施，連同獨立測量裝置和液貨艙裝載程序來實現。就本條而言，溢流閥不被視為等效於溢流系統。

6.3.2 壓力/真空釋放的輔助措施

應裝設允許蒸氣、空氣或惰性氣體混合物充分自由流動的輔助措施，防止在第6.1.2款的佈置發生故障時出現超壓或壓力不足。作為替代方式，可以在由第6.1.2款要求措施保護的每一液貨艙內安裝壓力傳感器，傳感器的監測系統設於船舶控制室或通常進行貨物操作的位置。此種監測設備還應設有報警裝置，在探測到液貨艙內出現超壓或壓力不足情況時啟動。

6.3.3 透氣總管的旁通裝置

當第6.1.1款所要求的壓力/真空閥位於透氣總管或桅頂通氣管

上，可以裝設旁通裝置。如果裝有這種旁通裝置，則應有適當的指示器以指示旁通裝置是處於開啟還是關閉位置。

6.3.4 壓力/真空防護裝置

應設有一個或多個壓力/真空保護裝置，以防止液貨艙遭受到：

- .1 在以最大額定能力裝載而所有其他排氣口未打開時，所產生的超過液貨艙試驗壓力的正壓；或
- .2 在以液貨泵的最大額定能力卸載而惰性氣體鼓風機失靈時，所產生的超過700 mm水柱壓力的負壓。

此種防護裝置若未安裝在第4.5.3.1條所要求的透氣系統或各個液貨艙上，則應安裝在惰性氣體總管上。裝置的位置和設計應符合第4.5.3條和本條第6款的要求。

6.4 透氣出口的尺寸

考慮到氣體的膨脹，防止任何液貨艙的壓力超過設計壓力，第6.1.2款所要求的用於液貨裝卸和壓載的透氣出口應根據最大設計裝載速率乘以至少1.25的系數加以設計。應向船長提供關於每一液貨艙最大允許裝載速率的信息，而係組合透氣系統時，則應提供每一組液貨艙的信息。

D部分—脫險

第12條

通知船員和乘客

1 目的

本條旨在將失火情況通知船員和乘客以便安全撤離。為此，應裝備一套通用應急報警系統和一套公共廣播系統。

2 通用應急報警系統

應安裝一個第III/6.4.2條所要求的通用報警系統，用於將失火事項通知船員和乘客。

3 客船上的公共廣播系統

在整個起居處所、服務處所、控制站以及開敞甲板應設有一套符合第III/6.5條要求的公共廣播系統或其他有效通信設施。

第13條

脫險通道

1 目的

本條旨在提供脫險通道，以便船上人員能夠安全迅速撤向救生艇和救生筏登乘甲板。為此，應符合下列功能要求：

- .1 應提供安全脫險通道；
- .2 脫險通道應保持處於安全狀態，內無障礙物；和
- .3 應提供必要的輔助脫險措施，確保其可到達性、標誌清晰，並在設計上能滿足緊急情況的需要。

2 一般要求

2.1 除本條中另有規定外，應為所有處所或處所群至少提供兩條儘量分開並隨時可用的脫險通道。

2.2 不得將升降機視為構成本條所要求的脫險通道之一。

3 控制站、起居處所和服務處所的脫險通道

3.1 一般要求

3.1.1 除機器處所外，所有乘客和船員起居處所以及船員通常使用的處所的梯道和梯子應佈置成，能提供到達救生艇和救生筏登乘甲板的脫險通道。

3.1.2 除本條中另有明確規定外，應禁止設置只有一條脫險通道的走廊、門廳或局部走廊。准許使用船舶實際利用所必需的用於服務處所的端部封閉走廊，如燃油站和橫向供應走廊，但這種端部封閉的走廊必須與船員起居區域分開，且不能從乘客起居處所進入。此外，准許設置深度不超過寬度的一款走廊，可視為凹入或局部延伸。

3.1.3 起居處所、服務處所和控制站內的所有梯道應為鋼框架結構，除非主管機關批准使用其他等效材料。

3.1.4 如果無線電報站沒有直接通往開敞甲板的出口，則該站應設有兩條出入脫險通道，其中之一可為尺寸足夠的舷窗或窗或主管機關滿意的其他設施。

3.1.5 脫險通道上的門一般應向脫險的方向開啟，下列情況除外：

- .1 個別客艙的門可開向客艙內側，以防當門打開時對走廊內的人員造成傷害；和
- .2 垂直緊急脫險圍阱上的門可開向圍阱外側，以使圍阱既能用於脫險也能用於出入。

3.2 客船的脫險通道

3.2.1 艙壁甲板以下處所的脫險通道

3.2.1.1 在艙壁甲板以下每一水密艙或類似的限界處所或處所群，應設置兩條脫險通道，至少其中一條應獨立於水密門。如果所要求的脫險通道獨立於水密門，主管機關可例外地免除船員處所脫險通道中只是偶爾用於進入的那條通道。

3.2.1.2 如果主管機關根據第3.2.1.1款的規定免除了一條脫險通道，則剩下的唯一脫險通道應能提供安全脫險。但是，梯道淨寬不得小於800 mm，梯道兩側應設有扶手。

3.2.2 艙壁甲板以上處所的脫險通道

在艙壁甲板以上每一主豎區或類似的限界處所和處所群，應至少設置兩條脫險通道，至少其中一條應通往形成垂直脫險通道的梯道。

3.2.3 梯道環圍的直接出入口

起居處所和服務處所的梯道環圍應設置直接通向走廊的出入口，且應考慮到緊急情況下可能使用這些出入口的人數所需要的足夠面積，以避免出現擁擠。在這些梯道環圍的周界內，只允許設置公共盥洗室、由不燃材料建成的用於存放安全設備的儲藏室和非封閉服務台。只有公共處所、走廊、升降梯、公共盥洗室、特種處所和所載任何乘客均可進入的開式滾裝處所、第3.2.4.1款所要求的其他脫險梯道以及船舶外部區域，方准許設置直接通向梯道環圍的出入口。用於將圍閉梯道與廚房或主洗衣房分隔開的小走廊或“門廳”可直接通向梯道，但其最小甲板面積應為4.5 m²，寬度不小於900 mm，並設有消防水帶站。

3.2.4 脫險通道的細節

3.2.4.1 第3.2.1.1和3.2.2款所要求的脫險通道中至少應有一條可隨時出入圍閉梯道，此梯道應設置連續的防火遮蔽，該防火遮蔽自其起點的一層一直到達適當的救生艇和救生筏登乘甲板，或者，如果登乘甲板沒有延伸至所考慮的主豎區，則到達最上層露天甲板。在後者情況下，應設置利用外部露天梯道和過道通向登乘甲板的直接通路，沿該通路應設置符合第III/11.5條要求的應急照明和防滑的地面。面向構成脫險通道一部分的外部露天梯道和過道的限界面以及位於在失火時遭受破壞後可能阻礙撤向登乘甲板處的限界面，應具有符合表9.1至9.4的相應耐火完整性，包括隔熱值。

3.2.4.2 應直接或通過具有按表9.1至9.4確定的梯道環圍的相應耐火完整性和隔熱值的受保護內部通道，對自梯道環圍至救生艇和救生閣登乘區域的通道提供保護。

3.2.4.3 只服務於一個處所和該處所的一個陽台的梯道不得視為構成所要求的脫險通道之一。

3.2.4.4 天井內的每一層應有兩個脫險通道，其中之一應能通向符合第3.2.4.1款要求的圍閉垂直脫險通道。

3.2.4.5 脫險通道的寬度、數量和連續性應符合《消防安全系統規則》的要求。

3.2.5 脫險通道的標誌

3.2.5.1 除應符合第II-1/42條和第III/11.5條要求的應急照明外，包括梯道和出口在內的脫險通道應佈置燈光或螢光條形顯示標誌，這些顯示標誌應設在甲板以上不超過300 mm的高度，遍佈脫險通道各點，包括拐彎和岔路口處。顯示標誌應使乘客能辨認出整個脫險通道並迅速斷定脫險通道出口。如果使用電力照明，應由應急電源供電，且其應佈置成任一單個顯示燈出現故障或有一個照明條被切斷時，不會導致顯示標誌失效。脫險通道的標誌和消防設備的位置標識應採用螢光材料製成或用燈光標出。主管機關應保證這些燈光或螢光照明設備的鑑定、試驗和使用符合《消防安全系統規則》。

3.2.5.2 在載客超過36人的客船上，第3.2.5.1款的要求還應適用於船員起居區域。

3.2.6 構成脫險通道部分通常鎖閉的門

3.2.6.1 客艙和特別艙客室的門應不用鑰匙即可從艙室內打開。沿任何指定的脫險路線向脫險方向運動時，途中的任何門也都不需鑰匙即可打開。

3.2.6.2 通常閉着的公共處所通往脫險通道的門應裝有快速鬆開裝置。這種裝置應由一個帶有受到向脫險方向的推力栓銷即鬆開的裝置的門閉機構構成。鬆開機構的設計和安裝應使主管機關滿意，並且特別要符合下列要求：

- .1 包括扳動部分至少橫向延伸到門扉寬度一半的扳動桿或板條，設在甲板以上至少760 mm，但不超過1120 mm；
- .2 在施力不超過67 N時使門閉鬆開；和
- .3 不設任何在施壓後阻止鬆開裝置打開的鎖閉裝置、止動螺絲或其他裝置。

3.3 貨船的脫險通道

3.3.1 總則

在起居處所的各層，從每一限界處所或處所群應至少設置兩條彼此遠離的脫險通道。

3.3.2 最低開敞甲板以下處所的脫險通道

在最低開敞甲板以下，主要的脫險通道應為梯道，而次要的脫險通道可為圍阱或梯道。

3.3.3 最低開敞甲板以上處所的脫險通道

在最低開敞甲板以上，脫險通道應為梯道或通往開敞甲板的門或兩者的組合。

3.3.4 一端封閉的走廊

不允許設置長度超過7 m的一端封閉的走廊。

3.3.5 脫險通道的寬度和連續性

脫險通道的寬度、數量和連續性應符合《消防安全系統規則》的要求。

3.3.6 對兩條脫險通道要求的免除

如果所要求的脫險通道獨立於水密門，主管機關可例外地免除船員處所脫險通道中只是偶爾用於進入的那條通道。

3.4 緊急脫險呼吸裝置

3.4.1 緊急脫險呼吸裝置應符合《消防安全系統規則》。船上應保持備用緊急脫險呼吸裝置。

3.4.2 所有船舶應在起居處所內配備至少兩套緊急脫險呼吸裝置。

3.4.3 在所有客船上的每一主豎區均應配備至少兩套緊急脫險呼吸裝置。

3.4.4 在載客超過36人的所有客船上，除應配備上述第3.4.3款的緊急脫險呼吸裝置外，還應在每一主豎區配備兩套緊急脫險呼吸裝置。

3.4.5 但是，第3.4.3和3.4.4款不適用於構成單獨主豎區的梯道環圍和不含第9.2.2.3條所定義的第（6）、（7）、（8）和（12）類處所的船艙或船艙上的主豎區。

4 機器處所的脫險通道

4.1 客船上的脫險通道

客船上每一機器處所的脫險通道均應符合下列規定。

4.1.1 艙壁甲板以下處所的脫險通道

如果處所位於艙壁甲板以下，兩條脫險通道應為下述二者之一：

- .1 兩部彼此儘可能遠離的鋼梯，通往該處所上部同樣遠離的門，從該門至相應的救生艇和救生筏登乘甲板設有通道。其中一部鋼梯應位於一個受到保護的圍蔽內，該圍蔽符合第9.2.2.3條第（2）類或第9.2.2.4條第（4）類的相應要求，從其服務的處所的下部通至該處所以外的安全位置。在圍蔽內應佈設具有相同耐火完整性的自閉式防火門。鋼梯的安裝方式應使熱量不致通過未隔熱固定點傳入圍蔽內。受保護圍蔽的內部尺寸至少應為800 mm × 800 mm，並應設置應急照明裝置；或
- .2 一部鋼梯，通往該處所上部的門，從該門至登乘甲板設有通道，此外，在該處所下部和遠離上述鋼梯的位置，設有一扇能從兩面操縱的鋼門，它能提供從該處所下部通往登乘甲板的安全脫險通道。

4.1.2 艙壁甲板以上處所的脫險通道

如果處所位於艙壁甲板以上，兩條脫險通道應儘可能彼此遠離，且在該脫險通道的門處應設有通往相應救生艇和救生筏登乘甲板的通道。如果該脫險通道需設梯子，則這些梯子應為鋼質。

4.1.3 對兩條脫險通道要求的免除

在小於1,000總噸的船舶上，主管機關在充分考慮到該處所上部的寬度和佈置後，可免除其中一條脫險通道。在1,000總噸及以上的船舶上，只要該處所（包括通常無人值班的輔機處所）中有一扇門或一

部鋼梯即可提供抵達登乘甲板的安全通道，則主管機關在充分考慮到該處所的性質和位置以及是否經常有人使用後，可免除一條脫險通道。在舵機處所，如果應急操舵位置位於該處所，應提供兩條脫險通道，除非該處所設有直接通向開敞甲板的通道。

4.1.4 機器控制室的脫險通道

位於機器處所的機器控制室應設置兩條脫險通道，其中至少一條能提供一直到機器處所外部的安全位置的連續防火遮蔽。

4.2 貨船的脫險通道

貨船上每一機器處所的脫險通道均應符合下列規定。

4.2.1 A類機器處所的脫險通道

除第4.2.2款規定者外，每一A類機器處所應設置兩條脫險通道。脫險通道特別應符合下列規定之一：

- .1 兩部彼此儘可能遠離的鋼梯，通往該處所上部同樣遠離的門，且從該門至開敞甲板設有通道。其中一部鋼梯應位於一個受到保護的圍蔽內，該圍蔽符合第9.2.3.3條第（4）類的要求，從其服務的處所的下部通至該處所以外的安全位置。在圍蔽內應佈設具有相同耐火完整性的自閉式防火門。鋼梯的安裝方式應使熱量不致通過未隔熱固定點傳入圍蔽內。該圍蔽的內部尺寸至少應為800 mm × 800 mm，並應設置應急照明裝置；或
- .2 一部鋼梯，通往該處所上部的門，從該門至開敞甲板設有通道；此外，在該處所下部和遠離上述鋼梯的位置，設有一扇

能從兩面操縱的鋼門，它能提供從該處所下部通往開敞甲板的安全脫險通道。

4.2.2 對兩條脫險通道要求的免除

在小於1,000總噸的船舶上，主管機關在充分考慮到該處所上部的尺寸和佈置後，可免除第4.2.1款中所要求的一條脫險通道。此外，A類機器處所的脫險通道不必符合第4.2.1.1款所列的防火遮蔽的要求。在舵機處所，如果應急操舵位置位於該處所，應提供兩條脫險通道，除非該處所設有直接通向開敞甲板的通道。

4.2.3 A類以外機器處所的脫險通道

A類以外機器處所應設置兩條脫險通道，但對於只是偶然進入的處所和到門的最大步行距離為5 m或以下的處所可以接受單條脫險通道。

4.3 緊急脫險呼吸裝置

4.3.1 在所有船上的機器處所內，緊急脫險呼吸裝置應位於易於見到的位置，隨時可用；在發生火災時這些位置應能夠迅速而容易地到達。緊急脫險呼吸裝置的存放位置應考慮到機器處所的佈置和通常在該處所工作的人數。

4.3.2 這些裝置的數量和位置應在第15.2.4條所要求的防火控制圖中標出。

4.3.3 緊急脫險呼吸裝置應符合《消防安全系統規則》。

5 客船特種處所和所載任何乘客能夠進入的開式滾裝處所的脫險通道

5.1 在特種處所和所載任何乘客能夠進入的開式滾裝處所，艙壁甲板以上和以下處所的脫險通道數量和位置應使主管機關滿意，並且，通向登乘甲板的通道的安全性一般應等效於第3.2.1.1、3.2.2、3.2.4.1和3.2.4.2款所規定的情況。此類處所應設置通往脫險處所的專用過道，寬度至少為600 mm。車輛的停車佈置應保持過道在任何時候都不受到阻礙。

5.2 通常有船員使用的機器處所的脫險通道之一，應避免直接進入任何特種處所。

6 滾裝處所的脫險通道

通常有船員使用的滾裝處所應設置兩條脫險通道。脫險通道應能夠提供安全通向救生艇和救生筏登乘甲板的通道，並位於該處所的艙部和艙部。

7 對客船的附加要求

7.1 總則

7.1.1 從船上的每一通常有人的處所至集合站均應設置脫險通道。脫險通道的佈置應能提供通往集合站的可能的最直接通道，並應根據本組織制定的指南標出符號。

7.1.2 從艙室到梯道環圍的脫險通道應儘可能筆直，儘量少地改變方向。在船舶一舷的人應不必走到另一舷才能到達脫險通道。為了從任何乘客處所到達集合站或開敞甲板，不必向上或向下走兩層以上甲板。

7.1.3 第7.1.2款所述的開敞甲板應設置通往救生艇筏登乘站的外部脫險通道。

7.1.4 如果圍蔽處所鄰接開敞甲板，圍蔽處所面向開敞甲板的開口在實際可行時應能夠被用作緊急出口。

7.1.5 脫險通道不得被家具或其他障礙物阻塞。除可被移到開敞處所的桌子和椅子以外，公共處所內和脫險通道沿線的櫥櫃和其他重家具應固定在原地，以防止在船舶搖擺或傾斜時發生移動。地板覆蓋物亦應原地固定。在船舶航行中，脫險通道內不得有清潔車、寢具、行李和什物箱等障礙物。

7.2 安全脫險指示

7.2.1 各層甲板應編有序號，由內底板或最下層甲板起為“1”。序號應顯著地顯示在樓梯平台和電梯門廊處。甲板也可以命名，但甲板序號仍應總與甲板名稱一起顯示。

7.2.2 顯示“你在此處”位置並用箭頭標出脫險通道的簡明“模擬”平面圖應明顯地張貼在每一艙室門的內側和公共處所內。該圖應顯示脫險通道的方向並正確地指明其在船上的方位。

7.3 扶手和走廊的強度

7.3.1 在所有沿脫險通道的走廊內應設置扶手和其他手扶物，以便儘可能在通向集合站和登乘站的通道內的每一台階處，都有穩固的手扶物。此種扶手應設在寬度超過1.8 m的縱向走廊和寬度超過1 m的橫向走廊的兩側。應特別注意能夠穿過脫險通道沿線的大廳、天井和其他開敞處所。扶手或其他手扶物的強度應能承受走廊或處所中心線方向750 N/m的水平均布荷載以及750 N/m的垂直向下均布荷載。兩種荷載不必同時施加。

7.3.2 脫險通道沿線的艙壁和其他構成垂直分隔的隔壁最下部0.5 m的區域應能夠承受750 N/m的荷載，從而在船舶處於大角度傾斜狀態時，允許在脫險通道的側表面上通行。

7.4 撤離分析

應在設計過程前期即通過撤離分析對脫險通道進行評估。這種分析應被用於確定並儘可能消除在棄船過程中由於乘客和船員沿脫險通道正常移動，包括有船員可能需要沿着這些通道朝着與乘客相反的方向移動，可能造成的擁擠。此外，這種分析還應用於證實脫險佈置具有充分的靈活性，以適應可能由於事故而引起某些脫險通道、集合站、登乘站或救生艇筏不能使用的情況。

E部分－操作性要求

第14條

隨時可用狀態和維護

1 目的

本條旨在保持和監測船舶所設防火安全措施的有效性。為此，應符合下列功能要求：

- .1 對防火系統和滅火系統及設備應進行維護，使其隨時可用；
- 和

.2 防火系統和滅火系統及設備應經正規試驗和檢查。

2 一般要求

在船舶運營期間的任何時候，應符合第1.1款的要求。船舶在下列情況下為非營運狀況：

- .1 船舶正在維修期間或閒置（停在錨地或停在港口）或在乾船塢中時；
- .2 船舶所有人或船舶所有人的代表宣佈船舶停止運營時；和
- .3 對於客船來說，船上無乘客時。

2.1 隨時可用狀態

2.1.1 下列防火系統應保持在完好狀態，以保證在發生火災時其能發揮所要求的作用：

- .1 結構防火，包括耐火分隔以及在這些分隔上的開口和貫穿；
- .2 探火和失火報警系統；和
- .3 脫險通道系統和設備。

2.1.2 滅火系統和設備應保持良好的工作狀態並立即可用。已經用過的手提式滅火器應立即再充或用等效裝置代替。

2.2 維護、試驗和檢查

2.2.1 維護、試驗和檢查應根據本組織制定的指南進行，並充分考慮到保證滅火系統和設備的可靠性。

2.2.2 維護計劃應保存在船上，並應能在主管機關無論何時要求時均能出示，以供其檢查。

2.2.3 維護計劃應至少包括下列無防火系統和滅火系統及設備(如裝有)：

- .1 消防總管、消防泵和消火栓，包括水帶、水槍和國際通岸接頭；
- .2 固定式探火和失火報警系統；
- .3 固定式滅火系統和其他滅火設備；
- .4 自動噴水器、探火和失火報警系統；
- .5 通風系統，包括擋火閘和擋煙閘、風機及其控制器；
- .6 燃油供應的緊急關閉；
- .7 防火門，包括其控制器；
- .8 通用緊急報警系統；
- .9 緊急脫險呼吸裝置；
- .10 手提式滅火器，包括備用滅火劑；和
- .11 消防員裝備。

2.2.4 維護計劃可編入計算機。

3 對客船的附加要求

除應有第2.2.3款所列的防火系統和設備維護計劃外，載客超過36人和客船還應編製低位照明和公共廣播系統的維護計劃。

4 對液貨船的附加要求

除應有第2.2.3款所列的防火系統和設備維護計劃外，液貨船還應具有下列系統和裝置的維護計劃：

- .1 惰性氣體系統；
- .2 甲板泡沫系統；
- .3 液貨泵艙內的防火安全裝置；和
- .4 易燃氣體探測器。

第15條

指導、船上培訓和演習

1 目的

本條旨在通過恰當指導船上人員在緊急情況下遵從正確的培訓和演習程序，以減輕火災的影響。為此，船員應具備處理火災緊急情況，包括照顧乘客的必要知識和技能。

2 一般要求

2.1 指導、職責和組織

2.1.1 船員應得到關於船上防火安全的指導。

2.1.2 船員應得到關於其所承擔職責的指導。

2.1.3 應組織負責滅火的小組。當船舶處於營運時，這些小組應具備在任何時候都能完成其職責的能力。

2.2 船上培訓和演習

2.2.1 應培訓船員熟悉船舶的佈置和可能需要其使用的任何滅火系統和設備的位置及操作。

2.2.2 關於緊急脫險呼吸裝置使用的訓練應被視為船上培訓的一部分。

2.2.3 被分配負責滅火的船員應通過開展船上培訓和演習進行定期評估，以確定其需要加以提高的方面、保證其滅火技能的適任性得以保持和保證滅火組織工作的就緒狀態。

2.2.4 使用船舶滅火系統和設備的船上訓練應按第III/19.4.1條的規定進行計劃和實施。

2.2.5 防火演習應按第III/19.3條和第III/19.5條的規定進行和記錄。

2.3 培訓手冊

2.3.1 應為每一船員餐廳和文娛室或在每一船員住室提供培訓手冊。

2.3.2 培訓手冊應用船舶的工作語言寫成。

2.3.3 該培訓手冊，可能由數卷組成，應包含第2.3.4款所要求的須知和信息，這些須知和信息應用易於理解的術語寫成，並在可能時配以圖解。此信息的任何部分都可以用聲像形式提供，用以代替手冊。

2.3.4 培訓手冊應詳細解釋下列事項：

- .1 有關煙氣的危害、電氣危險、易燃液體和船上類似的通常危險的一般防火安全做法和預防措施；
- .2 關於滅火行為和滅火程序的一般性須知，包括報告火災及使用手動操作呼叫點；
- .3 船舶各種警報的含義；
- .4 滅火設備和系統的操作和使用；
- .5 防火門的操作和使用；
- .6 擋火閘和擋煙閘的操作和使用；和
- .7 脫險系統和設備。

2.4 防火控制圖

2.4.1 應提供永久展示的總佈置圖供高級船員參考；圖上應清楚地標明每層甲板的控制站、“A”級分隔圍蔽的各防火區域、“B”級分隔圍蔽的各防火區域，連同探火和失火報警系統、噴水器裝置、滅火設備和各艙室、甲板等的出入通道，以及通風系統，包括風機控制位置、擋火閘位置和服務於每一區域的通風機識別號碼的細節。或者，主管機關可自行決定將上述細節可列入一個小冊子，發給高級船員人手一冊，另有一冊應放於船上易於到達的地方，以便隨時取用。控制圖和小冊子應不斷更新；任何更改應儘可能隨時記錄。此種控制圖和小冊子的說明文字應以主管機關所要求的一種或多種語文寫成。如果該語文既非英文亦非法文，則應包括其中一種語文的譯文。

2.4.2 防火控制圖或含有此圖的小冊子的一套複製品應永久性地置於甲板室外面有明顯標誌的風雨密的箱子中，用以幫助岸上的消防人員。

3 對客船的附加要求

3.1 消防演習

除應符合第2.2.3款的要求外，消防演習還應按第III/30條進行，並充分考慮到對乘客進行通知和乘客向集合站和登乘甲板的運動。

3.2 防火控制圖

在載客超過36人的客船上，本條所要求的防火控制圖和小冊子應根據本組織制定的指南提供有關防火、探火和滅火的信息。

第16條

操作

1 目的

本條旨在提供有關防火安全的適當船舶和貨物裝卸操作的信息和須知。為此，應符合下列功能要求：

- .1 船上應備有防火安全操作手冊；和
- .2 應控制從液貨艙透氣系統釋放出的易燃蒸氣。

2 防火安全操作手冊

2.1 所要求的防火安全操作手冊應包含與防火安全有關的船舶安全操作和貨物裝卸安全操作的必要信息和須知。該手冊應包括關於船員在船舶裝卸貨物時和航行時對船舶總體防火安全所負責任方面的信息。還應對裝卸一般貨物時需要採取的防火安全預防措施進行解釋。對於載運危險貨物和易燃散貨的船舶，防火安全操作手冊還應相應提及《固體散貨安全操作規則》、《國際散化規則》、《國際氣體運輸船規則》和《國際海運危險貨物規則》中有關消防和緊急貨物操作的指導。

2.2 應為每一船員餐廳和文娛室或每個船員的住室提供防火安全操作手冊。

2.3 防火安全手冊應以船舶的工作語言寫成。

2.4 防火安全操作手冊可以與第15.2.3條要求的培訓手冊合併。

3 對液貨船的額外要求

3.1 總則

本條第2款所述的防火安全操作手冊應包括防止由於易燃蒸氣着火蔓延至貨物區域的規定，並在考慮到第3.2款的規定的情況下，包括液貨艙驅氣和/或除氣的程序。

3.2 液貨艙驅氣和/或除氣程序

3.2.1 當船舶設有惰性氣體系統時，應首先按照第4.5.6條的規定進行液貨艙驅氣，直到液貨艙內碳氫化合物蒸氣的濃度(按體積計算)降至2%以下。然後，才可在液貨艙甲板面上進行除氣。

3.2.2 當船舶未設惰性氣體系統時，其操作應通過下列途徑首先排除易燃氣體：

- .1 第4.5.3.4條規定的透氣出口；
- .2 液貨艙甲板面以上至少2 m的出口，在除氣作業期間至少維持30 m/s的垂直出氣速度；或
- .3 液貨艙甲板面以上至少2 m的出口，至少有20 m/s的垂直出氣速度，並且出口有適當的保護裝置以防火焰通過。

3.2.3 以上出口距含有着火源的封閉處所的最近的空氣進口和開口以及可能包括錨機在內的甲板機械和錨鏈艙上的開口及可能構成失火危險的設備的水平距離應不少於10 m。

3.2.4 如果出口處的易燃蒸氣濃度已被減至可燃下限的30%，可在液貨艙甲板層面上繼續除氣。

F部分—替代設計和佈置

第17條

替代設計和佈置

1 目的

本條旨在提供防火安全替代設計和佈置的方法。

2 總則

2.1 防火安全設計和佈置可以偏離本章B、C、D、E或G部分的規定要求，但這些設計和佈置須符合本章的防火安全目標和功能要求。

2.2 如果防火安全設計和佈置偏離了本章的規定要求，該替代設計和佈置應按本條進行工程分析、評估和認可。

3 工程分析

工程分析應根據本組織制定的指南進行準備和提交主管機關，並應至少包括下列要素：

- .1 確定有關船型和處所；
- .2 判定船舶或處所不相符的規定要求；
- .3 判定有關船舶或處所的失火和爆炸危險，包括：
 - .3.1 判定可能的着火源；
 - .3.2 判定各有關處所火災蔓延的可能性；
 - .3.3 判定各有關處所產生煙氣和有毒流出物的可能性；
 - .3.4 判定從有關處所向其他處所傳播火、煙和有毒流出物的可能性；
- .4 確定規定要求對有關船舶或處所要求的防火安全性能指標；
 - .4.1 性能指標應基於本章的防火安全目標和功能要求；
 - .4.2 性能指標所規定的安全水平應不低於應用規定要求所達到的安全水平；和

- .4.3 性能指標應可量化並具備可測量性；
- .5 替代設計和佈置的細節描述，包括列出設計中採用的假定以及任何建議的操作性限制或條件；和
- .6 表明替代設計和佈置符合所要求的安全性能指標的技術論據。

4 替代設計和佈置的評估

4.1 第3款所要求的工程分析應由主管機關在考慮到本組織制定的指南的情況下予以評估和批准。

4.2 經主管機關批准的指明替代設計和佈置符合本條要求的文件的副本應隨船攜帶。

5 信息交流

主管機關應將其所批准的替代設計和佈置的有關信息通報本組織，以便分發給所有締約國。

6 條件改變後的再評估

如果替代設計和佈置所規定的假定和操作限制發生改變，應根據改變後的條件進行工程分析並應經主管機關批准。

G部分 – 特殊要求

第18條

直升飛機設施

1 目的

本條旨在使裝有直升飛機專門設施的船舶達到本章的防火安全目標規定附加措施。為此，應符合下列功能要求：

- .1 直升飛機甲板結構應能足以保護船舶免受與直升飛機操作有關的火災危險；
- .2 應配備足以保護船舶免受與直升飛機操作有關的火災危險的消防設備；
- .3 對加油和機庫設施及操作應採取必要措施以保護船舶免受與直升飛機操作有關的火災危險；和
- .4 應備有操作手冊並提供培訓。

2 適用範圍

2.1 除應符合B、C、D和E部分各條的相應要求外，設有直升飛機甲板的船舶應符合本條的要求。

2.2 只是偶爾或在緊急情況下才有直升飛機降落或進行絞車操作的未設直升飛機甲板的船舶，可以使用按C部分安裝的滅火設備。在直升飛機操作期間，這些設備應在緊靠降落和絞車區域附近隨時可用。

2.3 雖有上述第2.2款的規定，未設直升飛機甲板的滾裝客船應符合第III/28條。

3 結構

3.1 鋼或其他等效材料結構

直升飛機甲板一般應由鋼或其他等效材料建造。如果直升飛機甲板構成甲板間或上層建築的艙壁，應隔熱至“A-60”級標準。

3.2 鋁或其他低熔點金屬結構

如果主管機關允許使用不能等效於鋼的鋁或其他低熔點金屬結構，應符合下列規定：

- .1 如果平台為船舷以上的懸臂結構，在船舶或平台每次失火後，應對平台進行一次結構分析以確定其是否適合以後使用；和
- .2 如果平台位於船舶甲板間或類似結構物之上，應符合下列條件：
 - .2.1 甲板間的頂部和平台下的艙壁應沒有開口；
 - .2.2 平台下的窗子應裝有鋼質遮板；和
 - .2.3 在平台上或其附近每次發生火災後，應對平台進行一次結構分析以確定其是否適合以後使用。

4 脫險通道

直升飛機甲板應設置一條主脫險通道和一條應急脫險通道及出口，供消防和救助人員進出。兩條通道應儘可能彼此遠離，並最好位於直升飛機甲板上相對的兩側。

5 滅火設備

5.1 在緊靠直升飛機甲板處，應設有下列滅火設備，並存放在直升飛機甲板的進出口附近：

- .1 至少兩部乾粉滅火器，總容量不少於45 kg；
- .2 二氧化碳滅火器，總容量不少於18 kg或與之相當；
- .3 一個由監視器或泡沫發生分管組成的能夠在直升飛機可操作的任何氣候條件下向直升飛機甲板的各部位噴灑泡沫的適當泡沫噴施系統。該系統應能夠按表18.1所要求的噴灑率，工作至少5 min；

表18.1—泡沫噴灑率

類型	直升飛機總長	泡沫噴灑率 (l/min)
H1	15 m 以下 (不含 15 m)	250
H2	15 m 至 24 m (不含 24 m)	500
H3	24 m 至 35 m (不含 35 m)	800

- .4 主要滅火劑應適於與鹽水一起使用，並符合不低於本組織可接受的性能指標；
- .5 至少兩支經認可的兩用型（水柱/噴灑）水槍和足以到達直升飛機甲板各部位的水帶；
- .6 除第10.10條的要求外，另備兩套消防員裝備；和
- .7 至少應保存以下設備，其保存方式應做到即時可用，並能提供相應保護：

- .1 可調式絞車；
- .2 耐火毯；
- .3 60 cm螺栓刀具；
- .4 鈎、抓斗或撈鈎；
- .5 高負荷鋼鋸，配有6副備用鋸條；
- .6 梯子；
- .7 5 mm直徑起重繩，15 m長；
- .8 側剪鉗子；
- .9 全套分類螺絲刀；和
- .10 帶有可配掛刀鞘的工具刀。

6 排水設施

直升飛機甲板上的排水設施應由鋼建造，並獨立於任何其他系統，直接將水排向舷外；其設計應使排出的水不會落到船舶上的任何部位。

7 直升飛機加油和機庫設施

如果船上設有直升飛機加油和機庫設施，應符合下列要求：

- .1 應設置用於貯存燃料罐的專門區域，該區域應：
 - .1.1 儘可能遠離起居處所、脫險通道和登乘站；和
 - .1.2 與含有蒸氣着火源的區域隔離；

- .2 燃料貯存區域應設有將洩漏燃料收集起來並排往安全位置的裝置；
- .3 對油罐及所屬設備加以保護，防止受到物理損害以及鄰近處所或區域火災造成的危害；
- .4 若採用移動式燃料儲存罐，應特別注意下列各項：
 - .4.1 罐的設計符合其預期目的；
 - .4.2 安裝和穩固裝置；
 - .4.3 防電設備；和
 - .4.4 檢查程序；
- .5 貯存罐的燃料泵應裝有發生火災時能從遠離的安全位置關閉的裝置。如果裝有重力式加油系統，應設置隔離燃料源的等效關閉裝置；
- .6 燃料泵組應一次一個地與燃料罐連接。燃料罐與泵組之間的管系應由鋼或等效材料製成，儘可能短，並加以保護，防止受到損壞；
- .7 電動燃料泵組和相關控制設備的類型應適合其位置及可能的危險；
- .8 燃料泵組中應有一個防止送油或注油軟管超壓的裝置；
- .9 加油操作中使用的設備應裝防電設備；
- .10 應在適當的位置顯示“禁止吸煙”的標誌；

- .11 機庫、加油和維修設施的構造防火、固定式滅火和探火要求應按“A”級機器處所來考慮；
- .12 圍蔽的機庫設施或內設加油設備的圍蔽處所應設置第20.3條對貨船閉式滾裝處所要求的機械通風。風機應為無火花型；和
- .13 圍蔽機庫或內設加油設備的圍蔽處所中的電氣設備和線路應符合第20.3.2、20.3.3和20.3.4條。

8 操作手冊和滅火裝置

8.1 每一直升飛機設施應備有操作手冊，包括安全預防措施、程序和設備要求介紹和核查清單。此手冊可作為船舶應急反應程序的一部分。

8.2 加油操作時應遵守的程序和預防措施應符合認可的安全做法並包括在操作手冊之中。

8.3 當準備進行直升飛機操作時，應有至少兩名受過救生和消防職責及消防設備培訓的消防人員隨時可到。

8.4 當進行加油操作時，應有消防人員在場。但是，消防人員不得參與加油工作。

8.5 應開展船上更新性培訓，並應為培訓和設備試驗提供額外的滅火劑。

第19條

危險貨物運輸

1 目的

本條旨在載運危險貨物的船舶規定附加的安全措施，以達到本章的消防安全目標。為此，應符合下列功能要求：

- .1 應配備防火系統以保護船舶免受因載運危險貨物而帶來的額外火災危險；
- .2 應將危險貨物與着火源充分隔開；和
- .3 應針對載運危險貨物而構成的危害配備適當的人員保護設備。

2 一般要求

2.1 除應符合B、C、D和E部分相應條款及第18條和第20條的要求外，第2.2款所述的擬用於載運危險品的船舶類型和貨物處所應符合本條的相應要求，但載運有限數量的危險貨物時以及此種要求已通過符合本章的其他要求得到滿足時除外。船舶類型和載運危險貨物的方式見第2.2款和表19.1。小於500總噸的貨船應符合本條，但主管機關可以降低這些要求，此種降低的要求應記錄在第4款中所述的符合文件中。

2.2 下列船舶類型和貨物處所應支配表19.1和表19.2的適用範圍：

- .1 並非專門設計用於載運貨物集裝箱，而是準備用於載運包裝

形式的危險貨物包括裝於集裝箱和可移動罐櫃內的危險貨物的船舶類型和貨物處所；

- .2 準備用於載運裝於集裝箱和可移動罐櫃內的危險貨物的專用集裝箱船和貨物處所；
- .3 準備用於載運危險貨物的滾裝船和滾裝貨物處所；
- .4 準備用於散裝運輸固體危險貨物的船舶和貨物處所；和
- .5 準備用於運輸危險貨物的船舶和貨物處所，但不包括散裝液體和氣體危險貨物的船載駁船。

3 特殊要求

除另有規定外，下列要求應支配表19.1、表19.2和表19.3對危險貨物的“甲板上”和“甲板下”積載的適用，表的第一欄中標示了下列各款的編號。

3.1 供水

3.1.1 應作出安排，以便通過固定加壓或通過位於適當位置的遙控裝置啟動消防泵，保證能立即從消防總管提供符合壓力要求的水。

3.1.2 輸水量應能夠向第10.2條所規定尺寸的4支水槍以該條規定的壓力供水，當空艙時能夠射到貨物處所的任何部分。此水量亦可採用主管機關滿意的等效方式獲得。

3.1.3 應設置通過固定水霧噴槍設備或用水淹沒貨物處所的設施，以便以貨物處所水平區域每平米至少5 l/min的水有效冷卻指定的甲板下貨物處所。主管機關可自行決定在小型貨物處所和較大貨物處所的小區域為此目的使用消防水帶。但是，排水和抽水裝置應能夠防

止形成自由液面。排水系統的尺寸應為能夠排走不低於水霧系統泵和所要求數量的消防噴槍的合併能力的125%。排水系統的閥門應能夠從所保護位置的外部靠近滅火系統控制的位置進行操作。污水井應具有足夠的容量，並應佈置在船側，設於每一水密艙內，彼此間的距離不得超過40 m。如果不可能這樣安排，則主管機關在批准穩性資料時，應將增加的水的重量和自由液面對船舶穩性的不良影響考慮到其認為必要的程度。

3.1.4 可用以適當的專門介質淹沒指定的甲板下貨物處所的規定代替第3.1.3款中的要求。

3.1.5 所需的總供水能力應符合第3.1.2款以及如適用時第3.1.3款的要求，按最大的指定貨物處所同時計算。第3.1.2款要求的能力應通過主消防泵的能力來達到，但不包括應急消防泵（如裝有）的能力。如果裝有為符合第3.1.3款要求的噴淋系統，則在計算總能力時，還應考慮到噴淋泵。

3.2 着火源

電氣設備和電線不得安裝在圍蔽的貨物處所或車輛處所內，除非主管機關認為在操作上必要。但是，如果電氣設備安裝在此種處所內，它們必須為可以暴露在危險環境中使用的經認證的安全型式，除非該電氣系統能完全被隔離（例如，通過拆除系統內除保險絲以外的連接線）。電纜穿過的甲板和艙壁應予以密封，以防止氣體或蒸氣通過。穿通的電纜和貨物處所內的電纜應予以保護，以防止被碰損。禁止使用任何其他可能構成易燃蒸氣着火源的設備。

3.3 探測系統

滾裝處所應裝設一個符合《消防安全系統規則》的固定式探火和失火報警系統。所有其他類型的貨物處所應裝設一個符合《消防安全系統規則》的固定式探火和失火報警系統或一個符合《消防安全系統規則》的取樣探煙系統。如果裝設取樣探煙系統，應特別注意到《消防安全系統規則》第10/2.1.3款的要求，以防止有毒煙霧洩漏到有人使用區域。

3.4 通風

3.4.1 圍蔽貨物處所應提供足夠的動力通風。通風的佈置應為，以空貨物處所為基礎，每小時至少能對貨物處所換氣6次，並能視情從貨物處所的上部或下部排除蒸氣。

3.4.2 風機應為能避免易燃氣體和空氣混合物着火的可能性。通風系統的入口和出口處應裝有適當的金屬絲網保護。

3.4.3 用於散裝運輸固體危險貨物的圍蔽貨物處所如未提供機械通風，應設置自然通風。

3.5 艙底泵

3.5.1 如果擬在圍蔽貨物處所內載運易燃或有毒的液體物質，艙底泵系統的設計應保證防止由於疏忽而將此類液體輸往機器處所的管路或泵。如果載運大量此類液體，應考慮為這些貨物處所提供附加的泄放措施。

3.5.2 如果為由機器處所的泵所服務的系統附加了艙底排水系統，對於所服務的每個貨物處所，該系統的能力不得低於10 m³/h。

如附加系統係通用型，其能力不必超過25 m³/h。不必要佈置多餘的附加艙底系統。

3.5.3 如果載運易燃或有毒液體，通往機器處所的艙底泵管路應通過安裝盲板法蘭或可鎖閉的封閉閥門加以隔離。

3.5.4 置有服務於裝載易燃或有毒液體的貨物處所的艙底泵的機器處所以外的圍蔽處所，應裝設獨立的機械通風，做到每小時至少換氣6次。如果該處所設有通往其他圍蔽處所的通道，其門應為自閉型。

3.5.5 如果貨物處所的艙底排泄系統是通過重力排泄的，該排泄應直接通往舷外或通往位於機器處所外的封閉排泄艙。排泄艙應設置透氣管，通向開敞甲板上的一個安全位置。只有當較低處所的污水井符合與上述貨物處所相同的要求時，方能准許從該貨物處所向該污水井排水。

3.6 人員保護

3.6.1 除應配備第10.10條所要求的消防員裝備外，還應配備4套抗化學侵蝕的全面防護服。防護服應罩沒全部皮膚，以使身體的所有部分都得到保護。

3.6.2 除第10條所要求的自給式呼吸器外，至少還應配備兩套此種呼吸器。所要求的每個呼吸器還應配備兩個適合於其使用的備用充氣瓶。載客不超過36人的客船和貨船，如在適當位置裝有為所有氣瓶補充潔淨空氣的設備，則所要求的每套呼吸器只需配備一個備用氣瓶。

3.7 手提式滅火器

貨物處所應配備總量至少為12 kg乾粉或與其等效的手提滅火

器。這些滅火器係本章所有其他部分所要求的手提式滅火器的附加要求。

3.8 機器處所限界面的隔熱

構成貨物處所和A類機器處所限界面的艙壁應隔熱至“A-60”級標準，除非危險貨物積載於距此種艙壁的水平距離至少為3 m外。此類處所之間的其他限界面應隔熱至“A-60”級標準。

3.9 水霧系統

每一個在上面有甲板的開式滾裝處所和每一被視為閉式滾裝處所但不能密封的處所，應裝設經認可的手動操作的固定式壓力水霧系統。該水霧系統應保護該處所內的任何甲板和車輛平台的所有部位，但主管機關可以允許在該處所使用已經過全面試驗證明其效能不低於固定式壓力水霧系統的任何其他固定式滅火系統。然而，排水和抽水裝置應能夠防止形成自由液面。排水系統的大小應能夠排走不低於水霧系統泵和所要求數量的消防噴槍的合併能力的125%。排水系統的閥門應能夠從所保護位置的外部靠近滅火系統控制的位置進行操作。污水井應具有足夠的容量，並應佈置在船側，設於每一水密艙內，彼此間的距離不得超過40 m。如果這樣做不可能，應考慮將增加的水的重量和自由液面對船舶穩性的不良影響限制在主管機關在批准穩性資料時認為必要的程度。

3.10 滾裝處所的分隔

3.10.1 在設有滾裝貨物處所的船上，應在閉式滾裝處所和相鄰的滾裝處所之間加以分隔。該分隔應使這些處所間危險蒸氣和液體的通路減至最小。如果認為滾裝貨物處所在其整個長度上為一個封閉的貨

物處所，也可以不必進行此種分隔，但應完全符合本條的有關特殊要求。

3.10.2 在設有滾裝貨物處所的船上，應在閉式滾裝處所和相鄰的露天甲板之間加以分隔。該分隔應使這些處所間危險蒸氣和液體的通路減至最小。如果閉式滾裝處所的佈置符合對在鄰近的露天甲板上載運危險貨物的要求，也可以不必進行此種分隔。

4 符合證明

主管機關應向船舶提供一份適當的文件，作為對符合本條的構造和設備要求的證明。除散裝固體危險貨物外，對第VII/2條中被定義為第6.2和7類的那些貨物和數量有限的危險貨物不要求危險貨物證書。

表 19.1—船舶和貨物處所危險貨物的不同載運方式的適用要求

第 19 條 第 19.2.2 條	露天甲板，包括 .1 至 .5	.1	.2	.3		.4	.5
		非專門設計的	集裝箱貨物處所	封閉式滾裝處所 ⁵	開敞式滾裝處所	散裝固體危險貨物	船載駁船
3.1.1	X	X	X	X	X	關於對不同類別的危險貨物運用第 19 條的要求，見表 19.2	X
3.1.2	X	X	X	X	X		—
3.1.3	—	X	X	X	X		X
3.1.4	—	X	X	X	X		X
3.2	—	X	X	X	X		X ⁴
3.3	—	X	X	X	—		X ⁴
3.4.1	—	X	X ¹	X	—		X ⁴
3.4.2	—	X	X ¹	X	—		X ⁴
3.5	—	X	X	X	—		—
3.6.1	X	X	X	X	X		—
3.6.2	X	X	X	X	X		—
3.7	X	X	—	—	X		—
3.8	X	X	X ²	X	X		—
3.9	—	—	—	X ³	X		—
3.10.1	—	—	—	X	—		—
3.10.2	—	—	—	X	—	—	

註：

1 對於第4類和第5.1類不適用於封閉式貨物集裝箱。

對於裝在封閉式貨物集裝箱內的第2類、第3類、第6.1類和第8類，其通風率可減少到不低於換氣2次。就本要求而言，可移動罐櫃是封閉式貨物集裝箱。

2 只適用於甲板。

3 只適用不能密封的封閉式滾裝處所。

- 4 在駁船能夠容納易燃蒸氣或能夠通過與其連接的通風管道將易燃蒸氣排向駁船載運艙室之外的安全處所的特殊情況下，如主管機關同意，可以降低或取消這些要求。
- 5 當特種處所裝載危險貨物時應被視為封閉式滾裝處所。

表19.1中的X表示此要求適用於表19.3相應行中所列的所有類別的危險貨物，有註解者除外。

表19.2—散裝運輸固體危險貨物的船舶和貨物處所中的不同類別危險貨物對要求的適用

類別	4.1	4.2	4.3 ⁶	5.1	6.1	8	9
	第19條						
3.1.1	X	X	—	X	—	—	X
3.1.2	X	X	—	X	—	—	X
3.2	X	X ⁷	X	X ⁸	—	—	X ⁸
3.4.1	—	X ⁷	X	—	—	—	—
3.4.2	X ⁹	X ⁷	X	X ^{7,9}	—	—	X ^{7,9}
3.4.3	X	X	X	X	X	X	X
3.6	X	X	X	X	X	X	X
3.8	X	X	X	X ⁷	—	—	X ¹⁰

註：

- 6 可以散裝運輸的本類物質的危險性為，除應符合本表列舉的要求外，主管機關還應對有關船舶的構造和設備給以特殊考慮。
- 7 只適用於含有溶劑萃取物的種子餅、硝酸銨和硝酸銨化肥。
- 8 只適用於硝酸銨和硝酸銨化肥。但是，依照國際電工委員會的出版物60079《爆炸性氣體環境內的電氣設備》所列標準的保護程度便足夠。
- 9 只要求有合適的金屬絲網保護。
- 10 經修正的以第A.434（XI）號決議通過的《固體散貨安全操作規則》的要求便足夠。

表 19.3 除散裝固體危險貨物以外的不同類別危險貨物對要求的適用

類別 第19條	1.1 至 1.6	1.4S	2.1	2.2	2.3	3.1 3.2 液體 ≤23°C ¹⁵	3.3 液體 >23°C ¹⁵ ≤61°C	4.1	4.2	4.3	5.1	5.2	6.1 液體	6.1 液體 ≤23°C ¹⁵	6.1 液體 >23°C ¹⁵ ≤61°C	6.1 固體	8 液體	8 液體 ≤23°C ¹⁵	8 液體 >23°C ¹⁵ ≤61°C	8 固體	9
3.1.1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3.1.2	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—
3.1.3	X	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3.1.4	X	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3.2	X	—	X	—	—	X	—	—	—	—	—	—	—	X	—	—	—	X	—	—	—
3.3	X	X	X	X	X	X	X	X	X	X	X	—	—	X	X	X	X	X	X	X	—
3.4.1	—	—	X	—	X	X	—	X ¹¹	X ¹¹	X	X ¹¹	—	—	X	X	X ¹¹	—	X	X	—	X ¹¹
3.4.2	—	—	X	—	—	X	—	—	—	—	—	—	—	X	X	—	—	X	—	—	—
3.5	—	—	—	—	—	X	—	—	—	—	—	—	X	X	X	—	—	X	—	—	—
3.6	—	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X ¹⁴
3.7	—	—	—	—	—	X	X	X	X	X	X	—	—	X	X	—	—	X	—	—	—
3.8	X ¹²	—	X	X	X	X	X	X	X	X	X ¹³	—	—	X	X	—	—	X	X	—	—
3.9	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3.10.1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3.10.2	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

註：

11 當經修正的《國際海運危險貨物規則》要求“機械通風處所”時。

12 在所有情況下，積載於距機器處所限界的水平距離 3 m 以外。

13 參閱經修正的《國際海運危險貨物規則》。

14 視所載運的貨物而定。

15 指閃點。

第20條

車輛處所、特種處所和滾裝處所的保護

1 目的

本條旨在為裝有車輛處所、特種處所和滾裝處所的船舶規定附加的安全措施，以達到本章的消防安全目標。為此，應符合下列功能要求：

- .1 應設置能充分保護船舶免受與車輛處所、特種處所和滾裝處所有關的火災危險的防火系統；
- .2 應將着火源與車輛處所、特種處所和滾裝處所分開；和
- .3 應對車輛處所、特種處所和滾裝處所充分通風。

2 一般要求

2.1 適用範圍

除應符合B、C、D和E部分各條的相應要求外，車輛處所、特種處所和滾裝處所還應符合本條的要求。

2.2 對客船的基本原則

2.2.1 本條規定的基本原則是，在客車的車輛處所內，第9.2條所要求的主豎區可能不切實際，因此，在此類處所必須基於水平區的概念和通過提供有效的固定式滅火系統獲得等效的保護。根據這一概念，就本條而言，只要用於停放車輛處的總體淨高不超過10 m，則一個水平區可以包括多於一層甲板的若干特種處所。

2.2.2 第2.2.1款規定的基本原則也適用於滾裝處所。

2.2.3 本章中為維持豎直區完整性而對通風系統、“A”級分隔上的開口和“A”級分隔上的貫穿的要求應同等地適用於構成水平區之間或水平區與船舶其他部分分隔限界面的甲板和艙壁。

3 預防閉式車輛處所、閉式滾裝處所和特種處所內的易燃蒸氣着火

3.1 通風系統

3.1.1 通風系統的能力

應裝設至少足以達到下列換氣次數的有效動力通風系統：

.1 客船

特種處所	每小時換氣 10 次
載客超過 36 人的客船上的特種處所以外的閉式滾裝處所和車輛處所	每小時換氣 10 次
載客不超過 36 人的客船上的特種處所以外的閉式滾裝處所和車輛處所	每小時換氣 6 次

.2 貨船

每小時換氣 6 次

在裝載或卸載車輛時，主管機關可要求增加換氣次數。

3.1.2 通風系統的性能

3.1.2.1 在客船上，第3.1.1款所要求的動力通風系統應與其他通風系統分開，並且當車輛處於此類處所時通風系統必須一直工作。服務於此類貨物處所的能夠有效封閉的通風導管應與每一此類處所分開。該系統應能夠從此類處所以外的位置進行控制。

3.1.2.2 在貨船上，當船上有車輛時通風機通常應連續運轉。如果這樣做不可行，在氣候允許時，風機應每天運轉一定的時間；並且無論如何，風機應在卸貨前運轉一段合理的時間，經過這一段時間的運轉後，滾裝處所或車輛處所則應證明已經除氣了。為此目的，應配備一套或一套以上手提可燃氣體探測儀。此系統應與其他通風系統完全分開。對每一貨物處所，服務於滾裝處所或車輛處所的通風導管應能夠有效封閉。該系統應能夠從此類處所以外的位置進行控制。

3.1.2.3 通風系統應能夠防止空氣分層和形成氣囊。

3.1.3 通風系統的指示

在駕駛台應設置顯示任何通風能力降低的裝置。

3.1.4 關閉裝置和導管

3.1.4.1 應設置在考慮到天氣和海況的情況下，如發生火災時，能從處所外部快速關閉和有效封閉通風系統的裝置。

3.1.4.2 設在一般水平區內的通風導管，包括擋火閘，應為鋼質。在客船上，通過其他水平區或機器處所的通風導管應為根據第9.7.2.1.1條和第9.7.2.1.2條建造的“A-60”級鋼質導管。

3.1.5 永久性開口

處所側板、端板和船艙天花板上的永久性開口的位置應使貨物處所內的火災不會威脅到救生艇閣的存放區和登乘站，以及貨物處所上部的上層建築和甲板室中的起居處所、服務處所和控制站。

3.2 電氣設備和電線

3.2.1 除第3.2.2款中規定的情況外，電氣設備和電線應為適合於在可爆炸的汽油和空氣混合物中使用的型式。

3.2.2 對於艙壁甲板以下特種處所以外的處所，儘管有第3.2.1款的規定，在甲板或每層車輛平台（如設有）的450 mm高度以上，應允許裝設加以封閉並進行保護以防止火星外漏的電氣設備作為一種替代方式，但開口尺寸足夠使汽油氣體向下滲透的平台除外；採取此種替代方式的條件是，通風系統的設計和運轉能夠在船上有車輛時以每小時換氣10次的速率對貨物處所提供持續通風。

3.3 排氣通風導管內的電氣設備和電線

如果在排氣通風導管內裝有電氣設備和電線，這些電氣設備和電線應為經認可能夠在可爆炸和汽油和空氣混合物中使用的型式，並且考慮到其他可能的着火源，任何排氣導管的出口均應位於一個安全的位置。

3.4 其他着火源

不允許使用可能構成易燃氣體着火源的其他設備。

3.5 流水口和排水

流水口不得通向機器處所或其他可能存在着火源的處所。

4 探測和報警

4.1 固定式探火和失火報警系統

除第4.3.1款規定的情況以外，應設置符合《消防安全系統規則》要求的固定式探火和失火報警系統。固定式探火系統應能夠迅速探知初起的火災。探測器的型式及其間距和位置應使主管機關在考慮到通風和其他相關因素影響後認為滿意。該系統在安裝後，應在正常的通風條件下進行測試，並應給出主管機關認為滿意的總體反應時間。

4.2 取樣探煙系統

除開式滾裝處所、開式車輛處所和特種處所以外，可使用符合《消防安全系統規則》要求的取樣探煙系統，作為第4.1款要求的固定式探火和失火報警系統的一種替代。

4.3 特種處所

4.3.1 在特種處所內應保持有效的消防巡邏制度。如果在整個航行期間由持續的消防值班保持有效的消防巡邏，則不要求配備固定式探火和滅火報警系統。

4.3.2 手動呼叫點的間隔佈置應使處所內的任何一點距手動呼叫點的距離都不超過20 m，且在此類處所的每個出口處附近均應佈設一個手動呼叫點。

5 構造保護

儘管有第9.2.2條的規定，在載客超過36人的客船上，特動處所和滾裝處所的限界面艙壁和甲板應隔熱至“A-60”級標準。但是，如果第9.2.2.3條所定義的第（5）類、第（9）類和第（10）類處所位於分隔的一側，則該標準可減至“A-0”級。如果燃油艙位於特種處所或滾裝處所以下，此類處所之間的甲板完整性可減至“A-0”級標準。

6 滅火

6.1 固定式滅火系統

6.1.1 不是特種處所且能夠從貨物處所外部某一位置加以封閉的車輛處所和滾裝處所應裝設符合《消防安全系統規則》規定的固定式氣體滅火系統，但是：

- .1 如果裝有二氧化碳滅火系統，該系統能夠獲得的氣體數量應至少足以釋放出體積最少等於能夠被封閉的最大此類貨物處所總容積45%的自由氣體，且其佈置應為能保證在10 min內至少釋放出相應處所要求氣體的三分之二；
- .2 如果主管機關認為可達到等效的保護，可以安裝任何其他固定式惰性氣體滅火系統或固定式高膨脹泡沫滅火系統；和
- .3 可以安裝符合第6.1.2款要求的滅火系統作為替代。

6.1.2 不能加以封閉的滾裝處所和特種處所以及車輛處所應裝有經認可的手動操作固定式壓力水霧系統，該系統應保護此類處所的任何甲板和車輛平台的所有部分。該壓力水霧系統應：

- .1 在閥門總管上有一個壓力錶；
- .2 在每一總管閥門上清楚標出其所服務的處所；
- .3 在閥門房間內有維護和操作閥門的說明；和
- .4 有足夠數量的排水閥。

6.1.3 主管機關可以允許使用經過全面試驗表明在控制可能發生於車輛處所或滾裝處所的火災方面同樣有效的任何其他固定式滅火系統；該試驗應在模擬此類處所內流動的汽油火災的條件下進行。

6.1.4 如果裝有固定式壓力水霧滅火系統，鑑於在固定式壓力水霧系統工作期間大量的水聚集在一層或幾層甲板上會導致穩性的嚴重削弱，應作出下列安排：

- .1 在客船上：

- .1.1 在艙壁甲板以上處所，應設置泄水孔，以保證這些水能被迅速排至舷外；
- .1.2.1 在滾裝客船上，當船舶在海上時，應保持泄水孔的閘門處於打開狀態，泄水孔的閘門上應裝有符合現行《國際載重線公約》的能從艙壁甲板以上的位置操作的可靠的關閉裝置；
- .1.2.2 第6.1.4.1.2.1款所述的任何閘門的操作都應記錄在航海日誌中；
- .1.3 在艙壁甲板以下處所，主管機關可要求在第II-1/21條的要求以外另行裝設泵和排水設施。在這種情況下，排水系統的大小應能夠排走不低於水霧系統泵和所要求數量的消防噴槍的合併能力的125%。排水系統的閘門應能夠從所保護位置的外部靠近滅火系統控制的位置進行操作。污水井應具有足夠的容量，並應佈置在船側，設於每一水密艙內，彼此間的距離不得超過40 m；
- .2 在貨船上，排水和抽水裝置應能夠防止形成自由液面。在這種情況下，排水系統的大小應能夠排走不低於水霧系統泵和所要求數量的消防噴槍的合併能力的125%。排水系統的閘門應能夠從所保護位置的外部靠近滅火系統控制的位置進行操作。污水井應具有足夠的容量，並應佈置在船側，設於每一水密艙內，彼此間的距離不得超過40 m。如果這樣做不可能，主管機關在批准穩性資料時應將增加的水重量和自由液面對船舶穩性的不良影響考慮到其認為必要的程度。這些信息應包括在第II-1/22條所要求的向船長提供的穩性資料中。

6.2 手提式滅火器

6.2.1 在載運車輛的每個貨艙或艙室的每一層甲板應提供手提式滅火器，佈置於處所的兩側，間距不超過20 m。此類貨物處所的每一出入口處應至少放置一隻手提式滅火器。

6.2.2 除第6.2.1款的規定外，用於裝載油箱內備有用於自身驅動的燃料的機動車輛的車輛處所、滾裝處所和特種處所內應配備下列滅火設備：

- .1 至少3把水霧槍；和
- .2 一組符合《消防安全系統規則》規定的手提式泡沫噴射槍，但船上應配有至少兩組用於此類滾裝處所的這種噴射槍。”

第V章

航行安全

7 用下列條文代替本公約現有第V章：

“第1條

適用範圍

1 除另有明確規定外，本章應適用於除下列船舶以外的所有航線上的所有船舶：

- .1 軍艦、海軍輔助船或其他由一締約國政府擁有或營運並僅用於政府性非商業服務的船舶；和
- .2 只航行於北美洲五大湖區及其相連和支流水域的船舶，最東不超過加拿大魁北克省聖拉姆勃特船閘（St. Lambert Lock）的下游出口處。

但是，鼓勵軍艦、海軍輔助船或其他由締約國政府擁有或營運並僅用於政府性非商業服務的船舶，凡合理和可行時，以符合本章規定的方式運作。

2 主管機關可決定本章在多大程度上應適用於僅在按國際法確立的基線的向陸水域之內航行的船舶。

3 剛性連接的頂推船和相關的被推船組成的組合單位，當設計成一個專用和完整的拖船和駁船組合時，就本章而言，應被視為單一船舶。

4 主管機關應決定第15、16、17、18、19、20、21、22、23、24、25、26、27和28條的規定在多大程度上不適用於下列類型的船舶：

- .1 任何航線上小於150總噸的船舶；
- .2 不從事國際航行的小於500總噸船舶；和
- .3 漁船。

第2條

定義

就本章而言：

- 1 某一船舶的建造係指處於下述建造階段：
 - .1 安放龍骨；或
 - .2 可以認定某一具體船舶建造開始；或
 - .3 該船業已開始的裝配量至少為50 t或為所有結構材料估算重量的1%，以小者為準。
- 2 海圖或航海出版物係指由政府、經授權的海道測量部門或其他相關政府機構正式發行或授權發行的用於滿足海上航行需要的專用地圖或圖書，或能從中衍生此類地圖或圖書的專門編製的數據庫。
- 3 所有船舶係指任何船隻、船舶或艇筏，無論其型式和用途。

第3條

免除和等效

- 1 對於沒有機械推進裝置的船舶，主管機關可一般免除第15、17、18、19（19.2.1.7除外）、20、22、24、25、26、27和28條的規定。
- 2 當船舶所從事航行的最大離岸距離、航程的長度和性質、沒有

一般的航行危險及其他影響安全情況，使本章的適用成為不合理或沒有必要時，主管機關可准許單個船舶部分或有條件地免除或採取等效措施，但主管機關應考慮到此種免除和等效對所有其他船舶的安全可能具有的影響。

3 每一主管機關應於每年1月1日後儘快向本組織提交一個報告，總結根據本條第2款規定在前一日曆年度所准許的所有新免除和等效，並說明准許此種免除和等效的理由。本組織應向其他締約國政府分發此類信息，以供參考。

第4條

航行警告

每一締約國政府均應採取一切必要措施，確保一旦從任何可靠渠道獲得任何關於危險的信息時，迅速提請有關各方注意該信息，並通知其他有關的政府。

第5條

氣象服務和警告

1 締約國政府承諾鼓勵海上船舶搜集氣象資料並以最適合於助航目的的方式，對資料的審查、散發和交換做出安排。主管機關應鼓勵

使用高精度的氣象儀器，並應於提出請求時對儀器的校準提供便利。
也可由適當的國家氣象服務部門安排免費對船舶進行此種校準。

2 締約國政府特別承諾，合作進行下列氣象安排：

- .1 通過利用適當的岸基地空無線電通信服務設施，以文字形式以及儘實際可能地使用圖形格式，警告船舶注意強風、風暴和熱帶氣旋。
- .2 通過地空無線電通信服務，至少每天兩次發佈適用於航行的天氣信息，包括數據、分析、天氣警告和預報、波浪和冰況。應以文字以及儘實際可能地使用圖形格式傳送上述信息，包括用傳真或數字形式傳送氣象分析以及天氣走勢圖，供船上改編船舶數據處理系統使用。
- .3 準備並發行供海上順利開展氣象工作可能需要的出版物，並在可能時安排發佈和提供每日天氣圖，供出航船舶參考。
- .4 安排選定的船舶配備經過校驗的海洋氣象儀器（例如氣壓計、氣壓記錄儀、濕度計和測量海水溫度的適當儀器），以供氣象服務之用，並在主要標準時間進行、記錄和傳送氣象觀測（只要環境許可，每天至少4次），作為海面天氣觀測資料，以及鼓勵其他船舶採用變通方式進行、記錄和傳送觀測，特別是在航行稀少的區域。
- .5 鼓勵船公司讓其儘可能多的船舶參與天氣觀測並記錄觀測資料；使用船舶的地空無線電通信設施傳送的這些天氣觀測資料將有益於各國國家氣象服務。
- .6 這些天氣觀測資料的傳送，對有關船舶免費。

- .7 當處於熱帶氣旋或可能發生的熱帶氣旋附近時，應鼓勵船舶在凡可行時更頻繁地進行天氣觀測並傳送其觀測資料，但得牢記高級船員在風暴天氣下於航行方面需專注的事項。
- .8 使用適當的岸基地空無線電通信服務設施，作出與船舶之間氣象通報的接收和傳送安排。
- .9 鼓勵船長凡遇到50節或以上的風速（蒲福風級10級風力）時，通知附近船舶以及海岸電台。
- .10 努力使上述國際氣象服務獲得統一程序，並儘可能地符合世界氣象組織提出的技術規則和建議書；各締約國政府可以就執行本公約過程中可能出現的任何氣象問題提交該組織供研究和諮詢。

3 本條所規定的信息應按《無線電規則》規定的發送格式提供和優先順序發送。在向“所有電台”發送氣象信息、預報和警報期間，所有船舶電台都必須遵守《無線電規則》的規定。

4 供船舶使用的預報、警報、天氣形勢和其他氣象信息，應按有關締約國政府間的共同安排，尤其是按照世界氣象組織根據全球海上遇險和安全系統（GMDSS）為公海準備和散佈氣象預報和警報系統所規定的安排，由國家氣象機構在為不同的海岸和公海區域服務的最佳地點，進行發佈和傳播。

第6條

冰區巡邏服務

1 冰區巡邏有助於海上人命安全、航行安全和效率及保護北大西洋海洋環境。要求在冰季過往由冰區巡邏保護的冰山區域的船舶使用由冰區巡邏提供的服務。

2 各締約國政府承諾，繼續提供北大西洋冰區巡邏和研究與觀測冰情的服務。在整個冰季內，即每年的2月15日直至7月1日期間，在紐芬蘭大灘（Grand Banks）附近冰山區的東南、南和西南界限應予警戒，以便將該危險區的範圍通知過往船舶；研究浮冰的總體情況；以及對巡邏船舶和航空器活動區內的船舶和船員提供所需的援助。在一年中的其餘時間內也應適當保持對冰情的研究與觀測。

3 用於供冰區巡邏服務及研究與觀測冰情的船舶和航空器可承擔分配給它們的其他任務，但此類其他任務不得妨礙這些船舶和航空器的原來目的或增加服務的費用。

4 美利堅合眾國政府同意繼續冰區巡邏服務總體管理和冰情研究與觀測，包括由此得到的信息的傳播。

5 冰區巡邏管理、運作和財務的指導條款載於本章所附的《北大西洋冰區巡邏管理、運作和財務規則》之中，與本章構成一個整體。

6 如果美利堅合眾國和/或加拿大政府無論何時意欲中止提供這些服務，則其可以這樣做，而各締約國政府應根據它們的相互利益解決繼續提供此服務的問題。美利堅合眾國和/或加拿大政府應於中止

提供這些服務的18個月前，書面通知那些船舶懸掛其國旗和船舶在該國已將本條延伸適用的領土上註冊並在中止提供這些服務前從中受益的所有締約國政府。

第7條

搜尋和救助服務

1 各締約國政府承諾，保證作出一切必要的安排在其責任區域提供遇險通信和協調以及對沿其海岸的海上遇險人員進行救助。這些安排，在考慮到海上交通密度和航行危險的情況下，應包括被認為是可行和必要的海上安全設施的建立、操作和維護，並應在凡可能時，提供尋找和救助遇險人員的足夠設備。

2 每締約國政府承諾，向本組織提供關於它現有搜尋和救助設施以及對其所作的更改計劃（如有時）的信息。

3 第I章所適用的客船應攜有在發生緊急情況時與適當的搜尋和救助服務機構合作的計劃。該計劃應由船舶、第IX/1條所定義的公司與搜尋和救助機構合作制定。該計劃應包括進行定期演習以測試其有效性的條款。該計劃應根據本組織制定的指南來制定。

第8條

救生信號

締約國政府承諾，就從事搜尋和救助活動的搜救設施與遇險船舶或遇險人員之間通信時使用救生信號做出安排。

第9條

水文服務

1 締約國政府承諾，就搜集和編寫水文信息以及出版、散發和更新安全航行需要的所有航行信息做出安排。

2 締約國政府尤其承諾，以最適合助航目的的方式，儘可能地合作開展下述航海和水文服務：

- .1 確保水文調查的開展儘可能符合安全航行的要求；
- .2 準備和發佈滿足安全航行需要的海圖、航路指南、燈塔表、潮汐表以及其他航海出版物（如適用）；
- .3 發佈航海通告，以便海圖和航海出版物能儘可能地保持最新；和
- .4 就支持這些服務提供信息管理安排。

3 締約國政府承諾，確保海圖和航海出版物最大程度的一致，並在凡可能時，考慮到相關的國際性決議和建議。

4 締約國政府承諾，最大程度地協調其活動，以確保在全球範圍內儘可能及時、可靠和清楚地提供水文和航海信息。

第10條

船舶定線

1 船舶定線制有助於海上人命安全、航行安全與效率和/或海洋環境保護。當按照本組織制定的指南和衡準通過和實施時，船舶定線制係建議用於並可能被定為強制用於所有船舶或某些類型的船舶或載運某類貨物的船舶。

2 本組織在制定國際性船舶定線制的指南、衡準和規則方面是公認的唯一國際機構。締約國政府應將船舶定線制的建議提交本組織通過。本組織將整理並向締約國政府散發所有業已通過的船舶定線制的有關信息。

3 倡議制定船舶定線制的行動是有關的一個或多個政府的責任。在制定供本組織通過的此種制度時，應考慮到本組織制定的指南和衡準。

4 船舶定線制應提交本組織供通過。但是，鼓勵執行不準備提交本組織供通過的船舶定線制或本組織尚未通過的船舶定線制的一個或多個政府，在凡可能時，考慮到本組織制定的指南和衡準。

5 如兩個或多個政府在某一特定區域有共同利益，它們應在協議的基礎上擬定有關船舶定線制劃線和使用的聯合建議。在收到此種建議後，但在開始審議通過之前，本組織應確保向那些在建議的定線制區域有共同利益的國家，包括在建議的船舶定線制周圍的國家，分發該建議的詳細信息。

6 各締約國政府應遵守本組織通過的有關船舶定線制的措施。它們應公佈安全和有效使用已通過的船舶定線制的所有必要信息。有關的一個或多個政府可監測這些制度內的交通情況。締約國政府應在其權力範圍內儘一切努力保證恰當地採用本組織通過的船舶定線制。

7 船舶應按對其類型或運載貨物的要求和現行有關規定，採用本組織通過的強制性船舶定線制，除非有令人信服的理由不採用某一特定船舶定線制。任何此種理由均應記入航海日誌。

8 強制性船舶定線制應由有關的一個或幾個締約國政府根據本組織通過的指南和衡準予以審核。

9 所有通過的船舶定線制度和為實施這些制度所採取的行動均應與國際法包括與《1982年聯合國海洋法公約》的有關規定一致。

10 本條或與其相關的指南和衡準不得損害各國政府按國際法或用於國際航行的海峽和群島海域航路的法律制度享有的權利和義務。

第11條

船舶報告制度

1 船舶報告制度有助於海上人命安全、航行安全與效率和/或海洋環境保護。當按照本組織根據本條制定的指南和衡準通過和實施時，船舶報告制度應用於所有船舶，或用於按這樣通過的每一制度所規定的某些類型的船舶或載運某類貨物的船舶。

2 本組織在制定國際性船舶報告制度的指南、衡準和規則方面是公認的唯一國際機構。締約國政府應將船舶報告制度的建議提交本組織通過。本組織將整理並向締約國政府散發所有業已通過的船舶報告制度的有關信息。

3 倡議建立船舶報告制度的行動是有關的一個或多個政府的責任。在制定此種制度時，應考慮到本組織制定的指南和衡準的規定。

4 未提交本組織通過的船舶報告制度不必遵守本條規定。但是，鼓勵實施此種制度的政府，在凡可能時，遵循本組織制定的指南和衡準。締約國政府可將此種制度提交本組織，以供得到認可。

5 如兩個或多個政府在某一特殊區域有共同利益，它們應在協議的基礎上擬定經協調的船舶報告制度的建議。在開始通過船舶報告制度的建議之前，本組織應向那些在建議的報告制度區域有共同利益的國家，分發該建議的詳細信息。如果通過和制定了協調的船舶報告制度，則其應具有統一的程序和運作方法。

6 在按本條通過一種船舶報告制度後，相關的一個或幾個政府應採取所有必要的措施，公佈有效和高效使用該制度所需要的任何信息。任一被通過的船舶報告制度應具有互動能力和在必要時向船舶提供信息的能力。這些制度應按本組織根據本條制定的指南和衡準運作。

7 船長應遵守所通過的船舶報告制度的要求，並向有關當局報告按照每一此種制度的規定所要求的所有信息。

8 所有通過的船舶報告制度和為實施這些制度所採取的行動均應與國際法包括與《聯合國海洋法公約》的有關規定一致。

9 本條或與其相關的指南和衡準不得損害各國政府按國際法或用於國際航行的海峽和群島海域航路的法律制度享有的權利和義務。

10 船舶按照業已通過的船舶報告制度規定參加，則應對其免收費用。

11 本組織應保證根據本組織制定的指南和衡準對通過的船舶報告制度進行審查。

第12條

船舶交通服務

1 船舶交通服務（VTS）有助於海上人命安全、航行安全和效率以及海洋環境保護、臨岸區域、工作場所和近海設施免受海上交通可能帶來的負面影響。

2 締約國政府承諾做出安排，在其認為交通量或危險程度需要此服務的地方設立VTS。

3 規劃並實施VTS的締約國政府在凡可能時，應遵循本組織制定的指南。只有在沿海國領海範圍內的海域，才能強制採用VTS。

4 締約國政府應努力確保懸掛其船旗的船舶參與並遵循船舶交通服務的規定。

5 本條或本組織通過的指南不得損害各國政府按國際法或用於國際航行的海峽和群島海域航路的法律制度享有的權利和義務。

第13條

助航設備的設立和操作

1 每一締約國政府承諾，在其認為現實和必要時，單獨或與其他締約國政府合作，提供交通量證明合理和危險程度所要求的助航設備。

2 締約國政府承諾，為取得助航設備最大可能的一致，在設立此類助航設備時，考慮到國際上的建議和指南。

3 締約國政府承諾，做出向所有有關方面提供關於助航設備的信息的安排。應儘可能避免會對船上固定接收器性能產生負面影響的定位系統傳輸上的變動，並且只能在發佈及時和充分的通知後才能進行。

第14條

船舶配員

1 各締約國政府承諾，從海上人命安全角度出發，各自對其本國的船舶保持或如必要時採取措施，以保證所有船舶均充分和有效地予以配員。

2 本公約第I章所適用的每艘船舶應備有一份由主管機關頒發的適當的最低安全配員文件或等效文件，作為符合第1款規定的最低安全配員的必要憑證。

3 為確保船員在安全事項中的有效表現，在所有船舶上應確定一種工作語言並在船舶的航海日誌中作出記錄。第IX/1條所定義的船公司，或如適當時船長，應確定該適當的工作語言。應要求每個海員懂得該語言，並且如果適當，能用該語言發佈命令和指令及使用該語言回答。如果該工作語言不是船旗國的官方語言，則要求張貼的所有計劃和清單均應包括該工作語言的譯文。

4 在本公約第I章所適用的船舶上，駕駛室內應使用英語作為駕駛室與駕駛室和駕駛室與岸上之間的安全聯繫以及船上引航員與駕駛室值班人員之間進行聯繫的工作語言，除非聯繫的各直接參與方能講英語以外的一種共同語言。

第15條

駕駛室設計原理、航行系統與設備的

設計和佈置及駕駛室程序

旨在為適用第19、22、24、25、27和28條的要求所做出的所有決定和影響駕駛室設計、駕駛室航行系統與設備的設計和佈置及駕駛室程序的所有決定，應服務於如下目的：

- .1 便利駕駛室人員和引航員完成在所有操作條件下就所處的情形履行全面評估和安全駕駛船舶的任務；
- .2 促進駕駛室資源的有效與安全管理；

- .3 使駕駛室人員和引航員能通過使用控制器和顯示器標準符號和編碼系統方便和持續地獲得清晰和確切的基本信息；
- .4 指示自動功能和集成元件、系統和/或次系統的工作狀況；
- .5 允許駕駛室人員和引航員快速、連續和有效地進行信息處理並做出決策；
- .6 避免或儘量減少駕駛室內過分或不必要的工作以及可引起駕駛室人員和引航員疲勞或干擾其警惕性的任何狀況或分心；和
- .7 通過監控和警報系統，儘量減少人為失誤的危險，並在此種失誤一旦發生時發現它，以便駕駛室人員和引航員及時採取適當的行動。

第16條

設備的維護

1 應使主管機關滿意業已做出確保本章要求的設備的性能得到保持的適當安排。

2 除第I/7(b)(ii)條、第I/8條和第I/9條的規定外，雖應採取所有合理措施保持本章要求的設備處於高效的工作狀態，但如船長在計劃和執行前往可進行修理的港口的安全航行時，作出了計及失靈設備或得不到的信息的適當安排，則該設備的失靈不應被認為是使船舶不適航或作為使船舶在沒有維修設施的港口延誤的理由。

第17條

電磁兼容性

1 主管機關應在考慮到由本組織制定的建議的情況下，確保2002年7月1日或以後建造的船舶駕駛室上或駕駛室附近的所有電氣和電子設備，經過電磁兼容性測試。

2 電氣和電子設備應安裝成電磁干擾不影響航行系統和設備的正常功能。

3 如便攜式電氣和電子設備可能影響航行系統和設備的正常功能，則不得在駕駛室內操作。

第18條

導航系統和設備及航行數據記錄儀的認可、檢驗和性能標準

1 需要符合第19和20條要求的系統和設備應為經主管機關認可的型號。

2 2002年7月1日或以後安裝的履行第19和20條功能要求的系統和設備，如適當，包括相應的備用裝置，應符合不低於本組織通過的性能標準。

3 當2002年7月1日以前建造的船舶替換或增添這些系統和設備時，此類系統和設備應儘可能合理和可行地符合第2款的要求。

4 主管機關在充分考慮到本組織通過的建議性衡準後，可自行決定隨後免除在本組織通過該性能標準以前安裝的系統和設備完全符合該標準。但是，對於將被接受為符合第19.2.1.4條的海圖配備要求的電子海圖顯示和信息系統（ECDIS），該系統應符合不低於由本組織通過的在安裝之日正在實施的相關性能標準，或者，對於1999年1月1日前安裝的系統，該系統則應符合不低於本組織於1995年11月23日通過的性能標準。

5 主管機關應要求製造廠具備經主管當局審核的質量控制系統，以確保持續符合型式認可條件。或者，主管機關可採用由主管當局在產品安裝到船上之前對型式認可證書的符合性進行驗證的最終產品驗證程序。

6 主管機關在對具有本章未包括的新性能的系統和設備給予認可前，應確保這些性能支持與本章要求的功能至少同等有效的功能。

7 當在船上配備除第19和20條所要求的設備項目以外的由本組織制定性能標準的設備時，此類設備應經認可，並儘可能地符合不低於本組織所通過的性能標準。

8 航行數據記錄儀系統，包括所有傳感器，應接受年度性能測試。測試應由認可的測試或維護機構來驗證所記錄設備的精度、記錄時間和可恢復性。此外，還應通過測試和檢查來確定所有保護罩和幫助定位的裝置處於良好工作狀態。船上應保存一份測試機構簽發的符合證書的副本，載明符合日期和適用的標準。

第19條

船載導航系統和設備的配備要求

1 適用範圍和要求

除第1/4條的規定外：

1.1 2002年7月1日或以後建造的船舶應安裝符合第2.1至2.9款要求的導航系統和設備。

1.2 2002年7月1日以前建造的船舶：

- .1 在符合第1.2.2和1.2.3款規定的前提下，除非它們完全符合本條的規定，應繼續安裝符合2002年7月1日前生效的《1974年國際海上人命安全公約》第V/11、V/12和V/20條規定要求的設備；
- .2 應不晚於2002年7月1日以後的第一次檢驗時安裝第2.1.6款要求的設備或系統，此時不再要求2002年7月1日前生效的《1974年國際海上人命安全公約》第V/12（p）條所提及的無線電測向儀；和
- .3 應不晚於第2.4.2和2.4.3款規定的日期安裝第2.4款要求的系統。

2 船載導航設備和系統

2.1 所有船舶，不論其大小，均應：

- .1 配有一個獨立於任何電源，用於確定船舶航向並在主操舵位置顯示讀數的準確調整的標準磁羅經，或其他裝置；

- .2 配有一個獨立於任何電源，能在水平面360°弧範圍內測量方位的啞羅經或羅經方位儀，或其他裝置；
- .3 配有隨時修正成真航向和真方位的裝置；
- .4 配有用於計劃和顯示船舶預定航程路線並在整個航程中標繪和監控船位的海圖和航海出版物；可以接受電子海圖顯示和信息系統（ECDIS）作為符合本項的海圖配備要求；
- .5 配有滿足第.4項功能要求的備用裝置，如果電子設備部分或全部滿足這一要求；
- .6 配有一個適合於在整個預定航程中隨時以自動方式確定和更新船位的全球導航衛星系統或陸上無線電導航系統接收器，或其他裝置；
- .7 如果船舶小於150總噸並在可行時，配有雷達反射器，或其他裝置，以使航行船舶能在雷達的9和3 GHz頻率上進行探測；
- .8 當船舶駕駛室完全封閉並且除非主管機關未另行規定，安裝一個聲音接收系統，或其他裝置，以使負責航行值班的高級船員能聽到聲音信號並確定其方向；
- .9 安裝一部電話，或其他裝置，以向緊急操舵位置（如有）傳遞航向信息。

2.2 所有150總噸及以上的船舶和不論大小的客船，除應符合第2.1款的要求外，還應裝有：

- .1 第2.1.1款提及的可與磁羅經交替使用的備用磁羅經，或通過替換或雙套設備履行第2.1.1款的功能的其他裝置；

- .2 日光信號燈，或通過不是完全依賴船舶電源的應急能源進行日間和夜間燈號通信的其他裝置。

2.3 300總噸及以上的所有船舶和不論大小的客船，除應符合第2.2款的要求外，還應裝有：

- .1 測量和顯示水深的回聲測深儀，或其他的電子裝置；
- .2 9 GHz雷達，或用於確定和顯示雷達應答器及其他水上艇筏、障礙物、浮標、岸線和航行標誌的範圍及方位的其他裝置，以利於航行和避碰；
- .3 以電子標繪目標物的範圍和方位以確定碰撞危險的電子標繪儀，或其他裝置；
- .4 顯示水中速度和距離的速度和距離測量儀器，或其他裝置；
- .5 調整良好的航向傳送儀，或向第2.3.2、2.3.3和2.4款提及的設備傳送航向信息的其他裝置。

2.4 所有300總噸及以上從事國際航行的船舶和500總噸及以上非從事國際航行的貨船以及不論大小的客船，均應按照下述規定安裝自動識別系統（AIS）：

- .1 2002年7月1日或以後建造的船舶；
- .2 2002年7月1日以前建造的從事國際航行的船舶：
 - .2.1 如果是客船，不晚於2003年7月1日；
 - .2.2 如果是液貨船，不晚於2003年7月1日後的第一次安全設備檢驗；

- .2.3 除客船和液貨船外的50,000總噸及以上的船舶，不晚於2004年7月1日；
- .2.4 除客船和液貨船外的10,000總噸及以上但小於50,000總噸的船舶，不晚於2005年7月1日；
- .2.5 除客船和液貨船外的3,000總噸及以上但小於10,000總噸的船舶，不晚於2006年7月1日；
- .2.6 除客船和液貨船外的300總噸及以上但小於3,000總噸的船舶，不晚於2007年7月1日；和
- .3 2002年7月1日以前建造的非從事國際航行的船舶，不晚於2008年7月1日；
- .4 當船舶從第.2和.3項規定的執行日期起兩年內將被永久終止提供服務時，主管機關可以免除此類船舶適用本款的要求；
- .5 自動識別系統應：
 - .1 自動向適當裝備的岸站、其他船舶和航空器提供信息，包括船舶識別號、船型、位置、航向、速度、航行狀況及其他與安全有關的信息；
 - .2 從類似裝備的船舶自動接收此類信息；
 - .3 監測和跟蹤船舶；和
 - .4 與岸基設施交換資料；
- .6 第2.4.5款的要求不應適用於國際協定、規則或標準對航行信息予以保護的情況；

.7 操作自動識別系統時，應考慮到本組織通過的指南。

2.5 所有500總噸及以上的船舶，除須符合第2.3款（第2.3.3和2.3.5款除外）和第2.4款的要求外，還應配有：

- .1 通過非磁方式確定並顯示船舶航向和向第2.3.2、2.4和2.5.5款提及的設備傳送航向信息的電羅經，或其他裝置；
- .2 向緊急操舵位置（如有）提供可視航向信息的電羅經航向中繼器，或其他裝置；
- .3 使用電羅經或第.1項提及的其他裝置在水平面上360°弧範圍內測量方位的電羅經方位中繼器，或其他裝置。但是，小於1,600總噸的船舶應儘可能地安裝此類裝置；
- .4 用於確定並顯示所有可從駕駛指揮位置上讀取的舵角、推進器轉速、推力及其方向以及，如適用時，橫向推力及其方向和縱搖及操作模式的舵、推進器、推力、縱搖及操作模式顯示器，或其他裝置；和
- .5 自動標繪其他目標物的範圍和方位以確定碰撞危險的自動跟蹤儀，或其他裝置。

2.6 在所有500總噸及以上的船舶上，一件設備的失靈不應降低船舶符合第2.1.1、2.1.2和2.1.4款要求的能力。

2.7 所有3,000總噸及以上的船舶除應符合第2.5款的要求外，還應配有：

- .1 一台3 GHz雷達，或如主管機關認為適當時一台9 GHz雷達，或確定和顯示其他水上艇筏、障礙物、浮標、岸線和航行標

誌的範圍和方位的其他裝置，以利於航行和避碰，它們的功能應獨立於第2.3.2款提及的設備；和

- .2 第二台自動跟蹤儀，或自動標繪目標物的範圍和方位以確定碰撞危險的其他裝置，其功能獨立於第2.5.5款提及的設備。

2.8 所有10,000總噸及以上的船舶，除應符合第2.7款（第2.7.2款除外）的要求外，還應配有：

- .1 一台與顯示水中速度和距離的裝置相連，以電子設備標繪至少20個其他目標物的範圍和方位的自動雷達標繪儀，或其他裝置，以確定碰撞危險和模擬試驗操作；和
- .2 一個能自動控制並保持航向和/或直線航向的航跡或航跡控制系統，或其他裝置。

2.9 所有50,000總噸及以上的船舶，除應符合第2.8款的要求外，還應配有：

- .1 確定並顯示旋回角速率的旋回角速率指示器，或其他裝置；和
- .2 顯示船舶在前進方向和橫向對岸速度和距離的速度和距離測量裝置，或其他裝置；

3 當按本條允許“其他裝置時”，該裝置必須由主管機關根據第18條規定予以認可。

4 本條提及的導航設備和系統的安裝、測試和維護應儘量減少功能失靈。

5 提供替代操作模式的導航設備和系統應顯示實際使用的模式。

6 駕駛室綜合系統的安裝，應確保一個子系統失靈後能立即通過聲、光報警引起負責航行值班高級船員的注意，並且不引起任何其他子系統的失靈。萬一綜合導航系統的一部分失靈，那麼，該系統中的每一其他單獨設備或該系統的一部分應能分開操作。

第20條

航行數據記錄儀

1 為幫助事故調查，除第1.4條規定外，從事國際航行的船舶應按如下要求安裝航行數據記錄儀（VDR）：

- .1 2002年7月1日或以後建造的客船；
- .2 對於2002年7月1日以前建造的客滾船，不晚於2002年7月1日後的第一次檢驗；
- .3 對於2002年7月1日以前建造的除客滾船以外的客船，不晚於2004年1月1日；和
- .4 2002年7月1日或以後建造的除客船以外的3,000總噸及以上的船舶。

2 如果能證明VDR與船上的現有設備接合不合理和不可行，主管機關可對2002年7月1日以前建造的除客滾船以外的船舶免除安裝VDR的要求。

第21條

國際信號規則

按照本公約需配備無線電裝置的所有船舶，應備有可能經本組織修正的《國際信號規則》。如果主管機關認為任何其他船舶也有必要使用該規則，這些船舶亦應備有此規則。

第22條

駕駛室能見度

1 1998年7月1日或以後建造的第III/3.12條所定義的長度不小於45 m的船舶應符合下列要求：

- .1 從船舶指揮位置向前的海面視野，在任何吃水、縱傾和甲板載貨狀態下，從船艏向前至船舷兩側的 10° 範圍不得被遮擋超過兩倍船長或500 m，以小者為準；
- .2 橫樑前操舵室之外妨礙指揮位置海面視野的因貨物、貨物裝卸設備或其他障礙物造成的扇型盲區不得超過 10° 。扇型盲區的總弧度不得超過 20° 。在扇型盲區之間的無遮擋區至少應為 5° 。但是，在第.1款所述的視野內，每一單獨的扇型盲區不得超過 5° ；
- .3 指揮位置的水平視野應擴展為一個不小於 225° 的弧，即從船舶正前方到船舶的兩側正橫之後不小於 22.5° ；

- .4 駕駛室每一側的水平視野均應擴展為一個至少225°的弧，即從相對船艏處至少45°通過正前方以及然後從正前方至正後方通過船舶相同側面的180°；
 - .5 從主操舵位置看，水平視野應擴展為一個以船舶正前方到每側至少60°的弧；
 - .6 從駕駛室兩側的翼台應能夠看到船舷；
 - .7 駕駛室甲板上的駕駛台前窗下緣的高度應保持儘可能低。無論如何下緣不能成為本條所述的前視的障礙物；
 - .8 當船舶在大浪中縱搖時，駕駛台前窗的上緣應使在駕駛台甲板指揮位置上由眼高為1,800 mm的人向前可見到地平線。如果主管機關認為1,800 mm眼高不合理亦不實際，可降低眼高標準，但不得小於1,600 mm；
 - .9 窗戶應符合下列要求：
 - .9.1 為避免反光，駕駛台前窗豎直平面的上端應向外傾斜，角度不應小於10°，但不超過25°；
 - .9.2 船舶駕駛台窗戶間的框架應保持至最少，並且不得在任何緊靠工作台前處安裝；
 - .9.3 不可安裝偏光的和有色玻璃的窗戶；
 - .9.4 無論氣候狀況如何，在任何時候，應至少有兩個駕駛台前窗以及，根據駕駛台的結構，一些視野清楚的其他窗戶來提供清楚的視野。
- 2 如可行時，1998年7月1日之前建造的船舶應符合第1.1和1.2款的

要求。但是，不要求結構改裝或增加設備。

3 對於主管機關認為不能執行本條要求的非傳統型設計的船舶，應做出相應的佈置，使其能見度標準儘可能接近本條規定的要求。

第23條

引航員登離船裝置

1 適用範圍

1.1 在航程中可能使用引航員的船舶應配備引航員登離船裝置。

1.2 在1994年1月1日或以後安裝的供引航員登離船使用的設備和裝置，應符合本條要求並充分考慮到本組織通過的標準。

1.3 在1994年1月1日以前安裝的供引航員登離船使用的設備和裝置，至少應符合在該日期前生效的《1974年國際海上人命安全公約》第17條的要求，並充分考慮到在該日期前本組織通過的標準。

1.4 在1994年1月1日以後替換的設備和裝置，在合理和可行時，應符合本條的要求。

2 通則

2.1 供引航員登離船使用的所有裝置均應有效地達到使引航員安全登船和離船的目的。裝置應保持乾淨，維護和存放適當並應定期檢查，以保證它們使用安全。它們只應用於人員登船和離船。

2.2 引航員登離船裝置的架設和引航員的登離船，應由攜有與駕

駛台進行聯繫的通信裝置的負責的駕駛員進行監督；他還應做出護送引航員經由安全通道前往和離開駕駛台的安排。應向架設和操作任何機械設備的人員就將採用的安全程序進行指導；設備在使用前應進行檢查。

3 登離船裝置

3.1 應配備能使引航員從船舶任何一舷安全登船和離船的裝置。

3.2 在從海平面至船舶的入口或出口點的距離超過9 m的所有船上，並且當欲將舷梯或機械式引航員升降器或其他同樣安全和方便的裝置與引航員軟梯一起供引航員登船或離船時，船舶在每舷均應裝有此種裝置，除非該裝置能移動供任一舷使用。

3.3 應使用下列任一裝置提供安全和方便的進出船舶方式：

- .1 引航員軟梯，其所需爬高不低於1.5 m，離開水面高度不超過9 m；其位置和緊固應做到：
 - .1.1 避開船舶的任何可能的排放口；
 - .1.2 在船舶平行船體的長度範圍內，並儘實際可能位於船舶的船中半船長範圍內；
 - .1.3 每級踏板均應穩固地靠在船舷上；在護舷木等結構部件妨礙本規定的執行時，應做出使主管機關滿意的特別安排，以保證人員能安全登船和離船；
 - .1.4 引航員軟梯的單幅長度應能從船舶的入口或出口點伸達水面；應為所有的裝載狀況和船舶縱傾及15°的不利橫傾留出充分的餘量；安全加固點、卡扣和繫索至少應與扶手索

的強度相同；

- .2 凡當水面至船上入口點的距離超過9 m時，與引航員軟梯一起使用的舷梯，或其他同樣安全和方便的裝置。舷梯應安裝在通向船尾的位置上。在使用時，舷梯的下端應牢固地靠在船舶平行船體長度範圍內的舷側，並儘可能位於船中半船長範圍內，避開所有的排放口；或
- .3 引航員機械升降器，其位置處於船舶平行船體長度的範圍內，並應儘可能位於船舶的船中半船長範圍內，避開所有的排放口。

4 通向船舶甲板的通道

應配備裝置確保引航員軟梯的上端或任何舷梯或其他設施的上端與船舶的甲板之間有安全、方便和無障礙的通道，以供任何人員登船和離船。此種通道應由下列裝置提供：

- .1 在欄桿或舷牆中的舷門；應配有適當的扶手；
- .2 舷牆梯；應裝有在其底部或附近及更高位置上牢固地固定在船舶結構上的兩根扶手支柱。舷牆梯應牢固地固定在船舶上，以防翻轉。

5 舷門

供引航員登離船使用的舷門不應朝外開。

6 引航員機械升降器

6.1 引航員機械升降器及其輔助設備應為主管機關認可的型式。引航員升降器應設計成像活動梯一樣操縱，供一人在船舷升降；或像

平台一樣操縱，供一人或多人在船舷升降。其設計和構造應為能保證引航員能安全地登船和離船，包括從升降器到甲板和從甲板到升降器的安全通達。此種通達應通過由扶欄可靠保護的平台而直接獲得。

6.2 應配備有效的手動裝置，以降下或送回所載人員，該裝置並應保持可用狀態，以備斷電時使用。

6.3 升降器應牢固地固定在船舶結構上。其固定不應僅僅依靠船舶的船舷欄桿。應在船舶的每一舷為活動式升降器提供適當和牢固的固定點。

6.4 如果在升降器位置的通道上裝有外護舷材，則此種外護舷材應截短至升降器可以靠在船舷上進行工作的狀況。

6.5 引航員軟梯應裝在升降器的鄰近處並隨時可用，以便在升降器行程的任何位置上均可使用。引航員軟梯應能從自身進入船舶的位置伸至水面。

6.6 應在船舷降放升降器的位置做出標誌。

6.7 應為可攜式升降器配備適當的受保護的存放位置。在寒冷天氣中，為避免結冰危險，應僅在即將使用前方將可攜式升降器進行裝配。

7 有關設備

7.1 在傳送人員時，手頭應備有下列有關設備以便隨時可用：

- .1 如引航員要求時，兩根扶手繩，直徑不小於28 mm，牢固地繫在船上；
- .2 帶有自亮燈的救生圈；

.3 拋纜。

7.2 當第4款要求時，應配有支柱和舷牆梯。

8 照明

應配備適當照明，照亮舷外的登離船裝置、甲板上人員登船或離船的位置和引航員機械升降器的控制裝置。

第24條

航向和/或航跡控制系統的使用

1 在交通密度高的區域，在有限能見度的情況下以及在其他有航行危險的各種情形中，如果使用了航向和/或航跡控制系統，應能夠立即對船舶進行手動操舵。

2 在上述各種情況下，負責航行值班的高級船員應隨時能得到一個勝任的操舵員的協助，該操舵員應時刻準備接管操舵控制。

3 自動操舵改為手動操舵或手動操舵改為自動操舵應由負責的高級船員或在其監督下進行。

4 航向和/或航跡控制系統在長時間使用後和在駛入需要特別警惕的航行區域前，應進行手動操舵測試。

第25條

操舵裝置的操作

在需要特別警惕的航行區域，當船舶各操舵裝置動力設備能同時操作時，應有一套以上的此種設備在進行工作。

第26條

操舵裝置：測試和演習

1 船舶開航前12小時之內，應由船員對操舵裝置進行檢查和測試。測試程序（如適用時）應包括下述操作：

- .1 主操舵裝置；
- .2 輔助操舵裝置；
- .3 操舵裝置遙控系統；
- .4 駕駛室內的操舵位置；
- .5 應急動力供應；
- .6 相對於舵的實際位置的舵角指示器；
- .7 操舵裝置遙控系統動力故障報警器；
- .8 操舵裝置動力設備故障報警器；和

.9 自動隔斷裝置和其他自動設備。

2 檢查和測試應包括：

.1 按照所要求的操舵裝置能力進行操滿舵測試；

.2 操舵裝置及其連結部件的外觀檢查；和

.3 駕駛室與舵機室通信設備的工作情況。

3.1 在駕駛室和操舵室內應有永久顯示操舵裝置遙控系統和操舵裝置動力裝置轉換程序的簡單操作說明並附方框圖。

3.2 所有與操舵裝置的操作和/或維護有關的船舶高級船員，應熟悉船上安裝的操舵系統的操作，以及從一個系統轉換到另一系統的程序。

4 除第1和2款所述的常規檢查和測試外，至少每三個月應進行一次應急操舵演習，以便練習應急操舵程序。演習應包括在操舵裝置室內的直接控制、與駕駛室通信的程序，以及如適用時轉換動力供應的操作。

5 主管機關可免予對通常從事短途航行的船舶執行第1和2款所規定的檢查和測試要求。但這些船舶每周應至少進行一次這樣的檢查和測試。

6 進行第1和2款規定的檢查和測試的日期以及進行第4款所述應急操舵裝置演習的日期和詳細內容應予記錄。

第27條

海圖和航海出版物

預定航行所必需的海圖和航海出版物，諸如航路指南、燈塔表、航行通告、潮汐表以及所有其他航海出版物，應配備充分而且最新。

第28條

航行活動的記錄

所有從事國際航行的船舶應在考慮到本組織通過的建議書的情況下，於船上保存一份對航行安全有重要意義的航行活動和事件記錄，並且該記錄須含有足夠的細節以整理成完整的航程記錄。如此信息未記錄在船舶的航海日誌中，則應以主管機關認可的其他方式予以記錄。

第29條

遇險船舶、航空器或人員使用的救生信號

本章所適用的每一船舶的值班高級船員應能隨時獲得有圖解說明的救生信號表。遇險船舶或人員在和參與搜尋救助作業的救生站、海事救助機構和航空器進行通信時應使用這些信號。

第30條

操作限制

1 本條適用於第I章所適用的所有客船。

2 涉及客船所有操作限制的清單，包括對本章任何條款的免除、航區中的限制、天氣限制、海況限制、允許負載限制、縱傾、速度和任何其他限制，無論這些限制是由主管機關作出的還是在船舶設計或建造階段確定的，均應在該船投入服務前編製妥當。該清單，連同任何必要的解釋，應以主管機關能夠接受的格式編製，並應保存在船上，以便船長隨時可用。清單應不斷更新。如果清單所用文字既非英文又非法文，則該清單還應以其中一種語文提供。

第31條

危險通報

1 每艘船舶的船長如遇到危險的冰、危險的漂浮物或其他任何對航行的直接危險，或熱帶風暴，或遇到伴隨強風的低於冰點的氣溫致使上層建築嚴重積冰，或者未曾收到暴風警報而遇到蒲福風級10級或以上的風力時，均有責任自行採取所有措施將此信息通知附近各船並主管當局。發送這種信息的形式不限，可以用明語（最好是英文），也可用國際信號碼方式。

2 每一締約國政府將採取一切必要步驟，保證在收到第1款所述的任何危險信息時，迅速通知有關方面並通報給其他有關政府。

3 上述預計的危險通報係免費向有關船舶發送。

4 根據第1款所發的所有無線電報應使用第IV/2條所述《無線電規則》所規定的程序，冠以安全信號。

第32條

危險通報內所要求的信息

危險通報要求包括下列信息：

1 冰、漂浮物及其他直接的航行危險物：

- .1 所觀測到的冰、漂浮物或危險物的種類。
- .2 最後所觀測到的冰、漂浮物或危險物的位置。
- .3 最後所觀測到危險物的時刻和日期（協調世界時）。

2 熱帶氣旋（風暴）

- .1 遇到熱帶氣旋的報告書。這項義務應廣義地加以理解，並且每當船長有充分理由認為附近正形成或已存在熱帶氣旋時，即應發送信息。
- .2 進行觀測的時刻、日期（協調世界時）和船舶的位置。
- .3 在通報內必須儘實際可能包括下列信息：
 - 氣壓，最好是修正過的氣壓（註明其為毫巴、mm或英寸，以及是否已經修正）；

- 氣壓趨勢（過去3小時內氣壓的變化）；
- 真風向；
- 風力（蒲福風級）；
- 海況（小浪、中浪、大浪、巨浪）；
- 涌級（小、中、強）及其傳來的真方向。涌的周期和長度（短、中、長）亦有價值；
- 船舶真航向和航速。

繼續觀測

3 船長報告熱帶氣旋或其他危險的風暴後，只要船舶仍然處於風暴的影響之中，則雖無義務，但每小時作進一步的觀測和通報仍是可取的，如可行，無論如何間隔時間不要超過每3小時一次。

4 雖未收到風暴警報而風力已達蒲福10級或以上時。這是指處理第2款所述熱帶氣旋以外的其他風暴；當遇到此種風暴時，通報中應包括該款所列的同樣信息，但有關海況和涌的詳情除外。

5 伴隨強風的低於冰點的氣溫致使上層建築嚴重積冰：

- .1 時刻和日期（協調世界時）。
- .2 氣溫。
- .3 海水溫度（如可行）。
- .4 風力和風向。

舉例

冰

TTT冰。5月15日協調世界時8點在北緯45°06'，西經44°10' 發現大冰山。

漂浮物

TTT漂浮物。4月21日協調世界時16點30分在北緯40°06'，西經12°43' 見到幾乎淹沒的漂浮物。

航行危險

TTT航行。1月3日協調世界時18點。甲號燈船不在原位。

熱帶氣旋

TTT風暴。8月18日協調世界時0點30分。北緯20°04'，東經113°54'。修正氣壓994毫巴，趨勢下降6毫巴。西北風，風力9級，暴風雨。強涌由東來。航向067°，航速5節。

TTT風暴。跡象顯示颶風接近。9月14日協調世界時13點。北緯22°，西經72°36'。修正氣壓29.64英寸，趨勢下降0.015英寸。東北風，風力8級，陣風驟雨。航向035°，航速9節。

TTT風暴。情況表明已形成強旋風。5月4日協調世界時2點。北緯16°20'，東經92°03'。未修正氣壓753 mm，趨勢下降5 mm。風向南偏西，風力5級。航向300°，航速8節。

TTT風暴。颱風在東南方。6月12日協調世界時3點。北緯18°12'，東經126°05'。氣壓急速下降。北風在增強中。

TTT風暴。風力11級，未收到暴風警報。5月4日協調世界時3點。北緯48°30'，西經30°。修正氣壓983毫巴，趨勢下降4毫巴。西南風，風力11級，順時針轉向。航向260°，航速6節。

冰凍

TTT經受嚴重冰凍。3月2日協調世界時14點。北緯69°，西經10°。氣溫18°F (-7.8°C)。海水溫度29°F (-1.7°C)。東北風，風力8級。

第33條

遇險信息：義務和程序

1 處於能在海上提供援助的位置的船舶的船長由任何渠道接到人員海上遇險的信號時，有義務全速前往援助，如有可能，並通知他們或搜救機構其正在前往救援中。如果收到遇險警報的船舶不能或因特殊情況認為前往援助不合理或不必要時，其船長必須將未能前往援助遇險人員的理由記入航海日誌，並考慮到本組織的建議相應通知適當的搜救機構。

2 遇險船舶的船長或相關的搜救機構，在凡可能與應答遇險警報的各船船長協商後，有權召請這些船舶中其認為最能給予援助的一船或數船；被召請的一船或數船的船長有義務履行徵召，繼續全速前進以援助遇險人員。

3 當得悉其船舶未被召請而其他一船或數船已被召請並正在履行徵召時，這些船舶的船長得解除第1款所責成的義務。如可能時，應將此決定通知給其他被召請船舶和搜救機構。

4 當某船船長收到遇險人員、搜救機構或已到達遇險人員處的另一船船長的通知認為不再需要提供援助時，得解除第1款所責成的義務；而如果其船舶為已被召請者，得解除第2款責成的義務。

5 本條各項規定不影響1910年9月23日在布魯塞爾簽定的《統一關於海上救助打撈若干法律規定的公約》，特別是該公約第11條所責成的援助義務。

第34條

安全航行與避開危險情況

1 船長應確保在出海前利用相關海域的適當海圖和航海出版物計劃好預定的航程，同時考慮到本組織制定的指南和建議。

2 該航程計劃所確定的航線應：

- .1 考慮到任何相關的船舶定線制；
- .2 確保在整個航程中具有船舶安全航行的足夠海上活動範圍；
- .3 預計到所有已知的航行危險物和惡劣氣候情況；和
- .4 考慮到適用的海洋環境保護措施以及儘量避免任何可能對環境產生損害的行為和活動。

3 船舶所有人、承租人或第IX/1條所定義的經營船舶的公司或其他任何人，均不得阻止或限制船長根據其專業判斷做出或執行任何對於航行安全和海洋環境保護所必需的決定。

第35條

遇險信號濫用

除為表明一人或多人遇險外，禁止使用國際遇險信號和任何可能與國際遇險信號相混淆的信號。

第V章的附錄

北大西洋冰區巡邏的管理、運作和財務規則

- 1 在本規則中：
 - .1 冰季係指每年2月15日至7月1日間的期間。
 - .2 冰區巡邏所警戒的冰山區係指紐芬蘭大灘（Grand Banks）附近冰山區的東南、南和西南界限。
 - .3 穿越冰區巡邏所警戒的冰山區的航線係指：
 - .3.1 加拿大大西洋沿岸港口（包括通過坎索海峽（Gut of Canso）和卡伯特海峽（Cabot Straits）從北大西洋接近的內河港口）與通過直布羅陀海峽或以北從北大西洋接近的歐洲、亞洲或非洲港口之間的航線（穿越所有類型冰區極端界限南端的航線除外）。
 - .3.2 紐芬蘭雷斯角（Cape Race）以西的加拿大大西洋沿岸港口（包括通過坎索海峽（Gut of Canso）和卡伯特海峽（Cabot

Straits) 從北大西洋接近的內河港口) 和紐芬蘭雷斯角以北的加拿大大西洋沿岸港口之間經由紐芬蘭的雷斯角的航線。

- .3.3 美國大西洋和墨西哥灣沿岸港口(包括通過坎索海峽(Gut of Canso)和卡伯特海峽(Cabot Straits)從北大西洋接近的內河港口)與通過直布羅陀海峽或以北從北大西洋接近的歐洲、亞洲或非洲港口之間的路線(穿越所有類型冰區極端界限南端的航線除外)。
- .3.4 美國大西洋和墨西哥灣沿岸港口(包括通過坎索海峽(Gut of Canso)和卡伯特海峽(Cabot Straits)從北大西洋接近的內河港口)和紐芬蘭雷斯角以北的加拿大大西洋沿岸港口之間經由紐芬蘭的雷斯角的航線。

- .4 北大西洋中所有類型冰區極端界限由下列各點間的連線確定：

A — 北緯42°23' .00，西經59°25' .00

B — 北緯41°23' .00，西經57°00' .00

C — 北緯40°47' .00，西經55°00' .00

D — 北緯40°07' .00，西經53°00' .00

E — 北緯39°18' .00，西經49°39' .00

F — 北緯38°00' .00，西經47°35' .00

G — 北緯37°41' .00，西經46°40' .00

- H — 北緯38°00' .00，西經45°33' .00
- I — 北緯39°05' .00，西經43°00' .00
- J — 北緯39°49' .00，西經41°00' .00
- K — 北緯40°39' .00，西經39°00' .00
- L — 北緯41°19' .00，西經38°00' .00
- M — 北緯43°00' .00，西經37°27' .00
- N — 北緯44°00' .00，西經37°29' .00
- O — 北緯46°00' .00，西經37°55' .00
- P — 北緯48°00' .00，西經38°28' .00
- Q — 北緯50°00' .00，西經39°07' .00
- R — 北緯51°25' .00，西經39°45' .00

.5 管理和運作係指對冰區巡邏的維持、管理和運作，包括散發由此收到的信息。

.6 攤款政府係指根據本規則承諾分攤冰區巡邏服務費用的締約政府。

2 對這些服務工作有特殊利害關係且其船舶在冰季期間穿越冰山區域的締約政府承諾，向美利堅合眾國政府交納管理和運作冰區巡邏服務的比例費用份額。給予美利堅合眾國政府的攤款份額，應以該攤款政府在前三個冰季內穿越冰區巡邏所警戒的冰山區域的船舶年平均總噸位，與前三個冰季內穿越冰區巡邏所警戒的冰山區域的所有船舶年平均總噸位之間的比例為基礎。

3 所有的攤款應通過美利堅合眾國政府和加拿大政府在前三年內管理和運作冰區巡邏服務的實際年平均費用乘以第2款所述的比例進行計算。此種比例應每年加以計算，並以每年整筆費用的方式予以表述。

4 每一攤款政府有權變更或中止其攤款，其他有關政府可承諾分攤該部分費用。利用這項權利的攤款政府，仍應繼續負擔其當時的攤款費用直至變更或中止其攤款的通知發出後的9月1日為止。在利用這項權利時，該攤款政府必須在所述9月1日以前至少6個月通知管理國政府。

5 每一攤款政府應將其根據第2款承擔的義務通知秘書長，秘書長應將其通知所有締約政府。

6 美利堅合眾國政府應每年向攤款政府提供關於美利堅合眾國政府和加拿大政府在該年度管理和運作冰區巡邏所發生的總費用以及每一攤款政府在前三年內的平均攤款比例的報表。

7 管理國政府應公佈年度財務帳目，包括提供服務的政府在前三年內發生的費用及在前三年內使用該服務的合計總噸位的報表。這些財務帳目應可供公用。在收到費用報表後的三個月內，攤款政府可要求提供有關管理和運作冰區巡邏所發生費用的更詳盡信息。

8 本規則應於2002年冰季開始時實施。”

第IX章

船舶安全營運管理

第1條 — 定義

8 在第8款中，以“X/1”代替所提及的“X/1.2”。

第3條 — 安全管理要求

9 在現有第1款的結尾，增加下列條文：

“就本條而言，該規則的要求應視為強制性要求。”

第6條 — 驗證和控制

10 在現有第6.2款中，刪去“以本條第3款的規定為準”字樣。

11 刪去現有第6.3款。

第X章

高速船安全措施

第1條 — 定義

12 現有第1款由下列內容代替：

“就本章而言：

1 《1994年高速船規則》（1994年HSC規則）係指本組織海上安全委員會以第MSC.36（63）號決議通過的《國際高速船安

全規則》，該規則可由本組織修正，但此種修正案應按照本公約第VIII條關於適用於附件（除第I章以外）的修正程序的規定予以通過、生效和實施。

2 《2000年高速船規則》（2000年HSC規則）係指本組織海上安全委員會以MSC.97（73）號決議通過的《2000年國際高速船安全規則》，該規則可由本組織修正，但此種修正案應按照本公約第VIII條關於適用於附件（除第I章以外）的修正程序的規定予以通過、生效和實施。”

13 現有第2款由下文代替：

“3 高速船係指其最高速度，以每秒米（m/s）計，等於或大於下列值的船艇：

$$3.7 \nabla^{0.1667}$$

其中：

∇ = 相應於設計水線的排水量（ m^3 ），

不包括在非排水狀態以地面效應產生的氣體動力支承的船殼完全高出水面的船艇。”

14 現有第3款和第4款重新編號為第4款和第5款。

15 在重新編號的第5款第2項中，數據“1%”由“3%”代替。

第2條 – 適用範圍

16 第2款中的兩處日期“1996年1月1日”均由“2002年7月1日”代替。

第3條 — 對高速船的要求

17 現有第1款由下列內容代替：

“1 雖有第I章至第IV章和第V/18、19和20條的規定：

- .1 在1996年1月1日或以後但在2002年7月1日以前建造的高速船，如其整體上符合《1994年高速船規則》的要求並按該規則的規定進行了檢驗和發證，應被視為已符合第I章至第IV章和第V/18、19和20條的要求。就本條而言，該規則的要求應視為強制性要求。
- .2 在2002年7月1日或以後建造的高速船，如其整體上符合《2000年高速船規則》的要求並按該規則的規定進行了檢驗和發證，應被視為已符合第I章至第IV章和第V/18、19和20條的要求。”

附錄

客船安全證書的設備記錄（格式P）

18 刪除原第5和第6節，插入新的第5節如下：

“5 航行系統和設備細目

	項目	實際配備
1.1	標準磁羅經*	.....
1.2	備用磁羅經*	.....
1.3	電羅經*	.....
1.4	電羅經航向中繼器*	.....
1.5	電羅經方位中繼器*	.....
1.6	航向或航跡控制系統*	.....
1.7	啞羅經或羅經方位儀*	.....
1.8	航向和方位修正裝置	.....
1.9	航向發射儀（THD）*	.....
2.1	海圖/電子海圖顯示和信息系統（ECDIS） **	.....
2.2	ECDIS 後備安排	.....
2.3	航海出版物	.....
2.4	電子版航海出版物的後備安排	.....
3.1	全球導航衛星系統/地面無線電導航系統 接收機*、**	.....
3.2	9 GHz 雷達*	.....

項目	實際配備
3.3 第二套雷達 (3 GHz/9 GHz ^{**}) *
3.4 自動雷達標繪儀 (ARPA) *
3.5 自動跟蹤儀 *
3.6 第二套自動跟蹤儀 *
3.7 電子繪圖儀 *
4 自動識別系統 (AIS)
5 航行數據記錄儀 (VDR)
6.1 (水中) 速度和距離測量儀 *
6.2 (船舶向前和垂直龍骨方向對地) 速度和 距離測量儀 *
7 回聲測深儀 *
8.1 舵、推進器、推力、螺距和操作方式顯示 器 *
8.2 旋回角速率指示器 *
9 聲響接收系統 *
10 通向應急操舵位置的電話 *
11 日光信號燈 *
12 雷達反射器 *

項目	實際配備
13 國際信號規則

* 根據第 V/19 條，允許符合此要求的替代裝置。如果是其他裝置，應予寫明。
** 視情刪去。”

貨船設備安全證書的設備記錄（格式E）

19 刪去原第3節及相關腳註，插入新第3節如下：

“3 航行系統和設備細目

	項目	實際配備
1.1	標準磁羅經*	.....
1.2	備用磁羅經*	.....
1.3	電羅經*	.....
1.4	電羅經航向中繼器*	.....
1.5	電羅經方位中繼器*	.....
1.6	航向或航跡控制系統*	.....
1.7	啞羅經或羅經方位儀*	.....
1.8	航向和方位修正裝置	.....
1.9	航向發射儀（THD）*	.....
2.1	海圖/電子海圖顯示與信息系統（ECDIS） **	.....
2.2	ECDIS 後備安排	.....
2.3	航海出版物	.....
2.4	電子版航海出版物的後備安排	.....
3.1	全球導航衛星系統/地面無線電導航系統 接收機*，**	.....
3.2	9 GHz 雷達*	.....
3.3	第二套雷達（3 GHz/9 GHz**）*	.....
3.4	自動雷達標繪儀（ARPA）*	.....
3.5	自動跟蹤儀*	.....
3.6	第二套自動跟蹤儀*	.....

項目	實際配備
3.7 電子繪圖儀*
4 自動識別系統 (AIS)
5 航行數據記錄儀 (VDR)
6.1 (水中) 速度和距離測量儀*
6.2 (船舶向前和垂直龍骨方向對地) 速度和距離測量儀*
7 回聲測深儀*
8.1 舵、推進器、推力、螺距和操作方式顯示器*
8.2 旋回角速率指示器*
9 聲響接收系統*
10 通向應急操舵位置的電話*
11 日光信號燈*
12 雷達反射器*
13 國際信號規則

* 根據第V/19條，允許符合此要求的替代裝置。如果是其他裝置，應予寫明。

** 視情刪去。”

RESOLUTION MSC.99(73)
(adopted on 5 December 2000)

**ADOPTION OF AMENDMENTS TO THE INTERNATIONAL CONVENTION
FOR THE SAFETY OF LIFE AT SEA, 1974, AS AMENDED**

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

RECALLING FURTHER article VIII(b) of the International Convention for the Safety of Life at Sea (SOLAS), 1974, hereinafter referred to as "the Convention", concerning the procedures for amending the Annex to the Convention, other than the provisions of chapter I thereof,

HAVING CONSIDERED, at its seventy-third session, amendments to the Convention proposed and circulated in accordance with article VIII(b)(i) thereof,

1. ADOPTS, in accordance with article VIII(b)(iv) of the Convention, amendments to the Convention, 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 2002, 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 2002 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 INTERNATIONAL CONVENTION FOR THE
SAFETY OF LIFE AT SEA, 1974, AS AMENDED****CHAPTER II-1****CONSTRUCTION – STRUCTURE, SUBDIVISION AND STABILITY,
MACHINERY AND ELECTRICAL INSTALLATIONS**

Regulation 3-4 – Emergency towing arrangements on tankers

- 1 The existing text of the regulation is replaced by the following:

"Regulation 3-4**Emergency towing arrangements on tankers**

- 1 Emergency towing arrangements shall be fitted at both ends on board every tanker of not less than 20,000 tonnes deadweight.
- 2 For tankers constructed on or after 1 July 2002:
- .1 the arrangements shall, at all times, be capable of rapid deployment in the absence of main power on the ship to be towed and easy connection to the towing ship. At least one of the emergency towing arrangements shall be pre-rigged ready for rapid deployment; and
 - .2 emergency towing arrangements at both ends shall be of adequate strength taking into account the size and deadweight of the ship, and the expected forces during bad weather conditions. The design and construction and prototype testing of emergency towing arrangements shall be approved by the Administration, based on the guidelines developed by the Organization.
- 3 For tankers constructed before 1 July 2002, the design and construction of emergency towing arrangements shall be approved by the Administration, based on the Guidelines developed by the Organization.
- 2 The following new regulation 3-5 is inserted after existing regulation 3-4:

"Regulation 3-5**New installation of materials containing asbestos**

- 1 This regulation shall apply to materials used for the structure, machinery, electrical installations and equipment covered by the present Convention.

- 2 For all ships, new installation of materials which contain asbestos shall be prohibited except for:
- .1 vanes used in rotary vane compressors and rotary vane vacuum pumps;
 - .2 watertight joints and linings used for the circulation of fluids when, at high temperature (in excess of 350°C) or pressure (in excess of 7×10^6 Pa), there is a risk of fire, corrosion or toxicity; and
 - .3 supple and flexible thermal insulation assemblies used for temperatures above 1,000°C.”

Regulation 43 – Emergency source of electrical power in cargo ships

- 3 In paragraph 2.2.5, the word “and” is deleted.
- 4 In paragraph 2.2.6, the word “motors.” is replaced by the words “motors; and”.
- 5 In paragraph 2.2, the following new subparagraph .7 is added after existing subparagraph .6:
- “.7 in all cargo pump-rooms of tankers constructed on or after 1 July 2002.”

CHAPTER II-2

CONSTRUCTION – FIRE PROTECTION, FIRE DETECTION AND FIRE EXTINCTION

- 6 The existing text of chapter II-2 is replaced by the following:

“PART A - GENERAL

Regulation 1

Application

1 Application

- 1.1 Unless expressly provided otherwise, this chapter shall apply to ships constructed on or after 1 July 2002.
- 1.2 For the purpose of this chapter:
- .1 the expression *ships constructed* means ships the keels of which are laid or which are at a similar stage of construction;
 - .2 the expression *all ships* means ships, irrespective of type, constructed before, on or after 1 July 2002; and

- .3 a cargo ship, whenever built, which is converted to a passenger ship shall be treated as a passenger ship constructed on the date on which such a conversion commences.

1.3 For the purpose of this chapter, the expression *a similar stage of construction* means the stage at which:

- .1 construction identifiable with a specific ship begins; and
- * .2 assembly of that ship has commenced comprising at least 50 tonnes or 1% of the estimated mass of all structural material, whichever is less.

2 Applicable requirements to existing ships

2.1 Unless expressly provided otherwise, for ships constructed before 1 July 2002 the Administration shall ensure that the requirements which are applicable under chapter II-2 of the International Convention for the Safety of Life at Sea, 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), are complied with.

2.2 Ships constructed before 1 July 2002 shall also comply with:

- .1 paragraphs 3, 6.5 and 6.7 as appropriate;
- .2 regulations 13.3.4.2 to 13.3.4.5, 13.4.3 and Part E, except regulations 16.3.2.2 and 16.3.2.3 thereof, as appropriate, not later than the date of the first survey after 1 July 2002;
- .3 regulations 10.4.1.3 and 10.6.4 for new installations only; and
- .4 regulation 10.5.6 not later than 1 October 2005 for passenger ships of 2,000 gross tonnage and above.

3 Repairs, alterations, modifications and outfitting

3.1 All ships which undergo repairs, alterations, modifications and outfitting related thereto shall continue to comply with at least the requirements previously applicable to these ships. Such ships, if constructed before 1 July 2002, shall, as a rule, comply with the requirements for ships constructed on or after that date to at least the same extent as they did before undergoing such repairs, alterations, modifications or outfitting.

3.2 Repairs, alterations and modifications which substantially alter the dimensions of a ship or the passenger accommodation spaces, or substantially increase a ship's service life and outfitting related thereto shall meet the requirements for ships constructed on or after 1 July 2002 in so far as the Administration deems reasonable and practicable.

4 Exemptions

4.1 The Administration may, if it considers that the sheltered nature and conditions of the voyage are such as to render the application of any specific requirements of this chapter unreasonable or unnecessary, exempt from those requirements individual ships or classes of ships

entitled to fly the flag of its State, provided that such ships, which, in the course of their voyage, do not sail at distances of more than 20 miles from the nearest land.

4.2 In the case of passenger ships which are employed in special trades for the carriage of large numbers of special trade passengers, such as the pilgrim trade, the Administration, if satisfied that it is impracticable to enforce compliance with the requirements of this chapter, may exempt such ships from those requirements, provided that they comply fully with the provisions of:

- .1 the rules annexed to the Special Trade Passenger Ships Agreement, 1971; and
- .2 the rules annexed to the Protocol on Space Requirements for Special Trade Passenger Ships, 1973.

5 Applicable requirements depending on ship type

Unless expressly provided otherwise:

- .1 requirements not referring to a specific ship type shall apply to ships of all types; and
- .2 requirements referring to "tankers" shall apply to tankers subject to the requirements specified in paragraph 6 below.

6 Application of requirements for tankers

6.1 Requirements for tankers in this chapter shall apply to tankers carrying crude oil or petroleum products having a flashpoint not exceeding 60°C (closed cup test), as determined by an approved flashpoint apparatus, and a Reid vapour pressure which is below the atmospheric pressure or other liquid products having a similar fire hazard.

6.2 Where liquid cargoes other than those referred to in paragraph 6.1 or liquefied gases which introduce additional fire hazards are intended to be carried, additional safety measures shall be required, having due regard to the provisions of the International Bulk Chemical Code, as defined in regulation VII/8.1, the Bulk Chemical Code, the International Gas Carrier Code, as defined in regulation VII/11.1, and the Gas Carrier Code, as appropriate.

6.2.1 A liquid cargo with a flashpoint of less than 60°C for which a regular foam fire-fighting system complying with the Fire Safety Systems Code is not effective, is considered to be a cargo introducing additional fire hazards in this context. The following additional measures are required:

- .1 the foam shall be of alcohol resistant type;
- .2 the type of foam concentrates for use in chemical tankers shall be to the satisfaction of the Administration taking into account the guidelines developed by the Organization; and
- .3 the capacity and application rates of the foam extinguishing system shall comply with chapter 11 of the International Bulk Chemical Code, except that lower application rates may be accepted based on performance tests. For tankers fitted

with inert gas systems, a quantity of foam concentrate sufficient for 20 min of foam generation may be accepted.

6.2.2 For the purpose of this regulation, a liquid cargo with a vapour pressure greater than 1.013 bar absolute at 37.8°C is considered to be a cargo introducing additional fire hazards. Ships carrying such substances shall comply with paragraph 15.14 of the International Bulk Chemical Code. When ships operate in restricted areas and at restricted times, the Administration concerned may agree to waive the requirements for refrigeration systems in accordance with paragraph 15.14.3 of the International Bulk Chemical Code.

6.3 Liquid cargoes with a flashpoint exceeding 60°C other than oil products or liquid cargoes subject to the requirements of the International Bulk Chemical Code are considered to constitute a low fire risk, not requiring the protection of a fixed foam extinguishing system.

6.4 Tankers carrying petroleum products with a flashpoint exceeding 60°C (closed cup test), as determined by an approved flashpoint apparatus, shall comply with the requirements provided in regulations 10.2.1.4.4 and 10.10.2.3 and the requirements for cargo ships other than tankers, except that, in lieu of the fixed fire-extinguishing system required in regulation 10.7, they shall be fitted with a fixed deck foam system which shall comply with the provisions of the Fire Safety Systems Code.

6.5 Combination carriers constructed before, on or after 1 July 2002 shall not carry cargoes other than oil unless all cargo spaces are empty of oil and gas-freed or unless the arrangements provided in each case have been approved by the Administration taking into account the guidelines developed by the Organization.

6.6 Chemical tankers and gas carriers shall comply with the requirements for tankers, except where alternative and supplementary arrangements are provided to the satisfaction of the Administration, having due regard to the provisions of the International Bulk Chemical Code and the International Gas Carrier Code, as appropriate.

6.7 The requirements of regulations 4.5.10.1.1 and 4.5.10.1.4, and a system for continuous monitoring of the concentration of hydrocarbon gases shall be fitted on all tankers constructed before 1 July 2002 by the date of the first scheduled dry-docking after 1 July 2002, but not later than 1 July 2005. Sampling points or detector heads shall be located in suitable positions in order that potentially dangerous leakages are readily detected. When the hydrocarbon gas concentration reaches a pre-set level which shall not be higher than 10% of the lower flammable limit, a continuous audible and visual alarm signal shall be automatically effected in the pump-room and cargo control room to alert personnel to the potential hazard. However, existing monitoring systems already fitted having a pre-set level not greater than 30% of the lower flammable limit may be accepted.

Regulation 2

Fire safety objectives and functional requirements

1 Fire safety objectives

1.1 The fire safety objectives of this chapter are to:

- .1 prevent the occurrence of fire and explosion;
- .2 reduce the risk to life caused by fire;

- .3 reduce the risk of damage caused by fire to the ship, its cargo and the environment;
- .4 contain, control and suppress fire and explosion in the compartment of origin; and
- .5 provide adequate and readily accessible means of escape for passengers and crew.

2 Functional requirements

2.1 In order to achieve the fire safety objectives set out in paragraph 1, the following functional requirements are embodied in the regulations of this chapter as appropriate:

- .1 division of the ship into main vertical and horizontal zones by thermal and structural boundaries;
- .2 separation of accommodation spaces from the remainder of the ship by thermal and structural boundaries;
- .3 restricted use of combustible materials;
- .4 detection of any fire in the zone of origin;
- .5 containment and extinction of any fire in the space of origin;
- .6 protection of means of escape and access for fire-fighting;
- .7 ready availability of fire-extinguishing appliances; and
- .8 minimization of possibility of ignition of flammable cargo vapour.

3 Achievement of the fire safety objectives

The fire safety objectives set out in paragraph 1 shall be achieved by ensuring compliance with the prescriptive requirements specified in parts B, C, D, E or G, or by alternative design and arrangements which comply with part F. A ship shall be considered to meet the functional requirements set out in paragraph 2 and to achieve the fire safety objectives set out in paragraph 1 when either:

- .1 the ship's design and arrangements, as a whole, comply with the relevant prescriptive requirements in parts B, C, D, E or G;
- .2 the ship's design and arrangements, as a whole, have been reviewed and approved in accordance with part F; or
- .3 part(s) of the ship's design and arrangements have been reviewed and approved in accordance with part F and the remaining parts of the ship comply with the relevant prescriptive requirements in parts B, C, D, E or G.

Regulation 3

Definitions

For the purpose of this chapter, unless expressly provided otherwise, the following definitions shall apply:

1 *Accommodation spaces* are those spaces used for public spaces, corridors, lavatories, cabins, offices, hospitals, cinemas, game and hobby rooms, barber shops, pantries containing no cooking appliances and similar spaces.

2 *"A" class divisions* are those divisions formed by bulkheads and decks which comply with the following criteria:

- .1 they are constructed of steel or other equivalent material;
- .2 they are suitably stiffened;
- .3 they are insulated with approved non-combustible materials such that the average temperature of the unexposed side will not rise more than 140°C above the original temperature, nor will the temperature, at any one point, including any joint, rise more than 180°C above the original temperature, within the time listed below:

class "A-60"	60 min
class "A-30"	30 min
class "A-15"	15 min
class "A-0"	0 min

- .4 they are constructed as to be capable of preventing the passage of smoke and flame to the end of the one-hour standard fire test; and
- .5 the Administration required a test of a prototype bulkhead or deck in accordance with the Fire Test Procedures Code to ensure that it meets the above requirements for integrity and temperature rise.

3 *Atriums* are public spaces within a single main vertical zone spanning three or more open decks.

4 *"B" class divisions* are those divisions formed by bulkheads, decks, ceilings or linings which comply with the following criteria:

- .1 they are constructed of approved non-combustible materials and all materials used in the construction and erection of "B" class divisions are non-combustible, with the exception that combustible veneers may be permitted provided they meet other appropriate requirements of this chapter;
- .2 they have an insulation value such that the average temperature of the unexposed side will not rise more than 140°C above the original temperature, nor will the temperature at any one point, including any joint, rise more than 225°C above the original temperature, within the time listed below:

class "B-15"	15 min
class "B-0"	0 min

- .3 they are constructed as to be capable of preventing the passage of flame to the end of the first half hour of the standard fire test; and
- .4 the Administration required a test of a prototype division in accordance with the Fire Test Procedures Code to ensure that it meets the above requirements for integrity and temperature rise.
- 5 *Bulkhead deck* is the uppermost deck up to which the transverse watertight bulkheads are carried.
- 6 *Cargo area* is that part of the ship that contains cargo holds, cargo tanks, slop tanks and cargo pump-rooms including pump-rooms, cofferdams, ballast and void spaces adjacent to cargo tanks and also deck areas throughout the entire length and breadth of the part of the ship over the aforementioned spaces.
- 7 *Cargo ship* is a ship as defined in regulation I/2(g).
- 8 *Cargo spaces* are spaces used for cargo, cargo oil tanks, tanks for other liquid cargo and trunks to such spaces.
- 9 *Central control station* is a control station in which the following control and indicator functions are centralized:
- .1 fixed fire detection and fire alarm systems;
 - .2 automatic sprinkler, fire detection and fire alarm systems;
 - .3 fire door indicator panels;
 - .4 fire door closure;
 - .5 watertight door indicator panels;
 - .6 watertight door closures;
 - .7 ventilation fans;
 - .8 general/fire alarms;
 - .9 communication systems including telephones; and
 - .10 microphones to public address systems.
- 10 *"C" class divisions* are divisions constructed of approved non-combustible materials. They need meet neither requirements relative to the passage of smoke and flame nor limitations relative to the temperature rise. Combustible veneers are permitted provided they meet the requirements of this chapter.

- 11 *Chemical tanker* is a cargo ship constructed or adapted and used for the carriage in bulk of any liquid product of a flammable nature listed in chapter 17 of the International Bulk Chemical Code, as defined in regulation VII/8.1.
- 12 *Closed ro-ro spaces* are ro-ro spaces which are neither open ro-ro spaces nor weather decks.
- 13 *Closed vehicle spaces* are vehicle spaces which are neither open vehicle spaces nor weather decks.
- 14 *Combination carrier* is a cargo ship designed to carry both oil and solid cargoes in bulk.
- 15 *Combustible material* is any material other than a non-combustible material.
- 16 *Continuous "B" class ceilings or linings* are those "B" class ceilings or linings which terminate at an "A" or "B" class division.
- 17 *Continuously manned central control station* is a central control station which is continuously manned by a responsible member of the crew.
- 18 *Control stations* are those spaces in which the ship's radio or main navigating equipment or the emergency source of power is located or where the fire recording or fire control equipment is centralized. Spaces where the fire recording or fire control equipment is centralized are also considered to be a *fire control station*.
- 19 *Crude oil* is any oil occurring naturally in the earth whether or not treated to render it suitable for transportation and includes crude oil where certain distillate fractions may have been removed from or added to.
- 20 *Dangerous goods* are those goods referred to in regulation VII/2.
- 21 *Deadweight* is the difference in tonnes between the displacement of a ship in water of a specific gravity of 1.025 at the load waterline corresponding to the assigned summer freeboard and the lightweight of the ship.
- 22 *Fire Safety Systems Code* means the International Code for Fire Safety Systems as adopted by the Maritime Safety Committee of the Organization by resolution MSC.98(73), 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 thereof.
- 23 *Fire Test Procedures Code* means the International Code for Application of Fire Test Procedures as adopted by the Maritime Safety Committee of the Organization by resolution MSC.61(67), 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 thereof.
- 24 *Flashpoint* is the temperature in degrees Celsius (closed cup test) at which a product will give off enough flammable vapour to be ignited, as determined by an approved flashpoint apparatus.

- 25 *Gas carrier* is a cargo ship constructed or adapted and used for the carriage in bulk of any liquefied gas or other products of a flammable nature listed in chapter 19 of the International Gas Carrier Code, as defined in regulation VII/11.1.
- 26 *Helideck* is a purpose-built helicopter landing area located on a ship including all structure, fire-fighting appliances and other equipment necessary for the safe operation of helicopters.
- 27 *Helicopter facility* is a helideck including any refuelling and hangar facilities.
- 28 *Lightweight* is the displacement of a ship in tonnes without cargo, fuel, lubricating oil, ballast water, fresh water and feedwater in tanks, consumable stores, and passengers and crew and their effects.
- 29 *Low flame-spread* means that the surface thus described will adequately restrict the spread of flame, this being determined in accordance with the Fire Test Procedures Code.
- 30 *Machinery spaces* are machinery spaces of category A and other spaces containing propulsion machinery, boilers, oil fuel units, steam and internal combustion engines, generators and major electrical machinery, oil filling stations, refrigerating, stabilizing, ventilation and air conditioning machinery, and similar spaces, and trunks to such spaces.
- 31 *Machinery spaces of category A* are those spaces and trunks to such spaces which contain either:
- .1 internal combustion machinery used for main propulsion;
 - .2 internal combustion machinery used for purposes other than main propulsion where such machinery has in the aggregate a total power output of not less than 375 kW; or
 - .3 any oil-fired boiler or oil fuel unit, or any oil-fired equipment other than boilers, such as inert gas generators, incinerators, etc.
- 32 *Main vertical zones* are those sections into which the hull, superstructure and deckhouses are divided by "A" class divisions, the mean length and width of which on any deck does not in general exceed 40 m.
- 33 *Non-combustible material* is a material which neither burns nor gives off flammable vapours in sufficient quantity for self-ignition when heated to approximately 750°C, this being determined in accordance with the Fire Test Procedures Code.
- 34 *Oil fuel unit* is the equipment used for the preparation of oil fuel for delivery to an oil-fired boiler, or equipment used for the preparation for delivery of heated oil to an internal combustion engine, and includes any oil pressure pumps, filters and heaters dealing with oil at a pressure of more than 0.18 N/mm².
- 35 *Open ro-ro spaces* are those ro-ro spaces that are either open at both ends or have an opening at one end, and are provided with adequate natural ventilation effective over their entire length through permanent openings distributed in the side plating or deckhead or from above, having a total area of at least 10% of the total area of the space sides.

36 *Open vehicle spaces* are those vehicle spaces either open at both ends, or have an opening at one end and are provided with adequate natural ventilation effective over their entire length through permanent openings distributed in the side plating or deckhead or from above, having a total area of at least 10% of the total area of the space sides.

37 *Passenger ship* is a ship as defined in regulation I/2(f).

38 *Prescriptive requirements* means the construction characteristics, limiting dimensions, or fire safety systems specified in parts B, C, D, E or G.

39 *Public spaces* are those portions of the accommodation which are used for halls, dining rooms, lounges and similar permanently enclosed spaces.

40 *Rooms containing furniture and furnishings of restricted fire risk*, for the purpose of regulation 9, are those rooms containing furniture and furnishings of restricted fire risk (whether cabins, public spaces, offices or other types of accommodation) in which:

- .1 case furniture such as desks, wardrobes, dressing tables, bureaux, dressers, are constructed entirely of approved non-combustible materials, except that a combustible veneer not exceeding 2 mm may be used on the working surface of such articles;
- .2 free-standing furniture such as chairs, sofas, tables, are constructed with frames of non-combustible materials;
- .3 draperies, curtains and other suspended textile materials have qualities of resistance to the propagation of flame not inferior to those of wool having a mass of 0.8 kg/m², this being determined in accordance with the Fire Test Procedures Code;
- .4 floor coverings have low flame-spread characteristics;
- .5 exposed surfaces of bulkheads, linings and ceilings have low flame-spread characteristics;
- .6 upholstered furniture has qualities of resistance to the ignition and propagation of flame, this being determined in accordance with the Fire Test Procedures Code; and
- .7 bedding components have qualities of resistance to the ignition and propagation of flame, this being determined in accordance with the Fire Test Procedures Code.

41 *Ro-ro spaces* are spaces not normally subdivided in any way and normally extending to either a substantial length or the entire length of the ship in which motor vehicles with fuel in their tanks for their own propulsion and/or goods (packaged or in bulk, in or on rail or road cars, vehicles (including road or rail tankers), trailers, containers, pallets, demountable tanks or in or on similar stowage units or other receptacles) can be loaded and unloaded normally in a horizontal direction.

42 *Ro-ro passenger ship* means a passenger ship with ro-ro spaces or special category spaces.

43 *Steel or other equivalent material* means any non-combustible material which, by itself or due to insulation provided, has structural and integrity properties equivalent to steel at the end of the applicable exposure to the standard fire test (e.g., aluminium alloy with appropriate insulation).

44 *Sauna* is a hot room with temperatures normally varying between 80°C and 120°C where the heat is provided by a hot surface (e.g. by an electrically-heated oven). The hot room may also include the space where the oven is located and adjacent bathrooms.

45 *Service spaces* are those spaces used for galleys, pantries containing cooking appliances, lockers, mail and specie rooms, storerooms, workshops other than those forming part of the machinery spaces, and similar spaces and trunks to such spaces.

46 *Special category spaces* are those enclosed vehicle spaces above and below the bulkhead deck, into and from which vehicles can be driven and to which passengers have access. Special category spaces may be accommodated on more than one deck provided that the total overall clear height for vehicles does not exceed 10 m.

47 *A standard fire test* is a test in which specimens of the relevant bulkheads or decks are exposed in a test furnace to temperatures corresponding approximately to the standard time-temperature curve in accordance with the test method specified in the Fire Test Procedures Code.

48 *Tanker* is a ship as defined in regulation I/2(h).

49 *Vehicle spaces* are cargo spaces intended for carriage of motor vehicles with fuel in their tanks for their own propulsion.

50 *Weather deck* is a deck which is completely exposed to the weather from above and from at least two sides.

PART B - PREVENTION OF FIRE AND EXPLOSION

Regulation 4

Probability of ignition

1 Purpose

The purpose of this regulation is to prevent the ignition of combustible materials or flammable liquids. For this purpose, the following functional requirements shall be met:

- .1 means shall be provided to control leaks of flammable liquids;
- .2 means shall be provided to limit the accumulation of flammable vapours;
- .3 the ignitability of combustible materials shall be restricted;
- .4 ignition sources shall be restricted;
- .5 ignition sources shall be separated from combustible materials and flammable liquids; and

.6 the atmosphere in cargo tanks shall be maintained out of the explosive range.

2 Arrangements for oil fuel, lubrication oil and other flammable oils

2.1 *Limitations in the use of oils as fuel*

The following limitations shall apply to the use of oil as fuel:

- .1 except as otherwise permitted by this paragraph, no oil fuel with a flashpoint of less than 60°C shall be used;
- .2 in emergency generators oil fuel with a flashpoint of not less than 43°C may be used;
- .3 the use of oil fuel having a flashpoint of less than 60°C but not less than 43°C may be permitted (e.g., for feeding the emergency fire pump's engines and the auxiliary machines which are not located in the machinery spaces of category A) subject to the following:
 - .3.1 fuel oil tanks except those arranged in double bottom compartments shall be located outside of machinery spaces of category A;
 - .3.2 provisions for the measurement of oil temperature are provided on the suction pipe of the oil fuel pump;
 - .3.3 stop valves and/or cocks are provided on the inlet side and outlet side of the oil fuel strainers; and
 - .3.4 pipe joints of welded construction or of circular cone type or spherical type union joint are applied as much as possible; and
- .4 in cargo ships the use of fuel having a lower flashpoint than otherwise specified in paragraph 2.1, for example, crude oil may be permitted provided that such fuel is not stored in any machinery space and subject to the approval by the Administration of the complete installation.

2.2 *Arrangements for oil fuel*

In a ship in which oil fuel is used, the arrangements for the storage, distribution and utilization of the oil fuel shall be such as to ensure the safety of the ship and persons on board and shall at least comply with the following provisions.

2.2.1 *Location of oil fuel systems*

As far as practicable, parts of the oil fuel system containing heated oil under pressure exceeding 0.18 N/mm² shall not be placed in a concealed position such that defects and leakage cannot readily be observed. The machinery spaces in way of such parts of the oil fuel system shall be adequately illuminated.

2.2.2 *Ventilation of machinery spaces*

The ventilation of machinery spaces shall be sufficient under normal conditions to prevent accumulation of oil vapour.

2.2.3 *Oil fuel tanks*

2.2.3.1 Fuel oil, lubrication oil and other flammable oils shall not be carried in forepeak tanks.

2.2.3.2 As far as practicable, oil fuel tanks shall be part of the ships structure and shall be located outside machinery spaces of category A. Where oil fuel tanks, other than double bottom tanks, are necessarily located adjacent to or within machinery spaces of category A, at least one of their vertical sides shall be contiguous to the machinery space boundaries, and shall preferably have a common boundary with the double bottom tanks, and the area of the tank boundary common with the machinery spaces shall be kept to a minimum. Where such tanks are situated within the boundaries of machinery spaces of category A they shall not contain oil fuel having a flashpoint of less than 60°C. In general, the use of free-standing oil fuel tanks shall be avoided. When such tanks are employed their use shall be prohibited in category A machinery spaces on passenger ships. Where permitted, they shall be placed in an oil-tight spill tray of ample size having a suitable drain pipe leading to a suitably sized spill oil tank.

2.2.3.3 No oil fuel tank shall be situated where spillage or leakage therefrom can constitute a fire or explosion hazard by falling on heated surfaces.

2.2.3.4 Oil fuel pipes, which, if damaged, would allow oil to escape from a storage, settling or daily service tank having a capacity of 500 l and above situated above the double bottom, shall be fitted with a cock or valve directly on the tank capable of being closed from a safe position outside the space concerned in the event of a fire occurring in the space in which such tanks are situated. In the special case of deep tanks situated in any shaft or pipe tunnel or similar space, valves on the tank shall be fitted, but control in the event of fire may be effected by means of an additional valve on the pipe or pipes outside the tunnel or similar space. If such an additional valve is fitted in the machinery space, it shall be operated from a position outside this space. The controls for remote operation of the valve for the emergency generator fuel tank shall be in a separate location from the controls for remote operation of other valves for tanks located in machinery spaces.

2.2.3.5 Safe and efficient means of ascertaining the amount of oil fuel contained in any oil fuel tank shall be provided.

2.2.3.5.1 Where sounding pipes are used, they shall not terminate in any space where the risk of ignition of spillage from the sounding pipe might arise. In particular, they shall not terminate in passenger or crew spaces. As a general rule, they shall not terminate in machinery spaces. However, where the Administration considers that these latter requirements are impracticable, it may permit termination of sounding pipes in machinery spaces on condition that all of the following requirements are met:

- .1 an oil-level gauge is provided meeting the requirements of paragraph 2.2.3.5.2;
- .2 the sounding pipes terminate in locations remote from ignition hazards unless precautions are taken, such as the fitting of effective screens, to prevent the oil

fuel in the case of spillage through the terminations of the sounding pipes from coming into contact with a source of ignition; and

- .3 the termination of sounding pipes are fitted with self-closing blanking devices and with a small-diameter self-closing control cock located below the blanking device for the purpose of ascertaining before the blanking device is opened that oil fuel is not present. Provisions shall be made so as to ensure that any spillage of oil fuel through the control cock involves no ignition hazard.

2.2.3.5.2 Other oil-level gauges may be used in place of sounding pipes subject to the following conditions:

- .1 in passenger ships, such gauges shall not require penetration below the top of the tank and their failure or overfilling of the tanks shall not permit release of fuel; and
- .2 in cargo ships, the failure of such gauges or overfilling of the tank shall not permit release of fuel into the space. The use of cylindrical gauge glasses is prohibited. The Administration may permit the use of oil-level gauges with flat glasses and self-closing valves between the gauges and fuel tanks.

2.2.3.5.3 The means prescribed in paragraph 2.2.3.5.2 which are acceptable to the Administration shall be maintained in the proper condition to ensure their continued accurate functioning in service.

2.2.4 *Prevention of overpressure*

Provisions shall be made to prevent overpressure in any oil tank or in any part of the oil fuel system, including the filling pipes served by pumps on board. Air and overflow pipes and relief valves shall discharge to a position where there is no risk of fire or explosion from the emergence of oils and vapour and shall not lead into crew spaces, passenger spaces nor into special category spaces, closed ro-ro cargo spaces, machinery spaces or similar spaces.

2.2.5 *Oil fuel piping*

2.2.5.1 Oil fuel pipes and their valves and fittings shall be of steel or other approved material, except that restricted use of flexible pipes shall be permissible in positions where the Administration is satisfied that they are necessary. Such flexible pipes and end attachments shall be of approved fire-resisting materials of adequate strength and shall be constructed to the satisfaction of the Administration. For valves, fitted to oil fuel tanks and which are under static pressure, steel or spheroidal-graphite cast iron may be accepted. However, ordinary cast iron valves may be used in piping systems where the design pressure is lower than 7 bar and the design temperature is below 60°C.

2.2.5.2 External high-pressure fuel delivery lines between the high-pressure fuel pumps and fuel injectors shall be protected with a jacketed piping system capable of containing fuel from a high-pressure line failure. A jacketed pipe incorporates an outer pipe into which the high-pressure fuel pipe is placed, forming a permanent assembly. The jacketed piping system shall include a means for collection of leakages and arrangements shall be provided with an alarm in case of a fuel line failure.

2.2.5.3 Oil fuel lines shall not be located immediately above or near units of high temperature including boilers, steam pipelines, exhaust manifolds, silencers or other equipment required to be insulated by paragraph 2.2.6. As far as practicable, oil fuel lines shall be arranged far apart from hot surfaces, electrical installations or other sources of ignition and shall be screened or otherwise suitably protected to avoid oil spray or oil leakage onto the sources of ignition. The number of joints in such piping systems shall be kept to a minimum.

2.2.5.4 Components of a diesel engine fuel system shall be designed considering the maximum peak pressure which will be experienced in service, including any high pressure pulses which are generated and transmitted back into the fuel supply and spill lines by the action of fuel injection pumps. Connections within the fuel supply and spill lines shall be constructed having regard to their ability to prevent pressurized oil fuel leaks while in service and after maintenance.

2.2.5.5 In multi-engine installations which are supplied from the same fuel source, means of isolating the fuel supply and spill piping to individual engines, shall be provided. The means of isolation shall not affect the operation of the other engines and shall be operable from a position not rendered inaccessible by a fire on any of the engines.

2.2.5.6 Where the Administration may permit the conveying of oil and combustible liquids through accommodation and service spaces, the pipes conveying oil or combustible liquids shall be of a material approved by the Administration having regard to the fire risk.

2.2.6 *Protection of high temperature surfaces*

2.2.6.1 Surfaces with temperatures above 220°C which may be impinged as a result of a fuel system failure shall be properly insulated.

2.2.6.2 Precautions shall be taken to prevent any oil that may escape under pressure from any pump, filter or heater from coming into contact with heated surfaces.

2.3 *Arrangements for lubricating oil*

2.3.1 The arrangements for the storage, distribution and utilization of oil used in pressure lubrication systems shall be such as to ensure the safety of the ship and persons on board. The arrangements made in machinery spaces of category A, and whenever practicable in other machinery spaces, shall at least comply with the provisions of paragraphs 2.2.1, 2.2.3.3, 2.2.3.4, 2.2.3.5, 2.2.4, 2.2.5.1, 2.2.5.3 and 2.2.6, except that:

- .1 this does not preclude the use of sight-flow glasses in lubricating systems provided that they are shown by testing to have a suitable degree of fire resistance; and
- .2 sounding pipes may be authorized in machinery spaces; however, the requirements of paragraphs 2.2.3.5.1.1 and 2.2.3.5.1.3 need not be applied on condition that the sounding pipes are fitted with appropriate means of closure.

2.3.2 The provisions of paragraph 2.2.3.4 shall also apply to lubricating oil tanks except those having a capacity less than 500 l, storage tanks on which valves are closed during the normal operation mode of the ship, or where it is determined that an unintended operation of a quick closing valve on the oil lubricating tank would endanger the safe operation of the main propulsion and essential auxiliary machinery.

2.4 *Arrangements for other flammable oils*

The arrangements for the storage, distribution and utilization of other flammable oils employed under pressure in power transmission systems, control and activating systems and heating systems shall be such as to ensure the safety of the ship and persons on board. Suitable oil collecting arrangements for leaks shall be fitted below hydraulic valves and cylinders. In locations where means of ignition are present, such arrangements shall at least comply with the provisions of paragraphs 2.2.3.3, 2.2.3.5, 2.2.5.3 and 2.2.6 and with the provisions of paragraphs 2.2.4 and 2.2.5.1 in respect of strength and construction.

2.5 *Arrangements for oil fuel in periodically unattended machinery spaces*

In addition to the requirements of paragraphs 2.1 to 2.4, the oil fuel and lubricating oil systems in a periodically unattended machinery space shall comply with the following:

- .1 where daily service oil fuel tanks are filled automatically, or by remote control, means shall be provided to prevent overflow spillages. Other equipment which treats flammable liquids automatically (e.g., oil fuel purifiers) which, whenever practicable, shall be installed in a special space reserved for purifiers and their heaters, shall have arrangements to prevent overflow spillages; and
- .2 where daily service oil fuel tanks or settling tanks are fitted with heating arrangements, a high temperature alarm shall be provided if the flashpoint of the oil fuel can be exceeded.

3 **Arrangements for gaseous fuel for domestic purpose**

Gaseous fuel systems used for domestic purposes shall be approved by the Administration. Storage of gas bottles shall be located on the open deck or in a well ventilated space which opens only to the open deck.

4 **Miscellaneous items of ignition sources and ignitability**

4.1 *Electric radiators*

Electric radiators, if used, shall be fixed in position and so constructed as to reduce fire risks to a minimum. No such radiators shall be fitted with an element so exposed that clothing, curtains, or other similar materials can be scorched or set on fire by heat from the element.

4.2 *Waste receptacles*

Waste receptacles shall be constructed of non-combustible materials with no openings in the sides or bottom.

4.3 *Insulation surfaces protected against oil penetration*

In spaces where penetration of oil products is possible, the surface of insulation shall be impervious to oil or oil vapours.

4.4 *Primary deck coverings*

Primary deck coverings, if applied within accommodation and service spaces and control stations, shall be of approved material which will not readily ignite, this being determined in accordance with the Fire Test Procedures Code.

5 **Cargo areas of tankers**

5.1 *Separation of cargo oil tanks*

5.1.1 Cargo pump-rooms, cargo tanks, slop tanks and cofferdams shall be positioned forward of machinery spaces. However, oil fuel bunker tanks need not be forward of machinery spaces. Cargo tanks and slop tanks shall be isolated from machinery spaces by cofferdams, cargo pump-rooms, oil bunker tanks or ballast tanks. Pump-rooms containing pumps and their accessories for ballasting those spaces situated adjacent to cargo tanks and slop tanks and pumps for oil fuel transfer, shall be considered as equivalent to a cargo pump-room within the context of this regulation provided that such pump-rooms have the same safety standard as that required for cargo pump-rooms. Pump-rooms intended solely for ballast or oil fuel transfer, however, need not comply with the requirements of regulation 10.9. The lower portion of the pump-room may be recessed into machinery spaces of category A to accommodate pumps, provided that the deck head of the recess is in general not more than one third of the moulded depth above the keel, except that in the case of ships of not more than 25,000 tonnes deadweight, where it can be demonstrated that for reasons of access and satisfactory piping arrangements this is impracticable, the Administration may permit a recess in excess of such height, but not exceeding one half of the moulded depth above the keel.

5.1.2 Main cargo control stations, control stations, accommodation and service spaces (excluding isolated cargo handling gear lockers) shall be positioned aft of cargo tanks, slop tanks, and spaces which isolate cargo or slop tanks from machinery spaces, but not necessarily aft of the oil fuel bunker tanks and ballast tanks, and shall be arranged in such a way that a single failure of a deck or bulkhead shall not permit the entry of gas or fumes from the cargo tanks into main cargo control stations, control stations, or accommodation and service spaces. A recess provided in accordance with paragraph 5.1.1 need not be taken into account when the position of these spaces is being determined.

5.1.3 However, where deemed necessary, the Administration may permit main cargo control stations, control stations, accommodation and service spaces forward of the cargo tanks, slop tanks and spaces which isolate cargo and slop tanks from machinery spaces, but not necessarily forward of oil fuel bunker tanks or ballast tanks. Machinery spaces, other than those of category A, may be permitted forward of the cargo tanks and slop tanks provided they are isolated from the cargo tanks and slop tanks by cofferdams, cargo pump-rooms, oil fuel bunker tanks or ballast tanks, and have at least one portable fire extinguisher. In cases where they contain internal combustion machinery, one approved foam-type extinguisher of at least 45 l capacity or equivalent shall be arranged in addition to portable fire extinguishers. If operation of a semi-portable fire extinguisher is impracticable, this fire extinguisher may be replaced by two additional portable fire extinguishers. Main cargo control stations, control stations and accommodation and service spaces shall be arranged in such a way that a single failure of a deck or bulkhead shall not permit the entry of gas or fumes from the cargo tanks into such spaces. In addition, where deemed necessary for the safety or navigation of the ship, the Administration may permit machinery spaces containing internal combustion machinery not being main propulsion machinery having an output greater than 375 kW to be located forward of the cargo area provided the arrangements are in accordance with the provisions of this paragraph.

5.1.4 In combination carriers only:

- .1 the slop tanks shall be surrounded by cofferdams except where the boundaries of the slop tanks are part of the hull, main cargo deck, cargo pump-room bulkhead or oil fuel bunker tank. These cofferdams shall not be open to a double bottom, pipe tunnel, pump-room or other enclosed space, nor shall they be used for cargo or ballast and shall not be connected to piping systems serving oil cargo or ballast. Means shall be provided for filling the cofferdams with water and for draining them. Where the boundary of a slop tank is part of the cargo pump-room bulkhead, the pump-room shall not be open to the double bottom, pipe tunnel or other enclosed space; however, openings provided with gastight bolted covers may be permitted;
- .2 means shall be provided for isolating the piping connecting the pump-room with the slop tanks referred to in paragraph 5.1.4.1. The means of isolation shall consist of a valve followed by a spectacle flange or a spool piece with appropriate blank flanges. This arrangement shall be located adjacent to the slop tanks, but where this is unreasonable or impracticable, it may be located within the pump-room directly after the piping penetrates the bulkhead. A separate permanently installed pumping and piping arrangement incorporating a manifold, provided with a shut-off valve and a blank flange, shall be provided for discharging the contents of the slop tanks directly to the open deck for disposal to shore reception facilities when the ship is in the dry cargo mode. When the transfer system is used for slop transfer in the dry cargo mode, it shall have no connection to other systems. Separation from other systems by means of removal of spool pieces may be accepted;
- .3 hatches and tank cleaning openings to slop tanks shall only be permitted on the open deck and shall be fitted with closing arrangements. Except where they consist of bolted plates with bolts at watertight spacing, these closing arrangements shall be provided with locking arrangements under the control of the responsible ship's officer; and
- .4 where cargo wing tanks are provided, cargo oil lines below deck shall be installed inside these tanks. However, the Administration may permit cargo oil lines to be placed in special ducts provided they are capable of being adequately cleaned and ventilated to the satisfaction of the Administration. Where cargo wing tanks are not provided, cargo oil lines below deck shall be placed in special ducts.

5.1.5 Where the fitting of a navigation position above the cargo area is shown to be necessary, it shall be for navigation purposes only and it shall be separated from the cargo tank deck by means of an open space with a height of at least 2 m. The fire protection requirements for such a navigation position shall be that required for control stations, as specified in regulation 9.2.4.2 and other provisions for tankers, as applicable.

5.1.6 Means shall be provided to keep deck spills away from the accommodation and service areas. This may be accomplished by provision of a permanent continuous coaming of a height of at least 300 mm, extending from side to side. Special consideration shall be given to the arrangements associated with stern loading.

5.2 *Restriction on boundary openings*

5.2.1 Except as permitted in paragraph 5.2.2, access doors, air inlets and openings to accommodation spaces, service spaces, control stations and machinery spaces shall not face the cargo area. They shall be located on the transverse bulkhead not facing the cargo area or on the outboard side of the superstructure or deck-house at a distance of at least 4% of the length of the ship, but not less than 3 m from the end of the superstructure or deckhouse facing the cargo area. This distance need not exceed 5 m.

5.2.2 The Administration may permit access doors in boundary bulkheads facing the cargo area or within the 5 m limits specified in paragraph 5.2.1, to main cargo control stations and to such service spaces used as provision rooms, store-rooms and lockers, provided they do not give access directly or indirectly to any other space containing or providing for accommodation, control stations or service spaces such as galleys, pantries or workshops, or similar spaces containing sources of vapour ignition. The boundary of such a space shall be insulated to "A-60" standard, with the exception of the boundary facing the cargo area. Bolted plates for the removal of machinery may be fitted within the limits specified in paragraph 5.2.1. Wheelhouse doors and windows may be located within the limits specified in paragraph 5.2.1 so long as they are designed to ensure that the wheelhouse can be made rapidly and efficiently gas and vapour tight.

5.2.3 Windows and sidescuttles facing the cargo area and on the sides of the superstructures and deck-houses within the limits specified in paragraph 5.2.1 shall be of the fixed (non-opening) type. Such windows and sidescuttles, except wheelhouse windows, shall be constructed to "A-60" class standard.

5.2.4 Where there is permanent access from a pipe tunnel to the main pump-room, a watertight door shall be fitted complying with the requirements of regulation II-1/25-9.2 and, in addition, with the following:

- .1 in addition to the bridge operation, the watertight door shall be capable of being manually closed from outside the main pump-room entrance; and
- .2 the watertight door shall be kept closed during normal operations of the ship except when access to the pipe tunnel is required.

5.2.5 Permanent approved gastight lighting enclosures for illuminating cargo pump-rooms may be permitted in bulkheads and decks separating cargo pump-rooms and other spaces provided they are of adequate strength and the integrity and gastightness of the bulkhead or deck is maintained.

5.2.6 The arrangement of ventilation inlets and outlets and other deck-house and superstructure boundary space openings shall be such as to complement the provisions of paragraph 5.3 and regulation 11.6. Such vents, especially for machinery spaces, shall be situated as far aft as practicable. Due consideration in this regard shall be given when the ship is equipped to load or discharge at the stern. Sources of ignition such as electrical equipment shall be so arranged as to avoid an explosion hazard.

5.3 *Cargo tank venting*

5.3.1 *General requirements*

The venting systems of cargo tanks shall be entirely distinct from the air pipes of the other compartments of the ship. The arrangements and position of openings in the cargo tank deck from which emission of flammable vapours can occur shall be such as to minimize the possibility of flammable vapours being admitted to enclosed spaces containing a source of ignition, or collecting in the vicinity of deck machinery and equipment which may constitute an ignition hazard. In accordance with this general principle, the criteria in paragraphs 5.3.2 to 5.3.5 and regulation 11.6 will apply.

5.3.2 *Venting arrangements*

5.3.2.1 The venting arrangements in each cargo tank may be independent or combined with other cargo tanks and may be incorporated into the inert gas piping.

5.3.2.2 Where the arrangements are combined with other cargo tanks, either stop valves or other acceptable means shall be provided to isolate each cargo tank. Where stop valves are fitted, they shall be provided with locking arrangements which shall be under the control of the responsible ship's officer. There shall be a clear visual indication of the operational status of the valves or other acceptable means. Where tanks have been isolated, it shall be ensured that relevant isolating valves are opened before cargo loading or ballasting or discharging of those tanks is commenced. Any isolation must continue to permit the flow caused by thermal variations in a cargo tank in accordance with regulation 11.6.1.1.

5.3.2.3 If cargo loading and ballasting or discharging of a cargo tank or cargo tank group is intended, which is isolated from a common venting system, that cargo tank or cargo tank group shall be fitted with a means for over-pressure or under-pressure protection as required in regulation 11.6.3.2.

5.3.2.4 The venting arrangements shall be connected to the top of each cargo tank and shall be self-draining to the cargo tanks under all normal conditions of trim and list of the ship. Where it may not be possible to provide self-draining lines, permanent arrangements shall be provided to drain the vent lines to a cargo tank.

5.3.3 *Safety devices in venting systems*

The venting system shall be provided with devices to prevent the passage of flame into the cargo tanks. The design, testing and locating of these devices shall comply with the requirements established by the Administration based on the guidelines developed by the Organization. Ullage openings shall not be used for pressure equalization. They shall be provided with self-closing and tightly sealing covers. Flame arresters and screens are not permitted in these openings.

5.3.4 *Vent outlets for cargo handling and ballasting*

5.3.4.1 Vent outlets for cargo loading, discharging and ballasting required by regulation 11.6.1.2 shall:

- .1.1 permit the free flow of vapour mixtures; or

- .1.2 permit the throttling of the discharge of the vapour mixtures to achieve a velocity of not less than 30 m/s;
- .2 be so arranged that the vapour mixture is discharged vertically upwards;
- .3 where the method is by free flow of vapour mixtures, be such that the outlet shall be not less than 6 m above the cargo tank deck or fore and aft gangway if situated within 4 m of the gangway and located not less than 10 m measured horizontally from the nearest air intakes and openings to enclosed spaces containing a source of ignition and from deck machinery, which may include anchor windlass and chain locker openings, and equipment which may constitute an ignition hazard; and
- .4 where the method is by high-velocity discharge, be located at a height not less than 2 m above the cargo tank deck and not less than 10 m measured horizontally from the nearest air intakes and openings to enclosed spaces containing a source of ignition and from deck machinery, which may include anchor windlass and chain locker openings, and equipment which may constitute an ignition hazard. These outlets shall be provided with high velocity devices of an approved type.

5.3.4.2 The arrangements for the venting of vapours displaced from the cargo tanks during loading and ballasting shall comply with paragraph 5.3 and regulation 11.6 and shall consist of either one or more mast risers, or a number of high-velocity vents. The inert gas supply main may be used for such venting.

5.3.5 *Isolation of slop tanks in combination carriers*

In combination carriers, the arrangements for isolating slop tanks containing oil or oil residues from other cargo tanks shall consist of blank flanges which will remain in position at all times when cargoes other than liquid cargoes referred to in regulation 1.6.1 are carried.

5.4 *Ventilation*

5.4.1 *Ventilation systems in cargo pump-rooms*

Cargo pump-rooms shall be mechanically ventilated and discharges from the exhaust fans shall be led to a safe place on the open deck. The ventilation of these rooms shall have sufficient capacity to minimize the possibility of accumulation of flammable vapours. The number of air changes shall be at least 20 per hour, based upon the gross volume of the space. The air ducts shall be arranged so that all of the space is effectively ventilated. The ventilation shall be of the suction type using fans of the non-sparking type.

5.4.2 *Ventilation systems in combination carriers*

In combination carriers, cargo spaces and any enclosed spaces adjacent to cargo spaces shall be capable of being mechanically ventilated. The mechanical ventilation may be provided by portable fans. An approved fixed gas warning system capable of monitoring flammable vapours shall be provided in cargo pump-rooms, pipe ducts and cofferdams, as referred to in paragraph 5.1.4, adjacent to slop tanks. Suitable arrangements shall be made to facilitate measurement of flammable vapours in all other spaces within the cargo area. Such measurements shall be made possible from the open deck or easily accessible positions.

5.5 *Inert gas systems*

5.5.1 *Application*

5.5.1.1 For tankers of 20,000 tonnes deadweight and upwards, the protection of the cargo tanks shall be achieved by a fixed inert gas system in accordance with the requirements of the Fire Safety Systems Code, except that, in lieu of the above, the Administration, after having given consideration to the ship's arrangement and equipment, may accept other fixed installations if they afford protection equivalent to the above, in accordance with regulation I/5. The requirements for alternative fixed installations shall comply with the requirements in paragraph 5.5.4.

5.5.1.2 Tankers operating with a cargo tank cleaning procedure using crude oil washing shall be fitted with an inert gas system complying with the Fire Safety Systems Code and with fixed tank washing machines.

5.5.1.3 Tankers required to be fitted with inert gas systems shall comply with the following provisions:

- .1 double hull spaces shall be fitted with suitable connections for the supply of inert gas;
- .2 where hull spaces are connected to a permanently fitted inert gas distribution system, means shall be provided to prevent hydrocarbon gases from the cargo tanks entering the double hull spaces through the system; and
- .3 where such spaces are not permanently connected to an inert gas distribution system, appropriate means shall be provided to allow connection to the inert gas main.

5.5.2 *Inert gas systems of chemical tankers and gas carriers*

The requirements for inert gas systems contained in the Fire Safety Systems Code need not be applied to:

- .1 chemical tankers and gas carriers when carrying cargoes described in regulation 1.6.1, provided that they comply with the requirements for inert gas systems on chemical tankers established by the Administration, based on the guidelines developed by the Organization; or
- .2 chemical tankers and gas carriers when carrying flammable cargoes other than crude oil or petroleum products such as cargoes listed in chapters 17 and 18 of the International Bulk Chemical Code, provided that the capacity of tanks used for their carriage does not exceed 3,000 m³ and the individual nozzle capacities of tank washing machines do not exceed 17.5 m³/h and the total combined throughput from the number of machines in use in a cargo tank at any one time does not exceed 110 m³/h.

5.5.3 *General requirements for inert gas systems*

5.5.3.1 The inert gas system shall be capable of inerting, purging and gas-freeing empty tanks and maintaining the atmosphere in cargo tanks with the required oxygen content.

5.5.3.2 The inert gas system referred to in paragraph 5.5.3.1 shall be designed, constructed and tested in accordance with the Fire Safety Systems Code.

5.5.3.3 Tankers fitted with a fixed inert gas system shall be provided with a closed ullage system.

5.5.4 *Requirements for equivalent systems*

5.5.4.1 Where an installation equivalent to a fixed inert gas system is installed, it shall:

- .1 be capable of preventing dangerous accumulations of explosive mixtures in intact cargo tanks during normal service throughout the ballast voyage and necessary in-tank operations; and
- .2 be so designed as to minimize the risk of ignition from the generation of static electricity by the system itself.

5.6 *Inerting, purging and gas-freeing*

5.6.1 Arrangements for purging and/or gas-freeing shall be such as to minimize the hazards due to dispersal of flammable vapours in the atmosphere and to flammable mixtures in a cargo tank.

5.6.2 The procedure for cargo tank purging and/or gas-freeing shall be carried out in accordance with regulation 16.3.2.

5.6.3 The arrangements for inerting, purging or gas-freeing of empty tanks as required in paragraph 5.5.3.1 shall be to the satisfaction of the Administration and shall be such that the accumulation of hydrocarbon vapours in pockets formed by the internal structural members in a tank is minimized and that:

- .1 on individual cargo tanks, the gas outlet pipe, if fitted, shall be positioned as far as practicable from the inert gas/air inlet and in accordance with paragraph 5.3 and regulation 11.6. The inlet of such outlet pipes may be located either at deck level or at not more than 1 m above the bottom of the tank;
- .2 the cross-sectional area of such gas outlet pipe referred to in paragraph 5.6.3.1 shall be such that an exit velocity of at least 20 m/s can be maintained when any three tanks are being simultaneously supplied with inert gas. Their outlets shall extend not less than 2 m above deck level; and
- .3 each gas outlet referred to in paragraph 5.6.3.2 shall be fitted with suitable blanking arrangements.

5.7 *Gas measurement*

5.7.1 *Portable instrument*

Tankers shall be equipped with at least one portable instrument for measuring flammable vapour concentrations, together with a sufficient set of spares. Suitable means shall be provided for the calibration of such instruments.

5.7.2 *Arrangements for gas measurement in double hull and double bottom spaces*

5.7.2.1 Suitable portable instruments for measuring oxygen and flammable vapour concentrations shall be provided. In selecting these instruments, due attention shall be given to their use in combination with the fixed gas sampling line systems referred to in paragraph 5.7.2.2.

5.7.2.2 Where the atmosphere in double hull spaces cannot be reliably measured using flexible gas sampling hoses, such spaces shall be fitted with permanent gas sampling lines. The configuration of gas sampling lines shall be adapted to the design of such spaces.

5.7.2.3 The materials of construction and the dimensions of gas sampling lines shall be such as to prevent restriction. Where plastic materials are used, they shall be electrically conductive.

5.8 *Air supply to double hull and double bottom spaces*

Double hull and double bottom spaces shall be fitted with suitable connections for the supply of air.

5.9 *Protection of cargo area*

Drip pans for collecting cargo residues in cargo lines and hoses shall be provided in the area of pipe and hose connections under the manifold area. Cargo hoses and tank washing hoses shall have electrical continuity over their entire lengths including couplings and flanges (except shore connections) and shall be earthed for removal of electrostatic charges.

5.10 *Protection of cargo pump-rooms*

5.10.1 In tankers:

- .1 cargo pumps, ballast pumps and stripping pumps, installed in cargo pump-rooms and driven by shafts passing through pump-room bulkheads shall be fitted with temperature sensing devices for bulkhead shaft glands, bearings and pump casings. A continuous audible and visual alarm signal shall be automatically effected in the cargo control room or the pump control station;
- .2 lighting in cargo pump-rooms, except emergency lighting, shall be interlocked with ventilation such that the ventilation shall be in operation when switching on the lighting. Failure of the ventilation system shall not cause the lighting to go out;
- .3 a system for continuous monitoring of the concentration of hydrocarbon gases shall be fitted. Sampling points or detector heads shall be located in suitable positions in order that potentially dangerous leakages are readily detected. When the hydrocarbon gas concentration reaches a pre-set level which shall not be higher than 10% of the lower flammable limit, a continuous audible and visual alarm signal shall be automatically effected in the pump-room, engine control room, cargo control room and navigation bridge to alert personnel to the potential hazard; and
- .4 all pump-rooms shall be provided with bilge level monitoring devices together with appropriately located alarms.

Regulation 5

Fire growth potential

1 Purpose

The purpose of this regulation is to limit the fire growth potential in every space of the ship. For this purpose, the following functional requirements shall be met:

- .1 means of control for the air supply to the space shall be provided;
- .2 means of control for flammable liquids in the space shall be provided; and
- .3 the use of combustible materials shall be restricted.

2 Control of air supply and flammable liquid to the space

2.1 *Closing appliances and stopping devices of ventilation*

2.1.1 The main inlets and outlets of all ventilation systems shall be capable of being closed from outside the spaces being ventilated. The means of closing shall be easily accessible as well as prominently and permanently marked and shall indicate whether the shut-off is open or closed.

2.1.2 Power ventilation of accommodation spaces, service spaces, cargo spaces, control stations and machinery spaces shall be capable of being stopped from an easily accessible position outside the space being served. This position shall not be readily cut off in the event of a fire in the spaces served.

2.1.3 In passenger ships carrying more than 36 passengers, power ventilation, except machinery space and cargo space ventilation and any alternative system which may be required under regulation 8.2, shall be fitted with controls so grouped that all fans may be stopped from either of two separate positions which shall be situated as far apart as practicable. Fans serving power ventilation systems to cargo spaces shall be capable of being stopped from a safe position outside such spaces.

2.2 *Means of control in machinery spaces*

2.2.1 Means of control shall be provided for opening and closure of skylights, closure of openings in funnels which normally allow exhaust ventilation and closure of ventilator dampers.

2.2.2 Means of control shall be provided for stopping ventilating fans. Controls provided for the power ventilation serving machinery spaces shall be grouped so as to be operable from two positions, one of which shall be outside such spaces. The means provided for stopping the power ventilation of the machinery spaces shall be entirely separate from the means provided for stopping ventilation of other spaces.

2.2.3 Means of control shall be provided for stopping forced and induced draught fans, oil fuel transfer pumps, oil fuel unit pumps, lubricating oil service pumps, thermal oil circulating pumps and oil separators (purifiers). However, paragraphs 2.2.4 and 2.2.5 need not apply to oily water separators.

2.2.4 The controls required in paragraphs 2.2.1 to 2.2.3 and in regulation 4.2.2.3.4 shall be located outside the space concerned so they will not be cut off in the event of fire in the space they serve.

2.2.5 In passenger ships, the controls required in paragraphs 2.2.1 to 2.2.4 and in regulations 8.3.3 and 9.5.2.3 and the controls for any required fire-extinguishing system shall be situated at one control position or grouped in as few positions as possible to the satisfaction of the Administration. Such positions shall have a safe access from the open deck.

2.3 *Additional requirements for means of control in periodically unattended machinery spaces*

2.3.1 For periodically unattended machinery spaces, the Administration shall give special consideration to maintaining the fire integrity of the machinery spaces, the location and centralization of the fire-extinguishing system controls, the required shutdown arrangements (e.g., ventilation, fuel pumps, etc.) and that additional fire-extinguishing appliances and other fire-fighting equipment and breathing apparatus may be required.

2.3.2 In passenger ships, these requirements shall be at least equivalent to those of machinery spaces normally attended.

3 **Fire protection materials**

3.1 *Use of non-combustible materials*

3.1.1 *Insulating materials*

Insulating materials shall be non-combustible, except in cargo spaces, mail rooms, baggage rooms and refrigerated compartments of service spaces. Vapour barriers and adhesives used in conjunction with insulation, as well as the insulation of pipe fittings for cold service systems, need not be of non-combustible materials, but they shall be kept to the minimum quantity practicable and their exposed surfaces shall have low flame-spread characteristics.

3.1.2 *Ceilings and linings*

3.1.2.1 In passenger ships, except in cargo spaces, all linings, grounds, draught stops and ceilings shall be of non-combustible material except in mail rooms, baggage rooms, saunas or refrigerated compartments of service spaces. Partial bulkheads or decks used to subdivide a space for utility or artistic treatment shall also be of non-combustible materials.

3.1.2.2 In cargo ships, all linings, ceilings, draught stops and their associated grounds shall be of non-combustible materials in the following spaces:

- .1 in accommodation and service spaces and control stations for ships where Method IC is specified as referred to in regulation 9.2.3.1; and
- .2 in corridors and stairway enclosures serving accommodation and service spaces and control stations for ships where Method IIC and IIIC are specified as referred to in regulation 9.2.3.1.

3.2 *Use of combustible materials*

3.2.1 *General*

3.2.1.1 In passenger ships, "A", "B" or "C" class divisions in accommodation and services spaces which are faced with combustible materials, facings, mouldings, decorations and veneers shall comply with the provisions of paragraphs 3.2.2 to 3.2.4 and regulation 6. However, traditional wooden benches and wooden linings on bulkheads and ceilings are permitted in saunas and such materials need not be subject to the calculations prescribed in paragraphs 3.2.2 and 3.2.3.

3.2.1.2 In cargo ships, non-combustible bulkheads, ceilings and linings fitted in accommodation and service spaces may be faced with combustible materials, facings, mouldings, decorations and veneers provided such spaces are bounded by non-combustible bulkheads, ceilings and linings in accordance with the provisions of paragraphs 3.2.2 to 3.2.4 and regulation 6.

3.2.2 *Maximum calorific value of combustible materials*

Combustible materials used on the surfaces and linings specified in paragraph 3.2.1 shall have a calorific value not exceeding 45 MJ/m² of the area for the thickness used. The requirements of this paragraph are not applicable to the surfaces of furniture fixed to linings or bulkheads.

3.2.3 *Total volume of combustible materials*

Where combustible materials are used in accordance with paragraph 3.2.1, they shall comply with the following requirements:

- .1 the total volume of combustible facings, mouldings, decorations and veneers in accommodation and service spaces shall not exceed a volume equivalent to 2.5 mm veneer on the combined area of the walls and ceiling linings. Furniture fixed to linings, bulkheads or decks need not be included in the calculation of the total volume of combustible materials; and
- .2 in the case of ships fitted with an automatic sprinkler system complying with the provisions of the Fire Safety Systems Code, the above volume may include some combustible material used for erection of "C" class divisions.

3.2.4 *Low flame-spread characteristics of exposed surfaces*

The following surfaces shall have low flame-spread characteristics in accordance with the Fire Test Procedures Code:

3.2.4.1 In passenger ships:

- .1 exposed surfaces in corridors and stairway enclosures and of bulkhead and ceiling linings in accommodation and service spaces (except saunas) and control stations; and
- .2 surfaces and grounds in concealed or inaccessible spaces in accommodation and service spaces and control stations.

3.2.4.2 In cargo ships:

- .1 exposed surfaces in corridors and stairway enclosures and of ceilings in accommodation and service spaces (except saunas) and control stations; and
- .2 surfaces and grounds in concealed or inaccessible spaces in accommodation and service spaces and control stations.

3.3 *Furniture in stairway enclosures of passenger ships*

Furniture in stairway enclosures shall be limited to seating. It shall be fixed, limited to six seats on each deck in each stairway enclosure, be of restricted fire risk determined in accordance with the Fire Test Procedure Code, and shall not restrict the passenger escape route. The Administration may permit additional seating in the main reception area within a stairway enclosure if it is fixed, non-combustible and does not restrict the passenger escape route. Furniture shall not be permitted in passenger and crew corridors forming escape routes in cabin areas. In addition to the above, lockers of non-combustible material, providing storage for non-hazardous safety equipment required by these regulations, may be permitted. Drinking water dispensers and ice cube machines may be permitted in corridors provided they are fixed and do not restrict the width of the escape routes. This applies as well to decorative flower or plant arrangements, statues or other objects of art such as paintings and tapestries in corridors and stairways.

Regulation 6

Smoke generation potential and toxicity

1 Purpose

The purpose of this regulation is to reduce the hazard to life from smoke and toxic products generated during a fire in spaces where persons normally work or live. For this purpose, the quantity of smoke and toxic products released from combustible materials, including surface finishes, during fire shall be limited.

2 Paints, varnishes and other finishes

Paints, varnishes and other finishes used on exposed interior surfaces shall not be capable of producing excessive quantities of smoke and toxic products, this being determined in accordance with the Fire Test Procedures Code.

3 Primary deck coverings

Primary deck coverings, if applied within accommodation and service spaces and control stations, shall be of approved material which will not give rise to smoke or toxic or explosive hazards at elevated temperatures, this being determined in accordance with the Fire Test Procedures Code.

PART C - SUPPRESSION OF FIRE

Regulation 7

Detection and alarm

1 Purpose

The purpose of this regulation is to detect a fire in the space of origin and to provide for alarm for safe escape and fire-fighting activity. For this purpose, the following functional requirements shall be met:

- .1 fixed fire detection and fire alarm system installations shall be suitable for the nature of the space, fire growth potential and potential generation of smoke and gases;
- .2 manually operated call points shall be placed effectively to ensure a readily accessible means of notification; and
- .3 fire patrols shall provide an effective means of detecting and locating fires and alerting the navigation bridge and fire teams.

2 General requirements

2.1 A fixed fire detection and fire alarm system shall be provided in accordance with the provisions of this regulation.

2.2 A fixed fire detection and fire alarm system and a sample extraction smoke detection system required in this regulation and other regulations in this part shall be of an approved type and comply with the Fire Safety Systems Code.

2.3 Where a fixed fire detection and fire alarm system is required for the protection of spaces other than those specified in paragraph 5.1, at least one detector complying with the Fire Safety Systems Code shall be installed in each such space.

3 Initial and periodical tests

3.1 The function of fixed fire detection and fire alarm systems required by the relevant regulations of this chapter shall be tested under varying conditions of ventilation after installation.

3.2 The function of fixed fire detection and fire alarm systems shall be periodically tested to the satisfaction of the Administration by means of equipment producing hot air at the appropriate temperature, or smoke or aerosol particles having the appropriate range of density or particle size, or other phenomena associated with incipient fires to which the detector is designed to respond.

4 Protection of machinery spaces

4.1 Installation

A fixed fire detection and fire alarm system shall be installed in:

- .1 periodically unattended machinery spaces; and
- .2 machinery spaces where:
 - .2.1 the installation of automatic and remote control systems and equipment has been approved in lieu of continuous manning of the space; and
 - .2.2 the main propulsion and associated machinery including sources of the main sources of electrical power are provided with various degrees of automatic or remote control and are under continuous manned supervision from a control room.

4.2 Design

The fixed fire detection and fire alarm system required in paragraph 4.1.1 shall be so designed and the detectors so positioned as to detect rapidly the onset of fire in any part of those spaces and under any normal conditions of operation of the machinery and variations of ventilation as required by the possible range of ambient temperatures. Except in spaces of restricted height and where their use is specially appropriate, detection systems using only thermal detectors shall not be permitted. The detection system shall initiate audible and visual alarms distinct in both respects from the alarms of any other system not indicating fire, in sufficient places to ensure that the alarms are heard and observed on the navigation bridge and by a responsible engineer officer. When the navigation bridge is unmanned, the alarm shall sound in a place where a responsible member of the crew is on duty.

5 Protection of accommodation and service spaces and control stations

5.1 Smoke detectors in accommodation spaces

Smoke detectors shall be installed in all stairways, corridors and escape routes within accommodation spaces as provided in paragraphs 5.2, 5.3 and 5.4. Consideration shall be given to the installation of special purpose smoke detectors within ventilation ducting.

5.2 Requirements for passenger ships carrying more than 36 passengers

A fixed fire detection and fire alarm system shall be installed and arranged as to provide smoke detection in service spaces, control stations and accommodation spaces, including corridors, stairways and escape routes within accommodation spaces. Smoke detectors need not be fitted in private bathrooms and galleys. Spaces having little or no fire risk such as voids, public toilets, carbon dioxide rooms and similar spaces need not be fitted with a fixed fire detection and alarm system.

5.3 Requirements for passenger ships carrying not more than 36 passengers

There shall be installed throughout each separate zone, whether vertical or horizontal, in all accommodation and service spaces and, where it is considered necessary by the Administration,

in control stations, except spaces which afford no substantial fire risk such as void spaces, sanitary spaces, etc., either:

- .1 a fixed fire detection and fire alarm system so installed and arranged as to detect the presence of fire in such spaces and providing smoke detection in corridors, stairways and escape routes within accommodation spaces; or
- .2 an automatic sprinkler, fire detection and fire alarm system of an approved type complying with the relevant requirements of the Fire Safety Systems Code and so installed and arranged as to protect such spaces and, in addition, a fixed fire detection and fire alarm system and so installed and arranged as to provide smoke detection in corridors, stairways and escape routes within accommodation spaces.

5.4 *Protection of atriums in passenger ships*

The entire main vertical zone containing the atrium shall be protected throughout with a smoke detection system.

5.5 *Cargo ships*

Accommodation and service spaces and control stations of cargo ships shall be protected by a fixed fire detection and fire alarm system and/or an automatic sprinkler, fire detection and fire alarm system as follows depending on a protection method adopted in accordance with regulation 9.2.3.1.

5.5.1 Method IC

A fixed fire detection and fire alarm system shall be so installed and arranged as to provide smoke detection in all corridors, stairways and escape routes within accommodation spaces.

5.5.2 Method IIC

An automatic sprinkler, fire detection and fire alarm system of an approved type complying with the relevant requirements of the Fire Safety Systems Code shall be so installed and arranged as to protect accommodation spaces, galleys and other service spaces, except spaces which afford no substantial fire risk such as void spaces, sanitary spaces, etc. In addition, a fixed fire detection and fire alarm system shall be so installed and arranged as to provide smoke detection in all corridors, stairways and escape routes within accommodation spaces.

5.5.3 Method IIIC

A fixed fire detection and fire alarm system shall be so installed and arranged as to detect the presence of fire in all accommodation spaces and service spaces providing smoke detection in corridors, stairways and escape routes within accommodation spaces, except spaces which afford no substantial fire risk such as void spaces, sanitary spaces, etc. In addition, a fixed fire detection and fire alarm system shall be so installed and arranged as to provide smoke detection in all corridors, stairways and escape routes within accommodation spaces.

6 Protection of cargo spaces in passenger ships

A fixed fire detection and fire alarm system or a sample extraction smoke detection system shall be provided in any cargo space which, in the opinion of the Administration, is not accessible, except where it is shown to the satisfaction of the Administration that the ship is engaged on voyages of such short duration that it would be unreasonable to apply this requirement.

7 Manually operated call points

Manually operated call points complying with the Fire Safety Systems Code shall be installed throughout the accommodation spaces, service spaces and control stations. One manually operated call point shall be located at each exit. Manually operated call points shall be readily accessible in the corridors of each deck such that no part of the corridor is more than 20 m from a manually operated call point.

8 Fire patrols in passenger ships

8.1 *Fire patrols*

For ships carrying more than 36 passengers an efficient patrol system shall be maintained so that an outbreak of fire may be promptly detected. Each member of the fire patrol shall be trained to be familiar with the arrangements of the ship as well as the location and operation of any equipment he may be called upon to use.

8.2 *Inspection hatches*

The construction of ceiling and bulkheads shall be such that it will be possible, without impairing the efficiency of the fire protection, for the fire patrols to detect any smoke originating in concealed and inaccessible places, except where in the opinion of the Administration there is no risk of fire originating in such places.

8.3 *Two-way portable radiotelephone apparatus*

Each member of the fire patrol shall be provided with a two-way portable radiotelephone apparatus.

9 Fire alarm signalling systems in passenger ships

9.1 Passenger ships shall at all times when at sea, or in port (except when out of service), be so manned^o or equipped as to ensure that any initial fire alarm is immediately received by a responsible member of the crew.

9.2 The control panel of fixed fire detection and fire alarm systems shall be designed on the fail-safe principle (e.g., an open detector circuit shall cause an alarm condition).

9.3 Passenger ships carrying more than 36 passengers shall have the fire detection alarms for the systems required by paragraph 5.2 centralized in a continuously manned central control station. In addition, controls for remote closing of the fire doors and shutting down the ventilation fans shall be centralized in the same location. The ventilation fans shall be capable of reactivation by the crew at the continuously manned control station. The control panels in the central control station shall be capable of indicating open or closed positions of fire doors and closed or off status of the detectors, alarms and fans. The control panel shall be continuously

powered and shall have an automatic change-over to standby power supply in case of loss of normal power supply. The control panel shall be powered from the main source of electrical power and the emergency source of electrical power defined by regulation II-1/42 unless other arrangements are permitted by the regulations, as applicable.

9.4 A special alarm, operated from the navigation bridge or fire control station, shall be fitted to summon the crew. This alarm may be part of the ship's general alarm system and shall be capable of being sounded independently of the alarm to the passenger spaces.

Regulation 8

Control of smoke spread

1 Purpose

The purpose of this regulation is to control the spread of smoke in order to minimize the hazards from smoke. For this purpose, means for controlling smoke in atriums, control stations, machinery spaces and concealed spaces shall be provided.

2 Protection of control stations outside machinery spaces

Practicable measures shall be taken for control stations outside machinery spaces in order to ensure that ventilation, visibility and freedom from smoke are maintained so that, in the event of fire, the machinery and equipment contained therein may be supervised and continue to function effectively. Alternative and separate means of air supply shall be provided and air inlets of the two sources of supply shall be so disposed that the risk of both inlets drawing in smoke simultaneously is minimized. At the discretion of the Administration, such requirements need not apply to control stations situated on, and opening on to, an open deck or where local closing arrangements would be equally effective.

3 Release of smoke from machinery spaces

3.1 The provisions of this paragraph shall apply to machinery spaces of category A and, where the Administration considers desirable, to other machinery spaces.

3.2 Suitable arrangements shall be made to permit the release of smoke, in the event of fire, from the space to be protected, subject to the provisions of regulation 9.5.2.1 The normal ventilation systems may be acceptable for this purpose.

3.3 Means of control shall be provided for permitting the release of smoke and such controls shall be located outside the space concerned so that they will not be cut off in the event of fire in the space they serve.

3.4 In passenger ships, the controls required by paragraph 3.3 shall be situated at one control position or grouped in as few positions as possible to the satisfaction of the Administration. Such positions shall have a safe access from the open deck.

4 Draught stops

Air spaces enclosed behind ceilings, panelling or linings shall be divided by close-fitting draught stops spaced not more than 14 m apart. In the vertical direction, such enclosed air spaces, including those behind linings of stairways, trunks, etc., shall be closed at each deck.

5 Smoke extraction systems in atriums of passenger ships

Atriums shall be equipped with a smoke extraction system. The smoke extraction system shall be activated by the required smoke detection system and be capable of manual control. The fans shall be sized such that the entire volume within space can be exhausted in 10 min or less.

Regulation 9

Containment of fire

1 Purpose

The purpose of this regulation is to contain a fire in the space of origin. For this purpose, the following functional requirements shall be met:

- .1 the ship shall be subdivided by thermal and structural boundaries;
- .2 thermal insulation of boundaries shall have due regard to the fire risk of the space and adjacent spaces; and
- .3 the fire integrity of the divisions shall be maintained at openings and penetrations.

2 Thermal and structural boundaries

2.1 *Thermal and structural subdivision*

Ships of all types shall be subdivided into spaces by thermal and structural divisions having regard to the fire risks of the space.

2.2 *Passenger ships*

2.2.1 *Main vertical zones and horizontal zones*

2.2.1.1.1 In ships carrying more than 36 passengers, the hull, superstructure and deckhouses shall be subdivided into main vertical zones by "A-60" class divisions. Steps and recesses shall be kept to a minimum, but where they are necessary they shall also be "A-60" class divisions. Where a category (5), (9) or (10) space defined in paragraph 2.2.3.2.2 is on one side or where fuel oil tanks are on both sides of the division the standard may be reduced to "A-0".

2.2.1.1.2 In ships carrying not more than 36 passengers, the hull, superstructure and deckhouses in way of accommodation and service spaces shall be subdivided into main vertical zones by "A" class divisions. These divisions shall have insulation values in accordance with tables in paragraph 2.2.4.

2.2.1.2 As far as practicable, the bulkheads forming the boundaries of the main vertical zones above the bulkhead deck shall be in line with watertight subdivision bulkheads situated immediately below the bulkhead deck. The length and width of main vertical zones may be extended to a maximum of 48 m in order to bring the ends of main vertical zones to coincide with watertight subdivision bulkheads or in order to accommodate a large public space extending for the whole length of the main vertical zone provided that the total area of the main vertical zone is not greater than 1,600 m² on any deck. The length or width of a main vertical zone is the maximum distance between the furthestmost points of the bulkheads bounding it.

2.2.1.3 Such bulkheads shall extend from deck to deck and to the shell or other boundaries.

2.2.1.4 Where a main vertical zone is subdivided by horizontal "A" class divisions into horizontal zones for the purpose of providing an appropriate barrier between a zone with sprinklers and a zone without sprinklers, the divisions shall extend between adjacent main vertical zone bulkheads and to the shell or exterior boundaries of the ship and shall be insulated in accordance with the fire insulation and integrity values given in table 9.4.

2.2.1.5.1 On ships designed for special purposes, such as automobile or railroad car ferries, where the provision of main vertical zone bulkheads would defeat the purpose for which the ship is intended, equivalent means for controlling and limiting a fire shall be substituted and specifically approved by the Administration. Service spaces and ship stores shall not be located on ro-ro decks unless protected in accordance with the applicable regulations.

2.2.1.5.2 However, in a ship with special category spaces, such spaces shall comply with the applicable provisions of regulation 20 and where such compliance would be inconsistent with other requirements for passenger ships specified in this chapter, the requirements of regulation 20 shall prevail.

2.2.2 *Bulkheads within a main vertical zone*

2.2.2.1 For ships carrying more than 36 passengers, bulkheads which are not required to be "A" class divisions shall be at least "B" class or "C" class divisions as prescribed in the tables in paragraph 2.2.3.

2.2.2.2 For ships carrying not more than 36 passengers, bulkheads within accommodation and service spaces which are not required to be "A" class divisions shall be at least "B" class or "C" class divisions as prescribed in the tables in paragraph 2.2.4. In addition, corridor bulkheads, where not required to be "A" class, shall be "B" class divisions which shall extend from deck to deck except:

- .1 when continuous "B" class ceilings or linings are fitted on both sides of the bulkhead, the portion of the bulkhead behind the continuous ceiling or lining shall be of material which, in thickness and composition, is acceptable in the construction of "B" class divisions, but which shall be required to meet "B" class integrity standards only in so far as is reasonable and practicable in the opinion of the Administration; and
- .2 in the case of a ship protected by an automatic sprinkler system complying with the provisions of the Fire Safety Systems Code, the corridor bulkheads may terminate at a ceiling in the corridor provided such bulkheads and ceilings are of "B" class standard in compliance with paragraph 2.2.4. All doors and frames in such bulkheads shall be of non-combustible materials and shall have the same fire integrity as the bulkhead in which they are fitted.

2.2.2.3 Bulkheads required to be "B" class divisions, except corridor bulkheads as prescribed in paragraph 2.2.2.2, shall extend from deck to deck and to the shell or other boundaries. However, where a continuous "B" class ceiling or lining is fitted on both sides of a bulkhead which is at least of the same fire resistance as the adjoining bulkhead, the bulkhead may terminate at the continuous ceiling or lining.

2.2.3 *Fire integrity of bulkheads and decks in ships carrying more than 36 passengers*

2.2.3.1 In addition to complying with the specific provisions for fire integrity of bulkheads and decks of passenger ships, the minimum fire integrity of all bulkheads and decks shall be as prescribed in tables 9.1 and 9.2. Where, due to any particular structural arrangements in the ship, difficulty is experienced in determining from the tables the minimum fire integrity value of any divisions, such values shall be determined to the satisfaction of the Administration.

2.2.3.2 The following requirements shall govern application of the tables:

- .1 Table 9.1 shall apply to bulkheads not bounding either main vertical zones or horizontal zones. Table 9.2 shall apply to decks not forming steps in main vertical zones nor bounding horizontal zones.
- .2 For determining the appropriate fire integrity standards to be applied to boundaries between adjacent spaces, such spaces are classified according to their fire risk as shown in categories (1) to (14) below. Where the contents and use of a space are such that there is a doubt as to its classification for the purpose of this regulation, or where it is possible to assign two or more classifications to a space, it shall be treated as a space within the relevant category having the most stringent boundary requirements. Smaller, enclosed rooms within a space that have less than 30% communicating openings to that space are considered separate spaces. The fire integrity of the boundary bulkheads and decks of such smaller rooms shall be as prescribed in tables 9.1 and 9.2. The title of each category is intended to be typical rather than restrictive. The number in parentheses preceding each category refers to the applicable column or row in the tables.

(1) *Control stations*

Spaces containing emergency sources of power and lighting.

Wheelhouse and chartroom.

Spaces containing the ship's radio equipment.

Fire control stations.

Control room for propulsion machinery when located outside the propulsion machinery space.

Spaces containing centralized fire alarm equipment.

Spaces containing centralized emergency public address system stations and equipment.

(2) *Stairways*

Interior stairways, lifts, totally enclosed emergency escape trunks, and escalators (other than those wholly contained within the machinery spaces) for passengers and crew and enclosures thereto.

In this connection a stairway which is enclosed at only one level shall be regarded as part of the space from which it is not separated by a fire door.

(3) *Corridors*

Passenger and crew corridors and lobbies.

(4) *Evacuation stations and external escape routes*

Survival craft stowage area.

Open deck spaces and enclosed promenades forming lifeboat and liferaft embarkation and lowering stations.

Assembly stations, internal and external.

External stairs and open decks used for escape routes.

The ship's side to the waterline in the lightest seagoing condition, superstructure and deckhouse sides situated below and adjacent to the liferaft and evacuation slide embarkation areas.

(5) *Open deck spaces*

Open deck spaces and enclosed promenades clear of lifeboat and liferaft embarkation and lowering stations. To be considered in this category, enclosed promenades shall have no significant fire risk, meaning that furnishings shall be restricted to deck furniture. In addition, such spaces shall be naturally ventilated by permanent openings.

Air spaces (the space outside superstructures and deckhouses).

(6) *Accommodation spaces of minor fire risk*

Cabins containing furniture and furnishings of restricted fire risk.

Offices and dispensaries containing furniture and furnishings of restricted fire risk.

Public spaces containing furniture and furnishings of restricted fire risk and having a deck area of less than 50 m².

(7) *Accommodation spaces of moderate fire risk*

Spaces as in category (6) above but containing furniture and furnishings of other than restricted fire risk.

Public spaces containing furniture and furnishings of restricted fire risk and having a deck area of 50 m² or more.

Isolated lockers and small store-rooms in accommodation spaces having areas less than 4 m² (in which flammable liquids are not stowed).

Sale shops. Motion picture projection and film stowage rooms. Diet kitchens (containing no open flame).

Cleaning gear lockers (in which flammable liquids are not stowed).

Laboratories (in which flammable liquids are not stowed).

Pharmacies.

Small drying rooms (having a deck area of 4 m² or less).

Specie rooms.

Operating rooms.

(8) *Accommodation spaces of greater fire risk*

Public spaces containing furniture and furnishings of other than restricted fire risk and having a deck area of 50 m² or more.

Barber shops and beauty parlours.

Saunas.

(9) *Sanitary and similar spaces*

Communal sanitary facilities, showers, baths, water closets, etc.
Small laundry rooms.
Indoor swimming pool area.
Isolated pantries containing no cooking appliances in accommodation spaces.
Private sanitary facilities shall be considered a portion of the space in which they are located.

(10) *Tanks, voids and auxiliary machinery spaces having little or no fire risk*

Water tanks forming part of the ship's structure.
Voids and cofferdams.
Auxiliary machinery spaces which do not contain machinery having a pressure lubrication system and where storage of combustibles is prohibited, such as:

ventilation and air-conditioning rooms;
windlass room;
steering gear room;
stabilizer equipment room;
electrical propulsion motor room;
rooms containing section switchboards and purely electrical equipment other than oil-filled electrical transformers (above 10 kVA);
shaft alleys and pipe tunnels; and
spaces for pumps and refrigeration machinery (not handling or using flammable liquids).

Closed trunks serving the spaces listed above.
Other closed trunks such as pipe and cable trunks.

(11) *Auxiliary machinery spaces, cargo spaces, cargo and other oil tanks and other similar spaces of moderate fire risk*

Cargo oil tanks.
Cargo holds, trunkways and hatchways.
Refrigerated chambers.
Oil fuel tanks (where installed in a separate space with no machinery).
Shaft alleys and pipe tunnels allowing storage of combustibles.
Auxiliary machinery spaces as in category (10) which contain machinery having a pressure lubrication system or where storage of combustibles is permitted.
Oil fuel filling stations.
Spaces containing oil-filled electrical transformers (above 10 kVA).
Spaces containing turbine and reciprocating steam engine driven auxiliary generators and small internal combustion engines of power output up to 110 kW driving generators, sprinkler, drencher or fire pumps, bilge pumps, etc.
Closed trunks serving the spaces listed above.

(12) *Machinery spaces and main galleys*

Main propulsion machinery rooms (other than electric propulsion motor rooms) and boiler rooms.

Auxiliary machinery spaces other than those in categories (10) and (11) which contain internal combustion machinery or other oil-burning, heating or pumping units.

Main galleys and annexes.

Trunks and casings to the spaces listed above.

(13) *Store-rooms, workshops, pantries, etc.*

Main pantries not annexed to galleys.

Main laundry.

Large drying rooms (having a deck area of more than 4 m²).

Miscellaneous stores.

Mail and baggage rooms.

Garbage rooms.

Workshops (not part of machinery spaces, galleys, etc.).

Lockers and store-rooms having areas greater than 4 m², other than those spaces that have provisions for the storage of flammable liquids.

(14) *Other spaces in which flammable liquids are stowed*

Paint lockers.

Store-rooms containing flammable liquids (including dyes, medicines, etc.).

Laboratories (in which flammable liquids are stowed);

- .3 Where a single value is shown for the fire integrity of a boundary between two spaces, that value shall apply in all cases.
- .4 Notwithstanding the provisions of paragraph 2.2.2, there are no special requirements for material or integrity of boundaries where only a dash appears in the tables.
- .5 The Administration shall determine in respect of category (5) spaces whether the insulation values in table 9.1 shall apply to ends of deckhouses and superstructures, and whether the insulation values in table 9.2 shall apply to weather decks. In no case shall the requirements of category (5) of tables 9.1 or 9.2 necessitate enclosure of spaces which in the opinion of the Administration need not be enclosed.

Table 9.1 – Bulkheads not bounding either main vertical zones or horizontal zones

Spaces	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Control stations	B-0 ^a	A-0	A-0	A-0	A-0	A-60	A-60	A-60	A-0	A-0	A-60	A-60	A-60	A-60
Stairways		A-0 ^a	A-0	A-0	A-0	A-0	A-15	A-15	A-0 ^c	A-0	A-15	A-30	A-15	A-30
Corridors			B-15	A-60	A-0	B-15	B-15	B-15	B-15	A-0	A-15	A-30	A-0	A-30
Evacuation stations and external escape routes					A-0	A-60 ^{b,d}	A-60 ^{b,d}	A-60 ^{b,d}	A-0 ^d	A-0	A-60 ^b	A-60 ^b	A-60 ^b	A-60 ^b
Open deck spaces						A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0
Accommodation spaces of minor fire risk						B-0	B-0	B-0	C	A-0	A-0	A-30	A-0	A-30
Accommodation spaces of moderate fire risk							B-0	B-0	C	A-0	A-15	A-60	A-15	A-60
Accommodation spaces of greater fire risk								B-0	C	A-0	A-30	A-60	A-15	A-60
Sanitary and similar spaces									C	A-0	A-0	A-0	A-0	A-0
Tanks, voids and auxiliary machinery spaces having little or no fire risk										A-0 ^a	A-0	A-0	A-0	A-0
Auxiliary machinery spaces, cargo spaces, cargo and other oil tanks and other similar spaces of moderate fire risk											A-0 ^a	A-0	A-0	A-15
Machinery spaces and main galleys												A-0 ^a	A-0	A-60
Store-rooms, workshops, pantries, etc.													A-0 ^a	A-0
Other spaces in which flammable liquids are stowed														A-30

See notes following table 9.2.

Notes: To be applied to tables 9.1 and 9.2.

- a Where adjacent spaces are in the same numerical category and superscript "a" appears, a bulkhead or deck between such spaces need not be fitted if deemed unnecessary by the Administration. For example, in category (12) a bulkhead need not be required between a galley and its annexed pantries provided the pantry bulkhead and decks maintain the integrity of the galley boundaries. A bulkhead is, however, required between a galley and machinery space even though both spaces are in category (12).
 - b The ship's side, to the waterline in the lightest seagoing condition, superstructure and deckhouse sides situated below and adjacent to liferafts and evacuation slides may be reduced to "A-30".
 - c Where public toilets are installed completely within the stairway enclosure, the public toilet bulkhead within the stairway enclosure can be of "B" class integrity.
 - d Where spaces of categories (6), (7), (8) and (9) are located completely within the outer perimeter of the assembly station, the bulkheads of these spaces are allowed to be of "B-0" class integrity. Control positions for audio, video and light installations may be considered as part of the assembly station.
-

2.2.3.3 Continuous "B" class ceilings or linings, in association with the relevant decks or bulkheads, may be accepted as contributing wholly or in part, to the required insulation and integrity of a division.

2.2.3.4 *Construction and arrangement of saunas*

2.2.3.4.1 The perimeter of the sauna shall be of "A" class boundaries and may include changing rooms, showers and toilets. The sauna shall be insulated to "A-60" standard against other spaces except those inside of the perimeter and spaces of categories (5), (9) and (10).

2.2.3.4.2 Bathrooms with direct access to saunas may be considered as part of them. In such cases, the door between sauna and the bathroom need not comply with fire safety requirements.

2.2.3.4.3 The traditional wooden lining on the bulkheads and ceiling are permitted in the sauna. The ceiling above the oven shall be lined with a non-combustible plate with an air gap of at least 30 mm. The distance from the hot surfaces to combustible materials shall be at least 500 mm or the combustible materials shall be protected (e.g., non-combustible plate with an air gap of at least 30 mm).

2.2.3.4.4 The traditional wooden benches are permitted to be used in the sauna.

2.2.3.4.5 The sauna door shall open outwards by pushing.

2.2.3.4.6 Electrically heated ovens shall be provided with a timer.

2.2.4 *Fire integrity of bulkheads and decks in ships carrying not more than 36 passengers*

2.2.4.1 In addition to complying with the specific provisions for fire integrity of bulkheads and decks of passenger ships, the minimum fire integrity of bulkheads and decks shall be as prescribed in tables 9.3 and 9.4.

2.2.4.2 The following requirements govern application of the tables:

- .1 Tables 9.3 and 9.4 shall apply respectively to the bulkheads and decks separating adjacent spaces.
- .2 For determining the appropriate fire integrity standards to be applied to divisions between adjacent spaces, such spaces are classified according to their fire risk as shown in categories (1) to (11) below. Where the contents and use of a space are such that there is a doubt as to its classification for the purpose of this regulation, or where it is possible to assign two or more classifications to a space, it shall be treated as a space within the relevant category having the most stringent boundary requirements. Smaller, enclosed rooms within a space that have less than 30% communicating openings to that space are considered separate spaces. The fire integrity of the boundary bulkheads and decks of such smaller rooms shall be as prescribed in tables 9.3 and 9.4. The title of each category is intended to be typical rather than restrictive. The number in parentheses preceding each category refers to the applicable column or row in the tables.

(1) *Control stations*

Spaces containing emergency sources of power and lighting.

Wheelhouse and chartroom.

Spaces containing the ship's radio equipment.

Fire control stations.

Control room for propulsion machinery when located outside the machinery space.

Spaces containing centralized fire alarm equipment.

(2) *Corridors*

Passenger and crew corridors and lobbies.

(3) *Accommodation spaces*

Spaces as defined in regulation 3.1 excluding corridors.

(4) *Stairways*

Interior stairways, lifts, totally enclosed emergency escape trunks, and escalators (other than those wholly contained within the machinery spaces) and enclosures thereto.

In this connection, a stairway which is enclosed only at one level shall be regarded as part of the space from which it is not separated by a fire door.

(5) *Service spaces (low risk)*

Lockers and store-rooms not having provisions for the storage of flammable liquids and having areas less than 4 m² and drying rooms and laundries.

(6) *Machinery spaces of category A*

Spaces as defined in regulation 3.31.

(7) *Other machinery spaces*

Electrical equipment rooms (auto-telephone exchange, air-conditioning duct spaces).

Spaces as defined in regulation 3.30 excluding machinery spaces of category A.

(8) *Cargo spaces*

All spaces used for cargo (including cargo oil tanks) and trunkways and hatchways to such spaces, other than special category spaces.

(9) *Service spaces (high risk)*

Galleys, pantries containing cooking appliances, paint lockers, lockers and store-rooms having areas of 4 m² or more, spaces for the storage of flammable liquids, saunas and workshops other than those forming part of the machinery spaces.

(10) *Open decks*

Open deck spaces and enclosed promenades having little or no fire risk. Enclosed promenades shall have no significant fire risk, meaning that furnishing shall be restricted to deck furniture. In addition, such spaces shall be naturally ventilated by permanent openings. Air spaces (the space outside superstructures and deckhouses).

(11) *Special category and ro-ro spaces*

Spaces as defined in regulations 3.41 and 3.46.

.3 In determining the applicable fire integrity standard of a boundary between two spaces within a main vertical zone or horizontal zone which is not protected by an automatic sprinkler system complying with the provisions of the Fire Safety Systems Code or between such zones neither of which is so protected, the higher of the two values given in the tables shall apply.

.4 In determining the applicable fire integrity standard of a boundary between two spaces within a main vertical zone or horizontal zone which is protected by an automatic sprinkler system complying with the provisions of the Fire Safety Systems Code or between such zones both of which are so protected, the lesser of the two values given in the tables shall apply. Where a zone with sprinklers and a zone without sprinklers meet within accommodation and service spaces, the higher of the two values given in the tables shall apply to the division between the zones.

2.2.4.3 Continuous "B" class ceilings or linings, in association with the relevant decks or bulkheads, may be accepted as contributing, wholly or in part, to the required insulation and integrity of a division.

2.2.4.4 External boundaries which are required in regulation 11.2 to be of steel or other equivalent material may be pierced for the fitting of windows and sidescuttles provided that there

is no requirement for such boundaries of passenger ships to have "A" class integrity. Similarly, in such boundaries which are not required to have "A" class integrity, doors may be constructed of materials which are to the satisfaction of the Administration.

2.2.4.5 Saunas shall comply with paragraph 2.2.3.4.

Table 9.3 – Fire integrity of bulkheads separating adjacent spaces

Spaces	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Control stations (1)	A-0 ^c	A-0	A-60	A-0	A-15	A-60	A-15	A-60	A-60	*	A-60
Corridors (2)		C ^e	B-0 ^e	A-0 ^a B-0 ^e	B-0 ^e	A-60	A-0	A-0	A-15 A-0 ^d	*	A-15
Accommodation spaces (3)			C ^e	A-0 ^a B-0 ^e	B-0 ^e	A-60	A-0	A-0	A-15 A-0 ^d	*	A-30 A-0 ^d
Stairways (4)				A-0 ^a B-0 ^e	A-0 ^a B-0 ^e	A-60	A-0	A-0	A-15 A-0 ^d	*	A-15
Service spaces (low risk) (5)					C ^e	A-60	A-0	A-0	A-0	*	A-0
Machinery spaces of category A (6)						*	A-0	A-0	A-60	*	A-60
Other machinery spaces (7)							A-0 ^b	A-0	A-0	*	A-0
Cargo spaces (8)								*	A-0	*	A-0
Service spaces (high risk) (9)									A-0 ^b	*	A-30
Open decks (10)											A-0
Special category and ro-ro spaces (11)											A-0

Table 9.4 – Fire integrity of decks separating adjacent spaces

Space below ↓ Space above →	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Control stations (1)	A-0	A-0	A-0	A-0	A-0	A-60	A-0	A-0	A-0	*	A-30
Corridors (2)	A-0	*	*	A-0	*	A-60	A-0	A-0	A-0	*	A-0
Accommodation spaces (3)	A-60	A-0	*	A-0	*	A-60	A-0	A-0	A-0	*	A-30 A-0 ^d
Stairways (4)	A-0	A-0	A-0	*	A-0	A-60	A-0	A-0	A-0	*	A-0
Service spaces (low risk) (5)	A-15	A-0	A-0	A-0	*	A-60	A-0	A-0	A-0	*	A-0
Machinery spaces of category A (6)	A-60	A-60	A-60	A-60	A-60	*	A-60 ^f	A-30	A-60	*	A-60
Other machinery spaces (7)	A-15	A-0	A-0	A-0	A-0	A-0	*	A-0	A-0	*	A-0
Cargo spaces (8)	A-60	A-0	A-0	A-0	A-0	A-0	A-0	*	A-0	*	A-0
Service spaces (high risk) (9)	A-60	A-30 A-0 ^d	A-30 A-0 ^d	A-30 A-0 ^d	A-0	A-60	A-0	A-0	A-0	*	A-30
Open decks (10)	*	*	*	*	*	*	*	*	*	-	A-0
Special category and ro-ro spaces (11)	A-60	A-15	A-30 A-0 ^d	A-15	A-0	A-30	A-0	A-0	A-30	A-0	A-0

Notes: To be applied to both tables 9.3 and 9.4 as appropriate.

- a For clarification as to which applies, see paragraphs 2.2.2 and 2.2.5.
- b Where spaces are of the same numerical category and superscript b appears, a bulkhead or deck of the rating shown in the tables is only required when the adjacent spaces are for a different purpose (e.g., in category (9)). A galley next to a galley does not require a bulkhead, but a galley next to a paint room requires an "A-0" bulkhead.
- c Bulkhead separating the wheelhouse and chartroom from each other may have a "B-0" rating.
- d See paragraphs 2.2.4.2.3 and 2.2.4.2.4.
- e For the application of paragraph 2.2.1.1.2, "B-0" and "C", where appearing in table 9.3, shall be read as "A-0".
- f Fire insulation need not be fitted if the machinery space in category (7), in the opinion of the Administration, has little or no fire risk.

* Where an asterisk appears in the tables, the division is required to be of steel or other equivalent material, but is not required to be of "A" class standard. However, where a deck, except in a category (10) space, is penetrated for the passage of electric cables, pipes and vent ducts, such penetrations shall be made tight to prevent the passage of flame and smoke. Divisions between control stations (emergency generators) and open decks may have air intake openings without means for closure, unless a fixed gas fire-extinguishing system is fitted.

For the application of paragraph 2.2.1.1.2, an asterisk, where appearing in table 9.4, except for categories (8) and (10), shall be read as "A-0".

2.2.5 *Protection of stairways and lifts in accommodation area*

2.2.5.1 Stairways shall be within enclosures formed of "A" class divisions, with positive means of closure at all openings, except that:

- .1 a stairway connecting only two decks need not be enclosed, provided the integrity of the deck is maintained by proper bulkheads or self-closing doors in one 'tween-deck space. When a stairway is closed in one 'tween-deck space, the stairway enclosure shall be protected in accordance with the tables for decks in paragraphs 2.2.3 or 2.2.4; and
- .2 stairways may be fitted in the open in a public space, provided they lie wholly within the public space.

2.2.5.2 Lift trunks shall be so fitted as to prevent the passage of smoke and flame from one 'tween-deck to another and shall be provided with means of closing so as to permit the control of draught and smoke. Machinery for lifts located within stairway enclosures shall be arranged in a separate room, surrounded by steel boundaries, except that small passages for lift cables are permitted. Lifts which open into spaces other than corridors, public spaces, special category spaces, stairways and external areas shall not open into stairways included in the means of escape.

2.3 *Cargo ships except tankers*

2.3.1 *Methods of protection in accommodation area*

2.3.1.1 One of the following methods of protection shall be adopted in accommodation and service spaces and control stations:

.1 **Method IC**

The construction of internal divisional bulkheads of non-combustible "B" or "C" class divisions generally without the installation of an automatic sprinkler, fire detection and fire alarm system in the accommodation and service spaces, except as required by regulation 7.5.5.1; or

.2 **Method IIC**

The fitting of an automatic sprinkler, fire detection and fire alarm system as required by regulation 7.5.5.2 for the detection and extinction of fire in all spaces in which fire might be expected to originate, generally with no restriction on the type of internal divisional bulkheads; or

.3 **Method IIIC**

The fitting of a fixed fire detection and fire alarm system as required by regulation 7.5.5.3, in spaces in which a fire might be expected to originate, generally with no restriction on the type of internal divisional bulkheads, except that in no case shall the area of any accommodation space or spaces bounded by an "A" or "B" class division exceed 50 m². However, consideration may be given by the Administration to increasing this area for public spaces.

2.3.1.2 The requirements for the use of non-combustible materials in the construction and insulation of boundary bulkheads of machinery spaces, control stations, service spaces, etc., and the protection of the above stairway enclosures and corridors will be common to all three methods outlined in paragraph 2.3.1.1.

2.3.2 *Bulkheads within accommodation area*

2.3.2.1 Bulkheads required to be "B" class divisions shall extend from deck to deck and to the shell or other boundaries. However, where a continuous "B" class ceiling or lining is fitted on both sides of the bulkhead, the bulkhead may terminate at the continuous ceiling or lining.

2.3.2.2 Method IC

Bulkheads not required by this or other regulations for cargo ships to be "A" or "B" class divisions, shall be of at least "C" class construction.

2.3.2.3 Method IIC

There shall be no restriction on the construction of bulkheads not required by this or other regulations for cargo ships to be "A" or "B" class divisions except in individual cases where "C" class bulkheads are required in accordance with table 9.5.

2.3.2.4 Method IIIC

There shall be no restriction on the construction of bulkheads not required for cargo ships to be "A" or "B" class divisions except that the area of any accommodation space or spaces bounded by a continuous "A" or "B" class division shall in no case exceed 50 m², except in individual cases where "C" class bulkheads are required in accordance with table 9.5. However, consideration may be given by the Administration to increasing this area for public spaces.

2.3.3 *Fire integrity of bulkheads and decks*

2.3.3.1 In addition to complying with the specific provisions for fire integrity of bulkheads and decks of cargo ships, the minimum fire integrity of bulkheads and decks shall be as prescribed in tables 9.5 and 9.6.

2.3.3.2 The following requirements shall govern application of the tables:

- .1 Tables 9.5 and 9.6 shall apply respectively to the bulkheads and decks separating adjacent spaces.
- .2 For determining the appropriate fire integrity standards to be applied to divisions between adjacent spaces, such spaces are classified according to their fire risk as shown in categories (1) to (11) below. Where the contents and use of a space are such that there is a doubt as to its classification for the purpose of this regulation, or where it is possible to assign two or more classifications to a space, it shall be treated as a space within the relevant category having the most stringent boundary requirements. Smaller, enclosed rooms within a space that have less than 30% communicating openings to that space are considered separate spaces. The fire integrity of the boundary bulkheads and decks of such smaller rooms shall be as prescribed in tables 9.5 and 9.6. The title of each category is intended to be typical rather than restrictive. The number in parentheses preceding each category refers to the applicable column or row in the tables.

(1) *Control stations*

Spaces containing emergency sources of power and lighting.

Wheelhouse and chartroom.

Spaces containing the ship's radio equipment.

Fire control stations.

Control room for propulsion machinery when located outside the machinery space.

Spaces containing centralized fire alarm equipment.

(2) *Corridors*

Corridors and lobbies.

(3) *Accommodation spaces*

Spaces as defined in regulation 3.1, excluding corridors.

(4) *Stairways*

Interior stairway, lifts, totally enclosed emergency escape trunks, and escalators (other than those wholly contained within the machinery spaces) and enclosures thereto.

In this connection, a stairway which is enclosed only at one level shall be regarded as part of the space from which it is not separated by a fire door.

(5) *Service spaces (low risk)*

Lockers and store-rooms not having provisions for the storage of flammable liquids and having areas less than 4 m² and drying rooms and laundries.

(6) *Machinery spaces of category A*

Spaces as defined in regulation 3.31.

(7) *Other machinery spaces*

Electrical equipment rooms (auto-telephone exchange, air-conditioning duct spaces).

Spaces as defined in regulation 3.30, excluding machinery spaces of category A.

(8) *Cargo spaces*

All spaces used for cargo (including cargo oil tanks) and trunkways and hatchways to such spaces.

(9) *Service spaces (high risk)*

Galleys, pantries containing cooking appliances, saunas, paint lockers and store-rooms having areas of 4 m² or more, spaces for the storage of flammable liquids, and workshops other than those forming part of the machinery spaces.

(10) *Open decks*

Open deck spaces and enclosed promenades having little or no fire risk. To be considered in this category, enclosed promenades shall have no significant fire risk, meaning that furnishings shall be restricted to deck furniture. In addition, such spaces shall be naturally ventilated by permanent openings.

Air spaces (the space outside superstructures and deckhouses).

(11) *Ro-ro and vehicle spaces*

Ro-ro spaces as defined in regulation 3.41.

Vehicle spaces as defined in regulation 3.49.

Table 9.5 – Fire integrity of bulkheads separating adjacent spaces

Spaces	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Control stations (1)	A-0 ^e	A-0	A-60	A-0	A-15	A-60	A-15	A-60	A-60	*	A-60
Corridors (2)		C	B-0	B-0 A-0 ^c	B-0	A-60	A-0	A-0	A-0	*	A-30
Accommodation spaces (3)			C ^{a, b}	B-0 A-0 ^c	B-0	A-60	A-0	A-0	A-0	*	A-30
Stairways (4)				B-0 A-0 ^c	B-0 A-0 ^c	A-60	A-0	A-0	A-0	*	A-30
Service spaces (low risk) (5)					C	A-60	A-0	A-0	A-0	*	A-0
Machinery spaces of category A (6)						*	A-0	A-0 ^g	A-60	*	A-60 ^f
Other machinery spaces (7)							A-0 ^d	A-0	A-0	*	A-0
Cargo spaces (8)								*	A-0	*	A-0
Service spaces (high risk) (9)									A-0 ^d	*	A-30
Open decks (10)										-	A-0
Ro-ro and vehicle spaces (11)											* ^h

Table 9.6 – Fire integrity of decks separating adjacent spaces

Space below ↓ Space → above	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Control stations (1)	A-0	A-0	A-0	A-0	A-0	A-60	A-0	A-0	A-0	*	A-60
Corridors (2)	A-0	*	*	A-0	*	A-60	A-0	A-0	A-0	*	A-30
Accommodation spaces (3)	A-60	A-0	*	A-0	*	A-60	A-0	A-0	A-0	*	A-30
Stairways (4)	A-0	A-0	A-0	*	A-0	A-60	A-0	A-0	A-0	*	A-30
Service spaces (low risk) (5)	A-15	A-0	A-0	A-0	*	A-60	A-0	A-0	A-0	*	A-0
Machinery spaces of category A (6)	A-60	A-60	A-60	A-60	A-60	*	A-60 ⁱ	A-30	A-60	*	A-60
Other machinery spaces (7)	A-15	A-0	A-0	A-0	A-0	A-0	*	A-0	A-0	*	A-0
Cargo spaces (8)	A-60	A-0	A-0	A-0	A-0	A-0	A-0	*	A-0	*	A-0
Service spaces (high risk) (9)	A-60	A-0	A-0	A-0	A-0	A-60	A-0	A-0	A-0 ^d	*	A-30
Open decks (10)	*	*	*	*	*	*	*	*	*	-	*
Ro-ro and vehicle spaces (11)	A-60	A-30	A-30	A-30	A-0	A-60	A-0	A-0	A-30	*	* ^h

Notes: To be applied to tables 9.5 and 9.6 as appropriate.

- a No special requirements are imposed upon bulkheads in methods IIC and IIIC fire protection.
 - b In case of method IIIC, "B" class bulkheads of "B-0" rating shall be provided between spaces or groups of spaces of 50 m² and over in area.
 - c For clarification as to which applies, see paragraphs 2.3.2 and 2.3.4.
 - d Where spaces are of the same numerical category and superscript d appears, a bulkhead or deck of the rating shown in the tables is only required when the adjacent spaces are for a different purpose (e.g., in category (9)). A galley next to a galley does not require a bulkhead, but a galley next to a paint room requires an "A-0" bulkhead.
 - e Bulkheads separating the wheelhouse, chartroom and radio room from each other may have a "B-0" rating.
 - f An "A-0" rating may be used if no dangerous goods are intended to be carried or if such goods are stowed not less than 3 m horizontally from such a bulkhead.
 - g For cargo spaces in which dangerous goods are intended to be carried, regulation 19.3.8 applies.
 - h Bulkheads and decks separating ro-ro spaces shall be capable of being closed reasonably gastight and such divisions shall have "A" class integrity in so far as reasonable and practicable, if in the opinion of the Administration it has little or no fire risk.
 - i Fire insulation need not be fitted in the machinery space in category (7) if, in the opinion of the Administration, it has little or no fire risk.
-

* Where an asterisk appears in the tables, the division is required to be of steel or other equivalent material but is not required to be of "A" class standard. However, where a deck, except an open deck, is penetrated for the passage of electric cables, pipes and vent ducts, such penetrations shall be made tight to prevent the passage of flame and smoke. Divisions between control stations (emergency generators) and open decks may have air intake openings without means for closure, unless a fixed gas fire-extinguishing system is fitted.

2.3.3.3 Continuous "B" class ceilings or linings, in association with the relevant decks or bulkheads, may be accepted as contributing, wholly or in part, to the required insulation and integrity of a division.

2.3.3.4 External boundaries which are required in regulation 11.2 to be of steel or other equivalent material may be pierced for the fitting of windows and sidescuttles provided that there is no requirement for such boundaries of cargo ships to have "A" class integrity. Similarly, in such boundaries which are not required to have "A" class integrity, doors may be constructed of materials which are to the satisfaction of the Administration.

2.3.3.5 Saunas shall comply with paragraph 2.2.3.4.

2.3.4 *Protection of stairways and lift trunks in accommodation spaces, service spaces and control stations*

2.3.4.1 Stairways which penetrate only a single deck shall be protected, at a minimum, at one level by at least "B-0" class divisions and self-closing doors. Lifts which penetrate only a single deck shall be surrounded by "A-0" class divisions with steel doors at both levels. Stairways and lift trunks which penetrate more than a single deck shall be surrounded by at least "A-0" class divisions and be protected by self-closing doors at all levels.

2.3.4.2 On ships having accommodation for 12 persons or less, where stairways penetrate more than a single deck and where there are at least two escape routes direct to the open deck at every accommodation level, the "A-0" requirements of paragraph 2.3.4.1 may be reduced to "B-0".

2.4 *Tankers*

2.4.1 *Application*

For tankers, only method IC as defined in paragraph 2.3.1.1 shall be used.

2.4.2 *Fire integrity of bulkheads and decks*

2.4.2.1 In lieu of paragraph 2.3 and in addition to complying with the specific provisions for fire integrity of bulkheads and decks of tankers, the minimum fire integrity of bulkheads and decks shall be as prescribed in tables 9.7 and 9.8.

2.4.2.2 The following requirements shall govern application of the tables:

- .1 Tables 9.7 and 9.8 shall apply respectively to the bulkhead and decks separating adjacent spaces.
- .2 For determining the appropriate fire integrity standards to be applied to divisions between adjacent spaces, such spaces are classified according to their fire risk as shown in categories (1) to (10) below. Where the contents and use of a space are such that there is a doubt as to its classification for the purpose of this regulation, or where it is possible to assign two or more classifications to a space, it shall be treated as a space within the relevant category having the most stringent boundary requirements. Smaller, enclosed areas within a space that have less than 30% communicating openings to that space are considered separate areas. The fire integrity of the boundary bulkheads and decks of such smaller spaces shall be as prescribed in tables 9.7 and 9.8. The title of each category is intended to be typical rather than restrictive. The number in parentheses preceding each category refers to the applicable column or row in the tables.

(1) *Control stations*

Spaces containing emergency sources of power and lighting.
Wheelhouse and chartroom.
Spaces containing the ship's radio equipment.
Fire control stations.
Control room for propulsion machinery when located outside the machinery space.
Spaces containing centralized fire alarm equipment.

(2) *Corridors*

Corridors and lobbies.

(3) *Accommodation spaces*

Spaces as defined in regulation 3.1, excluding corridors.

(4) *Stairways*

Interior stairways, lifts, totally enclosed emergency escape trunks, and escalators (other than those wholly contained within the machinery spaces) and enclosures thereto.

In this connection, a stairway which is enclosed only at one level shall be regarded as part of the space from which it is not separated by a fire door.

(5) *Service spaces (low risk)*

Lockers and store-rooms not having provisions for the storage of flammable liquids and having areas less than 4 m² and drying rooms and laundries.

(6) *Machinery spaces of category A*

Spaces as defined in regulation 3.31.

(7) *Other machinery spaces*

Electrical equipment rooms (auto-telephone exchange and air-conditioning duct spaces).

Spaces as defined in regulation 3.30, excluding machinery spaces of category A.

(8) *Cargo pump-rooms*

Spaces containing cargo pumps and entrances and trunks to such spaces.

(9) *Service spaces (high risk)*

Galleys, pantries containing cooking appliances, saunas, paint lockers and store-rooms having areas of 4 m² or more, spaces for the storage of flammable liquids and workshops other than those forming part of the machinery spaces.

(10) *Open decks*

Open deck spaces and enclosed promenades having little or no fire risk. To be considered in this category, enclosed promenades shall have no significant fire risk, meaning that furnishings shall be restricted to deck furniture. In addition, such spaces shall be naturally ventilated by permanent openings.

Air spaces (the space outside superstructures and deckhouses).

2.4.2.3 Continuous "B" class ceilings or linings, in association with the relevant decks or bulkheads, may be accepted as contributing, wholly or in part, to the required insulation and integrity of a division.

2.4.2.4 External boundaries which are required in regulation 11.2 to be of steel or other equivalent material may be pierced for the fitting of windows and sidescuttles provided that there

Notes: To be applied to tables 9.7 and 9.8 as appropriate.

- a For clarification as to which applies, see paragraphs 2.3.2 and 2.3.4.
 - b Where spaces are of the same numerical category and superscript b appears, a bulkhead or deck of the rating shown in the tables is only required when the adjacent spaces are for a different purpose (e.g. in category (9)). A galley next to a galley does not require a bulkhead but a galley next to a paint room requires an "A-0" bulkhead.
 - c Bulkheads separating the wheelhouse, chartroom and radio room from each other may have a "B-0" rating.
 - d Bulkheads and decks between cargo pump-rooms and machinery spaces of category A may be penetrated by cargo pump shaft glands and similar gland penetrations, provided that gastight seals with efficient lubrication or other means of ensuring the permanence of the gas seal are fitted in way of the bulkheads or deck.
 - e Fire insulation need not be fitted in the machinery space in category (7) if, in the opinion of the Administration, it has little or no fire risk.
-

* Where an asterisk appears in the table, the division is required to be of steel or other equivalent material, but is not required to be of "A" class standard. However, where a deck, except an open deck, is penetrated for the passage of electric cables, pipes and vent ducts, such penetrations shall be made tight to prevent the passage of flame and smoke. Divisions between control stations (emergency generators) and open decks may have air intake openings without means for closure, unless a fixed gas fire-extinguishing system is fitted.

3 Penetration in fire-resisting divisions and prevention of heat transmission

3.1 Where "A" class divisions are penetrated, such penetrations shall be tested in accordance with the Fire Test Procedures Code, subject to the provisions of paragraph 4.1.1.5. In the case of ventilation ducts, paragraphs 7.1.2 and 7.3.1 apply. However, where a pipe penetration is made of steel or equivalent material having a thickness of 3 mm or greater and a length of not less than 900 mm (preferably 450 mm on each side of the division), and no openings, testing is not required. Such penetrations shall be suitably insulated by extension of the insulation at the same level of the division.

3.2 Where "B" class divisions are penetrated for the passage of electric cables, pipes, trunks, ducts, etc., or for the fitting of ventilation terminals, lighting fixtures and similar devices, arrangements shall be made to ensure that the fire resistance is not impaired, subject to the provisions of paragraph 7.3.2. Pipes other than steel or copper that penetrate "B" class divisions shall be protected by either:

- .1 a fire tested penetration device suitable for the fire resistance of the division pierced and the type of pipe used; or
- .2 a steel sleeve, having a thickness of not less than 1.8 mm and a length of not less than 900 mm for pipe diameters of 150 mm or more and not less than 600 mm for pipe diameters of less than 150 mm (preferably equally divided to each side of the division). The pipe shall be connected to the ends of the sleeve by flanges or couplings; or the clearance between the sleeve and the pipe shall not exceed 2.5 mm; or any clearance between pipe and sleeve shall be made tight by means of non-combustible or other suitable material.

3.3 Uninsulated metallic pipes penetrating "A" or "B" class divisions shall be of materials having a melting temperature which exceeds 950°C for "A-0" and 850°C for "B-0" class divisions.

3.4 In approving structural fire protection details, the Administration shall have regard to the risk of heat transmission at intersections and terminal points of required thermal barriers. The insulation of a deck or bulkhead shall be carried past the penetration, intersection or terminal point for a distance of at least 450 mm in the case of steel and aluminium structures. If a space is divided with a deck or a bulkhead of "A" class standard having insulation of different values, the insulation with the higher value shall continue on the deck or bulkhead with the insulation of the lesser value for a distance of at least 450 mm.

4 Protection of openings in fire-resisting divisions

4.1 Openings in bulkheads and decks in passenger ships

4.1.1 Openings in "A" class divisions

4.1.1.1 Except for hatches between cargo, special category, store, and baggage spaces, and between such spaces and the weather decks, openings shall be provided with permanently attached means of closing which shall be at least as effective for resisting fires as the divisions in which they are fitted.

4.1.1.2 The construction of doors and door frames in "A" class divisions, with the means of securing them when closed, shall provide resistance to fire as well as to the passage of smoke and flame equivalent to that of the bulkheads in which the doors are situated, this being determined in accordance with the Fire Test Procedures Code. Such doors and door frames shall be constructed of steel or other equivalent material. Watertight doors need not be insulated.

4.1.1.3 It shall be possible for each door to be opened and closed from each side of the bulkhead by one person only.

4.1.1.4 Fire doors in main vertical zone bulkheads, galley boundaries and stairway enclosures other than power-operated watertight doors and those which are normally locked, shall satisfy the following requirements:

- .1 the doors shall be self-closing and be capable of closing with an angle of inclination of up to 3.5° opposing closure;
- .2 the approximate time of closure for hinged fire doors shall be no more than 40 s and no less than 10 s from the beginning of their movement with the ship in upright position. The approximate uniform rate of closure for sliding doors shall be of no more than 0.2 m/s and no less than 0.1 m/s with the ship in upright position;
- .3 the doors, except those for emergency escape trunks, shall be capable of remote release from the continuously manned central control station, either simultaneously or in groups and shall be capable of release also individually from a position at both sides of the door. Release switches shall have an on-off function to prevent automatic resetting of the system;
- .4 hold-back hooks not subject to central control station release are prohibited;

- .5 a door closed remotely from the central control station shall be capable of being re-opened from both sides of the door by local control. After such local opening, the door shall automatically close again;
- .6 indication shall be provided at the fire door indicator panel in the continuously manned central control station whether each door is closed;
- .7 the release mechanism shall be so designed that the door will automatically close in the event of disruption of the control system or central power supply;
- .8 local power accumulators for power-operated doors shall be provided in the immediate vicinity of the doors to enable the doors to be operated after disruption of the control system or central power supply at least ten times (fully opened and closed) using the local controls;
- .9 disruption of the control system or central power supply at one door shall not impair the safe functioning of the other doors;
- .10 remote-released sliding or power-operated doors shall be equipped with an alarm that sounds at least 5 s but no more than 10 s, after the door being released from the central control station and before the door begins to move and continues sounding until the door is completely closed;
- .11 a door designed to re-open upon contacting an object in its path shall re-open not more than 1 m from the point of contact;
- .12 double-leaf doors equipped with a latch necessary for their fire integrity shall have a latch that is automatically activated by the operation of the doors when released by the system;
- .13 doors giving direct access to special category spaces which are power-operated and automatically closed need not be equipped with the alarms and remote-release mechanisms required in paragraphs 4.1.1.4.3 and 4.1.1.4.10;
- .14 the components of the local control system shall be accessible for maintenance and adjusting;
- .15 power-operated doors shall be provided with a control system of an approved type which shall be able to operate in case of fire and be in accordance with the Fire Test Procedures Code. This system shall satisfy the following requirements:
 - .15.1 the control system shall be able to operate the door at the temperature of at least 200°C for at least 60 min, served by the power supply;
 - .15.2 the power supply for all other doors not subject to fire shall not be impaired; and
 - .15.3 at temperatures exceeding 200°C the control system shall be automatically isolated from the power supply and shall be capable of keeping the door closed up to at least 945°C.

4.1.1.5 In ships carrying not more than 36 passengers, where a space is protected by an automatic sprinkler fire detection and fire alarm system complying with the provisions the Fire Safety Systems Code or fitted with a continuous "B" class ceiling, openings in decks not forming steps in main vertical zones nor bounding horizontal zones shall be closed reasonably tight and such decks shall meet the "A" class integrity requirements in so far as is reasonable and practicable in the opinion of the Administration.

4.1.1.6 The requirements for "A" class integrity of the outer boundaries of a ship shall not apply to glass partitions, windows and sidescuttles, provided that there is no requirement for such boundaries to have "A" class integrity in paragraph 4.1.3.3. The requirements for "A" class integrity of the outer boundaries of the ship shall not apply to exterior doors, except for those in superstructures and deckhouses facing life-saving appliances, embarkation and external assembly station areas, external stairs and open decks used for escape routes. Stairway enclosure doors need not meet this requirement.

4.1.1.7 Except for watertight doors, weathertight doors (semi-watertight doors), doors leading to the open deck and doors which need to be reasonably gastight, all "A" class doors located in stairways, public spaces and main vertical zone bulkheads in escape routes shall be equipped with a self-closing hose port. The material, construction and fire resistance of the hose port shall be equivalent to the door into which it is fitted, and shall be a 150 mm square clear opening with the door closed and shall be inset into the lower edge of the door, opposite the door hinges or, in the case of sliding doors, nearest the opening.

4.1.1.8 Where it is necessary that a ventilation duct passes through a main vertical zone division, a fail-safe automatic closing fire damper shall be fitted adjacent to the division. The damper shall also be capable of being manually closed from each side of the division. The operating position shall be readily accessible and be marked in red light-reflecting colour. The duct between the division and the damper shall be of steel or other equivalent material and, if necessary, insulated to comply with the requirements of paragraph 3.1. The damper shall be fitted on at least one side of the division with a visible indicator showing whether the damper is in the open position.

4.1.2 *Openings in "B" class divisions*

4.1.2.1 Doors and door frames in "B" class divisions and means of securing them shall provide a method of closure which shall have resistance to fire equivalent to that of the divisions, this being determined in accordance with the Fire Test Procedure Code except that ventilation openings may be permitted in the lower portion of such doors. Where such opening is in or under a door, the total net area of any such opening or openings shall not exceed 0.05 m². Alternatively, a non-combustible air balance duct routed between the cabin and the corridor, and located below the sanitary unit is permitted where the cross-sectional area of the duct does not exceed 0.05 m². All ventilation openings shall be fitted with a grill made of non-combustible material. Doors shall be non-combustible.

4.1.2.2 Cabin doors in "B" class divisions shall be of a self-closing type. Hold-back hooks are not permitted.

4.1.2.3 The requirements for "B" class integrity of the outer boundaries of a ship shall not apply to glass partitions, windows and sidescuttles. Similarly, the requirements for "B" class integrity shall not apply to exterior doors in superstructures and deckhouses. For ships carrying not more than 36 passengers, the Administration may permit the use of combustible materials in doors separating cabins from the individual interior sanitary spaces such as showers.

4.1.2.4 In ships carrying not more than 36 passengers, where an automatic sprinkler system complying with the provisions of the Fire Safety Systems Code is fitted:

- .1 openings in decks not forming steps in main vertical zones nor bounding horizontal zones shall be closed reasonably tight and such decks shall meet the "B" class integrity requirements in so far as is reasonable and practicable in the opinion of the Administration; and
- .2 openings in corridor bulkheads of "B" class materials shall be protected in accordance with the provisions of paragraph 2.2.2.

4.1.3 *Windows and sidescuttles*

4.1.3.1 Windows and sidescuttles in bulkheads within accommodation and service spaces and control stations other than those to which the provisions of paragraph 4.1.1.6 and of paragraph 4.1.2.3 apply, shall be so constructed as to preserve the integrity requirements of the type of bulkheads in which they are fitted, this being determined in accordance with the Fire Test Procedures Code.

4.1.3.2 Notwithstanding the requirements of tables 9.1 to 9.4, windows and sidescuttles in bulkheads separating accommodation and service spaces and control stations from weather shall be constructed with frames of steel or other suitable material. The glass shall be retained by a metal glazing bead or angle.

4.1.3.3 Windows facing life-saving appliances, embarkation and assembly stations, external stairs and open decks used for escape routes, and windows situated below liferaft and escape slide embarkation areas shall have fire integrity as required in table 9.1. Where automatic dedicated sprinkler heads are provided for windows, "A-0" windows may be accepted as equivalent. To be considered under this paragraph, the sprinkler heads shall either be:

- .1 dedicated heads located above the windows, and installed in addition to the conventional ceiling sprinklers; or
- .2 conventional ceiling sprinkler heads arranged such that the window is protected by an average application rate of at least 5 l/m² and the additional window area is included in the calculation of the area of coverage.

Windows located in the ship's side below the lifeboat embarkation area shall have fire integrity at least equal to "A-0" class.

4.2 *Doors in fire-resisting divisions in cargo ships*

4.2.1 The fire resistance of doors shall be equivalent to that of the division in which they are fitted, this being determined in accordance with the Fire Test Procedures Code. Doors and door frames in "A" class divisions shall be constructed of steel. Doors in "B" class divisions shall be non-combustible. Doors fitted in boundary bulkheads of machinery spaces of category A shall be reasonably gastight and self-closing. In ships constructed according to method IC, the Administration may permit the use of combustible materials in doors separating cabins from individual interior sanitary accommodation such as showers.

4.2.2 Doors required to be self-closing shall not be fitted with hold-back hooks. However, hold-back arrangements fitted with remote release devices of the fail-safe type may be utilized.

4.2.3 In corridor bulkheads, ventilation openings may be permitted in and under the doors of cabins and public spaces. Ventilation openings are also permitted in "B" class doors leading to lavatories, offices, pantries, lockers and store-rooms. Except as permitted below, the openings shall be provided only in the lower half of a door. Where such an opening is in or under a door, the total net area of any such opening or openings shall not exceed 0.05 m². Alternatively, a non-combustible air balance duct routed between the cabin and the corridor, and located below the sanitary unit is permitted where the cross-sectional area of the duct does not exceed 0.05 m². Ventilation openings, except those under the door, shall be fitted with a grill made of non-combustible material.

4.2.4 Watertight doors need not be insulated.

5 Protection of openings in machinery spaces boundaries

5.1 Application

5.1.1 The provision of this paragraph shall apply to machinery spaces of category A and, where the Administration considers it desirable, to other machinery spaces.

5.2 Protection of openings in machinery space boundaries

5.2.1 The number of skylights, doors, ventilators, openings in funnels to permit exhaust ventilation and other openings to machinery spaces shall be reduced to a minimum consistent with the needs of ventilation and the proper and safe working of the ship.

5.2.2 Skylights shall be of steel and shall not contain glass panels.

5.2.3 Means of control shall be provided for closing power-operated doors or actuating release mechanisms on doors other than power-operated watertight doors. The control shall be located outside the space concerned, where they will not be cut off in the event of fire in the space it serves.

5.2.4 In passenger ships, the means of control required in paragraph 5.2.3 shall be situated at one control position or grouped in as few positions as possible to the satisfaction of the Administration. Such positions shall have safe access from the open deck.

5.2.5 In passenger ships, doors, other than power-operated watertight doors, shall be so arranged that positive closure is assured in case of fire in the space by power-operated closing arrangements or by the provision of self-closing doors capable of closing against an inclination of 3.5° opposing closure, and having a fail-safe hold-back arrangement, provided with a remotely operated release device. Doors for emergency escape trunks need not be fitted with a fail-safe hold-back facility and a remotely operated release device.

5.2.6 Windows shall not be fitted in machinery space boundaries. However, this does not preclude the use of glass in control rooms within the machinery spaces.

6 Protection of cargo space boundaries

6.1 In passenger ships carrying more than 36 passengers, the boundary bulkheads and decks of special category and ro-ro spaces shall be insulated to "A-60" class standard. However, where a category (5), (9) and (10) space, as defined in paragraph 2.2.3, is on one side of the division the standard may be reduced to "A-0". Where fuel oil tanks are below a special category space, the integrity of the deck between such spaces may be reduced to "A-0" standard.

6.2 In passenger ships carrying not more than 36 passengers, the boundary bulkheads of special category spaces shall be insulated as required for category (11) spaces in table 9.3 and the horizontal boundaries as required for category (11) spaces in table 9.4.

6.3 In passenger ships carrying not more than 36 passengers the boundary bulkheads and decks of closed and open ro-ro spaces shall have a fire integrity as required for category (8) spaces in table 9.3 and the horizontal boundaries as required for category (8) spaces in table 9.4.

6.4 In passenger ships, indicators shall be provided on the navigation bridge which shall indicate when any fire door leading to or from the special category spaces is closed.

6.5 In tankers, for the protection of cargo tanks carrying crude oil and petroleum products having a flashpoint not exceeding 60°C, materials readily rendered ineffective by heat shall not be used for valves, fittings, tank opening covers, cargo vent piping, and cargo piping so as to prevent the spread of fire to the cargo.

7 Ventilation systems

7.1 *Duct and dampers*

7.1.1 Ventilation ducts shall be of non-combustible material. However, short ducts, not generally exceeding 2 m in length and with a free cross-sectional area not exceeding 0.02 m², need not be non-combustible subject to the following conditions:

- .1 the ducts are made of a material which has low flame-spread characteristics;
- .2 the ducts are only used at the end of the ventilation device; and
- .3 the ducts are not situated less than 600 mm, measured along the duct, from an opening in an "A" or "B" class division including continuous "B" class ceiling.

7.1.2 The following arrangements shall be tested in accordance with the Fire Test Procedures Code:

- .1 fire dampers, including their relevant means of operation; and
- .2 duct penetrations through "A" class divisions. However, the test is not required where steel sleeves are directly joined to ventilation ducts by means of riveted or screwed flanges or by welding.

7.2 Arrangement of ducts

7.2.1 The ventilation systems for machinery spaces of category A, vehicle spaces, ro-ro spaces, galleys, special category spaces and cargo spaces shall, in general, be separated from each other and from the ventilation systems serving other spaces. Except that the galley ventilation systems on cargo ships of less than 4,000 gross tonnage and in passenger ships carrying not more than 36 passengers, need not be completely separated, but may be served by separate ducts from a ventilation unit serving other spaces. In any case, an automatic fire damper shall be fitted in the galley ventilation duct near the ventilation unit. Ducts provided for the ventilation of machinery spaces of category A, galleys, vehicle spaces, ro-ro spaces or special category spaces shall not pass through accommodation spaces, service spaces or control stations unless they comply with the conditions specified in paragraphs 7.2.1.1.1 to 7.2.1.1.4 or 7.2.1.2.1 and 7.2.1.2.2 below:

- .1.1 the ducts are constructed of steel having a thickness of at least 3 mm and 5 mm for ducts the widths or diameters of which are up to and including 300 mm and 760 mm and over respectively and, in the case of such ducts, the widths or diameters of which are between 300 mm and 760 mm having a thickness obtained by interpolation;
- .1.2 the ducts are suitably supported and stiffened;
- .1.3 the ducts are fitted with automatic fire dampers close to the boundaries penetrated; and
- .1.4 the ducts are insulated to "A-60" class standard from the machinery spaces, galleys, vehicle spaces, ro-ro spaces or special category spaces to a point at least 5 m beyond each fire damper;

or

- .2.1 the ducts are constructed of steel in accordance with paragraphs 7.2.1.1.1 and 7.2.1.1.2; and
- .2.2 the ducts are insulated to "A-60" class standard throughout the accommodation spaces, service spaces or control stations;

except that penetrations of main zone divisions shall also comply with the requirements of paragraph 4.1.1.8.

7.2.2 Ducts provided for ventilation to accommodation spaces, service spaces or control stations shall not pass through machinery spaces of category A, galleys, vehicle spaces, ro-ro spaces or special category spaces unless they comply with the conditions specified in paragraphs 7.2.2.1.1 to 7.2.2.1.3 or 7.2.2.2.1 and 7.2.2.2.2 below:

- .1.1 the ducts where they pass through a machinery space of category A, galley, vehicle space, ro-ro space or special category space are constructed of steel in accordance with paragraphs 7.2.1.1.1 and 7.2.1.1.2;
- .1.2 automatic fire dampers are fitted close to the boundaries penetrated; and
- .1.3 the integrity of the machinery space, galley, vehicle space, ro-ro space or special category space boundaries is maintained at the penetrations;

or

- .2.1 the ducts where they pass through a machinery space of category A, galley, vehicle space, ro-ro space or special category space are constructed of steel in accordance with paragraphs 7.2.1.1.1 and 7.2.1.1.2; and
- .2.2 the ducts are insulated to "A-60" standard within the machinery space, galley, vehicle space, ro-ro space or special category space;

except that penetrations of main zone divisions shall also comply with the requirements of paragraph 4.1.1.8.

7.3 *Details of duct penetrations*

7.3.1 Where a thin plated duct with a free cross-sectional area equal to, or less than, 0.02 m² passes through "A" class bulkheads or decks, the opening shall be lined with a steel sheet sleeve having a thickness of at least 3 mm and a length of at least 200 mm, divided preferably into 100 mm on each side of the bulkhead or, in the case of the deck, wholly laid on the lower side of the decks pierced. Where ventilation ducts with a free cross-sectional area exceeding 0.02 m² pass through "A" class bulkheads or decks, the opening shall be lined with a steel sheet sleeve. However, where such ducts are of steel construction and pass through a deck or bulkhead, the ducts and sleeves shall comply with the following:

- .1 the sleeves shall have a thickness of at least 3 mm and a length of at least 900 mm. When passing through bulkheads, this length shall be divided preferably into 450 mm on each side of the bulkhead. These ducts, or sleeves lining such ducts, shall be provided with fire insulation. The insulation shall have at least the same fire integrity as the bulkhead or deck through which the duct passes; and
- .2 ducts with a free cross-sectional area exceeding 0.075 m² shall be fitted with fire dampers in addition to the requirements of paragraph 7.3.1.1. The fire damper shall operate automatically, but shall also be capable of being closed manually from both sides of the bulkhead or deck. The damper shall be provided with an indicator which shows whether the damper is open or closed. Fire dampers are not required, however, where ducts pass through spaces surrounded by "A" class divisions, without serving those spaces, provided those ducts have the same fire integrity as the divisions which they pierce. Fire dampers shall be easily accessible. Where they are placed behind ceilings or linings, these ceilings or linings shall be provided with an inspection door on which a plate reporting the identification number of the fire damper is provided. The fire damper identification number shall also be placed on any remote controls required.

7.3.2 Ventilation ducts with a free cross-sectional area exceeding 0.02 m² passing through "B" class bulkheads shall be lined with steel sheet sleeves of 900 mm in length divided preferably into 450 mm on each side of the bulkheads unless the duct is of steel for this length.

7.4 *Ventilation systems for passenger ships carrying more than 36 passengers*

7.4.1 The ventilation system of a passenger ship carrying more than 36 passengers shall be in compliance with the following additional requirements.

7.4.2 In general, the ventilation fans shall be so disposed that the ducts reaching the various spaces remain within the main vertical zone.

7.4.3 Where ventilation systems penetrate decks, precautions shall be taken, in addition to those relating to the fire integrity of the deck required by paragraphs 3.1 and 4.1.1.5, to reduce the likelihood of smoke and hot gases passing from one 'tween-deck space to another through the system. In addition to insulation requirements contained in paragraph 7.4, vertical ducts shall, if necessary, be insulated as required by the appropriate tables 9.1 and 9.2.

7.4.4 Except in cargo spaces, ventilation ducts shall be constructed of the following materials:

- .1 ducts not less than 0.075 m^2 in free cross-sectional area and all vertical ducts serving more than a single 'tween-deck space shall be constructed of steel or other equivalent material;
- .2 ducts less than 0.075 m^2 in free cross-sectional area other than the vertical ducts referred to in paragraph 7.4.4.1, shall be constructed of non-combustible materials. Where such ducts penetrate "A" or "B" class division due regard shall be given to ensuring the fire integrity of the division; and
- .3 short length of duct, not in general exceeding 0.02 m^2 in free cross-sectional area nor 2 m in length, need not be non-combustible provided that all of the following conditions are met:
 - .3.1 the duct is constructed of a material which has low flame-spread characteristics;
 - .3.2 the duct is used only at the terminal end of the ventilation system; and
 - .3.3 the duct is not located closer than 600 mm measured along its length to a penetration of an "A" or "B" class division, including continuous "B" class ceilings.

7.4.5 Stairway enclosures shall be ventilated and served by an independent fan and duct system which shall not serve any other spaces in the ventilation systems.

7.4.6 Exhaust ducts shall be provided with hatches for inspection and cleaning. The hatches shall be located near the fire dampers.

7.5 *Exhaust ducts from galley ranges*

7.5.1 *Requirements for passenger ships carrying more than 36 passengers*

Exhaust ducts from galley ranges shall meet the requirements of paragraphs 7.2.1.2.1 and 7.2.1.2.2 and shall be fitted with:

- .1 a grease trap readily removable for cleaning unless an alternative approved grease removal system is fitted;
- .2 a fire damper located in the lower end of the duct which is automatically and remotely operated and, in addition, a remotely operated fire damper located in the upper end of the duct;

- .3 a fixed means for extinguishing a fire within the duct;
- .4 remote-control arrangements for shutting off the exhaust fans and supply fans, for operating the fire dampers mentioned in paragraph 7.5.1.2 and for operating the fire-extinguishing system, which shall be placed in a position close to the entrance to the galley. Where a multi-branch system is installed, a remote means located with the above controls shall be provided to close all branches exhausting through the same main duct before an extinguishing medium is released into the system; and
- .5 suitably located hatches for inspection and cleaning.

7.5.2 Requirements for cargo ships and passenger ships carrying not more than 36 passenger ships

7.5.2.1 Where they pass through accommodation spaces or spaces containing combustible materials, the exhaust ducts from galley ranges shall be constructed of "A" class divisions. Each exhaust duct shall be fitted with:

- .1 a grease trap readily removable for cleaning;
- .2 a fire damper located in the lower end of the duct;
- .3 arrangements, operable from within the galley, for shutting off the exhaust fans; and
- .4 fixed means for extinguishing a fire within the duct.

Regulation 10

Fire fighting

1 Purpose

The purpose of this regulation is to suppress and swiftly extinguish a fire in the space of origin. For this purpose, the following functional requirements shall be met:

- .1 fixed fire-extinguishing systems shall be installed having due regard to the fire growth potential of the protected spaces; and
- .2 fire-extinguishing appliances shall be readily available.

2 Water supply systems

Ships shall be provided with fire pumps, fire mains, hydrants and hoses complying with the applicable requirements of this regulation.

2.1 *Fire mains and hydrants*

2.1.1 *General*

Materials readily rendered ineffective by heat shall not be used for fire mains and hydrants unless adequately protected. The pipes and hydrants shall be so placed that the fire hoses may be easily coupled to them. The arrangement of pipes and hydrants shall be such as to avoid the possibility of freezing. Suitable drainage provisions shall be provided for fire main piping. Isolation valves shall be installed for all open deck fire main branches used for purposes other than fire fighting. In ships where deck cargo may be carried, the positions of the hydrants shall be such that they are always readily accessible and the pipes shall be arranged as far as practicable to avoid risk of damage by such cargo.

2.1.2 *Ready availability of water supply*

The arrangements for the ready availability of water supply shall be:

- .1 in passenger ships:
 - .1.1 of 1,000 gross tonnage and upwards such that at least one effective jet of water is immediately available from any hydrant in an interior location and so as to ensure the continuation of the output of water by the automatic starting of one required fire pump;
 - .1.2 of less than 1,000 gross tonnage by automatic start of at least one fire pump or by remote starting from the navigation bridge of at least one fire pump. If the pump starts automatically or if the bottom valve cannot be opened from where the pump is remotely started, the bottom valve shall always be kept open; and
 - .1.3 if fitted with periodically unattended machinery spaces in accordance with regulation II-1/54, the Administration shall determine provisions for fixed water fire-extinguishing arrangement for such spaces equivalent to those required for normally attended machinery spaces;
- .2 in cargo ships:
 - .2.1 to the satisfaction of the Administration; and
 - .2.2 with a periodically unattended machinery space or when only one person is required on watch, there shall be immediate water delivery from the fire main system at a suitable pressure, either by remote starting of one of the main fire pumps with remote starting from the navigation bridge and fire control station, if any, or permanent pressurization of the fire main system by one of the main fire pumps, except that the Administration may waive this requirement for cargo ships of less than 1,600 gross tonnage if the fire pump starting arrangement in the machinery space is in an easily accessible position.

2.1.3 *Diameter of fire mains*

The diameter of the fire main and water service pipes shall be sufficient for the effective distribution of the maximum required discharge from two fire pumps operating simultaneously, except that in the case of cargo ships the diameter need only be sufficient for the discharge of 140 m³/h.

2.1.4 *Isolating valves and relief valves*

2.1.4.1 Isolating valves to separate the section of the fire main within the machinery space containing the main fire pump or pumps from the rest of the fire main shall be fitted in an easily accessible and tenable position outside the machinery spaces. The fire main shall be so arranged that when the isolating valves are shut all the hydrants on the ship, except those in the machinery space referred to above, can be supplied with water by another fire pump or an emergency fire pump. The emergency fire pump, its seawater inlet, and suction and delivery pipes and isolating valves shall be located outside the machinery space. If this arrangement cannot be made, the sea-chest may be fitted in the machinery space if the valve is remotely controlled from a position in the same compartment as the emergency fire pump and the suction pipe is as short as practicable. Short lengths of suction or discharge piping may penetrate the machinery space, provided they are enclosed in a substantial steel casing, or are insulated to “A-60” class standards. The pipes shall have substantial wall thickness, but in no case less than 11 mm, and shall be welded except for the flanged connection to the sea inlet valve.

2.1.4.2 A valve shall be fitted to serve each fire hydrant so that any fire hose may be removed while the fire pumps are in operation.

2.1.4.3 Relief valves shall be provided in conjunction with fire pumps if the pumps are capable of developing a pressure exceeding the design pressure of the water service pipes, hydrants and hoses. These valves shall be so placed and adjusted as to prevent excessive pressure in any part of the fire main system.

2.1.4.4 In tankers, isolation valves shall be fitted in the fire main at poop front in a protected position and on the tank deck at intervals of not more than 40 m to preserve the integrity of the fire main system in case of fire or explosion.

2.1.5 *Number and position of hydrants*

2.1.5.1 The number and position of hydrants shall be such that at least two jets of water not emanating from the same hydrant, one of which shall be from a single length of hose, may reach any part of the ship normally accessible to the passengers or crew while the ship is being navigated and any part of any cargo space when empty, any ro-ro space or any vehicle space in which latter case the two jets shall reach any part of the space, each from a single length of hose. Furthermore, such hydrants shall be positioned near the accesses to the protected spaces.

2.1.5.2 In addition to the requirements in the paragraph 2.1.5.1, passenger ships shall comply with the following:

- .1 in the accommodation, service and machinery spaces, the number and position of hydrants shall be such that the requirements of paragraph 2.1.5.1 may be complied with when all watertight doors and all doors in main vertical zone bulkheads are closed; and

- .2 where access is provided to a machinery space of category A at a low level from an adjacent shaft tunnel, two hydrants shall be provided external to, but near the entrance to that machinery space. Where such access is provided from other spaces, in one of those spaces two hydrants shall be provided near the entrance to the machinery space of category A. Such provision need not be made where the tunnel or adjacent spaces are not part of the escape route.

2.1.6 *Pressure at hydrants*

With the two pumps simultaneously delivering water through the nozzles specified in paragraph 2.3.3, with the quantity of water as specified in paragraph 2.1.3, through any adjacent hydrants, the following minimum pressures shall be maintained at all hydrants:

- .1 for passenger ships:
- | | |
|---------------------------------|--------------------------|
| 4,000 gross tonnage and upwards | 0.40 N/mm ² |
| less than 4,000 gross tonnage | 0.30 N/mm ² ; |
- .2 for cargo ships:
- | | |
|---------------------------------|------------------------------|
| 6,000 gross tonnage and upwards | 0.27 N/mm ² |
| less than 6,000 gross tonnage | 0.25 N/mm ² ; and |
- .3 the maximum pressure at any hydrant shall not exceed that at which the effective control of a fire hose can be demonstrated.

2.1.7 *International shore connection*

2.1.7.1 Ships of 500 gross tonnage and upwards shall be provided with at least one international shore connection complying with the Fire Safety Systems Code.

2.1.7.2 Facilities shall be available enabling such a connection to be used on either side of the ship.

2.2 *Fire pumps*

2.2.1 *Pumps accepted as fire pumps*

Sanitary, ballast, bilge or general service pumps may be accepted as fire pumps, provided that they are not normally used for pumping oil and that, if they are subject to occasional duty for the transfer or pumping of oil fuel, suitable change-over arrangements are fitted.

2.2.2 *Number of fire pumps*

Ships shall be provided with independently driven fire pumps as follows:

- .1 in passenger ships of:
- | | |
|---------------------------------|----------------|
| 4,000 gross tonnage and upwards | at least three |
| less than 4,000 gross tonnage | at least two |

.2 in cargo ships of:

1,000 gross tonnage and upwards	at least two
less than 1,000 gross tonnage	at least two power driven pumps, one of which shall be independently driven.

2.2.3 *Arrangement of fire pumps and fire mains*

2.2.3.1 *Fire pumps*

The arrangement of sea connections, fire pumps and their sources of power shall be as to ensure that:

- .1 in passenger ships of 1,000 gross tonnage and upwards, in the event of a fire in any one compartment all the fire pumps will not be put out of action; and
- .2 in passenger ships of less than 1,000 gross tonnage and in cargo ships, if a fire in any one compartment could put all the pumps out of action, there shall be an alternative means consisting of an emergency fire pump complying with the provisions of the Fire Safety Systems Code with its source of power and sea connection located outside the space where the main fire pumps or their sources of power are located.

2.2.3.2 *Requirements for the space containing the emergency fire pump*

2.2.3.2.1 *Location of the space*

The space containing the fire pump shall not be contiguous to the boundaries of machinery spaces of category A or those spaces containing main fire pumps. Where this is not practicable, the common bulkhead between the two spaces shall be insulated to a standard of structural fire protection equivalent to that required for a control station.

2.2.3.2.2 *Access to the emergency fire pump*

No direct access shall be permitted between the machinery space and the space containing the emergency fire pump and its source of power. When this is impracticable, the Administration may accept an arrangement where the access is by means of an airlock with the door of the machinery space being of "A-60" class standard, and the other door being at least steel, both reasonably gastight, self-closing and without any hold back arrangements. Alternatively, the access may be through a watertight door capable of being operated from a space remote from the machinery space and the space containing the emergency fire pump and unlikely to be cut off in the event of fire in those spaces. In such cases, a second means of access to the space containing the emergency fire pump and its source of power shall be provided.

2.2.3.2.3 *Ventilation of the emergency fire pump space*

Ventilation arrangements to the space containing the independent source of power for the emergency fire pump shall be such as to preclude, as far as practicable, the possibility of smoke from a machinery space fire entering or being drawn into that space.

2.2.3.3 *Additional pumps for cargo ships*

In addition, in cargo ships where other pumps, such as general service, bilge and ballast, etc., are fitted in a machinery space, arrangements shall be made to ensure that at least one of these pumps, having the capacity and pressure required by paragraphs 2.1.6.2 and 2.2.4.2, is capable of providing water to the fire main.

2.2.4 *Capacity of fire pumps*

2.2.4.1 *Total capacity of required fire pumps*

The required fire pumps shall be capable of delivering for fire-fighting purposes a quantity of water, at the pressure specified in paragraph 2.1.6, as follows:

- .1 pumps in passenger ships, the quantity of water is not less than two thirds of the quantity required to be dealt with by the bilge pumps when employed for bilge pumping; and
- .2 pumps in cargo ships, other than any emergency pump, the quantity of water is not less than four thirds of the quantity required under regulation II-1/21 to be dealt with by each of the independent bilge pumps in a passenger ship of the same dimension when employed in bilge pumping, provided that in no cargo ship need the total required capacity of the fire pumps exceed 180 m³/h.

2.2.4.2 *Capacity of each fire pump*

Each of the required fire pumps (other than any emergency pump required in paragraph 2.2.3.1.2 for cargo ships) shall have a capacity not less than 80% of the total required capacity divided by the minimum number of required fire pumps but in any case not less than 25 m³/h and each such pump shall in any event be capable of delivering at least the two required jets of water. These fire pumps shall be capable of supplying the fire main system under the required conditions. Where more pumps than the minimum of required pumps are installed, such additional pumps shall have a capacity of at least 25 m³/h and shall be capable of delivering at least the two jets of water required in paragraph 2.1.5.1.

2.3 *Fire hoses and nozzles*

2.3.1 *General specifications*

2.3.1.1 Fire hoses shall be of non-perishable material approved by the Administration and shall be sufficient in length to project a jet of water to any of the spaces in which they may be required to be used. Each hose shall be provided with a nozzle and the necessary couplings. Hoses specified in this chapter as "fire hoses" shall, together with any necessary fittings and tools, be kept ready for use in conspicuous positions near the water service hydrants or connections. Additionally, in interior locations in passenger ships carrying more than 36 passengers fire hoses shall be connected to the hydrants at all times. Fire hoses shall have a length of at least 10 m, but not more than:

- .1 15 m in machinery spaces;
- .2 20 m in other spaces and open decks; and

.3 25 m for open decks on ships with a maximum breadth in excess of 30 m.

2.3.1.2 Unless one hose and nozzle is provided for each hydrant in the ship, there shall be complete interchangeability of hose couplings and nozzles.

2.3.2 *Number and diameter of fire hoses*

2.3.2.1 Ships shall be provided with fire hoses the number and diameter of which shall be to the satisfaction of the Administration.

2.3.2.2 In passenger ships, there shall be at least one fire hose for each of the hydrants required by paragraph 2.1.5 and these hoses shall be used only for the purposes of extinguishing fires or testing the fire-extinguishing apparatus at fire drills and surveys.

2.3.2.3 In cargo ships:

- .1 of 1,000 gross tonnage and upwards, the number of fire hoses to be provided shall be one for each 30 m length of the ship and one spare, but in no case less than five in all. This number does not include any hoses required in any engine or boiler room. The Administration may increase the number of hoses required so as to ensure that hoses in sufficient number are available and accessible at all times, having regard to the type of ship and the nature of trade in which the ship is employed. Ships carrying dangerous goods in accordance with regulation 19 shall be provided with three hoses and nozzles, in addition to those required above; and
- .2 of less than 1,000 gross tonnage, the number of fire hoses to be provided shall be calculated in accordance with the provisions of paragraph 2.3.2.3.1. However, the number of hoses shall in no case be less than three.

2.3.3 *Size and types of nozzles*

2.3.3.1 For the purposes of this chapter, standard nozzle sizes shall be 12 mm, 16 mm and 19 mm or as near thereto as possible. Larger diameter nozzles may be permitted at the discretion of the Administration.

2.3.3.2 For accommodation and service spaces, a nozzle size greater than 12 mm need not be used.

2.3.3.3 For machinery spaces and exterior locations, the nozzle size shall be such as to obtain the maximum discharge possible from two jets at the pressure mentioned in paragraph 2.1.6 from the smallest pump, provided that a nozzle size greater than 19 mm need not be used.

2.3.3.4 Nozzles shall be of an approved dual-purpose type (i.e., spray/jet type) incorporating a shutoff.

3 Portable fire extinguishers

3.1 *Type and design*

Portable fire extinguishers shall comply with the requirements of the Fire Safety Systems Code.

3.2 *Arrangement of fire extinguishers*

3.2.1 Accommodation spaces, service spaces and control stations shall be provided with portable fire extinguishers of appropriate types and in sufficient number to the satisfaction of the Administration. Ships of 1,000 gross tonnage and upwards shall carry at least five portable fire extinguishers.

3.2.2 One of the portable fire extinguishers intended for use in any space shall be stowed near the entrance to that space.

3.2.3 Carbon dioxide fire extinguishers shall not be placed in accommodation spaces. In control stations and other spaces containing electrical or electronic equipment or appliances necessary for the safety of the ship, fire extinguishers shall be provided whose extinguishing media are neither electrically conductive nor harmful to the equipment and appliances.

3.2.4 Fire extinguishers shall be situated ready for use at easily visible places, which can be reached quickly and easily at any time in the event of a fire, and in such a way that their serviceability is not impaired by the weather, vibration or other external factors. Portable fire extinguishers shall be provided with devices which indicate whether they have been used.

3.3 *Spare charges*

3.3.1 Spare charges shall be provided for 100% of the first ten extinguishers and 50% of the remaining fire extinguishers capable of being recharged on board. Not more than sixty total spare charges are required. Instructions for recharging shall be carried on board.

3.3.2 For fire extinguishers which cannot be recharged onboard, additional portable fire extinguishers of the same quantity, type, capacity and number as determined in paragraph 3.3.1 above shall be provided in lieu of spare charges.

4 **Fixed fire-extinguishing systems**

4.1 *Types of fixed fire-extinguishing systems*

4.1.1 A fixed fire-extinguishing system required by paragraph 5 below may be any of the following systems:

- .1 a fixed gas fire-extinguishing system complying with the provisions of the Fire Safety Systems Code;
- .2 a fixed high-expansion foam fire-extinguishing system complying with the provisions of the Fire Safety Systems Code; and
- .3 a fixed pressure water-spraying fire-extinguishing system complying with the provisions of the Fire Safety Systems Code.

4.1.2 Where a fixed fire-extinguishing system not required by this chapter is installed, it shall meet the requirements of the relevant regulations of this chapter and the Fire Safety Systems Code.

4.1.3 Fire-extinguishing systems using Halon 1211, 1301, and 2402 and perfluorocarbons shall be prohibited.

4.1.4 In general, the Administration shall not permit the use of steam as a fire-extinguishing medium in fixed fire-extinguishing systems. Where the use of steam is permitted by the Administration, it shall be used only in restricted areas as an addition to the required fire-extinguishing system and shall comply with the requirements of the Fire Safety System Code.

4.2 *Closing appliances for fixed gas fire-extinguishing systems*

Where a fixed gas fire-extinguishing system is used, openings which may admit air to, or allow gas to escape from, a protected space shall be capable of being closed from outside the protected space.

4.3 *Storage rooms of fire-extinguishing medium*

When the fire-extinguishing medium is stored outside a protected space, it shall be stored in a room which is located behind the forward collision bulkhead, and is used for no other purposes. Any entrance to such a storage room shall preferably be from the open deck and shall be independent of the protected space. If the storage space is located below deck, it shall be located no more than one deck below the open deck and shall be directly accessible by a stairway or ladder from the open deck. Spaces which are located below deck or spaces where access from the open deck is not provided, shall be fitted with a mechanical ventilation system designed to take exhaust air from the bottom of the space and shall be sized to provide at least 6 air changes per hour. Access doors shall open outwards, and bulkheads and decks including doors and other means of closing any opening therein, which form the boundaries between such rooms and adjacent enclosed spaces shall be gastight. For the purpose of the application of tables 9.1 to 9.8, such storage rooms shall be treated as fire control stations.

4.4 *Water pumps for other fire-extinguishing systems*

Pumps, other than those serving the fire main, required for the provision of water for fire-extinguishing systems required by this chapter, their sources of power and their controls shall be installed outside the space or spaces protected by such systems and shall be so arranged that a fire in the space or spaces protected will not put any such system out of action.

5 Fire-extinguishing arrangements in machinery spaces

5.1 *Machinery spaces containing oil-fired boilers or oil fuel units*

5.1.1 *Fixed fire-extinguishing systems*

Machinery spaces of category A containing oil-fired boilers or oil fuel units shall be provided with any one of the fixed fire-extinguishing systems in paragraph 4.1. In each case, if the engine and boiler rooms are not entirely separate, or if fuel oil can drain from the boiler room into the engine-room, the combined engine and boiler rooms shall be considered as one compartment.

5.1.2 *Additional fire-extinguishing arrangements*

5.1.2.1 There shall be in each boiler room or at an entrance outside of the boiler room at least one portable foam applicator unit complying with the provisions of the Fire Safety Systems Code.

5.1.2.2 There shall be at least two portable foam extinguishers or equivalent in each firing space in each boiler room and in each space in which a part of the oil fuel installation is situated. There shall be not less than one approved foam-type extinguisher of at least 135 l capacity or equivalent in each boiler room. These extinguishers shall be provided with hoses on reels suitable for reaching any part of the boiler room. In the case of domestic boilers of less than 175 kW an approved foam-type extinguisher of at least 135 l capacity is not required.

5.1.2.3 In each firing space there shall be a receptacle containing at least 0.1 m³ sand, sawdust impregnated with soda, or other approved dry material, along with a suitable shovel for spreading the material. An approved portable extinguisher may be substituted as an alternative.

5.2 *Machinery spaces containing internal combustion machinery*

5.2.1 *Fixed fire-extinguishing systems*

Machinery spaces of category A containing internal combustion machinery shall be provided with one of the fixed fire-extinguishing systems in paragraph 4.1.

5.2.2 *Additional fire-extinguishing arrangements*

5.2.2.1 There shall be at least one portable foam applicator unit complying with the provisions of the Fire Safety Systems Code.

5.2.2.2 There shall be in each such space approved foam-type fire extinguishers, each of at least 45 l capacity or equivalent, sufficient in number to enable foam or its equivalent to be directed on to any part of the fuel and lubricating oil pressure systems, gearing and other fire hazards. In addition, there shall be provided a sufficient number of portable foam extinguishers or equivalent which shall be so located that no point in the space is more than 10 m walking distance from an extinguisher and that there are at least two such extinguishers in each such space. For smaller spaces of cargo ships the Administration may consider relaxing this requirement.

5.3 *Machinery spaces containing steam turbines or enclosed steam engines*

5.3.1 *Fixed fire-extinguishing systems*

In spaces containing steam turbines or enclosed steam engines used for main propulsion or other purposes having in the aggregate a total power output of not less than 375 kW, one of the fire-extinguishing systems specified in paragraph 4.1 shall be provided if such spaces are periodically unattended.

5.3.2 *Additional fire-extinguishing arrangements*

5.3.2.1 There shall be approved foam fire extinguishers each of at least 45 l capacity or equivalent sufficient in number to enable foam or its equivalent to be directed on to any part of the pressure lubrication system, on to any part of the casings enclosing pressure lubricated parts of the turbines, engines or associated gearing, and any other fire hazards. However, such extinguishers shall not be required if protection, at least equivalent to that required by this subparagraph, is provided in such spaces by a fixed fire-extinguishing system fitted in compliance with paragraph 4.1.

5.3.2.2 There shall be a sufficient number of portable foam extinguishers or equivalent which shall be so located that no point in the space is more than 10 m walking distance from an extinguisher and that there are at least two such extinguishers in each such space, except that such extinguishers shall not be required in addition to any provided in compliance with paragraph 5.1.2.2.

5.4 *Other machinery spaces*

Where, in the opinion of the Administration, a fire hazard exists in any machinery space for which no specific provisions for fire-extinguishing appliances are prescribed in paragraphs 5.1, 5.2 and 5.3, there shall be provided in, or adjacent to, that space such a number of approved portable fire extinguishers or other means of fire extinction as the Administration may deem sufficient.

5.5 *Additional requirements for passenger ships*

In passenger ships carrying more than 36 passengers, each machinery space of category A shall be provided with at least two suitable water fog applicators.

5.6 *Fixed local application fire-extinguishing systems*

5.6.1 Paragraph 5.6 shall apply to passenger ships of 500 gross tonnage and above and cargo ships of 2000 gross tonnage and above.

5.6.2 Machinery spaces of category A above 500 m³ in volume shall, in addition to the fixed fire-extinguishing system required in paragraph 5.1.1, be protected by an approved type of fixed water-based or equivalent local application fire-extinguishing system, based on the guidelines developed by the Organization. In the case of periodically unattended machinery spaces, the fire-extinguishing system shall have both automatic and manual release capabilities. In the case of continuously manned machinery spaces, the fire-extinguishing system is only required to have a manual release capability.

5.6.3 Fixed local application fire-extinguishing systems are to protect areas such as the following without the necessity of engine shutdown, personnel evacuation, or sealing of the spaces:

- .1 the fire hazard portions of internal combustion machinery used for the ship's main propulsion and power generation;
- .2 boiler fronts;
- .3 the fire hazard portions of incinerators; and
- .4 purifiers for heated fuel oil.

5.6.4 Activation of any local application system shall give a visual and distinct audible alarm in the protected space and at continuously manned stations. The alarm shall indicate the specific system activated. The system alarm requirements described within this paragraph are in addition to, and not a substitute for, the detection and fire alarm system required elsewhere in this chapter.

6 Fire-extinguishing arrangements in control stations, accommodation and service spaces

6.1 *Sprinkler systems in passenger ships*

6.1.1 Passenger ships carrying more than 36 passengers shall be equipped with an automatic sprinkler, fire detection and fire alarm system of an approved type complying with the requirements of the Fire Safety Systems Code in all control stations, accommodation and service spaces, including corridors and stairways. Alternatively, control stations, where water may cause damage to essential equipment, may be fitted with an approved fixed fire-extinguishing system of another type. Spaces having little or no fire risk such as voids, public toilets, carbon dioxide rooms and similar spaces need not be fitted with an automatic sprinkler system.

6.1.2 In passenger ships carrying not more than 36 passengers, when a fixed smoke detection and fire alarm system complying with the provisions of the Fire Safety Systems Code is provided only in corridors, stairways and escape routes within accommodation spaces, an automatic sprinkler system shall be installed in accordance with regulation 7.5.3.2.

6.2 *Sprinkler systems for cargo ships*

In cargo ships in which method IIC specified in regulation 9.2.3.1.1.2 is adopted, an automatic sprinkler, fire detection and fire alarm system shall be fitted in accordance with the requirements in regulation 7.5.5.2.

6.3 *Spaces containing flammable liquid*

6.3.1 Paint lockers shall be protected by:

- .1 a carbon dioxide system, designed to give a minimum volume of free gas equal to 40% of the gross volume of the protected space;
- .2 a dry powder system, designed for at least 0.5 kg powder/m³;
- .3 a water spraying or sprinkler system, designed for 5 l/m² min. Water spraying systems may be connected to the fire main of the ship; or
- .4 a system providing equivalent protection, as determined by the Administration.

In all cases, the system shall be operable from outside the protected space.

6.3.2 Flammable liquid lockers shall be protected by an appropriate fire-extinguishing arrangement approved by the Administration.

6.3.3 For lockers of a deck area of less than 4 m², which do not give access to accommodation spaces, a portable carbon dioxide fire-extinguisher sized to provide a minimum volume of free gas equal to 40% of the gross volume of the space may be accepted in lieu of a fixed system. A discharge port shall be arranged in the locker to allow the discharge of the extinguisher without having to enter into the protected space. The required portable fire extinguisher shall be stowed adjacent to the port. Alternatively, a port or hose connection may be provided to facilitate the use of fire main water.

6.4 *Deep-fat cooking equipment*

Deep-fat cooking equipment shall be fitted with the following:

- .1 an automatic or manual fire-extinguishing system tested to an international standard acceptable to the Organization;
- .2 a primary and backup thermostat with an alarm to alert the operator in the event of failure of either thermostat;
- .3 arrangements for automatically shutting off the electrical power upon activation of the fire-extinguishing system;
- .4 an alarm for indicating operation of the fire-extinguishing system in the galley where the equipment is installed; and
- .5 controls for manual operation of the fire-extinguishing system which are clearly labelled for ready use by the crew.

7 **Fire-extinguishing arrangements in cargo spaces**

7.1 *Fixed gas fire-extinguishing systems for general cargo*

7.1.1 Except as provided for in paragraph 7.2, the cargo spaces of passenger ships of 1,000 gross tonnage and upwards shall be protected by a fixed carbon dioxide or inert gas fire-extinguishing system complying with the provisions of the Fire Safety Systems Code or by a fixed high-expansion foam fire-extinguishing system which gives equivalent protection.

7.1.2 Where it is shown to the satisfaction of the Administration that a passenger ship is engaged on voyages of such short duration that it would be unreasonable to apply the requirements of paragraph 7.1.1 and also in ships of less than 1,000 gross tonnage, the arrangements in cargo spaces shall be to the satisfaction of the Administration, provided that the ship is fitted with steel hatch covers and effective means of closing all ventilators and other openings leading to the cargo spaces.

7.1.3 Except for ro-ro and vehicle spaces, cargo spaces on cargo ships of 2,000 gross tonnage and upwards shall be protected by a fixed carbon dioxide or inert gas fire-extinguishing system complying with the provisions of the Fire Safety Systems Code, or by a fire-extinguishing system which gives equivalent protection.

7.1.4 The Administration may exempt from the requirements of paragraphs 7.1.3 and 7.2 cargo spaces of any cargo ship if constructed, and solely intended, for the carriage of ore, coal, grain, unseasoned timber, non-combustible cargoes or cargoes which, in the opinion of the Administration, constitute a low fire risk. Such exemptions may be granted only if the ship is fitted with steel hatch covers and effective means of closing all ventilators and other openings leading to the cargo spaces. When such exemptions are granted, the Administration shall issue an Exemption Certificate, irrespective of the date of construction of the ship concerned, in accordance with regulation I/12(a)(vi), and shall ensure that the list of cargoes the ship is permitted to carry is attached to the Exemption Certificate.

7.2 *Fixed gas fire-extinguishing systems for dangerous goods*

A ship engaged in the carriage of dangerous goods in any cargo spaces shall be provided with a fixed carbon dioxide or inert gas fire-extinguishing system complying with the provisions of the Fire Safety Systems Code or with a fire-extinguishing system which, in the opinion of the Administration, gives equivalent protection for the cargoes carried.

8 **Cargo tank protection**

8.1 *Fixed deck foam fire-extinguishing systems*

8.1.1 For tankers of 20,000 tonnes deadweight and upwards, a fixed deck foam fire-extinguishing system shall be provided complying with the provisions of the Fire Safety Systems Code, except that, in lieu of the above, the Administration, after having given consideration to the ship's arrangement and equipment, may accept other fixed installations if they afford protection equivalent to the above, in accordance with regulation I/5. The requirements for alternative fixed installations shall comply with the requirements in paragraph 8.1.2.

8.1.2 In accordance with paragraph 8.1.1, where the Administration accepts an equivalent fixed installation in lieu of the fixed deck foam fire-extinguishing system, the installation shall:

- .1 be capable of extinguishing spill fires and also preclude ignition of spilled oil not yet ignited; and
- .2 be capable of combating fires in ruptured tanks.

8.1.3 Tankers of less than 20,000 tonnes deadweight shall be provided with a deck foam fire-extinguishing system complying with the requirements of the Fire Safety Systems Code.

9 **Protection of cargo pump-rooms in tankers**

9.1 *Fixed fire-extinguishing systems*

Each cargo pump-room shall be provided with one of the following fixed fire-extinguishing systems operated from a readily accessible position outside the pump-room. Cargo pump-rooms shall be provided with a system suitable for machinery spaces of category A.

9.1.1 A carbon dioxide fire-extinguishing system complying with the provisions of the Fire Safety Systems Code and with the following:

- .1 the alarms giving audible warning of the release of fire-extinguishing medium shall be safe for use in a flammable cargo vapour/air mixture; and
- .2 a notice shall be exhibited at the controls stating that due to the electrostatic ignition hazard, the system is to be used only for fire-extinguishing and not for inerting purposes.

9.1.2 A high-expansion foam fire-extinguishing system complying with the provisions of the Fire Safety Systems Code, provided that the foam concentrate supply is suitable for extinguishing fires involving the cargoes carried.

9.1.3 A fixed pressure water-spraying fire-extinguishing system complying with the provisions of the Fire Safety Systems Code.

9.2 *Quantity of fire-extinguishing medium*

Where the fire-extinguishing medium used in the cargo pump-room system is also used in systems serving other spaces, the quantity of medium provided or its delivery rate need not be more than the maximum required for the largest compartment.

10 **Fire-fighter's outfits**

10.1 *Types of fire-fighter's outfits*

Fire-fighter's outfits shall comply with the Fire Safety Systems Code.

10.2 *Number of fire-fighter's outfits*

10.2.1 Ships shall carry at least two fire-fighter's outfits.

10.2.2 In addition, in passenger ships there shall be provided:

- .1 for every 80 m, or part thereof, of the aggregate of the lengths of all passenger spaces and service spaces on the deck which carries such spaces or, if there is more than one such deck, on the deck which has the largest aggregate of such lengths, two fire-fighter's outfits and, in addition, two sets of personal equipment, each set comprising the items stipulated in the Fire Safety Systems Code. In passenger ships carrying more than 36 passengers, two additional fire-fighter's outfits shall be provided for each main vertical zone. However, for stairway enclosures which constitute individual main vertical zones and for the main vertical zones in the fore or aft end of a ship which do not contain spaces of categories (6), (7), (8) or (12) defined in regulation 9.2.2.3, no additional fire-fighter's outfits are required; and
- .2 ships carrying more than 36 passengers, for each pair of breathing apparatus there shall be provided one water fog applicator which shall be stored adjacent to such apparatus.

10.2.3 In addition, in tankers, two fire-fighter's outfits shall be provided.

10.2.4 The Administration may require additional sets of personal equipment and breathing apparatus, having due regard to the size and type of the ship.

10.2.5 Two spare charges shall be provided for each required breathing apparatus. Passenger ships carrying not more than 36 passengers and cargo ships that are equipped with suitably located means for fully recharging the air cylinders free from contamination, need carry only one spare charge for each required apparatus. In passenger ships carrying more than 36 passengers, at least two spare charges for each breathing apparatus shall be provided.

10.3 *Storage of fire-fighter's outfits*

10.3.1 The fire-fighter's outfits or sets of personal equipment shall be kept ready for use in an easily accessible location that is permanently and clearly marked and, where more than one

fire-fighter's outfit or more than one set of personal equipment is carried, they shall be stored in widely separated positions.

10.3.2 In passenger ships, at least two fire-fighter's outfits and, in addition, one set of personal equipment shall be available at any one position. At least two fire-fighter's outfits shall be stored in each main vertical zone.

Regulation 11

Structural integrity

1 Purpose

The purpose of this regulation is to maintain structural integrity of the ship preventing partial or whole collapse of the ship structures due to strength deterioration by heat. For this purpose, materials used in the ships' structure shall ensure that the structural integrity is not degraded due to fire.

2 Material of hull, superstructures, structural bulkheads, decks and deckhouses

The hull, superstructures, structural bulkheads, decks and deckhouses shall be constructed of steel or other equivalent material. For the purpose of applying the definition of steel or other equivalent material as given in regulation 3.43 the "applicable fire exposure" shall be according to the integrity and insulation standards given in tables 9.1 to 9.4. For example, where divisions such as decks or sides and ends of deckhouses are permitted to have "B-0" fire integrity, the "applicable fire exposure" shall be half an hour.

3 Structure of aluminium alloy

Unless otherwise specified in paragraph 2, in cases where any part of the structure is of aluminium alloy, the following shall apply:

- .1 the insulation of aluminium alloy components of "A" or "B" class divisions, except structure which, in the opinion of the Administration, is non-load-bearing, shall be such that the temperature of the structural core does not rise more than 200°C above the ambient temperature at any time during the applicable fire exposure to the standard fire test; and
- .2 special attention shall be given to the insulation of aluminium alloy components of columns, stanchions and other structural members required to support lifeboat and liferaft stowage, launching and embarkation areas, and "A" and "B" class divisions to ensure:
 - .2.1 that for such members supporting lifeboat and liferaft areas and "A" class divisions, the temperature rise limitation specified in paragraph 3.1 shall apply at the end of one hour; and
 - .2.2 that for such members required to support "B" class divisions, the temperature rise limitation specified in paragraph 3.1 shall apply at the end of half an hour.

4 Machinery spaces of category A

4.1 Crowns and casings

Crowns and casings of machinery spaces of category A shall be of steel construction and shall be insulated as required by tables 9.5 and 9.7, as appropriate.

4.2 Floor plating

The floor plating of normal passageways in machinery spaces of category A shall be made of steel.

5 Materials of overboard fittings

Materials readily rendered ineffective by heat shall not be used for overboard scuppers, sanitary discharges, and other outlets which are close to the waterline and where the failure of the material in the event of fire would give rise to danger of flooding.

6 Protection of cargo tank structure against pressure or vacuum in tankers

6.1 General

The venting arrangements shall be so designed and operated as to ensure that neither pressure nor vacuum in cargo tanks shall exceed design parameters and be such as to provide for:

- .1 the flow of the small volumes of vapour, air or inert gas mixtures caused by thermal variations in a cargo tank in all cases through pressure/vacuum valves; and
- .2 the passage of large volumes of vapour, air or inert gas mixtures during cargo loading and ballasting, or during discharging.

6.2 Openings for small flow by thermal variations

Openings for pressure release required by paragraph 6.1.1 shall:

- .1 have as great a height as is practicable above the cargo tank deck to obtain maximum dispersal of flammable vapours, but in no case less than 2 m above the cargo tank deck; and
- .2 be arranged at the furthest distance practicable but not less than 5 m from the nearest air intakes and openings to enclosed spaces containing a source of ignition and from deck machinery and equipment which may constitute an ignition hazard. Anchor windlass and chain locker openings constitute an ignition hazard.

6.3 *Safety measures in cargo tanks*

6.3.1 *Preventive measures against liquid rising in the venting system*

Provisions shall be made to guard against liquid rising in the venting system to a height which would exceed the design head of cargo tanks. This shall be accomplished by high-level alarms or overflow control systems or other equivalent means, together with independent gauging devices and cargo tank filling procedures. For the purposes of this regulation, spill valves are not considered equivalent to an overflow system.

6.3.2 *Secondary means for pressure/vacuum relief*

A secondary means of allowing full flow relief of vapour, air or inert gas mixtures shall be provided to prevent over-pressure or under-pressure in the event of failure of the arrangements in paragraph 6.1.2. Alternatively, pressure sensors may be fitted in each tank protected by the arrangement required in paragraph 6.1.2, with a monitoring system in the ship's cargo control room or the position from which cargo operations are normally carried out. Such monitoring equipment shall also provide an alarm facility which is activated by detection of over-pressure or under-pressure conditions within a tank.

6.3.3 *Bypasses in vent mains*

Pressure/vacuum valves required by paragraph 6.1.1 may be provided with a bypass arrangement when they are located in a vent main or masthead riser. Where such an arrangement is provided there shall be suitable indicators to show whether the bypass is open or closed.

6.3.4 *Pressure/vacuum-breaking devices*

One or more pressure/vacuum-breaking devices shall be provided to prevent the cargo tanks from being subject to:

- .1 a positive pressure, in excess of the test pressure of the cargo tank, if the cargo were to be loaded at the maximum rated capacity and all other outlets are left shut; and
- .2 a negative pressure in excess of 700 mm water gauge if the cargo were to be discharged at the maximum rated capacity of the cargo pumps and the inert gas blowers were to fail.

Such devices shall be installed on the inert gas main unless they are installed in the venting system required by regulation 4.5.3.1 or on individual cargo tanks. The location and design of the devices shall be in accordance with regulation 4.5.3 and paragraph 6.

6.4 *Size of vent outlets*

Vent outlets for cargo loading, discharging and ballasting required by paragraph 6.1.2 shall be designed on the basis of the maximum designed loading rate multiplied by a factor of at least 1.25 to take account of gas evolution, in order to prevent the pressure in any cargo tank from exceeding the design pressure. The master shall be provided with information regarding the maximum permissible loading rate for each cargo tank and, in the case of combined venting systems, for each group of cargo tanks.

PART D - ESCAPE

Regulation 12

Notification of crew and passengers

1 Purpose

The purpose of this regulation is to notify crew and passengers of a fire for safe evacuation. For this purpose, a general emergency alarm system and a public address system shall be provided.

2 General emergency alarm system

A general emergency alarm system required by regulation III/6.4.2 shall be used for notifying crew and passengers of a fire.

3 Public address systems in passenger ships

A public address system or other effective means of communication complying with the requirements of regulation III/6.5 shall be available throughout the accommodation and service spaces and control stations and open decks.

Regulation 13

Means of escape

1 Purpose

The purpose of this regulation is to provide means of escape so that persons onboard can safely and swiftly escape to the lifeboat and liferaft embarkation deck. For this purpose, the following functional requirements shall be met:

- .1 safe escape routes shall be provided;
- .2 escape routes shall be maintained in a safe condition, clear of obstacles; and
- .3 additional aids for escape shall be provided as necessary to ensure accessibility, clear marking, and adequate design for emergency situations.

2 General requirements

2.1 Unless expressly provided otherwise in this regulation, at least two widely separated and ready means of escape shall be provided from all spaces or group of spaces.

2.2 Lifts shall not be considered as forming one of the means of escape as required by this regulation.

3 Means of escape from control stations, accommodation and service spaces

3.1 *General requirements*

3.1.1 Stairways and ladders shall be so arranged as to provide ready means of escape to the lifeboat and liferaft embarkation deck from passenger and crew accommodation spaces and from spaces in which the crew is normally employed, other than machinery spaces.

3.1.2 Unless expressly provided otherwise in this regulation, a corridor, lobby, or part of a corridor from which there is only one route of escape shall be prohibited. Dead-end corridors used in service areas which are necessary for the practical utility of the ship, such as fuel oil stations and athwartship supply corridors, shall be permitted, provided such dead-end corridors are separated from crew accommodation areas and are inaccessible from passenger accommodation areas. Also, a part of a corridor that has a depth not exceeding its width is considered a recess or local extension and is permitted.

3.1.3 All stairways in accommodation and service spaces and control stations shall be of steel frame construction except where the Administration sanctions the use of other equivalent material.

3.1.4 If a radiotelegraph station has no direct access to the open deck, two means of escape from or access to, the station shall be provided, one of which may be a porthole or window of sufficient size or other means to the satisfaction of the Administration.

3.1.5 Doors in escape routes shall, in general, open in-way of the direction of escape, except that:

- .1 individual cabin doors may open into the cabins in order to avoid injury to persons in the corridor when the door is opened; and
- .2 doors in vertical emergency escape trunks may open out of the trunk in order to permit the trunk to be used both for escape and for access.

3.2 *Means of escape in passenger ships*

3.2.1 *Escape from spaces below the bulkhead deck*

3.2.1.1 Below the bulkhead deck two means of escape, at least one of which shall be independent of watertight doors, shall be provided from each watertight compartment or similarly restricted space or group of spaces. Exceptionally, the Administration may dispense with one of the means of escape for crew spaces that are entered only occasionally, if the required escape route is independent of watertight doors.

3.2.1.2 Where the Administration has granted dispensation under the provisions of paragraph 3.2.1.1, this sole means of escape shall provide safe escape. However, stairways shall not be less than 800 mm in clear width with handrails on both sides.

3.2.2 *Escape from spaces above the bulkhead deck*

Above the bulkhead deck there shall be at least two means of escape from each main vertical zone or similarly restricted space or group of spaces at least one of which shall give access to a stairway forming a vertical escape.

3.2.3 *Direct access to stairway enclosures*

Stairway enclosures in accommodation and service spaces shall have direct access from the corridors and be of a sufficient area to prevent congestion, having in view the number of persons likely to use them in an emergency. Within the perimeter of such stairway enclosures, only public toilets, lockers of non-combustible material providing storage for non-hazardous safety equipment and open information counters are permitted. Only public spaces, corridors, lifts, public toilets, special category spaces and open ro-ro spaces to which any passengers carried can have access, other escape stairways required by paragraph 3.2.4.1 and external areas are permitted to have direct access to these stairway enclosures. Small corridors or "lobbies" used to separate an enclosed stairway from galleys or main laundries may have direct access to the stairway provided they have a minimum deck area of 4.5 m², a width of no less than 900 mm and contain a fire hose station.

3.2.4 *Details of means of escape*

3.2.4.1 At least one of the means of escape required by paragraphs 3.2.1.1 and 3.2.2 shall consist of a readily accessible enclosed stairway, which shall provide continuous fire shelter from the level of its origin to the appropriate lifeboat and liferaft embarkation decks, or to the uppermost weather deck if the embarkation deck does not extend to the main vertical zone being considered. In the latter case, direct access to the embarkation deck by way of external open stairways and passageways shall be provided and shall have emergency lighting in accordance with regulation III/11.5 and slip-free surfaces underfoot. Boundaries facing external open stairways and passageways forming part of an escape route and boundaries in such a position that their failure during a fire would impede escape to the embarkation deck shall have fire integrity, including insulation values, in accordance with tables 9.1 to 9.4, as appropriate.

3.2.4.2 Protection of access from the stairway enclosures to the lifeboat and liferaft embarkation areas shall be provided either directly or through protected internal routes which have fire integrity and insulation values for stairway enclosures as determined by tables 9.1 to 9.4, as appropriate.

3.2.4.3 Stairways serving only a space and a balcony in that space shall not be considered as forming one of the required means of escape.

3.2.4.4 Each level within an atrium shall have two means of escape, one of which shall give direct access to an enclosed vertical means of escape meeting the requirements of paragraph 3.2.4.1.

3.2.4.5 The widths, number and continuity of escapes shall be in accordance with the requirements in the Fire Safety Systems Code.

3.2.5 *Marking of escape routes*

3.2.5.1 In addition to the emergency lighting required by regulations II-1/42 and III/11.5, the means of escape, including stairways and exits, shall be marked by lighting or photoluminescent strip indicators placed not more than 300 mm above the deck at all points of the escape route including angles and intersections. The marking must enable passengers to identify the routes of escape and readily identify the escape exits. If electric illumination is used, it shall be supplied by the emergency source of power and it shall be so arranged that the failure of any single light or cut in a lighting strip will not result in the marking being ineffective. Additionally, escape route signs and fire equipment location markings shall be of photoluminescent material or

marked by lighting. The Administration shall ensure that such lighting or photoluminescent equipment has been evaluated, tested and applied in accordance with the Fire Safety Systems Code.

3.2.5.2 In passenger ships carrying more than 36 passengers, the requirements of the paragraph 3.2.5.1 shall also apply to the crew accommodation areas.

3.2.6 *Normally locked doors that form part of an escape route*

3.2.6.1 Cabin and stateroom doors shall not require keys to unlock them from inside the room. Neither shall there be any doors along any designated escape route which require keys to unlock them when moving in the direction of escape.

3.2.6.2 Escape doors from public spaces that are normally latched shall be fitted with a means of quick release. Such means shall consist of a door-latching mechanism incorporating a device that releases the latch upon the application of a force in the direction of escape flow. Quick release mechanisms shall be designed and installed to the satisfaction of the Administration and, in particular:

- .1 consist of bars or panels, the actuating portion of which extends across at least one half of the width of the door leaf, at least 760 mm and not more than 1120 mm above the deck;
- .2 cause the latch to release when a force not exceeding 67 N is applied; and
- .3 not be equipped with any locking device, set screw or other arrangement that prevents the release of the latch when pressure is applied to the releasing device.

3.3 *Means of escape in cargo ships*

3.3.1 *General*

At all levels of accommodation there shall be provided at least two widely separated means of escape from each restricted space or group of spaces.

3.3.2 *Escape from spaces below the lowest open deck*

Below the lowest open deck the main means of escape shall be a stairway and the second escape may be a trunk or a stairway.

3.3.3 *Escape from spaces above the lowest open deck*

Above the lowest open deck the means of escape shall be stairways or doors to an open deck or a combination thereof.

3.3.4 *Dead-end corridors*

No dead-end corridors having a length of more than 7 m shall be accepted.

3.3.5 *Width and continuity of escape routes*

The width, number and continuity of escape routes shall be in accordance with the requirements in the Fire Safety Systems Code.

3.3.6 *Dispensation from two means of escape*

Exceptionally, the Administration may dispense with one of the means of escape, for crew spaces that are entered only occasionally, if the required escape route is independent of watertight doors.

3.4 *Emergency escape breathing devices*

3.4.1 Emergency escape breathing devices shall comply with the Fire Safety Systems Code. Spare emergency escape breathing devices shall be kept onboard.

3.4.2 All ships shall carry at least two emergency escape breathing devices within accommodation spaces.

3.4.3 In all passenger ships, at least two emergency escape breathing devices shall be carried in each main vertical zone.

3.4.4 In all passenger ships carrying more than 36 passengers, two emergency escape breathing devices, in addition to those required in paragraph 3.4.3 above, shall be carried in each main vertical zone.

3.4.5 However, paragraphs 3.4.3 and 3.4.4 do not apply to stairway enclosures which constitute individual main vertical zones and for the main vertical zones in the fore or aft end of a ship which do not contain spaces of categories (6), (7), (8) or (12) defined in regulation 9.2.2.3.

4 **Means of escape from machinery spaces**

4.1 *Means of escape on passenger ships*

Means of escape from each machinery space in passenger ships shall comply with the following provisions.

4.1.1 *Escape from spaces below the bulkhead deck*

Where the space is below the bulkhead deck, the two means of escape shall consist of either:

- .1 two sets of steel ladders as widely separated as possible, leading to doors in the upper part of the space similarly separated and from which access is provided to the appropriate lifeboat and liferaft embarkation decks. One of these ladders shall be located within a protected enclosure that satisfies regulation 9.2.2.3, category (2), or regulation 9.2.2.4, category (4), as appropriate, from the lower part of the space it serves to a safe position outside the space. Self-closing fire doors of the same fire integrity standards shall be fitted in the enclosure. The ladder shall be fixed in such a way that heat is not transferred into the enclosure through non-insulated fixing points. The protected enclosure shall have minimum internal dimensions of at least 800 mm x 800 mm, and shall have emergency lighting provisions; or
- .2 one steel ladder leading to a door in the upper part of the space from which access is provided to the embarkation deck and additionally, in the lower part of the space and in a position well separated from the ladder referred to, a steel door capable of being operated from each side and which provides access to a safe escape route from the lower part of the space to the embarkation deck.

4.1.2 *Escape from spaces above the bulkhead deck*

Where the space is above the bulkhead deck, the two means of escape shall be as widely separated as possible and the doors leading from such means of escape shall be in a position from which access is provided to the appropriate lifeboat and liferaft embarkation decks. Where such means of escape require the use of ladders, these shall be of steel.

4.1.3 *Dispensation from two means of escape*

In a ship of less than 1,000 gross tonnage, the Administration may dispense with one of the means of escape, due regard being paid to the width and disposition of the upper part of the space. In a ship of 1,000 gross tonnage and above, the Administration may dispense with one means of escape from any such space, including a normally unattended auxiliary machinery space, so long as either a door or a steel ladder provides a safe escape route to the embarkation deck, due regard being paid to the nature and location of the space and whether persons are normally employed in that space. In the steering gear space, a second means of escape shall be provided when the emergency steering position is located in that space unless there is direct access to the open deck.

4.1.4 *Escape from machinery control rooms*

Two means of escape shall be provided from a machinery control room located within a machinery space, at least one of which will provide continuous fire shelter to a safe position outside the machinery space.

4.2 *Means of escape on cargo ships*

Means of escape from each machinery space in cargo ships shall comply with the following provisions.

4.2.1 *Escape from machinery spaces of category A*

Except as provided in paragraph 4.2.2, two means of escape shall be provided from each machinery space of category A. In particular, one of the following provisions shall be complied with:

- .1 two sets of steel ladders as widely separated as possible leading to doors in the upper part of the space similarly separated and from which access is provided to the open deck. One of these ladders shall be located within a protected enclosure that satisfies regulation 9.2.3.3, category (4), from the lower part of the space it serves to a safe position outside the space. Self-closing fire doors of the same fire integrity standards shall be fitted in the enclosure. The ladder shall be fixed in such a way that heat is not transferred into the enclosure through non-insulated fixing points. The enclosure shall have minimum internal dimensions of at least 800 mm x 800 mm, and shall have emergency lighting provisions; or
- .2 one steel ladder leading to a door in the upper part of the space from which access is provided to the open deck and, additionally, in the lower part of the space and in a position well separated from the ladder referred to, a steel door capable of being operated from each side and which provides access to a safe escape route from the lower part of the space to the open deck.

4.2.2 *Dispensation from two means of escape*

In a ship of less than 1,000 gross tonnage, the Administration may dispense with one of the means of escape required under paragraph 4.2.1, due regard being paid to the dimension and disposition of the upper part of the space. In addition, the means of escape from machinery spaces of category A need not comply with the requirement for an enclosed fire shelter listed in paragraph 4.2.1.1. In the steering gear space, a second means of escape shall be provided when the emergency steering position is located in that space unless there is direct access to the open deck.

4.2.3 *Escape from machinery spaces other than those of category A*

From machinery spaces other than those of category A, two escape routes shall be provided except that a single escape route may be accepted for spaces that are entered only occasionally, and for spaces where the maximum travel distance to the door is 5 m or less.

4.3 *Emergency escape breathing devices*

4.3.1 On all ships, within the machinery spaces, emergency escape breathing devices shall be situated ready for use at easily visible places, which can be reached quickly and easily at any time in the event of fire. The location of emergency escape breathing devices shall take into account the layout of the machinery space and the number of persons normally working in the spaces.

4.3.2 The number and location of these devices shall be indicated in the fire control plan required in regulation 15.2.4.

4.3.3 Emergency escape breathing devices shall comply with the Fire Safety Systems Code.

5 Means of escape on passenger ships from special category and open ro-ro spaces to which any passengers carried can have access

5.1 In special category and open ro-ro spaces to which any passengers carried can have access, the number and locations of the means of escape both below and above the bulkhead deck shall be to the satisfaction of the Administration and, in general, the safety of access to the embarkation deck shall be at least equivalent to that provided for under paragraphs 3.2.1.1, 3.2.2, 3.2.4.1 and 3.2.4.2. Such spaces shall be provided with designated walkways to the means of escape with a breadth of at least 600 mm. The parking arrangements for the vehicles shall maintain the walkways clear at all times.

5.2 One of the escape routes from the machinery spaces where the crew is normally employed shall avoid direct access to any special category space.

6 Means of escape from ro-ro spaces

At least two means of escape shall be provided in ro-ro spaces where the crew are normally employed. The escape routes shall provide a safe escape to the lifeboat and liferaft embarkation decks and shall be located at the fore and aft ends of the space.

7 Additional requirements for ro-ro passenger ships

7.1 *General*

7.1.1 Escape routes shall be provided from every normally occupied space on the ship to an assembly station. These escape routes shall be arranged so as to provide the most direct route possible to the assembly station, and shall be marked with symbols based on the guidelines developed by the Organization.

7.1.2 The escape route from cabins to stairway enclosures shall be as direct as possible, with a minimum number of changes in direction. It shall not be necessary to cross from one side of the ship to the other to reach an escape route. It shall not be necessary to climb more than two decks up or down in order to reach an assembly station or open deck from any passenger space.

7.1.3 External routes shall be provided from open decks, as referred to in paragraph 7.1.2, to the survival craft embarkation stations.

7.1.4 Where enclosed spaces adjoin an open deck, openings from the enclosed space to the open deck shall, where practicable, be capable of being used as an emergency exit.

7.1.5 Escape routes shall not be obstructed by furniture and other obstructions. With the exception of tables and chairs which may be cleared to provide open space, cabinets and other heavy furnishings in public spaces and along escape routes shall be secured in place to prevent shifting if the ship rolls or lists. Floor coverings shall also be secured in place. When the ship is underway, escape routes shall be kept clear of obstructions such as cleaning carts, bedding, luggage and boxes of goods.

7.2 *Instruction for safe escape*

7.2.1 Decks shall be sequentially numbered, starting with "1" at the tank top or lowest deck. The numbers shall be prominently displayed at stair landings and lift lobbies. Decks may also be named, but the deck number shall always be displayed with the name.

7.2.2 Simple "mimic" plans showing the "you are here" position and escape routes marked by arrows, shall be prominently displayed on the inside of each cabin door and in public spaces. The plan shall show the directions of escape and shall be properly oriented in relation to its position on the ship.

7.3 *Strength of handrails and corridors*

7.3.1 Handrails or other handholds shall be provided in corridors along the entire escape route so that a firm handhold is available at every step of the way, where possible, to the assembly stations and embarkation stations. Such handrails shall be provided on both sides of longitudinal corridors more than 1.8 m in width and transverse corridors more than 1 m in width. Particular attention shall be paid to the need to be able to cross lobbies, atriums and other large open spaces along escape routes. Handrails and other handholds shall be of such strength as to withstand a distributed horizontal load of 750 N/m applied in the direction of the centre of the corridor or space, and a distributed vertical load of 750 N/m applied in the downward direction. The two loads need not be applied simultaneously.

7.3.2 The lowest 0.5 m of bulkheads and other partitions forming vertical divisions along escape routes shall be able to sustain a load of 750 N/m to allow them to be used as walking surfaces from the side of the escape route with the ship at large angles of heel.

7.4 *Evacuation analysis*

Escape routes shall be evaluated by an evacuation analysis early in the design process. The analysis shall be used to identify and eliminate, as far as practicable, congestion which may develop during an abandonment, due to normal movement of passengers and crew along escape routes, including the possibility that crew may need to move along these routes in a direction opposite the movement of passengers. In addition, the analysis shall be used to demonstrate that escape arrangements are sufficiently flexible to provide for the possibility that certain escape routes, assembly stations, embarkation stations or survival craft may not be available as a result of a casualty.

PART E - OPERATIONAL REQUIREMENTS

Regulation 14

Operational readiness and maintenance

1 Purpose

The purpose of this regulation is to maintain and monitor the effectiveness of the fire safety measures the ship is provided with. For this purpose, the following functional requirements shall be met:

- .1 fire protection systems and fire-fighting systems and appliances shall be maintained ready for use; and
- .2 fire protection systems and fire-fighting systems and appliances shall be properly tested and inspected.

2 General requirements

At all times while the ship is in service, the requirements of paragraph 1.1 shall be complied with. A ship is not in service when:

- .1 it is in for repairs or lay-up (either at anchor or in port) or in dry-dock;
- .2 it is declared not in service by the owner or the owner's representative; and
- .3 in the case of passenger ships, there are no passengers on board.

2.1 *Operational readiness*

2.1.1 The following fire protection systems shall be kept in good order so as to ensure their required performance if a fire occurs:

- .1 structural fire protection including fire-resisting divisions, and protection of openings and penetrations in these divisions;

- .2 fire detection and fire alarm systems; and
- .3 means of escape systems and appliances.

2.1.2 Fire-fighting systems and appliances shall be kept in good working order and readily available for immediate use. Portable extinguishers which have been discharged shall be immediately recharged or replaced with an equivalent unit.

2.2 *Maintenance, testing and inspections*

2.2.1 Maintenance, testing and inspections shall be carried out based on the guidelines developed by the Organization and in a manner having due regard to ensuring the reliability of fire-fighting systems and appliances.

2.2.2 The maintenance plan shall be kept on board the ship and shall be available for inspection whenever required by the Administration.

2.2.3 The maintenance plan shall include at least the following fire protection systems and fire-fighting systems and appliances, where installed:

- .1 fire mains, fire pumps and hydrants including hoses, nozzles and international shore connections;
- .2 fixed fire detection and fire alarm systems;
- .3 fixed fire-extinguishing systems and other fire-extinguishing appliances;
- .4 automatic sprinkler, fire detection and fire alarm systems;
- .5 ventilation systems including fire and smoke dampers, fans and their controls;
- .6 emergency shut down of fuel supply;
- .7 fire doors, including their controls;
- .8 general emergency alarm systems;
- .9 emergency escape breathing devices;
- .10 portable fire extinguishers including spare charges; and
- .11 fire-fighter's outfits.

2.2.4 The maintenance programme may be computer-based.

3 **Additional requirements for passenger ships**

In addition to the fire protection systems and appliances listed in paragraph 2.2.3, ships carrying more than 36 passengers shall develop a maintenance plan for low-location lighting and public address systems.

4 Additional requirements for tankers

In addition to the fire protection systems and appliances listed in paragraph 2.2.3, tankers shall have a maintenance plan for:

- .1 inert gas systems;
- .2 deck foam systems;
- .3 fire safety arrangements in cargo pump-rooms; and
- .4 flammable gas detectors.

Regulation 15

Instructions, on-board training and drills

1 Purpose

The purpose of this regulation is to mitigate the consequences of fire by means of proper instructions for training and drills of persons onboard in correct procedures under emergency conditions. For this purpose, the crew shall have the necessary knowledge and skills to handle fire emergency cases, including passenger care.

2 General requirements

2.1 Instructions, duties and organization

2.1.1 Crew members shall receive instruction on fire safety onboard the ship.

2.1.2 Crew members shall receive instructions on their assigned duties.

2.1.3 Parties responsible for fire-extinguishing shall be organized. These parties shall have the capability to complete their duties at all times while the ship is in service.

2.2 Onboard training and drills

2.2.1 Crew members shall be trained to be familiar with the arrangements of the ship as well as the location and operation of any fire-fighting systems and appliances that they may be called upon to use.

2.2.2 Training in the use of the emergency escape breathing devices shall be considered as part of on-board training.

2.2.3 Performance of crew members assigned fire-fighting duties shall be periodically evaluated by conducting on-board training and drills to identify areas in need of improvement, to ensure competency in fire-fighting skills is maintained, and to ensure the operational readiness of the fire-fighting organization.

2.2.4 On-board training in the use of the ship's fire-extinguishing systems and appliances shall be planned and conducted in accordance with provisions of regulation III/19.4.1.

2.2.5 Fire drills shall be conducted and recorded in accordance with the provisions of regulations III/19.3 and III/19.5.

2.3 *Training manuals*

2.3.1 A training manual shall be provided in each crew mess room and recreation room or in each crew cabin.

2.3.2 The training manual shall be written in the working language of the ship.

2.3.3 The training manual, which may comprise several volumes, shall contain the instructions and information required in paragraph 2.3.4 in easily understood terms and illustrated wherever possible. Any part of such information may be provided in the form of audio-visual aides in lieu of the manual.

2.3.4 The training manual shall explain the following in detail:

- .1 general fire safety practice and precautions related to the dangers of smoking, electrical hazards, flammable liquids and similar common shipboard hazards;
- .2 general instructions on fire-fighting activities and fire-fighting procedures including procedures for notification of a fire and use of manually operated call points;
- .3 meanings of the ship's alarms;
- .4 operation and use of fire-fighting systems and appliances;
- .5 operation and use of fire doors;
- .6 operation and use of fire and smoke dampers; and
- .7 escape systems and appliances.

2.4 *Fire control plans*

2.4.1 General arrangement plans shall be permanently exhibited for the guidance of the ship's officers, showing clearly for each deck the control stations, the various fire sections enclosed by "A" class divisions, the sections enclosed by "B" class divisions together with particulars of the fire detection and fire alarm systems, the sprinkler installation, the fire-extinguishing appliances, means of access to different compartments, decks, etc., and the ventilating system including particulars of the fan control positions, the position of dampers and identification numbers of the ventilating fans serving each section. Alternatively, at the discretion of the Administration, the aforementioned details may be set out in a booklet, a copy of which shall be supplied to each officer, and one copy shall at all times be available on board in an accessible position. Plans and booklets shall be kept up to date; any alterations thereto shall be recorded as soon as practicable. Description in such plans and booklets shall be in the language or languages required by the Administration. If the language is neither English nor French, a translation into one of those languages shall be included.

2.4.2 A duplicate set of fire control plans or a booklet containing such plans shall be permanently stored in a prominently marked weathertight enclosure outside the deckhouse for the assistance of shore-side fire-fighting personnel.

3 Additional requirements for passenger ships

3.1 Fire drills

In addition to the requirement of paragraph 2.2.3, fire drills shall be conducted in accordance with the provisions of regulation III/30 having due regard to notification of passengers and movement of passengers to assembly stations and embarkation decks.

3.2 Fire control plans

In ships carrying more than 36 passengers, plans and booklets required by this regulation shall provide information regarding fire protection, fire detection and fire extinction based on the guidelines developed by the Organization.

Regulation 16

Operations

1 Purpose

The purpose of this regulation is to provide information and instructions for proper ship and cargo handling operations in relation to fire safety. For this purpose, the following functional requirements shall be met:

- .1 fire safety operational booklets shall be provided on board; and
- .2 flammable vapour releases from cargo tank venting shall be controlled.

2 Fire safety operational booklets

2.1 The required fire safety operational booklet shall contain the necessary information and instructions for the safe operation of the ship and cargo handling operations in relation to fire safety. The booklet shall include information concerning the crew's responsibilities for the general fire safety of the ship while loading and discharging cargo and while underway. Necessary fire safety precautions for handling general cargoes shall be explained. For ships carrying dangerous goods and flammable bulk cargoes, the fire safety operational booklet shall also provide reference to the pertinent fire-fighting and emergency cargo handling instructions contained in the Code of Safe Practice for Solid Bulk Cargoes, the International Bulk Chemical Code, the International Gas Carrier Code and the International Maritime Dangerous Goods Code, as appropriate.

2.2 The fire safety operational booklet shall be provided in each crew mess room and recreation room or in each crew cabin.

2.3 The fire safety operational booklet shall be written in the working language of the ship.

2.4 The fire safety operational booklet may be combined with the training manuals required in regulation 15.2.3.

3 Additional requirements for tankers

3.1 General

The fire safety operational booklet referred to in paragraph 2 shall include provisions for preventing fire spread to the cargo area due to ignition of flammable vapours and include procedures of cargo tank gas-purging and/or gas-freeing taking into account the provisions in paragraph 3.2.

3.2 Procedures for cargo tank purging and/or gas-freeing

3.2.1 When the ship is provided with an inert gas system, the cargo tanks shall first be purged in accordance with the provisions of regulation 4.5.6 until the concentration of hydrocarbon vapours in the cargo tanks has been reduced to less than 2% by volume. Thereafter, gas-freeing may take place at the cargo tank deck level.

3.2.2 When the ship is not provided with an inert gas system, the operation shall be such that the flammable vapour is discharged initially through:

- .1 the vent outlets as specified in regulation 4.5.3.4;
- .2 outlets at least 2 m above the cargo tank deck level with a vertical efflux velocity of at least 30 m/s maintained during the gas-freeing operation; or
- .3 outlets at least 2 m above the cargo tank deck level with a vertical efflux velocity of at least 20 m/s and which are protected by suitable devices to prevent the passage of flame.

3.2.3 The above outlets shall be located not less than 10 m measured horizontally from the nearest air intakes and openings to enclosed spaces containing a source of ignition and from deck machinery, which may include anchor windlass and chain locker openings, and equipment which may constitute an ignition hazard.

3.2.4 When the flammable vapour concentration at the outlet has been reduced to 30% of the lower flammable limit, gas-freeing may be continued at cargo tank deck level.

PART F - ALTERNATIVE DESIGN AND ARRANGEMENTS

Regulation 17

Alternative design and arrangements

1 Purpose

The purpose of this regulation is to provide a methodology for alternative design and arrangements for fire safety.

2 General

2.1 Fire safety design and arrangements may deviate from the prescriptive requirements set out in parts B, C, D, E or G, provided that the design and arrangements meet the fire safety objectives and the functional requirements.

2.2 When fire safety design or arrangements deviate from the prescriptive requirements of this chapter, engineering analysis, evaluation and approval of the alternative design and arrangements shall be carried out in accordance with this regulation.

3 Engineering analysis

The engineering analysis shall be prepared and submitted to the Administration, based on the guidelines developed by the Organization and shall include, as a minimum, the following elements:

- .1 determination of the ship type and space(s) concerned;
- .2 identification of prescriptive requirement(s) with which the ship or the space(s) will not comply;
- .3 identification of the fire and explosion hazards of the ship or the space(s) concerned including:
 - .3.1 identification of the possible ignition sources;
 - .3.2 identification of the fire growth potential of each space concerned;
 - .3.3 identification of the smoke and toxic effluent generation potential for each space concerned;
 - .3.4 identification of the potential for the spread of fire, smoke or of toxic effluents from the space(s) concerned to other spaces;
- .4 determination of the required fire safety performance criteria for the ships or the space(s) concerned addressed by the prescriptive requirement(s), in particular:
 - .4.1 performance criteria shall be based on the fire safety objectives and on the functional requirements of this chapter;
 - .4.2 performance criteria shall provide a degree of safety not less than that achieved by using the prescriptive requirements; and
 - .4.3 performance criteria shall be quantifiable and measurable;
- .5 detailed description of the alternative design and arrangements, including a list of the assumptions used in the design and any proposed operational restrictions or conditions; and
- .6 technical justification demonstrating that the alternative design and arrangements meet the required fire safety performance criteria.

4 Evaluation of the alternative design and arrangements

4.1 The engineering analysis required in paragraph 3 shall be evaluated and approved by the Administration taking into account the guidelines developed by the Organization.

4.2 A copy of the documentation, as approved by the Administration, indicating that the alternative design and arrangements comply with this regulation shall be carried onboard the ship.

5 Exchange of information

The Administration shall communicate to the Organization pertinent information concerning alternative design and arrangements approved by them for circulation to all Contracting Governments.

6 Re-evaluation due to change of conditions

If the assumptions, and operational restrictions that were stipulated in the alternative design and arrangements are changed, the engineering analysis shall be carried out under the changed condition and shall be approved by the Administration.

PART G - SPECIAL REQUIREMENTS

Regulation 18

Helicopter facilities

1 Purpose

The purpose of this regulation is to provide additional measures in order to address the fire safety objectives of this chapter for ships fitted with special facilities for helicopters. For this purpose, the following functional requirements shall be met:

- .1 helideck structure shall be adequate to protect the ship from the fire hazards associated with helicopter operations;
- .2 fire-fighting appliances shall be provided to adequately protect the ship from the fire hazards associated with helicopter operations;
- .3 refuelling and hangar facilities and operations shall provide the necessary measures to protect the ship from the fire hazards associated with helicopter operations; and
- .4 operation manuals and training shall be provided.

2 Application

2.1 In addition to complying with the requirements of regulations in parts B, C, D and E, as appropriate, ships equipped with helidecks shall comply with the requirements of this regulation.

2.2 Where helicopters land or conduct winching operations on an occasional or emergency basis on ships without helidecks, fire-fighting equipment fitted in accordance with the requirements in part C may be used. This equipment shall be made readily available in close proximity to the landing or winching areas during helicopter operations.

2.3 Notwithstanding the requirements of paragraph 2.2 above, ro-ro passenger ships without helidecks shall comply with regulation III/28.

3 Structure

3.1 Construction of steel or other equivalent material

In general, the construction of the helidecks shall be of steel or other equivalent materials. If the helideck forms the deckhead of a deckhouse or superstructure, it shall be insulated to "A-60" class standard.

3.2 Construction of aluminium or other low melting point metals

If the Administration permits aluminium or other low melting point metal construction that is not made equivalent to steel, the following provisions shall be satisfied:

- .1 if the platform is cantilevered over the side of the ship, after each fire on the ship or on the platform, the platform shall undergo a structural analysis to determine its suitability for further use; and
- .2 if the platform is located above the ship's deckhouse or similar structure, the following conditions shall be satisfied:
 - .2.1 the deckhouse top and bulkheads under the platform shall have no openings;
 - .2.2 windows under the platform shall be provided with steel shutters; and
 - .2.3 after each fire on the platform or in close proximity, the platform shall undergo a structural analysis to determine its suitability for further use.

4 Means of escape

A helideck shall be provided with both a main and an emergency means of escape and access for fire fighting and rescue personnel. These shall be located as far apart from each other as is practicable and preferably on opposite sides of the helideck.

5 Fire-fighting appliances

5.1 In close proximity to the helideck, the following fire-fighting appliances shall be provided and stored near the means of access to that helideck:

- .1 at least two dry powder extinguishers having a total capacity of not less than 45 kg;
- .2 carbon dioxide extinguishers of a total capacity of not less than 18 kg or equivalent;
- .3 a suitable foam application system consisting of monitors or foam making branch pipes capable of delivering foam to all parts of the helideck in all weather conditions in which helicopters can operate. The system shall be capable of delivering a discharge rate as required in table 18.1 for at least 5 min;

Table 18.1 - Foam discharge rates

Category	Helicopter overall length	Discharge rate foam solution (l/min)
H1	up to but not including 15 m	250
H2	from 15 m up to but not including 24 m	500
H3	from 24 m up to but not including 35 m	800

- .4 the principal agent shall be suitable for use with salt water and conform to performance standards not inferior to those acceptable to the Organization;
- .5 at least two nozzles of an approved dual-purpose type (jet/spray) and hoses sufficient to reach any part of the helideck;
- .6 in addition to the requirements of regulation 10.10, two sets of fire-fighter's outfits; and
- .7 at least the following equipment shall be stored in a manner that provides for immediate use and protection from the elements:
- .1 adjustable wrench;
 - .2 blanket, fire resistant;
 - .3 cutters, bolt 60 cm;
 - .4 hook, grab or salving;
 - .5 hacksaw, heavy duty complete with six spare blades;
 - .6 ladder;
 - .7 lift line 5 mm diameter and 15 m in length;
 - .8 pliers, side cutting;
 - .9 set of assorted screwdrivers; and
 - .10 harness knife complete with sheath.

6 Drainage facilities

Drainage facilities in way of helidecks shall be constructed of steel and shall lead directly overboard independent of any other system and shall be designed so that drainage does not fall onto any part of the ship.

7 Helicopter refuelling and hangar facilities

Where the ship has helicopter refuelling and hangar facilities, the following requirements shall be complied with:

- .1 a designated area shall be provided for the storage of fuel tanks which shall be:
 - .1.1 as remote as is practicable from accommodation spaces, escape routes and embarkation stations; and
 - .1.2 isolated from areas containing a source of vapour ignition;

- .2 the fuel storage area shall be provided with arrangements whereby fuel spillage may be collected and drained to a safe location;
- .3 tanks and associated equipment shall be protected against physical damage and from a fire in an adjacent space or area;
- .4 where portable fuel storage tanks are used, special attention shall be given to:
 - .4.1 design of the tank for its intended purpose;
 - .4.2 mounting and securing arrangements;
 - .4.3 electric bonding; and
 - .4.4 inspection procedures;
- .5 storage tank fuel pumps shall be provided with means which permit shutdown from a safe remote location in the event of a fire. Where a gravity fuelling system is installed, equivalent closing arrangements shall be provided to isolate the fuel source;
- .6 the fuel pumping unit shall be connected to one tank at a time. The piping between the tank and the pumping unit shall be of steel or equivalent material, as short as possible, and protected against damage;
- .7 electrical fuel pumping units and associated control equipment shall be of a type suitable for the location and potential hazards;
- .8 fuel pumping units shall incorporate a device which will prevent over-pressurization of the delivery or filling hose;
- .9 equipment used in refuelling operations shall be electrically bonded;
- .10 "NO SMOKING" signs shall be displayed at appropriate locations;
- .11 hangar, refuelling and maintenance facilities shall be treated as category 'A' machinery spaces with regard to structural fire protection, fixed fire-extinguishing and detection system requirements;
- .12 enclosed hangar facilities or enclosed spaces containing refuelling installations shall be provided with mechanical ventilation, as required by regulation 20.3 for closed ro-ro spaces of cargo ships. Ventilation fans shall be of non-sparking type; and
- .13 electric equipment and wiring in enclosed hangar or enclosed spaces containing refuelling installations shall comply with regulations 20.3.2, 20.3.3 and 20.3.4.

8 Operations manual and fire-fighting arrangements

8.1 Each helicopter facility shall have an operations manual, including a description and a checklist of safety precautions, procedures and equipment requirements. This manual may be part of the ship's emergency response procedures.

8.2 The procedures and precautions to be followed during refuelling operations shall be in accordance with recognized safe practices and contained in the operations manual.

8.3 Fire-fighting personnel consisting of at least two persons trained for rescue and fire-fighting duties and fire-fighting equipment shall be immediately available at all times when helicopter operations are expected.

8.4 Fire-fighting personnel shall be present during refuelling operations. However, the fire-fighting personnel shall not be involved with refuelling activities.

8.5 On-board refresher training shall be carried out and additional supplies of fire-fighting media shall be provided for training and testing of the equipment.

Regulation 19

Carriage of dangerous goods

1 Purpose

The purpose of this regulation is to provide additional safety measures in order to address the fire safety objectives of this chapter for ships carrying dangerous goods. For this purpose, the following functional requirements shall be met:

- .1 fire protection systems shall be provided to protect the ship from the added fire hazards associated with carriage of dangerous goods;
- .2 dangerous goods shall be adequately separated from ignition sources; and
- .3 appropriate personnel protective equipment shall be provided for the hazards associated with the carriage of dangerous goods.

2 General requirements

2.1 In addition to complying with the requirements of regulations in parts B, C, D, E and regulations 18 and 20, as appropriate, ship types and cargo spaces, referred to in paragraph 2.2, intended for the carriage of dangerous goods shall comply with the requirements of this regulation, as appropriate, except when carrying dangerous goods in limited quantities unless such requirements have already been met by compliance with the requirements elsewhere in this chapter. The types of ships and modes of carriage of dangerous goods are referred to in paragraph 2.2 and in table 19.1. Cargo ships of less than 500 gross tonnage shall comply with this regulation, but Administrations may reduce the requirements and such reduced requirements shall be recorded in the document of compliance referred to in paragraph 4.

2.2 The following ship types and cargo spaces shall govern the application of tables 19.1 and 19.2:

- .1 ships and cargo spaces not specifically designed for the carriage of freight containers, but intended for the carriage of dangerous goods in packaged form including goods in freight containers and portable tanks;

- .2 purpose-built containerships and cargo spaces intended for the carriage of dangerous goods in freight containers and portable tanks;
- .3 ro-ro ships and ro-ro spaces intended for the carriage of dangerous goods;
- .4 ships and cargo spaces intended for the carriage of solid dangerous goods in bulk; and
- .5 ships and cargo spaces intended for carriage of dangerous goods other than liquids and gases in bulk in shipborne barges.

3 Special requirements

Unless otherwise specified, the following requirements shall govern the application of tables 19.1, 19.2 and 19.3 to both "on-deck" and "under-deck" stowage of dangerous goods where the numbers of the following paragraphs are indicated in the first column of the tables.

3.1 *Water supplies*

3.1.1 Arrangements shall be made to ensure immediate availability of a supply of water from the fire main at the required pressure either by permanent pressurization or by suitably placed remote arrangements for the fire pumps.

3.1.2 The quantity of water delivered shall be capable of supplying four nozzles of a size and at pressures as specified in regulation 10.2, capable of being trained on any part of the cargo space when empty. This amount of water may be applied by equivalent means to the satisfaction of the Administration.

3.1.3 Means shall be provided for effectively cooling the designated underdeck cargo space by at least 5 l/min per square metre of the horizontal area of cargo spaces, either by a fixed arrangement of spraying nozzles or flooding the cargo space with water. Hoses may be used for this purpose in small cargo spaces and in small areas of larger cargo spaces at the discretion of the Administration. However, the drainage and pumping arrangements shall be such as to prevent the build-up of free surfaces. The drainage system shall be sized to remove no less than 125% of the combined capacity of both the water spraying system pumps and the required number of fire hose nozzles. The drainage system valves shall be operable from outside the protected space at a position in the vicinity of the extinguishing system controls. Bilge wells shall be of sufficient holding capacity and shall be arranged at the side shell of the ship at a distance from each other of not more than 40 m in each watertight compartment. If this is not possible, the adverse effect upon stability of the added weight and free surface of water shall be taken into account to the extent deemed necessary by the Administration in its approval of the stability information.

3.1.4 Provision to flood a designated under-deck cargo space with suitable specified media may be substituted for the requirements in paragraph 3.1.3.

3.1.5 The total required capacity of the water supply shall satisfy paragraphs 3.1.2 and 3.1.3, if applicable, simultaneously calculated for the largest designated cargo space. The capacity requirements of paragraph 3.1.2 shall be met by the total capacity of the main fire pump(s) not including the capacity of the emergency fire pump, if fitted. If a drencher system is used to satisfy paragraph 3.1.3, the drencher pump shall also be taken into account in this total capacity calculation.

3.2 *Sources of ignition*

Electrical equipment and wiring shall not be fitted in enclosed cargo spaces or vehicle spaces unless it is essential for operational purposes in the opinion of the Administration. However, if electrical equipment is fitted in such spaces, it shall be of a certified safe type for use in the dangerous environments to which it may be exposed unless it is possible to completely isolate the electrical system (e.g. by removal of links in the system, other than fuses). Cable penetrations of the decks and bulkheads shall be sealed against the passage of gas or vapour. Through runs of cables and cables within the cargo spaces shall be protected against damage from impact. Any other equipment which may constitute a source of ignition of flammable vapour shall not be permitted.

3.3 *Detection system*

Ro-ro spaces shall be fitted with a fixed fire detection and fire alarm system complying with the requirements of the Fire Safety Systems Code. All other types of cargo spaces shall be fitted with either a fixed fire detection and fire alarm system or a sample extraction smoke detection system complying with the requirements of the Fire Safety Systems Code. If a sample extraction smoke detection system is fitted, particular attention shall be made to paragraph 2.1.3 in chapter 10 of the Fire Safety Systems Code in order to prevent the leakage of toxic fumes into occupied areas.

3.4 *Ventilation*

3.4.1 Adequate power ventilation shall be provided in enclosed cargo spaces. The arrangement shall be such as to provide for at least six air changes per hour in the cargo space based on an empty cargo space and for removal of vapours from the upper or lower parts of the cargo space, as appropriate.

3.4.2 The fans shall be such as to avoid the possibility of ignition of flammable gas air mixtures. Suitable wire mesh guards shall be fitted over inlet and outlet ventilation openings.

3.4.3 Natural ventilation shall be provided in enclosed cargo spaces intended for the carriage of solid dangerous goods in bulk, where there is no provision for mechanical ventilation.

3.5 *Bilge pumping*

3.5.1 Where it is intended to carry flammable or toxic liquids in enclosed cargo spaces, the bilge pumping system shall be designed to protect against inadvertent pumping of such liquids through machinery space piping or pumps. Where large quantities of such liquids are carried, consideration shall be given to the provision of additional means of draining those cargo spaces.

3.5.2 If the bilge drainage system is additional to the system served by pumps in the machinery space, the capacity of the system shall be not less than 10 m³/h per cargo space served. If the additional system is common, the capacity need not exceed 25 m³/h. The additional bilge system need not be arranged with redundancy.

3.5.3 Whenever flammable or toxic liquids are carried, the bilge line into the machinery space shall be isolated either by fitting a blank flange or by a closed lockable valve.

3.5.4 Enclosed spaces outside machinery spaces containing bilge pumps serving cargo spaces intended for carriage of flammable or toxic liquids shall be fitted with separate mechanical ventilation giving at least six air changes per hour. If the space has access from another enclosed space, the door shall be self-closing.

3.5.5 If bilge drainage of cargo spaces is arranged by gravity drainage, the drainage shall be either led directly overboard or to a closed drain tank located outside the machinery spaces. The tank shall be provided with a vent pipe to a safe location on the open deck. Drainage from a cargo space into bilge wells in a lower space is only permitted if that space satisfies the same requirements as the cargo space above.

3.6 *Personnel protection*

3.6.1 Four sets of full protective clothing resistant to chemical attack shall be provided in addition to the fire-fighter's outfits required by regulation 10.10. The protective clothing shall cover all skin, so that no part of the body is unprotected.

3.6.2 At least two self-contained breathing apparatuses additional to those required by regulation 10 shall be provided. Two spare charges suitable for use with the breathing apparatus shall be provided for each required apparatus. Passenger ships carrying not more than 36 passengers and cargo ships that are equipped with suitably located means for fully recharging the air cylinders free from contamination, need carry only one spare charge for each required apparatus.

3.7 *Portable fire extinguishers*

Portable fire extinguishers with a total capacity of at least 12 kg of dry powder or equivalent shall be provided for the cargo spaces. These extinguishers shall be in addition to any portable fire extinguishers required elsewhere in this chapter.

3.8 *Insulation of machinery space boundaries*

Bulkheads forming boundaries between cargo spaces and machinery spaces of category A shall be insulated to "A-60" class standard, unless the dangerous goods are stowed at least 3 m horizontally away from such bulkheads. Other boundaries between such spaces shall be insulated to "A-60" class standard.

3.9 *Water-spray system*

Each open ro-ro space having a deck above it and each space deemed to be a closed ro-ro space not capable of being sealed, shall be fitted with an approved fixed pressure water-spraying system for manual operation which shall protect all parts of any deck and vehicle platform in the space, except that the Administration may permit the use of any other fixed fire-extinguishing system that has been shown by full-scale test to be no less effective. However, the drainage and pumping arrangements shall be such as to prevent the build-up of free surfaces. The drainage system shall be sized to remove no less than 125% of the combined capacity of both the water-spraying system pumps and the required number of fire hose nozzles. The drainage system valves shall be operable from outside the protected space at a position in the vicinity of the extinguishing system controls. Bilge wells shall be of sufficient holding capacity and shall be arranged at the side shell of the ship at a distance from each other of not more than 40 m in each watertight compartment. If this is not possible the adverse effect upon stability of the added

weight and free surface of water shall be taken into account to the extent deemed necessary by the Administration in its approval of the stability information.

3.10 Separation of ro-ro spaces

3.10.1 In ships having ro-ro spaces, a separation shall be provided between a closed ro-ro space and an adjacent open ro-ro space. The separation shall be such as to minimize the passage of dangerous vapours and liquids between such spaces. Alternatively, such separation need not be provided if the ro-ro space is considered to be a closed cargo space over its entire length and shall fully comply with the relevant special requirements of this regulation.

3.10.2 In ships having ro-ro spaces, a separation shall be provided between a closed ro-ro space and the adjacent weather deck. The separation shall be such as to minimize the passage of dangerous vapours and liquids between such spaces. Alternatively, a separation need not be provided if the arrangements of the closed ro-ro spaces are in accordance with those required for the dangerous goods carried on adjacent weather deck.

4 Document of compliance

The Administration shall provide the ship with an appropriate document as evidence of compliance of construction and equipment with the requirements of this regulation. Certification for dangerous goods, except solid dangerous goods in bulk, is not required for those cargoes specified as class 6.2 and 7, as defined in regulation VII/2, and dangerous goods in limited quantities.

Table 19.1 - Application of the requirements to different modes of carriage of dangerous goods in ships and cargo spaces

Where “X” appears in table 19.1, it means this requirement is applicable to all classes of dangerous goods as given in the appropriate line of table 19.3, except as indicated by the notes.

Regulation 19.2.2 Regulation 19	Weather decks .1 to .5 inclusive	.1 Not specially designed	.2 Container cargo spaces	.3		.4 Solid dangerous goods in bulk	.5 Shipborne barges
				Closed ro-ro spaces ⁵	Open ro-ro spaces		
3.1.1	X	X	X	X	X	For application of requirements of regulation 19 to different classes of dangerous goods, see table 19.2	X
3.1.2	X	X	X	X	X		-
3.1.3	-	X	X	X	X		X
3.1.4	-	X	X	X	X		X ⁴
3.2	-	X	X	X	X		X ⁴
3.3	-	X	X	X	-		X ⁴
3.4.1	-	X	X ¹	X	-		X ⁴
3.4.2	-	X	X ¹	X	-		X ⁴
3.5	-	X	X	X	-		-
3.6.1	X	X	X	X	X		-
3.6.2	X	X	X	X	X		-
3.7	X	X	-	-	X		-
3.8	X	X	X ²	X	X		-
3.9	-	-	-	X ³	X		-
3.10.1	-	-	-	X	-		-
3.10.2	-	-	-	X	-		-

Notes

- 1 For classes 4 and 5.1 not applicable to closed freight containers.

For classes 2, 3, 6.1 and 8 when carried in closed freight containers the ventilation rate may be reduced to not less than two air changes. For the purpose of this requirement a portable tank is a closed freight container.
- 2 Applicable to decks only.
- 3 Applies only to closed ro-ro spaces, not capable of being sealed.
- 4 In the special case where the barges are capable of containing flammable vapours or alternatively if they are capable of discharging flammable vapours to a safe space outside the barge carrier compartment by means of ventilation ducts connected to the barges, these requirements may be reduced or waived to the satisfaction of the Administration.
- 5 Special category spaces shall be treated as closed ro-ro spaces when dangerous goods are carried.

Table 19.2 - Application of the requirements to different classes of dangerous goods for ships and cargo spaces carrying solid dangerous goods in bulk

Class	4.1	4.2	4.3 ⁶	5.1	6.1	8	9
Regulation 19							
3.1.1	X	X	-	X	-	-	X
3.1.2	X	X	-	X	-	-	X
3.2	X	X ⁷	X	X ⁸	-	-	X ⁸
3.4.1	-	X ⁷	X	-	-	-	-
3.4.2	X ⁹	X ⁷	X	X ^{7,9}	-	-	X ^{7,9}
3.4.3	X	X	X	X	X	X	X
3.6	X	X	X	X	X	X	X
3.8	X	X	X	X ⁷	-	-	X ¹⁰

Notes:

- 6 The hazards of substances in this class which may be carried in bulk are such that special consideration shall be given by the Administration to the construction and equipment of the ship involved in addition to meeting the requirements enumerated in this table.
- 7 Only applicable to Seedcake containing solvent extractions, to Ammonium nitrate and to Ammonium nitrate fertilizers.
- 8 Only applicable to Ammonium nitrate and to Ammonium nitrate fertilizers. However, a degree of protection in accordance with standards contained in the International Electrotechnical Commission publication 60079, *Electrical Apparatus for Explosive Gas Atmospheres*, is sufficient.
- 9 Only suitable wire mesh guards are required.
- 10 The requirements of the Code of Safe Practice for Solid bulk Cargoes adopted by resolution A.434(XI), as amended, are sufficient.

Table 19.3 - Application of the requirements to different classes of dangerous goods except solid dangerous goods in bulk

Class	1.1 to 1.6	1.4S	2.1	2.2	2.3	3.1 liquids ≤23°C ¹⁵	3.2 liquids ≤23°C ¹⁵	3.3 liquids >23°C ¹⁵ ≤61°C	4.1	4.2	4.3	5.1	5.2	6.1 liquids	6.1 liquids ≤23°C ¹⁵	6.1 liquids >23°C ¹⁵ ≤61°C	6.1 solids	8 liquids	8 liquids ≤23°C ¹⁵	8 liquids >23°C ¹⁵ ≤61°C	8 solids	9
Regulation 19																						
3.1.1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3.1.2	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	-
3.1.3	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3.1.4	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3.2	X	-	X	-	-	X	X	-	X	X	X	X	-	X	X	X	X	X	X	X	X	-
3.3	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3.4.1	-	-	X	-	X	X	X	-	X ¹¹	X ¹¹	X	X ¹¹	-	-	-	X	X ¹¹	-	X	X	-	X ¹¹
3.4.2	-	-	X	-	-	-	X	-	-	-	-	-	-	-	-	X	-	-	X	X	-	-
3.5	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	X	-	-	X	X	-	-
3.6	-	-	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3.7	-	-	-	-	-	-	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3.8	X ¹²	-	X	X	X	X	X	X	X	X	X	X ¹³	-	-	-	X	-	-	X	X	-	-
3.9	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3.10.1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3.10.2	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Notes

- 11 When "mechanically-ventilated spaces" are required by the International Maritime Dangerous Goods Code, as amended.
- 12 Stow 3 m horizontally away from the machinery space boundaries in all cases.
- 13 Refer to the International Maritime Dangerous Goods Code, as amended.
- 14 As appropriate to the goods to be carried.
- 15 Refers to flashpoint.

Regulation 20

Protection of vehicle, special category and ro-ro spaces

1 Purpose

The purpose of this regulation is to provide additional safety measures in order to address the fire safety objectives of this chapter for ships fitted with vehicle, special category and ro-ro spaces. For this purpose, the following functional requirements shall be met:

- .1 fire protection systems shall be provided to adequately protect the ship from the fire hazards associated with vehicle, special category and ro-ro spaces;
- .2 ignition sources shall be separated from vehicle, special category and ro-ro spaces; and
- .3 vehicle, special category and ro-ro spaces shall be adequately ventilated.

2 General requirements

2.1 *Application*

In addition to complying with the requirements of regulations in parts B, C, D and E, as appropriate, vehicle, special category and ro-ro spaces shall comply with the requirements of this regulation.

2.2 *Basic principles for passenger ships*

2.2.1 The basic principle underlying the provisions of this regulation is that the main vertical zoning required by regulation 9.2 may not be practicable in vehicle spaces of passenger ships and, therefore, equivalent protection must be obtained in such spaces on the basis of a horizontal zone concept and by the provision of an efficient fixed fire-extinguishing system. Based on this concept, a horizontal zone for the purpose of this regulation may include special category spaces on more than one deck provided that the total overall clear height for vehicles does not exceed 10 m.

2.2.2 The basic principle underlying the provisions of paragraph 2.2.1 are also applicable to ro-ro spaces.

2.2.3 The requirements of ventilation systems, openings in "A" class divisions and penetrations in "A" class divisions for maintaining the integrity of vertical zones in this chapter shall be applied equally to decks and bulkheads forming the boundaries separating horizontal zones from each other and from the remainder of the ship.

3 Precaution against ignition of flammable vapours in closed vehicle spaces, closed ro-ro spaces and special category spaces

3.1 *Ventilation systems*

3.1.1 Capacity of ventilation systems

There shall be provided an effective power ventilation system sufficient to give at least the following air changes:

.1	Passenger ships	
	Special category spaces	10 air changes per hour
	Closed ro-ro and vehicle spaces other than special category spaces for ships carrying more than 36 passengers	10 air changes per hour
	Closed ro-ro and vehicle spaces other than special category spaces for ships carrying not more than 36 passengers	6 air changes per hour
.2	Cargo ships	6 air changes per hour

The Administration may require an increased number of air changes when vehicles are being loaded and unloaded.

3.1.2 *Performance of ventilation systems*

3.1.2.1 In passenger ships, the power ventilation system required in paragraph 3.1.1 shall be separate from other ventilation systems and shall be in operation at all times when vehicles are in such spaces. Ventilation ducts serving such cargo spaces capable of being effectively sealed shall be separated for each such space. The system shall be capable of being controlled from a position outside such spaces.

3.1.2.2 In cargo ships, ventilation fans shall normally be run continuously whenever vehicles are on board. Where this is impracticable, they shall be operated for a limited period daily as weather permits and in any case for a reasonable period prior to discharge, after which period the ro-ro or vehicle space shall be proved gas-free. One or more portable combustible gas detecting instruments shall be carried for this purpose. The system shall be entirely separate from other ventilating systems. Ventilation ducts serving ro-ro or vehicle spaces shall be capable of being effectively sealed for each cargo space. The system shall be capable of being controlled from a position outside such spaces.

3.1.2.3 The ventilation system shall be such as to prevent air stratification and the formation of air pockets.

3.1.3 *Indication of ventilation systems*

Means shall be provided on the navigation bridge to indicate any loss of the required ventilating capacity.

3.1.4 *Closing appliances and ducts*

3.1.4.1 Arrangements shall be provided to permit a rapid shutdown and effective closure of the ventilation system from outside of the space in case of fire, taking into account the weather and sea conditions.

3.1.4.2 Ventilation ducts, including dampers, within a common horizontal zone shall be made of steel. In passenger ships, ventilation ducts that pass through other horizontal zones or machinery spaces shall be “A-60” class steel ducts constructed in accordance with regulations 9.7.2.1.1 and 9.7.2.1.2.

3.1.5 *Permanent openings*

Permanent openings in the side plating, the ends or deckhead of the space shall be so situated that a fire in the cargo space does not endanger stowage areas and embarkation stations for survival craft and accommodation spaces, service spaces and control stations in superstructures and deckhouses above the cargo spaces.

3.2 *Electrical equipment and wiring*

3.2.1 Except as provided in paragraph 3.2.2, electrical equipment and wiring shall be of a type suitable for use in an explosive petrol and air mixture.

3.2.2 In case of other than special category spaces below the bulkhead deck, notwithstanding the provisions in paragraph 3.2.1, above a height of 450 mm from the deck and from each platform for vehicles, if fitted, except platforms with openings of sufficient size permitting penetration of petrol gases downwards, electrical equipment of a type so enclosed and protected as to prevent the escape of sparks shall be permitted as an alternative on condition that the ventilation system is so designed and operated as to provide continuous ventilation of the cargo spaces at the rate of at least ten air changes per hour whenever vehicles are on board.

3.3 *Electrical equipment and wiring in exhaust ventilation ducts*

Electrical equipment and wiring, if installed in an exhaust ventilation duct, shall be of a type approved for use in explosive petrol and air mixtures and the outlet from any exhaust duct shall be sited in a safe position, having regard to other possible sources of ignition.

3.4 *Other ignition sources*

Other equipment which may constitute a source of ignition of flammable vapours shall not be permitted.

3.5 *Scuppers and discharges*

Scuppers shall not be led to machinery or other spaces where sources of ignition may be present.

4 **Detection and alarm**

4.1 *Fixed fire detection and fire alarm systems*

Except as provided in paragraph 4.3.1, there shall be provided a fixed fire detection and fire alarm system complying with the requirements of the Fire Safety Systems Code. The fixed fire

detection system shall be capable of rapidly detecting the onset of fire. The type of detectors and their spacing and location shall be to the satisfaction of the Administration, taking into account the effects of ventilation and other relevant factors. After being installed, the system shall be tested under normal ventilation conditions and shall give an overall response time to the satisfaction of the Administration.

4.2 *Sample extraction smoke detection systems*

Except open ro-ro spaces, open vehicle spaces and special category spaces, a sample extraction smoke detection system complying with the requirements of the Fire Safety Systems Code may be used as an alternative of the fixed fire detection and fire alarm system required in paragraph 4.1.

4.3 *Special category spaces*

4.3.1 An efficient fire patrol system shall be maintained in special category spaces. If an efficient fire patrol system is maintained by a continuous fire watch at all times during the voyage, a fixed fire detection and fire alarm systems is not required.

4.3.2 Manually operated call points shall be spaced so that no part of the space is more than 20 m from a manually operated call point, and one shall be placed close to each exit from such spaces.

5 **Structural protection**

Notwithstanding the provisions of regulation 9.2.2, in passenger ships carrying more than 36 passengers, the boundary bulkheads and decks of special category spaces and ro-ro spaces shall be insulated to "A-60" class standard. However, where a category (5), (9) and (10) space, as defined in regulation 9.2.2.3, is on one side of the division, the standard may be reduced to "A-0". Where fuel oil tanks are below a special category space or a ro-ro space, the integrity of the deck between such spaces, may be reduced to "A-0" standard.

6 **Fire-extinction**

6.1 *Fixed fire-extinguishing systems*

6.1.1 Vehicle spaces and ro-ro spaces which are not special category spaces and are capable of being sealed from a location outside of the cargo spaces shall be fitted with a fixed gas fire-extinguishing system which shall comply with the provisions of the Fire Safety Systems Code, except that:

- .1 if a carbon dioxide fire-extinguishing system is fitted, the quantity of gas available shall be at least sufficient to give a minimum volume of free gas equal to 45% of the gross volume of the largest such cargo space which is capable of being sealed, and the arrangements shall be such as to ensure that at least two thirds of the gas required for the relevant space shall be introduced within 10 min;
- .2 any other fixed inert gas fire-extinguishing system or fixed high-expansion foam fire-extinguishing system may be fitted provided the Administration is satisfied that an equivalent protection is achieved; and

- .3 as an alternative, a fire-extinguishing system meeting the requirements of paragraph 6.1.2 may be fitted.

6.1.2 Ro-ro and vehicle spaces not capable of being sealed and special category spaces shall be fitted with an approved fixed pressure water-spraying system for manual operation which shall protect all parts of any deck and vehicle platform in such spaces. Such water-spray systems shall have:

- .1 a pressure gauge on the valve manifold;
- .2 clear marking on each manifold valve indicating the spaces served;
- .3 instructions for maintenance and operation located in the valve room; and
- .4 a sufficient number of drainage valves.

6.1.3 The Administration may permit the use of any other fixed fire-extinguishing system that has been shown that it is not less effective by a full-scale test in conditions simulating a flowing petrol fire in a vehicle space or a ro-ro space in controlling fires likely to occur in such a space.

6.1.4 When fixed pressure water-spraying fire-extinguishing systems are provided, in view of the serious loss of stability which could arise due to large quantities of water accumulating on the deck or decks during the operation of the water-spraying system, the following arrangements shall be provided:

- .1 in passenger ships:
 - .1.1 in the spaces above the bulkhead deck, scuppers shall be fitted so as to ensure that such water is rapidly discharged directly overboard;
 - .1.2.1 in ro-ro passenger ships discharge valves for scuppers, fitted with positive means of closing operable from a position above the bulkhead deck in accordance with the requirements of the International Convention on Load Lines in force, shall be kept open while the ships are at sea;
 - .1.2.2 any operation of valves referred to in paragraph 6.1.4.1.2.1 shall be recorded in the log-book;
 - .1.3 in the spaces below the bulkhead deck, the Administration may require pumping and drainage facilities to be provided additional to the requirements of regulation II-1/21. In such case, the drainage system shall be sized to remove no less than 125% of the combined capacity of both the water spraying system pumps and the required number of fire hose nozzles. The drainage system valves shall be operable from outside the protected space at a position in the vicinity of the extinguishing system controls. Bilge wells shall be of sufficient holding capacity and shall be arranged at the side shell of the ship at a distance from each other of not more than 40 m in each watertight compartment;
- .2 in cargo ships, the drainage and pumping arrangements shall be such as to prevent the build-up of free surfaces. In such case, the drainage system shall be sized to remove no less than 125% of the combined capacity of both the water-spraying

system pumps and the required number of fire hose nozzles. The drainage system valves shall be operable from outside the protected space at a position in the vicinity of the extinguishing system controls. Bilge wells shall be of sufficient holding capacity and shall be arranged at the side shell of the ship at a distance from each other of not more than 40 m in each watertight compartment. If this is not possible, the adverse effect upon stability of the added weight and free surface of water shall be taken into account to the extent deemed necessary by the Administration in its approval of the stability information. Such information shall be included in the stability information supplied to the master as required by regulation II-1/22.

6.2 *Portable fire extinguishers*

6.2.1 Portable fire-extinguishers shall be provided at each deck level in each hold or compartment where vehicles are carried, spaced not more than 20 m apart on both sides of the space. At least one portable fire-extinguisher shall be located at each access to such a cargo space.

6.2.2 In addition to the provision of paragraph 6.2.1, the following fire-extinguishing appliances shall be provided in vehicle, ro-ro and special category spaces intended for the carriage of motor vehicles with fuel in their tanks for their own propulsion:

- .1 at least three water-fog applicators; and
- .2 one portable foam applicator unit complying with the provisions of the Fire Safety Systems Code, provided that at least two such units are available in the ship for use in such spaces. "

CHAPTER V

SAFETY OF NAVIGATION

7 The existing text of chapter V is replaced by the following:

"Regulation 1

Application

1 Unless expressly provided otherwise, this chapter shall apply to all ships on all voyages, except:

- .1 warships, naval auxiliaries and other ships owned or operated by a Contracting Government and used only on government non-commercial service; and
- .2 ships solely navigating the Great Lakes of North America and their connecting and tributary waters as far east as the lower exit of the St. Lambert Lock at Montreal in the Province of Quebec, Canada.

However, warships, naval auxiliaries or other ships owned or operated by a Contracting Government and used only on government non-commercial service are encouraged to act in a manner consistent, so far as reasonable and practicable, with this chapter.

2 The Administration may decide to what extent this chapter shall apply to ships operating solely in waters landward of the baselines which are established in accordance with international law.

3 A rigidly connected composite unit of a pushing vessel and associated pushed vessel, when designed as a dedicated and integrated tug and barge combination, shall be regarded as a single ship for the purpose of this chapter.

4 The Administration shall determine to what extent the provisions of regulations 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27 and 28 do not apply to the following categories of ships:

- .1 ships below 150 gross tonnage engaged on any voyage;
- .2 ships below 500 gross tonnage not engaged on international voyages; and
- .3 fishing vessels.

Regulation 2

Definitions

For the purpose of this chapter:

- 1 *Constructed* in respect of a ship means a stage of construction where:
 - .1 the keel is laid; or
 - .2 construction identifiable with a specific ship begins; or
 - .3 assembly of the ship has commenced comprising at least 50 tonnes or 1% of the estimated mass of all structural material whichever is less.
- 2 *Nautical chart* or *nautical publication* is a special-purpose map or book, or a specially compiled database from which such a map or book is derived, that is issued officially by or on the authority of a Government, authorized Hydrographic Office or other relevant government institution and is designed to meet the requirements of marine navigation.
- 3 *All ships* means any ship, vessel or craft irrespective of type and purpose.

Regulation 3

Exemptions and equivalents

- 1 The Administration may grant general exemptions to ships without mechanical means of propulsion from the requirements of regulations 15, 17, 18, 19 (except 19.2.1.7), 20, 22, 24, 25, 26, 27 and 28.
- 2 The Administration may grant to individual ships exemptions or equivalents of a partial or conditional nature, when any such ship is engaged on a voyage

where the maximum distance of the ship from the shore, the length and nature of the voyage, the absence of general navigational hazards, and other conditions affecting safety are such as to render the full application of this chapter unreasonable or unnecessary, provided that the Administration has taken into account the effect such exemptions and equivalents may have upon the safety of all other ships.

3 Each Administration shall submit to the Organization, as soon as possible after 1 January in each year, a report summarising all new exemptions and equivalents granted under paragraph 2 of this regulation during the previous calendar year and giving the reasons for granting such exemptions and equivalents. The Organization shall circulate such particulars to other Contracting Governments for information.

Regulation 4

Navigational warnings

Each Contracting Government shall take all steps necessary to ensure that, when intelligence of any dangers is received from whatever reliable source, it shall be promptly brought to the knowledge of those concerned and communicated to other interested Governments.

Regulation 5

Meteorological services and warnings

1 Contracting Governments undertake to encourage the collection of meteorological data by ships at sea and to arrange for their examination, dissemination and exchange in the manner most suitable for the purpose of aiding navigation. Administrations shall encourage the use of meteorological instruments of a high degree of accuracy, and shall facilitate the checking of such instruments upon request. Arrangements may be made by appropriate national meteorological services for this checking to be undertaken, free of charge to the ship.

2 In particular, Contracting Governments undertake to carry out, in co-operation, the following meteorological arrangements:

- .1 to warn ships of gales, storms and tropical cyclones by the issue of information in text and, as far as practicable graphic form, using the appropriate shore-based facilities for terrestrial and space radiocommunications services.
- .2 to issue, at least twice daily, by terrestrial and space radiocommunication services, as appropriate, weather information suitable for shipping containing data, analyses, warnings and forecasts of weather, waves and ice. Such information shall be transmitted in text and, as far as practicable, graphic form including meteorological analysis and prognosis charts transmitted by facsimile or in digital form for reconstitution on board the ship's data processing system.
- .3 to prepare and issue such publications as may be necessary for the efficient conduct of meteorological work at sea and to arrange, if practicable, for

the publication and making available of daily weather charts for the information of departing ships.

- .4 to arrange for a selection of ships to be equipped with tested marine meteorological instruments (such as a barometer, a barograph, a psychrometer, and suitable apparatus for measuring sea temperature) for use in this service, and to take, record and transmit meteorological observations at the main standard times for surface synoptic observations (i.e. at least four times daily, whenever circumstances permit) and to encourage other ships to take, record and transmit observations in a modified form, particularly when in areas where shipping is sparse.
- .5 to encourage companies to involve as many of their ships as practicable in the making and recording of weather observations; these observations to be transmitted using the ship's terrestrial or space radiocommunications facilities for the benefit of the various national meteorological services.
- .6 the transmission of these weather observations is free of charge to the ships concerned.
- .7 when in the vicinity of a tropical cyclone, or of a suspected tropical cyclone, ships should be encouraged to take and transmit their observations at more frequent intervals whenever practicable, bearing in mind navigational preoccupations of ships' officers during storm conditions.
- .8 to arrange for the reception and transmission of weather messages from and to ships, using the appropriate shore-based facilities for terrestrial and space radiocommunications services.
- .9 to encourage masters to inform ships in the vicinity and also shore stations whenever they experience a wind speed of 50 knots or more (force 10 on the Beaufort scale).
- .10 to endeavour to obtain a uniform procedure in regard to the international meteorological services already specified, and as far as practicable, to conform to the technical regulations and recommendations made by the World Meteorological Organization, to which Contracting Governments may refer, for study and advice, any meteorological question which may arise in carrying out the present Convention.

3 The information provided for in this regulation shall be furnished in a form for transmission and be transmitted in the order of priority prescribed by the Radio Regulations. During transmission "to all stations" of meteorological information, forecasts and warnings, all ship stations must conform to the provisions of the Radio Regulations.

4 Forecasts, warnings, synoptic and other meteorological data intended for ships shall be issued and disseminated by the national meteorological service in the best position to serve various coastal and high seas areas, in accordance with mutual arrangements made by Contracting Governments, in particular as defined by the World Meteorological Organization's System for the Preparation and Dissemination of

Meteorological Forecasts and Warnings for the High Seas under the Global Maritime Distress and Safety System (GMDSS).

Regulation 6

Ice Patrol Service

1 The Ice Patrol contributes to safety of life at sea, safety and efficiency of navigation and protection of the marine environment in the North Atlantic. Ships transiting the region of icebergs guarded by the Ice Patrol during the ice season are required to make use of the services provided by the Ice Patrol.

2 The Contracting Governments undertake to continue an ice patrol and a service for study and observation of ice conditions in the North Atlantic. During the whole of the ice season, i.e. for the period from February 15th through July 1st of each year, the south-eastern, southern and south-western limits of the region of icebergs in the vicinity of the Grand Banks of Newfoundland shall be guarded for the purpose of informing passing ships of the extent of this dangerous region; for the study of ice conditions in general; and for the purpose of affording assistance to ships and crews requiring aid within the limits of operation of the patrol ships and aircraft. During the rest of the year the study and observation of ice conditions shall be maintained as advisable.

3 Ships and aircraft used for the ice patrol service and the study and observation of ice conditions may be assigned other duties provided that such other duties do not interfere with the primary purpose or increase the cost of this service.

4 The Government of the United States of America agrees to continue the overall management of the ice patrol service and the study and observation of ice conditions, including the dissemination of information therefrom.

5 The terms and conditions governing the management, operation and financing of the Ice Patrol are set forth in the Rules for the management, operation and financing of the North Atlantic Ice Patrol appended to this chapter which shall form an integral part of this chapter.

6 If, at any time, the United States and/or Canadian Governments should desire, to discontinue providing these services, it may do so and the Contracting Governments shall settle the question of continuing these services in accordance with their mutual interests. The United States and/or Canadian Governments shall provide 18 months written notice to all Contracting Governments whose ships entitled to fly their flag and whose ships registered in territories to which those Contracting Governments have extended this regulation benefit from these services before discontinuing providing these services.

Regulation 7

Search and rescue services

1 Each Contracting Government undertakes to ensure that necessary arrangements are made for distress communication and co-ordination in their area of responsibility and for the rescue of persons in distress at sea around its coasts. These arrangements shall include the establishment, operation and maintenance of such search and rescue facilities

as are deemed practicable and necessary, having regard to the density of the seagoing traffic and the navigational dangers and shall, so far as possible, provide adequate means of locating and rescuing such persons.

2 Each Contracting Government undertakes to make available information to the Organization concerning its existing search and rescue facilities and the plans for changes therein, if any.

3 Passenger ships to which chapter I applies, shall have on board a plan for co-operation with appropriate search and rescue services in event of an emergency. The plan shall be developed in co-operation between the ship, the company, as defined in regulation IX/1 and the search and rescue services. The plan shall include provisions for periodic exercises to be undertaken to test its effectiveness. The plan shall be developed based on the guidelines developed by the Organization.

Regulation 8

Life-saving signals

Contracting Governments undertake to arrange that life-saving signals are used by search and rescue facilities engaged in search and rescue operations when communicating with ships or persons in distress.

Regulation 9

Hydrographic services

1 Contracting Governments undertake to arrange for the collection and compilation of hydrographic data and the publication, dissemination and keeping up to date of all nautical information necessary for safe navigation.

2 In particular, Contracting Governments undertake to co-operate in carrying out, as far as possible, the following nautical and hydrographic services, in the manner most suitable for the purpose of aiding navigation:

- .1 to ensure that hydrographic surveying is carried out, as far as possible, adequate to the requirements of safe navigation;
- .2 to prepare and issue nautical charts, sailing directions, lists of lights, tide tables and other nautical publications, where applicable, satisfying the needs of safe navigation;
- .3 to promulgate notices to mariners in order that nautical charts and publications are kept, as far as possible, up to date; and
- .4 to provide data management arrangements to support these services.

3 Contracting Governments undertake to ensure the greatest possible uniformity in charts and nautical publications and to take into account, whenever possible, relevant international resolutions and recommendations.

4 Contracting Governments undertake to co-ordinate their activities to the greatest possible degree in order to ensure that hydrographic and nautical information is made available on a world-wide scale as timely, reliably, and unambiguously as possible.

Regulation 10

Ships' routeing

1 Ships' routeing systems contribute to safety of life at sea, safety and efficiency of navigation and/or protection of the marine environment. Ships' routeing systems are recommended for use by, and may be made mandatory for, all ships, certain categories of ships or ships carrying certain cargoes, when adopted and implemented in accordance with the guidelines and criteria developed by the Organization.

2 The Organization is recognized as the only international body for developing guidelines, criteria and regulations on an international level for ships' routeing systems. Contracting Governments shall refer proposals for the adoption of ships' routeing systems to the Organization. The Organization will collate and disseminate to Contracting Governments all relevant information with regard to any adopted ships' routeing systems.

3 The initiation of action for establishing a ships' routeing system is the responsibility of the Government or Governments concerned. In developing such systems for adoption by the Organization, the guidelines and criteria developed by the Organization* shall be taken into account.

4 Ships' routeing systems should be submitted to the Organization for adoption. However, a Government or Governments implementing ships' routeing systems not intended to be submitted to the Organization for adoption or which have not been adopted by the Organization are encouraged to take into account, wherever possible, the guidelines and criteria developed by the Organization.

5 Where two or more Governments have a common interest in a particular area, they should formulate joint proposals for the delineation and use of a routeing system therein on the basis of an agreement between them. Upon receipt of such proposal and before proceeding with consideration of it for adoption, the Organization shall ensure details of the proposal are disseminated to the Governments which have a common interest in the area, including countries in the vicinity of the proposed ships' routeing system.

6 Contracting Governments shall adhere to the measures adopted by the Organization concerning ships' routeing. They shall promulgate all information necessary for the safe and effective use of adopted ships' routeing systems. A Government or Governments concerned may monitor traffic in those systems. Contracting Governments shall do everything in their power to secure the appropriate use of ships' routeing systems adopted by the Organization.

7 A ship shall use a mandatory ships' routeing system adopted by the Organization as required for its category or cargo carried and in accordance with the relevant provisions in force unless there are compelling reasons not to use a particular ships' routeing system. Any such reason shall be recorded in the ships' log.

8 Mandatory ships' routeing systems shall be reviewed by the Contracting Government or Governments concerned in accordance with the guidelines and criteria developed by the Organization.

9 All adopted ships' routeing systems and actions taken to enforce compliance with those systems shall be consistent with international law, including the relevant provisions of the 1982 United Nations Convention on the Law of the Sea.

10 Nothing in this regulation nor its associated guidelines and criteria shall prejudice the rights and duties of Governments under international law or the legal regimes of straits used for international navigation and archipelagic sea lanes.

Regulation 11

Ship reporting systems

1 Ship reporting systems contribute to safety of life at sea, safety and efficiency of navigation and/or protection of the marine environment. A ship reporting system, when adopted and implemented in accordance with the guidelines and criteria developed by the Organization pursuant to this regulation, shall be used by all ships, or certain categories of ships or ships carrying certain cargoes in accordance with the provisions of each system so adopted.

2 The Organization is recognized as the only international body for developing guidelines, criteria and regulations on an international level for ship reporting systems. Contracting Government shall refer proposals for the adoption of ship reporting systems to the Organization. The Organization will collate and disseminate to Contracting Governments all relevant information with regard to any adopted ship reporting system.

3 The initiation of action for establishing a ship reporting system is the responsibility of the Government or Governments concerned. In developing such systems provision of the guidelines and criteria developed by the Organization shall be taken into account.

4 Ship reporting systems not submitted to the Organization for adoption do not necessarily need to comply with this regulation. However, Governments implementing such systems are encouraged to follow, wherever possible, the guidelines and criteria developed by the Organization. Contracting Governments may submit such systems to the Organization for recognition.

5 Where two or more Governments have a common interest in a particular area, they should formulate proposals for a co-ordinated ship reporting system on the basis of agreement between them. Before proceeding with a proposal for adoption of a ship reporting system, the Organization shall disseminate details of the proposal to those Governments which have a common interest in the area covered by the proposed system. Where a co-ordinated ship reporting system is adopted and established, it shall have uniform procedures and operations.

6 After adoption of a ship reporting system in accordance with this regulation, the Government or Governments concerned shall take all measures necessary for the promulgation of any information needed for the efficient and effective use of the system. Any adopted ship reporting system shall have the capability of interaction and the ability

to assist ships with information when necessary. Such systems shall be operated in accordance with the guidelines and criteria developed by the Organization pursuant to this regulation.

7 The master of a ship shall comply with the requirements of adopted ship reporting systems and report to the appropriate authority all information required in accordance with the provisions of each such system.

8 All adopted ship reporting systems and actions taken to enforce compliance with those systems shall be consistent with international law, including the relevant provisions of the United Nations Convention on the Law of the Sea.

9 Nothing in this regulation or its associated guidelines and criteria shall prejudice the rights and duties of Governments under international law or the legal regimes of straits used for international navigation and archipelagic sea lanes.

10 The participation of ships in accordance with the provisions of adopted ship reporting systems shall be free of charge to the ships concerned.

11 The Organization shall ensure that adopted ship reporting systems are reviewed under the guidelines and criteria developed by the Organization.

Regulation 12

Vessel traffic services

1 Vessel traffic services (VTS) contribute to safety of life at sea, safety and efficiency of navigation and protection of the marine environment, adjacent shore areas, work sites and offshore installations from possible adverse effects of maritime traffic.

2 Contracting Governments undertake to arrange for the establishment of VTS where, in their opinion, the volume of traffic or the degree of risk justifies such services.

3 Contracting Governments planning and implementing VTS shall, wherever possible, follow the guidelines developed by the Organization. The use of VTS may only be made mandatory in sea areas within the territorial seas of a coastal State.

4 Contracting Governments shall endeavour to secure the participation in, and compliance with, the provisions of vessel traffic services by ships entitled to fly their flag.

5 Nothing in this regulation or the guidelines adopted by the Organization shall prejudice the rights and duties of Governments under international law or the legal regimes of straits used for international navigation and archipelagic sea lanes.

Regulation 13

Establishment and operation of aids to navigation

1 Each Contracting Government undertakes to provide, as it deems practical and necessary either individually or in co-operation with other Contracting Governments, such aids to navigation as the volume of traffic justifies and the degree of risk requires.

2 In order to obtain the greatest possible uniformity in aids to navigation, Contracting Governments undertake to take into account the international recommendations and guidelines when establishing such aids.

3 Contracting Governments undertake to arrange for information relating to aids to navigation to be made available to all concerned. Changes in the transmissions of position-fixing systems which could adversely affect the performance of receivers fitted in ships shall be avoided as far as possible and only be effected after timely and adequate notice has been promulgated.

Regulation 14

Ships' manning

1 Contracting Governments undertake, each for its national ships, to maintain, or, if it is necessary, to adopt, measures for the purpose of ensuring that, from the point of view of safety of life at sea, all ships shall be sufficiently and efficiently manned.

2 Every ship to which chapter I applies shall be provided with an appropriate minimum safe manning document or equivalent issued by the Administration as evidence of the minimum safe manning considered necessary to comply with the provisions of paragraph 1.

3 On all ships, to ensure effective crew performance in safety matters, a working language shall be established and recorded in the ship's log-book. The company, as defined in regulation IX/1, or the master, as appropriate, shall determine the appropriate working language. Each seafarer shall be required to understand and, where appropriate, give orders and instructions and to report back in that language. If the working language is not an official language of the State whose flag the ship is entitled to fly, all plans and lists required to be posted shall include a translation into the working language.

4 On ships to which chapter I applies, English shall be used on the bridge as the working language for bridge-to-bridge and bridge-to-shore safety communications as well as for communications on board between the pilot and bridge watchkeeping personnel, unless those directly involved in the communication speak a common language other than English.

Regulation 15

Principles relating to bridge design, design and arrangement of navigational systems and equipment and bridge procedures

All decisions which are made for the purpose of applying the requirements of regulations 19, 22, 24, 25, 27 and 28 and which affect bridge design, the design and arrangement of navigational systems and equipment on the bridge and bridge procedures shall be taken with the aim of:

- .1 facilitating the tasks to be performed by the bridge team and the pilot in making full appraisal of the situation and in navigating the ship safely under all operational conditions;
- .2 promoting effective and safe bridge resource management;

- .3 enabling the bridge team and the pilot to have convenient and continuous access to essential information which is presented in a clear and unambiguous manner, using standardized symbols and coding systems for controls and displays;
- .4 indicating the operational status of automated functions and integrated components, systems and/or sub-systems;
- .5 allowing for expeditious, continuous and effective information processing and decision-making by the bridge team and the pilot;
- .6 preventing or minimizing excessive or unnecessary work and any conditions or distractions on the bridge which may cause fatigue or interfere with the vigilance of the bridge team and the pilot; and
- .7 minimizing the risk of human error and detecting such error if it occurs, through monitoring and alarm systems, in time for the bridge team and the pilot to take appropriate action.

Regulation 16

Maintenance of equipment

1 The Administration shall be satisfied that adequate arrangements are in place to ensure that the performance of the equipment required by this chapter is maintained.

2 Except as provided in regulations I/7(b)(ii), I/8 and I/9, while all reasonable steps shall be taken to maintain the equipment required by this chapter in efficient working order, malfunctions of that equipment shall not be considered as making the ship unseaworthy or as a reason for delaying the ship in ports where repair facilities are not readily available, provided suitable arrangements are made by the master to take the inoperative equipment or unavailable information into account in planning and executing a safe voyage to a port where repairs can take place.

Regulation 17

Electromagnetic compatibility

1 Administrations shall ensure that all electrical and electronic equipment on the bridge or in the vicinity of the bridge, on ships constructed on or after 1 July 2002, is tested for electromagnetic compatibility taking into account the recommendations developed by the Organization.

2 Electrical and electronic equipment shall be so installed that electromagnetic interference does not affect the proper function of navigational systems and equipment.

3 Portable electrical and electronic equipment shall not be operated on the bridge if it may affect the proper function of navigational systems and equipment.

Regulation 18

Approval, surveys and performance standards of navigational systems and equipment and voyage data recorder

- 1 Systems and equipment required to meet the requirements of regulations 19 and 20 shall be of a type approved by the Administration.
- 2 Systems and equipment, including associated back-up arrangements, where applicable, installed on or after 1 July 2002 to perform the functional requirements of regulations 19 and 20 shall conform to appropriate performance standards not inferior to those adopted by the Organization.
- 3 When systems and equipment are replaced or added to on ships constructed before 1 July 2002, such systems and equipment shall, in so far as is reasonable and practicable, comply with the requirements of paragraph 2.
- 4 Systems and equipment installed prior to the adoption of performance standards by the Organization may subsequently be exempted from full compliance with such standards at the discretion of the Administration, having due regard to the recommended criteria adopted by the Organization. However, for an electronic chart display and information system (ECDIS) to be accepted as satisfying the chart carriage requirement of regulation 19.2.1.4, that system shall conform to the relevant performance standards not inferior to those adopted by the Organization in effect on the date of installation, or, for systems installed before 1 January 1999, not inferior to the performance standards adopted by the Organization on 23 November 1995.
- 5 The Administration shall require that the manufacturers have a quality control system audited by a competent authority to ensure continuous compliance with the type approval conditions. Alternatively, the Administration may use final product verification procedures where the compliance with the type approval certificate is verified by a competent authority before the product is installed on board ships.
- 6 Before giving approval to systems or equipment embodying new features not covered by this chapter, the Administration shall ensure that such features support functions at least as effective as those required by this chapter.
- 7 When equipment, for which performance standards have been developed by the Organization, is carried on ships in addition to those items of equipment required by regulations 19 and 20, such equipment shall be subject to approval and shall as far as practicable comply with performance standards not inferior to those adopted by the Organization.
- 8 The voyage data recorder system, including all sensors, shall be subjected to an annual performance test. The test shall be conducted by an approved testing or servicing facility to verify the accuracy, duration and recoverability of the recorded data. In addition, tests and inspections shall be conducted to determine the serviceability of all protective enclosures and devices fitted to aid location. A copy of the certificate of compliance issued by the testing facility, stating the date of compliance and the applicable performance standards, shall be retained on board the ship.

Regulation 19

Carriage requirements for shipborne navigational systems and equipment

1 Application and requirements

Subject to the provisions of regulation 1.4:

1.1 Ships constructed on or after 1 July 2002 shall be fitted with navigational systems and equipment which will fulfil the requirements prescribed in paragraphs 2.1 to 2.9.

1.2 Ships constructed before 1 July 2002 shall:

- .1 subject to the provisions of paragraphs 1.2.2 and 1.2.3, unless they comply fully with this regulation, continue to be fitted with equipment which fulfils the requirements prescribed in regulations V/11, V/12 and V/20 of the International Convention for the Safety of Life at Sea, 1974 in force prior to 1 July 2002;
- .2 be fitted with the equipment or systems required in paragraph 2.1.6 not later than the first survey after 1 July 2002 at which time the radio direction-finding apparatus referred to in V/12 (p) of the International Convention for the Safety of Life at Sea, 1974 in force prior to 1 July 2002 shall no longer be required; and
- .3 be fitted with the system required in paragraph 2.4 not later than the dates specified in paragraphs 2.4.2 and 2.4.3.

2 Shipborne navigational equipment and systems

2.1 All ships irrespective of size shall have:

- .1 a properly adjusted standard magnetic compass, or other means, independent of any power supply to determine the ship's heading and display the reading at the main steering position;
- .2 a pelorus or compass bearing device, or other means, independent of any power supply to take bearings over an arc of the horizon of 360°;
- .3 means of correcting heading and bearings to true at all times;
- .4 nautical charts and nautical publications to plan and display the ship's route for the intended voyage and to plot and monitor positions throughout the voyage; an electronic chart display and information system (ECDIS) may be accepted as meeting the chart carriage requirements of this subparagraph;
- .5 back-up arrangements to meet the functional requirements of subparagraph .4, if this function is partly or fully fulfilled by electronic means;

- .6 a receiver for a global navigation satellite system or a terrestrial radionavigation system, or other means, suitable for use at all times throughout the intended voyage to establish and update the ship's position by automatic means;
- .7 if less than 150 gross tonnage and if practicable, a radar reflector, or other means, to enable detection by ships navigating by radar at both 9 and 3 GHz;
- .8 when the ship's bridge is totally enclosed and unless the Administration determines otherwise, a sound reception system, or other means, to enable the officer in charge of the navigational watch to hear sound signals and determine their direction;
- .9 a telephone, or other means, to communicate heading information to the emergency steering position, if provided.

2.2 All ships of 150 gross tonnage and upwards and passenger ships irrespective of size shall, in addition to the requirements of paragraph 2.1, be fitted with:

- .1 a spare magnetic compass interchangeable with the magnetic compass, as referred to in paragraph 2.1.1, or other means to perform the function referred to in paragraph 2.1.1 by means of replacement or duplicate equipment;
- .2 a daylight signalling lamp, or other means to communicate by light during day and night using an energy source of electrical power not solely dependent upon the ship's power supply.

2.3 All ships of 300 gross tonnage and upwards and passenger ships irrespective of size shall, in addition to meeting the requirements of paragraph 2.2, be fitted with:

- .1 an echo sounding device, or other electronic means, to measure and display the available depth of water;
- .2 a 9 GHz radar, or other means to determine and display the range and bearing of radar transponders and of other surface craft, obstructions, buoys, shorelines and navigational marks to assist in navigation and in collision avoidance;
- .3 an electronic plotting aid, or other means, to plot electronically the range and bearing of targets to determine collision risk;
- .4 speed and distance measuring device, or other means, to indicate speed and distance through the water;
- .5 a properly adjusted transmitting heading device, or other means to transmit heading information for input to the equipment referred to in paragraphs 2.3.2, 2.3.3 and 2.4.

2.4 All ships of 300 gross tonnage and upwards engaged on international voyages and cargo ships of 500 gross tonnage and upwards not engaged on international voyages

and passenger ships irrespective of size shall be fitted with an automatic identification system (AIS), as follows:

- .1 ships constructed on or after 1 July 2002;
- .2 ships engaged on international voyages constructed before 1 July 2002:
 - .2.1 in the case of passenger ships, not later than 1 July 2003;
 - .2.2 in the case of tankers, not later than the first survey for safety equipment on or after 1 July 2003;
 - .2.3 in the case of ships, other than passenger ships and tankers, of 50,000 gross tonnage and upwards, not later than 1 July 2004;
 - .2.4 in the case of ships, other than passenger ships and tankers, of 10,000 gross tonnage and upwards but less than 50,000 gross tonnage, not later than 1 July 2005;
 - .2.5 in the case of ships, other than passenger ships and tankers, of 3,000 gross tonnage and upwards but less than 10,000 gross tonnage, not later than 1 July 2006.
 - .2.6 in the case of ships, other than passenger ships and tankers, of 300 gross tonnage and upwards but less than 3,000 gross tonnage, not later than 1 July 2007; and
- .3 ships not engaged on international voyages constructed before 1 July 2002, not later than 1 July 2008;
- .4 the Administration may exempt ships from the application of the requirements of this paragraph when such ships will be taken permanently out of service within two years after the implementation date specified in subparagraphs .2 and .3;
- .5 AIS shall:
 - .1 provide automatically to appropriately equipped shore stations, other ships and aircraft information, including the ship's identity, type, position, course, speed, navigational status and other safety-related information;
 - .2 receive automatically such information from similarly fitted ships;
 - .3 monitor and track ships; and
 - .4 exchange data with shore-based facilities;
- .6 the requirements of paragraph 2.4.5 shall not be applied to cases where international agreements, rules or standards provide for the protection of navigational information; and
- .7 AIS shall be operated taking into account the guidelines adopted by the Organization.

2.5 All ships of 500 gross tonnage and upwards shall, in addition to meeting the requirements of paragraph 2.3 with the exception of paragraphs 2.3.3 and 2.3.5, and the requirements of paragraph 2.4, have:

- .1 a gyro compass, or other means, to determine and display their heading by shipborne non-magnetic means and to transmit heading information for input to the equipment referred in paragraphs 2.3.2, 2.4 and 2.5.5;
- .2 a gyro compass heading repeater, or other means, to supply heading information visually at the emergency steering position if provided;
- .3 a gyro compass bearing repeater, or other means, to take bearings, over an arc of the horizon of 360°, using the gyro compass or other means referred to in subparagraph .1. However ships less than 1,600 gross tonnage shall be fitted with such means as far as possible;
- .4 rudder, propeller, thrust, pitch and operational mode indicators, or other means to determine and display rudder angle, propeller revolutions, the force and direction of thrust and, if applicable, the force and direction of lateral thrust and the pitch and operational mode, all to be readable from the conning position; and
- .5 an automatic tracking aid, or other means, to plot automatically the range and bearing of other targets to determine collision risk.

2.6 On all ships of 500 gross tonnage and upwards, failure of one piece of equipment should not reduce the ship's ability to meet the requirements of paragraphs 2.1.1, 2.1.2 and 2.1.4.

2.7 All ships of 3000 gross tonnage and upwards shall, in addition to meeting the requirements of paragraph 2.5, have:

- .1 a 3 GHz radar or where considered appropriate by the Administration a second 9 GHz radar, or other means to determine and display the range and bearing of other surface craft, obstructions, buoys, shorelines and navigational marks to assist in navigation and in collision avoidance, which are functionally independent of those referred to in paragraph 2.3.2; and
- .2 a second automatic tracking aid, or other means to plot automatically the range and bearing of other targets to determine collision risk which are functionally independent of those referred to in paragraph 2.5.5.

2.8 All ships of 10,000 gross tonnage and upwards shall, in addition to meeting the requirements of paragraph 2.7 with the exception of paragraph 2.7.2, have:

- .1 an automatic radar plotting aid, or other means, to plot automatically the range and bearing of at least 20 other targets, connected to a device to indicate speed and distance through the water, to determine collision risks and simulate a trial manoeuvre; and

- .2 a heading or track control system, or other means, to automatically control and keep to a heading and/or straight track.

2.9 All ships of 50,000 gross tonnage and upwards shall, in addition to meeting the requirements of paragraph 2.8, have:

- .1 a rate of turn indicator, or other means, to determine and display the rate of turn; and
- .2 a speed and distance measuring device, or other means, to indicate speed and distance over the ground in the forward and athwartships direction.

3 When "other means" are permitted under this regulation, such means must be approved by Administration in accordance with regulation 18.

4 The navigational equipment and systems referred to in this regulation shall be so installed, tested and maintained as to minimize malfunction.

5 Navigational equipment and systems offering alternative modes of operation shall indicate the actual mode of use.

6 Integrated bridge systems shall be so arranged that failure of one sub-system is brought to immediate attention of the officer in charge of the navigational watch by audible and visual alarms, and does not cause failure to any other sub-system. In case of failure in one part of an integrated navigational system, it shall be possible to operate each other individual item of equipment or part of the system separately.

Regulation 20

Voyage data recorders

1 To assist in casualty investigations, ships, when engaged on international voyages, subject to the provisions of regulation 1.4, shall be fitted with a voyage data recorder (VDR) as follows:

- .1 passenger ships constructed on or after 1 July 2002;
- .2 ro-ro passenger ships constructed before 1 July 2002 not later than the first survey on or after 1 July 2002;
- .3 passenger ships other than ro-ro passenger ships constructed before 1 July 2002 not later than 1 January 2004; and
- .4 ships, other than passenger ships, of 3,000 gross tonnage and upwards constructed on or after 1 July 2002.

2 Administrations may exempt ships, other than ro-ro passenger ships, constructed before 1 July 2002 from being fitted with a VDR where it can be demonstrated that interfacing a VDR with the existing equipment on the ship is unreasonable and impracticable.

Regulation 21

International Code of Signals

All ships which, in accordance with the present Convention, are required to carry a radio installation shall carry the International Code of Signals as may be amended by the Organization. The Code shall also be carried by any other ship which, in the opinion of the Administration, has a need to use it.

Regulation 22

Navigation bridge visibility

1 Ships of not less than 45 m in length as defined in regulation III/3.12, constructed on or after 1 July 1998, shall meet the following requirements:

- .1 The view of the sea surface from the conning position shall not be obscured by more than two ship lengths, or 500 m, whichever is the less, forward of the bow to 10° on either side under all conditions of draught, trim and deck cargo;
- .2 No blind sector caused by cargo, cargo gear or other obstructions outside of the wheelhouse forward of the beam which obstructs the view of the sea surface as seen from the conning position, shall exceed 10° . The total arc of blind sectors shall not exceed 20° . The clear sectors between blind sectors shall be at least 5° . However, in the view described in .1, each individual blind sector shall not exceed 5° ;
- .3 The horizontal field of vision from the conning position shall extend over an arc of not less than 225° , that is from right ahead to not less than 22.5° , abaft the beam on either side of the ship;
- .4 From each bridge wing the horizontal field of vision shall extend over an arc at least 225° , that is from at least 45° on the opposite bow through right ahead and then from right ahead to right astern through 180° on the same side of the ship;
- .5 From the main steering position the horizontal field of vision shall extend over an arc from right ahead to at least 60° on each side of the ship;
- .6 The ship's side shall be visible from the bridge wing;
- .7 The height of the lower edge of the navigation bridge front windows above the bridge deck shall be kept as low as possible. In no case shall the lower edge present an obstruction to the forward view as described in this regulation;
- .8 The upper edge of the navigation bridge front windows shall allow a forward view of the horizon, for a person with a height of eye of 1,800 mm above the bridge deck at the conning position, when the ship is pitching in heavy seas. The Administration, if satisfied that a 1,800 mm height of eye

is unreasonable and impractical, may allow reduction of the height of eye but not less than 1,600 mm;

.9 Windows shall meet the following requirements:

.9.1 To help avoid reflections, the bridge front windows shall be inclined from the vertical plane top out, at an angle of not less than 10° and not more than 25°.

.9.2 Framing between navigation bridge windows shall be kept to a minimum and not be installed immediately forward of any work station.

.9.3 Polarized and tinted windows shall not be fitted.

.9.4 A clear view through at least two of the navigation bridge front windows and, depending on the bridge configuration, an additional number of clear-view windows shall be provided at all times, regardless of weather conditions.

2 Ships constructed before 1 July 1998 shall, where practicable, meet the requirements of paragraphs 1.1 and 1.2. However, structural alterations or additional equipment need not be required.

3 On ships of unconventional design which, in the opinion of the Administration, cannot comply with this regulation, arrangements shall be provided to achieve a level of visibility that is as near as practical to that prescribed in this regulation.

Regulation 23

Pilot transfer arrangements

1 Application

1.1 Ships engaged on voyages in the course of which pilots are likely to be employed shall be provided with pilot transfer arrangements.

1.2 Equipment and arrangements for pilot transfer which are installed on or after 1 January 1994 shall comply with the requirements of this regulation, and due regard shall be paid to the standards adopted by the Organization.

1.3 Equipments and arrangements for pilot transfer which are provided on ships before 1 January 1994 shall at least comply with the requirements of regulation 17 of the International Convention for the Safety of Life at Sea, 1974 in force prior to that date, and due regard shall be paid to the standards adopted by the Organization prior to that date.

1.4 Equipment and arrangements which are replaced after 1 January 1994 shall, in so far as is reasonable and practicable, comply with the requirements of this regulation.

2 General

2.1 All arrangements used for pilot transfer shall efficiently fulfill their purpose of enabling pilots to embark and disembark safely. The appliances shall be kept clean, properly maintained and stowed and shall be regularly inspected to ensure that they are safe to use. They shall be used solely for the embarkation and disembarkation of personnel.

2.2 The rigging of the pilot transfer arrangements and the embarkation of a pilot shall be supervised by a responsible officer having means of communication with the navigation bridge who shall also arrange for the escort of the pilot by a safe route to and from the navigation bridge. Personnel engaged in rigging and operating any mechanical equipment shall be instructed in the safe procedures to be adopted and the equipment shall be tested prior to use.

3 Transfer arrangements

3.1 Arrangements shall be provided to enable the pilot to embark and disembark safely on either side of the ship.

3.2 In all ships where the distance from sea level to the point of access to, or egress from, the ship exceeds 9 m, and when it is intended to embark and disembark pilots by means of the accommodation ladder, or by means of mechanical pilot hoists or other equally safe and convenient means in conjunction with a pilot ladder, the ship shall carry such equipment on each side, unless the equipment is capable of being transferred for use on either side.

3.3 Safe and convenient access to, and egress from, the ship shall be provided by either:

- .1 a pilot ladder requiring a climb of not less than 1.5 m and not more than 9 m above the surface of the water so positioned and secured that:
 - .1.1 it is clear of any possible discharges from the ship;
 - .1.2 it is within the parallel body length of the ship and, as far as is practicable, within the mid-ship half length of the ship;
 - .1.3 each step rests firmly against the ship's side; where constructional features, such as rubbing bands, would prevent the implementation of this provision, special arrangements shall, to the satisfaction of the Administration, be made to ensure that persons are able to embark and disembark safely;
 - .1.4 the single length of pilot ladder is capable of reaching the water from the point of access to, or egress from, the ship and due allowance is made for all conditions of loading and trim of the ship, and for an adverse list of 15°; the securing strong point, shackles and securing ropes shall be at least as strong as the side ropes;

- .2 an accommodation ladder in conjunction with the pilot ladder, or other equally safe and convenient means, whenever the distance from the surface of the water to the point of access to the ship is more than 9 m. The accommodation ladder shall be sited leading aft. When in use, the lower end of the accommodation ladder shall rest firmly against the ship's side within the parallel body length of the ship and, as far as is practicable, within the mid-ship half length and clear of all discharges; or
- .3 a mechanical pilot hoist so located that it is within the parallel body length of the ship and, as far as is practicable, within the mid-ship half length of the ship and clear of all discharges.

4 Access to the ship's deck

Means shall be provided to ensure safe, convenient and unobstructed passage for any person embarking on, or disembarking from, the ship between the head of the pilot ladder, or of any accommodation ladder or other appliance, and the ship's deck. Where such passage is by means of:

- .1 a gateway in the rails or bulwark, adequate handholds shall be provided;
- .2 a bulwark ladder, two handhold stanchions rigidly secured to the ship's structure at or near their bases and at higher points shall be fitted. The bulwark ladder shall be securely attached to the ship to prevent overturning.

5 Shiplide doors

Shiplide doors used for pilot transfer shall not open outwards.

6 Mechanical pilot hoists

6.1 The mechanical pilot hoist and its ancillary equipment shall be of a type approved by the Administration. The pilot hoist shall be designed to operate as a moving ladder to lift and lower one person on the side of the ship, or as a platform to lift and lower one or more persons on the side of the ship. It shall be of such design and construction as to ensure that the pilot can be embarked and disembarked in a safe manner, including a safe access from the hoist to the deck and vice versa. Such access shall be gained directly by a platform securely guarded by handrails.

6.2 Efficient hand gear shall be provided to lower or recover the person or persons carried, and kept ready for use in the event of power failure.

6.3 The hoist shall be securely attached to the structure of the ship. Attachment shall not be solely by means of the ship's side rails. Proper and strong attachment points shall be provided for hoists of the portable type on each side of the ship.

6.4 If belting is fitted in the way of the hoist position, such belting shall be cut back sufficiently to allow the hoist to operate against the ship's side.

6.5 A pilot ladder shall be rigged adjacent to the hoist and available for immediate use so that access to it is available from the hoist at any point of its travel. The pilot ladder shall be capable of reaching the sea level from its own point of access to the ship.

6.6 The position on the ship's side where the hoist will be lowered shall be indicated.

6.7 An adequate protected stowage position shall be provided for the portable hoist. In very cold weather, to avoid the danger of ice formation, the portable hoist shall not be rigged until its use is imminent.

7 Associated equipment

7.1 The following associated equipment shall be kept at hand ready for immediate use when persons are being transferred;

- .1 two man-ropes of not less than 28 mm in diameter properly secured to the ship if required by the pilot;
- .2 a lifebuoy equipped with a self-igniting light;
- .3 a heaving line.

7.2 When required by paragraph 4, stanchions and bulwark ladders shall be provided.

8 Lighting

Adequate lighting shall be provided to illuminate the transfer arrangements overside, the position on deck where a person embarks or disembarks and the controls of the mechanical pilot hoist.

Regulation 24

Use of heading and/or track control systems

1 In areas of high traffic density, in conditions of restricted visibility and in all other hazardous navigational situations where heading and/or track control systems are in use, it shall be possible to establish manual control of the ship's steering immediately.

2 In circumstances as above, the officer in charge of the navigational watch shall have available without delay the services of a qualified helmsperson who shall be ready at all times to take over steering control.

3 The change-over from automatic to manual steering and vice versa shall be made by or under the supervision of a responsible officer.

4 The manual steering shall be tested after prolonged use of heading and/or track control systems, and before entering areas where navigation demands special caution.

Regulation 25

Operation of steering gear

In areas where navigation demands special caution, ships shall have more than one steering gear power unit in operation when such units are capable of simultaneous operation.

Regulation 26

Steering gear: Testing and drills

1 Within 12 hours before departure, the ship's steering gear shall be checked and tested by the ship's crew. The test procedure shall include, where applicable, the operation of the following:

- .1 the main steering gear;
- .2 the auxiliary steering gear;
- .3 the remote steering gear control systems;
- .4 the steering positions located on the navigation bridge;
- .5 the emergency power supply;
- .6 the rudder angle indicators in relation to the actual position of the rudder;
- .7 the remote steering gear control system power failure alarms;
- .8 the steering gear power unit failure alarms; and
- .9 automatic isolating arrangements and other automatic equipment.

2 The checks and tests shall include:

- .1 the full movement of the rudder according to the required capabilities of the steering gear;
- .2 a visual inspection for the steering gear and its connecting linkage; and
- .3 the operation of the means of communication between the navigation bridge and steering gear compartment.

3.1 Simple operating instructions with a block diagram showing the change-over procedures for remote steering gear control systems and steering gear power units shall be permanently displayed on the navigation bridge and in the steering compartment.

3.2 All ships' officers concerned with the operation and/or maintenance of steering gear shall be familiar with the operation of the steering systems fitted on the ship and with the procedures for changing from one system to another.

4 In addition to the routine checks and tests prescribed in paragraphs 1 and 2, emergency steering drills shall take place at least once every three months in order to practise emergency steering procedures. These drills shall include direct control within the steering gear compartment, the communications procedure with the navigation bridge and, where applicable the operation of alternative power supplies.

5 The Administration may waive the requirements to carry out the checks and tests prescribed in paragraphs 1 and 2 for ships which regularly engage on voyages of short duration. Such ships shall carry out these checks and tests at least once every week.

6 The date upon which the checks and tests prescribed in paragraphs 1 and 2 are carried out and the date and details of emergency steering drills carried out under paragraph 4, shall be recorded.

Regulation 27

Nautical charts and nautical publications

Nautical charts and nautical publications, such as sailing directions, lists of lights, notices to mariners, tide tables and all other nautical publications necessary for the intended voyage, shall be adequate and up to date.

Regulation 28

Records of navigational activities

All ships engaged on international voyages shall keep on board a record of navigational activities and incidents which are of importance to safety of navigation and which must contain sufficient detail to restore a complete record of the voyage, taking into account the recommendations adopted by the Organization. When such information is not maintained in the ship's log-book, it shall be maintained in another form approved by the Administration.

Regulation 29

Life-saving signals to be used by ships, aircraft or persons in distress

An illustrated table describing the life-saving signals shall be readily available to the officer of the watch of every ship to which this chapter applies. The signals shall be used by ships or persons in distress when communicating with life-saving stations, maritime rescue units and aircraft engaged in search and rescue operations.

Regulation 30

Operational limitations

1 This regulation applies to all passenger ships to which chapter I applies.

2 A list of all limitations on the operation of a passenger ship including exemptions from any of these regulations, restrictions in operating areas, weather restrictions, sea state restrictions, restrictions in permissible loads, trim, speed and any other limitations, whether imposed by the Administration or established during the design or the building

stages, shall be compiled before the passenger ship is put in service. The list, together with any necessary explanations, shall be documented in a form acceptable to the Administration, which shall be kept on board readily available to the master. The list shall be kept updated. If the language used is not English or French, the list shall be provided in one of the two languages.

Regulation 31

Danger messages

1 The master of every ship which meets with dangerous ice, a dangerous derelict, or any other direct danger to navigation, or a tropical storm, or encounters sub-freezing air temperatures associated with gale force winds causing severe ice accretion on superstructures, or winds of force 10 or above on the Beaufort scale for which no storm warning has been received, is bound to communicate the information by all means at his disposal to ships in the vicinity, and also to the competent authorities. The form in which the information is sent is not obligatory. It may be transmitted either in plain language (preferably English) or by means of the International Code of Signals.

2 Each Contracting Government will take all steps necessary to ensure that when intelligence of any of the dangers specified in paragraph 1 is received, it will be promptly brought to the knowledge of those concerned and communicated to other interested Governments.

3 The transmission of messages respecting the dangers specified is free of cost to the ships concerned.

4 All radio messages issued under paragraph 1 shall be preceded by the safety signal, using the procedure as prescribed by the Radio Regulations as defined in regulation IV/2.

Regulation 32

Information required in danger messages

The following information is required in danger messages:

- 1 Ice, derelicts and other direct dangers to navigation:
 - .1 The kind of ice, derelict or danger observed.
 - .2 The position of the ice, derelict or danger when last observed.
 - .3 The time and date (Universal Co-ordinated Time) when the danger was last observed.
- 2 Tropical cyclones (storms)
 - .1 A statement that a tropical cyclone has been encountered. This obligation should be interpreted in a broad spirit, and information transmitted whenever the master has good reason to believe that a tropical cyclone is developing or exists in the neighbourhood.

- .2 Time, date (Universal Co-ordinated Time) and position of ship when the observation was taken.
- .3 As much of the following information as is practicable should be included in the message:
 - barometric pressure, preferably corrected (stating millibars, millimetres, or inches, and whether corrected or uncorrected);
 - barometric tendency (the change in barometric pressure during the past three hours);
 - true wind direction;
 - wind force (Beaufort scale);
 - state of the sea (smooth, moderate, rough, high);
 - swell (slight, moderate, heavy) and the true direction from which it comes. Period or length of swell (short, average, long) would also be of value;
 - true course and speed of ship.

Subsequent observations

3 When a master has reported a tropical cyclone or other dangerous storm, it is desirable but not obligatory, that further observations be made and transmitted hourly, if practicable, but in any case at intervals of not more than 3 hours, so long as the ship remains under the influence of the storm.

4 Winds of force 10 or above on the Beaufort scale for which no storm warning has been received. This is intended to deal with storms other than the tropical cyclones referred to in paragraph 2; when such a storm is encountered, the message should contain similar information to that listed under the paragraph but excluding the details concerning sea and swell.

5 Sub-freezing air temperatures associated with gale force winds causing severe ice accretion on superstructures:

- .1 Time and date (Universal Co-ordinated Time).
- .2 Air temperature.
- .3 Sea temperature (if practicable).
- .4 Wind force and direction.

Examples

Ice

TTT ICE. LARGE BERG SIGHTED IN 4506 N, 4410W, AT 0800 UTC. MAY 15.

Derelicts

TTT DERELICT. OBSERVED DERELICT ALMOST SUBMERGED IN 4006 N, 1243 W, AT 1630 UTC. APRIL 21.

Danger to navigation

TTT NAVIGATION. ALPHA LIGHTSHIP NOT ON STATION. 1800 UTC. JANUARY 3.

Tropical cyclone

TTT STORM. 0030 UTC. AUGUST 18. 2004 N, 11354 E. BAROMETER CORRECTED 994 MILLIBARS, TENDENCY DOWN 6 MILLIBARS. WIND NW, FORCE 9, HEAVY SQUALLS. HEAVY EASTERLY SWELL. COURSE 067, 5 KNOTS.

TTT STORM. APPEARANCES INDICATE APPROACH OF HURRICANE. 1300 UTC. SEPTEMBER 14. 2200 N, 7236 W. BAROMETER CORRECTED 29.64 INCHES, TENDENCY DOWN .015 INCHES. WIND NE, FORCE 8, FREQUENT RAIN SQUALLS. COURSE 035, 9 KNOTS.

TTT STORM. CONDITIONS INDICATE INTENSE CYCLONE HAS FORMED. 0200 UTC. MAY 4. 1620 N, 9203 E. BAROMETER UNCORRECTED 753 MILLIMETRES, TENDENCY DOWN 5 MILLIMETRES. WIND S BY W, FORCE 5. COURSE 300, 8 KNOTS.

TTT STORM. TYPHOON TO SOUTHEAST. 0300 UTC. JUNE 12. 1812 N, 12605 E. BAROMETER FALLING RAPIDLY. WIND INCREASING FROM N.

TTT STORM. WIND FORCE 11, NO STORM WARNING RECEIVED. 0300 UTC. MAY 4. 4830 N, 30 W. BAROMETER CORRECTED 983 MILLIBARS, TENDENCY DOWN 4 MILLIBARS. WIND SW, FORCE 11 VEERING. COURSE 260, 6 KNOTS.

Icing

TTT EXPERIENCING SEVERE ICING. 1400 UTC. MARCH 2. 69 N, 10 W. AIR TEMPERATURE 18°F (-7.8°C). SEA TEMPERATURE 29°F (-1.7°C). WIND NE, FORCE 8.

Regulation 33

Distress messages: Obligations and procedures

1 The master of a ship at sea which is in a position to be able to provide assistance on receiving a signal from any source that persons are in distress at sea, is bound to proceed with all speed to their assistance, if possible informing them or the search and rescue service that the ship is doing so. If the ship receiving the distress alert is unable or, in the special circumstances of the case, considers it unreasonable or unnecessary to proceed to their assistance, the master must enter in the log-book the reason for failing to proceed to the assistance of the persons in distress, taking into account the recommendation of the Organization, to inform the appropriate search and rescue service accordingly.

2 The master of a ship in distress or the search and rescue service concerned, after consultation, so far as may be possible, with the masters of ships which answer the distress alert, has the right to requisition one or more of those ships as the master of the ship in distress or the search and rescue service considers best able to render assistance, and it shall be the duty of the master or masters of the ship or ships requisitioned to comply with the requisition by continuing to proceed with all speed to the assistance of persons in distress.

3 Masters of ships shall be released from the obligation imposed by paragraph 1 on learning that their ships have not been requisitioned and that one or more other ships have been requisitioned and are complying with the requisition. This decision shall, if possible be communicated to the other requisitioned ships and to the search and rescue service.

4 The master of a ship shall be released from the obligation imposed by paragraph 1 and, if his ship has been requisitioned, from the obligation imposed by paragraph 2 on being informed by the persons in distress or by the search and rescue service or by the master of another ship which has reached such persons that assistance is no longer necessary.

5 The provisions of this regulation do not prejudice the Convention for the Unification of Certain Rules of Law Relating to Assistance and Salvage at Sea, signed at Brussels on 23 September 1910, particularly the obligation to render assistance imposed by article 11 of that Convention.

Regulation 34

Safe navigation and avoidance of dangerous situations

1 Prior to proceeding to sea, the master shall ensure that the intended voyage has been planned using the appropriate nautical charts and nautical publications for the area concerned, taking into account the guidelines and recommendations developed by the Organization.

2 The voyage plan shall identify a route which:

- .1 takes into account any relevant ships' routing systems;

- .2 ensures sufficient sea room for the safe passage of the ship throughout the voyage;
- .3 anticipates all known navigational hazards and adverse weather conditions; and
- .4 takes into account the marine environmental protection measures that apply, and avoids as far as possible actions and activities which could cause damage to the environment.

3 The owner, the charterer, or the company, as defined in regulation IX/1, operating the ship or any other person, shall not prevent or restrict the master of the ship from taking or executing any decision which, in the master's professional judgement, is necessary for safe navigation and protection of the marine environment.

Regulation 35

Misuse of distress signals

The use of an international distress signal, except for the purpose of indicating that a person or persons are in distress, and the use of any signal which may be confused with an international distress signal, are prohibited.

APPENDIX TO CHAPTER V

RULES FOR THE MANAGEMENT, OPERATION AND FINANCING OF THE NORTH ATLANTIC ICE PATROL

- 1 In these Rules:
 - .1 *Ice season* means the annual period between February 15 and July 1.
 - .2 *Region of icebergs guarded by the ice patrol* means the south-eastern, southern and south-western limits of the region of icebergs in the vicinity of the Grand Banks of Newfoundland.
 - .3 *Routes passing through regions of icebergs guarded by the Ice Patrol* means:
 - .3.1 routes between Atlantic Coast ports of Canada (including inland ports approached from the North Atlantic through the Gut of Canso and Cabot Straits) and ports of Europe, Asia or Africa approached from the North Atlantic through or north of the Straits of Gibraltar (except routes which pass south of the extreme limits of ice of all types).
 - .3.2 routes via Cape Race, Newfoundland between Atlantic Coast ports of Canada (including inland ports approached from the North Atlantic through the Gut of Canso and Cabot Straits) west of Cape

Race, Newfoundland and Atlantic Coast ports of Canada north of Cape Race, Newfoundland.

- .3.3 routes between Atlantic and Gulf Coast ports of the United States of America (including inland ports approached from the North Atlantic through the Gut of Canso and Cabot straits) and ports of Europe, Asia or Africa approached from the North Atlantic through or north of the Straits of Gibraltar (except routes which pass south of the extreme limits of ice of all types).
- .3.4 routes via Cape Race, Newfoundland between Atlantic and Gulf Coast ports of the United States of America (including inland ports approached from the North Atlantic through the Gut of Canso and Cabot Straits) and Atlantic Coast ports of Canada north of Cape Race, Newfoundland.
- .4 *Extreme limits of ice of all types* in the North Atlantic Ocean is defined by a line connecting the following points:
- | | | | | | |
|---|---|--------------------------|---|---|---------------------------|
| A | - | 42° 23'.00N, 59° 25'.00W | J | - | 39° 49'.00N, 41° 00'.00W |
| B | - | 41° 23'.00N, 57° 00'.00W | K | - | 40° 39'.00N, 39° 00'.00W |
| C | - | 40° 47'.00N, 55° 00'.00W | L | - | 41° 19'.00N, 38° 00'.00W |
| D | - | 40° 07'.00N, 53° 00'.00W | M | - | 43° 00'.00N, 37° 27'.00W |
| E | - | 39° 18'.00N, 49° 39'.00W | N | - | 44° 00'.00N, 37° 29'.00W |
| F | - | 38° 00'.00N, 47° 35'.00W | O | - | 46° 00'.00N, 37° 55'.00W |
| G | - | 37° 41'.00N, 46° 40'.00W | P | - | 48° 00'.00N, 38° 28'.00W |
| H | - | 38° 00'.00N, 45° 33'.00W | Q | - | 50° 00'.00N, 39° 07'.00W |
| I | - | 39° 05'.00N, 43° 00'.00W | R | - | 51° 25'.00N, 39° 45'.00W. |
- .5 *Managing and operating* means maintaining, administering and operating the Ice Patrol, including the dissemination of information received therefrom.
- .6 *Contributing Government* means a Contracting Government undertaking to contribute to the costs of the ice patrol service pursuant to these Rules.

2 Each Contracting Government specially interested in these services whose ships pass through the region of icebergs during the ice season undertakes to contribute to the Government of the United States of America its proportionate share of the costs for the management and operation of the ice patrol service. The contribution to the Government of the United States of America shall be based on the ratio which the average annual gross tonnage of that contributing Government's ships passing through the region of icebergs guarded by the Ice Patrol during the previous three ice seasons bears to the combined average annual gross tonnage of all ships that passed through the region of icebergs guarded by the Ice Patrol during the previous three ice seasons.

3 All contributions shall be calculated by multiplying the ratio described in paragraph 2 by the average actual annual cost incurred by the Governments of the United States of America and Canada of managing and operating ice patrol services during the previous three years. This ratio shall be computed annually, and shall be expressed in terms of a lump sum per-annum fee.

4 Each of the contributing Governments has the right to alter or discontinue its contribution, and other interested Governments may undertake to contribute to the expense. The contributing Government which avails itself of this right will continue to be responsible for its current contribution up to 1 September following the date of giving notice of intention to alter or discontinue its contribution. To take advantage of the said right it must give notice to the managing Government at least six months before the said 1 September.

5 Each contributing Government shall notify the Secretary-General of its undertaking pursuant to paragraph 2, who shall notify all Contracting Governments.

6 The Government of the United States of America shall furnish annually to each contributing Government a statement of the total cost incurred by the Governments of the United States of America and Canada of managing and operating the Ice Patrol for that year and of the average percentage share for the past three years of each contributing Government.

7 The managing government shall publish annual accounts including a statement of costs incurred by the governments providing the services for the past three years and the total gross tonnage using the service for the past three years. The accounts shall be publicly available. Within three months after having received the cost statement, contributing Governments may request more detailed information regarding the costs incurred in managing and operating the Ice Patrol.

8 These Rules shall be operative beginning with the ice season of 2002.”

CHAPTER IX

MANAGEMENT FOR THE SAFE OPERATION OF SHIPS

Regulation 1 - Definitions

8 In paragraph 8, the reference “X/1.2” is replaced by “X/1”.

Regulation 3 - Safety management requirements

9 At the end of existing paragraph 1, the following text is added:

"For the purpose of this regulation, the requirements of the Code shall be treated as mandatory."

Regulation 6 - Verification and control

10 In existing paragraph 6.2, the words "Subject to the provisions of paragraph 3 of this regulation" are deleted.

11 Existing paragraph 6.3 is deleted.

CHAPTER X

SAFETY MEASURES FOR HIGH-SPEED CRAFT

Regulation 1 - Definitions

12 Existing paragraph 1 is replaced by the following:

"For the purpose of this chapter:

1 *High-Speed Craft Code, 1994 (1994 HSC Code)* means the International Code of Safety for High-Speed Craft adopted by the Maritime Safety Committee of the Organization by resolution MSC.36(63), 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 *High-Speed Craft Code, 2000 (2000 HSC Code)* means the International Code of Safety for High-Speed Craft, 2000 adopted by the Maritime Safety Committee of the Organization by resolution MSC.97(73), 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."

13 Existing paragraph 2 is replaced by the following:

"3 *High-speed craft* is a craft capable of a maximum speed, in metres per second (m/s), equal to or exceeding:

$$3.7 \nabla^{0.1667}$$

where:

∇ = volume of displacement corresponding to the design waterline (m³),

excluding craft the hull of which is supported completely clear above the water surface in non-displacement mode by aerodynamic forces generated by ground effect."

14 The existing paragraphs 3 and 4 are renumbered as paragraphs 4 and 5.

15 In the renumbered paragraph 5, in subparagraph .2, the figure "1%" is replaced by "3%".

Regulation 2 - Application

16 In paragraph 2, the date "1 January 1996" is replaced by "1 July 2002" in two places.

Regulation 3 - Requirements for high-speed craft

17 Existing paragraph 1 is replaced by the following:

"1 Notwithstanding the provisions of chapters I to IV and regulations V/18, 19 and 20:

- .1 a high-speed craft constructed on or after 1 January 1996 but before 1 July 2002 which complies with the requirements of the High-Speed Craft Code, 1994 in its entirety and which has been surveyed and certified as provided in that Code shall be deemed to have complied with the requirements of chapters I to IV and regulations V/18, 19 and 20. For the purpose of this regulation, the requirements of that Code shall be treated as mandatory.
- .2 a high-speed craft constructed on or after 1 July 2002 which complies with the requirements of the High-Speed Craft Code, 2000 in its entirety and which has been surveyed and certified as provided in that Code shall be deemed to have complied with the requirements of chapters I to IV and regulations V/18, 19 and 20."

APPENDIX

Record of Equipment for the Passenger Ship Safety Certificate (Form P)

18 Existing sections 5 and 6 are deleted and a new section 5 is inserted as follows:

“5 Details of navigational systems and equipment

Item	Actual provision
1.1 Standard magnetic compass*
1.2 Spare magnetic compass*
1.3 Gyro compass*
1.4 Gyro compass heading repeater*
1.5 Gyro compass bearing repeater*
1.6 Heading or track control system*
1.7 Pelorus or compass bearing device*
1.8 Means of correcting heading and bearings
1.9 Transmitting heading device (THD)*
2.1 Nautical charts/Electronic chart display and information system (ECDIS)**
2.2 Back up arrangements for ECDIS
2.3 Nautical publications
2.4 Back up arrangements for electronic nautical publications
3.1 Receiver for a global navigation satellite system/terrestrial radionavigation system* **
3.2 9 GHz radar*
3.3 Second radar (3 GHz/ 9 GHz**)*
3.4 Automatic radar plotting aid (ARPA)*
3.5 Automatic tracking aid*
3.6 Second automatic tracking aid*
3.7 Electronic plotting aid*
4 Automatic identification system (AIS)
5 Voyage data recorder (VDR)

Item		Actual provision
6.1	Speed and distance measuring device (through the water)*	.....
6.2	Speed and distance measuring device (over the ground in the forward and athwartship direction)*	.....
7	Echo sounding device*	
8.1	Rudder, propeller, thrust, pitch and operational mode indicator*	.....
8.2	Rate of turn indicator*	.....
9	Sound reception system*	.....
10	Telephone to emergency steering position*	.....
11	Daylight signalling lamp*	.....
12	Radar reflector*	.....
13	International Code of Signals	.....

* Alternative means of meeting this requirement are permitted under regulation V/19. In case of other means they shall be specified.

** Delete as appropriate."

Record of Equipment for the Cargo Ship Safety Equipment Certificate (Form E)

19 Existing section 3 and related footnote are deleted and a new section 3 is inserted as follows:

“3 Details of navigational systems and equipment

Item	Actual provision
1.1 Standard magnetic compass*
1.2 Spare magnetic compass*
1.3 Gyro compass*
1.4 Gyro compass heading repeater*
1.5 Gyro compass bearing repeater*
1.6 Heading or track control system*
1.7 Pelorus or compass bearing device*
1.8 Means of correcting heading and bearings
1.9 Transmitting heading device (THD)*
2.1 Nautical charts/Electronic chart display and information system (ECDIS)**
2.2 Back up arrangements for ECDIS
2.3 Nautical publications
2.4 Back up arrangements for electronic nautical publications
3.1 Receiver for a global navigation satellite system/terrestrial radionavigation system*, **
3.2 9 GHz radar*
3.3 Second radar (3 GHz/ 9 GHz**)*
3.4 Automatic radar plotting aid (ARPA)*
3.5 Automatic tracking aid*
3.6 Second automatic tracking aid*
3.7 Electronic plotting aid*
4 Automatic identification system (AIS)
5 Voyage data recorder (VDR)

Item	Actual provision
6.1 Speed and distance measuring device (through the water)*
6.2 Speed and distance measuring device (over the ground in the forward and athwartship direction)*
7 Echo sounding device*
8.1 Rudder, propeller, thrust, pitch and operational mode indicator*
8.2 Rate of turn indicator*
9 Sound reception system*
10 Telephone to emergency steering position*
11 Daylight signalling lamp*
12 Radar reflector*
13 International Code of Signals

* Alternative means of meeting this requirement are permitted under regulation V/19. In case of other means they shall be specified.

** Delete as appropriate."