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BOLETIM OFICIAL DA REGIÃO ADMINISTRATIVA ESPECIAL DE MACAU

第 二 副 刊
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目 錄

SUMÁRIO

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澳門特別行政區

行 政 長 官 辦 公 室

第 36/2015 號行政長官公告

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

國際海事組織海上安全委員會於二零一二年五月二十五日透過第MSC.327（90）號決議通過了《國際消防安全系統規則》修正案，該修正案自二零一四年一月一日起適用於澳門特別行政區；

基於此，行政長官根據澳門特別行政區第3/1999號法律第六條第一款的規定，命令公佈包含上指修正案的第MSC.327（90）號決議的中文及英文文本。

二零一五年三月五日發佈。

代理行政長官　陳海帆

REGIÃO ADMINISTRATIVA ESPECIAL DE MACAU

GABINETE DO CHEFE DO EXECUTIVO

Aviso do Chefe do Executivo n.º 36/2015

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

Considerando igualmente que, em 25 de Maio de 2012, o Comité de Segurança Marítima da Organização Marítima Internacional, através da resolução MSC.327(90), adoptou emendas ao Código Internacional dos Sistemas de Segurança Contra Incêndios, e que tais emendas são aplicáveis na Região Administrativa Especial de Macau desde 1 de Janeiro de 2014;

O Chefe do Executivo manda publicar, nos termos do n.º 1 do artigo 6.º da Lei n.º 3/1999 da Região Administrativa Especial de Macau, a resolução MSC.327(90), que contém as referidas emendas, nos seus textos em línguas chinesa e inglesa.

Promulgado em 5 de Março de 2015.

A Chefe do Executivo, interina, *Chan Hoi Fan*.

第MSC.327（90）號決議

（2012年5月25日通過）

《國際消防安全系統規則》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（二）條，

注意到本委員會以第MSC.98（73）號決議通過的《國際消防安全系統規則》（以下稱《消防系統規則》），根據《1974年國際海上人命安全公約》（以下簡稱“本公約”）第II-2章已成為強制性文件，

還注意到本公約關於《消防系統規則》修正程序的第VIII（b）條和第II-2/3.22條，

在其第90屆會議上**審議了**按照本公約第VIII（b）（i）條提出和散發的《消防系統規則》修正案，

1. 按照本公約第VIII（b）（iv）條，**通過**《國際消防安全系統規則》修正案，其文本載於本決議附件；

2. 按照本公約第VIII（b）（vi）（2）（bb）條，**決定**該修正案將於2013年7月1日被視為已獲接受，除非在此日期之前，有三分之一以上的本公約締約國政府或擁有商船合計噸位數不少於世界商船總噸數50%的締約國政府通知其反對該修正案；

3. **提請**本公約各締約國政府注意，按照本公約第VIII（b）（vii）（2）條，該修正案在按上述第2段獲接受後，將於2014年1月1日生效；

4. **要求**秘書長按照本公約第VIII（b）（v）條，將本決議及其附件中修正案文本的核證無誤副本分發給所有本公約締約國政府；

5. **進一步要求**秘書長將本決議及其附件的副本分發給非本公約締約國的本組織成員。

附件

《國際消防安全系統規則》修正案

第6章

固定式泡沫滅火系統

5 本章現有文本由下文替代：

“1 適用範圍

本章詳細規定了按照本公約第II-2/10.4.1.1.2條用於保護機器處所、按照第II-2/10.7.1.1條用於保護貨物處所、按照第II-2/10.9.1.2條用於保護貨泵艙和按照第II-2/20.6.1.3條用於保護車輛、特種和滾裝處所的固定式泡沫滅火系統的技術要求。除非主管機關基於對含乙醇燃料和抗乙醇泡沫的附加試驗，對該系統的使用予以特別接受，否則本章不適用於本公約第II-2/1.6.2條中所述載運液體貨物的化學品船的貨泵艙。除另有明文規定外，本章要求應適用於2014年1月1日或以後建造的船舶。

2 定義

2.1 *設計填充率*係指至少為認可試驗期間所使用的最小額定填充率。

2.2 *泡沫*係指當泡沫混合液通過泡沫發生器並和空氣混合時產生的滅火介質。

2.3 *泡沫溶液*係指泡沫濃縮液和水的溶液。

2.4 *泡沫濃縮液*係指以適當濃度與水混合時形成泡沫溶液的液體。

2.5 *泡沫輸送管*係指將高倍泡沫從設於被保護處所外的泡沫發生器注入被保護處所的供應管道。

2.6 *泡沫混合比*係指泡沫濃縮液在與水混合形成的泡沫溶液中所佔的比例。

2.7 *泡沫發生器*係指將高倍泡沫溶液通過發泡形成泡沫排放到被保護處所的排放裝置或組件。使用內部空氣的泡沫發生器通常由一個噴嘴或一套噴嘴和一個外殼組成。外殼典型地由穿孔鋼/不鏽鋼板製成盒子的形狀以圍蔽噴嘴。使用外部空氣的泡沫發生器一般由圍蔽在外殼中的向網噴射的噴嘴組成。還設有電動、液動或氣動的風扇使泡沫溶液發泡。

2.8 *高倍泡沫滅火系統*係指使用內部或外部空氣使泡沫溶液發泡的固定式全淹沒滅火系統。高倍泡沫滅火系統由按照第3.1.3段中規定的滅火試驗所認可的泡沫發生器和專用泡沫濃縮液組成。

2.9 *內部空氣發泡系統*係指泡沫發生器位於被保護處所內並利用該處所內空氣發泡的固定式高倍泡沫系統。

2.10 *額定流率*係指泡沫溶液的流率，以*l*/min表示。

2.11 *額定供給速率*係指單位面積的額定流率，以*l*/min/m^2表示。

2.12 *額定泡沫膨脹比*係指在無火條件下且環境溫度例如約為20℃左右時泡沫體積與形成泡沫的泡沫溶液體積之比。

2.13 *額定泡沫產生量*係指每個單位時間產生的泡沫體積，即額定流率乘以額定泡沫膨脹比，以m^3/min表示。

2.14 *額定填充率*係指額定泡沫產生量與面積之比，即以m^2/min表示。

2.15 *額定填充時間*係指被保護處所的高度與額定填充率之比，即以分鐘表示。

2.16 *外部空氣發泡系統*係指泡沫發生器安裝在被保護處所外直接獲取新鮮空氣的固定式高倍泡沫系統。

3 固定式高倍泡沫滅火系統

3.1 主要性能

3.1.1 該系統須能夠手動釋放，並須設計成在1分鐘之內能夠開始以規定的泡沫供給速率產生泡沫。除非採取適當的操作措施或聯鎖設置以防止本公約第II-2/10.5.6條所要求的任何局部使用系統影響該系統的有效性，否則不得允許該系統自動釋放。

3.1.2 泡沫濃縮液須經主管機關根據本組織制定的導則認可。同一個高倍泡沫系統裏不應混合不同類型的泡沫濃縮液。

3.1.3 該系統的滅火能力、製造和試驗須根據本組織制定的導則使主管機關滿意。

3.1.4 該系統及其部件須設計適當，能夠承受船上通常會遇到的環境溫度變化、振動、潮濕、衝擊、堵塞和腐蝕。被保護處所內的管路、附件和相關部件（墊圈除外）須設計成能承受925℃的溫度。

3.1.5 與泡沫濃縮液接觸的系統管路、泡沫濃縮液存儲櫃、部件和管路附件須能與泡沫濃縮液相兼容，並由諸如不鏽鋼或等效的耐腐蝕材料製成。其他系統管路和泡沫發生器須為全鍍鋅鋼或等效材料。分配管道須有自排乾能力。

3.1.6 須通過泡沫比例混合器進口（水和泡沫濃縮液）和出口處的壓力錶提供測試系統運行和確保所需壓力和流量的手段。在泡沫比例混合器的下游分配管路上須安裝一個試驗閥，及反映該系統計算壓降的測試孔。管路的所有部分須設有供沖洗、排空和通入空氣進行淨化的接頭。所有噴嘴須能拆下檢查以證明噴嘴裏無碎屑。

3.1.7 須為船員安全進行泡沫濃縮液數量檢查和泡沫質量定期控制採樣提供手段。

3.1.8 須在每個操作位置張貼系統操作說明。

3.1.9 須按照生產商的說明提供備件。

3.1.10 如果使用內燃機作為該系統海水泵的原動機，該原動機的燃油櫃內須有足夠的燃油以使泵能滿負荷運轉至少3個小時，且A類機器處所外須有足夠的燃油儲備以使泵能夠額外滿負荷運轉15個小時。如果該燃油櫃同時為其他內燃機服務，整個燃油櫃的容量須足以供給所有相連的發動機。

3.1.11 被保護處所內泡沫發生器和管路的佈置不得妨礙接近所安裝的機器進行日常維護活動。

3.1.12 該系統電源、泡沫濃縮液供應和系統的控制裝置須易於觸及並操作簡便，並須佈置在被保護處所外部不會被被保護處所的

失火所隔斷的位置。所有直接與泡沫發生器連接的電氣元件須至少為IP 54級。

3.1.13 管系的尺寸須按照液壓計算技術確定，以確保提供系統正確運行所需要的流量和壓力。

3.1.14 被保護處所的佈置須使該處所在灌注泡沫時可以通風。應設有程序以確保上部擋火閘、門和其他適當的開口在失火時保持開啟。對於內部空氣發泡系統，500m^3以下的處所無需符合本要求。

3.1.15 須制定船上程序，要求在系統釋放後重新進入被保護處所的人員配戴呼吸裝置，以防範空氣中缺氧和泡沫覆蓋層中夾雜燃燒產物。

3.1.16 安裝圖紙和操作手冊須向船舶提供，在船上隨時可用。須張貼一份清單或圖紙，標出所覆蓋的處所和每個分區內的區域位置。船上須備有試驗和維護說明。

3.1.17 該系統的所有安裝、操作和維護說明/圖紙須使用船舶的工作語言。如果船舶的工作語言既非英文、也非法文或西班牙文，則須包括其中一種語言的譯文。

3.1.18 對泡沫發生器室須進行通風，以防止超壓，並須進行加熱以避免發生凍結的可能性。

3.1.19 所備有的泡沫濃縮液數量須至少足以按照額定膨脹比產生5倍於由鋼質艙壁圍蔽的最大被保護處所容積的泡沫量，或足以對最大被保護處所完全釋放30分鐘的泡沫量，以大者為準。

3.1.20 機器處所、貨泵艙、車輛處所、滾裝處所和特種處所，須在被保護處所內設有聲光報警，對系統釋放發出警告。報警持續時間須為撤離該處所所需的時間，但在任何情況下不得少於20秒。

3.2 內部空氣發泡系統

3.2.1 ***用於保護機器處所和貨泵艙的系統***

3.2.1.1 該系統須由主電源和應急電源供電。應急電源須從被保護處所外提供。

3.2.1.2 須提供足夠的發泡能力以確保滿足該系統的最小設計填充率，並須足以在10分鐘內完全填充最大的被保護處所。

3.2.1.3 泡沫發生器的佈置通常須根據認可試驗的結果進行設計。每個包含內燃機、鍋爐、淨化器和類似設備的處所須至少安裝2台發生器。小工作間和類似處所可僅由一台泡沫發生器覆蓋。

3.2.1.4 泡沫發生器須在包括發動機殼罩在內的被保護處所的最上層天花板下均勻分佈泡沫。泡沫發生器的數量和位置須足以確保該處所內所有部分和所有水平面的所有高風險區域都受到保護。有障礙物位置處可能需要額外的泡沫發生器。除非以更小的間隙進行了試驗驗證，否則泡沫發生器的佈置須使泡沫出口前至少有1米的自由空間。發生器須位於主要結構之後、發動機和鍋爐上方和遠處不易遭受爆炸損壞的位置。

3.2.2 ***用於保護車輛、滾裝、特種和貨物處所的系統***

3.2.2.1 該系統須由船舶主電源供電。無需應急電源。

3.2.2.2 需提供足夠的發泡能力以確保滿足該系統的最小設計填

充率，並須足以在10分鐘內完全填充最大被保護處所。但是，對於甲板適度氣密且甲板高度小於或等於3米的車輛和滾裝處所和特種處所，填充率不得小於設計填充率的三分之二，並須足以在10分鐘填充最大被保護處所。

3.2.2.3 該系統可分成若干分區，但是系統的能力和設計須基於泡沫體積量需求最大的被保護處所。如果相鄰被保護處所之間的限界為“A”級分隔，則無需同時為相鄰處所提供服務。

3.2.2.4 泡沫發生器的佈置通常須根據認可試驗的結果進行設計。發生器的數量可能有所不同，但該系統須提供經認可試驗確定的最小設計填充率。每個處所內須安裝至少2台發生器。泡沫發生器須佈置成在被保護處所內均勻分佈泡沫，且其佈局須考慮到船上裝載貨物時預計可能造成的障礙。至少每個第二層甲板上，包括可移動甲板，須安裝發生器。發生器之間的水平間距須確保將泡沫快速供應至被保護處所的所有部分。此間距須在全尺度試驗的基礎上確定。

3.2.2.5 除非以更小的間隙進行了試驗驗證，否則泡沫發生器的佈置須使泡沫出口前至少有1米的自由空間。

3.3 外部空氣發泡系統

3.3.1 *用於保護機器處所和貨泵艙的系統*

3.3.1.1 該系統須由主電源和應急電源供電。應急電源須從被保護處所外提供。

3.3.1.2 需提供足夠的發泡能力以確保滿足該系統的最小設計填充率，並須足以在10分鐘內完全填充最大被保護處所。

3.3.1.3 泡沫輸送管的佈置通常須根據認可試驗的結果進行設計。泡沫輸送管的數量可能有所不同，但該系統須提供經認可試驗確定的最小設計填充率。每個包含內燃機、鍋爐、淨化器和類似設備的處所須至少安裝2條輸送管。小工作間和類似處所可僅由一條輸送管覆蓋。

3.3.1.4 泡沫輸送管須在包括發動機殼罩在內的被保護處所的最上層天花板下均勻分佈。輸送管的數量和位置須足以確保在該處所內所有部分和所有水平面的所有高風險區域都受到保護。有障礙物位置處可能需設額外的輸送管。除非以更小的間隙進行了試驗驗證，否則輸送管的佈置須使泡沫輸送管前至少有1米的自由空間。輸送管須位於主要結構之後、發動機和鍋爐上方和遠處不易遭受爆炸損壞的位置。

3.3.1.5 泡沫輸送管的佈置須使泡沫發生設備在被保護處所失火時不受影響。如果泡沫發生器的位置靠近被保護處所，則泡沫輸送管的安裝須使發生器和被保護處所之間至少有450毫米的間隔，且分隔應為“A-60”級。泡沫輸送管須為鋼質，其厚度不應小於5毫米。此外，在泡沫發生器和被保護處所之間的限界艙壁或甲板的開口處須安裝厚度不小於3毫米的不鏽鋼擋火閘（單葉或多葉）。該擋火閘須由與其相關的泡沫發生器的遙控裝置自動（電動、氣動或液動）操作，並設置成在泡沫發生器開始運行前保持關閉。

3.3.1.6 泡沫發生器所在位置須有充足的新鮮空氣供應。

3.3.2 ***用於保護車輛、滾裝和特種處所及貨物處所的系統***

3.3.2.1 該系統須由船舶主電源供電。無需設置應急電源。

3.3.2.2 需提供足夠的發泡能力以確保滿足該系統的最小設計填充率，並須足以在10分鐘內完全填充最大被保護處所。但是，對於保護甲板適度氣密且甲板高度小於或等於3米的車輛和滾裝處所和特種處所的系統，填充率不得小於設計填充率的三分之二，並須足以在10分鐘內填充最大的被保護處所。

3.3.2.3 該系統可分成若干分區，但是系統的能力和設計須基於泡沫體積量需求最大的被保護處所。但是該系統的容量和設計應基於被保護處所泡沫需求的最大體積量來確定。如果相鄰被保護處所之間的限界為“A”級分隔，則無需同時為相鄰處所提供服務。

3.3.2.4 泡沫輸送管的佈置通常須根據認可試驗的結果進行設計。泡沫輸送管的數量可能有所不同，但該系統須提供經認可試驗確定的最小設計填充率。每個處所須至少安裝2條輸送管。泡沫發生器須佈置成能在被保護處所內均勻分佈泡沫，且其佈局須考慮到船上裝載貨物時預計帶來的障礙。輸送管須至少通至每個第二層甲板，包括可移動甲板。各輸送管之間的水平間距須確保將泡沫快速供應至被保護處所的所有部分。此間距須在全尺度試驗的基礎上確定。

3.3.2.5 除非以更小的間隙進行了試驗驗證，否則系統的佈置須使泡沫出口前至少有1米的自由空間。

3.3.2.6 泡沫輸送管的佈置須使泡沫發生設備在被保護處所失火時不受影響。如果泡沫發生器的位置靠近被保護處所，泡沫輸送管的安裝須使發生器和被保護處所之間至少有450毫米的間隔，且分隔須為“A-60”級。泡沫輸送管須為鋼質，其厚度不得小於5毫米。此外，在泡沫發生器和被保護處所之間的限界艙壁或甲板的開口處須安裝厚度不小於3毫米的不鏽鋼擋火閘（單葉或多葉）。該擋火閘須由與其相關的泡沫發生器的遙控裝置自動（電動、氣動或液動）操作，並設置成在泡沫發生器開始運行前保持關閉。

3.3.2.7 泡沫發生器所在位置須有充足的新鮮空氣供應。

3.4 安裝試驗要求

3.4.1 安裝後，對管子、閥、附件和組裝的系統須進行試驗，包括對動力和控制系統、水泵、泡沫泵、閥、遙控和就地釋放站和報警裝置進行功能試驗，以使主管機關滿意。須使用安裝於試驗管路的測試孔驗證系統在所要求壓力下的流量。此外，所有分配管路須用淡水沖洗並使用空氣吹通，以確保管路無障礙。

3.4.2 對所有泡沫比例混合器或其他泡沫混合裝置須進行功能試驗，以確認混合比公差在系統認可時界定的額定混合比的+30至-0%的範圍內。對於使用0℃時動粘度等於或小於100 cSt且密度等於或小於1,100 kg/m^3的牛頓型泡沫濃縮液的泡沫比例混合器，該試驗可用水替代泡沫濃縮液進行。其他佈置須用實際的泡沫濃縮液進行試驗。

3.5 使用外部空氣而發生器安裝在被保護處所內的系統

主管機關可以接受使用外部空氣而發生器位於被保護處所內、通過新鮮空氣管道供氣的系統，前提是可表明這些系統具備與3.3段所界定的系統同等的性能和可靠性。在接受這些系統時，主管機關應至少考慮下列設計細節：

.1 供應管中可接受的空氣低壓和高壓及流率；

.2 擋火閘佈置的功能和可靠性；

.3 輸氣管包括泡沫出口的佈置和分佈；和

.4 輸氣管與被保護處所之間的分隔。

4 固定式低倍泡沫滅火系統

4.1 數量和泡沫濃縮液

4.1.1 低倍泡沫滅火系統的泡沫濃縮液須由主管機關根據本組織通過的導則認可。同一個低倍泡沫系統裏不得混合不同類型的泡沫濃縮液。除非其兼容性已獲得認可，否則來自不同生產商的同類型泡沫濃縮液不得混合。

4.1.2 該系統須能夠在不超過5分鐘的時間內通過固定的排放出口釋放出足以在燃油所能散佈的最大單個面積上產生一層有效覆蓋的泡沫量。

4.2 安裝要求

4.2.1 須設有通過固定管系和控制閥或旋塞有效分配泡沫至適當排放出口，及由固定噴射器直接將泡沫有效地噴射到被保護處所

內其他主要失火危險處的裝置。有效分配泡沫的裝置須通過計算或試驗證明可以獲得主管機關的接受。

4.2.2 這種系統的任何控制裝置須易於觸及且操作簡便，並須組合在儘可能少的、不會被被保護處所的失火所隔斷的位置。”

第8章

自動噴水器、探火和失火報警系統

6 在2.1.1段中現有第1句和第2句之間插入以下句子：

“在水可能造成關鍵設備損壞的控制站，可以安裝本公約第II-2/10.6.1.1條所准許的幹管系統或預作用系統。”

RESOLUTION MSC.327(90)
(adopted on 25 May 2012)

AMENDMENTS TO THE INTERNATIONAL CODE FOR FIRE SAFETY SYSTEMS

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

NOTING resolution MSC.98(73) by which it adopted the International Code for Fire Safety Systems (hereinafter referred to as "the FSS Code"), which has become mandatory under chapter II-2 of the International Convention for the Safety of Life at Sea, 1974 (hereinafter referred to as "the Convention"),

NOTING ALSO article VIII(b) and regulation II-2/3.22 of the Convention concerning the procedure for amending the FSS Code,

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

1. ADOPTS, in accordance with article VIII(b)(iv) of the Convention, amendments to the International Code for Fire Safety Systems, 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 July 2013, 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 per cent of the gross tonnage of the world's merchant fleet, have notified their objections to the amendments;

3. INVITES Contracting Governments to the Convention to note that, in accordance with article VIII(b)(vii)(2) of the Convention the amendments shall enter into force on 1 January 2014, 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 CODE FOR FIRE SAFETY SYSTEMS

CHAPTER 6
FIXED FOAM FIRE-EXTINGUISHING SYSTEMS

5 The existing text of the chapter is replaced by the following:

"**1 Application**

This chapter details the specifications for fixed foam fire-extinguishing systems for the protection of machinery spaces in accordance with regulation II-2/10.4.1.1.2 of the Convention, cargo spaces in accordance with regulation II-2/10.7.1.1, cargo pump-rooms in accordance with regulation II-2/10.9.1.2 and vehicle, special category and ro-ro spaces in accordance with regulation II-2/20.6.1.3. This chapter does not apply to cargo pump-rooms of chemical tankers carrying liquid cargoes referred to in regulation II-2/1.6.2 of the Convention, unless the Administration specifically accepts the use of these systems based on additional tests with alcohol-based fuel and alcohol resistant foam. Unless expressly provided otherwise, the requirements of this chapter shall apply to ships constructed on or after 1 January 2014.

2 Definitions

2.1 *Design filling rate* is at least the minimum nominal filling rate used during the approval tests.

2.2 *Foam* is the extinguishing medium produced when foam solution passes through a foam generator and is mixed with air.

2.3 *Foam solution* is a solution of foam concentrate and water.

2.4 *Foam concentrate* is a liquid which, when mixed with water in the appropriate concentration forms a foam solution.

2.5 *Foam delivery ducts* are supply ducts for introducing high-expansion foam into the protected space from foam generators located outside the protected space.

2.6 *Foam mixing ratio* is the percentage of foam concentrate mixed with water forming the foam solution.

2.7 *Foam generators* are discharge devices or assemblies through which high-expansion foam solution is aerated to form foam that is discharged into the protected space. Foam generators using inside air typically consist of a nozzle or set of nozzles and a casing. The casing is typically made of perforated steel/stainless steel plates shaped into a box that enclose the nozzle(s). Foam generators using outside air typically consist of nozzles enclosed within a casing that spray onto a screen. An electric, hydraulic or pneumatically driven fan is provided to aerate the solution.

2.8 *High-expansion foam fire-extinguishing systems* are fixed total flooding extinguishing systems that use either inside air or outside air for aeration of the foam solution. A high-expansion foam system consists of both the foam generators and the dedicated foam concentrate approved during the fire testing specified in 3.1.3.

2.9 *Inside air foam system* is a fixed high-expansion foam fire-extinguishing system with foam generators located inside the protected space and drawing air from that space.

2.10 *Nominal flow rate* is the foam solution flow rate expressed in *l*/min.

2.11 *Nominal application rate* is the nominal flow rate per area expressed in *l*/min/m^2.

2.12 *Nominal foam expansion ratio* is the ratio of the volume of foam to the volume of foam solution from which it was made, under non-fire conditions, and at an ambient temperature of e.g. around 20ºC.

2.13 *Nominal foam production* is the volume of foam produced per time unit, i.e. nominal flow rate times nominal foam expansion ratio, expressed in m^3/min.

2.14 *Nominal filling rate* is the ratio of nominal foam production to the area, i.e. expressed in m^2/min.

2.15 *Nominal filling time* is the ratio of the height of the protected space to the nominal filling rate, i.e. expressed in minutes.

2.16 *Outside air foam system* is a fixed high-expansion foam system with foam generators installed outside the protected space that are directly supplied with fresh air.

3 Fixed high-expansion foam fire-extinguishing systems

3.1 Principal performance

3.1.1 The system shall be capable of manual release, and shall be designed to produce foam at the required application rate within 1 minute of release. Automatic release of the system shall not be permitted unless appropriate operational measures or interlocks are provided to prevent any local application systems required by regulation II-2/10.5.6 of the Convention from interfering with the effectiveness of the system.

3.1.2 The foam concentrates shall be approved by the Administration based on the guidelines developed by the Organization. Different foam concentrate types shall not be mixed in a high-expansion foam system.

3.1.3 The system shall be capable of fire extinction and manufactured and tested to the satisfaction of the Administration based on the guidelines developed by the Organization.

3.1.4 The system and its components shall be suitably designed to withstand ambient temperature changes, vibration, humidity, shock, clogging and corrosion normally encountered on ships. Piping, fittings and related components inside the protected spaces (except gaskets) shall be designed to withstand 925°C.

3.1.5 System piping, foam concentrate storage tanks, components and pipe fittings in contact with the foam concentrate shall be compatible with the foam concentrate and be constructed of corrosion resistant materials such as stainless steel, or equivalent. Other system piping and foam generators shall be full galvanized steel or equivalent. Distribution pipework shall have self-draining capability.

3.1.6 Means for testing the operation of the system and assuring the required pressure and flow shall be provided by pressure gauges at both inlets (water and foam concentrate supply) and at the outlet of the foam proportioner. A test valve shall be installed on the distribution piping downstream of the foam proportioner, along with orifices which reflect the calculated pressure drop of the system. All sections of piping shall be provided with connections for flushing, draining and purging with air. All nozzles shall be able to be removed for inspection in order to prove clear of debris.

3.1.7 Means shall be provided for the crew to safely check the quantity of foam concentrate and take periodic control samples for foam quality.

3.1.8 Operating instructions for the system shall be displayed at each operating position.

3.1.9 Spare parts shall be provided based on the manufacturer's instruction.

3.1.10 If an internal combustion engine is used as a prime mover for the seawater pump for the system, the fuel oil tank to the prime mover shall contain sufficient fuel to enable the pump to run on full load for at least 3 h and sufficient reserves of fuel shall be available outside the machinery space of category A to enable the pump to be run on full load for an additional 15 h. If the fuel tank serves other internal combustion engines simultaneously, the total fuel tank capacity shall be adequate for all connected engines.

3.1.11 The arrangement of foam generators and piping in the protected space shall not interfere with access to the installed machinery for routine maintenance activities.

3.1.12 The system source of power supply, foam concentrate supply and means of controlling the system shall be readily accessible and simple to operate, and shall be arranged at positions outside the protected space not likely to be cut off by a fire in the protected space. All electrical components directly connected to the foam generators shall have at least an IP 54 rating.

3.1.13 The piping system shall be sized in accordance with a hydraulic calculation technique to ensure availability of flows and pressures required for correct performance of the system.

3.1.14 The arrangement of the protected spaces shall be such that they may be ventilated as the space is being filled with foam. Procedures shall be provided to ensure that upper level dampers, doors and other suitable openings are kept open in case of a fire. For inside air foam systems, spaces below 500 m^3 need not comply with this requirement.

3.1.15 Onboard procedures shall be established to require personnel re-entering the protected space after a system discharge to wear breathing apparatus to protect them from oxygen deficient air and products of combustion entrained in the foam blanket.

3.1.16 Installation plans and operating manuals shall be supplied to the ship and be readily available on board. A list or plan shall be displayed showing spaces covered and the location of the zone in respect of each section. Instructions for testing and maintenance shall be available on board.

3.1.17 All installation, operation and maintenance instructions/plans for the system shall be in the working language of the ship. If the working language of the ship is not English, French, nor Spanish, a translation into one of these languages shall be included.

3.1.18 The foam generator room shall be ventilated to protect against overpressure, and shall be heated to avoid the possibility of freezing.

3.1.19 The quantity of foam concentrate available shall be sufficient to produce a volume of foam equal to at least five times the volume of the largest protected space enclosed by steel bulkheads, at the nominal expansion ratio, or enough for 30 min of full operation for the largest protected space, whichever is greater.

3.1.20 Machinery spaces, cargo pump-rooms, vehicle spaces, ro-ro spaces and special category spaces shall be provided with audible and visual alarms within the protected space warning of the release of the system. The alarms shall operate for the length of time needed to evacuate the space, but in no case less than 20 s.

3.2 Inside air foam systems

3.2.1 *Systems for the protection of machinery spaces and cargo pump-rooms*

3.2.1.1 The system shall be supplied by both main and emergency sources of power. The emergency power supply shall be provided from outside the protected space.

3.2.1.2 Sufficient foam-generating capacity shall be provided to ensure the minimum design filling rate for the system is met and in addition shall be adequate to completely fill the largest protected space within 10 min.

3.2.1.3 The arrangement of foam generators shall in general be designed based on the approval test results. A minimum of two generators shall be installed in every space containing combustion engines, boilers, purifiers, and similar equipment. Small workshops and similar spaces may be covered with only one foam generator.

3.2.1.4 Foam generators shall be uniformly distributed under the uppermost ceiling in the protected spaces including the engine casing. The number and location of foam generators shall be adequate to ensure all high risk areas are protected in all parts and at all levels of the spaces. Extra foam generators may be required in obstructed locations. The foam generators shall be arranged with at least 1 m free space in front of the foam outlets, unless tested with less clearance. The generators shall be located behind main structures, and above and away from engines and boilers in positions where damage from an explosion is unlikely.

3.2.2 *Systems for the protection of vehicle, ro-ro, special category and cargo spaces*

3.2.2.1 The system shall be supplied by the ship's main power source. An emergency power supply is not required.

3.2.2.2 Sufficient foam-generating capacity shall be provided to ensure the minimum design filling rate for the system is met and in addition shall be adequate to completely fill the largest protected space within 10 min. However, for systems protecting vehicle and ro-ro spaces and special category spaces, with decks that are reasonably gas-tight and that have a deck height of 3 m or less, the filling rate shall be not less than two thirds of the design filling rate and in addition sufficient to fill the largest protected space within 10 min.

3.2.2.3 The system may be divided into sections, however, the capacity and design of the system shall be based on the protected space demanding the greatest volume of foam. Adjacent protected spaces need not be served simultaneously if the boundaries between the spaces are "A" class divisions.

3.2.2.4 The arrangement of foam generators shall in general be designed based on the approval test results. The number of generators may be different, but the minimum design filling rate determined during approval testing shall be provided by the system. A minimum of two generators shall be installed in every space. The foam generators shall be arranged to uniformly distribute foam in the protected spaces, and the layout shall take into consideration obstructions that can be expected when cargo is loaded on board. As a minimum, generators shall be located on every second deck, including movable decks. The horizontal spacing of the generators shall ensure rapid supply of foam to all parts of the protected space. This shall be established on the basis of full scale tests.

3.2.2.5 The foam generators shall be arranged with at least 1 m free space in front of the foam outlets, unless tested with less clearance.

3.3 Outside air foam systems

3.3.1 *Systems for the protection of machinery spaces and cargo pump-rooms*

3.3.1.1 The system shall be supplied by both main and emergency sources of power. The emergency power supply shall be provided from outside the protected machinery space.

3.3.1.2 Sufficient foam-generating capacity shall be provided to ensure the minimum design filling rate for the system is met and in addition shall be adequate to completely fill the largest protected space within 10 min.

3.3.1.3 The arrangement of foam delivery ducts shall in general be designed based on the approval test results. The number of ducts may be different, but the minimum design filling rate determined during approval testing shall be provided by the system. A minimum of two ducts shall be installed in every space containing combustion engines, boilers, purifiers, and similar equipment. Small workshops and similar spaces may be covered with only one duct.

3.3.1.4 Foam delivery ducts shall be uniformly distributed under the uppermost ceiling in the protected spaces including the engine casing. The number and location of ducts shall be adequate to ensure all high risk areas are protected in all parts and at all levels of the spaces. Extra ducts may be required in obstructed locations. The ducts shall be arranged with at least 1 m free space in front of the foam delivery ducts, unless tested with less clearance. The ducts shall be located behind main structures, and above and away from engines and boilers in positions where damage from an explosion is unlikely.

3.3.1.5 The arrangement of the foam delivery ducts shall be such that a fire in the protected space will not affect the foam-generating equipment. If the foam generators are located adjacent to the protected space, foam delivery ducts shall be installed to allow at least 450 mm of separation between the generators and the protected space, and the separating divisions shall be class "A-60" rated. Foam delivery ducts shall be constructed of steel having a thickness of not less than 5 mm. In addition, stainless steel dampers (single or multi-bladed) with a thickness of not less than 3 mm shall be installed at the openings in the boundary bulkheads or decks between the foam generators and the protected space. The dampers shall be automatically operated (electrically, pneumatically or hydraulically) by means of remote control of the foam generator related to them, and arranged to remain closed until the foam generators begin operating.

3.3.1.6 The foam generators shall be located where an adequate fresh air supply can be arranged.

3.3.2 *Systems for the protection of vehicle and ro-ro spaces and special category and cargo spaces*

3.3.2.1 The system shall be supplied by the ship's main power source. An emergency power supply is not required.

3.3.2.2 Sufficient foam-generating capacity shall be provided to ensure the minimum design filling rate for the system is met and in addition shall be adequate to completely fill the largest protected space within 10 min. However, for systems protecting vehicle and ro-ro spaces and special category spaces, with decks that are reasonably gas-tight and that have a deck height of 3 m or less, the filling rate shall be not less than two thirds of the design filling rate and in addition sufficient to fill the largest protected space within 10 min.

3.3.2.3 The system may be divided into sections, however, the capacity and design of the system shall be based on the protected space demanding the greatest volume of foam. Adjacent protected spaces need not be served simultaneously if the boundaries between the spaces are "A" class divisions.

3.3.2.4 The arrangement of foam delivery ducts shall in general be designed based on the approval test results. The number of ducts may be different, but the minimum design filling rate determined during approval testing shall be provided by the system. A minimum of two ducts shall be installed in every space. The foam generators shall be arranged to uniformly distribute foam in the protected spaces, and the layout shall take into consideration obstructions that can be expected when cargo is loaded on board. As a minimum, ducts shall be led to every second deck, including movable decks. The horizontal spacing of the ducts shall ensure rapid supply of foam to all parts of the protected space. This shall be established on the basis of full scale tests.

3.3.2.5 The system shall be arranged with at least 1 m free space in front of the foam outlets, unless tested with less clearance.

3.3.2.6 The arrangement of the foam delivery ducts shall be such that a fire in the protected space will not affect the foam-generating equipment. If the foam generators are located adjacent to the protected space, foam delivery ducts shall be installed to allow at least 450 mm of separation between the generators and the protected space, and the separating divisions shall be class "A-60" rated. Foam delivery ducts shall be constructed of steel having a thickness of not less than 5 mm. In addition, stainless steel dampers (single or multi-bladed) with a thickness of not less than 3 mm shall be installed at the openings in the boundary bulkheads or decks between the foam generators and the protected space. The dampers shall be automatically operated (electrically, pneumatically or hydraulically) by means of remote control of the foam generator related to them, and arranged to remain closed until the foam generators begin operating.

3.3.2.7 The foam generators shall be located where an adequate fresh air supply can be arranged.

3.4 Installation testing requirements

3.4.1 After installation, the pipes, valves, fittings and assembled systems shall be tested to the satisfaction of the Administration, including functional testing of the power and control systems, water pumps, foam pumps, valves, remote and local release stations and alarms. Flow at the required pressure shall be verified for the system using orifices fitted to the test line. In addition, all distribution piping shall be flushed with freshwater and blown through with air to ensure that the piping is free of obstructions.

3.4.2 Functional tests of all foam proportioners or other foam mixing devices shall be carried out to confirm that the mixing ratio tolerance is within +30 to -0% of the nominal mixing ratio defined by the system approval. For foam proportioners using foam concentrates of Newtonian type with kinematic viscosity equal to or less than 100 cSt at 0ºC and density equal to or less than 1,100 kg/m^3, this test can be performed with water instead of foam concentrate. Other arrangements shall be tested with the actual foam concentrate.

3.5 Systems using outside air with generators installed inside the protected space

Systems using outside air but with generators located inside the protected space and supplied by fresh air ducts may be accepted by the Administration provided that these systems have been shown to have performance and reliability equivalent to systems defined in 3.3. For acceptance, the Administration should consider the following minimum design features:

.1 lower and upper acceptable air pressure and flow rate in supply ducts;

.2 function and reliability of damper arrangements;

.3 arrangements and distribution of air delivery ducts including foam outlets; and

.4 separation of air delivery ducts from the protected space.

4 Fixed low-expansion foam fire-extinguishing systems

4.1 Quantity and foam concentrates

4.1.1 The foam concentrates of low-expansion foam fire-extinguishing systems shall be approved by the Administration based on the guidelines adopted by the Organization. Different foam concentrate types shall not be mixed in a low-expansion foam system. Foam concentrates of the same type from different manufacturers shall not be mixed unless they are approved for compatibility.

4.1.2 The system shall be capable of discharging through fixed discharge outlets, in no more than 5 min, a quantity of foam sufficient to produce an effective foam blanket over the largest single area over which oil fuel is liable to spread.

4.2 Installation requirements

4.2.1 Means shall be provided for effective distribution of the foam through a permanent system of piping and control valves or cocks to suitable discharge outlets, and for the foam to be effectively directed by fixed sprayers onto other main fire hazards in the protected space. The means for effective distribution of the foam shall be proven acceptable to the Administration through calculation or by testing.

4.2.2 The means of control of any such systems shall be readily accessible and simple to operate and shall be grouped together in as few locations as possible at positions not likely to be cut off by a fire in the protected space."

CHAPTER 8
AUTOMATIC SPRINKLER, FIRE DETECTION AND FIRE ALARM SYSTEMS

6 In paragraph 2.1.1, the following sentence is inserted between the existing first and second sentences:

"Control stations, where water may cause damage to essential equipment, may be fitted with a dry pipe system or a pre-action system as permitted by regulation II-2/10.6.1.1 of the Convention."

第 37/2015 號行政長官公告

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

國際海事組織海上安全委員會於一九九六年六月四日對公約第III章作出修正時，將有關《國際救生設備規則》（《救生設備規則》）的規定作為公約的強制性要求，並透過第MSC.48(66)號決議通過了《國際救生設備規則》（《救生設備規則》），該規則自一九九九年十二月二十日起適用於澳門特別行政區；

基於此，行政長官根據澳門特別行政區第3/1999號法律第六條第一款的規定，命令公佈包含上指規則的第MSC.48（66）號決議的中文及英文文本。

二零一五年四月十七日發佈。

行政長官　崔世安

Aviso do Chefe do Executivo n.º 37/2015

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

Considerando igualmente que, em 4 de Junho de 1996, o Comité de Segurança Marítima da Organização Marítima Internacional procedeu a emendas ao capítulo III da Convenção para tornar as disposições do Código Internacional dos Meios de Salvação (Código LSA) obrigatórias nos termos da Convenção, e que, através da resolução MSC.48(66), adoptou o Código Internacional dos Meios de Salvação (Código LSA), e que tal Código é aplicável na Região Administrativa Especial de Macau desde 20 de Dezembro de 1999;

O Chefe do Executivo manda publicar, nos termos do n.º 1 do artigo 6.º da Lei n.º 3/1999 da Região Administrativa Especial de Macau, a resolução MSC.48(66), que contém o referido Código, nos seus textos em línguas chinesa e inglesa.

Promulgado em 17 de Abril de 2015.

O Chefe do Executivo, *Chui Sai On*.

第 MSC.48（66）號決議

（1996 年 6 月 4 日通過）

通過《國際救生設備規則》(《救生設備規則》)

海上安全委員會，

憶及《國際海事組織公約》關於本委員會職責的第 28（b）條，

認識到有必要對經修正的《1974 年國際海上人命安全公約》(《安全公約》）第 III 章所要求的救生設備提供國際標準，

注意到第 MSC.47（66）號決議，據此決議它通過了，除其他事項外，《安全公約》第 III 章的修正案，使《國際救生設備（救生設備）規則》的規定在 1998 年 7 月 1 日或以後成為該公約的強制要求，

在其第 66 次會議上**審議了**提議的《救生設備規則》的條文，

1. **通過**《國際救生設備（救生設備）規則》，其條文載於本決議附件中；

2. **注意到**根據《1974 年安全公約》第 III 章修正案，《救生設備規則》的修正案應按照本公約第 VIII 條關於適用於除第 1 章外的本公約附件的修正案程序的規定予以通過、生效和實施；

3. **要求**秘書長將本決議及載於附件中的《救生設備規則》的條文的核證副本分發給本公約所有締約國政府；

4. **還要求**秘書長將本決議及其附件的副本分發給非本公約締約政府的本組織會員。

附件

國際救生設備規則（《救生設備規則》）

目錄

國際救生設備規則

前言

1 本規則的目的是為經修正的《1974 年國際海上人命安全公約》(《安全公約》）第 III 章要求的救生設備提供國際標準。

2 本規則的要求在 1998 年 7 月 1 日和以後將成為經修正的《1974 年國際海上人命安全公約》（《安全公約》）的強制要求。本規則的任何未來修正案將根據本公約第 VIII 條規定的程序通過和生效。

第 I 章

通則

1.1 定義

1.1.1 **本公約**係指經修正的《1974 年國際海上人命安全公約》。

1.1.2 **有效離開船舶**係指自由降落救生艇在自由降落降放後不使用其發動機離開船舶的能力。

1.1.3 **自由降落加速度**係指降放自由降落救生艇過程中，乘員所感受到的速度變化率。

1.1.4 **自由降落核准高度**係指救生艇經認可的最大降放高度，該高度應從平靜水面量至救生艇處於降放形態時的最低點。

1.1.5 **降放滑道角**係指當船舶首尾等吃水時處於降放位置的救生艇降放軌道與水平線所形成的角度。

1.1.6 **降放滑道長度**係指從救生艇艇尾至降放滑道最低端的距離。

1.1.7 **條款**係指本公約附件所載的條款。

1.1.8 **要求的自由降落高度**係指從平靜水面量至救生艇處於降放形態並且船舶處於空載航海狀況時救生艇最低點的最大距離。

1.1.9 **逆反射材料**係指從相反方向反射射入光束的材料。

1.1.10 **入水角**係指救生艇最初入水時其降放軌道與水平線所形成的角度。

1.1.11. 本規則所用術語與第 III/3 條定義者具有相同含義。

1.2 救生設備的一般要求

1.2.1 第 1.2.2.7 款適用於所有船上的救生設備。

1.2.2 除另有明文規定或主管機關認為鑑於船舶始終從事的特殊航程，其他要求是適合者外，本部分規定的所有救生設備應：

.1 以適當的工藝和材料製成；

.2 在－30℃至＋65℃的空氣溫度範圍內存放不致損壞；

.3 如其在使用時可能浸沒在海水中，則在－1℃至＋30℃的海水溫度範圍內使用；

.4 如適用，是防腐爛，耐腐蝕，並不受海水、油類或真菌侵襲的過度影響；

.5. 如暴露在日光下，應能抗老化；

.6 在一切有助於探測的部位具有高易見的顏色；

.7 在有助於探測的位置裝貼逆反射材料，並與本組織的建議相一致；

.8 如在風浪中使用，則能在該環境中令人滿意地工作；

.9 清晰地標出核准信息，包括核准主管機關和所有操作限制；及

.10 如適用，配置短路保護裝置以防損壞或損傷。

1.2.3 主管機關應確定會老化的救生設備的可使用壽命。這類救生設備應標明確定其壽命的方法或必須更換的日期。永久性地表示出到期日是確定壽命的較好方法。未標出到期日的電池，如每年進行更換，

或對於二次電池（蓄電池），如電解質的狀態能容易地測試的話，也可使用。

第 II 章

個人救生設備

2.1 救生圈

2.1.1. 救生圈規格

每一救生圈應：

.1 具有不大於 800 毫米的外徑及不小於 400 毫米的內徑；

.2 採用固有浮力材料製成；它應不依靠燈心草、軟木刨片或軟木粒、任何其他鬆散的粒狀材料或任何依靠充氣作浮力的空氣室；

.3 能在淡水中支撐不小於 14.5 公斤的鐵塊達 24 小時之久；

.4 具有不小於 2.5 公斤的質量；

.5 在被火完全包圍 2 秒後，不致燃燒或繼續熔化；

.6 構造成能經受從在空載航海狀況下的水線以上存放位高度或 30 米處（取其大者），墜入水中，而不損害其工作能力或其附件；

.7 如要驅動自發煙霧信號及自亮燈所配備的快速釋放裝置，具有足以驅動快速釋放裝置的質量；

.8 設有直徑不小於 9.5 毫米、長度不小於救生圈外徑 4 倍的救生握索 1 根。救生握索應固定在救生圈圓周上的四個等距點上，以形成四個相等的索環。

2.1.2 救生圈自亮燈

第 III/7.1.3 條所要求的自亮燈應：

.1 不會被水所熄滅；

.2 為白色且能以在上半球的所有方向上不小於 2 燭光的光強連續點亮，或能以至少相應的有效亮度、按每分鐘不少於 50 次並不大於 70 次的閃光率閃光（放出閃光）；

.3 設有能滿足第 2.1.2.2 款要求並且至少使用 2 小時的能源；

.4 能經受第 2.1.1.6 款所要求的投落試驗。

2.1.3 救生圈自發煙霧信號

第 III/7.1.3 條所要求的救生圈自發煙霧信號應：

.1 在平靜水面漂浮時，以均等速率噴出高易見顏色的煙霧不少於 15 分鐘；

.2 在信號噴出煙霧的整個期間，不會爆炸點燃或噴出任何火焰；

.3 在海浪中不致淹沒；

.4 當完全浸沒在水中時在至少 10 秒時間裏繼續噴出煙霧；

.5 能經受第 2.1.1.6 款所要求的投落試驗。

2.1.4 浮力救生索

第 III/7.1.2 條所要求的浮力救生索應：

.1 不打紐結；

.2 具有不小於 8 毫米的直徑；

.3 具有不小於 5 千牛頓的抗斷強度。

2.2. 救生衣

2.2.1 救生衣的一般要求

2.2.1.1 救生衣在被火完全包圍 2 秒後，不致燃燒或繼續熔化；

2.2.1.2 成人救生衣應構造成：

.1 至少有 75%完全不熟悉救生衣的人可在無人幫助、指導下或示範的情況下在 1 分鐘內正確地穿好救生衣；

.2 經示範後，在無人幫助的情況下所有人都能在 1 分鐘內正確地穿好救生衣；

.3 明顯地只能以一種方法穿著，或，在可行時，不會被錯誤地穿著；

.4 穿著舒適；

.5 穿著者從至少 4.5 米高度跳入水中不致受傷，且救生衣不致移位和損壞。

2.2.1.3 在平靜淡水中成人救生衣應具有足夠的浮力與穩性：

.1 將精疲力盡或失去知覺人員的嘴部托出水面不低於 120 毫米，並且身體向後傾斜成與垂直方位不少於 20°的角度；和

.2 在不超過 5 秒的時間內將水中失去知覺人員從任何姿勢轉成嘴部高出水面的姿勢。

2.2.1.4 成人救生衣應使穿著人員可作短距離的游泳，並登上救生艇筏。

2.2.1.5 除以下者外，兒童救生衣應與成人救生衣有相同的構造和性能：

.1 允許幫助幼兒穿著；

.2 將精疲力盡或失去知覺穿著者的嘴部托出水面的距離只需適合預期的穿著者的身體大小；和

.3. 可幫助登上救生艇筏，但不應明顯降低穿著者的活動能力。

2.2.1.6 除第 1.2.2.9 款要求的標誌外，兒童救生衣應有如下標誌：

.1 救生衣滿足本組織推薦的試驗和評估標準的高度或重量範圍；

.2 本組織通過的“兒童救生衣”符號中所示的“兒童”符號。

2.2.1.7 救生衣在浸入淡水中 24 小時後，其浮力的降低不應超過 5%。

2.2.1.8 每件救生衣應備有用細索繫牢的哨笛。

2.2.2 氣脹式救生衣

依靠充氣作浮力的救生衣應具有不少於兩個獨立充氣室和符合第2.2.1款的要求，並應：

.1 浸水時自動充氣，設有以單手動動作便能充氣的裝置，並能用嘴充氣；

.2 在任何一個充氣室失去浮力時能符合第 2.2.1.2、2.2.1.3 和2.2.1.4款的要求；

.3 使用自動機械裝置充氣後，符合第 2.2.1.7 款的要求。

2.2.3. 救生衣燈

2.2.3.1 每盞救生衣燈應：

.1 具有在上半球所有方向上不小於 0.75 燭光的光強；

.2 具有能提供 0.75 燭光光強至少達 8 小時的能源；

.3 當繫在救生衣上時，可在上半球的儘可能大的部分看到亮光；

.4 為白色。

2.2.3.2 如第 2.2.3.1 款所指的燈是閃光燈，該燈還應：

.1 設有手動操作開關；

.2 以每分鐘不少於 50 閃且不多於 70 閃的速率閃光，其有效光強至少為 0.75 燭光。

2.3 浸水服

2.3.1 浸水服的一般要求

2.3.1.1 浸水服應採用防水材料製成，使其：

.1 在無幫助情況下，能在2分鐘內拆包並穿好，計及其他有關的衣服，如浸水服應同救生衣一起穿著時，和救生衣；

.2 在被火完全包圍 2 秒後，不致燃燒或繼續熔化；

.3 遮蓋除臉部以外的整個身體，除配有永久附連的手套者外，雙手也應遮蓋；

.4 設有最大程度地排除或減少浸水服褲腿內自由空氣的裝置；和

.5 從不低於 4.5 米的高度跳入水中後，不致有過分的水進入浸水服。

2.3.1.2 亦符合第 2.2 節要求的浸水服可歸類為救生衣。

2.3.1.3 浸水服應使其穿著人員，如浸水服應同救生衣一起穿著時，和救生衣的穿著人員能：

.1 爬上並爬下長度至少為 5 米的垂直梯子；

.2 執行與棄船相關的正常的任務；

.3 從不低於 4.5 米的高度跳入水中，而不會使浸水服損壞或移位，或不會受傷；並且

.4 在水中作短距離游泳並登上救生艇筏。

2.3.1.4 具有浮力而且設計為不同救生衣一起穿著的浸水服，應設有符合第 2.2.3 款要求的燈以及第 2.2.1.8 款規定的哨笛。

2.3.1.5 如浸水服應同救生衣一起穿著，則救生衣應穿在浸水服的外面。穿著此種浸水服的人員，應能在無幫助的情況下穿上救生衣。

2.3.2 浸水服的熱性能要求

2.3.2.1 非固有絕熱材料製成的浸水服應：

.1 標明應同保暖衣服一起穿著的須知；

.2 構造成在同保暖衣服，如浸水服應同救生衣一起穿著時，和救生衣一起穿著，從 4.5 米高度跳入水中後，能繼續提供足夠的熱保護，確保穿著者在 5℃ 的平靜循環水中歷時 1 小時後，體心溫度的降低不超過 2℃。

2.3.2.2 固有絕熱材料製成的浸水服，不管是單獨穿著還是同救生衣一起穿著，當穿著者從 4.5 米高度跳入水中後，他應能繼續提供足夠的熱絕緣，確使穿著者在水溫為 0℃ 至 2℃ 之間的平靜循環水中間歷時 6 小時後，體心溫度降低不超過 2℃。

2.3.3 浮力要求

淡水中穿著浸水服或穿著浸水服外加救生衣的人員，應能在不超過 5 秒內從臉部朝下姿勢翻轉成臉部朝上姿勢。

2.4 防暴露服

2.4.1. 防暴露服的一般要求

2.4.1.1 防暴露服應採用防水材料製成使其：

.1 具有至少 70 牛頓的固有浮力；

.2 採用可減少救助和撤離操作中的熱應力風險的材料製成；

.3 遮蓋除頭部和手以外的整個身體，如主管機關許可也可不遮蓋腳。應配有手套和頭罩供與防暴露服一起使用；

.4 可在 2 分鐘內在無人幫助的情況下拆包並穿好；

.5 在被火完全包圍 2 秒後，不致燃燒或繼續熔化；

.6 配有裝便攜式 VHF 電話的口袋；

.7 具有至少 120°的橫向視野。

2.4.1.2 亦符合第 2.2 節要求的防暴露服可歸類為救生衣。

2.4.1.3 防暴露服應使其穿著人員能：

.1 爬上並爬下長度至少為 5 米的垂直梯子；

.2 從不低於 4.5 米的高度跳入水中，腳先入水，而不會使防暴露服損壞或移位，或不會受傷；

.3 在水中作至少 25 米游泳並登上救生艇筏；

.4 在無人幫助的情況下穿好救生衣；

.5 執行與棄船有關的所有任務，幫助他人並操作救助船。

2.4.1.4 防暴露服應設有符合第 2.2.3 款要求的燈及第 2.2.1.8 款規定的哨笛。

2.4.2 防暴露服的熱性能要求

2.4.2.1 所有防暴露服應：

.1 如果由非固有絕熱材料製成：標有須同保暖衣服一起穿著的須知；

.2 構造成：當按標示方法穿著時，跳入水中一次並且水完全浸沒穿著者後，應能繼續提供足夠的熱保護，並且確保穿著者在水溫為 5℃的平靜循環水中歷時 0.5 小時後，體心溫度的降低速率不超過每小時 1.5℃。

2.4.3 穩性要求

淡水中，穿著符合本節要求的防暴露服的人員，應能在不超過 5 秒內，從臉部朝下姿勢翻轉成臉部朝上姿勢並保持臉部朝上。在正常海況下防暴露服不應將穿著者翻轉成為臉部朝下。

2.5 保溫用具

2.5.1 保溫用具應用導熱率不大於 7800 瓦/（米 ^{2}K）的防水材料製成，並應構造成：當用來包裹人員時，他應減少穿著者體內的對流性和蒸發性熱損失。

2.5.2 保溫用具應：

.1 遮蓋所有身材的穿著救生衣人員除臉部以外的整個身體。除配有永久附連的手套者外，雙手也應遮蓋；

.2 能在救生艇筏或救助艇中在無人幫助的情況下將他拆包並容易穿著；

.3 如妨礙游泳能力的話：可使穿著者在2分鐘內在水中把他脫掉。

2.5.3 保溫用具應在氣溫為-30℃至+20℃的範圍內正常工作。

第 III 章

視覺信號

3.1 火箭降落傘火焰信號

3.1.1 火箭降落傘火焰信號應：

.1 裝在防水外殼內；

.2 在外殼上，印有清楚闡明火箭降落傘火焰信號用法的簡明須知或圖示；

.3 具有內置的點燃裝置；和

.4 設計成在按製造廠的操作須知使用時，不會使握持外殼的人感到不舒適。

3.1.2 當垂直發射時，火箭應達到不少於 300 米的高度。在達到或者接近其彈道頂點處，火箭應射出降落傘火焰信號，該信號應：

.1 燃燒並發出明亮紅光；

.2 燃燒均勻，平均光強不少於 30,000 燭光；

.3 具有不少於 40 秒的燃燒時間；

.4. 具有不大於 5 米/秒的降落速度；和

.5 在燃燒時不燒損降落傘或附件。

3.2 手持火焰信號

3.2.1 手持火焰信號應：

.1 裝在防水外殼內；

.2 在外殼上，印有清楚闡明手持火焰信號用法的簡明須知或圖示；

.3 具有獨立的點燃裝置；和

.4 設計成在按製造廠的操作須知使用時，不會使握持外殼的人感到不舒適，燃燒中的或有輝光的殘渣不致危害救生艇筏。

3.2.2 手持火焰信號應：

.1 燃燒並發出明亮紅光；

.2 燃燒均勻，平均光強不少於 15,000 燭光；

.3 具有不少於 1 分鐘的燃燒時間；和

.4 當在水下 100 毫米處浸沒 10 秒後，繼續燃燒。

3.3 漂浮煙霧信號

3.3.1 漂浮煙霧信號應：

.1 裝在防水外殼內；

.2 按製造廠的操作須知使用時，不會爆炸點燃；.和

.3 在外殼上，印有清楚闡明漂浮煙霧信號用法的簡明須知或圖示。

3.3.2 漂浮煙霧信號應：

.1 在平靜水面漂浮時，在不少於 3 分鐘時間裏以一致速率放出高易見顏色的煙霧；

.2 在整個放煙期間，不噴出任何火焰；

.3 在海浪中，不致淹沒；

.4 浸入水下 100 毫米處歷時 10 秒後，繼續放煙。

第 IV 章

救生艇筏

4.1 救生筏的一般要求

4.1.1 救生筏的構造

4.1.1.1 每隻救生筏應構造成能經受在一切海況下漂浮 30 天的暴露。

4.1.1.2 救生筏應構造成當從 18 米高度投落水中時，救生筏及其屬具將令人滿意地工作。如救生筏要存放在空載航行狀況時水線以上超過 18 米高度的地方，則該救生筏應是至少從該高度處進行過令人滿意的投落試驗的救生筏型號。

4.1.1.3 在頂篷撐起和未撐起的情況下，漂浮的救生筏應能經受從筏底以上至少 4.5 米的高度反複多次跳入。

4.1.1.4 救生筏及其屬具應構造成救生筏在載足全部額定乘員及設備並有 1 隻海錨在漂動時，在平靜水中能以 3 節航速被拖帶。

4.1.1.5 救生筏應設有保護乘員免受暴露的頂篷，該頂篷在救生筏被降放和浮在水上時自動就位。該頂篷應符合下列要求：

.1 採用以氣隙隔開的雙層材料或其他等效設施來防熱和禦寒。應設有防止水分聚集在氣隙內的設施；

.2 其內部的顏色應不使乘員感到不舒服；

.3 每個進口處應設有清晰的標誌和有效的可調關閉裝置，關閉裝置在筏內外兩面均能由穿著浸水服的人員容易而迅速打開和從筏內關上，以便於通風但又可防止海水、風和冷氣的侵入。載員超過8人的救生筏應設有至少兩個完全相對的入口；

.4 即使當入口關閉時，頂篷無論何時都應通入足夠乘員需要的空氣；

.5 設有至少一個瞭望窗；

.6 設有收集雨水的設施；

.7 設有將救生筏艇雷達應答器裝在高於海平面至少1米的高度上的設施；

.8 坐在頂篷下面各處的乘員，應有足夠的頭頂空間。

4.1.2 救生筏的最小乘員定額與質量

4.1.2.1 視情按第4.2.3或4.3.3款的要求計算的乘員定額少於6人的救生筏，概不得認可。

4.1.2.2 除非必須使用符合第6.1節要求的經認可降放設備降放救生筏或不要求救生筏存放在易於從一舷移至另一舷的位置，否則救生筏及其容器和設備的總質量不得超過185公斤。

4.1.3 救生筏屬具

4.1.3.1 救生索應沿救生筏外圍及內側牢固地裝設成索環。

4.1.3.2 救生筏應設一根有效的首纜，其長度應不少於 10 米加上從存放處到空載航海水線的距離或 15 米，取其大者。首纜系統（包括其與救生筏的連接裝置）的抗斷強度，除第 4.1.6 款要求的弱連接外，對於准乘超過 25 人的救生筏應不小於 15 千牛頓，對於准乘 9 至 25 人的救生筏應不小於 10 千牛頓，對於任何其他救生筏應不小於 7.5 千牛頓。

4.1.3.3 救生筏天篷的頂部應裝設一盞人工控制燈。該燈應為白色且能在上半球的所有方向以不少於 4.3 燭光的光強連續工作至少 12 小時。如是閃光燈，該燈應在 12 小時的使用時間內以每分鐘不少於 50 閃而不大於 70 閃的速率和相等的有效光強閃光。天棚撐開時，該燈應自動發光。電池應為不因所存放的救生筏內的潮濕或濕氣而變質的類型。

4.1.3.4 救生筏內部應裝設一盞人工控制燈，該燈應能連續工作至少 12 小時。該燈應在天篷撐開時自動發光，並有足夠光強以供閱讀逃生和設備須知。電池應為不因所存放的救生筏內的潮濕或濕氣而變質的類型。

4.1.4 吊架降放的救生筏

4.1.4.1 除上述要求外，與經認可的降放設備一起使用的救生筏還應：

.1 當救生筏載足全部額定乘員及設備時，能經受碰撞速度不少於 3.5 米/秒的碰撞船舷的水平撞擊力，並還要從不少於 3 米高度墜落下水，而沒有影響其性能的損壞；

.2 設有在登乘期間將救生筏停靠在登乘甲板邊並將其繫固的裝置。

4.1.4.2 每艘客船的吊架降落救生筏的佈置，應使救生筏的全部乘員能迅速地登上救生筏。

4.1.4.3 每艘貨船的吊架降放的救生艇應佈置成使救生筏的全部額定乘員能在發出登筏指令起不超過 3 分鐘內登上救生筏。

4.1.5 設備

4.1.5.1 每隻救生筏正常的設備應由下列者組成：

.1 繫在不少於 30 米長的浮索上的浮力救生環 1 個；

.2 裝有浮力柄的非折疊式小刀一把，繫以短繩並存放在天篷外面靠近首纜與救生筏繫連處的袋子內。另外，乘員定額為 13 人或以上的救生筏應加配一把小刀，該刀不必是非折疊式的；

.3 對於乘員定額不超過 12 人的救生筏，浮力水瓢 1 隻。乘員定額為 13 人或以上的救生筏，浮力水瓢 2 隻；

.4 海綿 2 塊；

.5 海錨 2 隻，每隻均配有耐震錨索和拉錨索各一根，一隻備用，另一隻永久性地繫於救生筏上，使救生筏在充氣或浮在水面時，以最穩定的方式迎風。每隻海錨及其錨索和拉錨索（如裝有）應具有足以適於一切海況的強度。海錨應設有防止錨索扭結的裝置，並應是不可能在其支索之間外轉的一種類型。永久性地繫固於吊架降放的救生筏和安裝在客船上的救生筏的海錨應佈置成只用於手動展開。所有其他救生筏在充氣時應使用自動展開的海錨；

.6 浮力槳 2 支；

.7 罐頭刀 3 把和剪刀 1 副。帶特殊罐頭刀的安全小刀可滿足本要求；

.8 放在使用後能蓋緊的防水箱內的急救用具 1 套；

.9 哨笛或等效的音響號具 1 隻；

.10 符合第 3.1 節要求的火箭降落傘火焰信號 4 支；

.11 符合第 3.2 節要求的手持火焰信號 6 支；

.12 符合第 3.3 節要求的漂力煙霧信號 2 個；

.13 適於摩氏通信的防水手電筒 1 支，連同備用電池 1 副及備用燈泡 1 支，裝在同一防水容器內；

.14 有效的雷達反射器 1 具，除非在救生筏內存放有 1 台救生艇筏雷達應答器；

.15 日光信號鏡 1 面，上面有向船舶和飛機發出信號用法的須知；

.16 印在防水硬紙上，或裝在防水容器內的第 V 章 16 條所提及的救生信號副本 1 份；

.17 釣魚用具 1 套；

.18 總數為救生筏額定乘員每人不少於 10,000 千焦耳的口糧。這些口糧在建議的整個貨架壽命期間應為可口和可食用的，而且應以能迅速分開並易於拆開方式進行包裝。口糧應保存於氣密包裝內並存放在水密容器內；

.19 水密容器數個，內裝按救生筏額定乘員每個人 1.5 升淡水計的總量，其中每個人所需的 0.5 升淡水量可由 2 天內能生產等量淡水的海水除鹽器來代替，或者每人所需的 1 升淡水量可由 2 天內能生產等量淡水的第 4.4.7.5 款所述的反滲透手動除鹽器來代替；

.20 防鏽飲料量杯 1 個；

.21 救生筏額定乘員每個人可足夠 48 小時使用的防暈船藥和嘔吐袋 1 個；

.22 逃生須知；

.23 緊急行動須知；和

.24 足供 10%的救生筏額定乘員使用的符合第 2.5 節要求的或 2 件保溫用具，取其大者。

4.1.5.2 在根據第 4.1.5.1 款配備的救生筏上，第 4.2.6.3.5 款和 4.3.6.7 款所要求的標誌應是粗體大寫羅馬字母的“SOLAS A PACK”。

4.1.5.3 從事短程國際航行的客船，如主管機關在考慮到航程性質與續航時間後，認為第 4.1.5.1 款所規定的全部項目不都是必要的，主管機關可允許這些船上所載的救生筏配備第 4.1.5.1.1 款至 4.1.5.1.6 款、4.1.5.1.8 款、4.1.5.1.9 款、4.1.5.1.13 款至 4.1.5.1.16 款和 4.1.5.1.21 款至 4.1.5.1.24 款所規定的設備及 4.1.5.1.10 款至 4.1.5.1.12 款所規定的設備的半數。在這些救生筏上，第 4.2.6.3.5 款和 4.3.6.7 款所要求的標誌應是粗體大寫羅馬字母的“SOLAS B PACK”。

4.1.5.4 適當時，設備應收存在容器內；如容器不是救生筏整體的一部分或不是永久附於救生筏上，則容器應存放並繫牢在救生筏內，並能在水面漂浮至少 30 分鐘而不致損壞其內存物。

4.1.6 救生筏浮離裝置

4.1.6.1 首纜系統

救生筏首纜系統應提供船舶與救生筏的某種連接，並應佈置成確保救生筏在釋放和（如為氣脹式救生筏）充氣後，不致被下沉的船舶拖到水下。

4.1.6.2 弱連接

如在浮離裝置中使用弱連接，則弱連接應：

.1 不致被從救生筏容器拉出首纜所需的力拉斷；

.2 如適用，有足夠強度使救生筏充氣；

.3 在 2.2±0.4 千牛頓的應力以下斷開。

4.1.6.3 靜水壓力釋放器

如浮離裝置中使用靜水壓力釋放器，則該裝置應：

.1 由兼容的材料製成，以防止該裝置發生故障。不應接受對靜水壓力釋放器的部件鍍鋅或其他形式的金屬鍍層；

.2 在水深不超過 4 米處，自動釋放救生筏；

.3 設有泄孔，以防止該裝置處在正常位置時，水聚積液壓室內；

.4 構造成當海浪拍擊裝置時，不會釋放；

.5 在其外部永久地標明其機型和系列號；

.6 在裝置或牢固地固定在裝置上的標牌上永久地標明製造日期、機型和系列號及是否適用於可載乘多於 25 人的救生筏；

.7 與首纜系統相連的每一部件的強度應小於對首纜所要求的強度；

.8 如可棄置，按照第 4.1.6.3.6 款的要求標明確定其壽命的方法。

4.2 氣脹救生筏

4.2.1 氣脹救生筏應符合第 4.1 節的要求，此外，還應符合本節的要求。

4.2.2 氣脹救生筏的構造

4.2.2.1 主浮力艙應分為不少於 2 個獨立的隔艙，每個隔艙通過各自的止回充氣閥充氣。浮力艙應佈置成在任一隔艙損壞或未能充氣時，完整的隔艙應能在救生筏整個周圍都是正乾舷的情況下支承該筏的額定乘員，每個乘員的質量以 75 公斤計並且全部坐在規定的座位上。

4.2.2.2 救生筏底應是防水的，並應能以下述方式作充分的御寒絕熱：

.1 通過能由乘員充氣或自動充氣並能由乘員放氣和再充氣的一個或幾個隔艙；或

.2 通過不依靠充氣的其他等效設施。

4.2.2.3 救生筏應能由一個人充氣。救生筏應使用無毒氣體充氣。在環境溫度為 18℃至 20℃之間時，充氣應在 1 分鐘內完成；在環境溫度為-30℃時，充氣應在 3 分鐘內完成。充氣後，救生筏應在載足全部乘員和屬具時保持其形狀。

4.2.2.4 每個充氣隔艙應能經受至少等於 3 倍工作壓力的壓力，應使用安全閥或限制供氣的方法，防止充氣隔艙的壓力超過 2 倍工作壓力。應設有安裝第 4.2.9.1.2 款要求的充氣泵或充氣器的設備，以保持工作壓力。

4.2.3 氣脹救生筏的乘員定額

氣脹救生筏的額定乘員人數應等於下列各數中較小者：

.1 其主浮力管（就本目的而言，不包括拱和橫坐板在內，如設有）充氣後的平方米數除以 0.096 後所得的最大整數；或

.2 救生筏量至浮力管的最內邊的內水平橫剖面的平方米數（就本目的而言，包括一個或多個橫座板在內，如設有）除以 0.372 後所得的最大整數；或

.3 可足夠舒適地坐下、有足夠的頭頂空間而且不妨礙操作任何救生筏設備的人數；這些人有 75 公斤的平均質量，並全部穿著浸水服和救生衣或，對於吊架降放的救生筏，穿著救生衣。

4.2.4 氣脹救生筏的通入

4.2.4.1 至少有一個進口應設置可承受重量為 100 公斤的人員的半剛性登筏跳板，以使人員能從海面登入救生筏。跳板應佈置成能防止在

跳板損壞時，救生筏嚴重泄氣。對於設多於一個進口的吊架降放的救生筏，應在對着拉索與登乘設施的進口處設有登筏跳板。

4.2.4.2 未設登乘跳板的進口處應設有登筏梯，其最下一級應位於救生筏的空載水線以下不少於 0.4 米處。

4.2.4.3 救生筏內應設有助於人員把自己從登筏梯拉進救生筏的設施。

4.2.5 氣脹救生筏的穩性

4.2.5.1 每隻氣脹救生筏應構造成當完全充氣並在頂篷撐至最高位置的情況下漂浮時，在風浪中是穩定的。

4.2.5.2 救生筏處於翻覆位置的穩性，應為在風浪中及在平靜水面上，均能由一人扶正。

4.2.5.3 救生筏在載有全部額定乘員和設備時的穩性應達到能在平靜水面以 3 節航速被拖帶。

4.2.5.4 救生筏應裝有符合以下要求的水袋：

.1 水袋應有高易見的顏色；

.2 水袋的設計應使在打開的 25 秒內能灌滿其容積的 60%

.3 對於不多於 10 人的救生筏，水袋的總容量應至少為 220 升；

.4 對於准乘多於 10 人的救生筏，水袋的總容量應不少於 20N 升，式中 N＝載員人數；

.5 水袋應在救生筏周圍對稱放置，應設有裝置使空氣迅速從救生筏下面逸出。

4.2.6 氣脹救生筏的容器

4.2.6.1 救生筏應裝在容器內，該容器：

.1 結構應在所能遇到的各種海上狀況下，均經久耐用；

.2 內裝救生筏及其設備時，具有充裕的固有浮力在船舶下沉時從內部拉出首纜並開動充氣裝置；

.3 可行時，除容器底部的泄水孔外，是水密的。

4.2.6.2 救生筏在其容器中的包裝方法，應儘可能確保浮在水上的救生筏從容器中脫開後，處於正浮的位置充氣。

4.2.6.3 容器上應標明：

.1 製造廠名或商標；

.2 系列號；

.3 認可當局的名稱和乘員定額；

.4 SOLAS；

.5 內裝應急袋的型號；

.6 最近一次檢修日期；

.7 首纜長度；

.8 水線以上最大許可存放高度（視投落實驗高度和首纜長度而定）；和

.9 降放須知。

4.2.7 氣脹救生筏的標誌

4.2.7.1 救生筏上應標明：

.1 製造廠名或商標；

.2 系列號；

.3 製造日期（年和月）；

.4 認可當局名稱；

.5 最後一次檢修的檢修站名稱和地點；和

.6 每個進口處上面寫明乘員定額，字高不小於100毫米，字色與救生筏顏色有明顯的差異。

4.2.7.2 應作出在每條救生筏上標明其所屬船舶的船名和登記港的措施，其格式應使船舶識別能隨時改變而無需打開容器。

4.2.8 吊架降放的氣脹救生筏

4.2.8.1 除符合上述要求外，與經認可的降放設備一起使用的救生筏，當懸掛在釣鉤或吊筏索時，還應能經受下列負荷：

.1 在環境溫度和穩定的救生筏溫度為 20±3°C、所有安全閥均不工作的情況下：全部乘員和設備質量的4倍；

.2 在環境溫度和穩定的救生筏溫度為-30°C、所有安全閥均工作的情況下：全部乘員和設備質量的1.1倍；

4.2.8.2 降放設備降放的救生筏的剛性容器應繫牢，以防止該容器或其部件在對所裝的救生筏進行充氣和降放的過程中及以後，落入海中。

4.2.9 氣脹救生筏的附加設備

4.2.9.1 除第 4.1.5 款要求的設備外，每隻氣脹救生筏應配備：

.1 修補浮力艙破洞的修補工具 1 套；

.2 充氣泵或充氣器 1 具。

4.2.9.2 第 4.1.5.1.2 款所要求的小刀應是安全小刀，第 4.1.5.1.7 款要求的罐頭刀和剪子應為安全類型。

4.3 剛性救生筏

4.3.1 剛性救生筏應符合第 4.1 節的要求，此外，還應符合本節的要求。

4.3.2 剛性救生筏的構造

4.3.2.1 救生筏的浮力應由認可的固有浮力的材料提供，材料置於儘可能靠近救生筏周圍處。浮力材料應是阻燃的，或用阻燃外層加以保護。

4.3.2.2 救生筏的筏底應能防止海水進入，並應有效地為乘員提供水上支承和御寒。

4.3.3 剛性救生筏的乘員定額

每隻剛性救生筏的額定乘員人數應等於下列各數中較小者：

.1 浮力材料的體積（以立方米計）乘以系數 1 減去該材料的比重所得的商數的乘積除以 0.096 所得的最大整數；或

.2 救生筏底的水平橫剖面面積（以平方米計）除以 0.372 所得的最大整數；或

.3 可足夠舒適地坐下、有足夠的頭頂空間而且不妨礙救生筏設備的操作的人數；這些人員的平均質量為 75 公斤、全部穿著浸水服和救生衣。

4.3.4 剛性救生筏的通入

4.3.4.1 至少應有一個進口設有剛性登筏跳板，以便人員能從海上登上救生筏。對於設有一個以上進口的吊架降放的救生筏，應在對着拉索與登乘設備的進口處設有登筏跳板。

4.3.4.2 未設登筏跳板的進口處應設有登筏梯，其最下一級應位於救生筏空載水線以下不小於 0.4 米處。

4.3.4.3 救生筏內應設有助於人員將自己從登梯拉進救生筏的設施。

4.3.5 剛性救生筏的穩性

4.3.5.1 除非救生筏在任何一端向上漂浮時都能安全使用，否則其強度與穩性應達到能自行扶正，或在風浪和平靜水中均能由一人扶正。

4.3.5.2 救生筏載足全部乘員和設備時的穩性，應達到能在靜水中以 3 節航速被拖帶。

4.3.6 剛性救生筏上的標誌

救生筏上應標明：

.1 其所屬船舶的名稱和登記港；

.2 製造廠名或商標；

.3 系列號；

.4 認可當局的名稱；

.5 在每個進口處上寫明乘員定額，字高不小於100毫米，字色與救生筏顏色有着顯著的差異；

.6 SOLAS；

.7 內裝應急袋的型號；

.8 首纜的長度；

.9 水線以上最大許可存放高度（視投落試驗高度）；和

.10 降放須知。

4.3.7 吊架降放的剛性救生筏

除上述要求外，與經認可的降放設備一起使用的剛性救生筏，當懸掛在吊筏鉤或吊筏索時，應能承受全部乘員和設備質量的 4 倍。

4.4 救生艇的一般要求

4.4.1 救生艇的構造

4.4.1.1 所有救生艇均應適當建造，其形狀及比例應使其在海浪中具有充裕的穩性，在載足全部額定乘員及設備時具有足夠的乾舷。所有救生艇應有剛性艇體，當在平靜水中處於正浮位置、載足全部額定乘員及設備、在水線以下任何部位破孔時，如果浮力材料沒有損失並且沒有其他損傷，則應能保證正穩性。

4.4.1.2 每隻救生艇應備有一份由主管機關簽署的認可證書，該證書上應至少載明下列項目：

— 製造廠名和地址；

— 救生艇型號和系列號；

— 製造年月；

— 乘員定額；和

— 第 1.2.2.9 款要求的認可信息。

發證機關應發給救生艇一份認可證書，除上述項目外，該證書應註明：

— 認可證書號碼；

— 艇體構造的材料，材料應詳細到確保在修理時不致出現兼容問題；

— 載足全部設備和乘員時的質量；和

— 關於第 4.5 節、4.6 節、4.7 節、4.8 節或 4.9 節的認可說明。

4.4.1.3 所有救生艇應具有足夠的強度：

.1 使其在載足全部額定乘員及設備時能安全降放水中；和

.2 當船舶在平靜水中以 5 節航速前進時，能被降放和拖帶。

4.4.1.4 艇體及剛性頂蓋應是阻燃的或不燃的。

4.4.1.5 應在橫座板、長櫈或固定椅上應設有座位，這些座具應構造成能支撐：

.1 等於按第 4.4.2.2.2 款的要求為其提供了空間的每位重 100 公斤的人數的靜態負荷；

.2 當以吊索降放的救生艇從至少 3 米的高度落入水中時，在任何單一座位位置的 100 公斤的負荷；

.3 當自由降落救生艇從至少是其自由降落驗證高度的 1.3 倍的高度降放時，在任何單一座位位置的 100 公斤的負荷；

4.4.1.6 除自由降落救生艇外，每隻以吊索降放的救生艇應具有足夠強度經受下列負荷並在卸去負荷後無剩餘變形：

.1 對於金屬艇體的救生艇，救生艇載足全部額定乘員及設備時的總質量的 1.25 倍；或

.2 對於其他救生艇，救生艇載足全部額定乘員及設備時的總質量的 2 倍。

4.4.1.7 除自由降落救生艇外，每隻以吊索降放的救生艇應具有足夠強度經受在載足全部額定乘員及設備、滑架或護舷材就位（如適用）時碰撞速度至少為 3.5 米/秒的船舷水平撞擊和從至少 3 米高度的入水墜落。

4.4.1.8 在超過 50%的艇底面積上，從艇底表面到封閉蓋或天篷內面的垂直距離應：

.1 對於額定乘員為 9 人或以下的救生艇：不少於 1.3 米；

.2 對於額定乘員為 24 人或以上的救生艇：不少於 1.7 米；

.3 對於額定乘員為 9 人至 24 人之間的救生艇：不少於以線性內插法確定的介於 1.3 米與 1.7 米之間的距離。

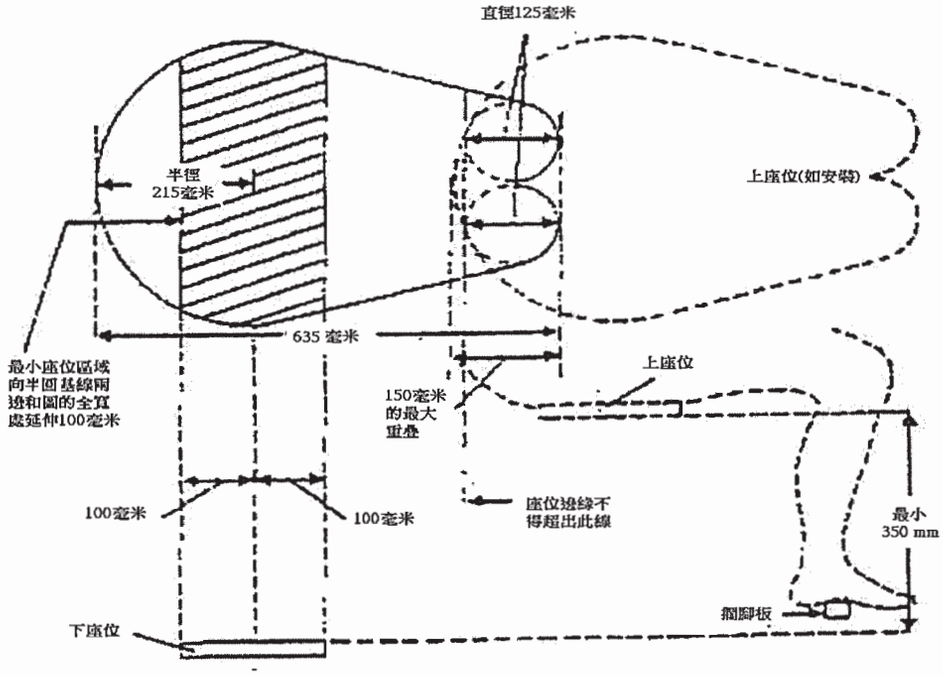
4.4.2 救生艇的乘員定額

4.4.2.1 概不認可載員超過 150 人的救生艇；

4.4.2.2 以吊索降放的救生艇的乘員定額應等於下列各數中的較小者：

.1 以正常姿勢坐着而不妨礙推進裝置或任何救生艇設備的操作的人數，這些人員的平均質量為 75 公斤，全部穿著救生衣；或

.2 按圖 1 的座位佈置所能提供的座位數目。倘若裝有擱腳板、有足夠腿部活動空間、上下座位之間的垂直距離不少於 350 毫米，則形狀可按圖 1 重疊。



（圖 1）

4.4.2.3 應在救生艇內清晰地標出每個座位位置。

4.4.3 救生艇的通入

4.4.3.1 每艘客船救生艇應佈置成其全部額定乘員能迅速登艇。尚應能迅速離艇。

4.4.3.2 每艘貨船救生艇應佈置成其全部額定乘員在從發出登艇指令起不超過 3 分鐘內登艇。尚應能迅速離艇。

4.4.3.3 救生艇應備有能在救生艇任何一進口使用的登乘梯，以便水中人員能夠登上救生艇。該梯子的最下一級座位於救生艇空載水線以下不小於 0.4 米處。

4.4.3.4 救生艇應佈置成失去自助能力的人員能從海中或者從擔架上抬進救生艇。

4.4.3.5 人員可能行走的所有表面應有防滑履面。

4.4.4 救生艇浮力

所有救生艇應具有固有浮力，或應設有不受海水、油類或油類產品不利影響的固有浮力材料，當艇內浸水和破漏通海時，足以使載有所有設備的救生艇浮在水上。應配備按救生艇額定乘員每人 280 牛頓浮力計的附加固有浮力材料。浮力材料不應設置在救生艇的艇體外面，除非是上述要求外的浮力材料。

4.4.5 救生艇的乾舷和穩性

4.4.5.1 當 50%額定乘員以正常姿勢坐在艇中心線一側時，所有救生艇應是穩定的並有正的橫穩心高度。

4.4.5.2 在第 4.4.5.1 款的負荷狀況下：

.1 每隻在舷緣附近有開口的救生艇的乾舷應至少為救生艇長度的 1.5%或 100 毫米，取大者；乾舷是從水線量至使救生艇可能變成浸水狀態的最低開口處；及

.2 每隻在舷緣附近沒有開口的救生艇應不超過 20 度橫傾，其乾舷應至少為救生艇長度的 1.5%或 100 毫米，取大者；乾舷是從水線量至使救生艇可能變成浸水狀態的最低開口處。

4.4.6 救生艇推進裝置

4.4.6.1 每艘救生艇應由壓燃式發動機驅動。任何救生艇概不得使用其燃料的閃點為 43℃ 或以下（閉杯試驗）的發動機。

4.4.6.2 發動機應設有手啟動系統，或設有帶兩個獨立的充電電源的電力啟動系統。尚應設有任何必要的輔助啟動設施。除主管機關考慮到配備該救生艇的船舶經常從事的特殊航線而認為另一種溫度適宜者外，發動機啟動系統和輔助啟動設施應在環境溫度為-15℃ 時在啟動程序開始後 2 分鐘內啟動發動機。發動機罩、座位或其他障礙物均不得妨礙啟動系統。

4.4.6.3 發動機應能在救生艇離開水面的情況下於冷態啟動後運轉不少於 5 分鐘。

4.4.6.4 當救生艇內水浸到曲軸中心線處時，發動機應仍能運轉。

4.4.6.5 螺旋槳軸應佈置成可與發動機脫開。應有救生艇正車和倒車推進的措施。

4.4.6.6 排氣管應佈置成能防止水在正常作業中進入發動機。

4.4.6.7 所有救生艇的設計應充分考慮到水中人員的安全和漂浮碎片損壞推進系統的可能性。

4.4.6.8 當載有全部額定乘員和設備、所有發動機驅動的輔助裝置均在運轉時，救生艇在平靜水中的前進航速，應至少為 6 節；當拖帶 1 隻載有全部額定乘員和設備的 25 人救生筏或與其相等的負載時，其前進航速應至少為 2 節。應配備適合在船舶營運航區預期的整個溫度範圍內使用的足夠燃料，使滿載的救生艇以 6 節航速運行不少於 24 小時。

4.4.6.9 救生艇發動機、傳動裝置和發動機的附件，應圍蔽在阻燃罩殼或其他能提供類似保護的適當裝置內。這些裝置尚應保護人員不致意外地接觸熱的和運動的部件，並保護發動機免於暴露在風雨和海浪中。應裝設降低發動機噪聲的適宜裝置以便能聽到口令。啟動電池應設有在電池底部和側面形成水密圍蔽的箱子。電池箱應設有緊密安裝，備有必要透氣的頂蓋。

4.4.6.10 救生艇發動機和附件應設計成能限制電磁釋放，使發動機的運轉不干擾在救生艇內使用的無線電救生設備的操作。

4.4.6.11 應設有對所有供發動機啟動、無線電和探照燈用的電池進行充電的設備。無線電用的電池不應用作啟動發動機的動力。應裝有使用船舶供電或太陽能電池充電池器對救生艇電池充電的設施；船舶供電電壓不應超過 50V 並可在救生艇登乘位置斷開。

4.4.6.12 應備有啟動和操作發動機的防水須知，張貼在發動機啟動控制裝置附近明顯處。

4.4.7 救生艇配件

4.4.7.1 除自由降落式救生艇外，所有救生艇應在靠近艇體內最低點處裝設至少一個排水閥。該排水閥在救生艇不在水面時應自動開啟，使水從艇體內排出，當救生艇在水面時應自動關閉，以防止海水浸入。每個排水閥應配有 1 隻關閉排水閥的蓋子或塞子，以短繩、鏈條或其他適宜方法繫於救生艇上。排水閥應位於救生艇內容易到達之處，其位置應有明顯標示。

4.4.7.2 所有救生艇應裝有舵和舵柄。當加設舵輪或其他遙控操舵裝置時，舵柄應能在操舵機械發生故障時操舵。舵應固定地附連在救生艇上。舵柄應固定地安裝或連接在舵柱上；但如救生艇設有遙控操舵裝置，舵柄可以是可拆卸的，可靠地存放在舵杆附近。舵和舵柄應佈置成有不會因操作釋放裝置或螺旋槳而遭到損壞。

4.4.7.3 除在舵和螺旋槳附近部位外，應沿救生艇外圍在水線以上且水中人員可夠到的高度上設有適宜扶手或裝設成索環的浮力救生索。

4.4.7.4 翻覆時不能自行扶正的救生艇，應在艇體下裝設供人員抓住救生艇的適宜扶手。扶手應固連在救生艇上，在受到碰撞而使扶手從救生艇上脫開時，不損壞救生艇。

4.4.7.5 所有救生艇應設置足夠的水密櫃或艙室，貯存第 4.4.8 款所要求的小設備、水和口糧。救生艇應備有收集雨水的設施；此外，如果主管機關要求的話，還應配備使用手動除鹽器以海水生產飲用水的裝置。除鹽器不得依靠太陽熱或除海水外的化學物質。應備有貯存所收集的雨水的設施。

4.4.7.6 每艘必須用單根或多根艇索降落的救生艇（除自由降落救生艇外）應設置符合下列要求的脫開機械裝置，但以下.5 款要求除外：

.1 該裝置應佈置成能同時釋放所有吊鈎；

.2 該裝置應具有下列兩種釋放能力：

.2.1 正常釋放能力。當救生艇浮在水面或吊鈎上無負載時，它會釋放救生艇；

.2.2 負載釋放能力。在吊鈎有負載時，它會釋放救生艇。此種釋放應佈置成能使救生艇在救生艇漂浮在水面上無負載到等於救生艇載有全部額定乘員及調和時的總質量的 1.1 倍的負載的任何負載情況下被釋放。此種釋放能力應得到適當的保護，以防止意外或過早使用。適當保護除危險標誌外還應包括對無負載釋放通常不需要的特殊機械保護。為防止回收艇時意外地釋放，該機械保護（連鎖）應只能在釋放裝置正確、完全地復位時才能接合。為防止過早地負載釋放，釋放裝置的負載釋放應需要操作人員有意和持久的動作。釋放裝置應設計成使救生艇上的船員能夠清楚地觀察到該裝置何時正確和完全地復位並適於起吊。應設置附有適當警告文字的簡要操作須知。

.3 釋放控制裝置應有清晰標誌，標誌顏色與其周圍環境有明顯的差異。

.4 救生艇內釋放裝置的固定結構連接的設計應取安全系數等於 6，按所選用材料的極限強度計算，假設救生艇質量平均分佈在各吊索上。

.5 當單吊索和吊鈎系統與適當首纜一起用於降放救生艇或救助艇時，第 4.4.7.6.2 款的要求不必適用；採用此種佈置時，釋放救生艇或救助艇的單一能力僅在其完全浮在水面上時會是足夠的。

4.4.7.7 每一救生艇應設有在艇首附近固定首纜的裝置。該裝置應使該艇在平靜水中由船舶以不超過 5 節的正車航速拖帶時，不致出現不安全或不穩定的現象。除自由降落救生艇外，首纜固定裝置應包括一釋放裝置，使首纜能夠在船舶以不超過 5 節的航速在平靜水面前進時從救生艇內釋放。

4.4.7.8 裝有單獨架設天線的固定式雙向甚高頻無線電話的每一救生艇，應有能將天線有效地定位和固定在其操作位置的裝置。

4.4.7.9 在船舷降放的救生艇，應設置便於救生艇降放和防止損壞所必需的滑架和護舷材。

4.4.7.10 應裝設一盞人工控制燈。該燈光應為白色，能在上半球的所有方向以光強不小於 4.3 燭光連續工作至少 12 小時。如是閃光燈，該燈應在 12 小時的工作時間內以每分鐘不少於 50 且不大於 70 閃的速率以相應的有效光強閃光。

4.4.7.11 救生艇內應裝設一盞手控的燈或光源，提供照明不少於 12 小時，供閱讀逃生和設備須知；但不准使用油燈作此用途。

4.4.7.12 每艘救生艇應佈置成在控制與操舵位置有適當的向前方、後方和兩舷的視域，以便安全地降放和操縱救生艇。

4.4.8 救生艇設備

本款或第 4.4 節其他條款要求的各項救生艇設備，應採用索具、貯存在櫃內或艙室內、貯存在框架或類似的裝放裝置或其他適宜的方式繫牢於救生艇內。但是，對於使用吊索降放的救生艇，帶鉤艇篙應不加固定以供撐開救生艇。設備應繫固成不妨礙任何棄船程序。各項救生艇設備應儘可能小巧輕便，並應包裝合適而緊湊。除另有說明者外，每艘救生艇的正常設備應包括：

.1 除自由降落救生艇外，足夠數量的浮力槳，以供在平靜海域中行進。所備的每支槳應配齊槳架、槳叉或等效裝置。槳架或槳叉應以短繩或鏈條繫於艇上；

.2 帶鉤艇篙 2 支；

.3 浮力舀水勺 1 隻，水桶 2 隻；

.4 逃生手冊 1 本；

.5 發光或具有適當照明裝置的工作羅經 1 隻。在全封閉救生艇上，該羅經應固定在操舵位置；對任何其他救生艇上，如需要，應配有為該羅經提供風雨保護的羅經櫃和適當的支架裝置；

.6 適當尺度的海錨 1 隻，配有浸濕時還可用手緊握的耐震錨索 1 根。海錨、錨索和收錨索（如裝有）的強度應適合一切海況；

.7 有效的首纜 2 根，其長度不小於從救生艇存放的位置至空載航行狀態水線距離的 2 倍或 15 米，取較大者。在自由降落降放的救生艇上，這兩根首纜應貯存在艇艏附近備用。

在其他救生艇上，附連於第 4.4.7.7 款要求的釋放裝置的一根首纜，應設置在救生艇的前端，而另一根首纜應繫固於救生艇艇首或艇首附近，以備使用；

.8 太平斧 2 把，救生艇前後端各一把；

.9 水密容器數個，內裝總量為按救生艇額定乘員每個人 3 升計的淡水，其中每個人 1 升的淡水量可用 2 天內能產生等量淡水的海水除鹽器來代替，或者每個人 2 升的淡水量可用第 4.4.7.5 款所述的能在 2 天內產生等量淡水的手動反滲透除鹽器來代替；

.10 附有短繩的不銹長柄勺 1 個；

.11 防銹飲料量杯 1 個；

.12 第 4.1.5.1.18 款所述的總量為按救生艇額定乘員每人不少於 10,000 千焦耳計的口糧；口糧應保存於氣密包裝內並存放在水密容器內；

.13 符合第 3.1 節要求的火箭降落傘火焰信號 4 支；

.14 符合第 3.2 節要求的手持火焰信號 6 支；

.15 符合第 3.3 節要求的浮力煙霧信號 2 支；

.16 適於摩氏信號的防水手電筒 1 隻，連同裝在防水容器內的備用電池 1 副和備用燈泡 1 隻；

.17 日光信號鏡 1 面，及其向船舶和飛機發送信號的使用須知；

.18 印在防水硬紙上或裝在防水容器內的第 V/16 條所規定的救生信號副本一份；

.19 哨笛或等效的音響號具 1 隻；

.20 使用後置於能蓋緊的防水箱內的急救器具 1 套；

.21 每人配至少供 48 小時使用的防暈船藥和嘔吐袋 1 個；

.22 以短繩繫於艇上的折疊刀 1 把；

.23 罐頭刀 3 把；

.24 繫有長度不小於 30 米浮索的可浮救助環 2 個；

.25 如救生艇不能自動排水，適於有效排水的手搖泵 1 具；

.26 釣魚用具 1 套；

.27 對發動機和其附件作小調整用的足夠數量工具；

.28 經認可類型的適於撲滅油類火災的手提滅火器 1 具；

.29 具有水平和垂直扇區至少為 6°且光強為 2500 燭光的探照燈 1 具，並至少能連續使用 3 小時；

.30 有效的雷達反射器 1 具，除非在救生艇內存放有 1 隻救生艇筏雷達應答器；

.31 足供 10%的救生艇額定乘員使用或 2 件符合第 2.5 節要求的保溫用具，取較大者；

.32 如主管機關考慮到該船所從事的航行性質與持續時間，認為第 4.4.8.12 款和 4.4.8.26 款所規定的物品為不必要者，主管機關可准予免除。

4.4.9 救生艇標記

4.4.9.1 在救生艇上應以經久的明顯字迹標明乘員定額。

4.4.9.2 救生艇所屬船舶名稱及登記港應以粗體羅馬字母標明於艇首兩側。

4.4.9.3 救生艇所屬船舶的識別標誌和救生艇號碼，應能從上空可看清。

4.5 部分封閉救生艇

4.5.1 部分封閉救生艇應符合第 4.4 節的要求，此外，還應符合本節的要求。

4.5.2 部分封閉救生艇應裝設永久附連的剛性頂蓋，該頂蓋從首柱延伸不少於該救生艇長度的 20%，並從該救生艇最後端延伸不少於救生艇長度的 20%。該救生艇應設永久附連的可折式頂篷，可折式頂篷連同剛性頂蓋形成一個能擋風雨的遮蔽，把該救生艇乘員完全罩住，使其免受風吹雨打。救生艇的艇首和艇尾及兩舷應具有進口。關閉時，剛性頂蓋的進口應是風雨密。頂篷應佈置成：

.1 設有適合的剛性型材或條板，以便撐起頂篷；

.2 能由不多於 2 個人即可容易地撐起頂篷；

.3 頂篷應採用氣隙隔開的不少於兩層的材料或其他等效設施來隔熱，以保護乘員不受冷熱的侵害；並應設有防止在氣隙內聚集水分的設施；

.4 頂篷外面應是鮮明易見的顏色，頂篷內面的顏色應不使乘員感到不舒適；

.5 頂篷的進口設有有效的可調關閉裝置，在內外兩面均能容易而迅速地開啟和關閉該裝置，以便既能通風，又可擋住海水、風和寒氣；並應設有使進口牢固地固定在開啟和關閉位置的設施；

.6 進口關閉時，它一直有足夠乘員需要的空氣進入；

.7 設有收集雨水的設施；

.8 萬一救生艇傾覆，乘員應能逃出。

4.5.3 救生艇內部應有高易見顏色。

4.5.4 如救生艇內裝有固定雙向甚高頻無線電設備，則應安裝在足以容納該設備和操作人員的艙室內。如救生艇的構造提供一個遮蔽處所並使主管機關滿意，則可不要求獨立艙室。

4.6 全封閉救生艇

4.6.1 全封閉救生艇應符合第 4.4 節的要求；另外，還應符合本節的要求。

4.6.2 封閉蓋

每艘全封閉救生艇應設有完全封閉救生艇的剛性水密封閉蓋。封閉應佈置成：

.1 為乘員提供遮蓋；

.2 由艙口提供進入救生艇的通道，艙口可關閉，使救生艇成為水密；

.3 除自由降落救生艇外，艙口應位於能進行降放和回收作業而無需任何乘員離開該封閉蓋處；

.4 通道艙口在內外兩面均能開啟和關閉，並設有使其牢固地固定在開啟位置的設施；

.5 除自由降落救生艇外，能划動救生艇；

.6 當救生艇處於傾覆位置、艙口關閉且無嚴重漏水時，他能支持救生艇的全部質量，包括全部設備、機械和全部額定乘員；

.7 它包括窗子或半透明板，使足夠的日光射進艙口關閉的救生艇內部，而不必採用人工光；

.8 其外部是高易見的顏色，而內部的顏色不會使乘員感到不舒適；

.9 扶手為在救生艇外部活動的人員提供牢靠的握持，並幫助登艇和離艇；

.10 人員從進口處無須跨過橫座板或其他障礙物而到達他們的座位；

.11 在封閉蓋處於關閉狀態的發動機工作期間，救生艇內的空氣壓力在任何時候不應超過和低於外面空氣壓力 20h 巴。

4.6.3 傾覆與扶正

4.6.3.1 除自由降落救生艇外，每個標明的座位處應設有一根安全帶。安全帶應設計成在救生艇處於傾覆位置時，能將質量為 100 公斤的人員牢固地縛在原處。每個座位的每套安全帶的顏色應與其鄰近座位安全帶的顏色有明顯區別。自由降落救生艇內的每個座位應設有一根顏

色反差明顯的安全帶，設計成在救生艇自由降落降放時和處於傾覆位置時，能將質量為 100 公斤的人員牢固地縛在原處。

4.6.3.2 救生艇的穩性應達到在裝載全部或部分額定乘員及設備、所有進口的開口是水密關閉而且所有乘員都用安全帶縛牢時，能固有或自動地自行扶正。

4.6.3.3 當救生艇處於第 4.4.1.1 款所述的破損狀況時，救生艇應能支持其全部額定乘員及設備；其穩性應達到在傾覆時，救生艇自動地處於乘員可在水面之上逃出的位置。當救生艇處於穩定的浸水狀態時，救生艇內水面高度沿座位靠背量在任何乘員座位處不應超過椅盤以上 500 毫米。

4.6.3.4 一切發動機排氣管、空氣管和其他開口應設計成在救生艇傾覆和扶正時，海水不至進入發動機。

4.6.4 推進裝置

4.6.4.1 應在舵工位置控制發動機和傳動裝置。

4.6.4.2 發動機及發動機裝置應能在傾覆時的任何位置上運轉並在救生艇回至正浮狀態後仍繼續運轉；或在傾覆時應自動停車並在救生艇回到正浮時易於再啟動。燃油及潤滑油系統應設計成在傾覆時能防止流失燃油和從發動中流失超過 250 毫升的潤滑油。

4.6.4.3 空氣冷卻式發動機應設有從救生艇外部吸進冷卻空氣並將其排到救生艇外部的管道系統。應設有手動調節閥門，使其能從救生艇內部吸進冷卻空氣並將其排到救生艇內部。

4.6.5 防加速保護

雖有第 4.4.1.7 款的規定，除自由降落救生艇外，全封閉救生艇的結構與護舷材應達到當救生艇在載有全部額定乘員及設備，以不少於 3.5 米/秒的碰撞速度碰撞船舷時，救生艇能提供防止由此產生的有害加速度的保護。

4.7 自由降落救生艇

4.7.1 一般要求

自由降落救生艇應符合第 4.6 節的要求，另外，還應符合本節的要求。

4.7.2 自由降落救生艇的乘員定額

自由降落救生艇乘員定額是在不妨礙推進裝置或任何救生設備的操作的情況下能配備座位的人數。座位的寬度應至少為 430 毫米，靠背前的無障礙間隙應至少為 635 毫米。靠背應在座盤之上延伸至少 1000 毫米。

4.7.3 性能要求

4.7.3.1 每隻自由降落救生艇在載有全部設備和載乘下述人員時應做到一旦入水即可穩定地正車前進，在船舶縱傾 10°、向任一舷橫傾達 20°的情況下在從核准高度自由降落降放後不與船舶接觸：

.1 全部額定乘員；

.2 導致重心最靠前的乘員；

.3 導致重心最靠後的乘員；

.4 只有操作船員。

4.7.3.2 對於視情按《經 1978 年議定書修訂的 1973 年防止船舶造成污染公約》和在適當時按本組織建議書計算最終橫傾角度超過 20°的油輪、化學品船和氣體船，救生艇應能在最終橫斜角的狀態下和該計算的最終水線情況下被自由降落降放。

4.7.3.3 所要求的自由降落高度應不超過自由降落的核准高度。

4.7.4 構造

每艘自由降落救生艇應有足夠強度承受在載有全部額定乘員和設備時從至少 1.3 倍於核准高度的高度上自由降落。

4.7.5 防止有害加速度的保護

每艘自由降落救生艇應構造成能對當救生艇載有全部設備和下述人員、船舶不利縱傾達 10°、向任一舷橫傾達 20°、在平靜水面從核准高度降放所產生的有害加速度作出保護：

.1 全部人員；

.2 導致重心最靠前的乘員；

.3 導致重心最靠後的乘員；

.4 只有操作船員。

4.7.6 救生艇的艙裝

每艘自由降落救生艇應設有釋放裝置。該裝置應：

.1 有兩套獨立的釋放裝置啟動系統，並只能從救生艇內操作，其顏色應與周圍有明顯差異；

.2 佈置成在救生艇從無負荷至至少是載有全部設備和額定乘員的救生艇的正常負荷的 200%的任何負荷條件下釋放救生艇；

.3 作出防止意外或過早使用的適當保護；

.4 設計成以不用降放救生艇而能測試釋放系統；

.5 設計時，按所選用材料的極限強度，取安全系數等於 6。

4.7.7 核准證書

除第 4.4.1.2 款的要求外，自由降落救生艇的核准證書還應寫明：

.1 自由降落核准高度；

.2 要求的降放滑道長度；

.3 自由降落核准高度的降放滑道角度。

4.8 具有獨立空氣維持系統的救生艇

除應視情符合第 4.6 節或 4.7 節的要求外，具有獨立空氣維持系統的救生艇應佈置成當救生艇在全部進口和開口均關閉的情況下航行時，救生艇內的空氣仍然是安全和適宜於呼吸的，而且發動機正常運轉時間不少於 10 分鐘。在此期間，救生艇內的氣壓不降到艇外大氣壓以下，也不超過艇外氣壓 20h 巴以上。該系統應有視覺指示器，可一直指示空氣供應壓力。

4.9 防火救生艇

4.9.1 除應符合第 4.8 節的要求外，在水面上的防火救生艇，應能在持續油火包圍救生艇不少於 8 分鐘的時間內保護其額定乘員。

4.9.2 灑水系統

裝有灑水防火系統的救生艇，應符合下列要求：

.1 用自吸馬達泵從海裏抽取該系統的供水。該系統應可能“開啟”和“關閉”灑到救生艇外面的水流；

.2 海水吸入口應佈置成能防止從海面吸入易燃液體；

.3 該系統應佈置成能用淡水沖洗，並完全排清積水。

第 V 章

救助艇

5.1 救助艇

5.1.1 一般要求

5.1.1.1 除本節所規定者外，所有救助艇均應符合第 4.4.1 至 4.4.7.4 款和 4.4.7.6、4.4.7.7、4.4.7.9、4.4.7.10 和 4.4.9 款的要求。如果其能滿足本節所有要求，成功地完成第 III/4.2 條要求的救助艇試驗，並且其在船上的貯存、降放和回收佈置滿足對救助艇的所有要求，則救生艇可被認可為和用作救助艇。

5.1.1.2 雖有第 4.4.4 款的要求，規定的救助艇浮性材料可以安裝在艇殼外部，但它應有防損壞的保護並能承受第 5.1.3.3 款所述的暴露。

5.1.1.3 救助艇可以是剛性或充氣結構，或兩者的混合結構，並應：

.1 長度不小於 3.8 米、不大於 8.5 米；和

.2 至少能乘載 5 個坐下的人員和 1 個躺在擔架上的人員。雖有第 4.4.1.5 款的規定，除舵工外，座位可設在艇底上，但第

4.4.2.2.2 款規定的座位空間分析應採用與圖 1 類似的形狀，不過總長度應改為 1190 毫米以便腿部伸展。座位空間的任何部分均不得在艇緣、艇尾板上，或艇兩側的充氣漂淨物上。

5.1.1.4 剛性與充氣混合結構的救助艇，應符合本節的適當要求，並使主管機關滿意。

5.1.1.5 除非救助艇具有足夠舷弧，否則救助艇應設有延伸不少於 15% 該艇長度的艇首蓋。

5.1.1.6 救助艇應能以至少 6 節的航速進行操縱，並保持此航速至少 4 小時。

5.1.1.7 救助艇在海浪中應具有足夠的機動性和操縱性，以便能從水中拯救人員，集結救生筏，並能以至少 2 節的航速拖帶船舶所配備的載有全部額定乘員及設備相當重量的最大救生筏。

5.1.1.8 救助艇應裝設舷內發動機或舷外發動機。如裝設舷外發動機，舵與舵柄可以是發動機的組成部分。雖有第 4.4.6.1 款的要求，救助艇可以裝設具有經認可燃油系統的汽油驅動舷外發動機，但燃油櫃應有特殊的防火和防爆保護。

5.1.1.9 拖帶裝置應永久地安裝在救助艇上，其強度應足夠集結或拖帶第 5.1.1.7 款所要求的救生筏。

5.1.1.10 除另有明文規定者外，每艘救助艇應設有有效的舀水裝置或可自行舀水。

5.1.1.11 救助艇應設有放小設備的風雨密貯存裝置。

5.1.2 救助艇設備

5.1.2.1 除帶鉤艇篙應不加固定以供擋開外，各項救助艇設備應採用綁扎、貯存在櫃內或艙室內、貯存在托架內或類似的支架裝置內等方式或其他適宜的方式繫牢於救助艇內。設備應繫固成不妨礙任何降放和回收作業。一切救助艇設備應儘可能小巧輕便並應包裝合適而緊湊。

5.1.2.2 每艘救助艇的正常設備應包括：

.1 足夠數量的浮力槳或手划槳，以供在平靜海面划槳前進。所備的每支槳應配齊槳架、槳叉或等效裝置。槳架或槳叉應以短繩或鏈條繫於艇上；

.2 浮力舀水勺 1 隻；

.3 內裝發光或具有適當照明裝置的有效羅經的羅經櫃一具；

.4 海錨 1 個和在配有足夠強度、不少於 10 米長的粗索時錨索 1 條；

.5 足夠長度和強度的首纜 1 根，附連於符合第 4.4.7.7 款要求的釋放裝置，放在救助艇的前端；

.6 長度不少於 50 米的浮力索 1 根，具有足夠拖帶第 5.1.1.7 款要求的救生筏的強度；

.7 適於摩氏通信的防水手電筒 1 隻，連同備用電池 1 副及備用燈泡 1 隻，裝在防水容器內；

.8 哨笛或等效的音響號具 1 隻；

.9 置於使用後能蓋緊的防水箱內的急救器具 1 套；

.10 繫有長度不少於 30 米浮索的浮力救生環 2 個；

.11 水平和垂直扇區至少為 6°、測定光強為 2500 燭光的探照燈 1 具，至少能連續使用 3 小時；

.12 有效的雷達反射器 1 具；

.13 足供 10%救助艇額定乘員使用的符合第 2.5 節要求的保溫用具或 2 件，取其大者；

.14 適於撲滅油火的經認可型號的手提式滅火器 1 具。

5.1.2.3 除第 5.1.2.2 款要求的設備外，每艘剛性救助艇的正常設備還應包括：

.1 帶鉤艇篙 1 支；

.2 水桶 1 隻；

.3 小刀或太平斧 1 把。

5.1.2.4 除第 5.1.2.2 款所要求的設備外，每艘充氣救助艇的正常設備還應包括：

.1 浮力安全小刀 1 把；

.2 海綿 2 塊；

.3 有效的手動充氣器或充氣泵 1 具；

.4 裝在適當容器內的修補破洞的修補工具 1 套；

.5 安全艇篙 1 支。

5.1.3 充氣救助艇的附加要求

5.1.3.1 第 4.4.1.4 款和 4.4.1.6 款的要求不適用於充氣救助艇。

5.1.3.2 充氣救助艇應構造成在被懸掛地吊索或吊鈎上時：

.1 有足夠的強度和剛性，使其能在裝載全部乘員和設備的情況下被降落和回收；

.2 有足夠的強度在環境溫度為 20±3°C、所有安全閥均不工作的情況下，承受等於其全部乘員及設備質量的 4 倍的負荷；

.3 有足夠的強度在環境溫度為-30°C、所有安全閥均工作的情況下，承受等於其全部乘員及設備質量的 1.1 倍的負荷。

5.1.3.3 充氣救助艇應構造成能經受下列情況下的暴露：

.1 在海上被存放在船舶開敞甲板上時；

.2 在一切海況下漂浮 30 天。

5.1.3.4 除符合第 4.4.9 款的要求外，充氣救助艇還應標明其系列號、製造廠名或商標和製造日期。

5.1.3.5 充氣救助艇的浮力應由至少有 5 個大致相等體積的獨立隔艙分隔的單一浮力管或由 2 個均不超過 60%總體的獨立浮力管提供。浮力管應佈置成在下列狀況下，完好的隔艙能支持該救助艇的額定乘員，每個乘員質量以 75 公斤計，以正常姿式坐着，救助艇整個周圍都是正乾舷：

.1 前端浮力隔艙漏氣；

.2 救助艇一舷的全部浮力隔艙漏氣；

.3 救助艇一舷的全部浮力隔艙和艇首浮力隔艙漏氣。

5.1.3.6 形成充氣救助艇邊界的浮力管在充氣後應為救助艇額定乘員的每一位提供不少於 0.17 米 ^{3} 的體積。

5.1.3.7 每個浮力艙應設有一個供人力充氣用的止回閥和放氣設備。還應設有 1 個安全減壓閥，除非主管機關確信此閥是不必要的。

5.1.3.8 在充氣救助艇的艇底之下和外部易受傷害部位，應加設主管機關滿意的防擦板條。

5.1.3.9 如裝有艇尾板，則其嵌入不應超過救助艇總長度的 20%。

5.1.3.10 應設有合適的接片來固定艇首纜和艇尾纜以及艇內外環狀救生索。

5.1.3.11 充氣救助艇應始終保持滿充氣狀態。

第 VI 章

降放與登乘設備

6.1 降放與登乘設備

6.1.1 一般要求

6.1.1.1 除自由降落救生艇的次要降放設備外，每具降放設備應佈置成在下列情況下，當船舶處於縱傾達 10°、任何一舷橫傾達 20°的不利狀況時，能安全降落其所服務的裝備齊全的救生艇筏或救助艇：

.1 按第 III/23 或第 III/33 條的要求，滿載全部額定乘員；

.2 僅載有所需的操作船員；

6.1.1.2 雖有第 6.1.1.1 款的規定，對於油船、化學品液貨船和氣體運輸船，如視情按《經 1978 年議定書修訂的 1973 年國際防止船舶造成污染公約》和海事組織的建議計算的最後橫傾角超過 20°，則其救生艇降放設備應能在該船舶處於此最後橫傾角的情況下，在較低一舷進行操作，同時需考慮到船舶的最終破損水線。

6.1.1.3 降放設備只應依靠重力或不依賴船舶動力的儲存機械動力來降放其服務的滿載人員和裝備以及空載的救生艇筏或救助艇。

6.1.1.4 每具降放設備應構造成僅需要最少量的日常保養。一切需要船員定期保養的部件，應容易接近和容易保養。

6.1.1.5 降放設備及其除絞車制動器外的附屬設備應具有足夠的強度承受不少於 2.2 倍最大工作負荷的靜力試驗負荷。

6.1.1.6 構件和一切滑車、吊艇索、眼板、鏈環、緊固件和其他一切與降放設備一起使用的配件，應以根據規定的最大工作負荷和結構所選用的材料的極限強度決定的安全系數來設計。一切構件的最小安全系數應為 4.5，吊艇索、吊艇鏈、鏈環和滑車的最小安全系數應為 6。

6.1.1.7 每具降放設備應儘實際可能在結冰情況下保持有效。

6.1.1.8 救生艇降放設備應能回收載有船員的救生艇。

6.1.1.9 每救生艇降放設備應有一隻能夠以不小於 0.3 米/秒的速度從水中將載有全部額定乘員和設備的救助艇吊起的絞車馬達。

6.1.1.10 降放設備應佈置成能按第 4.1.4.2、4.1.4.3、4.4.3.1 和 4.4.3.2 款的要求使人員安全地登上救生艇筏。

6.1.2 使用吊艇索和絞車的降放設備

6.1.2.1 除自由降落救生艇的次要降放設備外，每具使用吊艇索和絞車的降放設備應符合第 6.1.1 款的要求，另外，還應符合本款的要求。

6.1.2.2 降放機械應佈置成可由一個人自船舶甲板上某一位置和，除自由降落救生艇的次要降放設備外，自救生艇筏或救助艇內部某一位置來開動。在甲板上操作降放機械的人員應能看到救生艇筏或救助艇。

6.1.2.3 吊艇索應是防旋轉及耐腐蝕的鋼絲索。

6.1.2.4 除設置有效的補償裝置者外，對於多卷筒絞車，吊艇索應佈置成在降落時能以相同的速率從各卷筒捲出，在吊起時能以相同的速率均勻地捲到各卷筒上。

6.1.2.5 降放設備的絞車制動器應具有足夠強度承受：

.1 安全負荷不小於 1.5 倍最大工作負荷的靜態試驗；和

.2 以最大下降速度進行的、安全負荷不小於 1.1 倍最大工作負荷的動態試驗。

6.1.2.6 應設有回收每艘救生艇筏和救助艇的有效的手動裝置。當救生艇筏和救助艇被降下或使用動力被吊起時，絞車的活動部件應不使手動裝置的手柄或手輪旋轉。

6.1.2.7 使用電力回收吊艇架吊臂時，應裝設安全裝置，在吊艇架吊臂達到原位限制器之前自動地斷開動力，以防止吊艇索或吊艇架受到過度應力，除非馬達被設計成能防止此過度應力。

6.1.2.8 滿載的救生艇筏或救助艇降落下水的速度，應不小於由下列公式得出的速度：

S＝0.4+0.02H

式中：S 係下降速度（以米/秒計）；

H 係從吊艇架頂部到空載航行水線的距離（米）。

6.1.2.9 載有全部設備而無人員的救生筏的降落速度應使主管機關滿意。其他載有全部設備而無人員的救生艇筏的降落速度應至少為第 6.1.2.8 款所要求者的 70%。

6.1.2.10 根據救生艇筏或救助艇的設計、使乘員免受過度力的保護以及計入急剎車過程中的慣性力的降落裝置強度，主管機關應制定出最大下降速度。在裝置中應採用一些設施確保不超過此速度。

6.1.2.11 每具降放設備應設有制動器，使載有全部額定乘員及設備的救生艇筏或救助艇停止降落並可靠地繫留住；如有必要，制動塊應有防水和防油的保護。

6.1.2.12 手控制動器應佈置成始終處於制動狀態，除非操作者或操作者操作的機械把制動控制器保持在“關閉”的位置上。

6.1.3 浮離降放

當救生艇筏需要降放設備並計為浮離時，救生艇筏從其存放地點的浮離釋放應是自動的。

6.1.4 自由降落救生艇的降放設備

6.1.4.1 每具自由降落救生艇的降放設備應符合第 6.1.1 款的適用要求，另外，還應符合本款的要求。

6.1.4.2 降落設備應設計和安裝成使其及其服務的救生艇能作為一個系統工作，以按第 4.7.5 款要求保護乘員免受有害加速度力，並確保按第 4.7.3.1 和 4.7.3.2 款的要求有效地離開船舶。

6.1.4.3 降落設備應構造成在救生艇降放過程中能防止火花和引起燃燒的磨擦。

6.1.4.4 計及第 4.7.3 款的要求，降放設備應設計和佈置成在船舶處於空載航行狀況時在其準備降落位置處，從其服務的救生艇最低點至水面的距離不超過救生艇的自由降落核准高度。

6.1.4.5 降放設備應佈置成能防止救生艇在無人看守的存放位置被意外釋放。如果繫固救生艇的裝置不能從救生艇裏面釋放，則其佈置應能防止在未釋放前登艇。

6.1.4.6 釋放機械應佈置成至少需要在救生艇內進行兩個獨立的動作才能降放救生艇。

6.1.4.7 每具降放設備應備有一用吊艇索降放救生艇的次要設備。該設備應符合第 6.1.1（除第 6.1.1.3 款外）和 6.1.2 款（除第 6.1.2.6 款外）的要求。他必需能夠在縱傾達 2°、向任一舷的橫傾僅達 5°的不利情況下降放救生艇，但不需符合第 6.1.2.8 和 6.1.2.9 款的速度要求。如果次要降放設備不依賴於重力、儲存的機械動力或其他手動裝置，則應與船舶的主供電和應急供電相連接。

6.1.4.8 次要降放設備應配有至少一種單一的無負載釋放救生艇的能力。

6.1.5 救生筏降放設備

每具降放設備應符合第 6.1.1 和 6.1.2 款的要求，但不包括有關在存放位置登筏、回收有負載的救生筏和允許以手操作開動設備的要求。降落設備中應配有 1 副自動釋放鉤，佈置成能防止在降落過程中過早脫開，並應在救生筏浮到水面時釋放。釋放鉤應包括在負荷狀態下釋放該鉤的能力。負荷釋放控制器應：

.1 與啟動自動釋放功能的控制器有明顯不同；

.2 需要至少兩個分別進行的動作；

.3 釋放鉤承擔 150 公斤的負荷時，需要至少 600 牛頓並不大於 700 牛頓的力才能釋放負載；或提供等同的適當保護以防止意外釋放該鉤；和

.4 設計成甲板上的船員可清楚地觀察到釋放機械何時被正確和完全地設置。

6.1.6 登乘梯

6.1.6.1 應設有扶手以確保從甲板到登乘梯頂部間的安全通過。

6.1.6.2 登乘梯的踏板：

.1 應採用沒有節疤或其他凹凸不平外形的硬質木製成，而且加工平滑並無銳利棱邊和毛刺，或採用其他同等性質的適用材料製成；

.2 應使用縱向槽溝或經認可的防滑塗層來提供有效的防滑表面；

.3 其長度應不小於 480 毫米，寬度應不小於 115 毫米，厚度應不小於 25 毫米，防滑表面或塗層不計在內；

.4 間距應相等，不小於 300 毫米，也不大於 380 毫米，並且應將其繫固成保持水平。

6.1.6.3 登乘梯的邊繩應由兩根裸露的白棕繩組成，其周長不少於 65 毫米。每根邊繩在頂端踏板以下應為整根而無接頭。可以採用其他材料，但尺寸、斷裂張力、風化性能、伸縮性能和夾緊性能均至少等效於白棕繩的性能。所有繩端均應紮牢以防鬆散。

6.2 船舶撤離系統

6.2.1 船舶撤離系統的構造

6.2.1.1 船舶撤離系統的通道應確保穿著經認可的救生衣的各種年齡、身材和體能的人從登乘站安全地降到浮動平台或救生艇筏上。

6.2.1.2 通道和平台的強度和構造應使主管機關滿意。

6.2.1.3 平台（如設有）應：

.1 對工作負荷提供足夠的浮力。對於氣脹式平台，主浮力艙（就本目的而言包括任何橫座板或底部氣脹構件）應符合以平台容量為基礎的第 4.2 節的要求，但該容量應由第 6.2.1.3.3 款規定的可用面積除以 0.25 得到；

.2 在海浪中平穩並為該系統操作人員提供一個安全的工作區域；

.3 有足夠的面積確保繫固至少兩隻供登乘的救生筏，並至少容納為在任何時候平台上要容納的人數。該可用面積應至少等於：

$$\frac{\text{船舶撤離系統核准總人數的}20\%}{4}\ \text{米}^2$$

或者 10 米 ^{2}，取其較大者。但是，主管機關可允許使用證明符合所有規定的性能要求的替代佈置；

.4 自行排水；

.5 進行分艙，使任何一艙漏氣不會限制其作為撤離設施的操作使用。浮力管應被分隔或加以保護以免受到由於與船舷接觸而導致的損壞；

.6 配備穩定系統並使主管機關滿意；

.7 由一條拉索或其他被設計為自動開啟的並在必要時能被調整到撤離所需位置的定位設備繫固；和

.8 配有足夠強度的錨索和拉索接板將撤離系統的最大氣脹式救生筏牢固繫住。

6.2.1.4 如通道設有直接進入救生艇筏的通道，他應設有快速釋放裝置。

6.2.2 船舶撤離系統的性能

6.2.2.1 船舶撤離系統應：

.1 能由一人啟動；

.2 對於客船，從發出棄船信號 30 分鐘內；對於貨船，在發出棄船信號 10 分鐘內，能使設計的總人數從船上移至充氣救生筏；

.3 佈置成使救生筏能牢固地繫於平台並能由一人在救生筏或平台上將救生筏從平台釋放；

.4 能在縱傾達 10°、任一舷橫傾達 20°的不利條件下從船上啟動；

.5 如設有斜滑梯，其與水平線之間的角度為；

.1 當船舶正浮並處在空載航行狀態時：30°至 35°；

.2 對於客船，在處於由第 II－1/8 條要求確定的最終浸水階段時：最大 55°；

.6 由在港口進行的定時逃生練習評估其能力；

.7 能在蒲福風級為 6 級的海況下提供令人滿意的撤離手段；

.8 設計成儘實際可能在結冰情況下保持有效；

.9 構造成僅需要最少量的日常保養。任何需要船員進行定期保養的部件，應容易接近和保養。

6.2.2.2 如船上備有一個或一個以上的船舶撤離系統，至少 50%的此種系統應在安裝後進行試用。只有當試用令人滿意時，未試用的系統才可在安裝後十二月內使用。

6.2.3 與船舶撤離系統相關的氣脹式救生筏

與船舶撤離系統一同使用的氣脹式救生筏應：

.1 符合第 4.2 節的要求；

.2 靠近系統容器放置，但能投落而避開被啟動的系統和登乘平台；

.3 能從存放架一次一個地釋放並設有裝置使其沿平台繫泊；

.4 按第 III/13.4 條存放；

.5 設有與平台連接好的或易於與其連接的收繩。

6.2.4 船舶撤離系統的容器

6.2.4.1 撤離通道和平台應裝在容器內，該容器應：

.1 建造得能承受海上各種狀況下的嚴重擦損；

.2 除容器底部的排水孔外，儘可能水密。

6.2.4.2 容器應標明：

.1 製造廠名或商標；

.2 系列號；

.3 認可機關名稱和系統的容量；

.4 SOLAS 字樣；

.5 製造日期（年和月）；

.6 最後一次檢修的日期及地點；

.7 水線上最大允許存放高度；

.8 船上存放位置。

6.2.4.3 應在容器上或附近標明降放和操作須知；

6.2.5 船舶撤離系統的標誌

船舶撤離系統上應標明：

.1 製造廠名或商標；

.2 系列號；

.3 製造日期（年和月）；

.4 認可機關名稱；

.5 最後一次檢修的檢修站名稱和地點，以及檢修日期；

.6 系統容量。

第 VII 章

其他救生設備

7.1 拋繩設備

7.1.1 所有拋繩設備應：

.1 能夠相當準確地將繩拋射出；

.2 包括不少於四個拋射體，每個均能在無風天氣中將繩拋出 230 米遠；

.3 包括不少於四根拋射繩，每根拋射繩的抗斷強度不低於 2 千牛頓；和

.4 備有簡要說明書或圖解清楚地說明拋繩設備的使用方法。

7.1.2 手槍發射的火箭，或火箭與拋射繩為一整體的組件，應裝在防水箱內。此外，對於手槍發射的火箭、拋射繩和火箭以及引燃器材應存放在抗風雨的容器內。

7.2 通用報警和公共廣播系統

7.2.1 通用緊急報警系統

7.2.1.1 通用緊急報警系統應能由船舶號笛或警笛，另外還應由靠船舶主電源和視情靠第 II－1/42 條或第 II－1/43 條所要求的應急電源供電的電動鈴或小型振膜電警笛或其他等效警報系統發出由 7 個或更多的短聲繼以 1 個長聲構成的通用緊急報警信號。該系統應能從船舶駕駛台和除船舶號笛外，從其他戰略要點進行操作。所有起居和船員正常工作處所均應能聽到該系統的報警。警報在啟動後應持續工作，直到被手動關閉或臨時被公共廣播系統的信息打斷。

7.2.1.2 內部和外部處所中緊急報警音調的最低聲壓級應為 80 分貝（A）並至少比船舶航行時在一般氣候條件下設備正常運行時的現有環境噪音級高出 10 分貝（A）。在沒有揚聲器裝置的住艙內，應安裝電子警報轉換器，如蜂鳴器或類似裝置。

7.2.1.3 在住艙的睡覺位置和浴室內，聲壓級應至少為 75 分貝（A）並至少比環境噪音級高出 10 分貝（A）。

7.2.2 公共廣播系統

7.2.2.1 公共廣播系統應為一個能把信息播送到船員或乘客或兩者通常所在的所有處所和集合地點的揚聲器裝置。他應可以從駕駛室和主管機關認為必要的船上其他處所播送信息。它應按聲音的最低條件安裝而不需要收聽人的任何行動。他應有防止非法使用的保護。

7.2.2.2 當船舶處於正常航行狀態時，播送緊急通知的最低聲壓級應為：

.1 在內部處所為 75 分貝（A）並比講話干擾水平至少高 20 分貝（A）；及

.2 在外部處所為 80 分貝（A）並比講話干擾水平至少高 15 分貝（A）。

RESOLUTION MSC.48(66)
(adopted on 4 June 1996)

ADOPTION OF THE INTERNATIONAL LIFE-SAVING APPLIANCE (LSA) CODE

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

RECOGNIZING the need to provide international standards for life-saving appliances required by chapter III of the International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended,

NOTING resolution MSC.47(66) by which it adopted, *inter alia*, amendments to chapter III of the SOLAS Convention to make the provisions of the International Life-Saving Appliance (LSA) Code mandatory under that Convention on or after 1 July 1998,

HAVING CONSIDERED, at its sixty-sixth session, the text of the proposed LSA Code,

1. ADOPTS the International Life-Saving Appliance (LSA) Code the text of which is set out in the Annex to the present resolution;

2. NOTES that under the amendments to chapter III of the 1974 SOLAS Convention, amendments to the LSA Code shall be adopted, brought into force and shall take effect in accordance with the provisions of article VIII of that Convention concerning the amendments procedure applicable to the Annex to the Convention other than chapter I;

3. REQUESTS the Secretary-General to transmit certified copies of the present resolution and the text of the LSA Code contained in the Annex to all Contracting Governments to the Convention;

4. 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

INTERNATIONAL LIFE-SAVING APPLIANCE (LSA) CODE

Contents

THE INTERNATIONAL LIFE-SAVING APPLIANCE CODE

PREAMBLE

1 The purpose of this Code is to provide international standards for life-saving appliances required by chapter III of the International Convention for the Safety of Life at Sea (SOLAS), 1974.

2 On and after 1 July 1998, the requirements of this Code will be mandatory under the International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended. Any future amendment to the Code will be adopted and brought into force in accordance with the procedure laid down in article VIII of that Convention.

CHAPTER I - GENERAL

1.1 Definitions

1.1.1 *Convention* means the International Convention for the Safety of Life at Sea, 1974, as amended.

1.1.2 *Effective clearing of the ship* is the ability of the free-fall lifeboat to move away from the ship after free-fall launching without using its engine.

1.1.3 *Free-fall acceleration* is the rate of change of velocity experienced by the occupants during launching of a free-fall lifeboat.

1.1.4 *Free-fall certification height* is the greatest launching height for which the lifeboat is to be approved, measured from the still water surface to the lowest point on the lifeboat when the lifeboat is in the launch configuration.

1.1.5 *Launching ramp angle* is the angle between the horizontal and the launch rail of the lifeboat in its launching position with the ship on even keel.

1.1.6 *Launching ramp length* is the distance between the stern of the lifeboat and the lower end of the launching ramp.

1.1.7 *Regulation* means a regulation contained in the Annex to the Convention

1.1.8 *Required free-fall height* is the greatest distance measured from the still water surface to the lowest point on the lifeboat when the lifeboat is in the launch configuration and the ship is in its lightest seagoing condition.

1.1.9 *Retro-reflective material* is a material which reflects in the opposite direction a beam of light directed on it.

1.1.10 *Water-entry angle* is the angle between the horizontal and the launch rail of the lifeboat when it first enters the water.

1.1.11 The terms used in this Code have the same meaning as those defined in regulation III/3.

1.2 General requirements for life-saving appliances

1.2.1 Paragraph 1.2.2.7 applies to life-saving appliances on all ships.

1.2.2 Unless expressly provided otherwise or unless, in the opinion of the Administration having regard to the particular voyages on which the ship is constantly engaged, other requirements are appropriate, all life-saving appliances prescribed in this part shall:

.1 be constructed with proper workmanship and materials;

.2 not be damaged in stowage throughout the air temperature range -30°C to +65°C;

.3 if they are likely to be immersed in seawater during their use, operate throughout the seawater temperature range -1°C to +30°C;

.4 where applicable, be rot-proof, corrosion-resistant, and not be unduly affected by seawater, oil or fungal attack;

.5 where exposed to sunlight, be resistant to deterioration;

.6 be of a highly visible colour on all parts where this will assist detection;

.7 be fitted with retro-reflective material where it will assist in detection and in accordance with the recommendations of the Organization;

.8 if they are to be used in a seaway, be capable of satisfactory operation in that environment;

.9 be clearly marked with approval information including the Administration which approved it, and any operational restrictions; and

.10 where applicable, be provided with electrical short circuit protection to prevent damage or injury.

1.2.3 The Administration shall determine the period of acceptability of life-saving appliances which are subject to deterioration with age. Such life-saving appliances shall be marked with a means for determining their age or the date by which they must be replaced. Permanent marking with a date of expiry is the preferred method of establishing the period of acceptability. Batteries not marked with an expiration date may be used if they are replaced annually, or in the case of a secondary battery (accumulator), if the condition of the electrolyte can be readily checked.

CHAPTER II - PERSONAL LIFE-SAVING APPLIANCES

2.1 Lifebuoys

2.1.1 Lifebuoy specification

Every lifebuoy shall:

.1 have an outer diameter of not more than 800 mm and an inner diameter of not less than 400 mm;

.2 be constructed of inherently buoyant material; it shall not depend upon rushes, cork shavings or granulated cork, any other loose granulated material or any air compartment which depends on inflation for buoyancy;

.3 be capable of supporting not less than 14.5 kg of iron in fresh water for a period of 24 h;

.4 have a mass of not less than 2.5 kg;

.5 not sustain burning or continue melting after being totally enveloped in a fire for a period of 2 s;

.6 be constructed to withstand a drop into the water from the height at which it is stowed above the waterline in the lightest seagoing condition or 30 m, whichever is the greater, without impairing either its operating capability or that of its attached components;

.7 if it is intended to operate the quick release arrangement provided for the self-activated smoke signals and self-igniting lights, have a mass sufficient to operate the quick release arrangement; and

.8 be fitted with a grabline not less than 9.5 mm in diameter and not less than 4 times the outside diameter of the body of the buoy in length. The grabline shall be secured at four equidistant points around the circumference of the buoy to form four equal loops.

2.1.2 **Lifebuoy self-igniting lights**

Self-igniting lights required by regulation III/7.1.3 shall:

.1 be such that they cannot be extinguished by water;

.2 be of white colour and capable of either burning continuously with a luminous intensity of not less than 2 cd in all directions of the upper hemisphere or flashing (discharge flashing) at a rate of not less than 50 flashes and not more than 70 flashes per minute with at least the corresponding effective luminous intensity;

.3 be provided with a source of energy capable of meeting the requirement of paragraph 2.1.2.2 for a period of at least 2 h; and

.4 be capable of withstanding the drop test required by paragraph 2.1.1.6.

2.1.3 **Lifebuoy self-activating smoke signals**

Self-activating smoke signals required by regulation III/7.1.3 shall:

.1 emit smoke of a highly visible colour at a uniform rate for a period of at least 15 min when floating in calm water;

.2 not ignite explosively or emit any flame during the entire smoke emission time of the signal;

.3 not be swamped in a seaway;

.4 continue to emit smoke when fully submerged in water for a period of at least 10 s; and

.5 be capable of withstanding the drop test required by paragraph 2.1.1.6.

2.1.4 **Buoyant lifelines**

Buoyant lifelines required by regulation III/7.1.2 shall:

.1 be non-kinking;

.2 have a diameter of not less than 8 mm; and

.3 have a breaking strength of not less than 5 kN.

2.2 Lifejackets

2.2.1 **General requirements for lifejackets**

2.2.1.1 A lifejacket shall not sustain burning or continue melting after being totally enveloped in a fire for a period of 2 s.

2.2.1.2 An adult lifejacket shall be so constructed that:

.1 at least 75% of persons, who are completely unfamiliar with the lifejacket, can correctly don it within a period of 1 min without assistance, guidance or prior demonstration;

.2 after demonstration, all persons can correctly don it within a period of 1 min without assistance;

.3 it is clearly capable of being worn in only one way or, as far as is practicable, cannot be donned incorrectly;

.4 it is comfortable to wear; and

.5 it allows the wearer to jump from a height of at least 4.5 m into the water without injury and without dislodging or damaging the lifejacket

2.2.1.3 An adult lifejacket shall have sufficient buoyancy and stability in calm fresh water to:

.1 lift the mouth of an exhausted or unconscious person not less than 120 mm clear of the water with the body inclined backwards at an angle of not less than 20° from the vertical position; and

.2 turn the body of an unconscious person in the water from any position to one where the mouth is clear of the water in not more than 5 s.

2.2.1.4 An adult lifejacket shall allow the person wearing it to swim a short distance and to board a survival craft.

2.2.1.5 A child lifejacket shall be constructed and perform the same as an adult lifejacket except as follows:

.1 donning assistance is permitted for small children;

.2 it shall only be required to lift the mouth of an exhausted or unconscious wearer clear of the water a distance appropriate to the size of the intended wearer; and

.3 assistance may be given to board a survival craft, but wearer mobility shall not be significantly reduced.

2.2.1.6 In addition to the markings required by paragraph 1.2.2.9 , a child lifejacket shall be marked with:

.1 the height or weight range for which the lifejacket will meet the testing and evaluation criteria recommended by the Organization; and

.2 a "child" symbol as shown in the "child's lifejacket" symbol adopted by the Organization.

2.2.1.7 A lifejacket shall have buoyancy which is not reduced by more than 5% after 24 h submersion in fresh water.

2.2.1.8 Each lifejacket shall be fitted with a whistle firmly secured by a cord.

2.2.2 **Inflatable lifejackets**

A lifejacket which depends on inflation for buoyancy shall have not less than two separate compartments and comply with the requirements of paragraph 2.2.1 and shall:

.1 inflate automatically on immersion, be provided with a device to permit inflation by a single manual motion and be capable of being inflated by mouth;

.2 in the event of loss of buoyancy in any one compartment be capable of complying with the requirements of paragraphs 2.2.1.2, 2.2.1.3 and 2.2.1.4; and

.3 comply with the requirements of paragraph 2.2.1.7 after inflation by means of the automatic mechanism.

2.2.3 **Lifejacket lights**

2.2.3.1 Each lifejacket light shall:

.1 have a luminous intensity of not less than 0.75 cd in all directions of the upper hemisphere;

.2 have a source of energy capable of providing a luminous intensity of 0.75 cd for a period of at least 8 h;

.3 be visible over as great a segment of the upper hemisphere as is practicable when attached to a lifejacket; and

.4 be of white colour.

2.2.3.2 If the light referred to in paragraph 2.2.3.1 is a flashing light, it shall, in addition:

.1 be provided with a manually operated switch; and

.2 flash at a rate of not less than 50 flashes and not more than 70 flashes per minute with an effective luminous intensity of at least 0.75 cd.

2.3 Immersion suits

2.3.1 **General requirements for immersion suits**

2.3.1.1 The immersion suit shall be constructed with waterproof materials such that:

.1 it can be unpacked and donned without assistance within 2 min, taking into account any associated clothing, and a lifejacket if the immersion suit is to be worn in conjunction with a lifejacket;

.2 it will not sustain burning or continue melting after being totally enveloped in a fire for a period of 2 s;

.3 it will cover the whole body with the exception of the face. Hands shall also be covered unless permanently attached gloves are provided;

.4 it is provided with arrangements to minimize or reduce free air in the legs of the suit; and

.5 following a jump from a height of not less than 4.5 m into the water there is no undue ingress of water into the suit.

2.3.1.2 An immersion suit which also complies with the requirements of section 2.2 may be classified as a lifejacket.

2.3.1.3 An immersion suit shall permit the person wearing it, and also wearing a lifejacket if the immersion suit is to be worn in conjunction with a lifejacket, to:

.1 climb up and down a vertical ladder at least 5 m in length;

.2 perform normal duties associated with abandonment;

.3 jump from a height of not less than 4.5 m into the water without damaging or dislodging the immersion suit, or being injured; and

.4 swim a short distance through the water and board a survival craft.

2.3.1.4 An immersion suit which has buoyancy and is designed to be worn without a lifejacket shall be fitted with a light complying with the requirements of paragraph 2.2.3 and the whistle prescribed by paragraph 2.2.1.8.

2.3.1.5 If the immersion suit is to be worn in conjunction with a lifejacket, the lifejacket shall be worn over the immersion suit. A person wearing such an immersion suit shall be able to don a lifejacket without assistance.

2.3.2 **Thermal performance requirements for immersion suits**

2.3.2.1 An immersion suit made of material which has no inherent insulation shall be:

.1 marked with instructions that it must be worn in conjunction with warm clothing; and

.2 so constructed that, when worn in conjunction with warm clothing, and with a lifejacket if the immersion suit is to be worn with a lifejacket, the immersion suit continues to provide sufficient thermal protection, following one jump by the wearer into the water from a height of 4.5 m, to ensure that when it is worn for a period of 1h in calm circulating water at a temperature of 5°C, the wearer's body core temperature does not fall more than 2°C.

2.3.2.2 An immersion suit made of material with inherent insulation, when worn either on its own or with a lifejacket, if the immersion suit is to be worn in conjunction with a lifejacket, shall provide the wearer with sufficient thermal insulation, following one jump into the water from a height of 4.5 m, to ensure that the wearer's body core temperature does not fall more than 2°C after a period of 6 h immersion in calm circulating water at a temperature of between 0°C and 2°C.

2.3.3 **Buoyancy requirements**

A person in fresh water wearing either an immersion suit or an immersion suit with a lifejacket, shall be able to turn from a face-down to a face-up position in not more than 5 s.

2.4 Anti-exposure suits

2.4.1 **General requirements for anti-exposure suits**

2.4.1.1 The anti-exposure suit shall be constructed with waterproof materials such that it:

.1 provides inherent buoyancy of at least 70 N;

.2 is made of material which reduces the risk of heat stress during rescue and evacuation operations;

.3 covers the whole body with the exception of the head and hands and, where the Administration so permits, feet; gloves and a hood shall be provided in such a manner as to remain available for use with the anti-exposure suits;

.4 can be unpacked and donned without assistance within 2 min;

.5 does not sustain burning or continue melting after being totally enveloped in a fire for a period of 2 s;

.6 is equipped with a pocket for a portable VHF telephone; and

.7 has a lateral field of vision of at least 120°.

2.4.1.2 An anti-exposure suit which also complies with the requirements of section 2.2 may be classified as a lifejacket.

2.4.1.3 An anti-exposure suit shall permit the person wearing it, to:

.1 climb up and down a vertical ladder of at least 5 m in length;

.2 jump from a height of not less than 4.5 m into the water with feet first, without damaging or dislodging the suit, or being injured;

.3 swim through the water at least 25 m and board a survival craft;

.4 don a lifejacket without assistance; and

.5 perform all duties associated with abandonment, assist others and operate a rescue boat.

2.4.1.4 An anti-exposure suit shall be fitted with a light complying with the requirements of paragraph 2.2.3 and the whistle prescribed by paragraph 2.2.1.8.

2.4.2 **Thermal performance requirements for anti-exposure suits**

2.4.2.1 An anti-exposure suit shall:

.1 if made of material which has no inherent insulation, be marked with instructions that it must be worn in conjunction with warm clothing; and

.2 be so constructed, that when worn as marked, the suit continues to provide sufficient thermal protection following one jump into the water which totally submerges the wearer and shall ensure that when it is worn in calm circulating water at a temperature of 5°C, the wearer's body core temperature does not fall at a rate of more than 1.5°C per hour, after the first 0.5 h.

2.4.3 **Stability requirements**

A person in fresh water wearing an anti-exposure suit complying with the requirements of this section shall be able to turn from a face-down to a face-up position in not more than 5 s and shall be stable face-up. The suit shall have no tendency to turn the wearer face-down in moderate sea condition.

2.5 Thermal protective aids

2.5.1 A thermal protective aid shall be made of waterproof material having a thermal conductance of not more than 7,800 W/(m^2K) and shall be so constructed that, when used to enclose a person, it shall reduce both the convective and evaporative heat loss from the wearer's body.

2.5.2 The thermal protective aid shall:

.1 cover the whole body of persons of all sizes wearing a lifejacket with the exception of the face. Hands shall also be covered unless permanently attached gloves are provided;

.2 be capable of being unpacked and easily donned without assistance in a survival craft or rescue boat; and

.3 permit the wearer to remove it in the water in not more than 2 min, if it impairs ability to swim.

2.5.3 The thermal protective aid shall function properly throughout an air temperature range -30°C to +20°C.

CHAPTER III - VISUAL SIGNALS

3.1 Rocket parachute flares

3.1.1 The rocket parachute flare shall:

.1 be contained in a water-resistant casing;

.2 have brief instructions or diagrams clearly illustrating the use of the rocket parachute flare printed on its casing;

.3 have integral means of ignition; and

.4 be so designed as not to cause discomfort to the person holding the casing when used in accordance with the manufacturer's operating instructions.

3.1.2 The rocket shall, when fired vertically, reach an altitude of not less than 300 m. At or near the top of its trajectory, the rocket shall eject a parachute flare, which shall:

.1 burn with a bright red colour;

.2 burn uniformly with an average luminous intensity of not less than 30,000 cd;

.3 have a burning period of not less than 40 s;

.4 have a rate of descent of not more than 5 m/s; and

.5 not damage its parachute or attachments while burning.

3.2 Hand flares

3.2.1 The hand flare shall:

.1 be contained in a water-resistant casing;

.2 have brief instructions or diagrams clearly illustrating the use of the hand flare printed on its casing;

.3 have a self-contained means of ignition; and

.4 be so designed as not to cause discomfort to the person holding the casing and not endanger the survival craft by burning or glowing residues when used in accordance with the manufacturer's operating instructions.

3.2.2 The hand flare shall:

.1 burn with a bright red colour;

.2 burn uniformly with an average luminous intensity of not less than 15,000 cd;

.3 have a burning period of not less than 1 min; and

.4 continue to burn after having been immersed for a period of 10 s under 100 mm of water.

3.3 Buoyant smoke signals

3.3.1 The buoyant smoke signal shall:

.1 be contained in a water-resistant casing;

.2 not ignite explosively when used in accordance with the manufacturer's operating instructions; and

.3 have brief instructions or diagrams clearly illustrating the use of the buoyant smoke signal printed on its casing.

3.3.2 The buoyant smoke signal shall:

.1 emit smoke of a highly visible colour at a uniform rate for a period of not less than 3 min when floating in calm water;

.2 not emit any flame during the entire smoke emission time;

.3 not be swamped in a seaway; and

.4 continue to emit smoke when submerged in water for a period of 10 s under 100 mm of water.

CHAPTER IV - SURVIVAL CRAFT

4.1 General requirements for liferafts

4.1.1 Construction of liferafts

4.1.1.1 Every liferaft shall be so constructed as to be capable of withstanding exposure for 30 days afloat in all sea conditions.

4.1.1.2 The liferaft shall be so constructed that when it is dropped into the water from a height of 18 m, the liferaft and its equipment will operate satisfactorily. If the liferaft is to be stowed at a height of more than 18 m above the waterline in the lightest seagoing condition, it shall be of a type which has been satisfactorily drop-tested from at least that height.

4.1.1.3 The floating liferaft shall be capable of withstanding repeated jumps on to it from a height of at least 4.5 m above its floor both with and without the canopy erected.

4.1.1.4 The liferaft and its fittings shall be so constructed as to enable it to be towed at a speed of 3 knots in calm water when loaded with its full complement of persons and equipment and with one of its sea-anchors streamed.

4.1.1.5 The liferaft shall have a canopy to protect the occupants from exposure which is automatically set in place when the liferaft is launched and waterborne. The canopy shall comply with the following:

.1 it shall provide insulation against heat and cold by means of either two layers of material separated by an air gap or other equally efficient means. Means shall be provided to prevent accumulation of water in the air gap;

.2 its interior shall be of a colour that does not cause discomfort to the occupants;

.3 each entrance shall be clearly indicated and be provided with efficient adjustable closing arrangements which can be easily and quickly opened by persons clothed in immersion suits from inside and outside, and closed from inside, the liferaft so as to permit ventilation but exclude seawater, wind and cold. Liferafts accommodating more than eight persons shall have at least two diametrically opposite entrances;

.4 it shall admit sufficient air for the occupants at all times, even with the entrances closed;

.5 it shall be provided with at least one viewing port;

.6 it shall be provided with means for collecting rain water;

.7 it shall be provided with means to mount a survival craft radar transponder at a height of at least 1 m above the sea; and

.8 it shall have sufficient headroom for sitting occupants under all parts of the canopy.

4.1.2 **Minimum carrying capacity and mass of liferafts**

4.1.2.1 No liferaft shall be approved which has a carrying capacity of less than six persons calculated in accordance with the requirements of paragraph 4.2.3 or 4.3.3, as appropriate.

4.1.2.2 Unless the liferaft is to be launched by an approved launching appliance complying with the requirements of section 6.1 or is not required to be stowed in a position providing for easy side-to-side transfer, the total mass of the liferaft, its container and its equipment shall not be more than 185 kg.

4.1.3 **Liferaft fittings**

4.1.3.1 Lifelines shall be securely becketed around the inside and outside of the liferaft.

4.1.3.2 The liferaft shall be fitted with an efficient painter of length equal to not less than 10 m plus the distance from the stowed position to the waterline in the lightest seagoing condition or 15 m whichever is the greater. The breaking strength of the painter system, including its means of attachment to the liferaft, except the weak link required by paragraph 4.1.6, shall be not less than 15 kN for liferafts permitted to accommodate more than 25 persons, not less than 10 kN for liferafts permitted to accommodate 9 to 25 persons and not less than 7.5 kN for any other liferaft.

4.1.3.3 A manually controlled lamp shall be fitted to the top of the liferaft canopy. The light shall be white and be capable of operating continuously for at least 12 h with a luminous intensity of not less than 4.3 cd in all directions of the upper hemisphere. However, if the light is a flashing light it shall flash at a rate of not less than 50 flashes and not more than 70 flashes per minute for the 12 h operating period with an equivalent effective luminous intensity. The lamp shall light automatically when the canopy is erected. Batteries shall be of a type that does not deteriorate due to dampness or humidity in the stowed liferaft.

4.1.3.4 A manually controlled lamp shall be fitted inside the liferaft capable of continuous operation for a period of at least 12 h. It shall light automatically when the canopy is erected and be of sufficient intensity to permit reading of survival and equipment instructions. Batteries shall be of a type that does not deteriorate due to damp or humidity in the stowed liferaft.

4.1.4 **Davit-launched liferafts**

4.1.4.1 In addition to the above requirements, a liferaft for use with an approved launching appliance shall:

.1 when the liferaft is loaded with its full complement of persons and equipment, be capable of withstanding a lateral impact against the ship's side at an impact velocity of not less than 3.5 m/s and also a drop into the water from a height of not less than 3 m without damage that will affect its function; and

.2 be provided with means for bringing the liferaft alongside the embarkation deck and holding it securely during embarkation.

4.1.4.2 Every passenger ship davit-launched liferaft shall be so arranged that it can be rapidly boarded by its full complement of persons.

4.1.4.3 Every cargo ship davit-launched liferaft shall be so arranged that it can be boarded by its full complement of persons in not more than 3 min from the time the instruction to board is given.

4.1.5 **Equipment**

4.1.5.1 The normal equipment of every liferaft shall consist of:

.1 one buoyant rescue quoit, attached to not less than 30 m of buoyant line;

.2 one knife of the nonfolding type having a buoyant handle and lanyard attached and stowed in a pocket on the exterior of the canopy near the point at which the painter is attached to the liferaft. In addition, a liferaft which is permitted to accommodate 13 persons or more shall be provided with a second knife which need not be of the nonfolding type;

.3 for a liferaft which is permitted to accommodate not more than 12 persons, one buoyant bailer. For a liferaft which is permitted to accommodate 13 persons or more, two buoyant bailers;

.4 two sponges;

.5 two sea-anchors each with a shock resistant hawser and tripping line if fitted, one being spare and the other permanently attached to the liferaft in such a way that when the liferaft inflates or is waterborne it will cause the liferaft to lie oriented to the wind in the most stable manner. The strength of each sea-anchor and its hawser and tripping line if fitted shall be adequate in all sea conditions. The sea-anchors shall have means to prevent twisting of the line and shall be of a type which is unlikely to turn inside out between its shroud lines. The sea-anchor permanently attached to davit-launched liferafts and liferafts fitted on passenger ships shall be arranged for manual deployment only. All other liferafts are to have the sea-anchor deployed automatically when the liferaft inflates;

.6 two buoyant paddles;

.7 three tin-openers and a pair of scissors. Safety knives containing special tin-opener blades are satisfactory for this requirement;

.8 one first-aid outfit in a waterproof case capable of being closed tightly after use;

.9 one whistle or equivalent sound signal;

.10 four rocket parachute flares complying with the requirements of section 3.1;

.11 six hand flares complying with the requirements of section 3.2;

.12 two buoyant smoke signals complying with the requirements of section 3.3;

.13 one waterproof electric torch suitable for Morse signalling together with one spare set of batteries and one spare bulb in a waterproof container;

.14 an efficient radar reflector, unless a survival craft radar transponder is stowed in the liferaft;

.15 one daylight signalling mirror with instructions on its use for signalling to ships and aircraft;

.16 one copy of the life-saving signals referred to in regulation V/16 on a waterproof card or in a waterproof container;

.17 one set of fishing tackle;

.18 a food ration totalling not less than 10,000 kJ for each person the liferaft is permitted to accommodate. These rations should be palatable, edible throughout the recommended shelf life, and packed in a manner which can be readily divided and easily opened. The rations shall be kept in airtight packaging and be stowed in a watertight container;

.19 watertight receptacles containing a total of 1.5 *l* of fresh water for each person the liferaft is permitted to accommodate, of which either 0.5 *l* per person may be replaced by a de-salting apparatus capable of producing an equal amount of fresh water in 2 days or 1 *l* per person may be replaced by a manually powered reverse osmosis desalinator, as described in paragraph 4.4.7.5, capable of producing an equal amount of fresh water in 2 days;

.20 one rustproof graduated drinking vessel;

.21 anti-seasickness medicine sufficient for at least 48 h and one seasickness bag for each person the liferaft is permitted to accommodate;

.22 instructions on how to survive;

.23 instructions for immediate action; and

.24 thermal protective aids complying with the requirements of section 2.5 sufficient for 10% of the number of persons the liferaft is permitted to accommodate or two, whichever is the greater.

4.1.5.2 The marking required by paragraphs 4.2.6.3.5 and 4.3.6.7 on liferafts equipped in accordance with paragraph 4.1.5.1 shall be "SOLAS A PACK" in block capitals of the Roman alphabet.

4.1.5.3 In the case of passenger ships engaged on short international voyages of such a nature and duration that, in the opinion of the Administration, not all the items specified in paragraph 4.1.5.1 are necessary, the Administration may allow the liferafts carried on any such ships to be provided with the equipment specified in paragraphs 4.1.5.1.1 to 4.1.5.1.6 inclusive, 4.1.5.1.8, 4.1.5.1.9, 4.1.5.1.13 to 4.1.5.1.16 inclusive and 4.1.5.1.21 to 4.1.5.1.24 inclusive and one half of the equipment specified in paragraphs 4.1.5.1.10 to 4.1.5.1.12 inclusive. The marking required by paragraphs 4.2.6.3.5 and 4.3.6.7 on such liferafts shall be "SOLAS B PACK" in block capitals of the Roman alphabet.

4.1.5.4 Where appropriate the equipment shall be stowed in a container which, if it is not an integral part of, or permanently attached to, the liferaft, shall be stowed and secured inside the liferaft and be capable of floating in water for at least 30 min without damage to its contents.

4.1.6 **Float-free arrangements for liferafts**

4.1.6.1 **Painter system**

The liferaft painter system shall provide a connection between the ship and the liferaft and shall be so arranged as to ensure that the liferaft when released and, in the case of an inflatable liferaft, inflated is not dragged under by the sinking ship.

4.1.6.2 **Weak link**

If a weak link is used in the float-free arrangement, it shall:

.1 not be broken by the force required to pull the painter from the liferaft container;

.2 if applicable, be of sufficient strength to permit the inflation of the liferaft; and

.3 break under a strain of 2.2 ± 0.4 kN.

4.1.6.3 **Hydrostatic release units**

If a hydrostatic release unit is used in the float-free arrangements, it shall:

.1 be constructed of compatible materials so as to prevent malfunction of the unit. Galvanizing or other forms of metallic coating on parts of the hydrostatic release unit shall not be accepted;

.2 automatically release the liferaft at a depth of not more than 4 m;

.3 have drains to prevent the accumulation of water in the hydrostatic chamber when the unit is in its normal position;

.4 be so constructed as to prevent release when seas wash over the unit;

.5 be permanently marked on its exterior with its type and serial number;

.6 be permanently marked on the unit or identification plate securely attached to the unit, with the date of manufacture, type and serial number and whether the unit is suitable for use with a liferaft with a capacity of more than 25 persons;

.7 be such that each part connected to the painter system has a strength of not less than that required for the painter; and

.8 if disposable, in lieu of the requirement in paragraph 4.1.6.3.6 be marked with a means of determining its date of expiry.

4.2 Inflatable liferafts

4.2.1 Inflatable liferafts shall comply with the requirements of section 4.1 and, in addition, shall comply with the requirements of this section.

4.2.2 **Construction of inflatable liferafts**

4.2.2.1 The main buoyancy chamber shall be divided into not less than two separate compartments, each inflated through a nonreturn inflation valve on each compartment. The buoyancy chambers shall be so arranged that, in the event of any one of the compartments being damaged or failing to inflate, the intact compartments shall be able to support, with positive freeboard over the liferaft's entire periphery, the number of persons which the liferaft is permitted to accommodate, each having a mass of 75 kg and seated in their normal positions.

4.2.2.2 The floor of the liferaft shall be waterproof and shall be capable of being sufficiently insulated against cold either:

.1 by means of one or more compartments that the occupants can inflate, or which inflate automatically and can be deflated and reinflated by the occupants; or

.2 by other equally efficient means not dependent on inflation.

4.2.2.3 The liferaft shall be capable of being inflated by one person. The liferaft shall be inflated with a non-toxic gas. Inflation shall be completed within a period of 1 min at an ambient temperature of between 18°C and 20°C and within a period of 3 min at an ambient temperature of -30°C. After inflation the liferaft shall maintain its form when loaded with its full complement of persons and equipment.

4.2.2.4 Each inflatable compartment shall be capable of withstanding a pressure equal to at least 3 times the working pressure and shall be prevented from reaching a pressure exceeding twice the working pressure either by means of relief valves or by a limited gas supply. Means shall be provided for fitting the topping-up pump or bellows required by paragraph 4.2.9.1.2 so that the working pressure can be maintained.

4.2.3 **Carrying capacity of inflatable liferafts**

The number of persons which a liferaft shall be permitted to accommodate shall be equal to the lesser of:

.1 the greatest whole number obtained by dividing by 0.096 the volume, measured in cubic metres of the main buoyancy tubes (which for this purpose shall include neither the arches nor the thwarts, if fitted) when inflated; or

.2 the greatest whole number obtained by dividing by 0.372 the inner horizontal cross-sectional area of the liferaft measured in square metres (which for this purpose may include the thwart or thwarts, if fitted) measured to the innermost edge of the buoyancy tubes; or

.3 the number of persons having an average mass of 75 kg, all wearing either immersion suits and lifejackets or, in the case of davit-launched liferafts, lifejackets, that can be seated with sufficient comfort and headroom without interfering with the operation of any of the liferaft's equipment.

4.2.4 **Access into inflatable liferafts**

4.2.4.1 At least one entrance shall be fitted with a semi-rigid boarding ramp, capable of supporting a person weighing 100 kg, to enable persons to board the liferaft from the sea. The boarding ramp shall be so arranged as to prevent significant deflation of the liferaft if the ramp is damaged. In the case of a davit-launched liferaft having more than one entrance, the boarding ramp shall be fitted at the entrance opposite the bowsing lines and embarkation facilities.

4.2.4.2 Entrances not provided with a boarding ramp shall have a boarding ladder, the lowest step of which shall be situated not less than 0.4 m below the liferaft's light waterline.

4.2.4.3 There shall be means inside the liferaft to assist persons to pull themselves into the liferaft from the ladder.

4.2.5 **Stability of inflatable liferafts**

4.2.5.1 Every inflatable liferaft shall be so constructed that, when fully inflated and floating with the canopy uppermost, it is stable in a seaway.

4.2.5.2 The stability of the liferaft when in the inverted position shall be such that it can be righted in a seaway and in calm water by one person.

4.2.5.3 The stability of the liferaft when loaded with its full complement of persons and equipment shall be such that it can be towed at speeds of up to 3 knots in calm water.

4.2.5.4 The liferaft shall be fitted with water pockets complying with the following requirements:

.1 the water pockets shall be of a highly visible colour;

.2 the design shall be such that the pockets fill to at least 60% of their capacity within 25 s of deployment;

.3 the pockets shall have an aggregate capacity of at least 220 *l* for liferafts up to 10 persons;

.4 the pockets for liferafts certified to carry more than 10 persons shall have an aggregate capacity of not less than 20 N *l*, where N = number of persons carried; and

.5 the pockets shall be positioned symmetrically round the circumference of the liferaft. Means shall be provided to enable air to readily escape from underneath the liferaft.

4.2.6 **Containers for inflatable liferafts**

4.2.6.1 The liferaft shall be packed in a container that is:

.1 so constructed as to withstand hard wear under conditions encountered at sea;

.2 of sufficient inherent buoyancy, when packed with the liferaft and its equipment, to pull the painter from within and to operate the inflation mechanism should the ship sink; and

.3 as far as practicable watertight, except for drain holes in the container bottom.

4.2.6.2 The liferaft shall be packed in its container in such a way as to ensure, as far as possible, that the waterborne liferaft inflates in an upright position on breaking free from its container.

4.2.6.3 The container shall be marked with:

.1 maker's name or trade mark;

.2 serial number;

.3 name of approving authority and the number of persons it is permitted to carry;

.4 SOLAS;

.5 type of emergency pack enclosed;

.6 date when last serviced;

.7 length of painter;

.8 maximum permitted height of stowage above waterline (depending on drop-test height and length of painter); and

.9 launching instructions.

4.2.7 **Markings on inflatable liferafts**

4.2.7.1 The liferaft shall be marked with:

.1 maker's name or trade mark;

.2 serial number;

.3 date of manufacture (month and year);

.4 name of approving authority;

.5 name and place of servicing station where it was last serviced; and

.6 number of persons it is permitted to accommodate over each entrance in characters not less than 100 mm in height of a colour contrasting with that of the liferaft.

4.2.7.2 Provision shall be made for marking each liferaft with the name and port of registry of the ship to which it is to be fitted, in such a form that the ship identification can be changed at any time without opening the container.

4.2.8 **Davit-launched inflatable liferafts**

4.2.8.1 In addition to complying with the above requirements, a liferaft for use with an approved launching appliance shall, when suspended from its lifting hook or bridle, withstand a load of:

.1 4 times the mass of its full complement of persons and equipment, at an ambient temperature and a stabilized liferaft temperature of 20 ± 3°C with all relief valves inoperative; and

.2 1.1 times the mass of its full complement of persons and equipment at an ambient temperature and a stabilized liferaft temperature of -30°C with all relief valves operative.

4.2.8.2 Rigid containers for liferafts to be launched by a launching appliance shall be so secured that the container or parts of it are prevented from falling into the sea during and after inflation and launching of the contained liferaft.

4.2.9 **Additional equipment for inflatable liferafts**

4.2.9.1 In addition to the equipment required by paragraph 4.1.5, every inflatable liferaft shall be provided with:

.1 one repair outfit for repairing punctures in buoyancy compartments; and

.2 one topping-up pump or bellows.

4.2.9.2 The knives required by paragraph 4.1.5.1.2 shall be safety knives, and the tin-openers and scissors required by paragraph 4.1.5.1.7 shall be of the safety type.

4.3 Rigid liferafts

4.3.1 Rigid liferafts shall comply with the requirements of section 4.1 and, in addition, shall comply with the requirements of this section.

4.3.2 **Construction of rigid liferafts**

4.3.2.1 The buoyancy of the liferaft shall be provided by approved inherently buoyant material placed as near as possible to the periphery of the liferaft. The buoyant material shall be fire-retardant or be protected by a fire-retardant covering.

4.3.2.2 The floor of the liferaft shall prevent the ingress of water and shall effectively support the occupants out of the water and insulate them from cold.

4.3.3 **Carrying capacity of rigid liferafts**

The number of persons which a liferaft shall be permitted to accommodate shall be equal to the lesser of:

.1 the greatest whole number obtained by dividing by 0.096 the volume, measured in cubic metres, of the buoyancy material multiplied by a factor of 1 minus the specific gravity of that material; or

.2 the greatest whole number obtained by dividing by 0.372 the horizontal cross-sectional area of the floor of the liferaft measured in square metres; or

.3 the number of persons having an average mass of 75 kg, all wearing immersion suits and lifejackets, that can be seated with sufficient comfort and headroom without interfering with the operation of any of the liferaft's equipment.

4.3.4 **Access into rigid liferafts**

4.3.4.1 At least one entrance shall be fitted with a rigid boarding ramp to enable persons to board the liferaft from the sea. In the case of a davit-launched liferaft having more than one entrance, the boarding ramp shall be fitted at the entrance opposite to the bowsing and embarkation facilities.

4.3.4.2 Entrances not provided with a boarding ramp shall have a boarding ladder, the lowest step of which shall be situated not less than 0.4 m below the liferaft's light waterline.

4.3.4.3 There shall be means inside the liferaft to assist persons to pull themselves into the liferaft from the ladder.

4.3.5 **Stability of rigid liferafts**

4.3.5.1 Unless the liferaft is capable of operating safely whichever way up it is floating, its strength and stability shall be such that it is either self-righting or can be readily righted in a seaway and in calm water by one person.

4.3.5.2 The stability of a liferaft when loaded with its full complement of persons and equipment shall be such that it can be towed at speeds of up to 3 knots in calm water.

4.3.6 **Markings on rigid liferafts**

The liferaft shall be marked with:

.1 name and port of registry of the ship to which it belongs;

.2 maker's name or trade mark;

.3 serial number;

.4 name of approving authority;

.5 number of persons it is permitted to accommodate over each entrance in characters not less than 100 mm in height of a colour contrasting with that of the liferaft;

.6 SOLAS;

.7 type of emergency pack enclosed;

.8 length of painter;

.9 maximum permitted height of stowage above waterline (drop-test height); and

.10 launching instructions.

4.3.7 **Davit-launched rigid liferafts**

In addition to the above requirements, a rigid liferaft for use with an approved launching appliance shall, when suspended from its lifting hook or bridle, withstand a load of 4 times the mass of its full complement of persons and equipment.

4.4 General requirements for lifeboats

4.4.1 **Construction of lifeboats**

4.4.1.1 All lifeboats shall be properly constructed and shall be of such form and proportions that they have ample stability in a seaway and sufficient freeboard when loaded with their full complement of persons and equipment. All lifeboats shall have rigid hulls and shall be capable of maintaining positive stability when in an upright position in calm water and loaded with their full complement of persons and equipment and holed in any one location below the waterline, assuming no loss of buoyancy material and no other damage.

4.4.1.2 Each lifeboat shall be fitted with a certificate of approval, endorsed by the Administration, containing at least the following items:

- manufacturer's name and address;
- lifeboat model and serial number;
- month and year of manufacture;
- number of persons the lifeboat is approved to carry; and
- the approval information required under paragraph 1.2.2.9.

The certifying organization shall provide the lifeboat with a certificate of approval which, in addition to the above items, specifies:

- number of the certificate of approval;
- material of hull construction, in such detail as to ensure that compatibility problems in repair should not occur;
- total mass fully equipped and fully manned; and
- statement of approval as to sections 4.5, 4.6, 4.7, 4.8 or 4.9.

4.4.1.3 All lifeboats shall be of sufficient strength to:

.1 enable them to be safely launched into the water when loaded with their full complement of persons and equipment; and

.2 be capable of being launched and towed when the ship is making headway at a speed of 5 knots in calm water.

4.4.1.4 Hulls and rigid covers shall be fire-retardant or non-combustible.

4.4.1.5 Seating shall be provided on thwarts, benches or fixed chairs which are constructed so as to be capable of supporting:

.1 a static load equivalent to the number of persons each weighing 100 kg for which spaces are provided in compliance with the requirements of paragraph 4.4.2.2.2;

.2 a load of 100 kg in any single seat location when a lifeboat to be launched by falls is dropped into the water from a height of at least 3 m; and

.3 a load of 100 kg in any single seat location when a free-fall lifeboat is launched from a height of at least 1.3 times its free-fall certification height.

4.4.1.6 Except for free-fall lifeboats, each lifeboat to be launched by falls shall be of sufficient strength to withstand a load, without residual deflection on removal of that load:

.1 in the case of boats with metal hulls, 1.25 times the total mass of the lifeboat when loaded with its full complement of persons and equipment; or

.2 in the case of other boats, twice the total mass of the lifeboat when loaded with its full complement of persons and equipment.

4.4.1.7 Except for free-fall lifeboats, each lifeboat to be launched by falls shall be of sufficient strength to withstand, when loaded with its full complement of persons and equipment and with, where applicable, skates or fenders in position, a lateral impact against the ship's side at an impact velocity of at least 3.5 m/s and also a drop into the water from a height of at least 3 m.

4.4.1.8 The vertical distance between the floor surface and the interior of the enclosure or canopy over 50% of the floor area shall be:

.1 not less than 1.3 m for a lifeboat permitted to accommodate nine persons or less;

.2 not less than 1.7 m for a lifeboat permitted to accommodate 24 persons or more; and

.3 not less than the distance as determined by linear interpolation between 1.3 m and 1.7 m for a lifeboat permitted to accommodate between nine and 24 persons.

4.4.2 **Carrying capacity of lifeboats**

4.4.2.1 No lifeboat shall be approved to accommodate more than 150 persons.

4.4.2.2 The number of persons which a lifeboat to be launched by falls shall be permitted to accommodate shall be equal to the lesser of:

.1 the number of persons having an average mass of 75 kg, all wearing lifejackets, that can be seated in a normal position without interfering with the means of propulsion or the operation of any of the lifeboat's equipment; or

.2 the number of spaces that can be provided on the seating arrangements in accordance with figure 1. The shapes may be overlapped as shown, provided footrests are fitted and there is sufficient room for legs and the vertical separation between the upper and lower seat is not less than 350 mm.

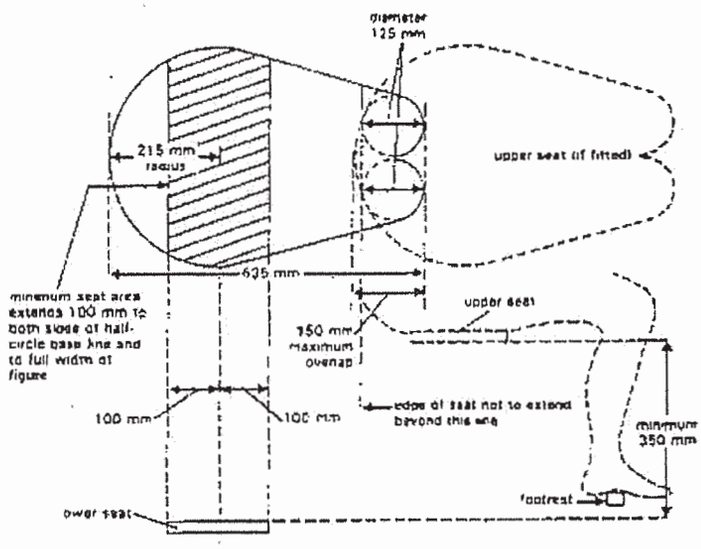


Figure 1

4.4.2.3 Each seating position shall be clearly indicated in the lifeboat.

4.4.3 **Access into lifeboats**

4.4.3.1 Every passenger ship lifeboat shall be so arranged that it can be rapidly boarded by its full complement of persons. Rapid disembarkation shall also be possible.

4.4.3.2 Every cargo ship lifeboat shall be so arranged that it can be boarded by its full complement of persons in not more than 3 min from the time the instruction to board is given. Rapid disembarkation shall also be possible.

4.4.3.3 Lifeboats shall have a boarding ladder that can be used at any boarding entrance of the lifeboat to enable persons in the water to board the lifeboat. The lowest step of the ladder shall be not less than 0.4 m below the lifeboat's light waterline.

4.4.3.4 The lifeboat shall be so arranged that helpless people can be brought on board either from the sea or on stretchers.

4.4.3.5 All surfaces on which persons might walk shall have a non-skid finish.

4.4.4 **Lifeboat buoyancy**

All lifeboats shall have inherent buoyancy or shall be fitted with inherently buoyant material which shall not be adversely affected by seawater, oil or oil products, sufficient to float the lifeboat with all its equipment on board when flooded and open to the sea. Additional inherently buoyant material, equal to 280 N of buoyant force per person shall be provided for the number of persons the lifeboat is permitted to accommodate. Buoyant material, unless in addition to that required above, shall not be installed external to the hull of the lifeboat.

4.4.5 **Lifeboat freeboard and stability**

4.4.5.1 All lifeboats shall be stable and have a positive GM value when loaded with 50% of the number of persons the lifeboat is permitted to accommodate in their normal positions to one side of the centreline.

4.4.5.2 Under the condition of loading in paragraph 4.4.5.1:

.1 each lifeboat with side openings near the gunwale shall have a freeboard, measured from the waterline to the lowest opening through which the lifeboat may become flooded, of at least 1.5% of the lifeboat's length or 100 mm, whichever is the greater; and

.2 each lifeboat without side openings near the gunwale shall not exceed an angle of heel of 20° and shall have a freeboard, measured from the waterline to the lowest opening through which the lifeboat may become flooded, of at least 1.5% of the lifeboat's length or 100 mm whichever is the greater.

4.4.6 **Lifeboat propulsion**

4.4.6.1 Every lifeboat shall be powered by a compression ignition engine. No engine shall be used for any lifeboat if its fuel has a flashpoint of 43°C or less (closed cup test).

4.4.6.2 The engine shall be provided with either a manual starting system, or a power starting system with two independent rechargeable energy sources. Any necessary starting aids shall also be provided.

The engine starting systems and starting aids shall start the engine at an ambient temperature of -15°C within 2 min of commencing the start procedure unless, in the opinion of the Administration having regard to the particular voyages in which the ship carrying the lifeboat is constantly engaged, a different temperature is appropriate. The starting systems shall not be impeded by the engine casing, seating or other obstructions.

4.4.6.3 The engine shall be capable of operating for not less than 5 min after starting from cold with the lifeboat out of the water.

4.4.6.4 The engine shall be capable of operating when the lifeboat is flooded up to the centreline of the crankshaft.

4.4.6.5 The propeller shafting shall be so arranged that the propeller can be disengaged from the engine. Provision shall be made for ahead and astern propulsion of the lifeboat.

4.4.6.6 The exhaust pipe shall be so arranged as to prevent water from entering the engine in normal operation.

4.4.6.7 All lifeboats shall be designed with due regard to the safety of persons in the water and to the possibility of damage to the propulsion system by floating debris.

4.4.6.8 The speed of a lifeboat when proceeding ahead in calm water, when loaded with its full complement of persons and equipment and with all engine-powered auxiliary equipment in operation, shall be at least 6 knots and at least 2 knots when towing a 25-person liferaft loaded with its full complement of persons and equipment or its equivalent. Sufficient fuel, suitable for use throughout the temperature range expected in the area in which the ship operates, shall be provided to run the fully loaded lifeboat at 6 knots for a period of not less than 24 h.

4.4.6.9 The lifeboat engine, transmission and engine accessories shall be enclosed in a fire-retardant casing or other suitable arrangements providing similar protection. Such arrangements shall also protect persons from coming into accidental contact with hot or moving parts and protect the engine from exposure to weather and sea. Adequate means shall be provided to reduce the engine noise so that a shouted order can be heard. Starter batteries shall be provided with casings which form a watertight enclosure around the bottom and sides of the batteries. The battery casings shall have a tight fitting top which provides for necessary gas venting.

4.4.6.10 The lifeboat engine and accessories shall be designed to limit electromagnetic emissions so that engine operation does not interfere with the operation of radio life-saving appliances used in the lifeboat.

4.4.6.11 Means shall be provided for recharging all engine starting, radio and searchlight batteries. Radio batteries shall not be used to provide power for engine starting. Means shall be provided for recharging lifeboat batteries from the ship's power supply at a supply voltage not exceeding 50 V which can be disconnected at the lifeboat embarkation station, or by means of a solar battery charger.

4.4.6.12 Water-resistant instructions for starting and operating the engine shall be provided and mounted in a conspicuous place near the engine starting controls.

4.4.7 **Lifeboat fittings**

4.4.7.1 All lifeboats except free-fall lifeboats shall be provided with at least one drain valve fitted near the lowest point in the hull, which shall automatically open to drain water from the hull when the lifeboat

is not waterborne and shall automatically close to prevent entry of water when the lifeboat is waterborne. Each drain valve shall be provided with a cap or plug to close the valve, which shall be attached to the lifeboat by a lanyard, a chain, or other suitable means. Drain valves shall be readily accessible from inside the lifeboat and their position shall be clearly indicated.

4.4.7.2 All lifeboats shall be provided with a rudder and tiller. When a wheel or other remote steering mechanism is also provided the tiller shall be capable of controlling the rudder in case of failure of the steering mechanism. The rudder shall be permanently attached to the lifeboat. The tiller shall be permanently installed on, or linked to, the rudder stock; however, if the lifeboat has a remote steering mechanism, the tiller may be removable and securely stowed near the rudder stock. The rudder and tiller shall be so arranged as not to be damaged by operation of the release mechanism or the propeller.

4.4.7.3 Except in the vicinity of the rudder and propeller, suitable handholds shall be provided or a buoyant lifeline shall be becketed around the outside of the lifeboat above the waterline and within reach of a person in the water.

4.4.7.4 Lifeboats which are not self-righting when capsized shall have suitable handholds on the underside of the hull to enable persons to cling to the lifeboat. The handholds shall be fastened to the lifeboat in such a way that, when subjected to an impact sufficient to cause them to break away from the lifeboat, they break away without damaging the lifeboat.

4.4.7.5 All lifeboats shall be fitted with sufficient watertight lockers or compartments to provide for the storage of the small items of equipment, water and provisions required by paragraph 4.4.8. The lifeboat shall be equipped with a means for collecting rain water, and in addition if required by the Administration a means for producing drinking water from seawater with a manually powered desalinator. The desalinator must not be dependent upon solar heat, nor on chemicals other than seawater. Means shall be provided for the storage of collected water.

4.4.7.6 Every lifeboat to be launched by a fall or falls, except a free-fall lifeboat, shall be fitted with a release mechanism complying with the following requirements subject to paragraph .5 below:

.1 the mechanism shall be so arranged that all hooks are released simultaneously;

.2 the mechanism shall have two release capabilities as follows:

.2.1 a normal release capability which will release the lifeboat when it is waterborne or when there is no load on the hooks; and

.2.2 an on-load release capability which will release the lifeboat with a load on the hooks. This release shall be so arranged as to release the lifeboat under any conditions of loading from no-load with the lifeboat waterborne to a load of 1.1 times the total mass of the lifeboat when loaded with its full complement of persons and equipment. This release capability shall be adequately protected against accidental or premature use. Adequate protection shall include special mechanical protection not normally required for offload release, in addition to a danger sign. To prevent an accidental release during recovery of the boat, the mechanical protection (interlock) should only engage when the release mechanism is properly and completely reset. To prevent a premature on-load release, on-load operation of the release mechanism should require a deliberate and sustained action by the operator. The release mechanism shall be so designed that crew members in the lifeboat can clearly observe when the release

mechanism is properly and completely reset and ready for lifting. Clear operating instructions should be provided with a suitably worded warning notice;

.3 the release control shall be clearly marked in a colour that contrasts with its surroundings;

.4 the fixed structural connections of the release mechanism in the lifeboat shall be designed with a calculated factor of safety of 6 based on the ultimate strength of the materials used, assuming the mass of the lifeboat is equally distributed between the falls; and

.5 where a single fall and hook system is used for launching a lifeboat or rescue boat in combination with a suitable painter, the requirements of paragraph 4.4.7.6.2 need not be applicable; in such an arrangement a single capability to release the lifeboat or rescue boat, only when it is fully waterborne, will be adequate.

4.4.7.7 Every lifeboat shall be fitted with a device to secure a painter near its bow. The device shall be such that the lifeboat does not exhibit unsafe or unstable characteristics when being towed by the ship making headway at speeds up to 5 knots in calm water. Except for free-fall lifeboats, the painter securing device shall include a release device to enable the painter to be released from inside the lifeboat, with the ship making headway at speeds up to 5 knots in calm water.

4.4.7.8 Every lifeboat which is fitted with a fixed two-way VHF radiotelephone apparatus with an antenna which is separately mounted shall be provided with arrangements for siting and securing the antenna effectively in its operating position.

4.4.7.9 Lifeboats intended for launching down the side of a ship shall have skates and fenders as necessary to facilitate launching and prevent damage to the lifeboat.

4.4.7.10 A manually controlled lamp shall be fitted. The light shall be white and be capable of operating continuously for at least 12 h with a luminous intensity of not less than 4.3cd in all directions of the upper hemisphere. However if the light is a flashing light it shall flash at a rate of not less than 50 flashes and not more than 70 flashes per minute for the 12 h operating period with an equivalent effective luminous intensity.

4.4.7.11 A manually controlled lamp or source of light shall be fitted inside the lifeboat to provide illumination for not less than 12 h to permit reading of survival and equipment instructions; however, oil lamps shall not be permitted for this purpose.

4.4.7.12 Every lifeboat shall be so arranged that an adequate view forward, aft and to both sides is provided from the control and steering position for safe launching and manoeuvring.

4.4.8 **Lifeboat equipment**

All items of lifeboat equipment, whether required by this paragraph or elsewhere in section 4.4, shall be secured within the lifeboat by lashings, storage in lockers or compartments, storage in brackets or similar mounting arrangements or other suitable means. However, in the case of a lifeboat to be launched by falls, the boat-hooks shall be kept free for fending off purposes. The equipment shall be secured in such a manner as not to interfere with any abandonment procedures. All items of lifeboat equipment shall be as small and of as little mass as possible and shall be packed in a suitable and compact form. Except where otherwise stated, the normal equipment of every lifeboat shall consist of:

.1 except for free-fall lifeboats, sufficient buoyant oars to make headway in calm seas. Thole pins, crutches or equivalent arrangements shall be provided for each oar provided. Thole pins or crutches shall be attached to the boat by lanyards or chains;

.2 two boat-hooks;

.3 a buoyant bailer and two buckets;

.4 a survival manual;

.5 an operational compass which is luminous or provided with suitable means of illumination. In a totally enclosed lifeboat, the compass shall be permanently fitted at the steering position; in any other lifeboat, it shall be provided with a binnacle if necessary to protect it from the weather, and suitable mounting arrangements;

.6 a sea-anchor of adequate size fitted with a shock-resistant hawser which provides a firm hand grip when wet. The strength of the sea-anchor, hawser and tripping line if fitted shall be adequate for all sea conditions;

.7 two efficient painters of a length equal to not less than twice the distance from the stowage position of the lifeboat to the waterline in the lightest seagoing condition or 15 m, whichever is the greater. On lifeboats to be launched by free-fall launching, both painters shall be stowed near the bow ready for use. On other lifeboats, one painter attached to the release device required by paragraph 4.4.7.7 shall be placed at the forward end of the lifeboat and the other shall be firmly secured at or near the bow of the lifeboat ready for use;

.8 two hatchets, one at each end of the lifeboat;

.9 watertight receptacles containing a total of 3 *l* of fresh water for each person the lifeboat is permitted to accommodate, of which either 1 *l* per person may be replaced by a de-salting apparatus capable of producing an equal amount of fresh water in 2 days, or 2 *l* per person may be replaced by a manually powered reverse osmosis desalinator as described in paragraph 4.4.7.5 capable of producing an equal amount of fresh water in 2 days;

.10 a rustproof dipper with lanyard;

.11 a rustproof graduated drinking vessel;

.12 a food ration as described in paragraph 4.1.5.1.18 totalling not less than 10,000 kJ for each person the lifeboat is permitted to accommodate; these rations shall be kept in airtight packaging and be stowed in a watertight container;

.13 four rocket parachute flares complying with the requirements of section 3.1;

.14 six hand flares complying with the requirements of section 3.2;

.15 two buoyant smoke signals complying with the requirements of section 3.3;

.16 one waterproof electric torch suitable for Morse signalling together with one spare set of batteries and one spare bulb in a waterproof container;

.17 one daylight signalling mirror with instructions for its use for signalling to ships and aircraft;

.18 one copy of the life-saving signals prescribed by regulation V/16 on a waterproof card or in a waterproof container;

.19 one whistle or equivalent sound signal;

.20 a first-aid outfit in a waterproof case capable of being closed tightly after use;

.21 anti-seasickness medicine sufficient for at least 48 h and one seasickness bag for each person;

.22 a jack-knife to be kept attached to the boat by a lanyard;

.23 three tin-openers;

.24 two buoyant rescue quoits, attached to not less than 30 m of buoyant line;

.25 if the lifeboat is not automatically self-bailing, a manual pump suitable for effective bailing;

.26 one set of fishing tackle;

.27 sufficient tools for minor adjustments to the engine and its accessories;

.28 portable fire-extinguishing equipment of an approved type suitable for extinguishing oil fires;

.29 a searchlight with a horizontal and vertical sector of at least 6° and a measured luminous intensity of 2,500 cd which can work continuously for not less than 3 h;

.30 an efficient radar reflector, unless a survival craft radar transponder is stowed in the lifeboat;

.31 thermal protective aids complying with the requirements of section 2.5 sufficient for 10% of the number of persons the lifeboat is permitted to accommodate or two, whichever is the greater; and

.32 in the case of ships engaged on voyages of such a nature and duration that, in the opinion of the Administration, the items specified in paragraphs 4.4.8.12 and 4.4.8.26 are unnecessary, the Administration may allow these items to be dispensed with.

4.4.9 **Lifeboat markings**

4.4.9.1 The number of persons for which the lifeboat is approved shall be clearly marked on it in clear permanent characters

4.4.9.2 The name and port of registry of the ship to which the lifeboat belongs shall be marked on each side of the lifeboat's bow in block capitals of the Roman alphabet.

4.4.9.3 Means of identifying the ship to which the lifeboat belongs and the number of the lifeboat shall be marked in such a way that they are visible from above.

4.5 Partially enclosed lifeboats

4.5.1 Partially enclosed lifeboats shall comply with the requirements of section 4.4 and in addition shall comply with the requirements of this section.

4.5.2 Partially enclosed lifeboats shall be provided with permanently attached rigid covers extending over not less than 20% of the length of the lifeboat from the stem and not less than 20% of the length of the lifeboat from the aftermost part of the lifeboat. The lifeboat shall be fitted with a permanently attached foldable canopy which together with the rigid covers completely encloses the occupants of the lifeboat in a weatherproof shelter and protects them from exposure. The lifeboat shall have entrances at both ends and on each side. Entrances in the rigid covers shall be weathertight when closed. The canopy shall be so arranged that:

.1 it is provided with adequate rigid sections or battens to permit erection of the canopy;

.2 it can be easily erected by not more than two persons;

.3 it is insulated to protect the occupants against heat and cold by means of not less than two layers of material separated by an air gap or other equally efficient means; means shall be provided to prevent accumulation of water in the air gap;

.4 its exterior is of a highly visible colour and its interior is of a colour which does not cause discomfort to the occupants;

.5 entrances in the canopy are provided with efficient adjustable closing arrangements which can be easily and quickly opened and closed from inside or outside so as to permit ventilation but exclude seawater, wind and cold; means shall be provided for holding the entrances securely in the open and closed position;

.6 with the entrances closed, it admits sufficient air for the occupants at all times;

.7 it has means for collecting rainwater; and

.8 the occupants can escape in the event of the lifeboat capsizing.

4.5.3 The interior of the lifeboat shall be of a highly visible colour.

4.5.4 If a fixed two-way VHF radiotelephone apparatus is fitted in the lifeboat, it shall be installed in a cabin large enough to accommodate both the equipment and the person using it. No separate cabin is required if the construction of the lifeboat provides a sheltered space to the satisfaction of the Administration.

4.6 Totally enclosed lifeboats

4.6.1 Totally enclosed lifeboats shall comply with the requirements of section 4.4 and in addition shall comply with the requirements of this section.

4.6.2 Enclosure

Every totally enclosed lifeboat shall be provided with a rigid watertight enclosure which completely encloses the lifeboat. The enclosure shall be so arranged that:

.1 it provides shelter for the occupants;

.2 access to the lifeboat is provided by hatches which can be closed to make the lifeboat watertight;

.3 except for free-fall lifeboats, hatches are positioned so as to allow launching and recovery operations to be performed without any occupant having to leave the enclosure;

.4 access hatches are capable of being opened and closed from both inside and outside and are equipped with means to hold them securely in open positions;

.5 except for a free-fall lifeboat, it is possible to row the lifeboat;

.6 it is capable, when the lifeboat is in the capsized position with the hatches closed and without significant leakage, of supporting the entire mass of the lifeboat, including all equipment, machinery and its full complement of persons;

.7 it includes windows or translucent panels which admit sufficient daylight to the inside of the lifeboat with the hatches closed to make artificial light unnecessary;

.8 its exterior is of a highly visible colour and its interior of a colour which does not cause discomfort to the occupants;

.9 handrails provide a secure handhold for persons moving about the exterior of the lifeboat, and aid embarkation and disembarkation;

.10 persons have access to their seats from an entrance without having to climb over thwarts or other obstructions; and

.11 during operation of the engine with the enclosure closed, the atmospheric pressure inside the lifeboat shall never be above or below the outside atmospheric pressure by more than 20 hPa.

4.6.3 Capsizing and re-righting

4.6.3.1 Except in free-fall lifeboats, a safety belt shall be fitted at each indicated seating position. The safety belt shall be designed to hold a person with a mass of 100 kg securely in place when the lifeboat is in a capsized position. Each set of safety belts for a seat shall be of a colour which contrasts with the belts for seats immediately adjacent. Free-fall lifeboats shall be fitted with a safety harness at each seat in contrasting colour designed to hold a person with a mass of 100 kg securely in place during a free-fall launch as well as with the lifeboat in capsized position.

4.6.3.2 The stability of the lifeboat shall be such that it is inherently or automatically self-righting when loaded with its full or a partial complement of persons and equipment and all entrances and openings are closed watertight and the persons are secured with safety belts.

4.6.3.3 The lifeboat shall be capable of supporting its full complement of persons and equipment when the lifeboat is in the damaged condition prescribed in paragraph .4.4.1.1 and its stability shall be such that in the event of capsizing, it will automatically attain a position that will provide an above-water escape for its occupants. When the lifeboat is in the stable flooded condition, the water level inside the lifeboat, measured along the seatback, shall not be more than 500 mm above the seat pan at any occupant seating position.

4.6.3.4 The design of all engine exhaust pipes, air ducts and other openings shall be such that water is excluded from the engine when the lifeboat capsizes and re-rights.

4.6.4 **Propulsion**

4.6.4.1 The engine and transmission shall be controlled from the helmsman's position.

4.6.4.2 The engine and engine installation shall be capable of running in any position during capsize and continue to run after the lifeboat returns to the upright or shall automatically stop on capsizing and be easily restarted after the lifeboat returns to the upright. The design of the fuel and lubricating systems shall prevent the loss of fuel and the loss of more than 250 *ml* of lubricating oil from the engine during capsize.

4.6.4.3 Air-cooled engines shall have a duct system to take in cooling air from, and exhaust it to, the outside of the lifeboat. Manually operated dampers shall be provided to enable cooling air to be taken in from, and exhausted to, the interior of the lifeboat.

4.6.5 **Protection against acceleration**

Notwithstanding paragraph 4.4.1.7, a totally enclosed lifeboat, except a free-fall lifeboat, shall be so constructed and fendered such that the lifeboat renders protection against harmful accelerations resulting from an impact of the lifeboat, when loaded with its full complement of persons and equipment, against the ship's side at an impact velocity of not less than 3.5 m/s.

4.7 Free-fall lifeboats

4.7.1 **General requirements**

Free-fall lifeboats shall comply with the requirements of section 4.6 and in addition shall comply with the requirements of this section.

4.7.2 **Carrying capacity of a free-fall lifeboat**

The carrying capacity of a free-fall lifeboat is the number of persons that can be provided with a seat without interfering with the means of propulsion or the operation of any of the lifeboat's equipment. The width of the seat shall be at least 430 mm. Free clearance in front of the backrest shall be at least 635 mm. The backrest shall extend at least 1,000 mm above the seatpan.

4.7.3 **Performance requirements**

4.7.3.1 Each free-fall lifeboat shall make positive headway immediately after water entry and shall not come into contact with the ship after a free-fall launching against a trim of up to 10° and a list of up to 20° either way from the certification height when fully equipped and loaded with:

.1 its full complement of persons;

.2 occupants so as to cause the centre of gravity to be in the most forward position;

.3 occupants so as to cause the centre of gravity to be in the most aft position; and

.4 its operating crew only.

4.7.3.2 For oil tankers, chemical tankers and gas carriers with a final angle of heel greater than 20° calculated in accordance with the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto and the recommendations of the Organization, as applicable, a lifeboat shall be capable of being free-fall launched at the final angle of heel and on the base of the final waterline of that calculation.

4.7.3.3 The required free-fall height shall never exceed the free-fall certification height.

4.7.4 **Construction**

Each free-fall lifeboat shall be of sufficient strength to withstand, when loaded with its full complement of persons and equipment, a free-fall launch from a height of at least 1.3 times the free-fall certification height.

4.7.5 **Protection against harmful acceleration**

Each free-fall lifeboat shall be so constructed as to ensure that the lifeboat is capable of rendering protection against harmful accelerations resulting from being launched from the height for which it is to be certified in calm water under unfavourable conditions of a trim of up to 10° and a list of up to 20° either way when it is fully equipped and loaded with:

.1 its full complement of persons;

.2 occupants so as to cause the centre of gravity to be in the most forward position;

.3 occupants so as to cause the centre of gravity to be in the most aft position; and

.4 the operating crew only.

4.7.6 **Lifeboat fittings**

Each free-fall lifeboat shall be fitted with a release system which shall:

.1 have two independent activation systems for the release mechanisms which may only be operated from inside the lifeboat and be marked in a colour that contrasts with its surroundings;

.2 be so arranged as to release the boat under any condition of loading from no-load up to at least 200% of the normal load caused by the fully equipped lifeboat when loaded with the number of persons for which it is to be approved;

.3 be adequately protected against accidental or premature use;

.4 be designed to test the release system without launching the lifeboat; and

.5 be designed with a factor of safety of 6 based on the ultimate strength of the materials used.

4.7.7 **Certificate of approval**

In addition to the requirements of paragraph 4.4.1.2, the certificate of approval for a free-fall lifeboat shall also state:

.1 free-fall certification height;

.2 required launching ramp length; and

.3 launching ramp angle for the free-fall certification height.

4.8 Lifeboats with a self-contained air support system

In addition to complying with the requirements of section 4.6 or 4.7, as applicable, a lifeboat with a self-contained air support system shall be so arranged that, when proceeding with all entrances and openings closed, the air in the lifeboat remains safe and breathable and the engine runs normally for a period of not less than 10 min. During this period the atmospheric pressure inside the lifeboat shall never fall below the outside atmospheric pressure nor shall it exceed it by more than 20 hPa. The system shall have visual indicators to indicate the pressure of the air supply at all times.

4.9 Fire-protected lifeboats

4.9.1 In addition to complying with the requirements of section 4.8, a fire-protected lifeboat when waterborne shall be capable of protecting the number of persons it is permitted to accommodate when subjected to a continuous oil fire that envelops the lifeboat for a period of not less than 8 min.

4.9.2 **Water spray system**

A lifeboat which has a water spray fire-protection system shall comply with the following:

.1 water for the system shall be drawn from the sea by a self-priming motor pump. It shall be possible to turn "on" and turn "off" the flow of water over the exterior of the lifeboat;

.2 the seawater intake shall be so arranged as to prevent the intake of flammable liquids from the sea surface; and

.3 the system shall be arranged for flushing with fresh water and allowing complete drainage.

CHAPTER V - RESCUE BOATS

5.1 Rescue boats

5.1.1 General requirements

5.1.1.1 Except as provided by this section, all rescue boats shall comply with the requirements of paragraphs 4.4.1 to 4.4.7.4 inclusive and 4.4.7.6, 4.4.7.7, 4.4.7.9, 4.4.7.10 and 4.4.9. A lifeboat may be approved and used as a rescue boat if it meets all of the requirements of this section, if it successfully completes the testing for a rescue boat required in regulation III/4.2, and if its stowage, launching and recovery arrangements on the ship meet all of the requirements for a rescue boat.

5.1.1.2 Notwithstanding the requirements of paragraph 4.4.4 required buoyant material for rescue boats may be installed external to the hull, provided it is adequately protected against damage and is capable of withstanding exposure as specified in paragraph 5.1.3.3 .

5.1.1.3 Rescue boats may be either of rigid or inflated construction or a combination of both and shall:

.1 be not less than 3.8 m and not more than 8.5 m in length; and

.2 be capable of carrying at least five seated persons and a person lying on a stretcher. Notwithstanding paragraph 4.4.1.5, seating, except for the helmsman, may be provided on the floor, provided that the seating space analysis in accordance with paragraph 4.4.2.2.2 uses shapes similar to figure 1 , but altered to an overall length of 1,190 mm to provide for extended legs. No part of a seating space shall be on the gunwale, transom, or on inflated buoyancy at the sides of the boat.

5.1.1.4 Rescue boats which are a combination of rigid and inflated construction shall comply with the appropriate requirements of this section to the satisfaction of the Administration.

5.1.1.5 Unless the rescue boat has adequate sheer, it shall be provided with a bow cover extending for not less than 15% of its length.

5.1.1.6 Rescue boats shall be capable of manoeuvring at a speed of at least 6 knots and maintaining that speed for a period of at least 4 h.

5.1.1.7 Rescue boats shall have sufficient mobility and manoeuvrability in a seaway to enable persons to be retrieved from the water, marshal liferafts and tow the largest liferaft carried on the ship when loaded with its full complement of persons and equipment or its equivalent at a speed of at least 2 knots.

5.1.1.8 A rescue boat shall be fitted with an inboard engine or outboard motor. If it is fitted with an outboard motor, the rudder and tiller may form part of the engine. Notwithstanding the requirements of paragraph 4.4.6.1 , petrol- driven outboard engines with an approved fuel system may be fitted in rescue boats provided the fuel tanks are specially protected against fire and explosion.

5.1.1.9 Arrangements for towing shall be permanently fitted in rescue boats and shall be sufficiently strong to marshal or tow liferafts as required by paragraph 5.1.1.7.

5.1.1.10 Unless expressly provided otherwise, every rescue boat shall be provided with effective means of bailing or be automatically self-bailing.

5.1.1.11 Rescue boats shall be fitted with weathertight stowage for small items of equipment.

5.1.2 **Rescue boat equipment**

5.1.2.1 All items of rescue boat equipment, with the exception of boat-hooks which shall be kept free for fending off purposes, shall be secured within the rescue boat by lashings, storage in lockers or compartments, storage in brackets or similar mounting arrangements, or other suitable means. The equipment shall be secured in such a manner as not to interfere with any launching or recovery procedures. All items of rescue boat equipment shall be as small and of as little mass as possible and shall be packed in suitable and compact form.

5.1.2.2 The normal equipment of every rescue boat shall consist of:

.1 sufficient buoyant oars or paddles to make headway in calm seas. Thole pins, crutches or equivalent arrangements shall be provided for each oar. Thole pins or crutches shall be attached to the boat by lanyards or chains;

.2 a buoyant bailer;

.3 a binnacle containing an efficient compass which is luminous or provided with suitable means of illumination;

.4 a sea-anchor and tripping line if fitted with a hawser of adequate strength not less than 10 m in length;

.5 a painter of sufficient length and strength, attached to the release device complying with the requirements of paragraph 4.4.7.7 and placed at the forward end of the rescue boat;

.6 one buoyant line, not less than 50 m in length, of sufficient strength to tow a liferaft as required by paragraph 5.1.1.7;

.7 one waterproof electric torch suitable for Morse signalling, together with one spare set of batteries and one spare bulb in a waterproof container;

.8 one whistle or equivalent sound signal;

.9 a first-aid outfit in a waterproof case capable of being closed tightly after use;

.10 two buoyant rescue quoits, attached to not less than 30 m of buoyant line;

.11 a searchlight with a horizontal and vertical sector of at least 6° and a measured luminous intensity of 2,500 cd which can work continuously for not less than 3 h;

.12 an efficient radar reflector;

.13 thermal protective aids complying with the requirements of section 2.5 sufficient for 10% of the number of persons the rescue boat is permitted to accommodate or two, whichever is the greater; and

.14 portable fire-extinguishing equipment of an approved type suitable for extinguishing oil fires.

5.1.2.3 In addition to the equipment required by paragraph 5.1.2.2, the normal equipment of every rigid rescue boat shall include:

.1 a boat-hook;

.2 a bucket; and

.3 a knife or hatchet.

5.1.2.4 In addition to the equipment required by paragraph 5.1.2.2, the normal equipment of every inflated rescue boat shall consist of:

.1 a buoyant safety knife;

.2 two sponges;

.3 an efficient manually operated bellows or pump;

.4 a repair kit in a suitable container for repairing punctures; and

.5 a safety boat-hook.

5.1.3 **Additional requirements for inflated rescue boats**

5.1.3.1 The requirements of paragraphs 4.4.1.4 and 4.4.1.6 do not apply to inflated rescue boats.

5.1.3.2 An inflated rescue boat shall be constructed in such a way that, when suspended by its bridle or lifting hook:

.1 it is of sufficient strength and rigidity to enable it to be lowered and recovered with its full complement of persons and equipment;

.2 it is of sufficient strength to withstand a load of 4 times the mass of its full complement of persons and equipment at an ambient temperature of 20 ± 3°C, with all relief valves inoperative; and

.3 it is of sufficient strength to withstand a load of 1.1 times the mass of its full complement of persons and equipment at an ambient temperature of -30°C, with all relief valves operative.

5.1.3.3 Inflated rescue boats shall be so constructed as to be capable of withstanding exposure:

.1 when stowed on an open deck on a ship at sea; and

.2 for 30 days afloat in all sea conditions.

5.1.3.4 In addition to complying with the requirements of paragraph 4.4.9 , inflated rescue boats shall be marked with a serial number, the maker's name or trade mark and the date of manufacture.

5.1.3.5 The buoyancy of an inflated rescue boat shall be provided by either a single tube subdivided into at least five separate compartments of approximately equal volume or two separate tubes neither

exceeding 60% of the total volume. The buoyancy tubes shall be so arranged that the intact compartments shall be able to support the number of persons which the rescue boat is permitted to accommodate, each having a mass of 75 kg, when seated in their normal positions with positive freeboard over the rescue boat's entire periphery under the following conditions:

.1 with the forward buoyancy compartment deflated;

.2 with the entire buoyancy on one side of the rescue boat deflated; and

.3 with the entire buoyancy on one side and the bow compartment deflated.

5.1.3.6 The buoyancy tubes forming the boundary of the inflated rescue boat shall on inflation provide a volume of not less than 0.17 m^3 for each person the rescue boat is permitted to accommodate.

5.1.3.7 Each buoyancy compartment shall be fitted with a nonreturn valve for manual inflation and means for deflation. A safety relief valve shall also be fitted unless the Administration is satisfied that such an appliance is unnecessary.

5.1.3.8 Underneath the bottom and on vulnerable places on the outside of the inflated rescue boat, rubbing strips shall be provided to the satisfaction of the Administration.

5.1.3.9 Where a transom is fitted it shall not be inset by more than 20% of the overall length of the rescue boat.

5.1.3.10 Suitable patches shall be provided for securing the painters fore and aft and the becketed lifelines inside and outside the boat.

5.1.3.11 The inflated rescue boat shall be maintained at all times in a fully inflated condition.

CHAPTER VI - LAUNCHING AND EMBARKATION APPLIANCES

6.1 Launching and embarkation appliances

6.1.1 General requirements

6.1.1.1 With the exception of the secondary means of launching for free-fall lifeboats, each launching appliance shall be so arranged that the fully equipped survival craft or rescue boat it serves can be safely launched against unfavourable conditions of a trim of up 10° and a list of up to 20° either way:

.1 when boarded, as required by regulation III/23 or III/33, by its full complement of persons; and

.2 with not more than the required operating crew on board.

6.1.1.2 Notwithstanding the requirements of paragraph 6.1.1.1, lifeboat launching appliances for oil tankers, chemical tankers and gas carriers with a final angle of heel greater than 20° calculated in accordance with the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto and the recommendations of the Organization, as applicable, shall be capable of operating at the final angle of heel on the lower side of the ship taking into consideration the final damaged waterline of the ship.

6.1.1.3 A launching appliance shall not depend on any means other than gravity or stored mechanical power which is independent of the ship's power supplies to launch the survival craft or rescue boat it serves in the fully loaded and equipped condition and also in the light condition.

6.1.1.4 Each launching appliance shall be so constructed that only a minimum amount of routine maintenance is necessary. All parts requiring regular maintenance by the ship's crew shall be readily accessible and easily maintained.

6.1.1.5 The launching appliance and its attachments other than winch brakes shall be of sufficient strength to withstand a static proof load on test of not less than 2.2 times the maximum working load.

6.1.1.6 Structural members and all blocks, falls, padeyes, links, fastenings and all other fittings used in connection with launching equipment shall be designed with a factor of safety on the basis of the maximum working load assigned and the ultimate strengths of the materials used for construction. A minimum factor of safety of 4.5 shall be applied to all structural members, and a minimum factor of safety of 6 shall be applied to falls, suspension chains, links and blocks.

6.1.1.7 Each launching appliance shall, as far as practicable, remain effective under conditions of icing.

6.1.1.8 A lifeboat launching appliance shall be capable of recovering the lifeboat with its crew.

6.1.1.9 Each rescue boat launching appliance shall be fitted with a powered winch motor capable of raising the rescue boat from the water with its full rescue boat complement of persons and equipment at a rate of not less than 0.3 m/s.

6.1.1.10 The arrangements of the launching appliance shall be such as to enable safe boarding of the survival craft in accordance with the requirements of paragraphs 4.1.4.2, 4.1.4.3, 4.4.3.1 and 4.4.3.2 .

6.1.2 **Launching appliances using falls and a winch**

6.1.2.1 Every launching appliance using falls and a winch, except for secondary launching appliances for free-fall lifeboats, shall comply with the requirements of paragraph 6.1.1 and, in addition, shall comply with the requirements of this paragraph:

6.1.2.2 The launching mechanism shall be so arranged that it may be actuated by one person from a position on the ship's deck and, except for secondary launching appliances for free-fall lifeboats, from a position within the survival craft or rescue boat. When launched by a person on the deck, the survival craft or rescue boat shall be visible to that person.

6.1.2.3 Falls shall be of rotation-resistant and corrosion-resistant steel wire rope.

6.1.2.4 In the case of a multiple drum winch, unless an efficient compensatory device is fitted, the falls shall be so arranged as to wind off the drums at the same rate when lowering, and to wind on to the drums evenly at the same rate when hoisting.

6.1.2.5 The winch brakes of a launching appliance shall be of sufficient strength to withstand:

.1 a static test with a proof load of not less than 1.5 times the maximum working load; and

.2 a dynamic test with a proof load of not less than 1.1 times the maximum working load at maximum lowering speed.

6.1.2.6 An efficient hand gear shall be provided for recovery of each survival craft and rescue boat. Hand gear handles or wheels shall not be rotated by moving parts of the winch when the survival craft or rescue boat is being lowered or when it is being hoisted by power.

6.1.2.7 Where davit arms are recovered by power, safety devices shall be fitted which will automatically cut off the power before the davit arms reach the stops in order to prevent overstressing the falls or davits, unless the motor is designed to prevent such overstressing.

6.1.2.8 The speed at which the fully loaded survival craft or rescue boat is lowered to the water shall not be less than that obtained from the formula:

$$S = 0.4 + 0.02H$$

where: S is the lowering speed in metres per second; and

H is the height in metres from the davit head to the waterline with the ship at the lightest seagoing condition.

6.1.2.9 The lowering speed of a fully equipped liferaft without persons on board shall be to the satisfaction of the Administration. The lowering speed of other survival craft, fully equipped but without persons on board, shall be at least 70% of that required by paragraph 6.1.2.8.

6.1.2.10 The maximum lowering speed shall be established by the Administration having regard to the design of the survival craft or rescue boat, the protection of its occupants from excessive forces, and the strength of the launching arrangements taking into account inertia forces during an emergency stop. Means shall be incorporated in the appliance to ensure that this speed is not exceeded.

6.1.2.11 Every launching appliance shall be fitted with brakes capable of stopping the descent of the survival craft or rescue boat and holding it securely when loaded with its full complement of persons and equipment; brake pads shall, where necessary, be protected from water and oil.

6.1.2.12 Manual brakes shall be so arranged that the brake is always applied unless the operator, or a mechanism activated by the operator, holds the brake control in the "off" position.

6.1.3 **Float-free launching**

Where a survival craft requires a launching appliance and is also designed to float free, the float-free release of the survival craft from its stowed position shall be automatic.

6.1.4 **Launching appliances for free-fall lifeboats**

6.1.4.1 Every free-fall launching appliance shall comply with the applicable requirements of paragraph 6.1.1 and, in addition, shall comply with the requirements of this paragraph.

6.1.4.2 The launching appliance shall be designed and installed so that it and the lifeboat it serves operate as a system to protect the occupants from harmful acceleration forces as required by paragraph 4.7.5 , and to ensure effective clearing of the ship as required by paragraphs 4.7.3.1 and 4.7.3.2.

6.1.4.3 The launching appliance shall be constructed so as to prevent sparking and incendiary friction during the launching of the lifeboat.

6.1.4.4 The launching appliance shall be designed and arranged so that in its ready to launch position, the distance from the lowest point on the lifeboat it serves to the water surface with the ship in its lightest seagoing condition does not exceed the lifeboat's free-fall certification height, taking into consideration the requirements of paragraph 4.7.3.

6.1.4.5 The launching appliance shall be arranged so as to preclude accidental release of the lifeboat in its unattended stowed position. If the means provided to secure the lifeboat cannot be released from inside the lifeboat, it shall be so arranged as to preclude boarding the lifeboat without first releasing it.

6.1.4.6 The release mechanism shall be arranged so that at least two independent actions from inside the lifeboat are required in order to launch the lifeboat.

6.1.4.7 Each launching appliance shall be provided with a secondary means to launch the lifeboat by falls. Such means shall comply with the requirements of paragraph 6.1.1 (except 6.1.1.3) and paragraph 6.1.2 (except 6.1.2.6). It must be capable of launching the lifeboat against unfavourable conditions of a trim of up to only 2° and a list of up to only 5° either way and it need not comply with the speed requirements of paragraphs 6.1.2.8 and 6.1.2.9. If the secondary launching appliance is not dependent on gravity, stored mechanical power or other manual means, the launching appliance shall be connected both to the ship's main and emergency power supplies.

6.1.4.8 The secondary means of launching shall be equipped with at least a single off-load capability to release the lifeboat.

6.1.5 **Liferaft launching appliances**

Every liferaft launching appliance shall comply with the requirements of paragraphs 6.1.1 and 6.1.2, except with regard to embarkation in the stowed position, recovery of the loaded liferaft and that manual operation is permitted for turning out the appliance. The launching appliance shall include an automatic release hook arranged so as to prevent premature release during lowering and shall release the liferaft when waterborne. The release hook shall include a capability to release the hook under load. The on-load release control shall:

.1 be clearly differentiated from the control which activates the automatic release function;

.2 require at least two separate actions to operate;

.3 with a load of 150 kg on the hook, require a force of at least 600 N and not more than 700 N to release the load, or provide equivalent adequate protection against inadvertent release of the hook; and

.4 be designed such that the crew members on deck can clearly observe when the release mechanism is properly and completely set.

6.1.6 **Embarkation ladders**

6.1.6.1 Handholds shall be provided to ensure a safe passage from the deck to the head of the ladder and vice versa.

6.1.6.2 The steps of the ladder shall be:

.1 made of hardwood, free from knots or other irregularities, smoothly machined and free from sharp edges and splinters, or of suitable material of equivalent properties;

.2 provided with an efficient non-slip surface either by longitudinal grooving or by the application of an approved non-slip coating;

.3 not less than 480 mm long, 115 mm wide and 25 mm in depth, excluding any non-slip surface or coating; and

.4 equally spaced not less than 300 mm or more than 380 mm apart and secured in such a manner that they will remain horizontal.

6.1.6.3 The side ropes of the ladder shall consist of two uncovered manila ropes not less than 65 mm in circumference on each side. Each rope shall be continuous with no joints below the top step. Other materials may be used provided the dimensions, breaking strain, weathering, stretching and gripping properties are at least equivalent to those of manila rope. All rope ends shall be secured to prevent unravelling.

6.2 Marine evacuation systems

6.2.1 Construction of the marine evacuation systems

6.2.1.1 The passage of the marine evacuation system shall provide for safe descent of persons of various ages, sizes and physical capabilities wearing approved lifejackets from the embarkation station to the floating platform or survival craft.

6.2.1.2 Strength and construction of the passage and platform shall be to the satisfaction of the Administration.

6.2.1.3 The platform, if fitted, shall be:

.1 such that sufficient buoyancy will be provided for the working load. In the case of an inflatable platform, the main buoyancy chambers, which for this purpose shall include any thwarts or floor inflatable structural members are to meet the requirements of section 4.2 based upon the platform capacity except that the capacity shall be obtained by dividing by 0.25 the usable area given in paragraph 6.2.1.3.3;

.2 stable in a seaway and provide a safe working area for the system operators;

.3 of sufficient area that will provide for the securing of at least two liferafts for boarding and to accommodate at least the number of persons that at any time are expected to be on the platform. This usable platform area shall be at least equal to:

$$\frac{20\% \text{ of total number of persons that the Marine Evacuation System is certificated for}}{4} \ m^2$$

or 10 m^2, whichever is the greater. However, Administrations may approve alternate arrangements which are demonstrated to comply with all the prescribed performance requirements.

.4 self-draining;

.5 subdivided in such a way that the loss of gas from any one compartment will not restrict its operational use as a means of evacuation. The buoyancy tubes shall be subdivided or protected against damage occuring from contact with the ship's side;

.6 fitted with a stabilizing system to the satisfaction of the Administration;

.7 restrained by a bowsing line or other positioning systems which are designed to deploy automatically and if necessary, to be capable of being adjusted to the position required for evacuation; and

.8 provided with mooring and bowsing line patches of sufficient strength to securely attach the largest inflatable liferaft associated with the system.

6.2.1.4 If the passage gives direct access to the survival craft, it should be provided with a quick release arrangement.

6.2.2 **Performance of the marine evacuation system**

6.2.2.1 A marine evacuation system shall be:

.1 capable of deployment by one person;

.2 such as to enable the total number of persons for which it is designed, to be transferred from the ship into the inflated liferafts within a period of 30 min in the case of a passenger ship and of 10 min in the case of a cargo ship from the time abandon ship signal is given;

.3 arranged such that liferafts may be securely attached to the platform and released from the platform by a person either in the liferaft or on the platform;

.4 capable of being deployed from the ship under unfavourable conditions of a trim of up to 10° and a list of up to 20° either way;

.5 in the case of being fitted with an inclined slide, such that the angle of the slide to the horizontal is:

.1 within a range of 30° to 35° when the ship is upright and in the lightest seagoing condition; and

.2 in the case of a passenger ship, a maximum of 55° in the final stage of flooding set by the requirements in regulation II-1/8;

.6 evaluated for capacity by means of timed evacuation deployments conducted in harbour;

.7 capable of providing a satisfactory means of evacuation in a sea state associated with a wind of force 6 on the Beaufort scale;

.8 designed to, as far as practicable, remain effective under conditions of icing; and

.9 so constructed that only a minimum amount of routine maintenance is necessary. Any part requiring maintenance by the ship's crews shall be readily accessible and easily maintained.

6.2.2.2 Where one or more marine evacuation systems are provided on a ship, at least 50% of such systems shall be subjected to a trial deployment after installation. Subject to these deployments being satisfactory, the untried systems are to be deployed within 12 months of installation.

6.2.3 **Inflatable liferafts associated with marine evacuation systems**

Any inflatable liferaft used in conjunction with the marine evacuation system shall:

.1 conform with the requirements of section 4.2 ;

.2 be sited close to the system container but be capable of dropping clear of the deployed system and boarding platform;

.3 be capable of release one at a time from its stowage rack with arrangements which will enable it to be moored alongside the platform;

.4 be stowed in accordance with regulation III/13.4; and

.5 be provided with pre-connected or easily connected retrieving lines to the platform.

6.2.4 **Containers for marine evacuation systems**

6.2.4.1 The evacuation passage and platform shall be packed in a container that is:

.1 so constructed as to withstand hard wear under conditions encountered at sea; and

.2 as far as practicable watertight, except for drain holes in the container bottom.

6.2.4.2 The container shall be marked with:

.1 maker's name or trade mark;

.2 serial number;

.3 name of approval authority and the capacity of the system;

.4 SOLAS;

.5 date of manufacture (month and year);

.6 date and place of last service;

.7 maximum permitted height of stowage above waterline; and

.8 stowage position on board.

6.2.4.3 Launching and operating instructions shall be marked on or in the vicinity of the container.

6.2.5 **Marking on marine evacuation systems**

The marine evacuation system shall be marked with:

.1 maker's name or trade mark;

.2 serial number;

.3 date of manufacture (month and year);

.4 name of approving authority;

.5 name and place of servicing station where it was last serviced, along with the date of servicing; and

.6 the capacity of the system.

CHAPTER VII - OTHER LIFE-SAVING APPLIANCES

7.1 Line-throwing appliances

7.1.1 Every line-throwing appliance shall:

.1 be capable of throwing a line with reasonable accuracy;

.2 include not less than four projectiles each capable of carrying the line at least 230 m in calm weather;

.3 include not less than four lines each having a breaking strength of not less than 2 kN; and

.4 have brief instructions or diagrams clearly illustrating the use of the line-throwing appliance.

7.1.2 The rocket, in the case of a pistol-fired rocket, or the assembly, in the case of an integral rocket and line, shall be contained in a water-resistant casing. In addition, in the case of a pistol-fired rocket, the line and rockets together with the means of ignition shall be stowed in a container which provides protection from the weather.

7.2 General alarm and public address system

7.2.1 General emergency alarm system

7.2.1.1 The general emergency alarm system shall be capable of sounding the general emergency alarm signal consisting of seven or more short blasts followed by one long blast on the ship's whistle or siren and additionally on an electrically operated bell or klaxon or other equivalent warning system, which shall be powered from the ship's main supply and the emergency source of electrical power required by regulation II-1/42 or II-1/43, as appropriate. The system shall be capable of operation from the navigation bridge and, except for the ship's whistle, also from other strategic points. The system shall be audible throughout all the accommodation and normal crew working spaces. The alarm shall continue

to function after it has been triggered until it is manually turned off or is temporarily interrupted by a message on the public address system.

7.2.1 2 The minimum sound pressure levels for the emergency alarm tone in interior and exterior spaces shall be 80 dB (A) and at least 10 dB (A) above ambient noise levels existing during normal equipment operation with the ship underway in moderate weather. In cabins without a loudspeaker installation, an electronic alarm transducer shall be installed, e.g. a buzzer or similar.

7.2.1.3 The sound pressure levels at the sleeping position in cabins and in cabin bathrooms shall be at least 75 dB (A) and at least 10 dB (A) above ambient noise levels.

7.2.2 **Public address system**

7.2.2.1 The public address system shall be a loudspeaker installation enabling the broadcast of messages into all spaces where crew members or passengers, or both, are normally present, and to muster stations. It shall allow for the broadcast of messages from the navigation bridge and such other places on board the ship as the Administration deems necessary. It shall be installed with regard to acoustically marginal conditions and not require any action from the addressee. It shall be protected against unauthorized use.

7.2.2.2 With the ship underway in normal conditions, the minimum sound pressure levels for broadcasting emergency announcements shall be:

.1 in interior spaces 75 dB (A) and at least 20 dB (A) above the speech interference level; and

.2 in exterior spaces 80 dB (A) and at least 15 dB (A) above the speech interference level.

第 38/2015 號行政長官公告

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

國際海事組織海上安全委員會於二零一零年五月十四日透過第MSC.289（87）號決議通過了《原油油船貨油艙防腐保護替代方法性能標準》，該標準自二零一二年一月一日起適用於澳門特別行政區；

基於此，行政長官根據澳門特別行政區第3/1999號法律第六條第一款的規定，命令公佈包含上指標準的第MSC.289（87）號決議的中文及英文文本。

二零一五年四月二十一日發佈。

行政長官　崔世安

Aviso do Chefe do Executivo n.º 38/2015

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

Considerando igualmente que, em 14 de Maio de 2010, o Comité de Segurança Marítima da Organização Marítima Internacional, através da resolução MSC.289(87), adoptou a Norma de Desempenho para os Meios Alternativos de Protecção Contra a Corrosão para os Tanques de Carga de Hidrocarbonetos de Navios-Tanque de Petróleo Bruto, e que tal Norma é aplicável na Região Administrativa Especial de Macau desde 1 de Janeiro de 2012;

O Chefe do Executivo manda publicar, nos termos do n.º 1 do artigo 6.º da Lei n.º 3/1999 da Região Administrativa Especial de Macau, a resolução MSC.289(87), que contém a referida Norma, nos seus textos em línguas chinesa e inglesa.

Promulgado em 21 de Abril de 2015.

O Chefe do Executivo, *Chui Sai On*.

第 MSC.289（87）號決議

（2010 年 5 月 14 日通過）

原油油船貨油艙防腐保護替代方法性能標準

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二十八條第（二）款，

注意到以第 MSC.291（87）號決議通過的關於原油油船貨油艙防腐保護替代方法的經修正的《1974 年國際海上人命安全公約》（《安全公約》）（下稱“公約”）第 II-1/3-11 條，

還注意到上述第 II-1/3-11 條規定，該條中所述防腐保護替代方法須符合《原油油船貨油艙防腐保護替代方法性能標準》（下稱“防腐保護替代方法性能標準”）的要求，

在其第 87 屆會議上，**審議了**《防腐保護替代方法性能標準》的建議文本，

1. **通過**《原油油船貨油艙防腐保護替代方法性能標準》，其正文載於本決議附件中；

2. **請**《公約》各締約政府注意，《防腐保護替代方法性能標準》將在《公約》第 II-1/3-11 條於 2012 年 1 月 1 日生效之時生效；

3. **注意到**，根據《安全公約》第 II-1/3-11.3.2 條的規定，《原油油船貨油艙防腐保護替代方法性能標準》的修正案須按照《公約》第 VIII 條關於公約附則除第 I 章外的適用修正程序予以通過、生效和實施；

4. **要求**秘書長將本決議副本和附件中《防腐保護替代方法性能標準》的核證無誤文本送發所有《公約》締約國政府；

5. **進一步要求**秘書長將本決議及其附件的副本送發本組織非《公約》締約國政府的所有會員國；

6. **請**各國政府鼓勵發展旨在作為替代系統的新穎技術，並隨時將任何有效結果通知本組織；

7. **決定**不斷審議《防腐保護替代方法性能標準》並根據應用中獲得的經驗做出必要修正。

附件

原油油船貨油艙防腐保護替代方法性能標準

1 目的

本標準規定了原油油船建造時貨油艙內使用除保護塗層外的其他防腐保護或使用耐腐蝕材料方法的最低標準的技術要求。

2 定義

2.1 *防腐保護替代方法*係指並非使用按照原油油船貨油艙保護塗層性能標準（第 MSC.288（87）號決議）塗裝保護塗層的方法。

2.2 *耐腐蝕鋼材*係指除符合其他相關船舶材料、結構和建造強度要求外，其位於內部貨油艙艙底或倉頂的性能，經試驗證明符合本標準要求的鋼材。

2.3 *目標使用壽命*係指防腐保護或使用耐腐蝕材料方法的設計壽命目標值，以年計。

3 適用

3.1 在本標準制定之日，就維持所要求的 25 年結構完整性的防腐保護或耐腐蝕材料使用而言，耐腐蝕鋼材是可替代保護塗層的唯一經認可的可能方法。如果使用耐腐蝕鋼材作為替代方法，須符合附件中所載性能標準。

3.2 如果研發出附件中的規定不適用的、經本組織認可的新穎類型替代方法，本組織應制定包括試驗程序在內的專門性能標準，作為本標準的新附件，並考慮到按照《安全公約》第 II-1/3-11.4 條進行新穎替代原型實地試驗所取得的經驗。

附件

耐腐蝕鋼材性能標準

1 目的

本標準規定了建造原油油船時用於貨油艙的耐腐蝕鋼材最低標準的技術要求。

2 通則

2.1 耐腐蝕鋼材達到其目標使用壽命的能力，有賴於鋼材的種類、應用和檢驗。所有這些方面均與耐腐蝕鋼材的良好性能相關。

2.2 技術檔案

2.2.1 第 2.2.3 和 2.2.4 段規定的文件和信息須記錄在技術檔案之中。技術檔案須經主管機關驗證。

2.2.2 技術檔案須保存於船上並在船舶整個壽命期間得到維護。

2.2.3 新建階段

技術檔案須至少包含與本標準相關並由船廠在新建階段提交的下列內容：

.1 形式認可證書的副本；

.2 技術數據，包括：

.2.1 經認可的焊接方法和焊料；及

.2.2 生產商推薦的修理方法（如有的話）；及

.3 應用記錄，包括：

.3.1 各艙室應用的實際處所和面積；及

.3.2 應用的產品及其厚度。

2.2.4 營運中的維護、修理和部分更換

營運中的維護、修理和部分更換活動須記錄在技術檔案中。

3 耐腐蝕鋼材標準

3.1 性能標準

本標準以擬提供 25 年目標使用壽命的規範和要求為根據，這一期限被認為是自初始應用開始，鋼材的厚度損耗擬為少於所允許的損耗及貨油艙水密完整性擬得以維持的期限。實際使用壽命將依據包括營運中遇到的實際條件在內的多種變數而不同。

3.2 標準的應用

原油油船建造期間，在貨油倉中第 3.4 段中規定的區域使用的耐腐蝕鋼材須至少符合本標準的要求，而且本標準應被視作最低標準。

3.3 特殊應用

3.3.1 本標準包括對船舶鋼結構的耐腐蝕鋼材要求。茲注意到艙中裝有其他獨立構件，對這些構件採取了防腐保護措施。

3.3.2 建議在實際可行的範圍內，對位於第 3.4 段規定的範圍內的檢驗通道，其非船體結構整體的部分，如扶手、獨立平台、梯子等，應用本標準或貨油艙保護塗層性能標準。對非船體結構整體的構件也可以使用其他等效防腐方法，只要這些方法對周圍結構的耐腐蝕鋼材

性能沒有影響。作為船體結構整體的通道，其佈置，如步道的縱向加強肋、縱樑等，如位於第 3.4 段規定的區域之內，須完全符合本標準或貨油艙保護塗層性能標準。

3.3.3 建議對管子、測量裝置等的支撐件，按照第 3.3.2 段所述對非結構整體構件的要求提供防腐保護。

3.4 應用區域

作為最低限度，下列區域須按照本標準加以保護：

.1 艙頂板及全部內部結構，包括與縱向和橫向隔艙壁連接的肘板。在具有環框縱樑構造的艙中，甲板下橫肋至上面板之下的第一防撓肘板須得到保護。

.2 縱向和橫向隔艙壁至最高檢驗通道的高度得到保護。最高檢驗通道及其支撐架全部得到保護。

.3 無最高檢驗通道的貨艙隔艙壁延伸至艙中線高度的 10%之處得到保護，但從甲板向下延伸無需超過 3 米。

.4 內平底和全部構件至內平底之上 0.3 米處得到保護。

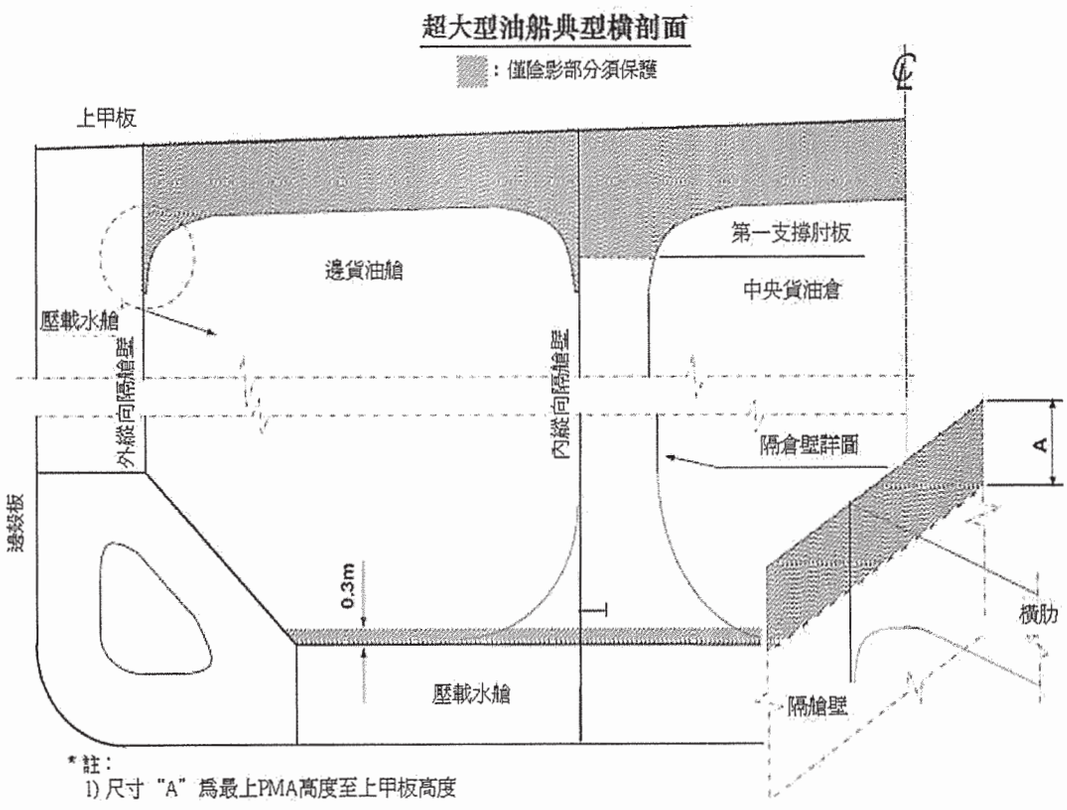


圖 1

3.5 基本要求

對於符合第 3.1 段性能標準、在船舶建造時用於貨油艙的耐腐蝕鋼材的要求是，使用按照形式認可證書中規定的條件和技術檔案認可的耐腐蝕鋼材，保護第 3.4 段中標明的應用部位。

4 認可

4.1 耐腐蝕鋼材須按照本附錄，或等效方法測試。在本標準生效前經過測試的耐腐蝕鋼材，只要是按照本附錄，或等效實驗程序測試的，可以接受。

4.2 耐腐蝕鋼材的合格試驗（4.1）結果須形成文件記錄，主管機關如對結果滿意，須簽發型式認可證書。

4.3 型式認可證書須包括下列信息：

.1 產品名稱和識別標記和（或）號碼；

.2 鋼材的材料、成分和耐腐蝕過程；

.3 鋼材的厚度；

.4 焊接方法和焊料；及

.5 應用區域（上頂板和（或）內底板）。

5 檢查和核實要求

為確保符合本標準，主管機關須在建造過程中進行檢驗並核實經認可的耐腐蝕鋼材已應用於所要求的區域。

附錄

原油油船貨油艙耐腐蝕鋼材合格試驗程序

1 範圍

本程序規定了本標準第 4.1 段中提及的測試程序的細節。

2 試驗

耐腐蝕鋼材須經下列實驗加以核實。

2.1 上甲板狀況模擬試驗

2.1.1 試驗條件

貨油艙上甲板狀況模擬試驗須滿足下列條件：

.1 耐腐蝕鋼材和常規鋼材須同時測試。

.2 常規鋼材的化學成分須符合表 1 的要求。試驗樣板的機械特性對於擬在船上應用中使用的鋼材，應具代表性。

表 1－常規鋼材的化學成分（%）

C	Mn	Si	P	S
0.13-0.17	1.00-1.20	0.15-0.35	0.010-0.020	0.002-0.008
Al（可溶酸 min）	Nb max.	V max	Ti max	Nb+V+Ti max
0.015	0.02	0.10	0.02	0.12

Cu max.	Cr max	Ni max	Mo max	其他 max
0.1	0.1	0.1	0.02	0.02（各項）

.3 對耐腐蝕鋼材的各項試驗須進行 21、49、77 和 98 天。對常規鋼材的試驗須進行 98 天。對焊縫的試驗須進行 98 天。

.4 每個試驗期須有五份試樣。

.5 每個試樣的尺寸是 25±1 mm × 60±1 mm × 5±0.5 mm。試樣的表面須用 600 號金剛砂紙拋光。焊縫試樣的尺寸是 25±1 mm × 60±1 mm × 5±0.5 mm，其中包括 15±5 mm 寬的焊接金屬部分。

.6 為避免影響試驗結果，試樣上除試驗表面外的其他表面須進行腐蝕環境防護。

.7 試驗設備由一個雙層倉構成，外倉溫度可以控制。

.8 試驗周期中使用蒸餾水和模擬貨油艙氣體（4±1%的 O_2-13±2% 的 CO_2-100±10 ppm 的 SO_2-500±50 ppm 的 H_2S-83±2%的 N_2），模擬上甲板的條件。試樣表面和蒸餾水之間要保持足夠的距離，避免蒸餾水濺潑。最低氣體流率為：開頭 24 小時內，每分鐘 100 cc，24 小時之後，每分鐘 20 cc。

.9 試樣須在 50±2°C 加熱 19±2 小時，在 25±2°C 加熱 3±2 小時，過渡時間至少為 1 小時。一個周期的時間為 24 小時。蒸餾水的溫度保持在不高於 36°C，試樣的溫度為 50°C。

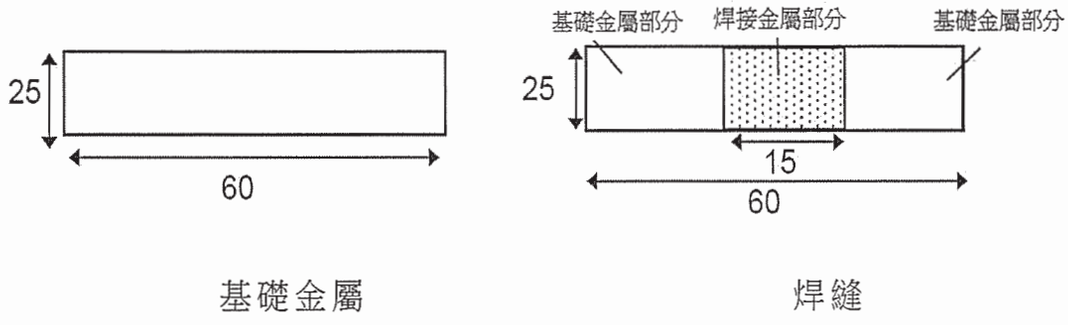


圖 1 － 本試驗試樣

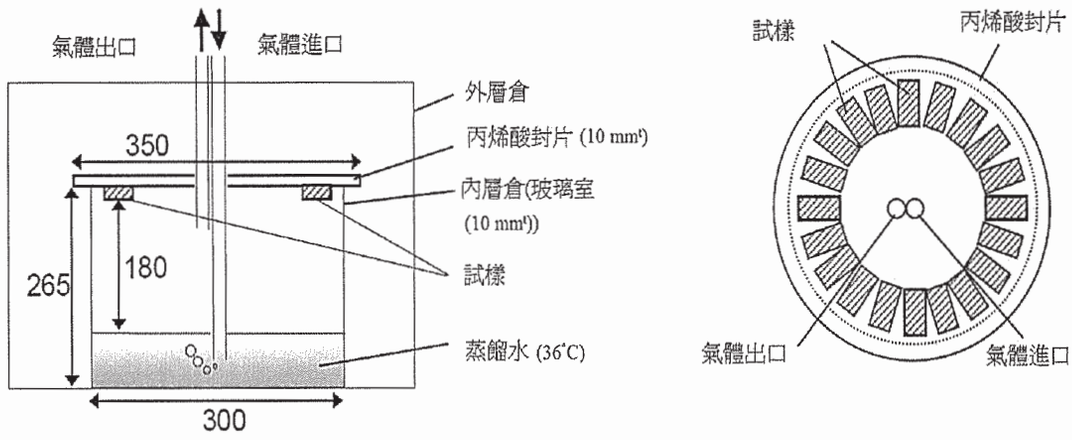


圖 2 － 上甲板模擬腐蝕試驗設備舉例

2.1.2 *基礎金屬試驗結果*

試驗前，須報告下列測得數據：

.1 試樣的尺寸和重量；

試驗後，須報告下列測得數據：

.2 常規鋼材（W_C）和耐腐蝕鋼材（W_{21}、W_{49}、W_{77}和 W_{98}）的重量損失（初始重量和試驗後重量之差）；

.3 常規鋼材（CL_C）和耐腐蝕鋼材（CL_{21}、CL_{49}、CL_{77}和 CL_{98}）的腐蝕損耗，按照下列公式計算：

$$CL_C(mm) = \frac{10 \times W_C}{S \times D}$$

$$CL_{21}(mm) = \frac{10 \times W_{21}}{S \times D}$$

$$CL_{49}(mm) = \frac{10 \times W_{49}}{S \times D}$$

$$CL_{77}(mm) = \frac{10 \times W_{77}}{S \times D}$$

$$CL_{98}(mm) = \frac{10 \times W_{98}}{S \times D}$$

式中：

W_C：常規鋼材（g）（五個試樣的平均）重量損失

W_{21}：耐腐蝕鋼材經過 21 天後的（g）（五個試樣的平均）重量損失

W_{49}：耐腐蝕鋼材經過 49 天後的（g）（五個試樣的平均）重量損失

W_{77}：耐腐蝕鋼材經過 77 天後的（g）（五個試樣的平均）重量損失

W_{98}：耐腐蝕鋼材經過 98 天後的（g）（五個試樣的平均）重量損失

S：表面面積（cm^2）

D：密度（g/cm^3）

如 CL_C 在 0.05 和 0.11（腐蝕率在 0.2 和 0.4 mm/年）之間，試驗應被視為正當完成。模擬貨油艙氣體中的 H_2S 可以為調整 CLC 而增加濃度；

.4 耐腐蝕鋼材的系數 A 和 B 用最小平方法根據 21、49、77 和 98 天的試驗結果計算出。

耐腐蝕鋼材的腐蝕損耗描述如下：

$$CL = A \times t^B$$

A（mm）和 B：系數

t： 試驗期（天）；

.5 25 年後的估計腐蝕損耗（ECL）按下列公式計算：

$$ECL（\text{mm}） = A \times （25 \times 365）^B.$$

2.1.3 *焊縫試驗結果*

基礎金屬和焊接金屬之間的表面邊界須使用顯微鏡放大 1,000 倍進行觀測。

2.1.4 *接受標準*

基於第 2.1.2 和 2.1.3 段規定的試驗結果須滿足下列標準：

.1 （對於基礎金屬）$ECL（mm）\leq 2$；及

.2 （對於焊縫）基礎金屬和焊接金屬之間沒有不連貫表面（如階梯狀）。

2.1.5 *試驗報告*

試驗報告須包括下列信息：

.1 生產商名稱；

.2 試驗日期；

.3 鋼材的化學成分和耐腐蝕的過程；

.4 按照第 2.1.2 和 2.1.3 段試驗的結果；及

.5 按照第 2.1.4 段作出的判定。

2.2 內底狀況模擬試驗

2.2.1 *試驗條件*

貨油艙（COT）內底狀況模擬試驗應滿足下列各項條件：

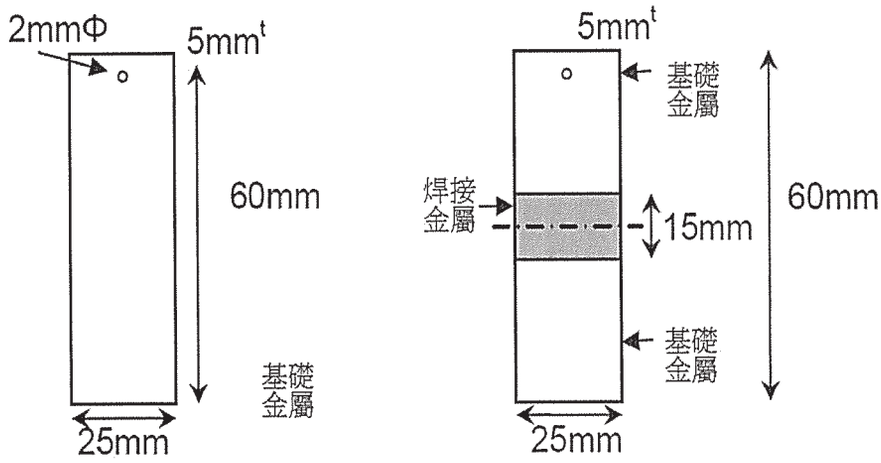
.1 基礎金屬試驗須進行 72 小時，焊縫試驗須進行 168 小時。

.2 基礎金屬和焊縫至少各有五個式樣。為了比較，至少五個常規鋼材式樣應在相同條件下進行試驗。

.3 每個僅為基礎金屬試樣的尺寸是 25±1 mm × 60±1 mm × 5±0.5 mm。帶有焊縫的試樣的尺寸是 25±1 mm × 60±1 mm × 5±0.5 mm，其中包括 15±5 mm 寬的焊接金屬部分如圖 3 所示。試樣的表面除懸吊孔之外須用 600 號金剛砂紙拋光。

.4 為避免裂隙狀和/（或）局部腐蝕，試樣用漁線（尼龍製，直徑 0.3 至 0.4 mm）懸吊於溶液之中。腐蝕試驗佈置範例見圖 4。

.5 試驗溶液含有為質量 10%的 NaCl，pH 值為 0.85，用 HCl 溶液調整。試驗溶液應每隔 24 小時更新一次，以盡力減少試驗溶液 pH 值變化。溶液容量大於 20 cc/cm^2（試樣表面面積）。試驗溶液溫度保持在 30±2°C。



基礎金屬　　焊縫

圖 3 － 本試驗的試樣

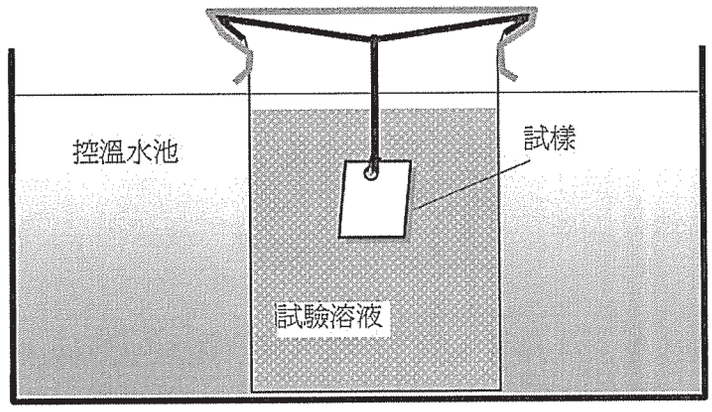


圖 4 － 內底模擬腐蝕試驗設備

2.2.2 *基礎金屬試驗結果*

試驗前須報告下列測得數據：

.1 試樣的尺寸和重量；

試驗後，須報告下列測得數據：

.2 重量損失（初始重量和試驗後重量之差）；

.3 按照下列公式計算出的腐蝕率（*C.R.*）：

$$C.R.(mm/年) = \frac{365(天)\times 24(小時)\times W\times 10}{S\times 72(小時)\times D}$$

式中：

W：重量損失（g），S：表面面積（cm^2），D：密度（g/cm^3）；

.4 為識別帶有裂隙狀和（或）局部腐蝕的試樣，將腐蝕率標繪在正常分佈統計圖上。偏離正常統計分佈的腐蝕率數據必須從試驗結果中排除。參見圖 5 中的舉例。

.5 計算平均腐蝕率數據（$C.R._{ave}$）：

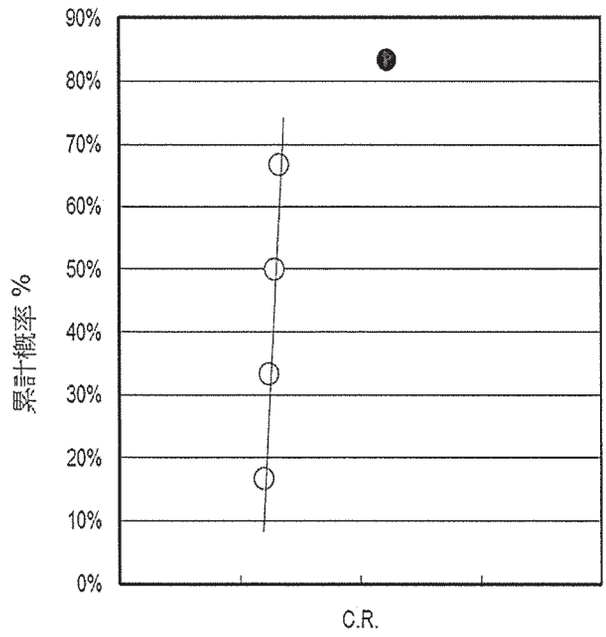


圖 5 — 將腐蝕率標繪在正常分佈圖上舉例

（例中的腐蝕率數據應放棄並排除。）

2.2.3 *焊縫試驗結果*

基礎金屬和焊接金屬之間的表面邊界須使用顯微鏡放大 1,000 倍進行觀測。

2.2.4 *接受標準*

基於第 2.2.2 和 2.2.3 段的試驗結果須滿足下列標準：

.1 （對於基礎金屬）$C.R._{ave}$（*mm/年*）≤1.0；及

.2 （對於焊縫）基礎金屬和焊接金屬之間沒有不連貫表面（如階梯狀）。

2.2.5 *試驗報告*

試驗報告須包括下列信息：

.1 生產商名稱；

.2 試驗日期；

.3 鋼材的化學成分和耐腐蝕的過程；

.4 按照第 2.2.2 和 2.2.3 段試驗的結果；及

.5 按照第 2.2.4 段作出的判定。

RESOLUTION MSC.289(87)
(adopted on 14 May 2010)

PERFORMANCE STANDARD FOR ALTERNATIVE MEANS OF CORROSION PROTECTION FOR CARGO OIL TANKS OF CRUDE OIL TANKERS

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

NOTING regulation II-1/3-11 of the International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended (hereinafter referred to as "the Convention") adopted by resolution MSC.291(87), concerning alternative means of corrosion protection for cargo oil tanks of crude oil tankers,

NOTING ALSO that the aforementioned regulation II-1/3-11 provides that the alternative means of corrosion protection referred to therein shall comply with the requirements of the Performance standard for alternative means of corrosion protection for cargo oil tanks of crude oil tankers (hereinafter referred to as "the Performance standard for alternative means of corrosion protection"),

HAVING CONSIDERED, at its eighty-seventh session, the text of the proposed Performance standard for alternative means of corrosion protection,

1. ADOPTS the Performance standard for alternative means of corrosion protection for cargo oil tanks of crude oil tankers, the text of which is set out in the Annex to the present resolution;

2. INVITES Contracting Governments to the Convention to note that the Performance standard for alternative means of corrosion protection will take effect on 1 January 2012 upon entry into force of SOLAS regulation II-1/3-11;

3. NOTES that, under the provisions of SOLAS regulation II-1/3-11.3.2, amendments to the Performance standard for alternative means of corrosion protection shall be adopted, brought into force and take effect in accordance with the provisions of article VIII of that Convention concerning the amendment procedure applicable to the annex to the Convention other than chapter I;

4. REQUESTS the Secretary-General to transmit certified copies of this resolution and the text of the Performance standard for protective coatings contained in the Annex to all Contracting Governments to the Convention;

5. FURTHER REQUESTS the Secretary-General to transmit copies of this resolution and the Annex to all Members of the Organization which are not Contracting Governments to the Convention;

6. INVITES Governments to encourage the development of novel technologies aimed at providing for alternative systems and to keep the Organization advised of any positive results;

7. RESOLVES to keep the Performance standard for alternative means of corrosion protection under review and amend it as necessary, in light of experience gained in its application.

ANNEX

PERFORMANCE STANDARD FOR ALTERNATIVE MEANS OF CORROSION PROTECTION FOR CARGO OIL TANKS OF CRUDE OIL TANKERS

1 PURPOSE

This Standard provides technical requirements for the minimum standard for means of corrosion protection or utilization of corrosion resistant material other than protective coating to be used for cargo oil tanks during construction of crude oil tankers.

2 DEFINITION

2.1 *Alternative means* is a means that is not a utilization of protective coating applied according to the Performance standard for protective coatings for cargo oil tanks of crude oil tankers (resolution MSC.288(87)).

2.2 *Corrosion resistant steel* is steel the corrosion resistance performance of which in the bottom or top of the internal cargo oil tank is tested and approved to satisfy the requirements in this Standard in addition to other relevant requirements for ship material, structure strength and construction.

2.3 *Target useful life* is the target value, in years, of the durability for which the means of corrosion protection or utilization of corrosion resistant material is designed.

3 APPLICATION

3.1 As of the date of the development of this Standard, corrosion resistant steel is the only recognized possible means for corrosion protection or utilization of corrosion resistant material to maintain the required structural integrity for 25 years, as an alternative to protective coating. If corrosion resistant steel is to be used as alternative means, it shall comply with the Performance Standard for corrosion resistant steel as set out in the annex.

3.2 When a novel type of alternative means to which the provisions in the annex are not applicable has been developed, and recognized by the Organization, a specific performance standard including testing procedure(s) should be developed by the Organization by adding a new annex to this Standard, taking into account experience gained through field tests for the novel prototype alternative conducted in accordance with SOLAS regulation II-1/3-11.4.

ANNEX

PERFORMANCE STANDARD FOR CORROSION RESISTANT STEEL

1 PURPOSE

This Standard provides technical requirements for the minimum standard for corrosion resistant steel to be used for cargo oil tanks during construction of crude oil tankers.

2 GENERAL PRINCIPLES

2.1 The ability of corrosion resistant steel to reach its target useful life depends on the type of steel, application and survey. all these aspects contribute to the good performance of corrosion resistant steel.

2.2 Technical File

2.2.1 Documents and information stipulated in 2.2.3 and 2.2.4 shall be documented in the Technical File. The Technical File shall be verified by the Administration.

2.2.2 The Technical File shall be kept on board and maintained throughout the life of the ship.

2.2.3 ***New construction stage***

The Technical File shall contain at least the following items relating to this Standard and shall be delivered by the shipyard at new ship construction stage:

.1 copy of a Type Approval Certificate;

.2 technical data, including:

.2.1 approved welding methods and welding consumables; and

.2.2 repairing methods recommended by the manufacturer (if any); and

.3 records of the application, including:

.3.1 applied actual space and area of each compartment; and

.3.2 applied product and its thickness.

2.2.4 ***In-service maintenance, repair and partial renewal***

In-service maintenance, repair and renewal activities shall be recorded in the Technical File.

3 CORROSION RESISTANT STEEL STANDARD

3.1 Performance standard

This Standard is based on specifications and requirements which intend to provide a target useful life of 25 years, which is considered to be the time period, from initial application, over which the thickness diminution of the steel is intended to be less than the diminution allowance and watertight integrity is intended to be maintained in cargo oil tanks. The actual useful life will vary, depending on numerous variables, including actual conditions encountered in service.

3.2 Standard application

Corrosion resistant steel for cargo oil tanks applied to the area specified in 3.4 during the construction of crude oil tankers shall at least comply with the requirements in this Standard and this should be considered as a minimum.

3.3 Special application

3.3.1 This Standard covers corrosion resistant steel requirements for ships' steel structures. It is noted that other independent items are fitted within the tanks to which measures are applied to provide protection against corrosion.

3.3.2 It is recommended that this Standard or the Performance standard for protective coatings for cargo oil tanks of crude oil tankers is applied, to the extent possible, to those portions of permanent means of access provided for inspection within the area specified in 3.4 that are not integral to the ship's structure, such as rails, independent platforms, ladders, etc. Other equivalent methods of providing corrosion protection for the non-integral items may also be used, provided they do not impair the performance of the corrosion resistant steel of the surrounding structure. Access arrangements that are integral to the ship structure, such as increased stiffener depths for walkways, stringers, etc., are to fully comply with this Standard or the Performance standard for protective coatings for cargo oil tanks of crude oil tankers, when located within the areas specified in 3.4.

3.3.3 It is also recommended that supports for piping, measuring devices, etc., be provided with corrosion protection in accordance with the non-integral items indicated in 3.3.2.

3.4 Area of application

The following areas are the minimum areas that shall be protected according to this Standard:

.1 Deckhead with complete internal structure, including brackets connecting to longitudinal and transverse bulkheads. In tanks with ring frame girder construction the underdeck transverse framing to be protected down to level of the first tripping bracket below the upper faceplate.

.2 Longitudinal and transverse bulkheads to be protected to the uppermost means of access level. The uppermost means of access and its supporting brackets to be fully protected.

.3 On cargo tank bulkheads without an uppermost means of access the protection to extend to 10% of the tanks height at centreline but need not extend more than 3 m down from the deck.

.4 Flat inner bottom and all structure to height of 0.3 m above inner bottom to be protected.

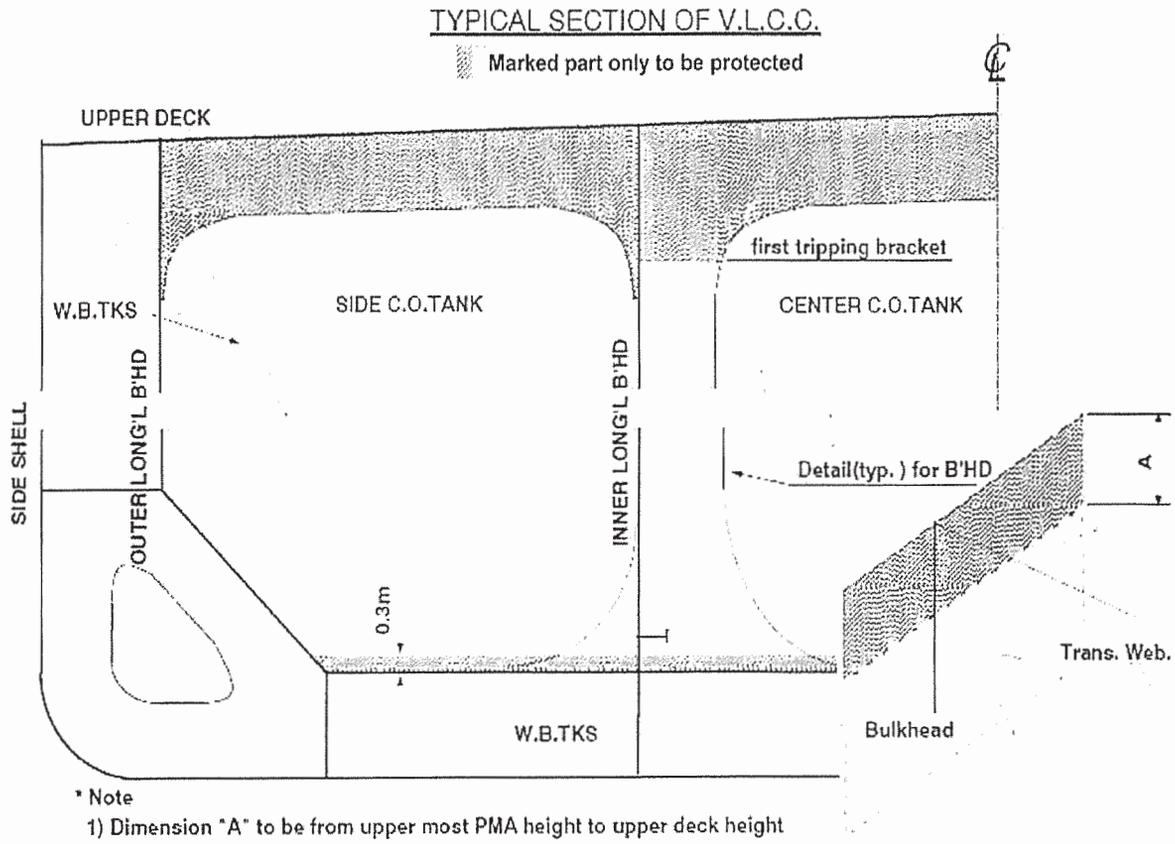


Figure 1

3.5 Basic requirements

The requirements for corrosion resistant steel to be applied at ship construction for cargo tanks in crude oil tankers meeting the performance standard specified in 3.1 are to use approved corrosion resistant steels according to the conditions specified in the Type Approval Certificate and the Technical File to protect the area of application indicated in 3.4.

4 APPROVAL

4.1 Corrosion resistant steel shall be tested according to the appendix, or equivalent, for approval. Corrosion resistant steel tested prior to entry into force of this Standard may be accepted, provided that the steel is tested according to the test procedure in the appendix, or equivalent.

4.2 Results from prequalification tests (4.1) of corrosion resistant steel shall be documented, and a Type Approval Certificate shall be issued if found satisfactory by the Administration.

4.3 The Type Approval Certificate shall include the following information:

.1 product name and identification mark and/or number;

.2 materials, components and corrosion resistance process of the steel;

.3 steel thickness;

.4 welding methods and welding consumables; and

.5 applicable area (upper and/or inner bottom plate).

5 INSPECTION AND VERIFICATION REQUIREMENTS

To ensure compliance with this Standard, the Administration shall carry out survey(s) during the construction process and verify that approved corrosion resistant steel has been applied to the area required.

APPENDIX

TEST PROCEDURES FOR QUALIFICATION OF CORROSION RESISTANT STEEL FOR CARGO TANKS IN CRUDE OIL TANKERS

1 Scope

These Procedures provide details of the test procedure referred to in 4.1 of this Standard.

2 Testing

Corrosion resistant steel shall be verified by the following tests.

2.1 *Test on simulated upper deck conditions*

2.1.1 *Test condition*

Tests on simulated upper deck conditions in cargo oil tank (COT) shall satisfy each of the following conditions:

.1 Corrosion resistant steel and conventional steel shall be tested at the same time.

.2 The chemical composition of conventional steel shall comply with the requirements of table 1. The mechanical properties of the test specimen should be representative of steel used in its intended shipboard application.

Table 1 – Chemical composition for conventional steel (%)

C	Mn	Si	P	S
0.13-0.17	1.00-1.20	0.15-0.35	0.010-0.020	0.002-0.008
Al(acid soluble min)	Nb max.	V max	Ti max	Nb+V+Ti max.
0.015	0.02	0.10	0.02	0.12
Cu max.	Cr max.	Ni max.	Mo max.	Others max.
0.1	0.1	0.1	0.02	0.02 (each)

.3 The tests for corrosion resistant steel shall be carried out for 21, 49, 77 and 98 days. The tests for conventional steel shall be carried out for 98 days. The tests for welded joints shall be carried out for 98 days.

.4 There are to be five test pieces for each test period.

.5 The size of each test piece is 25 ± 1 mm x 60 ± 1 mm x 5 ± 0.5 mm. The surface of the test piece shall be polished with an emery paper #600. The size of the test piece for a welded joint is 25 ± 1 mm x 60 ± 1 mm x 5 ± 0.5 mm, including 15 ± 5 mm width of the weld metal part.

.6 The surface of the test piece, except for the tested surface, shall be protected from corrosive environment in order not to affect the test results.

.7 The test apparatus consists of a double chamber, and the temperature of the outer chamber is to be controlled.

.8 Simulating the condition of the actual upper deck, the test cycle runs with distilled water and simulated COT gas (4 ± 1% O_2 - 13 ± 2% CO_2 - 100 ± 10 ppm SO_2 - 500 ± 50 ppm H_2S - 83 ± 2% N_2). A sufficient distance between the surface of the test piece and the distilled water is to be kept to avoid splashing of distilled water. The minimum gas flow rate is 100 cc per minute for the first 24 h and 20 cc per minute after 24 h.

.9 The test pieces shall be heated for 19 ± 2 h at 50 ± 2°C and 3 ± 2 h at 25 ± 2°C and the transition time is to be at least 1 h. The time for 1 cycle is 24 h. The temperature of the distilled water is to be kept at not higher than 36°C, while the temperature of the test pieces is 50°C.

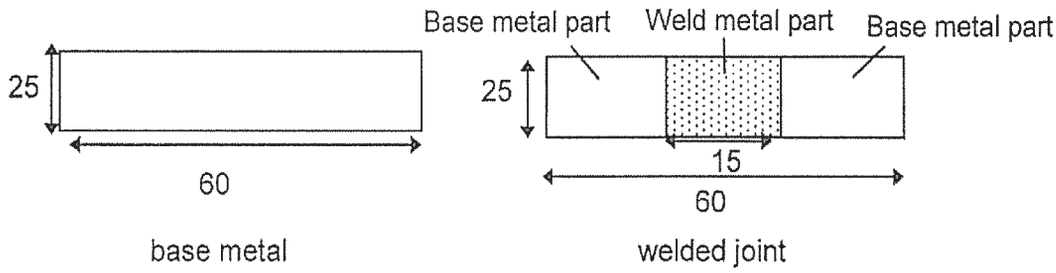


Figure 1 –Test piece of this test

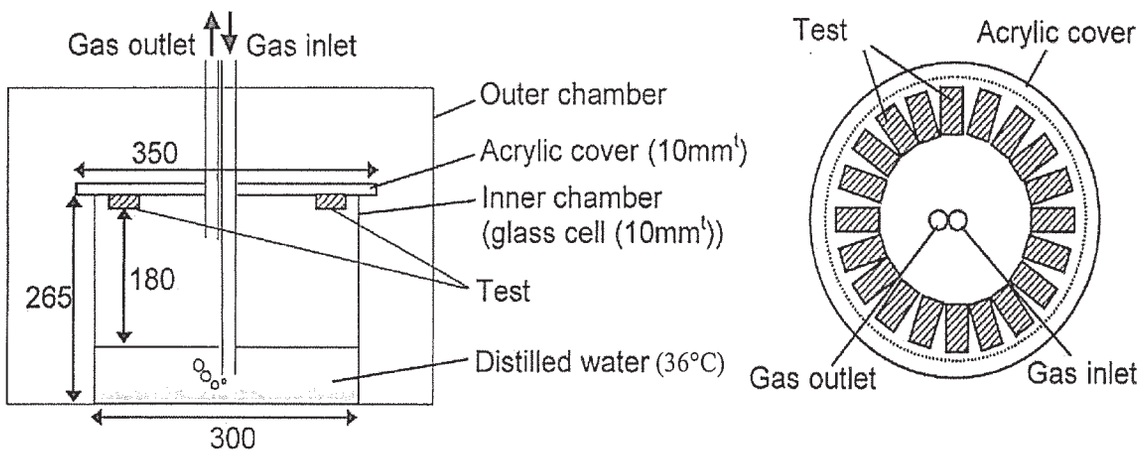


Figure 2 – An example of simulated corrosion test apparatus for upper deck

2.1.2 *Test results of base metal*

Prior to the testing, the following measured data shall be reported:

.1 size and weight of the test piece;

and, after the testing, the following measured data shall be reported:

.2 weight loss (difference between initial weight and weight after testing) of conventional steel (W_C) and corrosion resistant steel (W_{21}, W_{49}, W_{77} and W_{98});

.3 corrosion loss of conventional steel (CL_C) and corrosion resistant steel (CL_{21}, CL_{49}, CL_{77} and CL_{98}), calculated by the following formulae:

$$CL_C(mm) = \frac{10 \times W_C}{S \times D}$$

$$CL_{21}(mm) = \frac{10 \times W_{21}}{S \times D}$$

$$CL_{49}(mm) = \frac{10 \times W_{49}}{S \times D}$$

$$CL_{77}(mm) = \frac{10 \times W_{77}}{S \times D}$$

$$CL_{98}(mm) = \frac{10 \times W_{98}}{S \times D}$$

whereby:

W_C: weight loss of conventional steel (g) (average of five test pieces)

W_{21}: weight loss of corrosion resistant steel after 21 days (g) (average of five test pieces)

W_{49}: weight loss of corrosion resistant steel after 49 days (g) (average of five test pieces)

W_{77}: weight loss of corrosion resistant steel after 77 days (g) (average of five test pieces)

W_{98}: weight loss of corrosion resistant steel after 98 days (g) (average of five test pieces)

S: surface area (cm^2)

D: density (g/cm^3).

The test is considered to be carried out appropriately if CL_C is between 0.05 and 0.11 (corrosion rate is between 0.2 and 0.4 mm/year). The concentration of H_2S in simulated COT gas may be increased for adjusting CLC;

.4 coefficients A and B of corrosion resistant steel, calculated from the test results for 21, 49, 77 and 98 days by least square method.

Corrosion loss of corrosion resistant steel is described as follows:

$$CL = A \times t^B$$

A(mm) and B: coefficient
t: test period(days);

.5 estimated corrosion loss after 25 years (ECL) calculated by the following formula:

$$ECL(\text{mm}) = A \times (25 \times 365)^{B}.$$

2.1.3 *Test results of welded joint*

The surface boundary between base metal and weld metal shall be observed by microscope at 1,000 times magnification.

2.1.4 *Acceptance criteria*

The test results based on provisions of 2.1.2 and 2.1.3 shall satisfy the following criteria:

.1 $ECL(mm) \leq 2$ (for base metal); and

.2 no discontinuous surface (e.g., step) between the base metal and weld metal (for welded joint).

2.1.5 *Test report*

The test report shall include the following information:

.1 name of the manufacturer;

.2 date of tests;

.3 chemical composition and corrosion resistant process of steel;

.4 test results according to 2.1.2 and 2.1.3; and

.5 judgement according to 2.1.4.

2.2 *Test on simulated inner bottom conditions*

2.2.1 *Test condition*

Tests on simulated inner bottom conditions in cargo oil tanks (COT) should satisfy each of the following conditions:

.1 The test shall be carried out for 72 h for base metal, and 168 h for welded joint.

.2 There are to be at least five test pieces of corrosion resistant steel for base metal and welded joint, respectively. For comparison, at least five test pieces of base metal of conventional steel should be tested in the same condition.

.3 The size of each test piece is 25 ± 1 mm x 60 ± 1 mm x 5 ± 0.5 mm for a specimen with base metal only, and is 25 ± 1 mm x 60 ± 1 mm x 5 ± 0.5 mm for a specimen with welded joint including 15 ± 5 mm width of weld metal part as shown in figure 3. The surface of the test pieces shall be polished with an emery paper #600, except a hole for hanging.

.4 The samples are hung in a solution from a fishing line (0.3 mm to 0.4 mm in diameter, made of nylon) to avoid crevice-like and/or localized corrosion. An example of a corrosion test configuration is shown in figure 4.

.5 The test solution contains 10 mass% NaCl and its pH is 0.85 adjusted by HCl solution. The test solution should be changed to a new one every 24 h to minimize pH change of the test solution. The volume of the solution is more than 20 cc/cm^2 (surface area of test piece). The temperature of the test solution is to be kept at 30 ± 2°C.

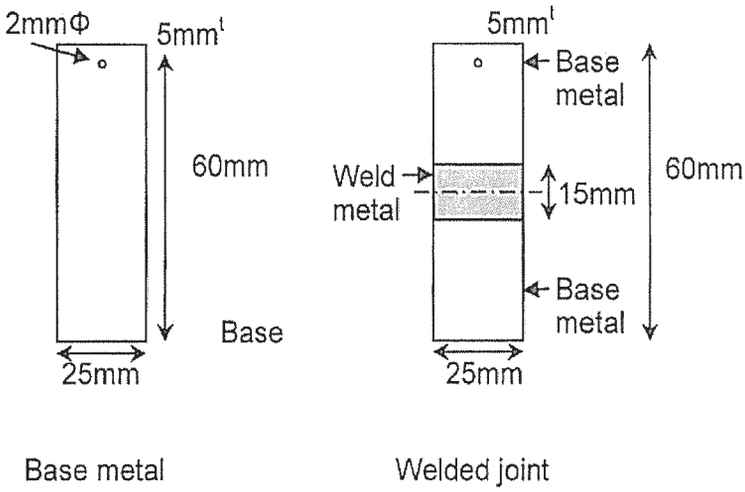


Figure 3 – Test piece for this test

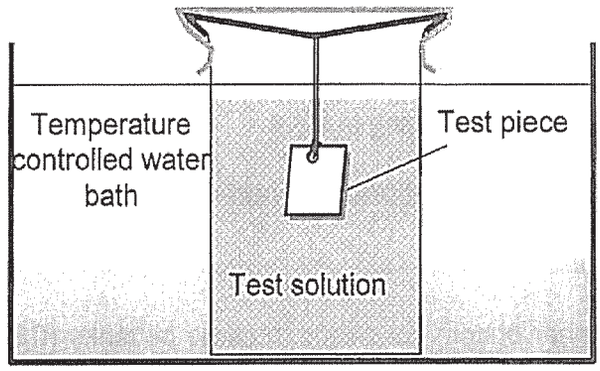


Figure 4 – Simulated corrosion test apparatus for inner bottom

2.2.2 *Test results of base metal*

Prior to the testing, the following data shall be measured and reported:

.1 size and weight of test piece;

and, after the testing, the following measured data shall be reported:

.2 weight loss (difference between initial weight and weight after testing);

.3 corrosion rate (*C.R.*) calculated by the following formula:

$$C.R.(mm/year) = \frac{365(days) \times 24(hours) \times W \times 10}{S \times 72(hours) \times D}$$

whereby:

W: weight loss(g), *S*: surface area(cm^2), *D*: density(g/cm^3);

.4 to identify specimen which hold crevice and/or localized corrosion, the C.R. is to be plotted on a normal distribution statistic chart. C.R. data which deviate from the normal statistical distribution must be eliminated from the test results. An example is shown in figure 5 for reference;

.5 calculation of average of *C.R.*'s data ($C.R._{ave}$):

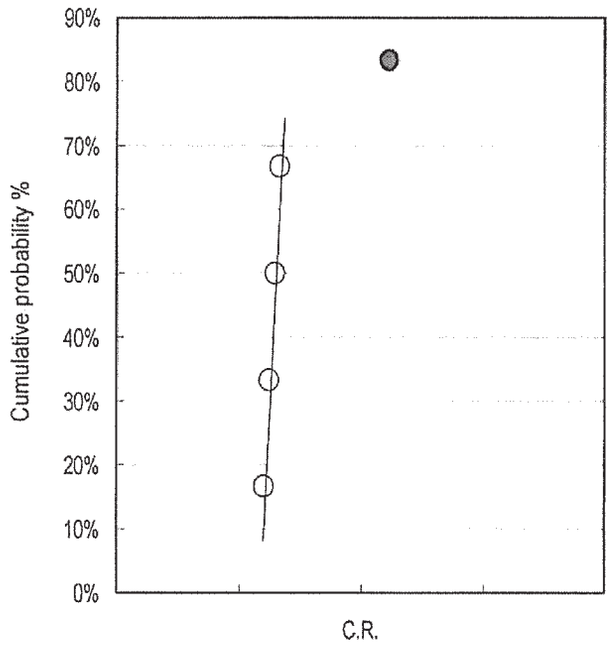


Figure 5 – An example of plot of C.R.s on a normal distribution chart (In this case C.R. data ● should be abandoned and eliminated.)

2.2.3 *Test results of welded joint*

The surface boundary between base metal and weld metal shall be observed by microscope at 1,000 times magnification.

2.2.4 *Acceptance criterion*

The test results based on sections 2.2.2 and 2.2.3 shall satisfy the following criteria:

.1 $C.R._{ave}(mm/year) \leq 1.0$ (for base metal); and

.2 no discontinuous surface (e.g., step) between the base metal and weld metal (for welded joint).

2.2.5 *Test report*

The test report shall include the following information:

.1 name of the manufacturer;

.2 date of tests;

.3 chemical composition and corrosion resistant process of steel;

.4 test results according to 2.2.2 and 2.2.3; and

.5 judgement according to 2.2.4.

第 39/2015 號行政長官公告

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

國際海事組織海上安全委員會於二零零六年十二月八日透過第MSC.222（82）號決議通過了《2000年國際高速船安全規則》（2000年HSC規則）的修正案，該修正案自二零零八年七月一日起適用於澳門特別行政區；

基於此，行政長官根據澳門特別行政區第3/1999號法律第六條第一款的規定，命令公佈包含上指修正案的第MSC.222（82）號決議的中文及英文文本。

二零一五年四月二十一日發佈。

行政長官　崔世安

Aviso do Chefe do Executivo n.º 39/2015

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

Considerando igualmente que, em 8 de Dezembro de 2006, o Comité de Segurança Marítima da Organização Marítima Internacional, através da resolução MSC.222(82), adoptou as emendas ao Código Internacional de Segurança para as Embarcações de Alta Velocidade, 2000 (Código HSC 2000), e que tais emendas são aplicáveis na Região Administrativa Especial de Macau desde 1 de Julho de 2008;

O Chefe do Executivo manda publicar, nos termos do n.º 1 do artigo 6.º da Lei n.º 3/1999 da Região Administrativa Especial de Macau, a resolução MSC. 222(82), que contém as referidas emendas, nos seus textos em línguas chinesa e inglesa.

Promulgado em 21 de Abril de 2015.

O Chefe do Executivo, *Chui Sai On*.

第 MSC.222（82）號決議

（2006 年 12 月 8 日通過）

《2000 年國際高速船安全規則》（2000 年 HSC 規則）的修正案

海上安全委員會，

憶及《國際海事組織公約》關於本委員會職能的第 28（b）條，

注意到海上安全委員會以第 MSC.97（73）號決議通過了《2000 年國際高速船安全規則》（以下簡稱《2000 HSC 規則》），該規則已通過 1974 年國際海上人命安全公約（SOLAS）（以下簡稱為《公約》）第 X 章成為強制性規定，

還注意到《公約》關於《2000 HSC 規則》修正程序的第 VIII（b）條和第 X/1.2 條，

考慮到本委員會在其 82 次會議上審議了建議的並按照《公約》第 VIII（b）（i）條散發的對《2000 HSC 規則》的修正案，

1. **通過**，根據《公約》第 VIII（b）（iv）條，對《2000 年國際高速船安全規則》的修正案，該修正案正文見本決議附件；

2. **決定**，根據《公約》第 VIII（b）（iv）（2）（bb）條，該修正案將於 2008 年 1 月 1 日被認為已被接受，除非在此日期之前，超過三分之一的《公約》締約政府，或其商船隊總噸位之和不低於世界商船隊總噸位 50%的締約政府提出反對本修正案；

3. **請**各締約政府注意，根據《公約》第 VIII（b）（vii）（2）條，在各締約政府按照上述第 2 款接受修正案後，修正案將於 2008 年 7 月 1 日生效；

4. **請求**秘書長，按照《公約》第 VIII（b）（v）條，將證明無誤的本決議及其附件包括的修正案文本發送至本公約各締約政府；

5. **進一步請求**秘書長將本決議及其附件文本發送至非《公約》當事國的本組織成員。

附件

《2000 年國際高速船安全規則》（2000 年 HSC 規則）的修正案

第 1 章

綜述和要求

1 將現有 1.2 節文字重新編號為 1.2.1，並新增 1.2.2 段如下：

“1.2.2 在所有高速船上，用於本規則適用的船上新安裝的結構、機械、電氣裝置和設備的材料中禁止使用石棉材料，但下列除外：

.1 葉片式壓縮機和旋轉式葉片真空泵上使用的葉片；

.2 高溫（超過 350℃）或高壓（超過 7 x 10^6 Pa）下有失火、腐蝕或產生毒性危險的液體循環用水密連接件和襯料；和

.3 抗溫超過 1,000℃的柔軟和易彎曲的隔熱裝置。”

2 在 1.3.4.1 段中，“營運航速”替換為“最大航速的 90%”。

3 在 1.3.4.2 段中，“營運航速”替換為“最大航速的 90%”。

4 在 1.4.16 段中，在“航行設備”之後插入“（13.2 至 13.7 段中所述設備的主要顯示裝置和控制裝置）”字樣。

5 在 1.4.29 段中，在“烹飪或”與“加熱裝置”間插入“食品”字樣。

6 將現有 1.4.35 段替換如下：

“1.4.35 *機器處所*：係指設有用於主推進或總輸出功率為 110kW 以上的內燃機、發電機、燃油裝置、主要電機的處所和類似處所，以及通往這些處所的圍壁通道。”

7 將現有 1.4.44 段刪除，並將現有 1.4.32 至 1.4.43 段分別重新編號為 1.4.33 至 1.4.44 段，並插入新的 1.4.32 段如下：

“1.4.32 *IMDG* 規則：係指公約第 VII 章所定義的《國際海運危險貨物規則》。”

8 在 1.4.53 段末尾，插入新的一句如下：

“無烹調設備的此類處所內可以有：

.1 自動咖啡機、烤麵包機、洗碗機、微波爐、開水壺以及類似用具，每一用具的最大功率為 5kW；和

.2 電加熱烹調盤以及食品保溫加熱盤，每一用具的最大功率為 2kW，且表面溫度不得超過 150℃。”

9 在 1.4.54 段中，將“平均值”和後面的內容替換如下：

“在規定的時間內跨零波浪數量中三分之一的最大波高的平均值。”

10 在 1.8.1 段末尾，插入下列文字：

“所有高速船均應隨船攜帶按本章規定簽發的所有證書或其核准的副本。除非船旗國為 1988 SOLAS 議定書的締約國，否則應在船上顯著和易到達處張貼每份此類證書的副本。”

11 在 1.9.1 段中，將第 2 句刪除，並插入新的 1.9.1.1 段如下：

“1.9.1.1 只要是非商業載客或載貨的營運，所有船舶可進行轉航而無需有效的《高速船營運許可證》。就本規定而言，轉航包括船舶交付航行，即從造船廠碼頭航行至基地港口，以及航程改變，即改變基地港和/或航線。超出本規則規定限制的轉航可在符合下列條件下進行：

.1 開航前，船上應具備有效的《高速船安全證書》或類似證明；

.2 為確保船舶安全完成轉航，營運人已制訂了航行安全計劃，包括所有臨時起居安排和 18.1.3 段中所列的相關事項；

.3 已向船長提供了進行安全轉航所必需的資料和信息；和

.4 已進行了為安全轉航所作的佈置，並使主管機關滿意。”

12 在現有 1.9.6 段後新增 1.9.7 段如下：

“1.9.7 在確定將船舶最壞預計工況和營運限制納入《營運許可證》時，主管機關應考慮附件 12 中的所有參數。所設定的限制應確保能符合這些因素。”

13 在 1.15.1 中，將“4 年”改為“6 年”。

第 2 章
浮力，穩性與分艙

14 將現有 2.1.3 段中的.1 小段替換如下：

“.1 *向下進水點*：係指使允許水流通過水密/風雨密結構的任何尺寸的開口（如開敞的窗），但其中不包括那些平時按相關標準保持關閉的水密/風雨密開口，除在應急情況下臨時打開以用於人員出入，或用於移動式艙底潛水泵的工作所需外（如，結構中所設置的與其具有類似強度和風雨密完整性的非開啟窗）。”

15 將現有 2.1.3 段中的.2 至.6 重新編號為.3 至.7，並在.1 小段後插入新的.2 小段如下：

“.2 *其他地方*：如用於圍檻和圍板時，2.2.7 和 2.2.8 段中所述的高度適用於所有位於該基準面或在該基準面以下的風雨密和水密圍閉結構。”

16 插入下列新的 2.1.5 段如下，並將現有 2.1.5 和 2.1.6 段重新編號為 2.1.6 和 2.1.7 段：

“2.1.5 必須首先通過與相關船型的實船試驗或模型試驗聯繫，證明數學模擬的充分性。可使用數學模擬協助設制其後進行的實際試驗中更臨界的情景。”

17 在 2.1.7 段末尾插入下列文字：

“如進行計算，應首先證明這些計算正確代表了船舶營運限制內的動力特性。”

18 將 2.2.9.3 段中的第 3 句及其之後的句子替換如下：

“在無人操縱的機器處所，與機器運行有關的主、輔海水進水孔和排水孔應：

.1 在 2.6.6 至 2.6.10 段規定的破損後，至少位於在最深進水水線以上相當於最壞預計工況時的有義波高 50%的高度；或

.2 可從操縱室進行操縱。”

19 將 2.3.4 段中的表 2.3.4 替換如下：

“表 2.3.4－附件 7 和附件 8 應用於單體船和多體船

GM_T	最大 GZ 角	
	≤25°	>25°
≤3m	附件 7 或附件 8	附件 8
＞3m	附件 7	附件 7 或附件 8

”

20 在 2.3.4 段中，“表中”後出現的 B_{WL}，A_{WP} 和 ∇ 的定義均予刪除，並代之以插入的定義“GZ = 復原力臂”

21 在 2.4.2 段中，將“第 18 章”改為“第 17 和第 18 章”字樣。

22 在 2.6.5 段中，在現有.4 段後插入新的.5 段：

“.5 就本段而言，裝滿泡沫塑料或浮力模件的空艙，或無透氣系統的任何處所，均應視為空艙，條件是此類泡沫塑料或浮力模件完全符合 2.6.4 段的要求。”

23 在 2.6.6 中，將最後一句刪除。

24 在 2.6.7 段中，“破損（複數）”改為“破損（單數）”。

25 在 2.6.7 段的 2.6.7.3 小段後新增下列內容：

“本段所述的破損應假定為平行六面體形狀。當此應用於圖 2.6.7a 時，長度中點處的舯內表面應與對應橫向貫穿範圍（如圖 2.6.7a 所示）的表面相切；否則，應至少可觸及 2 處位置。

舷側破損時，在設計水線處的橫向貫穿長度不得大於 $0.2\nabla^{1/3}$，但如 2.6.7.2 段中規定了更小長度者例外。參見圖 2.6.7b 和 c。

對多體船而言，可認為船舶周圍在任意剖面均僅由最外層的船體外表面圍成的船殼表面。

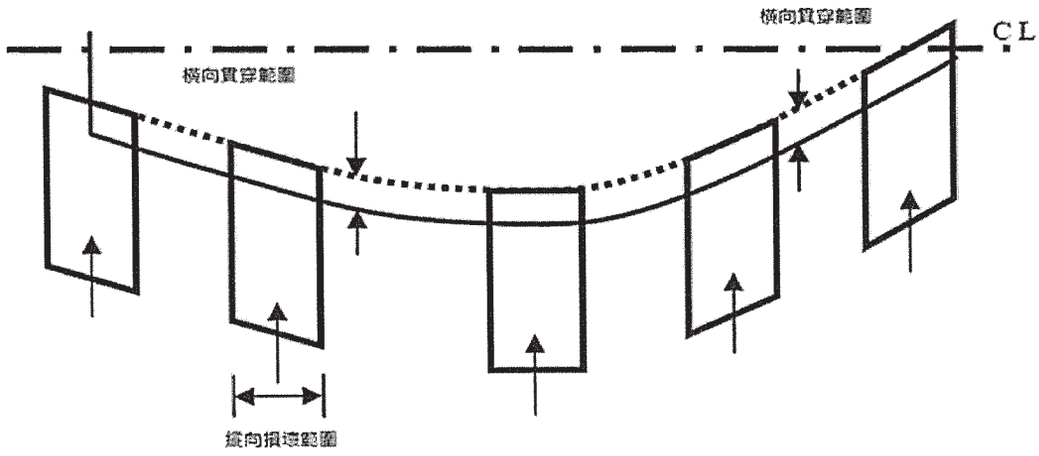


圖 2.6.7a

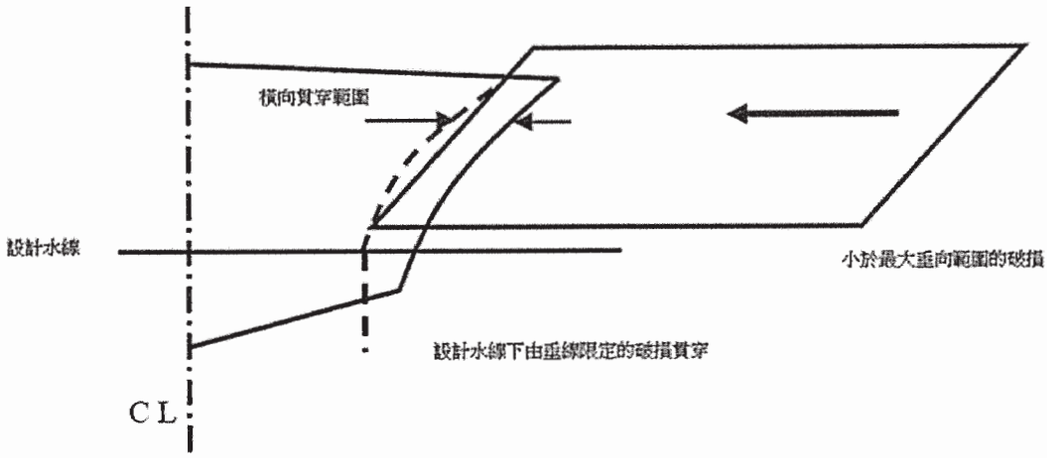


圖 2.6.7b

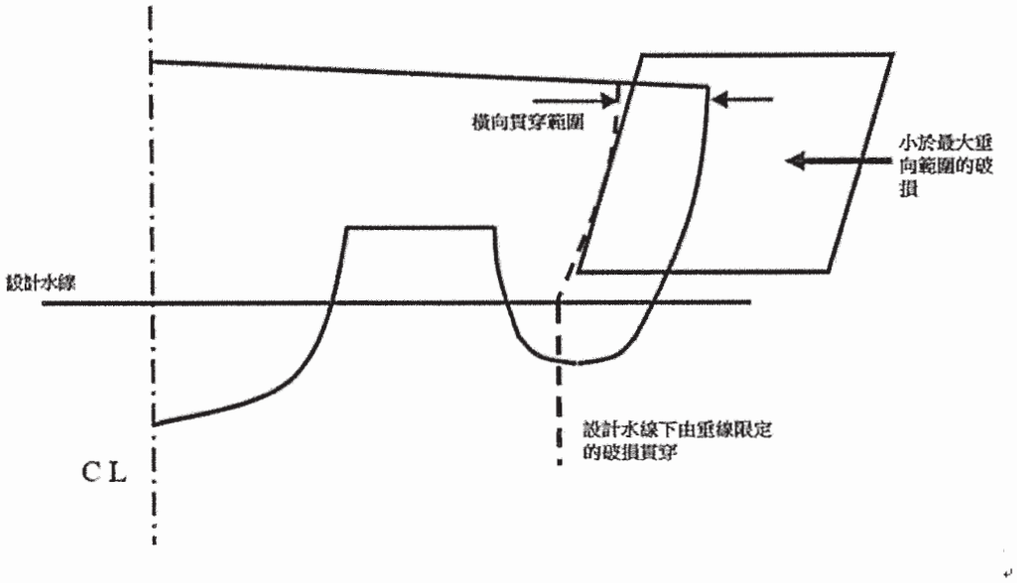


圖 2.6.7c”

26 將現有 2.6.8 至 2.6.12 段重新編號為 2.6.9 至 2.6.13 段，並在現有 2.6.7 段之後插入新的 2.6.8 段如下：

“2.6.8 *艏艉破損範圍*

2.6.8.1 下列破損範圍應適用於艏艉，如圖 2.6.8 所示：

.1 在艏端，對 4.4.1 中定義的區域 A_{bow} 的破損，其後端界限為一橫向垂直平面，條件是該區域從高速船水密包絡的最前端向後延伸不超過 2.6.7.1 段定義的距離；和

.2 在艉端，對橫向垂直平面之後區域的破損，該平面從船體水密包絡的最後端向前的距離為 $0.2\nabla^{1/3}$。

2.6.8.2 2.6.6 段中有關更小範圍破損的規定仍適用此類破損。

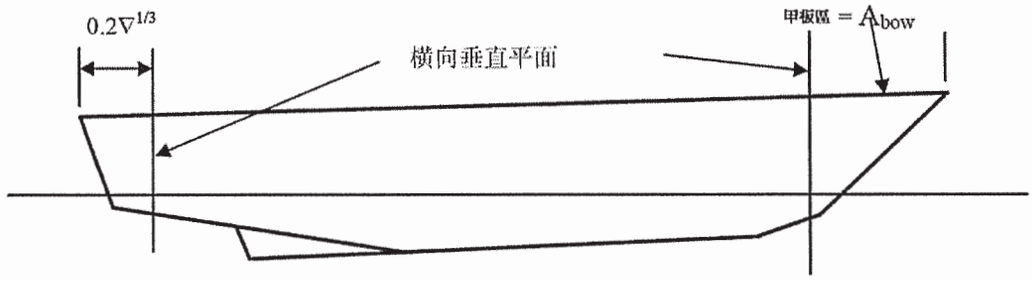


圖 2.6.8”

27 在 2.6.9.1.1.1 段中，將“營運航速”替換為“最大航速的 90%”。

28 在 2.6.9.1.2 段中，在定義“T”末尾插入下列文字：

“，條件是諸如單板尾鰭或完整的金屬附屬體等結構應視為非浮體，並因此排除在外。”

29 在現有 2.6.9.2.2 段之後插入新的 2.6.9.2.3 段如下：

“2.6.9.2.3 橫向平面破損形狀應假定為長方形，如圖 2.6.9.2 所示。應按圖 2.6.9.2 假定破損為在定義的縱向範圍內的一系列剖面；在整個縱向範圍內，破損圍長的中點與中心線距離保持一個固定距離。

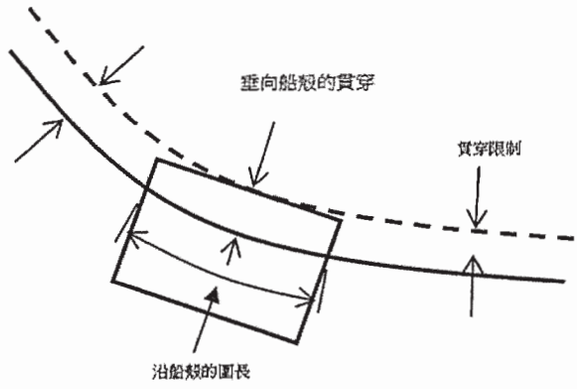


圖 2.6.9.2”

30 在 2.6.10.1 段中，在“船體”後插入“設計水線以下”。

31 在 2.6.10.2 段中的現有.3 小段之後插入新的.4 小段如下：

“.4 位於船殼平面以及橫向平面上的破損形狀均應假定為長方形，如圖 2.6.9.2 所示。”

32 將現有 2.7.2 至 2.7.8 段重新編號為 2.7.3 至 2.7.9 段，並在現有 2.7.1 段之後插入新的 2.7.2 段如下：

“2.7.2 對所有高速船，如因其重心高度（VCG 或 KG）小於橫穩性高度（GM_T）的三分之一，而無法進行精確的傾斜試驗時，主管機關可接受以詳細的計算取代傾斜試驗，對 KG 進行估算。此時，應進行排水量檢查，以確認計算的空船特性（包括 LCG）。如測得的空船排水量和 LCG 分別在估算值的 2%和 1%範圍內，則該空船特性可予接受。”

33 在 2.7.7 段的末尾插入新的句子如下：

“對兩棲氣墊船，可結合甲板基準面板，使用吃水儀確定吃水。”

34 在 2.10 段中，在現有.6 小段之後插入新的.7 至.10 小段如下：

“.7 對假定座位上的乘客，應認為其垂向重心與其坐姿對應，而其他乘客站立。

.8 有集合站的甲板處，每層甲板上的乘客人數應產生最大的橫傾力矩。其餘乘客應假定位於鄰近集合站的甲板處，並假定每層甲板的人數和傾斜力矩的組合產生最大的靜橫傾角。

.9 除非是制訂的撤離程序的必要部分，否則不應假定乘客能到達露天甲板或非正常地聚在高速船的首端或尾端。

.10 如在有乘客的處所內設有座位，應假定每個座位一個乘客；對被安排至甲板其餘區域（如合適，可包括梯道）的乘客，應假定每平方米容納 4 人。”

35 在現有 2.12.2 段之後插入新的 2.12.3 段：

“2.12.3 應通過試驗重量產生相同的橫傾力矩的試驗或模型試驗，驗證按上述 2.10 段或按一個確定的航行橫風壓所估算的乘客橫傾力矩的影響。如安全告示（見 8.4.1 和 18.7 段）特別要求乘客在整個航程中應留在座位上，則可忽略乘客移動對高速船的影響。”

第 4 章

艙室佈置與脫險措施

36 在 4.3.4 段中，將“營運航速的三分之二”改為“最大航速的 60%”。

37 在 4.3.7 段中，將“營運航速”改為“最大航速的 90%”。

38 在 4.4.1 段中，將“營運航速”改為“最大航速的 90%”。

39 在表 4.4.2 中的設計等級 2 項下：

.1 將現有 1.1 段替換如下：

“1.1 帶有保護性變形和填充物的椅子靠背。”；和

.2 在 1.4 段末尾插入“除非按此方向和佈置進行了不繫安全帶的滿意試驗”字樣。

40 在 4.4.5 段末尾插入新的句子如下：

“公共處所內設置的椅子靠手和靠背可作為扶手。”

41 在 4.6.1 段中，將“3g”改為“3”。

42 在 4.7.10 段中，將第 2 句替換如下：

“應設有清晰的標誌，包括防火控制圖位置，以引導船外救助人員實施救助。”

43 在 4.7.12 段的末尾新增如下內容：

“如可能，一個處所內的應急撤離門應位於該處所內的相對兩端。如應急撤離門位於處所的同一端，則這些門之間的距離應大於該處所的最大長度。”

44 在 4.7.13 段的末尾新增如下內容：

“本段要求不適用於過道（座位組隔離區的前後過道）或相鄰兩排座位間的處所。但是，過道寬度和座位坡度應使高速船符合 4.8 段的要求。”

45 將現有 4.7.14 至 4.7.16 段重新編號為 4.7.15 至 4.7.17 段，並插入新的 4.7.14 如下：

“4.7.14 用於存放機動車輛的特種處所應設有通往一個安全脫險通道的走道，走道寬度至少為 600mm。”

46 在 4.7.17 段的末尾增加新句如下：

“機器處所至少一條脫險通道應由一部通往一扇門或艙口（但不應是水平齊面艙口）的梯子組成，或由位於該處所低處的一扇門組成，通過該門通往設有安全脫險通道的鄰近艙室。”

47 在現有 4.7.17 段之後插入新的 4.7.18 段如下：

“4.7.18 對偶爾有船員進入的處所可僅設一個脫險通道，但其應獨立於水密門。”

48 在 4.8.1 段的末尾增加新句如下：

“確定撤離時間時，應認為所有脫險通道是可使用的。同時，也無需考慮脫險通道的尺度，以及因其他一個或多個脫險通道失效或無法使用時而出現的額外人員數。”

49 將現有 4.8.10 和 4.8.11 段重新編號為 4.8.11 和 4.8.12 段，並插入新的 4.8.10 段如下：

“4.8.10 如主管機關對按 4.8.1 至 4.8.9 段確定的撤離時間的精確估算感到滿意，則其可允許人員不通過 MES 或等效撤離裝置進行降落的撤離演示，條件是登上救生艇筏所需的時間可由如下確定：

.1 從設備型式認可試驗中獲得的數據並根據本組織制定的導則確定的因數對其進行增加；或

.2 通過有限人數的試驗推斷出的時間。”

第 6 章
錨泊、拖曳與繫泊

50 在現有 6.1.3 段之後插入新的 6.1.4 段如下：

“6.1.4 任何操作工況下（直至錨鏈或繫纜的破斷強度），繫柱或帶纜樁上的負荷不應對船體造成破壞而使水密完整性受損。應基於相關鋼纜或拖索，規定最小破斷強度負荷，要求至少有 20% 的負荷餘量。”

第 7 章
消防

51 在 7.3.1.2 段中，將第一行破折號後的“1.4.4”改為“1.4.5”。

52 在 7.3.1.3 段中，將第一行破折號後的“1.4.5”改為“1.4.6”。

53 在 7.3.1.4 段中，將“定義見 1.4.15 段”改為“定義見 1.4.16 段”。

54 將現有 7.3.2 段重新編號為 7.3.3 段，並插入新的 7.3.2 如下：

“7.3.2 下列附加標準應適用於 7.3.1 段所述的處所分類：

.1 如部分艙壁將一個處所分為二個（或更多）的較小區域以形成圍閉處所，則按表 7.4-1 和 7.4-2，這些處所須由艙壁和甲板作相應圍閉。但如此類處所的分隔艙壁有 30%以上是開敞時，則可認為這些處所為同一處所。

.2 甲板面積小於 2 平方米的艙室可作為其服務的處所的一部分，但條件是該艙室具有通向該處所的通風開口，且不含可能有失火危險的材料或設備。

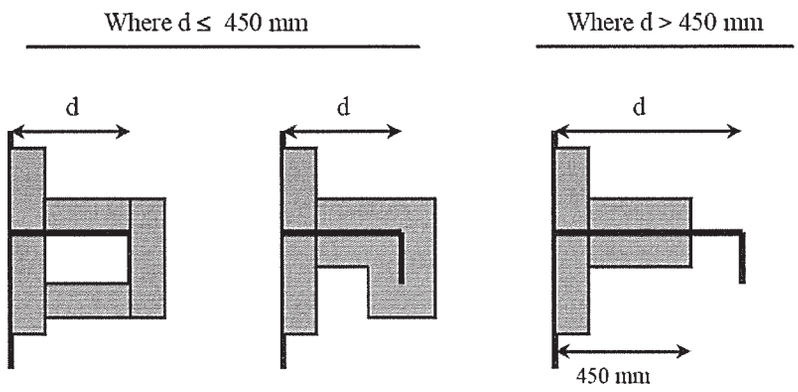
.3 如果一個處所具有 2 個或以上處所的組合特徵，則該分隔的結構防火時間對於相關的處所組合應最長。例如，當應急發電機室所在處所視為控制站（D）和機器處所（A）時，該處所分隔的結構防火時間應取為最高值。”

55 在現有 7.3.3 段後插入新的 7.3.4 至 7.3.6 段，以及相關的圖 7.3.4a、7.3.4b 和 7.3.6 如下：

“7.3.4 為防止在接頭處和終止點發生熱傳遞，對於鋼或鋁合金結構的甲板或艙壁，其隔熱應至少延續至超過接頭處或終止點 450mm 處（見圖 7.3.4a 和 7.3.4b）。

7.3.5 如一個處所由甲板或艙壁分隔，而每一處所的隔熱要求不同時，具有結構防火時間較長的隔熱應在具有結構防火時間較短隔熱的甲板或艙壁上沿處所間邊界以外至少延續 450mm。

7.3.6 如為排水而需在隔熱下部切口，則結構應符合圖 7.3.6 所示的結構細則。”



d = 縱桁扶強材深度

圖 7.3.4a

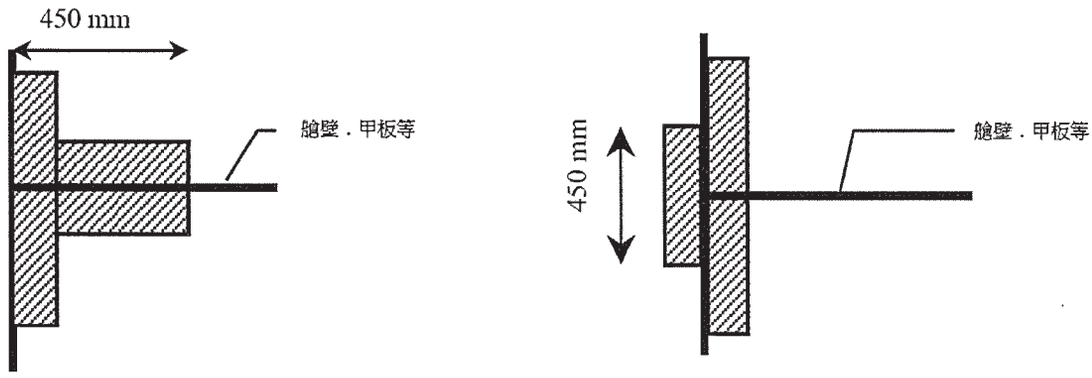


圖7.3.4b

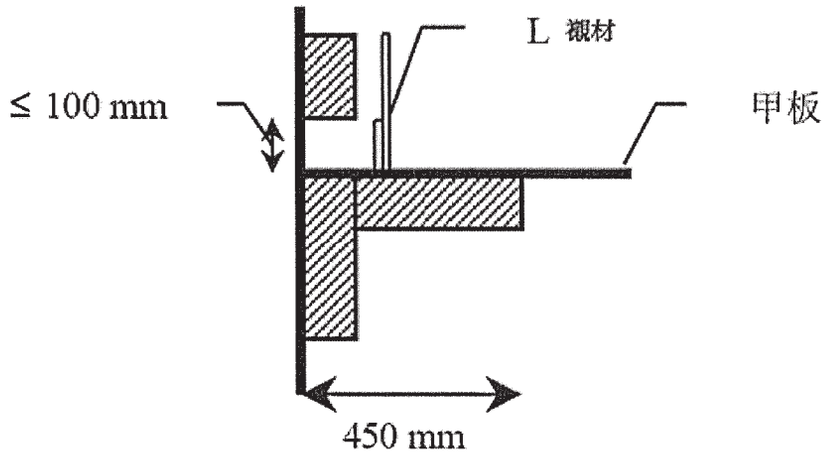


圖 7.3.6 ”

56 在現有 7.4.1.3 段後插入新的 7.4.1.4 段如下：

“7.4.1.4 第 7.4.1.3 段不適用於非高速船主結構的附件，諸如空氣螺旋槳、螺旋槳空氣導管、傳動軸、舵和其他操縱面、支柱、圓材、柔性圍裙等。”

57 在表 7.4-1 和 7.4-2 中，將註 1 替換如下：

“1 對由固定式滅火系統保護的處所內甲板的上一面，不必隔熱。”

58 在 7.4.2.1 段第 2 句中，將“在輕載條件下”改為“在排水狀態的輕載條件下，高速船水線以下至少 300mm”。

59 在 7.4.2.6 段末尾新增下列句子：

“如機器軸貫穿阻火水密分隔，應採取措施確保該分隔所需的水密和阻火完整性不受影響。”

60 在現有 7.4.2.6 段之後插入新的 7.4.2.7 段如下：

“7.4.2.7 進入公共廁所的門上可允許設置通風開口，但開口應位於門的下部，裝有可關閉的不燃材料或阻燃材料製成的格柵，並可從外部進行操作。”

61 在 7.4.3.2 段的末尾新增下列句子：

“此類處所內的隔熱層，可採用金屬板（未開孔），或採用防蒸氣玻璃纖維布在接合處精確密封予以覆蓋。”

62 在 7.4.3.3.1 段中，“家具”後插入“例如桌子、衣櫃、梳粧檯、寫字檯和食品櫃”。

63 在 7.4.3.4 段的段首插入：“根據 7.4.3.5 段規定”字樣。

64 在現有 7.4.3.4 段之後插入新的 7.4.3.5 段，並將現有 7.4.3.5 至 7.4.3.10 段重新編號為 7.4.3.6 至 7.4.3.11 段：

“7.4.3.5 7.4.3.4 段不適用於由認為是不燃性玻璃製成且其表面符合低播焰性要求的分隔、窗和舷窗，或 7.4.3.3 段所規定的項目和材料。”

65 將 7.4.4.1 中的最後一句刪除。

66 在現有 7.4.4.1 段之後新增 7.4.4.2 段如下，並將現有 7.4.4.2 和 7.4.4.3 段重新編號為 7.4.4.3 和 7.4.4.4：

“7.4.4.2 可在僅包含兩層甲板的公共處所的開敞部位安裝梯道，但該梯道應完全位於該公共處所內，且滿足下列條件：

.1 所有各層均用途相同；

.2 處所上下部分間的開口面積至少為該處所上下部分間的甲板面積的 10%；

.3 其設計應使位於該處所內的人員通常都能注意、或易意識到處所內的失火情況或其他危險情況；

.4 處所的兩層均設有足夠的脫險通道，通往鄰近的安全區域或艙室；和

.5 整個處所由噴水器系統一個分支提供保護。”

67 將 7.4.4.4 段中的第 2 句替換如下：

“在僅有單個公共處所的 A 類高速船上，以及處所內具有 40% 或以上的開敞天花板（穿孔型天花板），且其佈置能使天花板後的失火易於發現並被撲滅的其他高速船上，均不要求在公共處所內設有擋風條。”

68 在 7.5.2 段末尾新增下列句子：

“發動機潤滑油沉澱櫃，或安裝在發動機機身上的潤滑油過濾罩，可採用鋁合金材料。”

69 在現有 7.6.1 段的兩句之間插入下列句子：

“其控制位置應有顯著的永久性標誌並易於到達，還應顯示關閉裝置的開、關狀態。”

70 在 7.6.3.2 段中，在“管道下端”後插入“（管道與廚房爐灶罩的接頭）”字樣。

71 在 7.6.3.4 段中，將“關閉裝置”改為“位於上述控制位置的遙控關閉裝置”。

72 在現有 7.6.3.5 段末尾新增下列句子：

“至少應設有一個靠近排氣扇的孔蓋，其他孔蓋位於嚴重積油的部位，如 7.6.3.2 所述的管道下端。”

73 在現有 7.6.4 段末尾新增下列文字：

“擋火閘和擋煙閘的佈置應使其易於接近。如將其置於天花板或襯板後時，應安裝一個標明用於識別該閘的檢修門。該識別標誌還應在所要求的任何遙控裝置上予以標明。”

74 在 7.6.6 段的最後一句前插入下列句子：

“可通過機械釋放裝置或通過故障安全型電氣開關或氣壓釋放裝置（即彈簧支撐等）遙控操作擋火閘和擋煙閘，實現手動關閉。”

75 在 7.7.1 段的第一句後插入下列句子：

“對通常無人的控制站（如應急發電機室），不必安裝手動報警按鈕。”

76 在 7.7.1.1.4 段的第一句末尾，新增“，每個分區中應包括一組失火探測器，以及本段要求的在指示裝置上顯示的手動報警按鈕。”

77 在 7.7.1.1.9 段的第一句中，將“7.11.1”後的文字刪除，並在該段末尾新增下列句子：

“儘管有本段前述規定，但如該處所位於高速船艏或船艉，或這些處所的佈置使其成為各甲板的公用處所（如風機室、廚房和公共處所等），則主管機關可允許同一分區中的探測器服務於一層以上甲板上的處所。”

78 在 7.7.1.1.10 段末尾新增下列句子：

“對於一個具有遙控並可逐一識別每一探測器功能的探火系統，如果覆蓋起居處所、服務處所和控制站的回路（按順序連接各分區探測器的電路，以及將（輸入、輸出值）與指示裝置相連）中不包括有較大失火危險的機器處所，則符合本要求規定。”

79 在 7.7.1.1.14 段中，將“除了”之後的文字替換如下：

“可利用控制板激活下列一項或多項：

.1 尋呼系統；

.2 風機停止；

.3 防火門閉合；

.4 擋火閘和擋煙閘閉合；

.5 噴水器系統。”

80 在 7.7.1.1.15 段中，將引言文字替換如下：

“具有單獨識別所有失火探測器（即具有區域編址識別功能）的探火系統應按如下要求佈置：”

81 在 7.7.1.1.15.1 段末尾新增下列文字：

“任一回路不應兩次通過一個處所。如實際不可行時（如面積較大的公共處所），則對必需第二次通過該處所的回路部分，在安裝時應儘可能地遠離回路的其他部分。”

82 在 7.7.1.1.15.2 段中，在“將會”兩字中間插入“不”。

83 在現有 7.7.1.1.15 段之後插入新的 7.7.1.1.16 段如下：

“車輛裝卸期間，車輛甲板處所的探火系統（不包括手動報警按鈕）可採用定時器關閉。”

84 將 7.7.1.2.3 段中的最後一句替換如下：

“位於頂部的探測器應至少距艙壁 0.5m，但位於走廊、儲藏室和梯道的探測器除外。”

85 在 7.7.3.1 段的第 1 個句子中，在“控制”之前插入“操作間和，如配備，從”字樣。

86 在現有 7.7.3.1 段之後插入新的 7.7.3.2 段如下，並將現有 7.7.3.2 和 7.7.3.3 段重新編號為 7.7.3.3 和 7.7.3.4 段：

“非本規則要求的但安裝於高速船上的額外固定式滅火系統應符合本規則的設計，但固定式氣體滅火系統要求的第二次排放除外”

87 在 7.7.3.3.3 段的第一句後新增下列文字：

“管路可穿過起居處所，只要其厚度足夠，且安裝後進行了壓頭不小於 $5N/mm^2$ 的壓力試驗驗證其密性。此外，穿過起居處所的管路應僅使用焊接進行連接，並不得在此類處所內裝有泄水孔或其他開口。管路不應穿過冷藏處所。”

88 在 7.7.3.3.5 段末尾新增下列句子：

“受保護處所的空氣進口或排氣口應能從該處所的外部予以關閉。”

89 在 7.7.3.3.6 段末尾新增下列文字：

“對應於經壓縮空氣瓶轉換成自由空氣容積後增加的機器處所總容積。可選擇的方法是，只要其直接排向大氣中，就可在每一壓縮空氣瓶上接裝一個帶安全閥的排放管。”

90 在 7.7.3.3.7 段第一句中的“工作或”後插入“人員可能會進入（如滾裝處所）及其便於出入的門或艙口或”字樣。第二句中的“操作”改為“自動操作（如通過打開釋放箱門）”。

91 在 7.7.3.3.10 段末尾新增下列文字：

“如分隔符合表 7.4-1 和 7.4-2 的相應要求，或分隔為氣密鋼結構時，處所被視為隔開。”

92 在 7.7.3.3.12 段末尾新增下列文字：

“而不必將容器完全從其固定位置移開。”

93 將現有 7.7.3.3.14 段替換如下：

“7.7.3.3.14 如滅火介質儲存在被保護處所外，其所儲存的艙室應位於一個安全且易於到達的位置。就應用表 7.4-1 和 7.4-2 而言，此類儲存室應視為控制站。下列要求適用於存放固定式氣體滅火系統的滅火介質的儲藏室：

.1 儲存室不得用於其他用途；

.2 如儲存處所位於甲板下，則該處所不得位於開敞甲板下第一層甲板以下，且可通過梯道或梯子從開敞甲板直接進入；

.3 處所須進行有效的通風。位於甲板以下的處所或未設有從開敞甲板進入通道的處所，均應安裝設計為從處所底部排出廢氣的機械通風系統，並應具有每小時至少 6 次換氣的能力；和

.4 通道門應向外開啟，構成所述儲存室和鄰近圍閉處所間限界面的艙壁和甲板，包括門和其他開口關閉裝置，應保持氣密。”

94 在 7.7.4 段末尾新增下列文字：

“每具手提式滅火器須：

.1 總重不應超過 23kg；

.2 如係乾粉或二氧化碳，容量應為 5kg；

.3 如係泡沫，容量應為 9*l*；

.4 每年檢查一次；

.5 應有標明上次檢查日期的標示；

.6 應每 10 年進行一次液壓試驗（瓶和推劑瓶）；

.7 如係二氧化碳，不應存放在起居處所內；

.8 如位於控制站及其他裝有對高速船安全所必需的電氣或電子設備或裝置的處所內時，其滅火介質應為非導電或對這些設備和裝置無害；

.9 應即可使用並位於易於可見的位置，以便在發生火災時能快捷和方便的拿到；

.10 應位於不因天氣、振動或其他外部因素而影響其使用性能的位置；和

.11 應有表明是否使用過的標識。”

95 在 7.7.5.1 段中，“獨立驅動泵”改為“由獨立電源供電的泵”。

96 在 7.7.5.3 段的最後一句前插入下列句子：

“消防總管應有排水功能，並安裝閥門，以使消防總管的支管部分在總管用於非消防目的時能予以隔離。”

97 在 7.7.5.4 段末尾新增下列文字：

“在靠近每一機器處所的入口處外部應設有一個消防栓。”

98 在 7.7.5.5 段中，將“耐腐蝕材料”後的文字改為：

“消防水帶的長度應：

.1 至少 10m；

.2 在機器處所內不超過 15m；和

.3 在其他處所和開敞甲板處不超過 20m。”

99 在 7.8.1.1 段的段首插入“根據 7.8.1.2 規定”，並刪除第 2 句。

100 在現有 7.8.1.1 段之後新增 7.8.1.2 段如下，並將現有 7.8.1.2 和 7.8.1.3 段重新編號為 7.8.1.3 和 7.8.1.4 段：

“7.8.1.2 如對特種處所或滾裝處所，包括開敞式滾裝處所的車輛甲板有隔熱要求，則僅需在下一面進行隔熱。只要車輛甲板不是高速船主承載結構一部分或支撐部分，並已採取相關措施確保船舶安全（包括滅火能力、耐火分隔完整性和撤離措施）不受這些內部甲板部分或全部坍塌的影響，則完全位於滾裝處所內的這些車輛甲板可允許免於結構防火要求。”

101 將 7.8.2 段的第 1 段改為 7.8.2.1 段，並在 7.8.2.1 段後插入下列文字：

“7.8.2.2 該系統的泵應能保持：

.1 對 A 類高速船，當任一台泵組出現故障時，仍維持規定的施放總量的一半；和

.2 對 B 類高速船，當任一台泵組出現故障時，仍維持規定的施放總量。

7.8.2.3 固定式滅火系統應滿足下列要求：

.1 閥箱上應設有壓力錶，且其每個閥門均應標識其保護的區域；

.2 應在設有閥門的艙室內張貼裝置的維護和操作須知；和

.3 管系上應裝設足夠數量的泄水閥。”

102 在 7.8.4.1 段末尾新增下列文字：

“，包括 L 形金屬管在內的水霧槍，該管長肢長約 2m，並能與消防水帶連接；短肢長約 250mm，裝有一個固定水霧噴槍或能與一個噴水槍連接。”

103 在 7.8.4.3 段末尾新增下列文字：

“除符合 7.7.4 段的要求外，滅火器還應適合 A 類和 B 類火災，並具有 12kg 或等效的乾粉滅火劑。”

104 將 7.8.6 段重新編號為 7.8.6.1 段，並將第一句中的“排水孔應如此安裝”改為“泵和排水裝置應能防止水的積聚。為此目的而安裝的排水孔應按規定如此佈置。”

105 在現有 7.8.6.1 段後插入新的 7.8.6.2 段如下：

“7.8.6.2 對按 7.8.6.1 段規定安裝的排水孔和艙底水泵：

.1 排水系統的水量應考慮到水霧系統的泵和所需的消防水槍數量；

.2 排水系統的排量應不小於上述.1 規定排量的 125%；和

.3 應確保污水阱具有足夠的容量，並應佈置在兩舷側，其在每一水密艙內相互間的距離不應超過 40m。”

106 在 7.8.7.1 段中，將第一句之後的文字替換如下：

“安裝在甲板或平台以上超過 450mm 高度的電氣設備，應由符合經本組織認可的國際標準的防進水罩殼加以保護。但如為高速船安全所必需而在甲板或平台上低於 450mm 高度安裝電氣設備和佈線時，只要該電氣設備符合經本組織認可的國際標準的合格防爆型，則可安裝這些設備和佈線。

107 將現有 7.8.7.2 段替換如下：

“7.8.7.2 如電氣設備安裝在排氣通風導管內，其應為合格防爆型設備。安裝的設備和佈線應根據本組織認可的國際標準適合使用，任何排氣導管的出口應位於安全位置，並考慮到其他可能的着火源。”

108 在 7.10.1.2 段中的“水霧槍”之後插入“符合 7.8.4.1 段的要求”字樣。

109 在 7.10.2 段中，將“或個人配備應儲存於”改為“和個人配備應儲存於固定佈置並標有永久清晰標誌的位置處”。

110 在 7.10.3.1.2 段中，將文字“和手套”刪除。

111 在 7.10.3.1.4 段中，將“型”改為“符合本組織認可標準的合格防爆型”。

112 在 7.10.3.1.5 段末尾新增“具有高壓絕緣斧柄的”字樣。

113 將 7.10.3.2 和 7.10.3.2.1 段刪除，將 7.10.3.2.2 段重新編號為 7.10.3.2，並在“呼吸器”前插入“認可型”字樣。

114 將重新編號的 7.10.3.2 段的第二句替換如下：

“每一所要求的裝備均應分別配備 2 個適用的備用充氣器。”

115 在 7.10.3.3 段中，將“足夠長度”改為“約 30m 長度”字樣，並在末尾新增一句如下：

“救生繩應進行 5 分鐘的 3.5kN 靜載荷試驗。”

116 在 7.11.1.3 段末尾新增“在較大失火危險區域結構防火時間內”字樣。

117 在 7.13.1 段的第一句後插入下句：

“在一層甲板上開敞的梯道應視為該開敞處所的一部分，並應受到任何用於該處所的噴水器系統的保護。”

118 在 7.13.3 段中，將“營運航速”替換為“最大航速的 90%”。

119 將現有 7.17.2.2 段的.2 小段替換如下：

“.2 專門建造的集裝箱高速船以及擬在貨物集裝箱和可移動罐櫃內裝運危險貨物的貨物處所。就此而言，專門建造的集裝箱處所係指安裝有用於堆放和繫固集裝箱的箱格導軌的貨物處所；”

120 在 7.17.2.3 段中，在“滾裝處所”後插入“，包括特種處所”。

121 在 7.17.3 段末尾新增下句：

“就本節而言，“在甲板上”應指在露天甲板上的處所。”

122 將 7.17.3.1.2 段中的“供應”改為“按最大的指定貨物處所同時供應 7.17.3.1.3 段規定的裝置和”，並在第一句後插入下句：

“主消防泵的總容量（不包括應急消防泵的容量，如配備，）應滿足本要求。”

123 在現有 7.17.3.1.3 段中：

.1 將第一句中的文字“應配備”刪除，並將其重新插入句首單詞“裝置”之後；

.2 將文字“大量水”改為“按貨物處所水平面積計不小於 5*l*/min/m^2 的水量”字樣；和

.3 在“排水和泵系佈置”後插入“符合 7.8.6 段要求和”字樣。

124 在 7.17.3.1.4 段末尾新增下句：

“也可由符合《公約》第 II-2/10.4.1.1.2 條要求的高倍泡沫系統替代。”

125 在現有 7.17.3.1.4 段後新增 7.17.3.1.5 和 7.17.3.1.6 段如下：

“7.17.3.1.5 為滿足 7.17.3.1.1 至 7.17.3.1.4 段的要求，可採用經主管機關根據本組織制定的標準批准的水霧系統，但條件是按 7.17.3.1.2 段規定，在最大的貨物處所內規定用於消防的水量可同時滿足水霧系統加 4 支消防水槍用水量的需要。

7.17.3.1.6 除 7.7.5.5 段的要求外，裝運危險貨物的高速船還應配備三個符合 7.7.5.6 段要求的消防水帶和水槍。”

126 在 7.17.3.2 段的第一句中的“圍閉貨物處所”後新增“或車輛甲板”。

127 在 7.17.3.4.2 段的第一句後插入“排氣扇應為無火花型。”字樣，並將最後一句替換如下：

“在進氣和出氣口應安裝合適的尺寸不大於 13mm x 13mm 的金屬網，以防止異物進入罩內。”

128 將現有 7.17.3.4.3 段重新編號為 7.17.3.4.4 段；表 7.17-2 中的引用編號作相關修正；並新增 7.17.3.4.3 如下：

“7.17.3.4.3 如未以氣密艙壁或甲板將鄰近處所隔離，須將鄰近處所按作為貨物處所本身適用通風要求。”

129 在現有 7.17.3.4.4 段後新增 7.17.3.4.5 段如下：

“7.17.3.4.5 開頂式集裝箱高速船，僅需對貨艙下部進行動力通風，為此要求安裝專門的通風管道。通風率應根據露天甲板下的空艙容積至少為每小時 2 次。”

130 表 7.17-1 中，在右欄頂部的文字“散裝固體危險貨物”後新增“（包括《2004 年散裝貨物安全操作規則》（BC 規則）的 B 類貨物，但標明“散裝危險材料”的貨物除外）”。

131 表 7.17-1 中，在註 1 第二句末尾增加“每小時”。

132 表 7.17-2 在註 4 中，在“含有”後增加“殘餘”字樣。

133 表 7.17-2 中，在 7.17.3.4.2 參照行，4.2 和 4.3 欄插入註 7 如下，並將現有表 7.17-3 的註 7 至註 11 重新編號為註 8 至註 12：

“7 對含有溶劑萃取殘餘的種籽餅以及 BC 規則之第 4.3 類貨物，應安裝 2 台固定式獨立風扇。但如在裝載前和航行時，對移動風扇進行了繫固安裝（如予以固定），則也可採用此類風扇。通風系統應符合 7.17.3.4.1 和 7.17.3.4.2 段的規定。通風時，應不會將任何逸出的氣體吹向甲板上、下的公共處所或船員起居處所。”

134 表 7.17-3 中，在第 7 和第 8 欄內對“3.1 3.2”和“3.3”的參照均改為“3”，並在“5.2”一欄最後一行和倒數第二行中的“x”後新增註 13 如下：

“根據經修正的 IMDG 規則的規定，禁止在甲板下或在圍閉滾裝處所內積載第 5.2 類的危險貨物。”

135 在 7.17.3.5 段後新增內容如下：

“如下：

.1 如除由機器處所內的泵所服務的系統外還附加用於貨物處所的艙底泵排水系統時，則服務每一貨物處所的系統的排量不應小於 $10m^3/h$。如附加系統為公用系統，則排量無需大於 $25m^3/h$。該系統也無需冗餘。在裝運易燃或有毒液體時，應通過安裝一個盲板法蘭或通過關閉一個可鎖閉的閥門，將機器處所內的艙底管路予以隔離；

.2 如貨物處所艙底排水的佈置為重力排水時，則排水應直接通往舷外或通往位於機器處所外的一個封閉的泄水艙。該泄水艙還須設有通往露天甲板上一個安全位置的透氣管；

.3 含有用於擬裝運易燃或有毒液體貨物處所艙底泵的機器處所外的圍閉處所，應安裝獨立的機械通風裝置，且每小時至少換氣 6 次。該處所內的電氣設備應為合格防爆型。如該處所有從另一圍閉處所進入的通道，則該門應為自閉型；和

.4 如處所滿足與上述貨物處所相同的要求時，僅允許從該貨物處所排水至一個較低處所內的艙底水阱。”

136 在 7.17.3.6.1 段的第一句末尾新增下列文字：

“應考慮所運輸的化學品相關的危險性以及由本組織按類別和物理特性制訂的標準進行選擇。”

137 在 7.17.3.6.2 段末尾新增下句：

“除 7.10.3.2.2 段的要求外，還應為每一所需的裝備配備 2 個適用於呼吸器的備用充氣器。”

138 在 7.17.3.8.2 段中的“泄水和排水裝置應”後插入“符合 7.8.6 段的要求，並在該處所外位於滅火系統控制站附近的位置可操縱該閥門和”字樣。

第 8 章

救生設備與裝置

139 將現有 8.7.6 至 8.7.10 段重新編號為 8.7.7 至 8.7.11 段，並插入新的 8.7.6 段如下：

“8.7.6 如 B 類高速船上裝備有登乘救生艇筏的 MES 時，則應另設有撤離裝置，以使在 MES 失效時，或因 2.6.7.1 段所述的縱向範圍受損而導致 MES 無法使用時，直至並包括在最壞預計工況下，用於乘客和船員撤至船上相同一側的救生艇筏內。”

140 在 8.9.14.2 段中，在“應”字後增加“在按 1.5.1.3 段要求進行年度檢驗時進行一次徹底的檢查”字樣，並將該句剩餘部分刪除。

141 在 8.9.14.3 段中，在“制動器”後增加“在最大下降速度時進行動力試驗。試驗負荷應為救生艇或救助艇不載人時的質量，除非在不超過 5 年的間隔內，應採用等於救生艇或救助艇和其全部人員和設備重量的 1.1 倍的驗證負荷進行此試驗。”字樣並將該句剩餘部分刪除。

第 10 章

輔機系統

142 在 10.2.4.8 段中，將第一句末尾的“注入管”替代為“燃油管和船上泵動力服務的所有注入管”字樣。此外，原“以及閃點低於 43℃的燃油”改為“如無因油氣事故而產生失火或爆炸的危險，並且不應通往船員處所、乘客處所、特種處所、滾裝處所（開敞式滾裝處所除外）、機器處所或類似處所。對閃點低於 43℃的燃油，此類閥門和管路”字樣。

第 11 章

遙控、報警與安全系統

143 在 11.3.3 段的第一句中，將“控制站內”改為“在一個或多個控制站”字樣。

144 在 11.4.1.2 段中，將.4 至.11 小段重新編號為.5 至.12 小段，並在現有.3 段後插入新的.4 段如下：

“.4 設計水線以下的每一水密艙室內的艙底水探測。”

第 13 章

船舶航行系統和設備以及航行數據記錄儀

145 將現有 13.8.2 段重新編號為 13.8.3 段，並插入新的 13.8.2 段如下：

“13.8.2 高速船應安裝 ECDIS 的具體規定如下：

.1 2008 年 7 月 1 日或以後建造的高速船；

.2 2008 年 7 月 1 日以前建造的高速船，應不遲於 2010 年 7 月 1 日。”

第 14 章

無線電通信

146 將現有 14.15.10 段的內容替換如下：

“14.15.10 所有高速船上的衛星 EPIRB 應：

.1 每年進行操作性能的全面測試，特別是檢查工作頻率發射、編碼和登記，檢查間隔規定如下：

.1 對客船，《高速船安全證書》期滿之日的前 3 個月內；和

.2 對貨船，《高速船安全證書》期滿之日前 3 個月內，或《高速船安全證書》周年日的前或後 3 個月內；

測試可在船上進行或在經認可的測試站進行；和

.2 在不超過 5 年的間隔期內，在經認可的岸基檢修站進行檢修。”

第 18 章

營運要求

147 將現有 18.1.3 段的.4 小段的內容替換如下：

“.4 在具有符合本規則要求的功能和設施的基地港作業區域內有規定。”

附件 1

高速船安全證書和設備記錄格式

148 在《高速船安全證書》的設備記錄第.3 節中，在現有的第 15 項後插入新的第 16 項如下，並將現有的第 16 項重新編號為第 17 項。

“16 遠距離識別和追蹤系統”

149 在《高速船安全證書》的設備記錄第.4 節中，將“雙向現場無線電通信 121.5MHz 和 123.1MHz”字樣作為第 7 項。

附件 6

水翼船的穩性

150 在現有引言首段和第 1 段之間插入新的內容如下：

“根據 2.3.1 段的要求，應在所有允許的裝載工況下，對水翼船的穩性進行評估。

本附錄中術語“排水狀態”與本規則 1.4.22 段中定義的“排水狀態”含義相同。

本附錄中術語“翼航狀態”與本規則 1.4.38 段中定義的“非排水狀態”含義相同。”

附件 7

多體船的穩性

151 在 1.4.2 段後新增下句：

“或也可按本規則 2.1.4 段的規定採用其他的評估方法。”

152 在 1.5 段末尾新增下句：

“應採用附件 6 的 1.1.5.3 段中確定 θ_Z 的方法確定由模型試驗或其他數據得出的 θ_r。”

153 在 2.3 段末尾新增“按本附件 1.5 確定的”字樣。

附件 8

單體船的穩性

154 將現有 1.1 段替換如下：

“1.1 應採用《完整穩性規則》3.2 段中的氣象衡準。在應用氣象衡準時，風壓值 P（N/m2）應為：

$$500\{V_w/26\}^2$$

式中，V_w = 相應於最壞預計工況下的風速（m/s）。

應用《完整穩性規則》中 3.2.2.1.2 段的規定時，風引起的橫傾角不應超過 16° 或甲板邊緣浸水角的 80%（取小者）。如果風引起的橫傾角大於 10° 時，按本規則 2.13.1.1 段的規定，甲板表面應提供有效防滑並有適當的踩步支撐點。在應用氣象衡準時，還應考慮評估假定的橫搖角 θ_1 時的個別船具體的橫搖阻尼特點，或也可從模型試驗或實船試驗中通過採用附則 6 的 1.1.5.3 中確定 θ_Z 的方法求得。具有大量增加阻尼特性的船體，如浸沒的舷側船體、堅實的水翼列、或撓性裙板或氣墊密封，橫搖角可能會明顯減小。因此，對此類船，橫搖角應從模型試驗或實船試驗中求得，或如無此類數據時，應取為 15°。”

155 在 2.1.1 段後新增下句：

“範圍應取平衡橫傾角與剩餘復原力臂成負值間的差值或發生累進進水的橫傾角，取小者。”

附件 9

有關運行與安全性能的定義、要求和規定標準

156 將第一段第 2 句中的“原型”改為“第一次”。

157 在 2.1.1、2.1.2、2.1.3 和 3.3.1 段中的“最大營運航速”改為“最大航速的 90%”。

158 在 3.2 段中，句子“最壞預計工況不應超過二種測量的海況中更嚴重的一種的 150%”作為倒數第 2 句插入。

附件 10

乘客與船員座椅的試驗衡準與評估

159 在標題中，將“場所和船員”字樣刪除。

160 在 3.4 段中，“相同強度和剛度”改為“等同強度和剛度”。

161 在 3.6 段中，在“和測量”字樣之後，將“如可能”字樣刪除。

162 在 3.9 段中，在現有.3.2 小段後插入.3.3 至.3.5 小段如下，並將現有.3.3 小段重新編號為.3.6 段：

“.3.3 頸部曲率不超過 88Nm；

.3.4 頸部伸展率不超過 48Nm；

.3.5 作為上述.3.3 和.3.4 的替代，可接受在座墊以上至少 850mm 處設置靠背或頭枕；和”。

163 在現有附件 11 後新增附件 12 如下：

“附件 12

確定高速船操縱限制時應考慮的因素

1 目的和範圍

本附件的目的是列出所有在確定填入“營運許可證書”中“最壞預計工況”（1.4.61 段定義的）及其他“操縱限制”（1.4.41 段定義的）時應予考慮的參數，以便於統一運用本規則。

2 應予考慮的因素

須至少考慮下列因素：

.1 在 1.3.4 段中所述的距避難地的最遠距離。

.2 滿足 1.4.12.1 段要求的救援方法的可用性（僅適用 A 類船）。

.3 在 1.4.61 段中所述的安全操作的最低氣溫（易結冰），能見度和水深。

.4 應用第 2 章和相關附件中有關穩性和浮力要求時的有義波高和最大平均風速。

.5 維持安全航行的限制（尤其是有義波高），考慮 2.1.5 段中所列的已知穩性危險，預定航線上的操縱條件（見 18.1.3.2 段）以及附件 9 中 3.3 段定義的操作中的各種運動。

.6 按第 3 章規定在“臨界設計工況”中的高速船結構安全。

.7 在 8.6.5 段規定的撤離系統和救生艇筏的安全佈放和操作。

.8 按第 17 章和附則 3 和 9 要求進行的航行試驗所確定的安全操作限制，指明按 17.3 段規定的任何重量和重心限制，以及按 17.4 段規定的失效和故障影響。”

RESOLUTION MSC.222(82)
(adopted on 8 December 2006)

AMENDMENTS TO THE INTERNATIONAL CODE OF SAFETY FOR HIGH-SPEED CRAFT, 2000 (2000 HSC CODE)

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

NOTING resolution MSC.97(73), by which it adopted the International Code of Safety for High-Speed Craft, 2000 (hereinafter referred to as "the 2000 HSC Code"), which has become mandatory under chapter X of the International Convention for the Safety of Life at Sea (SOLAS), 1974, (hereinafter referred to as "the Convention"),

NOTING ALSO article VIII(b) and regulation X/1.2 of the Convention concerning the procedure for amending the 2000 HSC Code,

HAVING CONSIDERED, at its eighty-second session, amendments to the 2000 HSC Code proposed and circulated in accordance with article VIII(b)(i) of the Convention,

1. ADOPTS, in accordance with article VIII(b)(iv) of the Convention, amendments to the International Code of Safety for High-Speed Craft, 2000, the text of which is set out in the Annex to the present resolution;

2. DETERMINES, in accordance with article VIII(b)(vi)(2)(bb) of the Convention, that the amendments shall be deemed to have been accepted on 1 January 2008 unless, prior to that date, more than one third of the Contracting Governments to the Convention or Contracting Governments the combined merchant fleets of which constitute not less than 50% of the gross tonnage of the world's merchant fleet, have notified their objections to the amendments;

3. INVITES Contracting Governments to note that, in accordance with article VIII(b)(vii)(2) of the Convention, the amendments shall enter into force on 1 July 2008 upon their acceptance in accordance with paragraph 2 above;

4. REQUESTS the Secretary-General, in conformity with article VIII(b)(v) of the Convention, to transmit certified copies of the present resolution and the text of the amendments contained in the Annex to all Contracting Governments to the Convention;

5. FURTHER REQUESTS the Secretary-General to transmit copies of this resolution and its Annex to Members of the Organization, which are not Contracting Governments to the Convention.

ANNEX

AMENDMENTS TO THE INTERNATIONAL CODE OF SAFETY FOR HIGH-SPEED CRAFT, 2000 (2000 HSC CODE)

CHAPTER 1 GENERAL COMMENTS AND REQUIREMENTS

1 The existing text of section 1.2 is renumbered as paragraph 1.2.1 and the following paragraph 1.2.2 is added:

"1.2.2 On all craft, new installation of materials containing asbestos used for the structure, machinery, electrical installations and equipment of a craft to which this Code applies 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 1000°C."

2 In paragraph 1.3.4.1, the words "operational speed" are replaced by the words "90% of maximum speed".

3 In paragraph 1.3.4.2, the words "operational speed" are replaced by the words "90% of maximum speed".

4 In paragraph 1.4.16, the words "(main displays and controls for equipment specified in 13.2 to 13.7)" are inserted after the words "navigating equipment".

5 In paragraph 1.4.29, the word "food" is inserted between the words "cooking or" and "heating".

6 The existing paragraph 1.4.35 is replaced by the following:

"1.4.35 *Machinery spaces* are spaces containing internal combustion engines either used for main propulsion or having an aggregate total power output of more than 110 kW, generators, oil fuel units, major electrical machinery and similar spaces and trunks to such spaces."

7 The existing paragraph 1.4.44 is deleted and the existing paragraphs 1.4.32 to 1.4.43 are renumbered as paragraphs 1.4.33 to 1.4.44, with a new paragraph 1.4.32 being inserted as follows:

"1.4.32 *IMDG Code* means the International Maritime Dangerous Goods (IMDG) Code as defined in chapter VII of the Convention."

8 At end of paragraph 1.4.53, the following new sentence is inserted:

"Such spaces containing no cooking appliances may contain:

.1 coffee automats, toasters, dish washers, microwave ovens, water boilers and similar appliances, each of them with a maximum power of 5 kW; and

.2 electrically heated cooking plates and hot plates for keeping food warm, each of them with a maximum power of 2 kW and a surface temperature not above 150°C."

9 In paragraph 1.4.54, the text after "the average" is replaced by the following:

"crest-to-trough height of the highest one third of the zero-upcrossing waves in a specified period."

10 At end of paragraph 1.8.1, the following text is inserted:

"On all craft, all certificates issued under this chapter, or certified copies thereof, shall be carried on the craft. Except where the flag State is a Party to the 1988 SOLAS Protocol, a copy of each of these certificates shall be posted up in a prominent and accessible place in the craft."

11 In paragraph 1.9.1, the second sentence is deleted and the following new paragraph 1.9.1.1 is inserted:

"1.9.1.1 On all craft, transit voyages may be undertaken without a valid Permit to Operate High-Speed Craft provided the craft is not operating commercially with passengers or cargo onboard. For the purpose of this provision, these transit voyages include delivery voyages, i.e., builder's port to base port, and voyages for repositioning purposes, i.e., change of base port and/or route. Such transit voyages in excess of the limits set out in this Code may be undertaken provided that:

.1 the craft has a valid High-Speed Craft Safety Certificate or similar before the start of such a voyage;

.2 the operator has developed a safety plan for the voyage including any temporary accommodation and all relevant matters listed in 18.1.3 to ensure that the craft is capable of safely completing the transit voyage;

.3 the master of the craft is provided with the materials and information necessary to operate the craft safely during the transit voyage; and

.4 the Administration is satisfied that arrangements have been made for the safe conduct of the voyage."

12 The following new paragraph 1.9.7 is added after the existing paragraph 1.9.6:

"1.9.7 In determining the worst intended conditions and the operational limitations on all craft for insertion in the Permit to Operate, the Administration shall give consideration to all the parameters listed in annex 12. The limitations assigned shall be those that enable compliance with all of these factors."

13 In paragraph 1.15.1, the words "four years" are replaced by the words "six years".

CHAPTER 2
BUOYANCY, STABILITY AND SUBDIVISION

14 The existing text of subparagraph .1 of paragraph 2.1.3 is replaced by the following:

".1 *Downflooding point* means any opening, irrespective of size, that would permit passage of water through a water/weathertight structure (e.g., opening windows), but excludes any opening kept closed to an appropriate standard of water/weathertightness at all times other than when required for access or for operation of portable submersible bilge pumps in an emergency (e.g., non-opening windows of similar strength and weathertight integrity to the structure in which they are installed)."

15 In paragraph 2.1.3, subparagraphs .2 to .6 are renumbered as subparagraphs .3 to .7 and the following new subparagraph .2 is inserted after the existing subparagraph .1:

".2 *Elsewhere* when applied to sill and coaming heights in 2.2.7 and 2.2.8 is taken as applying to all weathertight and watertight closures located on or below the datum."

16 The following new paragraph 2.1.5 is inserted and the existing paragraphs 2.1.5 and 2.1.6 are renumbered as paragraphs 2.1.6 and 2.1.7:

"2.1.5 The adequacy of mathematical simulations must first be demonstrated by correlation with full-scale or model tests for the appropriate type of craft. It may be appropriate to use mathematical simulations to help to identify the more critical scenarios for subsequent physical testing."

17 The following text is inserted at the end of re-numbered paragraph 2.1.7:

"Where calculations are employed, it shall first be shown that they correctly represent dynamic behaviour within the operational limitations of the craft."

18 The third and subsequent sentences of paragraph 2.2.9.3 are replaced by the following:

"In unmanned machinery spaces, main and auxiliary sea inlet and discharge controls in connection with the operation of machinery shall either:

.1 be located at least 50% of the significant wave height corresponding to the worst intended conditions above the deepest flooded waterline following damage specified in 2.6.6 to 2.6.10; or

.2 be operable from the operating compartment."

19 In paragraph 2.3.4, table 2.3.4 is replaced by the following:

"Table 2.3.4 – Application of annexes 7 and 8 to monohull and multihull craft

GM_T	**Angle of maximum GZ**	
	≤ 25°	> 25°
≤ 3 m	annex 7 or annex 8	annex 8
> 3 m	annex 7	annex 7 or annex 8

"

20 In paragraph 2.3.4, the definitions of B_{WL}, A_{WP} *and* ∇ which appear after "where:" are deleted and the definition "GZ = righting lever" is inserted to replace them.

21 In paragraph 2.4.2, the words "chapter 18" are replaced by the words "chapters 17 and 18".

22 In paragraph 2.6.5, the following new subparagraph .5 is inserted after the existing subparagraph .4:

".5 void spaces filled with foam or modular buoyancy elements or any space without a venting system are considered to be void spaces for the purposes of this paragraph, provided such foam or elements fully comply with 2.6.4."

23 In paragraph 2.6.6, the final sentence is deleted.

24 In paragraph 2.6.7, the word "damages" is replaced by the word "damage".

25 The following new section of text is added in continuation of paragraph 2.6.7 after subparagraph 2.6.7.3:

"The damages described in this paragraph shall be assumed to have the shape of a parallelepiped. Applying this to figure 2.6.7a, the inboard face at its mid-length shall be tangential to, or otherwise touching in a least 2 places, the surface corresponding to the specified transverse extent of penetration, as illustrated in figure 2.6.7a.

Side damage shall not transversely penetrate a greater distance than the extent of $0.2\nabla^{1/3}$ at the design waterline, except where a lesser extent is provided for in 2.6.7.2. Refer to figures 2.6.7b and 2.6.7c.

If considering a multihull, the periphery of the craft is considered to only be the surface of the shell encompassed by the outboard surface of the outermost hull at any given section.

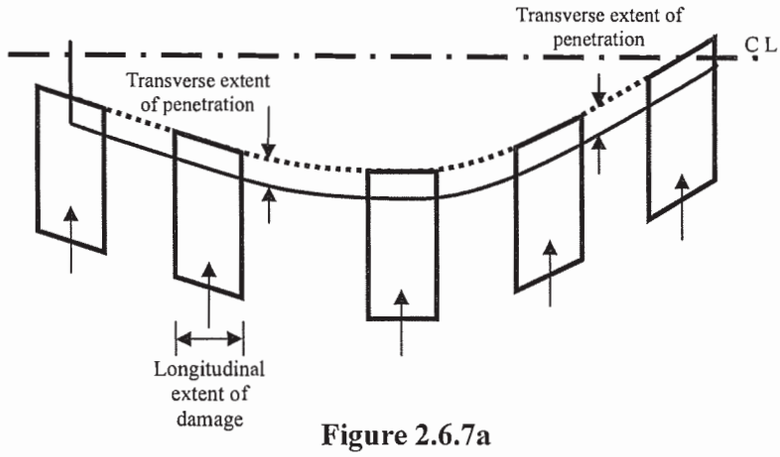


Figure 2.6.7a

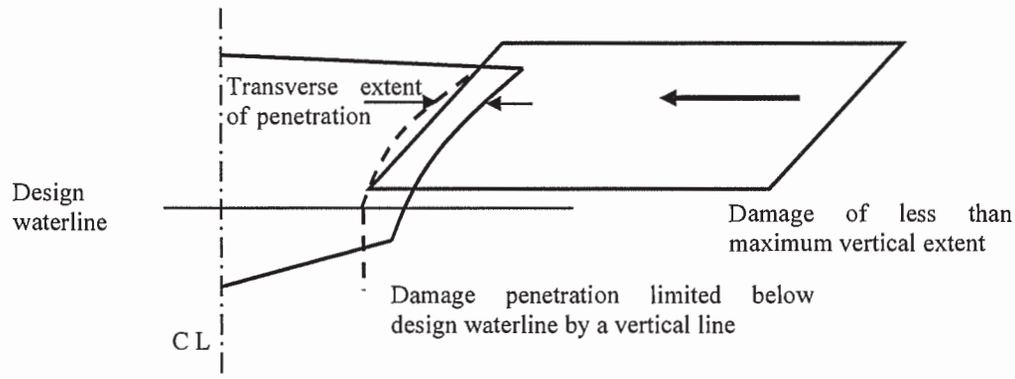


Figure 2.6.7b

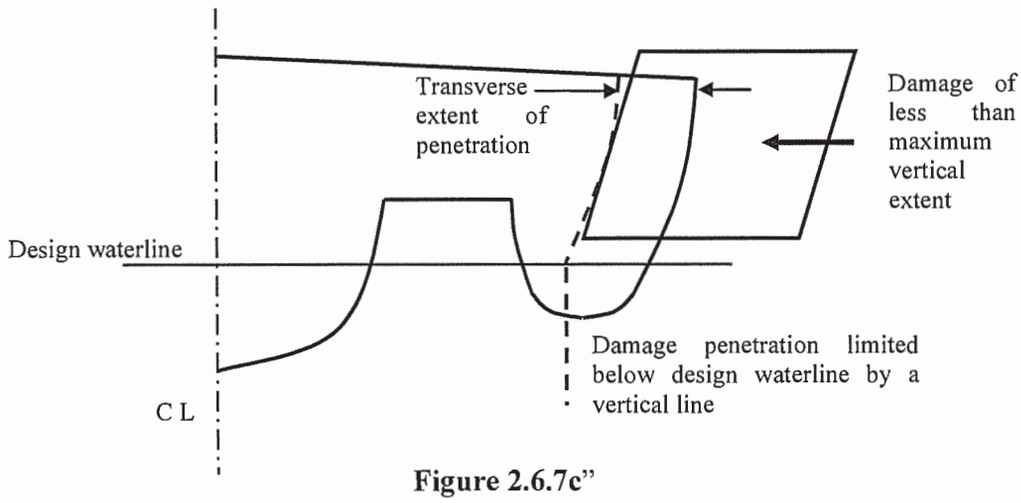


Figure 2.6.7c"

26 Existing paragraphs 2.6.8 to 2.6.12 are renumbered as paragraphs 2.6.9 to 2.6.13 and the following new paragraph 2.6.8 is inserted after the existing paragraph 2.6.7:

"2.6.8 *Extent of bow and stern damage*

2.6.8.1 The following extents of damage are to be applied to bow and stern, as illustrated in figure 2.6.8:

.1 at the fore end, damage to the area defined as A_{bow} in 4.4.1, the aft limit of which being a transverse vertical plane, provided that this area need not extend further aft from the forward extremity of the craft's watertight envelope than the distance defined in 2.6.7.1; and

.2 at the aft end, damage to the area aft of a transverse vertical plane at a distance $0.2\nabla^{1/3}$ forward of the aft extremity of the watertight envelope of the hull.

2.6.8.2 The provisions of 2.6.6 in relation to damage of lesser extent remain applicable to such damage.

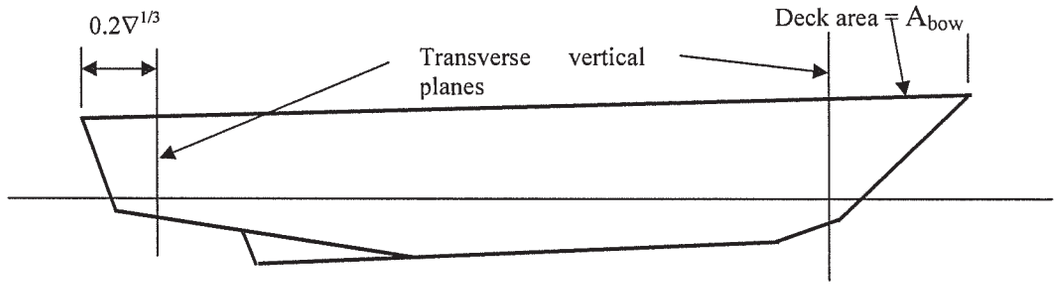


Figure 2.6.8"

27 In re-numbered paragraph 2.6.9.1.1.1, the words "operational speed" are replaced by the words "90% of maximum speed".

28 In re-numbered paragraph 2.6.9.1.2, the following text is inserted at the end of the definition of "T":

", provided that structures such as single plate skegs or solid metal appendages shall be considered to be non-buoyant and thus excluded."

29 The following new paragraph 2.6.9.2.3 is inserted after re-numbered paragraph 2.6.9.2.2:

"2.6.9.2.3 The shape of damage shall be assumed to be rectangular in the transverse plane as illustrated in figure 2.6.9.2 below. Damage is to be assumed at a series of sections within the defined longitudinal extent in accordance with figure 2.6.9.2, the mid-point of the damaged girth being maintained at a constant distance from the centreline throughout that longitudinal extent.

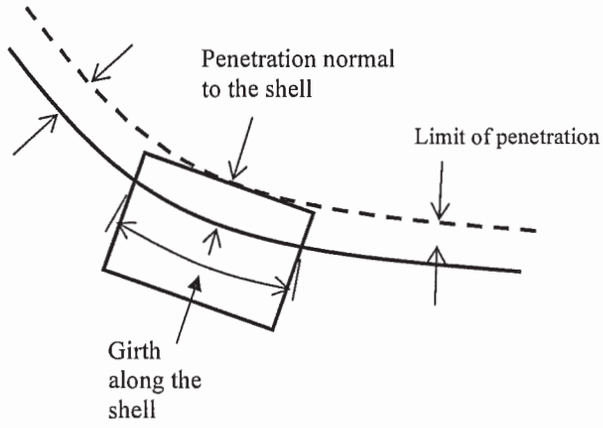


Figure 2.6.9.2"

30 In re-numbered paragraph 2.6.10.1, the words "below the design waterline" are inserted between the words "hull(s)" and "which".

31 In re-numbered paragraph 2.6.10.2, the following new subparagraph .4 is inserted after the existing subparagraph .3:

".4 the shape of damage shall be assumed to be rectangular in the plane of the shell of the craft, and rectangular in the transverse plane as illustrated in figure 2.6.9.2."

32 The existing paragraphs 2.7.2 to 2.7.8 are renumbered as paragraphs 2.7.3 to 2.7.9 and the following new paragraph 2.7.2 is inserted after the existing paragraph 2.7.1:

"2.7.2 On all craft, where an accurate inclining experiment is impractical owing to the height of the centre of gravity (VCG or KG) being less than one third of the transverse metacentric height (GM_T), the Administration may accept estimation of KG by detailed calculation in place of an inclining experiment. In such cases, a displacement check shall be undertaken to confirm the calculated lightship characteristics, including LCG, which may be accepted if the measured lightship displacement and LCG are respectively within 2% and 1% L relative to the estimate."

33 In re-numbered paragraph 2.7.7, the following new sentence is inserted at the end of the paragraph:

"For amphibious air-cushion vehicles this may be achieved by the use of draught gauges in conjunction with deck datum plates."

34 In paragraph 2.10, the following new subparagraphs .7 to .10 are inserted after the existing subparagraph .6:

".7 Passengers assumed to be occupying seats shall be taken as having a vertical centre of gravity corresponding to being seated, with all others standing.

.8 On the decks where assembly stations are located, the number of passengers on each deck shall be that which generates the maximum heeling moment. Any remaining passengers shall be assumed to occupy decks adjacent to those on which the assembly stations are located, and positioned such that the combination of number on each deck and total heeling moment generate the maximum static heel angle.

.9 Passengers shall not be assumed to gain access to the weather deck nor be assumed to crowd abnormally towards either end of the craft unless this is a necessary part of the planned evacuation procedure.

.10 Where there are seats in areas occupied by passengers, one passenger per seat shall be assumed, passengers being assigned to the remaining free areas of the deck (including stairways, if appropriate) at the rate of four per square metre."

35 The following new paragraph 2.12.3 is inserted after the existing paragraph 2.12.2:

"2.12.3 Demonstrating the effect of the passenger heeling moment calculated as given by 2.10 above, or a defined beam wind pressure when at speed, shall be established by conducting a trial or model test with an equivalent heeling moment applied by test weights. Passenger movement may only be neglected on craft where the safety announcement (refer to 8.4.1 and 18.7) expressly requires passengers to remain seated throughout the voyage."

CHAPTER 4
ACCOMMODATION AND ESCAPE MEASURES

36 In paragraph 4.3.4, the words "two thirds of operational speed" are replaced by the words "60% of maximum speed".

37 In paragraph 4.3.7, the words "operational speed" are replaced by the words "90% of maximum speed".

38 In paragraph 4.4.1, the words "operational speed" are replaced by the words "90% of maximum speed".

39 In table 4.4.2, under Design Level 2:

.1 the existing text of paragraph 1.1 is replaced by the following:

"1.1 Seatbacks with protective deformation and padding."; and

.2 the text "unless satisfactorily tested without belts in that orientation and arrangement" is inserted at the end of paragraph 1.4.

40 The following new sentence is inserted at the end of paragraph 4.4.5:

"The armrests and backrests of seats in public spaces may serve as handholds."

41 In paragraph 4.6.1, the reference to "3g" is replaced by the reference to "3".

42 In paragraph 4.7.10, the second sentence is replaced by the following:

"Clear markings, including the location of the fire control plan, shall be provided for the guidance of rescue personnel outside the craft."

43 In paragraph 4.7.12, the following text is added at the end of the paragraph:

"Doors providing escape from a space shall, where possible, be situated at opposite ends of the space. Where the doors providing escape from a space are situated in the same end of the space, the distance between those doors shall be greater than the maximum length of the space."

44 In paragraph 4.7.13, the following text is added at the end of the paragraph:

"Requirements of this paragraph do not apply to aisles (fore-aft passageways separating seating areas) or to spaces between adjacent rows of seats. However, the width of aisles and the seat pitch shall be such as to allow the craft to comply with the provisions of 4.8."

45 The existing paragraphs 4.7.14 to 4.7.16 are renumbered as paragraphs 4.7.15 to 4.7.17 respectively, and the following new paragraph 4.7.14 is inserted:

"4.7.14 Special category spaces used for stowage of motor vehicles shall be provided with walkways having a width of at least 600 mm leading to a safe means of escape."

46 In re-numbered paragraph 4.7.17, the following new sentence is added at the end of the paragraph:

"At least one means of escape from a machinery space shall consist of either a ladder leading to a door or hatch (not being a horizontal flush-hatch) or a door located in the lower part of that space and giving access to an adjacent compartment from which a safe means of escape is provided."

47 The following new paragraph 4.7.18 is inserted after re-numbered paragraph 4.7.17:

"4.7.18 Spaces that are only entered occasionally by crew members may have only one means of escape provided that it is independent of watertight doors."

48 In paragraph 4.8.1, the following new sentence is added at the end of the paragraph:

"In determining the evacuation time, all means of escape are to be considered serviceable and they need not be dimensioned to take into account any additional number of persons that might be diverted from other means of escape if one or more of those other means of escape are lost or rendered unserviceable."

49 The existing paragraphs 4.8.10 and 4.8.11 are renumbered as paragraphs 4.8.11 and 4.8.12 and the following new paragraph 4.8.10 inserted:

"4.8.10 Where the Administration is satisfied that the evacuation time determined in accordance with 4.8.1 to 4.8.9 can thereby be accurately estimated, the Administration may accept an evacuation demonstration in which persons are not required to descend through MES or equivalent means of evacuation, provided the time required to embark into the survival craft can be determined using:

.1 data obtained from the type-approval tests of the equipment, increased by a factor based on the guidelines developed by the Organization; or

.2 time extrapolated from trials using a limited number of participants."

CHAPTER 6
ANCHORING, TOWING AND BERTHING

50 The following new paragraph 6.1.4 is inserted after the existing paragraph 6.1.3:

"6.1.4 Under any operating load up to the breaking strength of the anchor cable or mooring lines, the loads on the bitts, bollards, etc., shall not result in damage to the hull structure that will impair its watertight integrity. A strength margin of at least 20% above the resultant load based on the minimum specified breaking strength of the relevant cable or warp shall be required."

CHAPTER 7
FIRE SAFETY

51 In paragraph 7.3.1.2, in the first bullet point, the reference to "1.4.4" is replaced by the reference to "1.4.5".

52 In paragraph 7.3.1.3, in the first bullet point, the reference to "1.4.5" is replaced by the reference to "1.4.6".

53 In paragraph 7.3.1.4, the words "as defined in 1.4.15" are replaced by the words "as defined in 1.4.16".

54 The existing paragraph 7.3.2 is renumbered as paragraph 7.3.3 and the following new paragraph 7.3.2 is inserted:

"7.3.2 In relation to the classification of spaces in 7.3.1, the following additional criteria shall be applied:

.1 If a space is divided by partial bulkheads into two (or more) smaller areas such that they form enclosed spaces, then the enclosed spaces shall be surrounded by bulkheads and decks in accordance with tables 7.4-1 and 7.4-2, as applicable. However, if the separating bulkheads of such spaces are at least 30% open, then the spaces may be considered as the same space.

.2 Cabinets having a deck area of less than 2 m^2 may be accepted as part of the space they serve, provided they have open ventilation to the space and do not contain any material or equipment that could be a fire risk.

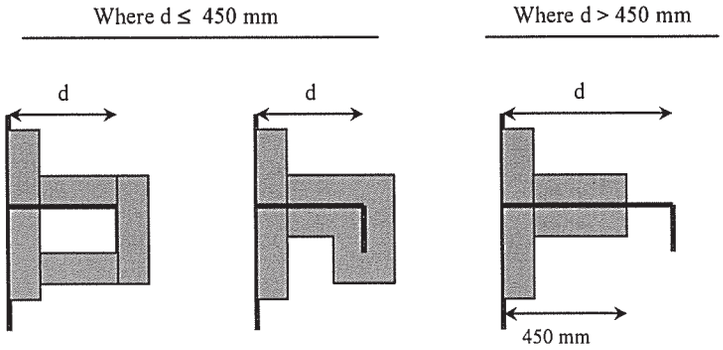
.3 Where a space has the special characteristics of two or more space groupings, the structural fire protection time of the divisions shall be the highest for the space groupings concerned. For example, the structural fire protection time of the divisions of emergency generator rooms shall be of the highest value for the space when the space is considered as being a control station (D) and a machinery space (A)."

55 The following new paragraphs 7.3.4 to 7.3.6 and associated figures 7.3.4a, 7.3.4b and 7.3.6 are inserted after re-numbered paragraph 7.3.3:

"7.3.4 To prevent heat transmission at intersections and terminal points, the insulation of the deck or bulkhead shall be carried past the intersection or terminal point for a distance of at least 450 mm in the case of steel or aluminium structures (refer to figures 7.3.4a and 7.3.4b).

7.3.5 If a space is divided by a deck or bulkhead and the fire insulation required for each space is different, the insulation with the higher structural fire protection time shall continue on the deck or bulkhead with the insulation of the lesser structural fire protection time for a distance of at least 450 mm beyond the boundary between the spaces.

7.3.6 Where the lower part of the fire insulation has to be cut for drainage, the construction shall be in accordance with the structural details shown in figure 7.3.6.



d = depth of stiffener on girder

Figure 7.3.4a

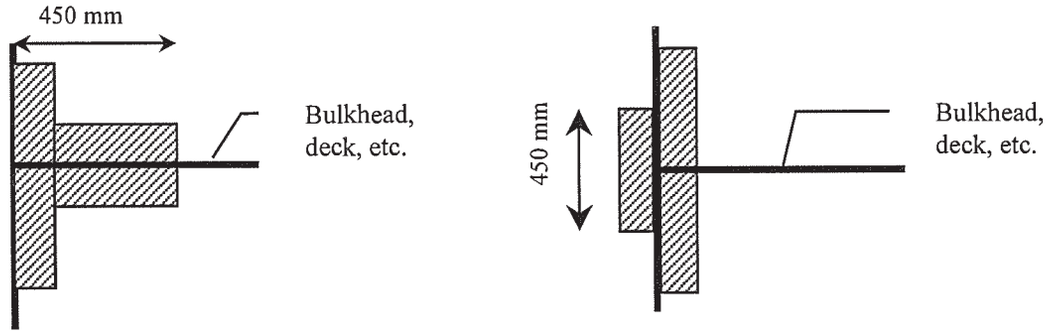


Figure 7.3.4b

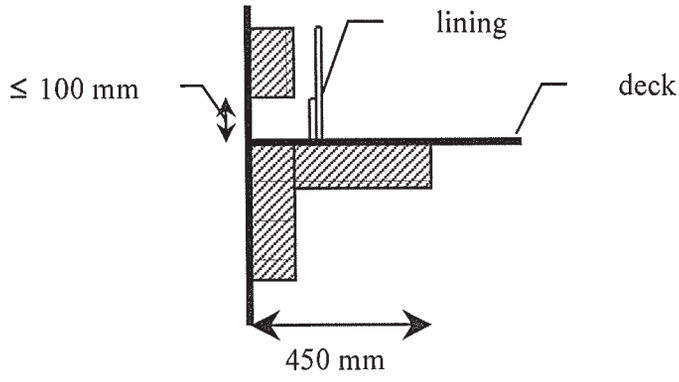


Figure 7.3.6 "

56 The following new paragraph 7.4.1.4 is inserted after the existing paragraph 7.4.1.3:

"7.4.1.4 Paragraph 7.4.1.3 does not apply to appendages such as air propellers, air ducts to propellers, transmission shafts, rudders and other control surfaces, struts, spars, flexible skirts, etc., which do not comprise part of the main structure of the craft."

57 In tables 7.4-1 and 7.4-2, note 1 is replaced by the following:

"1 The upper side of decks within spaces protected by fixed fire-extinguishing systems need not be insulated."

58 In paragraph 7.4.2.1, in the second sentence, the words "at the lightweight condition" are replaced by the words "at least 300 mm below the craft's waterline in the lightweight condition in displacement mode".

59 At the end of paragraph 7.4.2.6, the following new sentence is added:

"Where machinery shafts penetrate fire-resisting watertight divisions, arrangements shall be made to ensure that the required watertight and fire-resisting integrity of the division is not impaired."

60 The following new paragraph 7.4.2.7 is inserted after the existing paragraph 7.4.2.6:

"7.4.2.7 Ventilation openings may be accepted in entrance doors to public toilets, provided they are positioned in the lower portion of the door and fitted with closable grilles made of non-combustible or fire-restricting material and operable from outside the space."

61 At the end of paragraph 7.4.3.2, the following sentence is added:

"The fire insulation in such spaces may be covered by metal sheets (not perforated) or by vapour proof glass cloth sealed at joints."

62 In paragraph 7.4.3.3.1, the words "e.g., desks, wardrobes, dressing tables, bureaux and dressers" are inserted after the words "case furniture".

63 In paragraph 7.4.3.4, the words "Subject to 7.4.3.5" are inserted at the beginning of the paragraph.

64 The following new paragraph 7.4.3.5 is inserted after the existing paragraph 7.4.3.4 and the existing paragraphs 7.4.3.5 to 7.4.3.10 are renumbered as paragraphs 7.4.3.6 to 7.4.3.11:

"7.4.3.5 Paragraph 7.4.3.4 does not apply to partitions, windows and sidescuttles made of glass which are deemed to be non-combustible and to comply with the requirements for low-flame spread surfaces or to items and materials referred to in 7.4.3.3."

65 The last sentence of paragraph 7.4.4.1 is deleted.

66 The following new paragraph 7.4.4.2 is added after the existing paragraph 7.4.4.1 and the existing paragraphs 7.4.4.2 and 7.4.4.3 are renumbered as paragraphs 7.4.4.3 and 7.4.4.4:

"7.4.4.2 Open stairways may be fitted in public spaces consisting of only two decks, provided the stairways lie wholly within such public spaces and the following conditions are met:

.1 all levels are used for the same purpose;

.2 the area of the opening between the lower and upper parts of the space is at least 10% of the deck area between the upper and lower parts of the space;

.3 the design is such that persons within the space should be generally aware, or could easily be made aware of, a developing fire or other hazardous situation located within that space;

.4 sufficient means of escape are provided from both levels of the space directly leading to an adjacent safe area or compartment; and

.5 the whole space is served by one section of the sprinkler system."

67 The second sentence of re-numbered paragraph 7.4.4.4 is replaced by the following:

"Draught stops are not required in public spaces of category A craft having only one public space and on other craft in spaces with open ceilings (perforated ceilings) where the opening is 40% or more and the ceiling is arranged in such a way that a fire behind the ceiling can be easily seen and extinguished."

68 The following sentence is added at the end of paragraph 7.5.2:

"The use of aluminium in lubricating oil sump tanks for engines, or in lubricating oil filter housings fitted integral with the engines, is accepted."

69 In paragraph 7.6.1, the following sentence is inserted between the two existing sentences:

"The controls shall be easily accessible as well as prominently and permanently marked and shall indicate whether the shut-off is open or closed."

70 In paragraph 7.6.3.2, the words "(the junction between the duct and the galley range hood)" are inserted after the words "lower end of the duct".

71 In paragraph 7.6.3.4, the word "means" is replaced by the words "a remote means located with the above controls".

72 The following sentence is added at the end of the existing paragraph 7.6.3.5:

"At minimum, one hatch shall be provided close to the exhaust fan and others located in areas of high grease accumulation such as the lower end of the duct as referred to in 7.6.3.2."

73 The following text is added at the end of the existing paragraph 7.6.4:

"Fire and smoke dampers shall be arranged so as to be readily accessible. Where placed behind ceilings or linings, they shall be provided with an inspection door marked to identify the damper. Such identification shall also be placed on any required remote controls."

74 In paragraph 7.6.6, the following sentence is inserted before the last sentence:

"Manual closing may be achieved by mechanical means of release or by remote operation of the fire or smoke damper by means of a fail-safe electrical switch or pneumatic release (i.e. spring-loaded, etc.)."

75 In paragraph 7.7.1, the following sentence is inserted after the first sentence:

"Control stations not normally occupied (e.g., emergency generator rooms) need not be provided with manually operated call points."

76 In paragraph 7.7.1.1.4, the words ", each of which shall comprise a group of fire detectors and manually operated call points as displayed at the indicating unit(s) required by this paragraph" are added at the end of the first sentence.

77 In paragraph 7.7.1.1.9, in the first sentence, the text after "7.11.1" is deleted and a new sentence is added at the end of the paragraph as follows:

"Notwithstanding the preceding requirements of this paragraph, the Administration may accept that the same section of detectors can serve spaces on more than one deck if such spaces are located in the fore or aft end of the craft or they are so arranged that they constitute common spaces on different decks (e.g., fan rooms, galleys, public spaces, etc.)."

78 The following sentence is added at the end of paragraph 7.7.1.1.10:

"In the case of a fire detection system with remotely and individually identifiable fire detectors, this requirement is met if no machinery spaces of a major fire hazard are included in a loop (electrical circuit linking detectors of various sections in a sequence and connected (input and output) to the indicating unit(s)) covering accommodation spaces, service spaces and control stations."

79 In paragraph 7.7.1.1.14, the text following the words "except that" is replaced by the following:

"the control panel may be used to activate one or more of the following:

.1 paging system;

.2 fan stops;

.3 closure of fire doors;

.4 closure of fire and smoke dampers; and

.5 sprinkler system."

80 In paragraph 7.7.1.1.15, the text of the chapeau is replaced by the following:

"Fire detection systems in which all fire detectors are individually identifiable (i.e., having zone address identification capability) shall be so arranged that:"

81 In paragraph 7.7.1.1.15.1, the following words are added at the end of the paragraph:

"and no loop shall pass through a space twice. When this is not practical (e.g., for large public spaces), the part of the loop which by necessity passes through the space for a second time shall be installed at the maximum possible distance from the other parts of the loop."

82 In paragraph 7.7.1.1.15.2, the word "not" is inserted between the words "shall" and "render".

83 The following new paragraph 7.7.1.1.16 is inserted after the existing paragraph 7.7.1.1.15:

"The fire detection system in vehicle deck spaces, excluding manual call points, may be switched off with a timer during loading/unloading of vehicles."

84 The last sentence of paragraph 7.7.1.2.3 is replaced by the following:

"Detectors which are located in the overhead shall be a minimum distance of 0.5 m away from bulkheads, except in corridors, lockers and stairways."

85 In the first sentence of paragraph 7.7.3.1, the words "operating compartment and, where provided, from a" are inserted between the words "the" and "control".

86 The following new paragraph 7.7.3.2 is inserted after the existing paragraph 7.7.3.1 and the existing paragraphs 7.7.3.2 and 7.7.3.3 are renumbered as paragraphs 7.7.3.3 and 7.7.3.4:

"Additional fixed fire-extinguishing systems not required by the Code, but fitted to the craft are to meet the design requirements of this Code, except for the second discharge required for fixed gas fire-extinguishing systems."

87 In re-numbered paragraph 7.7.3.3.3, the following text is added after the first sentence:

"Pipelines may pass through accommodation spaces, provided they are of substantial thickness and their tightness is verified with a pressure test, after their installation, at a pressure head not less than 5 N/mm^2. In addition, pipelines passing through accommodation areas shall only be joined by welding and shall not be fitted with drains or other openings within such spaces. Pipelines shall not pass through refrigerated spaces."

88 The following sentence is added at the end of re-numbered paragraph 7.7.3.3.5:

"Openings that may admit air to, or allow gas to escape from, a protected space shall be capable of being closed from outside the protected space."

89 The following text is added at the end of re-numbered paragraph 7.7.3.3.6:

"corresponding to the gross volume of the machinery space being increased by the volume of air receivers converted to free air volume. Alternatively, a discharge pipe connected to a safety valve may be fitted to each air receiver, provided it leads directly to the open air."

90 In re-numbered paragraph 7.7.3.3.7, the words "which personnel can be expected to enter (e.g., ro-ro spaces) and where their access is facilitated by doors or hatches or" are inserted after the words "work or" in the first sentence; and in the second sentence, the word "operate" is replaced by the words "automatically operate (e.g., by opening of the release cabinet door)".

91 The following text is added at the end of re-numbered paragraph 7.7.3.3.10:

"Spaces are considered as separated where divisions comply with tables 7.4-1 and 7.4-2, as appropriate, or the divisions are gastight and of steel or equivalent materials."

92 The following text is added at the end of re-numbered paragraph 7.7.3.3.12:

"without moving the containers completely from their fixing position."

93 re-numbered paragraph 7.7.3.3.14 is replaced by the following:

"7.7.3.3.14 When the fire-extinguishing medium is stored outside a protected space, it shall be stored in a room which shall be situated in a safe and readily accessible location. For the purpose of the application of tables 7.4-1 and 7.4-2, such storage rooms shall be treated as control stations. For the storage rooms for fire-extinguishing media of fixed gas fire-extinguishing systems, the following apply:

.1 the storage room shall not be used for any other purposes;

.2 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;

.3 spaces shall be effectively ventilated. 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; and

.4 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."

94 The following text is added at the end of paragraph 7.7.4:

"Each portable fire extinguisher shall:

.1 not exceed 23 kg in total mass;

.2 have a capacity of at least 5 kg if of powder or carbon dioxide type;

.3 have a capacity of at least 9 *l* if of foam type;

.4 be examined annually;

.5 be provided with a sign indicating the date when was last examined;

.6 be hydraulic-pressure tested (cylinders and propellant bottles) every 10 years;

.7 not be placed in accommodation spaces if of carbon dioxide type;

.8 if located in control stations and other spaces containing electrical or electronic equipment or appliances necessary for the safety of the craft, be provided with extinguishing media which are neither electrically conductive nor harmful to the equipment and appliances;

.9 be ready for use and located in easily visible places such that it can be reached quickly and easily at any time in the event of a fire;

.10 be located such that its serviceability is not impaired by the weather, vibration or other external factors; and

.11 be provided with a device to identify whether it has been used."

95 In paragraph 7.7.5.1, the words "independently driven pumps" are replaced by the words "pumps powered by independent sources of power".

96 The following sentence is inserted before the last sentence of paragraph 7.7.5.3:

"The fire main shall be capable of being drained and shall be fitted with valves arranged so that fire main branches can be isolated when the main is used for purposes other than fire-fighting."

97 The following text is added at the end of paragraph 7.7.5.4:

"One hydrant shall be located in the vicinity of and outside each entrance to a machinery space."

98 In paragraph 7.7.5.5, the text after the words "non-perishable material" is replaced by the following:

"Fire hoses shall have a length of:

.1 at least 10 m;

.2 not more than 15 m in machinery spaces; and

.3 not more than 20 m for other spaces and open decks."

99 In paragraph 7.8.1.1, the words "Subject to 7.8.1.2" are inserted at the beginning and the second sentence is deleted.

100 The following new paragraph 7.8.1.2 is added after the existing paragraph 7.8.1.1 and the existing paragraphs 7.8.1.2 and 7.8.1.3 are renumbered as paragraphs 7.8.1.3 and 7.8.1.4:

"7.8.1.2 The vehicle deck of a special category space or a ro-ro space, including an open ro-ro space, need only be insulated on the underside if required. Vehicle decks located totally within ro-ro spaces may be accepted without structural fire protection, provided these decks are not part of, or do not provide support to, the craft's main load-carrying structure and provided satisfactory measures are taken to ensure that the safety of the craft, including fire-fighting abilities, integrity of fire resisting divisions and means of evacuation, is not affected by a partial or total collapse of these internal decks."

101 Paragraph 7.8.2 is renumbered 7.8.2.1 and the following text is inserted after paragraph 7.8.2.1:

"7.8.2.2 The pumps of the system shall be capable of maintaining:

.1 half the total required application rate with any one pump unit out of function, for category A craft; and

.2 the total required application rate with any one pump unit out of function, for category B craft.

7.8.2.3 Fixed fire-extinguishing systems shall fulfil the following requirements:

.1 the valve manifold shall be provided with a pressure gauge, and each of the valves shall be marked to identify the protected areas;

.2 instructions for maintenance and operation of the installation shall be set up in the room where the valves are located; and

.3 the piping system shall be provided with a sufficient number of drainage valves."

102 The following text is added at the end of paragraph 7.8.4.1:

", which shall consist of a metal L-shaped pipe, the long limb being approximately 2 m in length and capable of being fitted to a fire hose, and the short limb being approximately 250 mm in length and fitted with a fixed water fog nozzle or capable of being fitted with a water spray nozzle;"

103 The following text is added at the end of paragraph 7.8.4.3:

"In addition to complying with 7.7.4, fire extinguishers shall be suitable for A and B class fires and have a capacity of 12 kg dry powder or equivalent."

104 Paragraph 7.8.6 is renumbered as paragraph 7.8.6.1 and the words "scuppers shall be fitted so" in the first sentence are replaced by the words "pumping and drainage arrangements shall be such as to prevent such accumulation. Scuppers fitted for this purpose shall be so arranged".

105 The following new paragraph 7.8.6.2 is inserted after re-numbered paragraph 7.8.6.1:

"7.8.6.2 In respect of scuppers and drainage pumps fitted in accordance with 7.8.6.1:

.1 the amount of water for which drainage is provided shall take into account the capacity of both the water spraying system pumps and required number of fire hose nozzles;

.2 the drainage system shall have a capacity of not less than 125% of the capacity specified in .1 above; and

.3 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."

106 In paragraph 7.8.7.1, the text after the first sentence is replaced by the following:

"Electrical equipment installed more than 450 mm above the deck or platform shall be of a type enclosed and protected by an enclosure having an ingress protection based on an international standard acceptable to the Organization. However, if the installation electrical equipment and wiring less than 450 mm above the deck or platform is necessary for the safe operation of the craft, such electrical equipment and wiring may be installed provided that the equipment is certified "safe type" based on an international standard acceptable to the Organization. "

107 The existing text of paragraph 7.8.7.2 is replaced by the following:

"7.8.7.2 If installed in an exhaust ventilation duct, electrical equipment shall be certified "safe type". The equipment and wiring, if fitted, shall be suitable for use based on standards acceptable to the Organization and the outlet from any exhaust duct shall be sited in a safe position, having regard to other possible sources of ignition."

108 In paragraph 7.10.1.2, the words "complying with the requirements of 7.8.4.1" are inserted after the words "water fog applicator".

109 In paragraph 7.10.2, the words "or sets of personal equipment shall be so stored as" are replaced by the words "and sets of personal equipment shall be stored in permanently and clearly marked locations arranged so as".

110 In paragraph 7.10.3.1.2, the words "and gloves" are deleted.

111 In paragraph 7.10.3.1.4, the word "type" is replaced by the words "explosion-proof type certified to a standard acceptable to the Organization".

112 The words "having a handle provided with high-voltage insulation" are added at the end of paragraph 7.10.3.1.5.

113 Paragraphs 7.10.3.2 and 7.10.3.2.1 are deleted, the remaining paragraph 7.10.3.2.2 is renumbered as 7.10.3.2 and the words "of an approved type" are inserted after the words "breathing apparatus".

114 The second sentence of the renumbered paragraph 7.10.3.2 is replaced by the following:

"Two spare charges suitable for use with the apparatus shall be provided for each required apparatus."

115 In paragraph 7.10.3.3, the words "sufficient length" are replaced by the words "approximately 30 m in length" and the following new sentence is added at the end:

"The lifeline shall be subjected to a test by static load of 3.5 kN for 5 min."

116 In paragraph 7.11.1.3, the words "within the structural fire protection time for areas of major fire hazard." are added at the end.

117 In paragraph 7.13.1, the following sentence is inserted after the first sentence:

"A stairway open at one deck shall be considered part of the space to which it is open and consequently shall be protected by any sprinkler system provided for that space."

118 In paragraph 7.13.3, the words "operational speed" are replaced by the words "90% of maximum speed".

119 The existing text of subparagraph .2 of paragraph 7.17.2.2 is replaced by the following:

".2 purpose-built container craft and cargo spaces intended for the carriage of dangerous goods in freight containers and portable tanks. In this regard, a purpose-built container space is a cargo space fitted with cell guides for stowage and securing containers;"

120 In paragraph 7.17.2.3, the words ", including special category spaces," are inserted after the words "ro-ro spaces".

121 The following text is added at the end of paragraph 7.17.3:

"For the purpose of this section, "on deck" shall be taken to mean spaces on the weather deck."

122 In paragraph 7.17.3.1.2, the word "supplying" is replaced by the words "simultaneously supplying the arrangements required by 7.17.3.1.3 for the largest designated cargo space and the" and the following sentence is inserted after the first sentence:

"This requirement shall be met by the total capacity of the main fire pump(s) not including the capacity of the emergency fire pump, if fitted."

123 In paragraph 7.17.3.1.3:

.1 the words "shall be provided" are deleted from the end of the first sentence and are re-inserted after the first word "Means";

.2 the words "copious quantities of water" are replaced by the words "with water at not less than 5 *l*/min/m^2 of the horizontal area of cargo spaces"; and

.3 the words "meet the requirements of 7.8.6 and" are inserted after the words "drainage and pumping arrangements shall".

124 The following sentence is added at the end of paragraph 7.17.3.1.4:

"Substitution by a high expansion foam system complying with regulation II-2/10.4.1.1.2 of the Convention is also acceptable."

125 The following new paragraphs 7.17.3.1.5 and 7.17.3.1.6 are added after existing paragraph 7.17.3.1.4:

"7.17.3.1.5 The requirements of 7.17.3.1.1 to 7.17.3.1.4 may be fulfilled by a water spray system approved by the Administration based on the standards developed by the Organization, provided that the amount of water required for fire-fighting purposes in the largest cargo space allows simultaneous use of the water spray system plus four jets of water from hose nozzles in accordance with 7.17.3.1.2.

7.17.3.1.6 Craft carrying dangerous goods shall be provided with three fire hoses and nozzles complying with 7.7.5.6 in addition to those required by 7.7.5.5."

126 In the first sentence of paragraph 7.17.3.2, the words "or vehicle decks" are added after the words "enclosed cargo spaces".

127 In paragraph 7.17.3.4.2, the sentence "Exhaust fans shall be of non-sparking type." is inserted after the first sentence and the text of the last sentence is replaced by the following:

"Suitable wire mesh guards having a mesh size not exceeding 13 mm x 13 mm shall be fitted over inlet and outlet ventilation openings to prevent foreign objects from entering into the casing."

128 Existing paragraph 7.17.3.4.3 is renumbered as paragraph 7.17.3.4.4; the relevant reference in table 7.17-2 is amended; and the following new paragraph 7.17.3.4.3 is inserted:

"7.17.3.4.3 If adjacent spaces are not separated from cargo spaces by gastight bulkheads or decks, ventilation requirements shall apply to the adjacent spaces as for the cargo space itself."

129 The following new paragraph 7.17.3.4.5 is added after re-numbered paragraph 7.17.3.4.4:

"7.17.3.4.5 For open-top container craft, power ventilation is required only for the lower part of the cargo hold for which purpose-built ducting is required. The ventilation rate shall be at least two air changes per hour based on the empty hold volume below the weather deck."

130 In table 7.17-1, the words "(includes cargoes of group B of the Code of Safe Practice for Solid Bulk Cargoes, 2004, except for cargoes denoted Materials Hazardous in Bulk)" are added to the words "Solid dangerous goods in bulk" at the head of the right-hand column.

131 In table 7.17-1, the words "per hour" are added at the end of the second sentence of note 1.

132 In table 7.17-2, note 4, the words "residues of" are added after the word "containing".

133 In table 7.17-2, the following note 7 is inserted with references from row 7.17.3.4.2, columns 4.2 and 4.3, and the existing notes 7 to 11 to table 7.17-3 together with their references in that table are renumbered as notes 8 to 12:

"7 For seedcake containing residues of solvent extraction and cargoes of BC Code Class 4.3, two separate fans shall be permanently fitted unless portable type fans have been adapted for being securely fitted (e.g., fixed) prior to loading and during the voyage. The ventilation system shall comply with the provisions of 7.17.3.4.1 and 7.17.3.4.2. Ventilation shall be such that any escaping gases cannot reach public spaces or crew accommodation on or under deck."

134 In table 7.17-3, in the seventh and eighth columns, the references to "3.1 3.2" and "3.3" are replaced by the reference to "3" and the following new note 13 is added to "x" in column "5.2", last and penultimate lines:

"Under the provisions of the IMDG Code, stowage of class 5.2 dangerous goods under deck or in enclosed ro-ro spaces is prohibited."

135 At the end of the existing paragraph 7.17.3.5, the following new text is added:

"as follows:

.1 if the bilge drainage system for cargo spaces is additional to the system served by pumps in the machinery space, the capacity of the system shall be not less than than 10 m^3/h per cargo space served. If the additional system is a common system, the capacity need not exceed 25 m^3/h. The additional bilge system need not be arranged with redundancy. 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;

.2 if bilge drainage of cargo spaces is arranged by gravity drainage, the drainage shall be either lead directly overboard or to a closed drain tank located outside the machinery spaces. The tank shall be provided with vent pipe to a safe location on the open deck;

.3 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. Electrical equipment in the space shall be of certified safe type. If the space has access from another enclosed space, the door shall be self-closing; and

.4 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."

136 The following text is added at the end of the first sentence of paragraph 7.17.3.6.1:

"and shall be selected taking into account the hazards associated with the chemicals being transported and the standards developed by the Organization according to the class and physical state."

137 The following new sentence is added at the end of paragraph 7.17.3.6.2:

"In addition to the requirements of 7.10.3.2.2, two spare charges suitable for use with the breathing apparatus shall be provided for each required apparatus."

138 In paragraph 7.17.3.8.2, the words "meet the requirements of 7.8.6, have valves operable from outside the space at a position in the vicinity of the extinguishing system controls and" are inserted after the words "drainage and pumping arrangements shall".

CHAPTER 8
LIFE-SAVING APPLIANCES AND ARRANGEMENTS

139 Existing paragraphs 8.7.6 to 8.7.10 are renumbered as paragraphs 8.7.7 to 8.7.11 and the following new paragraph 8.7.6 is inserted:

"8.7.6 Where an MES is provided for embarkation into survival craft on a category B craft, an alternative means of evacuating passengers and crew into survival craft on the same side of the craft in conditions up to and including the worst intended conditions is to be provided for use if the MES is lost or rendered unserviceable in the event of damage of longitudinal extent specified in 2.6.7.1."

140 In paragraph 8.9.14.2, after the word "shall", the words "be subject to a thorough examination at the annual surveys required by paragraph 1.5.1.3" are added and the remainder of the sentence is deleted.

141 In paragraph 8.9.14.3, after the word "brake", the words "at maximum lowering speed. The load to be applied shall be the mass of the survival craft or rescue boat without persons on board, except that, at intervals not exceeding five years, the test shall be carried out with a proof load equal to 1.1 times the weight of the survival craft or rescue boat and its full complement of persons and equipment." are added and the remainder of the sentence is deleted.

CHAPTER 10
AUXILIARY SYSTEMS

142 In paragraph 10.2.4.8, the words "the filling pipes" at the end of the first sentence are replaced by the words "bunkering pipes and any filling pipes served by on-board pumps"; and the words "and, for fuel of flashpoint less than 43°C," are replaced by the words "where there is no risk of fire or explosion from the emergence of oils and vapour, shall not lead into crew spaces, passenger spaces, special category spaces, ro-ro spaces (other than open ro-ro spaces), machinery spaces or similar spaces. For fuel of flashpoint less than 43°C such valves and pipes".

CHAPTER 11
REMOTE CONTROL, ALARM AND SAFETY SYSTEMS

143 In paragraph 11.3.3, in the first sentence, the words "in a station" are replaced by the words "at one or more stations".

144 In paragraph 11.4.1.2, subparagraphs .4 to .11 are renumbered as subparagraphs .5 to .12 and the following new subparagraph .4 is inserted after the existing subparagraph .3:

".4 detection of bilge water in each watertight compartment below the design waterline;"

CHAPTER 13
SHIPBORNE NAVIGATIONAL SYSTEMS AND EQUIPMENT AND VOYAGE DATA RECORDERS

145 The existing paragraph 13.8.2 is renumbered as paragraph 13.8.3 and the following new paragraph 13.8.2 is inserted:

"13.8.2 High-speed craft shall be fitted with an ECDIS as follows:

.1 craft constructed on or after 1 July 2008;

.2 craft constructed before 1 July 2008, not later than 1 July 2010."

CHAPTER 14
RADIOCOMMUNICATIONS

146 The existing text of paragraph 14.15.10 is replaced by the following:

"14.15.10 Satellite EPIRBs on all craft shall be:

.1 annually tested for all aspects of operational efficiency, with special emphasis on checking the emission on operational frequencies, coding and registration, at intervals as specified below:

.1 on passenger craft, within 3 months before the expiry date of the High-Speed Craft Safety Certificate; and

.2 on cargo craft, within 3 months before the expiry date, or 3 months before or after the anniversary date, of the High-Speed Craft Safety Certificate;

The test may be conducted on board the craft or at an approved testing station; and

.2 subject to maintenance at intervals not exceeding five years, to be performed at an approved shore-based maintenance facility."

CHAPTER 18
OPERATIONAL REQUIREMENTS

147 The existing text of subparagraph .4 of paragraph 18.1.3. is replaced by the following:

".4 provision in the area of operation of a base port having functions and facilities in accordance with the requirements of this Code;"

ANNEX 1
FORM OF HIGH–SPEED CRAFT SAFETY CERTIFICATE AND RECORD OF EQUIPMENT

148 In the Record of Equipment for High-Speed Craft Safety Certificate, in section 3, the following new item 16 is inserted after the existing item 15 and the existing item 16 is renumbered as 17.

"16 Long-range identification and tracking system"

149 In the Record of Equipment for High-Speed Craft Safety Certificate, section 4, the words "Two-way on-scene radiocommunications 121.5 MHz & 123.1 MHz" are inserted as item 7.

ANNEX 6
STABILITY OF HYDROFOIL CRAFT

150 In the chapeau paragraph, the following new paragraphs are inserted after the existing introductory paragraph and prior to paragraph 1:

"As required by 2.3.1, the stability of hydrofoil craft shall be assessed under all permitted conditions of loading.

The term "hull-borne mode" has the same meaning as "displacement mode" defined in 1.4.22 of the Code.

The term "foil-borne mode" has the same meaning as "non-displacement mode" defined in 1.4.38 of the Code."

ANNEX 7
STABILITY OF MULTIHULL CRAFT

151 At the end of paragraph 1.4.2, the following sentence is added:

"Alternatively, another method of assessment may be employed, as provided for in 2.1.4 of this Code."

152 At the end of paragraph 1.5, the following sentence is added:

"The determination of θ_r using model test or other data shall be made using the method for determining θ_Z in 1.1.5.3 of annex 6."

153 At the end of paragraph 2.3, the words ", as determined in 1.5 of this annex" are added.

ANNEX 8
STABILITY OF MONOHULL CRAFT

154 The existing text of paragraph 1.1 is replaced by the following:

"1.1 The weather criterion contained in paragraph 3.2 of the Intact Stability Code shall apply. In applying the weather criterion, the value of wind pressure P (N/m2) shall be taken as:

$$500\{V_w/26\}^2$$

where V_w = wind speed (m/s) corresponding to the worst intended conditions.

The angle of heel due to wind, in applying paragraph 3.2.2.1.2 of the Intact Stability Code, shall not exceed 16° or 80% of the angle of deck-edge immersion (whichever is less). Where the angle of heel due to wind exceeds 10°, efficient non-slip deck surfaces and suitable holding points shall be provided, in accordance with 2.13.1.1 of this Code. In applying the weather criterion, account shall also be taken of the roll damping characteristics of individual craft in assessing the assumed roll angle θ_1, which may alternatively be derived from model or full scale tests using the method for determining θ_z in 1.1.5.3 of annex 6. Hulls with features which greatly increase damping, such as immersed sidehulls, substantial arrays of foils, or flexible skirts or seals, are likely to experience significantly smaller magnitudes of roll angle. For such craft, therefore, the roll angle shall be derived from model or full scale tests or, in the absence of such data, shall be taken as 15°."

155 The following new sentence is added at the end of paragraph 2.1.1:

"The range shall be taken as the difference between the equilibrium heel angle and the heel angle at which the residual righting lever subsequently becomes negative or the angle at which progressive flooding occurs, whichever is less."

ANNEX 9
DEFINITIONS, REQUIREMENTS AND COMPLIANCE CRITERIA RELATED TO OPERATIONAL AND SAFETY PERFORMANCE

156 In the second sentence of the first paragraph, the word "prototype" is replaced by the word "first".

157 In paragraphs 2.1.1, 2.1.2, 2.1.3 and 3.3.1, the words "maximum operational speed" are replaced by the words "90% of maximum speed".

158 In paragraph 3.2, the sentence "The worst intended conditions shall not exceed 150% of the more severe of the two measured sea conditions" is inserted as the penultimate sentence.

ANNEX 10
CRITERIA FOR TESTING AND EVALUATION OF REVENUE AND CREW SEATS

159 In the title, the words "REVENUE AND CREW" are deleted.

160 In paragraph 3.4, the words "same strength and stiffness" are replaced by the words "equivalent strength and stiffness".

161 In paragraph 3.6, after the words "and measurement," the words "if possible" are deleted.

162 In paragraph 3.9, the following subparagraphs .3.3 to .3.5 are inserted after the existing subparagraph .3.2 and the existing subparagraph .3.3 is renumbered as subparagraph .3.6:

".3.3 neck flexion does not exceed 88 Nm;

.3.4 neck extension does not exceed 48 Nm;

.3.5 in lieu of the requirements of .3.3 and .3.4 above, a seatback or headrest of at least 850 mm above the seat cushion is acceptable; and".

163 The following new annex 12 is added after the existing annex 11:

"ANNEX 12

FACTORS TO BE CONSIDERED IN DETERMINING CRAFT OPERATING LIMITATIONS

1 Purpose and scope

The purpose of this annex is to identify the parameters to which consideration should be given when determining the worst intended conditions (defined in 1.4.61) and other operational limitations (defined in 1.4.41) for insertion into the Permit to Operate, in order to facilitate consistent application of the Code.

2 Factors to be considered

As a minimum, the following factors shall be considered:

.1 The maximum distance from refuge implied by 1.3.4.

.2 The availability of rescue resources to comply with 1.4.12.1 (category A craft only).

.3 Minimum air temperature (susceptibility to icing), visibility and depth of water for safe operation as addressed by 1.4.61.

.4 The significant wave height and maximum mean wind speed used when applying the requirements for stability and buoyancy in chapter 2 and associated annexes.

.5 The safe seakeeping limitations (especially significant wave height) considering the known stability hazards listed in 2.1.5, the operating conditions on the intended route (see 18.1.3.2) and the motions experienced during operation defined in 3.3 of annex 9.

.6 The structural safety of the craft in critical design conditions according to chapter 3.

.7 The safe deployment and operation of evacuation systems and survival craft as required by 8.6.5.

.8 The safe handling limitations determined in accordance with the sea trials required by chapter 17 and annexes 3 and 9, identifying any limitations on weight and centre-of-gravity position according to 17.3, and the effects of failures and malfunctions according to 17.4."

第 40/2015 號行政長官公告

中華人民共和國於一九九九年十二月十三日以照會通知聯合國秘書長，經修訂的《1974年國際海上人命安全公約》的1978年議定書自一九九九年十二月二十日起適用於澳門特別行政區；

國際海事組織海上安全委員會於二零一二年十一月三十日透過第MSC.343（91）號決議通過了議定書修正案，該修正案自二零一四年七月一日起適用於澳門特別行政區；

基於此，行政長官根據澳門特別行政區第3/1999號法律第六條第一款的規定，命令公佈包含上指修正案的第MSC.343（91）號決議的中文及英文文本。

二零一五年四月二十二日發佈。

行政長官　崔世安

Aviso do Chefe do Executivo n.º 40/2015

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 do Protocolo de 1978 relativo à Convenção Internacional para a Salvaguarda da Vida Humana no Mar de 1974, tal como emendado, na Região Administrativa Especial de Macau, a partir de 20 de Dezembro de 1999;

Considerando igualmente que, em 30 de Novembro de 2012, o Comité de Segurança Marítima da Organização Marítima Internacional, através da resolução MSC.343(91), adoptou emendas ao Protocolo, e que tais emendas são aplicáveis na Região Administrativa Especial de Macau desde 1 de Julho de 2014;

O Chefe do Executivo manda publicar, nos termos do n.º 1 do artigo 6.º da Lei n.º 3/1999 da Região Administrativa Especial de Macau, a resolução MSC.343(91) que contém as referidas emendas, nos seus textos em línguas chinesa e inglesa.

Promulgado em 22 de Abril de 2015.

O Chefe do Executivo, *Chui Sai On*.

第 MSC.343（91）號決議

（2012 年 11 月 30 日通過）

《1974 年國際海上人命安全公約》1978 年議定書

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二十八條第（二）款，

還憶及《1974 年國際海上人命安全公約》（以下稱“本公約”）第 VIII（b）條和本公約 1978 年議定書（以下稱《1978 年安全公約議定書》）賦予海上安全委員會審議和通過《1978 年安全公約議定書》修正案的職能，

認識到有必要使《1978 年安全公約議定書》附錄中的“貨船構造安全證書”和“貨船設備安全證書”的格式內容與本公約和《1988 年安全公約議定書》的證書格式保持一致，

在其第九十一屆會議上**審議了**按本公約第 VIII（b）（i）條以及《1978 年安全公約議定書》第 II 條提出和分發的《1978 年安全公約議定書》修正案，

1. 按照本公約第 VIII（b）（iv）條以及《1978 年安全公約議定書》第 II 條，**通過**《1978 年安全公約議定書》附則附錄的修正案，其文本載於本決議附件中；

2. 按照本公約第 VIII（b）（vi）（2）（bb）條和《1978 年安全公約議定書》第 II 條，**決定**上述修正案須在 2014 年 1 月 1 日視為已被接受，除非在此日期之前，有三分之一以上的《1978 年安全公約議定書》締約國政府或擁有商船合計噸位不少於世界商船總噸位 50%的締約國政府表示反對該修正案；

3. **請**各締約國政府注意，按本公約第 VIII（b）（vii）（2）條和《1978 年安全公約議定書》第 II 條，該修正案須在按上述第 2 段被接受後，於 2014 年 7 月 1 日生效；

4. **要求**秘書長按本公約第 VIII（b）（v）條和《1978 年安全公約議定書》第 II 條規定，將本決議及其附件中的修正案文本的核證無誤副本分發給所有《1978 年安全公約議定書》締約國政府；

5. **還要求**秘書長將本決議及其附件的副本分發給非《1978 年安全公約議定書》締約國的本組織會員國。

附件

經修正的《1974 年國際海上人命安全公約》

1978 年議定書修正案

附件

《1974 年國際海上人命安全公約》附則的修改和增加

附錄

“貨船構造安全證書”和“貨船設備安全證書”的現有格式由如下替代：

貨船構造安全證書格式

貨船構造安全證書

（公章）（國家）

根據_____政府授權，

（國名）

由_____

（經授權的人員或組織）

按照經《1978 年議定書》修訂的

《1974 年國際海上人命安全公約》的規定簽發

船舶資料 [1]

船名.....

船舶編號或呼號.....

船籍港.....

總噸位.....

載重量（公噸）[2].....

IMO 編號.....

船型 [3]

散貨船

油船

化學品液貨船

氣體運輸船

上述船型以外的貨船

建議日期：

建造合同日期 .....

安放龍骨或處於類似建造階段的日期 .....

交船日期.....

重大改建或改裝或改造工作開始的日期（如適用）.....

須填寫所有適用日期。

茲證明：

1 該船業已按公約第 I/10 條的要求進行了檢驗。

2 該檢驗表明上述條款所界定的結構、輪機及設備的狀況令人滿意，並且該船符合公約第 II-1 章和第 II-2 章的有關要求（有關消防安全系統和設備及防火控制圖者除外）。

3 在實施第 I/6（b）條的過程中，締約國政府已實行：

- 強制性年度檢驗；

- 不定期檢查。

4 已經/沒有 [3] 簽發免除證書。

5 船舶有/沒有 [3] 按照公約第 II-1/55/II-2/17[3] 條經過替代設計和佈置。

6 輪機和電氣設備/防火 [3] 的替代設計和佈置的批准文件附於/沒有附於 [3] 本證書之後。

本證書有效期限至.....止。

本證書所依據的檢驗的完成日期：.....（*年/月/日*）

簽發於.....

（簽發證書的地點）

....

（簽發日期） （經授權發證的官員簽字）

（發證機關蓋章或鋼印）

中間檢驗

（10 年及以上船齡的液貨船）

茲證明，經《1978 年議定書》修訂的公約第 I/10 條要求的中間檢驗證實該船符合公約的有關規定。

簽字：.....
（經授權的官員簽字）

地點：.....

日期：.....
（簽註機關蓋章或鋼印）

簽字：.....
（經授權的官員簽字）

地點：.....

日期：.....

（簽註機關蓋章或鋼印）

強制性年度檢驗或不定期檢查

茲證明，業已按照經《1978 年議定書》修訂的公約第 I/6（b）條和本組織相關建議案對該船進行了檢驗。

第 1 次強制性年度檢驗 [3,4]　　簽字：.....

第 1 次不定期檢查 [3]　　地點：.....

日期：.....

（簽註機關蓋章或鋼印）

第 2 次強制性年度檢驗 [3,4] 簽字：.....

第 2 次不定期檢查 [3] 地點：.....

日期：.....

（簽註機關蓋章或鋼印）

第 3 次強制性年度檢驗 [3,4] 簽字：.....

第 3 次不定期檢查 [3] 地點：.....

日期：.....

（簽註機關蓋章或鋼印）

第 4 次強制性年度檢驗 [3,4] 簽字：.....

第 4 次不定期檢查 [3] 地點：.....

日期：.....

（簽註機關蓋章或鋼印）

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[1] 船舶資料也可在表格中橫向排列。

[2] 僅適用於油船、化學品液貨船和氣體運輸船。

[3] 酌情刪除。

[4] 中間檢驗可替代強制性年度檢驗，但不定期檢查不可替代強制性年度檢驗。

貨船設備安全證書格式

貨船設備安全證書

本證書須附有貨船安全設備記錄（格式 E）

（公章）（國家）

根據_____政府授權，

（國名）

由_____

（經授權的人員或組織）

按照經《1978 年議定書》修訂的

《1974 年國際海上人命安全公約》的規定簽發

船舶資料 [1]

船名 .....

船舶編號或呼號 .....

船籍港 .....

總噸位 .....

載重量（公噸）[2] .....

船長（第 III/3.12 條） .....

IMO 編號 .....

船型 [3]

散貨船

油船

化學品液貨船

氣體運輸船

上述船型以外的貨船

安放龍骨或處於類似建造階段的日期，

或（如適用）重大改建或改裝或改造工作開始的日期.....

茲證明：

1 該船業已按經《1978 年議定書》修訂的公約第 I/8 條的要求進行了檢驗。

2 檢驗表明：

2.1 該船符合公約有關消防安全系統和設備及防火控制圖的要求；

2.2 該船已按照公約要求配備了救生設備及救生艇、救生筏和救助艇用屬具；

2.3 該船已按照公約要求配備了在救生設備中使用的拋繩設備和無線電裝置；

2.4 該船在船載航行設備、引航員登船設施及航海出版物方面符合公約的要求；

2.5 該船根據公約及現行《國際海上避碰規則》的要求配備了航行燈、號型以及發出聲響信號和遇險信號的設備；

2.6 該船所有其他方面均符合公約的有關要求；

2.7 該船有/沒有[3]按照公約第 II-2/17/III/38[3]條經過替代設計和佈置;

2.8 防火/救生設備和裝置[3]的替代設計和佈置的批准文件附於/沒有附於[3]本證書之後。

3 該船按第 III/26.1.1.1 條[4]在.....航區範圍內運營。

4 在實施第 I/6（b）條的過程中，主管機關已實行：

- 強制性年度檢驗；

- 不定期檢查。

5 已經/沒有[3]簽發免除證書。

本證書有效期限至.....止。

本證書所依據的檢驗的完成日期：.....（*年/月/日*）

簽發於.....

（簽發證書的地點）

....

（簽發日期） （經授權發證的官員簽字）

（發證機關蓋章或鋼印）

中間檢驗

（10 年及以上船齡的液貨船）

茲證明，經《1978 年議定書》修訂的公約第 I/8 條要求的中間檢驗證實該船符合公約的有關規定。

簽字：.....

（經授權的官員簽字）

地點：.....

日期：.....

（簽註機關蓋章或鋼印）

強制性年度檢驗或不定期檢查

茲證明，業已按照經 1978 年議定書修訂的公約第 I/6（b）條和本組織相關建議案對該船進行了檢驗。

強制性年度檢驗 [3,5]

不定期檢查 [3]

簽字：.....

地點：.....

日期：.....

（簽註機關蓋章或鋼印）

***

按照經《1978 年議定書》修訂的公約第 I/14 條的規定，本證書有效期延長至.....止。

簽字：.....

地點：.....

日期：.....

（簽註機關蓋章或鋼印）

---

1 船舶資料也可在表格中橫向排列。

2 僅適用於油船、化學品液貨船和氣體運輸船。

3 酌情刪除。

4 參閱《安全公約》1983 年修正案（第 MSC.6（48）號決議），就船上自扶正部分封閉救生艇來說，適用於在 1986 年 7 月 1 日或以後但在 1998 年 7 月 1 日前建造的船舶。

5 中間檢驗可替代強制性年度檢驗，但不定期檢查不可替代強制性年度檢驗。

RESOLUTION MSC.343(91)
(adopted on 30 November 2012)

AMENDMENTS TO THE PROTOCOL OF 1978 RELATING TO THE INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

RECALLING ALSO Article VIII(b) of the International Convention for the Safety of Life at Sea (SOLAS), 1974 (hereinafter referred to as "the Convention") and the functions which the Protocol of 1978 relating to the Convention (hereinafter referred to as "the 1978 SOLAS Protocol") confers upon the Maritime Safety Committee for the consideration and adoption of amendments to the 1978 SOLAS Protocol,

RECOGNIZING the need to align the contents of the Forms of the Safety Construction Certificate and Safety Equipment Certificate for cargo ships set out in the appendix to the 1978 SOLAS Protocol with those in the Convention and the 1988 SOLAS Protocol,

HAVING CONSIDERED, at its ninety-first session, amendments to the 1978 SOLAS Protocol proposed and circulated in accordance with Article VIII(b)(i) of the Convention and Article II of the 1978 SOLAS Protocol,

1. ADOPTS, in accordance with Article VIII(b)(iv) of the Convention and Article II of the 1978 SOLAS Protocol, amendments to the appendix to the annex to the 1978 SOLAS Protocol, 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 and Article II of the 1978 SOLAS Protocol, that the said amendments shall be deemed to have been accepted on 1 January 2014, unless, prior to that date, more than one third of the Parties to the 1978 SOLAS Protocol or Parties the combined merchant fleets of which constitute not less than 50 per cent of the gross tonnage of the world's merchant fleet, have notified their objections to the amendments;

3. INVITES the Parties concerned to note that, in accordance with Article VIII(b)(vii)(2) of the Convention and Article II of the 1978 SOLAS Protocol, the amendments shall enter into force on 1 July 2014, upon their acceptance in accordance with paragraph 2 above;

4. REQUESTS the Secretary-General, in conformity with Article VIII(b)(v) of the Convention and Article II of the 1978 SOLAS Protocol, to transmit certified copies of the present resolution and the text of the amendments contained in the annex to all Parties to the 1978 SOLAS Protocol;

5. ALSO REQUESTS the Secretary-General to transmit copies of this resolution and its annex to Members of the Organization, which are not Parties to the 1978 SOLAS Protocol.

ANNEX

AMENDMENTS TO THE PROTOCOL OF 1978 RELATING TO THE INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974, AS AMENDED

ANNEX

MODIFICATIONS AND ADDITIONS TO THE ANNEX TO THE INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974

APPENDIX

The existing forms of the Cargo Ship Safety Construction Certificate and Cargo Ship Safety Equipment Certificate are replaced by the following:

FORM OF SAFETY CONSTRUCTION CERTIFICATE FOR CARGO SHIPS

CARGO SHIP SAFETY CONSTRUCTION CERTIFICATE

(Official seal) (State)

Issued under the provisions of the
INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE
AT SEA, 1974, as modified by the Protocol of 1978 relating thereto

under the authority of the Government of

_____
(*name of the State*)

by _____
(*person or organization authorized*)

Particulars of ship[1]

Name of ship .....

Distinctive number or letters .....

Port of registry .....

Gross tonnage .....

Deadweight of ship (metric tons)[2] .....

IMO Number .....

Type of ship[3]

Bulk carrier
Oil tanker
Chemical tanker
Gas carrier
Cargo ship other than any of the above

Date of build:

Date of building contract .....
Date on which keel was laid or ship was at similar stage of construction .....
Date of delivery .....
Date on which work for a conversion or an alteration or modification of a major character was commenced (where applicable) .....

All applicable dates shall be completed.

THIS IS TO CERTIFY:

1 That the ship has been surveyed in accordance with the requirements of regulation I/10 of the Convention.

2 That the survey showed that the condition of the structure, machinery and equipment as defined in the above regulation was satisfactory and the ship complied with the relevant requirements of chapters II-1 and II-2 of the Convention (other than those relating to fire safety systems and appliances and fire control plans).

3 That in implementing regulation I/6(b) the Government has instituted:

- mandatory annual surveys;
- unscheduled inspections.

4 That an Exemption Certificate has/has not[3] been issued.

5 The ship was/was not[3] subjected to an alternative design and arrangements in pursuance of regulation(s) II-1/55 / II-2/17[3] of the Convention.

6 A Document of approval of alternative design and arrangements for machinery and electrical installations/fire protection[3] is/is not[3] appended to this Certificate.

This certificate is valid until .....

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

Issued at .....
(Place of issue of certificate)

....
(Date of issue) (Signature of authorized official issuing the certificate)

(Seal or stamp of the issuing authority, as appropriate)

INTERMEDIATE SURVEY

(for tankers of 10 years of age and over)

This is to certify that at an intermediate survey required by regulation I/10 of the Convention, as modified by the 1978 Protocol, this ship was found to comply with relevant provisions of the Convention.

Signed: ……..
(Signature of authorized official)

Place: ……

Date: ……..
(Seal or stamp of the Authority, as appropriate)

Signed: ……..
(Signature of authorized official)

Place: ……

Date: ……..
(Seal or stamp of the Authority, as appropriate)

MANDATORY ANNUAL SURVEYS OR UNSCHEDULED INSPECTIONS

This is to certify that the ship has been surveyed in accordance with regulation I/6(b) of the Convention, as modified by the 1978 Protocol and the relevant recommendations of the Organization.

1st mandatory annual survey[3,4]

1st unscheduled inspection[3]

Signed: ……..……

Place: ……..

Date: ……..……..

(Seal or stamp of the Authority as appropriate)

2nd mandatory annual survey[3,4]

2nd unscheduled inspection[3]

Signed: ……

Place: ……..

Date: ……..

(Seal or stamp of the Authority as appropriate)

3rd mandatory annual survey[3,4] Signed: .....

3rd unscheduled inspection[3] Place: .....

Date: .....

(Seal or stamp of the Authority as appropriate)

4th mandatory annual survey[3,4] Signed: .....

4th unscheduled inspection[3] Place: .....

Date: .....

(Seal or stamp of the Authority as appropriate)

---

1 Alternatively, the particulars of the ship may be placed horizontally in boxes.
2 For oil tankers, chemical tankers and gas carriers only.
3 Delete as appropriate.
4 An intermediate survey, but not an unscheduled inspection, may take the place of a mandatory annual survey.

FORM OF SAFETY EQUIPMENT CERTIFICATE FOR CARGO SHIPS

CARGO SHIP SAFETY EQUIPMENT CERTIFICATE

This Certificate shall be supplemented by a Record of Equipment for Cargo Ship Safety (Form E)

(Official seal) (State)

Issued under the provisions of the
INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE
AT SEA, 1974, as modified by the Protocol of 1978 relating thereto

under the authority of the Government of

_____
(*name of the State*)

by _____
(*person or organization authorized*)

Particulars of ship[1]

Name of ship .....

Distinctive number or letters .....

Port of registry .....

Gross tonnage .....

Deadweight of ship (metric tons)[2] .....

Length of ship (regulation III/3.12) .....

IMO Number .....

Type of ship[3]

Bulk carrier
Oil tanker
Chemical tanker
Gas carrier
Cargo ship other than any of the above

Date on which keel was laid or ship was at a similar stage of construction or,
where applicable, date on which work for a conversion or an alteration
or modification of a major character was commenced .....

THIS IS TO CERTIFY:

1 That the ship has been surveyed in accordance with the requirements of regulation I/8 of the Convention, as modified by the 1978 Protocol.

2 That the survey showed that:

2.1 the ship complied with the requirements of the Convention as regards fire safety systems and appliances and fire control plans;

2.2 the life-saving appliances and the equipment of the lifeboats, liferafts and rescue boats were provided in accordance with the requirements of the Convention;

2.3 the ship was provided with a line-throwing appliance and radio installations used in life-saving appliances in accordance with the requirements of the Convention;

2.4 the ship complied with the requirements of the Convention as regards shipborne navigational equipment, means of embarkation for pilots and nautical publications;

2.5 the ship was provided with lights, shapes and means of making sound signals and distress signals in accordance with the requirements of the Convention and the International Regulations for Preventing Collisions at Sea in force;

2.6 in all other respects the ship complied with the relevant requirements of the Convention;

2.7 the ship was/was not[3] subjected to an alternative design and arrangements in pursuance of regulation(s) II-2/17 / III/38[3] of the Convention;

2.8 a Document of approval of alternative design and arrangements for fire protection/ life-saving appliances and arrangements[3] is/is not[3] appended to this Certificate.

3 That the ship operates in accordance with regulation III/26.1.1.1[4] within the limits of the trade area ……

4 That in implementing regulation I/6(b) the Government has instituted:

- mandatory annual surveys;
- unscheduled inspections.

5 That an Exemption Certificate has/has not[3] been issued.

This certificate is valid until ……

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

Issued at ……
(Place of issue of certificate)

…….....
(Date of issue)

…….....
(Signature of authorized official issuing the certificate)

(Seal or stamp of the issuing authority, as appropriate)

INTERMEDIATE SURVEY

(for tankers of 10 years of age and over)

This is to certify that at an intermediate survey required by regulation I/8 of the Convention, as modified by the 1978 Protocol, this ship was found to comply with relevant provisions of the Convention.

Signed: .....
(Signature of authorized official)

Place: .....

Date: .....

(Seal or stamp of the Authority, as appropriate)

MANDATORY ANNUAL SURVEYS OR UNSCHEDULED INSPECTIONS

This is to certify that the ship has been surveyed in accordance with regulation I/6(b) of the Convention, as modified by the 1978 Protocol and the relevant recommendations of the Organization.

mandatory annual survey[3,5]

unscheduled inspection[3]

Signed: .....

Place: .....

Date: .....

(Seal or stamp of the Authority as appropriate)

***

Under the provisions of regulation I/14 of the Convention, as modified by the 1978 Protocol, the validity of this Certificate is extended until .....

Signed: .....

Place: .....

Date: .....

(Seal or stamp of the Authority as appropriate)

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1 Alternatively, the particulars of the ship may be placed horizontally in boxes.
2 For oil tankers, chemical tankers and gas carriers only.
3 Delete as appropriate.
4 Refer to the 1983 amendments to SOLAS (MSC.6(48)), applicable to ships constructed on or after 1 July 1986, but before 1 July 1998 in the case of self-righting partially enclosed lifeboat(s) on board.
5 An intermediate survey, but not an unscheduled inspection, may take the place of a mandatory annual survey.

第 41/2015 號行政長官公告

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

國際海事組織海上安全委員會於二零一二年十一月三十日透過第MSC.337（91）號決議通過了《船上噪音等級規則》，該規則自二零一四年七月一日起適用於澳門特別行政區；

基於此，行政長官根據澳門特別行政區第3/1999號法律第六條第一款的規定，命令公佈包含上指規則的第MSC.337（91）號決議的中文及英文文本。

二零一五年四月二十二日發佈。

行政長官　崔世安

Aviso do Chefe do Executivo n.º 41/2015

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

Considerando igualmente que, em 30 de Novembro de 2012, o Comité de Segurança Marítima da Organização Marítima Internacional, através da resolução MSC.337(91), adoptou o Código relativo aos Níveis de Ruído a Bordo dos Navios, e que tal Código é aplicável na Região Administrativa Especial de Macau desde 1 de Julho de 2014;

O Chefe do Executivo manda publicar, nos termos do n.º 1 do artigo 6.º da Lei n.º 3/1999 da Região Administrativa Especial de Macau, a resolução MSC.337(91), que contém o referido Código, nos seus textos em línguas chinesa e inglesa.

Promulgado em 22 de Abril de 2015.

O Chefe do Executivo, *Chui Sai On*.

第MSC.337（91）號決議

（2012年11月30日通過）

《船上噪聲等級規則》

海上安全委員會，

憶及《國際海事組織公約》關於本委員會職能的第二十八條第（二）款，

還憶及本組織大會以第A.343（IX）和A.468（XII）號決議分別通過的《守聽位置噪聲等級測量方法建議案》及《船上噪聲等級規則》，

認識到，慮及自通過第A.468（XII）號決議以來就噪聲控制和允許暴露等級所獲得的經驗，有必要為船上的機器處所、控制室、工作間、居住處所和其他處所制定強制性噪聲等級限值，

注意到以第MSC.338（91）號決議通過的經修正的《1974年國際海上人命安全公約》（《安全公約》）（以下稱“公約”）有關噪聲防護的第II-1/3-12條，

還注意到上述第II-1/3-12條規定，船舶建造須遵循《船上噪聲等級規則》（以下稱“本規則”）以降低船上噪聲及實施人員噪聲防護，

在其第91屆會議上**審議了**船舶設計和設備分委會第56次會議提出的建議案，

1. **通過**《船上噪聲等級規則》，其文本載於本決議附件中；

2. **提請**公約各締約國政府注意，本規則將於2014年7月1日在公約第II-1/3-12條生效時生效；

3. **要求**秘書長將本決議及其附件中本規則文本的核證無誤副本分發給所有公約締約國政府；

4. **還要求**秘書長將本決議及其附件的副本分發給所有非公約締約國的本組織會員。

附件

船上噪聲等級規則

前言

1 《船上噪聲等級規則》（以下簡稱“本規則”）的制定，係為經修正的《1974國際海上人命安全公約》（《安全公約》）第II-1/3-12條所規定的噪聲防護提供國際標準。雖然本規則根據《安全公約》在法律上被視為強制性文件，但其中的某些規定仍為建議性或資料性的（見1.1.3）。

2 這些規定、建議和意見，旨在向各國主管機關提供促進船上“聽力保存”環境的工具。然而，這是處理相互交集的人與技術環境的動態主題。隨着各種技術和安全管理實踐的發展，規範和建議案必將根據具體情況而發展。因此，鼓勵各國主管機關傳授得自經認可組織、船舶經營人和設備設計者的經驗和信息，以完善本規則。

3 本規則針對常規客船和貨船制定。儘管本規則將某些類型和尺度的船舶排除於其適用範圍之外，但應認識到，對於在設計或作業上與常規船舶有顯著不同的船舶，在全面應用本規則時，需要具體考慮。

4 本規則無意取代本組織通過的《守聽位置噪聲等級測量方法建議案》（第A.343（IX）號決議）。該建議案相關於船舶噪聲對正確接收外部聲響航行信號的干擾，雖然根據該建議案和根據本規則測量噪聲等級的方法有所不同，但是由於本規則主要關注噪聲對健康和舒適的影響，這兩個文件應視為是相互兼容的。需注意確保一般要求與航行信號可聽度要求之間的兼容性。

第 1 章－總則

1.1 範圍

1.1.1 本規則旨在為防止船上出現具有潛在危險的噪聲等級提供標準，並為海員可接受的環境提供標準。這些標準係針對客船和貨船制定的。鑑於對某些尺度和營運類型的船舶免除這些要求，應認識到，對於與常規船舶顯著不同的船舶，在全面應用本規則時，將需要特殊考慮。本規則旨在為設計標準提供依據，符合標準的依據是滿意完成導致簽發“噪聲測量報告”的海上試驗。根據對船員進行的個人保護原理的培訓和降噪措施的保持，預測持續符合作業要求。這些將按照《安全公約》第IX章所規定的適當動態過程和實踐加以執行。

1.1.2 為以下所列提出了要求和建議：

.1 對噪聲等級和噪聲暴露的測量；

.2 在目前還不能把噪聲限制到無潛在傷害聲等級的各種情況下，防範海員因噪聲導致聽力損失的風險；

.3 船員通常進入的所有處所的可接受的最大噪聲等級限值；和

.4 對居住處所之間隔聲的驗證。

1.1.3 雖然本規則根據《安全公約》在法律上被視為強制性文件，但是本規則的下列規定仍為建議性、遵守的選項、或資料性的：

1.3.2和1.3.3段

3.4.2和3.4.3段

第5章

6.3節

7.3節

附錄2

附錄3

附錄4

1.2 目的

本規則的目的是限制噪聲等級和減少船員對噪聲的暴露，以便：

.1 考慮到通話和聽到聲響警報的需要，及在控制站、駕駛和無線電設備處所與有人值班機器處所中能作出清醒決定的環境，為安全工作條件作出規定；

.2 保護船員不暴露於可能造成噪聲導致的聽力損失的過大噪聲等級；和

.3 為船員在休息、娛樂和其他處所提供一種可接受的舒適度，也為暴露於高噪聲等級而受到影響提供恢復條件。

1.3 適用

1.3.1 本規則適用於1,600總噸及以上的新船。

1.3.2 本規則中有關具有潛在危險的噪聲等級、降噪和個人保護設備的具體規定，在合理和可行的範圍內，可適用於1,600總噸及以上的現有船舶，並使主管機關滿意。

1.3.3 在合理和可行的範圍內，本規則可適用於小於1,600總噸的新船，並使主管機關滿意。

1.3.4 本規則不適用於：

.1 動力支承船；

.2 高速船；

.3 漁船；

.4 鋪管駁船；

.5 起重駁；

.6 海上移動式鑽井平台；

.7 非商用遊艇；

.8 軍艦和軍用運輸船；

.9 非機械推進船舶；

.10 打樁船；

.11 挖泥船。

1.3.5 本規則適用於船上有船員的港內或海上船舶。

1.3.6 如果有文件證明，即使採用相關和合理的技術性降噪措施將仍不可能符合規定，主管機關可以在特殊情況下准予免除某些要求。除以例外情況為準外，此種免除不包括客艙。如果准予免除，須確保達到本規則的目標，並須結合第5章考慮噪聲暴露限值。

1.3.7 對設計成並用於短程航行的船舶，或涉及船舶短期運作且使主管機關滿意的其他營運的船舶，本規則第4.2.3和4.2.4段可僅適用船舶的港內工況，但在這種工況下應具有足夠的時間供船員休息和娛樂。

1.3.8 本規則擬不適用於乘客艙室和其他乘客處所，除非它們是本規則規定所涵蓋的工作處所。

1.3.9 對於現有船舶的重大修理、改裝和更改，及與之相關的舾裝，在主管機關認為合理和可行的範圍內，須確保發生變化的區域符合本規則對新船的要求。

1.3.10 本規則僅涵蓋與船舶相關的噪聲源，如機械和推進裝置，但並不包含風/浪/冰的噪聲、警報和公共廣播系統等。

1.4 定義

就本規則而言，下列定義適用。附加定義在本規則其他處給出。

1.4.1 *居住處所*：客艙、辦公室（處理船舶業務的）、醫務室、餐廳、娛樂室（例如休息室、吸煙室、電影廳、健身房、圖書室、興趣室和遊戲室）以及海員使用的露天娛樂場所。

1.4.2 *現場測試*（apparent）*計權隔聲指數* R'_w：表示牆、門或地板就地整體提供的隔聲性能的一個單一數值，以分貝（dB）計（見經1:2006修正的ISO 717-1：1996）。

1.4.3 *A-計權等效連續聲等級* L_{Aeq}（T）：連續穩定聲的A-計權聲壓級，其在1個測量間隔時間T內，其與所考慮的隨時間變化的聲具有相同的均方根聲壓。該聲等級以分貝A（dB（A））計，由下式得出：

$$L_{Aeq,T} = 10log\frac{1}{T}\int_0^T \frac{pa\ (t)^{\ 2}}{p_o{}^2}.dt$$

式中： T = 測量時間；

p_a（t）= A計權瞬時聲壓；

P_o = 20μPa（基準級）。

1.4.4 *A*-計權聲壓級或噪聲等級：聲等級計所測得的頻率響應按照A-計權曲線計權的數值（見IEC 61672-1）。

1.4.5 *C*-計權等效連續聲等級L_{Ceq}（*T*）：連續穩定聲的C-計權聲壓級，其在1個測量間隔時間*T*內，與所考慮的隨時間變化的聲具有相同的均方根聲壓。該聲等級以分貝C（dB（C））計，由下式得出：

$$L_{CeqT} = 10log\frac{1}{T}\int_{0}^{T}\frac{pc\ (t)^{2}}{p_{o}^{2}}.dt$$

式中： T = 測量時間；

p_c（t）= C-計權瞬時聲壓；

P_o = 20μPa（基準級）。

1.4.6 *C*-計權峰值聲等級L_{Cpeak}：C-計權最大瞬時聲壓級。該聲壓級以分貝C（dB（C））計，由下式得出：

$$L_{Cpeak} = 10\log\frac{p_{peak}^{2}}{p_{o}^{2}}$$

式中： P_{peak} = C-計權最大瞬時聲壓；

P_o = 20μPa（基準級）。

1.4.7 *C*-計權聲壓級或噪聲等級：聲等級計所測得的頻率響應按照C-計權曲線計權的數值（見IEC 61672-1（2002-05））。

1.4.8 連續有人值班處所：在正常作業期間海員需要連續或長期在場的處所。

1.4.9 起重駁：帶有固定安裝的起重機並設計為主要用於起吊作業的

船舶。

1.4.10 日噪聲暴露級（$L_{ex,24h}$）：表示24小時時間段內等效噪聲暴露級。

$L_{ex,24h} = L_{Aeq,}T+10 \log（T/T_0）$

式中： T為船上有效持續時間；

T_0為基準24小時持續時間。

總的等效連續A-計權聲壓級（L_{Aeq} T），須採用不同的噪聲等級（$L_{Aeq,}T_i$）和相關時間段以下列公式計算：

$$L_{Aeq,T} = 10 \lg\left[\frac{1}{T}\sum_{i=1}^{n}\left(T_i \times 10^{0.1L_{Aeq,T_i}}\right)\right]$$

式中： $L_{Aeq,Ti}$為等效連續A-計權聲壓級，以分貝計，按間隔時間T_i取平均值；

$$T = \sum_{i=1}^{n} T_i$$

如海員在船上的時間超過24小時，$L_{ex,24h}=L_{Aeq,24h}$。

1.4.11 挖泥船：帶有固定安裝的挖掘設備，從事水底沉積物挖掘作業的船舶。

1.4.12 值班站：主要航行設備、船舶無線電或應急電源所在的處所或者火災記錄或火災控制設備集中的處所，以及用作廚房、主配膳室、儲藏室（獨立的配膳室和儲物間除外）、郵件及貴重物品室、並非機器處所組成部分的工作間以及類似處所。

1.4.13 動力支承船：在水中或水上操作並具有與常規排水型船舶不同特性的船舶。在上述範疇內，係指符合下列任一特性的船：

.1 其重量或相當大一部分重量以借助靜水力以外的作業模式加以平衡；

.2 船能在函數$\frac{V}{\sqrt{gL}}$等於或大於0.9的航速下操作，其中V是最大航速，L是水線長度，g是重力加速度，所有各項均用一致的單位。

1.4.14 現有船舶：並非新船的船舶。

1.4.15 漁船：用於商業性捕撈魚類、鯨魚、海豹、海象或其他海洋生物資源的船舶。

1.4.16 聽力損失：聽力損失係參照在ISO 389-1（1998）號標準中有常規定義的基準聽覺閾值確定。聽力損失相當於被測對象的聽覺閾值與基準聽覺閾值之差。

1.4.17 聽力保護器：為減少到達耳朵的噪聲等級而配戴的裝置。被動降噪耳機阻擋噪聲到達耳朵。主動降噪頭戴式耳機在耳機內產生抵消環境噪聲的信號。

1.4.18 積分聲等級計：設計為或適用於測量平均均方根時間A-計權和C-計權聲壓的聲等級計。

1.4.19 機器處所：設有蒸汽機或內燃機、泵、空壓機、鍋爐、燃油裝置、主要電機、加油站、推進裝置、冷藏裝置、防搖裝置、操舵裝置、通風和空調機等的任何處所以及通向這些處所的圍壁通道。

1.4.20 海上移動式鑽井平台：能為勘探或開發海床下資源，如液態或氣態碳氫化合物、硫磺和鹽而從事鑽探作業的船舶。

1.4.21 駕駛室兩翼：船舶駕駛室延伸到船舶兩舷的部分。

1.4.22 新船：係指按照《安全公約》第II-1/3-12.1條規定適用於本規則的船舶。

1.4.23 噪聲：就本規則而言，能導致聽力損害或能對健康產生危害或具有其他危險性或破壞性的所有聲音。

1.4.24 噪聲導致的聽力損失：源於耳蝸之內神經細胞受損，係因聲音作用而引起的聽力損失。

1.4.25 噪聲等級：見A-計權聲壓級（1.4.4）。

1.4.26 偶爾暴露：通常每周一次或頻次更少的暴露。

1.4.27 打樁船：從事海底打樁作業的船舶。

1.4.28 鋪管駁船：專為海底管道鋪設相關作業建造或配合這些作業使用的船舶。

1.4.29 港內工況：僅推進所需的所有機器均停止的工況。

1.4.30 具有潛在危險的噪聲等級：人員在沒有保護的情況下暴露會有承受聽力損失風險的聲等級和更高聲等級。

1.4.31 重大修理、改裝和更改：係指對船舶做出改建，實質性地改變船舶的尺度、裝載量或發動機功率，改變船舶的類型，或以其他方式改變船舶，使其若為新船，則應遵守相關規定。

1.4.32 聲音：由空氣或其他物質中的壓力波所傳遞，並是產生聽覺的客觀原因的能量。

1.4.33 聲壓級L_p或SPL：聲音或噪聲的聲壓級，以分貝（dB）計，由下式得出：

$$L_p = 10 \log \frac{P^2}{P_0^2}$$

式中： P = 聲壓，以帕斯卡計；

P_0 = 20μPa（基準級）。

1.4.34 短程航行：在航行中，船舶的行進時間一般不致長到船員需要睡眠，或較長的非當班時間的航行。

1.4.35 計權隔聲指數R_w：表示牆、門或地板（在實驗室內）整體隔聲性能的一個單一數值，以分貝（dB）計（見經1：2006修正的ISO 717-1：1997）。

第2章－測量設備

2.1 設備規格

2.1.1 聲等級計

聲壓級的測量須按本章要求採用精密積分聲等級計進行。這種聲等級計須酌情按照IEC 61672-1（2002-05）1類型/級標準，或按照主管機關接受的等效標準製造。

2.1.2 倍頻程濾波器

當頻程濾波器酌情單獨使用或與聲等級計結合使用時，須符合IEC 61260（1995）或主管機關接受的等效標準。

2.2 設備的使用

2.2.1 校準

聲音校準儀須符合IEC 60942（2003-01）標準，並須經所用聲等級計的製造商認可。

2.2.2 測量儀器和校準儀的校驗

校準儀和聲等級計須至少每2年由國家標準實驗室或按照經（Cor 1：2006）更正的ISO 17025（2005）認證的適任實驗室驗證一次。

2.2.3 傳聲器風罩

在室外諸如在駕駛室兩翼或甲板上，和有任何顯著空氣流動的甲板下的處所採集讀數時，須使用傳聲器風罩。風罩對測量級的影響與在“無風”工況下相似噪聲相比須不大於0.5 dB（A）。

第3章－測量

3.1 通則

3.1.1 船舶建造完工後，或在其後儘可能早的實際可行時，須在3.3和3.4所規定的作業工況下，對第4章規定的所有處所進行噪聲等級測量，並按4.3的要求予以適當記錄。

3.1.2 為確保符合第4章，須進行A-計權等效連續聲等級L_{Aeq}（T）測量。

3.1.3 為按照HML-方法確定適當的聽力保護，須在L_{Aeq}（T）超過85 dB（A）的處所，進行C-計權等效連續聲等級L_{Ceq}（T）和C-計權峰值聲等級L_{Cpeak}的測量，見第7章和附錄2。

3.2 測量人員要求

3.2.1 為確保可以接受並具有可比性的測量結果和報告的質量，測量機構或專家須證明其勝任噪聲測量的能力。

3.2.2 進行測量的人員須：

.1 具有噪聲、聲音測量和所使用設備處理方面的知識；

.2 受過有關本規則所規定的程序的培訓。

3.3 海上試驗操作工況

3.3.1 測量應在船舶滿載或壓載工況下進行。船舶的航線須儘可能保持平直。測量時的實際條件須記錄在測量報告中。

3.3.2 噪聲測量須在正常營運航速下並且除下文另有規定外，在不小於80%最大額定持續功率（MCR）下進行。可調螺距和垂直翼螺旋槳（如有）須處於正常的航行位置。對於特殊船型及帶有特殊推進裝置和動力配置的船舶，如柴油－電氣系統，主管機關可以與船廠和船東合作，在應用3.3.1和3.3.2時，對實際的船舶設計或操作參數給與適當考慮。

3.3.3 正常航行狀態和水平下通常使用的所有機械、航行儀器、無線電和雷達裝置等，包括噪聲控制，在整個測量期間內均須工作。但是，在進行這些測量時，不得有通電霧信號和直升機作業。

3.3.4 在設有通常僅在應急或試驗時運行的柴油機驅動的應急發電機、消防泵或其他應急設備的處所內測量時，這些設備須在工作。測量的目的並不在於確定符合最大噪聲等級限值，而是作為船員在這些處所中進行維護、修理和測試活動時的個人保護的參考。

3.3.5 機械通風、加熱和空調設備須在正常工作，其功率須符合設計條件。

3.3.6 門和窗一般應予關閉。

3.3.7 處所內所有必要的設備應安裝完畢。可以在沒有家具的情況下進行測量，但不能由於沒有家具而有所寬鬆。可對包括家具的情況再次進行檢查或採集後續讀數。

3.3.8 裝有首推進器、防搖裝置等的船舶，在此類機械裝置工作時會經受高噪聲等級。對於首推進器，測量須在40%推進功率時進行，並且船舶的航速須適合於首推進器的工作。測量須在此類機械裝置工作時於其周圍，並在相鄰居住處所和值班室站的位置進行。如果此類設備擬用於連續工作，例如防搖裝置，須為確保符合第4章進行測量。如果此類系統僅擬短暫使用，如港內操縱期間，測量僅與確保符合關於噪聲暴露量的第5章相關。

3.3.9 如果船舶安裝擬用於正常工作狀況的動力定位裝置（DP），附加的DP模式下噪聲測量須在控制站、值班站和居住區域內進行，以確保不超過這些處所的最大噪聲等級限值。主管機關、船級社、船廠和DP設計方須酌情商定一種模擬DP推進器系統的工作模式，其工作條件要大致相當於按船舶營運的設計環境條件以推進器最大功率的40%或以上進行定位。

3.4 港內操作工況

3.4.1 3.4.2、3.4.3和3.4.4中規定的測量針對船舶港內工況。

3.4.2 當船舶貨物裝卸設備的噪聲可能導致受其作業影響的值班站和居住處所的噪聲高於最大噪聲等級，應進行測量。船舶以外的聲源所產生的噪聲應按第3.5.3所述扣除。

3.4.3 如船舶是車輛運輸船且裝卸期間的噪聲源於車輛，貨物處所內的噪聲等級和暴露時間應結合第5章考慮。船廠和船東可與主管機關合作，對此種源於車輛的噪聲等級進行理論上的評估。

3.4.4 如果在維護、檢修或類似港內工況期間將遵守5.3.5關於聽力保護的規定而非4.2.1的規定，則須在機械正在港內工況下工作的機器處所內進行測量。

3.5 環境條件

3.5.1 如果水深小於5倍的吃水或在船舶附近有大塊反射表面，則會影響到所獲取的讀數。因此須在噪聲測量報告中記下這些條件。

3.5.2 氣象條件，例如風雨和海況應不致影響測量。風力應不超過4級，波高應不超過1米。如果無法達到，則須報告實際條件。

3.5.3 須注意使外部聲源，例如人、娛樂、建造和修理工作所產生的噪聲，不致影響到測量位置處的船上噪聲等級。如有必要，實測值可根據能量總和原理按穩態背景噪聲予以修正。

3.6 測量程序

3.6.1 測量噪聲等級時，測量處所內須只有操作船舶所需的海員和測量人員在場。

3.6.2 聲壓級讀數須採用A-計權（dB（A））和C-計權（dB（C））濾波器以分貝讀取，如有必要，並須在31.5和8,000 Hz之間的倍頻帶上讀取。

3.6.3 噪聲等級測量須採用積分聲等級計以空間平均值方式進行（如3.13.1所述），並維持一段時間直到獲得穩定讀數或至少15s，以代表因不規則操作或聲場變化所造成變化的平均值。讀數須僅取最近的分貝。如dB讀數的第1個小數為5或更高，讀數應取最近的較高整數。

3.7 噪聲暴露的確定

除連續聲等級測量外，還應根據ISO 9612：2009確定海員的噪聲暴露程度（見第5章）。一種基於ISO 9612的簡化程序和與工作位置相關的噪聲暴露在附錄4中給出。

3.8 校準

在測量進行之前和之後，須用2.2.1所述校準儀校準聲等級計。

3.9 測量的不確定度

船上測量的不確定度視幾種因素而定，例如測量技術和環境條件。按本規則進行的測量除極少例外，其等效連續A-計權聲壓級的可重複標準偏差，等於或小於1.5dB。

3.10 測量點

3.10.1 測量位置

除非另有說明，測量時傳聲器須位於甲板以上1.2m（坐着的人員）和1.6m（站着的人員）之間的高度。兩個測量點之間的距離至少應為2m，在無機器的大處所內，應按不大於10m的測點間距（包括最

大噪聲等級位置在內）對整個處所進行測量。無論如何，均不得在距處所邊界小於0.5m處進行測量。傳聲器的位置須如3.10.3和3.11至3.14的規定。測量須在人員工作的位置，包括通信站，進行。

3.10.2 值班室

對所有進行工作的地點均須進行噪聲測量。如果認為值班室附近的噪聲等級有差異，則須在設有值班室的處所內作補充測量。

3.10.3 進氣口和排氣口

在測量噪聲等級時，如有可能，傳聲器不應位於氣流方向夾角的30°度之內，且距發動機、通風、空調和冷却系統的進氣口或排氣口邊緣的距離不小於1米，並儘可能遠離反射表面。

3.11 機器處所的測量

3.11.1 須在機器處所內海員的各個主要工作或控制站及相鄰控制室（如設有）進行測量，並特別注意電話所在處和語音交流及聲響信號具有重要性的位置。

3.11.2 通常不應在距運轉中的機器或距甲板、艙壁或其他大的表面或空氣進口等小於1米處進行測量。如這不可能，須在機器和相鄰反射表面之間的中點處進行測量。

3.11.3 對形成聲源的機器，應在距此機器1米之處進行測量。測量應在甲板、平台或走道以上1.2米至1.6米處如下進行：

.1 距各聲源1米，在聲源周圍以不大於3米的間距測量所有聲源，諸如：

- 在每一層的主渦輪機或柴油機；

- 主齒輪箱；
- 渦輪鼓風機；
- 濾清器；
- 交流發電機和發電機組；
- 鍋爐生火平台；
- 強力鼓風機和/或抽風機；
- 壓縮機；
- 貨泵（包括其驅動電機或渦輪機）。

對於大型發動機和機器處所，在按上述間距測得的聲壓級dB（A）變化不顯著的情況下，為避免不必要地進行大量不切實際的測量和記錄，不必在每個位置都進行記錄。但是，對具有代表性的位置和最大噪聲等級的位置須進行全面測量，在各級須至少記錄4次測量結果；

.2 在本地控制站，例如主機和機械控制室的主操縱台或應急操縱台；

.3 .1和.2未予規定而在進行例行檢查、調整和維護保養時通常停留的所有其他位置；

.4 在通常使用的通道上的各點（上文已規定的位置所包括者除外），測量間距不大於10m；和

.5 機器處所內的各房間，如工作間。為限制測量和記錄的次數，記錄的次數可按.1所述減少，但對機器處所直至上甲板的各層均有總數不少於4次的測量記錄（包括本段所規定的測量）。

3.12 駕駛處所的測量

測量須在駕駛室兩翼進行，但應在所測的一翼處於船舶背風面時進行測量。

3.13 居住處所的測量

3.13.1 須在處所的中央進行一次測量。傳聲器應緩慢地在水平方向和/或垂直方向上移動超過1米（±0.5米，計及3.10.1中所述的測量衡準）。如果室內的噪聲等級，特別是在靠近坐着或躺着人員頭部位置處有顯著差異，即大於10dB（A）時，則應在其他測點進行補充測量。

3.13.2 測量居住艙室的數目不得少於40%總艙數。在任何情況下，必須考慮明顯受到噪聲影響的居住艙室，即與機器或機艙棚相鄰的居住艙室。

3.13.3 對於具有大量船員艙室的船舶，如客船/遊船，可以接受減少測量位置數。在選擇受試艙室時，應選擇較為靠近噪聲源的艙室而使其對受試艙室組具有代表性，並使主管機關滿意。

3.13.4 在露天甲板上，須在供娛樂活動用的任何區域內進行測量。

3.14 通常無人處所的測量

3.14.1 在3.10至3.13所述的處所以外，須對噪聲等級特別高且船員可能暴露（即使是比較短時間的暴露）的所有地點和斷續使用的機械處所進行測量。

3.14.2 為限制測量和記錄的次數，對於通常無人的處所、貨艙、甲板區域和其他遠離噪聲的處所，不必測量噪聲等級。

3.14.3 在貨艙內可能有人員作業的區域須使用至少3個傳聲器位置點。

第4章－可接受的最大聲壓級

4.1 通則

4.1.1 本節所規定的限值須被視為最大聲等級，而非理想聲等級。如合理可行，噪聲等級應低於所規定的最大聲等級。

4.1.2 船舶投入營運之前，對4.2所規定的限值須通過所涉處所的等效連續聲等級測量進行評估。對於具有很多測量位置的大型艙室，各位置均須與限值作對比。

4.1.3 應要求進入額定噪聲等級大於85dB（A）處所的人員，在這些處所中停留時配戴聽力保護器（見第5章）。4.2.1給出的110dB（A）的限值，所假設的是，配戴了符合第7章聽力保護器要求的聽力保護器。

4.1.4 限值按A-計權聲壓級予以規定（見1.4.4和1.4.24）。

4.2 噪聲等級限值

不同處所的噪聲等級限值（dB（A））規定如下：

艙室和處所的名稱	船舶尺度	
	1,600 至 10,000 總噸	≥10,000 總噸
4.2.1 工作處所（見 5.1）		
機器處所	110	110
機器控制室	75	75

艙室和處所的名稱	船舶尺度	
	1,600 至 10,000 總噸	≥10,000 總噸
並非機器處所組成部分的工作間	85	85
未規定的工作處所（其他工作區域）	85	85
4.2.2 駕駛處所		
駕駛室和海圖室	65	65
瞭望位置，包括駕駛室兩翼和窗口	70	70
無線電室（無線電設備工作，但不產生聲響信號）	60	60
雷達室	65	65
4.2.3 居住處所		
居住艙室和醫務室	60	55
餐廳	65	60
娛樂室	65	60
露天娛樂區域（外部娛樂區域）	75	75
辦公室	65	60
4.2.4 服務處所		
廚房（食物加工設備不工作）	75	75
備膳室和配膳間	75	75
4.2.5 通常無人處所		
3.14 中所述處所	90	90

4.3 測量報告

4.3.1 每艘船舶均須有噪聲測量報告。報告須包括船上各處所的噪聲等級資料。報告須載明每一規定測量點的讀數。測量點須在報告所附的總佈置圖或居住艙室圖紙上標出，或用其他方法列明。

4.3.2 噪聲測量報告的格式見附錄1。

4.3.3 噪聲測量報告須一直保存在船上並方便船員取閱。

第5章－噪聲暴露限值

5.1 通則

5.1.1 第4章所述噪聲等級限值是用於在符合這些限值要求時，海員將不致暴露於超過80 dB（A）的L_{ex}（24），即在每天或24小時期間內，等效連續噪聲暴露將不超過80 dB（A）。對於新船，應按照3.7所述的方法計算各類船員的預期噪聲暴露量，以海上試驗噪聲等級測量為基礎，確認是否符合這些衡準。

5.1.2 在聲壓級超過85 dB（A）的處所內，應採用適當的聽力保護，或應用本節所述的暴露時間限值，以確保保持一個等效的保護水平。

5.1.3 適用這些規定的每艘船舶，應在其安全管理體系中包含關於公司聽力保護、暴露限值政策和就此進行培訓的一節，且培訓將記載在培訓記錄中。

5.1.4 對附錄2中所載有關這些方面的海員須知應給與考慮。船員不應無保護暴露於超過135 dB（C）的峰值。

5.2 聽力保護和聽力保護器的使用

為符合本節的暴露量衡準，允許使用符合第7章的聽力保護器。即使在要求配戴聽力保護器以符合本規則要求時，主管機關仍可實施風險評估、聽力保護方案和其他措施。

5.3 海員暴露於高噪聲等級的限制

海員不應暴露於超過圖5.1所示和5.3.1至5.3.5段中所述的噪聲等級和時限。

5.3.1 有保護的最大暴露（A區，圖1）

任何海員，即便配戴聽力保護器，不應暴露於超過120 dB（A）的噪聲等級或超過105 dB（A）的L_{eq}（24）。

5.3.2 偶爾暴露（B區，圖1）

在B區內，僅允許偶爾暴露，並應使用衰減為25至35 dB（A）之間的聽力保護器。

5.3.3 偶爾暴露（C區，圖1）

在C區內，僅允許偶爾暴露，並應使用衰減至少為25 dB（A）的聽力保護器。

5.3.4 日暴露（D區，圖1）

如果海員的例行工作（日暴露）在噪聲等級位於D區的處所內進行，應使用衰減至少為25 dB（A）的聽力保護器，並可考慮風險評估和聽力保護方案。

5.3.5 無保護的最大暴露（E區，圖1）

對於暴露時間少於8小時，沒有採取聽力保護措施的海員，不應暴露於超過85 dB（A）的噪聲中。如海員在高噪聲處所停留超過8小時，則不應超過80 dB（A）的L_{eq}（24）。因此，在每24小時中至少有三分之一時間內，每個海員應處於噪聲等級不超過75 dB（A）的環境中。

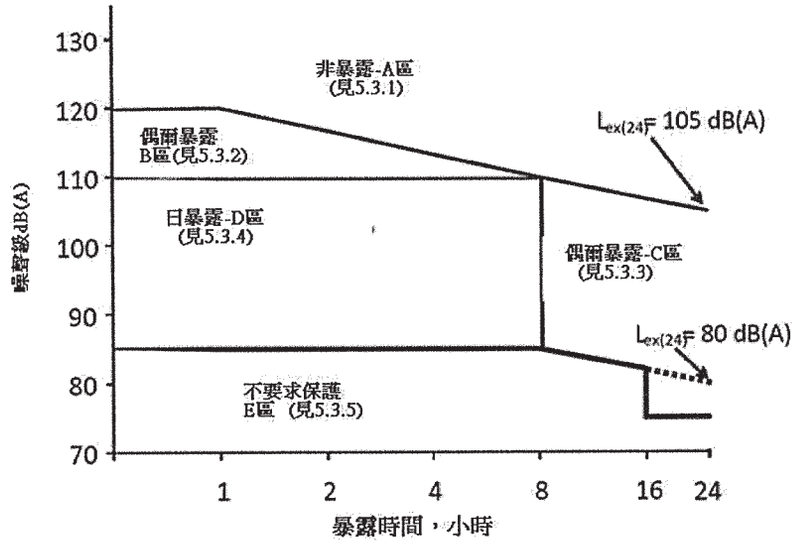


圖1：許可的每日和偶爾工作區

註： 在A-D區工作時，要求聽力保護器把入耳的聲音衰減至85 dB（A）以下。在E區工作時,不要求使用聽力保護器，但如果聲等級高於80 dB（A）超過8小時則應配置。

5.4 24小時等效連續聲等級的限值

作為符合5.3規定（圖1）的替代方法，任何無保護的海員均不應暴露於大於80 dB（A）的24小時等效連續聲等級。在要求使用聽力保護器的處所內，每人的日暴露時間不應超過連續4小時或總計8小時。

5.5 聽力保護方案

5.5.1 可為在L_{Aeq}>85 dB（A）的處所內工作的海員提供聽力保護方案，以使其在關於噪聲的危害、聽力保護的使用及監控聽力敏銳度方面得到培訓。聽力保護方案的一些要素如下：

.1 由經培訓的並具有適當資格的人員進行的初始和定期聽力測試，並使主管機關滿意。

.2 暴露人員長時期暴露於高噪聲的危害，以及護耳器正確使用的說明（見附錄2）。

.3 聽力測試記錄的保持。

.4 對聽力嚴重損失的人員的記錄和聽力敏銳度的定期分析。

5.5.2 聽力保護方案的一個可選要素，是對高噪聲等級處所內工作的人員所處的24小時等效連續聲等級進行控制。此類控制要求計算24小時等效連續聲等級。如果此24小時等效連續聲等級不符合限值要求，則應控制暴露時間或在適當時間使用聽力保護器，以使人員暴露量在限值之內。

第6章－居住處所之間的隔聲

6.1 通則

對居住處所之間的隔聲須給與考慮，以便即使在相鄰處所內進行諸如音樂、談話、裝卸貨物等活動，仍有可能休息和娛樂。

6.2 隔聲指數

6.2.1 居住處所的艙壁和甲板的空氣隔聲特性，按照經（1：2006）修正的ISO標準717-1：1996第一部分，須至少符合下列計權降噪指數（R_w）：

居住艙室至居住艙室 $R_w = 35$；

餐廳、娛樂室、公共處所和娛樂區域至居住艙室和醫療室 $R_w = 45$；

走廊至居住艙室 $R_w = 30$；

居住艙室至帶有交通門的居住艙室 $R_w = 30$。

6.2.2 空氣隔聲特性須按照ISO 10140-2：2010經實驗室試驗確定，並使主管機關滿意。

6.3 材料的裝設

6.3.1 應留意材料的裝設和居住處所的建造。在海上試驗期間，如果對材料的裝設存在疑義，應如6.2.1段的要求，選取具有代表性的每種類型的分隔板、地板、門，進行船上測量，並使主管機關滿意。

6.3.2 現場測試計權降噪指數R'_w應符合6.2.1段的要求，公差不大於3 dB。

註： 應按照ISO 140-4:1998進行現場測量。當所測試材料的面積小於10 m^2時，R'_w指數的計算應考慮10 m^2為最小值。

第7章－聽力保護和警告信息

7.1 通則

當在聲源處採用控制聲音的措施未能將任何處所的噪聲降至4.1.3段所規定的聲等級時，須向需要進入此等處所的海員提供有效的個人聽力保護。聽力保護器的提供不得視為有效噪聲控制的替代。附錄3彙總了可適用於新船的現有降噪方法。

7.2 對聽力保護器的要求

7.2.1 個人聽力保護器須選擇能消除聽力危害風險或將該風險降低至7.2.2段所述可接受聲等級者。船舶經營人須盡力確保聽力保護器的配戴，並須負責檢查所採取的符合本規則的措施的有效性。

7.2.2 聽力保護器須為可將聲壓級降至85 dB（A）或以下（見5.1）的類型。應按照ISO 4869-2：1994中所述的HML-方法（見附錄2中的解釋和範例）選擇適當的聽力保護器。如果在無源狀態下頭戴式耳機與聽力保護器具有等效功能，則可以採用消噪技術。

7.2.2.1 消噪耳機的規格應如同經確認的製造商規格。

7.3 聽力保護器的選擇和使用

應教會海員按附錄2正確使用船上提供或使用的聽力保護器。

7.4 警告牌

如機器處所（或其他處所）中的噪聲等級大於85 dB（A），這些處所的入口應懸掛警告牌，該警告牌由主管機關規定的以船舶工作語言描述的符號和補充標誌組成（見如下英文警告牌和標誌示例）。如果只是此類處所的小部分具有這類噪聲等級，應在眼睛高度對這個或這些特定位置或設備加以標明，並在可接近的各個方向上均可見到。

有噪聲艙室進口處的標誌	
80~85 dB（A）	高噪聲等級—使用聽力保護器
85~110 dB（A）	危險噪聲—強制使用聽力保護器
110~115 dB（A）	小心：危險噪聲—強制使用聽力保護器—僅可短暫逗留
>115dB（A）	小心：超高噪聲等級—強制使用聽力保護器—逗留時間不超過10分鐘

附錄1

噪聲測量報告的格式

1 船舶概況

.1 船名

.2 船籍港

.3 船東、船舶經營人或代理的姓名和地址

.4 船廠名稱和地址

.5 建造地點

.6 海事組織編號

.7 總噸位

.8 船舶類型

.9 船舶尺度 – 長度

寬度

型深

最大吃水（夏季載重線）

.10 最大吃水時的排水量

.11 安放龍骨日期

.12 交船日期

2 機械概況

.1 推進機械

製造廠： 類型： 台數：

最大連續額定功率 kW

正常設計營運軸轉速: r/min

正常營運額定功率: kW

.2 輔助柴油機

製造廠： 類型：

輸出功率： kW 台數：

.3 主減速齒輪：

.4 螺旋槳類型（固定螺距螺旋槳、可調螺距螺旋槳、垂直翼螺旋槳）

螺旋槳數： 葉片數：

設計螺旋槳軸轉速： r/min

.5 其他（如係特殊推進和動力配置）

.6 機艙通風

製造廠： 類型：

台數：

風機直徑： m 風機轉速： r/min/可變轉速(是/否)

氣流量： m^2/h 總壓力： Pa

3 測量儀器和人員

.1 儀器 商標 類型 序號

聲等級計

傳聲器

濾波器

風罩

校準儀

其他設備

.2 聲等級計的校準日期校準開始結束

- 在檢測時由主管當局進行

.3 進行測量的人員/組織的身份

4 測量時的條件

.1 測量日期： 開始時間： 完成時間：

.2 測量時的船舶位置

.3 船舶的裝載工況

.4 測量時的狀態

- 首吃水
- 尾吃水
- 龍骨下的水深

.5 氣象條件

- 風力
- 海況

.6 航速

.7 實際螺旋槳軸轉速： r/min

.8 螺旋槳的螺距：

.9 推進機械轉速： r/min

.10 推進機械功率： kW

.11 運轉的推進機械台數：

.12 運轉的輔助柴油機台數：

.13 運轉的渦輪發電機台數：

.14 機艙通風速度模式（高/低/可變）：

.15 發動機負荷（%MCR）：

.16 其他運轉的輔助設備：

運轉中的通風、加熱和空調設備

5 測量數據

噪聲限值	測得的聲壓級
dB（A）	L_{Aeq}dB（A）
	L_{Ceq}dB（C）
	L_{Cpeak}dB（C）

註： 聲壓級L_{Ceq}和L_{Cpeak}的測量僅在超過85 dB（A）並要求聽力保護器時進行。

工作處所

機器處所

機器控制室

工作間

非指定的工作場所

駕駛處所

駕駛室和海圖室

瞭望位置，包括駕駛室兩翼和窗口

無線電室

雷達室

居住處所

居住艙室和醫療室

餐廳

娛樂室

露天娛樂區域

辦公室

服務處所

廚房（食物加工設備不工作）

備膳室和配膳間

通常無人處所

6 主要降噪措施（列出所採取的措施）

7 備註（列出任何與本規則不同之處）

…… ……

姓名 ……

地址 .....

.....

....

地點 日期 簽名

附件

頻率分析附頁

對某些區域進行的頻率分析可以產生更為準確和精確的噪聲等級預測，並將有助於查明超過第4章中所規定限值的特定頻帶。進一步指導可見ISO 1996-2：2007。

附錄2

關於安全管理體系納入噪聲問題的導則

1 海員須知

1.1 應向海員說明長時間暴露於高噪聲的危害以及噪聲引起聽力損失的風險。對所有海員應在初始僱傭時說明須知事項，並在之後定期對那些經常在噪聲超過85 dB（A）的處所內工作的海員說明須知事項。對本規則各項規定的須知應包括：

.1 噪聲暴露限值和警告牌的使用；

.2 （首次使用時）所提供的聽力保護器的類型，其大致降噪值及其正確使用、安裝以及對正常交流的影響；

.3 有關聽力保護的公司政策和程序，及適用時，任何在懸掛警告牌的處所內工作的海員可享用的監控計劃；和

.4 關於聽力損失的可能跡象的指南，如耳鳴、失聽或耳堵塞，及當這些跡象出現時採取的減緩技術。

1.2 相關海員應接受必要的正確使用和維護機械和消聲器或降噪器的指導，以避免產生不必要的噪聲。

2 船舶經營人的職責

2.1 船舶經營人應負責確保執行和維護有關減少和控制噪聲的措施，使本規則的要求得到滿足。

2.2 如果任何處所內的噪聲等級超過85 dB（A）的限值，船東應確保：

.1 標明該處所並遵守本規則相關規定；

.2 船長和船舶高級船員應知曉控制進入該處所的重要性，以及使用適當的聽力保護器的重要性；

.3 提供足夠數量的適當的聽力保護器，以供發放給所有的相關船員每人一套；

.4 船長、高級船員和船上的任何安全員，均知曉船上提供相關培訓和資料的必要性。

2.3 如果手工工具、廚房和其他便攜設備，在正常工況下產生大於85 dB（A）的噪聲等級，船東應確保提供警告信息。

3 海員的職責

應使海員意識到有必要確保：

.1 採用所有的噪聲控制措施；

.2 向船舶安全管理體系規定的負責人報告任何有缺陷的噪聲控制設備；

.3 當進入警告牌要求使用聽力保護器的處所時，始終配戴適當的聽力保護器，並即使逗留很短的時間也不應摘下聽力保護器；

.4 不應損壞或誤用所提供使用的聽力保護器，並保持清潔。

4 聽力保護器的選擇

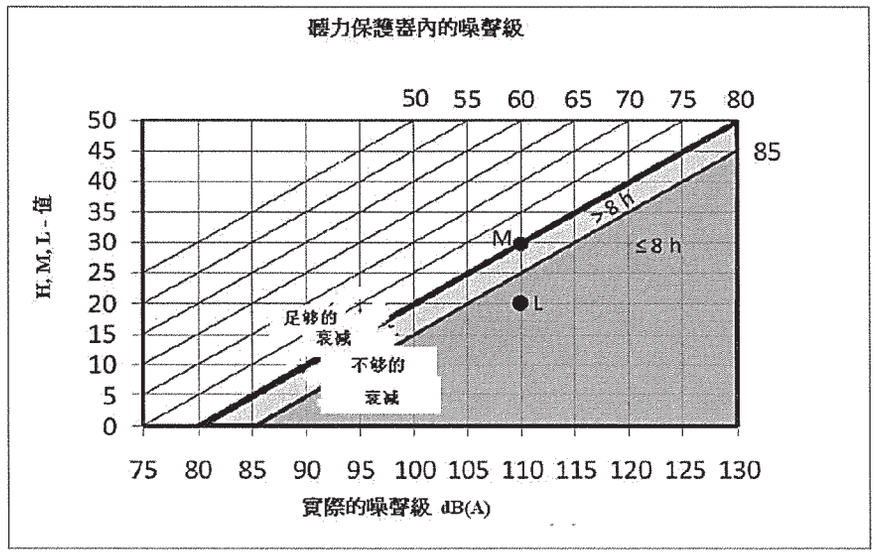
4.1 應按照ISO 4869-2:1994中所述的HML-方法選擇適當的聽力保護器。為向船舶經營人和海員選擇合適的聽力保護提供指導，對HML-方法及其使用簡述如下。

4.2 HML-方法是按照ISO 4869-2:1994“配戴聽力保護器時有效A-計權聲壓級的估算”計算的評定等級。使用H、M和L評定等級，需要噪聲的A-計權（L_{Aeq}）和C-計權（L_{Ceq}）聲壓級以及相關聽力保護器的HML值，這些將由製造廠提供。

4.2.1 聽力保護器的HML值與其提供的高、中和低頻率噪聲的降噪相關。這些H和M值用於暴露噪聲等級保護的計算，該噪聲在中、高頻率具有主要能量。如果測得的L_{Ceq}級和L_{Aeq}級相差2 dB或更少，即視為此種情況。

4.2.2 聽力保護器的M和L值用於暴露噪聲等級保護的計算，該噪聲具有明顯的低頻率成分，且在聽力保護器擬使用的處所內所測得的L_{Ceq}級和L_{Aeq}級相差大於2 dB。

4.3 HML-方法簡易應用實例：



在某一給定的船舶上，機艙內測得的聲等級為110 dB（A）、115 dB（C）。據製造廠稱，所選擇的聽力保護器具有下列降噪性能：H = 35 dB，M = 30 dB，L = 20 dB。

.1 自實際噪聲等級（110 dB（A））開始的垂線上標註聽力保護器的L和M值。

.2 確定噪聲是否具有低或高/中頻率。如果L_{Ceq}-L_{Aeq}之間的差值大於2 dB，則噪聲具有低頻率（L），如果L_{Ceq}-L_{Aeq}之間的差值小於2 dB，則噪聲具有高或中頻率（M）。

.3 如果聲音為高/中頻率（L_{Ceq}-L_{Aeq}≤2），沿M-值的對角線讀取聽力保護器內的噪聲等級。在此情況下，聽力保護器內的噪聲等級為80 dB（A），表明聽力保護器的降噪性能足以供每日工作超過8小時之用。

.4 如果聲音為低頻率（L_{Ceq}-L_{Aeq}>2），沿L-值的對角線讀取聽力保護器內的噪聲值。在此情況下，聽力保護器內的噪聲等級>85 dB（A），表明聽力保護器的性能不夠好，甚至不足以供8小時工作日之用。選用1個L-值大於25 dB的聽力保護器作為替代。

4.4 採用HML-方法的計算—原理和實例

特定噪聲環境下某一具體保護器的可取性確定也可計算。H、M和L值可用於對特定噪聲情況下某一具體保護器的L'A（耳部總A-計權噪聲等級）進行估算。

.1 計算L_{Ceq}-L_{Aeq}（這要求對L_{Aeq}和L_{Ceq}進行測量。所有的1級聲等級計均可採用A-計權或C-計權。）

.2 如果L_{Ceq}-L_{Aeq}≤2 dB，預測降噪聲等級（PNR）採用下列公式計算：

$$PNR = M - \left(\frac{H - M}{4} * (LCeq - LAeq - 2)\right)$$

如果L_{Ceq}-L_{Aeq}>2 dB，PNR採用下式計算：

$$PNR = M - \left(\frac{M - L}{8} * (LCeq - LAeq - 2)\right)$$

.3 然後從總A-計權噪聲等級中扣除PNR以給出保護器L'A的耳部有效A-計權聲等級：

L'A = L_{Aeq}-PNR

實例： 聽力保護器H = 35 dB，M = 25 dB，L = 20 dB

機艙中的噪聲等級：

L_{Aeq} = 108.7 dB（A）

L_{Ceq} = 109.0 dB（C）

L_{Ceq}-L_{Aeq} = 0.3 dB

PNR = 25-（（35-25）/4）*（0.3-2）= 29.3 dB

L'A = 108.7-29.3 = 79.4 dB（A）.

在這種情況下，聽力保護器內的噪聲等級在80 dB（A）以下，表明聽力保護器的降噪性能足以供每日工作超過8小時之用。

附錄3

建議降噪方法

1 通則

1.1 為減少船上的噪聲，以符合本規則第4章和第5章中所規定的限值，應仔細考慮這類減少噪聲的措施。本附錄旨在為船舶設計提供這方面的資料。

1.2 噪聲控制措施的設計和構造，應由精通噪聲控制技術的人員進行監督。

1.3 能夠用於控制噪聲等級或減少海員對於潛在有害噪聲暴露的一些措施，示於本附錄第2至第10節中。要強調的是，沒有必要對所有的船舶實施本附錄所建議的全部或任何措施。本規則沒有提供結構上有效控制噪聲措施所需的，或在特定環境下決定何種措施為適當所需的詳細技術資料。

1.4 採用噪聲控制措施時，應注意確保不違背有關船舶結構、居住處所和其他安全事項的規範和規則，降噪材料的使用不應引起火災、安全或健康方面的危險，而且這些材料也不應由於構造或附件的不結實而引發可能妨礙從處所撤離或疏水的危險。

1.5 設計階段中，在決定何種發動機和機械的安裝設計、機械的安裝方法和相對於其他處所的位置、以及居住處所的降噪措施和位置時，應對噪聲控制給與考慮。

1.6 由於一般的船舶建造方法，源於機器和螺旋槳並傳到居住處所和機器處所以外的其他處所的噪聲，極有可能是結構傳導噪聲。

1.7 當為控制現有船上機械裝置噪聲而設計有效和經濟的措施時，以A-計權聲等級計進行的聲音測量，可能需要以某些形式的頻率分析作為補充。

2 噪聲源的隔離

2.1 如實際可行，產生超過本規則4.2所規定噪聲等級的任何發動機或機械，應安裝在不需要連續照管的艙室內（另見本附錄6.1段）。

2.2 居住艙室無論在垂直方向還是水平方向的位置均應儘實際可能遠離諸如螺旋槳和推進機械等噪聲源。

2.3 如實際可行，機艙棚應佈置在設有居住處所的上層建築和甲板室之外。如這不可行，在機艙棚和居住處所之間應佈置通道（如可行）。

2.4 如實際可行，應考慮將居住處所佈置在甲板室內，而不是佈置在延至船舷的上層建築內。

2.5 適用時，也可考慮採用無人處所、衛生間和洗滌室將居住處所與機器處所隔開。

2.6 可能需要採用適當的分隔板、艙壁、甲板等防止聲音的傳播。其相對於聲源與所隔聲音的頻率而具有正確的結構和位置，是很重要的。

2.7 如一個處所，諸如機器處所，被分隔為噪聲大（不連續有人值班）和較低噪聲（能夠連續有人值班）的處所，最好具有完全的分隔。

2.8 在某些處所可能宜採用吸聲材料，以防止由於分隔板、艙壁、甲板等的反射而提高噪聲等級。

3 排氣和進氣的消音

3.1 內燃機的排氣系統、機器處所、居住處所和其他處所的進氣系統，其佈置應使進氣口或排氣口遠離海員常去的位置。

3.2 當需要時，應安裝消聲器、消噪設備或降噪器。

3.3 為將居住處所的噪聲降至最小，通常需要將排氣系統及某些管路和管道與艙棚、艙壁等隔絕，以減少結構傳導的噪聲。

4 機械的屏蔽

4.1 在連續有人值班處所或可合理預期海員會長時間進行維護保養或檢修工作的處所，且本附錄第2節所詳述的分隔實際上不可行時，應考慮給所產生聲壓級超過本規則4.2規定限值的發動機和機械，安裝隔聲屏蔽或部分屏蔽。

4.2 當安裝於上述4.1所指處所內的發動機或機器所產生的噪聲等級在本規則5.3.1的衡準範圍和圖5.1中的A區之內時，提供降噪措施是十分必要的。

4.3 安裝隔聲屏蔽時，重要的是將噪聲源完全屏蔽。

5 減少尾部噪聲

為減少船艉噪聲的影響，特別是對居住處所的噪聲影響，應在與尾部、螺旋槳等相關的設計程序中考慮噪聲輻射問題。

6 操作人員的圍蔽

6.1 在大多數機器處所內，採用降噪控制室或其他類似處所（見本附錄的2.1）保護操作或值班海員是理想及可取的。

6.2 在噪聲等級超過85 dB（A）的小船和現有船舶的連續有人值班的機器處所內，在預期值班人員可能花費大部分時間值守的控制室或操作平台內，最好提供一個噪聲庇護所。

7 居住處所內噪聲加重的控制

7.1 為減小居住處所內的噪聲等級，可能需要考慮通過彈性基座將包括此類處所的甲板室與船舶的其他結構隔絕。

7.2 還可考慮在居住處所內設置與艙壁、襯板和天花板的柔性連接以及安裝浮築地板。

7.3 在居住處所內，為舷窗和窗戶配備窗簾及使用地毯，有助於吸聲。

8 機械的選擇

8.1 在設計階段，應考慮到所安裝的每台機械所產生的聲音。通過選用產生較小的空氣噪聲、液體噪聲或結構噪聲的機器控制噪聲是有可能的。

8.2 應要求製造商提供其機械所產生噪聲的資料，並提供建議安裝方法以將噪聲降至最小。

9 檢查和維修

各台機械、設備和相關工作處所的有關任何噪聲控制/降低特徵的所有項目，應作為船上安全管理系統的一個部分定期檢查。如果這種檢查發現噪聲控制措施方面的缺陷或導致噪聲過大的其他缺陷，應實際可行地儘快糾正。

10 振動隔離

10.1 如有必要，機器應以仔細挑選的彈性基座為支撐。為確保隔離的有效性，彈性基座應安裝在具有足夠剛度的基礎上。

10.2 如輔助機械、空壓機、液壓裝置、發電機組、風機、排氣管和消聲器等的結構傳導噪聲在居住處所或駕駛室產生不能接受的噪聲等級，應考慮使用彈性基座。

10.3 安裝隔聲罩裝置時，可考慮為機器安裝彈性基座，及機器與所有管道、圍井和電纜之間均採用柔性連接。

11 噪聲預測

11.1 在新船設計階段，設計方/船廠可以通過計算、評估或類似方法，對船舶區域內可能產生超過第4章中可接受等級的噪聲等級進行預測。

11.2 在設計階段，應採用11.1所述的噪聲預測，查明船舶內為遵守本規則4.2節規定的噪聲等級限值必須對降噪措施給與特別考慮的可能區域。

11.3 設計階段中所計劃的噪聲預測和任何降噪措施應文件化，特別是在根據噪聲預測，儘管有合理的技術舉措，仍須預期符合本規則4.2節的任何噪聲等級限值將難以實現的情況下。

12 消噪設備

12.1 消噪，也稱為抗噪，是通過引入一個抗噪信號抵抵消諸如由發動機和回轉機械所產生的大多為低頻（低於500 Hz）的重複噪聲，該信號與噪聲相等但與噪聲形成180度異相。通過與相關區域的噪聲相匹配的方法，將這種抗噪聲引入到環境中。然後兩種信號相互抵消，有效地消除環境中相當部分的噪聲能量。

12.2 此種技術有幾種應用方式，包括：

.1 主動消聲器——已由其他運輸方式表明可減少內燃機、壓縮機和真空泵的排氣噪聲，而不因背壓而造成低效率。

.2 主動安裝——能遏制回轉機械的振動以改善舒適度，降低運動部件的磨損以及減少振動引起的二次噪聲。

.3 消噪安靜區域——目前各種運輸方式均有靜音座椅和（汽車）車廂靜噪系統。有可能在其他處所中為海員提供舒適和恢復體能的主動靜噪型鋪位。

.4 消噪耳機——能包括低頻率，提供優於被動耳罩的聽力保護。主動型耳機也可允許通過正常對話進行交流，並改善工作場所的安全。

12.3 建議向本組織提供這些主動降噪系統的相關經驗，以對其性能參數更好地加以評估。

13 噪聲疲勞恢復區域

13.1 設立噪聲疲勞恢復區域，可作為建造1,600總噸以下的船舶或破

冰船的可選設計方案。對超出正常例行海上操作的有噪聲作業（例如長時間空中/直升機作業或動力定位設備的惡劣天氣作業），也可考慮針對船舶具體應用設立噪聲疲勞恢復區域。這些處所的使用，應納入《安全管理規則》之下的船舶安全作業方針。

13.2 若無其他切實可行的技術或組織方案減少噪聲源所產生的過大噪聲，則應提供噪聲疲勞恢復區域。

附錄4

確定噪聲暴露的簡化程序

1 通則

1.1 為確保海員不暴露於超過80 dB（A）的L_{ex}（24），本附錄提供了確定相關噪聲暴露量的簡化程序。

1.2 通常應根據ISO 9612:2009確定噪聲暴露量。

1.3 對基於海上試驗/港內停留期間噪聲測量以及船員的崗位要求的簡化方法闡述如下：

2 工作分析/崗位要求和非當班時間

2.1 借助船員名單，對各類崗位（組別）進行界定。

實例：

- 船長；
- 輪機長；
- 電工；
- 廚師；
- 等。

2.2 對於各類崗位，須分別界定崗位要求。崗位要求與船上的工作處所相關。

實例：

- 駕駛室；
- 船舶辦公室；
- 機械控制室；
- 工作間；
- 機艙；
- 廚房；
- 等。

2.3 對於各類崗位，工作班次應分為相關於工作處所的幾個組成部分（i）。對非當班時間，應進行類似的評估（所區分的部分基於船東/船舶經營人/僱員的評估）。

實例：

電工的一整天可以分為下列幾個部分：

i = 1	工作間	=	T_i = 5h
i = 2	機械控制室	=	T_i = 2h
i = 3	船舶辦公室	=	T_i = 2h
i = 4	機艙	=	T_i = 1h
i = 5	非當班	=	T_i = 14h
	總計	=	T_{total} = 24h

3 預計噪聲暴露級的確定

3.1 根據噪聲報告以及為各類崗位預估的工作時間和非當班時間，可以計算出噪聲暴露級。假設不會超過本規則規定的居住艙室和娛樂處所的噪聲限值。根據本規則，使用精選的聽力保護器是建議性的。假設配戴聽力保護器工人的最大噪聲等級不超過85 dB（A）。

3.2 各處所的噪聲貢獻計算如下：

$L_{ex,24h,i}=L_{Aeq,i}+10\ \log\ (T_i/T_0)$

式中： T_i係船上每個處所的有效持續時間；

T_0係基準時間24小時；

$L_{Aeq,i}$係每個處所的A-計權等效連續聲等級

3.3 A-計權噪聲暴露級按每個處所的貢獻噪聲計算如下：

$$L_{ex,24h} = 10\log\left(\sum_{i=1}^{n} 10^{\frac{L_{ex,24h,i}}{10}}\right)$$

實例：結果表

崗位類型	電工	地點/處所						
		駕駛室	船舶辦公室	機械控制室	工作間	機艙	廚房	非當班
測得的A-計權等效連續聲等級 $L_{Aeq,i}$[dB（A）]		64	63	75	84	85	72	60
持續時間/逗留 T_i[h]		0	2	2	5	1	0	14
貢獻噪聲 $L_{ex,24h,i}$[dB]		0	52.2	64.2	77.2	71.2	0	57.7
A-計權噪聲暴露級 $L_{ex,24h}$[dB]	**78.3**							

RESOLUTION MSC.337(91)
(adopted on 30 November 2012)

CODE ON NOISE LEVELS ON BOARD SHIPS

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

RECALLING ALSO resolutions A.343(IX) and A.468(XII) by which the Assembly of the Organization adopted the Recommendation on methods of measuring noise levels at listening posts and the Code on noise levels on board ships, respectively,

RECOGNIZING the need to establish mandatory noise level limits for machinery spaces, control rooms, workshops, accommodation and other spaces on board ships, taking into account experience gained with regard to noise control and allowable exposure levels since the adoption of resolution A.468(XII),

NOTING regulation II-1/3-12 of the International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended (hereinafter referred to as "the Convention"), adopted by resolution MSC.338(91), concerning protection against noise,

NOTING ALSO that the aforementioned regulation II-1/3-12 provides that ships shall be constructed to reduce onboard noise and to protect personnel from noise in accordance with the Code on noise levels on board ships (hereinafter referred to as "the Code"),

HAVING CONSIDERED, at its ninety-first session, the recommendation made by the Sub-Committee on Ship Design and Equipment, at its fifty-sixth session,

1. ADOPTS the Code on noise levels on board ships, the text of which is set out in the annex to the present resolution;

2. INVITES Contracting Governments to the Convention to note that the Code will take effect on 1 July 2014 upon entry into force of regulation II-1/3-12 of the Convention;

3. REQUESTS the Secretary-General to transmit certified copies of this resolution and the text of the Code, contained in the annex, to all Contracting Governments to the Convention;

4. ALSO REQUESTS the Secretary-General to transmit copies of this resolution and the annex to all Members of the Organization which are not Contracting Governments to the Convention.

ANNEX

CODE ON NOISE LEVELS ON BOARD SHIPS

PREAMBLE

1 The Code on noise levels on board ships (hereinafter referred to as "the Code") has been developed to provide international standards for protection against noise regulated by regulation II-1/3-12 of the International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended. Although the Code is legally treated as a mandatory instrument under the SOLAS Convention, certain provisions of the Code remain recommendatory or informative (see paragraph 1.1.3).

2 These regulations, recommendations and advice are intended to provide Administrations with the tools to promote "hearing saving" environments on board ships. This is, however, a dynamic topic, dealing with the human and technical environments in which they interface. Rules and recommendations will necessarily evolve, on a case-by-case basis, as a result of various technological as well as safety management practice developments. For this reason Administrations are encouraged to pass on experience and information received from recognized organizations, ship operators and equipment designers to improve this Code.

3 The Code has been developed having regard to conventional passenger and cargo ships. While certain types and sizes of ships have been excluded from its application, it should be recognized that full application to ships which differ appreciably from the conventional types of ships regarding design or operations might need specific consideration.

4 The Organization adopted a Recommendation on methods of measuring noise levels at listening posts (resolution A.343(IX)), which this Code is not intended to supersede. That Recommendation relates to interference by shipborne noise with the proper reception of external audible navigation signals and although the methods of measuring noise levels in accordance with the Recommendation and with the Code differ, these documents are to be considered compatible inasmuch as this Code is concerned primarily with the effect of noise on health and comfort. Care will be needed to ensure that there is compatibility between the general requirements and the requirements for audibility of navigation signals.

CHAPTER 1 – GENERAL

1.1 Scope

1.1.1 The Code is intended to provide standards to prevent the occurrence of potentially hazardous noise levels on board ships and to provide standards for an acceptable environment for seafarers. These standards were developed to address passenger and cargo ships. Since some sizes and certain service types of ships have been exempted from these requirements, it should be recognized that full application of the Code to ships that differ appreciably from conventional ships will require special considerations. The Code is intended to provide the basis for a design standard, with compliance based on the satisfactory conclusion of sea trials that result in issuance of a Noise Survey Report. Ongoing operational compliance is predicated on the crew being trained in the principles of personal protection and maintenance of mitigation measures. These would be enforced under the dynamic processes and practices put in place under SOLAS chapter IX.

1.1.2 Requirements and recommendations are made for:

.1 measurement of noise levels and exposure;

.2 protecting the seafarer from the risk of noise-induced hearing loss under conditions where at present it is not feasible to limit the noise to a level which is not potentially harmful;

.3 limits on acceptable maximum noise levels for all spaces to which seafarers normally have access; and

.4 verification of acoustic insulation between accommodation spaces.

1.1.3 Although this Code is legally treated as a mandatory instrument under the SOLAS Convention, the following provisions of this Code remain recommendatory, options for compliance, or informative in nature:

Paragraphs 1.3.2 and 1.3.3
Paragraphs 3.4.2 and 3.4.3
Chapter 5
Section 6.3
Section 7.3
Appendix 2
Appendix 3
Appendix 4

1.2 Purpose

The purpose of the Code is to limit noise levels and to reduce seafarers' exposure to noise, in order to:

.1 provide for safe working conditions by giving consideration to the need for speech communication and for hearing audible alarms, and to an environment where clear-headed decisions can be made in control stations, navigation and radio spaces and manned machinery spaces;

.2 protect the seafarer from excessive noise levels which may give rise to a noise-induced hearing loss; and

.3 provide the seafarer with an acceptable degree of comfort in rest, recreation and other spaces and also provide conditions for recuperation from the effects of exposure to high noise levels.

1.3 Application

1.3.1 The Code applies to new ships of a gross tonnage of 1,600 and above.

1.3.2 The specific provisions relating to potentially hazardous noise levels, mitigation and personal protective gear contained in the Code may be applied to existing ships of a gross tonnage of 1,600 and above, as far as reasonable and practical, to the satisfaction of the Administration.

1.3.3 The Code may be applied to new ships of a gross tonnage of less than 1,600 as far as reasonable and practical, to the satisfaction of the Administration.

1.3.4 The Code does not apply to:

.1 dynamically supported craft;

.2 high-speed craft;

.3 fishing vessels;

.4 pipe-laying barges;

.5 crane barges;

.6 mobile offshore drilling units;

.7 pleasure yachts not engaged in trade;

.8 ships of war and troopships;

.9 ships not propelled by mechanical means;

.10 pile driving vessels; and

.11 dredgers.

1.3.5 The Code applies to ships in port or at sea with seafarers on board.

1.3.6 Dispensations from certain requirements may in special circumstances be granted by the Administration, if it is documented that compliance will not be possible despite relevant and reasonable technical noise reduction measures. Such dispensation shall not include cabins, unless exceptional circumstances prevail. If dispensation is granted, it shall be ensured that the goal of this Code is achieved, and the noise exposure limits shall be considered in conjunction with chapter 5.

1.3.7 For ships designed for and employed on voyages of short duration, or on other services involving short periods of operation of the ship, to the satisfaction of the Administration, paragraphs 4.2.3 and 4.2.4 may be applied only with the ship in the port condition, provided that the periods under such conditions are adequate for seafarers' rest and recreation.

1.3.8 The Code is not intended to apply to passenger cabins and other passenger spaces, except in so far as they are work spaces and are covered by the provisions of the Code.

1.3.9 In case of repairs, alterations and modifications of a major character and outfitting related thereto of existing ships, it shall be ensured that areas, in which changes have been made, meet the requirements of this Code for new ships, insofar as the Administration deems reasonable and practicable.

1.3.10 The Code covers only noise sources related to the ship such as machinery and propulsion but does not include wind/wave/ice noise, alarms, public address systems, etc.

1.4 Definitions

For the purpose of the Code the following definitions apply. Additional definitions are given elsewhere in the Code.

1.4.1 *Accommodation spaces:* Cabins, offices (for carrying out ship's business), hospitals, messrooms, recreation rooms (such as lounges, smoke rooms, cinemas, gymnasiums, libraries and hobbies and games rooms) and open recreation areas to be used by seafarers.

1.4.2 *Apparent weighted sound reduction index* R'_w: A single number value expressed in decibels (dB) which describes the overall sound insulation performance in situ of walls, doors or floors provides (see ISO 717-1:1996 as amended by 1:2006).

1.4.3 *A-weighted equivalent continuous sound level* $L_{Aeq}(T)$*:* A-weighted sound pressure level of a continuous steady sound that, within a measurement time interval, T, has the same mean square sound pressure as a sound under consideration which varies with time. It is expressed in decibels A (dB(A)) and is given by the following equation:

$$L_{Aeq,T} = 10log\frac{1}{T}\int_0^T \frac{pa(t)^2}{{p_0}^2}.dt$$

where: T = measurement time
p_a (t) = A-weighted instantaneous sound pressure
p_o = 20 μPa (the reference level).

1.4.4 *A-weighted sound pressure level or noise level:* The quantity measured by a sound level meter in which the frequency response is weighted according to the A-weighting curve (see IEC 61672-1).

1.4.5 *C-weighted equivalent continuous sound level* $L_{Ceq}(T)$*:* C-weighted sound pressure level of a continuous steady sound that within a measurement time interval, T, has the same mean square sound pressure as a sound under consideration which varies with time. It is expressed in decibels C (dB(C)) and is given by the following equation:

$$L_{Ceq,T} = 10log\frac{1}{T}\int_0^T \frac{pc(t)^2}{{p_0}^2}.dt$$

where: T = measurement time
p_c (t) = C-weighted instantaneous sound pressure
p_o = 20 μPa (the reference level).

1.4.6 *C-weighted peak sound level* L_{Cpeak}: C-weighted maximum instantaneous sound pressure level. It is expressed in decibels C (dB(C)) and is given by the following equation:

$$L_{Cpeak} = 10\log \frac{p_{peak}^{\ 2}}{p_0^{\ 2}}$$

where: p_{peak} = C-weighted maximum instantaneous sound pressure
p_o = 20 μPa (the reference level).

1.4.7 *C-weighted sound pressure level or noise level:* The quantity measured by a sound level meter in which the frequency response is weighted according to the C-weighting curve (see IEC 61672-1 (2002-05)).

1.4.8 *Continuously manned spaces:* Spaces in which the continuous or prolonged presence of seafarers is necessary for normal operational periods.

1.4.9 *Crane barge:* A vessel with permanently installed cranes designed principally for lifting operations.

1.4.10 *Daily noise exposure level* ($L_{ex,24h}$) represents the equivalent noise exposure level for a period of 24 hours.

$L_{ex,24h}=L_{Aeq},T + 10 \log(T/T_0)$

where: T is the effective duration on board
T_0 is the reference duration 24 h.

The total equivalent continuous A-weighted sound pressure level (L_{Aeq} T), shall be calculated by using the different noise levels (L_{Aeq}, T_i) and associated time periods with the following equation:

$$L_{Aeq,T} = 10 \lg \left[\frac{1}{T} \sum_{i=1}^{n} (T_i \times 10^{0,1 L_{Aeq,T_i}}) \right]$$

where

L_{Aeq,T_i} is the equivalent continuous A-weighted sound pressure level, in decibels, averaged over time interval T_i;

$$T = \sum_{i=1}^{n} T_i$$

$L_{ex,24h}$ = $L_{Aeq,24h}$ when seafarers are on board over a period of 24 hours.

1.4.11 *Dredger:* A vessel undertaking operations to excavate bottom sediment, where the vessel has permanently installed excavation equipment.

1.4.12 *Duty stations:* Those spaces in which the main navigating equipment, the ship's radio or the emergency source of power are located or where the fire recording or fire control equipment is centralized and also those spaces used for galleys, main pantries, stores (except isolated pantries and lockers), mail and specie rooms, workshops other than those forming part of the machinery spaces and similar such spaces.

1.4.13 *Dynamically supported craft:* A craft which is operable on or above water and which has characteristics different from those of conventional displacement ships. Within the aforementioned generality, a craft which complies with either of the following characteristics:

.1 the weight, or a significant part thereof, is balanced in one mode of operation by other than hydrostatic forces;

.2 the craft is able to operate at speeds such that the function $\frac{v}{\sqrt{gL}}$ is equal to or greater than 0.9, where "v" is the maximum speed, "L" is the water-line length and "g" is the acceleration due to gravity, all in consistent units.

1.4.14 *Existing ship: A* ship which is not a new ship.

1.4.15 *Fishing vessel:* A vessel used commercially for catching fish, whales, seals, walrus or other living resources of the sea.

1.4.16 *Hearing loss:* Hearing loss is evaluated in relation to a reference auditory threshold defined conventionally in ISO Standard 389-1(1998). The hearing loss corresponds to the difference between the auditory threshold of the subject being examined and the reference auditory threshold.

1.4.17 *Hearing protector:* A device worn to reduce the level of noise reaching the ears. Passive noise-cancelling headsets block noise from reaching the ear. Active noise-cancelling headphones generate a signal that cancels out the ambient noise within the headphone.

1.4.18 *Integrating sound level meter:* A sound level meter designed or adapted to measure the level of the mean squared time averaged A-weighted and C-weighted sound pressure.

1.4.19 *Machinery spaces:* Any space which contains steam or internal-combustion machinery, pumps, air compressors, boilers, oil fuel units, major electrical machinery, oil filling stations, thrusters, refrigerating, stabilizing, steering gear, ventilation and air conditioning machinery, etc., and trunks to such spaces.

1.4.20 *Mobile offshore drilling unit:* A vessel capable of engaging in drilling operations for the exploration for, or exploitation of, resources beneath the seabed, such as liquid or gaseous hydrocarbons, sulphur or salt.

1.4.21 *Navigating bridge wings:* Those parts of the ship's navigating bridge extending towards the ship's sides.

1.4.22 *New ship:* means a ship to which this Code applies in accordance with SOLAS regulation II-1/3-12.1.

1.4.23 *Noise:* For the purpose of the Code all sound which can result in hearing impairment, or which can be harmful to health or be otherwise dangerous or disruptive.

1.4.24 *Noise induced hearing loss:* A hearing loss, originating in the nerve cells within the cochlea, attributable to the effects of sound.

1.4.25 *Noise level:* See A-weighted sound pressure level (paragraph 1.4.4).

1.4.26 *Occasional exposures:* Those exposures typically occurring once per week, or less frequently.

1.4.27 *Pile driving vessel:* A vessel undertaking operations to install pilings in the seabed.

1.4.28 *Pipe-laying barge:* A vessel specifically constructed for, or used in conjunction with, operations associated with the laying of submarine pipelines.

1.4.29 *Port condition:* The condition in which all machinery solely required for propulsion is stopped.

1.4.30 *Potentially hazardous noise levels:* Those levels at and above which persons exposed to them without protection are at risk of sustaining a noise induced hearing loss.

1.4.31 *Repairs, alterations and modifications of a major character:* means a conversion of a ship which substantially alters the dimensions, carrying capacity or engine power of the ship, which change type of the ship, which otherwise so alters the ship that, if it were a new ship, it would become subject to the relevant provisions.

1.4.32 *Sound:* Energy that is transmitted by pressure waves in air or other materials and is the objective cause of the sensation of hearing.

1.4.33 *Sound pressure level L_p or SPL:* Sound pressure level expressed in decibel (dB), of a sound or noise given by the following equation:

$$L_p = 10\log\frac{p^2}{{p_0}^2}$$

where: p = sound pressure, in Pascal
p_o = 20 μPa (the reference level).

1.4.34 *Voyages of short duration:* Voyages where the ship is not generally underway for periods long enough for seafarers to require sleep, or long off-duty periods, during the voyages.

1.4.35 *Weighted sound reduction index, R_w:* A single number value expressed in decibels (dB) which describes the overall sound insulation performance (in laboratory) of walls, doors or floors provides (see ISO 717-1:1997 as amended by 1:2006).

CHAPTER 2 – MEASURING EQUIPMENT

2.1 Equipment specifications

2.1.1 *Sound level meters*

Measurement of sound pressure levels shall be carried out using precision integrating sound level meters subject to the requirements of this chapter. Such meters shall be manufactured to IEC 61672-1(2002-05) type/class 1 standard as applicable, or to an equivalent standard acceptable to the Administration.

2.1.2 *Octave filter set*

When used alone, or in conjunction with a sound level meter, as appropriate, an octave filter set shall conform to IEC 61260 (1995) or an equivalent standard acceptable to the Administration.

2.2 Use of equipment

2.2.1 *Calibration*

Sound calibrators shall comply with the standard IEC 60942 (2003-01) and shall be approved by the manufacturer of the sound level meter used.

2.2.2 *Check of measuring instrument and calibrator*

Calibrator and sound level meter shall be verified at least every two years by a national standard laboratory or a competent laboratory accredited according to ISO 17025 (2005) as corrected by (Cor 1:2006).

2.2.3 *Microphone wind screen*

A microphone wind screen shall be used when taking readings outside, e.g. on navigating bridge wings or on deck, and below deck where there is any substantial air movement. The wind screen should not affect the measurement level of similar sounds by more than 0.5 dB(A) in "no wind" conditions.

CHAPTER 3 – MEASUREMENT

3.1 General

3.1.1 On completion of the construction of the ship, or as soon as practicable thereafter, measurement of noise levels in all spaces specified in chapter 4 shall take place under the operating conditions specified in sections 3.3 and 3.4 and shall be suitably recorded as required by section 4.3.

3.1.2 Measurements of the A-weighted equivalent continuous sound level, $L_{Aeq}(T)$ shall be made for the purpose of ensuring compliance with chapter 4.

3.1.3 Measurements of the C-weighted equivalent continuous sound level $L_{Ceq}(T)$ and the C-weighted peak sound level L_{Cpeak} shall be made in spaces where $L_{Aeq}(T)$ exceeds 85 dB(A) for the purpose of determining appropriate hearing protection according to the HML-method, see chapter 7 and appendix 2.

3.2 Personnel requirements

3.2.1 In order to ensure an acceptable and comparable quality of the measurement results and the reports the measuring institutes or experts shall prove their competence with view to noise measurements.

3.2.2 This person conducting measurements shall have:

.1 knowledge in the field of noise, sound measurements and handling of used equipment;

.2 training concerning the procedures specified in this Code.

3.3 Operating conditions at sea trials

3.3.1 Measurements should be taken with the ship in the loaded or ballast condition. The course of the ship shall be as straight as possible. The actual conditions during the measurements shall be recorded on the survey report.

3.3.2 Noise measurements shall be taken at normal service speed and, unless otherwise addressed in the provisions below, no less than 80% of the maximum continuous rating (MCR). Controllable pitch and Voith-Schneider propellers, if any, shall be in the normal seagoing position. For special ship types and for ships with special propulsion and power configurations, such as diesel-electric systems, the Administration may, in cooperation with the shipyard and shipowners, give due consideration to actual ship design or operating parameters when applying the requirements of paragraphs 3.3.1 and 3.3.2.

3.3.3 All machinery, navigation instruments, radio and radar sets, etc., normally in use at normal seagoing condition and levels, including squelch shall operate throughout the measurement period. However, neither energized fog signals nor helicopter operations shall take place during the taking of these measurements.

3.3.4 Measurements in spaces containing emergency diesel engine driven generators, fire pumps or other emergency equipment that would normally be run only in emergency, or for test purposes, shall be taken with the equipment operating. Measurements are not intended for determining compliance with maximum noise level limits, but as a reference for personal protection of seafarers carrying out maintenance, repair and test activities in such spaces.

3.3.5 Mechanical ventilation, heating and air-conditioning equipment shall be in normal operation, taking into account that the capacity shall be in accordance with the design conditions.

3.3.6 Doors and windows should in general be closed.

3.3.7 Spaces should be furnished with all necessary equipment. Measurements without soft furnishings may be taken but no allowance should be made for their absence. Rechecks or follow-up readings may be taken with soft furnishings included.

3.3.8 Ships fitted with bow thrusters, stabilizers, etc., may be subject to high noise levels when this machinery is in operation. For thrusters, measurements shall be made at 40% thruster power and the ship's speed shall be appropriate for thruster operation. Measurements shall be taken at positions around such machinery when in operation and in adjacent accommodation spaces and duty stations. If such equipment is intended for continuous operation, e.g. stabilizers, measurements shall be made for ensuring compliance with chapter 4. If such systems are intended for short temporary use only, for instance during port manoeuvres, measurements are only relevant for ensuring compliance with chapter 5 on noise exposure.

3.3.9 In case of ships with Dynamical Positioning (DP), which is intended for use in normal working condition, additional noise measurements at DP mode shall be made at control stations, duty stations, and accommodation spaces to ensure that the maximum noise level limits in these spaces are not exceeded. The Administration, classification societies, shipyard and DP designers, as appropriate, shall agree on a process to simulate the operation of the DP thruster system under conditions which would approximate station-holding at or above 40 per cent of maximum thruster power for design environmental conditions that the ship operates in.

3.4 Operating conditions in port

3.4.1 Measurements as specified in paragraphs 3.4.2, 3.4.3 and 3.4.4 relate to the ship in port condition.

3.4.2 When the noise from the ship's cargo handling equipment may lead to noise above maximum levels in duty stations and accommodation spaces affected by its operation, measurements should be taken. Noise originating from sources external to the ship should be discounted as indicated in paragraph 3.5.3.

3.4.3 Where the ship is a vehicle carrier and noise during loading and discharging originates from vehicles, the noise level in the cargo spaces and the duration of the exposure should be considered in conjunction with chapter 5. Such noise levels originating from vehicles may be estimated theoretically by the shipyard and shipowners in cooperation with the Administration.

3.4.4 Measurements shall be taken in machinery spaces with the machinery operating in the port condition if the provisions of paragraph 5.3.5 in respect of hearing protection shall be met in lieu of the provisions of paragraph 4.2.1 during maintenance, overhaul or similar port conditions.

3.5 Environmental conditions

3.5.1 The readings obtained may be affected if the water depth is less than five times the draught or if there are large reflecting surfaces in the ship's vicinity. Such conditions shall therefore be noted in the noise survey report.

3.5.2 The meteorological conditions such as wind and rain, as well as sea state, should be such that they do not influence the measurements. Wind force 4 and 1 m wave height should not be exceeded. If this cannot be achieved, the actual conditions shall be reported.

3.5.3 Care shall be taken to see that noise from extraneous sound sources, such as people, entertainment, construction and repair work, does not influence the noise level on board the ship at the positions of measurement. If necessary, measured values may be corrected for steady state background noise according to the energy summation principle.

3.6 Measurement procedures

3.6.1 During noise level measurement, only seafarers necessary for the operation of the ship and persons taking the measurements shall be present in the space concerned.

3.6.2 Sound pressure level readings shall be taken in decibels using an A-weighting (dB(A)) and C-weighting (dB(C)) filter and if necessary also in octave bands between 31.5 and 8,000 Hz.

3.6.3 The noise level measurements shall be taken with the integrating sound level meter using spatial averaging (as described in paragraph 3.13.1) and over a time period until stable readings are found or at least 15 s in order to represent the average value from variations due to irregular operation or variations in the sound field. Readings shall be made only to the nearest decibel. If first decimal of the dB reading is 5 or higher, the reading shall be made to nearest higher integer.

3.7 Determination of noise exposure

In addition to the continuous sound level measurements the noise exposure level of seafarers (see chapter 5) shall be determined based upon ISO 9612:2009. A simplified procedure based on ISO 9612 and a work place related noise exposure is given in appendix 4.

3.8 Calibration

The sound level meter shall be calibrated with the calibrator referred to in paragraph 2.2.1 before and after measurements are taken.

3.9 Measurement uncertainties

The uncertainty of measurements on board vessels depends on several factors, for example, measurement techniques and environmental conditions. Measurements made in conformity with this Code with few exceptions results in reproducibility standard deviation of the equivalent continuous A-weighted sound pressure level equal to or less than 1.5 dB.

3.10 Points of measurement

3.10.1 *Measurement positions*

If not otherwise stated, measurements shall be taken with the microphone at a height of between 1.2 m (seated person) and 1.6 m (standing person) from the deck. The distance between two measurement points should be at least 2 m, and in large spaces not containing machinery, measurements should be taken at intervals not greater than 10 m throughout the space including positions of maximum noise level. In no case shall measurements be taken closer than 0.5 m from the boundaries of a space. The microphone positions shall be as specified in paragraphs 3.10.3 and sections 3.11 to 3.14. Measurements shall be taken at positions where the personnel work, including at communication stations.

3.10.2 *Duty stations*

The noise level shall be measured at all points where the work is carried out. Additional measurements shall be performed in spaces containing duty stations if variations in noise level are thought to occur in the vicinity of the duty stations.

3.10.3 *Intake and exhaust openings*

When measuring noise levels, the microphone should, where possible, not be placed within a 30° angle away from the direction of the gas stream and not less than a distance of 1 m from the edge of the intake or exhaust opening of engines, ventilation, air conditioning and cooler systems, and as far as possible from reflecting surfaces.

3.11 Measurements in machinery spaces

3.11.1 Measurements shall be taken at the principal working and control stations of the seafarers in the machinery spaces and in the adjacent control rooms, if any, special attention being paid to telephone locations and to positions where voice communication and audible signals are important.

3.11.2 Measurements should not normally be taken closer than 1 m from operating machinery, or from decks, bulkheads or other large surfaces, or from air inlets. Where this is not possible, measurement shall be taken at a position midway between the machinery and adjacent reflecting surface.

3.11.3 Measurements from machinery which constitutes a sound source should be taken at 1 m from the machinery. Measurement should be made at a height of between 1.2 m to 1.6 m above the deck, platform or walkway as follows:

.1 at a distance of 1 m from, and at intervals not greater than 3 m around, all sources such as:

- main turbines or engines at each level
- main gearing
- turbo-blowers
- purifiers
- electrical alternators and generators
- boiler firing platform
- forced and/or induced draught fans
- compressors
- cargo pumps (including their driving motors or turbines)

In order to avoid an unnecessarily large and impractical number of measurements and recordings in the case of large engines and of machinery spaces where the measured sound pressure level in dB(A) at the intervals above does not vary significantly, it will not be necessary to record each position. Full measurement at representative positions and at the positions of maximum sound pressure level shall, however, be made and recorded, subject to at least four measurements being recorded at each level;

.2 at local control stations, e.g. the main manoeuvring or emergency manoeuvring stand on the main engine and the machinery control rooms;

.3 at all other locations not specified in .1 and .2 which would normally be visited during routine inspection, adjustment and maintenance;

.4 at points on all normally used access routes, unless covered by positions already specified above, at intervals not greater than 10 m; and

.5 in rooms within the machinery space, e.g. workshops. In order to restrict the number of measurements and recordings, the number of recordings can be reduced as in .1, subject to a total of at least four measurements (including those specified in this paragraph) being recorded at each machinery space level up to upper deck.

3.12 Measurements in navigation spaces

Measurements shall be taken on both navigating bridge wings but should only be taken when the navigating bridge wing to be measured is on the lee side of the ship.

3.13 Measurements in accommodation spaces

3.13.1 One measurement shall be taken in the middle of the space. The microphone shall be moved slowly horizontally and/or vertically over a distance of 1 m (+/- 0.5 m, taking into account the measurement criteria in paragraph 3.10.1). Additional measurements should be performed at other points if appreciable differences, i.e. greater than 10 dB(A), in the level of sound inside the room occur, especially near the head positions of a sitting or lying person.

3.13.2 The number of measurement cabins shall be not less than 40 per cent of total number of cabins. Cabins which are obviously affected by noise, i.e. cabins adjacent to machinery or casings, must be considered in any case.

3.13.3 For ships with a large number of crew cabins, such as passenger/cruise ships, it will be acceptable to reduce the number of measurement positions. The selection of cabins to be tested shall be representative for the group of cabins being tested by selecting those cabins in closer proximity to noise sources, to the satisfaction of the Administration.

3.13.4 On open deck, measurements shall be taken in any areas provided for the purpose of recreation.

3.14 Measurements in normally unoccupied spaces

3.14.1 In addition to the spaces referred to in sections 3.10 to 3.13, measurements shall be taken in all locations with unusually high noise levels where seafarers may be exposed, even for relatively short periods, and at intermittently used machinery locations.

3.14.2 In order to restrict the number of measurements and recordings, noise levels need not be measured for normally unoccupied spaces, holds, deck areas and other spaces which are remote from sources of noise.

3.14.3 In cargo holds, at least three microphone positions in parts of holds where personnel are likely to carry out work shall be used.

CHAPTER 4 – MAXIMUM ACCEPTABLE SOUND PRESSURE LEVELS

4.1 General

4.1.1 The limits specified in this section shall be regarded as maximum levels and not as desirable levels. Where reasonably practicable, it is desirable for the noise level to be lower than the maximum levels specified.

4.1.2 Before the ship is put in service, the limits specified in section 4.2 shall be assessed by the equivalent continuous sound level measurement for that space. In large rooms with many measurement positions the individual positions shall be compared to the limits.

4.1.3 Personnel entering spaces with nominal noise levels greater than 85 dB(A) should be required to wear hearing protectors while in those spaces (see chapter 5). The limit of 110 dB(A) given in paragraph 4.2.1 assumes that hearing protectors giving protection meeting the requirements for hearing protectors in chapter 7 are worn.

4.1.4 Limits are specified in terms of A-weighted sound pressure levels (see paragraphs 1.4.4 and 1.4.24).

4.2 Noise level limits

Limits for noise levels (dB(A)) are specified for various spaces as follows:

Designation of rooms and spaces	Ship size	
	1,600 up to 10,000 GT	≥10,000 GT
4.2.1 Work spaces (see 5.1)		
Machinery spaces	110	110
Machinery control rooms	75	75
Workshops other than those forming part of machinery spaces	85	85
Non–specified work spaces (other work areas)	85	85
4.2.2 Navigation spaces		
Navigating bridge and chartrooms	65	65
Look-out posts, incl. navigating bridge wings and windows	70	70
Radio rooms (with radio equipment operating but not producing audio signals)	60	60
Radar rooms	65	65
4.2.3 Accommodation spaces		
Cabin and hospitals	60	55
Messrooms	65	60
Recreation rooms	65	60
Open recreation areas (external recreation areas)	75	75
Offices	65	60
4.2.4 Service spaces		
Galleys, without food processing equipment operating	75	75
Serveries and pantries	75	75
4.2.5 Normally unoccupied spaces		
Spaces referred to in section 3.14	90	90

4.3 Survey report

4.3.1 A noise survey report shall be made for each ship. The report shall comprise information on the noise levels in the various spaces on board. The report shall show the reading at each specified measuring point. The points shall be marked on a general arrangement plan, or on accommodation drawings attached to the report, or shall otherwise be identified.

4.3.2 The format for noise survey reports is set out in appendix 1.

4.3.3 The noise survey report shall always be carried on board and be accessible for the crew.

CHAPTER 5 – NOISE EXPOSURE LIMITS

5.1 General

5.1.1 The noise level limits as set out in chapter 4 are designed so that if they are complied with seafarers will not be exposed to an $L_{ex}(24)$ exceeding 80 dB(A), i.e. within each day or 24-hour period the equivalent continuous noise exposure would not exceed 80 dB(A). For a new ship, compliance with these criteria should be verified on the basis of sea trial measurements of noise levels by calculation of the expected noise exposure of each category of crew members in accordance with the method prescribed in section 3.7.

5.1.2 In spaces with sound pressure levels exceeding 85 dB(A), suitable hearing protection should be used, or to apply time limits for exposure, as set out in this section, to ensure that an equivalent level of protection is maintained.

5.1.3 Each ship to which these regulations apply should include in their Safety Management System a section on the company's policy regarding hearing protection, exposure limits and conduct training on those matters, which will be logged in their training records.

5.1.4 Consideration should be given to the instruction of seafarers on these aspects, as recorded in appendix 2. No crew member should be exposed unprotected to peak values exceeding 135 dB(C).

5.2 Conservation of hearing and use of hearing protectors

In order to comply with the exposure criteria of this section, the use of hearing protectors complying with chapter 7 is permitted. Even when hearing protectors are required for compliance with the Code, risk assessments, a hearing conservation programme and other measures may be implemented by the Administration.

5.3 Limits of exposure of seafarers to high-noise levels

Seafarers should not be exposed to noise in excess of the levels and durations shown in figure 5.1 and described in paragraphs 5.3.1 to 5.3.5.

5.3.1 *Maximum exposure with protection (zone A, Figure 1)*

No seafarer, even when wearing hearing protectors, should be exposed to levels exceeding 120 dB(A) or to an L_{eq} (24) exceeding 105 dB(A).

5.3.2 *Occasional exposure (zone B, Figure 1)*

Only occasional exposures should be allowed in zone B and hearing protectors with an attenuation between 25 and 35 dB(A) should be used.

5.3.3 *Occasional exposure (zone C, Figure 1)*

In zone C only occasional exposures should be allowed and hearing protectors with an attenuation of at least 25 dB(A) should be used.

5.3.4 *Daily exposure (zone D, Figure 1)*

If seafarers routinely work (daily exposure) in spaces with noise levels within zone D hearing protectors with an attenuation up to at least 25 dB(A) should be used and risk assessment and a hearing conservation programme may be considered.

5.3.5 *Maximum exposure without protection (zone E, Figure 1)*

For exposures of less than eight hours, seafarers without hearing protection should not be exposed to noise levels exceeding 85 dB(A). When seafarers remain for more than eight hours in spaces with a high noise level, an L_{eq} (24) of 80 dB(A) should not be exceeded. Consequently, for at least a third of each 24 hours each seafarer should be subject to an environment with a noise level below 75 dB(A).

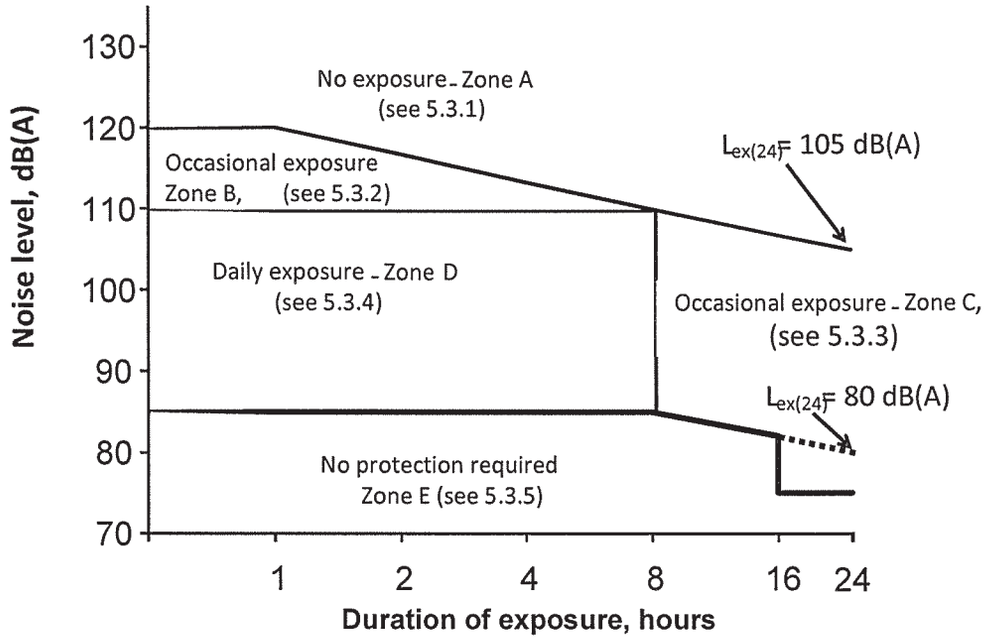


Figure 1: Allowable daily and occasionally occupational zones

Note: To work in Zone A – D hearing protectors attenuating the sound to the ear down to below 85 dB(A) are required. To work in Zone E hearing protectors are not required but should be accessible if the sound level is over 80 dB(A) for more than eight hours.

5.4 24-hour equivalent continuous sound level limit

As an alternative to compliance with the provisions of section 5.3 (figure 1), no unprotected seafarer should be exposed to a 24-hour equivalent continuous sound level greater than 80 dB(A). Each individual's daily exposure duration in spaces requiring the use of hearing protectors should not exceed four hours continuously or eight hours in total.

5.5 Hearing conservation programme

5.5.1 A hearing conservation programme may be provided for seafarers working in spaces with L_{Aeq} >85 dB(A) in order to train them in the hazards of noise and use of hearing protection, and to monitor hearing acuity. Some elements of a hearing conservation programme are as follows:

.1 Initial and periodic audiometric tests administered by a trained and appropriately qualified person, to the satisfaction of the Administration.

.2 Instruction of exposed persons on the hazards of high and long duration noise exposures and on the proper use of ear protectors (see appendix 2).

.3 Maintenance of audiometric test records.

.4 Periodic analysis of records and hearing acuity of individuals with high-hearing loss.

5.5.2 An optional element of a hearing conservation programme is to control the 24-hour equivalent continuous sound level to which individuals working in high noise level spaces are exposed. Such control requires calculation of the 24-hour equivalent continuous sound level. If this 24-hour level does not meet the limits, the duration of exposure should be controlled or hearing protectors used at appropriate times to bring the individual's exposure within the limit.

CHAPTER 6 – ACOUSTIC INSULATION BETWEEN ACCOMMODATION SPACES

6.1 General

Consideration shall be given to the acoustic insulation between accommodation spaces in order to make rest and recreation possible even if activities are going on in adjacent spaces, e.g. music, talking, cargo handling, etc.

6.2 Sound insulation index

6.2.1 The airborne sound insulation properties for bulkheads and decks within the accommodation shall comply at least with the following weighted sound reduction index (R_w) according to ISO Standard 717-1:1996 as amended (1:2006), part 1:

Cabin to cabin	$R_w = 35$
Messrooms, recreation rooms, public spaces and entertainment areas to cabins and hospitals	$R_w = 45$
Corridor to cabin	$R_w = 30$
Cabin to cabin with communicating door	$R_w = 30$.

6.2.2 The airborne sound insulation properties shall be determined by laboratory tests in accordance with ISO 10140-2:2010, to the satisfaction of the Administration.

6.3 Erection of materials

6.3.1 Care should be taken in the erection of materials and in the construction of accommodation spaces. During sea trial testing, if the erection of materials is in doubt then measurements should be taken on board ships for a representative selection of each type of partition, floors, doors as requested in paragraph 6.2.1 and to the satisfaction of the Administration.

6.3.2 The apparent weighted sound reduction index R'_w should comply with the requirements of the paragraph 6.2.1 with tolerance of up to 3 dB.

Note: Field measurements should be performed according to ISO 140-4:1998. When the area of the materials tested is <10 m^2, a minimum value of 10 m^2 should be considered for the calculation of the R'_w index.

CHAPTER 7 – HEARING PROTECTION AND WARNING INFORMATION

7.1 General

When the application of means for controlling sound at source does not reduce the noise level in any space to that specified in paragraph 4.1.3, seafarers who are required to enter such spaces shall be supplied with effective hearing protection on an individual basis. The provision of hearing protectors shall not be considered to be a substitute for effective noise control. Appendix 3 summarizes current noise abatement methods which may be applied on new ships.

7.2 Requirements for hearing protectors

7.2.1 The individual hearing protectors shall be so selected as to eliminate the risk to hearing or to reduce the risk to an acceptable level as specified in paragraph 7.2.2. The ship operator shall make every effort to ensure the wearing of hearing protectors and shall be responsible for checking the effectiveness of measures taken in compliance of this Code.

7.2.2 Hearing protectors shall be of a type such that they can reduce sound pressure levels to 85 dB(A) or less (see section 5.1). Selection of suitable hearing protectors should be in accordance with the HML-method described in ISO 4869-2:1994 (see explanation and example in appendix 2). Noise-cancelling technology may be used if the headset(s) have equivalent performance to hearing protectors in their unpowered condition.

7.2.2.1 Noise-cancelling headsets specifications should be as per confirmed manufacturer specifications.

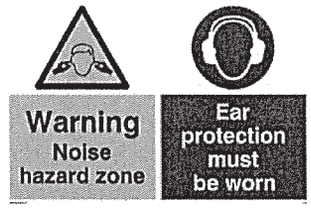
7.3 Selection and use of hearing protectors

Seafarers should be instructed in the proper use of hearing protectors as provided or used on board in accordance with appendix 2.

7.4 Warning notices

Where the noise level in machinery spaces (or other spaces) is greater than 85 dB(A), entrances to such spaces shall carry a warning notice comprising symbol and supplementary sign in the working language of the ship as prescribed by the Administration (see below an example of the warning notice and signs in English). If only a minor portion of the space has such noise levels the particular location(s) or equipment shall be identified at eye level, visible from each direction of access.

Signs at the entrance to noisy rooms (example in English)	
80-85 dB(A)	HIGH-NOISE LEVEL – USE HEARING PROTECTORS
85-110 dB(A)	DANGEROUS NOISE – USE OF HEARING PROTECTORS MANDATORY
110-115 dB(A)	CAUTION: DANGEROUS NOISE – USE OF HEARING PROTECTORS MANDATORY – SHORT STAY ONLY
>115 dB(A)	CAUTION: EXCESSIVELY HIGH-NOISE LEVEL – USE OF HEARING PROTECTORS MANDATORY – NO STAY LONGER THAN 10 MINUTES



Appendix 1

FORMAT FOR NOISE SURVEY REPORT

1 Ship particulars

.1 Name of ship
.2 Port of registry
.3 Name and address of shipowner, managing owner or agent
.4 Name and address of shipbuilder
.5 Place of build
.6 IMO number
.7 Gross tonnage
.8 Type of ship
.9 Ship's dimensions – length
breadth
depth
maximum draught (summer load line)
.10 Displacement at maximum draught
.11 Date of keel laying
.12 Date of delivery

2 Machinery particulars

.1 Propulsion machinery
Manufacturer: Type: Number of units:
Maximum cont. rating – power kW
Normal designed service shaft speed: rpm
Normal service rating – power: kW

.2 Auxiliary diesel engines
Manufacturer: Type:
Output: kW Number of units:

.3 Main reduction gear:

.4 Type of propeller (fixed propeller, controllable pitch propeller, Voith-Schneider propeller)
Number of propellers: Number of blades:
Designed propeller shaft speed: rpm

.5 Other (in case of special propulsion and power configurations)

.6 Engine room ventilation
Manufacturer: Type:
Number of units:
Fan diameter: m Fan speed: rpm /variable speed (Y/N)
Airflow capacity: m^3/h Total pressure: Pa

3 Measuring instrumentation and personnel

.1	Instrumentation	Make	Type	Serial No.
	Sound level meter			
	Microphone			
	Filter			
	Windscreen			
	Calibrator			
	Other equipment			

.2 Calibration of sound level meter Date Calibration Start Finish
- at survey by competent authority

.3 Identification of persons/organizations carrying out measurements

4 Conditions during measurement

.1 Date of measurement: Starting time: Completion time:
.2 Ship's position during measurement
.3 Loading condition of the ship
.4 Conditions during measurement
- Draught forward
- Draught aft
- Depth of water under keel

.5 Weather conditions
- Wind force
- Sea state

.6 Ship speed
.7 Actual propeller shaft speed: rpm
.8 Propeller pitch:
.9 Propulsion machinery speed: rpm
.10 Propulsion machinery power: kW
.11 Number of propulsion machinery units operating:
.12 Number of diesel auxiliary engines operating:
.13 Number of turbogenerators operating:
.14 Engine room ventilation speed mode (high/low/variable)
.15 Engine load (%MCR)
.16 Other auxiliary equipment operating:
Ventilation, heating and air conditioning equipment in operation

5 Measuring data

Noise limits	Measured sound pressure levels	
dB(A)	L_{Aeq}	dB(A)
	L_{Ceq}	dB(C)
	L_{Cpeak}	dB(C)

Note: Measurement of sound pressure level L_{Ceq} and L_{Cpeak} should be done only in the case of exceeding 85dB(A) and hearing protectors are required.

Work spaces

Machinery spaces
Machinery control rooms
Workshops
Non-specified workspaces

Navigation spaces

Navigating bridge and chartrooms
Look-out posts, including navigating bridge wings and windows
Radio rooms
Radar rooms

Accommodation spaces

Cabins and hospitals
Messrooms
Recreation rooms
Open recreation areas
Offices

Service spaces

Galleys, without food processing equipment operating
Serveries and pantries

Normally unoccupied spaces

6 **Main noise abatement measures** (list measures taken)

7 **Remarks** (list any exceptions to the Code)

…….. ……..

Name ……..

Address ……..

……..

…….. …… ……
Place Date Signature

ATTACHMENT

PAGES OF FREQUENCY ANALYSIS

Frequency analysis for certain areas may result in more accurate and precise noise level predictions and will aide in the detection of specific frequency bands which exceed the established limits in chapter 4. Further guidance may be found in ISO 1996-2:2007.

Appendix 2

GUIDANCE ON THE INCLUSION OF NOISE ISSUES IN SAFETY MANAGEMENT SYSTEMS

1 Instruction to seafarers

1.1 Seafarers should be instructed in the hazards of high and long duration noise exposures and the risk of noise-induced hearing loss. Instruction should be given to all seafarers on initial employment and periodically thereafter to those regularly working in spaces with noise levels in excess of 85 dB(A). Instruction in the provisions of the Code should include:

.1 noise exposure limits and the use of warning notices;

.2 the types of hearing protectors provided, their approximate attenuation and their proper use, fitting, and the effects on normal communications when first wearing such protection;

.3 company policies and procedures related to hearing protection and where appropriate any monitoring programme which may be available for seafarers working in spaces covered by warning notices; and

.4 guidance on the possible signs of hearing loss such as ringing in the ear, dead ear, or fullness in the ear and mitigating techniques to be effected when those signs occur.

1.2 Appropriate seafarers should receive such instruction as is necessary in the correct use and maintenance of machinery and silencers or attenuators in order to avoid the production of unnecessary noise.

2 Responsibility of ship operators

2.1 The ship operator should be responsible for ensuring that means for noise reduction and control are applied and maintained such that the requirements of the Code are met.

2.2 Where noise levels in any space exceed the limit of 85 dB(A), shipowners should ensure that:

.1 the space is identified and relevant provisions of the Code are complied with;

.2 the master and senior officers of the ship are aware of the importance of controlling entry into the space and the importance of the use of suitable hearing protection;

.3 suitable and sufficient hearing protection is provided for distribution on an individual basis to all relevant crew members; and

.4 the master, senior officers and any safety officer on board a ship are aware of the need for the relevant training and information to be provided on board.

2.3 Where hand tools, galley and other portable equipment produce noise levels above 85 dB(A) in normal working conditions, shipowners should ensure that warning information should be provided.

3 Responsibility of seafarers

Seafarers should be made aware of the need to ensure that:

.1 all measures adopted for noise control are utilized;

.2 any defective noise control equipment is reported to responsible persons under the ship's safety management system;

.3 suitable hearing protectors are always worn when entering areas in which their use is required by warning notices and that those protectors are not removed in those spaces, even for short periods; and

.4 the hearing protectors provided for their use are not damaged or misused and are maintained in a sanitary condition.

4 Selection of hearing protectors

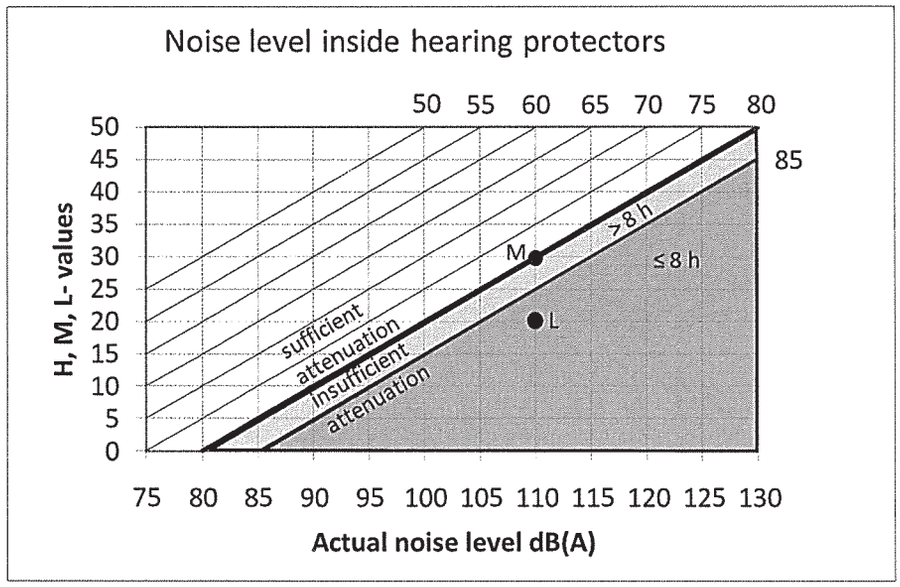
4.1 Selection of suitable hearing protectors should be carried out according to the HML-method described in ISO 4869-2:1994. In order to give guidance to ship operators and seafarers in choosing proper hearing protection, a short description of the HML-method and its use is given below.

4.2 The HML-method is a rating which is calculated in accordance with ISO 4869-2:1994, "Estimation of effective A-weighted sound pressure levels when hearing protectors are worn". Using the H, M, and L ratings requires both A-weighted (L_{Aeq}) and C-weighted (L_{Ceq}) sound pressure levels of the noise and the HML values for the hearing protector in question, which will be provided by the manufacturer.

4.2.1 The HML values for a hearing protector are related to the attenuation that the protector offers in noise of high, medium and low frequencies. These H and M values are used in the calculation of the protected exposure level for noises which have primary energy in the middle and high frequencies. This is considered the case if the measured L_{Ceq} and L_{Aeq} levels differ by 2 dB or less.

4.2.2 The M and L values for the hearing protector are used in the calculation of the protected exposure level for noises which have appreciable low-frequency components and for which the measured L_{Ceq} and L_{Aeq} levels differ by more than 2 dB in those spaces where the protector is intended to be used.

4.3 An example of simple use of the HML method:



On a given ship, the measured sound level in the machinery room is 110 dB(A), 115 dB(C). The chosen hearing protectors have the following attenuation according to the manufacturer: H= 35 dB, M=30 dB, L=20 dB.

.1 Mark the hearing protectors' L and M values on the vertical line starting at the actual noise level (110 dB(A)).

.2 Settle if the noise has low or high/medium frequency. If the difference L_{Ceq}-L_{Aeq} is more than 2 dB the noise has low frequency (L) and if L_{ceq}-L_{Aeq} is less than 2 dB the noise has high or medium frequency (M).

.3 If the sound is of high/medium frequency (L_{Ceq}-L_{Aeq}≤2), follow the diagonal line from the M-value and take a reading of the noise level inside the hearing protectors. In this case the noise level inside the hearing protectors is 80 dB(A) which means that the attenuation of the hearing protectors are sufficient for work over 8 hours a day.

.4 If the sound has low frequency (L_{Ceq}-L_{Aeq}>2), follow the diagonal lines from the L-value and take a reading of the noise level inside the hearing protectors. In this case, the noise level inside the hearing protectors is >85 dB(A) which means that the hearing protectors are not good enough even for a working day of 8 hours. Choose a hearing protector that has an L-value above 25 dB instead.

4.4 ***Calculation by the HML-method – Principle and example***

Determination of feasibility of a particular protector in a specific noise environment can also be calculated. The values H, M and L may be used to estimate L'A (total A-weighted noise level at the ear) for a particular protector in specific noise situation.

.1 Calculate L_{Ceq}-L_{Aeq} (This requires measurements of L_{Aeq} and L_{Ceq}. All class 1 sound level meter can apply A-weighted or C-weighted.)

.2 If L_{Ceq}-L_{Aeq} is ≤2 dB, the Predicted Noise Reduction level (PNR) is calculated using the equation:

$$PNR = M - (\frac{H - M}{4} * (LCeq - LAeq - 2))$$

If L_{Ceq}-L_{Aeq} is >2 dB, PNR is calculated using the equation:

$$PNR = M - (\frac{M - L}{8} * (LCeq - LAeq - 2))$$

.3 The PNR is then subtracted from the total A-weighted noise level to give the effective A-weighted level at the ear under the protector L'A:

$L'A = L_{Aeq}$ - PNR

Example: Hearing protector H = 35 dB, M = 25 dB, L = 20 dB

Noise level in engine-room:

L_{Aeq} = 108.7 dB(A)
L_{Ceq} = 109.0 dB(C)

L_{Ceq}-L_{Aeq} = 0.3 dB

PNR = 25 - ((35-25)/4)*(0.3-2) = 29.3 dB

L'A = 108.7-29.3 = 79.4 dB(A).

In this case, the noise level inside the hearing protectors is below 80 dB(A) which means that the attenuation of the hearing protectors is sufficient for work over eight hours a day.

Appendix 3

SUGGESTED METHODS OF ATTENUATING NOISE

1 General

1.1 In order to obtain a noise reduction on board ships to comply with the limits given in chapters 4 and 5 of the Code, careful consideration should be given to means of such reduction. This appendix is intended to provide information for the design of a ship in this respect.

1.2 Design and construction of noise control measures should be supervised by persons skilled in noise control techniques.

1.3 Some of the measures which can be taken to control the noise level or reduce the exposure of seafarers to potentially harmful noise are indicated in sections 2 to 10 of this appendix. It is emphasized that it will not be necessary to implement all or any of the measures recommended in this appendix on all ships. This Code does not provide detailed technical information needed for putting constructional noise control measures into effect, or for deciding which measures are appropriate in particular circumstances.

1.4 In applying noise control measures, care should be taken to ensure that rules and regulations concerning ship structure, accommodation and other safety matters are not infringed and the use of sound reduction materials should not introduce fire, safety or health hazards nor should such material, by virtue of flimsy construction or attachment, introduce hazards that may tend to impede either evacuation or de-watering of the spaces.

1.5 The need for noise control should be taken into account at the design stage when deciding which of different designs of engines and machinery are to be installed, the method of installation and the siting of machinery in relation to other spaces, and the acoustic insulation and siting of the accommodation spaces.

1.6 Due to the normal method of ship construction, it is most probable that noise originating from machinery and propellers reaching the accommodation and other spaces outside the machinery spaces will be of the structure-borne type.

1.7 When designing efficient and economic measures for noise control of machinery installations in existing ships, the measurement of sound produced in terms of A-weighted sound level may need to be supplemented by some form of frequency analysis.

2 Isolation of sources of noise

2.1 Where practicable, any engines or machinery producing noise levels in excess of the limits set out in section 4.2 of the Code should be installed in compartments which do not require continuous attendance (see also paragraph 6.1 of this appendix).

2.2 Accommodation should be sited both horizontally and vertically as far away as is practicable from sources of noise such as propellers and propulsion machinery.

2.3 Machinery casings should, where practicable, be arranged outside superstructures and deckhouses containing accommodation spaces. Where this is not feasible, passageways should be arranged between the casings and accommodation spaces, if practicable.

2.4 Consideration should be given, where practicable, to the placing of accommodation spaces in deck houses not in superstructures extending to the ship's side.

2.5 Consideration may also be given, where applicable, to the separation of accommodation spaces from machinery spaces by unoccupied spaces, sanitary and washing rooms.

2.6 Suitable partitions, bulkheads, decks, etc., may be needed to prevent the spread of sound. It is important that these be of the correct construction and location in relation to the source of sound and the frequency of the sound to be attenuated.

2.7 Where a space, such as a machinery space, is being divided into noisy (not continually manned) and less noisy (capable of being continually manned) spaces, it is preferable to have complete separation.

2.8 It may be advisable to provide sound absorbing material in certain spaces in order to prevent increase of noise level due to reflection from partitions, bulkheads, decks, etc.

3 Exhaust and intake silencing

3.1 Exhaust systems from internal combustion engines, air-intake systems to machinery spaces, accommodation spaces and other spaces should be so arranged that the inflow or discharge orifices are remote from places frequented by seafarers.

3.2 Silencers, noise-cancelling equipment or attenuators should be fitted when necessary.

3.3 To minimize accommodation noise levels it is normally necessary to reduce structure-borne noise by isolating exhaust systems and certain pipe work and duct work from casings, bulkheads, etc.

4 Machinery enclosure

4.1 In continuously manned spaces or spaces where seafarers might reasonably be expected to spend lengthy periods of time on maintenance or overhaul work, and where separation as detailed in section 2 of this appendix is not practicable, consideration should be given to the fitting of sound insulating enclosures or partial enclosures to engines or machinery producing sound pressure levels in excess of the limits set out in section 4.2 of the Code.

4.2 Where the noise level produced by engines or machinery installed in spaces as in paragraph 4.1 above falls within the criteria of paragraph 5.3.1 of the Code and zone A of figure 5.1, it is essential that noise reduction measures are provided.

4.3 When sound insulating enclosures are fitted, it is important that they entirely enclose the noise source.

5 Reduction of noise in the aft body

To reduce the noise influence in the aft body of the ship, especially to the accommodation spaces, consideration may be given to noise emission problems during the design procedures relating to the aft body, propeller, etc.

6 Enclosure of the operator

6.1 In most machinery spaces it would be desirable and advisable to protect operating or watchkeeping seafarers by providing a sound reducing control room or other similar space (see paragraph 2.1 of this appendix).

6.2 In continuously manned machinery spaces of small ships and of existing ships where noise levels are in excess of 85 dB(A), it would be desirable to provide a noise refuge at the control station or manoeuvring platform where the watch keeper might be expected to spend the major part of the time.

7 Control of noise accentuation into accommodation spaces

7.1 To reduce noise levels in accommodation spaces it may be necessary to consider the isolation of deckhouses containing such spaces from the remaining structure of the ship by resilient mountings.

7.2 Consideration may also be given to the provision of flexible connections to bulkheads, linings and ceilings and the installation of floating floors within accommodation spaces.

7.3 The provision of curtains to side scuttles and windows and the use of carpets within accommodation spaces assist in absorbing noise.

8 Selection of machinery

8.1 The sound produced by each item of machinery to be fitted should be taken into account at the design stage. It may be possible to control noise by using a machine producing less airborne, fluid-borne or structure-borne sound.

8.2 Manufacturers should be requested to supply information on the sound produced by their machinery and also to provide recommended methods of installation in order to keep noise levels to a minimum.

9 Inspection and maintenance

All items of machinery, equipment and associated working spaces should be periodically inspected as part of the onboard safety management system with respect to any noise control/reduction features. Should such inspection reveal defects in the means for noise control, or other defects causing excessive noise, these should be rectified as soon as is practical.

10 Vibration isolation

10.1 Where necessary, machines should be supported on carefully selected resilient mountings. To ensure the effectiveness of the isolation, the mountings should be installed on a sufficient stiff foundation.

10.2 Where structure-borne sound from auxiliary machinery, compressors, hydraulic units, generating sets, vents, exhaust pipes and silencers produces unacceptable noise levels in accommodation spaces or on the navigating bridge, use of resilient mountings should be considered.

10.3 When sound insulating enclosures are fitted consideration may be given to the machine being resiliently mounted and pipe, trunk and cable connections to it being flexible.

11 Noise prediction

11.1 In the design phase of new ships, the designer/yard may predict by calculations, qualified assessments or the like, the expected noise levels in areas of the ship likely to have noise levels over acceptable levels from chapter 4.

11.2 The noise predictions referred to in paragraph 11.1 should be used in the design phase to identify possible areas in the ship where special consideration must be given to noise reduction measures in order to observe the noise level limits stipulated in section 4.2 of the Code.

11.3 The noise predictions and any noise reduction measures planned in the design phase should be documented, especially in cases where, according to the noise predictions, it must be expected that compliance with any of the noise level limits of section 4.2 of the Code will be difficult to achieve, despite reasonable technical initiatives.

12 Noise-cancelling equipment

12.1 Noise cancellation, also known as anti-noise, is the process whereby mostly low-frequency (below 500 Hz) repetitive noises such as made by engines and rotating machinery, is cancelled out by introducing a cancelling anti-noise signal which is equal to but 180 degrees out of phase with the noise. This anti-noise is introduced to the environment in a way that it matches the noise in the region of interest. The two signals then cancel each other out, effectively removing a significant portion of the noise energy from the environment.

12.2 Several applications for this technology exist. They include:

.1 Active mufflers – have been shown in other modes of transportation to reduce exhaust noise from internal combustion engines, compressors, and vacuum pumps without the inefficiencies caused by back pressure.

.2 Active mounts – these can contain vibration from rotating machines to improve comfort, decrease wear on moving parts, and reduce secondary acoustic noise from vibration.

.3 Noise-cancelled quiet zones – currently silent seats and (automobile) cabin quieting systems for various modes of transportation exist. The possibility exists for producing active-quieted bunks of other spaces for seafarer comfort and recovery.

.4 Noise-cancelling headsets – these can extend hearing protection beyond passive ear defenders to include low frequencies. Active headsets can also allow communication, by permitting normal conversation, and improve work place safety.

12.3 It is suggested that information concerning experience from these active noise-reducing systems be provided to the Organization to better evaluate the performance parameters of these systems.

13 Noise recovery areas

13.1 Incorporation of noise recovery areas may be used as an alternative design approach for the construction of ships under 1,600 GT or ice-breaking vessels. Noise recovery areas may also be considered for incorporation in ship-specific applications where noisy operations (examples are extended air/helicopter operations or heavy weather operation of dynamic positioning equipment) are undertaken for time periods over and above those of normal, routine seagoing practices. The use of these spaces should be integrated into ship safe operations policies under the ISM Code.

13.2 Noise recovery areas should be provided if no other technical or organizational solutions are feasible to reduce excessive noise from sound sources.

Appendix 4

SIMPLIFIED PROCEDURE FOR DETERMINING NOISE EXPOSURE

1 General

1.1 In order to ensure that seafarers will not be exposed to an $L_{ex}(24)$ exceeding 80 dB(A), this appendix is providing information on a simplified procedure for determining the related noise exposure.

1.2 The determination of noise exposure should be usually carried out based on ISO 9612:2009.

1.3 A simplified method based on the noise measurements during sea trail/harbour stay and a job profile for crew members is described in the following:

2 Work analysis/Job profiling and off-duty hours

2.1 With the help of a crew list, different job categories (groups) will be defined.

Example:

- Master
- Chief engineer
- Electrician
- Cook
- etc.

2.2 For each job category, a job profile has to be defined individually. The job profile is related to the work spaces on board the vessel.

Example:

- Wheelhouse
- Ship office
- Machinery control room
- Workshop
- Engine-room
- Galley
- etc.

2.3 For each job category, the working shift is to be divided into partitions (i) related to the work spaces. A similar assessment should be made for off-duty hours (the partitions are based on estimations by the owner/operator/employer).

Example:

A full day for an electrician may be divided into the following partitions:

i = 1	Workshop	=	T_i = 5 hours
i = 2	Machinery control room	=	T_i = 2 hours
i = 3	Ship office	=	T_i = 2 hours
i = 4	Engine-room	=	T_i = 1 hour
i = 5	Off-duty	=	T_i = 14 hours
	Total	=	T_{total} = 24 hours

3 Determination of estimated noise exposure levels

3.1 Based on the noise report and the estimated working times and off-duty hours for each job category, the noise exposure level can be calculated. It is assumed that the noise limits for cabins and recreation spaces according to this Code will not be exceeded. Using well-selected hearing protectors is recommendatory according to this Code. It is assumed that the maximum noise level of workers wearing hearing protectors does not exceed 85 dB(A).

3.2 The noise contribution from each space is calculated as follows:

$$L_{ex,24h,i}=L_{Aeq,i} + 10 \log(Ti/T_0)$$

where: Ti is the effective duration on board for each space
T_0 is the reference duration 24 h
$L_{Aeq,i}$ is the A-weighted equivalent continuous sound level for each space

3.3 The A-weighted noise exposure level is calculated from the noise contribution from each space as follows:

$$L_{ex,24h} = 10\log\left(\sum_{i=1}^{n} 10^{\frac{L_{ex,24h,i}}{10}}\right)$$

Example: Result Sheet

Job category	**Electrician**	Location/Space						
		Navigating bridge	Ship Office	Machinery Control Room	Workshops	Engine-room	Galley	Off-duty
Measured A-weighted equivalent continuous sound level $L_{Aeq,i}$ [dB(A)]		64	63	75	84	85	72	60
Duration/Stay T_i [h]		0	2	2	5	1	0	14
Noise contribution $L_{ex,24h,i}$ [dB]		0	52.2	64.2	77.2	71.2	0	57.7
A-weighted noise exposure level $L_{ex,24h}$ [dB]	**78.3**							

第 42/2015 號行政長官公告

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

國際海事組織海上安全委員會於二零一二年十一月三十日透過第MSC.339（91）號決議通過了《國際消防安全系統規則》修正案，該修正案自二零一四年七月一日起適用於澳門特別行政區；

基於此，行政長官根據澳門特別行政區第3/1999號法律第六條第一款的規定，命令公佈包含上指修正案的第MSC.339（91）號決議的中文及英文文本。

二零一五年五月四日發佈。

行政長官　崔世安

Aviso do Chefe do Executivo n.º 42/2015

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

Considerando igualmente que, em 30 de Novembro de 2012, o Comité de Segurança Marítima da Organização Marítima Internacional, através da resolução MSC.339(91), adoptou emendas ao Código Internacional dos Sistemas de Segurança contra Incêndios, e que tais emendas são aplicáveis na Região Administrativa Especial de Macau desde 1 de Julho de 2014;

O Chefe do Executivo manda publicar, nos termos do n.º 1 do artigo 6.º da Lei n.º 3/1999 da Região Administrativa Especial de Macau, a resolução MSC.339(91), que contém as referidas emendas, nos seus textos em línguas chinesa e inglesa.

Promulgado em 4 de Maio de 2015.

O Chefe do Executivo, *Chui Sai On*.

第 MSC.339（91）號決議

（2012 年 11 月 30 日通過）

《國際消防安全系統規則》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二十八條第（二）款，

注意到第 MSC.98（73）號決議，憑該決議，委員會通過了《國際消防安全系統規則》（以下稱“消防系統規則”），根據《1974 年國際海上人命安全公約》（以下稱“公約”）第 II－2 章，該規則具有強制性，

還注意到公約關於《消防系統規則》修正程序的第 VIII（b）條和第 II－2/3.22 條，

在其第九十一屆會議上審議了按照公約第 VIII（b）（i）條提出和分發的《消防系統規則》的修正案，

1. 按照公約第 VIII（b）（iv）條，**通過**《國際消防安全系統規則》修正案，其文本載於本決議附件中；

2. 按照公約第 VIII（b）（vi）（2）（bb）條，**決定**該修正案將於 2014 年 1 月 1 日視爲已獲接受，除非在此日期之前，有三分之一以上的公約締約國政府或擁有商船合計噸位不少於世界商船總噸位 50%的締約國政府表示反對該修正案；

3. **請**公約各締約國政府注意，按照公約第 VIII（b）（vii）（2）條，該修正案在按上述第 2 段獲接受後，將於 2014 年 7 月 1 日生效；

4. **要求**秘書長遵照公約第 VIII（b）（v）條，將本決議及其附件中修正案文本的核證無誤副本分發給所有公約締約國政府；

5. **還要求**秘書長將本決議及其附件的副本分發給非公約締約國的本組織會員國。

附件

《國際消防安全系統規則》修正案

第 3 章

人員保護

1 現有第 2.1.2 段由下列二個新段落替代：

“2.1.2.1 呼吸器應爲自給式壓縮空氣呼吸器，其瓶內儲氣量須至少爲 1,200 升，或其他型式的自給式呼吸器，其可供使用的時間須至少爲 30 分鐘。呼吸器所有的空氣瓶須能互換。

2.1.2.2 壓縮空氣呼吸器須設有聽覺報警和視覺或其他裝置，以在瓶內儲氣量降至不少於 200 升前向使用者發出警報。”

第 5 章

固定式氣體滅火系統

2 在第 2.1.1.1 段第二句後，新增句子如下：

“未採用至少 A－0 級分隔分開並設有獨立通風系統的相鄰處所應視為同一處所。”

3 在第 2.1.1.3 段第一句後，新增句子如下：

“無需為此目的而將容器從其固定位置完全移開。對於二氧化碳系統，在每排瓶子上須設有懸掛稱重裝置的橫杠或其他裝置。對於其他滅火劑類型，可使用適當的液面指示器。”

4 第 2.1.3.2 段的第一句由下文替代：

“對任何滾裝處所、裝有整體式冷藏集裝箱的集裝箱貨艙、可經門或艙口進出的處所和通常有人員工作或進出的其他處所，須設有釋放滅火劑的聽覺和視覺自動報警裝置。”

5 現有第 2.2.1.1 段後新增第 2.2.1.2 如下，之後的段落（包括對其的引述）相應重新編號：

“2.2.1.2 特種處所以外的車輛處所和滾裝處所所備二氧化碳的數量須足以釋放出體積至少等於可被密封的最大貨物處所總容積 45%的自由氣體，且該佈置須確保相關處所所需氣體的至少三分之二將在 10 分鐘內注入。二氧化碳系統不得用於保護特種處所。”

6 在重新編號的第 2.2.1.6 段之後，新增第 2.2.1.7 段如下：

“2.2.1.7 對於集裝箱和普通貨物處所（主要擬載運多種獨立繫固或包裝的貨物），固定管系須可在 10 分鐘內將至少三分之二的氣體注入該處所。對於固體散貨處所，固定管系須可在 20 分鐘內將至少三分之二的氣體注入該處所。系統控制裝置的佈置須允許根據貨艙的裝載狀況釋放氣體總量的三分之一、三分之二或全部。”

7 第 2.2.2 段的第一句由下文替代：

“保護滾裝處所、裝有整體式冷藏集裝箱的集裝箱貨艙、可經門或艙口進出的處所和通常有人員工作或進出的其他處所的二氧化碳系統須符合下列要求：” 。

8 刪除第 2.4 節。

9 第 2.5 節重新編號為第 2.4 節，且其中的文字“第 2.2 至 2.4 段”由“第 2.2 和 2.3 段”所替代。

第 7 章

固定式壓力噴水和水霧滅火系統

10 現有第 2.3 段後新增第 2.4 段如下：

“**2.4 用於滾裝處所、車輛處所和特種處所的固定式水基滅火系統**

用於滾裝處所、車輛處所和特種處所的固定式水基滅火系統須由主管機關根據本組織制定的導則予以認可。”

第 8 章

自動噴水器、探火和失火報警系統

11 在第 2.5.2.3 段第一句後，新增句子如下：

“為此，額定面積須為受保護區域的總水平投影面積。”

第 9 章

固定式探火和失火報警系統

12 在第 2.2.1 段第三句後，新增句子如下：

“在 2014 年 7 月 1 日或以後建造的船舶上，轉換開關須佈置成在發生故障時不會導致兩套電源同時斷電。”

13 在第 2.2.1 段後新增第 2.2.2 段如下，現有第 2.2.2 段重新編號為第 2.2.3 段：

“2.2.2 在 2014 年 7 月 1 日或以後建造的船舶上，自動轉換開關的操作或其中一套電源的故障不得導致探火能力的喪失。如短暫斷電會導致系統能力下降，須配有足夠容量的蓄電池以確保轉換期間的持續運行。”

14 刪除現有第 2.2.3 段，並在重新編號的第 2.2.3 段後新增如下段落：

“2.2.4 上述第 2.2.1 段中規定的應急電源可由蓄電池組或應急配電板供電。該電源須足以在公約第 II－1/42 和 43 條所要求的時間期限內維持探火和失火報警系統的運行，並且在該所要求的時間期限結束時，須能夠運作所有相連接的視覺和聽覺失火報警信號至少 30 分鐘。

2.2.5 在 2014 年 7 月 1 日或以後建造的船舶上，如系統由蓄電池組供電，蓄電池組須位於探火系統的控制板內或附近，或在另一個適合在應急情況下使用的位置。電池充電裝置的功率須足以在對處於完全放電狀態的電池充電時維持對探火系統的正常供電輸出。”

15 在第 2.3.1.2、2.3.1.3 和 2.3.1.5 段中，所引述的標準“IEC 60092－505:2001”改換為“IEC 60092－504”。

16 在第 2.5.1.3 段第二句後，新增句子如下：

“對於設有貨物控制室並在 2014 年 7 月 1 日或以後建造的船舶，貨物控制室內須有一個額外指示裝置。”

17 在第 2.5.2 段第二句後，新增句子如下：

“在 2014 年 7 月 1 日或以後建造的船舶上，安裝在低温處所（例如，冷藏艙）的探測器須使用充分慮及此類位置特點的程序進行測試。”

第 12 章

固定式應急消防泵

18 現有第 2.2.2.1 段由下文替代：

“2.2.2.1 柴油機的起動

任何應急消防泵的柴油驅動動力源，須在温度降至 0℃時的冷態下能用人工手搖曲柄隨時起動。在不能確保隨時起動時，如不可行，或如可能遇到更低温度時，及如柴油驅動動力源所在艙室無供暖時，則須設有令主管機關滿意的柴油機冷卻水或潤滑油電力加熱系統。如人工起動不可行時，主管機關可允許採用壓縮空氣、電或其他儲備能源，包括液壓蓄能器或起動藥筒作為起動裝置。這些起動裝置，須能在 30 分鐘內起動柴油機驅動動力源至少 6 次，並在第一個 10 分鐘內起動至少 2 次。”

第 13 章

脫險通道的佈置

19 現有第 2.2.4 段由下文替代：

“2.2.4 梯道平台

除服務於公共處所直接通向梯道環圍的梯道平台外，每一層甲

板的梯道平台（不包括中間梯道平台）的面積不得小於 $2m^2$。並在使用該平台人員數超過 20 人時，每增加 10 人須增加 $1m^2$ 面積，但不必超過 $16m^2$。中間梯道平台的尺寸須按照第 2.3.1 條劃定。”

第 14 章

固定式甲板泡沫系統

20 現有第 14 章由下文替代：

“**1 適用範圍**

1.1 本章詳細規定了公約第 II－2 章要求配備的固定式甲板泡沫系統的技術要求。

2 技術要求

2.1 ***通則***

2.1.1 提供泡沫的裝置須能將泡沫輸送到整個貨艙甲板區域，並且能送入甲板已經破裂的任一貨艙內。

2.1.2 甲板泡沫系統操作須簡單而迅速。

2.1.3 按所要求的輸出量操作甲板泡沫系統時，須從消防總管按所要求的壓力同時噴射所要求的最少數目的水柱。如甲板泡沫系統由消防總管的共用管路水，須為泡沫系統提供同時操作兩支水槍所需的額外泡沫濃縮液。須能在船舶全長範圍的甲板上、起居處所、服務處所、控制站和機器處所內同時噴射所要求的最少數目的水柱。

2.2 *部件要求*

2.2.1 *泡沫混合液和泡沫濃縮液*

2.2.1.1 對於載運下列貨物的液貨船：

.1 閃點不超過 60℃（閉杯試驗，由經認可閃點儀測定），且其雷德蒸氣壓力低於大氣壓力的原油或石油產品或具有類似失火危險的其他液體產品，包括《國際散化規則》第 18 章中閃點不超過 60℃（閉杯試驗）且常規泡沫滅火系統對之有效的貨物（參見公約第 II－2/1.6.1 和 10.8 條）；或

.2 閃點超過 60℃（閉杯試驗，由經認可閃點儀測定）的石油產品（參見公約第 II－2/1.6.4 條）；或

.3 閃點超過 60℃（閉杯試驗，由經認可閃點儀測定）的《國際散化規則》第 17 章貨物（參見《國際散化規則第 11.1.3 段和公約第 II－2/1.6.4 條），

泡沫混合液的供給率不得小於下例數值中的最大值：

.1 貨艙甲板區域每平方米 0.6 升/分鐘，貨艙甲板面積係指船舶最大寬度乘以全部貨艙處所的縱向總長度；

.2 具有最大這種面積的單個貨艙的水平截面面積每平方米 6 升/分鐘；或

.3 最大泡沫炮保護的並完全位於該炮前方的面積每平方米 3 升/分鐘，但任何泡沫炮的輸出量不應少於 1,250 升/分鐘。

2.2.1.2 對於載運《國際散化規則》第 17 章所列閃點不超過 60℃（閉杯試驗）的散裝化學品的液貨船，泡沫混合液的供給率須符合《國際散化規則》的要求。

2.2.1.3 須供給足量的泡沫濃縮液，以確保對裝設惰性氣體裝置的液貨船產生泡沫至少 20 分鐘，或，對未裝設惰性氣體裝置或不要求使用惰性氣體系統的液貨船產生泡沫至少 30 分鐘。

2.2.1.4 船上供給的泡沫濃縮液須由主管機關針對擬載運的貨物予以認可。為保護原油、石油產品和非極性溶劑貨物須供給 B 類泡沫濃縮液。對《國際散化規則》第 17 章表中所列極性溶劑貨物須供給 A 類泡沫濃縮液。須僅供給一種類型的泡沫濃縮液，且該濃縮液應對最大可能數量的擬載運貨物有效。對於泡沫對其無效或與之不兼容的貨物，須提供令主管機關滿意的附加安排。

2.2.1.5 閃點不超過 60℃且常規泡沫滅火系統對其無效的液體貨物，須符合公約第 II－2/1.6.2.1 條的規定。

2.2.2 *泡沫炮和泡沫槍*

2.2.2.1 固定式泡沫系統的泡沫，須用若干泡沫炮和泡沫槍提供。須進行泡沫炮和泡沫槍的原型試驗以確保所產生泡沫的發泡時間和析液時間與第 2.2.1.4 段中所確定者相差不超過 ±10%。當採用中等發泡倍數的泡沫（發泡率在 21:1 和 200:1 之間）時，泡沫施放率和泡沫炮裝置的能力須令使主管機關滿意。每一泡沫炮須至少供給所要求的泡沫混合液供給率的 50%。對於小於 4,000 載重噸的液貨船，主管機關可以不要求裝設泡沫

炮，而只要求裝設泡沫槍。但是，在這種情況下，每一泡沫槍的能力須至少是所要求的泡沫混合液供給率的 25%。

2.2.2.2 任何泡沫槍的能力須不小於 400 升/分鐘，在靜止空氣中，噴槍的射程須不小於 15 米。

2.3 *安裝要求*

2.3.1 *主控制站*

2.3.1.1 系統的主控制站須適當地佈置在貨物區域以外，靠近起居處所並在被保護區域萬一失火時能易於到達並操作的位置。

2.3.2 *泡沫炮*

2.3.2.1 泡沫炮的數目和位置須符合第 2.1.1 段的規定。

2.3.2.2 從泡沫炮至其前方所保護區域最遠端的距離，不得大於該炮在靜止空氣中射程的 75%。

2.3.2.3 在尾樓或面向貨艙甲板的起居處所的前端左右兩舷須各裝設 1 具泡沫炮和泡沫槍軟管接頭。泡沫炮和軟管接頭須位於任何貨艙的後方，但若能夠保護相互之下的甲板和後方，可位於泵艙、隔離空艙、壓載艙和相鄰於貨艙的空艙上方的貨物區域內。對小於 4,000 載重噸的液貨船，在尾樓或面向貨艙甲板的起居處所的前端左右兩舷須各裝設 1 具泡沫槍軟管接頭。

2.3.3 *泡沫槍*

2.3.3.1 所有液貨船須至少配備 4 具泡沫槍。泡沫槍總管出口的數量和佈置須使至少兩具泡沫槍將泡沫噴射到貨艙甲板區域的任何部分。

2.3.3.2 須為確保滅火作業中的動作靈活性並覆蓋泡沫炮所保護不到的區域，提供泡沫槍。

2.3.4 *隔離閥*

2.3.4.1 在泡沫總管中，並在緊接任何泡沫炮之前的係甲板泡沫系統構成部分的消防總管中，須裝有閥門，以隔離總管的損壞部分。”

RESOLUTION MSC.339(91)
(adopted on 30 November 2012)

AMENDMENTS TO THE INTERNATIONAL CODE FOR FIRE SAFETY SYSTEMS

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

NOTING resolution MSC.98(73), by which it adopted the International Code for Fire Safety Systems (hereinafter referred to as "the FSS Code"), which has become mandatory under chapter II-2 of the International Convention for the Safety of Life at Sea, 1974 (hereinafter referred to as "the Convention"),

NOTING ALSO article VIII(b) and regulation II-2/3.22 of the Convention concerning the procedure for amending the FSS Code,

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

1. ADOPTS, in accordance with article VIII(b)(iv) of the Convention, amendments to the International Code for Fire Safety Systems, 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 2014, 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 per cent of the gross tonnage of the world's merchant fleet, have notified their objections to the amendments;

3. INVITES Contracting Governments to the Convention to note that, in accordance with article VIII(b)(vii)(2) of the Convention the amendments shall enter into force on 1 July 2014, 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. ALSO 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 CODE FOR FIRE SAFETY SYSTEMS

CHAPTER 3
PERSONNEL PROTECTION

1 The existing paragraph 2.1.2 is replaced by the following two new paragraphs:

"2.1.2.1 Breathing apparatus shall be a self-contained compressed air breathing apparatus for which the volume of air contained in the cylinders shall be at least 1,200 *l*, or other self-contained breathing apparatus which shall be capable of functioning for at least 30 min. All air cylinders for breathing apparatus shall be interchangeable.

2.1.2.2 Compressed air breathing apparatus shall be fitted with an audible alarm and a visual or other device which will alert the user before the volume of the air in the cylinder has been reduced to no less than 200 *l*."

CHAPTER 5
FIXED GAS FIRE-EXTINGUISHING SYSTEMS

2 In paragraph 2.1.1.1, after the second sentence, the following new sentence is added:

"Adjacent spaces with independent ventilation systems not separated by at least A-0 class divisions should be considered as the same space."

3 In paragraph 2.1.1.3, after the first sentence, the following new sentence is added:

"It shall not be necessary to move the containers completely from their fixing position for this purpose. For carbon dioxide systems, hanging bars for a weighing device above each bottle row, or other means shall be provided. For other types of extinguishing media, suitable surface indicators may be used."

4 In paragraph 2.1.3.2, the first sentence is replaced by the following:

"Means shall be provided for automatically giving audible and visual warning of the release of fire-extinguishing medium into any ro-ro spaces, container holds equipped with integral reefer containers, spaces accessible by doors or hatches, and other spaces in which personnel normally work or to which they have access."

5 The following new paragraph 2.2.1.2 is added after the existing paragraph 2.2.1.1 and the subsequent paragraphs are renumbered accordingly, including references to those paragraphs:

"2.2.1.2 For vehicle spaces and ro-ro spaces which are not special category spaces, the quantity of carbon dioxide available shall be at least sufficient to give a minimum volume of free gas equal to 45 per cent 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. Carbon dioxide systems shall not be used for the protection of special category spaces."

6 The following new paragraph 2.2.1.7 is added after the renumbered paragraph 2.2.1.6:

"2.2.1.7 For container and general cargo spaces (primarily intended to carry a variety of cargoes separately secured or packed), the fixed piping system shall be such that at least two thirds of the gas can be discharged into the space within 10 min. For solid bulk cargo spaces, the fixed piping system shall be such that at least two thirds of the gas can be discharged into the space within 20 min. The system controls shall be arranged to allow one third, two thirds or the entire quantity of gas to be discharged based on the loading condition of the hold."

7 In paragraph 2.2.2, the first sentence is replaced by the following:

"Carbon dioxide systems for the protection of ro-ro spaces, container holds equipped with integral reefer containers, spaces accessible by doors or hatches, and other spaces in which personnel normally work or to which they have access shall comply with the following requirements:"

8 Section 2.4 is deleted.

9 Section 2.5 is renumbered as "2.4" and the words "in paragraphs 2.2 to 2.4" are replaced with the words "in paragraphs 2.2 and 2.3".

CHAPTER 7
FIXED PRESSURE WATER-SPRAYING AND WATER-MIST FIRE-EXTINGUISHING SYSTEMS

10 The following new paragraph 2.4 is added after the existing paragraph 2.3:

"**2.4 Fixed water-based fire-fighting systems for ro-ro spaces, vehicle spaces and special category spaces**

Fixed water-based fire-fighting systems for ro-ro spaces, vehicle spaces and special category spaces shall be approved by the Administration based on guidelines developed by the Organization."

CHAPTER 8
AUTOMATIC SPRINKLER, FIRE DETECTION AND FIRE ALARM SYSTEMS

11 In paragraph 2.5.2.3, after the first sentence, the following new sentence is added:

"For this purpose, nominal area shall be taken as the gross horizontal projection of the area to be covered."

CHAPTER 9
FIXED FIRE DETECTION AND FIRE ALARM SYSTEMS

12 In paragraph 2.2.1, after the third sentence, the following new sentence is added:

"On ships constructed on or after 1 July 2014, the changeover switch shall be arranged such that a fault will not result in the loss of both power supplies."

13 The following new paragraph is added after paragraph 2.2.1, and the existing paragraph 2.2.2 is renumbered as paragraph 2.2.3:

"2.2.2 On ships constructed on or after 1 July 2014, the operation of the automatic changeover switch or a failure of one of the power supplies shall not result in loss of fire detection capability. Where a momentary loss of power would cause degradation of the system, a battery of adequate capacity shall be provided to ensure continuous operation during changeover."

14 The existing paragraph 2.2.3 is deleted and the following new paragraphs are added after the renumbered paragraph 2.2.3:

"2.2.4 The emergency source of power specified in paragraph 2.2.1 above may be supplied by accumulator batteries or from the emergency switchboard. The power source shall be sufficient to maintain the operation of the fire detection and fire alarm system for the periods required under chapter II-1, regulations 42 and 43, of the Convention and, at the end of that period, shall be capable of operating all connected visual and audible fire alarm signals for a period of at least 30 min.

2.2.5 On ships constructed on or after 1 July 2014, where the system is supplied from accumulator batteries, they shall be located in or adjacent to the control panel for the fire detection system, or in another location suitable for use in an emergency. The rating of the battery charge unit shall be sufficient to maintain the normal output power supply to the fire detection system while recharging the batteries from a fully discharged condition."

15 In paragraphs 2.3.1.2, 2.3.1.3 and 2.3.1.5, the referenced standard "IEC 60092-505:2001" is replaced by "IEC 60092-504".

16 In paragraph 2.5.1.3, after the second sentence, the following new sentence is added:

"In ships constructed on or after 1 July 2014, with a cargo control room, an additional indicating unit shall be located in the cargo control room."

17 In paragraph 2.5.2, after the second sentence, the following new sentence is added:

"On ships constructed on or after 1 July 2014, detectors installed within cold spaces such as refrigerated compartments shall be tested using procedures having due regard for such locations.

CHAPTER 12
FIXED EMERGENCY FIRE PUMPS

18 The existing paragraph 2.2.2.1 is replaced by the following:

"2.2.2.1 Starting of diesel engine

Any diesel-driven power source for the pump shall be capable of being readily started in its cold condition down to the temperature of 0°C by hand (manual) cranking. Where ready starting cannot be assured, if this is impracticable, or if lower temperatures are likely to be encountered, and if the room for the diesel driven power source is not heated, electric heating of the diesel engine cooling water or lubricating oil system shall be fitted, to the satisfaction of the Administration. If hand (manual) starting is impracticable, the Administration may permit compressed air, electricity, or other sources of stored energy, including hydraulic power or starting cartridges to be used as a means of starting. These means shall be such as to enable the diesel-driven power source to be started at least six times within a period of 30 min and at least twice within the first 10 min."

CHAPTER 13
ARRANGEMENT OF MEANS OF ESCAPE

19 The existing paragraph 2.2.4 is replaced by the following:

"2.2.4 Landings

With the exception of intermediate landings, landings at each deck level shall be not less than 2 m^2 in area and shall increase by 1 m^2 for every 10 persons provided for in excess of 20 persons, but need not exceed 16 m^2, except for those landings servicing public spaces having direct access onto the stairway enclosure. Intermediate landings shall be sized in accordance with paragraph 2.3.1."

CHAPTER 14
FIXED DECK FOAM SYSTEMS

20 The existing chapter 14 is replaced by the following:

"**1 Application**

1.1 This chapter details the specification of fixed deck foam systems which are required to be provided by chapter II-2 of the Convention.

2 Engineering specifications

2.1 *General*

2.1.1 The arrangements for providing foam shall be capable of delivering foam to the entire cargo tanks deck area as well as into any cargo tank the deck of which has been ruptured.

2.1.2 The deck foam system shall be capable of simple and rapid operation.

2.1.3 Operation of a deck foam system at its required output shall permit the simultaneous use of the minimum required number of jets of water at the required pressure from the fire main. Where the deck foam system is supplied by a common line from the fire main, additional foam concentrate shall be provided for operation of two nozzles for the same period of time required for the foam system. The simultaneous use of the minimum required jets of water shall be possible on deck over the full length of the ship, in the accommodation, service spaces, control stations and machinery spaces.

2.2 *Component requirements*

2.2.1 *Foam solution and foam concentrate*

2.2.1.1 For tankers carrying:

.1 crude oil or petroleum products having a flashpoint not exceeding 60ºC (closed cup), as determined by an approved flashpoint apparatus, and a Reid vapour pressure which is below atmospheric pressure or other liquid products having a similar fire hazard, including cargoes in chapter 18 of the IBC Code, having a flashpoint not exceeding 60ºC (closed cup) for which a regular foam fire-fighting system is effective (refer to regulations II-2/1.6.1 and 10.8 of the Convention); or

.2 petroleum products with a flashpoint exceeding 60ºC (closed cup), as determined by an approved flashpoint apparatus (refer to regulation II-2/1.6.4 of the Convention); or

.3 IBC Code chapter 17 products with a flashpoint exceeding 60ºC (closed cup) determined by an approved flashpoint apparatus (refer to paragraph 11.1.3 of the IBC Code and regulation II-2/1.6.4 of the Convention),

the rate of supply of foam solution shall be not less than the greatest of the following:

.1 0.6 l/min per square metre of cargo tanks deck area, where cargo tanks deck area means the maximum breadth of the ship multiplied by the total longitudinal extent of the cargo tank spaces;

.2 6 l/min per square metre of the horizontal sectional area of the single tank having the largest such area; or

.3 3 l/min per square metre of the area protected by the largest monitor, such area being entirely forward of the monitor, but in no case should the output of any monitor be less than 1,250 l/min.

2.2.1.2 For tankers carrying chemicals in bulk listed in chapter 17 of the IBC Code having a flashpoint not exceeding 60ºC (closed cup), the rate of supply of foam solution shall be as required by the IBC Code.

2.2.1.3 Sufficient foam concentrate shall be supplied to ensure at least 20 min of foam generation in tankers fitted with an inert gas installation or 30 min of foam generation in tankers not fitted with an inert gas installation or not required to use an inert gas system.

2.2.1.4 The foam concentrate supplied on board shall be approved by the Administration for the cargoes intended to be carried. Type B foam concentrates shall be supplied for the protection of crude oil, petroleum products and non-polar solvent cargoes. Type A foam concentrates shall be supplied for polar solvent cargoes, as listed in the table of chapter 17 of the IBC Code. Only one type of foam concentrate shall be supplied, and it shall be effective for the maximum possible number of cargoes intended to be carried. For cargoes for which foam is not effective or is incompatible, additional arrangements to the satisfaction of the Administration shall be provided.

2.2.1.5 Liquid cargoes with a flashpoint not exceeding 60°C for which a regular foam fire-fighting system is not effective shall comply with the provisions of regulation II-2/1.6.2.1 of the Convention.

2.2.2 *Monitors and foam applicators*

2.2.2.1 Foam from the fixed foam system shall be supplied by means of monitors and foam applicators. Prototype tests of the monitors and foam applicators shall be performed to ensure the foam expansion and drainage time of the foam produced does not differ more than ±10 per cent of that determined in paragraph 2.2.1.4. When medium expansion ratio foam (between 21 to 1 and 200 to 1 expansion ratio) is employed, the application rate of the foam and the capacity of a monitor installation shall be to the satisfaction of the Administration. At least 50 per cent of the foam solution supply rate required shall be delivered from each monitor. On tankers of less than 4,000 tonnes deadweight the Administration may not require installation of monitors but only applicators. However, in such a case the capacity of each applicator shall be at least 25 per cent of the foam solution supply rate required.

2.2.2.2 The capacity of any applicator shall be not less than 400 *l*/min and the applicator throw in still air conditions shall be not less than 15 m.

2.3 *Installation requirements*

2.3.1 *Main control station*

2.3.1.1 The main control station for the system shall be suitably located outside the cargo area, adjacent to the accommodation spaces and readily accessible and operable in the event of fire in the areas protected.

2.3.2 *Monitors*

2.3.2.1 The number and position of monitors shall be such as to comply with paragraph 2.1.1.

2.3.2.2 The distance from the monitor to the farthest extremity of the protected area forward of that monitor shall not be more than 75 per cent of the monitor throw in still air conditions.

2.3.2.3 A monitor and hose connection for a foam applicator shall be situated both port and starboard at the front of the poop or accommodation spaces facing the cargo tanks deck. The monitors and hose connections shall be aft of any cargo tanks, but may be located in the cargo area above pump-rooms, cofferdams, ballast tanks and void spaces adjacent to cargo tanks if capable of protecting the deck below and aft of each other. On tankers of less than 4,000 tonnes deadweight, a hose connection for a foam applicator shall be situated both port and starboard at the front of the poop or accommodation spaces facing the cargo tanks deck.

2.3.3.1 At least four foam applicators shall be provided on all tankers. The number and disposition of foam main outlets shall be such that foam from at least two applicators can be directed on to any part of the cargo tanks deck area.

2.3.3.2 Applicators shall be provided to ensure flexibility of action during fire-fighting operations and to cover areas screened from the monitors.

2.3.4 *Isolation valves*

2.3.4.1 Valves shall be provided in the foam main, and in the fire main when this is an integral part of the deck foam system, immediately forward of any monitor position to isolate damaged sections of those mains."

第 43/2015 號行政長官公告

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

國際海事組織海上安全委員會於二零零四年十二月十日透過第MSC.177（79）號決議通過了《國際散裝運輸液化氣體船舶構造和設備規則》（IGC規則）修正案，該修正案自二零零六年七月一日起適用於澳門特別行政區；

基於此，行政長官根據澳門特別行政區第3/1999號法律第六條第一款的規定，命令公佈包含上指修正案的第MSC.177（79）號決議的中文及英文文本。

二零一五年五月四日發佈。

行政長官　崔世安

Aviso do Chefe do Executivo n.º 43/2015

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

Considerando igualmente que, em 10 de Dezembro de 2004, o Comité de Segurança Marítima da Organização Marítima Internacional, através da resolução MSC.177(79), adoptou emendas ao Código Internacional para a Construção e Equipamento de Navios que Transportam Gases Liquefeitos a Granel (Código IGC), e que tais emendas são aplicáveis na Região Administrativa Especial de Macau desde 1 de Julho de 2006;

O Chefe do Executivo manda publicar, nos termos do n.º 1 do artigo 6.º da Lei n.º 3/1999 da Região Administrativa Especial de Macau, a resolução MSC.177(79), que contém as referidas emendas, nos seus textos em línguas chinesa e inglesa.

Promulgado em 4 de Maio de 2015.

O Chefe do Executivo, *Chui Sai On*.

第 MSC.177（79）號決議

（2004 年 12 月 10 日通過）

通過《國際散裝運輸液化氣體船舶構造和設備規則》（IGC 規則）修正案

海上安全委員會，

憶及《國際海事組織公約》關於本委員會職能的第 28（b）條，

注意到海安會第 MSC.5（48）號決議，委員會以該決議通過了《國際散裝運輸液化氣體船舶構造和設備規則》（以下簡稱“IGC 規則”），根據《1974 年國際海上人命安全（SOLAS）公約》（以下簡稱“公約”）第 VII 章，該規則已具有強制性，

還注意到公約關於 IGC 規則修正程序的第 VIII(b)條和第 VII/11.1 條，

在其第七十九屆會議上**審議了**根據公約第 VIII（b）（i）條建議並散發的 IGC 規則修正案，

1. 根據公約第 VIII（b）（iv）條，**通過了** IGC 規則的修正案，正文列於本決議之附件；

2. **決定**，根據公約第 VIII（b）（vi）（2）（bb）條，上述修正案將於 2006 年 1 月 1 日視為已被接受，除非在該日期以前，有超過三分之一的締約國政府或者合計商船總噸位佔世界商船總噸位不少於 50%的締約國政府通知其反對修正案；

3. **提請**公約締約國政府注意，根據公約第 VIII（b）（vii）（2）條，修正案在根據上文第 2 段被接受後，將於 2006 年 7 月 1 日生效；

4. **要求**秘書長根據公約第 VIII（b）（v）條，將本決議及其所附修正案正文的核證無誤副本送公約的所有締約國政府；

5. **還要求**秘書長將本決議及其附件的副本送所有非公約締約國政府的本組織成員。

附件

《國際散裝運輸液化氣體船舶構造和設備規則》

（IGC 規則）修正案

第 3 章－船舶佈置

（下述修正案適用於 2007 年 1 月 1 日或以後建造的船舶）

1 在第 3.6.4 段中，所引用的“第 10.2.5.4 段”由“第 10.1.4 段”取代。

第 10 章－電氣設備

（下述修正案適用於 2007 年 1 月 1 日或以後建造的船舶）

2 在第 10.1.4 段中，刪除第一句中的“如果允許第 10.2 段所列的例外”的字樣。

3 在第 10.1.4 段的末尾增加下列新的句子：

“電氣設備、電纜和電線不應安裝在有危險的位置，除非符合不低於本組織接受的標準。但是，對於該標準未涉及的位置，不符合該標準的電氣設備、電纜和電線可根據主管機關認為滿意的危險評估安裝在有危險的位置，但要確保同等的安全標準。”

4 刪除現有的第 10.2 段。

附錄

《國際散裝液化氣體船舶適裝證書》格式

5 在《國際散裝液化氣體船舶適裝證書》的格式中，在以“本證書有效期至”開始的一節與以“簽發於”開始的一節之間增加以下新的一節：

“本證書所依據之檢驗的完成日期為.....。”

日/月/年

RESOLUTION MSC.177(79)
(adopted on 10 December 2004)

ADOPTION OF

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

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

NOTING resolution MSC.5(48), by which it adopted the International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (hereinafter referred to as "the IGC Code"), which has become mandatory under chapter VII of the International Convention for the Safety of Life at Sea (SOLAS), 1974 (hereinafter referred to as "the Convention"),

NOTING ALSO article VIII(b) and regulation VII/11.1 of the Convention concerning the procedure for amending the IGC Code,

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

1. ADOPTS, in accordance with article VIII(b)(iv) of the Convention, amendments to the IGC Code, the text of which is set out in the Annex to the present resolution;

2. DETERMINES, in accordance with article VIII(b)(vi)(2)(bb) of the Convention, that the amendments shall be deemed to have been accepted on 1 January 2006 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 2006 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 CODE FOR THE CONSTRUCTION AND EQUIPMENT OF SHIPS CARRYING LIQUEFIED GASES IN BULK (IGC CODE)

CHAPTER 3 – SHIP ARRANGEMENTS

(Following amendment applies to ships constructed on or after 1 January 2007)

1 In paragraph 3.6.4, the reference to "10.2.5.4" is replaced by "10.1.4".

CHAPTER 10 – ELECTRICAL INSTALLATIONS

(Following amendments apply to ships constructed on or after 1 January 2007)

2 In paragraph 10.1.4, the words "when the exceptions listed in 10.2 are permitted" in the first sentence are deleted.

3 The following new sentence is added at the end of paragraph 10.1.4:

"Electrical equipment, cables and wiring should not be installed in hazardous locations unless it conforms with the standards not inferior to those acceptable to the Organization. However, for locations not covered by such standards, electrical equipment, cables and wiring which do not conform to the standards may be installed in hazardous locations based on a risk assessment to the satisfaction of the Administration, to ensure that an equivalent level of safety is assured."

4 Existing paragraph 10.2 is deleted.

APPENDIX

Model form of International Certificate of Fitness for the Carriage of Liquefied Gases in Bulk

5 In the form of the International Certificate of Fitness for the Carriage of Liquefied Gases in Bulk, the following new section is inserted between the section commencing with the words "This certificate is valid until" and the section commencing with the words "Issued at":

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

第 44/2015 號行政長官公告

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

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

國際海事組織海上安全委員會於一九九零年五月二十四日透過第MSC.17（58）號決議通過了上指規則的修正案，該修正案自二零零零年二月三日起適用於澳門特別行政區；

基於此，行政長官根據澳門特別行政區第3/1999號法律第六條第一款的規定，命令公佈包含上指修正案的第MSC.17（58）號決議的中文及英文文本。

二零一五年五月四日發佈。

行政長官　崔世安

Aviso do Chefe do Executivo n.º 44/2015

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

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

Considerando ainda que, em 24 de Maio de 1990, o Comité de Segurança Marítima da Organização Marítima Internacional, através da sua resolução MSC.17(58), adoptou emendas ao referido Código, e que tais emendas são aplicáveis na Região Administrativa Especial de Macau desde 3 de Fevereiro de 2000;

O Chefe do Executivo manda publicar, nos termos do n.º 1 do artigo 6.º da Lei n.º 3/1999 da Região Administrativa Especial de Macau, a resolução MSC.17(58), que contém as referidas emendas, nos seus textos em línguas chinesa e inglesa.

Promulgado em 4 de Maio de 2015.

O Chefe do Executivo, *Chui Sai On*.

第 MSC.17（58）號決議

1990 年 5 月 24 日通過

通過《國際散裝運輸液化氣體船舶構造和設備規則》（IGC 規則）的修正案（經協調的檢驗和發證系統）

海上安全委員會，

憶及《國際海事組織公約》關於本委員會職責的第 28（b）條，

還憶及本委員會據以通過《國際散裝運輸液化氣體船舶構造和設備規則》（《國際氣體船舶運輸船規則》）的第 MSC.5（48）號決議，

注意到經修正的《1974 年國際海上人命安全公約》（《1974 年安全公約》）第 VII 章 C 部分，根據此部分，《國際氣體運輸船規則》的修正案應按該公約的第 VIII 條通過、生效和實施，

還注意到 1978 年國際液貨船安全和防污會議第 10 號決議和 1988 年國際檢驗和發證協調系統會議的第 4 號決議，這些決議建議國際海事組織採取必要措施，將經協調的檢驗和發證系統引入各種公約和規則，

在其第五十八次會議上，按《1974 年安全公約》第 VIII（b）（i）條審議並散發了經提議的《國際氣體運輸船規則》的修正案，

1. 按《1974 年安全公約》第 VIII（b）（iv）條，通過《國際氣體運輸船規則》的修正案，其文本載於本決議的附件中；

2. 要求秘書長按《1974 年安全公約》第 VIII（b）（v）條，將本決議和載於附件中的修正案文本的核證無誤副本分發給該公約的所有締約政府；

3. 按《1974 年安全公約》第 VIII（b）（vi）（2）（bb）條決定：這些修正案應在《安全公約 1988 年議定書》和《載重線公約 1988 年議定書》的生效條件均已達到後六個月之日視為已被接受，但此接受日期不得早於 1991 年 8 月 1 日，除非在此日期前，已按第 VIII（b）（vi）（2）條規定通知本組織反對這些修正案；

4. 提請各締約政府注意：按《1974 年安全公約》第 VIII（b）（vii）（2）條，這些修正案應在按上段被接受後六個月生效；

5. 要求秘書長將《安全公約 1988 年議定書》和《載重線公約 1988 年議定書》的生效條件均已達到的時間，以及按照《1974 年安全公約》第 VIII（g）條，將載於本決議附件中的《國際氣體運輸船規則》的修正案的生效時間通知所有締約政府；

6. 還要求秘書長將本決議及其附件的副本分發給非屬《1974 年安全公約》締約政府的本組織會員，並將這些修正案的生效時間通知它們。

附件

《國際散裝運輸液化氣體船舶構造和設備規則》

（IGC 規則）的修正案

1.3 定義

增加一個新的定義如下：

“1.3.3.3 ‘周年日’係指相應於《國際散裝液化氣適運證書》失效日期的每年的月份和日期。”

1.5 檢驗與發證

以下列條文取代 1.5 的現有條文：

“1.5.1 檢驗程序

1.5.1.1 凡屬實施和免除本規則的規定的船舶檢驗，均應由主管機關的官員進行。但主管機關可以將此種檢驗委託給為此指定的驗船師或經其認可的組織。

1.5.1.2 指定驗船師或認可組織的主管機關至少應給予任何經指定的驗船師或經認可的組織以下列權力：

.1 要求對船舶進行修理；和

.2 應港口國有關當局要求進行檢驗。

主管機關應將經指定的驗船師或經認可的組織的具體責任及向其授權的條件通知本組織，以便分發給各締約政府。

1.5.1.3 如果經指定的驗船師或認可的組織斷定，船舶及其設備的狀況與《國際散裝液化氣體適運證書》所列特徵有重大不符或其狀況會對船舶和船上人員產生危險或會對海洋環境造成嚴重損害威脅，因而船舶不適於繼續出海，則此種驗船師或組織應立即確保已採取了糾正措施並及時通知主管機關。如未採取此種糾正措施，則應撤回證書並立即通知主管機關；如果船舶係在另一締約政府的港口內，則亦應立即通知該港口國的有關當局。在主管機關的官員、經指定的驗船師或經認可的組織通知港口國的有關當局後，有關港口國政府應向此種官員、驗船師或組織提供履行本條規定的義務所必需的任何幫助。如適當，有關港口國政府應採取措施，確保該船不得航行，直至其能繼續出海或離港駛往最近的適當修船廠而不會對船舶或船上人員產生危險或不會對海洋環境造成嚴重威脅時止。

1.5.1.4 在所有情況下，主管機關均應保證檢驗的完整性和有效性，確保為履行這一義務作出必要安排。

1.5.2 檢驗要求

1.5.2.1 液化氣體船舶的結構、設備、附件、裝置和材料（不包括頒發《貨船構造安全證書》和《貨船設備安全證書》和《貨船無線電安全證書》或《貨船安全證書》所需檢驗的項目）應接受下述檢驗：

.1 初次檢驗。該檢驗應在船舶投入營運前或在第一次頒發《國際散裝液化氣體適運證書》前進行。對於本規則範圍內的船舶，該檢驗應包括對結構、設備、附件、裝置和材料的全面檢查。該檢驗應確保結構、設備、附件、裝置和材料完全符合本規則適用的規定。

.2 換證檢驗。該檢驗應在主管機關規定的間隔期進行，但不得超過 5 年，除 1.5.6.2.2、1.5.6.5、1.5.6.6 或 1.5.6.7 適用者外。換證檢驗應確保結構、設備、附件、裝置和材料完全符合本規則的適用規定。

.3 期間檢驗。該檢驗應在證書的第二個周年日之前或之後的 3 個月內或在證書的第三個周年日之前或之後的 3 個月內進行。它應取代 1.5.2.1.4 中規定的某一年度檢驗。期間檢驗應確保安全設備和其他設備以及有關的泵和管系完全符合本規則的適用規定並處於良好的工作狀態。此種檢驗應在按 1.5.4 或 1.5.5 頒發的證書簽證。

.4 年度檢驗。該檢驗應在證書的每一周年日之前或之後的 3 個月內進行，其中包括對 1.5.2.1.1 中所述的結構、設備、附件、裝置和材料的全面檢查，以確保按 1.5.3 進行了保養並仍然適合船舶的預定營運。此種年度檢驗應在按 1.5.4 或 1.5.5 頒發的證書上簽證。

.5 附加檢驗。該檢驗視情可為全面或局部的，應在 1.5.3.3 規定的調查後經要求進行。或在凡有重大修理或更新時進行。此種檢驗應確保已有效地進行了必要的修理或更新，此種修理或更新的材料和工藝是合格的，船舶適於繼續出海而不會對船舶或船上人員產生危險或不會對海洋環境造成嚴重損害威脅。

1.5.3 檢驗後狀況的維持

1.5.3.1 應維持船舶及其設備的狀況，使其符合本規則的規定，以確保船舶仍然適於繼續出海，而不會對船舶或船上人員產生危險或不會對海洋環境造成嚴重損害威脅。

1.5.3.2 在完成了 1.5.2 規定的任何船舶檢驗後，非經主管機關許可，不得對檢驗範圍內的結構、設備、附件、裝置及材料作任何改變，但直接更換者除外。

1.5.3.3 每當船舶發生事故或發現缺陷時，如其影響該船的安全或該船的救生設備或本規則規定的其他設備的有效性或完整性，則該船的船長或船東應儘早向負責發證的主管機關、經指定的驗船師或經認可的組織報告；此種主管機關、驗船師或組織應促成調查，以確定是否需要進行 1.5.2.1.5 要求的檢驗。如果船舶係在另一締約政府的港口內，則船長或船東亦應立即向港口國有關當局報告；經指定的驗船師或經認可的組織應查明此種報告是否做出。

1.5.4 “國際適運證書”的頒發或簽證

1.5.4.1 對符合本規則有關規定、從事國際航行的液化氣體船舶進行初次檢驗或換證檢驗後，應頒發一份名為《國際散裝液化氣體適運證書》的證件。

1.5.4.2 《國際散裝液化氣體適運證書》應按附錄中列出的標準格式製做。如所用語文不是英文或法文，則其文本應包括其中一種語文的譯文。

1.5.4.3 按本條規定頒發的證書，應存放在船上，隨時可供檢查。

1.5.4.4 雖有由海上安全委員會（海安會）的第 MSC.17（58）號決議通過的本規則修正案的任何其他規定，在這些修正案生效時正在使用的任何《國際散裝液化氣體適運證書》，在修正案生效之前的本規則條款所規定的生效日期之前，仍應有效。

1.5.5 由他國政府頒發或簽證《國際適運證書》

1.5.5.1 《1974 年安全公約》的締約政府可應另一締約政府要求，對有權懸掛該另一國國旗的船舶進行檢驗；如果確信該船符合本規則的要求，則可向該船頒發或授權向該船頒發《國際散裝液化氣體適運證書》，並視情按本規則對船上的證書簽證或授權對其簽證。按此頒發的任何證書中應聲明證書係應船旗國政府要求頒發。

1.5.6 《國際適運證書》的期限和效力

1.5.6.1 《國際散裝液化氣體適運證書》應在主管機關規定的期限頒發，但該期限不得超過 5 年。

1.5.6.2.1 雖有 1.5.6.1 的規定，如果換證檢驗係在原有證書失效日期前的三個月內完成，則新證書的有效期限應從完成換證檢驗之日起至從原有證書失效日期起算不超過 5 年的某一日期止。

1.5.6.2.2 如果換證檢驗係在原有證書失效日期之後完成，則新證書的有效期限應從完成換證檢驗之日起至從原有證書失效日期起算不超過 5 年的某一日期止。

1.5.6.2.3 如果換證檢驗係在早於原有證書失效日期的 3 個月前完成，則新證書的有效期限應從完成換證檢驗之日起至從該日期起算不超過 5 年的某一日期止。

1.5.6.3 如果頒證期限短於 5 年，只要視情進行了 1.5.2.1.3 和 1.5.2.1.4 中適用於 5 年頒證期限的檢驗，則主管機關可以將該證書的有效期展至 1.5.6.1 中規定的最長期限。

1.5.6.4 如果雖已完成換證檢驗，但在原有證書的失效日期前不能頒發新證書或將新證書存放船上，則經主管機關授權的人員或組織可在原有證書上簽證。此種證書應在從失效日期起算不超過 5 個月的期限內被接受為有效。

1.5.6.5 如果證書失效時船舶不在其檢驗港口，則主管機關可以延長證書的有效期限，但是給予這種展期的目的僅僅是為了使船舶完成駛往其檢驗港口的航次，而且只有在適當和合理時才能這樣做。任何證書的展期不得超過 3 個月，獲得展期的船舶在抵達檢驗港口時起，無權依據這種展期在沒有取得新證書的情況下駛離該港口。在完成了換證檢驗後，新證書的有效期限應在從原有證書未經展期前的失效日期起算不超過 5 年的某一日期止。

1.5.6.6 對從事短途航行的船舶頒發的證書，如未根據本條的上述規定加以展期，則主管機關可予展期，但不得超過從證書註明的失效日期起算的 1 個月的寬限期。在完成了換證檢驗後，新證書的有效期應在從原有證書未經展期前的失效日期起算不超過 5 年的某一日期止。

1.5.6.7 在由主管機關確定的特殊情況下，新證書不必按 1.5.6.2.2、1.5.6.5 或 1.5.6.6 的要求從原有證書的失效日期起算。在此種特殊情況下，新證書的有效期限應在從完成換證檢驗之日起算不超過 5 年的某一日期止。

1.5.6.8 如果年度檢驗或期間檢驗係在 1.5.2 中規定的期限之前完成，則：

.1 應通過簽證將證書中標明的周年日改為從完成檢驗之日起算不超過 3 個月的某一日期；

.2 1.5.2 要求的而後的年度檢驗或期間檢驗，應使用新的周年日，在該條規定的間隔期完成；

.3 如果視情進行了一次或多次年度或期間檢驗因而沒有超過 1.5.2 規定的最長檢驗間隔期，則失效日期可以不變。

1.5.6.9 按 1.5.4 或 1.5.5 頒發的證書，在下列任何情況下應不再有效：

.1 在 1.5.2 規定的期限內未完成有關檢驗；

.2 未按 1.5.2.1.3 或 1.5.2.1.4 對證書進行簽證；

.3 在船舶變更船旗國時，只有在頒發新證書的政府充分確信船舶符合規則 1.5.3.1 和 1.5.3.2 的規定時才能頒發新證書。對於在締約政府之間的變更，如在變更船旗後的 12 個月內接到要求，該船的原船旗國政府應儘快將該船在變更船旗前所攜證書的副本，以及如有的話，有關的檢驗報告送交主管機關。”

附錄

《國際散裝液化氣體適運證書》的標準格式

用下列格式取代證書的現有標準格式：

“國際散裝液化氣體適運證書

（官方鋼印）

根據《國際散裝運輸液化氣體船舶構造和設備規則》的規定（經第 MSC.17（58）號決議修正的第 MSC.5（48）號決議）

經_____政府授權，由_____

（國家的全名） （按該規則規定

_____頒發。

被授權的主管人員或機構的全名）

船舶特徵 1/

船名_____

識別編號和字母_____

船籍港_____

貨容量(m^3)_____

船型(規則的 2.1.2) _____

海事組織識別號 2/_____

安放龍骨或相應船舶建造階段的日期，或（如屬改建船舶）改建為氣體運輸船的開始日期：_____

該船亦完全符合該規則的下列修正案：

_____

_____

該船被免除符合該規則的下列規定：

_____

_____

茲證明：

1 .1 該船業已按照該規則 1.5 的規定進行了檢驗；

.2 檢驗查明，該船的結構、設備、附件、裝置和材料及其狀況在各方面均合格，且該船符合該規則的有關規定。

2 使用了下列設計標準：

.1 環境氣溫_____°C

.2 環境水溫_____°C

.3

液艙型式及艙號	應力系數				材料	安全閥最大許可調定值
	A	B	C	D		
貨物管系						

注意：本表所列液艙編號註明在附頁 2 中經簽署並註有日期的液艙佈置圖上。

.4 液貨艙材料的機械性能是在_____°C 確定的。

3 該船適於散裝運輸下列貨品，但須遵守該規則所有有關操作規定：

貨品	承載條件（艙號等）
下接附件1. [3/]	
本表所列的艙號註明在附件2上。	

4 按照 1.4/2.8.2 [3/]的規定，該規則的規定對該船用下述方式做了修改：

5 該船的裝載必須：

.1 符合經認可的裝載手冊中規定的裝載條件，該手冊蓋有公章、日期為_____，並由主管機關或經主管機關認可的組織的負責官員簽署；[3/]

.2 符合本證書所附的裝載限制 [3/]。如果要求船舶不按照上述規定裝載，則應向發證主管機關提供用以論證提議的裝載條件合理性的必要計算；該主管機關可以書面批准採用提議的裝載條件。[4/]

本證書的有效期限至_____止，[5/]但須按照該規則 1.5 進行檢驗。

頒發於_____

（證書頒發地點）

_____ _____

（頒發日期） （經正式授權的發證官員的簽字）

（當局的鋼印或章印）

填寫證書的說明：

1 “船型”：此行下的任何項目均應與所有有關的建議書相符。如：填寫的“2G型”係指在所有方面均為該規則所規定的2G型。

2 第 2.1 段和第 2.2 段：應填入就該規則的 4.8.1 而言，主管機關所接受或要求的環境溫度。

3 第 2.3 段：應填入就該規則的 4.5.1.4 和 4.5.1.6 而言，主管機關所接受或要求的應力系數和材料。

4 第 2.4 段：應填入就該規則 4.5.1.7 而言，主管機關所接受的溫度。

5 第 3 段：只應列入該規則第 19 章中所列的貨品或已由主管機關按照該規則的 1.1.6 予以評定的貨品或其物理特性在液貨艙設計限制內的這些貨品的兼容混合物。對於後一種“新”貨品，應註明暫行規定的任何特殊要求。

年度檢驗和期間檢驗的簽證

茲證明，經該規則 1.5.2 要求進行的檢驗查明，該船符合規則的有關規定。

年度檢驗： 簽字_____

（經授權的官員的簽字）

地點_____

日期_____

（當局的鋼印或章印）

年度/期間 [3/]檢驗： 簽字_____

（經授權的官員的簽字）

地點_____

日期_____

（當局的鋼印或章印）

年度/期間 [3/]檢驗： 簽字_____

（經授權的官員的簽字）

地點_____

日期_____

（當局的鋼印或章印）

年度檢驗： 簽字_____

（經授權的官員的簽字）

地點_____

日期_____

（當局的鋼印或章印）

按照 1.5.6.8.3 進行的年度/期間檢驗

茲證明，經按該規則 1.5.6.8.3 進行的年度/期間 [3/]檢驗查明，該船符合該規則的有關規定。

簽字_____

（經授權的官員的簽字）

地點_____

日期_____

（當局的鋼印或章印）

在 1.5.6.3 適用時，對有效期少於 5 年的證書的展期簽證

該船符合該規則的有關規定，本證書應按照該規則 1.5.6.3 被承認，其有效期限至_____止。

簽字_____

（經授權的官員的簽字）

地點_____

日期_____

（當局的鋼印或章印）

在完成換證檢驗並且 1.5.6.4 適用時的簽證

該船符合該規則的有關規定；本證書應按照該規則 1.5.6.4 被承認，其有效期限至_____止。

簽字_____

（經授權的官員的簽字）

地點_____

日期_____

（當局的鋼印或章印）

在 1.5.6.5/1.5.6.6 適用時，將證書的有效期展至船舶抵達檢驗港或給予寬限展期的簽證

本證書應按照該規則 1.5.6.5/1.5.6.6[3/] 被承認，其有效期限至_____止。

簽字_____

（經授權的官員的簽字）

地點_____

日期_____

（當局的鋼印或章印）

在 1.5.6.8 適用時，將周年日提前的簽證

按照該規則 1.5.6.8，新的周年日為_____。

簽字_____

（經授權的官員的簽字）

地點_____

日期_____

（當局的鋼印或章印）

按照該規則 1.5.6.8，新的周年日為_____。

簽字_____

（經授權的官員的簽字）

地點_____

日期_____

（當局的鋼印或章印）

[1/] 亦可將船舶的特徵橫向排列於方框中。

[2/] 根據第 A.600（15）號決議 – 國際海事組織船舶識別號方案，該資料可自願填寫。

[3/] 視情刪除。

[4/] 此段文字可附於證書上而不寫入證書中，但應經正式簽署和蓋章。

[5/] 填入主管機關按照該規則 1.5.6.1 規定的失效日期。除非已按該規則 1.5.6.8 進行了修正，否則該日期的月份和日期應與該規則 1.3.3.3 中規定的周年日相一致。

國際散裝液化氣體適運證書附件 1

第 3 條規定的貨品清單續表及其承載條件。

貨　　品	承載條件(艙號等)

日期_____

（與證書日期相同）

_____

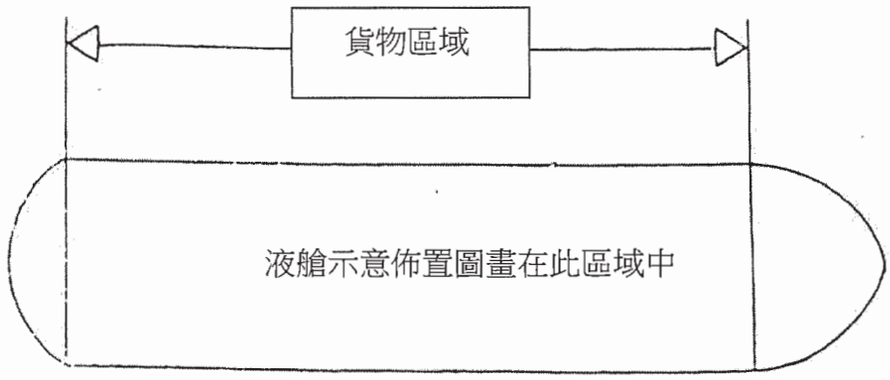
（發證官員的簽字和/或發證當局的鋼印或章印）

國際散裝液化氣體適運證書附件 2

液艙佈置圖（樣張）

船名：_____

識別編號或字母：_____



日期_____ _____

（與證書日期相同） （發證官員的簽字和/或發證當局的鋼印或章印）

RESOLUTION MSC.17(58)

adopted on 24 May 1990

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

(Harmonized System of Survey and Certification)

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

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

NOTING part C of chapter VII of the International Convention for the Safety of Life at Sea, 1974 (SOLAS 1974) as amended, by which amendments to the IGC Code shall be adopted, be brought into force and take effect in accordance with article VIII of that Convention,

NOTING FURTHER resolution 10 of the International Conference on Tanker Safety and Pollution Prevention, 1978, and resolution 4 of the International Conference on the Harmonized System of Survey and Certification, 1988, which recommended that IMO take the necessary action to introduce the harmonized system of survey and certification into various conventions and codes,

HAVING CONSIDERED, at its fifty-eighth session, amendments to the IGC Code proposed and circulated in accordance with article VIII(b)(i) of SOLAS 1974,

1. ADOPTS, in accordance with article VIII(b)(iv) of SOLAS 1974, amendments to the IGC Code, the text of which is set out in the Annex to the present resolution;

2. REQUESTS the Secretary-General, in conformity with article VIII(b)(v) of SOLAS 1974, to transmit to all Contracting Governments to the Convention certified copies of the present resolution and the text of the amendments contained in the Annex;

3. DETERMINES, in accordance with article VIII(b)(vi)(2)(bb) of SOLAS 1974, that the amendments shall be deemed to have been accepted on the date six months after the conditions for the entry into force of both the 1988 SOLAS Protocol and the 1988 Load Line Protocol are met, provided that the date of acceptance is not before 1 August 1991, unless, prior to that date, objections are communicated to the Organization as provided for in article VIII(b)(vi)(2);

4. INVITES Contracting Governments to note that, in accordance with article VIII(b)(vii)(2) of SOLAS 1974, the amendments shall enter into force six months after their acceptance in accordance with the preceding paragraph;

5. REQUESTS the Secretary-General to inform all Contracting Governments when the conditions for the entry into force of both the 1988 SOLAS Protocol and the 1988 Load Line Protocol are met and, in conformity with article VIII(g) of SOLAS 1974, when the amendments to the IGC Code contained in the Annex to the present resolution will enter into force;

6. FURTHER REQUESTS the Secretary-General to transmit to the Members of the Organization which are not Contracting Governments to SOLAS 1974 copies of the resolution and its Annex and to inform them when the amendments enter into force.

ANNEX

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

1.3 Definitions

A new definition should be added as follows:

"1.3.3.3 "Anniversary date" means the day and the month of each year which will correspond to the date of expiry of the International Certificate of Fitness for the Carriage of Liquefied Gases in Bulk".

1.5 Surveys and Certification

The existing text of section 1.5 should be replaced by the following:

"1.5.1 Survey procedure

1.5.1.1 The survey of ships, so far as regards the enforcement of the provisions of the regulations and granting of exemptions therefrom, should be carried out by officers of the Administration. The Administration may, however, entrust the surveys either to surveyors nominated for the purpose or to organizations recognized by it.

1.5.1.2 The Administration nominating surveyors or recognizing organizations to conduct surveys should, as a minimum, empower any nominated surveyor or recognized organization to:

.1 require repairs to a ship; and

.2 carry out surveys if requested by the appropriate authorities of a port State.

The Administration should notify the Organization of the specific responsibilities of the nominated surveyors or recognized organizations and of the conditions of the authority delegated to them for circulation to the Contracting Governments.

1.5.1.3 When a nominated surveyor or recognized organization determines that the condition of the ship or its equipment does not correspond substantially with the particulars of the International Certificate of Fitness for the Carriage of Liquefied Gases in Bulk, or is such that the ship is not fit to proceed to sea without danger to the ship, or persons on board, or without presenting unreasonable threat of harm to the marine environment, such surveyor or organization should immediately ensure that corrective action is taken and should in due course notify the Administration. If such corrective action is not taken, the Certificate should be withdrawn and the Administration should be notified immediately; and, if the ship is in a port

of another Contracting Government, the appropriate authorities of the port State should also be notified immediately. When an officer of the Administration, a nominated surveyor or a recognized organization has notified the appropriate authorities of the port State, the Government of the port State concerned should give such officer, surveyor or organization any necessary assistance to carry out their obligations under this paragraph. When applicable, the Government of the port State concerned should take such steps as will ensure that the ship does not sail until it can proceed to sea or leave the port for the purpose of proceeding to the nearest appropriate repair yard available without danger to the ship or persons on board or without presenting an unreasonable threat of harm to the marine environment.

1.5.1.4 In every case, the Administration should guarantee the completeness and efficiency of the survey, and should undertake to ensure the necessary arrangements to satisfy this obligation.

1.5.2 Survey requirements

1.5.2.1 The structure, equipment, fittings, arrangements and material (other than items in respect of which a Cargo Ship Safety Construction Certificate, Cargo Ship Safety Equipment Certificate and Cargo Ship Safety Radio Certificate or Cargo Ship Safety Certificate are issued) of a gas carrier should be subjected to the following surveys:

.1 an initial survey before the ship is put in service or before the International Certificate of Fitness for the Carriage of Liquefied Gases in Bulk is issued for the first time, which should include a complete examination of its structure, equipment, fittings, arrangements and material in so far as the ship is covered by the Code. This survey should be such as to ensure that the structure, equipment, fittings, arrangements and material fully comply with the applicable provisions of the Code;

.2 a renewal survey at intervals specified by the Administration, but not exceeding 5 years, except where regulation 1.5.6.2.2, 1.5.6.5, 1.5.6.6 or 1.5.6.7 is applicable. The renewal survey should be such as to ensure that the structure, equipment, fittings, arrangements and material fully comply with the applicable provisions of the Code;

.3 an intermediate survey within 3 months before or after the second anniversary date or within 3 months before or after the third anniversary date of the Certificate which should take the place of one of the annual surveys specified in 1.5.2.1.4. The intermediate survey should be such as to ensure that the safety equipment, and other equipment, and associated pump and piping systems fully comply with the applicable provisions of the Code and are in good working order. Such intermediate surveys should be endorsed on the Certificate issued under 1.5.4 or 1.5.5;

.4 an annual survey within 3 months before or after each anniversary date of the Certificate, including a general inspection of the structure, equipment, fittings, arrangements and material referred to in 1.5.2.1.1 to ensure that they have been maintained in accordance with 1.5.3 and that they remain satisfactory for the service for which the ship is intended. Such annual surveys should be endorsed on the Certificate issued under 1.5.4 or 1.5.5;

.5 an additional survey, either general or partial according to the circumstances, should be made when required after an investigation prescribed in 1.5.3.3, or whenever any important repairs or renewals are made. Such a survey should ensure that the necessary repairs or renewals have been effectively made, that the material and workmanship of such repairs or renewals are satisfactory, and that the ship is fit to proceed to sea without danger to the ship or persons on board or without presenting unreasonable threat of harm to the marine environment.

1.5.3 Maintenance of conditions after survey

1.5.3.1 The condition of the ship and its equipment should be maintained to conform with the provisions of the Code to ensure that the ship will remain fit to proceed to sea without danger to the ship or persons on board or without presenting an unreasonable threat of harm to the marine environment.

1.5.3.2 After any survey of the ship under 1.5.2 has been completed, no change should be made in the structure, equipment, fittings, arrangements and material covered by the survey, without the sanction of the Administration, except by direct replacement.

1.5.3.3 Whenever an accident occurs to a ship or a defect is discovered, either of which affects the safety of the ship or the efficiency or completeness of its life-saving appliances or other equipment covered by the Code, the master or owner of the ship should report at the earliest opportunity to the Administration, the nominated surveyor or recognized organization responsible for issuing the Certificate, who should cause investigations to be initiated to determine whether a survey, as required by 1.5.2.1.5, is necessary. If the ship is in a port of another Contracting Government, the master or owner should also report immediately to the appropriate authorities of the port State and the nominated surveyor or recognized organization should ascertain that such a report has been made.

1.5.4 Issue or endorsement of International Certificate of Fitness

1.5.4.1 A Certificate called an International Certificate of Fitness for the Carriage of Liquefied Gases in Bulk, should be issued after an initial or renewal survey to a gas carrier engaged in international voyages which complies with the relevant provisions of the Code.

1.5.4.2 An International Certificate of Fitness for the Carriage of Liquefied Gases in Bulk should be drawn up in the form corresponding to the model given in the appendix. If the language used is neither English nor French, the text should include the translation into one of these languages.

1.5.4.3 The Certificate issued under provisions of this section should be available on board for examination at all times.

1.5.4.4 Notwithstanding any other provisions of the amendments to this Code, adopted by the Maritime Safety Committee (MSC) by resolution MSC.17(58), any International Certificate of Fitness for the Carriage of Liquefied Gases in Bulk, which is current when these amendments enter into force, should remain valid until it expires under the terms of this Code prior to the amendments entering into force.

1.5.5 Issue or endorsement of International Certificate of Fitness by another Government

1.5.5.1 A Contracting Government to the 1974 SOLAS Convention may, at the request of another Contracting Government, cause a ship entitled to fly the flag of the other State to be surveyed and, if satisfied that the requirements of the Code are complied with, issue or authorize the issue of the International Certificate of Fitness for the Carriage of Liquefied Gases in Bulk to the ship, and, where appropriate, endorse or authorize the endorsement of the Certificate on board the ship in accordance with the Code. Any Certificate so issued should contain a statement to the effect that it has been issued at the request of the Government of the State whose flag the ship is entitled to fly.

1.5.6 Duration and validity of International Certificate of Fitness

1.5.6.1 An International Certificate of Fitness for the Carriage of Liquefied Gases in Bulk should be issued for a period specified by the Administration which should not exceed 5 years.

1.5.6.2.1 Notwithstanding the provisions of 1.5.6.1, when the renewal survey is completed within 3 months before the expiry date of the existing Certificate, the new Certificate should be valid from the date of completion of the renewal survey to a date not exceeding 5 years from the date of expiry of the existing Certificate.

1.5.6.2.2 When the renewal survey is completed after the expiry date of the existing Certificate, the new Certificate should be valid from the date of completion of the renewal survey to a date not exceeding 5 years from the date of expiry of the existing Certificate.

1.5.6.2.3 When the renewal survey is completed more than 3 months before the expiry date of the existing Certificate, the new Certificate should be valid from the date of completion of the renewal survey to a date not exceeding 5 years from the date of completion of the renewal survey.

1.5.6.3 If a Certificate is issued for a period of less than 5 years, the Administration may extend the validity of the Certificate beyond the expiry date to the maximum period specified in 1.5.6.1, provided that the surveys referred to in regulation 1.5.2.1.3 and 1.5.2.1.4, applicable when a Certificate is issued for a period of 5 years, are carried out as appropriate.

1.5.6.4 If a renewal survey has been completed and a new Certificate cannot be issued or placed on board the ship before the expiry date of the existing Certificate, the person or organization authorized by the Administration may endorse the existing Certificate and such a Certificate should be accepted as valid for a further period which should not exceed 5 months from the expiry date.

1.5.6.5 If a ship, at the time when a Certificate expires, is not in a port in which it is to be surveyed, the Administration may extend the period of validity of the Certificate but this extension should be granted only for the purpose of allowing the ship to complete its voyage to the port in which it is to be surveyed, and then only in cases where it appears proper and reasonable to do so. No Certificate should be extended for a period longer than 3 months, and a ship to which an extension is granted should not, on its

arrival in the port in which it is to be surveyed, be entitled by virtue of such extension to leave that port without having a new Certificate. When the renewal survey is completed, the new Certificate should be valid to a date not exceeding 5 years from the date of expiry of the existing Certificate before the extension was granted.

1.5.6.6 A Certificate issued to a ship engaged on short voyages, which has not been extended under the foregoing provisions of this section, may be extended by the Administration for a period of grace of up to one month from the date of expiry stated on it. When the renewal survey is completed, the new Certificate should be valid to a date not exceeding 5 years from the date of expiry of the existing Certificate before the extension was granted.

1.5.6.7 In special circumstances, as determined by the Administration, a new Certificate need not be dated from the date of expiry of the existing Certificate as required by 1.5.6.2.2, 1.5.6.5 or 1.5.6.6. In these special circumstances, the new Certificate should be valid to a date not exceeding 5 years from the date of completion of the renewal survey.

1.5.6.8 If an annual or intermediate survey is completed before the period specified in 1.5.2, then:

.1 the anniversary date shown on the Certificate should be amended by endorsement to a date which should not be more than 3 months later than the date on which the survey was completed;

.2 the subsequent annual or intermediate survey required by 1.5.2 should be completed at the intervals prescribed by that section using the new anniversary date;

.3 the expiry date may remain unchanged provided one or more annual or intermediate surveys, as appropriate, are carried out so that the maximum intervals between the surveys prescribed by 1.5.2 are not exceeded.

1.5.6.9 A Certificate issued under 1.5.4 or 1.5.5 should cease to be valid in any of the following cases:

.1 if the relevant surveys are not completed within the periods specified under 1.5.2;

.2 if the Certificate is not endorsed in accordance with 1.5.2.1.3 or 1.5.2.1.4;

.3 upon transfer of the ship to the flag of another State. A new Certificate should only be issued when the Government issuing the new Certificate is fully satisfied that the ship is in compliance with the provisions of 1.5.3.1 and 1.5.3.2. In the case of a transfer between Contracting Governments, if requested within 3 months after the transfer has taken place, the Government of the State whose flag the ship was formerly entitled to fly should, as soon as possible, transmit to the Administration copies of the Certificate carried by the ship before the transfer and, if available, copies of the relevant survey reports."

Appendix

MODEL FORM OF INTERNATIONAL CERTIFICATE OF FITNESS
FOR THE CARRIAGE OF LIQUEFIED GASES IN BULK

The existing Model Form of Certificate should be replaced by the following:

"INTERNATIONAL CERTIFICATE OF FITNESS FOR THE
CARRIAGE OF LIQUEFIED GASES IN BULK

(Official seal)

Issued under the provisions of the

INTERNATIONAL CODE FOR THE CONSTRUCTION AND EQUIPMENT
OF SHIPS CARRYING LIQUEFIED GASES IN BULK

(resolution MSC.5(48) as amended by resolution MSC.17(58))

under the authority of the Government of

.....
(full designation of country)

by .....
(full designation of the competent person or organization
authorized under the provisions of the Code)

Particulars of ship[1/]

Name of ship .....

Distinctive number or letters .....

Port of registry .....

Cargo capacity (m^3).....

Ship type (Code paragraph 2.1.2) .....

IMO Number[2/] .....

Date on which keel was laid or ship was at a
similar stage of construction or, (in the case of a
converted ship) date on which conversion to a gas
carrier was commenced .....

The ship also complies fully with the following amendments to the Code:

.....

.....

This ship is exempted from compliance with the following provisions of the Code:

.....

.....

THIS IS TO CERTIFY:

1 .1 That the ship has been surveyed in accordance with the provisions of 1.5 of the Code;

.2 that the survey showed that the structure, equipment, fittings, arrangements and materials of the ship and the conditions thereof are in all respects satisfactory and that the ship complies with the relevant provisions of the Code.

2 That the following design criteria have been used:

.1 ambient air temperature.....°C

.2 ambient water temperature.....°C

.3

Tank type and number	Stress factors				Materials	MARVS
	A	B	C	D		
Cargo piping						

NB: Tank numbers referred to in this list are identified on attachment 2, signed and dated tank plan.

.4 Mechanical properties of the cargo tank material were determined at ..... °C

3 That the ship is suitable for the carriage in bulk of the following products, provided that all relevant operational provisions of the Code are observed.

Products	Conditions of carriage (tank numbers, etc.)
Continued on attachment 1.3/	
Tank numbers referred to in this list are identified on attachment 2.	

4 That in accordance with 1.4/2.8.2[3/], the provisions of the Code are modified in respect of the ship in the following manner:

5 That the ship must be loaded:

.1 in accordance with the loading conditions provided in the approved loading manual, stamped and dated ..... and signed by a responsible officer of the Administration, or of an organization recognized by the Administration;[3/]

.2 in accordance with the loading limitations appended to this Certificate.[3/]

Where is is required to load the ship other than in accordance with the above instruction, then the necessary calculations to justify the proposed loading conditions should be communicated to the certifying Administration which may authorize in writing the adoption of the proposed loading condition.[4/]

This Certificate is valid until .....[5/]
subject to surveys in accordance with 1.5 of the Code.

Issued at .....
(Place of issue of Certificate)

....
(Date of issue) (Signature of duly authorized official issuing the Certificate)

(Seal or stamp of the authority, as appropriate)

Notes on completion of Certificate:

1/ "Ship type": any entry under this line must be related to all relevant recommendations, e.g. an entry "type 2G" should mean type 2G in all respects prescribed by the Code.

2/ Paragraphs 2.1 and 2.2: the ambient temperatures accepted or required by the Administration for the purposes of 4.8.1 of the Code to be inserted.

3/ Paragraph 2.3: stress factors and materials as accepted or required by the Administration for the purposes of 4.5.1.4 and 4.5.1.6 of the Code to be inserted.

4/ Paragraph 2.4: temperature accepted by the Administration for the purposes of 4.5.1.7 to be inserted.

5/ Paragraph 3: only products listed in chapter 19 of the Code or which have been evaluated by the Administration in accordance with paragraph 1.1.6 of the Code or their compatible mixtures having physical properties within the limitations of tank design should be listed. In respect of the latter "new" products, any special requirements provisionally prescribed should be noted.

ENDORSEMENT FOR ANNUAL AND INTERMEDIATE SURVEYS

THIS IS TO CERTIFY that, at a survey required by 1.5.2 of the Code the ship was found to comply with the relevant provisions of the Code:

Annual survey:

Signed.....
(Signature of authorized official)

Place.....

Date.....

(Seal or stamp of the authority, as appropriate)

Annual/Intermediate[3/] survey:

Signed.....
(Signature of authorized official)

Place.....

Date.....

(Seal or stamp of the authority, as appropriate)

Annual/Intermediate[3/] survey:

Signed.....
(Signature of authorized official)

Place.....

Date.....

(Seal or stamp of the authority, as appropriate)

Annual survey:

Signed.....
(Signature of authorized official)

Place.....

Date.....

(Seal or stamp of the authority, as appropriate)

Annual/intermediate survey in accordance with 1.5.6.8.3

THIS IS TO CERTIFY that, at an annual/intermediate[3/] survey in accordance with 1.5.6.8.3 of the Code, the ship was found to comply with the relevant provisions of the Code.

Signed.....
(Signature of authorized official)

Place.....

Date.....

(Seal or stamp of the authority, as appropriate)

Endorsement to extend the Certificate if valid for less than 5 years where 1.5.6.3 applies

The ship complies with the relevant provisions of the Code, and this Certificate should, in accordance with 1.5.6.3 of the Code, be accepted as valid until .....

Signed.....
(Signature of authorized official)

Place.....

Date.....

(Seal or stamp of the authority, as appropriate)

Endorsement where the renewal survey has been completed and 1.5.6.4 applies

The ship complies with the relevant provisions of the Code, and this Certificate should, in accordance with 1.5.6.4 of the Code, be accepted as valid until .....

Signed.....
(Signature of authorized official)

Place.....

Date.....

(Seal or stamp of the authority, as appropriate)

Endorsement to extend the validity of the Certificate until reaching the port of survey or for a period of grace where 1.5.6.5/1.5.6.6 applies

This Certificate should, in accordance with 1.5.6.5/1.5.6.6[3/] of the Code, be accepted as valid until .....

Signed.....
(Signature of authorized official)

Place.....

Date.....

(Seal or stamp of the authority, as appropriate)

Endorsement for advancement of anniversary date where 1.5.6.8 applies

In accordance with 1.5.6.8 of the Code, the new anniversary date is .....

Signed.....
(Signature of authorized official)

Place.....

Date.....

(Seal or stamp of the authority, as appropriate)

In accordance with 1.5.6.8 of the Code, the new anniversary date is .....

Signed .....
(Signature of authorized official)

Place.....

Date.....

(Seal or stamp of the authority, as appropriate)

1/ Alternatively, the particulars of the ship may be placed horizontally in boxes.

2/ In accordance with resolution A.600(15) - IMO Ship Identification Number Scheme, this information may be included voluntarily.

3/ Delete as appropriate.

4/ Instead of being incorporated in the Certificate, this text may be appended to the Certificate if duly signed and stamped.

5/ Insert the date of expiry as specified by the Administration in accordance with 1.5.6.1 of the Code. The day and the month of this date correspond to the anniversary date as defined in 1.3.3.3 of the Code, unless amended in accordance with 1.5.6.8 of the Code.

ATTACHMENT 1

TO THE

INTERNATIONAL CERTIFICATE OF FITNESS FOR THE CARRIAGE OF LIQUEFIED GASES IN BULK

Continuation of the list of products specified in section 3, and the conditions of their carriage

Products	Conditions of carriage (tank numbers, etc.)

Date.....
(as for Certificate)

.....
(Signature of official issuing the Certificate and/or seal or stamp of issuing authority)

ATTACHMENT 2

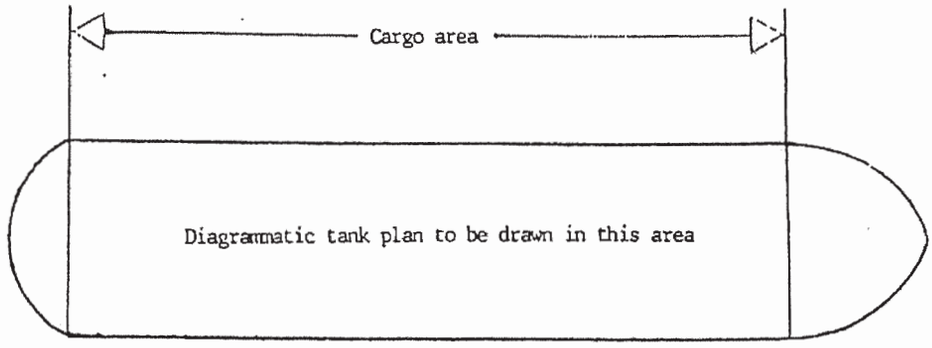
TO THE

INTERNATIONAL CERTIFICATE OF FITNESS FOR THE CARRIAGE OF LIQUEFIED GASES IN BULK

TANK PLAN (specimen)

Name of ship: .....

Distinctive number or letters: .....



Date.....
(as for Certificate)

.....
(Signature of official issuing the Certificate and/or seal or stamp of issuing authority)"

第 45/2015 號行政長官公告

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

國際海事組織海上安全委員會於二零一零年五月十四日透過第MSC.288（87）號決議通過了《原油油船貨油艙保護塗層性能標準》，該標準自二零一二年一月一日起適用於澳門特別行政區；

基於此，行政長官根據澳門特別行政區第3/1999號法律第六條第一款的規定，命令公佈包含上指標準的第MSC.288（87）號決議的中文及英文文本。

二零一五年五月四日發佈。

行政長官　崔世安

Aviso do Chefe do Executivo n.º 45/2015

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

Considerando igualmente que, em 14 de Maio de 2010, o Comité de Segurança Marítima da Organização Marítima Internacional, através da resolução MSC.288(87), adoptou a Norma de Desempenho para Revestimentos de Protecção para Tanques de Carga de Hidrocarbonetos de Navios-Tanque de Petróleo Bruto, e que tal Norma é aplicável na Região Administrativa Especial de Macau desde 1 de Janeiro de 2012;

O Chefe do Executivo manda publicar, nos termos do n.º 1 do artigo 6.º da Lei n.º 3/1999 da Região Administrativa Especial de Macau, a resolução MSC. 288(87), que contém a referida Norma, nos seus textos em línguas chinesa e inglesa.

Promulgado em 4 de Maio de 2015.

O Chefe do Executivo, *Chui Sai On*.

第 MSC.288（87）號決議

（2010 年 5 月 14 日通過）

原油油船貨油艙保護塗層性能標準

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二十八條第（二）款，

注意到以第 MSC.291（87）號決議通過的關於原油油船貨油艙保護塗層的經修正的《1974 年國際海上人命安全公約》（《安全公約》）（下稱“公約”）第 II-1/3-11 條，

還注意到上述第 II-1/3-11 條規定，該條中所述保護塗層須符合《原油油船貨油艙保護塗層性能標準》（下稱“保護塗層性能標準”）的要求，

認識到上述《保護塗層性能標準》無意阻礙作為替代系統的新型或新穎技術的發展，

在其第 87 屆會議上，**審議了**《保護塗層性能標準》的建議文本，

1. **通過**《原油油船貨油艙保護塗層性能標準》，其正文載於本決議附件；

2. **請**《公約》各締約國政府注意，該《保護塗層性能標準》將在《公約》第 II-1/3-11 條於 2012 年 1 月 1 日生效之時生效；

3. **注意到**，根據《安全公約》第 II-1/3-11.3.1 條的規定，《原油油船貨油艙保護塗層性能標準》的修正案須按照《公約》第 VIII 條關於公約附則除第 I 章外的適用修正程序予以通過、生效和實施；

4. **要求**秘書長將本決議和附件中《保護塗層性能標準》文本的核證無誤副本送發所有《公約》締約國政府；

5. **進一步要求**秘書長將本決議及其附件的副本送發本組織非《公約》締約國政府的所有會員國；

6. **請**各國政府鼓勵發展旨在作為替代系統的新穎技術，並隨時將任何有效結果通知本組織。

7. **決定**不斷審議《保護塗層性能標準》並根據應用中獲得的經驗做出必要修正。

附 件

原油油船貨油艙保護塗層性能標準

1 目的

本標準規定了原油油船建造時貨油艙內塗裝的保護塗層最低標準的技術要求。

2 定義

下列定義適用於本標準：

2.1 *原油油船*為《73/78 年防污公約》附則 I 中界定的油船。

2.2 *露點*為空氣中濕度飽和時的溫度。

2.3 *DFT* 為乾膜厚度。

2.4 *灰塵*為呈現在準備塗漆的表面上的、由於噴砂清理或其他表面處理工藝而產生的，或由於環境作用而產生的鬆散顆粒性物質。

2.5 *邊緣打磨*係指二次表面處理前對邊緣的處理。

2.6 *"良好"狀況*係指評估油船壓載艙塗層的第 A.744（18）號決議界定的有少量點鏽的狀況。

2.7 *硬塗層*係指在固化過程中發生化學變化的塗層或可用於維護目的的非化學變化、在空氣中乾燥的塗層。它可以是無機的也可以是有機的。

2.8 *NDFT* 為標定乾膜厚度。90/10 原則係指所有測厚點的 90%測量結果須大於或等於標定乾膜厚度，其餘 10%測量結果均須不小於 0.9×標定乾膜厚度。

2.9 *底漆*係指車間底漆塗裝後在船廠塗裝的塗層系統的第一道塗層。

2.10 *車間底漆*係指加工前塗在鋼板表面的底漆，通常在自動化車間噴塗（在塗層系統第一道塗層之前）。

2.11 *預塗*係指對關鍵區域邊緣、焊縫、不易噴塗區域等位置的預先塗刷，以保證良好的塗料附着力和恰當的塗層厚度。

2.12 *目標使用壽命*為塗層系統設計壽命的目標值，以年計。

2.13 *技術規格書*為塗料生產商的產品規格書，包含與塗料及其塗裝有關的詳細技術性說明和資料。

3. 通則

3.1 塗層系統達到其目標使用壽命的能力取決於塗層系統的類型、鋼材處理、運營環境、塗裝和塗層檢查及維護。所有這些方面對塗層系統的優良性能都有影響。

3.2 船東、船廠和塗料生產商須就表面處理和塗裝過程的檢查達成協議，並提交主管機關審查。須報告這些檢查的明確證據並包括在塗層技術檔案中（CTF）（見第 3.4 段）。

3.3 關於第 4 節所列的標準，應考慮下列因素：

.1 為了防止塗層系統過早老化和（或）退化，船廠有必要在塗裝作業中嚴格執行塗裝技術規範、程序和各種不同步驟（包括，但不限於表面處理）；

.2 在船舶設計階段可採取措施以提高塗層的性能，如減少挖孔、採用圓順的外形、避免複雜的幾何結構，保證結構形狀能便於工具進入，方便塗裝部位的清潔、排水和乾燥；和

.3 本文件規定的塗層性能標準基於製造商、船廠和船舶經營人的經驗；並不意味着排斥其他合適的替代塗層系統，只要證明其性能至少不低於本標準規定的性能。替代塗層系統的接受標準見第 8 節。

3.4 塗層技術檔案

3.4.1 所塗裝的貨油艙塗層系統的技術規範、船廠和船東的塗裝工作、塗層選擇的詳細標準、工作說明書、檢查、維護和修補的記錄均須按照第 MSC.215（82）號決議的要求包括在塗層技術檔案之中。

3.4.2 *新造階段*

塗層技術檔案至少須包括與本標準相關的下列項目，並在新船建造階段由船廠提交：

.1 符合規定證明或型式認可證書的副本；

.2 技術規格書副本，包括：

.2.1 產品名稱，識別標記和（或）編號；

.2.2 塗層系統的材料、成分和構成、顏色；

.2.3 最小和最大乾膜厚度；

.2.4 塗裝的方式、工具和（或）機械；

.2.5 塗裝前的表面狀況（除鏽等級、清潔度、粗糙度等）；和

.2.6 環境限制條件（溫度和濕度）；

.3 船廠塗裝作業工作記錄，包括：

.3.1 各貨油艙實際塗裝面積（以平方米計）；

.3.2 塗裝的塗層系統；

.3.3 塗裝的時間、厚度、道數，等等；

.3.4 塗裝時的環境條件；和

.3.5 表面處理的細節；

.4 船舶建造期間塗層系統的檢查和修補程序；

.5 塗層檢查員簽發的塗裝日誌－聲明塗層系按照規範塗裝，已得到塗料供應商代表的認可，並詳細說明與規範的差異（見附件 2）；

.6 船廠經核實的檢查報告，包括：

.6.1 檢查完成日期；

.6.2 檢查結果；

.6.3 備註（如有的話）；和

.6.4 檢查員簽名；及

.7 塗層系統營運中維護和修補程序。

3.4.3 營運中的維護、修補和局部重塗

營運中的維護、修補和局部重塗事項須按照塗層維護和修補導則有關章節的要求記錄在塗層技術檔案中。

3.4.4 在船舶壽命期內，塗層技術檔案須保存在船上並及時補充有關材料。

3.5 健康和安全

船廠負責執行國家規定，確保勞動者的健康和安全，減少失火和爆炸的危險。

4 塗層標準

4.1 性能標準

本標準基於使塗層達到 15 年目標使用壽命的技術條件和要求，這是從最初的塗裝開始，塗層系統維持“良好”狀態的持續時間。塗層的實際使用壽命將有變化，取決於眾多可變因素，包括在使用中遇到的真實條件。

4.2 標準適用範圍

新原油油船建造時塗裝的貨油艙保護塗層須至少符合本標準的要求。

4.3 塗層系統

對滿足測試和物理性能（表 1.1.3）的環氧基系統須做出文件記錄，並須提供型式認可證書或符合規定證明。

4.4 塗裝區域

作為最低限度，下列區域須按照本標準得到保護：

.1 艙頂板及全部內部結構，包括與縱向和橫向隔艙壁連接的肘板。在具有環框縱樑構造的艙中，甲板下橫肋須塗裝至上面板之下的第一防撓肘板。

.2 縱向和橫向隔艙壁塗裝至最高檢驗通道的高度。最高檢驗通道及其支撐架全部塗裝。

.3 無最高檢驗通道的貨艙隔艙壁塗層延伸至艙中線高度的10%，但從甲板向下延伸無需超過 3 米。

.4 內平底和全部構件塗裝至內平底之上 0.3 米處。

圖一

4.5 特殊應用

4.5.1 本標準涵蓋了貨油艙內鋼結構保護塗層的要求。注意到貨油艙內裝有一些其他獨立構件，須塗裝塗料防止腐蝕。

4.5.2 建議在實際可行的範圍內，對位於第 4.4 段規定的範圍內的檢驗通道的非船體結構整體的部分，如扶手、獨立平臺、梯子等，應用本標準。對非船體結構整體的構件也可以使用其他防腐等效方法，只要這些方法對周圍結構的保護塗層性能沒有影響。作為船體結構整體

的通道佈置，如步道的縱向加強肋、縱樑等，如位於塗裝區域之內，須完全符合本標準。

4.5.3 建議管子、測量裝置等的支撐件，至少按照第 4.5.2 段所述對非結構整體構件的要求塗裝。

4.6 塗層的基本要求

4.6.1 表 1 中列出了滿足第 4.1 段所規定的性能標準的原油油船貨油艙保護塗層在建造時的塗裝要求。

4.6.2 塗料生產商須提供滿足表 1 所列要求和作業環境的保護塗層系統規範。

4.6.3 主管機關須核實保護塗層系統的技術規格書和符合規定證明或型式認可證書。

4.6.4 船廠須依據經核實的技術規格書和工廠自己經核實的塗裝程序塗裝保護塗層。

4.7 本標準中所列參照標準為本組織可接受的標準。測試設備、測試方法、準備方法和（或）測試結果須符合不劣於本組織可接受的性能標準。

表 1－原油油船貨油艙塗層系統基本要求

	特性	要求
1 塗層系統的設計		
.1	塗層系統的選擇	塗層系統的選擇須由各有關方面結合塗層的使用條件和有計劃的保養加以考慮。其中須考慮下列事項： .1 與受熱表面相關的艙室位置； .2 貨物作業的頻率；

	特性	要求
		.3 要求的表面條件； .4 要求的表面清潔度和乾燥度； .5 輔助陰極保護裝置，如有（如果塗層有輔助的陰極保護，塗層須與輔助陰極保護系統相兼容）； .6 塗層滲透性和耐惰性氣體性和耐酸性；及 .7 適當的機械特性（塑性、耐衝擊性）。 塗層生產商須提供有成文的、令人滿意的性能記錄和技術規格書的產品。生產商須有能力提供適當技術協助。性能記錄、技術規格書，及所提供的技術協助（如有的話）須記錄在塗層技術檔案中。 在陽光曝曬甲板下面或在構成加熱艙室限界的艙壁上應用的塗料須能承受反覆加熱和（或）冷卻而不變脆。
.2	塗層類型	環氧基系統。 性能符合附件中測試程序的其他塗層系統。 建議多道塗層系統，每道塗層的顏色要有對比。 表面塗層須為淺色，便於營運中檢查。 吸入口和加熱盤管下行管處應考慮使用強化塗層。 在有電流問題之處，應考慮使用輔助陰極保護。
.3	塗層測試	在本標準生效日之前，依據與附件 1 中的試驗程序相應或等效的方法進行實驗室試驗的環氧基系統，如至少滿足對鏽蝕和鼓泡的要求，或有實地暴露 5 年後塗層最終狀況不低於“良好”的文件記錄，可以接受。 本標準生效之日或之後批准的環氧基系統，要求按照附件 1 中的試驗程序或等效的試驗程序進行試驗。
.4	工作規範	須至少進行兩道預塗和兩道噴塗。在證明塗裝的塗層能夠滿足標定總乾膜厚度要求時，可僅在焊縫區減少第二道預塗的範圍，以避免不必要的塗層過厚。任何第二道預塗範圍的減少須詳細地全部記錄在塗層技術檔案中。

	特性	要求
		預塗須採用刷塗或輥塗的方法。輥塗須僅用於排水孔、老鼠洞等部位。 須根據塗料生產商的建議，在每一道主塗層適當固化後再塗裝在下一道主塗層。 工作規範須包括塗料商規定的塗層複塗時間間隔和可踩踏時間間隔。 表面污染物如鏽、油脂、灰塵、鹽、油等須在塗裝前按照塗料生產商建議的方法去除。須去除嵌入塗層中的磨料夾雜物。
.5	NDFT（名義總乾膜厚度）	環氧基塗層系統在 90/10 原則下為 NDFT 320 μm，其他系統依照塗料生產商的規範。 最大總乾膜厚度依照塗料生產商的詳細規範。 須小心避免塗膜過厚。塗裝中須定期檢查濕膜厚度。 稀釋劑須限於使用塗料商推薦的類型和用量。
2 初次表面處理		
.1	噴砂處理和粗糙度	Sa 2½級，粗糙度介於 30-75 μm。 在下列情況下不得進行噴砂： .1 相對濕度超過 85%；或 .2 鋼板的表面溫度不到露點溫度以上 3°C。 在表面處理結束後和進行底漆塗裝前，須依據塗料商的建議檢查鋼板表面的清潔度和粗糙度。
.2	水溶性鹽限值（相當於氯化鈉）	≤50 mg/m^2 氯化鈉
.3	車間底漆	無緩蝕劑的含鋅硅酸鋅基塗料或等效塗料。 車間底漆與主塗層系統的相容性須得到塗料生產商的確認。

	特性	要求
3	**二次表面處理**	
.1	鋼板狀況	鋼板表面須通過去除毛邊，打磨焊道，去除焊接飛濺物和任何其他的表面污染物加以處理，達到 P2 級，以使所選擇的塗層能夠均勻塗布，達到所要求的標定總乾膜厚度（NDFT）並有足夠的附着力。 塗裝前邊緣須處理成半徑至少為 2mm 的圓角，或經過三次打磨，或至少經過等效處理。
.2	表面處理	被破壞的車間底漆和焊縫處達到 Sa 2½； 全部待塗裝表面噴砂清潔達到 Sa 2。如車間底漆按第 1.3 項所述試驗程序未通過預合格證實測試，至少要去除 70%的完好底漆。 如果由環氧基的主塗層和車間底漆組成的整體塗層系統按第 1.3 項的試驗程序通過了預合格證實測試，則當使用同樣的環氧塗層系統時，可保留完好的車間底漆。保留的車間底漆須用掃掠式噴砂、高壓水洗或等效方法清潔。 如果一種硅酸鋅車間底漆作為環氧塗層系統的一部分已通過第 1.3 項的塗層預合格試驗，該底漆可和其他的通過第 1.3 項塗層預合格試驗的環氧塗層組合使用，只要該底漆的兼容性得到生產商通過參照附件 1 浸沒實驗或按照所有類型船舶專用海水壓載艙和散貨船雙舷側處所保護塗層性能標準（第 MSC.215（82）號決議）進行測試而做出的確認。
.3	合攏後的表面處理	大接縫為 St 3 或更佳，或可行時，為 Sa 2½。 *內底*： — 破壞區域不大於須塗裝面積 20%時，至少為 St 3。 — 相連破壞區域面積超過 25 m^2 或超過須塗裝面積 20%時，須為 Sa 2½。

	特性	要求
		甲板下： — 破壞區域不大於塗裝面積 3%時，至少為 St 3。 — 相連破壞區域面積超過 25 m^2 或超過須塗裝面積 3%時，須為 Sa 2½。 塗層搭接處表面要處理成斜坡狀。
.4	粗糙度要求	全面或局部噴砂處理，30-75 μ m，其他處理依照塗料生產商的建議。
.5	灰塵	顆粒大小為“3”、“4”或“5”級的灰塵分佈量為 1 等。 去除待塗表面上不用放大鏡可見的更低顆粒級別的灰塵。
.6	噴砂/打磨後水溶性鹽限值（相當於氯化鈉）	≤ 50 mg/m^2 氯化鈉
.7	沾污	無油污。 對於各道塗層之間的其他沾污物，應遵循塗料生產商的建議。
4 其他		
.1	通風	為使塗料適當地乾燥和固化，需予以充足的通風。應根據塗料生產商的建議，在整個塗裝過程中和塗裝完成後的一段時間內保持通風。
.2	環境條件	須按照生產商的規範，在對濕度和表面條件的控制下進行塗裝。此外，下述情況下不得進行塗裝： .1 相對濕度超過 85%，或 .2 鋼材表面溫度不到露點溫度以上 3°C；或 .3 未達到塗料生產商的任何其他要求。

	特性	要求
.3	塗層檢驗	須避免破壞性檢驗。 為了質量控制，每道塗層乾膜厚度都要進行測量。最後一道塗層塗裝後須使用適當的測厚計確定總乾膜厚度。
.4	修補	任何缺陷區域，如針孔，氣泡，露底等，須標出並適當修補。對所有這類修補須再次檢查並做文件記錄。

5 塗層系統認可

塗層系統預合格測試（表 1，第 1.3 項）的結果須做文件記錄。如結果令人滿意，須由獨立於塗料生產商的第三方簽發一份符合規定證明或型式認可證書。

6 塗層檢查要求

6.1 通則

6.1.1 為保證符合本標準，下列事項須由具有 NACE 檢查員 2 級、FROSIO 檢查員 III 級資格或主管機關承認的同等資格的塗層檢查員完成。

6.1.2 塗層檢查員須在塗裝過程中檢查表面處理和塗裝施工，作為最低要求，應至少進行第 6.2 節中的檢查項目，保證符合本標準。檢查重點須放在表面處理和塗裝施工各階段的起始，因為不恰當的工作在以後的塗裝過程中很難糾正。須採用非破壞性的方法檢查代表性結構件的塗層厚度。檢查員須證實業已完成適當集體措施。

6.1.3 檢查結果須由檢查員予以記錄，並須納入塗層技術檔案（CTF）中（見附件 2）。

6.2 檢查項目

建造階段		檢查項目
初次表面處理	1	在噴砂開始前和天氣發生突變時，須測量並記錄鋼材表面溫度、相對濕度和露點。
	2	須測量鋼板表面的可溶性鹽分並檢查油、油脂和其他污染物。
	3	車間底漆塗裝過程中須監控鋼板表面的清潔度。
	4	須確認車間底漆的材料滿足表 1 第 2.3 項的要求。業經生產商證實。
厚度		如證明硅酸鋅車間底漆與主塗層體系相兼容，則應確認車間底漆的厚度和固化與規定值相符。
分段組裝	1	分段建造完成後，二次表面處理開始前，須目視檢查鋼材表面處理，包括檢查邊緣處理。 去除任何油、油脂或其他可見污染物。
	2	噴砂/打磨/清潔後，在塗裝前須目視檢查處理好的表面。 完成噴砂、清潔後，系統第一道塗層塗裝前，須檢查鋼材表面殘留可溶性鹽水平，每個分段至少取一點。
	3	在塗層塗裝和固化階段，須監測並記錄鋼材板表面溫度、相對濕度和露點。
	4	須對表 1 中所述塗裝過程步驟進行檢查。
	5	須進行乾膜厚度（DFT）測量，驗證塗層達到了規定的厚度。
合攏	1	目視檢查鋼材表面狀況，表面處理情況，驗證表 1 中其他要求是否達到，商定的規範是否得到執行。
	2	塗裝前和塗裝過程中定期測量並記錄鋼材表面溫度、相對濕度和露點。
	3	須對表 1 中所述塗裝過程步驟進行檢查。

7 塗層驗證要求

對於執行本性能標準的船舶，在審核其塗層技術檔案之前，主管機關須完成下列各項：

.1 核查技術規格書和符合規定證明或型式認可證書與本標準相符；

.2 核查代表性包裝桶上的塗料標識與技術規格書和符合規定證明或型式認可證書中標出的塗料一致；

.3 按第 6.1.1 段的資質標準核查檢查員的資質；

.4 核查檢查員關於表面處理和塗層塗裝報告，表明與塗料商的技術規格書和符合規定證明或型式認可證書相符；和

.5 監督塗層檢查要求的執行。

8 替代塗層系統

8.1 所有根據本標準表 1 塗裝的非環氧基塗層系統均定義為替代系統。

8.2 本標準基於公認的和常用的塗層系統。這並不意味着排斥其他經證明具有等效性能的替代系統，如非環氧基的系統。

8.3 接受替代系統須有文件證據，通過：

.1 按照本標準測試；或

.2 五年的實地暴露並有連續運輸原油貨物的文件證據。五年後的塗層最終狀況不低於“良好”；

證明其防腐蝕性能至少與本標準要求相當。

附件 1

原油油船貨油艙保護塗層合格測試程序

1 範圍

本程序提供了本標準第 4.6 和 8.3 段所指原油油船貨油艙保護塗層測試程序的詳細步驟。艙內底和艙頂板均須塗裝已完全通過本文件所述測試程序的塗層系統。

2 定義

*塗層規範*係指塗層系統的規範，包括塗層系統類型、鋼材處理、表面處理、表面清潔度、環境條件、塗裝程序、檢查和接受標準。

3 背景

3.1 船上的原油貨艙暴露於兩種完全不同的環境狀況，這是公認的。

3.2 當貨艙裝載時，有三個截然不同的豎區：

.1 最低處和縱通甲板的水平部分等等，暴露於可能屬酸性的水，及可含有厭氧細菌的淤泥。

.2 中部，貨油接觸到所有浸沒中的鋼材。

.3 蒸氣空間，空氣中飽和有載貨貨艙的各種蒸氣，如 H_2S、CO_2、SO_2，水氣和來自惰性氣體系統的其他氣體和複合物。

3.3 當貨艙空載時：

.1 最低處和縱通甲板的水平部分等等，暴露於貨物殘餘和可能屬酸性的水，及可含有厭氧細菌的淤泥。

.2 在艙的空間，空氣中含有來自原油殘餘的各種蒸氣，如 H_2S、CO_2、SO_2，水氣和來自惰性氣體系統的其他氣體和複合物。

4 試驗

此實驗設計為，儘實際可行地模擬原有貨艙塗層將接觸的兩種主要環境狀況。塗層須通過下列試驗加以驗證：試驗程序須符合附錄 1（氣密室模擬裝載貨艙的蒸氣相）和附錄 2（浸沒試驗模擬原油艙的裝載狀態）：

5 試驗氣體的構成

試驗氣體基於原油艙蒸氣相的構成，但不包含碳氫成分，因為這些成分對用於貨油倉中的環氧塗層不具有害影響。

試驗氣體的構成

N_2	乾氣體積的百分之 83±百分之 2
CO_2	乾氣體積的百分之 13±百分之 2
O_2	乾氣體積的百分之 4±百分之 1
SO_2	百萬分之 300±百萬分之 20
H_2S	百萬分之 200±百萬分之 20

6 試驗液體

原油是一種複雜的化學物質，儲存時，隨着時間的流逝而不穩定。原油成分也會隨着時間的流逝而變化。另外，使用原油已證明對有關試驗機構造成實際和 HSE 障礙。為克服此問題，使用浸沒液體模型模擬原油。此原油模型系統的配方如下：

1. 首先是蒸餾船用燃料，DMA 級 15°C 時最大密度為 890kg/m3，40°C 時黏度最大為 6mm2/s；

2. 加入環烷酸至酸值為 2.5±0.1mg KOH/g；

3. 加入苯/甲苯（比率 1：1）至 DMA 總量的 8.0±0.2% w/w；

4. 加入人造海水至混合物總量的 5.0±0.2% w/w；

5. 加入溶於液體載體的 H_2S（以便達到試驗液體總量的百萬分之 5±百萬分之 1w/w 的 H_2S）；

6. 臨使用前，對以上成分作充分混合；及

7. 混合一旦完成，應加以測試，確認該混合物符合試驗液體濃度

註： 為防止 H_2S 釋放到試驗設施之中，建議使用第 1 至 4 步驟的溶液儲備，之後注入試驗容器再按照第 5 和 6 步驟完成試驗溶液。

附錄 1

氣密櫃試驗

1 試驗條件

蒸氣試驗須在氣密櫃中進行。氣密櫃的尺寸和設計並非關鍵，只要滿足下列.6 至.10 項的要求即可。試驗氣體設計為模擬空載狀態下貨油艙的實際環境以及裝載狀態下的蒸氣環境。

.1 試驗期為 90 天。

.2 使用兩塊相同樣板進行試驗；另製備第三塊樣板存放於環境狀態下，在對試驗樣板作最後評定時用作參照板。

.3 每塊樣板尺寸為 150mm×100mm×3mm。

.4 試板按本性能標準表 1，第 1.2 項處理，塗層系統的塗裝按表 1，第 1.4 和 1.5 項進行。

.5 如使用了硅酸鋅車間底漆，須風化至少 2 個月並用低壓淡水清洗乾淨。須報告塗裝塗層前車間底漆的具體製備方法，並對該具體系統作出評判。試驗樣板的背面和邊緣須適當塗裝，以避免影響試驗結果。

.6 氣密櫃中須有水槽一具，其中注入 2±0.2 升的水。該槽中的水須在每次重新進行試驗之前排空並換新。

.7 氣密櫃的蒸氣空間須注入符合標準第 5 項的試驗氣體。氣密櫃中的氣體環境須在試驗期間加以保持。當氣體不在試驗方

法範圍內時，須加以更新。監測的頻率和方法，及更新試驗氣體的日期和時間須記入試驗報告。

.8 試驗櫃中的空氣應隨時保持 95±5%的相對濕度。

.9 試驗空氣的溫度須為 60±3°C。

.10 樣板支架須使用適宜的惰性材料製作，將樣板垂直夾持，樣板之間的間距至少為 20mm。該支架在試驗櫃中的位置須使樣板的下緣距水面的高度至少為 200mm，距試驗艙壁至少 100mm。如試驗櫃中有兩層，須小心保證溶液不致滴落到下層樣板上。

2 試驗結果

2.1 試驗前，須報告構成塗層系統的各道塗層包括硅酸鋅車間底漆（如在塗層系統下使用）的下列測量數據：

.1 該塗料的基料和固化劑組分的紅外鑑定；

.2 該塗料的基料和固化劑組分的比重；和

.3 乾膜厚度平均值（使用模板）。

2.2 完成試驗期限後，須從試驗櫃中取出樣板並用熱水漂洗。用吸水紙吸乾樣板並在試驗結束後 24 小時之內對鏽蝕和起泡進行評定。

2.3 須報告下列測量數據：起泡和鏽蝕。

3 接受衡準

3.1 第 2 節的試驗結果須滿足下列衡準；在報告中，須使用兩塊相同樣板中性能最差者：

項目	環氧基系統的接受衡準	替代系統的接受衡準
樣板起泡	無	無
樣板鏽蝕	Ri 0 級（0%）	Ri 0 級（0%）

3.2 鑑定樣板時，位於邊緣 5mm 之內的起泡或鏽蝕須忽略不計。

4 試驗報告

試驗報告須包括下列內容：

.1 塗料生產商名稱和生產地點；

.2 試驗日期；

.3 塗料和，如適用，硅酸鋅車間底漆的產品名稱／標識；

.4 各產品各個組分的批號；

.5 塗裝車間底漆前，鋼板表面處理的細節，和相關時，加塗塗層前對車間底漆的處理並至少包括：

.5.1 表面處理，或風化車間底漆的處理及任何影響性能的有關處理的重要信息；

.5.2 塗裝車間底漆前測量的鋼材表面水溶性鹽含量；

.6 塗層系統細節，包括：

.6.1 硅酸鋅車間底漆（如相關的話），其二次表面處理和塗裝條件、風化期；

.6.2 塗層道數，包括車間底漆，及各層的厚度；

.6.3 試驗前的平均乾膜厚度；

.6.4 稀釋劑，如使用；

.6.5 濕度；

.6.6 氣溫；和

.6.7 鋼板溫度；

.7 試驗氣體更新安排表細節；

.8 按第 2 節試驗的試驗結果；和

.9 按第 3 節判定的結果。

附錄 2

浸沒試驗

1 試驗條件

浸沒試驗為模擬裝載條件下原油艙的狀態而制定。

.1 暴露時間為 180 天。

.2 試驗液體應按照本標準第 6 項製備。

.3 試驗液體應注入一個具有內平底的容器，至試驗液體柱的高度達到 400mm，生成 20mm 的水相。任何其他使用同樣試驗液體並亦導致試驗樣板浸入 20mm 水相的試驗安排，亦可接受。這可通過使用例如惰性大理石實現。

.4 試驗液體的溫度應為 60±2°C 並應均勻及使用經認可的方法保持恆溫，例如水浴或油浴池或能夠將浸沒液保持在要求溫度範圍內的循環空氣恆溫箱。

.5 試驗樣板須垂直放置，並在試驗期間全部浸沒。

.6 須使用兩塊同樣的樣板進行試驗。

.7 須使用不遮擋試驗區域的惰性隔離物分離樣板。

.8 每個樣板的尺寸為 150mm × 100mm × 3mm。

.9 樣板須按照本性能標準表 1 第 1.2 項加以處理，並按照表 1 第 1.4 和 1.5 項塗裝塗層系統。

.10 如使用了硅酸鋅車間底漆，須風化至少 2 個月並用低壓淡水清洗乾淨。須報告塗裝塗層前車間底漆的具體製備方法，並對該具體系統作出判定。試驗樣板的背面和邊緣須適當塗裝，以避免影響試驗結果。

.11 在全浸沒試驗期完成之後，須從試驗液體中取出樣板並用乾布擦乾，之後對樣板進行鑑定。

.12 樣板鑑定須在試驗完成後 24 小時之內進行。

2 試驗結果

2.1 試驗前，須報告構成塗層系統的各道塗層包括硅酸鋅車間底漆（如在塗層系統下使用）的下列測量數據：

.1 該塗料的基料和固化劑組分的紅外鑑定；

.2 該塗料的基料和固化劑組分的比重；和

.3 乾膜厚度平均值（使用模板）。

2.2 試驗後，須報告下列測量數據：起泡和鏽蝕。

3 接受衡準

3.1 第 2 節的試驗結果須滿足下列衡準；在報告中，須使用兩塊相同樣板中性能最差者：

項目	環氧基系統的接受衡準	替代系統的接受衡準
樣板起泡	無	無
樣板鏽蝕	Ri 0 級（0%）	Ri 0 級（0%）

3.2 鑑定樣板時，位於邊緣 5mm 之內的起泡或鏽蝕須忽略不計。

4 試驗報告

試驗報告須包括下列內容：

.1 塗料生產商名稱和生產地點；

.2 試驗日期；

.3 各層塗料和，如適用，硅酸鋅車間底漆的產品名稱/標識；

.4 各產品各個組分的批號；

.5 塗裝車間底漆前鋼板表面處理的細節，和相關時，加塗塗層前對車間底漆的處理並至少包括：

.5.1 表面處理，或車間底漆的風化處理及任何影響性能的有關處理的重要信息；

.5.2 塗裝車間底漆前測量的鋼材表面水溶性鹽含量；

.6 塗層系統細節，包括：

.6.1 硅酸鋅車間底漆（如相關的話），其二次表面處理和塗裝條件、風化期；

.6.2 塗層道數，包括車間底漆，及各層的厚度；

.6.3 試驗前的平均乾膜厚度；

.6.4 稀釋劑，如使用；

.6.5 濕度；

.6.6 氣溫；

.6.7 鋼板溫度。

.7 按第 2 節試驗的試驗結果；和

.8 按第 3 節判定的結果。

附錄 3

使用危險物質注意事項

1 試驗方法涉及到使用下列會有害健康的物質：

.1 二氧化硫：受潮時具腐蝕性，吸入有毒，引致灼傷並對眼睛和呼吸道有刺激性。

.2 硫化氫：極易燃（閃點-82°C），可與空氣形成爆炸性混合物，受潮時具腐蝕性，引致灼傷，須遠離火源，有刺激性並會引起窒息，長期接觸限值 5 ppm，短期接觸限值 10 ppm，更高濃度會致死並且無味。重複暴露於低濃度之中會導致對該氣體的嗅覺降低。

.3 苯：極易燃（閃點-11°C），可與空氣形成爆炸性混合物，有毒，致癌物，極具健康風險。

.4 甲苯：極易燃（閃點 4°C），可與空氣形成爆炸性混合物，有刺激性，極具健康風險，生殖毒素。

2 依據進行試驗的國家中的規定，可能需要專試驗儀器和防範措施。

3 雖然一些國家沒有防止進行任一試驗的具體要求，但仍須要求：

.1 進行工作條件風險評估；

.2 試驗期間，對系統需加以封閉；及

.3 對環境進行控制，特別是在試驗啟動和結束時，須有適當排氣，並須穿着個人防護器具。

附件 2

檢查日誌和不符合規定報告樣本

檢查日誌 編頁號：

船名：	艙/櫃編號：	數據庫：
結構部位：		
表面處理		
處理方法： 磨料： 表面溫度： 相對濕度（最大值）： 達到的標準： 邊緣圓度：		面積（m^2） 顆粒度： 大氣溫度： 露點：
檢查意見：		
工號：	日期：	簽名：
塗裝： 方法：		

塗料號	系統	批號	日期	氣溫	表面溫度	相對濕度	露點	乾膜厚度* 測量	規定值

*測得的最小和最大乾膜厚度，乾膜厚度的讀數應附在檢查日誌後。

檢查意見：		
工號：	日期：	簽名：

不符合規定報告 編頁號：

船名：	艙/櫃編號：	數據庫：
結構部位：		
對檢查發現應糾正問題的描述		
對所發現情況的描述：		
參照文件（日誌）：		
所採取的行動：		
工號：	日期：	簽名：

RESOLUTION MSC.288(87)
(adopted on 14 May 2010)

PERFORMANCE STANDARD FOR PROTECTIVE COATINGS FOR CARGO OIL TANKS OF CRUDE OIL TANKERS

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

NOTING regulation II-1/3-11 of the International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended (hereinafter referred to as "the Convention") adopted by resolution MSC.291(87), concerning protective coatings for cargo oil tanks of crude oil tankers,

NOTING ALSO that the aforementioned regulation II-1/3-11 provides that the protective coatings referred to therein shall comply with the requirements of the Performance standard for protective coatings for cargo oil tanks of crude oil tankers (hereinafter referred to as "the Performance standard for protective coatings"),

RECOGNIZING that the Performance standard for protective coatings referred to above is not intended to inhibit the development of new or novel technologies which provide for alternative systems,

HAVING CONSIDERED, at its eighty-seventh session, the text of the proposed Performance standard for protective coatings,

1. ADOPTS the Performance standard for protective coatings for cargo oil tanks of crude oil tankers, the text of which is set out in the Annex to the present resolution;

2. INVITES Contracting Governments to the Convention to note that the Performance standard for protective coatings will take effect on 1 January 2012 upon entry into force of SOLAS regulation II-1/3-11;

3. NOTES that, under the provisions of SOLAS regulation II-1/3-11.3.1, amendments to the Performance standard for protective coatings shall be adopted, brought into force and take effect in accordance with the provisions of article VIII of that Convention concerning the amendment procedure applicable to the Annex to the Convention other than chapter I;

4. REQUESTS the Secretary-General to transmit certified copies of this resolution and the text of the Performance standard for protective coatings contained in the Annex to all Contracting Governments to the Convention;

5. FURTHER REQUESTS the Secretary-General to transmit copies of this resolution and the Annex to all Members of the Organization which are not Contracting Governments to the Convention;

6. INVITES Governments to encourage the development of novel technologies aimed at providing for alternative systems and to keep the Organization advised of any positive results;

7. RESOLVES to keep the Performance standard for protective coatings under review and amend them as necessary, in light of experience gained in its application.

ANNEX

PERFORMANCE STANDARD FOR PROTECTIVE COATINGS FOR CARGO OIL TANKS OF CRUDE OIL TANKERS

1 PURPOSE

This Standard provides technical requirements for the minimum standard for protective coatings to be applied in cargo oil tanks during the construction of new crude oil tankers.

2 DEFINITIONS

For the purpose of this Standard, the following definitions apply:

2.1 *Crude oil tanker* is as defined in Annex I of MARPOL 73/78.

2.2 *Dew point* is the temperature at which air is saturated with moisture.

2.3 *DFT* is dry film thickness.

2.4 *Dust* is loose particulate matter present on a surface prepared for painting, arising from blast-cleaning or other surface preparation processes, or resulting from the action of the environment.

2.5 *Edge grinding* is the treatment of the edge before secondary surface preparation.

2.6 "*GOOD*" *condition* is the condition with minor spot rusting as defined in resolution A.744(18) for assessing the ballast tank coatings for tankers.

2.7 *Hard coating* is a coating that chemically converts during its curing process or a non-convertible air drying coating which may be used for maintenance purposes. This can be either inorganic or organic.

2.8 *NDFT* is the nominal dry film thickness. 90/10 practice means that 90% of all thickness measurements shall be greater than or equal to NDFT and none of the remaining 10% measurements shall be below 0.9 x NDFT.

2.9 *Primer coat* is the first coat of the coating system applied in the shipyard after shop primer application.

2.10 *Shop primer* is the prefabrication primer coating applied to steel plates, often in automatic plants (and before the first coat of a coating system).

2.11 *Stripe coating* is painting of edges, welds, hard to reach areas, etc., to ensure good paint adhesion and proper paint thickness in critical areas.

2.12 *Target useful life* is the target value, in years, of the durability for which the coating system is designed.

2.13 *Technical Data Sheet* is the paint manufacturer's Product Data Sheet which contains detailed technical instruction and information relevant to the coating and its application.

3 GENERAL PRINCIPLES

3.1 The ability of the coating system to reach its target useful life depends on the type of coating system, steel preparation, operating environment, application and coating inspection and maintenance. All these aspects contribute to the good performance of the coating system.

3.2 Inspection of surface preparation and coating processes shall be agreed upon between the shipowner, the shipyard and the coating manufacturer and presented to the Administration for review. Clear evidence of these inspections shall be reported and included in the Coating Technical File (CTF) (see subsection 3.4).

3.3 When considering the Standard provided in section 4, the following is to be taken into account:

.1 it is essential that specifications, procedures and the various different steps in the coating application process (including, but not limited to, surface preparation) are strictly applied by the shipbuilder in order to prevent premature decay and/or deterioration of the coating system;

.2 the coating performance can be improved by adopting measures at the ship design stage such as reducing scallops, using rolled profiles, avoiding complex geometric configurations and ensuring that the structural configuration permits easy access for tools and to facilitate cleaning, drainage and drying of the space to be coated; and

.3 the coating performance standard provided in this instrument is based on the experience of manufacturers, shipyards and ship operators; it is not intended to exclude suitable alternative coating systems, providing a performance at least equivalent to that specified in this Standard is demonstrated. Acceptance criteria for alternative systems are provided in section 8.

3.4 Coating Technical File

3.4.1 Specifications of the cargo oil tank coating system applied, records of the shipyard's and shipowner's coating work, detailed criteria for coating selection, job specifications, inspection, maintenance and repair shall be included in the Coating Technical File required by resolution MSC.215(82).

3.4.2 ***New construction stage***

The Coating Technical File shall contain at least the following items relating to this Standard and shall be delivered by the shipyard at new ship construction stage:

.1 copy of Statement of Compliance or Type Approval Certificate;

.2 copy of Technical Data Sheet, including:

.2.1 product name and identification mark and/or number;

.2.2 materials, components and composition of the coating system, colours;

.2.3 minimum and maximum dry film thickness;

.2.4 application methods, tools and/or machines;

.2.5 condition of surface to be coated (de-rusting grade, cleanness, profile, etc.); and

.2.6 environmental limitations (temperature and humidity);

.3 shipyard work records of coating application, including:

.3.1 applied actual areas (in square metres) of coating in each cargo oil tank;

.3.2 applied coating system;

.3.3 time of coating, thickness, number of layers, etc.;

.3.4 ambient conditions during coating; and

.3.5 details of surface preparation;

.4 procedures for inspection and repair of coating system during ship construction;

.5 coating log issued by the coating inspector – stating that the coating was applied in accordance with the specifications to the satisfaction of the coating supplier representative and specifying deviations from the specifications (see annex 2);

.6 shipyard's verified inspection report, including:

.6.1 completion date of inspection;

.6.2 result of inspection;

.6.3 remarks (if given); and

.6.4 inspector signature; and

.7 procedures for in-service maintenance and repair of coating systems.

3.4.3 ***In-service maintenance and repair***

In-service maintenance and repair activities shall be recorded in the Coating Technical File in accordance with the relevant section of the Guidelines for coating maintenance and repair.

3.4.4 The Coating Technical File shall be kept on board and maintained throughout the life of the ship.

3.5 Health and safety

The shipyard is responsible for implementation of national regulations to ensure the health and safety of individuals and to minimize the risk of fire and explosion.

4 COATING STANDARD

4.1 Performance standard

This Standard is based on specifications and requirements to provide a target useful coating life of 15 years, which is considered to be the time period, from initial application, over which the coating system is intended to remain in "GOOD" condition. The actual useful life will vary, depending on numerous variables including actual conditions encountered in service.

4.2 Standard application

Protective coatings for cargo oil tanks applied during the construction of new crude oil tankers shall at least comply with the requirements in this Standard.

4.3 Coating system

An epoxy-based system meeting test and physical properties (table 1.1.3) shall be documented, and a Type Approval Certificate or Statement of Compliance shall be provided.

4.4 Area of application

The following areas are the minimum areas that shall be protected according to this Standard:

.1 Deckhead with complete internal structure, including brackets connecting to longitudinal and transverse bulkheads. In tanks with ring frame girder construction the underdeck transverse framing to be coated down to level of the first tripping bracket below the upper faceplate.

.2 Longitudinal and transverse bulkheads to be coated to the uppermost means of access level. The uppermost means of access and its supporting brackets to be fully coated.

.3 On cargo tank bulkheads without an uppermost means of access the coating to extend to 10% of the tanks height at centreline but need not extend more than 3 m down from the deck.

.4 Flat inner bottom and all structure to height of 0.3 m above inner bottom to be coated.

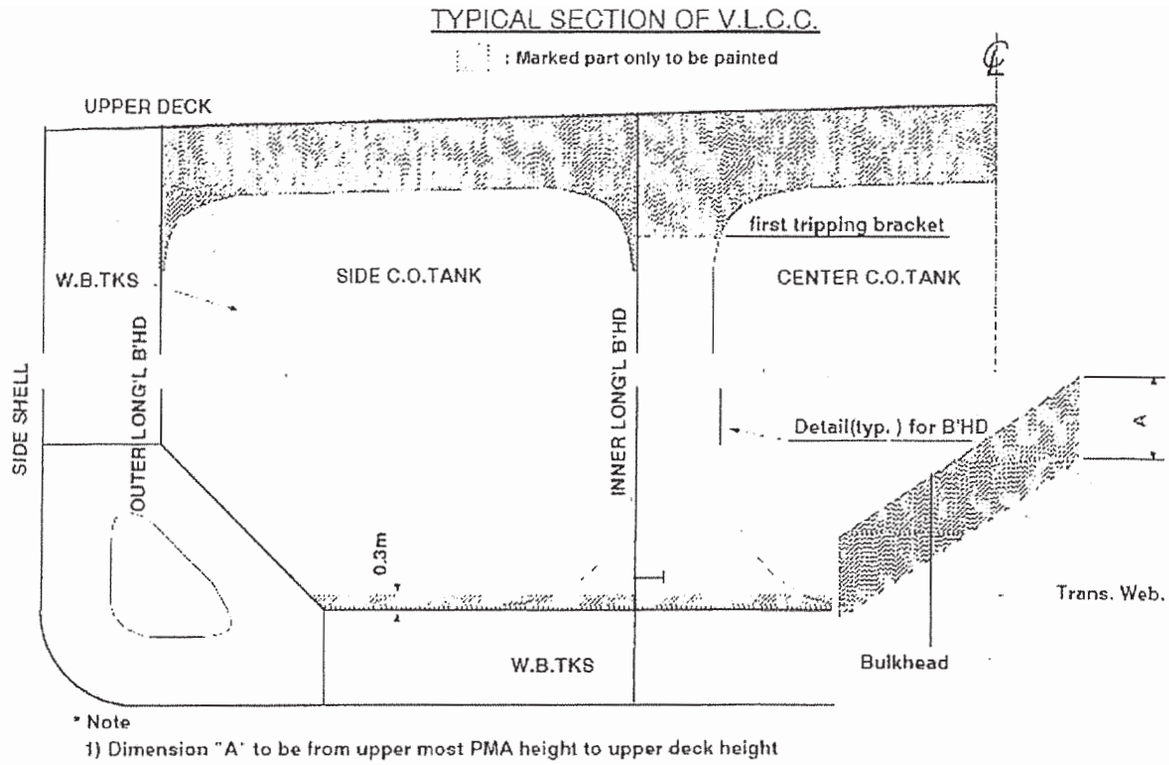


Figure 1

4.5 Special application

4.5.1 This Standard covers protective coating requirements for steel structure within cargo oil tanks. It is noted that there are other independent items that are fitted within the cargo oil tanks and to which coatings are applied to provide protection against corrosion.

4.5.2 It is recommended that this Standard is applied, to the extent practicable, to those portions of means of access provided for inspection within the areas specified in paragraph 4.4 that are not integral to the ship structure, such as rails, independent platforms, ladders, etc. Other equivalent methods of providing corrosion protection for non-integral items may also be used, provided they do not impair the performance of the coatings of the surrounding structure. Access arrangements that are integral to the ship structure, such as stiffener depths for walkways, stringers, etc., are to fully comply with this Standard when located within the coated areas.

4.5.3 It is also recommended that supports for piping, measuring devices, etc., be coated as a minimum in accordance with the non-integral items indicated in paragraph 4.5.2.

4.6 Basic coating requirements

4.6.1 The requirements for protective coating systems to be applied at ship construction for the cargo oil tanks of crude oil tankers meeting the performance standard specified in paragraph 4.1 are listed in table 1.

4.6.2 Coating manufacturers shall provide a specification of the protective coating system to satisfy the requirements of table 1 and the operating environment.

4.6.3 The Administration shall verify the Technical Data Sheet and Statement of Compliance or Type Approval Certificate for the protective coating system.

4.6.4 The shipyard shall apply the protective coating in accordance with the verified Technical Data Sheet and its own verified application procedures.

4.7 The referenced standards listed in this Standard are acceptable to the Organization. Test equipment, test methods, preparation methods and/or test results shall conform to performance standards not inferior to those acceptable to the Organization.

Table 1 – Basic coating system requirements for cargo oil tanks of crude oil tankers

	Characteristic	Requirement
1	**Design of coating system**	
.1	Selection of the coating system	The selection of the coating system shall be considered by the parties involved with respect to the service conditions and planned maintenance. The following aspects, among other things shall be considered: .1 location of space relative to heated surfaces; .2 frequency of cargo operations; .3 required surface conditions; .4 required surface cleanliness and dryness; .5 supplementary cathodic protections, if any (where coating is supplemented by cathodic protection, the coating shall be compatible with the cathodic protection system); .6 permeability of the coating and resistance to inert gas and acids; and .7 appropriate mechanical properties (flexibility, impact resistance). The coating manufacturer shall supply products with documented satisfactory performance records and technical data sheets. The manufacturer shall also be capable of rendering adequate technical assistance. Performance records, technical data sheet and any manufacturer's technical assistance provided shall be recorded in the Coating Technical File. Coatings for application underneath sun-heated decks or on bulkheads forming boundaries of heated spaces shall be able to withstand repeated heating and/or cooling without becoming brittle.
.2	Coating type	Epoxy-based systems. Other coating systems with performance according to the test procedure in the annex. A multi-coat system with each coat of a contrasting colour is recommended. The top coat shall be of a light colour to facilitate in-service inspection. Consideration should be given to the use of enhanced coatings in way of suction bellmouths and heating coil downcomers. Consideration should be given to the use of supplementary cathodic protection where there may be galvanic issues.

	Characteristic	Requirement
.3	Coating test	Epoxy-based systems tested prior to the date of entry into force of this Standard in a laboratory by a method corresponding to the test procedure in annex 1 or equivalent, which as a minimum meets the requirements for rusting and blistering, or which have documented field exposure for 5 years with a final coating condition of not less than "GOOD", may be accepted. For epoxy-based systems approved on or after entry into force of this Standard, testing according to the procedure in annex 1, or equivalent, is required.
.4	Job specification	There shall be a minimum of two stripe coats and two spray coats, except that the second stripe coat, by way of welded seams only, may be reduced in scope where it is proven that the NDFT can be met by the coats applied in order to avoid unnecessary over thickness. Any reduction in scope of the second stripe coat shall be fully detailed in the CTF. Stripe coat shall be applied by brush or roller. Roller shall be used for scallops, ratholes, etc., only. Each main coating layer shall be appropriately cured before application of the next coat, in accordance with the coating manufacturer's recommendations. Job specifications shall include the dry-to-recoat times and walk-on time given by the manufacturer. Surface contaminants such as rust, grease, dust, salt, oil, etc., shall be removed prior to painting. The method to be according to the paint manufacturer's recommendations. Abrasive inclusions embedded in the coating shall be removed.
.5	NDFT (nominal total dry film thickness)	NDFT 320 μm with 90/10 rule for epoxy-based systems; other systems to the coating manufacturer's specifications. Maximum total dry film thickness according to the manufacturer's detailed specifications. Care shall be taken to avoid increasing the DFT in an exaggerated way. Wet film thickness shall be regularly checked during application. Thinners shall be limited to those types and quantities recommended by the manufacturer.
2	**Primary surface preparation**	

	Characteristic	Requirement
.1	Blasting and profile	Sa 2½; with profiles between 30-75 µm. Blasting shall not be carried out when: .1 the relative humidity is above 85%; or .2 the surface temperature of steel is less than 3°C above the dew point. Checking of the steel surface cleanliness and roughness profile shall be carried out at the end of the surface preparation and before the application of the primer, and in accordance with the coating manufacturer's recommendations.
.2	Water soluble salt limit equivalent to NaCl	≤ 50 mg/m^2 of sodium chloride.
.3	Shop primer	Zinc containing inhibitor free zinc silicate based or equivalent. Compatibility with main coating system shall be confirmed by the coating manufacturer.
3	**Secondary surface preparation**	
.1	Steel condition	The steel surface to be coated shall be prepared so that the coating selected can achieve an even distribution at the required NDFT and have an adequate adhesion by removing sharp edges, grinding weld beads and removing weld spatter and any other surface contaminant to grade P2. Edges to be treated to a rounded radius of minimum 2 mm, or subjected to three pass grinding or at least equivalent process before painting.
.2	Surface treatment	Sa 2½ on damaged shop primer and welds. All surfaces to be coated shall be blasted to Sa 2, removing at least 70% of intact shop primer, which has not passed a pre-qualification certified by test procedures in table 1.3. If the complete coating system comprising epoxy-based main coating and shop primer has passed a pre-qualification certified by test procedures in table 1.3 intact shop primer may be retained provided the same epoxy-based system is used. Retained shop primer shall be cleaned by sweep blasting, high pressure water washing or equivalent method. If a zinc silicate shop primer has passed the pre-qualification test of table 1.3 as part of an epoxy coating system, it may be used in combination with other epoxy coatings certified under table 1.3, provided that the compatibility has been confirmed by the manufacturer by the test with reference to the immersion test of annex 1 or in accordance with the Performance standard for protective coatings for dedicated seawater ballast tanks in all types of ships and double-side skin spaces of bulk carriers (resolution MSC.215(82)).

	Characteristic	Requirement
.3	Surface treatment after erection	Erection joints St 3 or better or Sa 2½ where practicable. *For inner bottom*: - Damages up to 20% of the area to be coated to be treated to minimum St 3. - Contiguous damages over 25 m^2 or over 20% of the area to be coated, Sa 2½ shall be applied. *For underdeck*: - Damages up to 3% of area to be coated to be treated to minimum St 3. - Contiguous damages over 25 m^2 or over 3% of the area to be coated, Sa 2½ shall be applied. Coating in overlap to be feathered.
.4	Profile requirements	In case of full or partial blasting 30-75 μm, otherwise as recommended by the coating manufacturer.
.5	Dust	Dust quantity rating "1" for dust size class "3", "4" or "5". Lower dust size classes to be removed if visible on the surface to be coated without magnification.
.6	Water soluble salts limit equivalent to NaCl after blasting/ grinding	≤ 50 mg/m^2 of sodium chloride.
.7	Contamination	No oil contamination. Paint manufacturer's recommendations should be followed regarding any other contamination between coats.
4	**Miscellaneous**	
.1	Ventilation	Adequate ventilation is necessary for the proper drying and curing of coating. Ventilation should be maintained throughout the application process and for a period after application is completed, as recommended by the coating manufacturer.

	Characteristic	Requirement
.2	Environmental conditions	Coating shall be applied under controlled humidity and surface conditions, in accordance with the manufacturer's specifications. In addition, coating shall not be applied when: .1 the relative humidity is above 85%; or .2 the surface temperature is less than 3°C above the dew point; or .3 any other requirements of the paint manufacturer are not being met.
.3	Testing of coating[1]	Destructive testing should be avoided. Sample dry film thickness shall be measured after each coat for quality control purposes and the total dry film thickness shall be confirmed after completion of the final coat, using appropriate thickness gauges.
.4	Repair	Any defective areas, e.g., pinholes, bubbles, voids, etc., shall be marked up and appropriate repairs effected. All such repairs shall be re-checked and documented.

5 COATING SYSTEM APPROVAL

Results from prequalification tests (table 1, paragraph 1.3) of the coating system shall be documented, and a Statement of Compliance or Type Approval Certificate shall be issued if found satisfactory by a third party, independent of the coating manufacturer.

6 COATING INSPECTION REQUIREMENTS

6.1 General

6.1.1 To ensure compliance with this Standard, the following shall be carried out by qualified coating inspectors certified to NACE Coating Inspector Level 2, FROSIO Inspector Level III or equivalent as verified by the Administration.

6.1.2 Coating inspectors shall inspect surface preparation and coating application during the coating process by carrying out, as a minimum, those inspection items identified in subsection 6.2 to ensure compliance with this Standard. Emphasis shall be placed on initiation of each stage of surface preparation and coatings application as improper work is extremely difficult to correct later in the coating progress. Representative structural members shall be non-destructively examined for coating thickness. The inspector shall verify that appropriate collective measures have been carried out.

6.1.3 Results from the inspection shall be recorded by the inspector and shall be included in the CTF (see annex 2).

6.2 Inspection items

Construction stage		Inspection items
Primary surface preparation	1	The surface temperature of steel, the relative humidity and the dew point shall be measured and recorded before the blasting process starts and at times of sudden changes in weather.
	2	The surface of steel plates shall be tested for soluble salt checked for oil, grease and other contamination.
	3	The cleanliness of the steel surface shall be monitored in the shop primer application process.
	4	The shop primer material shall be confirmed to meet the requirements of 2.3 of table 1. Verified by manufacturer.
Thickness		If compatibility with the main coating system has been declared, then the thickness and curing of the zinc silicate shop primer to be confirmed to conform to the specified values.
Block assembly	1	After completing construction of the block and before secondary surface preparation starts, a visual inspection for steel surface treatment including edge treatment shall be carried out. Any oil, grease or other visible contamination to be removed.

Construction stage		Inspection items
	2	After blasting/grinding/cleaning and prior to coating, a visual inspection of the prepared surface shall be carried out. On completion of blasting and cleaning and prior to the application of the first coat of the system, the steel surface shall be tested for levels of remaining soluble salts in at least one location per block.
	3	The surface temperature, the relative humidity and the dew point shall be monitored and recorded during the coating application and curing.
	4	Inspection to be performed of the steps in the coating application process mentioned in table 1.
	5	DFT measurements shall be taken to prove that the coating has been applied to the thickness as specified.
Erection	1	Visual inspection for steel surface condition, surface preparation and verification of conformance to other requirements in table 1, and the agreed specification to be performed.
	2	The surface temperature, the relative humidity and the dew point shall be measured and recorded before coating starts and regularly during the coating process.
	3	Inspection to be performed of the steps in the coating application process mentioned in table 1.

7 COATING VERIFICATION REQUIREMENTS

The following shall be carried out by the Administration prior to reviewing the Coating Technical File for the ship subject to this Standard:

.1 check that the Technical Data Sheet and Statement of Compliance or Type Approval Certificate comply with the Standard;

.2 check that the coating identification on representative containers is consistent with the coating identified in the Technical Data Sheet and Statement of Compliance or Type Approval Certificate;

.3 check that the inspector is qualified in accordance with the qualification standards in paragraph 6.1.1;

.4 check that the inspector's reports of surface preparation and the coating's application indicate compliance with the manufacturer's Technical Data Sheet and Statement of Compliance or Type Approval Certificate; and

.5 monitor implementation of the coating inspection requirements.

8 ALTERNATIVE COATING SYSTEMS

8.1 All systems that are not an epoxy-based system applied according to table 1 of this Standard are defined as alternative systems.

8.2 This Standard is based on recognized and commonly used coating systems. It is not meant to exclude other, alternative, systems with proven equivalent performance, for example non-epoxy-based systems.

8.3 Acceptance of alternative systems shall be subject to documented evidence that they ensure a corrosion prevention performance at least equivalent to that indicated in this Standard, by either:

.1 testing according to this standard; or

.2 five years' field exposure with documentary evidence of continuous trading with crude oil cargoes. The coating condition shall not be less than "GOOD" after five years.

ANNEX 1

TEST PROCEDURES FOR COATING QUALIFICATION FOR CARGO OIL TANKS OF CRUDE OIL TANKERS

1 Scope

This annex provides details of the test procedures for cargo tank coatings of crude oil carriers as referred to in paragraphs 4.6 and 8.3 of this Standard. Both the tank-top and deck-head should be applied with coating systems that have passed the full test protocol as described in this standard.

2 Definitions

Coating specification means the specification of coating systems which include the type of coating system, steel preparation, surface preparation, surface cleanliness, environmental conditions, application procedure, inspection and acceptance criteria.

3 Background

3.1 It is acknowledged that a crude oil cargo tank on board a ship is exposed to two very different environmental conditions.

3.2 When the cargo tank is loaded there are three distinct vertical zones:

.1 Lowest part, and horizontal parts on stringer decks, etc., exposed to water that can be acidic and sludge that can contain anaerobic bacteria.

.2 Mid part where the oil cargo is in contact with all immersed steel.

.3 Vapour space where the air is saturated with various vapours from the loaded cargo tank such as H_2S, CO_2, SO_2, water vapour and other gases and compounds from the inert gas system.

3.3 When the tank is in a ballast condition:

.1 Lowest part and horizontal parts on stringer decks, etc., exposed to cargo residues and water that can be acidic and sludge that can contain anaerobic bacteria.

.2 Tank space where the air contains various vapours from the crude oil residues such as H_2S, CO_2, SO_2, water vapour and other gases and compounds from the inert gas system.

4 Testing

The tests herein are designed to simulate, as far as practicable, the two main environmental conditions to which the crude oil cargo tank coating will be exposed. The coating shall be validated by the following tests: the test procedures shall comply with Appendix 1 (Gas-tight chamber simulating the vapour phase of the loaded tank) and Appendix 2 (Immersion test simulating the loaded condition of the crude oil tank).

5 Test gas composition

The test gas is based on the composition of the vapour phase in crude oil tanks, except that the hydrocarbon components are not included as these have no detrimental effect on epoxy coatings such as those used in cargo oil tanks.

TEST GAS COMPOSITION

N_2	83 ± 2 per cent by volume of dry gas
CO_2	13 ± 2 per cent by volume of dry gas
O_2	4 ± 1 per cent by volume of dry gas
SO_2	300 ± 20 ppm
H_2S	200 ± 20 ppm

6 Test liquid

Crude oil is a complex chemical material which is not stable over time when stocked. Crude oils can also vary in composition over time. In addition, the use of crude oil has proven to create practical and HSE barriers for the involved testing institutes. To overcome this, a model immersion liquid is used to simulate crude oil. The formulation of this crude oil model system is given below:

.1 start with distillate Marine Fuel, DMA Grade density at 15°C: maximum 890 kg/m^3, viscosity of maximum 6 mm^2/s at 40°C;

.2 add naphthenic acid up to an acid number of 2.5 ± 0.1 mg KOH/g;

.3 add benzene/ toluene (1:1 ratio) up to a total of 8.0 ± 0.2% w/w of the DMA;

.4 add artificial seawater up to a total of 5.0 ± 0.2% w/w to the mixture;

.5 add H_2S dissolved in a liquid carrier (in order to get 5 ± 1 ppm w/w H_2S in the total test liquid);

.6 thoroughly mix the above constituents immediately prior to use; and

.7 once the mixture is completed, it should be tested to confirm the mixture is compliant with the test mixture concentrations.

Note: To prevent the risk of H_2S release into the test facility, it is recommended to use a stock solution for steps 1 to 4, then fill the test containers and complete the test solution with steps 5 and 6.

APPENDIX 1

GAS-TIGHT CABINET TEST

1 Test condition

The vapour test shall be carried out in a gas-tight cabinet. The dimensions and design of the air tight gas cabinet are not critical, provided the requirements of subparagraphs .6 to .10 below are met. The test gas is designed to simulate the actual crude oil cargo tank environment in ballast condition as well as the vapour conditions of the loaded tank.

.1 The exposure time is 90 days.

.2 Testing shall be carried out using duplicate panels; a third panel shall be prepared and stored at ambient conditions to act as a reference panel during final evaluation of the test panels.

.3 The size of each test panel is 150 mm x 100 mm x 3 mm.

.4 The panels shall be treated according to the Performance standard table 1, 1.2, and the coating system applied according to table 1, 1.4 and 1.5.

.5 The zinc silicate shop primer, when used, shall be weathered for at least 2 months and cleaned by low pressure fresh water washing. The exact method of shop primer preparation before being over coated shall be reported, and the judgement issued for that specific system. The reverse side and edges of the test piece shall be coated appropriately, in order not to influence the test results.

.6 Inside the gas-tight cabinet a trough shall be present. This trough shall be filled with 2 ± 0.2 / of water. The water in the trough shall be drained and renewed prior to each time the test gas is refreshed.

.7 The vapour spaces inside the gas-tight cabinet shall be filled with a mixture of test gas as per item 5 of the Standard. The cabinet atmosphere shall be maintained over the period of the test. When the gas is outside the scope of the test method, it shall be refreshed. The monitoring frequency and method, and the date and time for refreshing the test gas, shall be in the test report.

.8 The atmosphere in the test cabinet shall at all times be 95 ± 5% relative humidity.

.9 The temperature of the test atmosphere shall be 60 ± 3°C.

.10 A stand for the test panels shall be made of a suitable inert material to hold the panels vertically spaced at least 20 mm between panels. The stand shall be positioned in the cabinet to ensure the lower edge of the panels is at least 200 mm above the height of the water and at least 100 mm from the walls of the cabinet. If two shelves are in the cabinet, care shall be taken to ensure solution does not drip on to the lower panels.

2 Test results

2.1 Prior to testing, the following measured data of each coating composing the coating system, including the zinc silicate shop primer when used under the coating system, shall be reported:

.1 infrared (IR) identification of the base and hardener components of the coating;

.2 specific gravity of the base and hardener components of the paint; and

.3 mean dry film thickness (DFT) (by using a template).

2.2 After completion of the test, the panels shall be removed from the cabinet and rinsed with warm tap water. The panels shall be dried by blotting with absorbent paper and then evaluated for rust and blistering within 24 h of the end of the test.

2.3 After testing, the following measured data shall be reported: blisters and rust.

3 Acceptance criteria

3.1 The test results based on section 2 shall satisfy the following criteria, the poorest performing of the duplicate test panels shall be used in the report:

Item	Acceptance criteria for epoxy-based systems	Acceptance criteria for alternative systems
Blisters on panel	No blisters	No blisters
Rust on panel	Ri 0 (0%)	Ri 0 (0%)

3.2 When evaluating test panels, blistering or rusting within 5 mm of the panel edge shall be ignored.

4 Test report

The test report shall include the following information:

.1 coating manufacturers' name and manufacturing site;

.2 dates of test;

.3 product name/identification of each coat and, where applicable, zinc silicate shop primer;

.4 batch numbers of each component of each product;

.5 details of surface preparation of steel panels, before shop primer application, and treatment of the shop primer before over coating where relevant and at a minimum including the following:

.5.1 surface treatment, or treatment of weathered shop primer, and any other important information on treatment influencing the performance; and

.5.2 water soluble salt level measured on the steel prior to application of the shop primer;

.6 details of coating system, including the following:

.6.1 zinc silicate shop primer if relevant, its secondary surface pre-treatment and condition under which applied, weathering period;

.6.2 number of coats, including the shop primer, and thickness of each;

.6.3 mean dry film thickness (DFT) prior to testing;

.6.4 thinner if used;

.6.5 humidity;

.6.6 air temperature; and

.6.7 steel temperature;

.7 details of schedule for refreshing the test gas;

.8 test results according to section 2; and

.9 results according to section 3.

APPENDIX 2

IMMERSION TEST

1 Test condition

The immersion test has been developed to simulate the conditions in a crude oil tank in loaded condition.

.1 The exposure time is 180 days.

.2 The test liquid shall comply with section 6 of annex 1 of the Standard.

.3 The test liquid shall be added to a container with an inside flat bottom until a column of the test liquid of height of 400 mm is reached, resulting in an aqueous phase of 20 mm. Any other alternative test set-up, using an identical test liquid, which will also result in the immersion of the test panel in 20 mm of the aqueous phase, is also accepted. This can be achieved by using, for instance, inert marbles.

.4 The temperature of the test liquid should be 60 ± 2°C and should be uniform and maintained constant with recognized methods such as water or oil bath or air circulation oven capable of keeping the immersion liquid within the required temperature range.

.5 Test panels shall be positioned vertically and fully immersed during the test.

.6 Testing shall be carried out using duplicate panels.

.7 Inert spacers which do not cover the test area shall be used to separate test panels.

.8 The size of each test panel is 150 mm x 100 mm x 3 mm.

.9 The panels shall be treated according to table 1, 1.2, and the coating system applied according to table 1, 1.4 and 1.5.

.10 The zinc silicate shop primer, when used, shall be weathered for at least 2 months and cleaned by low pressure fresh water washing. The exact method of shop primer preparation before being over coated shall be reported, and the judgement issued for that specific system. The reverse side, and edges, of the test piece shall be coated appropriately, in order not to influence the test results.

.11 After the full immersion test period is completed the panels shall be removed from the test liquid and wiped with dry clean cloth before evaluation of the panels.

.12 Evaluation of the test panels shall be done within 24 h after completion of the test.

2 Test results

2.1 Prior to testing, the following measured data of each coating composing the coating system, including the zinc silicate shop primer when used under the coating system, shall be reported:

.1 infrared (IR) identification of the base and hardener components of the coating;

.2 specific gravity of the base and hardener components of the paint; and

.3 mean dry film thickness (DFT) (by using a template).

2.2 After testing, the following measured data shall be reported: blisters and rust.

3 Acceptance criteria

3.1 The test results based on section 2 shall satisfy the following criteria, the poorest performing of the duplicate test panels shall be used in the report:

Item	Acceptance criteria for epoxy-based systems	Acceptance criteria for alternative systems
Blisters on panel	No blisters	No blisters
Rust on panel	Ri 0 (0%)	Ri 0 (0%)

3.2 When evaluating test panels, blistering or rusting within 5 mm of the panel edge should be ignored.

4 Test report

The test report shall include the following information:

.1 coating manufacturers' name and manufacturing site;

.2 dates of test;

.3 product name/identification of each coat and, where applicable, zinc silicate shop primer;

.4 batch numbers of each component of each product;

.5 details of surface preparation of steel panels, before shop primer application, and treatment of the shop primer before over coating where relevant and at a minimum including the following:

.5.1 surface treatment, or treatment of weathered shop primer, and any other important information on treatment influencing the performance; and

.5.2 water soluble salt level measured on the steel prior to application of the shop primer;

.6 details of coating system, including the following:

.6.1 zinc silicate shop primer if relevant, its secondary surface pre-treatment and condition under which applied, weathering period;

.6.2 number of coats, including the shop primer, and thickness of each;

.6.3 mean dry film thickness (DFT) prior to testing;

.6.4 thinner if used;

.6.5 humidity ;

.6.6 air temperature; and

.6.7 steel temperature;

.7 test results according to section 2; and

.8 results according to section 3.

APPENDIX 3

PRECAUTIONS REGARDING THE USE OF DANGEROUS MATERIALS

1 The test methods involve the use of materials that may be hazardous to health as follows:

.1 Sulphur Dioxide: Corrosive when wet, toxic if inhaled, causes burns, and is an irritant to the eyes and respiratory system.

.2 Hydrogen Sulphide: Highly flammable (Flash point of -82°C), can form an explosive mixture with air, corrosive when wet, causes burns, has to be kept away from sources of ignition, irritant and asphyxiant, LTEL 5 ppm, STEL 10 ppm, higher concentrations can be fatal and have no odour. Repeated exposure to low concentrations can result in the sense of smell for the gas being diminished.

.3 Benzene: Highly flammable (Flash point of -11°C), can form an explosive mixture with air, toxic, carcinogenic, acute health risk.

.4 Toluene: Highly flammable (Flash point of 4°C), can form an explosive mixture with air, irritant, acute health risk, reprotoxin.

2 Special test apparatus and precautions may be required depending on the regulations in force in the country where the tests are carried out.

3 Although some countries have no specific requirements preventing either of the tests being carried out, it shall still be required that:

.1 a risk assessment of the working conditions is carried out;

.2 during the test period, the system shall be enclosed; and

.3 the environment shall be controlled, particularly at the start and end of the tests, suitable air exhaust shall be available and personal protective equipment shall be worn.

ANNEX 2

EXAMPLE OF DAILY LOG AND NON-CONFORMITY REPORT

DAILY LOG Sheet No:

Ship:	Tank/Hold No:	Database:
Part of structure:		
SURFACE PREPARATION		
Method:	Area (m^2):	
Abrasive:	Grain size:	
Surface temperature:	Air temperature:	
Relative humidity (max):	Dew point:	
Standard achieved:		
Rounding of edges:		
Comments:		
Job No.:	Date:	Signature:

COATING APPLICATION:

Method:

Coat No.	System	Batch No.	Date	Air temp.	Surf temp.	RH%	Dew point	DFT* Meas.	Specified

* Measured minimum and maximum DFT. DFT readings to be attached to daily log.

Comments:		
Job No:	Date:	Signature:

NON-CONFORMITY REPORT Sheet No:

Ship:	Tank/Hold No:	Database:
Part of structure:		
DESCRIPTION OF THE INSPECTION FINDINGS TO BE CORRECTED		
Description of findings:		
Reference document (daily log):		
Action taken:		
Job No.:	Date:	Signature:

第 46/2015 號行政長官公告

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

國際海事組織海上安全委員會於二零零八年十二月四日透過第MSC.271（85）號決議通過了《2000年國際高速船安全規則》（2000年HSC規則）的修正案，該修正案自二零一一年一月一日起適用於澳門特別行政區；

基於此，行政長官根據澳門特別行政區第3/1999號法律第六條第一款的規定，命令公佈包含上指修正案的第MSC.271（85）號決議的中文及英文文本。

二零一五年五月四日發佈。

行政長官　崔世安

Aviso do Chefe do Executivo n.º 46/2015

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

Considerando igualmente que, em 4 de Dezembro de 2008, o Comité de Segurança Marítima da Organização Marítima Internacional, através da resolução MSC.271(85), adoptou as emendas ao Código Internacional de Segurança para as Embarcações de Alta Velocidade, 2000 (Código HSC 2000), e que tais emendas são aplicáveis na Região Administrativa Especial de Macau desde 1 de Janeiro de 2011;

O Chefe do Executivo manda publicar, nos termos do n.º 1 do artigo 6.º da Lei n.º 3/1999 da Região Administrativa Especial de Macau, a resolução MSC. 271(85), que contém as referidas emendas, nos seus textos em línguas chinesa e inglesa.

Promulgado em 4 de Maio de 2015.

O Chefe do Executivo, *Chui Sai On*.

第 MSC.271（85）號決議

（2008 年 12 月 4 日通過）

通過對《2000 年國際高速船安全規則》

（2000 年 HSC 規則）的修正案

海上安全委員會，

憶及《國際海事組織公約》關於本委員會職能的第 28（b）條，

注意到海上安全委員會以第 MSC.97（73）號決議通過了《2000 年國際高速船安全規則》（下文稱“2000 年高速船規則”），該規則根據《1974 年國際海上人命安全公約》（《安全公約》）（下文稱“公約”）第 X 章成為強制性要求，

還注意到《公約》關於《2000 年高速船規則》的修正程序的第 VIII（b）條和第 X/1.2 條，

在其第八十五屆會議上，**審議了**按照《公約》第 VIII（b）（i）條建議並散發的《2000 年高速船規則》的修正案，

1. 按照《公約》第 VIII（b）（iv）條，**通過**《2000 年高速船規則》的修正案，其正文載於本決議的附件中；

2. 按照《公約》第 VIII（b）（vi）（2）（bb）條，**決定**上述修正案將於 2010 年 7 月 1 日視為已被接受，除非在此日期前有超過三分之一的《公約》締約國政府或其合計商船總噸位不少於世界商船總噸位 50%的締約國政府表示反對該修正案；

3. **請**各締約國政府注意：按照《公約》第 VIII（b）（vii）（2）條，該修正案將在按上述第 2 段被接受後於 2011 年 1 月 1 日生效；

4. **要求**秘書長依照《公約》第 VIII（b）（v）條，將本決議及載於附件的修正案文本的核證無誤副本送發《公約》的所有締約國政府；

5. **進一步要求**秘書長將本決議及其附件的副本送發非《公約》締約國政府的本組織會員。

附 件

《2000 年國際高速船安全規則》

（2000 年 HSC 規則）的修正案

第 7 章

消防安全

1 在第 7.17.1 款的末尾增加以下新的一句：

“在 2002 年 7 月 1 日或以後但在 2011 年 1 月 1 日之前建造的、具有擬裝運包裝危險貨物的貨物處所的船舶，除按照表 7.17-1 和表 7.17-3 裝運列為第 6.2 類和第 7 類的危險貨物及有限數量內和免除數量內的危險貨物外，須在不遲於 2011 年 1 月 1 日或其後的第一次換新檢驗之日符合第 7.13.3 款的規定。”

2 在第 7.17.1 款中，在“只有在載運有限數量”之後增加以下文字：

“和免除數量”。

3 將表 7.17-1 的現有註 1 改為以下文字：

“[1] 對於不適用於封閉式貨運集裝箱的第 4 類和第 5.1 類固體。對於裝在封閉式貨運集裝箱內的第 2、3、6.1 和 8 類，通風率可減至不少於每小時換氣兩次。對於裝在封閉式貨運集裝箱內的第 4 類和第 5.1 類液體，通風率可減至不少於每小時換氣兩次。就本要求而言，封閉式可移動罐櫃即是封閉式集裝箱。”

4 以下列表格取代現有的表 7.17-3：

“表 7.17-3

將第 7.17.3 節的要求適用於除固體散裝危險貨物以外的各類危險貨物

節 \ 類別	1.1 至 1.6[9]	1.4S	2.1	2.2	2.3 *易燃的*[17]	2.3 *非易燃的*	3 FP[12] < 23℃	3 FP[12] ≥ 23℃ to ≤ 60℃	4.1	4.2	4.3 *液體*[18]	4.3 *固體*	5.1[10]	5.2[13]	6.1 液體 FP[12] < 23℃	6.1 液體 FP[12] ≥ 23℃ to ≤ 60℃	6.1 *液體*	6.1 固體	8 液體 FP[12] < 23℃	8 液體 FP[12] ≥ 23℃ to ≤ 60℃	8 *液體*	8 固體	9
7.17.3.1.1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
7.17.3.1.2	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	-
7.17.3.1.3	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7.17.3.1.4	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7.17.3.2	X	-	X	-	X	-	X	-	-	-	X[15]	-	-	-	X	-	-	-	X	-	-	-	X[14]
7.17.3.3	X	X	X	X	-	X	X	X	X	X	X	X	X	-	X	X	X	X	X	X	X	X	-
7.17.3.4.1	-	-	X	-	-	X	X	-	X[8]	X[8]	X	X	X[8]	-	X	X	-	X[8]	X	X	-	-	X[8]
7.17.3.4.2	-	-	X	-	-	-	X	-	-	-	-	-	-	-	X	-	-	-	X	-	-	-	X[14]
7.17.3.5	-	-	-	-	-	-	X	-	-	-	-	-	-	-	X	X	X	-	X	X[16]	X[16]	-	-
7.17.3.6	-	-	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X[11]
7.17.3.7	-	-	-	-	-	-	X	X	X	X	X	X	X	-	X	X	-	-	X	X	-	-	-
7.17.3.8	X[9]	X	X	X	X	X	X	X	X	X	X	X	X[10]	X	X	X	X	X	X	X	X	X	X
7.17.3.9	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
7.17.3.10	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

8 當《國際危規》要求“機械通風處所”時。

9 在所有情況下，裝載於離機器處所隔艙壁橫向 3m 之外。

10 參閱《國際危規》。

11 與所裝運貨物相適應。

12 FP 係指閃點。

13 按照《國際危規》的規定，禁止將第 5.2 類危險品積載於甲板之下或圍閉的滾裝處所內。

14 僅適用於《國際危規》所列的會散出易燃蒸氣的危險貨物。

15 僅適用於《國際危規》所列的閃點低於 23℃ 的危險貨物。

16 僅適用於具有第 6.1 類次危險的危險貨物。

17 按照《國際危規》的規定，禁止在甲板下或封閉的滾裝貨物處所積載具有第 2.1 類次危險的第 2.3 類貨物。

18 按照《國際危規》的規定，禁止在甲板下或封閉的滾裝貨物處所積載閃點低於 23℃ 的第 4.3 類液體。”

RESOLUTION MSC.271(85)
(adopted on 4 December 2008)

ADOPTION OF AMENDMENTS TO THE INTERNATIONAL CODE OF SAFETY FOR HIGH-SPEED CRAFT, 2000 (2000 HSC CODE)

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

NOTING resolution MSC.97(73), by which it adopted the International Code of Safety for High-Speed Craft, 2000 (hereinafter referred to as "the 2000 HSC Code"), which has become mandatory under chapter X of the International Convention for the Safety of Life at Sea (SOLAS), 1974 (hereinafter referred to as "the Convention"),

NOTING ALSO article VIII(b) and regulation X/1.2 of the Convention concerning the procedure for amending the 2000 HSC Code,

HAVING CONSIDERED, at its eighty-fifth session, amendments to the 2000 HSC Code proposed and circulated in accordance with article VIII(b)(i) of the Convention,

1. ADOPTS, in accordance with article VIII(b)(iv) of the Convention, amendments to the 2000 HSC Code, the text of which is set out in the Annex to the present resolution;

2. DETERMINES, in accordance with article VIII(b)(vi)(2)(bb) of the Convention, that the amendments shall be deemed to have been accepted on 1 July 2010 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 January 2011 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 CODE OF SAFETY FOR HIGH-SPEED CRAFT, 2000 (2000 HSC CODE)

CHAPTER 7
FIRE SAFETY

1 At the end of paragraph 7.17.1, the following new sentence is added:

"Craft constructed on or after 1 July 2002 but before 1 January 2011, with cargo spaces intended for the carriage of packaged dangerous goods, shall comply with 7.13.3, except when carrying dangerous goods specified as classes 6.2 and 7 and dangerous goods in limited quantities and excepted quantities in accordance with tables 7.17-1 and 7.17-3, not later than the date of the first renewal survey on or after 1 January 2011."

2 In paragraph 7.17.1, in the first sentence, after the words "except when carrying dangerous goods in limited quantities", the following words are added:

"and excepted quantities".

3 The existing note 1 to table 7.17-1 is replaced by the following:

"[1] For classes 4 and 5.1 solids 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 per hour. For classes 4 and 5.1 liquids, when carried in closed freight containers, the ventilation rate may be reduced to not less than two air changes per hour. For the purpose of this requirement a portable tank is a closed freight container."

4 The existing table 7.17-3 is replaced by the following:

"Table 7.17-3

Application of the requirements of section 7.17.3 to different classes of dangerous goods except solid dangerous goods in bulk

Section \ Class	1.1 to 1.6[9]	1.4S	2.1	2.2	2.3 *flammable*[17]	2.3 *non-flammable*	3 FP[12] < 23°C	3 FP[12] ≥ 23°C to ≤ 60°C	4.1	4.2	4.3 *liquids*[18]	4.3 *solids*	5.1[10]	5.2[13]	6.1 liquids FP[12] < 23°C	6.1 liquids FP[12] ≥ 23°C to ≤ 60°C	6.1 *liquids*	6.1 solids	8 liquids FP[12] < 23°C	8 liquids FP[12] ≥ 23°C to ≤ 60°C	8 *liquids*	8 solids	9
7.17.3.1.1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
7.17.3.1.2	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	-
7.17.3.1.3	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7.17.3.1.4	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7.17.3.2	X	-	X	-	X	-	X	-	-	-	X[15]	-	-	-	X	-	-	-	X	-	-	-	X[14]
7.17.3.3	X	X	X	X	-	X	X	X	X	X	X	X	X	-	X	X	X	X	X	X	X	X	-
7.17.3.4.1	-	-	X	-	-	X	X	-	X[8]	X[8]	X	X	X[8]	-	X	X	-	X[8]	X	X	-	-	X[8]
7.17.3.4.2	-	-	X	-	-	-	X	-	-	-	-	-	-	-	X	-	-	-	X	-	-	-	X[14]
7.17.3.5	-	-	-	-	-	-	X	-	-	-	-	-	-	-	X	X	X	-	X	X[16]	X[16]	-	-
7.17.3.6	-	-	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X[11]
7.17.3.7	-	-	-	-	-	-	X	X	X	X	X	X	X	-	X	X	-	-	X	X	-	-	-
7.17.3.8	X[9]	X	X	X	X	X	X	X	X	X	X	X	X[10]	X	X	X	X	X	X	X	X	X	X
7.17.3.9	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
7.17.3.10	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

[8] When "mechanically-ventilated spaces" are required by the IMDG Code.

[9] Stow 3 m horizontally away from the machinery space boundaries in all cases.

[10] Refer to the IMDG Code.

[11] As appropriate for the goods to be carried.

[12] FP means flashpoint.

[13] Under the provisions of the IMDG Code, stowage of class 5.2 dangerous goods under deck or in enclosed ro-ro spaces is prohibited.

[14] Only applicable to dangerous goods evolving flammable vapour listed in the IMDG Code.

[15] Only applicable to dangerous goods having a flashpoint less than 23°C listed in the IMDG Code.

[16] Only applicable to dangerous goods having a subsidiary risk class 6.1.

[17] Under the provisions of the IMDG Code, stowage of class 2.3 having subsidiary risk class 2.1 under deck or in enclosed ro-ro spaces is prohibited.

[18] Under the provisions of the IMDG Code, stowage of class 4.3 liquids having a flashpoint less than 23°C under deck or in enclosed ro-ro spaces is prohibited."

二零一五年五月四日於行政長官辦公室

辦公室主任　柯嵐

Gabinete do Chefe do Executivo, aos 4 de Maio de 2015. — A Chefe do Gabinete, *O Lam*.

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