

## 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

### 前言

### 第 I 章 — 通則

#### 1.1 定義

#### 1.2 救生設備的一般要求

### 第 II 章 — 個人救生設備

#### 2.1 救生圈

#### 2.2 救生衣

#### 2.3 浸水服

#### 2.4 防暴露服

#### 2.5 保溫用具

### 第 III 章 — 視覺信號

#### 3.1 火箭降落傘火焰信號

#### 3.2 手持火焰信號

#### 3.3 漂浮煙霧信號



## 第 IV 章 – 救生艇筏

- 4.1 救生筏的一般要求
- 4.2 氣脹救生筏
- 4.3 剛性救生筏
- 4.4 救生艇的一般要求
- 4.5 半封閉救生艇
- 4.6 全封閉救生艇
- 4.7 自由降落救生艇
- 4.8 具有獨立空氣支持系統的救生艇
- 4.9 耐火救生艇

## 第 V 章 – 救助艇

- 5.1 救助艇

## 第 VI 章 – 降放與登乘設備

- 6.1 降放與登乘設備
- 6.2 海上撤離系統

## 第 VII 章 – 其他救生設備

- 7.1 拋繩設備
- 7.2 通用警報和公共廣播系統

## 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  $-30^{\circ}\text{C}$  至  $+65^{\circ}\text{C}$  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  $-1^{\circ}\text{C}$  至  $+30^{\circ}\text{C}$  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°C 的平靜循環水中歷時 1 小時後，體心溫度的降低不超過 2°C。

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°C 至 2°C 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°C。

### 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°C 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°C。

#### 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<sup>2</sup>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°C 至+20°C 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 米的高度反復多次跳入。

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  $2.2 \pm 0.4$  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°C 至 20°C 之間時，充氣應在 1 分鐘內完成；在環境溫度為 -30°C 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  $20\pm 3^{\circ}\text{C}$ 、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  $-30^{\circ}\text{C}$ 、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，當懸掛在吊筏鈎或吊筏索時，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、長櫂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。

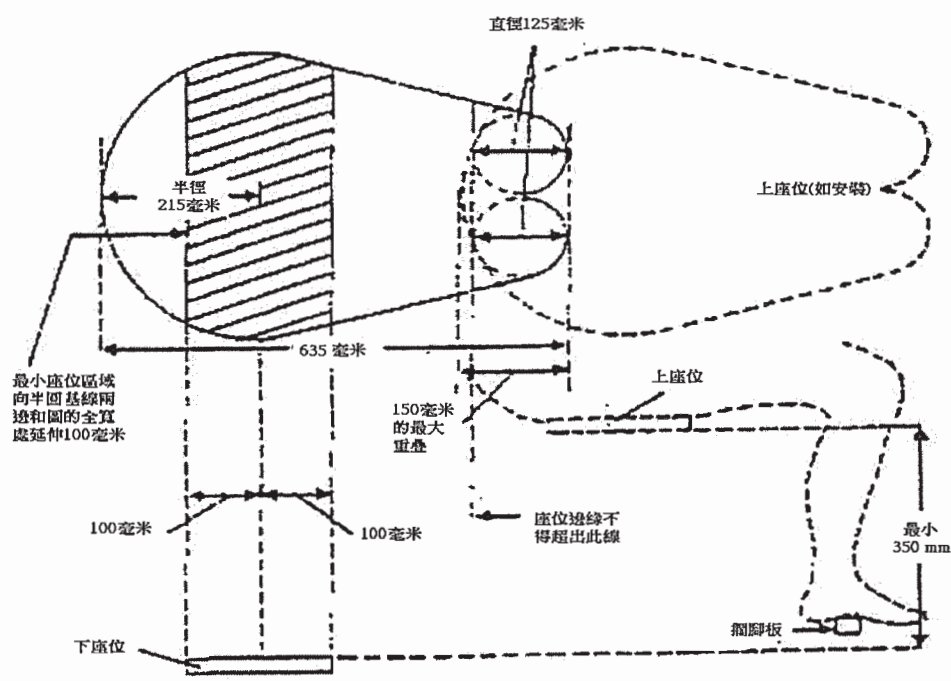
4.4.2 救生艇的乘員定額

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°C 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°C 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鉤；
- .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鉤上無負載時，它會釋放救生艇；
  - .2.2 負載釋放能力。在吊鉤有負載時，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，帶鈎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 帶鈎艇篙 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艙附近備用。



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  $6^{\circ}$  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 帶鈎艇篙 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鉤上時：

- .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  $20\pm 3^{\circ}\text{C}$ 、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  $-30^{\circ}\text{C}$ 、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<sup>3</sup>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  $20^{\circ}$ ，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稜邊和毛刺，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。所有繩端均應繫牢以防鬆散。

## 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<sup>2</sup>，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 船舶撇離系統的容器

##### 6.2.4.1 撇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

Preamble

## CHAPTER I - GENERAL

- 1.1 Definitions
- 1.2 General requirements for life-saving appliances

## CHAPTER II - PERSONAL LIFE-SAVING APPLIANCES

- 2.1 Lifebuoys
- 2.2 Lifejackets
- 2.3 Immersion suits
- 2.4 Anti-exposure suits
- 2.5 Thermal protective aids

## CHAPTER III - VISUAL SIGNALS

- 3.1 Rocket parachute flares
- 3.2 Hand flares
- 3.3 Buoyant smoke signals

## CHAPTER IV - SURVIVAL CRAFT

- 4.1 General requirements for liferafts
- 4.2 Inflatable liferafts
- 4.3 Rigid liferafts
- 4.4 General requirements for lifeboats
- 4.5 Partially enclosed lifeboats
- 4.6 Totally enclosed lifeboats
- 4.7 Free-fall lifeboats
- 4.8 Lifeboats with a self-contained air support system
- 4.9 Fire-protected lifeboats

## CHAPTER V - RESCUE BOATS

- 5.1 Rescue boats

## CHAPTER VI - LAUNCHING AND EMBARKATION APPLIANCES

- 6.1 Launching and embarkation appliances
- 6.2 Marine evacuation systems

## CHAPTER VII - OTHER LIFE-SAVING APPLIANCES

- 7.1 Line-throwing appliances
- 7.2 General alarm and public address system

**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<sup>2</sup>K) 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  $2.2 \pm 0.4$  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 bowing 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  $20 \pm 3^{\circ}\text{C}$  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  $-30^{\circ}\text{C}$  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 bowing 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.

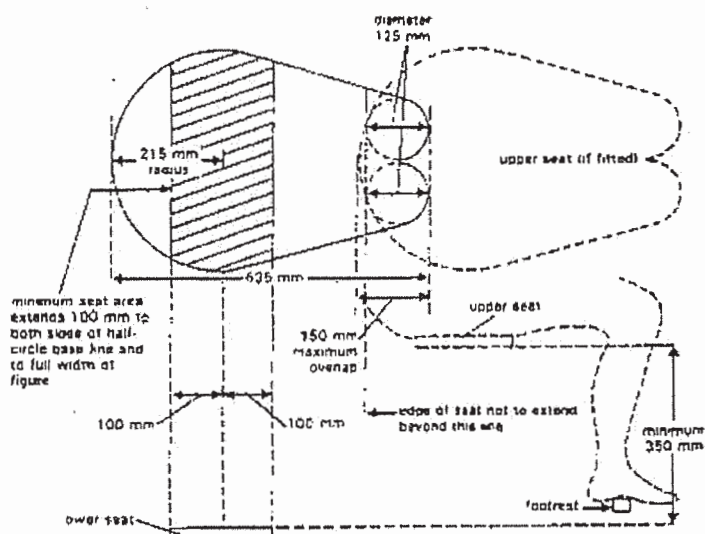


Figure 1

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  $-15^{\circ}\text{C}$  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  $20 \pm 3^{\circ}\text{C}$ , 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  $-30^{\circ}\text{C}$ , 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<sup>3</sup> 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 to 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:

$$\frac{20\% \text{ of total number of persons that the Marine Evacuation System is certificated for}}{4} \text{ m}^2$$

or 10 m<sup>2</sup>, 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 occurring 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*.