Treaty Series

Treaties and international agreements
registered
or filed and recorded
with the Secretariat of the United Nations

VOLUME 1370

Recueil des Traités

Traités et accords internationaux
enregistrés
ou classés et inscrits au répertoire
au Secrétariat de l'Organisation des Nations Unies

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Treaties and international agreements registered or filed and recorded with the Secretariat of the United Nations

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NOTE BY THE SECRETARIAT

Under Article 102 of the Charter of the United Nations every treaty and every international agreement entered into by any Member of the United Nations after the coming into force of the Charter shall, as soon as possible, be registered with the Secretariat and published by it. Furthermore, no party to a treaty or international agreement subject to registration which has not been registered may invoke that treaty or agreement before any organ of the United Nations. The General Assembly, by resolution 97 (I), established regulations to give effect to Article 102 of the Charter (see text of the regulations, vol. 859, p. VIII).

The terms "treaty" and "international agreement" have not been defined either in the Charter or in the regulations, and the Secretariat follows the principle that it acts in accordance with the position of the Member State submitting an instrument for registration that so far as that party is concerned the instrument is a treaty or an international agreement within the meaning of Article 102. Registration of an instrument submitted by a Member State, therefore, does not imply a judgement by the Secretariat on the nature of the instrument, the status of a party or any similar question. It is the understanding of the Secretariat that its action does not confer on the instrument the status of a treaty or an international agreement if it does not already have that status and does not confer on a party a status which it would not otherwise have.

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Unless otherwise indicated, the translations of the original texts of treaties, etc., published in this *Series* have been made by the Secretariat of the United Nations.

NOTE DU SECRÉTARIAT

Aux termes de l'Article 102 de la Charte des Nations Unies, tout traité ou accord international conclu par un Membre des Nations Unies après l'entrée en vigueur de la Charte sera, le plus tôt possible, enregistré au Secrétariat et publié par lui. De plus, aucune partie à un traité ou accord international qui aurait dû être enregistré mais ne l'a pas été ne pourra invoquer ledit traité ou accord devant un organe des Nations Unies. Par sa résolution 97 (I), l'Assemblée générale a adopté un règlement destiné à mettre en application l'Article 102 de la Charte (voir texte du règlement, vol. 859, p. IX).

Le terme «traité» et l'expression «accord international» n'ont été définis ni dans la Charte ni dans le règlement, et le Secrétariat a pris comme principe de s'en tenir à la position adoptée à cet égard par l'Etat Membre qui a présenté l'instrument à l'enregistrement, à savoir que pour autant qu'il s'agit de cet Etat comme partie contractante l'instrument constitue un traité ou un accord international au sens de l'Article 102. Il s'ensuit que l'enregistrement d'un instrument présenté par un Etat Membre n'implique, de la part du Secrétariat, aucun jugement sur la nature de l'instrument, le statut d'une partie ou toute autre question similaire. Le Secrétariat considère donc que les actes qu'il pourrait être amené à accomplir ne confèrent pas à un instrument la qualité de «traité» ou d'«accord international» si cet instrument n'a pas déjà cette qualité, et qu'ils ne confèrent pas à une partie un statut que, par ailleurs, elle ne posséderait pas.

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Sauf indication contraire, les traductions des textes originaux des traités, etc., publiés dans ce *Recueil* ont été établies par le Secrétariat de l'Organisation des Nations Unies.

ANNEX A

Ratifications, accessions, prorogations, etc., concerning treaties and international agreements registered with the Secretariat of the United Nations

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ANNEXE A

Ratifications, adhésions, prorogations, etc., concernant des traités et accords internationaux enregistrés au Secrétariat de l'Organisation des Nations Unies

[CHINESE TEXT — TEXTE CHINOIS]

No. 18961 一九七四年国际海上人命安全公约

1974年国际海上人命安全公约修正案

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13 固定式探火和失火报警系统

14 周期性无人照管机器处所的自动探火和失火报警系统

15 燃油、润滑油和其他易燃油类的布置

16 载客超过36人客船以外船舶的通风系统

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第一节 —— 通则

规 则 1

适 用 范 围

1.1 除另有明文规定外，本章适用于1984年9月1日或以后安放龙骨或处于相应建造阶段的船舶。

1.2 在本章内，术语“处于相应建造阶段”，系指：

.1 可看作与特定船舶开始建造的相同阶段；

.2 业已开始安装的船舶不少于50吨，或为所有结构材料估量的百分之一，视何者小而定。

1.3 在本章范围内：

.1 “建造船舶”指“安放龙骨或处于相应建造阶段的船舶”；

.2 “所有船舶”指“在1984年9月1日之前、之日或之后建造的船舶”；

.3 无论何时建造的货船，一经改装成客船后，就于开始改装之日起作为建造客船看待；

2 除另有明文规定外：

.1 在1984年9月1日之前建造的船舶，主管机关应保证在满足2.2款规定的条件下，使之符合1974年国际海上人命安全公约第Ⅱ－1章*定义为新船或现有船舶所适用的各项要求；

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* 1974年国际海上人命安全会议通过的文本。

.2 在1984年9月1日之前建造的船舶，主管机关应保证使之符合有关1981年修正的1974年国际海上人命安全公约1978年议定书附件的第II-1章中定义为新船或现有船舶所适用的各项要求。

3 所有船舶在进行修理、改装、改建以及与之有关的舣装时，至少应继续符合这些船舶原先适用的要求。上述船舶如在1984年9月1日之前建造，一般至少应在其修理、改装、改建或舣装之前原来的程度上符合在该日或以后建造船舶的要求。重大的修理、改装、改建以及与之有义的舣装在主管机关认为合理和可行的范围内，应满足对在1984年9月1日或以后建造船舶的要求。

4 主管机关如考虑到航程的遮蔽性及其条件，认为引用本章的某些特殊要求为不合理或不必要时，可对其悬挂该国国旗的在航程中距最近陆地不超过20海里的个别船舶或某类船舶免除这些要求。

5 根据规则III/27(c)准予搭载的人数超过其所备救生艇容量的任何客船，应符合规则6.5所载的分舱特种标准以及规则5.4关于渗透率的特种规定，除非主管机关根据航程的自然条件及情况认为该船仅需符合本章其他各条规则和第II-2章的规定时，可作例外。

6 客船用于载运大量特种业务如朝山进香的旅客时，该船有权悬挂国旗的国家主管机关如认为实施本章要求为不切实际时，可对此类船舶免除这些要求，但此类船舶应完全符合下列规定：

.1 1971年特种业务客船协定所附的规则；和

.2 1973年特种业务客船舱室要求议定书所附的规则。

规 则 2

定 义

除另有明文规定外，就本章来说：

1.1 “分舱载重线”是指用以决定船舶分舱的吃水线。

1.2 “最深分舱载重线”是指相当于适用的分舱要求所允许的最大吃水线。

2 “船长”是指在最深分舱载重线两端的垂线间量得的长度。

3 “船宽”是指在最深分舱载重线处或其下，由一舷肋骨外缘至另一舷肋骨外缘间的最大宽度。

4 “吃水”是指在船长的中点由船型基线至有关分舱载重线间的垂直距离。

5 “舱壁甲板”是指横向水密舱壁所到达的最高一层甲板。

6 “限界线”是指在船侧由舱壁甲板上表面以下至少76毫米处所绘的线。

7 “某一处所的渗透率”是指该处所能被水浸占的百分比。 某一处所体积伸展至限界线以上时，仅应量至该线高度为止。

8 “机器处所”是指由船型基线至限界线并介于两端主横向水密舱壁间供安置主辅推进机械及推进所需的锅炉和一切固定煤舱的处所。 对于特殊布置的船舶，机器处所的范围可由主管机关确定之。

9 “旅客处所”是指供旅客起居和使用的处所，不包括行李室、储藏室、食品库及邮件舱。 对于规则5和6来说，在限界线以下供船员起居和使用的处所，亦应认作旅客处所。

10 在一切情况下，容积与面积均应计至船型线为止。

11 “风雨密”是指在任何海洋条件下，水不应渗入船内。

规 则 三

有关第三、四和五节的定义

除另有明文规定外，对于第三、四和五节来说：

1 “操舵装置的控制系统”是指用以将舵令由驾驶台传至操舵装置动力设备的设备。 操舵装置控制系统由发送器、接收器、液压控制泵和它们的联结电动机、电动机控制器、管系和电缆等组成。

2 “主操舵装置”是指舵机、舵传动装置、操舵装置动力设备，如有的话，和辅助设备以及将正常营运情况下为操纵船舶而运转舵所必需的扭矩作用在舵杆(例如舵柄或舵扇)上的设备。

3 “操舵装置动力设备”是指：

.1 在电动操舵装置情况下，电动机和其随同电器设备；

.2 在电动液压操舵装置情况下，电动机和其随同电器设备与联结的泵；

.3 在其他液压操舵装置情况下，驱动机械和联结的泵。

4 “辅助操舵装置”是指主操舵装置发生故障情况下，操纵船舶必须有的设备，但不包括除舵杆、舵扇或同样用途的部件以外的主操舵装置的任何部分。

5 “正常操作和居住情况”是指船舶作为一个整体、机器、维修设施、保证推进的设备和辅助设备、操舵能力、安全航行、消防和抗沉性、内外通讯和信号、脱险通道和应急救生艇绞车以及所设计的舒适居住条件处于工作秩序和正常作用的情况。

6 “应急情况”是指由于主电源发生故障以致正常操作和居住条件所需的任何业务均不处于工作秩序的情况。

7 “主电源”是指向主配电板供电以分配给保持船舶正常操作和居住条件所必须的一切用途的电源。

8 “死船状态”是指由于缺少动力，主推进装置、锅炉和副机不能运转的情况。

9 “主发电站”是指主电源所在处所。

10 “主配电板”是指由主电源直接供电并用来将电能分配给船上各种用途的配电板。

11 “应急配电板”是指主电源供电系统发生故障情况下，由应急电源或过渡应急电源直接供电，并用来将电能分配给应急用途的配电板。

12 “应急电源”是指主电源的供电发生故障情况下用来向应急配电板供电的电源。

13 “动力传动系统”是指提供动力以转舵的液压设备，由一个或若干个操舵装置动力设备，连同所附管系和属具以及舵传动装置所组成。 动力传动系统可共有若干机械部件，即舵柄、舵扇和舵杆或同样用途的部件。

14 “最大营运前进航速”是指船舶在最大航海吃水情况下从事海上航行的设计最大航速。

15 “最大后退速度”是指船舶在最大航海吃水情况下应用设计最大后退动力预计能够达到的速度。

16 “机器处所”是指一切A类机器处所和一切包括推进机械、锅炉、燃油装置、蒸汽机和内燃机、发电机和主要电动机、加油站、冷藏机、防摇装置、通风机和空气调节机械在内的其他处所，以及类似处所；连同通往这些处所的围壁通道。

17 “A类机器处所”是具有下列设施的处所，连同通往这些处所的围壁通道：

.1 用作主推进的内燃机；或

.2 非主推进用的合计总输出功率不小于375千瓦的内燃机；或

.3 任何燃油锅炉或燃油装置。

18 "控制站"是船舶无线电设备、主要航行设备或应急电源所在的处所，或者火警指示器或火灾控制设备集中的处所。

19 "化学品船"系指建造或改建的并用于散装载运任何液化产品的货船，而这些产品已列入本组织大会490(XII)号决议同意授权海安会通过、并可能由本组织修改的关于散装载运危险化学品船舶的构造和设备规则的最低要求摘要（以下简称"散装化学品规则"）之中，或散装载运任何液体物质，而这些物质已列入或临时确定属于现行有效的国际防止船舶造成污染公约附件I附录II的A、B或C类。

20 "气体运载船"系指建造或改建的用于散装载运任何液化气体或其他物质，这些气体或物质已列入本组织大会通过的大会328(IX)决议，并已经本组织修订或可能修订的散装液态气体运载船构造和设备规则（以下简称"气体运载船规则"）第XIX章。

21 "载重量"系指船舶在比重为1.025的海水中，相应于所勘划的夏季载重线的排水量与该船空船排水量之差，以吨计。

22 "空载排水量"是指船舶在舱内没有货物、燃油、润滑油、压载水、淡水、给水和易耗物料，且无旅客、船员及其财物时的排水量，以吨计。

第二节——分舱和稳性*

（第二节适用于客船，如规则中指明的，也适用于货船）

规 则 4

客船可浸长度

1 船长中任何一点的可浸长度，应由计及该船船型、吃水及其他特征的一种计算方法来确定。

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* 本组织通过的大会265(VIII)号决议，作为1960年国际海上人命安全公约第II章第B节等效规则的客船分舱和稳性规则，如适用，可全部用来代替本节要求。

2 对有连续舱壁甲板的船舶，在船长中某一点的可浸长度，是以该点为中心的最大限度的一段船长，在按规则5限定的假设条件下浸水时，船舶不致淹过限界线。

3.1 对无连续舱壁甲板的船舶，船长中任何一点的可浸长度，可按假定的连续限界线来确定；此线的任何点均须在该甲板上表面（船侧）以下至少76毫米，而通至该甲板的有关舱壁及船体均须为水密。

3.2 当假定的限界线有一部分低于舱壁所通达的甲板相当距离时，则对该舱壁在高出限界线而直接位于较高层甲板以下的部分，主管机关可有限度地放宽其水密程度。

规 则 5

客 船 渗 透 率

1 规则4所指限定的假设条件，是指限界线以下处所的渗透率。

在决定可浸长度时，对限界线以下的下列船舶各部分的整个长度范围内，应使用同一平均渗透率：

.1 规则2定义所指的机器处所；

.2 机器处所以前部分；和

.3 机器处所以后部分。

2.1 整个机器处所内的同一平均渗透率应按下列公式确定：

$$85 + 10\left(\frac{a - c}{v}\right)$$

式中：a —— 在限界线以下位于机器处所范围内按规则2定义所指的旅客处所容积；

c —— 在限界线以下位于机器处所范围内专供货物、煤或物料储藏用的甲板间处所容积；

v —— 限界线以下机器处所的总容积。

2.2 如用详细计算法求得的平均渗透率小于上列公式所得的数值，而主管机关认为满意时，则可采用详细计算求得的数值。 在此种计算中，按规则2定义所指

的旅客处所的渗透率应为95；一切货物、煤及物料储藏处所应为60；双层底、燃油舱柜及其他舱柜应分别根据情况采用认可的数值。

3 除第4款的规定外，位于机器处所以前（或以后）的整个部分的同一平均渗透率，应按下列公式确定：

$$63 + 35\frac{a}{v}$$

式中：a —— 在限界线以下位于机器处所以前或以后按规则2定义所指旅客处所的容积；

v —— 在限界线以下位于机器处所以前或以后部分的总容积。

4 若船舶根据规则III/27(c)准予搭载超过其所备救生艇容量的人数，并按规则1.5要求符合特种规定者，其位于机器处所以前或以后的整个部分的同一平均渗透率应按下列公式确定：

$$95 - 35\frac{b}{v}$$

式中：b —— 位于机器处所以前或以后限界线以下以及按各个情况如肋板顶部、内底或尖舱以上，专供作装货处所、煤或燃油舱、物料储藏室、行李室及邮件舱、锚链舱及淡水舱柜的容积。

v —— 限界线以下位于机器处所以前或以后部分的总容积；

如按照船舶业务，其货舱通常并不装载任何大宗货物，则在计算"b"时，装货处所的任何部分均不包括在内。

5 对特殊布置的船舶，主管机关可允许或要求对位于机器处所以前或以后部分的平均渗透率作详细的计算。在此种计算中，按规则2定义所指旅客处所的渗透率应为95；安置机器的处所为85；一切货物、煤及物料储藏处所为60；双层底、燃油舱柜及其他舱柜的渗透率应分别根据情况采用认可的数值。

6 在两水密横舱壁间的甲板间舱内没有任何旅客或船员处所时，除完全包围于固定钢质舱壁内并作其他用途的处所外，整个甲板间舱应视作旅客处所。若所述旅客或船员处所完全包围在固定的钢质舱壁以内，则仅需将被包围部分视作旅客处所。

规 则 6

客船许可舱长

1 船舶应按其预定的用途尽可能作有效的分舱。分舱的程度应视船舶的长度与业务而定，即船长最大而以载客为主的船舶的分舱程度为最高。

2 分舱因数。

2.1 以船长中任何点为中心的最大许可舱长是以适当的因数乘其可浸长度求得之，此因数称为分舱因数。

2.2 分舱因数随船舶的长度而定，在一定长度下，又视船舶预定的用途而变化。此因数按下列情况顺次连续递减：

.1 当船长增加时，和

.2 从适用于运货为主的船舶的因数A至适用于载客为主的船舶的因数B。

2.3 因数A和B的变动应用下列公式(1)和(2)来表示，式中L即规则2定义所指的船长：

$$A=\frac{58.2}{L-60}+0.18\ (L=131\text{米及以上}) \quad \cdots\cdots (1)$$

$$B=\frac{30.3}{L-42}+0.18\ (L=79\text{米及以上}) \quad \cdots\cdots (2)$$

3 业务的衡准。

3.1 一定长度的船舶，其适用的分舱因数，应由下列公式(3)及(4)所求得的业务衡准数（以下简称衡准数）来确定，式中：

C_S —— 衡准数；

L —— 规则2定义所指的船长（米）；

M —— 规则2定义所指机器处所的容积（立方米），加上位于内底以上机器处所以前或以后的任何固定燃油舱的容积；

P —— 规则2定义所指的限界线以下旅客处所的总容积（米）；

V —— 限界线以下的船舶总容积（立方米）；

P_1 —— KN，其中：

N —— 核准该船搭载的旅客数，和

K —— 0.056 L

3.2 如KN的数值大于P与限界线以上的实际旅客处所总容积的和，则P_1应采用上述的和或三分之二KN，视何者为大而定。

当P_1大于P时：

$$C_S = 72 \frac{M + 2P_1}{V + P_1 - P} \quad \text{.....} \quad (3)$$

在其他情况时：

$$C_S = 72 \frac{M + 2P}{V} \quad \text{.....} \quad (4)$$

3.3 对无连续舱壁甲板的船舶，各容积应计算到决定可浸长度时所用的实际限界线。

4 第5款所述以外的船舶分舱规则。

4.1 长度在131m及以上的船舶，如衡准数为23或以下者，前尖舱以后的分舱，取分舱因数A，由公式(1)求得；如衡准数为123或以上者，取分舱因数B，由公式(2)求得；如衡准数在23与123之间，则分舱因数为F，按下列公式在因数A与B之间用直线内插法求得：

$$F = A - \frac{(A-B)(C_S - 23)}{100} \quad \text{.....} \quad (5)$$

但衡准数如等于或大于45，同时用公式(5)求得的分舱因数等于或小于0.65而大于0.50时，则前尖舱以后的分舱因数应取0.5。

4.2 如求得的因数F小于0.40，并经主管机关同意，此数值不能在该船机舱内适用，则此舱的分舱，可取较大的因数，但该因数不应超过0.40。

4.3 长度小于131m，但不小于79米的船舶，当其衡准数等于S时，分舱因数应取1，其中：

$$S = \frac{3574 - 25L}{13}$$

如衡准数为123或以上者，取分舱因数B，由公式(2)求得；如衡准数在S和123之间时，则分舱因数为F，按下列公式在1与因数B之间用直线内插法求得：

$$F = 1 - \frac{(1-B)(c_s-S)}{123-S} \quad \text{.....} \quad (6)$$

4.4 长度在131米以下但不小于79米，且衡准数小于S的船舶，以及一切长度小于79米的船舶，前尖舱以后的分舱，取分舱因数1；但在上述任何一种情况中，如主管机关同意此因数在该船的任何部分不实用时，则主管机关在考虑了一切情况后，可给予适当的放宽。

4.5 第4.4款的规定，也适用于任何长度的船舶，如其核准搭载的乘客数额在12人以上，但不超过

$$\frac{L^2}{650} \text{或} \ 50$$，视何者为小而定。

5 根据规则III/27(c)准予搭载人数超过其所备救生艇容量和按规则1.5应符合特种规定的船舶的分舱特种标准。

5.1.1 以载客为主的船舶，其前尖舱以后的分舱应取因数0.50；如按第3和4款计算所得的因数小于0.50时，则用计算所得的数值。

5.1.2 当此种船舶的长度小于91.5米时，如经主管机关同意，认为对某一舱采用上述因数为不实用时，可允许对该舱的长度采用较大的分舱因数，但所有因数应是在此情况下实际可行和合理的最小数值。

5.2 不论船长是否小于91.5米，如因需要装载相当数量的货物致使前尖舱以后的分舱不可能采用0.50以下的因数时，则该船所采用的分舱标准应按照下列第.1至.5目的规定选取，但如主管机关同意，认为从任何方面强求严格遵守均属不合理时，可准其对水密舱壁作变通的布置，然而此种布置就其功能来说，应为不减低整个分舱效用者为限。

.1 第3款关于衡准数的规定仍然适用，但计算P_1值时，对有铺位的旅客，K应取第3款所确定的数值或取3.5立方米，视何者为大而定；对无铺位的旅客，K值应取3.5立方米。

.2 第2款内的因数B应以按下列公式计算求得的因数BB来代替：

$$BB = \frac{17.6}{L - 33} + 0.20 \quad (L = 55\text{米及以上})$$

.3 长度在131米及以上的船舶，如衡准数为23或以下者，前尖舱以后的分舱，取分舱因数A，由第2.3款公式(1)求得；如衡准数为123或以上者，则分舱因数取BB，由第5.2.2款的公式求得；如衡准数在23与123之间，则分舱因数为F，按下列公式在A与BB之间用直线内插法求得：

$$F = A - \frac{(A-BB)(C_s-23)}{100}$$

但是，如求得的因数F小于0.50时，则分舱因数应取0.50或按第4.1款规定求得的因数，视何者为小而定。

.4 长度在131米以下但不小于55米的船舶，当衡准数等于S_1时，前尖舱以后的分舱，取分舱因数1，其中：

$$S_1 = \frac{3{,}712 - 25L}{19}$$

如衡准数为123或以上者，则分舱因数取BB值，由第5.2.2款的公式求得；如衡准数在S_1与123之间，则分舱因数为F，按下列公式在1与BB之间用直线内插法求得：

$$F = 1 - \frac{(1-BB)(C_s - S_1)}{123 - S_1}$$

但在上述后两种情况中的任何一种时，如求得的因数小于0.50时，分舱因数可取为不超过0.50。

.5 长度在131米以下，但不小于55米，且衡准数小于S_1的船舶，以及一切长度在55米以下的船舶，前尖舱以后的分舱，取分舱因数1；但是，若主管机关同意，认为此项分舱因数对某些个别舱为不实用时，则主管机关在考虑了一切情况后可对这些舱给予适当的放宽，但尾部最后一个舱与尽可能多的前部各舱（在前尖舱与机器处所后端舱壁之间者）的长度，均不得大于可浸长度。

规 则 7

关于客船分舱的特殊规则

1 在船舶的一部分或数部分，如其水密舱壁通至比其他部分为高的一层甲板，而在计算可浸长度时又要利用这种舱壁的升高部分时，则各该部分可采用分别的限界线，但需符合下列规定：

.1 整个船长度两侧船壳板均延伸至相当于较高限界线的甲板，且在整个船长内，此甲板下的船壳开口均应按规则 17 作为限界线以下的开口；

.2 舱壁甲板或阶层处的相邻两舱，应各不超过其相应限界线的许可长度，且相邻两舱的总长不超过以较低限界线为基础的许可长度的两倍；

2.1 某舱的长度可以超过按规则 6 所求得的许可舱长，但该舱与其相邻的前舱或后舱加在一起的总长均不应超过许可舱长的两倍或可浸长度，视何者为小而定。

2.2 如果相邻两舱之一位于机器处所内，而另一舱在机器处所以外，且后者所在部分的平均渗透率与机器处所的不同，则此相邻两舱的总长应予调整，使其适应两舱所在部分平均渗透率的平均值。

2.3 如相邻两舱的分舱因数不同时，此两舱的总长应按此例来确定。

3 长度为 100 米及以上的船舶，其前尖舱以后的主横舱壁之一应设置在距首垂线不大于许可舱长之处。

4 主横舱壁可以凹折，但整个凹折部分应处于在船内距外壳板五分之一船宽的两侧垂直面之间，船宽按规则 2 定义所指并在最深分舱载重线的水平面上自船侧向垂直于纵中剖面的方向量取。 位于上述范围以外的任何凹折部分，应按照第 5 款作为阶层处理。

5 主横舱壁可作阶层状，但应符合下列条件之一：

.1 此舱壁所分隔的两舱总长度不超过可浸长度的百分之 90 或许可舱长的两倍，但是如果船舶的分舱因数大于 0.9 者，此两舱的总长度不应超过其许可舱长；

.2 在阶层处另加分舱设置，以保持与用平面舱壁时有同等的安全程度；

.3 被此阶层向上延伸所超过的舱，其长度不超过相当于在此阶层下面76毫米所作限界线的许可舱长。

6 主横舱壁有凹折或阶层者，应采用一等效的平面舱壁来确定其分舱。

7 若相邻两主横舱壁间的距离，或其等效平面舱壁间的距离，或通过相邻两主横舱壁的最近阶层部分的横向平面间的距离，小于3.0米加船长的百分之三或11米，视何者为小而定，则只应将上述舱壁之一视为是按照规则6规定形成船舶分舱的部分。

8 当在一个主横水密舱内包含有局部分舱，而在任何假定的船侧破损长度达3米加船长的百分之三或11米时，视何者为小而定，此时主水密舱的全部容积并未被水浸满，则经主管机关同意，可对此船按通常所要求的许可舱长，按比例予以放长。 在此情况下，对未破损一侧所假定的有效浮力容积不得大于对破损一侧所假定的数值。

9 当所要求的分舱因数为0.50或以下者，任何相邻两舱的总长不应超过可浸长度。

规 则 8

客船破舱稳性

1.1 在所有营运状态下，船舶应具有足够的完整稳性，以能支持其任一不超过可浸长度的主舱浸水至最后阶段。

1.2 当相邻两主舱由按规则7.5.1条件的阶层舱壁所分隔，则船舶的完整稳性应足以支持此相邻两主舱的浸水。

1.3 当所要求的分舱因数为0.50或以下，但大于0.33者，其完整稳性应足以支持任意相邻两主舱的浸水。

1.4 当所要求的分舱因数为0.33或以下者，其完整稳性应足以支持任意相邻三主舱的浸水。

2.1 第1款的要求，应按照第3、4和6款并顾及船舶的尺度比例与设计特性以及受损舱的布置与形状以计算决定之。 作此项计算时，应假定船舶的稳性处于最恶劣的预计营运状态。

2.2 凡拟装设足够严密的甲板、内壳板或纵舱壁以严格限制水的流动者，在计算中对此类限制所作的适当考虑，应经主管机关同意。

2.3 当主管机关对破损情况下的稳性有怀疑时，可以要求对其进行核查。

3 为计算破舱稳性，容积和表面渗透率一般应按以下规定：

处 所	渗透率
货物、煤或物料储藏专用处所	60
起居设备占用处所	95
机器占用处所	85
供装载液体的处所	0或95*

* 视何者造成较严重的后果而定。

对处于破损水面附近并未包容相当数量的起居设备或机器的处所，以及经常并未被相当数量的货物或物料占用的处所，均应假定有较高的表面渗透率。

4 假定的破损范围应如下：

.1 纵向范围：3.0米加船长的百分之三或11.0米，视何者为小而定。如所要求的分舱因数为0.33或以下，则假定的纵向破损范围应按需要增加，以使其包括任何两个依次排列的主横水密舱壁；

.2 横向范围（在船内于最深分舱载重线水平面上自船侧向垂直于纵中剖面的方向量计）：为规则2定义所指船宽的五分之一距离；和

.3 竖向范围：自基线向上，无限制；

.4 如任何小于第4.1、4.2和4.3款所指的破损，会使倾斜或初稳性高度的损失更为严重，则在计算中应对此种破损情况作出假定。

5 应作有效布置使不对称浸水降至最小程度。如必须校正大倾斜角时，所采用的方法，应尽可能是自动的；但在任何情况下当横贯浸水装置设有控制设备时，此项设备应能在舱壁甲板以上操作。这种装置及其控制设备连同平衡前的最大倾角，均应是主管机关所能接受的。如需设有横贯浸水装置时，平衡所需时间应不超过15分钟。关于使用横贯浸水装置的相应资料应提供给该船船长*。

* 参阅本组织通过的A.266(VIII)号决议“关于为适应客船横贯浸水装置的要求而制定的标准方法的建议案”。

6 船舶破损后以及不对称浸水情况下经采取平衡措施后，其最终状态应如下：

.1 在对称浸水情况下，当采用固定排水量法计算时，应至少有50毫米的正值剩余稳性高度。

.2 在不对称浸水情况下，其总横倾角不得超过7°，但在特殊情况下，主管机关可允许放宽由于不对称力矩而产生的较大横倾角，可是在任何情况下，其最终横倾角不应超过15°。

.3 在任何情况下，船舶浸水的终了阶段不得淹没限界线。如认为在浸水的某一中间阶段可能淹没限界线时，主管机关可要求作船舶安全所必需的研究与布置。

7 应将各种营运情况下为保持船舶具有足够的完整稳性以经受得住危害性破损所需的资料提供给船长。对需用横贯浸水装置的船舶，其倾斜计算所依据的稳性情况应通知船长，并警告船长若该船在不利情况下受损时，可能发生过度的倾斜。

8.1 除证明在任何营运状态下为满足上述要求所需的完整稳性高度超过计划营运状态的要求者外，主管机关不得考虑放宽对破舱稳性的要求。

8.2 只是在特殊情况下，经主管机关同意，认为船舶的尺度比例、布置及其他性能对破舱后的稳性最为有利，而在该特殊情况下采用这种破舱范围是合理和可行时，方准放宽对破舱稳性的要求。

规 则 9

客船的压载

1 压载水一般不得装于计划装载燃油的舱内。如实际上不能避免将水装入燃油舱的船舶，则应设置经主管机关同意的油水分离装置，或为主管机关所接受的处理带油压载水的其他设施，如向岸上排放的设施。

2 本规则的规定并不影响现行有效的国际防止船舶造成污染公约的规定。

规 则 10

客船尖舱及机器处所的舱壁、轴隧等

1 应设有水密高达舱壁甲板的前尖舱舱壁或防撞舱壁。此舱壁须装设于距首垂线不少于船长的百分之五而不大于3米加船长的百分之五的处所。

2 当水线以下船舶的任何部分自首垂线向前延伸，例如球鼻艏，第1款规定的距离应自下列各点之一来量计：

.1 这类延伸部分的长度中点；或

.2 首垂线以前船长的百分之1.5处；或

.3 首垂线以前3米处；

视何者为小而定。

3 当设有长的前部上层建筑，则前尖舱舱壁或防撞舱壁应风雨密地延伸至舱壁甲板的上一层甲板。此延伸部分不必直接设于下面舱壁之上，但除第4款允许免除者外应位于第1或2款规定的限度内，并且形成阶层部分的舱壁甲板应有效地作成风雨密。

4 当设有首开门和倾斜装卸跳板组成舱壁甲板以上的防撞舱壁延伸部分，在舱壁甲板以上多于2.3米的跳板部分可自第1和2款规定限度向前延伸。在整个长度内跳板应为风雨密。

5 后尖舱舱壁，以及将规则2定义所指机器处所与前后客货处所隔开的舱壁，均应设置并做成水密，直至舱壁甲板。但是，如果不致减低船舶分舱的安全程度时，则后尖舱舱壁可在舱壁甲板下方作成阶层状。

6 在一切情况下，尾轴管均应封闭于具有适度容积的水密处所内。尾轴填料函压盖须装设于水密尾轴隧内或与尾轴管室分开的其他水密处所内，而该处所的容积，在尾轴填料函压盖渗漏而浸水时，将不致淹没限界线。

规 则 11

货船的防撞舱壁

1 就本条规则来说，“干舷甲板”、“船长”和“首垂线”的意义按现行国际船舶载重线公约定义所指。

2 应设置防撞舱壁，并应为水密高达干舷甲板。此舱壁应位于离首垂线不小于船长百分之五或10米，视何者为小而定，经主管机关允许，可不大于船长的百分之八。

3 如水线以下的船舶任何部分自首垂线向前延伸，例如球鼻艏，第2款规定的距离应自下列各点之一来量计：

.1 这类延伸部分的长度中点；或

.2 首垂线以前船长的百分之1.5处；或

.3 首垂线以前3米处；

视何者为小而定。

4 此舱壁在第2或3款所述限度之内可有阶层或凹折。穿过防撞舱壁的管子应装有在干舷甲板以上操作的适宜的阀，阀箱应位于首尖舱内，固定在舱壁上。如在一切营运情况下阀均能到达，且阀所在的处所不是装货处所，阀可安装在防撞舱壁的后侧。所有阀应为钢质、青铜或其他认可的延性材质。普通铸铁或类似材质的阀不能采用。此舱壁上不应设门、人孔、通风管道或任何其他开口。

5 当设有长的前部上层建筑，则防撞舱壁应风雨密地延伸至干舷甲板的上一层甲板。此延伸部分不必直接设于下面舱壁之上，但除第6款允许免除者外应位于第2或3款规定的限度内，并且形成阶层部分的甲板应有效地作成风雨密。

7 干舷甲板以上防撞舱壁延伸处的开口数应在适合船舶设计和正常作业情况下减至最小。这类开口均应能够作风雨密关闭。

规 则 12

客 船 双 层 底

1 双层底的设置应在适合于船舶设计及船舶正常作业要求的情况下尽量自前尖舱舱壁延伸至后尖舱舱壁。

.1 长度在50米以上、61米以下的船舶，至少应自机器处所至前尖舱舱壁或尽可能接近该处之间设置双层底。

.2 长度在61米以上、76米以下的船舶，至少应在机器处所以外设置双层底，并应延伸至前、后尖舱舱壁，或尽可能接近该处。

.3 长度在76米及以上的船舶，应在船中部设置双层底，并应延伸至前、后尖舱舱壁，或尽可能接近该处。

2 凡需设置双层底时，其高度应经主管机关同意，其内底应延伸至船的两侧，以保护船底至舭部弯曲处。此项保护如能使内底边板的外缘与舭部壳板的交线，在任何部分都不低于一个在基线上距中线为型宽一半处与基线成25°角的横斜线与在船中处的肋骨线相交之点的水平面，即认为满意。

3 设于双层底内与货舱等排水装置有关的小阱等等，不应向下延伸至超过所需的深度。 此阱的深度，在任何情况下不得大于中线处双层底高度减460毫米，也不得延伸至第2款所述的水平面以下。 但在螺旋桨船上，准许其轴隧后端的污水阱延伸至外底。 其他的阱（如主机下的润滑油阱），如其布置与符合本条规则的双层底具有同等的保护作用时，经主管机关同意亦可设置。

4 专供装载液体而大小适度的水密舱，如主管机关认为当该舱的船底或船侧破损时不致因此妨碍船舶的安全者，可不设双层底。

5 适用规则1.5规定并在规则III/2定义所指的短程国际航行范围内营运的班轮，如因在其分舱因数不超过0.50的任一部分设置双层底将对该船的设计与船舶正常作业不相适应时，主管机关可准予在该部分免设双层底。

规 则 13

客船分舱载重线的勘定、勘划与记载

1 为了保持所要求的分舱程度，应在船舶两舷勘定并勘划相当于所核准分舱吃水的载重线。 若船内有专供交替载客和载货的处所者，经船舶所有人请求，可勘定和勘划一个或数个相当于主管机关核准的交替营运状态分舱吃水的附加载重线。

2 所勘定和勘划的分舱载重线应载入客船安全证书，并以C.1表示主要载客情况，C.2、C.3等分别表示交替载客和载货情况。

3 相应于每一载重线的干舷，应与按现行国际船舶载重线公约确定的干舷在同一位置上并从同一甲板线进行测量。

4 相应于每一经核准载重线的干舷以及对其所核准的营运条件，均应清楚地载明于客船安全证书内。

5 在任何情况下，任何分舱载重线均不得勘划于按船舶强度或现行国际船舶载重线公约所确定的海水中最深载重线以上。

6 无论分舱载重线标志的位置如何，船舶装载概不得使按现行国际船舶载重线公约所确定的适合于所在季节和区域的载重线标志淹没于水中。

7 船舶的装载，当其在海水中时，概不得将适合于该航次及营运状态的分舱载重线淹没于水中。

规 则 14

客船和货船的水密舱壁等的构造与初次试验

1 无论横向或纵向的每一水密分舱舱壁，其构造应能以适当的抗强裕度支持船舶在破损时可能遭受的最大水头的压力，但至少须能支持高达限界线的水头压力。此等舱壁的构造应经主管机关同意。

2.1 舱壁上的阶层及凹折均应水密，并与其所在处所的舱壁具有同等强度。

2.2 如肋骨或横梁穿过水密甲板或舱壁时，此甲板或舱壁应在不用木材或水泥的情况下做成结构上的水密。

3.3 对各主要舱室并不强制进行灌水试验。 但如不进行该项灌水试验，则必须进行冲水试验，此试验应在船舶进行舾装的最后阶段进行。 在任何情况下，都应对水密舱壁进行全面的检查。

4 前尖舱、双层底（包括箱形龙骨）及内侧壳板均应以相当于第1款要求的水头作试验。

5 供装载液体并形成船舶分舱部分的舱柜，应以高达最深分舱载重线或相当于该舱所在处由龙骨上面至限界线高度三分之二的水头，视何者为大而定，试验其密性；但在任何情况下，试验水头不得低于该舱舱顶以上0.90米。

6 第4和5款所述的试验，其目的在于确保分舱结构布置的水密，并非作为该舱用作装载燃油或其他特殊用途的适应性试验；对此项适应性试验，可按照液体进入舱内或其连接部分的高度，要求作更严格的试验。

规 则 15

客船水密舱壁上的开口

1 水密舱壁上的开口，应在适合船舶设计及船舶正常作业的情况下减至最少数量；此等开口均应备有经认可的关闭设备。

2.1 凡管子、流水口和电缆等通过水密分舱舱壁时，应设有保证该舱壁水密完整性的装置。

2.2 不构成管系组成部分的阀不准设在水密分舱舱壁上。

2.3 铅或其他易熔材料，不得用于穿过水密分舱舱壁的管系上，该处在发生火灾时此等管系的损坏将会损害舱壁的水密完整性。

3.1 下列各处不准设门、人孔或出入口：

.1 限界线以下的防撞舱壁；

.2 分隔相邻货舱之间，或货舱与固定或备用煤舱之间的水密横舱壁，但第12款和规则16规定者除外。

3.2 除第3.3款所规定者外，在限界线以下的防撞舱壁上仅可通过一根管子，以处理前尖舱内的液体，但该管应装有能在舱壁甲板上方操作的截止阀，其阀箱应设于前尖舱内并装在防撞舱壁上。

3.3 如前尖舱分隔成装载两种不同的液体，经主管机关同意，除装设第二根管子外无其他切实办法可以代替，且考虑在前尖舱内增加分隔仍保持船舶安全时，则主管机关可允许在限界线以下的防撞舱壁上穿过二根管子；每根管子均应按第3.2款的要求进行装设。

4.1 装于固定和备用煤舱之间舱壁上的水密门，应是随时可以通达的，但第11.2款所规定的甲板间煤舱门除外。

4.2 应以屏隔或其他措施作成适当的布置，以防煤炭阻碍煤舱水密门的关闭。

5 在主副推进机械包括推进所需的锅炉及一切固定煤舱的处所内，其每一主横舱壁上，除通往煤舱及轴隧的门外，不得设置多于一扇的门。 如装有二根或更多的轴，其轴隧之间应设有一个互通的连接过道。 若装设二根轴者，在机器处所与轴隧间仅准设一扇门；如装设二根以上轴者，则仅准设二扇门。 所有此种门均须为滑动式，且应装置于使其门槛尽可能高之处。 由舱壁甲板操纵这些门的手动装置，如能妥善布置其必要的传动系统时，应设于机器处所以外。

6.1 水密门应为滑动门或铰链门或其他等效型式的门。 仅以螺栓紧固的平板门和需借坠落或重物坠落作用关闭的门都不允许使用。

6.2 滑动门可为单一手动式的，或动力和手动式的。

6.3 因此，许可采用的水密门可分为三级：

一级—— 铰链门

二级—— 手动式滑动门

三级—— 动力和手动式滑动门。

6.4 任何水密门的操作装置，无论是否动力操作，均须于船舶向左或向右倾斜至15°时能将门关闭。

6.5 对各级水密门，在看不见门的所有操作站处，均应设有显示该门处于开启或关闭位置的指示器。 不能由总控制站关闭的任何水密门，不论其属于哪一级，应备有机械的、电动的、电话的或其他适宜的直接通信装置，使值班驾驶员能根据事先的命令与负责关闭各该水密门的人员迅速联系。

7 铰链门（一级）应装有能由舱壁两侧都能操作的速闭装置，诸如搭扣之类。

8 手动式滑动门（二级）可为横动式或竖动式。 此门应能在门所在处的两侧操作其机构，此外，并能在舱壁甲板上方可到达之处用全周旋转动作或其他同样安全可靠并经认可的动作方式来进行操作。 如因空间的限制，不可能从两侧操作时，则此项要求可予放宽。 当船舶在正浮位置时，用手动装置将门完安关闭所需的时间应不超过90秒。

9.1 动力式滑动门（三级）可为竖动式或横动式。 如要求由总控制站以动力操作的门，其传动装置的布置也应能在门所在处的两侧用动力操作。 此装置应使该门于总控制站加以关闭后，如由就地控制装置开启，仍能自动关闭；也使任一门能由就地控制系统保持关闭，以防止被上方的控制系统开启。 在舱壁的两侧应设置与动力控制装置相连的就地控制手柄，其布置应使经过此门的人，能把持两侧的手柄，使之处于开启位置，以免关闭机械突然动作。 动力式滑动门应备有可在门的两侧操作的手动装置，并须在舱壁甲板上方可到达之处用全周旋转动作或其他同样安全可靠并经认可的动作方式来进行操作。 应设有音响信号装置，在此门开始关闭、继续移动直至完全关闭为止的期间发出警报。 门的关闭应有充分时间以保证安全。

9.2 至少应有两组独立的动力源以开关所有由其控制的门，每一动力源应能同时对各门进行操作。 此两动力源应由驾驶室的总控制站进行控制，并应备有用以校验每一动力源能圆满工作的一切必要指示器。

9.3 如用液压操作时，每一动力源应包括一个能在60秒钟以内关闭所有各门的泵。 此外，用于整个装置的液体贮存器，应有足够操作所有各门至少3次，即关闭－开启－关闭的容量。 所用的液体应在船舶营运中可能遇到的任何温度下不致冻结。

10.1 旅客、船员及工作处所的铰链水密门（一级），仅准设置于下述甲板以上，即此甲板的底面在船侧的最低点，至少应高出最深分舱载重线2.0米。

10.2 凡水密门的门槛在最深载重线以上但在第10.1款规定的线以下者，应为滑动式，并可为手动式的（二级）；但对于分舱因数小于0.50的从事短程国际航行的船舶，此种门应为动力式。 连通冷藏货物及通风或强制通风管道的围壁通道，当穿过多于一主水密分舱舱壁时，舱壁上开口的门应为动力式。

11.1 有时需在航海中开启的水密门，且其门槛在最深分舱载重线以下者，应为滑动式，并应符合下列规定：

.1 当此类门的数量（不计轴隧入口处的门）超过5扇时，所有这些门及轴隧入口处或通风或强制通风管道的门，应为动力式的（三级），并应能由驾驶室的总控制站同时予以关闭；

.2 当此类门的数量（不计轴隧入口处的门）多于1扇，但不超过5扇；

.2.1 在舱壁甲板以下未设旅客处所的船舶，所有上述的门可为手动式的（二级）；

.2.2 在舱壁甲板以下设有旅客处所的船舶，所有上述的门应为动力式的（三级），并应能由驾驶室的总控制站同时予以关闭；

.3 如船舶上仅有两扇此类水密门，且是位于机器处所或这种处所周围的舱壁内，则主管机关可准许此两门仅为手动式的（二级）。

11.2 装于舱壁甲板以下甲板间内煤舱之间的滑动水密门，有时因整理燃煤须在航海中开启者，此门应由动力操作。 此类门的开启及关闭应记入主管机关所规定的航海日志中。

12.1 如主管机关认为是必需的，则在甲板间内分隔货舱的水密舱壁上可装设适当构造的水密门。 此类门可为铰链式、滚动式或滑动式，但不应为遥控的。 此类门应装在最高处并尽可能远离船壳板，但在任何情况下，其垂直外边概不得位于距船壳板少于规则2定义所指船宽的五分之一，此距离在最深分舱载重线水平面上向垂直于纵中剖面的方向量计。

12.2 此类门应在开航前关妥，并应在航行中保持关闭；此类门在港内开启及船舶离港前关闭的时间应记入航海日志中。 此类门如在航程中是可以到达的，应装

有防止任意开启的装置。 在提出设置此类门时，其数量及布置均应经主管机关特殊考虑。

13 可移式板门不应用于舱壁上，但在机器处所内除外。 此种门应在船舶离港前装在原位，在航行中除紧急情况外不得取下。 装复此种板门时必须审慎，以确保其接缝水密。

14 所有水密门均应在航行中保持关闭，因船舶的操作而必需开启者除外，但在这种情况下应做到随时可以关闭。

15.1 凡由船员舱室通至锅炉舱、用作装设管子及任何其他用途的围壁通道或隧道，如穿过主横水密舱壁者，应为水密，并应符合规则19的要求。 在航行中用作通路的每一围壁通道或隧道，至少其一端的出入口须通过一水密保持到足够高度的围壁通道，使能由限界线以上处所出入。 围壁通道或隧道的另一端出入口，可经过一水密门，其型式按所在位置决定。 此类围壁通道或隧道不得通过在防撞舱壁之后的第一个分舱舱壁。

15.2 如提出需装设穿过主横水密舱壁的强制通风隧道或围壁通道时，应经主管机关特殊考虑。

规 则 16

载运货车和伴同人的客船

1 本规则适用于为载运货车和伴同人员而设计或改建的客船，不论其建造日期如何，但船上人员总数，除规则I/2(e)(i)和(ii)规定的那些人员外，超过12人者。

2 若这类船上的旅客总数，包括伴同车辆的人员在内，不超过 $N = 12 + \frac{A}{25}$ 其中A＝能用于装载货车处所的甲板总面积平方米，而装载车辆处和这类处所出入口的净空高度不小于4米，关于水密门适用规则15.12的规定，除非这些门可设置在分隔装货处所舱壁的任何水平上。 此外，要求在驾驶台设置指示器以自动指示每扇门的关闭和所有门的安全紧固情况。

3 对这类船舶应用本章的规定时，N应取按本规则所核准的船舶可载最大旅客数。

4 对最恶劣营运情况应用规则8时，预计装载货车和集装箱的装货处所的渗透率应用计算来确定，在这类计算中货车和集装箱应假设为非水密，它们的渗透率取65。从事专门业务的船舶，可应用货车或集装箱的实际渗透率。在任何情况下，装载货车和集装箱的装货处所的透渗率应不小于60。

规 则 17

限界线以下客船船壳板上的开口

1 船壳板上的开口数应在适合船舶设计及船舶正常作业的情况下减至最小。

2 任何船壳板开口的关闭设备的布置及效用，应与其预定的用途及装设的位置相适应，一般应经主管机关同意。

3.1 根据现行国际船舶载重线公约要求，舷窗不应设在这样的位置，以致其窗槛低于平行于舱壁甲板边线所绘的线，此线的最低点在最深分舱载重线以上百分之2.5船宽或500毫米，视何者为大而定。

3.2 第3.1款所准许的所有舷窗，凡窗槛低于限界线者，其构造应能有效地防止任何人未经船长许可而开启。

3.3.1 平行于舱壁甲板边线绘一线，其最低点在船舶离开任何港口时的水面以上1.40米加百分之2.5船宽，当第3.2款所述的任何舷窗的窗槛低于此线时，则此甲板间的所有舷窗在船舶离港前应关闭水密并加锁，此等舷窗在船舶到达下一个港口前不得开启。在引用本款时，如适用，则可计入适量的淡水宽限。

3.3.2 此类舷窗在港内开启的时间及船舶离港前将其关闭和加锁的时间，均应记入主管机关规定的航海日志中。

3.3.3 当任何船舶浮置于其最深分舱载重线，而有一或数个舷窗位置适用第3.3.1款要求时，主管机关可指明其限制平均吃水，在此吃水时若此等舷窗窗槛将高出平行于舱壁甲板边线所绘的线，其最低点在此限制平均吃水的相应水线以上1.4米加百分之2.5船宽，则在此限制平均吃水的情况下，可准许该船离港而不必事先将这类舷窗关闭和加锁，而在开往下一港口的航程中，由船长负责可准许在海上开启该窗。在现行国际船舶载重线公约定义所指的热带地区内，此限制吃水可增加0.3米。

4 所有舷窗均应装设有效的内部铰链舷窗盖，其布置应能方便和有效地关闭及紧固成水密；但在距首垂线八分之一船长以后，且在平行于舷壁甲板边线，而其最低点在最深分舱载重线以上3.7米加百分之2.5船宽所绘的线以上者，则除统舱外的旅客舱室的舷窗盖可为可移式的，但按现行国际船舶载重线公约要求永久附着于其应在位置者除外。此类可移式舷窗盖应存放于其所属的舷窗附近。

5 航行时不能到达的舷窗及其舷窗盖，应在离港前关闭并扣紧。

6.1 凡专供载货或装煤的处所不得装设舷窗。

6.2 供交替载货或载客的处所，可装设舷窗，但其构造须能有效地防止任何人未经船长许可而开启舷窗或舷窗盖。

6.3 如在此类处所装货时，舷窗及其舷窗盖应在装货前关闭水密和加锁，而此项关闭和加锁应记入主管机关规定的航海日志中。

7 除经主管机关特准外，不应在限界线下的船壳板上装设自动通风舷窗。

8 船壳板上的流水口、卫生水排泄孔及其他同类开口，应减至最少数量，或采取每个排水口供尽可能多的卫生水管及其他管道共用，或采用其他适当的办法。

9.1 船壳板上的所有进水孔及排水孔，均应装设防止海水意外进入船内的有效并可到达的装置。

9.2.1 根据现行国际船舶载重线公约要求和除了第9.3款规定以外，凡穿过船壳板而来自限界线以下处所的每一独立排水孔，应设有一个自动止回阀，此阀应具有由舷壁甲板以上将其关闭的可靠装置，或者代以两个无此项关闭装置的自动止回阀，其较高者应设于最深分舱载重线以上，以便在营运状态下能随时到达查验，此阀并应为经常关闭的型式。如设置具有可靠关闭装置的阀，其在舷壁甲板以上的操作位置应随时易于到达，并应备有表明阀门开启或关闭的指示装置。

9.2.2 现行国际船舶载重线公约的要求应适用于穿过船壳板而来自限界线以上处所的排水孔。

9.3 与操作机器有关的机器处所主、辅海水进水孔和排水孔，应在管系与船壳板间或管系与附着于船壳板的组合箱之间装设易于到达的阀门。阀门可在当地控制，并应备有表明阀门开启或关闭的指示器。

9.4 所有本规则要求的船壳配件和阀门应为钢质、青铜或其他经认可的延性材质。普通铸铁或类似材质的阀不能采用。本规则所指的所有管子应为钢质或主管机关认为满意的其他等效材质。

10.1 设于限界线以下的舷门、装货门及装煤门，均应具有足够的强度。 此类门须于船舶离港以前切实关闭和紧固成水密，并应在航行中保持关闭。

10.2 此类门的最低点一概不得低于最深分舱载重线。

11.1 每一出灰管、垃圾管等等的船内开口，均应装以有效的盖子。

11.2 如船内开口位于限界线以下，此盖应为水密的，并应在最深分舱载重线以上易于到达处所，在管内增设自动止回阀。 当此管不使用时，其盖及阀均应保持关闭并扣紧。

规 则 18

客船和货船的水密门、舷窗等的构造和初次试验

1 客船：

.1 本规则所述的一切水密门、舷窗、舷门、装货门、装煤门、阀门、管子、出灰管及垃圾管的设计、材料及构造，均应经主管机关同意。

.2 竖动式水密门的门框，其底部不得有可能积聚污秽的槽，以免妨碍门的正常关闭。

2 客船和货船的每扇水密门应作水头分别高达舱壁甲板或干舷甲板的水压试验。 此试验应在船舶投入营运之前，于该门安装前或装妥后进行。

规 则 19

客船和货船的水密甲板、围壁通道等的构造和初次试验

1 水密甲板、围壁通道、隧道、箱形龙骨及通风管道，均应与在同一高度的水密舱壁具有同等的强度。 作成水密的措施与关闭其开口的装置，均须经主管机关同意。 水密通风管道及围壁通道在客船上应至少向上延伸到舱壁甲板，在货船上应至少向上延伸到干舷甲板。

2 在完工以后，水密甲板应作冲水或灌水试验，而水密围壁通道、隧道和通风管道则应作冲水试验。

规 则 20

限界线以上的客船水密完整性

1 主管机关可要求采取一切合理和可行的措施，以限制海水在舱壁甲板以上浸入及漫流。 此类措施可包括装设局部舱壁或桁材。 当局部水密舱壁或桁材装于主分舱舱壁上方或紧靠其附近的舱壁甲板上时，应与舱壁甲板及船壳板水密连接，以使在船舶破损倾斜的情况下限制海水沿甲板漫流。 如局部水密舱壁与其下方的舱壁错开，则两者间的舱壁甲板应作成有效的水密。

2 舱壁甲板或其上一层甲板应为风雨密。 露天甲板上的所有开口，应设有足够高度和强度的围板，并须设有能迅速关闭成风雨密的有效设备。 应按需要，装设排水口、栏杆及流水口，以便在任何天气情况下能迅速排除露天甲板上的积水。

3 在限界线以上船壳板上的舷窗、舷门、装货门和装煤门以及关闭开口的其他装置，应就其所装设的处所及其相对于最深分舱载重线的位置，作有效的设计与构造，并应具有足够的强度。

4 在舱壁甲板以上第一层甲板以下处所内的所有舷窗，应备有有效的内侧舷窗盖，其布置须能使之易于有效地关闭，并紧固成水密。

规 则 21

舱底排水设备

1 客船和货船

1.1 应备有有效的舱底排水设备，以能抽除及排干任何水密舱，固定用来装载淡水、压载水、燃油或液体货物，并在所有实际情况下备有其他有效抽除措施的处所除外。 冷藏舱应设置有效的排水装置。

1.2 卫生泵、压载泵及通用泵，如与舱底排水系统有必要的连接者，均可作为独立的动力舱底泵。

1.3 所有用于煤舱或燃油贮存舱柜内及其在下方处所，或用于锅炉舱或机器处所内，包括设置于澄油柜或燃油泵所在处所内的舱底水管，应为钢质或其他认可的材质。

1.4 舱底及压载管系的布置，应能防止水自海上或自压载水舱进入货舱及机器处所，或自一舱进入另一舱的可能性。 对于连接舱底排水管及压载管的任何深舱，应设有设施以防在装有货物时不慎灌入海水，或在装有压载水时由舱底排水管抽出压载水。

1.5 所有与舱底排水设备有关的分配箱和手动阀，应设在通常情况下可以到达之处。

2 客船

2.1 第1.1款要求的舱底排水设备，在海事后所有实际可能的情况下，无论船舶正浮或倾斜，应能操作。 为此，通常应设侧吸水管，除非在船舶两端的狭窄舱室内，设一根吸水管可能已足够。 对形状特殊的舱可要求增设吸水管。 舱内布置应使水能流至吸水管。 对于某些个别舱室，主管机关认为不一定需要设置排水设备时，如按规则8.2.1至8.2.3规定的条件计算证明无损于船舶安全者，得免予设置。

2.2 至少应有三台与舱底总管连接的动力泵，其中一台可为推进机械带动的。如其衡准数为30或以上，则应增设一台独立动力泵。

2.3 如实际可行时，动力舱底泵应置于分开的水密舱内，其布置或位置应使这些舱室不致因同一破损而浸水。 如主推进机械、副机和锅炉置于两个或两个以上的水密舱内，则用作舱底排水的各泵应尽可能远离地分布于这些舱内。

2.4 长度为91.5米和以上或衡准数为30或以上的船舶，当处于船舶应当经受住的一切情况下其抽水布置应至少有一台动力泵可供使用，按下列要求布置即可满足要求：

.1 所需各泵中的一台是可靠的可潜式应急泵，其动力源位于舱壁甲板以上；或

.2 舱底水泵及其动力源要在整个船长内分布，在未破损的一舱内至少有一台泵可供使用。

2.5 除仅供尖舱专用的附加泵外，所需的每一舱底泵的布置应能从第1.1款所要求的任何处所抽水。

2.6 每一动力舱底水泵应能通过所需的排水总管用不小于2米/秒的速度抽水。位于机器处所内的独立动力舱底泵应有自各该处所的直接吸水管，但此种吸水管在

任一处所内应不多于2根。 如设有2根或以上的此种吸水管，则船舶的每舷应有1根。 主管机关可要求在其他处所内的各独立动力舱底泵备有单独的直接吸水管。各直接吸水管应适宜地布置，而在机器处所内的直接吸水管的直径，不应小于对舱底排水总管所要求的直径。

2.7.1 除直接舱底吸水管或第2.6款要求的吸水管外，在机器处所内应增设1根自主循环水泵引至机器处所排水水准面的直接吸水管，此管应装有止回阀。 此直接吸水管的直径，对蒸汽机船至少应为循环水泵进口直径的三分之二，对柴油机船则与循环水泵进口的直径相等。

2.7.2 如主管机关认为主循环水泵不适宜作此用途时，则应自可用的最大独立动力泵引一根直接应急舱底吸水管至机器处所排水水准面；此管的直径应与所用泵的主进水管口相同。 如此连接的泵的排量应超过所要求舱底泵的排量，其超过量应经主管机关同意。

2.7.3 海水进水阀及直接吸水管阀的阀杆，应延伸至机舱平台以上相当高度处。

2.8 所有舱底吸水管系，直至与泵连接为止，应与其他管系独立。

2.9 舱底水总管的直径d应按下列公式计算。 但是舱底水总管的实际内径可按主管机关所能接受的最接近标准尺寸取整：

$$d = 25 + 1.68\sqrt{L(B+D)}$$

式中d是舱底总管的内径毫米；

L和B是规则2定义所指的船长和船宽米；和

D是至舱壁甲板的型深米。

舱底支管的直径应符合主管机关的要求。

2.10 应设有设施以防装有任何舱底吸水管的舱室因管子被截断或因碰撞或搁浅而使其他任何舱室内管子受损时，使此舱浸水。 为此，凡此水管的任何部分位于距船侧不足（规则2定义所指在最深分舱载重线水平面上向垂直于纵中剖面的方向量计的）船宽的五分之一或在箱形龙骨内者，应在其开口端所在舱室内管子上装有止回阀。

2.11 与舱底排水设备有关的分配箱、旋塞及阀门应布置成浸水时舱底水泵之一能用于任何舱室；此外，在距船侧五分之一船宽所绘一线以外的舱底泵或其与舱底水总管连接的管子损坏时，不应使舱底水系统丧失作用。 如仅有一组管子为各泵共用时，则控制舱底吸水管所必需的阀，须能自舱壁甲板以上操作。 若设有应急舱底排水系统以补充主舱底排水系统，则该应急系统应独立于主系统，并按 2.1 段的规定布置成浸水时有一泵能用于任一舱室；在此情况下，只有操作应急系统所需的阀需要能在舱壁甲板以上操作。

2.12 第2.11款所述的能自舱壁甲板以上操作的一切旋塞和阀门，在它们的操作处所应有明显标志的控制器，并应备有指示其开启或关闭的装置。

3 货船

至少应备有与主舱底排水系统连结的两台动力泵，其中一台可由推进机械带动。 如主管机关认为不损害船舶的安全，特殊的舱室可免掉舱底排水设备。

规 则 22

客船和货船的稳性资料 *

1 每艘客船，不论其大小如何，和按现行国际船舶载重线公约的规定船长为24米和以上的每艘货船，应在完工时作倾斜试验，并确定其稳性要素。 应将主管机关同意的这类资料给船长，这是使船长在各种营运状态下能以迅速而简便的方法获得有关船舶稳性的正确指导所必需者。 应将稳性资料的副本一份提供给主管机关。

2 如船舶作某种改建以致对供给船长的稳性资料有实质性影响时，应提供修正的稳性资料。 必要时，船舶应重作倾斜试验。

3 主管机关得准许某一船舶免作倾斜试验，但须具有由其姐妹船作倾斜试验所得的基本稳性数据，且经主管机关同意认为可由此基本数据求得所免除船舶的可靠稳性资料。

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* 参阅本组织通过的大会 167(ES Ⅳ) 号决议关于船长不足 100 米的客船和货船完整稳性的建议案以及本组织通过的大会 206(Ⅶ)号决议对此建议案的修正。

4 如参考类似船舶的已有数据，能明显表示由于该船的尺度比例及布置，在一切可能的装载情况下，具有大于足够的初稳心高度时，主管机关也可准许某一船舶或某一类船舶免作倾斜试验，特别是专门设计用来载运散装液体货或矿石的船舶。

规 则 23

客船破损控制示意图

船上须固定展示表明各层甲板及货舱的水密舱室界限、界限上的开口及其关闭方法与控制位置，以及用于校正浸水倾斜的装置的示意图，以供值班高级船员参考。 此外，应供给船上高级船员以载有上述资料的小册子。

规 则 24

客船水密门等的标志、定期操作及检查

1 本条规则适用于所有船舶

2.1 水密门、舷窗、阀门以及流水口、出灰管与垃圾管的关闭机械的操作演习，应每周举行一次。 对航期超过一周的船舶，在离港前应举行一次全面演习，此后在航行中至少每周举行一次。

2.2 在所有船舶的主横舱壁上的一切水密门，不论是动力操作的还是铰链操作的，凡需在航海中使用者，应每天进行操作。

3.1 水密门及与其连接的所有机械与指示器、为使舱室水密所必需关闭的一切阀门及为海损控制横贯连通所必需操作的一切阀门，应在航行中定期检查，每周至少一次。

3.2 这类阀门、门及机械装置，应作适当的标志，以保证其正确使用而策最大安全。

规 则 25

客船航海日志的记载

1 本条规则适用于所有船舶。

2 本规则要求在航行中保持关闭的铰链门、可移式板门、舷窗、炫门、装货门、装煤门及其他开口，均应在船舶离港前关闭。 关闭的时间及开启的时间（如本规则所准许者），应记入主管机关所规定的航海日志中。

3 规则24所要求的一切演习和检查的记录，均应记入航海日志中，并明确记载所发现的任何缺点。

第三节—— 机器设备

（除另有明文规定之处外第三节适用于客船和货船）

规 则 26

通 则

1 机器、锅炉和其他受压容器，连带的管系和属具等设计和构造应适合于它们的用途，并在充分注意到运动部件、热表面和其他危险情况下，应如此安装和保护以使对船上人员的任何危险减至最小。 设计应注意到结构所用材料，设备的用途，会遇到的工作条件和船上环境条件。

2 主管机关应特别关心单一的重要推进部件的可靠性，并可要求，特别是在非常规布置情况下，备有足以使船舶保持航行速度的独立推进动力源。

3 应备有措施以使即使必须的辅机之一损坏的情况下推进机械的正常操作能够维持或恢复。 应特别注意下列设备的故障：

.1 作为主电源的发电机组；

.2 蒸汽供应源；

.3 锅炉供水系统；

.4 锅炉或机器的燃油供应系统；

.5 润滑油压力源；

.6 水压源；

.7 凝水泵和保持冷凝器真空的装置；

.8 锅炉的机械供气；

.9 空气压缩机和起动或控制用空气瓶柜；

.10 主推进机械，包括可控螺距推进器的液压、气动或电动控制装置。

但是，经考虑到全面安全情况后，主管机关可同意将推进能力较之正常操作作部分降低。

4 应提供措施以保证在没有外来帮助情况下使机器从死船状态运转起来。

5 所有锅炉、机器的所有部分、所有蒸汽、液压、气动和其他系统，以及经受内部压力的它们的连带属具，在首次投入使用前，应经受包括压力试验在内的相应试验。

6 主推进机械和对船舶推进和安全必须的一切辅机，应配合船舶设计成在下述情况下能运转，即当船舶正浮时和当船舶在静止情况下向任一舷倾斜直至15°和在运动情况下（横摇）向任一舷横倾22.5°和同时向艏或艉纵倾（纵摇）7.5°。主管机关经顾及船舶的型式、尺度和营运条件可允许偏离这些角度。

7 应作出规定以利对主推进机械和辅机，包括锅炉和受压容器的清洁、检查和维修保养。

8 应特别注意推进机械系统的设计、构造和安装，以使在正常运转范围内机械的任何振动状态不应在机器内部起过度应力。

规 则 27

机 器

1 当机器存在超速的危险时，应提供措施以保证不超过安全速度。

2 当主机或辅机，包括受压容器或这类机器的任何部分经受内部压力或可能经受危险的超压时，应提供措施以实际防止这类过分的压力。

3 所有齿轮装置和每根轴与轴承，用以将动力传输至对于船舶推进、船舶安全和船上人员安全必须的机器者，其设计和构造应经得住一切作业情况下会产生的最大工作应力，并应充分考虑驱动它们或由它们所组成的机器型式。

4 缸径为200毫米或曲柄箱容积为0.6立方米或以上的内燃机，应备有适当型式和足够卸压面积的曲柄箱爆炸卸压阀。 卸压阀的布置或提供的措施应保证阀中的排出物对人员伤害的可能性降至最小。

5 主涡轮推进机械和，如适用时，主内燃推进机械和辅机，应备有发生故障时能自动关闭的装置。 这类故障，诸如燃油供应故障等，可能导致机械的整个破坏，严重损伤或爆炸。 主管机关可允许采用快速自动关闭装置。

规 则 28

后 退 措 施

1 船舶应备有足够的后退能力，以保证在一切正常情况下能适当控制船舶。

2 在一定时间内使推进器换向和在合理的距离内使船舶从最大营运前进速度到停止的机器能力，应作试验并记录。*

3 航行试验中记录在案的停船时间、船舶航向和距离，连同多推进器船舶在一个或多个推进器不工作情况下所作的航行和操纵试验测定的船舶能力的结果，应备在船上以供船长或指派的人员使用。*

4 具有操纵或停船补充措施的船舶，应按第2和3款所述对这些措施作试验并记录。

规 则 29

操 舵 装 置

1 除另有明文规定外，每艘船舶应配备主管机关认为满意的主操舵装置和辅助操舵装置。 主操舵装置和辅助操舵装置的安排应使即使两者之一发生故障也不致导至另一装置不能工作。

2.1 操舵装置的部件和舵杆应为主管机关认为满意的合理和可靠的构造。 对于不是双套的任何重要部件的适用性应特别注意。 任何这类部件，如合适时，应采用减摩轴承，诸如滚珠轴承、滚柱轴承或持久润滑或备有润滑属具的套筒轴承。

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* 参阅本组织通过的大会209(Ⅶ)号决议关于应纳入操纵手册的资料的建议。

2.2 通过计算以确定承受内部液压的管系和其他操舵装置部件尺度的设计压力应不小于第3.2款所指操作情况下可预期的最大工作压力的1.25倍，同时要考虑在该系统低压一侧可能存在的压力。 根据主管机关的意见，考虑到动力负荷所产生的抖动压力，管系和部件的设计应采用疲劳衡准。

2.3 在液压系统中能够隔断的和由于动力源或外力作用能形成压力的任何部位，应设置卸压阀。 卸压阀应调整成不超过设计压力。 卸压阀应有足够尺度和布置成能够防止超过设计压力的过分压力升高。

3 主操舵装置和舵杆应：

.1 有足够强度，并能在应用试验证明的最大营运前进航速情况下操纵船舶；

.2 能在船舶最深航海吃水和以最大营运前进航速前进时将舵自一舷35°转至另一舷35°，以及于相同条件下在不超过28秒钟内将舵自一舷35°转至另一舷30°；

.3 当为满足第3.2款要求有需要时和除了在冰中航行要加强以外，在主管机关要求舵柄处舵杆直径大于120毫米的任何情况下由动力操作；

.4 设计成在最大后退航速时不致损坏；但是这个设计要求不需要用最大后退航速和最大舵角的试验来证明。

4 辅助操舵装置应：

.1 有足够强度和足以在可驾驶的航速下操纵船舶，并能于紧急时迅速投入行动；

.2 能在船舶最深航海吃水和以最大营运前进航速的一半或7节前进时，视何者为大而定，在不超过60秒钟内将舵自一舷15°转至另一舷15°；

.3 当为满足第4.2款要求有需要时和在主管机关要求舵柄处舵杆直径大于230毫米的任何情况下，除了在冰中航行要加强以外，由动力操作。

5 主操舵装置和辅助操舵装置动力设备应：

.1 布置成动力发生故障后经修复时能自动再启动；

.2 能从驾驶台使之投入运行。 任何一台操舵装置动力设备发生动力故障时，在驾驶台应发出能视听的警报。

6.1 主操舵装置包含两台或更多台同一的动力设备，不需设置辅助操舵装置，如果：

.1 在客船上，当任一台动力设备不能运转时，主操舵装置能按第3.2款所要求操纵舵；

.2 在货船上，当所有动力设备都运转时，主操舵装置能按第3.2款所要求操纵舵；

.3 主操舵装置布置成当其管系或一台动力设备发生单一故障时，缺陷能加以隔离，从而保持或迅速再次获得操舵能力。

6.2 直至1986年9月1日为止，主管机关可同意设置具有可靠性记录但不符合第6.1.3款对液压系统要求的操舵装置。

6.3 非液压型式的操舵装置应达到本款的同等标准，并经主管机关同意。

7 操舵装置的控制应：

.1 对于主操舵装置，在驾驶台和操舵装置室等两个地点均能进行；

.2 当主操舵装置按照第6款布置，由两个均能在驾驶台操作的独立控制系统来控制。 这并不要求设两套舵轮或操舵杆。 控制系统由液压舵机传动装置组成时，除了一万总吨和以上的油船、化学品船或气体运载船外，不必设置第二个独立控制系统；

.3 对于辅助操舵装置，在操舵装置室进行，如系动力操纵，也应能在驾驶台进行，并应独立于主操舵装置的控制系统。

8 能从驾驶台操作的任何主操舵装置和辅助操舵装置的控制系统应符合下列要求：

.1 如系电动者，应由操舵装置电力网在操舵装置室内的一点供电的该系统自己的独立电路来供电或者由配电板上邻近于操舵装置电力网供电处的一点直接从配电板汇流排来供电；

.2 应在操舵装置室内备有将驾驶台操作的任何控制系统与它服务的操舵装置断开的装置；

.3 此系统应能由驾驶台使之投入操作。

.4 当控制系统的电源供应发生故障时，应在驾驶台发出能视听的警报。

.5 只应对操舵装置的控制供电线路配备短路保护。

9 本条规则和规则30要求的电力网和操舵装置控制系统及其附带部件、电缆和管子应在它们的整个长度范围内尽可能地分离。

10 驾驶台与操舵装置之间应备有通讯手段。

11 舵角位置应：

.1 当主操舵装置系动力操作者，在驾驶台显示。舵角的指示应与操舵装置控制系统独立；

.2 能在操舵装置室内辨认出来。

12 液力操作的操舵装置应备有：

.1 参照液压系统的型式和设计，保持液体清洁的装置；

.2 每个液体贮存器的低位警报器，以便实际上尽早地指示液体的泄漏。在很快能够发现泄漏的驾驶台和机器处所，发出声响和能见的警报；和

.3 当主操舵装置要求动力操纵时，容量足以至少再次为一个动力传动装置包括贮存器充液的固定储存柜。储存柜应用管系固定联结以使能从操舵装置室内一处很快地再次为液压系统充液，并应备有容量表。

13 操舵装置室应：

.1 能迅速到达，并实际可行地远离机器处所；和

.2 备有适当装置以保证通到操舵机械和控制器的工作通道。这些装置包括扶手栏杆和格子板或其他防滑面板以保证液体泄漏时的适宜工作条件。

14 除了在冰中航行要加强以外，舵柄处舵杆直径要求大于230毫米，应备有由应急电源或位于操舵装置室内的独立动力源在45秒内自动供电的备用动力，其容量应至少足以供应符合第4.2款要求的操舵装置动力设备以及其联带控制系统和

舵角指示器。此独立动力源应为此目的专用。每艘一万总吨和以上的船舶，备用动力应具有至少连续运转30分钟的功率，在任何其他船舶上则至少10分钟。

15 一万总吨和以上的每艘油船、化学品船或气体运载船和七万总吨和以上的每艘其他船舶，主操舵装置应由符合第6款规定的两个或更多个同一的动力设备组成。

16 一万总吨和以上的每艘油船、化学品船或气体运载船应除第17款外符合下述要求：

.1 主操舵装置应这样布置，即由于主操舵装置某个动力传动系统的任何部分，除了舵柄、舵扇或为同样目的服务的部件以外，发生单一故障或舵传动装置损坏以致丧失操舵能力，在这个动力传动系统丧失工作能力后不超过45秒钟内能够重新获得操舵能力。

.2 主操舵装置应包括：

.2.1 两个独立和单独的动力传动系统，每个系统均能满足第3.2款的要求；或

.2.2 至少两个同一的动力传动系统，在正常运转中能同时工作者，应能满足第3.2款的要求。当需要符合此要求时，液力传动系统应备有交叉联结。一个系统中液体的流失应能发现，有缺陷的系统应能自动隔离以使一个或多个其他传动系统能保持全面运转。

.3 非液压型式的操舵装置应能达到同等标准。

17 一万总吨和以上，但小于十万载重吨的油船、化学品船或气体运载船，对于舵的一个或多个传动装置不适用单一故障衡准者，如果能够达到同等安全标准和符合下列条件，则可允许采用不同于第16款规定的其他解决办法：

.1 由于管系或一个动力装置的任何部分发生单一故障而丧失了操舵能力，在45秒钟内应能重新获得操舵能力；和

.2 操舵装置只包含单一的舵传动装置，应特别注意对使用的材料，密封装置的安装、试验检查和有效的维护规定作设计的应力分析，包括疲劳分析和破断力学分析，如适当的话。在考虑上述各点时，

主管机关应采用包括本组织通过的一万总吨和以上但小于十万载重吨油船非双套舵传动装置验收原则的规定在内的各条规则。*

18 对于一万总吨和以上但小于七万载重吨的油船、化学品船或气体运载船，直至1986年9月1日为止，主管机关可接受具有可靠性记录但不符合第16款对液压系统所要求单一故障衡准的操舵装置系统。

19 1984年9月1日以前建造的一万总吨和以上的每艘油船、化学品船或气体运载船应在1986年9月1日以前符合下列要求：

.1 第7.1、8.2、8.4、10、11、12.2、12.3和13.2等款的要求；

.2 两个独立操舵装置控制系统，每个系统应能由驾驶台操作。这点并不要求双套舵轮或操舵杆；

.3 如正在操作的操舵装置控制系统发生损坏，第二个系统应能由驾驶台立刻投入操作；和

.4 每个操舵装置控制系统，如系电动者，应由操舵装置电力网供电的该系统自己的独立电路或者由邻近于操舵装置电力网供电处的一点直接从配电板汇流排来供电。

20 作为第19款要求的补充，1984年9月1日以前建造的四万总吨和以上的每艘油船、化学品船或气体运载船，在不晚于1988年9月1日，其操舵装置应布置成管系或一台动力设备发生单一故障，操舵能力能够保持或舵的运动能加以限制以使操舵能力能迅速重新获得。这点应由下列方式来实现：

.1 管束舵的独立设备；或

.2 速动阀，可用人力操作将一个或多个传动装置与外部液压管系隔离开，连同用固定的独立动力操作泵和管系来直接补充传动装置的设备；或

.3 液压动力系统交叉联结时，能使一个系统中液体的流失即能发现和有缺陷的系统能自动或由驾驶台加以隔离以使其他系统能保持全面运转的安排。

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* 参阅本组织通过的大会467(XII)号决议，关于接受一万总吨和以上但小于十万载重吨油船、化学品船和气体运载船非双套舵传动装置验收原则。

规 则 30

电动和电动液压操舵装置的补充要求

1 指示电动和电动液压操舵装置的电动机正在运转的设备应设置在驾驶台和适当的主机控制位置。

2 由一或更多的动力设备组成的每一电动或电动液压操舵装置至少要由主配电板直接供给的两个专用电路来供电；但是，其中之一可以由应急配电板供电。与电动或电动液压操舵装置联合的辅助电动或电动液压操舵装置可与供给此主操舵装置电力的电路之一接通。供给电动或电动液压操舵装置的电路应有足够容量以向能够同时与它接通和要求同时工作的所有电动机供电。

3 这类电路和电动机应备有短路保护和过载报警装置。包括起动电流（如有时）在内的过量电流保护，应不小于所保护电路或电动机全负荷电流的两倍，并应布置成能允许适当的起动电流通过。如采用三相供电，应备有能指示任一相发生故障的报警装置。本项所要求的警报应既是声响的又是能见的，并应按规则51的要求和位于主机处所或通常控制主机的控制室内显著位置。

4 在小于1,600吨的船上，按规则29.4.3要求为动力操纵的辅助操舵装置不是电动的或由原来用作其他目的的电动机来操作者，主操舵装置可由来自主配电板的一路电路供电。当这类原来用作其他目的的电动机作为这种辅助操舵装置的动力，如主管机关对于适用于辅助操舵装置的规则29.5.1和.2以及29.7.3的要求与保护装置认为满意时，可免除第3款的要求。

规 则 31

机 器 的 控 制

1 主机和对船舶推进和安全必须的辅机应有有效的操纵和控制装置。

2 如备有推进机械的遥控装置的驾驶台和机器处所有人值班，则应适用下列各点：

.1 在一切航海情况包括操纵情况下，速度、推力方向，如适用时还有推进器的螺距应能由驾驶台完全控制。

.2 每一独立推进器的遥控应由一个设计和构造成操作时不需对机器的操作细节给予特别注意的控制装置来执行。 如多个推进器按设计为同时操作，可以由一个控制装置来控制。

.3 主机应配备能自驾驶台操作的、独立于驾驶台控制系统的紧急停机装置。

.4 来自驾驶台的推进机械指令应在主机控制室或适当的操纵平台指示出来。

.5 推进机械只能在一个时间由一处进行遥控；在这类处所可允许内连控制位置。 每一处所应有指示何处在控制推进机械的指示器。在驾驶台和机器处所之间的控制转换，应只能在主机器处所或主机控制室来进行。 此系统应包含由一处将控制转换到另一处时防止推进器推力发生极大变更的装置。

.6 即使遥控系统的任何一部分发生故障，推进机械应能在当地进行控制。

.7 遥控系统的设计应在发生故障时能给出警报。 除非主管机关认为不可行以外，在当地控制进入操作以前预定的推进器速度和推力方向仍应保持。

.8 驾驶台应设置指示器以指示；

.8.1 固定螺距推进器时，推进器速度和转动方向；

.8.2 可控螺距推进器时，推进器速度和螺距状态；

.9 在驾驶台和机器处所应备有报警装置以指出能再次起动主机的起动空气的低压。 如推进机械的遥控系统设计成自动起动，起动失败的自动连续尝试数应加限制，以使当地起动时能有足够的起动空气压力。

3 当主推进机械和连同的机械，包括主电源在内，其自动化或遥控的程度不同，并在控制室内有连续的人员监控，这种布置和控制应设计、配备和安装成机器的运输具有同样的安全和可靠程度如同处于直接监控之下，为此应适当应用规则46到50。 对于这类处所的防火和浸水应给予特别注意。

4 总的来说，自动起动、操纵和控制系统应包括人力能替代自动控制的装置。这类系统的任何部分发生故障应不致妨碍使用人力替代装置。

规 则 32

蒸汽锅炉和蒸汽供给系统

1 每台蒸汽锅炉和每一非燃烧蒸汽发生器应备有至少两个足够容量的安全阀。但是，经考虑任何锅炉或非燃烧蒸汽发生器的产汽量或任何其他特性，如主管机关认为过压已得到充分保护，可允许只设一个安全阀。

2 预定为无人监控的每台燃油锅炉，应有水位过低、空气供给发生故障或燃烧发生故障时能关闭燃油供应和发出警报的安全装置。

3 为涡轮推进机械服务的水管锅炉应安设高水位报警装置。

4 提供对船舶安全所必须的服务或由于其供水故障可能导致危险的每一蒸汽发生系统，应备有不少于两个来自供给泵并包括供给泵在内的独立供水系统，但单一的贯穿汽鼓是可以接受的。 除非泵的特性能防止超压，应备有装置以防止此系统的任何部分超压。

5 锅炉应备有监视和控制供水质量的装置。 应有适当布置尽实际可行地阻止严重影响锅炉的油或其他污物进入锅炉。

6 对船舶安全所必须并设计成含有特定水位的水的每台锅炉，应备有至少两个指示水位的装置，至少其一应是直接读数的玻璃管水位表。

规 则 33

蒸 汽 管 系

1 每一蒸汽管和蒸汽可能通过的管系上每一属件应设计、构造和安装成能承受它们可能遭到的最大工作应力。

2 可能不同程度地发生危险性水击的每一蒸汽管应备有泄水装置。

3 可能自任何来源接受较其设计压力为高的蒸汽管或属件，应安设适当的减压阀、释放阀和压力表。

规 则 34

空气压力系统

1 在每艘船上，压缩空气系统的任何部分和由于承受空气压力部分的泄漏会导致危险超压的空压机和空冷机水套或水箱处应备有防止超压装置。 所有系统应备有适当的压力释放装置。

2 主推进内燃机的主起动空气装置应有防护起动空气管中背火和内部爆炸影响的足够保护。

3 起动空压机的所有排放管应直接通至起动空气储存器，由空气储存器通至主机或辅机的所有起动空气管应完全与压缩机的排放管系隔开。

4 应采取措施以使进入空气压力系统的油降至最少，并为这些系统泄油。

规 则 35

机器处所的通风系统

1 A类机器处所应有足够的通风，以保证其中的机器或锅炉在所有气候包括恶劣气候条件下全功率运转时，该处所保持对人员安全和舒适以及机器运转来说充足的空气供应。 任何其他机器处所应有适合于该机器处所目的的充足通风。

规 则 36

噪 音 的 防 护 *

应采取措施将机器处所的机器噪音减至主管机关确定的允许强度。 如噪音不能充分地降低，过度的噪音源应适当地隔离或隔绝，或者如该处所有人值班应配备噪音隔音装置。 如需要，进入这类处所的人员应配备护耳器。

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* 参阅本组织通过的大会 468(XII)号决议关于船上噪音强度规则。

规 则 37

驾驶台与机器处所之间的通信

至少应配备两个独立装置以自驾驶台将车铃传递至机器处所或控制室内通常控制机器的位置：其一应为在机器处所和驾驶台等两处均能将车铃和复述用能见的信号指示出来的机舱车钟。 应配备通向可能控制机器的任何其他位置的适当通信装置。

规 则 38

轮机员的警报装置

应配备能由机器控制室或操纵平台（如适当时）来操作的轮机员警报装置，并能在轮机员舱室中清晰地听到。

规 则 39

客船应急装置的位置

电力的应急电源、消防泵、除了防撞舱壁以前处所专用舱底泵以外的舱底泵、第II－2章要求的任何固定灭火系统和对船舶安全所必须的其他应急装置，除了锚机以外，不应安装在防撞舱壁以前。

第四节——电气装置

（除另有明文规定者外，第四节适用于客船和货船）

规 则 40

通 则

1 电气设备应是：

.1 保持船舶处于正常操作和可居住情况下所必需的所有辅助用电得以保证而不求助于应急电源；

.2 在各种应急情况下，能保证对安全所必需的用途供电；

.3 能确保旅客、船员和船舶的安全，免受电气事故的危害。

2 主管机关应采取相应步骤，以保证本节关于电气装置的各项规定能得到统一的执行和应用。*

规 则 41

主电源和照明系统

1.1 应配备其功率足以供给规则 40.1.1 所述所有用途的主电源。主电源应至少由两套发电机组所组成。

1.2 这些发电机组的功率，应是当任一发电机组停止供电时，应仍能保证正常推进和安全所必须用途的供电。最低舒适居住条件，至少包括烹调、取暖、生活冷冻、机械通风、卫生和淡水等充分用途，也应保证。

1.3 船舶主电源的布置应是：不管推进机械或轴系的速度和方向如何，规则 40.1.1 所指的那些用途能得到维持。

1.4 此外，发电机组应保证任一发电机或初级电源损坏，其余发电机组应能向使主推进装置自死船状态起动所必须的用途供电。如应急电源单独或与任何其他电源组合的功率足以同时向规则 42.2.1 至 42.2.3 或 43.2.1 至 43.2.4 所需用途供电，则此应急电源可用作自死船状态起动的目的。

1.5 如变压器组成本款所要求供电系统的必要部分，此系统应布置成保证本款所述的同样供电连贯性。

2.1 向旅客或船员通常到达和使用的船舶各个部分提供照明的主电力照明系统应由主电源供电。

2.2 主电力照明系统的布置应是：主电源、随同变压设备，如有，主配电板和主照明配电板所在处所发生火灾或其他事故，不应使规则 42.2.1 和 42.2.2 或 43.2.1、43.2.2 和 43.2.3 所要求的应急电力照明系统失效。

2.3 应急电力照明系统的布置应是：应急电源、随同变压设备（如有的话）、应急配电板和应急照明配电板所在处所发生火灾或其他事故，不应使本条规则所要求的主电力照明系统失效。

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* 参阅国际电工委员会公布的建议案，特别是第 92 号出版物——船舶电气装置。

3 主配电板应尽可能远离一个主发电站，以使只是在一个处所内发生的火灾或其他事故才可影响正常供电的完整性。 主配电板的环境围炉，例如位于一个处所的主界限以内的机器控制室，不能视作将配电板与发电机离开。

4 如主发电机组的总安装功率超过3 MW，主汇流排应至少分成两部分，通常应由移动连接件或其他经认可的装置来连接；如实际可行，发电机组之间的连接和任何其他复式设备应在这两部分中平均分配。 经主管机关同意，可准许采用等效装置。

规 则 42

客船应急电源

1.1 应备有一个独立应急电源。

1.2 应急电源、随同变压设备（如有的话）、过渡应急电源、应急配电板和应急照明配电板应置于最高连续甲板之上，并应自露天甲板易于到达。 它们不应置于防撞舱壁的前面。

1.3 应急电源和随同变压设备（如有的话）、过渡应急电源、应急配电板和应急照明配电板，与主电源、随同变压设备（如有的话）、和主配电板的相对位置应经主管机关同意，以使主电源、随同变压设备（如有的话）、和主配电板所在处所或任何A类机器处所发生火灾或其他事故，不应妨碍应急电源的供电、控制和配电。如实际可行，应急电源、随同变压设备（如有的话）、过渡应急电源和应急配电板所在处所不应毗连于A类机器处所或主电源、随同变压设备（如有的话）、或主配电板所在处所的限界面。

1.4 如采取适当措施保证在各种环境下的独立应急作业，应急发电机可短时间例外地用来向非应急电路供电。

2 可用的电源功率应足够向紧急情况下安全所必须的用途供电，同时适当地考虑到这些用途可能同时存在。 应急电源应足以同时至少在下述期限内向以下用途供电，如这些用途依靠电力，同时考虑到起动电流和某些载荷的过渡性质：

2.1 供下列处所应急照明36小时之用：

.1 规则III/19和III/30所要求的每一登艇站处的甲板和舷外；

.2 所有服务和居住舱室的走廊、梯道、出入口、人员升降车；

.3 机器处所和主发电站，包括它们的控制站；

.4 所有控制站、机器控制室和每一主配电板和应急配电板处；

.5 储藏消防员装备的所有处所；

.6 操舵装置处；和

.7 消防泵、洒水式消防泵和2.4段所指的应急舱底泵处和它们的发动机起动位置。

2.2 供给现行国际海上避碰规则所要求航行灯和其他灯36小时之用。

2.3 供下列设备36小时之用：

.1 应急情况下所要求的所有内部通信设备；

.2 规则V/12所要求的助航设备；当此项规定为不合理或不可行时，主管机关可对小于5,000总吨的船舶免除此要求；

.3 探头和火灾报警系统，和防火门的固定和释放系统；和

.4 断续操作白昼信号灯、船舶号笛、人力火灾警报和紧急时需要的所有船内信号；

除非这类用途能由位于紧急时适于使用处所的蓄电池组独立供电36小时。

2.4 供下列设备36小时之用：

.1 规则II-2/4.3.1和4.3.3要求的消防泵之一；

.2 自动洒水泵，如有的话；和

.3 应急舱底泵和操作电动遥控舱底阀所必须的一切设备。

2.5 如规则29.14要求供电，则按该规则要求的时间向操舵装置供电。

2.6 供下列设备半小时之用：

.1 规则15所要求的任何动力操作水平门，连同它们的指示器和警报信号。如规则15.9.2的要求得到执行，在所有的门能在60秒内关闭的情况下，可允许继续操纵这些门。

.2 将升降车提升至甲板高度以便人员脱逃的应急布置，在紧急情况下旅客用升降车可顺序提升到甲板高度。

2.7 固定从事短途航行的船舶，如充分的安全标准得到满足，主管机关可接受比第2.1至2.5款所指36小时为短的期限，但不短于12小时。

3 应急电源可以是一台发电机或一组蓄电池，它们应符合下列要求：

3.1 当应急电源为发电机时，它应是：

.1 由适当的原动机驱动，独立供给燃油，燃油闪点（闭杯试验）不小于43℃；

.2 主电源供电发生故障时能自动起动，并应自动与应急配电板接通；第4款所指用途也应自动转由应急发电机组供电。自动起动系统和原动机的特性应是在最多45秒内能使应急发电机尽快地安全和实际可行地承担其预定的全部任务；除非备有应急发电机组的第二套独立起动装置，所贮备的单一能源应加保护，以免为自动起动系统全部耗尽；和

.3 备有第4款规定的过渡应急电源。

3.2 当应急电源为蓄电池组时，它应能：

.1 承担应急负荷而在整个供电阶段保持电池的电压在其正常电压的上下12%之内无须再充电；

.2 主电源发生故障时自动与应急配电板接通；和

.3 立即向至少是第4款所指的那些用途供电。

4 第3.1.3款要求的过渡应急电源应由位于紧急时适于使用处所的蓄电池组来组成，这个蓄电池组应在整个供电阶段保持电池的电压在其正常电压的上下12%之内无须再充电，并具有足够的能量和布置成主电源或应急电源发生故障时能自动地至少向下列用途供电，当这些用途依靠电力时：

4.1 供下列用途半小时之用：

.1 第2.1和2.2款要求的照明；

.2 第2.3.1、2.3.3和2.3.4款要求的所有用途，除非这些用途是由位于紧急时适于使用处所的蓄电池组在指定期间独立供电。

4.2 关闭第2.6.1款要求的水密门连同其指示器和报警信号的动力，但不必同时关闭所有门。

5.1 应急配电板应尽实际可能装设在靠近应急电源之处。

5.2 当应急电源为发电机时，应急配电板应与应急电源设置在同一处所，除非因此会妨碍应急配电板的操作。

5.3 按本条规则装备的蓄电池组不得与应急配电板设置在同一处所。 在主配电板或机器控制室的适当位置应安装一指示器，以指示蓄电池正在代替应急电源或第3.1.3或4款所指的过渡应急电源进行供电。

5.4 在正常工作情况下，应急配电板应用内连馈线由主配电板供电，此内连馈线应足以保护主配电板，免于过载和短路，并能在主电源发生故障时自动在应急配电板处断开。 当此系统采用反馈操作，内连馈线也应在应急配电板处得到保护，至少免于短路。

5.5 为了保证应急电源迅速可用，应作出安排当必要时将非应急电路从应急配电板自动断开，以保证向应急电路供电。

6 应急发电机和原动机与任何应急蓄电池组应设计和布置成，当船舶正浮时和倾斜至横倾达22.5°的任何角度与向艏或艉纵倾达10°或在这些范围内的任何组合角度时，它们的全部预计功率得以发挥作用。

7 应作出规定对整个应急系统进行定期试验，并应包括自动起动装置的试验。

规 则 43

货船应急电源

1.1 应备有一个独立应急电源。

1.2 应急电源、随同变压设备（如有的话）、过渡应急电源、应急配电板和应急照明配电板应置于最高连续甲板之上，并应自露天甲板易于到达。 除在例外情况下经主管机关允许外，它们不应置于防撞舱壁的前面。

1.3 应急电源，随同变压设备（如有的话）、过渡应急电源、应急配电板和应急照明配电板，与主电源、随同变压设备（如有的话）、和主配电板的相对位置应经主管机关同意，以使主电源、随同变压设备（如有的话）、和主配电板所在处所或任何A类机器处所发生火灾或其他事故，不应妨碍应急电源的供电、控制和配电。如实际可行，应急电源、随同变压设备（如有的话）、过渡应急电源和应急配电板所在处所不应毗连于A类机器处所或主电源、随同变压设备（如有的话）、或主配电板所在处所的限界面。

1.4 如采取适当措施保证在各种环境下的独立应急作业，应急发电机可短时间例外地用来向非应急电路供电。

2 可用的电源功率应足够向紧急情况下安全所必须的用途供电，同时适当地考虑到这些用途可能必须同时使用。 应急电源应足以同时至少在下述期限内向以下用途供电，如这些用途依靠电力，同时考虑到起动电流和某些载荷的过渡性质：

2.1 规则 III／19 和 III／38 所要求的每一登艇站处甲板和舷外的 3 小时 应急照明。

2.2 下列处所的 18 小时应急照明：

.1 所有服务和居住舱室的走廊、梯道和出入口、人员升降车和人员升降围栏；

.2 机器处所和主发电站，包括它们的控制站；

.3 所有控制站、机器控制室和每一主配电板和应急配电板处；

.4 储藏消防员装备的所有处所；

.5 操舵装置处；和

.6 第 2.5 款所指消防泵、洒水式消防泵（如有的话）和应急舱底泵（如有的话）和它们的发动机起动位置。

2.3 供给现行国际海上避碰规则所要求的航行灯和其他灯 18 小时之用。

2.4 供下列设备 18 小时之用：

.1 应急情况下所要求的所有内部通信设备；

.2 规则 V／12 所要求的助航设备；当此项规定为不合理或不可行时，主管机关可对小于 5，000 总吨的船舶免除此要求；

.3 探火和火灾报警系统；和

.4 断续操作白昼信号灯、船舶号笛、人力火灾警报和紧急时需要的所有船内信号；

除非这类用途能由位于紧急时适于使用处所的蓄电池组独立供电 18 小时。

2.5 如应急发电机是消防泵之一的动力源，则供规则 II-2／4.3.1 和 4.3.3 所要求的此消防泵 18 小时之用。

2.6.1 如规则 29.14 要求供电，则按该规则要求的时间向操舵装置供电。

2.6.2 固定从事短途航行的船舶，如充分的安全标准得到满足，主管机关可 接受比第 2.2 至 2.5 款所指 18 小时为短的期限，但不短于 12 小时。

3 应急电源可以是一台发电机或一组蓄电池，它们应符合下列要求：

3.1 当应急电源为发电机，它应是：

.1 由适当的原动机驱动，独立供给燃油，燃油闪点（闭杯试验）不小于43℃；

.2 除非根据第3.1.3款备有过渡应急电源，否则在主电源发生故障时自动起动；当应急发电机是自动起动的，它应自动与应急配电板接通；应急发电机因此要自动与第4款所指的那些用途接通；除非备有应急发电机的第二套独立起动装置，所贮备的单一能源应加保护，以免为自动起动系统全部耗尽；和

.3 除非备有应急发电机，既能向第4款所指的用途供电，又能在最多45秒内尽快地安全和实际可行地自动起动和供给所需的电荷，否则应配备该款所指的过渡应急电源。

3.2 当应急电源为蓄电池组，它应能：

.1 承担应急负荷而在整个供电阶段保持电池的电压在其正常电压的上下12%之内无须再充电；

.2 主电源发生故障时自动与应急配电板接通；和

.3 立即向至少是第4款所指的那些用途供电。

4 第3.1.3款要求的过渡应急电源应由位于紧急时适于使用处所的蓄电池组来组成，这个蓄电池组应在整个供电阶段保持电池的电压在其正常电压的12%左右之内无须再充电，并具有足够的能量和布置成主电源或应急电源发生故障时能自动地至少向下列用途供电，当这些用途依靠电力时：

4.1 第2.1、2.2和2.3款要求的照明。对于过渡阶段，就机器处所、居住和服务舱室来说，所要求的应急电力照明可以用固定安装的、单个的、自动充电的、用继电器操作的电池灯；和

4.2 第2.4.1、2.4.3和2.4.4款要求的所有用途，除非这些用途是由位于紧急时适于使用处所的蓄电池组在指定期间独立供电。

5.1 应急配电板应尽实际可能装设在靠近应急电源之处。

5.2 当应急电源为发电机时，应急配电板应与应急电源设置在同一处所，除非因此会妨碍应急配电板的操作。

5.3 按本条规则装备的蓄电池组不得与应急配电板设置在同一处所。 在主配电板或机器控制室的适当位置应安装一指示器，以指示蓄电池正在代替应急电源或第3.2或4款所指的过渡应急电源进行供电。

5.4 在正常工作情况下，应急配电板应用内连馈线由主配电板供电，此内连馈线应足以保护主配电板，免于过载和短路，并能在主电源发生故障时自动在应急配电板处断开。 当此系统采用反馈操作，内连馈线也应在应急配电板处得到保护，至少免于短路。

5.5 为了保证应急电源迅速可用，应作出安排当必要时将非应急电路从应急配电板自动断开，以保证向应急电路供电。

6 应急发电机和原动机与任何应急蓄电池组应设计和布置成，当船舶正浮时和倾斜至横倾达22.5° 的任何角度与向艏和艉纵倾达10° 或在这些范围内的任何组合角度时，它们的全部预计功率得以发挥作用。

7 应作出规定对整个应急系统进行定期试验，并应包括自动起动装置的试验。

规 则 44

应急发电机组的起动装置

1 应急发电机组应能在温度为0℃的冷态下迅速起动。 如这是实际上不可行或者不会遇到这种较低的温度，应作出主管机关能够接受的维护加热装置的规定，以保证发电机组的迅速起动。

2 布置成自动起动的每台应急发电机组应配备带有至少三次连续起动的能源并经主管机关认可的起动装置。 还应配备在30分钟内另加三次 起动的第二能源，除非人力起动经演习证明是有效的。

3 贮备的能源应在全部时间内保持如下：

.1 电力和液压起动系统应由应急配电板来保持；

.2 压缩空气起动系统可用通过适当止回阀的主或副压缩空气储存器或应急空气压缩机来保持，如此应急空气压缩机是电力驱动的，则由应急配电板供电；

.3 所有这些起动、充电和能源贮存装置应设置在应急发电机处所；这些装置除操作应急发电机组外不作其他目的之用。 这并不排除由

设置在应急发电机处所内的主压缩空气系统或副压缩空气系统通过止回阀向空气储存器供气。

4.1 当不要求自动起动时，可允许用人力起动，例如人力曲柄、惯性起动器、人力充液液压蓄能器，或火药填充筒，当能用演习证明是有效者。

4.2 当人力起动不实际时，应符合第2和3款的要求，但开始时可由人工起动。

规 则 45

触电、电气火灾及其它电气灾害的预防措施

1.1 电机或电器设备的裸露金属部分，原来不拟通电但在漏电情况下易于变为通电者，应接地，除非这些电机或设备：

.1 所用电的电压，直流不超过55V或导体间均方根不超过55V；不应用自耦变压器来实现这个电压；

.2 由安全绝缘的变压器供电，电压不超过250V，同时这种变压器只向一个耗电装置供电；或

.3 是根据双层绝缘原理构造的。

1.2 用于行动受限制或特别潮湿处所的可移动电器设备，而这些处所由于导电可能产生特殊危险者，主管机关可要求额外的预防措施。

1.3 一切电器的构造和安装，应在正常使用或接触时不致造成伤害。

2 主配电板和应急配电板的布置，应使需要时易于到达电器和设备，而对人员无危险。 配电板的侧面、后面和前面，如有必要，均应作适当的防护。 裸露带电部分的对地电压超过主管机关规定电压者不应装在这类配电板的板面上。

3.1 船体回路配电系统不得用于油船上的任何目的或1,600总吨及以上任何其他船上的动力、加热取暖或照明等。

3.2 第3.1款的要求并不排除经主管机关批准后用于：

.1 外加电流阴极保护系统，

.2 有限的和局部的接地系统，或

.3 在最不利条件下不超过30mA电流循环用的绝缘程度监控装置。

3.3 当使用船壳回路系统，所有终端分支电路，即最末保护装置以后的所有电路应为双导线的，并采取主管机关同意的预防措施。

4.1 油船上不得使用接地配电系统。 主管机关可例外地允许在油船上采用3,000V（线对线）及以上交流电力网的中线接地，如果由此可能形成的任何电流并不直接流过任何危险处所的话。

4.2 当动力、加热取暖或照明配电系统，不论是初级的还是次级的，不接地时，应备有能不断监控对地绝缘程度和绝缘值异常低时能发生能视听的信号的装置。

5.1 除在例外情况下经主管机关许可者外，电缆的所有金属护套和铠装应为连续导电，并应接地。

5.2 设备外面的所有电缆和电线应至少为滞燃式，并应在敷设时不损伤它们原来的滞燃性能。 当时特殊申请有需要时，主管机关可允许使用不符合前述要求的专用电缆，例射频电缆。

5.3 为了安全和应急所需的动力、照明、内部通信或信号的电缆和电线应尽实际可行地远离厨房、洗衣房、A类机器处所和其围壁以及其他有高度失火危险的地区。 连接消防泵与应急配电板的电缆，当通过有高度失火危险地区时，应为耐火型的。 当实际可行时，所有这类电缆的敷设，要使它们不因相邻处所失火所致的舱壁变热而导致不适用。

5.4 当敷设在危险区域的电缆因这类区域内的电器故障会引起火灾或爆炸危险时，应采取主管机关同意的防止这类危险的专门预防措施。

5.5 电缆和电线的敷设和支承，应避免擦伤或其他损害。

5.6 所有导线的终端和接头，应保持它们原来的电气、机械、滞燃以及需要时的耐火性能。

6.1 除规则29和30许可者或主管机关例外允许者外，所有独立馈电线路应加保护以免短路和过载。

6.2 每一馈电线路过载保护装置的定额或相应的调定，应固定标示在保护装置所在位置。

7 照明装置的布置，应能防止其温度升高而损伤电缆和电线，并能防止其周围的物料过热。

8 在煤舱或货舱内终止的所有照明和动力馈电线路应在该处所以外备有切断这些馈电线路的多极开关。

9.1 蓄电池组应作适当的保护，主要用作存放蓄电池组的舱室应有适当的构造和足够的通风。

9.2 除第10款许可者外，可能形成可燃气体点燃源的电器或其他设备不应存放在这些舱室内。

9.3 除主管机关同意的密封者外，蓄电池组不应放在卧室内。

10 电器设备不应安放在任何可燃混合气体易于积聚的处所，包括油船船上的这类处所或专门用来存放蓄电池的舱室、油漆间、乙炔贮藏室或类似处所，除非主管机关认为这些设备是：

.1 操作所必需的；

.2 不致点燃这类混合气体的型式；

.3 适合于有关处所；和

.4 经适当证明能在多半会遇到的灰尘、蒸汽或气体中安全使用者。

11 在客船上，配电系统的布置应使规则II-2/3.9所规定的任何主竖区内发生的火灾不致妨碍任何其他主竖区内必需用途的供电。 如主馈电线路及应急馈电线路通过任何主竖区时，在垂直和水平方向尽可能远离，此项要求即可满足。

第五节——周期性无人值班机器处所的补充要求

（除规则54关系到客船外，第五节适用于货船）

规 则 46

总 则

1 所作布置应保证在所有航海情况包括操纵情况下与有人值班机器处所的船舶具有同样的安全程度。

2 应采取主管机关同意的措施以保证设备可靠运行和作出满意的布置进行定期检查和循回测试以确保持续可靠操作。

3 每艘船舶应备有主管机关同意的证明文件，说明它适合于在周期性无人值班机器处所从事运行。

规 则 47

防 火 措 施

1 锅炉供气和排气管（烟囱）的失火应能探知和报警，除非主管机关认为在特殊情况下为不必要者。

2 推进机械的扫气道的失火应在初始阶段即能探知和报警，除非主管机关认为特殊情况下为不必要者。

3 2250KW 及以上的内燃机或汽缸内径大于300毫米的内燃机，应备有曲柄箱油雾探测器或机器轴承温度监测器或等效装置。

规 则 48

防 止 浸 水

1 周期性无人值班机器处所的舱底污水阱的位置和监测，应使液体的积聚在正常纵倾和横倾角度时能够探知；并应大得足以易于容纳无人照管期间的正常泄水量。

2 当舱底泵能够自动起动，应备有装置以指示注入的液体大于泵的能量或泵比正常预计的更频繁地工作。 在这些情况下，可以允许采用足以支持一个合理时间的较小的舱底污水阱。 当备有自动控制舱底泵时，应特别注意防止油污的要求。

3 海水进口、水线下排水或舱底喷射系统等任何阀门的控制设备所在位置应是当水注入该处所时能有足够时间来操作，并要顾及到达和操纵这些控制设备所需的时间。 如所要求的位置可能于船舶满载情况下被水所浸，则应作出安排能在该位置以上地点操作这些控制装置。

规 则 49

推进机械的驾驶台操纵

1 在所有航海情况，包括操纵情况下，速度、推力方向和（如适用的话）推进器的螺矩应完全由驾驶台控制。

1.1 对于每一独立推进器，这类遥控应由一个单一的控制装置来执行，连同自动操作所有附带服务装置，必需时包括防止推进机械超负荷的装置。

1.2 主推进机械应备有驾驶台紧急停机装置，并应与驾驶台控制系统相独立。

2 来自驾驶台的推进机械车令应在主机控制室或适当的推进机械控制位置指示出来。

3 推进机械的遥控在一个时间应只能在一处进行；在这些地点允许互连控制状态。在每一控制地点应有指示器指明那个控制地点正在控制推进机械。在驾驶台和机器处所之间的控制转换应只能在机器处所或机器控制室进行。这个系统应包含当由一个控制地点将控制转换到另一地点时防止发生推力严重改向的装置。

4 对于安全操作船舶所必须的所有机器，即使自动或遥控系统的任何部分发生故障，应能在当地进行控制。

5 自动遥控系统的设计应使其发生故障时能发出警报。除非主管机关认为实际上不可行，否则直到进行当地控制时，预定的速度和推力方向应该保持。

6 驾驶台应安装指示器，以指示：

.1 固定螺矩推进器时，推进器速度和转动方向，或

.2 可变螺矩推进器时，推进器速度和螺矩状态。

7 起动失败的连续自动起动次数应加限制，以维护足够的起动空气压力。应备有报警装置以指示仍然能进行推进机械起动操作的最低起动空气压力。

规 则 50

通 信

主机器控制室或相应的推进机械控制位置、驾驶台和轮机员居住舱室之间应备有可靠的声响通信装置。

规 则 51

警 报 系 统

1 应备有警报系统以指示任何需要注意的故障，此警报系统应：

.1 能在主机器控制室或推进机械控制位置发出声响警报和能在适当位置能见地指示每个独立的警报职能；

.2 与轮机员公用舱室和通过选择开关与每一个轮机员居室有联系，以保证至少与这些居室的一个有联系。主管机关可准许采用等效的布置；

.3 在要求值班驾驶员采取行动或加以注意的任何情况下，于驾驶台发出可视听的警报；

.4 尽实际可行地按自动防止故障原理来设计；

.5 如果一个警报在一定时间内于当地未得到注意，能按规则38要求向轮机员发出警报。

2.1 警报系统应不断地取得动力，并在失去正常动力供应情况下应自动地由备用动力来提供。

2.2 警报系统的正常动力供应发生故障时应发出警报。

3.1 警报系统应能在同一时间表示一个以上的故障，并在接受任何报警时，应不抑制接受其他报警。

3.2 在第1款所指的位置接受了任何警报，应在显示这种警报的其余位置也指示出来。 警报应保持到它们被接受，个别警报的能见标 志 应 保持到故障被排除，此时警报系统应自动地复位到正常操作状态。

规 则 52

安 全 系 统

应备有安全系统，以保证机器或锅炉在运行中发生会造成即刻危险的严重故障时能自动关闭该装置的这一部分，并应发出警报。 除了会导致严重损坏、完全破坏或爆炸的情况以外，推进系统的关停不应自动进行。 当主推进机械安装有快速关停装置时，应防止无意中的操作导致其动作。 当动用快速关停装置时，应有能见的指示装置加以指示。

规 则 53

机器、锅炉和电气装置的特殊要求

1 对机器、锅炉和电气装置的特殊要求应经主管机关同意，并应至少包括本条规则的要求。

2 主电源应符合下列要求：

2.1 当电力通常由一台发电机供应时，应备有适当的负荷分配装置以保证推进操舵所要求各种用途的供电完整性和船舶的安全。 在处于运行中的发电机损坏时，应有充分的措施自动起动备用发电机，并与主配电板接通，此备用发电机应有足够的功率从事推进和操舵，并能自动再起动必须的副机，包括需要时的继续运行，以保证船舶的安全。 如主管机关认为实际不可行时，可对小于1,600总吨的船舶免除这项要求。

2.2 如电力通常由一台以上的发电机平行操作同时供应时，应有措施，例如负荷分配措施，以保证其中一台发电机组损坏时，其余的各台能继续运行从事推进和操舵而不超负荷，并保证船舶安全。

3 当推进所必须的其他副机也需要备用机器时，应备有自动转换装置。

4 自动控制和警报系统

4.1 控制系统应使操纵主推进机械和其副机所需的各种服务均通过必须的自动装置来保证。

4.2 自动转换时应发出警报。

4.3 符合规则51的警报系统应供所有重要的压力、温度和液面与其他必须的仪表之用。

4.4 应安排一个带有必须的警报控制板和指示各种警报的检测仪表的集中控制点。

5 当主推进使用内燃机时，应备有将起动空气压力保持在要求水平的装置。

规 则 54

关于客船的特殊考虑

客船应经主管机关特殊考虑，它们的机器处所可否周期无人值班，如可以，则对本规则所规定的那些要求是否需要补充，以达到与有人值班机器处所相同的安全程度。

第II－2章

构造——防火、探火和灭火

第II－2章的现有文本用下文代替：

第一节—— 通则

规 则 1

适 用 范 围

1.1 除另有明文规定外，本章适用于1984年9月1日或以后安放龙骨或处于相应建造阶段的船舶。

1.2 在本章内，术语“处于相应建造阶段”，系指：

.1 可看作与特定船舶开始建造的相同阶段；

.2 业已开始安装的船舶至少为50吨，或为所有结构材料估量的百分之一，视何者小而定。

1.3 在本章范围内：

.1 “建造船舶”指“安放龙骨或处于相应建造阶段的船舶”；

.2 “所有船舶”指“在1984年9月1日之前、之日或之后建造的船舶”；

.3 无论何时建造的货船，一经改装成客船后，就于开始改装之日起作为建造客船看待。

2 除另有明文规定外：

.1 在1984年9月1日之前建造的船舶，主管机关应保证在满足2.2款规定的条件下，使之符合1974年国际海上人命安全公约第II－2章*中定义为新船或现有船舶所适用的各项要求；

.2 在1984年9月1日之前建造的船舶，主管机关应保证使之符合有关1974年国际海上人命安全公约1978年议定书附件的第II－2章中定义为新船或现有船舶所适用的各项要求。

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* 1974年国际海上人命安全会议通过的文本。

3 所有船舶在进行修理、改装、改建以及与之有关的舣装时，至少应继续符合这些船舶原先适用的要求。 上述船舶如在1984年9月1日之前建造，一般至少应在其修理、改装、改建或舣装之前原来的程度上符合在该日或以后建造船舶的要求。 重大的修理、改装、改建以及与之有关的舣装在主管机关认为合理和可行的范围内，应满足对在1984年9月1日或以后建造船舶的要求。

4.1 主管机关如考虑到航程的遮蔽性及其条件，认为引用本章的某些特殊要求为不合理或不必要时，可对其悬挂该国国旗的在航程中距最近陆地不超过20海里的个别船舶或某类船舶免除这些要求。

4.2 客船用于载运大量特种业务如朝山进香的旅客时，该船有权悬挂国旗的国家主管机关如认为实施本章要求为不切实际时，可对此类船舶免除这些要求，但此类船舶应完全符合下列规定：

.1 1971年特种业务客船协定所附的规则；

.2 1973年特种业务客船舱室要求议定书所附的规则。

规 则 2

基 本 原 则

1 本章的目的是要求船舶的防火、探火和灭火达到最充分可行的程度。

2 考虑到船舶的类型和所涉及潜在火灾的危险，下列基本原则是本章各条款的基础，并体现在相应的条文中：

.1 用耐热与结构性限界面，将船舶划分为若干主竖区；

.2 用耐热与结构性限界面将起居处所与船舶其他处所隔开；

.3 限制使用可燃材料；

.4 探知火源区域内的任何火灾；

.5 抑制和扑灭火源处所内的任何火灾；

.6 保护脱险通道或灭火出入口；

.7 灭火设备的即刻可用性；

.8 易燃货物蒸发气体着火的可能性减至最低限度。

规 则 3

定 义

除另有明文规定外，在本章范围内：

1 “不燃材料”，系指某种材料加热至约750℃时，既不燃烧，亦不发出足量的造成自燃的易燃蒸发气体；此系通过既定的试验程序确定，并取得主管机关的同意。 除此以外的任何其他材料，皆为“可燃材料”。*

2 “标准耐火试验”系指将需要试验的舱壁或甲板的试样置于试验炉内，加温到大致相当于下列标准时间－温度曲线的一种试验，试样暴露表面面积应不少于4.65平方米，其高度（或甲板长度）应不少于2.44米，试样应尽可能与所设计的构件近似，并在相当位置包括至少一个接头。 标准时间－温度曲线应是连接下列诸起始炉温以上测量的各温度点的一条光滑曲线：

自开始至满 5 分钟时 —— 556℃
自开始至满10 分钟时 —— 659℃
自开始至满15 分钟时 —— 718℃
自开始至满30 分钟时 —— 821℃
自开始至满60 分钟时 —— 925℃

3 “A级分隔”是由符合下列要求的舱壁与甲板所组成的分隔：

.1 它们应以钢或其他等效的材料制造；

.2 它们应为适当的防挠加强；

.3 它们的构造，应在一小时的标准耐火试验结束时能防止烟及火焰通过；

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* 参看本组织通过的大会472(XII)号决议“关于鉴定船用结构材料为不燃性的试验方法的改进建议案”。

.4 它们应用经认可的不燃材料隔热，使在下列时间内，其背火一面的平均温度，较原温度增高不超过139℃，且在任何一点包括任何接头在内的温度较原温度增高不超过180℃：

"A-60"级	60分钟
"A-30"级	30分钟
"A-15"级	15分钟
"A-0"级	0分钟

.5 主管机关可以要求将原型的舱壁或甲板进行一次试验，以保证满足上述完整性及温升的要求。*

4 "B级分隔"是由符合下列要求的舱壁、甲板、天花板或衬板所组成的分隔：

.1 它们的构造应在最初半小时的标准耐火试验至结束时，能防止火焰通过；

.2 它们应具有这样的隔热值，使在下列时间内，其背火一面的平均温度，较原温度增高不超过139℃，且在包括任何接头在内的任何一点的温度，较原温度增高不超过225℃：

"B-15"级	15分钟
"B-0"级	0分钟

.3 它们应以经认可的不燃材料制成，"B级分隔"的结构和装配所用的一切材料应为不燃材料，但是，并不排除可燃镶片的使用，只要这些材料符合本章的其他要求；

.4 主管机关可要求将原型分隔进行一次试验，以保证满足上述完整性和温升的要求。*

5 "C级分隔"系以经认可的不燃材料制成，它们既不需要满足有关防止烟和火焰通过的要求，也勿需限制温升。可使用可燃镶片，只要这些材料符合本章的其他要求。

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* 参阅本组织通过的大会163(特Ⅳ)号及大会215(Ⅶ)号决议"关于'A'级和'B'级分隔耐火试验程序的建议案"。

6 "连续B级天花板或衬板"系指"B"级天花板或衬板只在一个"A或B级分隔"终止者。

7 "钢或其他等效材料"，凡遇有"钢或其他等效材料"的字样，"等效材料"系指任何不可燃材料本身或由于所设隔热物，当经过标准耐火试验的相应曝火时间后，在结构性和完整性上与钢具有同等的性能（例如设有适当隔热材料的铝合金）。

8 "低播焰性"系指所述表面能有效地限制火焰的蔓延，此系通过既定的试验程序确定，并取得主管机关的同意。

9 "主竖区"系指船体、上层建筑和甲板室以"A级分隔"分成的各段，它在任何一层甲板上的平均长度一般不超过40米。

10 "起居处所"系指用作公共处所、走廊、盥洗室、住室、办公室、医务室、影院、娱乐室、理发室、无烹调设备的配膳室，以及类似的处所。

11 "公共处所"系指起居所中用作大厅、餐室、休息室以及类似的固定围蔽处所的部分。

12 "服务处所"系指用作厨房、具有烹调设备的配膳室、橱柜、邮件舱及贵重物品室、储藏室、组成机器处所的部分以外的车间，以及类似处所和通往这些处所的围壁通道。

13 "装货处所"系指一切用作装载货物的处所（包括货油舱）以及通往这些处所的围壁通道。

14 "滚装装货处所"系指非正常分隔的并延伸至船舶的大部分长度或整个长度的处所，该处所能以水平方向正常装卸货物（包装或散装、公路或铁路用车、车辆（包括公路或铁路油车）、拖车、集装箱、货板、可拆箱柜、类似装载装置或其他容器）。

15 "开式滚装装货处所"系指二端开口或一端开口的滚装装货处所，该处所通过侧壁或天花板上的固定开口，具有有效地遍及整个长度的适当的自然通风，并使主管机关满意。

16 "闭式滚装装货处所"系指既不是开口的滚装装货处所也不是露天甲板的滚装装货处所。

17 "露天甲板"系指在上方并至少有二侧完全暴露在外的甲板。

18 “特种处所”系指在舱壁甲板以上或以下用作装载在油箱内备有自用燃油的机动车辆的围蔽处所，此处所能让上述车辆驾驶进出，并有旅客进入的通路。

19 “A类机器处所”系指具有下列设施和通往这些处所的围壁通道的那些处所：

.1 用作主推进的内燃机；

.2 用作主推进以外用途的合计总输出功率不小于373千瓦的内燃机；

.3 任何燃油锅炉或燃油装置。

20 “机器处所”系指一切A类机器处所和一切其他包括推进机械、锅炉、燃油装置、蒸汽机和内燃机、发电机和主要电动机、加油站、冷藏机、防摇装置、通风机和空气调节机械的处所，以及类似处所；连同通往这些处所的围壁通道。

21 “燃油装置”系指准备为燃油锅炉输送燃油的设备或准备为内燃机输送加热燃油的设备，并包括用于处理压力超过0.18牛顿／毫米^{2}油类的任何压力油泵过滤器和加热器。

22 “控制站”系指船舶无线电设备，主要航行设备或应急电源所在的处所，或者是指火警指示器或失火控制设备集中的处所。

23 “设有限制失火危险的家具和设备的房间”，在规则26内，设有限制失火危险的家具和装备的房间（无论住室、公共处所、办公室或其他类型的起居处所），应为：

.1 一切框架式家具，如书桌、衣橱、梳妆台、书柜、餐具柜，除其使用表面可用不超过2毫米的可燃镶片外，完全由经认可的不燃材料制成；

.2 一切可移动的家具，如椅子、沙发、桌子，其骨架由不燃材料制成；

.3 一切帷幔、窗帘及其他悬挂的纺织品材料，其阻止火焰蔓延的性能应不差于每平方米重0.8公斤* 的毛织品，并取得主管机关的同意；

.4 一切地板覆盖物，其阻止火焰蔓延的性能应不差于用于同一目的的等效的毛料，并取得主管机关的同意；

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* 参阅本组织通过的大会471(XII)号决议“关于决定垂直悬挂的纺织品和薄膜阻止火焰的试验方法的建议案”。

.5 一切舱壁、衬板及天花板的外露表面，应具有低播焰性；

.6 所有棕簧垫套家具，其阻止火焰着火和蔓延的性能应取得主管机关的同意。

24 “舱壁甲板”系指横向水密舱壁所到达的最高一层甲板。

25 “载重量”系指船舶在比重为1.025的海水中，相应于所勘划的夏季载重线的排水量与该船空船排水量之差，以吨计。

26 “空载排水量”系指船舶在舱内没有货物、燃油、润滑油、压载水、淡水、给水和易耗物料，且无旅客、船员及其财物时的排水量，以吨计。

27 “油类／散货两用船”系指设计用来装油，并能交替装载散装固体货物的油船。

28 “原油”系指自然存在于地下的可能未予处理的适于运输的任何油类，并包括下列情况：

.1 可能业经去掉某些馏出物的原油；

.2 可能已经加了某些馏出物的原油。

29 “危险货物”系指规则Ⅶ／2中所称的那些货物。

30 〔“化学品船”系指建造或改建的并用于散装载运任何易燃性液化产品的船舶，而这些产品已列入本组织大会490(XII)号决议同意授权海安会通过、并可能由本组织修改的“关于散装载运危险化学品船舶的构造和设备规则的最低要求摘要”（以下简称“散装化学品规则”）之中。

31 “气体运输船”系指建造或改建的并用于散装载运任何液化气体的或其他易燃性物质，这些气体或物质已列入本组织大会328(IX)号决议通过并业经或可能由本组织修改的“关于散装载运液化气体船舶的构造和设备规则”（以下简称“气体运输船规则”）第XIX章。

规 则 4

消防泵、消防总管、消火栓和消防水带

1 每条船舶应设有符合适用于本规则要求的消防泵、消防总管、消火栓和消防水带。

2 消防泵的排量

2.1 所需的全部消防泵，应能按下述4款规定的压力供给消防用水：

.1 在客船上，泵的出水量应不少于指定供舱底抽输的全部舱底泵所需出水量的⅔；

.2 出货船上，除任何应急泵以外的泵，其出水量应不少于按规则II-1/21关于同样大小的客船指定供舱底抽输的每一独立舱底水泵所需出水量的⅓，但货船所需各消防泵总排量不需超过180立方米/小时。

2.2 所需的每一消防泵（除在货船3.3.2款中所需的任何应急泵以外），其排量应不少于所需总排量的80%除以所需的最少消防泵数，但不得少于25立方米/小时，并在任何情况下，每一个这样的消防泵至少应能维持两股所需的水柱。这些消防泵应能按所需的条件向消防总管系统供水。如设置泵数多于所需的最低数量，则这些增加的泵的排量应取得主管机关的同意。

3 消防泵和消防总管的布置

3.1 所有船舶应设置如下独立驱动的消防泵：

.1 4,000总吨及4,000总吨以上的客船……至少三台

.2 4,000总吨以下的客船以及
1,000总吨及1,000总吨以上的货船……至少二台

.3 1,000总吨以下的货船……应取得主管机关同意。

3.2 卫生泵、压载泵、舱底泵或通用泵，如非经常用来抽输油类者，均可作为消防泵；如它们偶尔用于移注燃油，则要装设适宜的转换装置。

3.3 通海接头、消防泵及其动力源的布置，应保证：

.1 1,000总吨及1,000总吨以上的客船，当任何一舱失火时不使所有的消防泵同时失去作用；

.2 2,000总吨及2,000总吨以上的货船，如任何一舱失火时使所有的消防泵失去作用，作为替代措施的固定独立驱动应急消防泵，应能供给两股水柱，并为主管机关所满意。该泵及其位置应符合下列要求：

.2.1 应急消防泵的排量应不少于本规则所要求的消防泵总排量的40%，且不得少于25立方米／小时。

.2.2 当应急消防泵按3.3.2.1款所要求的水量排出时，在任何消火栓处的水压应不少于4.2款中所规定的最低压力。

.2.3 作为应急消防泵驱动动力的任何柴油机，应在温度降至0℃时的冷态下能用人工随时起动。 若属不可能，或可能遇到较低气温时，则应考虑到加热装置措施及其维修，并取得主管机关的认可，以便确保随时起动。 如不可能人工起动，主管机关可允许采用其他起动设施。 这些起动装置，应在30分钟内至少起动驱动动力的柴油机6次，并在前10分钟内至少起动2次。

.2.4 任何燃油供给柜所装盛的燃油，应能使该泵在全负荷下至少运行3小时，在主机舱以外获得的储备燃油，亦应能使该泵在全负荷下再运行15小时。

.2.5 应急消防泵的总吸头，应在船舶营运中的航行条件下不超过4.5米，同时吸入管的设计应使吸入损失减至最少。

.2.6 存放消防泵处所的限界面，应隔热至相当于规则44“控制室”所要求的等效防火构造标准。

.2.7 在机器处所和应急消防泵及其动力源处所之间，不允许有直接入口。 若属不可能，主管机关可以认可一个采用气锁措施的入口布置，该入口的二个门均应为自闭式门，或一个通过由机器处所和设置应急消防泵处所遥控的并在这些处所失火时不易被切断的某一处所操纵的水密门。 在此种情况下，设置应急消防泵及其动力源的处所应设有第二个入口设施。

.2.8 设置应急消防泵独立动力源处所的通风，应布置成尽可能排除可能由机器处所进入或抽入该处所的烟气。

.3 1,000总吨以下的客船和2,000总吨以下的货船，若任何一舱失火时可能使所有的消防泵均失去作用，则供给消防用水的替代措施，应取得主管机关的同意。

.4 此外，在货船上机器处所内所设置的通用泵、压载泵和舱底泵等其他泵，其布置应确保在这些泵中至少有一台能具有2.2和4.2款中所要求的排量和压力向消防总管供水。

3.4 为随时获得供水，应布置成：

.1 1,000总吨及1,000总吨以上的客船，至少以内部位置的任何消火栓上能立即获得一股有效的水柱，以便保证自动起动的所需消防泵能持续出水；

.2 1,000总吨以下的客船和货船，应取得主管机关的同意。

.3 具有周期无人照管机器处所或仅需一人值班的货船，消防总管系统应在适当压力下立即排水，排水控制可以从驾驶室和消防控制站遥控起动的主消防泵之一遥控起动（若设有时），或消防总管系统的固定压力输送，应由主消防泵之一加以控制。但对1,600总吨以下的货船，如进入在机器处所的布置不需要时，主管机关可以免除本要求。

.4 客船上若按规则II-1/54设有周期无人照管机器处所时，对上述处所，主管机关应按相当通常有人照管机器处所的规定确定固定式水雾灭火系统。

3.5 如消防泵的压力可能超过消防水管、消火栓和消防水带的设计压力，则应在全部消防泵装设溢流阀。这些阀应恰当分布和调节，以防止消防总管系统内任何部分发生超压。

3.6 对于油船，应在船舶尾楼前端防护位置处和横向不大于40米的舱柜甲板的消防总管上设置隔离阀，以便在失火或爆炸时能维护消防总管系统的完整性。

4 消防总管的直径和压力

4.1 消防总管和消防水管的直径应足够有效地从两个同时工作的消防泵传输所需的最大出水量；但货船例外，其消防总管的直径仅需足以出水140立方米/小时。

4.2 在两泵同时工作并通过8款规定的水枪从任何相邻的消火栓传输4.1款所确定的水量时，在一切消火栓上应维持下述最低压力：

客船：	
4,000 总吨及4,000 总吨以上	0.31 牛顿／毫米^2
1,000 总吨及1,000 总吨以上	
但小于4,000 总吨	0.27 牛顿／毫米^2
1,000 总吨以下	应取得主管机关的同意
货船：	
6,000 总吨及6,000 总吨以上	0.27 牛顿／毫米^2
1,000 总吨及1,000 总吨以上	
但小于6,000 总吨	0.25 牛顿／毫米^2
1,000 总吨以下	应取得主管机关的同意

4.3 于任何消火栓处的最大压力，均不得超过所能证明的消防水带有效控制。

5 消火栓的数目和位置

5.1 消火栓的数目和位置，应至少能将两股不是由同一消火栓发出的水柱，射至船舶在航行时旅客或船员经常到达的任何部分，而其中一股应仅用1根消防水带。而对任何装货处所空舱时的任何部分、任何滚装装货处所或任何特种处所的后者情况，两股水柱中每股应用1根消防水带射至上述处所的任何部分。 此外，上述消火栓应位于靠近被保护处所的出口。

5.2 对于客船的起居处所、服务处所和机器处所，当主竖区舱壁上的所有水密门和门均关闭时，消火栓的数目和位置可以符合5.1款的要求。

5.3 对于客船，A类机器处所邻近于轴隧的下层应设有通道，并在该机器处所出入口的附近外面设置二只消火栓。 如在其他处所也设有上述通道，则应在那些处所之一靠近A类机器处所的出入口设置二只消火栓。 若轴隧或相邻处所非系脱险通道的部分，则无须考虑上述措施。

6 管子及消火栓

6.1 在热力作用下易于失效的材料，除非有充分的保护，不得用作消防总管和消火栓。 管子及消火栓的位置应使消防水带易于与之连接。 管子及消火栓应布置成能免于可能的冻结。 在可能装运甲板货物的船上，消火栓的地位应随时易于到达，消防管的布置应尽可能避免被此项货物所损坏。 各消防水带接头与各水枪应能完全互换使用，除非船上对每一消火栓备有1根消防水带和1支水枪。

6.2 应设有一旋塞或阀门供每一消防水带使用，在消防泵工作时可以折卸任何消防水带。

6.3 为分开设置主消防泵或消防总管其余各泵的机器处所内的消防总管部分，应在该机器处所外面易于到达的可靠位置上设置隔离阀。 消防总管应布置成当隔离阀关闭船上除上述机器处所内以外的所有消火栓时，上述机器处所内的消火栓能由置于该机器处所外的一台消防泵通过未经该处所的管子供给消防用水。 但下列情况例外，即不方便从该机器处所外面通过时，主管机关可允许应急消防泵的吸入管和排泄管短途穿越该处所，并用坚固的钢质罩壳覆盖管子，以使之维持消防总管的完整性。

7 消防水带

7.1 消防水带应为主管机关认可的材料，并具备足够的长度射出一股水柱至可能需要使用的一处所。 其最大长度应取得主管机关的同意。 每1根消防水带应配有一支水枪和必需的接头。 按本章指定为“消防水带”的水带应与其必要的配件及工具，存放于供水消火栓或接头附近显著的部位，以备随时取用。 此外，在载客超过36人客船的各内部处所，消防水带应一直保持与消火栓相连接。

7.2 船舶应设有其数目和直径取得主管机关同意的消防水带。

7.3 对于客船，5款中所要求的每只消火栓应至少备有1根消防水带，这些消防水带仅供灭火或在消防训练和检验时试验灭火设备之用。

7.4.1 1,000总吨及1,000总吨以上的货船，所需的消防水带数目应为每30米船长设1根，备用1根，但总数不得少于5根。 此数目不包括任何机舱或锅炉舱所需的任何消防水带。 主管机关顾及到船舶类型和该船所从事的贸易性质，可以增加所需的消防水带数目，以便保证能随时获得足够数目的消防水带。

7.4.2 1,000总吨以下的货船，所需消防水带的数目，应取得主管机关的同意。

8 水枪

8.1 在本章范围内，标准水枪的尺寸应为12毫米、16毫米和19毫米，或尽可能与之相近。 如经主管机关同意，可准许使用较大直径的水枪。

8.2 在起居和服务处所内，不必使用大于12毫米的水枪。

8.3 在机器处所和各外部处所，水枪的尺寸应能从最小的泵在4款所述的压力下，从两股水柱上获得最大限度的出水量，但不必使用大于19毫米的水枪。

8.4 设有转换装置的所有水枪应为经认可的两用型式（即水雾／水柱型）。

9 其他灭火系统的水泵等的位置和布置

本章其他灭火系统所需的消防水泵，其动力源和控制位置应安装在由本系统所防护的处所或各个处所之外，并应布置成在其所防护的处所或各个处所失火时，不使该系统的任何部分失去作用。

规 则 5

固定式气体灭火系统

1 通则

1.1 所采用的灭火剂，主管机关认为其本身或在预期使用条件下，将发生一定数量有毒气体足以危害人身者，不准使用。

1.2 输送灭火剂至所防护处所的管子应设有控制阀，并应清楚地标明这些管子通往的处所。 应有适当的措施以防止灭火剂因疏忽而注入任何处所。 设有气体灭火系统的货舱如用作旅客处所时，在运客期间，气体的管子接头应予以封闭。

1.3 灭火剂的分配管的布置以及喷嘴的设置应能均布所得的灭火剂。

1.4 应采取措施，以便能够关闭可能使空气或气体从所防护处所逃出的所有开口。

1.5 在任何处所中，空气瓶内含有的自由空气量如因失火而在该处所内施放时，会严重影响固定灭火系统的有效性者，主管机关应要求额外增加灭火剂的数量。

1.6 向任何经常有人员工作或出入的处所施放灭火剂时，应有自动声响警报的设施。 此项警报应在灭火剂施放前报警一段适当的时间。

1.7 任何固定式气体灭火系统的控制设施，应能易于到达和操作简便，且应成组地分装于尽可能少的处所；其所在位置应不致为被保护处所的火灾所切断。 在每一位置的明显部位上，应备有关于该系统的工作人员安全操作说明书。

1.8 不许自动释放灭火剂，但对3.3.5款所允许的以及3.4和3.5款所指的局部自动操作装置例外。

1.9 若要求灭火剂数重保护一个处所以上，则可能得到的灭火剂数量不必大于上述被保护的任一处所中所需的最大数量。

1.10 除3.3、3.4或3.5各款所准许的以外，储存蒸汽以外的灭火剂所需的受压容器，应按1.13款置于所被保护处所的外面。

1.11 应备有安全设施，以便船员安全地检查容器内的灭火剂数量。

1.12 存放灭火剂的容器及其受压部件，应设计成使其压力操作规则就其位置和营运中外部的最大环境温度，取得主管机关的同意。

1.13 当灭火剂需要储存在被保护处所外面时，该储存室应位于安全和随时可到达的地方，并应有经主管机关满意的有效通风。 这种储存室的任何进口最好应开向开敞甲板，且在任何情况下应与被保护处所分开。 出入口的门应为向外开启，并在这种储存室和毗连围闭处所之间构成限界面的舱壁和甲板包括门和关闭其上任何开口的其他设施，均应为气密。 为了执行规则26、27、44和58的各表，上述储存室应作为控制站看待。

1.14 船上应设有该系统的备件，并取得主管机关的同意。

2 二氧化碳系统

2.1 除装货处所另有规定外，所备二氧化碳的数量应足以发出体积至少等于该船能密封的最大货舱总容积30%的自由气体。

2.2 对于机器处所，所携二氧化碳的数量应足以发出至少等于下列两者中较大值的自由气体：

.1 最大处所总容积的40%；此容积不包括机舱棚一个水平面积以上的机舱棚部分，在这个水平面上，机舱棚的水平面积等于或小于从双层底顶至机舱棚最低部分的中点处水平面积的40%；

.2 所保护的最大机器处所包括机舱棚在内的全部容积的35%；

但在小于2,000总吨的货船上，上述各百分数可分别减为35%与30%；再者，两个或两个以上的机器处所未完全隔开者，应作为一个处所看待。

2.3 本款内所指的二氧化碳自由气体的容积应以每公斤相当于0.56立方米计算。

2.4 机器处所的固定管系应能使85%的气体在两分钟内注入该处所。

3 卤化烃系统

3.1 卤化烃灭火剂，只能用于机器处所、泵舱以及仅用于装载没有载运任何货物的车辆的装货处所。

3.2 全浸没系统所使用的卤化烃灭火剂应：

.1 该系统应布置成使其动力仅由人工方可开始释放；

.2 若卤化烃的容量需要供给一个以上处所时，其储存和释放的布置应分别按照3.2.9或3.2.10款的要求；

.3 应设有适当设施，以便在释放该灭火剂之前，能自动停止被保护处所内的所有风机；

.4 应设有适当设施，以便人工关闭被保护处所的通风系统中的所有挡火闸；

.5 释放装置的设计，应使装货处所或机器处所分别按照3.2.9或3.2.10款所需的最小灭火剂量，确实能够在20秒或以内排出液态灭火剂；

.6 本系统应设计成使其在主管机关所同意的温度范围内易于操作；

.7 灭火剂释放时应不能危害从事维修设备或使用正常出入口梯道和为该处所服务的脱险口的工作人员；

.8 应设有装置能使船员安全地检验容器内的压力；

.9 仅用于装载不装运任何货物的车辆的装货处所，其所需的灭火剂数量应按表5.1计算。该数量应根据所保护处所的总容积来计算。卤化烃1301和1211的数量应按体积浓度为基础加以计算，而卤化烃2402则以单位容积的重量为基础进行计算。

表 5.1

卤化烃	最小	最大
1301	5%	7%
1211	5%	5.5%
2402	0.23 公斤／立米	0.30 公斤／立米

.10 机器处所的灭火剂数量应按表5.2进行计算。关于最小浓度的量是以包括舱棚空间的总容积来计算，最大浓度的量是以包括舱棚空间的净容积来计算。卤化烃1301和1211的数量应按体积浓度

为基础加以计算，而卤化烃2402则以单位容积的重量为基础进行计算。

表 5.2

卤 化 烃	最 小	最 大
1301	4.25 %	7 %
1211	4.25 %	5.5 %
2402	0.20 公斤／立米	0.30 公斤／立米

.11 在3.2.9和3.2.10二款范围内，卤化烃1301的容积应以0.16立米／公斤予以计算，而卤化烃1211的容积应以0.14立米／公斤予以计算。

3.3 只有卤化烃1301才可储存在所保护的机器处所内。 此容器应单独地遍布在该处所内，并应符合下列要求：

.1 用于人力启动位于被保护处所外的动力施放，应在被保护处所外设有双套动力源，并除机器处所外应即刻可用，其中一套动力源可设在被保护处所内。

.2 与灭火剂容器相连接的电力线路应设有可视听警报，以监控故障情况及动力消失。

.3 与灭火剂容器相连接的气动或液压动力线路应设置双套。 气动或液压的压力源应设有可视听警报，以监控其失压。

.4 敷设在所保护处所内用于该系统释放所需的电力线路，应能抗热，即为矿物绝缘电缆或等效物。 用于该系统释放所需的管束，若设计成液压或风动操纵，应用钢或主管机关满意的其他等效抗热材料制成。

.5 每一个受压容器应装有一个自动超压释放装置，以便在容器暴露在火的影响下且系统未动作时，能使容器安全地向所保护处所放出气体。

.6 灭火剂容器的布置以及用于任何系统释放所需的电力线路和管束，应在所保护处所内发生火灾或爆炸致使损坏任何一条动力释放线路的情况下，即单一故障概念，至少有按该处所的3.2.9或3.2.10款所要求的灭火剂量的三分之二，仍能按灭火剂均匀遍布整个处所的要求进行释放。 对仅需一个或二个容器的处所系统，其布置应取得主管机关的同意。

.7 任何受压容器最多配置二只喷嘴，每一容器的最大剂量，应取得主管机关关于灭火剂均匀遍布整个处所的满意要求。

.8 应在被保护区域和驾驶室或在消防控制设备集中的处所设置可视听警报，以监控容器由于漏气和释放而减压，但对装货处所，仅需在驾驶室或消防控制设备集中的处所设置警报。

3.4 具有卤化烃1301或1211的局部自动操纵的固定式灭火装置，除设于机器处所内高度失火危险的围蔽区域外，且又与任何所需的固定式灭火系统相独立的，但凡符合下列规定者均可接受：

.1 凡设有此种附加局部保护的处所，最好设在一个工作平面上和在同一平面上作为出入口的地方。 假如在每一平面上均设有出入口，则可根据主管机关的意见允许多于一个平面。

.2 处所的大小及其出入口与机械的布置，应能在不超过10秒时间内从该处所的任何地方达到脱险目的。

.3 应在机器处所的每一出入口外面和在驾驶室或消防控制设备集中的处所设有可视听信号，以指示任何装置的动作。

.4 应在处所的每一出入口的外面展示一指示牌，以指明该处所具有一个或几个自动操纵的灭火装置及其所用的灭火剂种类。

.5 喷嘴应布置成，使灭火剂的释放不致危害使用正常出入口梯道和服务于该工作舱室要脱险的人员。 为防止灭火剂的误释放，也应有措施以保护正常从事维护机械的工作人员。

.6 灭火装置应设计成能在主管机关同意的温度范围内予以操纵。

.7 应设有装置能使船员安全地校验容器内的压力。

.8 局部自动操纵装置所备的灭火剂总量，是以围闭处所的净容积为基础，在20℃时的浓度，卤化烃1301不超过7%，卤化烃1211不超过5.5%。此项要求既适用于业已动作的局部自动操纵装置，也适用于业已动作的符合3.2款所设的固定式系统，但二者同时操作时不适用。卤化烃1301的容积应以0.16立米／公斤计算，卤化烃1211的容积应以0.14立米／公斤计算。

.9 以液态释放为基础，灭火装置的释放时间应不超过10秒。

.10 局部自动操纵灭火装置的布置，应使其释放不致引起电力损失或降低船舶的操纵性。

3.5 3.4款所述的自动操纵灭火装置，除装于机器处所内具有高度失火危险的设备上以外，还独立于任何所需的固定式灭火系统，但凡符合3.4.3至3.4.6、3.4.9和3.4.10各款以及下列要求者，均可接受：

.1 局部自动操纵灭火装置所备的灭火剂量，应以机器处所的总容积为基础，在其同时发生操作的情况下，于20℃时在空气中所能得到的灭火剂蒸发气体的浓度，不得大于1.25%。

.2 卤化烃1301的容积应以0.16立米／公斤计算，卤化烃1211的容积应以0.14立米／公斤计算。

4 蒸汽系统

一般情况下，在新船的固定式灭火系统中，主管机关应不准使用蒸汽作为灭火剂。如主管机关允许使用蒸汽，则应仅用在一些限定的区域作为所需灭火剂的额外灭火剂，其条件是供给蒸汽的一个或数个锅炉的蒸发量，应对该船用蒸汽保护的最大处所的总容积每0.75立方米每小时能提供至少应为1公斤的蒸汽。除了符合上面所提到的要求之外，该系统在其他各方面应由主管机关确定和同意。

5 其他气体系统

5.1 除二氧化碳或卤化烃或4款许可的蒸汽外，如在船上生产的气体作为灭火剂时，它应是燃油燃烧的气态产物，在此产物中氧气含量、一氧化碳含量、腐蚀元素以及任何固体可燃元素均需降低到容许的最少量。

5.2 如在固定式灭火系统中使用这种气体作为灭火剂来保护机器处所时，它应与使用二氧化碳作为灭火剂的固定式系统具有等效的保护作用。

5.3 如在固定式灭火系统中使用这种气体作为灭火剂来保护装货处所时，应备有足够的数量，使每小时能供给自由气体的容积至少等于最大一个被保护处所总容积的25%，并可连续供给72小时。

规 则 6

灭 火 机

1 所有灭火机应为经认可的型式和设计。

1.1 所需手提式液体灭火机的容量应不大于13.5升，且不少于9升。 其他灭火机应至少与13.5升液体灭火机的可携性等同，并应具有至少相当于9升液体灭火机的灭火性能。

1.2 主管机关应确定灭火机的等同物。

2 应按照主管机关规定的要求配足备用药剂。

3 灭火机所盛的灭火剂，倘主管机关认为其本身或在预期使用条件下，将发出一定数量的毒气足以危害人身者，不准使用。

4 可携式泡沫器装置应包括一只能以消防水带连接于消防总管的收入式空气泡沫枪，连同一只至少能盛装20升发泡液的可携式容器和一只备用容器。 泡沫枪应能每分钟至少产生1.5立方米适合于扑灭油类火灾的有效泡沫。

5 灭火机应定期进行检验，并按主管机关的要求进行试验。

6 用于任何处所的手提灭火机，其中应有一只存放在该处所的入口附近。

7 起居处所、服务处所和控制站内应配备经主管机关认为合适和足量的经认可的手提式灭火机。 1,000总吨及1,000总吨以上的船舶，应至少备有五只手提式灭火机。

规 则 7

机器处所的灭火设备

1 设有燃油锅炉或燃油装置的处所

1.1 设有燃油锅炉或燃油装置的A类机器处所，应有下列固定式灭火系统的任何一种：

.1 符合规则5 规定的气体系统；

.2 符合规则9 规定的高膨胀泡沫系统；

.3 符合规则10规定的压力式水雾系统；

在每一情况下，若机舱和锅炉舱没有完全分隔，或燃油能从锅炉舱流入机舱，则机舱和锅炉舱应作为一个舱室看待。

1.2 每一锅炉舱内至少应设一套符合规则6.4规定的可携式空气泡沫装置。

1.3 在每一锅炉舱的每一生火处所和燃油装置的某一部分所在的每一处所，至少应设置泡沫型或其等效物的手提式灭火机两具。 在每一锅炉舱内应设置容量至少为135升的经认可的泡沫型或与之等效的灭火机一具。 此项灭火机应备有绕在卷筒上的足以到达锅炉舱的任何部位的软管。 货船上小于175千瓦的日用锅炉，主管机关可考虑放宽本款的要求。

1.4 每一生火处所应有按主管机关所要求容量的容器1具，内装砂子、浸透苏打的锯木屑或其他认可的干燥物。 此项设备亦可由1具经认可的手提式灭火机代替之。

2 设有内燃机的处所

设有内燃机的A类机器处所应设有下列装置：

.1 1.1款所要求的各灭火系统中的一种。

.2 符合规则6.4规定的可携式空气泡沫设备至少1套。

.3 在每一此种处所内，每只容量至少为 45升的经认可的泡沫灭火机或等效设备，其数目足以使泡沫或等效物能射到燃油和滑油压力系统、传动装置和其他有失火危险的任何部分。 此外，还应设有足够数量的手提式泡沫灭火机或等效设备，其布置应使该处所内任何一点到达一具灭火器的步行距离不大于10米，同时每一此种处所内应至少设有此种灭火机两具。

对于货船的较小处所，主管机关可考虑放宽本要求。

3 设有汽轮机或闭式蒸汽机的所在处所

设有汽轮机或闭式蒸汽机的处所，不论此项机器用于主推进或用于其他目的，如其总输出功率不少于375千瓦者，应设有下列装置：

.1 每只容量至少有45升的经认可的泡沫灭火机或等效设备，其数目足以使泡沫（或等效物）能射到压力滑油系统的任何部分，射到汽轮机、蒸汽机或附属传动装置的压力润滑部分的封闭罩壳以及其他有失火危险的任何部分。 此种处所，如果设有符合1.1款的固定式灭火系统，并具有至少等效于本项所需的保护，则不再要求设置此项灭火机。

.2 足够数量的手提式泡沫灭火机或等效设备，其布置应使该处所内任何一点到达一具灭火器的步行距离不大于10米，同时每一此种处所内应至少设有此种灭火机两具；除非在符合1.3款所规定的数之外不要求再增设此项灭火机。

.3 上述处所若系周期无人照管者，则设1.1款所需的灭火系统中的一种。

4 其他机器处所的灭火设备

如主管机关认为有失火危险的任何机器处所，其灭火设备在1、2和3款无明确规定者，应在该处所内或其相邻处设置主管机关认为足够数量的经认可的手提式灭火机或其他灭火设备。

5 本章未作要求的固定式灭火系统

若设有本章未作要求的固定式灭火系统时，则该系统应取得主管机关同意。

6 客船的A类机器处所

对于载客超过36人的客船，其每一A类机器处所至少应设有两只适宜的水雾器。*

规 则 8

机器处所的固定式低膨胀泡沫灭火系统

1 如在任何机器处所内设置固定式低膨胀泡沫灭火系统，则该系统除应符合规则7的要求以外，还应能使在不超过五分钟的时间内通过固定的喷射口喷出的泡

* 水雾器可为一“L”形金属管组成，其长肢长约2米能与消防水带连接，其短肢长约250毫米。 其上装有固定喷雾水枪或能接上一只喷雾水枪。

沫量足以覆盖燃油所能散布的最大单个面积达150毫米厚度。 该系统所产生的泡沫应能适宜于扑灭油类火灾。 应设有通过固定管系和控制阀或旋塞有效地分配泡沫至适当喷射口的设施。 并应设有用固定式嘴射器将泡沫有效地射到被保护处所内其他主要火灾危险处的设施。 泡沫膨胀率应不超过12:1。

2 任何这种系统的控制设施应易于到达和操作简便，且应成组地分装于尽可能少的处所，其所在位置应不致为被保护处所的火灾所切断。

规 则 9

机器处所的固定式高膨胀泡沫灭火系统

1.1 机器处所所需的任何固定式高膨胀泡沫系统应能使通过固定喷射口迅速喷出的泡沫量足以按每分钟至少1米的厚度注入最大一个被保护处所。 所备发泡液的数量，应足够产生5倍于最大一个被保护处所容积的泡沫容积。 泡沫膨胀率应不超过1,000 : 1。

1.2 主管机关可以允许变更设备及喷出速度，但应获得等效的保护效果。

2 输送泡沫的供给管道，泡沫发生器的空气进口以及泡沫产生装置的数量，应根据主管机关的意见，使之有效地生产和分配泡沫。

3 泡沫发生器输送管道的布置，在被保护处所发生火灾时，应使泡沫发生设备不受影响。

4 泡沫发生器、发生器的动力源、发泡液以及控制这个系统的设施，应易于到达和操作简便，且应成组地设在尽可能少的处所，其所在位置，应不致为被保护处所的火灾所切断。

规 则 10

机器处所的固定式压力水雾灭火系统

1 机器处所所需的任何固定式压力水雾灭火系统应备有经认可的水雾喷嘴。

2 喷嘴的数目和布置应取得主管机关的同意，并应保证使水按每分钟每一平方米至少5升的水量在其被保护的处所作有效而平均的分布。 如认为需要增加出

水率时，应取得主管机关的同意。 在污水沟、舱柜顶部和燃油易于流布的其他处所，以及在机器处所内其他具有特殊失火危险处的上方，都应设置喷嘴。

3 该系统可以分成若干区域，其分配阀应能从被保护处所以外易于到达的部位进行操作，且不致因保护处所失火而被立即切断。

4 该系统应以必要的压力保持充水，并应于该系统内压力降低时，供水泵即自动向系统供水。

5 水泵应能同时向任一被保护舱室内该系统的所有区域以必要的压力供水。水泵及其控制设备应装于被保护处所以外。 水泵应不致因水雾系统所保护处所失火而使该系统失去作用。

6 水泵可以为独立内燃机驱动；但如由符合规则 II-1/44 或规则 II-1/45 规定的应急发电机供给动力，则该发电机的布置应在主动力损坏时，能自动起动，以使5款所要求的水泵立刻获得动力。 如水泵由独立内燃机驱动，其所在位置应在被保护舱室失火时，不会影响对该机器的空气供应。

7 应采取措施以防止喷嘴被水中的杂质或管系、喷嘴、阀门和水泵的锈蚀所阻塞。

规 则 11

机器处所内的特别布置

1 本规则规定适用于A类机器处所以及主管机关认为需要的其他机器处所。

2.1 天窗、门、通风筒、供排气通风的烟囱开口以及机器处所的其他开口，其数量应减低到符合船舶通风以及正常、安全运行所需要的最少量。

2.2 天窗应为钢质，但不包括玻璃板。 应采取适当的措施，以便在发生火灾时使烟气能从被保护处所释放。

2.3 在客船上，除动力操纵的水密门外，上述门的布置应能在所在处所失火时，由动力操纵的关闭装置，或由设置在向关闭方向反向倾斜3.5°时能关闭的自闭式门来保证其确实关闭，该门具有由遥控操纵脱开装置操作的保安型的门背钩装置。

3 机器处所的限界面上不应设窗，但并不排除在机器处所内的控制室上使用玻璃。

4 下列各项应装有控制设施：

.1 天窗的开启和关闭、正常供排气通风的烟囱开口的关闭及通风筒挡火闸的关闭；

.2 释放烟气；

.3 动力操纵门的关闭或门的驱动脱开机构，但动力操纵水密门除外；

.4 停止通风机；

.5 停止强力送风和抽风机，停止燃油驳运泵、燃油装置泵及其他类似的燃油泵。

5 4款和规则15.2.4所需的控制设施应位于有关处所的外面，并在它们所服务的处所内失火时不致被切断。 在客船上，此种控制设施和任何规定的灭火系统控制设施，应尽可能置于一个控制位置上或集中于少数几个位置上，并应取得主管机关的同意。 上述位置应具有开向开敞甲板的安全出入口。

6 在相邻于轴隧的低层上设置任何A类机器处所出入口时，在水密门附近的轴隧内应设有每侧均可操纵的轻型钢质防火门。

7 对货船上的周期无人照管机器处所，主管机关应对保持机器处所的耐火完整性、灭火系统控制的位置和集中性、所需的关闭装置（如通风、燃油泵等）以及可能要求的附加灭火设施和其他消防设备与呼吸器等，予以特别考虑。 在客船上，这些要求应至少相当于有人照管机器处所的规定。

8 应于任何机器处所内设置符合规定14要求的经认可的自动探火与报警系统：

.1 安装业经认可的自动和遥控系统和设备，以代替该处所的连续人工操纵；

.2 主推进及其附属机械包括主电源应设有不同程度的自动或遥控，并应在连续操纵下能从控制室予以监督。

规 则 12

自动喷水器、探火和失火报警系统

1.1 任何所需的自动喷水器、探火和失火报警系统应能在任何时间立即进入工作，而不需依靠船员的操作。 该系统应为湿管式，但对少量暴露管段可采用干管

式，如主管机关认为这是一项必要的预防措施的话。 该系统的任何部位，如在使用中可能承受冰冻温度时，应有适宜的防冻措施。 该系统应以必要的压力保持充水，且应按本规则要求具有连续供水的设施。

1.2 每一喷水器分区应有可视听信号报警设施，当任一喷水器动作时，能在一个或数个指示装置中自动发出信号。 这种报警系统应能显示出该系统本身发生的任何故障。

1.2.1 在客船上，这种装置应显示出该系统所服务的任一处所发生的任何火灾征兆及其位置，并应集中于驾驶室或主消防控制站内，该处应配备一定的人员或设备，以保证该系统发出的任何警报可立刻被负责船员收到。

1.2.2 在货船上，这种装置应能显示出该系统所服务的分区内业已发生火灾征兆，并应集中于驾驶室内，而且，该装置的可视听报警设施应位于驾驶室以外的位置上，以保证火灾信号可立刻被船员收到。

2.1 喷水器应分组成为若干分区，每一分区的喷水器不应多于200只。 在客船上，任一喷水器分区所服务的处所不得多于两层甲板，且只能布置在一个主竖区范围内，但如主管机关认为不致因此而降低船舶的防火性能者，可以允许一个喷水器分区所服务的处所多于两层甲板或其布置范围超过一个主竖区。

2.2 每一喷水器分区只能用一个截止阀加以分隔。 每一喷水器分区的这种停止阀应易于到达，其位置应有清楚的固定标志，并应有防止任何未经许可的人员操作这种停止阀的措施。

2.3 在每一分区的截止阀处和中心站内，均应设有指示此系统中压力的仪表。

2.4 喷水器应为耐海上大气腐蚀的。 在起居和服务处所中，喷水器应在68°至79℃的温度范围内进入工作，但在例如干燥室等可能发生较高环境温度的处所除外，在这些处所内，喷水器的工作温度可以增加至不大于甲板顶最高温度加30℃。

2.5 在每一指示装置处应设有图或表，表示该装置所涉及的处所和有关每一分区的区段位置，并应有试验和保养的适当说明。

3 喷水器应设于顶部位置，并间隔成合适的格局，使喷水器所保护的标称面积，保持每分钟每平方米不少于5升的平均出水量。 但是，主管机关也可以准许使用能提供作适当散布的此种可能出水量的喷水器，其出水量业经使主管机关满意，表明其效能并不较上述为低。

4.1 应设有压力柜，其容积至少等于本款所述的充注水量的两倍。 压力柜贮存的常备充注淡水量应等于5.2款所述水泵的一分钟排量，并应设有保持柜内空气压力的设备，当柜内常备充注淡水量被使用时，柜内压力的安排应能例如保证不低于喷水器的工作压力加上从柜底量至系统中最高位置喷水器的水头压力。 应有在压力下补充空气和补充柜内充注淡水的适当设施。 压力柜应设有显示柜内正确水位的玻璃水位表。

4.2 应有防止海水进入柜内的设施。

5.1 应设有1台专供喷水器自动连续喷水的独立动力泵。 此泵应在压力柜内常备淡水完全排干之前，由于系统中压力降低而能自动进入工作。

5.2 泵和管系应能维持在最高位置的喷水器所必需的压力，以保证按3款规定的出水量连续喷水，并足以同时覆盖280平方米的最小面积。

5.3 泵的输出端，应装有一只试验阀连同1根开口的排水短管。 该阀和管子的有效截面积，应在系统内保持4.1款所规定的压力时，足以放出该泵所要求的出水量。

5.4 泵的海水进口，应尽可能位于该泵所在处所，其布置应在船舶漂浮时，除检查或修理水泵外，不需因任何目的而切断水泵的海水供给。

6 喷水器泵和压力柜应位于远离任何A类机器处所的位置，且不应位于需要由这种喷水器系统保护的任何处所内。

7.1 在客船上，海水泵及自动失火报警和探火系统应有不少于两套的动力源。若泵的动力源为电力时，则应一为主发电机，另一为应急电源。 泵的供电，应通过专设的单独馈电线，一路来自主配电板，另一路来自应急配电板。 馈电线应避免布置在厨房、机器处所和有高度失火危险的其他围闭处所，但为了通达相应的配电板而必需者除外；该线路应接通至设在喷水器泵附近的一只自动转换开关。 在正常供电情况下，此开关应一直由主配电板供电，并设计成当此路供电发生故障时，即能自动转换至由应急配电板供电。 主配电板和应急配电板的开关均应有清楚的标记，并在正常情况下保持闭合状态。 上述馈电线上不允许设有其他开关。 报警和探火系统动力源中的一路应是应急电源。 如果泵的动力源之一是内燃机时，则除应符合6款规定外，该机所在位置应在任何被保护处所失火时不影响对机器的空气供给。

7.2 在货船上，海水泵及自动探火和失火报警系统的动力源应不少于两套。若泵为电力驱动时，应与主电源连接，该电源至少应有两台发电机供电。馈电线应避免布置在厨房、机器处所和有高度失火危险的其他围蔽处所，但为了通达相应的配电板而必需者除外。探火和报警系统动力源中的一路应是应急电源。如果泵的动力源之一是内燃机时，则除应符合6款规定外，该机所在位置应在任何被保护处所失火时不影响对机器的空气供给。

8 喷水器系统和船上消防总管间应有连接，在连接处应设一只可锁闭的截止止回阀，以防止水从喷水器系统中倒流至消防总管。

9.1 每一喷水器分区应设有试验阀，用以通过放出相当于一只喷水器工作时的排水以便进行自动报警的试验；每一分区的试验阀应装在该分区的停止阀附近。

9.2 应设有降低系统中压力来试验水泵自动工作的设施。

9.3 在1.2款所述的指示装置位置之一，应设有能试验每一喷水器分区的报警和指示器的开关。

10 每一喷水器分区应备有备用喷水器头，其数量应取得主管机关的同意。

规 则 13

固定式探火和失火报警系统

1 一般要求

1.1 任何具有手动报警按钮的自动探火和失火报警系统应能在任何时候立即工作。

1.2 应对操纵系统所必需的电源和电路在断电或故障上作适当的监控。故障的发生应在控制板上启动以区别于火灾信号的声、光故障信号。

1.3 应具备至少两个电源，以供自动探火和失火报警系统电器设备的工作使用。其中一个电源应为应急电源。为此目的，应由分开的供电设备单独提供电源。这些供电设备应引向位于或邻近于自动探火系统的控制板上的自动转换开关上。

1.4 探测器和手动报警按钮应被分组成若干分区。任何探测器或手动报警按钮工作时，应在控制板和指示装置上启动声、光火警信号。如果在两分钟内信号未得到注意，应自动发出声响报警，且遍达船员起居处所和服务处所、控制站以及A类机器处所。这一声响报警系统无须为探测系统总体的组成部分。

1.5 控制板应位于驾驶室或主防火控制站内。

1.6 指示装置应表明已经动作的探测器或手动报警按钮所在的区域。 至少有一套装置应位于负责船员在航行中或在港内任何时候都容易到达的地点，船舶于非营运状态时除外。 如果控制板位于主防火控制站内，一套指示装置应位于驾驶室内。

1.7 应在每一指示装置上或附近清楚地表示其所保护的处所和所在的分区的位置。

1.8 一般不允许在起居处所、服务处所和控制站内的一个分区超过一层甲板，但包含围蔽梯道的区域除外。 为了避免延迟识别火源，包括每一分区内的围蔽处的数量限额，应由主管机关决定。 任何情况下，不允许任何一个分区内有多于50个围蔽处所。

1.9 对于客船，一个分区的探测器所服务的处所不得同时包括船舶的两舷，不得超过一层甲板，也不得超过一个主竖区，但是，如果主管机关认为船舶防火并不因此而减弱，可以允许这种分区的探测器服务于船舶的两舷并超过一层甲板。

1.10 服务于控制站、服务处所或起居处所的探测器分区，不得将A类机器处所包括在内。

1.11 探测器应根据热、烟或其他燃烧产物、火焰或这些因素的任何组合而动作。主管机关可以考虑认可根据其他因素而动作并显示出早期火灾的探测器，但是，其灵敏度不能低于上述那些探测器。 火焰探测器只能用作烟或热探测器的额外探测器。

1.12 应提供适当的说明书以及用于试验和维护的组成备件。

1.13 应定期试验探测系统的功能，使主管机关认为满意，试验方法是用设备产生为探测器的设计所规定要作出反应的适当温度的热空气或烟，或具有适当密度范围或颗粒大小的空气悬浮微粒，或其他与早期火灾有关联的现象。 所有探测器应是这样一种类型，使其正确动作试验后，而恢复到正常工作状态又无须更换任何部件。

1.14 除了可以允许在控制板关闭防火门和类似功能外，自动探火系统不得用于其他任何目的。

2 安装要求

2.1 手动报警按钮应遍布于起居处所、服务处所和控制站。 每一通道出口应装有一个手动报警按钮。 在每一层甲板的走廊内，手动报警按钮应便于到达，并使走廊任何部分与手动报警按钮的距离不大于20米。

2.2 应在所有梯道、走廊和起居处所的逃口安装烟探测器。 应考虑在通风管道内安装特殊用途的烟探测器。

2.3 如果要求在2.2款明确规定以外的其他处所安装一个固定式自动探火和失火报警系统，在每一此类处所内应至少有一个符合1.11款规定的探测器。

2.4 探测器的安装部位应能取得最佳功能。 靠近横梁和通风管道的位置，或气流影响探测器性能的其他位置，或有可能产生冲击或物理性损坏的位置都应予避开。 一般来说，位于顶部的探测器与舱壁的距离至少为0.5米。

2.5 探测器的最大间距应符合下表：

探测器类型	每一探测器的最大地板面积	两个中心之间的最大距离	与舱壁的最大距离
热	37米^2	9米	4.5米
烟	74米^2	11米	5.5米

基于证实探测器特性的试验资料，主管机关可以规定或允许其他间距。

2.6 系统的电线应避免布置在厨房、A类机器处所以及具有高度失火危险的其他围蔽处所，但有必要在此类处所配备探火或火灾报警的或通达相应的电源者除外。

3 系统设计要求

3.1 系统和设备应作适当设计以能承受一般在船上出现的电压变动和瞬时变动、环境温度的变化、振动、潮湿、颠振、冲击和腐蚀。

3.2 2.2款所要求的烟探测器应被证明，在烟密度未超过每米2%的减光率之前不动作，但未超过每米12.5%的减光率前就动作。 安装于其他处所之内的烟探测器应在主管机关考虑到避免探测器不灵敏或过度灵敏的情况下而认为满意的灵敏度极限内进行动作。

3.3 热探测器在温度以每分钟不大于1℃的速率向下述温度界限升高时，在空气温度低于54℃时不应动作，而在空气温度超过78℃之前即应动作。 温升率更大

时，热探测器应在主管机关考虑到避探测器不灵敏或过度灵敏的情况下而认为满意的温度极限内动作。

3.4 由主管机关考虑决定，在环境温度一般偏高的干燥室或类似的高温处所内，热探测器动作的许可温度可以较该类处所的甲板顶最高温度增加30℃。

规 则 14

周期性无人照管机器处所的自动探火和失火报警系统

1 周期性无人照管机器处所应安装以自控原理为基础的探火系统，并包括定期试验的设备。

2 这种探火系统的设计和探测器的安置，应在上述处所的任何部位刚开始发生火灾征兆时以及在机器操作的任何正常状况和环境温度的可能范围内所需的通风变化下，能迅速地探出火灾征兆来。 除高度限制的处所及其使用特别适宜者外，不许设置仅使用感温探测器的探火系统。 该探火系统将从任何其他系统不能显示火灾征兆的二个方面清楚地引进了可视听报警装置，并设于足量的处所，以保证驾驶室和负责轮机的高级船员听到和看到该报警信号。 当驾驶室不在操纵时，应能在负责值班船员的处所发出警报。

3 探测器安装以后应能在机器运转以及通风的变化情况下进行试验。 探火系统在主动力源发生故障时，应能通过由专设的单独馈电线的应急动力源自动供电。

规 则 15

燃油、润滑油和其他易燃油类的布置

1 燃油使用规定

燃油使用应符合下列限定：

.1 除本款另有许可外，燃油的闪点低于60℃者，概不得使用。

.2 对于应急发电机，其燃油闪点不低于43℃者，可以使用。

.3 只要采取认为必要的附加措施，并符合下述条件，即此类燃油的贮藏或使用处所的温度不允许升高至低于该燃油闪点的10℃之内，主管机关可以允许普遍使用闪点低于60℃但不低于43℃的燃油。

.4 对于货船，可准许使用闪点低于本款规定以外的燃油如原油，只要此种燃油并不贮藏在任何机器处所内，且整套装置经主管机关认可。

燃油的闪点应由经认可的闭杯法测定。

2 燃油的布置

使用燃油的船舶，其燃油的贮藏、分配和使用的布置应能保证船舶和船上人员的安全，并应至少符合下列规定：

.1 在燃油系统中凡包含压力超过0.18牛顿／毫米^{2}的加热燃油的任何部分，应尽实际可能不被隐蔽，以免不易观察其缺陷和泄漏。在机器处所内燃油系统的此种部分应有足够的照明。

.2 在所有正常情况下，机器处所应有足够的通风，以防止油气聚集。

.3 燃油舱（柜）应尽实际可能是船体结构的一部分，并位于A类机器处所之外。除双层底柜外，其他燃油舱（柜）如必须邻接或位于A类机器处所时，其垂直面中至少有一面应与该机器处所的限界面相邻接，并最好与双层底柜具有共同的限界面，而使与机器处所的共同限界面的面积减至最小程度。若此种燃油舱（柜）位于A类机器处所的限界面之内时，它们不得贮存闪点低于60℃的燃油。一般应避免使用孤立架设的燃油柜，但如使用这种油柜时，在客船上应禁止在A类机器处所内使用。倘若准许使用时，该油柜应置于足够大小的油密溢油盘内，此盘设备有能导至适当尺寸溢油柜的适当排泄管。

.4 从燃油舱（柜）溢出或渗漏的燃油可能落于热表面而构成危险的地方，不得设燃油舱（柜）。应采取预防措施，防止任何油在压力下可能从油泵、滤器或加热器溢出而与热表面相接触。

.5 每一燃油管如其损坏后会使燃油从设在双层底上方的贮油柜、澄油柜和日用油柜溢出，则应在这些油柜上装设当油柜所在处所失火时，能在此处所之外的安全地点加以关闭的旋塞或阀门。如在深油舱

位于任何轴隧、管隧内或类似处所内的特殊情况下，这些深油舱上应装设阀门，但可在隧道或类似处所之外的管路上加装阀门，以便在失火时加以控制。 如在机器处所内加装上述阀门，此阀应于该处所外面操纵。

.6 应设有安全和有效的设施，以确定任何油舱（柜）内的存油量。测量管不得伸延至有点燃测量管溢油危险的任何处所，尤其不得伸延至客舱或船员所在的处所。 其他确定任何燃油舱（柜）存油量的设施，如符合下列要求者，亦可允许采用：

.6.1 在客船上，如这种设施不需在柜顶以下穿孔，且在其损坏或舱（柜）注油过量时不致因此而溢出燃油者。

.6.2 在货船上，此种设施在其损坏或舱（柜）注油过量时不致因此而溢出燃油者。 禁止使用圆形玻璃测量表。 主管机关可允许使用具有扁形玻璃且在表和油柜之间设有自闭阀的油位测量表。主管当局将接受其他这类设施，它们应处于良好状况，以保证其不断正确地发挥作用。

.7 任一油舱（柜）或燃油系统的任一部分，包括注入管在内，应有防止超压的设施。 任何溢流阀，以及空气管或溢流管，应引至主管机关认为安全的处所。

.8 燃油管及其阀件和附件须用钢材或其他经认可材料建造，但主管机关认为确是必要的地方，可允许有限制地使用挠性管。 这种挠性管及其端部附件应为具有足够强度的经认可的耐火材料，且其结构应取得主管机关的同意。

3 滑油的布置

用于压力润滑系统的滑油的贮藏、分配和使用，其布置应保证船舶和船上人员的安全。 在A类机器处所以及每当实际可行时在其他机器处所，此项布置应至少符合2.1、2.4、2.5、2.6、2.7和2.8各款的规定，但并不排除在滑油系统中使用窥流镜，只要它们经试验显示出具有适当的耐火度。

4 其他易燃油类的布置

在压力下使用于动力传动系统、控制和驱动系统以及加热系统中的其他易燃油类，其贮藏、分配和使用的布置应保证船舶和船上人员的安全。 在含有点火设施的处所，此项布置至少须符合2.4款和2.6款的规定，以及符合2.7 款 和2.8款有关强度和结构的规定。

5 周期性无人照管的机器处所

燃油和滑油系统除应符合1至4款的要求外，尚应符合下列规定：

.1 燃油和滑油管路应被遮护，或采取其他适当保护，以尽可能避免油类喷在或漏在热表面上或进入机器的进气口。 上述管系的接头数目应保持最少，如属可能，应收集来自高压燃油管的漏油，并设有发出警报的装置。

.2 若日用燃油柜为自动注油式或遥控式，应设有装置以防溢油。 自动处理易燃液体的其他设备如燃油净化器，应设有装置以防溢油，可能时，这些设备应置于专供储存净化器及其加热器的处所内。

.3 若日用燃油柜或沉淀柜设有加热装置时，应设置高温警报，以防可能超过燃油闪点。

规 则 16

载客超过36人客船以外船舶的通风系统

1 通风导管应为不燃材料制成。 但对长度一般不超过2米，横截面积不超过0.02平方米的短节导管，如其符合下列条件，则不需使用不燃材料：

.1 这些导管是用经主管机关同意的具有低失火危险的材料制成；

.2 这些导管只可用作通风装置的末端；

.3 这些导管的位置，从“A”或“B”级分隔包括“B”级连续天花板的开口处沿着导管量起，不小于600毫米。

2 若通风导管通过“A”级舱壁和甲板的净截面积超过0.02平方米时，除非通过舱壁或甲板的导管在通过甲板或舱壁的邻近处为钢质，否则其开口应装有钢质套管。 本节的导管和套管应符合下列要求：

.1 套管的壁厚至少为3毫米，长度至少为900毫米。当通过舱壁时，该长度最好分成在舱壁的两侧各为450毫米。这些导管或装在这些导管上的套管应具有耐火隔热性，该隔热性应至少同导管通过的舱壁或甲板的耐火完整性一样。经主管机关同意，可以设有等效的贯穿保护。

.2 净横截面积超过0.075平方米的导管，除应符合2.1款的要求外，还应设置挡火闸。挡火闸应能自动操纵，也能在舱壁或甲板的两侧人工关闭。挡火闸上应装有指示器，以指明其是否打开或关闭。但如导管通过被"A"级分隔包围的无须服务的处所时，只是那些导管同其穿过的分隔具有一样的耐火完整性，则无需设置挡火闸。

3 A类机器处所、厨房、汽车甲板处所、滚装装货处所或特种处所的通风导管，均不得通过起居处所、服务处所或控制站，但下列情况者除外：

.1.1 导管的宽度或直径分别为300毫米和760毫米及300毫米和760毫米以上者，其制造用钢板的厚度至少为3毫米和5毫米，而对宽度或直径在300毫米和760毫米之间的导管，其制造用钢板的厚度应用内插法求得；

.1.2 受到适当支承和加强者；

.1.3 接近穿过限界面处设有自动挡火闸；

.1.4 从机器处所、厨房、汽车甲板处所、滚装装货处所或特种处所到每一挡火闸以外至少5米处隔热至"A-60"级标准；

或：

.2.1 导管制造用钢符合3.1.1和3.1.2款的规定；

.2.2 所有起居处所、服务处所或控制站均隔热至"A-60"级标准。

但对符合8款要求的主区分隔的穿越者除外。

4 起居处所、服务处所或控制站的通风导管，均不得通过A类机器处所、厨房、汽车甲板处所、滚装装货处所或特种处所，但下列情况者除外：

.1.1 制造通过A类机器处所、厨房、汽车甲板处所、滚装装货处所或特种处所导管的钢材，符合3.1.1和3.1.2款的规定；

.1.2 靠近穿过限界面处设有自动挡火闸；

.1.3 保持机器处所、厨房、汽车甲板处所、滚装装货处所或特种处所的限界面在穿越处的完整性；

或：

.2.1 制造通过A类机器处所、厨房、汽车甲板处所、滚装装货处所或特种处所导管的钢材，符合3.1.1和3.1.2款的规定；

.2.2 在机器处所、厨房或汽车甲板处所、滚装装货处所或特种处所内隔热至“A-60”级标准；

但对也符合8款要求的主区分隔的穿越者除外。

5 通过“B”级舱壁的净横截面积超过0.02平方米的通风导管，应装有长度为900毫米的钢质套管，该套管最好分成在舱壁的两侧各为450毫米，但该长度导管为钢质时除外。

6 对机器处所外面的控制站，应采取实际可行的措施来保证使通风、能见度和烟气排除得以保持，以便在失火时，位于其中的机械和设备可以受到监管并继续有效地运转。 应设有交替的和分开的供气设施；两个供气源的空气吸口，其分布应使两个吸口同时吸进烟气的危险性减至最小。 主管机关可决定上述要求不必适用于位在开敞甲板和开口通向开敞甲板的控制站，或在具有同等效用的局部关闭装置的处所。

7 厨房炉灶的排气管道，在其通过起居处所或内含可燃材料的处所的地方，应按“A级分隔”建造。 每一排气管道应设有：

.1 一只易于拆下的集油器，以便于清洁；

.2 一个挡火闸，位于导管的下端；

.3 能在厨房内操纵的关闭抽风机的装置；

.4 在管道内进行灭火用的固定设施。

8 在客船上，凡必需穿过主竖区舱壁的通风导管，应在舱壁邻近装设保安型的自动关闭挡火闸，此种挡火闸还应能从舱壁的每一面都可用手关闭。 其操纵位置应易于到达，并用能反光的红色标志之。 舱壁与挡火闸之间的导管应为钢质或其他等效材料，必要时并应符合规则18.1.1的要求。 挡火闸应至少在舱壁的一侧装设可见的指示器，以表示挡火闸是否处于开启位置。

9 一切通风系统的主要进风口及出风口应能在被通风处所的外部加以关闭。

10 起居处所、服务处所、装货处所、控制站和机器处所的动力通风，均能从其服务处所外面的易于到达之处将其停止。 此位置在其服务处所失火时须不易被切断。 机器处所内动力通风的停止装置，应同其他处所内通风的停止装置完全分开。

规 则 17

消 防 员 装 备

1 消防员装备的组成：

1.1 个人配备包括：

.1 防护服，其材料应能保护皮肤不受火焰的热辐射，并不受蒸汽的灼伤和烫伤。 衣服的外表应是防水的。

.2 长统靴和手套，由橡胶或其他绝缘材料制成。

.3 一顶能对撞击提供有效防护的硬头盔。

.4 一盏型式业经认可的电安全灯（手提灯），其照明时间至少为3小时。

.5 一把主管机关同意的太平斧。

1.2 一具业经认可的呼吸器，其型式可为下列之一：

.1 一具装有适宜空气泵和一段空气管的防烟盔或防烟罩，其空气管的长度应足够从开敞甲板到达货舱或机器处所的任一部分，且不受舱口或门口的妨碍。 为符合本款要求，如空气管所需的长度超过36米时，应按主管机关的决定用储压式呼吸器代替防烟盔或防烟罩或增设储压式呼吸器1具。

.2 一具储压式压缩空气呼吸器，筒内空气储存量至少应有1,200升，或一具储压式呼吸器，其可供使用的时限至少为30分钟。 船上还应备有一些为主管机关所满意的、对所用呼吸器合用的备用充气器。

2 每一呼吸器应有足够长度与强度的耐火救生绳1根，此绳应能用弹条卡钩系在呼吸器的背带上，或系在一条独立的腰带上，使在拉曳救生绳时防止呼吸器脱开。

3 所有船舶至少应备有两套符合1款要求的消防员装备。

3.1 此外：

.1 凡在客船上于所有旅客处所和服务处所所在甲板的总长度中，或在具有一层以上的上述长度总计最大的此种甲板中，每80米或其部分，应设两套消防员装备和两套个人配备，而每套应包括1.1.1、1.1.2和1.2.3款中规定的各项。

.2 油船应设两套消防员装备。

3.2 在载客超过36人的客船上，每副呼吸器应设有一只水雾器，水雾器应置于该呼吸器相邻之处。

3.3 主管机关考虑到船舶的大小和类型可要求附加数套个人配备和呼吸器。

4 消防员装备或数套个人配备，应储存在易于到达和即刻可用之处，如所备消防员装备或个人配备多于一套时，它们的储存位置应尽量远离。 在客船上，至少应在任一位置上可以获得两套消防员装备和一套个人配备。

规 则 18

杂 项

1.1 若电缆、管路、干线、导管等或者桁材、横梁或其他结构件穿过“A”级分隔时，在符合规则30.5规定的条件下，应设有装置以保证不致消弱耐火性能。

1.2 若电缆、管路、干线、导管等或者通风装置末端附件、照明夹具或类似装置穿过“B”级分隔时，应设有装置以保证不致削弱耐火性能。

2.1 穿过“A”级或“B”级分隔的管子，应为主管机关经考虑该分隔所需经受的温度而认可的材料。

2.2 若主管机关可准许输送油类和可燃液体通过起居处所和服务处所时，输送油类或可燃液体的管子，应为主管机关经考虑失火危险而认可的材料。

2.3 在热力作用下易于失效的材料，不应用作舷边流水管、污水排泄管及其他靠近水线和因失火时该材料失效后将会造成浸水危险的部位的出水口。

3 如使用电力取暖器，应于装设位置加以固定，其构造应能使失火危险减至最低程度。 凡取暖器的电热丝暴露到可能因其热度而将衣服、帷幔或其他类似的物件烧焦或着火者，概不得设置。

4 硝酸纤维素基胶片不得用于电影设备。

5 所有废物箱应以不燃材料制成，四周和底部不得有开口。

6 凡油类产品可能渗透的处所，其表面隔热应防止油类或油汽的渗透。

规 则 19

国际通岸接头 *

1 500总吨及500总吨以上的船舶，至少应设有1只符合3款规定的国家通岸接头。

2 应备有使此项接头能用于船的任何一舷的设施。

3 国际通岸接头的法兰的标准尺寸，应符合下表所列要求：

名 称	尺 寸
外 径	178毫米
内 径	64毫米
螺栓圈直径	132毫米
法兰槽口	直径为19毫米的螺栓孔4个，等距离间隔于上述直径的螺栓圈上，并开槽至法兰边缘
法兰厚度	最少为14.5毫米
螺栓及螺母	4副，每只直径16毫米，长度50毫米

4 国际通岸接头应用钢材或其他合适的材料制成并设计成能承受1.0牛顿／毫米^{2}工作压力。 其一端应为平面法兰，另一端则有永久附连于适合船上消火栓或消防水带的接头。 国际通岸接头应与能承受1.0牛顿／毫米^{2}工作压力的任何材料的垫片1只，及长度为50毫米、直径为16毫米螺栓4只和垫圈8只，一同保存于船上。

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* 参阅本组织通过的大会470(XII)号决议中的建议案“国际通岸接头(岸边)”

规 则 20

防 火 控 制 图

1 在所有船舶上应有固定展示的总布置图供船员参考。 图上应清楚地标明：每层甲板的各控制站，“A级分隔”围闭的各防火区域，“B级分隔”围闭的各区域，连同探火和失火报警系统、喷水器装置、灭火设备、各舱室和甲板等出入通道设施的细目，以及通风系统，包括风机控制位置、挡火闸位置和服务于每一区域通风机识别号码的细目。 或经主管机关决定，上述细目可记入一小册子，每一高级船员一本，并应有一份放于船上易于到达的地方可随时取用。 控制图和小册子应拥有最新资料，如有改动，应尽可能立即加以更正。 控制图和小册子的说明应为本国文字，如该文字既不是英文也不是法文，则应译成其中的一种。 此外，船上灭火和抑制火灾用的所有设备和装置的保养和操作说明，应保存在一个封套内，并放在易于到达的地方，以便随时取用。

2 在所有船上，应有一套防火控制图或具有该图的小册子的复制品，永久性地置于甲板室外面显著标示的风雨密的盒子里，以有助于岸上的消防人员。

规 则 21

灭火设备的即刻可用性

在一切船舶中，灭火设备应保持良好状况，并在船舶整个航程期间能立刻使用。

规 则 22

代 用 品 的 采 用

本章内对任何船舶所规定的任何特定型式的设备、用具、灭火剂或装置，在主管机关认为不降低效能的情况下，可允许用其他型式的设备来代替。

第二节——客船的消防措施

规 则 23

结 构

1 船体、上层建筑、结构性舱壁、甲板及甲板室应以钢材或其他等效材料建造。为运用规则3.7款所指的钢或其他等效材料的定义，“相应曝火时间”应按规则26和27表列的完整性及隔热性标准来确定。例如当各种分隔诸如甲板或甲板室的两侧和两端，允许为“B－0”级耐火完整性时，则“相应曝火时间”应为半小时。

2 如结构的任何部分为铝合金时，则应符合下列要求：

.1 “A”或“B”级分隔的铝合金部件，除由主管机关认为是无负荷的结构外，在标准耐火试验的任何相应曝火时间内，其隔热层应能使结构心材的温度升高不超过其环境温度200℃。

.2 应特别注意用于支承救生艇、筏的存放、降落和登乘区域以及支承“A”和“B”级分隔的铝合金圆柱、支柱和其他结构部件的隔热要求，以保证：

.2.1 对用于支承救生艇、筏区域以及“A”级分隔的部件，在标准耐火试验的一小时之末，应适用本规则2.1款规定的温升限度。

.2.2 对用于支承“B”级分隔的部件，在标准耐火试验的半小时之末，应适用本规则2.1款规定的温升限度。

3 A类机器处所的顶盖及舱棚，应为足够隔热的钢结构；其上的任何开口(如有时)，均应适当布置和保护，以防止火灾蔓延。

规 则 24

主竖区和水平区

1.1 载客超过36人的客船，其船体、上层建筑及甲板室应以“A”级分隔分为若干主竖区。阶层和壁凹应减至最少量，但如属必需者，则亦应为“A”级分隔。此分隔的隔热值，应符合规则26中相应的表列规定。

1.2 载客不超过36人的客船，在居住处所和服务处所的船体、上层建筑及甲板室应以"A"级分隔分为若干主竖区。 此分隔的隔热值，应符合规则27中相应的表列规定。

2 舱壁甲板以上的形成主竖区限界面舱壁，只要实际可行，应与直接在舱壁甲板以下的水密分舱舱壁位于同一直线上。

3 这种舱壁应由甲板延伸至甲板，并延伸至船壳或其他限界面。

4 如某一主竖区内以水平"A"级分隔再分为水平区，用以对船上喷水器系统区域与非喷水器系统区域之间提供一适当的屏障时，此项水平分隔应延伸至相邻两个主竖区舱壁，并延伸至该船的船壳或外部限界面，并应按表26.3或表27.2所列的耐火隔热性和完整性的数值予以隔热。

5.1 为特殊用途而设计的船舶，例如汽车或铁路车辆渡船，如设置主竖区舱壁将影响船舶所预定的用途时，应以能控制和限制火灾的等效设施代替，并应由主管机关特殊认可。

5.2 倘若船上有特种类别的处所，则任何这种处所应符合规则37的相应规定，且此规定与本节的其他要求有矛盾时应以规则37的要求为准。

规 则 25

主竖区内的舱壁

1.1 载客超过36人的客船，不要求为"A"级分隔的一切舱壁，应至少为规则26表列的"B"级或"C"级分隔。

1.2 载客不超过36人的客船，不要求为"A"级分隔的在起居处所和服务处所的一切舱壁，应至少为规则27表列的"B"级或"C"级分隔。

1.3 一切这种分隔可按规则34的规定，在其表面覆以可燃材料。

2 一切走廊舱壁，当不要求为"A"级分隔时，应为从甲板延伸至甲板的"B"级分隔，但下列者除外：

.1 当在舱壁的两侧设置连续"B"级天花板或衬板时，连续天花板或衬板后面的舱壁部分，其所用材料应为"B"级分隔结构所允许的厚度和成分，但在主管机关认为合理和可行的范围内，这种舱壁部分只需满足"B"级完整性标准的要求；

.2 在具有符合规则12规定的自动喷水器系统所保护的船舶上，以"B"级材料建造的走廊舱壁可在走廊内天花板处终止，但此项天花板应为"B"级分隔结构所允许的厚度和成分。 尽管有规则26和27的要求，在主管机关认为合理和可行的范围内，上述舱壁和天花板只需满足"B"级完整性标准的要求。 上述舱壁上的一切门和门框，应为不燃材料，其构造和安装应能提供可靠的耐火性能，并取得主管机关的同意。

3 除走廊舱壁外，一切要求为"B"级分隔的舱壁，应由甲板延伸至甲板，并延伸至船壳或其他限界面；但如在舱壁的两侧均设有连续"B"级天花板或衬板时，此舱壁可终止于连续的天花板或衬板。

规 则 26

载客超过36人的客船舱壁及甲板的耐火完整性

1 除应符合本节其他规则关于舱壁及甲板耐火完整性的明确规定外，一切舱壁及甲板的最低耐火完整性应按表26.1至表26.4办理。 如因船舶的任何特殊结构布置，致使任何分隔的最低的耐火完整性数值难于从这些表中确定时，则该数值的确定应取得主管机关的同意。

2 下列要求应作为运用各表的指导原则：

.1 表26.1适用于作为主竖区或水平区限界面的舱壁。

表26.2适用于不作为主竖区或水平区限界面的舱壁。

表26.3适用于在主竖区内形成阶层的甲板或作为水平区限界面的甲板。

表26.4适用于在主竖区内不形成阶层的甲板也不作为水平区限界面的甲板。

.2 为了确定应用于相邻处所的限界面相应的耐火完整性标准，这些处所应按其失火危险程度分为下列(1)至(4)类。 如因某一处所的内容和用途，在按本规则规定进行分类存在疑问时，则此处所应按具有最严格的限界面要求的有关类别中的某一处所来处理。 每类的名

称只是举例，而不是限制。 每类前面括号内的数字是指表内相应的“列”或“行”数。

(1) 控制站

设有应急电源和应急照明电源的处所。

操舵室和海图室。

设有船舶无线电报设备的处所。

灭火室、失火控制站和失火记录站。

位于推进机械处所外面的推进机械控制室。

设有集中失火报警设备的处所。

设有集中应急广播系统站和设备的处所。

(2) 梯道

旅客和船员用的内部梯道、升降机、自动扶梯（完全设在机器处所内者除外）以及通往上述梯道等的环围。

至于仅环围于一层甲板的梯道，应作为未被防火门隔开的处所的一部分。

(3) 走廊

旅客及船员的走廊和休息室。

(4) 救生艇与救生筏的操作及登乘地点

作为救生艇、筏登乘与降落地点的开敞甲板处所和围蔽散步甲板处所。

(5) 开敞甲板处所

救生艇、筏登乘与降落地点以外的开敞甲板处所和围蔽散步甲板处所。

露天处所（上层建筑及甲板室外面的处所）。

(6) 失火危险较小的起居处所

设有限制失火危险的家具和装备的住室。

设有限制失火危险的家具和装备的办公室及诊疗室。

设有限制失火危险的家具和装备的公共处所，且其甲板面积少于50平方米者。

(7) 中等失火危险的起居处所

与上述(6)同，但设有非限制性失火危险的家具和装备。

设有限制性失火危险的家具及装备的公共处所，但甲板面积等于或大于50平方米者。

起居处所内单独的橱柜及小储物间。

小卖部

电影放映室及影片储藏室。

食物厨房（没有明火者）。

清洁用具橱柜（柜内不放可燃液体）。

实验室（室内不放可燃液体）。

药房。

小干燥间，且其甲板面积等于或少于4平方米者。

贵重物品保管室。

(8) 失火危险较大的起居处所

设有非限制失火危险的家具和装备的公共处所，且其甲板面积等于或大于50平方米者。

理发室及美容室。

(9) 盥洗室及类似处所

公共盥洗设施、淋浴室、洗澡室、厕所等。

小洗衣间。

室内游泳池场所。

手术室。

起居处所内没有厨房设备的单独配膳室。

个人盥洗设施应作为其所在处所的一部分。

(10) 极少或没有失火危险的舱（柜）、空室及辅机处所

构成船体结构部分的水舱。

空室及隔离空舱。

不设置具有压力润滑系统的机器的辅机处所，且在该处所内禁止储藏可燃物体，例如：

通风机及空气调节机间、锚机室、舵机室、减摇装置机室、电力推进电动机间、分区配电报间及浸油式电力变压器（10千伏安以上）以外的纯电气设备间、轴隧及管隧、泵及冷藏机（可抽送或使用可燃液体）的处所。

为上述处所服务的封闭围壁通道。

其他封闭围壁通道，例如管子及电缆的围壁通道。

(11) 具有中等失火危险的辅机处所、装货处所、特种处所、货油舱与其他油舱（柜），以及其他类似处所

货油舱。

货舱、围壁通道及舱口。

冷藏舱。

燃油舱（柜）（设在没有机器的单独处所内者。）

允许储藏可燃物体的轴隧及管隧。

在(10)类中所述的辅机处所，且在该处所内允许设置压力润滑系统的机器或储藏可燃物体者。

燃油加油站。

设有浸油式电力变压器（10千伏安以上）的处所。

设有由汽轮机及往复式蒸汽机驱动的辅发电机处所，以及功率为110千瓦和110千瓦以下小内燃机驱动的应急发电机、喷水器、洒水器或消防泵、舱底泵等。

特种处所（仅表26.1及表26.3所适用者）。

为用于上述处所的封闭围壁通道。

(12) 机器处所及主厨房

主推进机械舱（电力推进电动机舱除外）及锅炉舱。

除前述(10)及(11)类的辅机处所外，设有内燃机或其它燃油、加热或泵装置的辅机处所。

主厨房及其附属设施。

上述处所的围壁通道及舱棚。

(13) 储藏室、车间、配膳室等

不附属于厨房的主配膳室等。

主洗衣间。

大干燥间（甲板面积大于4平方米者）。

杂物间。

邮件舱及行李室。

垃圾间。

车间（不属于机器处所、厨房等的一部分者）。

(14) 贮藏易燃液体的其他处所

灯间。

油漆间。

内装易燃液体的储藏室（包括储藏染料、药品等）。

实验室（室内放置易燃液体）。

.3 如果以一个数值表明两个处所之间的限界面的耐火完整性时，则此数值应适用于各种情况。

.4 凡未设有符合规则12规定的自动喷水器系统的某一主竖区或水平区内的两个处所之间，或两个均未被此种自动喷水器系统保护的主竖区或水平区之间的限界面，在确定其所适用的耐火完整性标准时，应采用表列两个数值中的较高值。

.5 凡设有符合规则12规定的自动喷水器系统的某一主竖区或水平区内的两个处所之间，或两个均由此种自动喷水器系统保护的主竖区或水平区之间的限界面，在确定其所适用的耐火完整性标准时，应采用表列两个数值中的较低值。 当一个喷水器系统区域和一个非喷水器系统区域在起居处所及服务处所内相遇时，此两区域之间的分隔应采用表列两个数值中的较高值。

.6 尽管规则25有所规定，当在表中只标有一长划时，则对限界面的材料或完整性不作特殊要求。

.7 关于(5)类处所，主管机关应确定表26.1或26.2中的隔热值适用于甲板室及上层建筑的末端，以及表26.3或26.4中的隔热值适

用于露天甲板。 如主管机关认为不必环围时，表 26.1 至 26.4 的(5)类处所就不一定要环围。

3 连续“B”级天花板或衬板连同其甲板或舱壁可以认为全部或部分地起到分隔所要求的隔热性和完整性的作用。

4 在批准结构的防火细节时，主管机关应考虑所要求的隔热层在交接点和终止点导热的危险。

表 26.1　作为主竖区或水平区限界面的舱壁

处　　所		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
控制站	(1)	A-60	A-30	A-30	A-0	A-0	A-60	A-60	A-60	A-0	A-0	A-60	A-60	A-60	A-60
梯道	(2)		A-0	A-0	A-0	A-0	A-15 A-0	A-30 A-0	A-60 A-15	A-0	A-0	A-30	A-60	A-15 A-0	A-60
走廊	(3)			A-0	A-0	A-0	A-0	A-30 A-0	A-30 A-0	A-0	A-0	A-30	A-60	A-15 A-0	A-60
救生艇与救生筏操作及登乘地点	(4)				–	–	A-0	A-0	A-0	A-0	A-0	A-0	A-60	A-0	A-60
开敞甲板处所	(5)					–	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0
较小失火危险的起居处所	(6)						A-15 A-0	A-30 A-0	A-30 A-0	A-0	A-0	A-15 A-0	A-30	A-15 A-0	A-30
中等失火危险的起居处所	(7)							A-30 A-0	A-60 A-15	A-0	A-0	A-30 A-0	A-60	A-30 A-0	A-60
较大失火危险的起居处所	(8)								A-60 A-15	A-0	A-0	A-60 A-15	A-60	A-30 A-0	A-60
盥洗室及类似处所	(9)									A-0	A-0	A-0	A-0	A-0	A-0
极少失火危险的舱(柜)、空室及辅机处所	(10)										A-0	A-0	A-0	A-0	A-0
具有中等失火危险的辅机处所、装货处所、特种处所、货油舱与其他油舱(柜)以及其他类似处所	(11)											A-0	A-60	A-0	A-60
机器处所及主厨房	(12)												A-60	A-30[b] A-15	A-60
储藏室、车间、配膳间等	(13)													A-0	A-30
贮藏易燃液体的其他处所	(14)														A-60

表 26.2　不作为主竖区或水平区限界面的舱壁

处　所		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
控制站	(1)	B-0[a]	A-0	A-0	A-0	A-0 B-0	A-60	A-60	A-60	A-0	A-0	A-60	A-60	A-60	A-60
梯道	(2)		A-0[a]	A-0	A-0	A-0	A-0	A-15 A-0	A-30 A-0	A-0	A-0	A-15	A-30	A-15 A-0	A-30
走廊	(3)			C	A-0	A-0 B-0	B-0	B-15 B-0	B-15 B-0	B-0	A-0	A-15	A-30	A-0	A-30 A-0
救生艇与救生筏操作及登乘地点	(4)				–	–	A-0	A-0	A-0	A-0	A-0	A-0	A-15	A-0	A-15 A-0
开敞甲板处所	(5)					–	A-0 B-0	A-0 B-0	A-0 B-0	A-0 B-0	A-0	A-0	A-0	A-0 B-0	A-0 B-0
较少失火危险的起居处所	(6)						B-0 C	B-15 C	B-15 C	B-0 C	A-0	A-15 A-0	A-30	A-0	A-30 A-0
中等失火危险的起居处所	(7)							B-15 C	B-15 C	B-0 C	A-0	A-15 A-0	A-60	A-15 A-0	A-60 A-15
较大失火危险的起居处所	(8)								B-15 C	B-0 C	A-0	A-30 A-0	A-60	A-15 A-0	A-60 A-15
盥洗室及类似处所	(9)									C	A-0	A-0	A-0	A-0	A-0
极少失火危险的舱（柜）、空室及辅机处所	(10)										A-0[a]	A-0	A-0	A-0	A-0
具有中等失火危险的辅机处、所、装货处所、特种处所、货油舱与其他油舱（柜），以及其他类似处所	(11)											A-0[a]	A-0	A-0	A-30[b] A-15
机器处所及主厨房	(12)												A-0[a]	A-0	A-60
储藏室、车间、配膳间等	(13)													A-0[a]	A-0
贮藏易燃液体的其他处所	(14)														A-30[b] A-15

表 26.3　在主竖区内形成阶层的甲板或作为水平区限界面的甲板

甲板下处所 \ 甲板上处所		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
控制站	(1)	A-60	A-60	A-30	A-0	A-0	A-15	A-30	A-60	A-0	A-0	A-30	A-60	A-15	A-60
梯道	(2)	A-15	A-0	A-0	A-0	A-0	A-0	A-15 A-0	A-15 A-0	A-0	A-0	A-0	A-60	A-0	A-60
走廊	(3)	A-30	A-0	A-0	A-0	A-0	A-0	A-15 A-0	A-15 A-0	A-0	A-0	A-0	A-60	A-0	A-60
救生艇与救生筏操作及登乘地点	(4)	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	甲-0	A-0	A-0	A-0
开敞甲板处所	(5)	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0
较小失火危险的起居处所	(6)	A-60	A-30 A-0	A-15 A-0	A-0	A-0	A-0	A-15 A-0	A-30 A-0	A-0	A-0	A-15 A-0	A-15	A-0	A-15
中等失火危险的起居处所	(7)	A-60	A-60 A-15	A-30 A-0	A-15 A-0	A-0	A-15 A-0	A-30 A-0	A-60 A-15	A-0	A-0	A-30 A-0	A-30	A-0	A-30
较大失火危险的起居处所	(8)	A-60	A-60 A-15	A-60 A-15	A-60 A-15	A-0	A-30 A-0	A-60 A-15	A-60 A-15	A-0	A-0	A-30 A-0	A-60	A-15 A-0	A-60
盥洗室及类似处所	(9)	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0
极少失火危险的舱(柜)、空室及辅机处所	(10)	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0
具有中等失火危险的辅机处所、装货处所、特种处所、货油舱与其他油舱(柜),以及其他类似处所	(11)	A-60	A-60	A-60	A-60	A-0	A-30 A-0	A-60 A-15	A-60 A-15	A-0	A-0	A-0	A-30	A-30[b] A-0	A-30
机器处所及主厨房	(12)	A-60	A-60	A-60	A-60	A-0	A-60	A-60	A-60	A-0	A-0	A-60	A-60	A-60	A-60
储藏室、车间、配膳间等	(13)	A-60	A-60 A-15	A-30 A-0	A-15	A-0	A-15 A-0	A-30 A-0	A-60 A-15	A-0	A-0	A-0	A-30	A-0	A-30
贮藏易燃液体的其他处所	(14)	A-60	A-60	A-60	A-60	A-0	A-60	A-60	A-60	A-0	A-0	A-60	A-60	A-60	A-60

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表 26.4　在主竖区内不形成阶层的甲板也不作为水平区限界面的甲板

甲板下处所 \ 甲板上处所		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
控制站	(1)	A-30 A-0	A-30 A-0	A-15 A-0	A-0	A-0 B-0	A-0	A-15 A-0	A-30 A-0	A-0	A-0	A-0	A-60	A-0	A-60 A-15
梯道	(2)	A-0	A-0	A-0	A-0	A-0 B-0	A-0	A-0	A-0	A-0	A-0	A-0	A-30	A-0	A-30 A-0
走廊	(3)	A-15 A-0	A-0	A-0[a] B-0[a]	A-0	A-0 B-0	A-0 B-0	A-15 B-0	A-15 B-0	A-0 B-0	A-0	A-0	A-30	A-0	A-30 A-0
救生艇与救生筏操作及登乘地点	(4)	A-0	A-0	A-0	A-0	–	A-0 B-0	A-0 B-0	A-0 B-0	A-0 B-0	A-0	A-0	A-0	A-0	A-0
开敞甲板处所	(5)	A-0	A-0	A-0 B-0	A-0	–	A-0 B-0	A-0 B-0	A-0 B-0	A-0 B-0	A-0	A-0	A-0	A-0 B-0	A-0
较小失火危险的起居处所	(6)	A-60	A-15 A-0	A-0	A-0	A-0 B-0	A-0 B-0	A-0 B-0	A-0 B-0	A-0 B-0	A-0	A-0	A-15 A-0	A-0	A-15 A-0
中等失火危险的起居处所	(7)	A-60	A-30 A-15	A-15 A-0	A-15 A-0	A-0 B-0	A-0 B-0	A-15 B-0	A-30 B-0	A-0 B-0	A-0	A-15 A-0	A-30 A-0	A-0	A-30 A-0
较大失火危险的起居处所	(8)	A-60	A-60 A-15	A-60 A-0	A-30 A-0	A-0 B-0	A-15 B-0	A-30 B-0	A-60 B-0	A-0 B-0	A-0	A-30 A-0	A-30 A-0	A-0	A-30 A-0
盥洗室及类似处所	(9)	A-0	A-0	A-0 B-0	A-0	A-0 B-0	A-0 B-0	A-0 B-0	A-0 B-0	A-0 B-0	A-0	A-0	A-0	A-0	A-0
极少失火危险的舱(柜)、空室及辅机处所	(10)	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0[a]	A-0	A-0	A-0	A-0
具有中等失火危险的辅机处所、装货处所、特种处所、货油舱与其他油舱(柜)，以及其他类似处所	(11)	A-60	A-60 A-15	A-60 A-15	A-30 A-0	A-0	A-0	A-15 A-0	A-30 A-0	A-0	A-0	A-0[1]	A-0	A-0	A-30[b] A-15
机器处所及主厨房	(12)	A-60	A-60	A-60	A-60	A-0	A-60	A-60	A-60	A-0	A-0	A-30	A-30[a]	A-0	A-60
储藏室、车间、配膳间等	(13)	A-60	A-30 A-0	A-15 A-0	A-15 A-0	A-0 B-0	A-15 A-0	A-30 A-0	A-30 A-0	A-0 B-0	A-0	A-0	A-0	A-0	A-15[b] A-0
储藏易燃液体的其他处所	(14)	A-60	A-60 A-30	A-60 A-30	A-60	A-0	A-30 A-0	A-60 A-15	A-60 A-15	A-0	A-0	A-30[b] A-0	A-30[b] A-0	A-0	A-30[b] A-0

注：当适合时应适用于表26.1至表26.4。

a. 当相邻处所在相同的数字类别及右上角注1时，若主管机关认为没有必要时，则在此类处所之间不必设置舱壁或甲板。 例如，在(12)类内厨房及其所属的配膳室之间，如配膳室的舱壁和甲板能保持厨房限界面的完整性时，则不要求设置舱壁。 但是，厨房和机器处所之间要求有一舱壁，即使这两个处所都属于(12)类。

b. 只有当两相连处所中至少有一个受符合规则12规定的自动喷水器系统保护时可以允许有较小的绝缘值。

规 则 27

载客不超过36人的客船舱壁及甲板的耐火完整性

1 除应符合本节其他规则关于舱壁及甲板耐火完整性的明确规定外，舱壁及甲板的最低耐火完整性应按表27.1及表27.2办理。

2 下列要求应作为运用各表的指导原则：

.1 表27.1和27.2分别适用于作为分隔相邻处所的舱壁和甲板。

.2 为了确定应用于相邻处所之间的隔壁的适当耐火完整性标准，这些处所按其失火危险程度分为下列(I)至(II)类。 每类的名称只是举例，而不是限制。 每类前面括号内的数字是指表内相应的“列”或“行”数。

(1) 控制站

设有应急电源和应急照明源的处所。

操舵室和海图室。

设有船舶无线电报设备的处所。

灭火室、失火控制站和失火记录站。

位于机器处所外面的推进机械控制室。

设有集中失火报警设备的处所。

(2) 走廊

旅客及船员的走廊和休息室。

(3) 起居处所

如规则3.10款所规定的除走廊外的处所。

(4) 梯道

内部梯道、升降机、自动扶梯（完全设在机器处所内者除外）以及通往上述梯道的环围。

至于仅环围于一层甲板的梯道，应作为未被防火门隔开的处所的一部分。

(5) 失火危险较小的服务处所

面积小于2平方米的橱柜及储藏室、干燥间及洗衣间。

(6) A类机器处所

规则3.19规定的各处所。

(7) 其他机器处所

除了A类机器处所之外规则3.20中规定的各处所。

(8) 装货处所

所有装货的处所（包括货油舱）以及通往这些处所的围壁通道和舱口，特种处所除外。

(9) 失火危险较大的服务处所

厨房、有烹调设备的配膳室、油漆间和灯间、具有面积2平方米或2平方米以上的橱柜和储藏室，不属于机器处所的组成部分的工场。

(10) 开敞甲板处所

开敞甲板处所和没有失火危险的围蔽的散步甲板处所。

露天处所（上层建筑及甲板室外面的处所）。

(11) 特种处所

规则3.18规定的处所。

.3 凡未设有符合规则12规定的自动喷水器系统的某一主竖区或水平区内的两个处所之间，或两个均无此种自动喷水器系统保护的主竖区或水平区之间的限界面，在确定其所适用的耐火完整性标准时，应录用表列两个数值中的较高值。

.4 凡设有符合规则12规定的自动喷水器系统的某一主竖区或水平区的两个处所之间，或两个均有此种自动喷水器系统保护的主竖区或水平区之间的限界面，在确定其所适用的耐火完整性标准时，应采用表列两个数值中的较低值。 当一个喷水器系统区域和一个非喷水器系统区域在起居处所及服务处所内相遇时，此两区域之间的分隔应采用表列两个数值中的较高值。

3 连续“B”级天花板或衬板连同其甲板或舱壁可以认为全部或部分地起到分隔所要求的隔热性和完整性的作用。

4 如在本章其他规则对此类限界面不要求有“A”级完整性时，则为了安装窗和舷窗，在规则23.1款要求为钢质或其他等效材料的外部限界面可以是拼接而成的。同样，在没有要求有“A”级完整性的此类限界面，门可以用主管机关认为满意的材料。

表27.1 分隔相邻处所舱壁的耐火完整性

处所	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
控制站 (1)	A-0[c]	A-0	A-60	A-0	A-15	A-60	A-15	A-60	A-60	*	A-60
走廊 (2)		C[e]	B-0[e]	B-0[e] A-0[a]	B-0[e]	A-60	A-0	A-0	A-15 A-0[d]	*	A-15
起居处所 (3)			C[e]	B-0[e] A-0[a]	B-0[e]	A-60	A-0	A-0	A-15 A-0[d]	*	A-30 A-0[d]
梯道 (4)				B-0[e] A-0[a]	B-0[e] A-0[a]	A-60	A-0	A-0	A-15 A-0[d]	* *	A-15
较小失火危险的服务处所 (5)					C[e]	A-60	A-0	A-0	A-0	*	A-0
A类机器处所 (6)						*	A-0	A-0	A-60	*	A-60
其他机器处所 (7)							A-0[b]	A-0	A-0	*	A-0
装货处所 (8)								*	A-0	*	A-0
较高失火危险的服务处所 (9)									A-0[b]	*	A-30
开敞甲板处所 (10)										-	A-0
特种处所 (11)											A-0

表27.2 分隔相邻处所甲板的耐火完整性

甲板上处所 / 甲板下处所		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
控制站	(1)	A-0	A-0	A-0	A-0	A-0	A-60	A-0	A-0	A-0	*	A-30
走廊	(2)	A-0	*	*	A-0	*	A-60	A-0	A-0	A-0	*	A-0
起居处所	(3)	A-60	A-0	*	A-0	*	A-60	A-0	A-0	A-0	*	A-30 A-0 d/
梯道	(4)	A-0	A-0	A-0	*	A-0	A-60	A-0	A-0	A-0	*	A-0
较小失火危险的服务处所	(5)	A-15	A-0	A-0	A-0	*	A-60	A-0	A-0	A-0	*	A-0
A类机器处所	(6)	A-60	A-60	A-60	A-60	A-60	*	A-60 f/	A-30	A-60	*	A-60
其他机器处所	(7)	A-15	A-0	A-0	A-0	A-0	A-0	*	A-0	A-0	*	A-0
装货处所	(8)	A-60	A-0	A-0	A-0	A-0	A-0	A-0	*	A-0	*	A-0
较高失火危险的服务处所	(9)	A-60	A-30 A-0 d/	A-30 A-0 d/	A-30 A-0 d/	A-0	A-60	A-0	A-0	A-0	*	A-30
开敞甲板处所	(10)	*	*	*	*	*	*	*	*	*	—	A-0
特种处所	(11)	A-60	A-15	A-30 A-0 d/	A-15	A-0	A-30	A-0	A-0	A-30	A-0	A-0

注：当适合时应适用于表27.1及表27.2。

a/ 要弄清哪一个适用，参见规则25及规则29。

b/ 当处所在相同的数字类别并出现注角b时，只有当采用不同用途的相邻处所时才要求参阅表中所列级别的舱壁或甲板，例如在(9)类。 在两个厨房间不要求有舱壁分隔，但油漆间和厨房之间要求有“A-0”级舱壁。

c/ 分隔操舵室和海图室的舱壁可以为“B-0”级。

d/ 参见本规则2.3及2.4。

e/ 当应用规则24.1.2时，在表27.1中的“B-0”和“C”级应为“A-0”级。

f/ 若(7)类机器处所经主管机关审查，认为很少危险或没有失火危险，则不必设置防火隔热层。

* 表中有*号者时，该分隔应为钢质或其他等效材料，但并不要求为“A”级标准。 当应用规则24.1.2时，在表27.2中的*号为“A-0”级，(8)类和(10)的除外。

规 则 28

脱 险 通 道

1 除机器处所外，一切旅客及船员出入处所及在船员经常使用的处所内，应布置有梯道与梯子，以提供到达救生艇、筏登乘甲板的方便的脱险通道，特别应符合下列规定：

.1 在舱壁甲板以下，从每一水密舱或类似限界的处所或处所群，应有两个脱险通道，其中至少一个不得利用水密门。 但主管机关对有关处所的性质和部位以及对经常居住或使用这些处所的人数经过恰当的考虑后，可以免除其中一个脱险通道。

.2 在舱壁甲板以上，从每一主竖区或类似限定的处所或处所群，至少应有两个脱险通道，其中至少应有一个能通达形成垂直脱险的梯道。

.3 如无线电台设有直接通往开敞甲板的出口，则该台应有两个出口或入口，其一可为足够尺寸的舷窗或窗或主管机关同意的其他设施。

.4 只有一条脱险通道的走廊或部分走廊的长度应不超过：

载客超过36人的客船为13米；

载客不超过36人的客船为7米。

.5 按照1.1款及1.2款要求的脱险通道应至少有一个是利用易于到达的环围的梯道，此梯道应提供连续的防火遮蔽，自其起点的一层起到达适当的救生艇、筏的登乘甲板，或到达此梯道所至的最高层，以何者为高而定。 如果主管机关根据1.1款的规定允准免除时，则仅有一个脱险通道应能提供为主管机关满意的安全通路。 梯道的宽度、数目及连续性应取得主管机关的同意。

.6 当梯道环围至救生艇、筏登乘区域的出入口保护，应取得主管机关的同意。

.7 仅用于一个处所及此处所内阳台的梯道，不得视为构成所要求的脱险通道之一。

2.1 在特种处所内，舱壁甲板以上或以下的脱险通道的数目及布置应取得主管机关的同意，其到达登乘甲板的通道的安全性一般应至少等效于1.1、1.2、1.5及1.6款的规定。

2.2 船员经常使用的机器处所的脱险通道之一应避免直接进入任何特种处所。

3.1 每一机器处所应设置两个脱险通道。 特别应符合下列规定：

.1 位于舱壁甲板以下的处所，其两个脱险通道应由下列情况之一所组成；

.1.1 尽可能远离的两部钢质梯子引向该处所上部同样远离的门，并从该门设有通道通往适当的救生艇、筏的登乘甲板。 其中一部梯子从该处所的下部起至该处所外面的一个安全地点，应能提供连续的防火遮蔽；

.1.2 一个钢质梯子引向该处所上部的一扇门，并从该门可以进到登乘甲板；以及在该处所下部完全与前述钢梯分开的一扇能由每一面开关的钢质门，该门设有从该处所下部通往登乘甲板的安全脱险通道。

.2 如该处所不位于舱壁甲板以上，则应设有尽可能远离的两个脱险通道，而上述通道的门应位于从该处所能通往适当的救生艇、筏登乘甲板的地方。 这些通道如需要使用梯子时，应为钢质梯。

3.2 但是，对不满1,000总吨的船舶，主管机关经考虑了每一处所上部的宽度及布置后，可免除其中的一个脱险通道；而对1,000总吨或以上的船舶，若任一处所有一扇门或一部钢梯即可提供抵达登乘甲板的安全通道，则主管机关经考虑了这一处所的性质、位置以及该处所是否经常有人使用后，可免除其中的一个脱险通道。

4 升降机不得视为构成所要求的脱险通道之一。

规 则 29

起居处所与服务处所内梯道与升降机的保护

1 除主管机关特准使用其他等效材料者外，一切梯道应为钢质结构，并应环围在“A”级分隔之内，还应在一切开口处具有有效的关闭装置，但下列者除外：

.1 仅连接两层甲板的梯道，若在一个甲板间具有适当的舱壁或门以保持甲板的完整性者，则不需环围。 当梯道在一个甲板间被封闭时，其梯道环围应按照规则26或27表列对甲板的要求加以保护。

.2 完全位于公共处所内的梯道，可装于该处所的开敞部位。

2 梯道环围应直接通至走廊，并考虑到紧急时可能使用该处的人数而应具有足够的面积以免拥挤。 如属可行，梯道环围不得直接通往住室、生活用橱(柜)或其他存有可燃物品可能起火的环围处所。

3 升降机围壁通道的装设，应能防止烟及火焰从一个甲板间通至另一个甲板间，并应设置关闭装置以控制气流及烟气的流通。

规 则 30

“A”级分隔上的开口

1 除装货处所之间、特种处所之间、储藏室之间与行李室之间的舱口以及这些处所与露天甲板之间的舱口外，一切开口应设有永久附连于其上的关闭装置，其耐火效能至少应与其所在的分隔相等。

2 “A”级分隔上的所有门、门框及其在关闭时的制牢装置，其构造应尽实际可行提供等效于其所在舱壁的耐火性以及阻止烟和火焰穿过的效能，这些门及门框应由钢材或其他等效材料建造。 水密门则不需隔热。

3 每个门应能在舱壁的每一面仅需一人即能将其开启及关闭。

4 主竖区舱壁及梯道围壁上的防火门，除动力操纵的水密门及经常锁闭的水密门外，应为在向关闭方向反向倾斜3.5°时仍能将门关闭的自闭式门。 门的关闭速度，需要时应能控制，以防止对人身发生不应有的危险。 所有这种自闭式防火门，除经常关闭者外，应能同时地或成组地将门由控制站予以脱开，也应能个别地在门的位置处就地脱开。 脱开机构的设计，应在控制系统万一损坏时，此门能自动关闭；但如采用经认可的动力操纵水密门，可以认为达到这一目的。 不能由控制站脱开的门背钩，不允许使用。 当允许使用双摆动门时，它们应具有受防火门脱开系统控制的自动插上的插销装置。

5 如某一处所由符合规则12规定的自动喷水器系统保护或没有连续的“B”级天花板，则在主竖区内未形成阶层亦不作为水平区限界面的甲板上的开口应能适

度地紧密关闭，并且在主管机关认为合理和实际可行的范围内，这类甲板应 满足“A”级完整性的要求。

6 对船舶外部限界面的“A”级完整性的要求不适用于玻璃隔板、窗及舷窗。同样，对“A”级完整性的要求也不适用于上层建筑及甲板室的外门。

规 则 31

“B”级分隔上的开口

1 “B”级分隔的门及门框以及它们的制牢装置，除在这些门的下部可以允许设置通风开口外，应提供尽可能等效于此分隔耐火性能的关闭方法。 如果这种通风开口系开在门上或在门以下时，则一个或几个这种开口的总净面积 不 得 超 过0.05平方米。 如这种开口系开在门上，则此开口应设有不燃材料制成的栅格。这些门应是不燃性的。

2 对船舶外部限界面的“B”级完整性的要求不适用于玻璃隔板、窗及舷窗。同样，对“B”级完整性的要求也不适用于上层建筑及甲板室的外门。 载客不超过36人的客船，主管机关可允许分隔舱室与个别内部的卫生处所的门为可燃材料，例如淋浴间。

3 当设有符合规则12规定的自动喷水器系统时：

.1 在主竖区内未形成阶层亦不作为水平区限界面的甲板上开口应能适度地紧密关闭，并且在主管机关认为合理和实际可行的范围内，这类甲板应满足“B”级完整性的要求。

.2 “B”级材料的走廊舱壁上的开口，应按规则25的规定加以保护。

规 则 32

通 风 系 统

1 载客超过36人的客船。

1.1 载客超过36人的客船的通风系统除满足本规则之1款的要求以外，也应满足规则16.2至16.9的要求。

1.2 通风机的分布，一般应使通往各处的通风导管保持在同一主竖区内。

1.3 通风系统穿过甲板时，除应按照规则18.1.1及30.5有关甲板耐火完整性要求外，还应采取预防措施以减少烟及炽热气体通过该系统从一甲板间处所至另一甲板间处所的可能性。除按本规则中的隔热要求外，在必要时，垂直导管应按规则26相应各表的要求予以隔热。

1.4 除装货处所外，通风导管应用下列材料建造：

.1 截面面积不小于0.075平方米的导管以及不止用于一个甲板间处所的所有垂直导管，应用钢材或其他等效材料建造。

.2 除本1.4.1款提到的以外的截面面积小于0.075平方米的导管，应用不燃材料建造。如这些导管穿过"A"级或"B"级分隔之处，应适当考虑保证该分隔的耐火完整性。

.3 截面面积一般不超过0.02平方米，长度又不大于2米的短节导管，倘若满足下列所有条件，则不需使用不燃材料；

.3.1 此导管是用经主管机关同意的限制失火危险的材料建造；

.3.2 此导管只用作通风系统的末端；

.3.3 此导管的位置，不是位于沿其长度量至穿过"A"或"B"级分隔处，包括"B"级连续天花板在内为600毫米的范围内。

1.5 如梯道环围设有通风时，其导管或若干导管，应单独从通风机室引出，而与通风系统的其他导管分开，并且不得用于其他任何处所。

1.6 除机器处所和装货处所的通风以及根据规则16.6可能要求的任何交替供气的系统外，一切动力通风应设有控制装置，将其集中在能从两个尽可能远离的地点中的任何一个地点将所有的通风机停止。用于机器处所的动力通风的控制装置，也应集中而能从两个地点加以控制，其中一个应设在机器处所的外面。用于装货处所动力通风系统的风机，应能在该处所外面的一个安全地点将其停止。

2 载客不超过36人的客船

2.1 载客不超过36人的客船的通风系统应满足规则16的要求。

规 则 33

窗 与 舷 窗

1 除适用规则30.6及规则31.2款的规定者外，起居处所、服务处所及控制站内各舱壁上的一切窗及舷窗，其构造应能保持其所在该型舱壁的完整性要求。

2 尽管有规则26及27各表的要求，但是：

.1 起居处所、服务处所及控制站与露天隔开的舱壁上的一切窗及舷窗应有钢材或其他适宜材料建造的框架。 玻璃应用金属镶边或镶角加以固定。

.2 应特别注意面向露天的或环围的救生艇和救生筏登乘区域的窗的耐火完整性；并特别注意上述区域下面窗的耐火完整性，当这些窗的位置因失火而受损时，将会阻碍救生艇或筏的放下或人员登入者。

规 则 34

可燃材料的限制使用

1 除装货处所、邮件舱、行李室或服务处所的冷藏室外，一切衬板、地板、天花板及隔热物应为不燃材料。 为了实用或美术处理而用作某一处所内部分隔的局部舱壁或甲板，也应为不燃材料。

2 用于冷却设备系统的与隔热物连用的防潮层和粘合剂以及管系装置的隔热物，不需要为不燃材料，但应保持在实际可行的最低数量，并且它们的外露表面应具有经主管机关满意的限制火焰蔓延的性质。

3 下列的表面应具有低播焰性：*

.1 走廊及梯道环围内的外露表面，以及所有起居处所及服务处所和控制站内舱壁、围壁及天花板衬板的外露表面；

.2 起居处所、服务处所及控制站内隐蔽或不能到达的处所。

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* 参阅本组织通过的大会166（特Ⅳ）号决议“关于评定材料的防火性能的准则”。

4 任何起居处所及服务处所内的可燃面板、嵌条、饰片及镶片的总体积，不得超过相当于各围壁及天花板的联合面积上厚2.5毫米镶片的体积。如船舶设有符合规则12规定的自动喷水器系统，则上述体积可以包含一些用于建立"C"级分隔的可燃材料。

5 本规则3款所要求的在表面的镶片和衬板所具有的热量之值对采用厚度的面积应不超过每平方米45 MJ。

6 走廊及梯道环围内的家具应保持为最低数量。

7 用于外露的内部表面上的油漆，清漆及其他表面涂料应不致产生过量的烟及毒性产物。

8 在起居处所、服务处所及控制站内使用的甲板基层敷料（如涂敷时）应为在高温时不易着火或不会发生毒性或爆炸性危险的认可材料。*

规 则 35

构 造 细 节

1 在起居处所和服务处所、控制站、走廊和梯道内：

.1 封闭在天花板、镶板或衬板后面的空隙应以紧密安装的且间距不超过14米的挡风条作适宜的分隔。

.2 上述此类围蔽空隙，包括梯道、围壁通道等衬板后面的空隙，在垂直方向上，应在每层甲板处加以封堵。

2 天花板及舱壁的构造应在不减损其防火效能的情况下，使消防及巡逻人员能探知隐蔽和不易到达处所的烟源，但主管机关认为该处所不致产生失火危险者可以除外。

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* 参阅本组织通过的大会214（Ⅶ）号决议"关于甲板基层敷料试验程序改进的暂行准则"。

规 则 36

自动喷水器、探火和失火报警系统或自动探火和失火报警系统

1 凡适用本节所规定的任何船舶，除实质上没有失火危险的处所（例如空室、盥洗室等）外，在所有起居处所和服务处所内的不论是垂直的或水平的每独立分隔区内，以及主管机关认为必要时在控制站内，均应普遍设置下列两者之一：

.1 符合规则12规定的一种经认可的自动喷水器以及探火和失火报警系统，其设置和布置足以保护上述处所；

.2 符合规则13规定的一种经认可的固定探火和失火报警系统，其设置和布置足以探知上述处所内火灾的发生。如果可不装设规则13.2.2所要求的烟气探测器的话。

规 则 37

特种处所的保护

1 适用于不论舱壁甲板以上或以下特种处所的规定

1.1 通则

1.1.1 构成本规则规定的基本原则的是在特种处所内按通常的主竖区进行划分可能不切实际，但在这些处所内必须以水平区的概念和设置有效的固定灭火系统作为基础来获得等效的保护。根据这一概念，在本规则范围内，倘若供车辆通过的总的全面净高度不超过10米，则一个水平区可以包括多于一层甲板的若干特种处所。

1.1.2 规则16、18、30及32内所规定的为保持主竖区完整性的要求，应同样适用于形成分隔各水平区之间以及分隔水平区与船舶其他部分之间的限界面的各甲板和舱壁。

1.2 结构性保护

1.2.1 特种处所的限界面舱壁应按表26.1或表27.1(11)类处所的要求予以隔热，同时水平限界面应按表26.3或27.2(11)类处所的要求予以隔热。

1.2.2 驾驶室应设有指示器，当进出特种处所的任一防火门关闭时，这些指示器应能显示出来。

1.3 固定式灭火系统 *

每一特种处所，应设有人力操纵的经认可的固定式压力水雾灭火系统，此系统应能保护该处所内任何甲板与车辆平台的所有部分，但是主管机关可以允许使用任何其他类型的固定式灭火系统，如此项系统系经在某一特种处所内作模拟的流动汽油火灾条件的全面试验，证明其对控制上述处所内可能发生火灾的效果并不低于压力水雾灭火系统。

1.4 巡逻与探火

1.4.1 在特种处所内应保持有效的巡逻制度。 在整个航行期间，如果任何上述处所未保持连续的消防值班，则应装设经认可的自动探火系统。

1.4.2 整个特种处所应设有必要的手动报警按钮，并应在这些处所的每一出口处附近设置1个。

1.5 灭火设备

每一特种处所内应设有：

.1 至少3具水雾器；

.2 1具符合规则6.4规定的可携式泡沫器装置，但船上须备有供特种处所使用的这种装置至少2具；

.3 主管机关认为足够数量的手提式灭火机，但在通往此类处所的每一出口至少放置一具手提式灭火机。

1.6 通风系统

1.6.1 特种处所应设有有效的动力通风系统，每小时至少能足以更换空气10次。 这些处所的动力通风系统应与其他通风系统完全分开，并且当这些处所内载有车辆时，应一直在运转。 在装卸车辆期间，主管机关可以要求增加更换空气的次数，使用于能够有效密闭的特种处所的通风导管对每一此类处所应是分开的。这样的系统应能在其所在处所的外面予以控制。

1.6.2 此项通风应能防止空气层化和形成空气囊。

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* 参阅本组织通过的大会123(V)号决议“关于特种处所设置固定灭火系统的建议案”。

1.6.3 驾驶室应设有指示装置，以显示出所需通风量的任何损失或减少。

1.6.4 考虑到天气或海况，通风系统的布置应在失火时可迅速关断并能有效地关闭。

1.6.5 通风导管包括调节风门应为钢质，其布置应经主管机关同意。

2 仅适用于舱壁甲板以上特种处所的补充规定。

2.1 流水口

鉴于使用固定式压力水雾灭火系统的结果，使甲板上大量积水，因而可能导致严重的稳性损失，流水口的安设，应能保证上述积水迅速地直接排出舷外。

2.2 防止易燃气体着火的措施。

2.2.1 在任何载运车辆的且可能积聚爆炸性气体的甲板上，可以形成易燃气体着火源的设备，特别是电气设备与线路，应安装在甲板上方至少450毫米处。设在甲板上方超过450毫米的电气设备应是封闭的并有保护的型式，以防止火花逸出。然而，如果为了船舶安全操作的需要，经主管机关同意上述电气设备与线路的安设在甲板上方低于450米高度时，可以安装此电气设备与线路，但它们应是经认可在汽油与空气爆炸性混合物中适用的一种型式。

2.2.2 电气设备及线路如果安装在排气通风导管内，则应为经认可在汽油与空气爆炸性混合物中适用的一种型式，并且任何排气导管的出口，经考虑其他可能的着火源，应设在一个安全的地点。

3 仅适用于舱壁甲板以下特种处所的补充规定

3.1 舱底抽水及排水

鉴于使用固定式压力水雾灭火系统的结果，使甲板上或双层底舱顶上大量积水，因而可能导致严重的稳性损失，主管机关可以在规则II-1/21各项规定之外，要求增设舱底抽水与排水设施。

3.2 防止易燃气体着火的措施

3.2.1 如装有电气设备与线路，它们应为在汽油与空气爆炸性混合物中适用的型式，其他可以构成易燃气体着火源的设备，不得使用。

3.2.2 电气设备及线路，如果安装在排气通风导管内，则应为经认可在汽油与空气爆炸性混合物中适用的一种型式，并且任何排气导管的出口，经考虑其他可能的着火源，应设在一个安全的地点。

规 则 38

除特种处所外用于载运油箱中备有自用燃料的机动车辆的装货处所的保护

在任何装货处所内（特种处所除外），载有在油箱中备有自用燃料的机动车辆时，应符合以下规定：

1 探火

应设有一个经认可的自动探火与失火报警系统。 本系统的设计与布置应与3款的通风要求一起考虑。

2 灭火装置

2.1 应设有符合规则5规定的固定式灭火系统，如果设置的是二氧化碳系统，则其所提供的自由气体的容积应至少等于此种最大的能够密封的装货处所总容积的百分之四十五，且其布置应保证在10分钟内有关处所所要求的灭火剂量的三分之注入。 也可以设置任何能提供等效保护能力的其他固定式气体灭火系统或固定式高膨胀泡沫灭火系统。 此外，设计成载运不装载任何货物的车辆的装货处所可以安装固定式卤化烃灭火系统，该系统应符合规则5的规定。

2.2 或者，可以安装符合规则37.1.3要求的系统，但也应适当地符合规则37.2.1或37.3.1的要求。

2.3 应设有任何这种处所使用的经主管机关认为足够数量的手提式灭火机。至少在通往此类处所的出入口处设置一具手提式灭火机。

3 通风系统

3.1 应设有有效的动力通风系统，对载客超过36人的客船每小时至少足以更换空气10次，对载客不超过36人的客船每小时至少足以更换空气6次。 供这种装货处所的这一通风系统应与其他通风系统完全分开，并且当这些处所内载有车辆时，应一直在运转。 使用在此类装货处所能够有效密封的通风导管应与每一此类处所分开。 该系统应在此类处所的外部进行控制。

3.2 此项通风应能防止空气层化和形成空气囊。

3.3 驾驶室应设有指示器，以显示出所需通风量的任何损失或减少。

3.4 考虑到天气或海况，通风系统的布置应在失火时可迅速关断并能有效地关闭。

3.5 通风导管包括调节风门应为钢质，其布置应经主管机关同意。

4 防止易燃气体着火的措施

4.1 如装有电气设备及线路，它们应为在汽油与空气爆炸性混合物中适用的一种型式，其他可以构成易燃气体着火源的设备，不得使用。

4.2 电气设备及线路，如果安装在排气通风导管内，则应为经认可在汽油与空气爆炸性混合物中适用的一种型式，并且任何排气导管的出口，经考虑其他可能的着火源，应设在一个安全的地点。

4.3 流水口应不引向机器处所或可能存在着火源的其他处所。

规 则 39

装货处所的固定式灭火布置

1 除本规则第3段规定者外，1,000总吨及1,000总吨以上船舶的装货处所应由符合规则5规定的固定式气体灭火系统的保护，或者由提供等效保护的固定式高膨胀泡沫灭火系统保护。

2 若经主管机关同意的船舶，航程短暂应用1款的要求将属不合理时，并且也是小于1,000总吨的船舶则装货处所的布置应经主管机关同意。

3 从事载运危险货物的船舶应在任何装货处所提供一符合规则5规定或符合固定式气体灭火系统，或者根据主管机关的意见对装载货物提供等效保护的灭火系统。

规 则 40

消防巡逻和探火、失火报警和广播系统

1 起居处所和服务处所应遍设手动失火报警按钮，以便能立即向驾驶室或主消防控制站发出报警。

2 在主管机关认为不能到达的任何装货处所内应设有经认可的探火报警或失火系统，该系统应能在一个或数个适当地点或站自动显示火灾的发生或征兆及其位置，但经主管机关认为某船航程短暂，应用本要求将属不合理者除外。

3 所有船舶在海上或港口的所有时间内（非营运时除外）应配置船员或设备，以保证负责船员能立即接到任何初始的失火警报。

4 应设置由驾驶室或控制站操纵的召集船员的专用报警器。此种报警器可以是船上通用报警系统的一部分，但是它应能与旅客处所的报警系统分开而单独施放。

5 起居处所、服务处所以及控制站应普遍设有广播系统或其他有效的通信设施。

6 载客超过36人的客船应保持一有效的巡逻制可迅速探测到火灾的发生。训练每一消防巡逻人员熟悉船舶的布置以及其可能被召唤去使用的任何设备的位置及操作。

规 则 41

载运危险货物船舶的特别要求

规则54的要求如适当应适用于载运危险货物的客船。

第三节——货船的消防措施

（除规则53、54以及在规则57、58中另有规定者外，
本节也适用于规则55所规定的油轮。）

规 则 42

构 造

1 除本规则4款另有规定者外，船体、上层建筑、结构性舱壁、甲板及甲板室应以钢材或其他等效材料建造。

2 "A"级或"B"级分隔的铝合金部件，除由主管机关认为无负荷的结构外，在标准耐火试验的任何相应曝火时间内，其隔热层应能使结构芯材的温度升高不超过其周围环境温度200℃。

3 应特别注意用于支承救生艇、筏的存放、降落和登乘区域以及支承"A"和"B"级分隔的铝合金圆柱、支柱和其他结构部件的隔热要求，以保证：

.1 对用于支承救生艇、筏区域以及"A"级分隔的部件，在标准耐火试验一小时结束时，其温度升高界限应符合本规则2款的要求；和

.2 用对于支承"B"级分隔的部件，在标准耐火试验半小时结束时，其温度升高界限应符合本规则2款的要求。

4 A类机器处所的顶盖和舱棚，应为足够隔热的钢结构；其上的任何开口(如有时)，均应适当布置和保护，以防止火灾蔓延。

5 在起居地区和服务地区内应采取下列保护方法之一：

.1 IC法—— 除非按规则52.1的要求外，在起居处所和服务处所内，以不燃的"B"级或"C"级分隔作内部分隔舱壁，一般没有自动喷水器探火和失火报警系统；或

.2 IIC法—— 在可能发生火源的所有处所，按规则52.3的要求装设为探火及灭火用的自动喷水器、探火和失火报警系统，一般对内部分隔的舱壁型式不予限制；或

.3 IIIC法—— 除面积不超过50平方米的任何起居处所或用"A"级或"B"级分隔的各处所外，在可能发生火源的所有处所，按规则52.3的要求装设固定式探火和失火报警系统，一般对内部分隔舱壁的型式不予限制，但在任何情况下任何起居处所或用"A"级或"B"级分隔的处所不得超过50平方米。主管机关审定可增加这种地区的公共处所面积。

6 在机器处所、控制站、服务处所等舱室内限界舱壁的构造和隔热所用的不燃材料的要求，以及梯道环围和走廊的保护应为本规则5款所述的三种方式。

规 则 43

起居处所和服务处所为的舱壁

1 一切要求为“B”级分隔的舱壁，应由甲板延伸至甲板，并延伸至船壳或其他限界面；但如在舱壁的两侧均设有连续“B”级天花板或衬板时，此舱壁可终止于连续天花板或衬板。

2 I C法—— 凡本规则或其他规则未规定有“A”级或“B”级分隔的一切舱壁，至少应为“C”级构造。

3 II C法—— 除个别情况根据表44.1规定为“C”级舱壁外，凡本规则或其他规则未规定为“A”级或“B”级分隔的舱壁，在构造上应无限制。

4 III C法—— 除面积不超过50平方米的任何起居处所或用“A”级或“B”级分隔的各处所外，舱壁在结构上应无限制。 除了个别情况，根据表44.1规定为“C”级舱壁，经主管机关审定可增加公共处所的面积。

规 则 44

舱壁和甲板的耐火完整性

1 舱壁和甲板的耐火完整性，除了应符合这些要求中的专门规定外，一切舱壁及甲板的最低耐火完整性应按表44.1及表44.2办理。

2 下列要求应作为应用各表的指导原则：

.1 表44.1及表44.2分别适用于分隔相邻处所的舱壁及甲板。

.2 为了对相邻处所之间的分隔确定其适用的耐火完整性标准，这些处所应按其失火危险程度分为下列(1)至(11)类。 每类的名称只是举例而不是限制。 每类前面的括号内的数字是指表内相应的“列”或“行”数。

(1) 控制站

设有应急电源和应急照明电源的处所。

操舵室和海图室。

设有船舶无线电报设备的处所。

灭火室、失火控制室和失火记录站。

位于机器处所外面的推进机械控制室。

设有集中失火报警设备的处所。

(2) 走廊

走廊和休息室。

(3) 起居处所

规则 3.10 中规定的除走廊外的各处所。

(4) 梯道

内部梯道、升降机、自动扶梯（完全设在机器处所者除外）以及通往上述梯道等的环围。 至于仅环围于一层甲板的梯道，应作为未被防火门隔开的处所的一部分。

(5) 失火危险较小的服务处所

面积小于2平方米的橱柜和贮藏室，干燥室和洗衣间。

(6) A 类机器处所

规则 3.19 中规定的各处所。

(7) 其他机器处所

除了 A 类机器处所以外规则 3.20 中规定的各处所。

(8) 装货处所

所有装货的处所（包括货油舱）以及通往这些处所的围壁通道及舱口。

(9) 失火危险较大的服务处所

厨房、具有烹调设备的配膳室、油漆间和灯间，具有面积2平方米或2平方米以上的橱柜和储藏室，不属于机器处所组成部分的工场。

(10) 开敞甲板处所

开敞甲板处所和没有失火危险的围蔽的散步甲板处所。 露天处所（上层建筑及甲板室外部的处所）。

(11) 滚装装货处所

规则 3.14 中规定的各处所。 用以载运油箱中装有自用燃料以能自行推进的机动车辆的装货处所。

3 连续“B”级天花板或衬板，连同其甲板或舱壁可以认为已全部或部分满足分隔的隔热性和完整性要求。

4 规则42.1中规定为钢质或其他等效材料的外部限界面，如本要求中的其他规定不要求其具有“A”级完整性者，可予穿透以装设窗及舷窗。 同样，在这种无须具有“A”级完整性的限界面上，门可使用主管机关认为满意的材料。

表44.1 分隔相邻处所舱壁的耐火完整性

处所	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
控制站 (1)	A-0 e/	A-0	A-60	A-0	A-15	A-60	A-15	A-60	A-60	*	A-60
走廊 (2)		C	B-0	B-0 A-0 c/	B-0	A-60	A-0	A-0	A-0	*	A-30
起居处所 (3)			C a, b/	B-0 A-0 c/	B-0	A-60	A-0	A-0	A-0	*	A-30
梯道 (4)				B-0 A-0 c/	B-0 A-0 c/	A-60	A-0	A-0	A-0	* *	A-30
较小失火危险的服务处所 (5)					C	A-60	A-0	A-0	A-0	*	A-0
A类机器处所 (6)						*	A-0	A-0 g/	A-60	*	A-60 f/
其他机器处所 (7)							A-0 d/	A-0	A-0	*	A-0
装货处所 (8)								*	A-0	*	A-0
较大失火危险的服务处所 (9)									A-0 d/	*	A-30
开敞甲板处所 (10)										-	A-0
滚装装货处所 (11)											* h/

注：根据情况适用于表 44.1 和表 44.2

a/ 在 IIC 及 IIIC 防火法中不强加特殊要求。

b/ 在 IIIC 法的“B”级舱壁情况中，在面积 50 平方米或 50 平方米以上的处所间或处所间群应装设“B-0”级舱壁。

c/ 应用说明见规则 43 和 46。

d/ 如这些处所具有同一数值的类别和出现了注有 d/的字样，只有当采用不同用途的相邻处所时才要求参阅这些表中所列等级的舱壁或甲板，例如在第(9)类中，在两个厨房之间不必要有舱壁分隔，但油漆间和厨房之间就需要有“A-0”级舱壁。

e/ 互相分隔操舵室、海图室和无线电室的舱壁可以为“B-0”级舱壁。

f/ 如果不打算用于载运危险货物或危险货物的堆存距舱壁的水平距离不少于 3 米，该舱壁可为“A-0”级舱壁。

g/ 用于载运危险货物的货舱应符合规则 54.2.8 的要求。

h/ 滚装船货舱互相分隔的舱壁和甲板应能适当的气密，这样的分隔应在主管机关认为合理和可行的范围内具有“A”级完整性的标准。

表 44.2 分隔相邻处所甲板的耐火完整性

甲板上处所 / 甲板下处所	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
控制站 (1)	A-0	A-0	A-0	A-0	A-0	A-60	A-0	A-0	A-0	*	A-60
走廊 (2)	A-0	*	*	A-0	*	A-60	A-0	A-0	A-0	*	A-30
起居处所 (3)	A-60	A-0	*	A-0	*	A-60	A-0	A-0	A-0	*	A-30
梯道 (4)	A-0	A-0	A-0	*	A-0	A-60	A-0	A-0	A-0	*	A-30
较小失火危险的服务处所 (5)	A-15	A-0	A-0	A-0	*	A-60	A-0	A-0	A-0	*	A-0
A 类机器处所 (6)	A-60	A-60	A-60	A-60	A-60	*	A-60 i/	A-30	A-60	*	A-60
其他机器处所 (7)	A-15	A-0	A-0	A-0	A-0	A-0	*	A-0	A-0	*	A-0
装货处所 (8)	A-60	A-0	A-0	A-0	A-0	A-0	A-0	*	A-0	*	A-0
较大失火危险的服务处所 (9)	A-60	A-0	A-0	A-0	A-0	A-60	A-0	A-0	A-0 d/	*	A-30
开敞甲板处所 (10)	*	*	*	*	*	*	*	*	*	–	*
滚装装货处所 (11)	A-60	A-30	A-30	A-30	A-0	A-60	A-0	A-0	A-30	*	* h/

注：

i/ 经主管机关审查，对于很少危险或没有失火危险的(7)类机器处所可以不设置耐火绝缘。

* 表中出现的星号是指这种分隔需要钢材或等效材料制成，但不必具有“A”级标准的分隔。

规 则 45

脱 险 通 道

1 一切起居处所以及除机器处所外船员经常使用的处所，应布置有梯道和梯子，以提供到达开敞甲板并继而到达救生艇、筏的方便脱险通道。特别是应符合下列的一般规定：

.1 在起居处所的各层，从每一限定处所或处所群至少应有两个远离的脱险通道。

.2.1 在露天甲板以下，主要的脱险通道应是梯道，另一个可以是围壁通道或梯道。

.2.2 在露天甲板以上，脱险通道应是通往开敞甲板的梯道或门或这两者的结合。

.3 主管机关对处所的性质和部位以及通常居住或使用这些处所的人数经过恰当的考虑后，可例外地免除其中一个脱险通道。

.4 凡长度超过7米的一端不通的走廊，均不应接受。一端不通的走廊是只有单向脱险通道的走廊或走廊的一部分。

.5 脱险通道的宽度和连续性应取得主管机关的同意。

.6 如无线电台没有直接通往开敞甲板的开口，则该台应有两个出口或入口，其一可以为足够尺寸的舷窗或窗或主管机关同意的其他设施，以供紧急脱险之用。

2 经常使用滚装船货舱的船员人数和通向开敞甲板脱险通道的位置应经主管机关满意，但任何情况不应少于两个，且应远离。

3 除本规则4款规定免除的外，从每一A类机器处所应有两个脱险通道。特别应符合下列的规定之一：

.1 两具尽可能远离的钢梯，通至该处所上部同样远离的门，从该门至开敞甲板应设有通路。一般说来，其中一具钢梯自该处所的下部至该处所外面的安全地点应提供连续的防火遮蔽。但是，如果由于机器处所的特殊布置或尺度，从该处所的下部将有一个安全的脱险通路，则主管机关可以不要求这种遮蔽。该遮蔽应是钢质的，

如果需要，应有主管机关认为满意的隔热装置、同时在下端应设有一个自闭式的钢门；或

.2 一具钢梯通至该处所上部的门，从该门至开敞甲板应设有通路，此外，从该处所的下部远离上述钢梯的地点应有一个可以两面操纵的钢门，作为进入从该处所下部通往开敞甲板的安全脱险通路的入口。

4 少于1,000总吨的船舶，主管机关对该处所上部的宽度和布置经过恰当的考虑后，可以免除本规则3款规定的脱险通道中的一个。

5 非A类机器处所的脱险通路的设置，应考虑到该处所的性质和地点以及人员是否经常使用该处所，并取得主管机关的同意。

6 升降机不应看作是本规则规定所要求的脱险通道。

规 则 46

起居处所、服务处所及控制站内的梯道与升降机围壁通道的保护

1 仅穿过一层甲板的梯道，应至少在一个水平上用“B－0”级分隔及自闭门保护。仅穿过一层甲板的升降机，应在两个水平面上用带钢门的“A－0”级分隔环围。穿过多于一层甲板的梯道及升降机围壁通道，应至少用“A－0”级分隔环围，并在所有水平门上用自闭式门保护。

2 在容纳12人或小于12人的船上，如梯道穿过多于一层甲板且每一层起居处所甲板上至少有两个直接通往露天甲板的脱险通道，则经主管机关审定可降低本规则1款内的“A－0”级要求为“B－0”级。

3 除非主管机关批准使用其他等效材料，所有梯道应为钢质结构。

规 则 47

阻火分隔上的门

1 在分隔上所装设的门应尽可能与分隔的阻火性能相同。在“A”级分隔上的门及门框应为钢质结构。装在“B”级分隔上的门应用不燃材料制成。装

设在A类机器处所限界面舱壁上的门应适当气密和自闭。 按IC法建造的船舶，经主管机关同意，在分隔住室与个别的内部盥洗室如浴室的门可以用可燃材料。

2 要求自闭的门不应装设门背钩。 但装有安全释放型遥控释放设备的门背装置可以使用。

3 除梯道环围的门上及其下部不允许开设通风开口外，在走廊舱壁内的门上及门以下可允许开设通风开口。 这种开口只允许设在门的下部。 如这种开口系开在门上或门以下时，则任何这种开口或其开口的总净面积不得超过0.05平方米。这种开口在门上时，则此开口应设有不燃材料制成的格栅。

4 水密门不必隔热。

规 则 48

通 风 系 统

货船的通风系统应符合规则16的规定，但该规则的8款除外。

规 则 49

可燃材料的限制使用

1 走廊及梯道环围内的所有外露表面，以及起居处所、服务处所和控制站内荫蔽或不能到达处所的表面包括地板，均应具有低播焰性*。 起居处所、服务处所和控制站内天花板的外露表面，应具有低播焰性。

2 用于外露的内部表面上的油漆、清漆及其他表面涂料，应具有主管机关认为不会造成过度的失火危险的性质，并应不致产生过量的烟。

3 在起居处所、服务处所及控制站使用的甲板基层敷料（如涂敷时），应为主管机关认为不易着火的材料。**

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* 参阅本组织通过的大会166(特Ⅳ)号决议“关于评定材料的防火性能的准则。”

** 参看本组织通过的大会214(Ⅶ)号决议“关于甲板基层敷料试验程序改进的暂行准则。”

规 则 50

构 造 细 节

1 IC法——在起居处所、服务处所和控制站中所有的衬板、风挡、天花板以及它们相连的地板，均应为不燃材料。

2 IIC法和IIIC法—— 供起居处所、服务处所和控制站使用的走廊和梯道环围中的天花板、衬板、风挡以及它们相连的地板，均应为不燃材料。

3 IC、IIC和IIIC法

3.1 除装货处所内或服务处所的冷藏库室以外，隔热材料应是不燃的。 用于冷却系统的隔热物连同防潮层及粘合剂以及管系装置的隔热物无须为不燃材料，但它们的用量应尽可能维持在最低数量，同时它们的外露表面应具有主管机关认为满意的限制火焰蔓延的性能。

3.2 起居处所和服务处所的舱壁、衬板和天花板如系不燃者，则它们可装有厚度不超过2毫米的可燃镶片。 但走廊、梯道环围和控制站内的镶片厚度不得超过1.5毫米。

3.3 围闭在天花板、镶板或衬板背面的空隙，应用紧密安装的、其间距不得大于14米的挡风条分隔之。 在垂直方向，这种空隙，包括那些在梯道衬板、围壁通道等的背面的空隙，应在每一层甲板予以封闭。

规 则 51

生活用途的气体燃料的布置

如以气体燃料供生活用途，其布置、储存、分配和利用应考虑到使用这种燃料可能引起的失火和爆炸危险，以保护船舶和船上人员的安全。

规 则 52

固定式探火和失火报警系统自动喷水器、自动探火和失火报警系统

1 采用IC法的船舶，安装和布置规则13有关规定的烟气探测系统应能保护居住处所的所有走廊、梯道和脱险通道。

2 采用IIC法的船舶，应装设经认可的且符合规则12有关规定的自动喷水器、探火和失火报警系统，其安装和布置应能保护起居处所、厨房以及其他服务处所，但实际上没有火灾危险的处所如空的处所、卫生处所等除外。另外，对规则13规定的烟气探测系统的布置和安装，应能保护居住处所的走廊、梯道和脱险通道。

3 采用IIIC法的船舶，应装设经认可的且符合规则13有关规定的固定式探火和失火报警系统，其布置应能探测引起居住处所和服务处所所发生的火灾，但实际上没有火灾危险的处所如空的处所、卫生处所等除外。

4 尽管有上述各条规定，主管机关在1985年9月1日为止以前不必要求按规则13.2.2的规定装设探测器。

规 则 53

装货处所内的固定灭火装置

1 通则

1.1 除了包括在2款和3款内的装货处所外，在2,000总吨或2,000总吨以上的装货处所，应符合规则5规定的固定式气体灭火系统予以保护或用能提供等效作用的固定式灭火系统予以保护。

1.2 任何船舶的装货处所，如果它是专门建造用以装运矿砂、煤、谷物，没有干燥的木料和不燃货物或主管机关认为较小失火危险的各种货物，则主管机关可以对之免除1.1款的要求。这样的免除只有在船舶装设有钢结构的舱盖板和具有能关闭所有通风导管的有效设施和其他通向装货处所的开口时方可允许。

1.3 尽管1.1款作了规定，任何从事载运危险货物的船舶应在任何装货处所内设置符合规则5规定的固定气体灭火系统或由主管机关认为能对所载货物起同等保护作用的灭火系统。

2 滚装装货处所

2.1 探火

应装设一个经认可的自动探火和失火报警系统。 该系统的设计和布置应结合2.3款所述的通风要求考虑。

2.2 灭火装置

2.2.1 可以进行密封的滚装装货处所应装有符合规则5规定的固定式气体灭火系统，但下列除外：

.1 如果装有一个二氧化碳灭火系统，则其所提供的自由气体的最小容积应至少能够等于这种可以密封的最大装货处所总容积的45%。且其布置应能保证有关处所所需的气体至少有三分之二能在10分钟内放入该处所。

.2 卤化烃系统仅可以用于设计成用以载运不装载任何货物的车辆的装货处所。

.3 可以装设任何其他固定式气体灭火系统或高膨胀泡沫灭火系统，但其所具有的等效保护应为主管机关所满意。

.4 作为替代可以安装符合规则37.1.3要求的系统。 然而，排水或泵的布置应能防止自由液面的提高。 如果达不到这个目的，应将水的额外重量和自由液面对船的稳性的不良影响考虑在内，达到主管机关在批准稳性资料* 时认为必须考虑的程度。 按照第II-1章规则22要求，这种资料应包括在给船长提供的稳性资料内。

2.2.2 不能进行密闭的滚装装货处所应装设符合规则37.1.3要求的一个系统。然而，排水和泵的布置应能防止自由液面的提高。 如果达不到这个目的，应将水的额外重量和自由液面对船舶稳性的不良影响考虑在内，达到主管机关在批准稳性

资料*时认为必需考虑的程度。 按照第Ⅱ-1章规则22要求，这种资料应包括在给船长提供的稳性资料内。

2.2.3 在任何滚装装货处所内应配备主管机关认为数量足够的手提式灭火机。至少应有一个手提式灭火机位于通到这种装货处所的每一出入口处。

2.2.4 每一用于载运油箱中装有自用燃料的机动车辆的滚装装货处所应装设：

.1 至少三个水雾喷射器；

.2 一个符合规则6.4规定的移动式泡沫喷射器，但船上应至少备有两具这种设备，以供滚装装货处所内使用。

2.3 通风系统

2.3.1 闭式滚装装货处所应设有有效的动力通风系统，在空舱的情况下每小时至少足以更换空气6次。 无论何时，只要船装有车辆，一般通风机应继续不断地运转。 如不可能，那只要气候许可，应每天规定一个时期开动这些通风机并在卸货前运行一段合理的时间，之后该装货处所应被证明为无石油气体的处所。 为此，船上应配备一个或多个手提式可燃气体探测器。 该系统应与其他通风系统完全分离。 服务于可以进行有效密封的滚装装货处所的通风导管应就每一装货处所予以隔开。 主管机关可以要求在装载或卸下车辆时增加一定数量的换气次数。 应能在上述这样处所的外部位置控制这个系统。

2.3.2 此项通风应能防止空气分层和形成空气袋。

2.3.3 应在驾驶台配备设施以显示需要的通风能量的任何损失。

2.3.4 应有设施以在失火时迅速停止和有效关闭通风系统，且应将气候和海况考虑在内。

2.3.5 通风导管包括挡风闸，应用钢制成，它们的布置应由主管机关认为满意。

2.4 防止易燃气体着火措施

闭式滚装装货处所用于载运油箱中装有自用燃料的机动车辆应符合下列额外规定：

.1 除第2.4.2段规定者外，如装有电气设备及线路，它们应为在汽油与空气的爆炸性混合物中适用的一种型式。

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* 参阅本组织通过的大会123(Ⅴ)号决议“关于特种类别处所的固定式灭火系统的建议案”。

.2 在通风系统的设计和运转能使载有车辆的货物处所以每小时至少更换空气10次的比率连续通风的条件下，可允许设在甲板上方450毫米的电气设备为封闭的和有保护的型式，以防止火花逸出。

.3 不得使用可以构成易燃气体着火源的其他设备。

.4 电气设备及线路，如果安装在排气通风导管内，则应为经认可在汽油与空气爆炸性混合物中适用的一种型式，并且任何排气导管的出口，经考虑其他可能的着火源，应设在一个安全的地点。

.5 排气孔不能延伸到可能出现着火源的机器处所或其他处所。

3 滚装装货处所以外用于载运油箱中装有自用燃料的机动车辆的装货处所

旨在载运油箱中装有自用燃料的机动车辆的装货处所应符合2款的要求，但无须符合2.2.4款的要求。

规 则 54

载运危险货物船舶的特殊要求

1 通则

1.1 除了应符合货船规则53的要求和客船规则38和39的要求以外，本规则1.2段所指用于载运危险货物的船舶类型和装货处所应符合本规则的要求，但对载运有限数量*的危险货物时除外，除非这种要求由于遵守本章其他地方的规定已得到满足。船舶类型和载运危险货物的方式已在1.2款和表54.1中提到，出现在1.2款中的数字编号列于表的顶行。

1.2 下列船舶类型和装货处所应适用于表54.1和54.2：

.1 不是特定设计来用于载运货物集装箱但旨在装运包装式危险货物、包括装在集装箱和可移式货柜内的货物的船舶和装货处所。

.2 用于载运以集装箱和可移式货柜载运危险货物而专门建造的集装箱船舶和装货处所。

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* 关于"有限数量"这个词的定义，参见国际海运危险货物规则总导言之第18节。

.3 用于载运危险货物的滚装船和滚装装货处所。

.4 用于载运散装固体危险货物的船舶和装货处所。

.5 用于载运除了装在船载驳船内的散装液体和气体以外的危险货物的船舶和装货处所。

2 特殊要求

除有明文规定外，下列要求应适用于指导表54.1、54.2和54.3对"在甲板上"和"在甲板下"这两者堆装危险货物的实施，在那里下列各款中的数字和编号列于第一栏。

2.1 供水

2.1.1 系统的布置应保证通过固定加压或适当位置的遥控起动消防泵立即向消防总管供给符合压力要求的消防水。

2.1.2 出水量应满足按规则4所规定的尺寸和压力向四支水枪供水，并能使水射到当装货处所是空舱时的任何部位。上述水量也可由主管机关认为满意的等效设施来达到。

2.1.3 应通过固定式喷雾水枪的布置或放水浸没装货处所等设施以用大量的水有效地冷却指定的甲板下装货处所。为此对小的装货处所和较大装货处所的小区域主管机关可以酌情允许使用水带。无论如何，排水和泵的布置应能防止自由液面的上升。如不行，应将水的额外重量和自由液面对船舶稳性的不良影响考虑在内，达到主管机关批准稳性资料*时认为必须考虑的程度。

2.1.4 可以采用特定介质来浸没指定的甲板下装货处所的设备以代替2.1.3款的要求。

* 参阅本组织通过的大会123(V)号决议"关于特种类别处所的固定式灭火系统的建议案"。

2.2 着火源

电气设备和电线不应安装在围蔽的装货处所，除非主管机关认为闭式车辆甲板处所或开式车辆甲板处所出于营运目的而有此必要。 然而，如果这种处所内装有电气设备，它应是合格的安全型*，可用于暴露于危险的环境中，除非应能完全隔离电气系统（通过移开系统内的隔离闸而不是保险丝）。 电缆通过甲板和舱壁应予以密封以防止气体或蒸汽通过。 穿越的电缆和装货处所内之电缆应得到保护以便不致因碰撞而损坏。 不允许装设其他任何构成可燃蒸汽着火源的设备。

2.3 探测系统

所有闭式装货处所，包括闭式车辆甲板处所，应装设一个经认可的探火和失火报警系统。 如果探测系统是利用从这种处所抽出来的大气为气样，应有设备防止万一货物渗漏时通过取样系统向探测器械所在的处所内排放被污染的大气。应在设备所在处所展示永久性通告，说明如果货物发出有毒烟雾，气样应排到开敞的空气中去。

2.4 通风

2.4.1 闭式装货处所应设置足够的动力通风。 其布置应能基于装货处所为空气时每小时至少换气6次，并能从装货处所的上部或下部排除蒸汽。

2.4.2 风机应能避免可燃气体和空气混合物着火的可能性。 应在通风的入口和出口的开口处设有适当的钢丝网。

2.5 舱底泵

如果在闭式装货处所为载运可以着火的或有毒液体，其舱底泵系统的设计应能保证防止由于疏忽而将这种液体泵送到机器处所的管系或泵。 如载运大量这种液体，应考虑这些处所的额外排泄措施，这些措施并应使主管机关满意。

2.6 人员的保护

2.6.1 除了规则17所要求的消防员装备品以外，应配备四套对化学侵蚀能全面防护的服装。 防护服装应罩盖全部皮肤，使身体的任何部分都受到保护。

2.6.2 除了规则17所要求的以外，应配备至少两套自背式呼吸器。

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* 参阅国际电工协会出版的建议案，尤其是92期—— 船舶电气装置。

2.7 手提灭火机

装货处所应配备总容量至少为12公斤的干粉或其等效的手提灭火机。这些灭火机是本章其他地方所要求的任何手提灭火机以外的增加物。

2.8 机器处所限界面的隔热

在装货处所与A类机器处所之间的限界面舱壁应隔热到“A-60”级标准，除非危险货物的堆装离开这种舱壁的水平距离至少3米。 在这两种处所之间的其他限界面也应隔热到“A-60”标准。

2.9 水雾系统

每一个在其上方有一层甲板的开式滚装装货处所以及被认为不能密封的闭式滚装装货处所应装设经认可的用人力操纵的固定压力水雾系统，以保护任何甲板和车辆平台（如装有的话）的所有部位。 除非主管机关允许在该处所使用经全面积试验证明其效应不低于上述设备的其他固定式灭火系统。 无论如何，排水以及泵的布置应能防止自由液面的升高。 如果不行，应将水的额外重量和自由液面对船舶稳性的不良影响考虑在内，达到主管机关在批准稳性资料*时认为必须考虑的程度。

3 证明符合要求的文件

主管机关应向船舶提供一个相应的文件，作为构造和设备符合本规则要求的证据。

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* 见本组织通过的大会123(V)号决议“关于特种类别处所固定灭火系统的建议案”。

表54.1 对以不同方式在船上和货物处所内载运危险货物的要求的应用

在表54.1中出现"x"的任何地方，即指这一要求适用于表54.3相应的行所列的所有级别的危险货物，有说明标志者除外。

规则 54.1.2 / 规则 54.2	.1 不设计是特别的	.2 集装货装箱处所	.3 闭式货滚装处所	.3 开式货滚装处所	.3 露天甲板	.4 散装固体危险货物	.5 船载驳船
.1.1	x	x	x	x	x	关于对不同级别的危险货物运用规则54的要求，见表54.2。	x
.1.2	x	x	x	x	x		–
.1.3	x	x	x	x	–		x
.1.4	x	x	x	x	–		x
.2	x	x	x	x	–		x d/
.3	x	x	x	–	–		x d/
.4.1	x	x a/	x	–	–		x d/
.4.2	x	x a/	x	–	–		x d/
.5	x	x	x	–	–		·
.6.1	x	x	x	x	x		–
.6.2	x	x	x	x	x		–
.7	x	–	–	x	x		–
.8	x	x b/	x	x	x		–
.9	–		x c/	x	–		–

注：

a/ 对于4级和5.1级不适用于闭式货物集装箱。对于装载在闭式货物集装箱内的2级、3级、6.1级和3级，其通风率可以减少到不少于换气二次。作为这个要求的用意，一个可移式货柜可认为是一个闭式货物集装箱。

b/ 仅适用于甲板。

c/ 仅适用于不能进行密封的闭式滚装装货处所。

d/ 在驳船能够包容可燃蒸汽，或者作为替代，它们能够通过与驳船相连接的通风管道将可燃蒸汽排到载运驳船的舱室以外的安全处所，对于上述这些特殊情况，经主管机关同意可以降低或取消这些要求。

表54.2 载运散装固体危险货物的船舶和装货处所对不同级别危险货物的要求的应用

级——第VII章 规则54.2	4.1	4.2	4.3 [f]	5.1	6.1	8	9
.1.1	x	x	–	x	x [g]	x [g]	x
.1.2 [e]	x	x	–	x	–	–	x
.2	x	x [g]	x	x [g]	–	–	x [g]
.4.1 [h]	x [g]	x [g]	x	x [g]	–	–	x [g]
.4.2 [h]	x	x [g]	x	x [g]	–	–	x [g]
.6	x	x	x	x	x	x	x
.8	x	x	x	x [g]	x [g]	x [g]	x

注：

[e] 这一要求适用于具有需要大量的水进行灭火这一特点的货物。

[f] 可能散装运输的这一级别的物质的危险是指除本表所列举的特殊考虑外，主管机关必须就有关船舶的构造和设备予以特殊考虑。

[g] 参考国际海运危险品规则（经修订的决议4.81(VI)）或散装固体危险货物的安全实务规则（经修订的决议A.434(XI)号）。

[h] 旨在载运散装固体危险货物的闭式装货处所应至少设有自然通风。 在散装固体危险货物的安全实务规则（经修订的决议A.434(XI)号）要求设有动力通风的情况下，经主管机关同意，使用移动式通风单元(设备)也是合乎要求的。

表54.3 除散装固体危险货物外不同级别危险货物的要求的应用

级—— 第VII章 / 规则 54.2	1	2	3	4	5.1	5.2	6.1	8
.1.1	x	x	x	x [p]	x	x [p]	x	x
.1.2 [i]	x	x	x	x [p]	x	x [p]	–	–
.1.3	x [k]	–	–	–	–	–	–	–
.1.4	x [k]	–	–	–	–	–	–	–
.2	x [k]	x [l]	x [m]	–	–	–	x [m] [p]	x [m] [p]
.3	x	x	x	x	x	–	x	x
.4.1	–	x [j]	x [m]	x [p]	x [p]	–	x [m] [p]	x [m] [p]
.4.2	–	x [l]	x [m]	–	–	–	x [m] [p]	x [m] [p]
.5	–	–	x [m]	–	–	–	x [n]	x [m]
.6	–	x	x	x	x	x [p]	x	x
.7	–	–	x	x	x	x [p]	x [p]	x [p]
.8	x [k] [o]	x	x	x	x [p]	–	x [p]	x [p]
.9	x	x	x [m]	x [p]	x	–	x [m]	x [m]

注

[i] 这一要求适用于具有需要大量的水进行灭火这一特点的货物。

[j] 适用于可燃或有毒气体。

[k] 适用S组，1.4分隔中的1级货物除外。

[l] 所有可燃气体。

[m] 所有闪点低于23℃（闭杯试验）的液体。

[n] 仅限于液体。

[o] 任何情况下，1级货物的堆装距机器处所的限界面的水平距离为3米。

[p] 相应参考国际海运危险货物规则（经修订的决议4.81(Ⅳ)号）或散装固体危险货物的安全实务规则（经修订的决议A.434(Ⅺ)号）。

第四节 油船的消防措施

（除不适用于油船的规则53和54外，以及除规则57和58规定者外，本节的要求系增补第三节的规定）

规 则 55

适 用 范 围

1 除另有明文规定者外，本节适用于载运具有经认可的闪点仪测定（闭杯试验），其闪点不超过60℃、其雷特蒸汽压低于大气压的原油和石油产品，以及载运具有同样失火危险的其他液体产品的油船。

2 如果旨在载运1款所述那些货物以外的液体货物或能引起额外失火危险的液化气体，就应适当注意散装化学品运输规则和气体运输规则的规定，并应采取主管机关满意的额外安全措施。

3 本段适用于所有混装船，这类船舶不得载运固体货物，除非所有货油舱已排空和排除了油气，或者除非主管机关按照惰性气体指南*所列有关的营运要求对每一事项的处理认为满意。

4 载运具有经认可的闪点仪测定闪点超过60℃（闭杯试验）石油产品的油船应符合第三节的规定，但装有符合规则61要求的固定式甲板泡沫灭火系统以代替规则53所要求的固定式灭火系统者除外。

5 所有化学品运输船或气体运输船，当它们载运1款所述的货物时，无须对它们实施规则60关于惰性气体系统的要求，但它们要装有本组织将予拟订的替代装置。**

6 化学品运输船和气体运输船应符合本节的规定，但是，注意到散装化学品规则和气体运输规则的规定而装备了主管机关认为满意的选择性和补充性装置者除外。

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* 见海上安全委员会1980年5月第42次会议通过的惰性气体系统指南（海安会／通函282）

** 参阅本组织通过的大会473(XII)号决议，关于载运石油产品的化学品船惰性气体系统的临时规则。

规 则 56

处所的位置和分隔

1 A类机器处所，艏推力器及其有关设备所占处所除外，应位于货油舱和含油污水舱的后方，这类机器处所并应位于货油泵舱和隔离空舱的后方，但不必位于燃油舱的后方。 A类所有机器处所应用隔离空舱、货油泵舱或燃油舱与之隔开。 然而，货油泵舱的下部可以凹入上述机器处所，以便安置货油泵，其条件是凹入部分的顶板高度一般不超过龙骨上面型深的⅓；但载重量不超过25,000吨的船舶除外，在这种船舶上，如能证明为便于进入壁凹部分和便于妥善布置管系的需要，上述深度是不切实际的，则主管机关可以准许凹入部分超过上述高度，但不得超过龙骨上面型深的一半。

2 起居处所、货油主控制站、控制站及服务处所（独立的货物装卸工具储藏室不包括在内）均应位于所有货油舱、含油污水舱、货油泵舱和用以隔开货油舱、含油污水舱与A类机器处所的隔离空舱后方。 分隔货油泵舱（包括货油泵舱的入口）与起居处所、服务处所和控制站的任何公共舱壁，其构造应为“A-60”标准。如认为必要时，起居处所、控制站、A类以外的机器处所以及服务处所可以允许位于所有货油舱、含油污水舱、货油泵舱和隔离空舱的前方，但须具备经主管机关认为等效的安全标准及适用的灭火装置。

3 如经证明有必要把驾驶处所布置在货油舱区域的上方，则此处所只能用于驾驶目的，并且必须用一个高度为至少2米的开敞空间使之与货油舱甲板隔开。此外，这种驾驶处所的防火还应符合规则58.1和规则58.2所规定的要求，以及本节中可适用的其它规定。

4 应设有使甲板上溢油与起居和服务区域隔开的设施。 这个设施可以是安装一个具有适当高度延伸到两舷的连续的固定挡板。 对于具有尾部装油设施的船舶，此项挡油布置应予特别考虑。

5 环围起居处所和服务处所的上层建筑和甲板室的外部限界面，包括支承这些起居处所的悬架甲板，其面向货油舱的全部限界面及该限界面之后3米之内，应隔热至“A-60”标准。 对于这种上层建筑和甲板室的各个侧面，此项隔热标准应通达主管机关认为必要的高度。

6.1 通往起居处所、服务处所和控制站的入口、空气进口和开口不得面向载货区域。它们应位于不面向载货区域的末端舱壁上，及／或位于上层建筑或甲板室的外档一边、距离面向载货区域的上层建筑或甲板室的末端至少船长的25% 但不少于3米。然而，这个距离无须超过5米。

6.2 在6.1款所述的限制范围之内不准设门，但进入那些不能通往起居处所、服务处所和控制站的处所的门除外，主管机关可以准许在诸如货物控制站、食物库和物料库设门。如果装设这种门，处所限界面的隔热应为“A-60”标准。在6.1款所规定的限制范围之内允许装设以螺栓固紧的板门，作为拆移机器之用。驾驶室的门和操舵室的窗，只要它们的设计能保证驾驶台迅速而有效地达到气体和蒸汽的气密，就允许位于6.1款所规定的限制范围之内。

6.3 面向载货区域和在上层建筑及甲板室侧边上6.1款规定的限制范围之内的舷窗必须是永闭（不能开启）型。在主甲板上第一排的这种舷窗应装有钢或其他等效材料制成的内部罩盖。

规 则 57

构造、起居处所和服务处所内的舱壁及其构造细节

1 对油船实施规则42、43和50的规定，只应使用规则42.5.1所规定的IC法。

2 货油泵舱的天窗应用钢制成，不应镶有玻璃，并应能在泵舱外部予以关闭。

规 则 58

舱壁和甲板的耐火完整性

1 作为规则44的替代并进而符合本节其他地方所作关于舱壁和甲板耐火完整性的规定，舱壁和甲板最低耐火完整性应按表58.1和58.2办理。

2 下列要求应作为运用各表的指导原则：

.1 表58.1和58.2分别适用于分隔相邻处所的舱壁和甲板。

.2 为了对相邻处所之间的分隔确定其适用的耐火完整性标准，这些处所应按其失火危险程度分为(1)至(10)类。 每类的名称只是举例而不是限制。 每类前面括弧内的数字指的是表内相应的列或行。

(1) 控制站

设有应急电源和应急照明电源的处所。

操舵室和海图室。

设有船舶无线电报设备的处所。

灭火室、失火控制室和失火记录站。

位于机器处所之外的推进机械控制站。

设有集中失火报警设备的处所。

(2) 走廊

走廊和休息室。

(3) 起居处所

规则 3.10 所规定的处所，不包括走廊。

(4) 梯道

内部梯道、升降机和自动扶梯（全部设在机器处所之内者除外）以及通往上述梯道等的环围。 至于仅环围一层甲板的梯道应作为没有被防火门隔开的处所的一部分。

(5) 较小失火危险的服务处所

面积小于 2 平方米的储柜和储藏室、干燥室和洗衣间。

(6) A 类机器处所

规则 3.19 中规定的各处所。

(7) 其他机器处所

除了 A 类机器处所以外，规则 3.20 中规定的各处所。

(8) 货油泵舱

设有货油泵的处所以及进出这种处所的出入口和围壁通道。

(9) 较大失火危险的服务处所

厨房、设有烹调设备的配膳室、油漆间和灯间、具有面积2平方米或2平方米以上的储柜和储藏室、不属于机器处所组成部分的工场。

(10) 开敞甲板处所

开敞甲板处所和没有失火危险的围蔽散步甲板处所。 露天处所（上层建筑和甲板室外部的处所）。

3 连续“B”级天花板或衬板连同其甲板或舱壁可以认为是全部或部分地起到分隔所要求的隔热性和完整性作用。

4 规则57.1规定要用钢或其他同等材料制成的外部限界面，如果这些规则不在其他地方对这种限界面提出“A”级完整性要求，就可以打洞，供安装窗和炫窗之用。 同样，制造这种不要求具有“A”级完整性的限界面，门的材料应经主管机关满意。

5 准许在分隔货油泵舱和其他处所的舱壁和甲板上安装经认可的、用于货油泵舱照明的永固式气密照明灯围罩，但是，它们应具有足够强度并能保持舱壁或甲板的完整性和气密性。

表 58.1 分隔相邻处所舱壁的耐火完整性

处所	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
控制站 (1)	A-0 c/	A-0	A-60	A-0	A-15	A-60	A-15	A-60	A-60	*
走廊 (2)		c/	B-0	B-0 A-0 a/	B-0	A-60	A-0	A-60	A-0	*
起居处所 (3)			c/	B-0 A-0 a/	B-0	A-60	A-0	A-60	A-0	*
梯道 (4)				B-0 A-0 a/	B-0 A-0 a/	A-60	A-0	A-60	A-0	*
较小失火危险的服务处所 (5)					c/	A-60	A-0	A-60	A-0	*
A 类机器处所 (6)						*	A-0	A-0 d/	A-60	*
其他机器处所 (7)							A-0 b/	A-0	A-0	*
货油泵舱 (8)								*	A-60	*
较大失火危险的服务处所 (9)									A-0 b/	*
开敞甲板处所 (10)										-

注：根据情况适用于规则 58.1 和 58.2。

表58.2 分隔相邻处所甲板的耐火完整性

甲板上处所 / 甲板下处所		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
控制站	(1)	A-0	A-0	A-0	A-0	A-0	A-60	A-0	–	A-0	*
走廊	(2)	A-0	*	*	A-0	*	A-60	A-0	–	A-0	*
起居处所	(3)	A-60	A-0	*	A-0	*	A-60	A-0	–	A-0	*
梯道	(4)	A-0	A-0	A-0	*	A-0	A-60	A-0	–	A-0	*
较小失火危险的服务处所	(5)	A-15	A-0	A-0	A-0	*	A-60	A-0	–	A-0	*
A类机器处所	(6)	A-60	A-60	A-60	A-60	A-60	*	A-60 e/	A-0	A-60	*
其他机器处所	(7)	A-15	A-0	A-0	A-0	A-0	A-0	*	A-0	A-0	*
货油泵舱	(8)	–	–	–	–	–	A-0 d/	A-0	*	–	*
较大失火危险的服务处所	(9)	A-60	A-0	A-0	A-0	A-0	A-60	A-0	–	A-0 b/	*
开敞甲板处所	(10)	*	*	*	*	*	*	*	*	*	–

a 应用说明见规则45和46。

b 如果这些处所具有同一类别和出现了注有b的字样，只有当采用不同用途的相邻处所时才要求参阅这些表中所列等级的舱壁和甲板，例如在(9)类里，在两个厨房之间不必要求有舱壁分隔，但油漆间和厨房之间就要求有“A-0”级舱壁。

c 将操舵室、海图室和无线电报室彼此分隔开的舱壁可以是“B-0”级。

d 在货油泵舱和A类机器处所之间的舱壁和甲板可以让货油泵轴的填料涵盖以及有填料的类似物体穿过，但是，必须在舱壁或甲板的穿洞部位装有用有效润滑或其他措施来保证永久性气密的密封装置。

* 表内出现星号的地方，其分隔要求用钢或其他等效材料制成，但不要求它为“A”级标准。

规 则 59

透气、清除、除气和通风

1 货油舱透气

1.1 货油舱的透气系统应与船舶其他舱室的空气管道完全隔开。 凡货油舱甲板上能散发出可燃气体的开口，其布置和部位应使可燃气体进入含有着火源的围蔽处所或积聚在可能构成着火危险的甲板机械和设备附近的可能性减至最小程度。为此按照这一总的原则，如实施下列1.2至1.10款的规定。

1.2 透气装置的设计和操作应能保证货油舱的压力和真空都不超过设计参数，并足以使：

.1 在任何情况下，由于货油舱内温度变化所产生的少量气体、空气或惰性气体混合物能流经压力／真空阀；

.2 在装货油和压载或卸油和卸载的过程中，大量的气体、空气或惰性气体混合物能够通过。

1.3.1 每一货油舱的透气装置可以是独立的，亦可以同其他货油舱连在一起，并且可以与惰性气体管系联成一体。

1.3.2 如其装置是与其他货油舱连在一起时，应装有截止阀或其他可接受的设施，以隔绝每一货油舱。 若安装的是截止阀，它们应配备锁闭装置，并由高级负责船员控制。 按照1.2.1款的规定，任何隔离措施须使由于货油舱内温度变化所产生的气体等能继续流通无阻。

1.4 透气装置应接至每一货油舱的顶部，并在船舶处于纵倾和横倾的所有正常情况下，应能自动排泄到货油舱。 如果不能装设自动排泄管系，则应装设永久性装置，以使透气管系排泄到货油舱去。

1.5 透气系统应设有装置，以防止火焰进入货油舱。 这些装置的设计、试验和设置应符合主管机关所制订的至少包括海协组织所通过的标准的各项要求。

1.6 应采取措施，以防止透气系统内液体上升至可能超过货油舱设计压头的高度。 这一措施包括采用高液位警报、溢流控制系统或其他等效措施，以及测量装置和货油舱注油程序等所完成。

1.7 1.2.1款规定的压力释放口应为：

.1 具有高于货油舱甲板尽可能大的高度，以获得可燃气体的最大扩散，但不得低于货油舱甲板之上2米；

.2 布置的距离尽可能最远，但距通向含有着火源的围蔽处所的最近进气口和开口的和距可能构成着火危险的甲板机械和设备的距离，均不得少于5米。

1.8 当1.2.1款规定的压力／真空阀位于透气总管或桅杆式立管之内时，它们可以装设旁通装置。如设有上述装置，则应有适当的指示器，以示明旁通装置是否开启还是关闭。

1.9 1.2.2款规定的用于货油装卸和压载的透气出口应为：

.1.1 能使气体混合物自由流通；

.1.2 能使排泄气体混合物的调节流速达到不小于30米／秒；

.2 布置能传气体混合物垂直向上排出；

.3 如采用气体混合物自由流通的方式，则其出口距离货油舱甲板和前后舷梯的高度不得小于6米；倘若出口位于舷梯4米之内时，则距通向含有着火源的围蔽处所的最近进气口和开口的和距可能构成着火危险的甲板机械和设备的水平距离，均不得小于10米；

.4 如果采用高速排气方法，其出口距离货油舱甲板的高度应不小于2米，并距通向含有着火源的围蔽处所的最近进气口和开口的和距可能构成着火危险的甲板机械和设备的水平距离，均不得小于10米。这些出口应设有认可型的高速装置；

.5 为防止任何货油舱的压力超过设计压力，并考虑到放气情况，因此设计基础应以最大设计装油速率乘以至少1.25的系数。应向船长提供关于每一货油舱最大许可装油速率的资料，对于组合透气系统来说，则应提供每一组货油舱的资料。

1.10 对于混装船舶，应以盲板法兰将含有油类或油渣的污油舱与其他货油舱加以隔离，这些法兰当载运规则55.1所述液货以外的货物时应在所有时间保持在位。

2 货油舱清除和／或除气

货油舱清除和／或除气的布置应能使由于大气中可燃气体的散布和货油舱内可燃混合气体所造成的危险降至最低程度。 因此：

.1 如船舶设有惰性气体系统，应首先按照规则62.13的规定清除货油舱气体，直至货油舱内碳氢气体的浓度以体积计算降至少于2%为止，其后，可以在货油舱甲板面上进行透气。

.2 如船舶未设惰性气体系统，则其操作应为初步排除可燃气体：

.2.1 如1.9款所规定，通过透气出口；

.2.2 以至少为20米／秒的垂直出气速度，通过在货油舱甲板之上至少为2米的出口，并且那些出口应有适当的防护装置，以防止火焰通过。

当出口处的可燃气体浓度业已降至可燃下限的30%时，则可在货油舱甲板面上进行排出气体混合物。

3 通风

3.1 货油泵舱应为机械通风，抽风机的排气应予引至开敞甲板上的安全地点。这些舱室的通风能量应足以最大限度地降低可燃气体积聚的可能性。 根据该处所的总容积，换气次数应至少为每小时20次。 空气导管的布置应使该处所的所有空间均能得到有效通风。 通风应为抽吸式，使用无火星型风机。

3.2 通风入口和出口以及甲板室和上层建筑边界处所上的其他开口，其布置应与1款的规定相符。 上述通风，尤其是机器处所的通风，应尽可能位于后部。当船舶设有艉部装卸货油设备时，这一点应予适当考虑。 诸如电气设备一类的着火源，其布置应避免发生爆炸危险。

3.3 对于混装船舶，所有载货处所及其相邻的任何围蔽处所均应进行机械通风。该通风可用可携式风机进行通风。 货油泵舱、管道以及规则56.1所述的邻接于污油舱的隔离室舱内，均应设置一认可的能监控可燃气体的固定式气体报警系统。布置应适当，以便于测量货油舱区域内其他所有处所的可燃气体，测量应尽可能在开敞甲板上或易于到达的位置上进行。

规 则 60

货油舱的保护

1 对于载重量为20,000吨及20,000吨以上的新油船，其货油舱甲板区域和货油舱的保护应按规则61及62的要求，通过装设一个固定式甲板泡沫系统和一个固定式惰性气体系统来获得。 但主管机关根据第一章规则5经考虑该船的布置和设备后，可以同意采取其他能提供等效于上述系统的保护的固定式联合装置来代替上述装置。

2 凡认为等效而建议用来代替甲板泡沫系统的系统，应：

.1 能够熄灭喷出的油火，并能阻止尚未燃烧的溢油着火；

.2 能够在破裂的货油舱内扑灭火焰。

3 凡认为等效而建议用来代替固定式惰性气体系统的系统，应：

.1 在空载正常航行的全航程中以及必要的舱内作业中，能防止爆炸性混合物在完整的货油舱内作危险的积聚；

.2 设计成使该系统本身产生静电而着火的危险减至最小程度。

4 在1984年9月1日以前建造，载重量为20,000吨或20,000吨以上从事于载运原油的油船，应装有符合1款要求的一个惰性气体系统，装设日期不迟于：

.1 载重量为70,000吨或70,000吨以上的油船，1984年9月1日或竣工交船日期以两者中较迟出现的日期为准；而

.2 载重量少于70,000吨的油船，1985年5月1日或竣工交船日期以两者中较迟出现的日期为准，但是，对于载重量少于40,000吨未装有自身出水量大于60立方米／小时洗舱机的油船，主管机关经考虑船舶的设计特点，认为实施这些要求是不合理、又不可行时，可以例外对此种油船免除这一款的要求。

5 在1984年9月1日以前建造、载重量为40,000吨或40,000吨以上从事于载运原油以外其他油类的油船，以及任何这种油船，其载重量为20,000吨或20,000吨以上从事于载运原油以外其他油类，并装有自身出水量大于60立方米／小时洗舱机者，均应装有符合1款要求的一个惰性气体系统，装设日期不迟于：

.1 载重量为70,000吨或70,000吨以上的油船，1984年9月1日或竣工交船日期两者中以较迟出现的日期为准；而

.2 载重量少于70,000吨的油船，1985年5月1日或竣工交船日期两者中以较迟出现的日期为准。

6 所有以使用原油为清洗货油舱程序的油船应装有符合规则62要求的一个惰性气体系统和固定式货油舱洗舱机。

7 所有装有一个固定式惰性气体系统的油船应配备闭式测量油舱液位系统。

8 载重量少于20,000吨的油船应配备一个符合规则61要求的泡沫系统。

规 则 61

固定式甲板泡沫系统

1 提供泡沫的设备应能将泡沫喷射到整个货油舱区域并喷射到其甲板已经破裂的任何货油舱内。

2 甲板泡沫系统应能使操作简单而迅速。系统的主控制站应适当地位于货油舱区域以外、邻接于起居处所，并在被保护区域万一失火时能易于到达和进行操纵的地点。

3 泡沫溶液的供给率不得少于下列数值中的最大值：

.1 按货舱甲板面积：0.6升／分·平方米，此处货舱甲板面积是指船舶最大宽度乘以货油舱处所的纵向总长度；

.2 按单个具有最大这种面积的货油舱的水平截面面积：6升／分·平方米；或

.3 按被最大炮式喷射器所保护并完全位于该喷射器前方的面积：3升／分·平方米，但不少于1,250升／分。

4 在引用3.1、3.2或3.3各款所规定的溶液供给率数值中的最大值时，应有足量的泡沫浓缩剂供应，以保证装设了一个惰性气体系统的油船能产生泡沫至少20分钟，或者，保证没有装设惰性气体系统的油船能产生泡沫至少30分钟。泡沫膨胀率（即所产生的泡沫体积与水和发泡浓缩剂混合物的体积之比）一般不超过12比1。如本来就产生低膨胀泡沫的系统，但其膨胀率稍微超过12比1者，则

所需的泡沫溶液的数量仍然按膨胀率为12比1的系统计算。 当采用中等膨胀率的泡沫时（膨胀率在50比1至150比1之间），泡沫的喷射率和炮式喷射器的能量应取得主管机关同意。

5 来自固定式泡沫系统的泡沫，须用若干炮式喷射器和泡沫喷枪来供送。每一炮式喷射器应至少供送3.1和3.2款所要求的泡沫喷射率的50%。 对于载重量少于4,000吨的油船，主管机关可以不要求装设炮式喷射器，而只要求装设泡沫喷枪。 但是，在这种情况下，每一喷枪的能量应至少是3.1和3.2款所要求的泡沫喷射率的25%。

6.1 炮式喷射器的数量和位置应符合1款的要求，任何一个炮式喷射器的能量应对由它保护、完全位于它的前方的甲板面积至少发射3升／分·平方米。 这一能量不得低于1,250升／分。

6.2 从炮式喷射器到它前方所保护区域最远端的距离，应不大于该炮式喷射器在平静空气中射程的75%。

7 车尾楼前端左右两侧或面向货油舱甲板的起居处所的左右两侧应各装设一具炮式喷射器和用于泡沫喷枪的软管接头。 载重量少于4,000吨的油船，在尾楼前端左右两侧或面向货油舱甲板的起居处所的左右两侧应各装设一具用于泡沫喷枪的软管接头。

8 喷枪的装设应保证在灭火操作中动作灵活，并覆盖炮式喷射器保护不到的区域。 任何喷枪的容量应不少于400升，在静止空气中喷枪的射程应不少于15米。 装设的泡沫喷枪数量不得少于四具。 泡沫总管泡沫出口的数量和布置应能使至少两具喷枪将泡沫喷射到货油舱甲板的任何区域。

9 为了隔离总管的损坏部分，泡沫总管和消防总管（后者如果是甲板泡沫系统整体的构成部分）均应装有阀门，这些阀门应位于紧接任何炮式喷射器的前方。

10 按所需输出量操作甲板泡沫系统时，须同时能从消防总管按所需压力使用所需最少数目的水柱。

规 则 62

惰性气体系统

1 规则60所提到的惰性气体系统，从设计、构造和试验均应使主管机关满意。它的设计和操作应能导致并维持货油舱*内的大气在任何时候不能着火，当需要这种舱排清油气时除外。万一惰性系统不能满足上述规定的操作要求，并估计不能作有效修理时，那就只有在采取了惰性系统指南**所规定的"紧急情况"措施后，才应重新继续卸油、排除压载和必要的货油舱清洗工作。

2 该系统应能：

.1 通过降低每一个货油舱大气的含氧量到不能支持燃烧的水平而使空货油舱惰化；

.2 在任何时候、在港内停泊和海上航行中，保持任何货油舱内任何部分大气的含氧量以体积计算不超过8%，并保持正压；有必要排清货油舱的油气时除外。

.3 除有必要排清货油舱的油气外，在正常作业中应消除空气进入货油舱；

.4 扫清空货油舱的碳氢化合物气体，使后续的清除油气工作永不在舱内产生可燃气体。

3.1 该系统应能以船舶最大卸油率的125%的速率（以体积计算）向货油舱输送惰性气体。

3.2 该系统应能以任何需要的流速，向货油舱输送惰性气体，其在惰性气体供气总管内的含氧量（以体积计算）不超过5%。

4 惰性气体的来源可以是主或副锅炉的经过处理的烟道气体。主管机关也可以允许系统使用来自一个或多个各自独立的惰性气体发生器或其他来源或任何它们的组合的烟道气体，但必须达到等效的安全标准。这种系统应尽可能符合本规

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* 在本规则内"货油舱"这个词也包括"含油污水舱"。

** 参阅海上安全委员会1980年5月第四十二届会议通过的（海安会/通函282）惰性气体系统指南。

则的要求。 不准使用储备二氧化碳气体，除非主管机关认为来自系统本身所产生的静电着火危险已降至最小程度。

5 在锅炉烟道与烟道气体洗涤器之间的惰性气体供气总管上应装设烟道气体隔离阀。 该阀应设有指示阀的开闭状态的装置，并在锅炉吹灰器之间设有连锁装置或其他有效设施，以保证烟道气体隔离阀打开时锅炉吹灰器不能运转，此外还应设有该阀的吹洗设施。

6.1 应装设烟道气体洗涤器，使其有效地冷却3款所确定的整个气体并清除其中固体颗粒和硫的燃烧产物。 冷却水系统的布置应保证连续向惰性气体系统供应足量的冷却水时并不妨碍船上其他任何有重要用途的供水。 此外应配备冷却水的备用供水装置。

6.2 应装设过滤器或等效设施，以尽量减少被带到惰性气体风机的水量。

6.3 洗涤器应位于所有货油舱、货油泵舱和将这些处所与A类机器处所分隔开的隔离空舱的后方。

7.1 应装设至少两个风机，在并用时它们应能向货油舱至少输送3款要求的惰性气体体积。 如果带有气体发生器的系统能输出本规则第3条规定的气体总量，则主管当局可允许只备一个风机。 但船上应有风机及其发动机的足够备件，以便船员在风机及其发动机发生故障时进行检修。

7.2 惰性气体发生器应装有两个燃油泵。 在船上带有燃油泵及其发动机的足够备件以便船员在燃油泵及其发动机发生故障时可进行检修的条件下，主管机关可允许只装一个燃油泵。

7.3 惰性气体系统的设计应使其作用在任何一个货油舱的最大压力不能超过该货油舱的试验压力。 在每一个风机的进、排气口应装有截止阀。 应能使惰性气体整台设备的功能在开始卸油以前能够稳定运输。 如果将风机用于清除油气，它们的新鲜空气进口应装有盲断装置。

7.4 风机应位于所有货油舱、货油泵舱和将这些处所与A类机器处所分隔开的隔离空舱的后方。

8.1 洗涤器和风机连同有关管系和附件的设计和位置应予以特别考虑，以防止烟道气体渗漏到围蔽的处所之内。

8.2 为了保证安全维护，应在烟道气体隔离阀与洗涤器之间，或在洗涤器的烟道气体入口处装设一个附加水封装置或其他能有效防止烟道气体渗漏的有效设备。

9.1 在惰性气体供气总管上应装设一个气体调节阀。 按照19.2和19.3两款要求，这个阀应能自动控制到关闭。 它也应能自动调节通往货油舱的惰性气体气流，除非如7款所要求，装有设备以自动控制惰性气体风机的转速。

9.2 在惰性气体总管最前面的气体安全处所*的前舱壁处应装设一个9.1款所述的气体调节阀。

10.1 在惰性气体供气总管上，应装设至少两个止回装置，其中之一应是一个水封，以便在船舶所有正常的纵倾、横倾以及航行情况下，防止碳氢化合物气体回流至机器处所的烟道，或回流到任何气体安全处所。 它们应位于9.1款所要求的自动阀与通货油舱或货油管系最后方连接之间。

10.2 10.1款所述的装置应位于货油舱区域的甲板面上。

10.3 10.1款所述的水封应能由两台独立的泵供水，每一台应能连续保持足够的供水量。

10.4 水封和它的附属设备的布置应能在各种工况下均能防止碳氢化合物气体倒流，并能保证适当的密封作用。

10.5 应有确保防止水封被冰冻的措施，所采取的措施不能由于过热而损坏水封的完整性。

10.6 与水封有关的供水和排水管以及通往气体安全处所的透气管或压力传感管均应装设环流水管或其他经认可的装置，应有防止上述环流水管被真空抽空的措施。

10.7 甲板水封和所有环流水管装置应能防止碳氢化合物气体在其压力等于货油舱的试验压力时回流。

10.8 第二个装置应为止回阀或等效设备，应能防止气体或液体倒流，其安装位置应在10.1款所要求的甲板水封的前方。 它应装有可靠的关闭装置。 作为可靠的关闭装置的替代，可以在止回阀的前方装设一个附加的具有这种关闭设备的阀，以便将甲板水封与通往货油舱惰性气体总管隔离开来。

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* 油气安全处所是这样一个处所，碳氢化合物气体进入它内部时，会产生着火或毒性方面的危险。

10.9 作为防止从甲板总管倒流来的碳氢化合物液体或气体可能渗漏的一个附加措施应有透气装置以便当10.8款所述的具有可靠关闭装置的阀关闭时，使该阀与9款所述的阀之间的管段，在阀的第一个被关闭时，能安全地透气。

11.1 在10款所要求的止回装置的前方，惰性气体总管可以分成两个或两个以上的支管。

11.2.1 惰性气体总管应装有支管通向每一个货油舱。 惰性气体支管应装有截止阀或等效设施以隔离每一个货油舱。 如果装的是截止阀，它们应设有锁固装置，这装置由负责的高级船员控制。

11.2.2 对于油类／散装两用船，用以隔离含有来自其他舱柜的油或油泥的含油污水舱的装置应由盲板法兰组成，在卸油类以外其他货物时，这法兰应在所有时间保持其位置，惰性气体系统指南的有关段落另有规定者除外。

11.3 应装有设备以保护货油舱在被隔离于惰性气体总管时受到因温度变化而引起的超压或真空的影响。

11.4 管系的设计应能在所有正常情况下防止货油或水在管系内积聚。

11.5 应配备适当装置使惰性气体总管能与外界的惰性气体供应管相连接。

12 用于排清所有在装油和压舱时所排出的气体的装置应符合规则59.1的规定，并应由一个或多个桅杆透气管或多个高速出气口组成。 惰性气体总管可以用于这种排气。

13 用于2款所要求的空货油舱惰性化、清扫或清除气体的装置应取得主管机关同意，这些装置并应做到使碳氢化合物气体在由货油舱内部构件所形成的袋形空间的积聚降到最小程度，并且：

.1 在个别货油舱的气体出气管（如果装有）应尽可能位于远离惰性气体／空气的进口，并应符合规则59.1的规定。 这种出气管的进气口可以位于与甲板相平的高度或位于货油舱底之上不超过1米。

.2 13.1款所述的这种出气管的横截面面积应是这样：当同时向任何三个货油舱供给惰性气体时，出气速度应至少为20米／秒。 它们的出口伸延在甲板高度之上不应少于2米。

.3 13.2款所述的每一出气口应装有适当的盲断装置；

.4.1 如果在惰性气体供气总管与货油管系之间装有连接管，应有装置来保证有效的隔离，这要注意到在两个系统之间可能存在较大的压力差。 该装置应有两个截止阀组成，在两阀之间具有安全方式的透气装置或为带盲板装置的短管组成。

.4.2 将惰性气体供气总管隔离于货油总管、并且是位于货油总管一侧的阀应为带有可靠关闭装置的止回阀。

14.1 应在惰性气体供气总管上装有一个或多个压力—— 真空的休止装置，以防止货油舱遭受到：

.1 在以规定的最大速率装货油而所有其他出气口被关闭时，超过货油舱的试验压力的一个正压；或

.2 在以货油泵的最大额定功能卸货油而惰性气体喷射器失灵时，超过700毫米水柱压力计的一个负压。

14.2 14.1款所述的装置的安装位置和设计应符合规则59.1的规定。

15 在惰性气体风机进行工作的任何时候，应有设备用以连续指示风机排气端惰性气体的温度和压力。

16.1 当供给惰性气体时应有仪表连续指示和固定地记录：

.1 如10.1款所要求在止回装置前方的惰性气体供气总管的压力；和

.2 在风机排气端的惰性气体供气总管内惰性气体的含氧量。

16.2 16.1款所述的装置应安装在货油控制室内（如有此室）。 但如果没有货油控制室，它们应安装在负责货油作业的高级船员容易到达的位置。

16.3 此外，应装设下列仪表：

.1 于驾驶台内，在全部时间指示16.1.1款所述的压力，以及当含油污水舱被隔离于惰性气体供气总管时，显示货油／散货两用船的含油污水舱内的压力；和

.2 于机器处所控制室或机器处所内，以显示16.1.2款所述的含氧量。

17 应配备手提式仪器，用以测定氧气和可燃气体的浓度。 此外，应在每一个货油舱作出适当布置，以便能使用这些手提式仪器来测定货油舱大气情况。

18 应配备适当装置，用以校准16和17款所述的固定式和手提式气体浓度测量仪表的零位和刻度。

19.1 应装设可视听报警以显示；

.1 6.1款所述烟道气体洗涤器的低水压或低水流；

.2 6.1款所述烟道气体洗涤器内的高水位；

.3 15款所述的气体的高温；

.4 7款所述的惰性气体风机的故障；

.5 16.1.2款所述以体积计算含氧量超过8%；

.6 9和16.1款所述的气体调节阀自动控制系统和指示装置的动力供应失灵；

.7 10.1款所述的水封内的低水位；

.8 16.1款所述的气体压力低于100毫米水柱。 其报警装置应保证油类／散装两用船的含油污水舱内的压力在所有时间得到监控；以及

.9 16.1.1款所述的气体的高压。

19.2 根据本规则19.1.1，19.1.3，19.1.5至19.1.9条，应给气体发生器系统提供可视听报警和附加的报警以显示：

.1 燃油不足；

.2 发生器动力供应失灵；

.3 发生器自动控制系统动力供应失灵。

19.3 惰性气体风机和气体调节阀的自动关停应按照19.1.1、19.1.2 和19.1.3款所述的预定极限值进行布置。

19.4 气体调节阀的自动关停应按照19.1.4款所述进行布置。

19.5 按照19.1.5所述，当惰性气体的含氧量超过8%时，应立即采取措施以改善气体的性质。 除非气体的性质得到改善，不然所有货油舱作业应予停止，以避免空气被吸引到舱内，至于10.8款所述的隔离阀也应关闭。

19.6 19.1.5、19.1.6和19.1.8所要求的报警应安装在机器处所和货油控制室（如有此室）之内，但在每一情况中，应安装在使负责船员能立即收到警报位置。

19.7 关于19.1.7款所述所有时间维持充足水量以及在气流停止时维持装置的完整性以能自动形成水封，都应由主管机关核准。 水封低水位的可视听报警，在得不到惰性气体供应时就应工作。

19.8 在装设独立于19.1.8款所要求的一个声响报警系统或自动关停货油泵装置，它们应在惰性气体供气总管内达到事先制订的低压限额时进行工作。

20 在1984年9月1日以前建造、需要装有惰性气体系统的油船至少应该符合1974年国际海上人命安全公约*第II-2章规则62的要求。 此外，它们应符合本规则的要求，但下列事项除外：

.1 在1981年6月1日以前安装在这种油船上的惰性气体系统无须符合下列各款的要求：

3.2、6.3、7.4、8、9.2、10.2、10.7、10.9、11.3、11.4、13.2、13.4.2和19.8；

.2 在1981年6月1日或以后安装在这种油船上的惰性气体系统无须符合下列各款的要求：3.2、6.3、7.4和13.2。

21 船上应备有详细的使用说明书，其内容包括操作方法、安全和维护要求以及惰性系统和将它运用于货油舱系统**有关的职业上对健康的危险。 各说明书应包含万一惰性气体系统发生故障或失灵时所应遵循的程序指南。

规 则 63

货 油 泵 舱

1 每一货油泵舱应装设下列固定式灭火系统之一，且可以在货油泵舱外部一个随时易于到达的位置进行操纵。 货油泵舱应装设一个适合于A类机器处所的系统。

1.1 一个符合规则5规定的二氧化碳或卤化烃系统，连同下列的：

.1 符合规则5.1.6所述应能安全地用于可燃货油气体/空气混合体中的报警；

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* 以1974年国际海上人命安全会议所通过的文本为准。

** 参阅海上安全委员会1980年5月第四十二届会议通过的(海安会/通函282)惰性气体系统指南。

.2 在控制部位显示一个通告，说明由于静电着火危险，这系统只能用于灭火而不能用于惰性目的。

1.2 符合规则9规定的一个高膨胀泡沫系统，且泡沫浓缩剂的供应应适宜于扑灭所载货油的火灾。

1.3 一个符合规则10规定的固定式压力水雾系统。

2 如果用于货油泵舱系统的灭火剂也用于为其他处所服务的系统，则所配备的灭火剂的量或其施放率无须多于最大舱室所需的最大用量。

第 III 章

救 生 设 备 等

规 则 1

适 用 范 围

(c)(iii)(2)项的现有文本用下文代替：

"(2) 规则II-2/28.1.5和II-2/28.1.6；和"

规 则 27

救生艇、救生筏和救生浮具

(c)(iii)项中，提到"第II-1章规则1(d)款"之处修正为：

"规则II-1/1.5"

(c)(vii)项中，提到"第II-1章规则1(d)款"之处修正为：

"规则II-1/1.5"

规 则 30

甲板、救生艇、救生筏等的照明

(a)款中，提到"第II-1章规则25"之处修正为：

"规则II-1/42"

规 则 38

应 急 照 明

提到“第Ⅱ-1章规则26”之处修正为：

“规则Ⅱ-1/43”

第 Ⅳ 章

无 线 电 报 与 无 线 电 话

本章内增加下列新规则：

规 则 4-1

甚高频无线电话设备

(a) 任何吨位的客船与300总吨及300总吨以上的货船，应设置符合规则17规定的甚高频无线电话设备。

(b) 规则17的规定也适用于缔约国政府对于第Ⅴ章所适用的在其主管水域内航行、而(a)款又未作强制要求的所有船舶的甚高频无线电话设备。

规则7现有条文用下文取代：

“规 则 7

无线电话值班

(a) 按照规则4设置无线电话台的每艘船舶，为了安全的目的，当该船在海上时，应在船上通常驾驶的地方，通过利用扬声器、滤波扬声器或无线电话自动报警器的无线电话遇险频率值班收信机，在无线电话遇险频率上保持连续值班。

(b) (a)款述及的每艘船舶应按下述配备合格的无线电话务员（该员可为船长、驾驶员或其它船员）：

(i) 如为300总吨及300总吨以上但小于500总吨时，至少一个话务员；

(ii) 如为500总吨及500总吨以上但小于1,600总吨时，至少两个话务员。 如果此种船上配备有一个专门履行有关无线电话职能的话务员，则无须强制配备第二个话务员。

(c) 按照规则3或规则4设置无线电报台的每艘船舶，当该船在海上时，应在船上由主管机构所确定的一个地方，通过利用扬声器、滤波扬声器或无线电报自动报警器的无线电话遇险频率接收机，在无线电话遇险频率上保持连续值班。”

规则8现有条文用下文取代：

“规 则 8

甚高频无线电话值班

按照规则4－1设置甚高频无线电话设备的每艘船舶，当在海上时，应在驾驶台上保持连续守听值班：

(i) 实际可行时，使用156.8 MHz（16频道），和／或

(ii) 按规则4－1(b)述及的缔约国政府所可能要求的时间和频率，保持守听值班。”

规 则 10

无线电报设备

(7)款现有条文用下文取代：

“（g-1）当主用及备用发信机连接于主用天线时，应具有下列最小正常射程，即在昼间以及正常情况和环境下，于所规定的射程内，* 它们应能在船与船之间发送清晰可辨的信号。 （如收信机处的场强有效值至少为每米50微伏时，通常能收到清晰可辨的信号）。

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* 在无场强的直接测量时，下列数据可作为近似地确定正常射程的参考。

A 非自撑式天线

注（续）：

正常射程海里数	米－安培[1]
200	128
175	102
150	76
125	58
100	45
75	34

[1] 天线最高部分至最深载重水线间距离（米）与天线电流（安培）的积。表中第二栏所列数值，相当于下式比值的平均值：

$$\frac{\text{天线有效高度}}{\text{天线最大高度}} = 0.47$$

此比值随天线附近情况而变，其变化范围约在0.3与0.7之间。

B 自撑式发射天线

正常射程海里数	米－安培[2]
200	305
175	215
150	150
125	110
100	85
75	55

[2] 天线最高部分至最深载重水线间距离（米）与由天线发射部分底部量得的电流（安培）的积。 第二栏所列数值系基于CCIR第368-2号建议案中的传播曲线并根据CCIR第502-1号报告和第43-1号意见所述的方法、试验结果与计算得出。 米－安培这一必要的数值随天线附近的情况而发生较大的变化。

	最小正常射程海里数	
	主发信机	备用发信机
所有客船与1,600总吨及1,600总吨以上的货船	150	100
1,600总吨以下的货船	100	75

(g-2) 无线电报设备应包括在无线电话遇险频率上进行无线电话发射和接收的设施。 这一要求可通过在主用或备用设备或者其它安装的设备中包括此类设施来实现。 设备中无线电话部分如在1986年9月1日之后安装，则其发信机功率和收信机灵敏度须分别符合规则16(c)(i)和(f)的规定。 在此日期之前安装的设备，此类发信机功率和收信机灵敏度应由主管机关确定。 本规则所要求的无线电话设施的地点及其它情况应由主管机关确定，但当其构成主用或备用无线电报设备的一个部分时除外。

(h)(iv)现有条文用下文取代：

"(h)(iv)(1) (g-2)要求的无线电话发信设施，应有产生无线电话报警信号的自动装置，其设计应能防止由于误动作而开动，并应符合规则16(e)的要求。 该设施应随时能停止工作，以便能立即发送遇险通信。 1986年9月1日之前安装的设备，其产生无线电话报警信号自动装置的设置应由主管机关确定。

(2) 应作好布置，以便在遇险频率以外的其它频率上，使用一根适当的仿真天线，定期检查产生无线电话报警信号的自动装置是否正常工作。 对于只有无线电话遇险频率的无线电话应急设备应视作例外，但此种情况下须采用适当的仿真天线。

注：在采取所有合理步骤以保持装置处于有效状态的同时，本规则要求的无线电话发信设施功能失常，不得认作船舶不再适航，而在不能提供修理便利的港口亦不得作为拖延船舶在港的理由。"

删去(l)(ii)现有条文。

(m)(iv)现有条文用下文取代：

"(m)(iv)按规则17(c)设置的甚高频设备。"

规 则 16

无线电话设备

删去A3H、A3A及A3J，以修正(b)的现有条文。

(c)的现有条文用下文取代：

"(c)(i) 300总吨及300总吨以上但小于1,600总吨的货船，其发信机应具有150海里的最小正常射程，即在昼间以及正常情况和环境下，发信机应能在此射程*范围上，在船与船之间发送清晰可辨的信号。（如在收信机上，由未调制载波所产生的场强有效值对于双边带和单边带全载波发射至少为每米25微伏时，通常能收到清晰可辨的信号。）

(ii) 安装在300总吨及300总吨以上但小于500总吨货船上由双边带发射的现有设备，其发信机的最小正常射程应至少为75海里。"

(j)(iv)现有条文改成：

"(iv) 按规则17(c)设置的甚高频设备。"

规则17现有条文由下文取代：

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* 在无场强测量时，如天线上的功率为15瓦特（未调制载波），且双边带发射的天线效率为27%，或以100%单正弦振荡调制时单边带全载波发射包线峰值为60瓦时，则可假定获得了此射程。

规 则 17

甚高频无线电话设备

(a) 甚高频无线电话设备应符合本规则的规定位于船内上部并应包括一套发信机和收信机、能供其在额定功率上工作的电源以及适于在工作频率上有效地发射和接收信号的天线。

(b) 在所有客船上，不管其大小如何以及在500总吨及500总吨以上的货船上，应可由设置在船舶上部并至少能进行6小时有效工作的电源供电操作。

(c) 主管机关可授权以采用规则10(m)及规则16(j)述及的无线电报设备或无线电话设备的备用电源向甚高频无线电话设备供电。 在此情况下，备用电源应具有足够能量以同时操作甚高频无线电话设备和下述设备：

(i) 备用无线电报发信机和收信机至少工作6小时，但在装有转换装置仅能确保交替工作者除外，或

(ii) 无线电话发信机和收信机至少工作6小时，但在装有转换装置仅能确保交替工作者除外。

(d) 甚高频无线电话设备应符合无线电规则为国际水上行动甚高频无线电话业务所用设备所规定的要求，并应在无线电规则所规定的各频道上和按规则4-1(b)述及的缔约国政府可能要求的频道上都能工作。*

(e) 规则4-1(b)述及的缔约国政府，不应要求发信机射频载波的输出功率大于10瓦特。 天线应尽可能在所有方向不受遮挡。

(f) 为航行安全所需的频道的控制，应在驾驶室内便于指挥的地点即刻可用；必要时，在驾驶室两翼应有能进行无线电通信的设备。”

规 则 19

无 线 电 日 志

下述段落加入现有条文，现有(c)重新编号为(d)：

“(c) 每一根据规则4-1设置甚高频无线电话设备的船舶：

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* 作为参考，假设每艘船舶在高出水面9.15米的公称高度处设有垂直极化单位增益天线、一个输出功率为10瓦特的射频发信机以及对于信噪比为20分贝的输入端灵敏度为2毫伏的收信机。”

(i) 无线电规则所要求的记载事项应按主管机关要求记入无线电日志；

(ii) 有关遇险、紧急和安全通航的所有通信的摘要应记入船舶日志。

第 V 章

航 行 安 全

规则12的现有条文用下文取代：

规 则 12

船用航海设备

(a) 在本规则范围内，对于一艘船舶，“建造的”意谓相当于下述的某个建造阶段：

(i) 安放龙骨；或

(ii) 相当于一艘具体船舶开始建造；或

(iii) 船舶至少不下于50吨或预计所有建造材料总量的1%的装配已经开始，以小者为准。

(b) (i) 150总吨及150总吨以上的船舶均应装设：

(1) 一具标准磁罗经，但符合(iv)款规定者除外；

(2) 一具电罗经，但在(1)项要求的标准罗经能提供艏向情况并使舵工在主操舵位置可以清楚地读出的情况下可以除外；

(3) 标准罗经和正常控制航行的位置之间有为主管机关所满意的足够的通信手段；

(4) 在一个有360度弧度的平面上取得尽量接近实际的方位的手段。

(ii) (i)款述及的各磁罗经应适当校正，并应随时备有其剩余偏差表或曲线。

(iii) 应配备一具能与标准罗经互换的备用磁罗经，但在设有(i)(2)项提及的操舵罗经或罗经时除外。

(iv) 由于航程的性质、船舶接近陆地的情况或船舶类型的确无须标准罗经而在主管机关认为装设此项设备为不合理或不必要时，可以对个别船舶或某类船舶免除此类要求，但必须在任何情况下配备一个适当的操舵罗经。

(c) 150总吨以下的船舶，在主管机关认为合理及可行时，应装设一具操舵罗经，同时应有取得方位的手段。

(d) 1984年9月1日或以后建造的500总吨及500总吨以上的船舶，应装设一具符合下述要求的电罗经：

(i) 在主操舵位置上舵工可以清晰地读出读数的主电罗经或一具电罗经复示器；

(ii) 在1，600总吨及1，600总吨以上的船舶上应装设一具或数具置于适当位置，以在一个有360度弧度的平面上取得尽量接近实际方位的电罗经复示器。

(e) 1984年9月1日之前建造、从事国际航行的1，600总吨及1，600总吨以上的船舶应装设一具符合(d)款要求的电罗经。

(f) 在有应急操舵位置的船舶上，应有为此种位置提供指向情况的装置。

(g) 1984年9月1日或以后建造的500总吨及500总吨以上的船舶以及1984年9月1日以前建造的1，600总吨及1，600总吨以上的船舶，应装设一台雷达装置。

(h) 10，000总吨及10，000总吨以上的船舶均应装设二台各自能独立操作的雷达装置。*

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* 参阅本组织通过的大会477(XII)号决议，关于雷达装置操作标准的建议案的第四节。

(i) (g)款和(h)款要求装设雷达装置的每条船舶的驾驶室内应有便于标绘雷达读数的设备。1984年9月1日或以后建造的每艘1,600总吨及1,600总吨以上的船舶，标绘雷达读数的设备应至少与反射标图仪一样有效。

(j) (i) 下述船舶应设置一具自动雷达标图仪：

(1) 1984年9月1日或以后建造的10,000总吨及10,000总吨以上的船舶；

(2) 1984年9月1日之前建造的油轮：

(aa) 总吨位为40,000及40,000以上者，〔1985年1月1日〕以前；

(bb) 总吨位为10,000及10,000以上但小于40,000者，〔1986年1月1日〕以前；

(3) 1984年9月1日以前建造的非油轮：

(aa) 总吨位为40,000及以上者，1986年9月1日以前；

(bb) 总吨位为20,000及以上但小于40,000者，1987年9月1日以前；

(cc) 总吨位为15,000及15,000以上但小于20,000者，1988年9月1日以前；

(ii) 1984年9月1日之前装设、又不完全符合本组织通过的性能标准的自动雷达标图仪，经主管机关考虑，可保留至1991年1月1日。

(iii) 主管机关在认为配备此类设备为不合理或不必要时，或当船舶在适当实施期二年之内将永久退役者，可以对此类船舶免除本款要求。

(k) 在1980年5月25日之前建造的1,600总吨及1,600总吨以上的船舶，以及在1980年5月25日或以后建造的500总吨及以上的船舶，当从事国际航行时，均应装设一具回声测深仪。

(l) 在1984年9月1日或以后建造的500总吨及500总吨以上的船舶，当从事国际航行时，均应装设指示速度和距离的仪器。(j)款要求装设自动雷达标图仪的船舶应装设一台能通过水指示速度和距离的仪器。

(m) 在1984年9月1日之前建造的1,600总吨及1,600总吨以上的船舶以及在1984年9月1日或以后建造的500总吨及500总吨以上的船舶应装设能显示舵角及每个推进器转速的指示器，此外，在装有可变螺矩推进器或侧推进器时，指示器应能显示此类推进器的螺矩及工作方式。所有这些指示器均应在指挥的地点能够读数。

(n) 在1984年9月1日或以后建造的100,000总吨及100,000总吨以上的船舶，应装设一具回旋指示器。

(o) 除规则I/7(b)(ii)，I/8和I/9规定者外，在采取所有合理步骤以保持(d)至(n)款述及的装置处于有效工作状态的同时，设备的功能失常，不得认作船舶不再适航，而在不能提供修理便利的港口亦不得作为拖延船舶在港的理由。

(p) 1,600总吨以上的船舶，当从事国际航行时，应装设符合规则IV/12(a)规定的无线电测向设备。主管机关在适当考虑了无线电测向设备既可作为一种航行仪器又可作为一种帮助测定其它船舶、飞机或救生艇筏位置的重要工具的事实以后，可以对5,000总吨的任何船舶免除此项要求。

(q) 在1980年5月25日或以后建造的1,600总吨及1,600总吨以上的船舶，当从事国际航行时，应装设规则IV/12(b)有关规定中提的在无线电话遇险频率上进行搜索的无线电设备。

(r) 按本规则装设的所有设备，其型式应为主管机关所认可。在1984年9月1日或以后装设在船上的设备应符合不低于本组织通过的相应的性能标准。对在有关性能标准通过以前装设的设备，主管机关在适当考虑了本组织可能通过的与有关标准相关的建议的衡准后，可以免除完全符合这些标准。

(s) 在本规则内，顶推船舶的刚性连结混合单元以及有关被顶推的船舶，当其设计成专用及一体的拖船和驳船时，应视作一艘船舶。

(t) 如果实施本规则的要求需要改变在1984年9月1日之前建造的船舶的结构，主管机关在考虑了这一船舶按目前规则要求的首次进干坞的日期后，可允许将要求装设的设备的期限延长至不迟于1989年9月1日。

(u) 除本规则其它地方另有规定外，任何从事航行的船舶，当其距陆地的最大距离、航行的距离和性质，大体上并无航行危险以及影响安全的其它情况决定其完全实施本规则为不合理或不需要时，主管机关可以对个别船舶进行部分或有条件的

危险。 当确定个别船舶是否给予免除时，主管机关应考虑到此种免除可能对所有其他船舶的安全所产生的影响。

规 则 16

救 生 信 号

(d)款现有条文由下文取代：

“(d) 飞机在进行搜索与营救工作中指引船舶驶向遇险的飞机、船舶或人员所用的信号：

(i) 飞机顺序执行下列操作，表示它愿意指引一艘水面船艇驶向一遇险的飞机或遇险的水面船艇。

(1) 环绕水面船艇飞行至少一次；

(2) 紧贴水面船艇艏前方低飞并横越其航线的延伸方向，以及：

—— 摇摆机翼；或

—— 开闭节气阀；或

—— 变更推进器螺距；

（由于水面船艇的高噪音音频，音响信号可能不如视觉信号有效并可视作吸引注意力的替代措施）。

(3) 飞向指引水面船艇应前进的方向。

重复这些操作，其意义相同。

(ii) 飞机执行下列操作表示已不再需要信号所指引的水面船艇提供援助：

紧贴水面船艇后身低飞并横越该船艇的航迹，以及

—— 摇摆机翼；或

—— 开闭节气阀；或

—— 变更推进器螺距。

（由于水面船艇上的高噪音音频，音响信号可能不如视觉信号有效并可视作吸引注意力的替代措施）。

注：对这些信号的变更将由本组织按需要预先发布通告。

规 则 18

甚高频无线电话

删去本规则现有条文（见规则Ⅳ/4-1(b)）。

规 则 19

自动操舵仪的使用

将下述款加入现有条文：

(d) 在延长使用自动操舵仪之后以及在进入需要特别注意的航行区域之前，应对人工操舵进行测试。

将下述规则加入本章：

规 则 19-1

操舵装置的操作

在需要特别注意的航行区域，船舶应有一台以上能同时工作的操舵装置的动力装置进行工作。

规 则 19-2

操舵装置——测试及操演

(a) 船舶开航后十二个小时之内，应由船员对操舵装置进行检查和测试。测试程序在适当时应包括下述作业：

(i) 主操舵装置；

(ii) 副操舵装置；

(iii) 操舵装置遥控系统；

(iv) 位于驾驶台内的操舵装置；

(v) 应急动力供应；

(vi) 相对于舵的实际位置的舵角指示器；

(vii) 操舵装置遥控系统动力故障告警器；

(viii) 操舵装置动力装置故障告警器；

(ix) 自动隔断装置及其它自动设备。

(b) 检查和测试应包括：

(i) 根据操舵装置所要求的能力的舵的全运动；

(ii) 操舵装置及其连结部件的直观检查；以及

(iii) 驾驶台及操舵装置室通信手段的工作情况。

(c) (i) 在驾驶台及操舵装置室内应永久布置显示操舵装置遥控系统和操舵装置动力装置转换程序的简单操作说明和方框图。

(ii) 所有与操舵装置的操作和维修有关的船舶驾驶员应熟悉装设于船上的操舵系统的操作以及一个系统转换到另一个系统的程序。

(d) 除(b)款所述的日常检查和测试外，至少每三个月应进行一次应急操舵演习，以练习应急操舵程序。 操演应包括在操舵装置室内的直接控制，与驾驶台的通信程序，以及可行时的备用动力供应的操作。

(e) 对于从事定期短期航行的船舶，主管机关可取消进行(a)款和(b)款述及的进行检查和测试的要求。 这些船舶每周至少进行一次这样的检查和测试。

(f) 进行(a)款和(b)款述及的检查和测试的日期以及进行(d)款述及的应急操舵装置的演习的日期应按主管机关可能提出的要求载入航海日志。

第 VI 章

谷 物 装 运

第一节 通则

规则 1 现有条文由下文取代：

规 则 1

适 用 范 围

除另有明文规定外，本章适用于现规则所适用的一切船舶的谷物装运以及500总吨以下货船的谷物装运。

第二节 假定倾侧力距的计算

第五条 现有船舶可替代的装载布置

(A) 总则

第二段修改如下：

“为本节的目的，“现有船舶”一词指1980年5月25日以前安放龙骨的船舶”。

(B) 特别适合装运谷物的船舶的装载

(a)(ii)(2)项现有条文由下文取代：

“(2) 在部分装载的舱间或货舱内，谷物自由表面下沉和移动如(1)项所述，或移动到主管机关或代表主管机关的缔约国政府认为必要的较大角度；如谷物表面加以堆装，将散装谷物整平并以袋装谷物压顶或以其它适当货物紧密堆装，则堆装高度在出纵向舱壁或止移板分隔的

处所应超出散装谷物顶部不少于1.22米的距离；在并非此种分隔处所、而袋装谷物或其它适当货物由铺于整个散装谷物表面之上的适当平板支垫，而此种平板系由间隔不大于1.22米的承本组成，且又有25毫米的板条以不大于0.10米的间隔横铺其上或由坚固的分隔布覆盖其上并有足够重叠时，则移动到与原平整成水平的表面成8°倾角。 在本项情况下，如设置止移板，可认为能限制谷物表面的横向移动。"

[CHINESE TEXT — TEXTE CHINOIS]

关于一九七四年国际海上人命安全公约的一九七八年议定书

1974年国际海上人命安全公约1978年议定书的修正

第II-1章规则29

操 舵 装 置

用下列文字代替第(d)(i)(1)分段的第四句：

每一操舵装置的控制系统，如果是电动的，应有其独立的供电线路，由操舵装置的电力网供电，或者由配电板上邻近于操舵装置电力网供电处的一点直接从配电板汇流排来供电。

用下列文字代替第(d)(i)(3)分段：

(3) 在操舵装置室内应备有将驾驶台操作的任何控制系统与它服务的操舵装置断开的装置；

No. 18961. INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974. CONCLUDED AT LONDON ON 1 NOVEMBER 1974[1]

AMENDMENTS to the above-mentioned Convention

The amendments were adopted on 20 November 1981 by resolution MSC.1 (XLV) of the Maritime Safety Committee of the International Maritime Organization, in accordance with article VIII (*b*) (iv) of the Convention.

They came into force on 1 September 1984 for all Parties to the Convention, i.e., six months after the date on which they were deemed to have been accepted (1 March 1984, as determined by the Maritime Safety Committee), no objection having been notified to the Secretary-General of the International Maritime Organization by any Contracting Government prior to that date, in accordance with article VIII of the said Convention.

AMENDMENTS TO THE INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974

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[1] United Nations, *Treaty Series*, vol. 1184, p. 2, and annex A in volumes 1198, 1208, 1226, 1266, 1286, 1300, 1323, 1331 and 1355.

Chapter III. Life-saving appliances, etc.

Amendment to Regulation 1. Application
Amendment to Regulation 27. Lifeboats, liferafts and buoyant apparatus
Amendment to Regulation 30. Lighting for deck, lifeboats, liferafts, etc.
Amendment to Regulation 38. Emergency lighting

Chapter IV. Radiotelegraphy and radiotelephony

Addition of new Regulation 4-1. VHF radiotelephone installation
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Replacement of Regulation 12. Shipborne navigational equipment
Amendment to Regulation 16. Life-saving signals
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Addition of new Regulation 19-2. Steering gear-testing and drills

Chapter VI. Carriage of grain

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Amendments to Part B. Calculation of assumed heeling moments, section V(A) and (B).

CHAPTER II-1. CONSTRUCTION – SUBDIVISION AND STABILITY, MACHINERY AND ELECTRICAL INSTALLATIONS

The existing text of chapter II-1 is replaced by the following:

PART A. GENERAL

Regulation 1. APPLICATION

1.1. Unless expressly provided otherwise, this chapter shall apply to ships the keels of which are laid or which are at a similar stage of construction on or after 1 September 1984.

1.2. For the purpose of this Chapter, the term "a similar stage of construction" means the stage at which:

1. Construction identifiable with a specific ship begins; and
2. Assembly of that ship has commenced comprising at least 50 tonnes or one per cent of the estimated mass of all structural material, whichever is less.

1.3. For the purpose of this Chapter:

1. The expression "ships constructed" means "ships the keels of which are laid or which are at a similar stage of construction";

2. The expression "all ships" means "ships constructed before, on or after 1 September 1984";

3. A cargo ship, whenever built, which is converted to a passenger ship shall be treated as a passenger ship constructed on the date on which such a conversion commences.

[1] The words or absence of words between brackets reflect the corrections effected in the original of the English authentic text of the Amendments, as witnessed by two procès-verbaux of rectification drawn up by the Secretary-General of the International Maritime Organization on 16 April 1985 and 11 December 1985. The rectifications have been registered with the Secretariat of the United Nations on 10 July 1985 and on 21 February 1986, as indicated in volumes 1402 and 1419 respectively, and published in this volume for the reader's convenience.

2. Unless expressly provided otherwise:

1. For ships constructed before 1 September 1984, the Administration shall ensure that subject to the provisions of paragraph 2.2 the requirements which are applicable under chapter II-1 of the International Convention for the Safety of Life at Sea, 1974* [1] to new or existing ships as defined in that chapter are complied with;
2. For tankers constructed before 1 September 1984, the Administration shall ensure that the requirements which are applicable [under] chapter II-1 of the annex to the Protocol of 1978[2] relating to the International Convention for the Safety of Life at Sea, 1974, as amended in 1981[3] to new or existing ships as defined in that chapter are complied with.

3. All ships which undergo repairs, alterations, modifications and outfitting related thereto shall continue to comply with at least the requirements peviously applicable to these ships. Such ships if constructed before 1 September 1984 shall, as a rule, comply with the requirements for ships constructed on or after that date to at least the same extent as they did before undergoing such repairs, alterations, modifications or outfitting. Repairs, alterations and modifications of a major character and outfitting related thereto shall meet the requirements for ships constructed on or after 1 September 1984 in so far as the Administration deems reasonable and practicable.

4. The Administration of a State may, if it considers that the sheltered nature and conditions of the voyage are such as to render the application of any specific requirements of this chapter unreasonable or unnecessary, exempt from those requirements individual ships or classes of ships entitled to fly the flag of that State which, in the course of their voyage, do not proceed more than 20 miles from the nearest land.

5. Any passenger ship which is permitted under regulation III/27(*c*) to carry a number of persons in excess of the lifeboat capacity provided, shall comply with the special standards of subdivision set out in regulation 6.5, and the associated special provisions regarding permeability in Regulation 5.4, unless the Administration is satisfied that, having regard to the nature and conditions of the voyage, compliance with the other provisions of the Regulations of this chapter and chapter II-2 is sufficient.

6. In the case of passenger ships which are employed in special trades for the carriage of large numbers of special trade passengers, such as the pilgrim trade, the Administration of the State whose flag such ships are entitled to fly, if satisfied that it is impracticable to enforce compliance with the requirements of this Chapter, may exempt such ships from those requirements, provided that they comply fully with the provisions of:

1. The Rules annexed to the Special Trade Passenger Ships Agreement, 1971;[4] and
2. The Rules annexed to the Protocol of Space Requirements for Special Trade Passenger Ships, 1973.[5]

Regulation 2. DEFINITIONS

For the purpose of this chapter, unless expressly provided otherwise:

1.1. "Subdivision load line" is a water-line used in determining the subdivision of the ship.

1.2. "Deepest subdivision load line" is the water-line which corresponds to the greatest draught permitted by the subdivision requirements which are applicable.

2. "Length of the ship" is the length measured between perpendiculars taken at the extremities of the deepest subdivision load line.

* The text as adopted by the International Conference on Safety of Life at Sea, 1974.

[1] United Nations, *Treaty Series*, vol. 1184, p. 2.
[2] *Ibid.*, vol. 1226, p. 237.
[3] See p. 329 of this volume.
[4] United Nations, *Treaty Series*, vol. 910, p. 61.
[5] *Ibid.*, vol. 1046, p. 317.

3. "Breadth of the ship" is the extreme width from outside of frame to outside of frame at or below the deepest subdivision load line.

4. "Draught" is the vertical distance from the moulded base line amidships to the subdivision load line in question.

5. "Bulkhead deck" is the uppermost deck up to which the transverse watertight bulkheads are carried.

6. "Margin line" is a line drawn at least 76 mm below the upper surface of the bulkhead deck at side.

7. "Permeability of a space" is the percentage of that space which can be occupied by water. The volume of a space which extends above the margin line shall be measured only to the height of that line.

8. "Machinery space" is to be taken as extending from the moulded base line to the margin line and between the extreme main transverse watertight bulkheads, bounding the spaces containing the main and auxiliary propulsion machinery, boilers serving the needs of propulsion, and all permanent coal bunkers. In the case of unusual arrangements, the Administration may define the limits of the machinery spaces.

9. "Passenger spaces" are those spaces which are provided for the accommodation and use of passengers, excluding baggage, store, provision and mail rooms. For the purposes of regulations 5 and 6, spaces provided below the margin line for the accommodation and use of the crew shall be regarded as passenger spaces.

10. In all cases volumes and areas shall be calculated to moulded lines.

11. "Weathertight" means that in any sea conditions water will not penetrate into the ship.

Regulation 3. DEFINITIONS RELATING TO PARTS C, D AND E

For the purpose of parts C, D and E, unless expressly provided otherwise:

1. "Steering gear control system" is the equipment by which orders are transmitted from the navigating bridge to the steering gear power units. Steering gear control systems comprise transmitters, receivers, hydraulic control pumps and their associated motors, motor controllers, piping and cables.

2. "Main steering gear" is the machinery, rudder actuators, steering gear power units, if any, and ancillary equipment and the means of applying torque to the rudder stock (e.g., tiller or quadrant) necessary for effecting movement of the rudder for the purpose of steering the ship under normal service conditions.

3. "Steering gear power unit" is:

1. In the case of electric steering gear, an electric motor and its associated electrical equipment;
2. In the case of electrohydraulic steering gear, an electric motor and its associated electrical equipment and connected pump;
3. In the case of other hydraulic steering gear, a driving engine and connected pump.

4. "Auxiliary steering gear" is the equipment other than any part of the main steering gear necessary to steer the ship in the event of failure of the main steering gear but not including the tiller, quadrant or components serving the same purpose.

5. "Normal operational and habitable condition" is a condition under which the ship as a whole, the machinery, services, means and aids ensuring propulsion, ability to steer, safe navigation, fire and flooding safety, internal and external communications and signals, means of escape, and emergency boat winches, as well as the designed comfortable conditions of habitability are in working order and functioning normally.

6. "Emergency condition" is a condition under which any services needed for normal operational and habitable conditions are not in working order due to failure of the main source of electrical power.

7. "Main source of electrical power" is a source intended to supply electrical power to the main switchboard for distribution to all services necessary for maintaining the ship in normal operational and habitable conditions.

8. "Dead ship condition" is the condition under which the main propulsion plant, boilers and auxiliarics are not in operation due to the absence of power.

9. "Main generating station" is the space in which the main source of electrical power is situated.

10. "Main switchboard" is a switchboard which is directly supplied by the main source of electrical power and is intended to distribute electrical energy to the ship's services.

11. "Emergency switchboard" is a switchboard which in the event of failure of the main electrical power supply system is directly supplied by the emergency source of electrical power or the transitional source of emergency power and is intended to distribute electrical energy to the emergency services.

12. "Emergency source of electrical power" is a source of electrical power, intended to supply the emergency switchboard in the event of failure of the supply from the main source of electrical power.

13. "Power actuating system" is the hydraulic equipment provided for supplying power to turn the rudder stock, comprising a steering gear power unit or units, together with the associated pipes and fittings, and a rudder actuator. The power actuating systems may share common mechanical components, i.e., tiller, quadrant and rudder stock, or components serving the same purpose.

14. "Maximum ahead service speed" is the greatest specd which the ship is designed to maintain in service at sea at the deepest sea-going draught.

15. "Maximum astern speed" is the speed which it is estimated the ship can attain at the designed maximum astern power at the deepest sea-going draught.

16. "Machinery spaces" are all machinery spaces of category A and all other spaces containing propelling machinery, boilers, oil fuel units, steam and internal combustion engines, generators and major electrical machinery, oil filling stations, refrigerating, stabilizing, ventilation and air conditioning machinery, and similar spaces, and trunks to such spaces.

17. "Machinery spaces of category A" are those spaces and trunks to such spaces which contain:

1. Internal combustion machinery used for main propulsion; or
2. Internal combustion machinery used for purposes other than main propulsion where such machinery has in the aggregate a total power output of not less than 375 kW; or
3. Any oil-fired boiler or oil fuel unit.

18. "Control stations" are those spaces in which the ship's radio or main navigating equipment or the emergency source of power is located or where the fire recording or [fire] control equipment is centralized.

19. "Chemical tanker" is a cargo ship constructed or adapted and used for the carriage in bulk of any liquid product listed in the summary of minimum requirements of the Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk to be adopted by the Maritime Safety Committee under the authority of the Assembly of the Organization conferred by resolution A.490(XII)[1] hereinafter referred to as "Bulk Chemical Code", as may be amended by the Organization, or any liquid substance listed or provisionally assessed as

[1] International Maritime Organization, *Resolutions and Other Decisions, Assembly, Twelfth Session*, 9-20 November 1981, p. 210.

category A, B or C in appendix II to annex II of the International Convention for the Prevention of Pollution from Ships[1] in force.

20. "Gas carrier" is a cargo ship constructed or adapted and used for the carriage in bulk of any liquefied gas or other substance listed in chapter XIX of the Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk adopted by the Assembly of the Organization by resolution A.328(IX)[2], hereinafter referred to as "Gas Carrier Code" as has been or may be amended by the Organization.

21. "Deadweight" is the difference in tonnes between the displacement of a ship in water of a specific gravity of 1.025 at the load water-line corresponding to the assigned summer freeboard and the lightweight of the ship.

22. "Lightweight" is the displacement of a ship in tonnes without cargo, fuel, lubricating oil, ballast water, fresh water and feedwater in tanks, consumable stores, and passengers and crew and their effects.

PART B. SUBDIVISION AND STABILITY*

(Part B applies to passenger ships and to cargo ships, as indicated in the regulations)

Regulation 4. FLOODABLE LENGTH IN PASSENGER SHIPS

1. The floodable length at any point of the length of a ship shall be determined by a method of calculation which takes into consideration the form, draught [and] other characteristics of the ship in question.

2. In a ship with a continuous bulkhead deck, the floodable length at a given point is the maximum portion of the length of the ship, having its centre at the point in question, which can be flooded under the definite assumptions set forth in regulation 5 without the ship being submerged beyond the margin line.

3.1. In the case of a ship not having a continuous bulkhead deck, the floodable length at any point may be determined to an assumed continuous margin line which at no point is less than 76 mm below the top of the deck (at side) to which the bulkheads concerned and the shell are carried watertight.

3.2. Where a portion of an assumed margin line is appreciably below the deck to which bulkheads are carried, the Administration may permit a limited relaxation in the watertightness of those portions of the bulkheads which are above the margin line and immediately under the higher deck.

Regulation 5. PERMEABILITY IN PASSENGER SHIPS

1.1. The definite assumptions referred to in regulation 4 relate to the permeabilities of the spaces below the margin line.

1.2. In determining the floodable length, a uniform average permeability shall be used throughout the whole length of each of the following portions of the ship below the margin line:

1. The machinery space as defined in regulation 2;
2. The portion forward of the machinery space; and
3. The portion abaft the machinery space.

* Instead of the requirements in this part, the Regulations on Subdivision and Stability of Passenger Ships as an Equivalent to part B of chapter II of the International Convention for the Safety of Life at Sea, 1960[1], adopted by the Organization by resolution A.265(VIII)[2], may be used, if applied in their entirety.

[1] United Nations, *Treaty Series*, vol. 536, p. 27.

[2] Inter-Governmental Maritime Consultative Organization, *Resolutions and Other Decisions, Assembly, Eighth Session*, 13-23 November 1973, p. 35.

[1] United Nations, *Treaty Series*, vol. 1340, No. I-22484.

[2] Inter-Governmental Maritime Consultative Organization, *Resolutions and Other Decisions, Assembly, Ninth Session*, 3-14 November 1975, p. 90.

2.1. The uniform average permeability throughout the machinery space shall be determined from the formula:

$$85 + 10\left(\frac{a - c}{v}\right)$$

where:

a = the volume of the passenger spaces, as defined in regulation 2, which are situated below the margin line within the limits of the machinery space;

c = the volume of between deck spaces below the margin line within the limits of the machinery space which are appropriated to cargo, coal or stores;

v = the whole volume of the machinery space below the margin line.

2.2. Where it is shown to the satisfaction of the Administration that the average permeability as determined by detailed calculation is less than that given by the formula, the detailed calculated value may be used. For the purpose of such calculation, the permeability of passenger spaces, as defined in regulation 2, shall be taken as 95, that of all cargo, coal and store spaces as 60, and that of double bottom, oil fuel and other tanks at such value as may be approved in each case.

3. Except as provided in paragraph 4, the uniform average permeability throughout the portion of the ship forward of or abaft the machinery space shall be determined from the formula:

$$63 + 35\frac{a}{v}$$

where:

a = the volume of the passenger spaces, as defined in regulation 2, which are situated below the margin line, forward of or abaft the machinery space; and

v = the whole volume of the portion of the ship below the margin line forward of or abaft the machinery space.

4.1. In the case of a ship which is permitted under regulation III/27(*c*) to carry a number of persons on board in excess of the lifeboat capacity provided, and is required under regulation 1.5 to comply with special provisions, the uniform average permeability throughout the portion of the ship forward of or abaft the machinery space shall be determined from the formula:

$$95 - 35\frac{b}{v}$$

where:

b = the volume of the spaces below the margin line and above the tops of floors, inner bottom, or peak tanks, as the case may be, which are appropriated to and used as cargo spaces, coal or oil fuel bunkers, store-rooms, baggage and mail rooms, chain lockers and fresh water tanks, forward of or abaft the machinery space; and

v = the whole volume of the portion of the ship below the margin line forward of or abaft the machinery space.

4.2. In the case of ships engaged on services where the cargo holds are not generally occupied by any substantial quantities of cargo, no part of the cargo spaces is to be included in calculating "b".

5. In the case of unusual arrangements the Administration may allow, or require, a detailed calculation of average permeability for the portions forward of or abaft the machinery space. For the purpose of such calculation, the permeability of passenger spaces as defined in regulation 2 shall be taken as 95, that of spaces containing machinery as 85, that of all cargo,

coal and store spaces as 60, and that of double bottom, oil fuel and other tanks at such value as may be approved in each case.

6. Where a between deck compartment between two watertight transverse bulkheads contains any passenger or crew space, the whole of that compartment, less any space completely enclosed within permanent steel bulkheads and appropriated to other purposes, shall be regarded as passenger space. Where, however, the passenger or crew space in question is completely enclosed within permanent steel bulkheads, only the space so enclosed need be considered as passenger space.

Regulation 6. PERMISSIBLE LENGTH OF COMPARTMENTS IN PASSENGER SHIPS

1. Ships shall be as efficiently subdivided as is possible having regard to the nature of the service for which they are intended. The degree of subdivision shall vary with the length of the ship and with the service, in such manner that the highest degree of subdivision corresponds with the ships of greatest length, primarily engaged in the carriage of passengers.

2. *Factor of subdivision*

2.1. The maximum permissible length of a compartment having its centre at any point in the ship's length is obtained from the floodable length by multiplying the latter by an appropriate factor called the factor of subdivision.

2.2. The factor of subdivision shall depend on the length of the ship, and for a given length shall vary according to the nature of the [service] for which the ship is intended. It shall decrease in a regular and continuous manner:

1. As the length of the ship increases, and
2. From a factor A, applicable to ships primarily engaged in the carriage of cargo, to a factor B, applicable to ships primarily engaged in the carriage of passengers.

2.3. The variations of the factors A and B shall be expressed by the following formulae (1) and (2) where L is the length of the ship as defined in regulation 2:

$$A = \frac{58.2}{L - 60} + .18 \text{ (L = 131 m and upwards)} \quad \ldots\ldots (1)$$

$$B = \frac{30.3}{L - 42} + .18 \text{ (L = 79 m and upwards)} \quad \ldots\ldots (2)$$

3. *Criterion of service*

3.1. For a ship of given length the appropriate factor of subdivision shall be determined by the criterion of service numeral (hereinafter called the criterion numeral) as given by the following formulae (3) and (4) where:

C_s = the criterion numeral;

L = the length of the ship (metres), as defined in regulation 2;

M = the volume of the machinery space (cubic metres), as defined in regulation 2; with the addition thereto of the volume of any permanent oil fuel bunkers which may be situated above the inner bottom and forward or abaft the machinery space;

P = the whole volume of the passenger spaces below the margin line (cubic metres), as defined in regulation 2;

V = the whole volume of the ship below the margin line (cubic metres);

P_1 = KN where:

N = the number of passengers for which the ship is to be certified, and

K = 0.056L

3.2. Where the value of KN is greater than the sum of P and the whole volume of the actual passenger spaces above the margin line, the figure to be taken as P_1 is that sum or two-thirds KN, whichever is the greater.

When P_1 is greater than P:

$$C_s = 72 \frac{M + 2P_1}{V + P_1 - P} \quad \ldots\ldots (3)$$

and in other cases:

$$C_s = 72 \frac{M + 2P}{V} \quad \ldots\ldots (4)$$

3.3. For ships not having a continuous bulkhead deck the volumes are to be taken up to the actual margin lines used in determining the floodable lengths.

4. *Rules for subdivision of ships other than those covered by paragraph 5*

4.1. The subdivision abaft the forepeak of ships of 131 m in length and upwards having a criterion numeral of 23 or less shall be governed by the factor A given by formula (1); of those having a criterion numeral of 123 or more by the factor B given by formula (2); and of those having a criterion numeral between 23 and 123 by the factor F obtained by linear interpolation between the factors A and B, using the formula:

$$F = A - \frac{(A - B)(C_s - 23)}{100} \quad \ldots\ldots (5)$$

Nevertheless, where the criterion numeral is equal to 45 or more and simultaneously the computed factor of subdivision as given by formula (5) is .65 or less, but more than .50, the subdivision abaft the forepeak shall be governed by the factor .50.

4.2. Where the factor F is less than .40 and it is shown to the satisfaction of the Administration to be impracticable to comply with the factor F in a machinery compartment of the ship, the subdivision of such compartment may be governed by an increased factor, which, however, shall not exceed .40.

4.3. The subdivision abaft the forepeak of ships of less than 131 m but not less than 79 m in length having a criterion numeral equal to S, where:

$$S = \frac{3{,}574 - 25L}{13}$$

shall be governed by the factor unity; of those having a criterion numeral of 123 or more by the factor B given by the formula (2); of those having a criterion numeral between S and 123 by the factor F obtained by linear interpolation between unity and the factor B using the formula:

$$F = 1 - \frac{(1 - B)(C_s - S)}{123 - S} \quad \ldots\ldots (6)$$

4.4. The subdivision abaft the forepeak of ships of less than 131 m but not less than 79 m in length and having a criterion numeral less than S, and of ships of less than 79 m in length shall be governed by the factor unity, unless, in either case, it is shown to the satisfaction of the Administration to be impracticable to comply with this factor in any part of the ship, in which case the Administration may allow such relaxation as may appear to be justified, having regard to all the circumstances.

4.5. The provisions of paragraph 4.4 shall apply also to ships of whatever length, which are to be certified to carry a number of passengers exceeding 12 but not exceeding:

$\frac{L_2}{650}$, or 50, whichever is the less.

5. *Special standards of subdivision for ships which are permitted under regulation III/27*(c) *to carry a number of persons on board in excess of the lifeboat capacity provided and are required under regulation I.5 to comply with special provisions*

5.1.1. In the case of ships primarily engaged in the carriage of passengers, the subdivision abaft the forepeak shall be governed by a factor of .50 or by the factor determined according to paragraphs 3 and 4, if less than .50.

5.1.2. In the case of such ships of less than 91.5 m in length, if the Administration is satisfied that compliance with such factor would be impracticable in a compartment, it may allow the length of that compartment to be governed by a higher factor provided the factor used is the lowest that is practicable and reasonable in the circumstances.

5.2. Where, in the case of any ship whether of less than 91.5 m or not, the necessity of carrying appreciable quantities of cargo makes it impracticable to require the subdivision abaft the forepeak to be governed by a factor not exceeding .50, the standard of subdivision to be applied shall be determined in accordance with the following sub-paragraphs 1 to 5, subject to the condition that where the Administration is satisfied that insistence on strict compliance in any respect would be unreasonable, it may allow such alternative arrangement of the watertight bulkheads as appears to be justified on merits and will not diminish the general effectiveness of the subdivision.

1. The provisions of paragraph 3 relating to the criterion numeral shall apply with the exception that in calculating the value of P_1 for berthed passengers K is to have the value defined in paragraph 3, or 3.5 m^3, whichever is the greater, and for unberthed passengers K is to have the value 3.5 m^3.

2. The factor B in paragraph 2 shall be replaced by the factor BB determined by the following formula:

$$BB = \frac{17.6}{L - 33} + .20 \text{ (L = 55 and upwards)}$$

3. The subdivision abaft the forepeak of ships of 131 m in length and upwards having a criterion numeral of 23 or less shall be governed by the factor A given by formula (1) in paragraph 2.3; of those having a criterion numeral of 123 or more by the factor BB given by the formula in paragraph 5.2.2; and of those having a criterion numeral between 23 and 123 by the factor F obtained by linear interpolation between the factors A and BB, using the formula:

$$F = A - \frac{(A - BB)(C_s - 23)}{100}$$

except that if the factor F so obtained is less than .50 the factor to be used shall be either .50 or the factor calculated according to the provisions of paragraph 4.1, whichever is the smaller.

4. The subdivision abaft the forepeak of ships of less than 131 m but not less than 55 m in length having a criterion numeral equal to S_1 where:

$$S_1 = \frac{3{,}712 - 25L}{19}$$

shall be governed by the factor unity; of those having a criterion numeral of 123 or more by the factor BB given by the formula in paragraph 5.2.2; of those having a criterion numeral between S_1 and 123 by the factor F obtained by linear interpolation between unity and the factor BB using the formula:

$$F = 1 - \frac{(1 - BB)(C_s - S_1)}{123 - S_1}$$

except that in either of the two latter cases if the factor so obtained is less than .50 the subdivision may be governed by a factor not exceeding .50.

5. The subdivision abaft the forepeak of ships of less than 131 m but not less than 55 m in length and having a criterion numeral less than S_1 and of ships of less than 55 m in length shall be governed by the factor unity, unless it is shown to the satisfaction of the Administration to be impracticable to comply with this factor in particular compartments, in which event the Administration may allow such relaxations in respect of those compartments as appear to be justified, having regard to all the circumstances, provided that the aftermost compartment and as many as possible of the forward compartments (between the forepeak and the after end of the machinery space) shall be kept within the floodable length.

Regulation 7. SPECIAL REQUIREMENTS CONCERNING PASSENGER SHIP SUBDIVISION

1. Where in a portion or portions of a ship the watertight bulkheads are carried to a higher deck than in the remainder of the ship and it is desired to take advantage of this higher extension of the bulkheads in calculating the floodable length, separate margin lines may be used for each such portion of the ship provided that:

1. The sides of the ship are extended throughout the ship's length to the deck corresponding to the upper margin line and all openings in the shell plating below this deck throughout the length of the ship are treated as being below a margin line, for the purposes of regulation 17; and
2. The two compartments adjacent to the "step" in the bulkhead deck are each within the permissible length corresponding to their respective margin lines, and, in addition, their combined length does not exceed twice the permissible length based on the lower margin line.

2.1. A compartment may exceed the permissible length determined by the rules of regulation 6 provided the combined length of each pair of adjacent compartments to which the compartment in question is common does not exceed either the floodable length or twice the permissible length, whichever is the less.

2.2. If one of the two adjacent compartments is situated inside the machinery space, and the second is situated outside the machinery space, and the average permeability of the portion of the ship in which the second is situated differs from that of the machinery space, the combined length of the two compartments shall be adjusted to the mean average permeability of the two portions of the ship in which the compartments are situated.

2.3. Where the two adjacent compartments have different factors of subdivision, the combined length of the two compartments shall be determined proportionately.

3. In ships of 100 m in length and upwards, one of the main transverse bulkheads abaft the forepeak shall be fitted at a distance from the forward perpendicular which is not greater than the permissible length.

4. A main transverse bulkhead may be recessed provided that all parts of the recess lie inboard of vertical surfaces on both sides of the ship, situated at a distance from the shell plating equal to one-fifth the breadth of the ship, as defined in regulation 2, and measured at right angles to the centre line at the level of the deepest subdivision load line. Any part of a recess which lies outside these limits shall be dealt with as a step in accordance with paragraph 5.

5. A main transverse bulkhead may be stepped provided that it meets one of the following conditions:

1. The combined length of the two compartments, separated by the bulkhead in question, does not exceed either 90 per cent of the floodable length or twice the permissible length, except that, in ships having a factor of subdivision greater than .9, the combined length of the two compartments in question shall not exceed the permissible length;
2. Additional subdivision is provided in way of the step to maintain the same measure of safety as that secured by a plane bulkhead;
3. The compartment over which the step extends does not exceed the permissible length corresponding to a margin line taken 76 mm below the step.

6. Where a main transverse bulkhead is recessed or stepped, an equivalent plane bulkhead shall be used in determining the subdivision.

7. If the distance between two adjacent main transverse bulkheads, or their equivalent plane bulkheads, or the distance between the transverse planes passing through the nearest stepped portions of the bulkheads, is less than 3.0 m plus 3 per cent of the length of the ship, or 11.0 m whichever is the less, only one of these bulkheads shall be regarded as forming part of the subdivision of the ship in accordance with the provisions of regulation 6.

8. Where a main transverse watertight compartment contains local subdivision and it can be shown to the satisfaction of the Administration that, after any assumed side damage extending over a length of 3.0 m plus 3 per cent of the length of the ship, or 11.0 m whichever is the less, the whole volume of the main compartment will not be flooded, a proportionate allowance may be made in the permissible length otherwise required for such compartment. In such a case the volume of effective buoyancy assumed on the undamaged side shall not be greater than that assumed on the damaged side.

9. Where the required factor of subdivision is .50 or less, the combined length of any two adjacent compartments shall not exceed the floodable length.

Regulation 8. STABILITY OF PASSENGER SHIPS IN DAMAGED CONDITION

1.1. Sufficient intact stability shall be provided in all service conditions so as to enable the ship to withstand the final stage of flooding of any one main compartment which is required to be within the floodable length.

1.2. Where two adjacent main compartments are separated by a bulkhead which is stepped under the conditions of regulation 7.5.1 the intact stability shall be adequate to withstand the flooding of those two adjacent main compartments.

1.3. Where the required factor of subdivision is .50 or less but more than .33 intact stability shall be adequate to withstand the flooding of any two adjacent main compartments.

1.4. Where the required factor of subdivision is .33 or less the intact stability shall be adequate to withstand the flooding of any three adjacent main compartments.

2.1. The requirements of paragraph 1 shall be determined by calculations which are in accordance with paragraphs 3, 4 and 6 and which take into consideration the proportions and design characteristics of the ship and the arrangement and configuration of the damaged compartments. In making these calculations the ship is to be assumed in the worst anticipated service condition as regards stability.

2.2. Where it is proposed to fit decks, inner skins or longitudinal bulkheads of sufficient tightness to seriously restrict the flow of water the Administration shall be satisfied that proper consideration is given to such restrictions in the calculations.

2.3. In cases where the Administration considers the range of stability in the damaged condition to be doubtful, it may require investigation thereof.

3. For the purpose of making damage stability calculations the volume and surface permeabilities shall be in general as follows:

Spaces	*Permeability*
Appropriated to cargo, coal or stores	60
Occupied by accommodation	95
Occupied by machinery	85
Intended for liquids	0 or 95*

*Whichever results in the more severe requirements.

Higher surface permeabilities are to be assumed in respect of spaces which, in the vicinity of the damage waterplane, contain no substantial quantity of accommodation or machinery and spaces which are not generally occupied by any substantial quantity of cargo or stores.

4. Assumed extent of damage shall be as follows:

1. Longitudinal extent: 3.0 m plus 3 per cent of the length of the ship, or 11.0 m whichever is the less. Where the required factor of subdivision is .33 or less the assumed longitudinal extent of damage shall be increased as necessary so as to include any two consecutive main transverse watertight bulkheads;
2. Transverse extent (measured inboard from the ship's side, at right angles to the centre line at the level of the deepest subdivision load line): a distance of one-fifth of the breadth of the ship, as defined in regulation 2; and
3. Vertical extent: from the base line upwards without limit;
4. If any damage of lesser extent than that indicated in paragraphs 4.1, 4.2 and 4.3 would result in a more severe eondition regarding heel or loss of metacentric height, such damage shall be assumed in the calculations.

5. Unsymmetrical flooding is to be kept to a minimum consistent with efficient arrangements. Where it is necessary to correct large angles of heel, the means adopted shall, where practicable, be self-acting, but in any case where controls to cross-flooding fittings are provided they shall be operable from above the bulkhead deck. These fittings together with their controls as well as the maximum heel before equalization shall be acceptable to the Administration. Where cross-flooding fittings are required the time for equalization shall not exceed 15 minutes. Suitable information concerning the use of cross-flooding fittings shall be supplied to the master of the ship.*

6. The final conditions of the ship after damage and, in the case of unsymmetrical flooding, after equalization measures have been taken shall be as follows:

1. In the case of symmetrical flooding there shall be a positive residual metacentric height of at least 50 mm as calculated by the constant displacement method;
2. In the case of unsymmetrical flooding the total heel shall not exceed 7°, except that, in special cases, the Administration may allow additional heel due to the unsymmetrical moment, but in no case shall the final heel exceed 15°;
3. In no case shall the margin line be submerged in the final stage of flooding. If it is considered that the margin line may become submerged during an intermediate stage of flooding, the Administration may require such investigations and arrangements as it considers necessary for the safety of the ship.

7. The master of the ship shall be supplied with the data necessary to maintain sufficient intact stability under service conditions to enable the ship to withstand the critical damage. In the case of ships requiring cross-flooding the master of the ship shall be informed of the conditions of stability on which the calculations of heel are based and be warned that excessive heeling might result should the ship sustain damage when in a less favourable condition.

8.1. No relaxation from the requirements for damage stability may be considered by the Administration unless it is shown that the intact metacentric height in any service condition necessary to meet these requirements is excessive for the service intended.

8.2. Relaxations from the requirements for damage stability shall be permitted only in exceptional cases and subject to the condition that the Administration is to be satisfied that the proportions, arrangements and other characteristics of the ship are the most favourable to stability after damage which can practically and reasonably be adopted in the particular circumstances.

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* Reference is made to the Recommendation on a Standard Method for Establishing Compliance with the Requirements for Cross-Flooding Arrangements in Passenger Ships, adopted by the Organization by resolution A.266(VIII).[1]

[1] Inter-Governmental Maritime Consultative Organization, *Resolutions and Other Decisions, Assembly, Eighth Session*, 13-23 November 1973, p. 54.

Regulation 9. BALLASTING OF PASSENGER SHIPS

1. Water ballast should not in general be carried in tanks intended for oil fuel. In ships in which it is not practicable to avoid putting water in oil fuel tanks, oily-water separating equipment to the satisfaction of the Administration shall be fitted, or other alternative means, such as discharge to shore facilities, acceptable to the Administration shall be provided for disposing of the oily-water ballast.

2. The provisions of this regulation are without prejudice to the provisions of the International Convention for the Prevention of Pollution from Ships in force.

Regulation 10. PEAK AND MACHINERY SPACE BULKHEADS, SHAFT TUNNELS, ETC. IN PASSENGER SHIPS

1. A forepeak or collision bulkhead shall be fitted which shall be watertight up to the bulkhead deck. This bulkhead shall be located at a distance from the forward perpendicular of not less than 5 per cent of the length of the ship and not more than 3 m plus 5 per cent of the length of the ship.

2. Where any part of the ship below the water-line extends forward of the forward perpendicular, e.g., a bulbous bow, the distances stipulated in paragraph 1 shall be measured from a point either:

1. At the mid-length of such extension; or
2. At a distance 1.5 per cent of the length of the ship forward of the forward perpendicular; or
3. At a distance 3 m forward of the forward perpendicular;

whichever gives the smallest measurement.

3. Where a long forward superstructure is fitted, the forepeak or collision bulkhead shall be extended weathertight to the deck next above the bulkhead deck. The extension need not be fitted directly above the bulkhead below provided it is located within the limits specified in paragraph 1 or 2 with the exemption permitted by paragraph 4 and the part of the deck which forms the step is made effectively weathertight.

4. Where bow doors are fitted and a sloping loading ramp forms part of the extension of the collision bulkhead above the bulkhead deck the part of the ramp which is more than 2.3 m above the bulkhead deck may extend forward of the limit specified in paragraphs I and 2. The ramp shall be weathertight over its complete length.

5. An afterpeak bulkhead, and bulkheads dividing the machinery space, as defined in regulation 2, from the cargo and passenger spaces forward and aft, shall also be fitted and made watertight up to the bulkhead deck. The afterpeak bulkhead may, however, be stepped below the bulkhead deck, provided the degree of safety of the ship as regards subdivision is not thereby diminished.

6. In all cases stern tubes shall be enclosed in watertight spaces of moderate volume. The stern gland shall be situated in a watertight shaft tunnel or other watertight space separate from the stern tube compartment and of such volume that, if flooded by leakage through the stern gland, the margin line will not be submerged.

Regulation 11. COLLISION BULKHEADS IN CARGO SHIPS

I. For the purpose of this regulation, "freeboard deck", "length of ship" and "forward perpendicular" have the meanings as defined in the International Convention on Load Lines in force.

2. A collision bulkhead shall be fitted which shall be watertight up to the freeboard deck. This bulkhead shall be located at a distance from the forward perpendicular of not less than 5 per cent of the length of the ship or 10 m, whichever is the less, and, except as may be permitted by the Administration, not more than 8 per cent of the length of the ship.

3. Where any part of the ship below the water-line extends forward of the forward perpendicular, e.g., a bulbous bow, the distances stipulated in paragraph 2 shall be measured from a point either:

1. At the mid-length of such extension; or
2. At a distance 1.5 per cent of the length of the ship forward of the forward perpendicular; or
3. At a distance 3 m forward of the forward perpendicular;

whichever gives the smallest measurement.

4. The bulkhead may have steps or recesses provided they are within the limits prescribed in paragraph 2 or 3. Pipes piercing the collision bulkhead shall be fitted with suitable valves operable from above the freeboard deck and the valve chest shall be secured at the bulkhead inside the forepeak. The valves may be fitted on the after side of the collision bulkhead provided that the valves are readily accessible under all service conditions and the space in which they are located is not a cargo space. All valves shall be of steel, bronze or other approved ductile material. Valves of ordinary cast iron or similar material are not acceptable. No door, manhole, ventilation duct or any other opening shall be fitted in this bulkhead.

5. Where a long forward superstructure is fitted the collision bulkhead shall be extended weathertight to the deck next above the freeboard deck. The extension need not be fitted directly above the bulkhead below provided it is located within the limits prescribed in paragraph 2 or 3 with the exemption permitted by paragraph 6 and the part of the deck which forms the step is made effectively weathertight.

6. Where bow doors are fitted and a sloping loading ramp forms part of the extension of the collision bulkhead above the freeboard deck the part of the ramp which is more than 2.3 m above the freeboard deck may extend forward of the limit specified in paragraph 2 or 3. The ramp shall be weathertight over its complete length.

7. The number of openings in the extension of the collision bulkhead above the freeboard deck shall be restricted to the minimum compatible with the design and normal operation of the ship. All such openings shall be capable of being closed weathertight.

Regulation 12. DOUBLE BOTTOMS IN PASSENGER SHIPS

1. A double bottom shall be fitted extending from the forepeak bulkhead to the afterpeak bulkhead as far as this is practicable and compatible with the design and proper working of the ship.

1. In ships of 50 m and upwards but less than 61 m in length a double bottom shall be fitted at least from the machinery space to the forepeak bulkhead, or as near thereto as practicable.
2. In ships of 61 m and upwards but less than 76 m in length a double bottom shall be fitted at least outside the machinery space, and shall extend to the fore and after peak bulkheads, or as near thereto as practicable.
3. In ships of 76 m in length and upwards, a double bottom shall be fitted amidships, and shall extend to the fore and after peak bulkheads, or as near thereto as practicable.

2. Where a double bottom is required to be fitted its depth shall be to the satisfaction of the Administration and the inner bottom shall be continued out to the ship's sides in such a manner as to protect the bottom to the turn of the bilge. Such protection will be deemed satisfactory if the line of intersection of the outer edge of the margin plate with the bilge plating is not lower at any part than a horizontal plane passing through the point of intersection with the frame line amidships of a transverse diagonal line inclined at 25° to the base line and cutting it at a point one-half the ship's moulded breadth from the middle line.

3. Small wells constructed in the double bottom in connexion with drainage arrangements of holds, etc., shall not extend downwards more than necessary. The depth of the well shall in no case be more than the depth less 460 mm of the double bottom at the centre line,

nor shall the well extend below the horizontal plane referred to in paragraph 2. A well extending to the outer bottom is, however, permitted at the after end of the shaft tunnel. Other wells (e.g., for lubricating oil under main engines) may be permitted by the Administration if satisfied that the arrangements give protection equivalent to that afforded by a double bottom complying with this regulation.

4. A double bottom need not be fitted in way of watertight compartments of moderate size used exclusively for the carriage of liquids, provided the safety of the ship, in the event of bottom or side damage, is not, in the opinion of the Administration, thereby impaired.

5. In the case of ships to which the provisions of regulation 1.5 apply and which are engaged on regular service within the limits of a short international voyage as defined in regulation III/2, the Administration may permit a double bottom to be dispensed with in any part of the ship which is subdivided by a factor not exceeding .50, if satisfied that the fitting of a double bottom in that part would not be compatible with the design and proper working of the ship.

Regulation 13. ASSIGNING, MARKING AND RECORDING OF SUBDIVISION LOAD LINES FOR PASSENGER SHIPS

1. In order that the required degree of subdivision shall be maintained, a load line corresponding to the approved subdivision draught shall be assigned and marked on the ship's sides. A ship having spaces which are specially adapted for the accommodation of passengers and the carriage of cargo alternatively may, if the owners desire, have one or more additional load lines assigned and marked to correspond with the subdivision draughts which the Administration may approve for the alternative service conditions.

2. The subdivision load lines assigned and marked shall be recorded in the Passenger Ship Safety Certificate, and shall be distinguished by the notation C.1 for the principal passenger condition, and C.2, C.3, etc. for the alternative conditions.

3. The freeboard corresponding to each of these load lines shall be measured at the same position and from the same deck line as the freeboards determined in accordance with the International Convention on Load Lines[1] in force.

4. The freeboard corresponding to each approved subdivision load line and the conditions of service for which it is approved, shall be clearly indicated on the Passenger Ship Safety Certificate.

5. In no case shall any subdivision load line mark be placed above the decpest load line in salt water as determined by the strength of the ship or the International Convention on Load Lines in force.

6. Whatever may be the position of the subdivision load line marks, a ship shall in no case be loaded so as to submerge the load line mark appropriate to the season and locality as determined in accordance with the International Convention on Load Lines in force.

7. A ship shall in no case be so loaded that when it is in salt water the subdivision load line mark appropriate to the particular voyage and condition of service is submerged.

Regulation 14. CONSTRUCTION AND INITIAL TESTING OF WATERTIGHT BULKHEADS, ETC., IN PASSENGER SHIPS AND CARGO SHIPS

1. Each watertight subdivision bulkhead, whether transverse or longitudinal, shall be constructed in such a manner that it shall be capable of supporting, with a proper margin of resistance, the pressure due to the maximum head of water which it might have to sustain in the event of damage to the ship but at least the pressure due to a head of water up to the margin line. The construction of these bulkheads shall be to the satisfaction of the Administration.

2.1. Steps and recesses in bulkheads shall be watertight and as strong as the bulkhead at the place where each occurs.

[1] United Nations, *Treaty Series*, vol. 640, p. 133.

2.2. Where frames or beams pass through a watertight desk or bulkhead, such deck or bulkhead shall be made structurally watertight without the use of wood or cement.

3. Testing main compartments by filling them with water is not compulsory. When testing by filling with water is not carried out, a hose test is compulsory; this test shall be carried out in the most advanced stage of the fitting out of the ship. In any case, a thorough inspection of the watertight bulkheads shall be carried out.

4. The forepeak, double bottoms (including duct keels) and inner skins shall be tested with water to a head corresponding to the requirements of paragraph 1.

5. Tanks which are intended to hold liquids, and which form part of the subdivision of the ship, shall be tested for tightness with water to a head up to the deepest subdivision load line or to a head corresponding to two-thirds of the depth from the top of keel to the margin line in way of the tanks, whichever is the greater; provided that in no case shall the test head be less than 0.9 m above the top of the tank.

6. The tests referred to in paragraphs 4 and 5 are for the purpose of ensuring that the subdivision structural arrangements are watertight and are not to be regarded as a test of the fitness of any compartment for the storage of oil fuel or for other special purposes for which a test of a superior character may be required depending on the height to which the liquid has access in the tank or its connexions.

Regulation 15. OPENINGS IN WATERTIGHT BULKHEADS IN PASSENGER SHIPS

1. The number of openings in watertight bulkheads shall be reduced to the minimum compatible with the design and proper working of the ship; satisfactory means shall be provided for closing these openings.

2.1. Where pipes, scuppers, electric cables, etc. are carried through watertight subdivision bulkheads, arrangements shall be made to ensure the watertight integrity of the bulkheads.

2.2. Valves not forming part of a piping system shall not be permitted in watertight subdivision bulkheads.

2.3. Lead or other heat sensitive materials shall not be used in systems which penetrate watertight subdivision bulkheads, where deterioration of such systems in the event of fire would impair the watertight integrity of the bulkheads.

3.1. No doors, manholes, or access openings are permitted:

1. In the collision bulkhead below the margin line;
2. In watertight transverse bulkheads dividing a cargo space from an adjoining cargo space or from a permanent or reserve bunker, except as provided in paragraph 12 and in regulation 16.

3.2. Except as provided in paragraph 3.3 the collision bulkhead may be pierced below the margin line by not more than one pipe for dealing with fluid in the forepeak tank, provided that the pipe is fitted with a screwdown valve capable of being operated from above the bulkhead deck, the valve chest being secured inside the forepeak to the collision bulkhead.

3.3. If the forepeak is divided to hold two different kinds of liquids the Administration may allow the collision bulkhead to be pierced below the margin line by two pipes, each of which is fitted as required by paragraph 3.2, provided the Administration is satisfied that there is no practical alternative to the fitting of such a second pipe and that, having regard to the additional subdivision provided in the forepeak, the safety of the ship is maintained.

4.1. Watertight doors fitted in bulkheads between permanent and reserve bunkers shall be always accessible, except as provided in paragraph 11.2 for between deck bunker doors.

4.2. Satisfactory arrangements shall be made by means of screens or otherwise to prevent the coal from interfering with the closing of watertight bunker doors.

5. Within spaces containing the main and auxiliary propulsion machinery including boilers serving the needs of propulsion and all permanent bunkers, not more than one door apart from the doors to bunkers and shaft tunnels may be fitted in each main transverse bulkhead. Where two or more shafts are fitted the tunnels shall be connected by an intercommunicating passage. There shall be only one door between the machinery space and the tunnel spaces where two shafts are fitted and only two doors where there are more than two shafts. All these doors shall be of the sliding type and shall be so located as to have their sills as high as practicable. The hand gear for operating these doors from above the bulkhead deck shall be situated outside the spaces containing the machinery if this is consistent with a satisfactory arrangement of the necessary gearing.

6.1. Watertight doors shall be sliding doors or hinged doors or doors of an equivalent type. Plate doors secured only by bolts and doors required to be closed by dropping or by the action of a dropping weight are not permitted.

6.2. Sliding doors may be either:

— Hand-operated only, or

— Power-operated as well as hand-operated.

6.3. Authorized watertight doors may therefore be divided into three classes:

— Class 1, hinged doors;

— Class 2, hand-operated sliding doors;

— Class 3, sliding doors which are power-operated as well as hand-operated.

6.4. The means of operation of any watertight door whether power-operated or not shall be capable of closing the door with the ship listed to 15° either way.

6.5. In all classes of watertight doors indicators shall be fitted which show, at all operating stations from which the doors are not visible, whether the doors are open or closed. If any of the watertight doors, of whatever class, is not fitted so as to enable it to be closed from a central control station, it shall be provided with a mechanical, electrical, telephonic, or any other suitable direct means of communication, enabling the officer of the watch promptly to contact the person who is responsible for closing the door in question, under previous orders.

7. Hinged doors (class 1) shall be fitted with quick action closing devices, such as catches, workable from each side of the bulkhead.

8. Hand-operated sliding doors (class 2) may have a horizontal or vertical motion. It shall be possible to operate the mechanism at the door itself from either side, and in addition, from an accessible position above the bulkhead deck, with an all round crank motion, or some other movement providing the same guarantee of safety and of an approved type. Departures from the requirement of operation on both sides may be allowed, if this requirement is impossible owing to the layout of the spaces. When operating a hand gear the time necessary for the complete closure of the door with the vessel upright, shall not exceed 90 seconds.

9.1. Power-operated sliding doors (class 3) may have a vertical or horizontal motion. If a door is required to be power-operated from a central control, the gearing shall be so arranged that the door can be operated by power also at the door itself from both sides. The arrangement shall be such that the door will close automatically if opened by local control after being closed from the central control, and also such that any door can be kept closed by local systems which will prevent the door from being opened from the upper control. Local control handles in connexion with the power gear shall be provided each side of the bulkhead and shall be so arranged as to enable persons passing through the doorway to hold both handles in the open position without being able to set the closing mechanism in operation accidentally. Power-operated sliding doors shall be provided with hand gear workable at the door itself on either side and from an accessible position above the bulkhead deck, with an all round crank motion or some other movement providing the same guarantee of safety and of an approved type. Provision shall be made to give warnings by sound signal that the door has begun to close and will con-

tinue to move until it is completely closed. The door shall take a sufficient time to close to ensure safety.

9.2. There shall be at least two independent power sources capable of opening and closing all the doors under control, each of them capable of operating all the doors simultaneously. The two power sources shall be controlled from the central station on the navigating bridge provided with all the necessary indicators for checking that each of the two power sources is capable of giving the required service satisfactorily.

9.3. In the case of hydraulic operation, each power source shall consist of a pump capable of closing all doors in not more than 60 seconds. In addition, there shall be for the whole installation hydraulic accumulators of sufficient capacity to operate all the doors at least three times, i.e., closed-open-closed. The fluid used shall be one which does not freeze at any of the temperatures liable to be encountered by the ship during its service.

10.1. Hinged watertight doors (class I) in passenger, crew and working spaces are only permitted above a deck the underside of which, at its lowest point at side, is at least 2.0 m above the deepest subdivision load line.

10.2. Watertight doors, the sills of which are above the deepest load line and below the line specified in paragraph 10.1 shall be sliding doors and may be hand-operated (class 2), except in vessels engaged on short international voyages and required to have a factor of subdivision of .50 or less in which all such doors shall be power-operated. When trunkways in connexion with refrigerated cargo and ventilation or forced draught ducts are carried through more than one main watertight subdivision bulkhead, the doors at such openings shall be operated by power.

11.1. Watertight doors which may sometimes be opened at sea, and the sills of which are below the deepest subdivision load line shall be sliding doors. The following rules shall apply:

1. When the number of such doors (excluding doors at entrances to shaft tunnels) exceeds five, all of these doors and those at the entrance to shaft tunnels or ventilation or forced draught ducts, shall be power-operated (class 3) and shall be capable of being simultaneously closed from a central station situated on the navigating bridge;
2. When the number of such doors (excluding doors at entrances to shaft tunnels) is greater than one, but does not exceed five,
   2.1. Where the ship has no passenger spaces below the bulkhead deck, all the above-mentioned doors may be hand-operated (class 2);
   2.2. Where the ship has passenger spaces below the bulkhead deck all the above-mentioned doors shall be power-operated (class 3) and shall be capable of being simultaneously closed from a central station situated on the navigating bridge;
3. In any ship where there are only two such watertight doors and they are situated in the machinery space or in the bulkheads bounding such space, the Administration may allow these two doors to be hand-operated only (class 2).

11.2. If sliding watertight doors which have sometimes to be open at sea for the purpose of trimming coal are fitted between bunkers in the between decks below the bulkhead deck, these doors shall be operated by power. The opening and closing of these doors shall be recorded in such log book as may be prescribed by the Administration.

12.1. If the Administration is satisfied that such doors are essential, watertight doors of satisfactory construction may be fitted in watertight bulkheads dividing cargo between deck spaces. Such doors may be hinged, rolling or sliding doors but shall not be remotely controlled. They shall be fitted at the highest level and as far from the shell plating as practicable, but in no case shall the outboard vertical edges be situated at a distance from the shell plating which is less than one-fifth of the breadth of the ship, as defined in regulation 2, such distance being measured at right angles to the centre line of the ship at the level of the deepest subdivision load line.

12.2. Such doors shall be closed before the voyage commences and shall be kept closed during navigation: the time of opening such doors in port and of closing them before the ship leaves port shall be entered in the log book. Should any of the doors be accessible during the voyage, they shall be fitted with a device which prevents unauthorized opening. When it is proposed to fit such doors, the number and arrangements shall receive the special consideration of the Administration.

13. Portable plates on bulkheads shall not be permitted except in machinery spaces. Such plates shall always be in place before the ship leaves port, and shall not be removed during navigation except in case of urgent necessity. The necessary precautions shall be taken in replacing them to ensure that the joints shall be watertight.

14. All watertight doors shall be kept closed during navigation except when necessarily opened for the working of the ship, in which case they shall always be ready to be immediately closed.

15.1. Where trunkways or tunnels for access from crew accommodation to the stokehold, for piping, or for any other purpose are carried through main transverse watertight bulkheads, they shall be watertight and in accordance with the requirements of regulation 19. The access to at least one end of each such tunnel or trunkway, if used as a passage at sea, shall be through a trunk extending watertight to a height sufficient to permit access above the marginline. The access to the other end of the trunkway or tunnel may be through a watertight door of the type required by its location in the ship. Such trunkways or tunnels shall not extend through the first subdivision bulkhead abaft the collision bulkhead.

15.2. Where it is proposed to fit tunnels or trunkways for forced draught, piercing main transverse watertight bulkheads, these shall receive the special consideration of the Administration.

Regulation 16. PASSENGER SHIPS CARRYING GOODS VEHICLES AND ACCOMPANYING PERSONNEL

1. This Regulation applies to passenger ships regardless of the date of construction designed or adapted for the carriage of goods vehicle accompanying personnel where the total number of persons on board, other than those specified in regulation I/2(*e*)(i) and (ii), exceeds 12.

2. If in such a ship the total number of passengers which include personnel accompanying vehicles does not exceed $N = 12 + A/25$, where A = total deck area (square metres) of spaces available for the stowage of goods vehicles and where the clear height at the storage position and at the entrance to such spaces is not less than 4 m, the provisions of regulation 15.12 in respect of watertight doors apply except that the doors may be fitted at any level in watertight bulkheads dividing cargo spaces. Additionally, indicators are required on the navigating bridge to show automatically when each door is closed and all door fastenings are secured.

3. When applying the provisions of this Chapter to such a ship, N shall be taken as the maximum number of passengers for which the ship may be certified in accordance with this regulation.

4. In applying regulation 8 for the worst operating conditions, the permeability for cargo spaces intended for the stowage of goods vehicles and containers shall be derived by calculation in which the goods vehicles and containers shall be assumed to be non-watertight and their permeability taken as 65. For ships engaged in dedicated services the actual value of permeability for goods vehicles or containers may be applied. In no case shall the permeability of the cargo spaces in which the goods vehicles and containers are carried be taken as less than 60.

Regulation 17. OPENINGS IN THE SHELL PLATING OF PASSENGER SHIPS BELOW THE MARGIN LINE

1. The number of openings in the shell plating shall be reduced to the minimum compatible with the design and proper working of the ship.

2. The arrangement and efficiency of the means for closing any opening in the shell plating shall be consistent with its intended purpose and the position in which it is fitted and generally to the satisfaction of the Administration.

3.1. Subject to the requirements of the International Convention on Load Lines in force, no sidescuttle shall be fitted in such a position that its sill is below a line drawn parallel to the bulkhead deck at side and having its lowest point 2.5 per cent of the breadth of the ship above the deepest subdivision load line, or 500 mm, whichever is the greater.

3.2. All sidescuttles the sills of which are below the margin line, as permitted by paragraph 3.1 shall be of such construction as will effectively prevent any person opening them without the consent of the master of the ship.

3.1.1. Where in a between decks, the sills of any of the sidescuttles referred to in paragraph 3.2 are below a line drawn parallel to the bulkhead deck at side and having its lowest point 1.4 m plus 2.5 per cent of the breadth of the ship above the water when the ship departs from any port, all the sidescuttles in that between decks shall be closed watertight and locked before the ship leaves pod, and they shall not be opened before the ship arrives at the next port. In the application of this paragraph thc appropriate allowance for fresh water may be made when applicable.

3.3.2. The time of opening such sidescuttles in port and of closing and locking them before the ship leaves port shall be entered in such log book as may be prescribed by the Administration.

3.3.3. For any ship that has one or more sidescuttles so placed that the requirements of paragraph 3.3.1. would apply when it was floating at its deepest subdivision load line, the Administration may indicate the limiting mean draught at which these sidescuttles will havc their sills above the line drawn parallel to the bulkhead deck at side, and having its lowest point 1.4 m plus 2.5 per cent of the breadth of the ship above the water-line corresponding to the limiting mean draught, and at which it will therefore be part from port without previously closing and locking them and to open them at sea on the responsibility of the master during the voyage to the next port. In tropical zones as defined in the International Convention on Load Lines in force, this limiting draught may be increased by 0.3 m.

4. Efficient hinged inside deadlights so arranged that they can be easily and effectively closed and secured watertight, shall be fitted to all sidescuttles except that abaft one-eighth of the ship's length from the forward perpendicular and above a line drawn parallel to the bulkhead deck at side and having its lowest point at a height of 3.7 m plus 2.5 per cent of the breadth of the ship above the deepest subdivision load line, the deadlights may be portable in passenger accommodation other than that for steerage passengers, unless the deadlights are required by the International Convention on Load Lines in force to be permanently attached in their proper positions. Such portable deadlights shall be stowed adjacent to the sidescuttles they serve.

5. Sidescuttles and their deadlights which will not be accessible during navigation shall be closed and secured before the ship leaves port.

6.1. No sidescuttles shall be fitted in any spaces which are appropriated exclusively to the carriage of cargo or coal.

6.2. Sidescuttles may, however, be fitted in spaces appropriated alternatively to the carriage of cargo or passengers, but they shall be of such construction as will effectively prevent any person opening them or their deadlights without the consent of the master.

6.3. If cargo is carried in such spaces, the sidescuttles and their deadlights shall be closed watertight and locked before the cargo is shipped and such closing and locking shall be recorded in such log book as may be prescribed by the Administration.

7. Automatic ventilating sidescuttles shall not be fitted in the shell plating below the margin line without the special sanction of the Administration.

8. The number of scuppers, sanitary discharges and other similar openings in the shell plating shall be reduced to the minimum either by making each discharge serve for as many as possible of the sanitary and other pipes, or in any other satisfactory manner.

9.1. All inlets and discharges in the shell plating shall be fitted with efficient and accessible arrangements for preventing the accidental admission of water into the ship.

9.2.1. Subject to the requirements of the International Convention on Load Lines in force, and except as provided in paragraph 9.3, each separate discharge led through the shell plating from spaces below the margin line shall be provided with either one automatic non-return valve fitted with a positive means of closing it from above the bulkhead deck or with two automatic non-return valves without positive means of closing, provided that the inboard valve is situated above the deepest subdivision load line and is always accessible for examination under service conditions. Where a valve with positive means of closing is fitted, the operating position above the bulkhead deck shall always be readily accessible and means shall be provided for indicating whether the valve is open or closed.

9.2.2. The requirements of the International Convention on Load Lines in force shall apply to discharges led through the shell plating from spaces above the margin line.

9.3. Machinery space main and auxiliary sea inlets and discharges in connexion with the operation of machinery shall be fitted with readily accessible valves between the pipes and the shell plating or between the pipes and fabricated boxes attached to the shell plating. The valves may be controlled locally and shall be provided with indicators showing whether they are open or closed.

9.4. All shell fittings and valves required by this regulation shall be of steel, bronze or other approved ductile material. Valves of ordinary cast iron or similar material are not acceptable. All pipes to which this regulation refers shall be of steel or other equivalent material to the satisfaction of the Administration.

10.1. Gangway, cargo and coaling ports fited below the margin line shall be of sufficient strength. They shall be effectively closed and secured watertight before the ship leaves port, and shall be kept closed during navigation.

10.2. Such ports shall in no case be so fitted as to have their lowest point below the deepest subdivision load line.

11.1. The inboard opening of each ash-shoot, rubbish-shoot, etc. shall be fitted with an efficient cover.

11.2. If the inboard opening is situated below the margin line, the cover shall be watertight, and in addition an automatic non-return valve shall be fitted in the shoot in an easily accessible position above the deepest subdivision load line. When the shoot is not in use both the cover and the valve shall be kept closed and secured.

Regulation 18. CONSTRUCTION AND INITIAL TESTS OF WATERTIGHT DOORS, SIDESCUTTLES, ETC., IN PASSENGER SHIPS AND CARGO SHIPS

1. In passenger ships:

1. The design, materials and construction of all watertight doors, sidescuttles, gangway, cargo and coaling ports, valves, pipes, ash-shoots and rubbish-shoots referred to in these regulations shall be to the satisfaction of the Administration;
2. The frames of vertical watertight doors shall have no groove at the bottom in which dirt might lodge and prevent the door closing properly.

2. In passenger ships and cargo ships each watertight door shall be tested by water pressure to a head up to the bulkhead deck or freeboard deck respectively. The test shall be made before the ship is put into service, either before or after the door is fitted.

Regulation 19. CONSTRUCTION AND INITIAL TESTS OF WATERTIGHT DECKS, TRUCKS, ETC., IN PASSENGER SHIPS AND CARGO SHIPS

1. Watertight decks, trunks, tunnels, duct keels and ventilators shall be of the same strength as watertight bulkheads at corresponding levels. The means used for making them watertight, and the arrangements adopted for closing openings in them, shall be to the satisfaction of the Administration. Watertight ventilators and trunks shall be carried at least up to the bulkhead deck in passenger ships and up to the freeboard deck in cargo ships.

2. After completion, a hose or flooding test shall be applied to watertight decks and a hose test to watertight trunks, tunnels and ventilators.

Regulation 20. WATERTIGHT INTEGRITY OF PASSENGER SHIPS ABOVE THE MARGIN LINE

1. The Administration may require that all reasonable and practicable measures shall be taken to limit the entry and spread of water above the bulkhead deck. Such measures may include partial bulkheads or webs. When partial watertight bulkheads and webs are fitted on the bulkhead deck, above or in the immediate vicinity of main subdivision bulkheads, they shall have watertight shell and bulkhead deck connexions so as to restrict the flow of water along the deck when the ship is in a heeled damaged condition. Where the partial watertight bulkhead does not line up with the bulkhead below, the bulkhead deck between shall be made effectively watertight.

2. The bulkhead deck or a deck above it shall be weathertight. All openings in the exposed weather deck shall have coamings of ample height and strength and shall be provided with efficient means for expeditiously closing them weathertight. Freeing ports, open rails and scuppers shall be fitted as necessary for rapidly clearing the weather deck of water under all weather conditions.

3. Sidescuttles, gangway, cargo and coaling ports and other means for closing openings in the shell plating above the margin line shall be of efficient design and construction and of sufficient strength having regard to the spaces in which they are fitted and their positions relative to the deepest subdivision load line.

4. Efficient inside deadlights, so arranged that they can be easily and effectively closed and secured watertight, shall be provided for all sidescuttles to spaces below the first deck above the bulkhead deck.

Regulation 21. BILGE PUMPING ARRANGEMENTS

1. *Passenger ships and cargo ships*

1.1. An efficient bilge pumping system shall be provided, capable of pumping from and draining any watertight compartment other than a space permanently appropriated for the carriage of fresh water, water ballast, oil fuel or liquid cargo and for which other efficient means of pumping are provided, under all practical conditions. Efficient means shall be provided for draining water from insulated holds.

1.2. Sanitary, ballast and general service pumps may be accepted as independent power bilge pumps if fitted with the necessary connexions to the bilge pumping system.

1.3. All bilge pipes used in or under coal bunkers or fuel storage tanks or in boiler or machinery spaces, including spaces in which oil-settling tanks or oil fuel pumping units are situated, shall be of steel or other suitable material.

1.4. The arrangement of the bilge and ballast pumping system shall be such as to prevent the possibility of water passing from the sea and from water ballast spaces into the cargo and machinery spaces, or from one compartment to another. Provision shall be made to prevent any deep tank having bilge and ballast connexions being inadvertently flooded from the sea when containing cargo, or being discharged through a bilge pipe when containing water ballast.

1.5. All distribution boxes and manually operated valves in connexion with the bilge pumping arrangements shall be in positions which are accessible under ordinary circumstances.

2. *Passenger ships*

2.1. The bilge pumping system required by paragraph 1. 1 shall be capable of operation under all practicable conditions after a casualty whether the ship is upright or listed. For this purpose wing suctions shall generally be fitted except in narrow compartments at the end of the ship where one suction may be sufficient. In compartments of unusual form, additional suctions may be required. Arrangements shall be made whereby water in the compartment may find its way to the suction pipes. Where, for particular compartments, the Administration is satisfied that the provision of drainage may be undesirable, it may allow such provision to be dispensed with if calculations made in accordance with the conditions laid down in regulation 8.2.1 to 8.2.3 show that the survival capability of the ship will not be impaired.

2.2. At least three power pumps shall be fitted connected to the bilge main, one of which may be driven by the propulsion machinery. Where the criterion numeral is 30 or more, one additional independent power pump shall be provided.

2.3. Where practicable, the power bilge pumps shall be placed in separate watertight compartments and so arranged or situated that these compartments will not be flooded by the same damage. If the main propulsion machinery, auxiliary machinery and boilers are in two or more watertight compartments, the pumps available for bilge service shall be distributed as far as is possible throughout these compartments.

2.4. On a ship of 91.5 m in length and upwards or having a criterion numeral of 30 or more, the arrangements shall be such that at least one power bilge pump shall bc available for use in all flooding conditions which the ship is required to withstand, as follows:

1. One of the required bilge pumps shall be an emergency pump of a reliable submersible type having a source of power situated above the bulkhead deck; or
2. The bilge pumps and their sources of power shall be so distributed throughout the length of the ship that at least one pump in an undamaged compartment will be available.

2.5. With the exception of additional pumps which may be provided for peak compartments only, each required bilge pump shall be so arranged as to draw water from any space required to be drained by paragraph 1.1.

2.6. Each power bilge pump shall be capable of pumping water through the required main bilge pipe at a speed of not less than 2 m/sec. Independent power bilge pumps situated in machinery spaces shall have direct suctions from these spaces, except that not more than two such suctions shall be required in any one space. Where two or more such suctions are provided there shall be at least one on each side of the ship. The Administration may require independent power bilge pumps situated in other spaces to have separate direct suctions. Direct suctions shall be suitably arranged and those in a machinery space shall be of a diameter not less than that required for the bilge main.

2.7.1. In addition to the direct bilge suction or suctions required by paragraph 2.6 a direct suction from the main circulating pump leading to the drainage level of the machinery space and fitted with a non-return valve shall be provided in the machinery space. The diameter of this direct suction pipe shall be at least two-thirds of the diameter of the pump inlet in the case of steamships, and of the same diameter as the pump inlet in the case of motorships.

2.7.2. Where in the opinion of the Administration the main circulating pump is not suitable for this purpose, a direct emergency bilge suction shall be led from the largest available independent power driven pump to the drainage level of the machinery space; the suction shall be of the same diameter as the main inlet of the pump used. The capacity of the pump so connected shall exceed that of a required bilge pump by an amount deemed satisfactory by the Administration.

2.7.3. The spindles of the sea inlet and direct suction valves shall extend well above the engine room platform.

2.8. All bilge suction piping up to the connexion to the pumps shall be independent of other piping.

2.9. The diameter d of the bilge main shall be calculated according to the following formula. However, the actual internal diameter of the bilge main may be rounded off to the nearest standard size acceptable to the Administration:

$$d = 25 + 1.68 \sqrt{L(B + D)}$$

where d is the internal diameter of the bilge main (millimetres);

L and B are the length and the breadth of the ship (metres) as defined in Regulation 2; and

D is the moulded depth of the ship to bulkhead deck (metres).

The diameter of the bilge branch pipes shall meet the requirements of the Administration.

2.10. Provision shall be made to prevent the compartment served by any bilge suction pipe being flooded in the event of the pipe being severed or otherwise damaged by collision or grounding in any other compartment. For this purpose, where the pipe is at any part situated nearer the side of the ship than one-fifth of the breadth of the ship (as defined in regulation 2 and measured at right angles to the centreline at the level of the deepest subdivision load line), or is in a duct keel, a non-return valve shall be fitted to the pipe in the compartment containing the open end.

2.11. Distribution boxes, cocks and valves in connexion with the bilge pumping system shall be so arranged that, in the event of flooding, one of the bilge pumps may be operative on any compartment; in addition, damage to a pump or its pipe connecting to the bilge main outboard of a line drawn at one-fifth of the breadth of the ship shall not put the bilge system out of action. If there is only one system of pipes common to all the pumps, the necessary valves for controlling the bilge suctions must be capable of being operated from above the bulkhead deck. Where in addition to the main bilge pumping system an emergency bilge pumping system is provided, it shall be independent of the main system and so arranged that a pump is capable of operating on any compartment under flooding condition as specified in paragraph 2.1; in that case only the valves necessary for the operation of the emergency system need be capable of being operated from above the bulkhead deck.

2.12. All cocks and valves referred to in paragraph 2.11 which can be operated from above the bulkhead deck shall have their controls at their place of operation clearly marked and shall be provided with means to indicate whether they are open or closed.

3. *Cargo ships*

At least two power pumps connected to the main bilge system shall be provided, one of which may be driven by the propulsion machinery. If the Administration is satisfied that the safety of the ship is not impaired, bilge pumping arrangements may be dispensed with in particular compartments.

Regulation 22. STABILITY INFORMATION FOR PASSENGER SHIPS AND CARGO SHIPS*

1. Every passenger ship regardless of size and every cargo ship having a length, as defined in the International Covention on Load Lines in force, of 24 m and upwards, shall be inclined upon its completion and the elements of its stability determined. The master shall be sup-

* Reference is made to the Recommendation on Intact Stability for Passenger and Cargo Ships under 100 metres in length, adopted by the Organization by resolution A.167(ES.IV),[1] and Amendments to this Recommendation, adopted by the Organization by resolution A.206(VII).[2]

[1] Inter-Governmental Maritime Consultative Organization, *Resolutions and Other Decisions, Assembly, Fourth Extraordinary Session*, 26-28 November 1968, p. 53.

[2] *Ibid., Seventh Session*, 5-15 October 1971, p. 10.

plied with such information satisfactory to the Administration as is necessary to enable him by rapid and simple processes to obtain accurate guidance as to the stability of the ship under varying conditions of service. A copy of the stability information shall be furnished to the Administration.

2. Where any alterations are made to a ship so as to materially affect the stability information supplied to the master, amended stability information shall be provided. If necessary the ship shall be re-inclined.

3. The Administration may allow the inclining test of an individual ship to be dispensed with provided basic stability data are available from the inclining test of a sister ship and it is shown to the satisfaction of the Administration that reliable stability information for the exempted ship can be obtained from such basic data.

4. The Administration may also allow the inclining test of an individual ship or class of ships especially designed for the carriage of liquids or ore in bulk to be dispensed with when reference to existing data for similar ships clearly indicates that due to the ship's proportions and arrangements more than suffcient metacentric height will be available in all probable loading conditions.

Regulation 23. DAMAGE CONTROL PLANS IN PASSENGER SHIPS

There shall be permanently exhibited, for the guidance of the officer in charge of the ship, plans showing clearly for each deck and hold the boundaries of the watertight compartments, the openings therein with the means of closure and position of any controls thereof, and the arrangements for the correction of any list due to flooding. In addition, booklets containing the aforementioned information shall be made available to the officers of the ship.

Regulation 24. MARKING, PERIODICAL OPERATION AND INSPECTION OF WATERTIGHT DOORS, ETC. IN PASSENGER SHIPS

1. This regulation applies to all ships.

2.1. Drills for the operating of watertight doors, sidescuttles, valves and closing mechanisms of scuppers, ash-shoots and rubbish-shoots shall take place weekly. In ships in which the voyage exceeds one week in duration a complete drill shall be held before leaving port, and others thereafter at least once a week during the voyage.

2.2. All watertight doors, both hinged and power operated, in main transverse bulkheads, in use at sea, shall be operated daily.

3.1. The watertight doors and all mechanisms and indicators connected therewith, all valves, the closing of which is necessary to make a compartment watertight, and all valves the operation of which is necessary for damage control cross connexions shall be periodically inspected at sea at least once a week.

3.2. Such valves, doors and mechanisms shall be suitably marked to ensure that they may be properly used to provide maximum safety.

Regulation 25. ENTRIES IN LOG OF PASSENGER SHIPS

1. This regulation applies to all ships.

2. Hinged doors, portable plates, sidescuttles, gangway, cargo and coaling ports and other openings, which are required by these regulations to be kept closed during navigation, shall be closed before the ship leaves port. The time of closing and the time of opening (if permissible under these regulations) shall be recorded in such log book as may be prescribed by the Administration.

3. A record of all drills and inspections required by regulation 24 shall be entered in the log book with an explicit record of any defects which may be disclosed.

PART C. MACHINERY INSTALLATIONS

(Except where expressly provided otherwise part C applies to passenger ships and cargo ships)

Regulation 26. GENERAL

1. The machinery, boilers and other pressure vessels, associated piping systems and fittings shall be of a design and construction adequate for the service for which they are intended and shall be so installed and protected as to reduce to a minimum any danger to persons on board, due regard being paid to moving parts, hot surfaces and other hazards. The design shall have regard to materials used in construction, the purpose for which the equipment is intended, the working conditions to which it will be subjected and the environmental conditions on board.

2. The Administration shall give special consideration to the reliability of single essential propulsion components and may require a separate source of propulsion power sufficient to give the ship a navigable speed, especially in the case of unconventional arrangements.

3. Means shall be provided whereby normal operation of propulsion machinery can be sustained or restored even though one of the essential auxiliaries becomes inoperative. Special consideration shall be given to the malfunctioning of:

1. A generating set which serves as a main-source of electrical power;
2. The sources of steam supply;
3. The boiler feed water systems;
4. The fuel oil supply systems for boilers or engines;
5. The sources of lubricating oil pressure;
6. The sources of water pressure;
7. A condensate pump and the arrangements to maintain vacuum in condensers;
8. The mechanical air supply for boilers;
9. An air compressor and receiver for starting or control purposes;
10. The hydraulic, pneumatic or electrical means for control in main propulsion machinery including controllable pitch propellers.

However, the Administration, having regard to overall safety considerations, may accept a partial reduction in propulsion capability from normal operation.

4. Means shall be provided to ensure that the machinery can be brought into operation from the dead ship condition without external aid.

5. All boilers, all parts of machines, all steam, hydraulic, pneumatic and other systems and their associated fittings which are under internal pressure shall be subjected to appropriate tests including a pressure test before being put into service for the first time.

6. Main propulsion machinery and all auxiliary machinery essential to the propulsion and the safety of the ship shall, as fitted in the ship, be designed to operate when the ship is upright and when inclined at any angle of list up to and including 15° either way under static conditions and 22.5° under dynamic conditions (rolling) either way and simultaneously inclined dynamically (pitching) 7.5° by bow or stern. The Administration may permit deviation from these angles, taking into consideration the type, size and service conditions of the ship.

7. Provision shall be made to facilitate cleaning, inspection and maintenance of main propulsion and auxiliary machinery including boilers and pressure vessels.

8. Special consideration shall be given to the design, construction and installation of propulsion machinery systems so that any mode of their vibrations shall not cause undue stresses in this machinery in the normal operating ranges.

Regulation 27. MACHINERY

1. Where risk from overspeeding of machinery exists, means shall be provided to ensure that the safe speed is not exceeded.

2. Where main or auxiliary machinery including pressure vessels or any parts of such machinery are subject to internal pressure and may be subject to dangerous overpressure, means shall be provided where practicable to protect against such excessive pressure.

3. All gearing and every shaft and coupling used for transmission of power to machinery essential for the propulsion and safety of the ship or for the safety of persons on board shall be so designed and constructed that they will withstand the maximum working stresses to which they may be subjected in all service conditions, and due consideration shall be given to the type of engines by which they are driven or of which they form part.

4. Internal combustion engines of a cylinder diameter of 200 mm or a crankcase volume of 0.6 m^3 and above shall be provided with crankcase explosion relief valves of a suitable type with sufficient relief area. The relief valves shall be arranged or provided with means to ensure that discharge from them is so directed as to minimize the possibility of injury to personnel.

5. Main turbine propulsion machinery and, where applicable, main internal combustion propulsion machinery and auxiliary machinery shall be provided with automatic shut-off arrangements in the case of failures such as lubricating oil supply failure which could lead rapidly to complete breakdown, serious damage or explosion. The Administration may permit provisions for overriding automatic shut-off devices.

Regulation 28. MEANS OF GOING ASTERN

1. Sufficient power for going astern shall be provided to secure proper control of the ship in all normal circumstances.

2. The ability of the machinery to reverse the direction of thrust of the propeller in sufficient time, and so to bring the ship to rest within a reasonable distance from maximum ahead service speed, shall be demonstrated and recorded.*

3. The stopping times, ship headings and distances recorded on trials, together with the results of trials to determine the ability of ships having multiple propellers to navigate and manœuvre with one or more propellers inoperative, shall be available on board for the use of the master or designated personnel.*

4. Where the ship is provided with supplementary means for manœuvring or stopping, the effectiveness of such means shall be demonstrated and recorded as referred to in paragraphs 2 and 3.

Regulation 29. STEERING GEAR

1. Unless expressly provided otherwise, every ship shall be provided with a main steering gear and an auxiliary steering gear to the satisfaction of the Administration. The main steering gear and the auxiliary steering gear shall be so arranged that the failure of one of them will not render the other one inoperative.

2.1. All the steering gear components and the rudder stock shall be of sound and reliable construction to the satisfaction of the Administration. Special consideration shall be given to the suitability of any essential component which is not duplicated. Any such essential component shall, where appropriate, utilize anti-friction bearings such as ball bearings, roller bearings or sleeve bearings which shall be permanently lubricated or provided with lubrication fittings.

* Reference is made to the Recommendation on Information to be Included in the Manoeuvring Booklets adopted by the Organization by resolution A.209(VII).[1]

[1] Inter-Governmental Maritime Consultative Organization, *Resolutions and Other Decisions, Assembly, Seventh Session*, 5-15 October 1971, p. 24.

2.2. The design pressure for calculations to determine the scantlings of piping and other steering gear components subjected to internal hydraulic pressure shall be at least 1.25 times the maximum working pressure to be expected under the operational conditions specified in paragraph 3.2, taking into account any pressure which may exist in the low pressure side of the system. At the discretion of the Administration, fatigue criteria shall be applied for the design of piping and components, taking into account pulsating pressures due to dynamic loads.

2.3. Relief valves shall be fitted to any part of the hydraulic system which can be isolated and in which pressure can be generated from the power source or from external forces. The setting of the relief valves shall not exceed the design pressure. The valves shall be of adequate size and so arranged as to avoid an undue rise in pressure above the design pressure.

3. The main steering gear and rudder stock shall be:

1. Of adequate strength and capable of steering the ship at maximum ahead service speed which shall be demonstrated;
2. Capable of putting the rudder over from 35° on one side to 35° on the other side with the ship at its deepest seagoing draught and running ahead at maximum ahead service speed and, under the same conditions, from 35° on either side to 30° on the other side in not more than 28 seconds;
3. Operated by power where necessary to meet the requirements of paragraph 3.2 and in any case when the Administration requires a rudder stock of over 120 mm diameter in way of the tiller, excluding strengthening for navigation in ice; and
4. So designed that they will not be damaged at maximum astern speed; however, this design requirement need not be proved by trials at maximum astern speed and maximum rudder angle.

4. The auxiliary steering gear shall be:

1. Of adequate strength and capable of steering the ship at navigable speed and of being brought speedily into action in an emergency;
2. Capable of putting the rudder over from 15° on one side to 15° on the other side in not more than 60 seconds with the ship at its deepest seagoing draught and running ahead at one half of the maximum ahead service speed or 7 knots, whichever is the greater; and
3. Operated by power where necesssary to meet the requirements of paragraph 4.2 and in any case when the Administration requires a rudder stock of over 230 mm diameter in way of the tiller, excluding strengthening for navigation in ice.

5. Main and auxiliary steering gear power units shall be:

1. Arranged to re-start automatically when power is restored after a power failure; and
2. Capable of being brought into operation from a position on the navigating bridge. In the event of a power failure to any one of the steering gear power units, an audible and visual alarm shall be given on the navigating bridge.

6.1. Where the main steering gear comprises two or more identical power units, an auxiliary steering gear need not be fitted, provided that:

1. In a passenger ship, the main steering gear is capable of operating the rudder as required by paragraph 3.2 while any one of the power units is out of operation;
2. In a cargo ship, the main steering gear is capable of operating the rudder as required by paragraph 3.2 while operating with all power units;
3. The main steering gear is so arranged that after a single failure in its piping system or in one of the power units the defect can be isolated so that steering capability can be maintained or speedily regained.

6.2. The Administration may, until 1 September 1986, accept the fitting of a steering gear which has a proven record of reliability but does not comply with the requirements of paragraph 6.1.3 for a hydraulic system.

6.3. Steering gears, other than of the hydraulic type, shall achieve standards equivalent to the requirements of this paragraph to the satisfaction of the Administration.

7. Steering gear control shall be provided:

1. For the main steering gear, both on the navigating bridge and in the gear compartment;
2. Where the main steering gear is arranged in accordance with paragraph 6, by two independent control systems, both operable from the navigating bridge. This does not require duplication of the steering wheel or steering lever. Where the control system consists of an hydraulic telemotor, a second independent system need not be fitted, except in a tanker, chemical tanker or gas carrier of 10,000 tons gross tonnage and upwards;
3. For the auxiliary steering gear, in the steering gear compartment and, if power operated, it shall also be operable from the navigating bridge and shall be independent of the control system for the main steering gear.

8. Any main and auxiliary steering gear control system operable from the navigating bridge shall comply with the following:

1. If electric, it shall be served by its own separate circuit supplied from a steering gear power circuit from a point within the steering gear compartment, or directly from switchboard busbars supplying that steering gear power circuit at a point on the switchboard adjacent to the supply to the steering gear power circuit;
2. Means shall be provided in the steering gear compartment for disconnecting any control system operable from the navigating bridge from the steering gear it serves;
3. The system shall be capable of being brought into operation from a position on the navigating bridge;
4. In the event of a failure of electrical power supply to the control system, an audible and visual alarm shall be given on the navigating bridge; and
5. Short circuit protection only shall be provided for steering gear control supply circuits.

9. The electric power circuits and the steering gear control systems with their associated components, cables and pipes required by this regulation and by regulation 30 shall be separated as far as is practicable throughout their length.

10. A means of communication shall be provided between the navigating bridge and the steering gear compartment.

11. The angular position of the rudder shall:

1. If the main steering gear is power operated, be indicated on the navigating bridge. The rudder angle indication shall be independent of the steering gear control system;
2. Be recognizable in the steering gear compartment.

12. Hydraulic power-operated steering gear shall be provided with the following:

1. Arrangements to maintain the cleanliness of the hydraulic fluid taking into consideration the type and design of the hydraulic system;
2. A low level alarm for each hydraulic fluid reservoir to give the earliest practicable indication of hydraulic fluid leakage. Audible and visual alarms shall be given on the navigating bridge and in the machinery space where they can be readily observed; and
3. A fixed storage tank having sufficient capacity to recharge at least one power actuating system including the reservoir, where the main steering gear is required to be power operated. The storage tank shall be permanently connected by piping in such a manner that the hydraulic systems can be readily recharged from a position within the steering gear compartment and shall be provided with a contents gauge.

13. The steering gear compartment shall be:

1. Readily accessible and, as far as practicable, separated from machinery spaces; and
2. Provided with suitable arrangements to ensure working access to steering gear machinery and controls. These arrangements shall include handrails and gratings or other non-slip surfaces to ensure suitable working conditions in the event of hydraulic fluid leakage.

14. Where the rudder stock is required to be over 230 mm diameter in way of the tiller, excluding strengthening for navigation in ice, an alternative power supply, sufficient at least to supply the steering gear power unit which complies with the requirements of paragraph 4.2 and also its associated control system and the rudder angle indicator, shall be provided automatically, within 45 seconds, either from the emergency source of electrical power or from an independent source of power located in the steering gear compartment. This independent source of power shall be used only for this purpose. In every ship of 10,000 tons gross tonnage and upwards, the alternative power supply shall have a capacity for at least 30 minutes of continuous operation and in any other ship for at least 10 minutes.

15. In every tanker, chemical tanker or gas carrier of 10,000 tons gross tonnage and upwards and in every other ship of 70,000 tons gross tonnage and upwards, the main steering gear shall comprise two or more identical power units complying with the provisions of paragraph 6.

16. Every tanker, chemical tanker or gas carrier of 10,000 tons gross tonnage and upwards shall, subject to paragraph 17, comply with the following:

1. The main steering gear shall be so arranged that in the event of loss of steering capability due to a single failure in any part of one of the power actuating systems of the main steering gear, excluding the tiller, quadrant or components serving the same purpose, or seizure of the rudder actuators, steering capability shall be regained in not more than 45 seconds after the loss of one power actuating system;
2. The main steering gear shall comprise either:
   - 2.1. Two independent and separate power actuating systems, each capable of meeting the requirements of paragraph 3.2; or
   - 2.2. At least two identical power actuating systems which, acting simultaneously in normal operation, shall be capable of meeting the requirements of paragraph 3.2. Where necessary to comply with this requirement, inter-connexion of hydraulic power actuating systems shall be provided. Loss of hydraulic fluid from one system shall be capable of being detected and the defective system automatically isolated so that the other actuating system or systems shall remain fully operational;
3. Steering gears other than of the hydraulic type shall achieve equivalent standards.

17. For tankers, chemical tankers or gas carriers of 10,000 tons gross tonnage and upwards, but of less than 100,000 tonnes deadweight, solutions other than those set out in paragraph 16, which need not apply the single failure criterion to the rudder actuator or actuators, may be permitted provided that an equivalent safety standard is achieved and that:

1. Following loss of steering capability due to a single failure of any part of the piping system or in one of the power units, steering capability shall be regained within 45 seconds; and
2. Where the steering gear includes only a single rudder actuator, special consideration is given to stress analysis for the design including fatigue analysis and fracture mechanics analysis, as appropriate, to the material used, to the installation of sealing arrangements and to testing and inspection and to the provision of effective maintenance. In consideration of the foregoing, the Administration shall adopt regulations which include the provisions of the Guidelines for Acceptance of Non-Duplicated Rudder Actuators for Tankers,

Chemical Tankers and Gas Carriers of 10,000 Tons Gross Tonnage and Above but Less than 100,000 Tonnes Deadweight, adopted by the Organization.*

18. For a tanker, chemical tanker or gas carrier of 10,000 tons gross tonnage and upwards, but less than 70,000 tonnes deadweight, the Administration may, until 1 September 1986, accept a steering gear system with a proven record of reliability which does not comply with the single failure criterion required for a hydraulic system in paragraph 16.

19. Every tanker, chemical tanker or gas carrier of 10,000 tons gross tonnage and upwards, constructed before 1 September 1984, shall comply, not later than 1 September 1986, with the following:

1. The requirements of paragraphs 7.1, 8.2, 8.4, 10, 11, 12.2, 12.3 and 13.2;
2. Two independent steering gear control systems shall be provided each of which can be operated from the navigating bridge. This does not require duplication of the steering wheel or steering lever;
3. If the steering gear control system in operation fails, the second system shall be capable of being brought into immediate operation from the navigating bridge; and
4. Each steering gear control system, if electric, shall be served by its own separate circuit supplied from the steering gear power circuit or directly from switchboard busbars supplying that steering gear power circuit at a point on the switchboard adjacent to the supply to the steering gear power circuit.

20. In addition to the requirements of paragraph 19, in every tanker, chemical tanker or gas carrier of 40,000 tons gross tonnage and upwards, constructed before 1 September 1984, the steering gear shall, not later than 1 September 1988, be so arranged that, in the event of a single failure of the piping or of one of the power units, steering capability can be maintained or the rudder movement can be limited so that steering capability can be speedily regained. This shall be achieved by:

1. An independent means of restraining the rudder; or
2. Fast acting valves which may be manually operated to isolate the actuators from the external hydraulic piping together with a means of directly refilling the actuators by a fixed independent power-operated pump and piping system; or
3. An arrangement such that, where hydraulic power systems are interconnected, loss of hydraulic fluid from one system shall be detected and the defective system isolated either automatically or from the navigating bridge so that the other system remains fully operational.

Regulation 30. ADDITIONAL REQUIREMENTS FOR ELECTRIC AND ELECTROHYDRAULIC STEERING GEAR

1. Means for indicating that the motors of electric and electrohydraulic steering gear are running shall be installed on the navigating bridge and at a suitable main machinery control position.

2. Each electric or electrohydraulic steering gear comprising one or more power units shall be served by at least two exclusive circuits fed directly from the main switchboard; however, one of the circuits may be supplied through the emergency switchboard. An auxiliary electric or electrohydraulic steering gear associated with a main electric or electrohydraulic steering gear may be connected to one of the circuits supplying this main steering gear. The circuits supplying an electric or electrohydraulic steering gear shall have adequate rating for sup-

* Reference is made to the Guidelines for Acceptance of Non-Duplicated Rudder Actuators for Tankers, Chemical Tankers and Gas Carriers of 10,000 Tons Gross Tonnage and Above but Less than 100,000 Tonnes Deadweight, adopted by the Organization by resolution A.467(XII).[1]

[1] International Maritime Organization, *Resolutions and Other Decisions, Assembly, Twelfth Session*, 9-20 November 1981, p. 69.

plying all motors which can be simultaneously connected to them and may be required to operate simultaneously.

3. Short circuit protection and an overload alarm shall be provided for such circuits and motors. Protection against excess current, including starting current, if provided, shall be for not less than twice the full load current of the motor or circuit so protected, and shall be arranged to permit the passage of the appropriate starting currents. Where a three-phase supply is used an alarm shall be provided that will indicate failure of any one of the supply phases. The alarms required in this paragraph shall be both audible and visual and shall be situated in a conspicuous position in the main machinery space or control room from which the main machinery is normally controlled and as may be required by regulation 51.

4. When in a ship of less than 1,600 tons gross tonnage an auxiliary steering gear which is required by regulation 29.4.3 to be operated by power is not electrically powered or is powered by an electric motor primarily intended for other services, the main steering gear may be fed by one circuit from the main switchboard. Where such an electric motor primarily intended for other services is arranged to power such an auxiliary steering gear, the requirement of paragraph 3 may be waived by the Administration if satisfied with the protection arrangement together with the requirements of [regulations] 29.5.1 and 2 and 29.7.3 applicable to auxiliary steering gear.

Regulation 31. MACHINERY CONTROLS

1. Main and auxiliary machinery essential for the propulsion and safety of the ship shall be provided with effective means for its operation and control.

2. Where remote control of propulsion machinery from the navigating bridge is provided and the machinery spaces are intended to be manned, the following shall apply:

1. The speed, direction of thrust and, if applicable, the pitch of the propeller shall be fully controllable from the navigating bridge under all sailing conditions, including manoeuvring;
2. The remote control shall be performed, for each independent propeller, by a control device so designed and constructed that its operation does not require particular attention to the operational details of the machinery. Where multiple propellers are designed to operate simultaneously, they may be controlled by one control device;
3. The main propulsion machinery shall be provided with an emergency stopping device on the navigating bridge which shall be independent of the navigating bridge control system;
4. Propulsion machinery orders from the navigating bridge shall be indicated in the main machinery control room or at the manoeuvring platform as appropriate;
5. Remote control of the propulsion machinery shall be possible only from one location at a time; at such locations interconnected control positions are permited. At each location there shall be an indicator showing which location is in control of the propulsion machinery. The transfer of control between the navigating bridge and machinery spaces shall be possible only in the main machinery space or the main machinery control room. This system shall include means to prevent the propelling thrust from altering significantly when transferring control from one location to another;
6. It shall be possible to control the propulsion machinery locally, even in the case of failure in any part of the remote control system;
7. The design of the remote control system shall be such that in case of its failure an alarm will be given. Unless the Administration considers it impracticable the preset speed and direction of thrust of the propeller shall be maintained until local control is in operation;
8. Indicators shall be fitted on the navigating bridge for:
   8.1. Propeller speed and direction of rotation in the case of fixed pitch propellers;
   8.2. Propeller speed and pitch position in the case of controllable pitch propellers;

9. An alarm shall be provided on the navigating bridge and in the machinery space to indicate low starting air pressure which shall be set at a level to permit further main engine starting operations. If the remote control system of the propulsion machinery is designed for automatic starting, the number of automatic consecutive attempts which fail to produce a start shall be limited in order to safeguard sufficient starting air pressure for starting locally.

3. Where the main propulsion and associated machinery, including sources of main electrical supply, are provided with various degrees of automatic or remote control and are under continuous manual supervision from a control room the arrangements and controls shall be so designed, equipped and installed that the machinery operation will be as safe and effective as if it were under direct supervision; for this purpose regulations 46 to 50 shall apply as appropriate. Particular consideration shall be given to protect such spaces against fire and flooding.

4. In general, automatic starting, operational and control systems shall include provisions for manually overriding the automatic controls. Failure of any part of such systems shall not prevent the use of the manual override.

Regulation 32. STEAM BOILERS AND BOILER FEED SYSTEMS

1. Every steam boiler and every unfired steam generator shall be provided with not less than two safety valves of adequate capacity. However, having regard to the output or any other features of any boiler or unfired steam generator, the Administration may permit only one safety valve to be fitted if it is satisfied that adequate protection against overpressure is thereby provided.

2. Each oil-fired boiler which is intended to operate without manual supervision shall have safety arrangements which shut off the fuel supply and give an alarm in the case of low water level, air supply failure or flame failure.

3. Water tube boilers serving turbine propulsion machinery shall be fitted with a high-water-level alarm.

4. Every steam generating system which provides services essential for the safety of the ship, or which could be rendered dangerous by the failure of its feed water supply, shall be provided with not less than two separate feed water systems from and including the feed pumps, noting that a single penetration of the steam drum is acceptable. Unless overpressure is prevented by the pump characteristics means shall be provided which will prevent overpressure in any part of the systems.

5. Boilers shall be provided with means to supervise and control the quality of the feed water. Suitable arrangements shall be provided to preclude, as far as practicable, the entry of oil or other contaminants which may adversely affect the boiler.

6. Every boiler essential for the safety of the ship and designed to contain water at a specified level shall be provided with at least two means for indicating its water level, at least one of which shall be a direct reading gauge glass.

Regulation 33. STEAM PIPE SYSTEMS

1. Every steam pipe and every fitting connected thereto through which steam may pass shall be so designed, constructed and installed as to withstand the maximum working stresses to which it may be subjected.

2. Means shall be provided for draining every steam pipe in which dangerous water hammer action might otherwise occur.

3. If a steam pipe or fitting may receive steam from any source at a higher pressure than that for which it is designed a suitable reducing valve, relief valve and pressure gauge shall be fitted.

Regulation 34. AIR PRESSURE SYSTEMS

1. In every ship means shall be provided to prevent overpressure in any part of compressed air systems and wherever water jackets or casings of air compressors and coolers might be subjected to dangerous overpressure due to leakage into them from air pressure parts. Suitable pressure relief arrangements shall be provided for all systems.

2. The main starting air arrangements for main propulsion internal combustion engines shall be adequately protected against the effects of backfiring and internal explosion in the starting air pipes.

3. All discharge pipes from starting air compressors shall lead directly to the starting air receivers, and all starting pipes from the air receivers to main or auxiliary engines shall be entirely separate from the compressor discharge pipe system.

4. Provision shall be made to reduce to a minimum the entry of oil into the air pressure systems and to drain these systems.

Regulation 35. VENTILATING SYSTEMS IN MACHINERY SPACES

Machinery spaces of category A shall be adequately ventilated so as to ensure that when machinery or boilers therein are operating at full power in all weather conditions including heavy weather, an adequate supply of air is maintained to the spaces for the safety and comfort of personnel and the operation of the machinery. Any other machinery space shall be adequately ventilated appropriate for the purpose of that machinery space.

Regulation 36. PROTECTION AGAINST NOISE*

Measures shall be taken to reduce machinery noise in machinery spaces to acceptable levels as determined by the Administration. If this noise cannot be sufficiently reduced the source of excessive noise shall be suitably insulated or isolated or a refuge from noise shall be provided if the space is required to be manned. Ear protectors shall be provided for personnel required to enter such spaces, if necessary.

Regulation 37. COMMUNICATION BETWEEN NAVIGATING BRIDGE AND MACHINERY SPACE

At least two independent means shall be provided for communicating orders from the navigating bridge to the position in the machinery space or in the control room from which the engines are normally controlled: one of these shall be an engine room telegraph which provides visual indication of the orders and responses both in the machinery space and on the navigating bridge. Appropriate means of communication shall be provided to any other positions from which the engines may be controlled.

Regulation 38. ENGINEERS' ALARM

An engineers' alarm shall be provided to be operated from the engine control room or at the manœuvring platform as appropriate, and shall be clearly audible in the engineers' accommodation.

Regulation 39. LOCATION OF EMERGENCY INSTALLATIONS IN PASSENGER SHIPS

Emergency sources of electrical power, fire pumps, bilge pumps except those specifically serving the spaces forward of the collision bulkhead, any fixed fire-extinguishing system required by chapter II-2 and other emergency installations which are essential for the safety of the ship, except anchor windlasses, shall not be installed forward of the collision bulkhead.

* Reference is made to the Code on Noise Levels on Board Ships, adopted by the Organization by resolution A.468(XII).[1]

[1] International Maritime Organization, *Resolutions and Other Decisions, Assembly, Twelfth Session*, 9-20 November 1981, p. 73.

PART D. ELECTRICAL INSTALLATIONS

(Except where expressly provided otherwise part D applies to passenger ships and cargo ships)

Regulation 40. GENERAL

1. Electrical installations shall be such that:

1. All electrical auxiliary services necessary for maintaining the ship in normal operational and habitable conditions will be ensured without recourse to the emergency source of electrical power;
2. Electrical services essential for safety will be ensured under various emergency conditions; and
3. The safety of passengers, crew and ship from electrical hazards will be ensured.

2. The Administration shall take appropriate steps to ensure uniformity in the implementation and application of the provisions of this Part in respect of electrical installations.*

Regulation 41. MAIN SOURCE OF ELECTRICAL POWER AND LIGHTING SYSTEMS

1.1. A main source of electrical power of sufficient capacity to supply all those services mentioned in regulation 40.1.1 shall be provided. This main source of electrical power shall consist of at least two generating sets.

1.2. The capacity of these generating sets shall be such that in the event of any one generating set being stopped it will still be possible to supply those services necessary to provide normal operational conditions of propulsion and safety. Minimum comfortable conditions of habitability shall also be ensured which include at least adequate services for cooking, heating, domestic refrigeration, mechanical ventilation, sanitary and fresh water.

1.3. The arrangements of the ship's main source of electrical power shall be such that the services referred to in regulation 40.1.1 can be maintained regardless of the speed and direction [of rotation] of the propulsion machinery or shafting.

1.4. In addition, the generating sets shall be such as to ensure that with any one generator or its primary source of power out of operation, the remaining generating sets shall be capable of providing the electrical services necessary to start the main propulsion plant from a dead ship condition. The emergency source of electrical power may be used for the purpose of starting from a dead ship condition if its capability either alone or combined with that of any other source of electrical power is sufficient to provide at the same time those services required to be supplied by regulations 42.2.1 to 42.2.3 or 43.2.1 to 43.2.4.

1.5. Where transformers constitute an essential part of the electrical supply system required by this paragraph, the system shall be so arranged as to ensure the same continuity of the supply as is stated in this paragraph.

2.1. A main electric lighting system which shall provide illumination throughout those parts of the ship normally accessible to and used by passengers or crew shall be supplied from the main source of electrical power.

2.2. The arrangement of the main electric lighting system shall be such that a fire or other casualty in spaces containing the main source of electrical power, associated transforming equipment, if any, the main switchboard and the main lighting switchboard, will not render the emergency electric lighting system required by regulations 42.2.1 and 42.2.2 or 43.2.1, 43.2.2 and 43.2.3 inoperative.

2.3. The arrangement of the emergency electric lighting system shall be such that a fire or other casualty in spaces containing the emergency source of electrical power, associated transforming equipment, if any, the emergency switchboard and the emergency lighting switchboard will not render the main electric lighting system required by this regulation inoperative.

* Reference is made to the Recommendations published by the International Electrotechnical Commission and, in particular, Publication 92 — Electrical Installations in Ships.

3. The main switchboard shall be so placed relative to one main generating station that, as far as is practicable, the integrity of the normal electrical supply may be affected only by a fire or other casualty in one space. An environmental enclosure for the main switchboard such as may be provided by a machinery control room situated within the main boundaries of the space, is not to be considered as separating the switchboards from the generators.

4. Where the total installed electrical power of the main generating sets is in excess of 3 MW, the main busbars shall be subdivided into at least two parts which shall normally be connected by removable links or other approved means; so far as is practicable, the connexion of generating sets and any other duplicated equipment shall be equally divided between the parts. Equivalent arrangements may be permitted to the satisfaction of the Administration.

Regulation 42. EMERGENCY SOURCE OF ELECTRICAL POWER IN PASSENGER SHIPS

1.1. A self-contained emergency source of electrical power shall be provided.

1.2. The emergency source of electrical power, associated transforming equipment, if any, transitional source of emergency power, emergency switchboard and emergency lighting switchboard shall be located above the uppermost continuous deck and shall be readily accessible from the open deck. They shall not be located forward of the collision bulkhead.

1.3. The location of the emergency source of electrical power and associated transforming equipment, if any, the transitional source of emergency power, the emergency switchboard and the emergency electric lighting switchboards in relation to the main source of electrical power, associated transforming equipment, if any, and the main switchboard shall be such as to ensure to the satisfaction of the Administration that a fire or other casualty in spaces containing the main source of electrical power, associated transforming equipment, if any, and the main switchboard or in any machinery space of category A will not interfere with the supply, control and distribution of emergency electrical power. As far as practicable, the space containing the emergency source of electrical power, associated transforming equipment, if any, the transitional source of emergency electrical power and the emergency switchboard shall not be contiguous to the boundaries of machinery spaces of category A or those spaces containing the main source of electrical power, associated transforming equipment, if any, or the main switchboard.

1.4. Provided that suitable measures are taken for safeguarding independent emergency operation under all circumstances, the emergency generator may be used exceptionally, and for short periods, to supply non-emergency circuits.

2. The electrical power available shall be sufficient to supply all those services that are essential for safety in an emergency, due regard being paid to such serviees as may have to be operated simultaneously. The emergency source of electrical power shall be capable, having regard to starting currents and the transitory nature of certain loads, of supplying simultaneously at least the following services for the periods specified hereinafter, if they depend upon an electrical source for their operation:

2.1. For a period of 36 hours, emergency lighting:

1. At every embarkation station on deck and over sides as required by regulations III/19 and III/30;
2. In all service and accommodation alleyways, stairways and exits, personnel lift cars;
3. In the machinery spaces and main generating stations including their control positions;
4. In all control stations, machinery control rooms, and at each main and emergency switchboard;
5. At all stowage positions for firemen's outfits;
6. At the steering gear; and
7. At the fire pump, the sprinkler pump and the emergency bilge pump referred to in paragraph 2.4 and at the starting position of their motors.

2.2. For a period of 36 hours, the navigation lights and other lights required by the International Regulations for Preventing Collisions at Sea[1] in force.

2.3. For a period of 36 hours:

1. All internal communication equipment required in an emergency;
2. The navigational aids as required by regulation V/12; where such provision is unreasonable or impracticable the Administration may waive this requirement for ships of less than 5,000 tons gross tonnage;
3. The fire detection and fire alarm system, and the fire door holding and release system, and
4. For intermittent operation of the daylight signalling lamp, the ship's whistle, the [manually operated call points] and all internal signals that are required in an emergency;

unless such services have an independent supply for the period of 36 hours from an accumulator battery suitably located for use in an emergency.

2.4. For a period of 36 hours:

1. One of the fire pumps required by regulation II-2/4.3.1 and 4.3.3;
2. The automatic sprinkler pump, if any; and
3. The emergency bilge pump and all the equipment essential for the operation of electrically powered remote controlled bilge valves.

2.5. For the period of time required by regulation 29.14 the steering gear if required to be so supplied by that regulation.

2.6. For a period of half an hour:

1. Any watertight doors required by regulation 15 to be power operated together with their indicators and warning signals. Provided the requirements of regulation 15.9.2 are complied with, sequential operation of the doors may be permitted providing all doors can be closed in 60 seconds;
2. The emergency arrangements to bring the lift cars to deck level for the escape of persons. The passenger lift cars may be brought to deck level sequentially in an emergency.

2.7. In a ship engaged regularly on voyages of short duration, the Administration if satisfied that an adequate standard of safety would be attained may accept a lesser period than the 36 hour period specified in paragraphs 2.1 to 2.5 but not less than 12 hours.

3. The emergency source of electrical power may be either a generator or an accumulator battery, which shall comply with the following:

3.1. Where the emergency source of electrical power is a generator, it shall be:

1. Driven by a suitable prime-mover with an independent supply of fuel having a flashpoint (closed cup test) of not less than 43°C;
2. Started automatically upon failure of the electrical supply from the main source of electrical power and shall be automatically connected to the emergency switchboard; those services referred to in paragraph 4 shall then be transferred automatically to the emergency generating set. The automatic starting system and the characteristic of the prime-mover shall be such as to permit the emergency generator to carry its full rated load as quickly as is safe and practicable, subject to a maximum of 45 seconds; unless a second independent means of starting the emergency generating set is provided, the single source of stored energy shall be protected to preclude its complete depletion by the automatic starting system; and
3. Provided with a transitional source of emergency electrical power according to paragraph 4.

3.2. Where the emergency source of electrical power is an accumulator battery, it shall be capable of:

[1] United Nations, *Treaty Series*, vol. 1050, p. 16.

1. Carrying the emergency electrical load without recharging while maintaining the voltage of the battery throughout the discharge period within 12 per cent above or below its nominal voltage;
2. Automatically connecting to the emergency switchboard in the event of failure of the main source of electrical power; and
3. Immediately supplying at least those services specified in paragraph 4.

4. The transitional source of emergency electrical power required by paragraph 3.1.3 shall consist of an accumulator battery suitably located for use in an emergency which shall operate without recharging while maintaining the voltage of the battery throughout the discharge period within 12 per cent above or below its nominal voltage and be of sufficient capacity and so arranged as to supply automatically in the event of failure of either the main or emergency source of electrical power at least the following services, if they depend upon an electrical source for their operation:

4.1. For half an hour:

1. The lighting required by paragraphs 2.1 and 2.2;
2. All services required by paragraphs 2.3.1, 2.3.3 and 2.3.4 unless such services have an independent supply for the period specified from an accumulator battery suitably located for use in an emergency.

4.2. Power to close the watertight doors but not necessarily all of them simultaneously, together with their indicators and warning signals as required by paragraph 2.6.1.

5.1. The emergency switchboard shall be installed as near as is practicable to the emergency source of electrical power.

5.2. Where the emergency source of electrical power is a generator, the emergency switchboard shall be located in the same space unless the operation of the emergency switchboard would thereby be impaired.

5.3. No accumulator battery fitted in accordance with this regulation shall be installed in the same space as the emergency switchboard. An indicator shall be mounted in a suitable place on the main switchboard or in the machinery control room to indicate when the batteries constituting either the emergency source of electrical power or the transitional source of emergency electrical power referred to in paragraph 3.1.3 or 4 are being discharged.

5.4. The emergency switchboard shall be supplied during normal operation from the main switchboard by an interconnector feeder which is to be adequately protected at the main switchboard against overload and short circuit and which is to be disconnected automatically at the emergency switchboard upon failure of the main source of electrical power. Where the system is arranged for feedback operation, the interconnector feeder is also to be protected at the emergency switchboard at least against short circuit.

5.5. In order to ensure ready availability of the emergency source of electrical power, arrangements shall be made where necessary to disconnect automatically non-emergency circuits from the emergency switchboard to ensure that power shall be available to the emergency circuits.

6. The emergency generator and its prime-mover and any emergency accumulator battery shall be so designed and arranged as to ensure that they will function at full rated power when the ship is upright and when inclined at any angle of list up to 22.5° or when inclined up to 10° either in the fore or aft direction, or is in any combination of angles within those limits.

7. Provision shall be made for the periodic testing of the complete emergency system and shall include the testing of automatic starting arrangements.

Regulation 43. EMERGENCY SOURCE OF ELECTRICAL POWER IN CARGO SHIPS

1.1. A self-contained emergency source of electrical power shall be provided.

1.2. The emergency source of electrical power, associated transforming equipment, if any, transitional source of emergency power, emergency switchboard and emergency lighting switchboard shall be located above the [uppermost] continuous deck and shall be readily accessible from the open deck. They shall not be located forward of the collision bulkhead, except where permitted by the Administration in exceptional circumstances.

1.3. The location of the emergency source of electrical power, associated transforming equipment, if any, the transitional source of emergency power, the emergency switchboard and the emergency lighting switchboard in relation to the main source of electrical power, associated transforming equipment, if any, and the main switchboard shall be such as to ensure to the satisfaction of the Administration that a fire or other casualty in the space containing the main source of electrical power, associated transforming equipment, if any, and the main switchboard, or in any machinery space of category A will not interfere with the supply, control and distribution of emergency electrical power. As far as practicable the [space] containing the emergency source of electrical power, associated transforming equipment, if any, the transitional source of emergency electrical power and the emergency switchboard shall not be contiguous to the boundaries of machinery spaces of category A or those spaces containing the main source of electrical power, associated transforming equipment, if any, and the main switchboard.

1.4. Provided that suitable measures are taken for safeguarding independent emergency operation under all circumstances, the emergency generator may be used, exceptionally, and for short periods, to supply non-emergency circuits.

2. The electrical power available shall be sufficient to supply all those services that are essential for safety in an emergency, due regard being paid to such services as may have to be operated simultaneously. The emergency source of electrical power shall be capable, having regard to starting currents and the transitory nature of certain loads, of supplying simultaneously at least the following services for the periods secified hereinafter, if they depend upon an electrical source for their operation:

2.1. For a period of 3 hours, emergency lighting at every embarkation station on deck and over sides as required by regulations III/19 and III/38.

2.2. For a period of 18 hours, emergency lighting:

1. In all service and accommodation alleyways stairways and exits, personnel lift cars and personnel lift trunks;
2. In the machinery spaces and main generating stations including their control positions;
3. In all control stations, machinery control rooms, and at each main and emergency switchboard;
4. At all stowage positions for firemen's outfits;
5. At the steering gear; and
6. At the fire pump referred to in paragraph 2.5, at the sprinkler pump, if any, and at the emergency bilge pump, if any, and at the starting positions of their motors.

2.3. For a period of 18 hours, the navigation lights and other lights required by the International Regulations for Preventing Collisions at Sea in force.

2.4. For a period of 18 hours:

1. All internal communication equipment as required in an emergency;
2. The navigational aids as required by regulation V/12; where such provision is unreasonable or impracticable the Administration may waive this requirement for ships of less than 5,000 tons gross tonnage;
3. The fire detection and fire alarm system; and

4. Intermittent operation of the daylight signalling lamp, the ship's whistle, the [manually operated call points] and all internal signals that are required in an emergency;

unless such services have an independent supply for the period of 18 hours from an accumulator battery suitably located for use in an emergency.

2.5. For a period of 18 hours one of the fire pumps required by regulation II-2/4.3.1 and 4.3.3 if dependent upon the emergency generator for its source of power.

2.6.1. For the period of time required by regulation 29.14 the steering gear where it is required to be so supplied by that regulation.

2.6.2. In a ship engaged regularly in voyages of short duration, the Administration if satisfied that an adequate standard of safety would be attained may accept a lesser period than the 18 hour period specified in paragraphs 2.2 to 2.5 but not less than 12 hours.

3. The emergency source of electrical power may be either a generator or an accumulator battery, which shall comply with the following:

3.1. Wbere the emergency source of electrical power is a generator, it shall be:

1. Driven by a suitable prime-mover with an independent supply of fuel, having a flashpoint (closed cup test) of not less than 43 °C;
2. Started automatically upon failure of the main source of electrical power supply unless a transitional source of emergency electrical power in accordance with paragraph 3.1.3 is provided; where the emergency generator is automatically started, it shall be automatically connected to the emergency switchboard; those services referred to in paragraph 4 shall then be connected automatically to the emergency generator; and unless a second independent means of starting the emergency generator is provided the single source of stored energy shall be protected to preclude its complete depletion by the automatic starting system; and
3. Provided with a transitional source of emergency electrical power as specified in paragraph 4 unless an emergency generator is provided capable both of supplying the services mentioned in that paragraph and of being automatically started and supplying the required load as quickly as is safe and practicable subject to a maximum of 45 seconds.

3.2. Where the emergency source of electrical power is an accumulator battery it shall be capable of:

1. Carrying the emergency electrical load without recharging while maintaining the voltage of the battery throughout the discharge period within 12 per cent above or below its nominal voltage;
2. Automatically connecting to the cmergency switchboard in the event of failure of the main source of electrical power; and
3. Immediately supplying at least those services specified in paragraph 4.

4. The transitional source of emergency electrical power where required by paragraph 3.1.3 shall consist of an accumulator battery suitably located for use in an emergency which shall operate without recharging while maintaining the voltage of the battery throughout the discharge period within 12 per cent above or below its nominal voltage and be of sufficient capacity and shall be so arranged as to supply automatically in the event of failure of either the main or the emergency source of electrical power for half an hour at least the following services if they depend upon an electrical source for their operation:

1. The lighting required by paragraphs 2.1, 2.2 and 2.3. For this transitional phase, the required emergency electric lighting, in respect of the machinery space and accommodation and service spaces may be provided by permanently fixed, individual, automatically charged, relay operated accumulator lamps; and

2. All services required by paragraphs 2.4.1, 2.4.3 and 2.4.4 unless such services have an independent supply for the period specified from an accumulator battery suitably located for use in an emergency.

5.1. The emergency switchboard shall be installed as near as is practicable to the emergency source of electrical power.

5.2. Where the emergency source of electrical power is a generator, the emergency switchboard shall be located in the same space unless the operation of the emergency switchboard would thereby be impaired.

5.3. No accumulator battery fitted in accordance with this regulation shall be installed in the same space as the emergency switchboard. An indicator shall be mounted in a suitable place on the main switchboard or in the machinery control room to indicate when the batteries constituting either the emergency source of electrical power or the transitional source of electrical power referred to in paragraph 3.2 or 4 are being discharged.

5.4. The emergency switchboard shall be supplied during normal operation from the main switchboard by an interconnector feeder which is to be adequately protected at the main switchboard against overload and short circuit and which is to be disconnected automatically at the emergency switchboard upon failure of the main source of electrical power. Where the system is arranged for feedback operation, the interconnector feeder is also to be protected at the emergency switchboard at least against short circuit.

5.5. In order to ensure ready availability of the emergency source of electrical power, arrangements shall be made where necessary to disconnect automatically non-emergency circuits from the emergency switchboard to ensure that electrical power shall be available automatically to the emergency circuits.

6. The emergency generator and its prime-mover and any emergency accumulator battery shall be so designed and arranged as to ensure that they will function at full rated power when the ship is upright and when inclined at any angle of list up to 22.5° or when inclined up to 10° either in the fore or aft direction, or is in any combination of angles within those limits.

7. Provision shall be made for the periodic testing of the complete emergency system and shall include the testing of automatic starting arrangements.

Regulation 44. STARTING ARRANGEMENTS FOR EMERGENCY GENERATING SETS

1. Emergency generating sets shall be capable of being readily started in their cold condition at a temperature of 0 ° C. If this is impracticable, or if lower temperatures are likely to be encountered, provision acceptable to the Administration shall be made for the maintenance of heating arrangements, to ensure ready starting of the generating sets.

2. Each emergency generating set arranged to be automatically started shall be equipped with starting devices approved by the Administration with a stored energy capability of at least three consecutive starts. A second source of energy shall be provided for an additional three starts within 30 minutes unless manual starting can be demonstrated to be effective.

3. The stored energy shall be maintained at all times as follows:

1. Electrical and hydraulic starting systems shall be maintained from the emergency switchboard;
2. Compressed air starting systems may be maintained by the main or auxiliary compressed air receivers through a suitable non-return valve or by an emergency air compressor which, if electrically driven, is supplied from the emergency switchboard;
3. All of these starting, charging and energy storing devices shall be located in the emergency generator space; these devices are not to be used for any purpose other than the operation of the emergency generating set. This does not preclude the supply to the air receiver of the emergency generating set from the main or auxiliary compressed air system through the non-return valve fitted in the emergency generator space.

4.1. Where automatic starting is not required, manual starting is permissible, such as manual cranking, inertia starters, manually charged hydraulic accumulators, or powder charge cartridges, where they can be demonstrated as being effective.

4.2. When manual starting is not practicable, the requirements of paragraphs 2 and 3 shall be complied with except that starting may be manually initiated.

Regulation 45. PRECAUTIONS AGAINST SHOCK, FIRE AND OTHER HAZARDS OF ELECTRICAL ORIGIN

1.1. Exposed metal parts of electrical machines or equipment which are not intended to be live but which are liable under fault conditions to become live shall be earthed unless the machines or equipment are:

1. Supplied at a voltage not exceeding 55 V direct current or 55 V, root mean square between conductors; auto-transformers shall not be used for the purpose of achieving this voltage; or
2. Supplied at a voltage not exceeding 250 V by safety isolating transformers supplying only one consuming device; or
3. Constructed in accordance with the principle of double insulation.

1.2. The Administration may require additional precautions for portable electrical equipment for use in confined or exceptionally damp spaces where particular risks due to conductivity may exist.

1.3. All electrical apparatus shall be so constructed and so installed as not to cause injury when handled or touched in the normal manner.

2. Main and emergency switchboards shall be so arranged as to give easy access as may be needed to apparatus and equipment, without danger to personnel. The sides and the rear and, where necessary, the front of switchboards shall be suitably guarded. Exposed live parts having voltages to earth exceeding a voltage to be specified by the Administration shall not be installed on the front of such switchboards. Where necessary, non-conducting mats or gratings shall be provided at the front and rear of the switchboard.

3.1. The hull return system of distribution shall not be used for any purpose in a tanker, or for power, heating, or lighting in any other ship of 1,600 tons gross tonnage and upwards.

3.2. The requirement of paragraph 3.1 does not preclude under conditions by the Administration the use of:

1. Impressed current cathodic protective systems;
2. Limited and locally earthed systems; or
3. Insulation level monitoring devices provided the circulation current does not exceed 30 mA under the most unfavourable conditions.

3.3. Where the hull return system is used, all final subcircuits, i.e. all circuits after the last protective device, shall be two-wire and special precautions shall be taken to the satisfaction of the Administration.

4.1. Earthed distribution systems shall not be used in a tanker. The Administration may exceptionally permit in a tanker the earthing of the neutral for alternating current power networks of 3,000 V (line to line) and over, provided that any possible resulting current does not flow directly through any of the dangerous spaces.

4.2. When a distribution system, whether primary or secondary, for power, heating or lighting, with no connexion to earth is used, a device capable of continuously monitoring the insulation level to earth and of giving an audible or visual indication of abnormally low insulation values shall be provided.

5.1. Except as permitted by the Administration in exceptional circumstances, all metal sheaths and armour of cables shall be electrically continuous and shall be earthed.

5.2. All electric cables and wiring external to equipment shall be at least of a flame retardant type and shall be so installed as not to impair their original flame retarding properties. Where necessary for particular applications the Administration may permit the use of special types of cables such as radio frequency cables, which do not comply with the foregoing.

5.3. Cables and wiring serving essential or emergency power, lighting, internal communications or signals shall so far as practicable be routed clear of galleys, laundries, machinery spaces of category A and their casings and other high fire risk areas. Cables connecting fire pumps to the emergency switchboard shall be of a fire resistant type where they pass through high fire risk areas. Where practicable all such cables should be run in such a manner as to preclude their being rendered unserviceable by heating of the bulkheads that may be caused by a fire in an adjacent space.

5.4. Where cables which are installed in hazardous areas introduce the risk of fire or explosion in the event of an electrical fault in such areas, special precautions against such risks shall be taken to the satisfaction of the Administration.

5.5. Cables and wiring shall be installed and supported in such a manner as to avoid chaffing or other damage.

5.6. Terminations and joints in all conductors shall be so made as to retain the original electrical, mechanical, flame retarding and, where necessary, fire resisting properties of the cable.

6.1. Each separate circuit shall be protected against short circuit and against overload, except as permitted in regulations 29 and 30 or where the Administration may exceptionally otherwise permit.

6.2. The rating or appropriate setting of the overload protective device for each circuit shall be permanently indicated at the location of the protective device.

7. Lighting fittings shall be so arranged as to prevent temperature rises which could damage the cables and wiring, and to prevent surrounding material from becoming excessively hot.

8. All lighting and power circuits terminating in a bunker or cargo space shall be provided with a multiple pole switch outside the space for disconnecting such circuits.

9.1. Accumulator batteries shall be suitably housed, and compartments used primarily for their accommodation shall be properly constructed and efficiently ventilated.

9.2. Electrical or other equipment which may constitute a source of ignition of flammable vapours shall not be permitted in these compartments except as permitted in paragraph 10.

9.3. Accumulator batteries shall not be located in sleeping quarters except where hermetically sealed to the satisfaction of the Administration.

10. No electrical equipment shall be installed in any space where flammable mixtures are liable to collect including those on board tankers or in compartments assigned principally to accumulator batteries, in paint lockers, acetylene stores or similar spaces, unless the Administration is satisfied that such equipment is:

1. Essential for operational purposes;
2. Of a type which will not ignite the mixture concerned;
3. Appropriate to the space concerned; and
4. Appropriately certified for safe usage in the dusts, vapours or gases likely to be encountered.

11. In a passenger ship, distribution systems shall be so arranged that fire in any main vertical zone as is defined in regulation II-2/3.9 will not interfere with services essential for safety in any other such zone. This requirement will be met if main and emergency feeders passing through any such zone are separated both vertically and horizontally as widely as is practicable.

PART E. ADDITIONAL REQUIREMENTS FOR PERIODICALLY UNATTENDED MACHINERY SPACES

(Part E applies to cargo ships except that regulation 54 refers to passenger ships)

Regulation 46. GENERAL

1. The arrangements provided shall be such as to ensure that the safety of the ship in all sailing conditions, including manoeuvring, is equivalent to that of a ship having the machinery spaces manned.

2. Measures shall be taken to the satisfaction of the Administration to ensure that the equipment is functioning in a reliable manner and that satisfactory arrangements are made for regular inspections and routine tests to ensure continuous reliable operation.

3. Every ship shall be provided with documentary evidence, to the satisfaction of the Administration, of its fitness to operate with periodically unattended machinery spaces.

Regulation 47. FIRE PRECAUTIONS

1. Means shall be provided to detect and give alarms at an early stage in case of fires:

1. In boiler air supply casings and exhausts (uptakes); and

2. In scavenging air belts of propulsion machinery,

unless the Administration considers this to be unnecessary in a particular case.

2. Internal combustion engines of 2250 kW and above or having cylinders of more than 300 mm bore shall be provided with erankcase oil mist detectors or engine bearing temperature monitors or equivalent devices.

Regulation 48. PROTECTION AGAINST FLOODING

1. Bilge wells in periodically unattended machinery spaces shall be located and monitored in such a way that the accumulation of liquids is detected at normal angles of trim and heel, and shall be large enough to accommodate easily the normal drainage during the unattended period.

2. Where the bilge pumps are capable of being started automatically, means shall be provided to indicate when the influx of liquid is greater than the pump capacity or when the pump is operating more frequently than would normally be expected. In these cases, smaller bilge wells to cover a reasonable period of time may be permitted. Whcre automatically controlled bilge pumps are provided, special attention shall be given to oil pollution prevention requirements.

3. The location of the controls of any valve serving a sea inlet, a discharge below the water-line or a bilge injection system shall be so sited as to allow adequate time for operation in case of influx of water to the space, having regard to the time likely to be required in order to reach and operate such controls. If the level to which the space could become flooded with the ship in the fully loaded condition so requires, arrangements shall be made to operate the controls from a position above such level.

Regulation 49. CONTROL OF PROPULSION MACHINERY FROM THE NAVIGATING BRIDGE

1. Under all sailing conditions, including manoeuvring, the speed, direction of thrust and, if applicable, the pitch of the propeller shall be fully controllable from the navigating bridge.

1.1. Such remote control shall be performed by a single control device for each independent propeller, with automatic performance of all associated services, including, where necessary, means of preventing overload of the propulsion machinery.

1.2. The main propulsion machinery shall be provided with an emergency stopping device on the navigating bridge which shall be independent of the navigating bridge control system.

2. Propulsion machinery orders from the navigating bridge shall be indicated in the main machinery control room or at the propulsion machinery control position as appropriate.

3. Remote control of the propulsion machinery shall be possible only from one location at a time; at such locations interconnected control positions are permitted. At each location there shall be an indicator showing which location is in control of the propulsion machinery. The transfer of control between the navigating bridge and machinery spaces shall be possible only in the [main] machinery space or in the [main] machinery control room. The system shall include means to prevent the propelling thrust from altering significantly when transferring control from one location to another.

4. It shall be possible for all machinery essential for the safe operation of the ship to be controlled from a local position, even in the case of failure in any part of the automatic or remote control systems.

5. The design of the remote automatic control system shall be such that in case of its failure an alarm will be given. Unless the Administration considers it impracticable, the preset speed and direction of thrust [of the propeller] shall be maintained until local control is in operation.

6. Indicators shall be fitted on the navigating bridge for:

1. Propeller speed and direction of rotation in [the] case of fixed pitch propellers; or
2. Propeller speed and pitch position in [the] case of controllable pitch propellers.

7. The number of consecutive automatic attempts which fail to produce a start shall be limited to safeguard sufficient starting air pressure. An alarm shall be provided to indicate low starting air pressure set at a level which still permits starting operations of the propulsion machinery.

Regulation 50. COMMUNICATION

A reliable means of vocal communication shall be provided between the main machinery control room or the propulsion machinery control position as appropriate, the navigating bridge and the engineer officers' accomodation.

Regulation 51. ALARM SYSTEM

1. An alarm system shall be provided indicating any fault requiring attention and shall:

1. Be capable of sounding an audible alarm in the main machinery control room or at the propulsion machinery control position, and indicate visually each separate alarm function at a suitable position;
2. Have a connexion to the engineers' public rooms and to each of the engineers' cabins through a selector switch, to ensurc connexion to at least one of those cabins. Administrations may permit equivalent arrangements;
3. Activate an audible and visual alarm on the navigating bridge for any situation which requires action by or attention of the officer on watch;
4. As far as is practicable be designed on the fail-to-safety principle; and
5. Activate the engineers' alarm required by regulation 38 if an alarm function has not received attention locally within a limited time.

2.1. The alarm system shall be continuously powered and shall have an automatic change-over to a stand-by power supply in case of loss of normal power supply.

2.2. Failure of the normal power supply of the alarm system shall be indicated by an alarm.

3.1. The alarm system shall be able to indicate at the same time more than one fault and the acceptance of any alarm shall not inhibit another alarm.

3.2. Acceptance at the position referred to in paragraph 1 of any alarm condition shall be indicated at the positions where it was shown. Alarms shall be maintained until they are accepted and the visual indications of individual alarms shall remain until the fault has been corrected, when the alarm system shall automatically reset to the normal operating condition.

Regulation 52. SAFETY SYSTEMS

A safety system shall be provided to ensure that serious malfunction in machinery or boiler operations, which presents an immediate danger, shall initiate the automatic shut-down of that part of the plant and that an alarm shall be given. Shut-down of the propulsion system shall not be automatically activated except in cases which could lead to serious damage, complete breakdown, or explosion. Where arrangements for overriding the shut-down of the main propelling machinery are fitted, these shall be such as to preclude inadvertent operation. Visual means shall be provided to indicate when the override has been activated.

Regulation 53. SPECIAL REQUIREMENTS FOR MACHINERY, BOILER AND ELECTRICAL INSTALLATIONS

1. The special requirements for the machinery, boiler and electrical installations shall be to the satisfaction of the Administration and shall include at least the requirements of this regulation.

2. The main source of electrical power shall comply with the following:

2.1. Where the electrical power can normally be supplied by one generator, suitable load shedding arrangements shall be provided to ensure the integrity of supplies to services required for propulsion and steering as well as the safety of the ship. In the case of loss of the generator in operation adequate provision shall be made for automatic starting and connecting to the main switchboard of a stand-by generator of sufficient capacity to permit propulsion and steering and to ensure the safety of the ship with automatic re-starting of the essential auxiliaries including, where necessary, sequential operations. The Administration may dispense with this requirement for a ship of less than 1,600 tons gross tonnage, if it is considered impracticable.

2.2. If the electrical power is normally supplied by more than one generator simultaneously in parallel operation, provision shall be made, for instance by load shedding, to ensure that, in case of loss of one of these generating sets, the remaining ones are kept in operation without overload to permit propulsion and steering, and to ensure the safety of the ship.

3. Where stand-by machines are required for other auxiliary machinery essential to propulsion, automatic change-over devices shall be provided.

4. *Automatic control and alarm system*

4.1. The control system shall be such that the services needed for the operation of the main propulsion machinery and its auxiliaries are ensured through the necessary automatic arrangements.

4.2. An alarm shall be given on the automatic change-over.

4.3. An alarm system complying with regulation 51 shall be provided for all important pressures, temperatures and fluid levels and other essential parameters.

4.4. A centralized control position shall be arranged with the necessary alarm panels and instrumentation indicating any alarm.

5. Means shall be provided to keep the starting air pressure at the required level where internal combustion engines are used for main propulsion.

Regulation 54. SPECIAL CONSIDERATION IN RESPECT OF PASSENGER SHIPS

Passenger ships shall be specially considered by the Administration as to whether or not their machinery spaces may be periodically unattended and if so whether additional requirements to those stipulated in these regulations are necessary to achieve equivalent safety to that of normally attended machinery spaces.

CHAPTER II-2. CONSTRUCTION – FIRE PROTECTION, FIRE DETECTION AND FIRE EXTINCTION

The existing text of chapter II-2 is replaced by the following:

PART A. GENERAL

Regulation 1. APPLICATION

1.1. Unless expressly provided otherwise, this chapter shall apply to ships the keels of which are laid or which are at a similar stage of construction on or after 1 September 1984.

1.2. For the purpose of this chapter the term "a similar stage of construction" means the stage at which:

1. Construction identifiable with a specific ship begins; and
2. Assembly of that ship has commenced comprising at least 50 tonnes or one per cent of the estimated mass of all structural material, whichever is less.

1.3. For the purpose of this chapter:

1. The expression "ships constructed" means "ships the keels of which are laid or which are at a similar stage of construction";

2. The expression "all ships" means "ships constructed before, on or after 1 September 1984";

3. A cargo ship, whenever built, which is converted to a passenger ship shall be treated as a passenger ship constructed on the date on which such a conversion commences.

2. Unless expressly provided otherwise:

1. For ships constructed before 1 September 1984, the Administration shall ensure that, subject to the provisions of paragraph 2.2, the requirements which are applicable under chapter II-2 of the International Convention for the Safety of Life at Sea, 1974* to new or existing ships as defined in that chapter are complied with;
2. For tankers constructed before 1 September 1984, the Administration shall ensure that the requirements which are applicable under chapter II-2 of the annex to the Protocol of 1978 relating to the International Convention for the Safety of Life at Sea, 1974 to new or existing ships as defined in that chapter are complied with.

3. All ships which undergo repairs, alterations, modifications and outfitting related thereto shall continue to comply with at least the requirements previously applicable to these ships. Such ships, if constructed before 1 September 1984 shall, as a rule, comply with the requirements for ships constructed on or after that date to at least the same extent as they did before undergoing such repairs, alterations, modifications or outfitting. Repairs, alterations and modifications of a major character and outfitting related thereto shall meet the requirements for ships constructed on or after 1 September 1984 in so far as the Administration deems reasonable and practicable.

4.1. The Administration of a State may, if it considers that the sheltered nature and conditions of the voyage are such as to render the application of any specific requirements of this chapter unreasonable or unnecessary, exempt from those requirements individual ships or

* The text as adopted by the International Conference on Safety of Life at Sea, 1974.

classes of ships entitled to fly the flag of that State which, in the course of their voyage, do not proceed more than 20 miles from the nearest land.

4.2. In the case of passenger ships which are employed in special trades for the carriage of large numbers of special trade passengers, such as the pilgrim trade, the Administration of the State whose flag such ships are entitled to fly, if satisfied that it is impracticable to enforce compliance with the requirements of this chapter, may exempt such ships from those requirements, provided that they comply fully with provisions of:

1. The Rules annexed to the Special Trade-Passenger Ships Agreement, 1971; and
2. The Rules annexed to the Protocol on Space Requirements for Special Trade Passenger Ships, 1973.

Regulation 2. BASIC PRINCIPLES

1. The purpose of this chapter is to require the fullest practicable degree of fire protection, fire detection and fire extinction in ships.

2. The following basic principles underlie the regulations in this chapter and are embodied in the regulations as appropriate, having regard to the type of ships and the potential fire hazard involved:

1. Division of ship into main vertical zones by thermal and structural boundaries;
2. Separation of accommodation spaces from the remainder of the ship by thermal and structural boundaries;
3. Restricted use of combustible materials;
4. Detection of any fire in the zone of origin;
5. Containment and extinction of any fire in the space of origin;
6. Protection of means of escape or access for fire fighting;
7. Ready availability of fire-extinguishing appliances;
8. Minimization of possibility of ignition of flammable cargo vapour.

Regulation 3. DEFINITIONS

For the purpose of this chapter, unless expressly provided otherwise:

1. "Non-combustible material" is a material which neither burns nor gives off flammable vapours in sufficient quantity for self-ignition when heated to approximately 750 ° C, this being determined to the satisfaction of the Administration by an established test procedure.* Any other material is a combustible material.

2. "A standard fire test" is one in which specimens of the relevant bulkheads or decks are exposed in a test furnace to temperatures corresponding approximately to the standard time-temperature curve. The specimen shall have an exposed surface of not less than 4.65 m^2 and height (or length of deck) of 2.44 m, resembling as closely as possible the intended construction and including where appropriate at least one joint. The standard time-temperature curve is defined by a smooth curve drawn through the following temperature points measured above the initial furnace temperature:

- At the end of the first 5 minutes, 556°C
- At the end of the first 10 minutes, 659°C
- At the end of the first 15 minutes, 718°C
- At the end of the first 30 minutes, 821°C
- At the end of the first 60 minutes, 925°C

* Reference is made to Improved Recommendation on Test Method for Qualifying Marine Construction Materials as Non-Combustible, adopted by the Organization by resolution A.472(XII).[1]

[1] International Maritime Organization, *Resolutions and Other Decisions, Assembly, Twelfth Session*, 9-20 November 1981, p. 128.

3. "'A' class divisions" are those divisions formed by bulkheads and decks which comply with the following:

1. They shall be constructed of steel or other equivalent material;
2. They shall be suitably stiffened;
3. They shall be so constructed as to be capable of preventing the passage of smoke and flame to the end of the one-hour standard fire test;
4. They shall be insulated with approved non-combustible materials such that the average temperature of the unexposed side will not rise more than 139°C above the original temperature, nor will the temperature, at any one point, including any joint, rise more than 180°C above the original temperature, within the time listed below:
   - Class "A-60", 60 minutes
   - Class "A-30", 30 minutes
   - Class "A-15", 15 minutes
   - Class "A-0" , 0 minutes
5. The Administration may require a test of a prototype bulkhead or deck to ensure that it meets the above requirements for integrity and temperature rise.*

4. "'B' class divisions" are those divisions formed by bulkheads, decks, ceilings or linings which comply with the following:

1. They shall be so constructed as to be capable of preventing the passage of flame to the end of the first half hour of the standard fire test;
2. They shall have an insulation value such that the average temperature of the unexposed side will not rise more than 139°C above the original temperature, nor will the temperature at any one point, including any joint, rise more than 225°C above the original temperature, within the time listed below:
   - Class "B-15" 15 minutes
   - Class "B-0" 0 minutes
3. They shall be constructed of approved non-combustible materials and all materials entering into the construction and erection of "B" class divisions shall be non-combustible, with the exception that combustible veneers may be permitted provided they meet other requirements of this chapter;
4. The Administration may require a test of a prototype division to ensure that it meets the above requirements for integrity and temperature rise.*

5. "'C' class divisions" are divisions constructed of approved non-combustible materials. They need meet neither requirements relative to the passage of smoke and flame nor limitations relative to the temperature rise. Combustible veneers are permitted provided they meet other requirements of this chapter.

6. "Continuous 'B' class ceilings or linings" are those "B" class ceilings or linings which terminate only at an "A" or "B" class division.

7. "Steel or other cquivalent material". Where the words "steel or other equivalent material" occur, "equivalent material" means any non-combustible material which, by itself or due to insulation provided, has structural and integrity properties equivalent to steel at the end of the applicable exposure to the standard fire test (e.g., aluminium alloy with appropriate insulation).

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* Reference is made to Recommendation for Fire Test Procedures for "A" and "B" Class Divisions, adopted by the Organization by resolutions A.163(ES.IV)[1] and A.215(VII).[2]

[1] Inter-Governmental Maritime Consultative Organization, *Resolutions and Other Decisions, Assembly, Fourth Extraordinary Session*, 26-28 November 1968, p. 36.

[2] *Ibid., Seventh Session*, 5-15 October 1971, p. 92.

8. "Low flame spread" means that the surface thus described will adequately restrict the spread of flame, this being determined to the satisfaction of the Administration by an established test procedure.

9. "Main vertical zones" are those sections into which the hull, superstructure, and deckhouses are divided by "A" class divisions, the mean length of which on any deck does not in general exceed 40 m.

10. "Accommodation spaces" are those spaces used for public spaces, corridors, lavatories, cabins, offices, hospitals, cinemas, games and hobbies rooms, barber shops, pantries containing no cooking appliances and similar spaces.

11. "Public spaces" are those portions of the accommodation which are used for halls, dining rooms, lounges and similar permanently enclosed spaces.

12. "Service spaces" are those spaces used for galleys, pantries containing cooking appliances, lockers, [mail] and specie rooms, store-rooms, workshops other than those forming part of the machinery spaces, and similar spaces and trunks to such spaces.

13. "Cargo spaces" are all spaces used for cargo (including cargo oil tanks) and trunks to such spaces.

14. "Ro/ro cargo spaces" are spaces not normally subdivided in any way and extending to either a substantial length or the entire length of the ship in which goods (packaged or in bulk, in or on rail or road-cars, vehicles (including road or rail tankers), trailers, containers, pallets, demountable tanks or in or on similar stowage units or other receptacles) can be loaded and unloaded normally in a horizontal direction.

15. "Open ro/ro cargo spaces" are ro/ro cargo spaces either open at both ends, or open at one end and provided with adequate natural ventilation effective over their entire length through permanent openings in the side plating or deckhead to the satisfaction of the Administration.

16. "Closed ro/ro cargo spaces" are ro/ro cargo spaces which are neither open ro/ro cargo spaces nor weather decks.

17. "Weather deck" is a deck which is completely exposed to the weather, from above and from at least two sides.

18. "Special category spaces" are those enclosed spaces above or below the bulkhead deck intended for the carriage of motor vehicles with fuel in their tanks for their own propulsion, into and from which such vehicles can be driven and to which passengers have access.

19. "Machinery spaces of category A" are those spaces and trunks to such spaces which contain:

1. Internal combustion machinery used for main propulsion; or
2. Internal combustion machinery used for purposes other than main propulsion where such machinery has in the aggregate a total power output of not less than 375 kW; or
3. Any oil-fired boiler or oil fuel unit.

20. "Machinery spaces" are all machinery spaces of category A and all other spaces containing propulsion machinery, boilers, oil fuel units, steam and internal combustion engines, generators and major electrical machinery, oil filling stations, refrigerating, stabilizing, ventilation and air conditioning machinery, and similar spaces, and trunks to such spaces.

21. "Oil fuel unit" is the equipment used for the preparation of oil fuel for delivery to an oil-fired boiler, or equipment used for the preparation for delivery of heated oil to an internal combustion engine, and includes any oil pressure pumps, filters and heaters dealing with oil at a pressure of more than 0.18 N/mm^2.

22. "Control stations" are those spaces in which the ship's radio or main navigation equipment or the emergency source of power is located or where the fire recording or fire control equipment is centralized.

23. "Rooms containing furniture and furnishings of restricted fire risk" are, for the purpose of regulation 26, those rooms containing furniture and furnishings of restricted fire risk (whether cabins, public spaces, offices or other types of accommodation) in which:

1. All case furniture such as desks, wardrobes, dressing tables, bureaux, dressers, is constructed entirely of approved non-combustible materials, except that a combustible veneer not exceeding 2 mm may be used on the working surface of such articles;
2. All free-standing furniture such as chairs, sofas, tables, is constructed with frames of non-combustible materials;
3. All draperies, curtains and other suspended textile materials have, to the satisfaction of the Administration, qualities of resistance to the propagation of flame not inferior to those of wool of mass 0.8 kg/m^2;*
4. All floor coverings have, to the satisfaction of the Administration, qualities of resistance to the propagation of flame not inferior to those of an equivalent woollen material used for the same purpose;
5. All exposed surfaces of bulkheads, linings and ceilings have low flame-spread characteristics; and
6. All upholstered furniture has qualities of resistance to the ignition and propagation of flame to the satisfaction of the Administration.

24. "Bulkhead deck" is the uppermost deck up to which the transverse watertight bulkheads are carried.

25. "Deadweight" is the difference in tonnes between the displacement of a ship in water of a specific gravity of 1.025 at the load water-line corresponding to the assigned summer freeboard and the lightweight of the ship.

26. "Lightweight" is the displacement of a ship in tonnes without cargo, fuel, lubricating oil, ballast water, fresh water and feedwater in tanks, consumable stores, and passengers and crew and their effects.

27. "Combination carrier" is a tanker designed to carry oil or alternatively solid cargoes in bulk.

28. "Crude oil" is any oil occurring naturally in the earth whether or not treated to render it suitable for transportation and includes:

1. Crude oil from which certain distillate fractions may have been removed; and
2. Crude oil to which certain distillate fractions may have been added.

29. "Dangerous goods" are those goods referred to in regulation VII/2.

30. "Chemical tanker" is a tanker constructed or adapted and used for the carriage in bulk of any liquid product of a flammable nature listed in the summary of minimum requirements of the Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk to be adopted by the Maritime Safety Committee under the authority of the Assembly of the Organization conferred by resolution A.490(XII), hereinafter referred to as "Bulk Chemical Code", as may be amended by the Organization.

31. "Gas carrier" is a tanker constructed or adapted and used for the carriage in bulk of any liquefied gas or certain other substances of a flammable nature listed in chapter XIX of the Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk adopted by the Organization by resolution A.328(IX), hereinafter referred to as "Gas Carrier Code", as has been or may be amended by the Organization.

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* Reference is made to Recommendation on Test Method for Determining the Resistance to Flame of Vertically Supported Textiles and Films, adopted by the Organization by resolution A.471(XII).[1]

[1] International Maritime Organization, *Resolutions and Other Decisions, Assembly, Twelfth Session*, 9-20 November 1981, p. 117.

Regulation 4. FIRE PUMPS, FIRE MAINS, HYDRANTS AND HOSES

1. Every ship shall be provided with fire pumps, fire mains, hydrants and hoses complying as applicable with the requirements of this Regulation.

2. *Capacity of fire pumps*

2.1. The required fire pumps shall be capable of delivering for fire-fighting purposes a quantity of water, at the pressure specified in paragraph 4, as follows:

1. Pumps in passenger ships, not less than two-thirds of the quantity required to be dealt with by the bilge pumps when employcd for bilge pumping; and
2. Pumps in cargo ships, other than any emergency pump, not less than four-thirds of the quantity required under regulation II-1/21 to be dealt with by each of the independent bilge pumps in a passenger ship of the same dimension when employed in bilge pumping, provided that in no cargo ship need the total required capacity of the fire pumps exceed 180 m^3/hour.

2.2. Each of the required fire pumps (other than any emergency pump required in paragraph 3.3.2 for cargo ships) shall have a capacity not less than 80 per cent of the total required capacity divided by the minimum number of required fire pumps but in any case not less than 25 m^3/hour and each such pump shall in any event be capable of delivering at least the two required jets of water. These fire pumps shall be capable of supplying the fire main system under the required conditions. Where more pumps than the minimum of required pumps are installed the capacity of such additional pumps shall be to the satisfaction of the Administration.

3. *Arrangements of fire pumps and of fire mains*

3.1. Ships shall be provided with independently driven fire pumps as follows:

1. Passenger ships of 4,000 tons gross tonnage and upwards: at least three
2. Passenger ships of less than 4,000 tons gross tonnage and cargo ships of 1,000 tons gross tonnage and upwards: at least two
3. Cargo ships of less than 1,000 tons gross tonnage: to the satisfaction of the Administration

3.2. Sanitary, ballast, bilge or general service pumps may be accepted as fire pumps, provided that they are not normally used for pumping oil and that if they are subject to occasional duty for the transfer or pumping of oil fuel, suitable change-over arrangements are fitted.

3.3. The arrangement of sea connexions, fire pumps and their sources of power shall be such as to ensure that:

1. In passenger ships of 1,000 tons gross tonnage and upwards, in the event of a fire in any one compartment all the fire pumps will not be put out of action.
2. In cargo ships of 2,000 tons gross tonnage and upwards if a fire in any one compartment could put all the pumps out of action there shall be an alternative means consisting of a fixed independently driven emergency pump which shall be capable of supplying two jets of water to the satisfaction of the Administration. The pump and its location shall comply with the following requirements:

   2.1. The capacity of the pump shall not be less than 40 per cent of the total capacity of the fire pumps required by this Regulation and in any case not less than 25 m^3/hour.

   2.2. When the pump is delivering the quantity of water required by paragraph 3.3.2.1 the pressure at any hydrant shall be not less than the minimum pressures given in paragraph 4.2.

   2.3. Any diesel driven power source for the pump shall be capable of being readily started in its cold condition down to a temperature of 0 ° C by hand (manual) cranking. If this is impracticable, or if lower temperatures are likely to be encountered, consideration is to be given to the provision and maintenance of heating arrangements, acceptable to the Administration, so that ready starting will be assured. If hand (manual) starting is impracticable the Administration may permit other means

of starting. These means shall be such as to enable the diesel driven power source to be started at least 6 times within a period of 30 minutes, and at least twice within the first 10 minutes.

2.4. Any service fuel tank shall contain sufficient fuel to enable the pump to run on full load for at least three hours and sufficient reserves of fuel shall be available outside the main machinery space to enable the pump to be run on full load for an additional 15 hours.

2.5. The total suction head of the pump shall not exceed 4.5 m under all conditions of list and trim likely to be encountered in service and the suction piping shall be designed to minimize suction losses.

2.6. The boundaries of the space containing the fire pump shall be insulated to a standard of structural fire protection equivalent to that required for a control [station] in regulation 44.

2.7. No direct access shall be permitted between the machinery space and the space containing the emergency fire pump and its source of power. When this is impracticable an Administration may accept an arrangement where the access is by means of an airlock, each of the two doors being self-closing, or through a watertight door capable of being operated from a space remote from the machinery space and the space containing the emergency fire pump and unlikely to be cut off in the event of fire in those spaces. In such cases a second means of access to the space containing the emergency fire pump and its source of power shall be provided.

2.8. Ventilation arrangements to the space containing the independent source of power for the emergency fire pump shall be such as to preclude, as far as practicable, the possibility of smoke from a machinery space fire entering or being drawn into that space.

3. In passenger ships of less than 1,000 tons gross tonnage and cargo ships of less than 2,000 tons gross tonnage, if a fire in any one compartment could put all the pumps out of action the alternative means of providing water for fire-fighting purposes are to the satisfaction of the Administration.

4. In addition, in cargo ships where other pumps, such as general service, bilge and ballast, etc., are fitted in a machinery space, arrangements shall be made to ensure that at least one of these pumps, having the capacity and pressure required by paragraphs 2.2 and 4.2, is capable of providing water to the fire main.

3.4. The arrangements for the ready availability of water supply shall be:

1. In passenger ships of 1,000 tons gross tonnage and upwards such that at least one effective jet of water is immediately available from any hydrant in an interior location and so as to ensure the continuation of the output of water by the automatic starting of a required fire pump;

2. In passenger ships of less than 1,000 tons gross tonnage and in cargo ships to the satisfaction of the Administration;

3. In cargo ships with a periodically unattended machinery space or when only one person is required on watch there shall be immediate water delivery from the fire main system at a suitable pressure, either by remote starting of one of the main fire pumps with remote starting from the navigating bridge and fire control station, if any, or permanent pressurization of the fire main system by one of the main fire pumps, except that the Administration may waive this requirement for cargo ships of less than 1,600 tons gross tonnage if the arrangement of the machinery space access makes it unnecessary;

4. In passenger ships, if fitted with periodically unattended machinery spaces in accordance with Regulation II-1/54, the Administration shall determine provisions for fixed water

fire-extinguishing arrangement for such spaces equivalent to those required for normally attended machinery spaces.

3.5. Relief valves shall be provided in conjunction with all fire pumps if the pumps are capable of developing a pressure exceeding the design pressure of the water service pipes, hydrants and hoses. These valves shall be so placed and adjusted as to prevent excessive pressure in any part of the fire main system.

3.6. In tankers isolation valves shall be fitted in the fire main at poop front in a protected position and on the tank deck at intervals of not more than 40 m to preserve the integrity of the fire main system in case of fire or explosion.

4. *Diameter of and pressure in the fire mains*

4.1. The diameter of the fire main and water service pipes shall be sufficient for the effective distribution of the maximum required discharge from two fire pumps operating simultaneously; except that in the case of cargo ships the diameter need only be sufficient for the discharge of 140 m^3/hour.

4.2. With the two pumps simultaneously delivering through nozzles specified in paragraph 8 the quantity of water specified in paragraph 4.I, through any adjacent hydrants, the following minimum pressures shall be maintained at all hydrants:

- Passenger ships:
  - 4,000 tons gross tonnage and upwards: 0.31 N/mm^2
  - 1,000 tons gross tonnage and upwards but under 4,000 tons gross tonnage: 0.27 N/mm^2
  - Under 1,000 tons gross tonnage: to the satisfaction of the Administration
- Cargo ships:
  - 6,000 tons gross tonnage and upwards: 0.27 N/mm^2
  - 1,000 tons gross tonnage and upwards but under 6,000 tons gross tonnage: 0.25 N/mm^2
  - Under 1,000 tons gross tonnage: to the satisfaction of the Administration

4.3. The maximum pressure at any hydrant shall not exceed that at which the effective control of a fire hose can be demonstrated.

5. *Number and position of hydrants*

5.1. The number and position of hydrants shall be such that at least two jets of water not emanating from the same hydrant, one of which shall be from a single length of hose, may reach any part of the ship normally accessible to the passengers or crew while the ship is being navigated and any part of any cargo space when empty, any ro/ro cargo space or any special category space in which latter case the two jcts shall reach any part of such space, each from a single length of hose. Furthermore, such hydrants shall be positioned near the accesses to the protected spaces.

5.2. In the accommodation, service and machinery spaces of passenger ships the number and position of hydrants shall be such that the requirements of paragraph 5.1 may be complied with when all watertight doors and all doors in main vertical zone bulkheads are closed.

5.3. Where, in a passenger ship, access is provided to a machinery space of category A at a low level from an adjacent shaft tunnel, two hydrants shall be provided external to, but near the entrance to that machinery space. Where such access is provided from other spaces, in one of those spaces two hydrants shall be provided near the entrance to the machinery space of category A. Such provision need not be made where the tunnel or adjacent spaces are not part of the escape route.

6. *Pipes and hydrants*

6.1. Materials readily rendered ineffective by heat shall not be used for fire mains and hydrants unless adequately protected. The pipes and hydrants shall be so placed that the fire hoses may be easily coupled to them. The arrangement of pipes and hydrants shall be such as to avoid

the possibility of freezing. In ships where deck cargo may be carried, the positions of the hydrants shall be such that they are always readily accessible and the pipes shall be arranged as far as practicable to avoid risk of damage by such cargo. Unless one hose and nozzle is provided for each hydrant in the ship, there shall be complete interchangeability of hose couplings and nozzles.

6.2. A valve shall be fitted to serve each fire hose so that any fire hose may be removed while the fire pumps are at work.

6.3. Isolating valves to separate the section of the fire main within the machinery space containing the main fire pump or pumps from the rest of the fire main shall be fitted in an easily accessible and tenable position outside the machinery spaces. The fire main shall be so arranged that when the isolating valves are shut all the hydrants on the ship, except those in the machinery space referred to above, can be supplied with water by a fire pump not located in this machinery space through pipes which do not enter this space. Exceptionally, the Administration may permit short lengths of the emergency fire pump suction and discharge piping to penetrate the machinery space if it is impracticable to route it externally provided that the integrity of the fire main is maintained by the enclosure of the piping in a substantial steel casing.

7. *Fire hoses*

7.1. Fire hoses shall be of material approved by the Administration and shall be sufficient in length to project a jet of water to any of the spaces in which they may be required to be used. Their maximum length shall be to the satisfaction of the Administration. Each hose shall be provided with a nozzle and the necessary couplings. Hoses specified in this chapter as "fire hoses" shall together with any necessary fittings and tools be kept ready for use in conspicuous positions near the water service hydrants or connexions. Additionally in interior locations in passenger ships carrying more than 36 passengers fire hoses shall be connected to the hydrants at all times.

7.2. Ships shall be provided with fire hoses the number and diameter of which shall be to the satisfaction of the Administration.

7.3. In passenger ships there shall be at least one fire hose for each of the hydrants required by paragraph 5 and these hoses shall be used only for the purposes of extinguishing fires or testing the fire-extinguishing apparatus at fire drills and surveys.

7.4.1. In cargo ships of 1,000 tons gross tonnage and upwards the number of fire hoses to be provided shall be one for each 30 m length of the ship and one spare but in no case less than five in all. This number does not include any hoses required in any engine or boiler room. The Administration may increase the number of hoses required so as to ensure that hoses in sufficient number are available and accessible at all times, having regard to the type of ship and the nature of trade in which the ship is employed.

7.4.2. In cargo ships of less than 1,000 tons gross tonnage the number of fire hoses to be provided shall be to the satisfaction of the Administration.

8. *Nozzles*

8.1. For the purposes of this chapter, standard nozzle sizes shall be 12 mm, 16 mm and 19 mm or as near thereto as possible. Larger diameter nozzles may be permitted at the discretion of the Administration.

8.2. For accommodation and service spaces, a nozzle size greater than 12 mm need not be used.

8.3. For machinery spaces and exterior locations, the nozzle size shall be such as to obtain the maximum discharge possible from two jets at the pressure mentioned in paragraph 4 from the smallest pump, provided that a nozzle size greater than 19 mm need not be used.

8.4. All nozzles shall be of an approved dual purpose type (i.e. spray/jet type) incorporating a shut-off.

9. *Location and arrangement of water pumps, etc., for other fire-extinguishing systems*

Pumps required for the provision of water for other fire-extinguishing systems required by this chapter, their sources of power and their controls shall be installed outside the space or spaces protected by such systems and shall be so arranged that a fire in the space or spaces protected will not put any such system out of action.

Regulation 5. FIXED GAS FIRE-EXTINGUISHING SYSTEMS

1. *General*

1.1. The use of a fire-extinguishing medium which, in the opinion of the Administration, either by itself or under expected conditions of use gives off toxic gases in such quantities as to endanger persons shall not be permitted.

1.2. The necessary pipes for conveying fire-extinguishing medium into protected spaces shall be provided with control valves so marked as to indicate clearly the spaces to which the pipes are led. Suitable provision shall be made to prevent inadvertent admission of the medium to any space. Where a cargo space fitted with a gas fire-extinguishing system is used as a passenger space the gas connexion shall be blanked during such use.

1.3. The piping for the distribution of fire-extinguishing medium shall be arranged and discharge nozzles so positioned that a uniform distribution of medium is obtained.

1.4. Means shall be provided to close all openings which may admit air to or allow gas to escape from a protected space.

1.5. Where the volume of free air contained in air receivers in any space is such that, if released in such space in the event of fire, such release of air within that space would seriously affect the efficiency of the fixed fire-extinguishing system, the Administration shall require the provision of an additional quantity of fire-extinguishing medium.

1.6. Means shall be provided for automatically giving audible warning of the release of fire-extinguishing medium into any space in which personnel normally work or to which they have access. The alarm shall operate for a suitable period before the medium is released.

1.7. The means of control of any fixed gas fire-extinguishing system shall be readily accessible and simple to operate and shall be grouped together in as few locations as possible at positions not likely to be cut off by a fire in a protected space. At each location there shall be clear instructions relating to the operation of the system having regard to the safety of personnel.

1.8. Automatic release of fire-extinguishing medium shall not be permitted, except as permitted by paragraph 3.3.5 and in respect of local automatically operated units referred to in paragraphs 3.4 and 3.5.

1.9. Where the quantity of extinguishing medium is required to protect more than one space, the quantity of medium available need not be more than the largest quantity required for any one space so protected.

1.10. Except as otherwise permitted by paragraphs 3.3, 3.4 or 3.5 pressure containers required for the storage of fire-extinguishing medium, other than steam, shall be located outside protectcd spaces in accordance with paragraph 1.13.

1.11. Means shall be provided for the crew to safely check the quantity of medium in the containers.

1.12. Containers for the storage of fire-extinguishing medium and associated pressure components shall be designed to pressure codes of practice to the satisfaction of the Administration having regard to their locations and maximum ambient temperatures expected in service.

1.13. When the fire-extinguishing medium is stored outside a protected space, it shall be stored in a room which shall be situated in a safe and readily accessible position and shall be effectively ventilated to the satisfaction of the Administration. Any entrance to such a storage room shall preferably be from the open deck and in any case shall be independent of the protected

space. Access doors shall open outwards, and bulkheads and decks including doors and other means of closing any opening therein, which form the boundaries between such rooms and adjoining enclosed spaces shall be gastight. For the purpose of the application of the integrity tables in regulations 26, 27, 44 and 58, such storage rooms shall be treated as control stations.

1.14. Spare parts for the system shall be stored on board and be to the satisfaction of the Administration.

2. *Carbon dioxide systems*

2.1. For cargo spaces the quantity of carbon dixoide available shall, unless otherwise provided, be sufficient to give a minimum volume of free gas equal to 30 per cent of the gross volume of the largest cargo space so protected in the ship.

2.2. For machinery spaces the quantity of carbon dioxide carried shall be [sufficient] to give a minimum [volume] of free gas equal to the larger of the following [volumes], either:

1. 40 per cent of the gross volume of the largest machinery space so protected, the volume to exclude that part of the casing above the level at which the horizontal area of the casing is 40 per cent or less of the horizontal area of the space concerned taken midway between the tank top and the lowest part of the casing; or
2. 35 per cent of the gross volume of the largest machinery space protected, including the casing;

provided that the above-mentioned percentages may be reduced to 35 per cent and 30 per cent respectively for cargo ships of less than 2,000 tons gross tonnage; provided also that if two or more machinery spaces are not entirely separate they shall be considered as forming one space.

2.3. For the purpose of this paragraph the volume of free carbon dioxide shall be calculated at 0.56 m^3/kg.

2.4. For machinery spaces the fixed piping system shall be such that 85 per cent of the gas can be discharged into the space within 2 minutes.

3. *Halogenated hydrocarbon systems*

3.1. The use of halogenated hydrocarbons as fire-extinguishing media is only permitted in machinery spaces, pumprooms and in cargo spaces intended solely for the carriage of vehicles which are not carrying any cargo.

3.2. When halogenated hydrocarbons are used as the fire-extinguishing media in total flooding systems:

1. The system shall be arranged for manual initiation of power release only.
2. If the charge of halogenated hydrocarbon is required to supply more than one space, the arrangements for its storage and release shall be such that compliance with paragraphs 3.2.9 or 3.2.10 respectively, is obtained.
3. Means shall be provided for automatically stopping all ventilation fans serving the protected space before the medium is released.
4. Means shall be provided to manually close all dampers in the ventilation system serving a protected space.
5. The discharge arrangements shall be so designed that the minimum quantity of medium required for cargo spaces or machinery spaces in paragraphs 3.2.9 or 3.2.10 respectively can be substantially discharged in a nominal 20 seconds or less based on the discharge of the liquid phase.
6. The system shall be designed to operate within a temperature range to the satisfaction of the Administration.
7. The discharge shall not endanger personnel engaged on maintenance of equipment or using the normal access ladders and escapes serving the space.
8. Means shall be provided for the crew to safely check the pressure within containers.

9. The quantity of extinguishing medium for cargo spaces intended solely for the carriage of vehicles which are not carrying any cargo shall be calculated in accordance with table 5.1. This quantity shall be based on the gross volume of the protected space. In respect of Halon 1301 and 1211, the quantity shall be calculated on a volumetric ratio basis, and in respect of Halon 2402 on a mass per unit volume basis.

Table 5.1

Halon	*Minimum*	*Maximum*
1301	5 per cent	7 per cent
1211	5 per cent	5.5 per cent
2402	0.23 kg/m^3	0.30 kg/m^3

10. The quantity of extinguishing media for machinery spaces shall be calculated in accordance with table 5.2. This quantity shall be based on the gross volume of the space in respect of the minimum concentration and the net volume of the space in respect of the maximum concentration, including the casing. In respect of Halon 1301 and 1211, the quantity shall be calculated on a volumetric ratio basis, and in respect of Halon 2402 on a mass per unit volume basis.

Table 5.2

Halon	*Minimum*	*Maximum*
1301	4.25 per cent	7 per cent
1211	4.25 per cent	5.5 per cent
2402	0.20 kg/m^3	0.30 kg/m^3

11. For the purpose of paragraphs 3.2.9 and 3.2.10, the volume of Halon 1301 shall be calculated at 0.16 m^3/kg and the volume of Halon 1211 shall be calculated at 0.14 m^3/kg.

3.3. Only Halon 1301 may be stored within a protected machinery space. Containers shall be individually distributed throughout that space and the following requirements shall be complied with:

1. A manually initiated power release, located outside the protected space, shall be provided. Duplicate sources of power shall be provided for this release and shall be located outside the protected space and be immediately available except that for machinery spaces, one of the sources of power may be located inside the protected space.
2. Electric power circuits connecting the containers shall be monitored for fault conditions and loss of power. Visual and audible alarms shall be provided to indicate this.
3. Pneumatic or hydraulic power circuits connecting the containers shall be duplicated. The sources of pneumatic or hydraulic pressure shall be monitored for loss of pressure. Visual and audible alarms shall be provided to indicate this.
4. Within the protected space, electrical circuits essential for the release of the system shall be heat resistant e.g. mineral insulated cable or equivalent. Piping systems essential for the release of systems designed to be operated hydraulically or pneumatically shall be of steel or other equivalent heat-resisting material to the satisfaction of the Administration.
5. Each pressure container shall be fitted with an automatic overpressure release device which, in the event of the container being exposed to the effects of fire and the system not being operated, will safely vent the contents of the container into the protected space.
6. The arrangement of containers and the electrical circuits and piping essential for the release of any system shall be such that in the event of damage to any one power release line through fire or explosion in a protected space, i.e. a single fault concept, at least two thirds of the fire-extinguishing charge required by paragraphs 3.2.9 or 3.2.10 for that space can still be discharged having regard to the requirement for uniform distribution of medium

throughout the space. The arrangements in respect of systems for spaces requiring only one or two containers shall be to the satisfaction of the Administration.

7. Not more than two discharge nozzles shall be fitted to any pressure container and the maximum quantity of agent in each container shall be to the satisfaction of the Administration having regard to the requirement for uniform distribution of medium throughout the space.
8. The containers shall be monitored for decrease in pressure due to leakage and discharge. Visual and audible alarms in the protected area and on the navigating bridge or in the space where the fire control equipment is centralized shall be provided to indicate this condition, except that for cargo spaces, alarms are only required on the navigating bridge or the space where the fire control equipment is centralized.

3.4. Local automatically operated fixed fire-extinguishing units containing Halon 1301 or 1211, fitted in enclosed areas of high fire risk within machinery spaces, in addition to, and independent of, any required fixed fire-extinguishing system may be accepted subject to compliance with the following:

1. The space in which such additional local protection is provided shall preferably be on one working level and on the same level as the access. At the discretion of the Administration more than one working level may be permitted subject to an access being provided on each level.
2. The size of the space and arrangements of accesses thereto and machinery therein, shall be such that escape from anywhere in the space can be effected in not more than 10 seconds.
3. The operation of any unit shall be signalled both visually and audibly outside each access to the machinery space and at the navigating bridge or in the space where the fire control equipment is centralized.
4. A notice indicating that the space contains one or more automatically operated fire-extinguishing units and stating which medium is used, shall be displayed outside each access thereto.
5. Discharge nozzles shall be so positioned that the discharge does not endanger personnel using the normal access ladders and escapes serving the compartment. Provision shall also be made to protect personnel engaged in maintenance of machinery from inadvertent discharge of the medium.
6. The fire-extinguishing units shall be designed to operate within a temperature range to the satisfaction of the Administration.
7. Means shall be provided for the crew to safely check the pressure within the containers.
8. The total quantity of extinguishing medium provided in the local automatically operated units shall be such that a concentration of 7 per cent in respect of Halon 1301 and 5.5 per cent in respect of Halon 1211 at 20°C based on the net volume of the enclosed space is not exceeded. This requirement applies when either a local automatically operated unit or a fixed system fitted in compliance with paragraph 3.2 has operated, but not when both have operated. The volume of Halon 1301 shall be calculated at 0.16 m^3/kg and the volume of Halon 1211 shall be calculated at 0.14 m^3/kg.
9. The time of discharge of a unit, based on the discharge of the liquid phase, shall be 10 seconds or less.
10. The arrangement of local automatically operated fire-extinguishing units shall be such that their release does not result in loss of electrical power or reduction of the manoeuvrability of the ship.

3.5. Automatically operated fire-extinguishing units, as described in paragraph 3.4, fitted in machinery spaces over equipment having a high fire risk, in addition to and independent of any required fixed fire-extinguishing system, may be accepted subject to compliance with paragraphs 3.4.3 to 3.4.6, 3.4.9 and 3.4.10 and with the following:

1. The quantity of medium provided in local automatically operated units shall be such that a vapour in air concentration not greater than 1.25 per cent at 20 ° C based on the gross volume of the machinery space is obtained in the event of their simultaneous operation.
2. The volume of Halon 1301 shall be calculated at 0.16 m^3/kg and the volume of Halon 1211 shall be calculated at 0.14 m^3/kg.

4. *Steam systems*

In general, the Administration shall not permit the use of steam as a fire-extinguishing medium in fixed fire-extinguishing systems. Where the use of steam is permitted by the Administration it shall be used only in restricted areas as an addition to thc required fire-extinguishing medium and with the proviso that the boiler or boilers available for supplying steam shall have an evaporation of at least 1.0 kg of steam per hour for each 0.75 m^3 of the gross volume of the largest space so protected. In addition to complying with the foregoing requirements the systems in all respects shall be as determined by, and to the satisfaction of, the Administration.

5. *Other gas systems*

5.1. Where gas other than carbon dioxide or halogenated hydrocarbons, or steam as permitted by paragraph 4 is produced on thc ship and is used as a fire-extinguishing medium, it shall be a gaseous product of fuel combustion in which the oxygen content, the carbon monoxide content, the corrosive elements and any solid combustible elements have been reduced to a permissible minimum.

5.2. Where such gas is used as the fire-extinguishing medium in a fixed fire-extinguishing system for the protection of machinery spaces it shall afford protection equivalent to that provided by a fixed system using carbon dioxide as the medium.

5.3. Where such gas is used as a fire-extinguishing medium in a fixed fire-extinguishing system for the protection of cargo spaces, a sufficient quantity of such gas shall be available to supply hourly a volume of free gas at least equal to 25 per cent of the gross volume of the largest space protected in this way for a period of 72 hours.

Regulation 6. FIRE EXTINGUISHERS

1. *All fire extinguishers shall be of approved types and designs.*

1.1. The capacity of required portable fluid extinguishers shall be not more than 13.5 *l* and not less than 9 *l*. Other extinguishers shall be at least as portable as the 13.5 *l* fluid extinguisher and shall have a fire-extinguishing capability at least equivalent to that of a 9 *l* fluid extinguisher.

1.2. The Administration shall determine the equivalents of fire extinguishers.

2. Spare charges shall be provided in accordance with requirements to be specified by the Administration.

3. Fire extinguishers containing an extinguishing medium which, in the opinion of the Administration, either by itself or under expected conditions of use gives off toxic gases in such quantities as to endanger persons shall not be permitted.

4. A portable foam applicator unit shall consist of an air-foam nozzle of an inductor type capable of being connected to the fire main by a fire hose, together with a portable tank containing at least 20 *l* of foam-making liquid and one spare tank. The nozzle shall be capable of producing effective foam suitable for extinguishing an oil fire, at the rate of at least 1.5 m^3/minute.

5. Fire extinguishers shall be periodically examined and subjected to such tests as the Administration may require.

6. One of the portable fire extinguishers intended for use in any space shall be stowed near the entrance to that space.

7. Accommodation spaces, service spaces and control stations shall be [sufficient] with portable fire extinguishers of appropriate types and in sufficient number to the satisfaction of the Administration. Ships of 1,000 tons gross tonnage and upwards shall carry at least five portable fire cxtinguishers.

Regulation 7. FIRE-EXTINGUISHING ARRANGEMENTS IN MACHINERY SPACES

1. *Spaces containing oil-fired boilers or oil fuel units*

1.1. Machinery spaces of category A containing oil-fired boilers or oil fuel units shall be provided with any one of the following fixed fire-extinguishing systems:

1. A gas system complying with the provisions of regulation 5;
2. A high expansion foam system complying with the provisions of regulation 9;
3. A pressure water-spraying system complying with the provisions of regulation 10.

In each case if the engine and boiler rooms are not entirely separate, or if fuel oil can drain from the boiler room into the engine room, the combined engine and boiler rooms shall be considered as one compartment.

1.2. There shall be in each boiler room at least one set of portable [foam applicator unit] complying with the provisions of regulation 6.4.

1.3. There shall be at least two portable foam extinguishers or equivalent in each firing space in each boiler room and in each space in which a part of the oil fuel installation is situated. There shall be not less than one approved foam-type extinguisher of at least 135 *l* capacity or equivalent in each boiler room. These extinguishers shall be provided with hoses on reels suitable for reaching any part of the boiler room. In the case of domestic boilers of less than 175 kW in cargo ships the Administration may consider relaxing the requirements of this paragraph.

1.4. In each firing space there shall be a receptacle containing sand, sawdust impregnated with soda, or other approved dry material in such quantity as may be required by the Administration. An approved portable extinguisher may be substituted as an alternative:

2. *Spaces containing internal combustion machinery*

Machinery spaces of category A containing internal combustion machinery shall be provided with:

1. One of the fire-extinguishing systems required by paragraph 1.1.
2. At least one set of portable air-foam equipment complying with the provisions of regulation 6.4.
3. In each such space approved foam type fire extinguishers, each of at least 45 *l* capacity or equivalent, sufficient in number to enable foam or its equivalent to be directed on to any part of the fuel and lubricating oil pressure systems, gearing and other fire hazards. In addition, there shall be provided a sufficient number of portable foam extinguishers or equivalent which shall be so located that no point in the space is more than 10 m walking distance from an extinguisher and that there are at least two such extinguishers in each such space. For smaller spaces of cargo ships the Administration may consider relaxing this requirement.

3. *Spaces containing steam turbines or enclosed steam engines*

In spaces containing steam turbines or enclosed steam engines used either for main propulsion or for other purposes when such machinery has in the aggregate a total power output of not less than 375 kW there shall be provided:

1. Approved foam fire extinguishers each of at least 45 *l* capacity or equivalent sufficient in number to enable foam or its equivalent to be directed on to any part of the pressure lubrication system, on to any part of the casings enclosing pressure lubricated parts of the turbines, engines or associated gearing, and any other fire hazards. However, such extinguishers

shall not be required if protection at least equivalent to that required by this sub-paragraph is provided in such spaces by a fixed fire-extinguishing system fitted in compliance with paragraph 1.1.

2. A sufficient number of portable foam extinguishers or equivalent which shall be so located that no point in the space is more than 10 m walking distance from an extinguisher and that there are at least two such extinguishers in each such space, except that such extinguishers shall not be required in addition to any provided in compliance with paragraph 1.3.

3. One of the fire-extinguishing systems required by paragraph 1.1, where such spaces are periodically unattended.

4. *Fire-extinguishing appliances in other machinery spaces*

Where, in the opinion of the Administration, a fire hazard exists in any machinery space for which no specific provisions for fire-extinguishing appliances are prescribed in paragraphs 1, 2 and 3, there shall be provided in, or adjacent to, that space such a number of approved portable fire extinguishers or other means of fire extinction as the Administration may deem sufficient.

5. *Fixed fire-extinguishing systems not required by this chapter*

Where a fixed fire-extinguishing system not required by this chapter is installed, such a system shall be to the satisfaction of the Administration.

6. *Machinery spaces of category A in passenger ships*

In passenger ships carrying more than 36 passengers each machinery space of category A shall be provided with at least two suitable water fog applicators.*

Regulation 8. FIXED LOW-EXPANSION FOAM FIRE-EXTINGUISHING SYSTEMS IN MACHINERY SPACES

1. Where in any machinery space a fixed low-expansion foam fire-extinguishing system is fitted in addition to the requirements of regulation 7, such system shall be capable of discharging through fixed discharge outlets in not more than five minutes a quantity of foam sufficient to cover to a depth of 150 mm the largest single area over which oil fuel is liable to spread. The system shall be capable of generating foam suitable for extinguishing oil fires. Means shall be provided for effective distribution of the foam through a permanent system of piping and control valves or cocks to suitable discharge outlets, and for the foam to be effectively directed by fixed sprayers on other main fire hazards in the protected space. The expansion ratio of the foam shall not exceed 12 to 1.

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

Regulation 9. FIXED HIGH-EXPANSION FOAM FIRE-EXTINGUISHING SYSTEMS IN MACHINERY SPACES

1.1. Any required fixed high-expansion foam system in machinery spaces shall be capable of rapidly discharging through fixed discharge outlets a quantity of foam sufficient to fill the greatest space to be protected at a rate of at least 1 m in depth per minute. The quantity of foam-forming liquid available shall be sufficient to produce a volume of foam equal to five times the volume of the largest space to be protected. The expansion ratio of the foam shall not exceed 1,000 to 1.

1.2. The Administration may permit alternative arrangements and discharge rates provided that it is satisfied that equivalent protection is achieved.

* A water fog applicator might consist of a metal "L" -shaped pipe, the long limb being about 2 m in length capable of being fitted to a fire hose and the short limb being about 250 mm in length fitted with a fixed water fog nozzle or capable of being fitted with a water spray nozzle.

2. Supply ducts for delivering foam, air intakes to the foam generator and the number of foam-producing units shall in the opinion of the Administration be such as will provide effective foam production and distribution.

3. The arrangement of the foam generator delivery ducting shall be such that a fire in the protected space will not affect the foam generating equipment.

4. The foam generator, its sources of power supply, foam-forming liquid and means of controlling the system shall be readily accessible and simple to operate and shall be grouped in as few locations as possible at positions not likely to be cut off by a fire in the protected space.

Regulation 10. FIXED PRESSURE WATER-SPRAYING FIRE-EXTINGUISHING SYSTEMS IN MACHINERY SPACES

1. Any required fixed pressure water-spraying fire-extinguishing system in machinery spaces shall be provided with spraying nozzles of an approved type.

2. The number and arrangement of the nozzles shall be to the satisfaction of the Administration and shall be such as to ensure an effective average distribution of water of at least 5 l/m^2 per minute in the spaces to be protected. Where increased application rates are considered necessary, these shall be to the satisfaction of the Administration. Nozzles shall be fitted above bilges, tank tops and other areas over which oil fuel is liable to spread and also above other specific fire hazards in the machinery spaces.

3. The system may be divided into sections, the distribution valves of which shall be operated from easily accessible positions outside the spaces to be protected and will not be readily cut off by a fire in the protected space.

4. The system shall be kept charged at the necessary pressure and the pump supplying the water for the system shall be put automatically into action by a pressure drop in the system.

5. The pump shall be capable of simultaneously supplying at the necessary pressure all sections of the system in any one compartment to be protected. The pump and its controls shall be installed outside the space or spaces to be protected. It shall not be possible for a fire in the space or spaces protected by the water-spraying system to put the system out of action.

6. The pump may be driven by independent internal combustion machinery but, if it is dependent upon power being supplied from the emergency generator fitted in compliance with the provisions of regulation II-1/44 or regulation II-1/45, as appropriate, that generator shall be so arranged as to start automatically in case of main power failure so that power for the pump required by paragraph 5 is immediately available. When the pump is driven by independent internal combustion machinery it shall be so situated that a fire in the protected space will not affect the air supply to the machinery.

7. Precautions shall be taken to prevent the nozzles from becoming clogged by impurities in the water or corrosion of piping, nozzles, valves and pump.

Regulation 11. SPECIAL ARRANGEMENTS IN MACHINERY SPACES

1. The provisions of this regulation shall apply to machinery spaces of category A and, where the Administration considers it desirable, to other machinery spaces.

2.1. The number of skylights, doors, ventilators, openings in funnels to permit exhaust ventilation and other openings to machinery spaces shall be reduced to a minimum consistent with the needs of ventilation and the proper and safe working of the ship.

2.2. Skylights shall be of steel and shall not contain glass panels. Suitable arrangements shall be made to permit the release of smoke in the event of fire, from the space to be protected.

2.3. In passenger ships, doors other than power-operated watertight doors, shall be so arranged that positive closure is assured in case of fire in the space, by power-operated closing arrangements or by the provision of self-closing doors capable of closing against an inclination

of 3.5° opposing closure and having a fail-safe hook-back facility, provided with a remotely operated release device.

3. Windows shall not be fitted in machinery space boundaries. This does not preclude the use of glass in control rooms within the machinery spaces.

4. Means of control shall be provided for:

1. Opening and closure of skylights, closure of openings in funnels which normally allow exhaust ventilation, and closure of ventilator dampers;
2. Permitting the release of smoke;
3. Closing power-operated doors or actuating release mechanism on doors other than power-operated watertight doors;
4. Stopping ventilating fans; and
5. Stopping forced and induced draught fans, oil fuel transfer pumps, oil fuel unit pumps and other similar fuel pumps.

5. The controls required in paragraph 4 and in regulation 15.2.5 shall be located outside the space concerned, where they will not be cut off in the event of fire in the space they serve. In passenger ships such controls and the controls for any required fire-extinguishing system shall be situated at one control position or grouped in as few positions as possible to the satisfaction of the Administration. Such positions shall have a safe access from the open deck.

6. When access to any machinery space of category A is provided at a low level from an adjacent shaft tunnel, there shall be provided in the shaft tunnel, near the watertight door, a light steel fire-screen door operable from each side.

7. For periodically unattended machinery spaces in cargo ships, the Administration shall give special consideration to maintaining fire integrity of the machinery spaces, the location and centralization of the fire-extinguishing system controls, the required shut-down arrangements (e.g., ventilation, fuel pumps, etc.) and may require additional fire-extinguishing appliances and other fire-fighting equipment and breathing apparatus. In passenger ships these requirements shall be at least equivalent to those of machinery spaces normally attended.

8. [A fixed] fire detection and alarm system complying with the provisions of regulation 14 shall be fitted in any machinery space:

1. Where the installation of automatic and remote control systems and equipment has been approved in lieu of continuous manning of the space; and
2. Where the main propulsion and associated machinery including sources of main electrical supply are provided with various degrees of automatic or remote control and are under continuous manned supervision from a control room.

Regulation 12. AUTOMATIC SPRINKLER, FIRE DETECTION AND FIRE ALARM SYSTEMS

1.1. Any required automatic sprinkler, fire detection and fire alarm system shall be capable of immediate operation at all times and no action by the crew shall be necessary to set it in operation. It shall be of the wet pipe type but small exposed sections may be of the dry pipe type where in the opinion of the Administration this is a necessary precaution. Any parts of the system which may be subjected to freezing temperatures in service shall be suitably protected against freezing. It shall be kept charged at the necessary pressure and shall have provision for a continuous supply of water as required in this regulation.

1.2. Each section of sprinklers shall include means for giving a visual and audible alarm signal automatically at one or more indicating units whenever any sprinkler comes into operation. Such alarm systems shall be such as to indicate if any fault occurs in the system.

1.2.1. In passenger ships such units shall give an indication of any fire and its location in any space served by the system and shall be centralized on the navigating bridge or in the main

fire control station, which shall be so manned or equipped as to ensure that any alarm from the system is immediately received by a responsible member of the crew.

1.2.2. In cargo ships such units shall indicate in which section served by the system fire has occurred and shall be centralized on the navigating bridge and in addition, visible and audible alarms from the unit shall be placed in a position other than on the navigating bridge, so as to ensure that the indication of fire is immediately received by the crew.

2.1. Sprinklers shall be grouped into separate sections, each of which shall contain not more than 200 sprinklers. In passenger ships any section of sprinklers shall not serve more than two decks and shall not be situated in more than one main vertical zone. However, the Administration may permit such a section of sprinklers to serve more than two decks or be situated in more than one main vertical zone, if it is satisfied that the protection of the ship against fire will not thereby be reduced.

2.2. Each section of sprinklers shall be capable of being isolated by one stop valve only. The stop valve in each section shall be readily accessible and its location shall be clearly and permanently indicated. Means shall be provided to prevent the operation of the stop valves by any unauthorized person.

2.3. A gauge indicating the pressure in the system shall be provided at each section stop valve and at a central station.

2.4. The sprinklers shall be resistant to corrosion by marine atmosphere. In accommodation and service spaces the sprinklers shall come into operation within the temperature range from 68° to 79°C, except that in locations such as drying rooms, where high ambient temperatures might be expected, the operating temperature may be increased by not more than 30°C above the maximum deckhead temperature.

2.5. A list or plan shall be displayed at each indicating unit showing the spaces covered and the location of the zone in respect of each section. Suitable instructions for testing and maintenance shall be available.

3. Sprinklers shall be placed in an overhead position and [spaced] in a suitable pattern to maintain an average application rate of not less than 5 l/m^2 per minute over the nominal area covered by the sprinklers. However, the Administration may permit the use of sprinklers providing such an alternative amount of water suitably distributed as has been shown to the satisfaction of the Administration to be not less effective.

4.1. A pressure tank having a volume equal to at least twice that of the charge of water specified in this sub-paragraph shall be provided. The tank shall contain a standing charge of fresh water, equivalent to the amount of water which would be discharged in one minute by the pump referred to in paragraph 5.2, and the arrangements shall provide for maintaining an air pressure in the tank such as to ensure that where the standing charge of fresh water in the tank has been used the pressure will be not less than the working pressure of the sprinkler, plus the pressure exerted by a head of water measured from the bottom of the tank to the highest sprinkler in the system. Suitable means of replenishing the air under pressure and of replenishing the fresh water charge in the tank shall be provided. A glass gauge shall be provided to indicate the correct level of the water in the tank.

4.2. Means shall be provided to prevent the passage of sea-water into the tank.

5.1. An independent power pump shall be provided solely for the purpose of continuing automatically the discharge of water from the sprinklers. The pump shall be brought into action automatically by the pressure drop in the system before the standing fresh water charge in the pressure tank is completely exhausted.

5.2. The pump and the piping system shall be capable of maintaining the necessary pressure at the level of the highest sprinkler to ensure a continuous output of water sufficient for the simultaneous coverage of a minimum area of 280 m^2 at the application rate specified in paragraph 3.

5.3. The pump shall have fitted on the delivery side a test valve with a short open-ended discharge pipe. The effective area through the valve and pipe shall be adequate to permit the release of the required pump output while maintaining the pressure in the system specified in paragraph 4.1.

5.4. The sea inlet to the pump shall wherever possible be in the space containing the pump and shall be so arranged that when the ship is afloat it will not be necessary to shut off the supply of sea-water to the pump for any purpose other than the inspection or repair of the pump.

6. The sprinkler pump and tank shall be situated in a position reasonably remote from any machinery space of category A and shall not be situated in any space required to be protected by the sprinkler system.

7.1. In passenger ships there shall be not less than two sources of power supply for the sea-water pump and automatic alarm and detection system. Where the sources of power for the pump are electrical, these shall be a main generator and an emergency source of power. One supply for the pump shall be taken from the main switchboard, and one from the emergency switchboard by separate feeders reserved solely for that purpose. The feeders shall be so arranged as to avoid galleys, machinery spaces and other enclosed spaces of high fire risk except in so far as it is necessary to reach the appropriate switchboards, and shall be run to an automatic change-over switch situated near the sprinkler pump. This switch shall permit the supply of power from the main switchboard so long as a supply is available therefrom, and be so designed that upon failure of that supply it will automatically change over to the supply from the emergency switchboard. The switches on the main switchboard and the emergency switchboard shall be clearly labelled and normally kept closed. No other switch shall be permitted in the feeders concerned. One of the sources of power supply for the alarm and detection system shall be an emergency source. Where one of the sources of power for the pump is an internal combustion engine it shall, in addition to complying with the provisions of paragraph 6, be so situated that a fire in any protected space will not affect the air supply to the machinery.

7.2. In cargo ships there shall not be less than two sources of power supply for the sea-water pump and automatic alarm and detection system. If the pump is electrically driven it shall be connected to the main source of electrical power, which shall be capable of being supplied by at least two generators. The feeders shall be so arranged as to avoid galleys, machinery spaces and other enclosed spaces of high fire risk except in so far as it is necessary to reach the appropriate switchboards. One of the sources of power supply for the alarm and detection system shall be an emergency source. Where one of the sources of power for the pump is an internal combustion engine it shall, in addition to complying with the provisions of paragraph 6, be so situated that a fire in any protected space will not affect the air supply to the machinery.

8. The sprinkler system shall have a connexion from the ship's fire main by prevent a backflow from the sprinkler system to the fire main.

9.1. A test valve shall be provided for testing the automatic alarm for each section of sprinklers by a discharge of water equivalent to the operation of one sprinkler. The test valve for each section shall be situated near the stop valve for that section.

9.2. Means shall be provided for testing the automatic operation of the pump on reduction of pressure in the system.

9.3. Switches shall be provided at one of the indicating positions referred to in paragraph 1.2 which will enable the alarm and the indicators for each section of sprinklers to be tested.

10. Spare sprinkler heads shall be provided for each section of sprinklers to the satisfaction of the Administration.

Regulation 13. FIXED FIRE DETECTION AND FIRE ALARM SYSTEMS

1. *General requirements*

1.1. Any required fixed fire detection and fire alarm system with manually operated call points shall be capable of immediate operation at all times.

1.2. Power supplies and electric circuits necessary for the operation of the system shall be monitored for loss of power or fault conditions as appropriate. Occurrence of a fault condition shall initiate a visual and audible fault signal at the control panel which shall be distinct from a fire signal.

1.3. There shall be not less than two sources of power supply for the electrical equipment used in the operation of the fire detection and fire alarm system, one of which shall be an emergency source. The supply shall be provided by separate feeders reserved solely for that purpose. Such feeders shall run to an automatic change-over switch situated in or adjacent to the control panel for the fire detection system.

1.4. Detectors and manually operated call points shall be grouped into sections. The activation of any detector or manually operated call point shall initiate a visual and audible fire signal at the control panel and indicating units. If the signals have not received attention within two minutes an audible alarm shall be automatically sounded throughout the crew accommodation and service spaces, control stations and machinery spaces of category A. This alarm sounder system need not be an integral part of the detection system.

1.5. The control panel shall be located on the navigating bridge or in the main fire control station.

1.6. Indicating units shall denote the section in which a detector or manually operated call point has operated. At least one unit shall be so located that it is easily accessible to responsible members of the crew at all times, when at sea or in port except when the ship is out of service. One indicating unit shall be located on the navigating bridge if thc control panel is located in the main fire control station.

1.7. Clear information shall be displayed on or adjacent to each indicating unit about the spaces covered and the location of the sections.

1.8. No section covering more than one deck within accommodation, service and control stations shall normally be permitted except a section which covers an enclosed stairway. In order to avoid delay in identifying the source of firc, the number of enclosed spaces included in each section shall be limited as determined by the Administration. In no case shall more than fifty enclosed spaces be permitted in any section.

1.9. In passenger ships a section of detectors shall not scrve spaces on both sides of the ship nor on more than one deck and neither shall it be situated in more than one main vertical zone except that the Administration, if it is satisfied that the protection of the ship against fire will not thereby be reduced, may permit such a section of detectors to serve both sides of the ship and more than one deck.

1.10. A section of fire detectors which covers a control station, a service space or an accommodation spacc shall not include a machinery space of category A.

1.11. Detectors shall be operated by heat, smoke or other products of combustion, flame, or any combination of these factors. Detectors operated by other factors indicative of incipient fires may be considered by the Administration provided that they are no less sensitive than such detectors. Flame detectors shall only be used in addition to smoke or heat detectors.

1.12. Suitable instructions and components spares for testing and maintenance shall be provided.

1.13. The function of the detection system shall be periodically tested to the satisfaction of the Administration by means of equipment producing hot air at the appropriate temperature, or smoke or aerosol particles having the appropriate range of density or particle size, or

other phenomena associated with incipient fires to which the detector is designed to respond. All detectors shall be of a type such that they can be tested for correct operation and restored to normal surveillance without the renewal of any component.

1.14. The fire detection system shall not be used for any other purpose, except that closing of fire doors and similar functions may be permitted at the control panel.

2. *Installation requirements*

2.1. [Manually operated] call points shall be installed throughout the accommodation spaces, service spaces and control stations. One [manually operated] call point shall be located at each exit. [Manually operated] call points shall be readily accessible in the corridors of each deck such that no part of the corridor is more than 20 m from a [manually operated] call point.

2.2. Smoke detectors shall be installed in all stairways, corridors and escape routes within accommodation spaces. Consideration shall be given to the installation of special purpose smoke detectors within ventilation ducting.

2.3. Where a fixed fire detection and fire alarm system is required for the protection of spaces other than those specified in paragraph 2.2, at least one detector complying with paragraph 1.11 shall be installed in each such space.

2.4. Detectors shall be located for optimum performance. Positions near beams and ventilation ducts or other positions where patterns of air flow could adversely affect performance and positions where impact or physical damage is likely shall be avoided. In general, detectors which are located on the overhead shall be a minimum distance of 0.5 m away from bulkheads.

2.5. The maximum spacing of detectors shall be in accordance with the table below:

Type of detector	*Maximum floor area per detector*	*Maximum distance apart between centres*	*Maximum distance away from bulkheads*
Heat	37 m^2	9 m	4.5 m
Smoke	74 m^2	11 m	5.5 m

The Administration may require or permit other spacings based upon test data which demonstrate the characteristics of the detectors.

2.6. Electrical wiring which forms part of the system shall be so arranged as to avoid galleys, machinery spaces of category A, and other enclosed spaces of high fire risk except where it is necessary to provide for fire detection or fire alarm in such spaces or to connect to the appropriate power supply.

3. *Design requirements*

3.1. The system and equipment shall be suitably designed to withstand supply voltage variation and transients, ambient temperature changes, vibration, humidity, shock, impact and corrosion normally encountered in ships.

3.2. Smoke detectors required by paragraph 2.2 shall be certified to operate before the smoke density exceeds 12.5 per cent obscuration per metre, but not until the smoke density exceeds 2 per cent obscuration per metre. Smoke detectors to be installed in other spaces shall operate within sensitivity limits to the satisfaction of the Administration having regard to the avoidance of detector insensitivity or oversensitivity.

3.3. Heat detectors shall be certified to operate before the temperature exceeds 78 °C but not until the temperature exceeds 54 °C, when the temperature is raised to those limits at a rate less than 1 °C per minute. At higher rates of temperature rise, the heat detector shall operate within temperature limits to the satisfaction of the Administration having regard to the avoidance of detector insensitivity or oversensitivity.

3.4. At the discretion of the Administration, the permissible temperature of operation of heat detectors may be increased to 30°C above the maximum deckhead temperature in drying rooms and similar spaces of a normal high ambient temperature.

Regulation 14. FIXED FIRE DETECTION AND FIRE ALARM SYSTEMS FOR PERIODICALLY UNATTENDED MACHINERY SPACES

1. A fixed fire detection and fire alarm system in accordance with the relevant provisions of regulation 13 shall be installed in periodically unattended machinery spaces.

2. This fire detection system shall be so designed and the detectors so positioned as to detect rapidly the onset of fire in any part of those spaces and under any normal conditions of operation of the machinery and variations of ventilation as required by the possible range of ambient temperatures. Except in spaces of restricted height and where their use is specially appropriate, detection systems using only thermal detectors shall not be permitted. The detection system shall initiate audible and visual alarms distinct in both respects from the alarms of any other system not indicating fire, in sufficient places to ensure that the alarms are heard and observed on the navigating bridge and by a responsible engineer officer. When the navigating bridge is unmanned the alarm shall sound in a place where a responsible member of the crew is on duty.

3. After installation the system shall be tested under varying conditions of engine operation and ventilation.

Regulation 15. ARRANGEMENTS FOR OIL FUEL, LUBRICATING OIL AND OTHER FLAMMABLE OILS

1. *Limitations in the use of oil as fuel*

The following limitations shall apply to the use of oil as fuel:

1. Except as otherwise permitted by this paragraph, no oil fuel with a flashpoint of less than 60°C shall be used.
2. In emergency generators oil fuel with a flashpoint of not less than 43°C may be used.
3. Subject to such additional precautions as it may consider necessary and on condition that the ambient temperature of the space in which such oil fuel is stored or used shall not be allowed to rise to within 10°C below the flashpoint of the oil fuel, the Administration may permit the general use of oil fuel having a flashpoint of less than 60°C but not less than 43°C.
4. In cargo ships the use of fuel having a lower flashpoint than otherwise specified in this paragraph, for example crude oil, may be permitted provided that such fuel is not stored in any machinery space and subject to the approval by the Administration of the complete installation.

The flashpoint of oils shall be determined by an approved closed cup method.

2. *Oil fuel arrangements*

In a ship in which oil fuel is used, the arrangements for the storage, distribution and utilization of the oil fuel shall be such as to ensure the safety of the ship and persons on board and shall at least comply with the following provisions:

1. As far as practicable, parts of the oil fuel system containing heated oil under pressure exceeding 0.18 N/mm^2 shall not be placed in a concealed position such that defects and leakage cannot readily be observed. The machinery spaces in way of such parts of the oil fuel system shall be adequately illuminated.
2. The ventilation of machinery spaces shall be sufficient under all normal conditions to prevent accumulation of oil vapour.
3. As far as practicable, oil fuel tanks shall be part of the ship's structure and shall be located outside machinery spaces of category A. Where oil fuel tanks, other than double bottom

tanks, are necessarily located adjacent to or within machinery spaces of category A, at least one of their vertical sides shall be contiguous to the machinery space boundaries, and shall preferably have a common boundary with the double bottom tanks, and the area of the tank boundary common with the machinery spaces shall be kept to a minimum. Where such tanks arc situated within the boundaries of machinery spaces of category A they shall not contain oil fuel having a flashpoint of less than 60°C. In general the use of free standing oil fuel tanks shall be avoided. When such tanks are employed their use shall be prohibited in category A machinery spaces on passenger ships. Where permitted, they shall be placcd in an oil-tight spill tray of ample size having a suitable drain pipe leading to a suitably sized spill oil tank.

4. No oil fuel tank shall be situated where spillage or leakage therefrom can constitute a hazard by falling on heated surfaces. Precautions shall be taken to prevent any oil that may escape under pressure from any pump, filter or heater from coming into contact with heated surfaces.

5. Every oil fuel pipe, which, if damaged, would allow oil to escape from a storage, settling or daily service tank situated above the double bottom shall be fitted with a cock or valve directly on the tank capable of being closed from a safe position outside the space concerned in the event of a fire occurring in the space in wlıich such tanks are situated. In the special case of deep tanks situated in any shaft or pipe tunnel or similar space, valves on the tank shall be fitted but control in the event of fire may be effected by means of an additional valve on the pipe or pipes outside the tunnel or similar space. If such additional valve is fitted in the machinery space it shall be operated from a position outside this space.

6. Safe and efficient means of ascertaining the amount of oil fuel contained in any oil fuel tank shall be provided. Sounding pipes shall not terminate in any space where the risk of ignition of spillage from the sounding pipe might arise. In particular, they sliall not terminate in passenger or crew spaces. Other means of ascertaining the amount of oil fuel contained in any oil fuel tank may be permitted:

   6.1. In passenger ships, if such means do not require penetration below the top of the tank, and providing their failure or over-filling of the tanks will not permit release of fuel;

   6.2. In cargo ships, providing the failure of such means or over-filling of the tanks will not permit release of fuel. Tlıe use of cylindrical gauge glasses is prohibited. The Administration may permit the use of oil level gauges with flat glasses and self-closing valves between the gauges and oil tanks.

   Such other means sliall be acceptable to the Administration and shall be maintained in the proper condition to ensure their continued accurate functioning in service.

7. Provision shall be made to prevent overpressure in any oil tank or in any part of the oil fuel system, including the filling pipes. Any relief valves and air or overflow pipes shall discharge to a position which, in the opinion of tlıe Administration, is safe.

8. Oil fuel pipes and their valves and fittings sliall be of steel or other approved material, except that restricted use of flexiblc pipes shall be permissible in positions where the Administration is satisfied that they are necessary. Such flexible pipes and end attachments shall be of approved fire-resisting materials of adequate strength and shall be constructed to the satisfaction of the Administration.

3. *Lubricating oil arrangements*

The arrangements for the storage, distribution and utilization of oil used in pressure lubrication systems shall be such as to ensure the safety of the ship and persons on board, and such arrangements in machinery spaces of category A and whenever practicable in other machinery spaces shall at least comply with the provisions of paragraphs 2.1, 2.4, 2.5, 2.6, 2.7 and 2.8,

except that this does not preclude the use of sight flow glasses in lubricating systems provided that they are shown by test to have a suitable degree of fire resistance.

4. *Arrangements for other flammable oils*

The arrangements for the storage, distribution and utilization of other flammable oils employed under pressure in power transmission systems, control and activating systems and heating systems shall be such as to ensure the safety of the ship and persons on board. In locations where means of ignition are present, such arrangements shall at least comply with the provisions of paragraphs 2.4 and 2.6, and with the provisions of paragraphs 2.7 and 2.8 in respect of strength and construction.

5. *Periodically unattended machinery spaces*

In addition to the requirements of paragraphs 1 to 4, the oil fuel and lubricating oil systems shall comply with the following:

1. Where necessary, oil fuel and lubricating oil pipelines shall be screened or otherwise suitably protected to avoid as far as practicable oil spray or oil leakages on to hot surfaces or into machinery air intakes. The number of joints in such piping systems shall be kept to a minimum and, where practicable, leakages from high pressure oil fuel pipes shall be collected and arrangements provided for an alarm to be given.
2. Where daily service oil fuel tanks are filled automatically, or by remote control, means shall be provided to prevent overflow spillages. Other equipment which treats flammable liquids automatically, e.g. oil fuel purifiers, which, whenever practicable, shall be installed in a special space reserved for purifiers and their heaters, shall have arrangements to prevent overflow spillages.
3. Where daily service oil fuel tanks or settling tanks are fitted with heating arrangements, a high temperature alarm shall be provided if the flashpoint of the oil fuel can be exceeded.

Regulation 16. VENTILATION SYSTEMS IN SHIPS OTHER THAN PASSENGER SHIPS CARRYING MORE THAN 36 PASSENGERS

1. Ventilation ducts shall be of non-combustible material. Short ducts, however, not generally exceeding 2 m in length and with a cross-section not exceeding 0.02 m^2 need not be non-combustible, subject to the following conditions:

I. These ducts shall be of a material which, in the opinion of the Administration, has a low fire risk;
2. They may only be used at the end of the ventilation device;
3. They shall not be situated less than 600 mm, measured along the duct, from an opening in an "A" or "B" class division including continuous "B" class ceilings.

2. Where the ventilation ducts with a free-sectional area exceeding 0.02 m^2 pass through class "A" bulkheads or decks, the opening shall be lined with a steel sheet sleeve unless the ducts passing through the bulkheads or decks are of steel in the vicinity of passage through the deck or bulkhead and the ducts and sleeves shall comply in this part with the following:

1. The sleeves shall have a thickness of at least 3 mm and a length of at least 900 mm. When passing through bulkheads, this length shall be divided preferably into 450 mm on each side of the bulkhead. These ducts, or sleeves lining such ducts, shall be provided with fire insulation. The insulation shall have at least the same fire integrity as the bulkhead or deck through which the duct passes. Equivalent penetration protection may be provided to the satisfaction of the Administration.
2. Ducts with a free cross-sectional area exceeding 0.075 m^2 shall be fitted with fire dampers in addition to the requirements of paragraph 2.1. The fire damper shall operate automatically but shall also be capable of being closed manually from both sides of the bulkhead or deck. The damper shall be provided with an indicator which shows whether the damper is

open or closed. Fire dampers are not required, however, where ducts pass through spaces surrounded by "A" class divisions, without serving those spaces, provided those ducts have the same fire integrity as the divisions which they pierce.

3. Ducts provided for the ventilation of machinery spaces of category A, galleys, car deck spaces, ro/ro cargo spaces or special category spaces shall not pass through accommodation spaces, service spaces or control stations unless [they comply with the conditions specified in sub-paragraphs 1.1 to 1.4 or 2.1 and 2.2 below:]

1.1. [The ducts are] constructed of steel having a thickness of at least 3 mm and 5 mm for ducts the widths or diameters of which are up to and including 300 mm and 760 mm and over respectively and, in the case of such ducts, the widths or diameters of which are between 300 mm and 760 mm having a thickness to be obtained by interpolation;

1.2. [The ducts are] suitably supported and stiffened;

1.3. [The ducts are] fitted with automatic fire dampers close to the boundaries penetrated; and

1.4. [The ducts are] insulated to "A-60" standard from the machinery spaces, galleys, car deck spaces, ro/ro cargo spaces or special category spaces to a point at least 5 m beyond each fire damper;

or

2.1. [The ducts are] constructed of steel in accordance with paragraphs 3.1.1 and 3.1.2; and

2.2. [The ducts are] insulated to "A-60" standard throughout the accommodation spaces, service spaces or control stations;

except that penetrations of main zone divisions shall also comply with the requirements of paragraph 8.

4. Ducts provided for ventilation to accommodation spaces, service spaces or control stations shall not pass through machinery spaces of category A, galleys, car deck spaces, ro/ro cargo spaces or special category spaces unless [they comply with the conditions specified in sub-paragraphs 1.1 to 1.3 or 2.1 and 2.2 below:]

1.1. The ducts where they pass through a machinery space of category A, galley, car deck space, ro/ro cargo space or special category space are constructed of steel in accordance with paragraphs 3.1.1 and 3.1.2;

1.2. Automatic fire dampers are fitted close to the boundaries penetrated; and

1.3. The integrity of the machinery space, galley, car deck space, ro/ro cargo space or special category space boundaries is maintained at the penetrations;

or

2.1. The ducts where they pass through a machinery space of category A, galley, car deck space, ro/ro cargo space or special category space are constructed of steel in accordance with paragraphs 3.1.1 and 3.1.2; and

2.2. [The ducts] are insulated to "A-60" standard within the machinery space, galley, car deck space, ro/ro cargo space or special category space;

except that penetrations of main zone divisions shall also comply with the requirements of paragraph 8.

5. Ventilation ducts with a free cross-sectional area exceeding 0.02 m^2 passing through "B" class bulkheads shall be lined with steel sheet sleeves of 900 mm in length divided preferably into 450 mm on each side of the bulkheads unless the duct is of steel for this length.

6. Such measures as are practicable shall be taken in respect of control stations outside machinery spaces in order to ensure that ventilation, visibility and freedom from smoke are maintained, so that in the event of fire the machinery and equipment contained therein may be supervised and continue to function effectively. Alternative and separate means of air supply shall be provided; air inlets of the two sources of supply shall be so disposed that the risk of

both inlets drawing in smoke simultaneously is minimized. At the discretion of the Administration, such requirements need not apply to control stations situated on, and opening on to, an open deck, or where local closing arrangements would be equally effective.

7. Where they pass through accommodation spaces or spaces containing combustible materials, the exhaust ducts from galley ranges shall be constructed of "A" class divisions. Each exhaust duct shall be fitted with:

1. A grease trap readily removable for cleaning;
2. A fire damper located in the lower end of the duct;
3. Arrangements, operable from within the galley, for shutting off the exhaust fans; and
4. Fixed means for extinguishing a fire within the duct.

8. Where in a passenger ship it is necessary that a ventilation duct passes through a main vertical zone division, a fail-safe automatic closing fire damper shall be fitted adjacent to the division. The damper shall also be capable of being manually closed from each side of the division. The operating position shall be readily accessible and be marked in red light-reflecting colour. The duct between the division and the damper shall be of steel or other equivalent material and, if necessary, insulated to comply with the requirements of regulation 18.1.1. The damper shall be fitted on at least one side of the division with a visible indicator showing whether the damper is in the open position.

9. The main inlets and outlets of all ventilation systems shall be capable of being closed from outside the spaces being ventilated.

10. Power ventilation of aecommodation spaces, service spaces, cargo spaces, control stations and machinery spaces shall be capable of being stopped from an easily accessible position outside the space being served. This position should not be readily cut off in the event of a fire in the spaces served. The means provided for stopping the power ventilation of the machinery spaces shall be entirely separate from the means provided for stopping ventilation of other spaces.

Regulation 17. FIREMAN'S OUTFIT

1. A fireman's outfit shall consist of:

1.1. Personal equipment comprising:

1. Protective elothing of material to protect the skin from the heat radiating from the fire and from burns and scalding by steam. The outer surface shall be water-resistant.
2. Boots and gloves of rubber or other electrically non-conducting material.
3. A rigid helmet providing effective protection against impact.
4. An electric safety lamp (hand lantern) of an approved type with a minimum burning period of three hours.
5. An axe to the satisfaction of the Administration.

1.2. A breathing apparatus of an approved type which may be either:

1. A smoke helmet or smoke mask which shall be provided with a suitable air pump and a length of air hose sufficient to reach from the open deck, well clear of hatch or doorway, to any part of the holds or machinery spaces. If, in order to comply with this sub-paragraph, an air hose exceeding 36 m in length would be necessary, a self-contained breathing apparatus shall be substituted or provided in addition as determined by the Administration; or
2. A self-contained compressed air-operated breathing apparatus, the volume of air contained in the cylinders of which shall be at least 1,200 *l*, or other self-contained breathing apparatus which shall be capable of functioning for at least 30 minutes. A number of spare charges, suitable for use with the apparatus provided, shall be available on board to the satisfaction of the Administration.

2. For each breathing apparatus a fireproof lifeline of sufficient length and strength shall be provided capable of being attached by means of a snaphook to the harness of the apparatus or to a separate belt in order to prevent the breathing apparatus becoming detached when the lifeline is operated.

3. All ships shall carry at least two fireman's outfits complying with the requirements of paragraph 1.

3.1. In addition, there shall be provided:

1. In passenger ships for every 80 m, or part thereof, of the aggregate of the lengths of all passenger spaces and service spaces on the deck which carries such spaces or, if there is more than one such deck, on the deck which has the largest aggregate of such lengths, two fireman's outfits and two sets of personal equipment, each set comprising the items stipulated in paragraphs 1.1.1, 1.1.2 and 1.1.3;
2. In tankers, two fireman's outfits.

3.2. In passenger ships carrying more than 36 passengers for each pair of breathing apparatus there shall be provided one water fog applicator which shall be stored adjacent to such apparatus.

3.3 The Administration may require additional sets of personal equipment and breathing apparatus, having due regard to the size and type of the ship.

4. The fireman's outfits or sets of personal equipment shall be so stored as to be easily accessible and ready for use and, where more than one fireman's outfit or more than one set of personal equipment is carried, they shall be stored in widely separated positions. In passenger ships at least two fireman's outfits and one set of personal equipment shall be available at any one position.

Regulation 18. MISCELLANEOUS ITEMS

1.1. Where "A" class divisions are penetrated for the passage of electric cables, pipes, trunks, ducts, etc., or for girders, beams or other structural members, arrangements shall be made to ensure that the fire resistance is not impaired, subject to the provisions of regulation 30.5.

1.2. Where "B" class divisions are penetrated for the passage of electric cables, pipes, trunks, ducts, etc., or for the fitting of ventilation terminals, lighting fixtures and similar devices, arrangements shall be made to ensure that the fire resistance is not impaired.

2.1. Pipes penetrating "A" or "B" class divisions shall be of materials approved by the Administration having regard to the temperature such divisions are required to withstand.

2.2. Where the Administration may permit the conveying of oil and combustible liquids through accommodation and service spaces, the pipes conveying oil or combustible liquids shall be of a material approved by the Administration having regard to the fire risk.

2.3. Materials readily rendered ineffective by heat shall not be used for overboard scuppers, sanitary discharges, and other outlets which are close to the water-line and where the failure of the material in the event of fire would give rise to danger of flooding.

3. Electric radiators, if used, shall be fixed in position and so constructed as to reduce fire risks to a minimum. No such radiators shall be fitted with an element so exposed that clothing, curtains, or other similar materials can be scorched or set on fire by heat from the element.

4. Cellulose-nitrate based films shall not be used for cinematograph installations.

5. All waste-receptacles shall be constructed of non-combustible materials with no openings in the sides or bottom.

6. In spaces where penetration of oil products is possible, the surface of insulation shall be impervious to oil or oil vapours.

Regulation 19. INTERNATIONAL SHORE CONNEXION*

1. Ships of 500 tons gross tonnage and upwards shall be provided with at least one international shore connexion, complying with provisions of paragraph 3.

2. Facilities shall be available enabling such a connexion to be used on either side of the ship.

3. Standard dimensions of flanges for the international shore connexion shall be in accordance with the following table:

Description	*Dimension*
Outside diameter	178 mm
Inside diameter	64 mm
Bolt circle diameter	132 mm
Slots in flange	4 holes 19 mm in diameter spaced equidistantly on a bolt circle of the above diameter, slotted to the flange periphery
Flange thickness	14.5 mm minimum
Bolts and nuts	4, each of 16 mm diameter, 50 mm in length

4. The connexion shall be of steel or other suitable material and shall be designed for 1.0 N/mm^2 services. The flange shall have a flat face on one side and on the other shall be permanently attached to a coupling that will fit the ship's hydrant and hose. The connexion shall be kept aboard the ship together with a gasket of any material suitable for 1.0 N/mm^2 services, together with four 16 mm bolts, 50 mm in length and eight washers.

Regulation 20. FIRE CONTROL PLANS

1. In all ships general arrangement plans shall be permanently exhibited for the guidance of the ship's officers, showing clearly for each deck the control stations, the various fire sections enclosed by "A" class divisions, the sections enclosed by "B" class divisions together with particulars of the fire detection and fire alarm systems, the sprinkler installation, the fire-extinguishing appliances, means of access to different compartments, decks, etc. and the ventilating system including particulars of the fan control positions, the position of dampers and identification numbers of the ventilating fans serving each section. Alternatively, at the discretion of the Administration, the aforementioned details may be set out in a booklet, a copy of which shall be supplied to each officer, and one copy shall at all times be available on board in an accessible position. Plans and booklets shall be kept up to date, any alterations being recorded thereon as soon as practicable. Description in such plans and booklets shall be in the [official language of the flag State]. If the language is neither English nor French, a translation into one of those languages shall be included. In addition, instructions concerning the maintenance and operation of all the equipment and installations on board for the fighting and containment of fire shall be kept under one cover, readily available in an accessible position.

2. In all ships a duplicate set of fire control plans or a booklet containing such plans shall be permanently stored in a prominently marked weathertight enclosure outside the deckhouse for the assistance of shoreside fire-fighting personnel.

Regulation 21. READY AVAILABILITY OF FIRE-EXTINGUISHING APPLIANCES

In all ships, fire-extinguishing appliances shall be kept in good order and available for immediate use at all times during the voyage.

* Reference is made to the recommendation contained in resolution A.470(XII)[1] adopted by the Organization entitled "International Shore Connexion (shore side)".

[1] International Maritime Organization, *Resolutions and Other Decisions, Assembly, Twelfth Session*, 9-20 November 1981, p. 116.

Regulation 22. ACCEPTANCE OF SUBSTITUTES

1. This regulation applies to all ships.

2. Where in this chapter any special type of appliance, apparatus, extinguishing medium or arrangement is specified in any ship, any other type of appliance etc., may be allowed, provided the Administration is satisifed that it is not less effective.

PART B. FIRE SAFETY MEASURES FOR PASSENGER SHIPS

Regulation 23. STRUCTURE

1. The hull, superstructure, structural bulkheads, decks and deckhouses shall be constructed of steel or other equivalent material. For the purpose of applying the definition of steel or other equivalent material as given in regulation 3.7 the "applicable fire exposure" shall be according to the integrity and insulation standards given in the tables of regulations 26 and 27. For example where divisions such as decks or sides and ends of deckhouses are permitted to have "B-0" fire integrity, the "applicable fire exposure" shall be half an hour.

2. However, in cases where any part of the structure is of aluminium alloy, the following shall apply:

1. The insulation of aluminium alloy components of "A" or "B" class divisions, except structure which, in the opinion of the Administration, is non-load-bearing, shall be such that the temperature of the structural core does not rise more than 200°C above the ambient temperature at any time during the applicable fire exposure to the standard fire test.
2. Special attention shall be given to the insulation of aluminium alloy components of columns, stanchions and other structural members required to support lifeboat and liferaft stowage, launching and embarkation areas, and "A" and "B" class divisions to ensure:
   2.1. That for such members supporting lifeboat and liferaft areas and "A" class divisions, the temperature rise limitation specified in paragraph 2.1 shall apply at the end of one hour; and
   2.2. That for such members required to support "B" class divisions, the temperature rise limitation specified in paragraph 2.1 shall apply at the end of half an hour.

3. Crowns and casings of machinery spaces of category A shall be of steel construction adequately insulated and openings therein, if any, shall be suitably arranged and protected to prevent the spread of fire.

Regulation 24. MAIN VERTICAL ZONES AND HORIZONTAL ZONES

1.1. For ships carrying more than 36 passengers, the hull, superstructure and deckhouses shall be subdivided into main vertical zones by "A" class divisions. Steps and recesses shall be kept to a minimum, but where they are necessary they shall also be "A" class divisions. These divisions shall have insulation values in accordance with tables in regulation 26.

1.2. For ships carrying not more than 36 passengers, the hull, superstructure and deckhouses in way of accommodation and service spaces shall be subdivided into main vertical zones by "A" class divisions. These divisions shall have insulation values in accordance with tables in regulation 27.

2. As far as practicable, the bulkheads forming the boundaries of the main vertical zones above the bulkhead deck shall be in line with watertight subdivision bulkheads situated immediately below the bulkhead deck.

3. Such bulkheads shall extend from deck to deck and to the shell or other boundaries.

4. Where a main vertical zone is subdivided by horizontal "A" class divisions into horizontal zones for the purpose of providing an appropriate barrier between sprinklered and non-sprinklered zones of the ship, the divisions shall extend between adjacent main vertical zone

bulkheads and to the shell or exterior boundaries of the ship and shall be insulated in accordance with the fire insulation and integrity values given in table 26.3 or in table 27.2.

5.1. On ships designed for special purposes, such as automobile or railroad car ferries, where the provision of main vertical zone bulkheads would defeat the purpose for which the ship is intended, equivalent means for controlling and limiting a fire shall be substituted and specifically approved by the Administration.

5.2. However, in a ship with special category spaces, any such space shall comply with the applicable provisions of regulation 37 and in so far as such compliance would be inconsistent with compliance with other requirements of this part, the requirements of regulation 37 shall prevail.

Regulation 25. BULKHEADS WITHIN A MAIN VERTICAL ZONE

1.1. For ships carrying more than 36 passengers all bulkheads which are not required to be "A" class divisions shall be at least "B" class or "C" class divisions as prescribed in the tables in regulation 26.

1.2. For ships carrying not more than 36 passengers all bulkheads within accommodation and service spaces which are not required to be "A" class divisions shall be at least "B" class or "C" class divisions as prescribed in the tables in regulation 27.

1.3. All such divisions may be faced with combustible materials in accordance with the provisions of regulation 34.

2. All corridor bulkheads where not required to be "A" class shall be class divisions which shall extend from deck to deck except:

1. When continuous "B" class ceilings or linings are fitted on both sides of the bulkhead, the portion of the bulkhead behind the continuous ceiling or lining shall be of material which, in thickness and composition, is acceptable in the construction of "B" class divisions but which shall be required to meet "B" class integrity standards only in so far as is reasonable and practicable in the opinion of the Administration;
2. In the case of a ship protected by an automatic sprinkler system complying with the provisions of regulation 12 the corridor bulkheads of "B" class materials may terminate at a ceiling in the corridor provided such a ceiling is of material which, in thickness and composition, is acceptable in the construction of "B" class divisions. Notwithstanding the requirements of regulations 26 and 27 such bulkheads and ceilings shall be required to meet "B" class integrity standards only in so far as is reasonable and practicable in the opinion of the Administration. All doors and frames in such shall be of non-combustible materials and shall be so constructed and erected as to provide substantial fire resistance to the satisfaction of the Administration.

3. All bulkheads required to be "B" class divisions, except corridor bulkheads, shall extend from deck to deck and to the shell or other boundaries unless continuous "B" class ceilings or linings are fitted on both sides of the bulkhead, in which case the bulkhead may terminate at the continuous ceiling or lining.

Regulation 26. FIRE INTEGRITY OF BULKHEADS AND DECKS IN SHIPS CARRYING MORE THAN 36 PASSENGERS

1. In addition to complying with the specific provisions for fire integrity of bulkheads and decks mentioned elsewhere in this Part, the minimum fire integrity of all bulkheads and decks shall be as prescribed in tables 26.1 to 26.4. Where, due to any particular structural arrangements in the ship, difficulty is experienced in determining from the tables the minimum fire integrity value of any divisions, such values shall be determined to the satisfaction of the Administration.

2. The following requirements shall govern application of the tables:

1. Table 26.1 shall apply to bulkheads bounding main vertical zones or horizontal zones.

Table 26.2 shall apply to bulkheads not bounding either main vertical zones or horizontal zones.

Table 26.3 shall apply to decks forming steps in main vertical zones or bounding horizontal zones.

Table 26.4 shall apply to decks not forming steps in main vertical zones nor bounding horizontal zones.

2. [For] determining the appropriate fire integrity standards to be applied to boundaries between adjacent spaces, such spaces are classified according to their fire risk as shown in categories (1) to (14) below. Where the contents and use of a space are such that there is a doubt as to its classification for the purpose of this regulation, it shall be treated as a space within the relevant category having the most stringent boundary requirements. The title of each category is intended to be typical rather than restrictive. The number in parentheses preceding each category refers to the applicable column or row [ ] in the tables.

(1) Control stations
- Spaces containing emergency sources of power and lighting.
- Wheelhouse and chartroom.
- Spaces containing the ship's radio equipment.
- Fire-extinguishing rooms, fire control [rooms] and [fire-]recording stations.
- Control room for propulsion machinery when located outside the propulsion machinery space.
- Spaces containing centralized fire alarm equipment.
- Spaces containing centralized emergency public address system stations and equipment.

(2) Stairways
- Interior stairways, lifts and escalators (other than those wholly contained within the machinery spaces) for passengers and crew and enclosures thereto.
- In this connexion a stairway which is enclosed at only one level shall be regarded as part of the space from which it is not separated by a fire door.

(3) Corridors
- Passenger and crew corridors and lobbies.

(4) Lifeboat and liferaft handling and embarkation stations
- Open deck spaces and enclosed promenades forming lifeboat and liferaft embarkation and lowering stations.

(5) Open deck spaces
- Open deck spaces and enclosed promenades clear of lifeboat and liferaft embarkation and lowering stations.
- Air spaces (the space outside superstructures and deckhouses).

(6) Accommodation spaces of minor fire risk
- Cabins containing furniture and furnishings of restricted fire risk.
- Offices and dispensaries containing furniture and furnishings of restricted fire risk.
- Public spaces containing furniture and furnishings of restricted fire risk and having a deck area of less than 50 m^2.

(7) Accommodation spaces of moderate fire risk
- Spaces as in category (6) above but containing furniture and furnishings of other than restricted fire risk.
- Public spaces containing furniture and furnishings of restricted fire risk and having a deck area of 50 m^2 or more.
- Isolated lockers and small store-rooms in accommodation spaces.
- Sale shops.
- Motion picture projection and film stowage rooms.
- Diet kitchens (containing no open flame).
- Cleaning gear lockers (in which flammable liquids are not stowed).
- Laboratories (in which flammable liquids are not stowed).
- Pharmacies.
- Small drying rooms (having a deck area of 4 m^2 or less).
- Specie rooms.

(8) Accommodation spaces of greater fire risk
- Public spaces containing furniture and furnishings of other than restricted fire risk and having a deck area of 50 m^2 or more.
- Barber shops and beauty parlours.

(9) Sanitary and similar spaces
- Communal sanitary facilities, showers, baths, water closets, etc.
- Small laundry rooms.
- Indoor swimming pool area.
- Operating rooms.
- Isolated pantries containing no cooking appliances in accommodation spaces.
- Private sanitary facilities shall be considered a portion of the space in which they are located.

(10) Tanks, voids and auxiliary machinery spaces having little or no fire risk
- Water tanks forming part of the ship's structure.
- Voids and cofferdams.
- Auxiliary machinery spaces which do not contain machinery having a pressure lubrication system and where storage of combustibles is prohibited, such as ventilation and air-conditioning rooms; windlass room; steering gear room; stabilizer equipment room; electrical propulsion motor room; rooms containing section switchboards and purely electrical equipment other than oil-filled electrical transformers (above 10 kVA); shaft alleys and pipe tunnels; spaces for pumps and refrigeration machinery (not handling or using flammable liquids).
- Closed trunks serving the spaces listed above.
- Other closed trunks such as pipe and cable trunks.

(11) Auxiliary machinery spaces, cargo spaces, special category spaces, cargo and other oil tanks and other similar spaces of moderate fire risk
- Cargo oil tanks.
- Cargo holds, trunkways and hatchways.
- Refrigerated chambers.
- Oil fuel tanks (where installed in a separate space with no machinery).
- Shaft alleys and pipe tunnels allowing storage of combustibles.

- Auxiliary machinery spaces as in category (10) which contain machinery having a pressure lubrication system or where storage of combustibles is permitted.
- Oil fuel filling stations.
- Spaces containing oil-filled electrical transformers (above 10 kVA).
- Spaces containing turbine and reciprocating steam engine driven auxiliary generators and small internal combustion engines of power output up to 110 kW driving emergency generators, sprinkler, drencher or fire pumps, bilge pumps, etc.
- Special category spaces (tables 26.1 and 26.3 only apply).
- Closed trunks serving the spaces listed above.

(12) Machinery spaces and main galleys

- Main propulsion machinery rooms (other than electric propulsion motor rooms) and boiler rooms.
- Auxiliary machinery spaces other than those in categories (10) and (11) which contain internal combustion machinery or other oil-burning, heating or pumping units.
- Main galleys and annexes.
- Trunks and casings to the spaces listed above.

(13) Store-rooms, workshops, pantries, etc.

- Main pantries not annexed to galleys.
- Main laundry.
- Large drying rooms (having a deck area of more than 4 m^2).
- Miscellaneous stores.
- Mail and baggage rooms.
- Garbage rooms.
- Workshops (not part of machinery spaces, galleys, etc.)

(14) Other spaces in which flammable liquids are stowed

- Lamp rooms.
- Paint rooms.
- Store-rooms containing flammable liquids (including dyes, medicines, etc.).
- Laboratories (in which flammable liquids are stowed).

3. Where a single value is shown for the fire integrity of a boundary between two spaces, that value shall apply in all cases.

4. In determining the applicable fire integrity standard of a boundary between two spaces within a main vertical zone or horizontal zone which is not protected by an automatic sprinkler system complying with the provisions of regulation 12 or between such zones neither of which is so protected, the higher of the two values given in the tables shall apply.

5. In determining the applicable fire integrity standard of a boundary between two spaces within a main vertical zone or horizontal zone which is protected by an automatic sprinkler system complying with the provisions of regulation 12 or between such zones both of which are so protected, the lesser of the two values given in the tables shall apply. Where a sprinklered zone and a non-sprinklered zone meet within accommodation and service spaces, the higher of the two values given in the tables shall apply to the division between the zones.

6. Notwithstanding the provisions of regulation 35 there are no special requirements for material or integrity of boundaries where only a dash appears in the tables.

7. The Administration shall determine in respect of category (5) spaces whether the insulation values in table 26.1 or 26.2 shall apply to ends of deckhouses and superstructures, and

TABLE 26.1 – BULKHEADS BOUNDING MAIN VERTICAL ZONES OR HORIZONTAL ZONES

Spaces		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Control stations	(1)	A-60	A-30	A-30	A-0	A-0	A-60	A-60	A-60	A-0	A-0	A-60	A-60	A-60	A-60
Stairways	(2)		A-0	A-0	A-0	A-0	A-15 A-0	A-30 A-0	A-60 A-15	A-0	A-0	A-30	A-60	A-15 A-0	A-60
Corridors	(3)			A-0	A-0	A-0	A-0	A-30 A-0	A-30 A-0	A-0	A-0	A-30	A-60	A-15 A-0	A-60
Lifeboat and liferaft handling and embarkation stations	(4)				–	–	A-0	A-0	A-0	A-0	A-0	A-0	A-60	A-0	A-60
Open deck spaces	(5)					–	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0
Accommodation spaces of minor fire risk	(6)						A-15 A-0	A-30 A-0	A-30 A-0	A-0	A-0	A-15 A-0	A-30	A-15 A-0	A-30
Accommodation spaces of moderate fire risk	(7)							A-30 A-0	A-60 A-15	A-0	A-0	A-30 A-0	A-60	A-30 A-0	A-60
Accommodation spaces of greater fire risk	(8)								A-60 A-15	A-0	A-0	A-60 A-15	A-60	A-30 A-0	A-60
Sanitary and similar spaces	(9)									A-0	A-0	A-0	A-0	A-0	A-0
Tanks, voids and auxiliary machinery spaces having little or no fire risk	(10)										A-0	A-0	A-0	A-0	A-0
Auxiliary machinery spaces, cargo spaces, special category spaces, cargo and other oil tanks and other similar spaces of moderate fire risk	(11)											A-0	A-60	A-0	A-60
Machinery spaces and main galleys	(12)												A-60	A-30[b/] A-15	A-60
Store-rooms, workshops, pantries etc.	(13)													A-0	A-30
Other spaces in which flammable liquids are stowed	(14)														A-60

See notes under table 26.4

TABLE 26.2 – BULKHEADS NOT BOUNDING EITHER MAIN VERTICAL ZONES OR HORIZONTAL ZONES

Spaces		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Control stations	(1)	B-0[a]	A-0	A-0	A-0	A-0 B-0	A-60	A-60	A-60	A-0	A-0	A-60	A-60	A-60	A-60
Stairways	(2)		A-0[a]	A-0	A-0	A-0	A-0	A-15 A-0	A-30 A-0	A-0	A-0	A-15	A-30	A-15 A-0	A-30
Corridors	(3)			C	A-0	A-0 B-0	B-0	B-15 B-0	B-15 B-0	B-0	A-0	A-15	A-30	A-0	A-30 A-0
Lifeboat and liferaft handling and embarkation stations	(4)				–	–	A-0	A-0	A-0	A-0	A-0	A-0	A-15	A-0	A-15 A-0
Open deck space	(5)					–	A-0 B-0	A-0 B-0	A-0 B-0	A-0 B-0	A-0	A-0	A-0	A-0 B-0	A-0 B-0
Accommodation spaces of minor fire risk	(6)						B-0 C	B-15 C	B-15 C	B-0 C	A-0	A-15 A-0	A-30	A-0	A-30 A-0
Accommodation spaces of moderate fire risk	(7)							B-15 C	B-15 C	B-0 C	A-0	A-15 A-0	A-60	A-15 A-0	A-60 A-15
Accommodation spaces of greater fire risk	(8)								B-15 C	B-0 C	A-0	A-30 A-0	A-60	A-15 A-0	A-60 A-15
Sanitary and similar spaces	(9)									C	A-0	A-0	A-0	A-0	A-0
Tanks, voids and auxiliary machinery spaces having little or no fire risk	(10)										A-0[a]	A-0	A-0	A-0	A-0
Auxiliary machinery spaces, cargo spaces, cargo and other oil tanks and other similar spaces of moderate fire risk	(11)											A-0[a]	A-0	A-0	A-30[b] A-15
Machinery spaces and main galleys	(12)												A-0[a]	A-0	A-60
Store-rooms, workshops, pantries, etc.	(13)													A-0[a]	A-0
Other spaces in which flammable liquids are stowed	(14)														A-30[b] A-15

See notes under table 26.4

TABLE 26.3 – DECKS FORMING STEPS IN MAIN VERTICAL ZONES OR BOUNDING HORIZONTAL ZONES

Space below ↓ Space above →		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Control stations	(1)	A-60	A-60	A-30	A-0	A-0	A-15	A-30	A-60	A-0	A-0	A-30	A-60	A-15	A-60
Stairways	(2)	A-15	A-0	A-0	A-0	A-0	A-0	A-15 A-0	A-15 A-0	A-0	A-0	A-0	A-60	A-0	A-60
Corridors	(3)	A-30	A-0	A-0	A-0	A-0	A-0	A-15 A-0	A-15 A-0	A-0	A-0	A-0	A-60	A-0	A-60
Lifeboat and liferaft handling and embarkation stations	(4)	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0
Open deck spaces	(5)	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0
Accommodation spaces of minor fire risk	(6)	A-60	A-30 A-0	A-15 A-0	A-0	A-0	A-0	A-15 A-0	A-30 A-0	A-0	A-0	A-15 A-0	A-15	A-0	A-15
Accommodation spaces of moderate fire risk	(7)	A-60	A-60 A-15	A-30 A-0	A-15 A-0	A-0	A-15 A-0	A-30 A-0	A-60 A-15	A-0	A-0	A-30 A-0	A-30	A-0	A-30
Accommodation spaces of greater fire risk	(8)	A-60	A-60 A-15	A-60 A-15	A-60 A-15	A-0	A-30 A-0	A-60 A-15	A-60 A-15	A-0	A-0	A-30 A-0	A-60	A-15 A-0	A-60
Sanitary and similar spaces	(9)	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0
Tanks, voids and auxiliary machinery spaces having little or no fire risk	(10)	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0
Auxiliary machinery spaces, cargo spaces, special category spaces, cargo and other oil tanks and other similar spaces of moderate fire risk	(11)	A-60	A-60	A-60	A-60	A-0	A-30 A-0	A-60 A-15	A-60 A-15	A-0	A-0	A-0	A-30	A-30[b/] A-0	A-30
Machinery spaces and main galleys	(12)	A-60	A-60	A-60	A-60	A-0	A-60	A-60	A-60	A-0	A-0	A-60	A-60	A-60	A-60
Store-rooms, workshops, pantries, etc.	(13)	A-60	A-60 A-15	A-30 A-0	A-15	A-0	A-15 A-0	A-30 A-0	A-60 A-15	A-0	A-0	A-0	A-30	A-0	A-30
Other spaces in which flammable liquids are stowed	(14)	A-60	A-60	A-60	A-60	A-0	A-60	A-60	A-60	A-0	A-0	A-60	A-60	A-60	A-60

See notes under table 26.4

TABLE 26.4 – DECKS NOT FORMING STEPS IN MAIN VERTICAL ZONES NOR BOUNDING HORIZONTAL ZONES

Space below ↓ Space above →		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Control stations	(1)	A-30 A-0	A-30 A-0	A-15 A-0	A-0	A-0 B-0	A-0	A-15 A-0	A-30 A-0	A-0	A-0	A-0	A-60	A-0	A-60 A-15
Stairways	(2)	A-0	A-0	A-0	A-0	A-0 B-0	A-0	A-0	A-0	A-0	A-0	A-0	A-30	A-0	A-30 A-0
Corridors	(3)	A-15 A-0	A-0	A-0[a] B-0[a]	A-0	A-0 B-0	A-0 B-0	A-15 B-0	A-15 B-0	A-0 B-0	A-0	A-0	A-30	A-0	A-30 A-0
Lifeboat and liferaft handling and embarkation stations	(4)	A-0	A-0	A-0	A-0	–	A-0 B-0	A-0 B-0	A-0 B-0	A-0 B-0	A-0	A-0	A-0	A-0	A-0
Open deck spaces	(5)	A-0	A-0	A-0 B-0	A-0	–	A-0 B-0	A-0 B-0	A-0 B-0	A-0 B-0	A-0	A-0	A-0	A-0 B-0	A-0
Accommodation spaces of minor fire risk	(6)	A-60	A-15 A-0	A-0	A-0	A-0 B-0	A-0 B-0	A-0 B-0	A-0 B-0	A-0 B-0	A-0	A-0	A-15 A-0	A-0	A-15 A-0
Accommodation spaces of moderate fire risk	(7)	A-60	A-30 A-0	A-15 A-0	A-15 A-0	A-0 B-0	A-0 B-0	A-15 B-0	A-30 B-0	A-0 B-0	A-0	A-15 A-0	A-30 A-0	A-0	A-30 A-0
Accommodation spaces of greater fire risk	(8)	A-60	A-60 A-15	A-60 A-0	A-30 A-0	A-0 B-0	A-15 B-0	A-30 B-0	A-60 B-0	A-0 B-0	A-0	A-30 A-0	A-30 A-0	A-0	A-30 A-0
Sanitary spaces and similar spaces	(9)	A-0	A-0	A-0 B-0	A-0	A-0 B-0	A-0 B-0	A-0 B-0	A-0 B-0	A-0 B-0	A-0	A-0	A-0	A-0	A-0
Tanks, voids and auxiliary machinery spaces having little or no fire risk	(10)	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0[a]	A-0	A-0	A-0	A-0
Auxiliary machinery spaces, cargo spaces, cargo and other oil tanks and other similar spaces of moderate fire risk	(11)	A-60	A-60 A-15	A-60 A-15	A-30 A-0	A-0	A-0	A-15 A-0	A-30 A-0	A-0	A-0	A-0[a]	A-0	A-0	A-30[b] A-15
Machinery spaces and main galleys	(12)	A-60	A-60	A-60	A-60	A-0	A-60	A-60	A-60	A-0	A-0	A-30	A-30[a]	A-0	A 60
Store-rooms, workshops, pantries, etc.	(13)	A-60	A-30 A-0	A-15 A-0	A-15 A-0	A-0 B-0	A-15 A-0	A-30 A-0	A-30 A-0	A-0 B-0	A-0	A-0	A-0	A-0	A-15[b] A-0
Other spaces in which flammable liquids are stowed	(14)	A-60	A-60 A-30	A-60 A-30	A-60	A-0	A-30 A-0	A-60 A-15	A-60 A-15	A-0	A-0	A-30[b] A-0	A-30[b] A-0	A-0	A-30[b] A-0

Notes: To be applied to tables 26.1 to 26.4, as appropriate.

a/ Where adjacent spaces are in the same numerical category and superscript a/ appears, a bulkhead or deck between such spaces need not be fitted if deemed unnecessary by the Administration. For example, in category (12) a bulkhead need not be required between a galley and its annexed pantries provided the pantry bulkheads and decks maintain the integrity of the galley boundaries. A bulkhead is, however, required between a galley and a machinery space even though both spaces are in category (12).

b/ Where superscript b/ appears the lesser insulation value may be permitted only if at least one of the adjoining spaces is protected by an automatic sprinkler system complying with the provisions of Regulation 12.

whether the insulation values in table 26.3 or 26.4 shall apply to weather decks. In no case shall the requirements of category (5) of tables 26.1 to 26.4 necessitate enclosure of spaces which in the opinion of the Administration need not be enclosed.

3. Continuous "B" class ceilings or linings, in association with the relevant decks or bulkheads, may be accepted as contributing wholly or in part, to the required insulation and integrity of a division.

4. In approving structural fire protection details, the Administration shall have regard to the risk of heat transmission at intersections and terminal points of required thermal barriers.

Regulation 27. FIRE INTEGRITY OF BULKHEADS AND DECKS IN SHIPS CARRYING NOT MORE THAN 36 PASSENGERS

1. In addition to complying with the specific provisions for fire integrity of bulkheads and decks mentioned elsewhere in this part, the minimum fire integrity of bulkheads and decks shall be as prescribed in table 27.1 and table 27.2.

2. The following requirements shall govern application of the tables:

1. Tables 27.1 and 27.2 shall apply respectively to the bulkheads and decks separating adjacent spaces.

2. For determining the appropriate fire integrity standards to be applied to divisions between adjacent spaces, such spaces are classified according to their fire risk as shown in categories (1) to (11) below. The title of each category is intended to be typical rather than restrictive. The number in parentheses preceding each category refers to the applicable column or row in the tables.

(1) Control stations
- Spaces containing emergency sources of power and lighting.
- Wheelhouse and chartroom.
- Spaces containing the ship's radio equipment.
- Fire-extinguishing rooms, fire control [rooms] and fire-recording stations.
- Control room for propulsion machinery when located outside the machinery space.
- Spaces containing centralized fire alarm equipment.

(2) Corridors
- Passenger and crew corridors and lobbies.

(3) Accommodation spaces
- Spaces as defined in regulation 3.10 excluding corridors.

(4) Stairways
- Interior stairways, lifts and escalators (other than those wholly contained within the machinery spaces) and enclosures thereto.
- In this connexion, a stairway which is enclosed only at one level shall be regarded as part of the space from which it is not separated by a fire door.

(5) Service spaces (low risk)
- Lockers and store-rooms having areas of less than 2 m^2, drying rooms and laundries.

(6) Machinery spaces of category A
- Spaces as defined in regulation 3.19.

(7) Other machinery spaces
- Spaces as defined in regulation 3.20 excluding machinery spaces of category A.

TABLE 27.1 – FIRE INTEGRITY OF BULKHEADS SEPARATING ADJACENT SPACES

Spaces	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Control stations (1)	A-0[c/]	A-0	A-60	A-0	A-15	A-60	A-15	A-60	A-60	*	A-60
Corridors (2)		C[e/]	B-0[e/]	A-0[a] B-0[e]	B-0[e/]	A-60	A-0	A-0	A-15 A-0[d/]	*	A-15
Accommodation spaces (3)			C[e/]	A-0[a] B-0[e]	B-0[e/]	A-60	A-0	A-0	A-15 A-0[d/]	*	A-30 A-0[d/]
Stairways (4)				A-0[a] B-0[e]	A-0[a] B-0[e]	A-60	A-0	A-0	A-15 A-0[d/]	* *	A-15
Service spaces (low risk) (5)					C[e/]	A-60	A-0	A-0	A-0	*	A-0
Machinery spaces of category A (6)						*	A-0	A-0	A-60	*	A-60
Other machinery spaces (7)							A-0[b/]	A-0	A-0	*	A-0
Cargo spaces (8)								*	A-0	*	A-0
Service spaces (high risk) (9)									A-0[b/]	*	A-30
Open decks (10)										–	A-0
Special category spaces (11)											A-0

Notes: To be applied to both tables 27.1 and 27.2, as appropriate.

[a] For clarification as to which applies see Regulations 25 and 29.

[b] Where spaces are of the same numerical category and superscript b appears, a bulkhead or deck of the ratings shown in the tables is only required when the adjacent spaces are for a different purpose, e.g. in category (9). A galley next to a galley does not require a bulkhead but a galley next to a paint room requires an "A-0" bulkhead.

[c] Bulkheads separating the wheelhouse and chartroom from each other may be "B-0" rating.

[d] See 2.3 and 2.4 of this Regulation.

[e] For the application of Regulation 24.1.2, "B-0" and "C", where appearing in table 27.1, shall be read as "A-0".

[f] Fire insulation need not be fitted if the machinery space of category (7), in the opinion of the Administration, has little or no fire risk.

* Where an asterisk appears in the tables, the division is required to be of steel or other equivalent material but is not required to be of "A" class standard.

For the application of Regulation 24.1.2 an asterisk, where appearing in table 27.2, except for categories (8) and (10), shall be read as "A-0".

TABLE 27.2 – FIRE INTEGRITY OF DECKS SEPARATING ADJACENT SPACES

Space below ↓ Space above →	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Control stations (1)	A-0	A-0	A-0	A-0	A-0	A-60	A-0	A-0	A-0	*	A-30
Corridors (2)	A-0	*	*	A-0	*	A-60	A-0	A-0	A-0	*	A-0
Accommodation spaces (3)	A-60	A-0	*	A-0	*	A-60	A-0	A-0	A-0	*	A-30 A-0 d/
Stairways (4)	A-0	A-0	A-0	*	A-0	A-60	A-0	A-0	A-0	*	A-0
Service spaces (low risk) (5)	A-15	A-0	A-0	A-0	*	A-60	A-0	A-0	A-0	*	A-0
Machinery spaces of category A (6)	A-60	A-60	A-60	A-60	A-60	*	A-60 f/	A-30	A-60	*	A-60
Other machinery spaces (7)	A-15	A-0	A-0	A-0	A-0	A-0	*	A-0	A-0	*	A-0
Cargo spaces (8)	A-60	A-0	A-0	A-0	A-0	A-0	A-0	*	A-0	*	A-0
Service spaces (high risk) (9)	A-60	A-30 A-0 d/	A-30 A-0 d/	A-30 A-0 d/	A-0	A-60	A-0	A-0	A-0	*	A-30
Open decks (10)	*	*	*	*	*	*	*	*	*	–	A-0
Special category spaces (11)	A-60	A-15	A-30 A-0 d/	A-15	A-0	A-30	A-0	A-0	A-30	A-0	A-0

(8) Cargo spaces

— All spaces used for cargo (including cargo oil tanks) and trunkways and hatchways to such spaces, other than special category spaces.

(9) Service spaces (high risk)

— Galleys, pantries containing cooking appliances, paint and lamp rooms, lockers and store-rooms having areas of 2 m^2 or more and workshops other than those forming part of the machinery spaces.

(10) Open decks

— Open deck spaces and enclosed promenades having no fire risk. Air spaces (the space outside superstructures and deckhouses).

(11) Special category spaces

— Spaces as defined in regulation 3.18.

3. In determining the applicable fire integrity standard of a boundary between two spaces within a main vertical zone or horizontal zone which is not protected by an automatic sprinkler system complying with the provisions of regulation 12 or between such zones neither of which is so protected, the higher of the two values given in the tables shall apply.

4. In determining the applicable fire integrity standard of a boundary between two spaces within a main vertical zone or horizontal zone which is protected by an automatic sprinkler system complying with the provisions of regulation 12 or between such zones both of

which are so protected, the lesser of the two values given in the tables shall apply. Where a sprinklered zone and a non-sprinklered zone meet within accommodation and service spaces, the higher of the two values given in the tables shall apply to the division between the zones.

3. Continuous "B" class ceilings or linings, in association with the relevant decks or bulkheads, may be accepted as contributing, wholly or in part, to the required insulation and integrity of a division.

4. External boundaries which are required in regulation 23.1 to be of steel or other equivalent material may be pierced for the fitting of windows and sidescuttles provided that there is no requirement for such boundaries to have "A" class integrity elsewhere in [this part]. Similarly, in such boundaries which are not required to have "A" class integrity, doors may be of materials to the satisfaction of the Administration.

Regulation 28. MEANS OF ESCAPE

1. Stairways and ladders shall be arranged to provide ready means of escape to the lifeboat and liferaft embarkation deck from all passenger and crew spaces and from spaces in which the crew is normally employed, other than machinery spaces. In particular, the following provisions shall be complied with:

1. Below the bulkhead deck two means of escape, at least one of which shall be independent of watertight doors, shall be provided from each watertight compartment or similarly restricted space or group of spaces. Exceptionally, the Administration may dispense with one of the means of escape, due regard being paid to the nature and location of spaces and to the number of persons who might normally be accommodated or employed there.
2. Above the bulkhead deck there shall be at least two means of escape from each main vertical zone or similarly restricted space or group of spaces at least one of which shall give access to a stairway forming a vertical escape.
3. If a radiotelegraph station has no direct access to the open deck, two means of escape from or access to such station shall be provided, one of which may be a porthole or window of sufficient size or another means to the satisfaction of the Administration.
4. A corridor or part of a corridor from which there is only one route of escape shall not exceed:
   - 13 m in length for ships carrying more than 36 passengers, and 7 m in length for ships carrying not more than 36 passengers.
5. At least one of the means of escape required by paragraphs 1.1 and 1.2 shall consist of a readily accessible enclosed stairway, which shall provide continuous fire shelter from the level of its origin to the appropriate lifeboat and liferaft embarkation decks or the highest level served by the stairway, whichever level is the highest. However, where the Administration has granted dispensation under the provisions of paragraph 1.I the sole means of escape shall provide safe escape to the satisfaction of the Administration. The width, number and continuity of the stairways shall be to the satisfaction of the Administration.
6. Protection of access from the stairway enclosures to the lifeboat and liferaft embarkation areas shall be to the satisfaction of the Administration.
7. Stairways serving only a space and a balcony in that space shall not be considered as forming one of the required means of escape.

2.1. In special category spaces the number and disposition of the means of escape both below and above the bulkhead deck shall be to the satisfaction of the Administration and in general the safety of access to the embarkation deck shall be at least equivalent to that provided for under paragraphs 1.1, 1.2, 1.5 and 1.6.

2.2. One of the escape routes from the machinery spaces where the crew is normally employed shall avoid direct access to any special category space.

3.1. Two means of escape shall be provided from each machinery space. In particular, the following provisions shall be complied with:

1. Where the space is below the bulkhead deck the two means of escape shall consist of either:
   1.1. Two sets of steel ladders as widely separated as possible, leading to doors in the upper part of the space similarly separated and from which access is provided to the appropriate lifeboat and liferaft embarkation decks. One of these ladders shall provide continuous fire shelter from the lower part of the space to a safe position outside the space; or
   1.2. One steel ladder leading to a door in the upper part of the space from which access is provided to the embarkation deck and additionally, in the lower part of the space and in a position well separated from the ladder referred to, a steel door capable of being operated from each side and which provides access to a safe escape route from the lower part of the space to the embarkation deck.
2. Where the space is above the bulkhead deck, the two means of escape shall be as widely separated as possible and the doors leading from such means of escape shall be in a position from which access is provided to the appropriate lifeboat and liferaft embarkation decks. Where such means of escape require the use of ladders, these shall be of steel.

3.2. In a ship of less than 1,000 tons gross tonnage, the Administration may dispense with one of the means of escape, due regard being paid to the width and disposition of the upper part of the space, and in a ship of 1,000 tons gross tonnage and above, the Administration may dispense with one means of escape from any such space so long as either a door or a steel ladder provides a safe escape route to the embarkation deck, due regard being paid to the nature and location of the space and whether persons are normally employed in that space.

4. In no case shall lifts be considered as forming one of the required means of escape.

Regulation 29. PROTECTION OF STAIRWAYS AND LIFTS IN ACCOMMODATION AND SERVICE SPACES

1. All stairways shall be of steel frame construction except where the Administration sanctions the use of other equivalent material, and shall be within enclosures formed of "A" class divisions, with positive means of closure at all openings, except that:

1. A stairway connecting only two decks nced not be enclosed, provided the integrity of the deck is maintained by proper bulkheads or doors in one 'tweendeck space. When a stairway is closed in one 'tweendeck space, the stairway enclosure shall be protected in accordance with the tables for decks in regulations 26 or 27;
2. Stairways may be fitted in the open in a public space, provided they lie wholly within such public space.

2. Stairway enclosures shall have direct communication with the corridors and be of sufficient area to prevent congestion, having in view the numbcr of persons likely to use them in an emergency. In so far as is practicable, stairway enclosures shall not give direct access to cabins, service lockers, or other enclosed spaces containing combustibles in which a fire is likely to originate.

3. Lift trunks shall be so fitted as to prevent the passage of smoke and flame from one 'tweendeck to another and shall be provided with means of closing so as to permit the control of draught and smoke.

Regulation 30. OPENINGS IN "A" CLASS DIVISIONS

1. Except for hatches between cargo, special category, store, and baggage spaces, and between such spaces and the weather-decks, all openings shall be provided with permanently attached means of closing which shall be at least as effective for resisting fires as the divisions in which they are fitted.

2. The construction of all doors and door frames in "A" class divisions, with the means of securing them when closed, shall provide resistance to fire as well as to the passage of smoke and flame, as far as practicable, equivalent to that of the bulkheads in which the doors are situated. Such doors and door frames shall be constructed of steel or other equivalent material. Watertight doors need not be insulated.

3. It shall be possible for each door to be opened and closed from each side of the bulkhead by one person only.

4. Fire doors in main vertical zone bulkheads and stairway enclosures, other than power-operated watertight doors and those which are normally locked, shall be of the self-closing type capable of closing against an inclination of 3.5° opposing closure. The speed of door closure shall, if necessary, be controlled so as to prevent undue danger to persons. All such doors, except those that are normally closed, shall be capable of release from a control station, either simultaneously or in groups, and also individually from a position at the door. The release mechanism shall be so designed that the door will automatically close in the event of disruption of the control system; however, approved power-operated watertight doors will be considered acceptable for this purpose. Hold-back hooks not subject to control station release will not be permitted. When double swing doors are permitted, they shall have a latch arrangement which is automatically engaged by the operation of the door release system.

5. Where a space is protected by an automatic sprinkler system complying with the provisions of regulation 12 or fitted with a continuous "B" class ceiling, openings in decks not forming steps in main vertical zones nor bounding horizontal zones shall be closed reasonably tight and such decks shall meet the "A" class integrity requirements in so far as is reasonable and practicable in the opinion of the Administration.

6. The requirements for "A" class integrity of the outer boundaries of a ship shall not apply to glass partitions, windows and sidescuttles. Similarly, the requirements for "A" class integrity shall not apply to exterior doors in superstructures and deckhouses.

Regulation 31. OPENINGS IN "B" CLASS DIVISIONS

1. Doors and door frames in "B" class divisions and means of securing them shall provide a method of closure which shall have resistance to fire as far as practicable equivalent to that of the divisions except that ventilation openings may be permitted in the lower portion of such doors. Where such opening is in or under a door the total net area of any such opening or openings shall not exceed 0.05 m^2. When such opening is cut in a door it shall be fitted with a grill made of non-combustible material. Doors shall be non-combustible.

2. The requirements for "B" class integrity of the outer boundaries of a ship shall not apply to glass partitions, windows and sidescuttles. Similarly, the requirements for "B" class integrity shall not apply to exterior doors in superstructures and deckhouses. For ships carrying not more than 36 passengers, the Administration may permit the use of combustible materials in doors separating cabins from the individual interior sanitary spaces such as showers.

3. Where an automatic sprinkler system complying with the provisions of regulation 12 is fitted:

1. Openings in decks not forming steps in main vertical zones nor bounding horizontal zones shall be closed reasonably tight and such decks shall meet the "B" class integrity requirements in so far as is reasonable and practicable in the opinion of the Administration; and
2. Openings in corridor bulkheads of "B" class materials shall be protected in accordance with the provisions of regulation 25.

Regulation 32. VENTILATION SYSTEMS

1. *Passenger ships carrying more than 36 passengers*

1.1. The ventilation system of a passenger ship carrying more than 36 passengers shall, in addition to this part of this regulation, also be in compliance with the requirements of regulation 16.2 to 16.9.

1.2. In general, the ventilation fans shall be so disposed that the ducts reaching the various spaces remain within the main vertical zone.

1.3. Where ventilation systems penetrate decks, precautions shall be taken, in addition to those relating to the fire integrity of the deck required by regulations 18.1.1 and 30.5, to reduce the likelihood of smoke and hot gases passing from one 'tweendeck space to another through the system. In addition to insulation requirements contained in this regulation, vertical ducts shall, if necessary, be insulated as required by the appropriate tables in regulation 26.

1.4. Except in cargo spaces, ventilation ducts shall be constructed of the following materials:

1. Ducts not less than 0.075 m^2 in sectional area and all vertical ducts serving more than a single 'tweendeck space shall be constructed of steel or other equivalent material;
2. Ducts less than 0.075 m^2 in sectional area other than the vertical ducts referred to in paragraph 1.4.1, shall be constructed of non-combustible materials. Where such ducts penetrate "A" or "B" class divisions due regard shall be given to ensuring the fire integrity of the division;
3. Short lengths of duct, not in general exceeding 0.02 m^2 in sectional area nor 2 m in length, need not be non-combustible provided that all of the following conditions are met:
   - 3.1. The duct is constructed of a material of [low] fire risk to the satisfaction of the Administration;
   - 3.2. The duct is used only at the terminal end of the ventilation system; and
   - 3.3. The duct is not located closer than 600 mm measured along its length to a penetration of an "A" or "B" class division, including continuous "B" class ceilings.

1.5. Where a stairway enclosure is ventilated, the duct or ducts shall be taken from the fan room independently of other ducts in the ventilation system and and shall not serve any other space.

1.6. All power ventilation, except machinery space and cargo space ventilation and an alternative system which may be required under regulation 16.6, shall be fitted with controls so grouped that all fans may be stopped from either of two separate positions which shall be situated as far apart as practicable. Controls provided for the power ventilation serving machinery spaces shall also be grouped so as to be operable from two positions, one of which shall be outside such spaces. Fans serving power ventilation systems to cargo spaces shall be capable of being stopped from a safe position outside such spaces.

2. *Passenger ships carrying not more than 36 passengers*

2.1. The ventilation system of passenger ships carrying not more than 36 passengers shall be in compliance with regulation 16.

Regulation 33. WINDOWS AND SIDESCUTTLES

1. All windows and sidescuttles in bulkheads within accommodation and service spaces and control stations other than those to which the provisions of regulation 30.6 and of regulation 31.2 apply, shall be so constructed as to preserve the integrity requirements of the type of bulkheads in which they are fitted.

2. Notwithstanding the requirements of the tables in regulations 26 and 27:

1. All windows and sidescuttles in bulkheads separating accommodation and service spaces and control stations from weather shall be constructed with frames of steel or other suitable material. The glass shall be retained by a metal glazing bead or angle;

2. Special attention shall be given to the fire integrity of windows facing open or enclosed lifeboat and liferaft embarkation areas and to the fire integrity of windows situated below such areas in such a position that their failure during a fire would impede the launching of, or embarkation into, lifeboats or liferafts.

Regulation 34. RESTRICTED USE OF COMBUSTIBLE MATERIALS

1. Except in cargo spaces, mail rooms, baggage rooms, or refrigerated compartments of service spaces, all linings, grounds, ceilings and insulations shall be of non-combustible materials. Partial bulkheads or decks used to subdivide a space for utility or artistic treatment shall also be of non-combustible material.

2. Vapour barriers and adhesives used in conjunction with insulation, as well as insulation of pipe fittings, for cold service systems need not be non-combustible, but they shall be kept to the minimum quantity practicable and their exposed surfaces shall have qualities of resistance to the propagation of flame to the satisfaction of the Administration.

3. The following surfaces shall have low flame-spread characteristics:*

1. Exposed surfaces in corridors and stairway enclosures, and of bulkheads, wall and ceiling linings in all accommodation and service spaces and control stations;

2. Concealed or inaccessible spaces in accommodation, service spaces and control stations.

4. The total volume of combustible facings, mouldings, decorations and veneers in any accommodation and service space shall not exceed a volume equivalent to 2.5 mm veneer on the combined area of the walls and ceilings. In the case of ships fitted with an automatic sprinkler system complying with the provisions of regulation 12, the above volume may include some combustible material used for erection of "C" class divisions.

5. Veneers used on surfaces and linings covered by the requirements of paragraph 3 shall have a calorific value not exceeding 45 MJ/m^2 of the area for the thickness used.

6. Furniture in the corridors and stairway enclosures shall be kept to a minimum.

7. Paints, varnishes and other finishes used on exposed interior surfaces shall not be capable of producing excessive quantities of smoke and toxic products.

8. Primary deck coverings, if applied within accommodation and service spaces and control stations, shall be of approved material which will not readily ignite, or give rise to toxic or explosive hazards at elevated temperatures.**

Regulation 35. DETAILS OF CONSTRUCTION

1. In accommodation and service spaces, control stations, corridors and stairways:

1. Air spaces enclosed behind ceilings, panelling or linings shall be suitably divided by close-fitting draught stops not more than 14 m apart;

2. In the vertical direction, such enclosed air spaces, including those behind linings of stairways, trunks, etc. shall be closed at each deck.

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* Reference is made to Guideline on the Evaluation of Fire Hazard Properties of Materials, adopted by the Organization by resolution A.166(ES.IV)[1].

[1] Inter-Governmental Maritime Consultative Organization, *Resolutions and Other Decisions, Assembly, Fourth Extraordinary Session*, 26-28 November 1968, p. 52.

** Reference is made to Improved Provisional Guidelines on Text Procedures for Primary Deck Coverings, adopted by the Organization by resolution A.214(VII)[1].

[1] *Ibid., Seventh Session*, 5-15 October 1971, p. 80.

2. The construction of ceiling and bulkheading shall be such that it will be possible, without impairing the efficiency of the fire protection, for the fire patrols to detect any smoke originating in concealed and inaccessible places, except where in the opinion of the Administration there is no risk of fire originating in such places.

Regulation 36. AUTOMATIC SPRINKLER, FIRE DETECTION AND FIRE ALARM SYSTEMS OR [FIXED] FIRE DETECTION AND FIRE ALARM SYSTEMS

1. In any ship to which this part applies there shall be installed throughout each separate zone, whether vertical or horzontal, in all accommodation and service spaces and, where it is considered necessary by the Administration, in control stations, except spaces which afford no substantial fire risk (such as void spaces, sanitary spaces, etc.) either:

1. An automatic sprinkler, fire detection and fire alarm system of an approved type, complying with the provisions of regulation 12 and so installed and arranged as to protect such spaces; or
2. A fixed fire detection and fire alarm system of an approved type, complying with the provisions of regulation 13 and so installed and arranged as to detect the presence of fire in such spaces, except that the smoke detectors required by regulation 13.2.2 need not be provided.

Regulation 37. PROTECTION OF SPECIAL CATEGORY SPACES

1. *Provisions applicable to special category spaces whether above or below the bulkhead deck*

1.1. General

1.1.1. The basic principle underlying the provisions of this regulation is that as normal main-vertical zoning may not be practicable in special category spaces, equivalent protection must be obtained in such spaces on the basis of a horizontal zone concept and by the provision of an efficient fixed fire-extinguishing system. Under this concept a horizontal zone for the purpose of this regulation may include special category spaces on more than one deck provided that the total overall clear height for vehicles does not exceed 10 m.

1.1.2. The requirements of regulations 16, 18, 30 and 32 for maintaining the integrity of vertical zones shall be applied equally to decks and bulkheads forming the boundaries separating horizontal zones from each other and from the remainder of the ship.

1.2. Structural protection

1.2.1. Boundary bulkheads of special category spaces shall be insulated as required for category (11) spaces in table 26.1 or in table 27.1 and the horizontal boundaries as required for category (11) spaces in table 26.3 or in table 27.2.

1.2.2. Indicators shall be provided on the navigating bridge which shall indicate when any fire door leading to or from the special category spaces is closed.

1.3. Fixed fire-extinguishing system*

Each special category space shall be fitted with an approved fixed pressure water-spraying system for manual operation which shall protect all parts of any deck and vehicle platform in such space, provided that the Administration may permit the use of any other fixed fire-extinguishing system that has been shown by full-scale test in conditions simulating a flowing petrol fire in a special category space to be not less effective in controlling fires likely to occur in such a space.

* Reference is made to Recommendation on Fixed Fire-Extinguishing Systems for Special Category Spaces, adopted by the Organization by resolution A.123(V)[1].

[1] Inter-Governmental Maritime Consultative Organization, *Resolutions and Other Decisions, Assembly, Fifth Session*, 17-26 October 1967, p. 92.

1.4. Patrols and detection

1.4.1. An efficient patrol system shall be maintained in special category spaces. In any such space in which the patrol is not maintained by a continuous fire watch at all times during the voyage there shall be provided [a fixed] fire detection system of an approved type.

1.4.2. Manually operated call points shall be provided as necessary throughout the special category spaces and one shall be placed close to each exit from such spaces.

1.5. Fire-extinguishing equipment

There shall be provided in each special category space:

1. At least three water fog applicators;
2. One portable foam applicator unit complying with the provisions of regulation 6.4, provided that at least two such units are available in the ship for use in such spaces; and
3. Such number of portable fire extinguishers as the Administration may deem sufficient, provided that at least one portable extinguisher is located at each access to such spaces.

1.6. Ventilation system

1.6.1. There shall be provided an effective power ventilation system for the special category spaces sufficient to give at least 10 air changes per hour. The system for such spaces shall be entirely separated from other ventilation systems and shall be operating at all times when vehicles are in such spaces. The Administration may require an increased number of air changes when vehicles are being loaded and unloaded. Ventilation ducts serving special category spaces capable of being effectively sealed shall be separated for each such space. The system shall be capable of being controlled from a position outside such spaces.

1.6.2. The ventilation shall be such as to prevent air stratification and the formation of air pockets.

1.6.3. Means shall be provided to indicate on the navigating bridge any loss or reduction of the required ventilating capacity.

1.6.4. Arrangements shall be provided to permit a rapid shut-down and effective closure of the ventilation system in case of fire, taking into account the weather and sea conditions.

1.6.5. Ventilation ducts, including dampers, shall be made of steel and their arrangement shall be to the satisfaction of the Administration.

2. *Additional provisions applicable only to special category spaces above the bulkhead deck*

2.1. Scuppers

In view of the serious loss of stability which could arise due to large quantities of water accumulating on the deck or decks consequent on the operation of the fixed pressure water-spraying system, scuppers shall be fitted so as to ensure that such water is rapidly discharged directly overboard.

2.2. Precautions against ignition of flammable vapours

2.2.1. On any deck on which vehicles are carried and on which explosive vapours might be expected to accumulate, equipment which may constitute a source of ignition of flammable vapours and, in particular, electrical equipment and wiring, shall be installed at least 450 mm above the deck. Electrical equipment installed at more than 450 mm above the deck shall be of a type so enclosed and protected as to prevent the escape of sparks. However, if the Administration is satisfied that the installation of electrical equipment and wiring at less than 450 mm above the deck is necessary for the safe operation of the ship, such electrical equipment and wiring may be installed provided that it is of a type approved for use in an explosive petrol and air mixture.

2.2.2. Electrical equipment and wiring, if installed in an exhaust ventilation duct, shall be of a type approved for use in explosive petrol and air mixtures and the outlet from any exhaust duct shall be sited in a safe position, having regard to other possible sources of ignition.

3. *Additional provisions applicable only to special category spaces below the bulkhead deck*

3.1. Bilge pumping and drainage

In view of the serious loss of stability which could arise due to large quantities of water accumulating on the deck or tank top consequent on the operation of the fixed pressure water-spraying system, the Administration may require pumping and drainage facilities to be provided additional to the requirements of regulation II-1/21.

3.2. Precautions against ignition of flammable vapours

3.2.1. Electrical equipment and wiring, if fitted, shall be of a type suitable for use in explosive petrol and air mixtures. Other equipment which constitute a source of ignition of flammable vapours shall not be permitted.

3.2.2. Electrical equipment and wiring, if installed in an exhaust ventilation duct, shall be of a type approved for use in explosive petrol and air mixtures and the outlet from any exhaust duct shall be sited in a safe position, having regard to other possible sources of ignition.

Regulation 38. PROTECTION OF CARGO SPACES, OTHER THAN SPECIAL CATEGORY SPACES, INTENDED FOR THE CARRIAGE OF MOTOR VEHICLES WITH FUEL IN THEIR TANKS FOR THEIR OWN PROPULSION

In any cargo space (other than special category spaces) containing motor vehicles with fuel in their tanks for their own propulsion the following provisions shall be complied with.

1. *Fire detection*

There shall be provided an approved automatic fire detection and fire alarm system. The design and arrangements of this system shall be considered in conjunction with the ventilation requirements referred to in paragraph 3.

2. *Fire-extinguishing arrangements*

2.1. There shall be fitted a fixed fire-extinguishing system which shall comply with the provisions of regulation 5, except that, if a carbon dioxide system is fixed, the quantity of gas available shall be at least sufficient to give a minimum volume of free gas equal to 45 per cent of the gross volume of the largest such cargo space which is capable of being sealed, and the arrangements shall be such as to ensure that at least two thirds of the gas required for the relevant space shall be introduced during 10 minutes. Any other fixed gas fire-extinguishing system or fixed high expansion foam fire-extinguishing system may be fitted provided it gives equivalent protection. Furthermore, any cargo space designated only for vehicles which are not carrying any cargo may be fitted with fixed halogenated hydrocarbon fire-extinguishing systems which shall comply with the provisions of regulation 5.

2.2. As an alternative, a system meeting the requirements of regulation 37.1.3 may be fitted, provided that regulation 37.2.1 or 37.3.1, as appropriate, is also complied with.

2.3. There shall be provided for use in any such space such number of portable fire extinguishers as the Administration may deem sufficient. At least one portable extinguisher shall be located at each access to such spaces.

3. *Ventilation system*

3.1. There shall be provided an effective power ventilation system sufficient to give at least 10 air changes per hour for ships carrying more than 36 passengers, and 6 air changes per hour for ships carrying not more than 36 passengers. The system for such cargo spaces shall be entirely separate from other ventilation systems and shall be operating at all times when vehicles are in such spaces. Ventilation ducts serving such cargo spaces capable of being effectively sealed shall be separated for each such space. The system shall be capable of being controlled from a position outside such spaces.

3.2. The ventilation shall be such as to prevent air stratification and the formation of air pockets.

3.3. Means shall be provided to indicate on the navigating bridge any loss or reduction of the required ventilating capacity.

3.4. Arrangements shall be provided to permit a rapid shut-down and effective closure of the ventilation system in case of fire, taking into account the weather and sea conditions.

3.5. Ventilation ducts, including dampers, shall be made of steel and their arrangement shall be to the satisfaction of the Administration.

4. *Precautions against ignition of flammable vapours*

4.1. Electrical equipment and wiring, if fitted, shall be of a type suitable for use in explosive petrol and air mixtures. Other equipment which may constitute a source of ignition of flammable vapours shall not be permitted.

4.2. Electrical equipment and wiring, if installed in an exhaust ventilation duct, shall be of a type approved for use in explosive petrol and air mixtures and the outlet from any exhaust duct shall be sited in a safe position, having regard to other possible sources of ignition.

4.3. Scuppers shall not be led to machinery or other spaces where sources of ignition may be present.

Regulation 39. FIXED FIRE-EXTINGUISHING ARRANGEMENTS IN CARGO SPACES

1. Except as provided for in paragraph 3, the cargo spaces of ships of 1,000 tons gross tonnage and upwards shall be protected by a fixed gas fire-extinguishing system complying with the provisions of regulation 5, or by a fixed high expansion foam fire-extinguishing system which gives equivalent protection.

2. Where it is shown to the satisfaction of the Administration that a ship is engaged on voyages of such short duration that it would be unreasonable to apply the requirements of paragraph 1 and also in ships of less than 1,000 tons gross tonnage, the arrangements in cargo spaces shall be to the satisfaction of the Administration.

3. A ship engaged in the carriage of dangerous goods shall be provided in any cargo spaces with a fixed gas fire-extinguishing system complying with the provisions of regulation 5 or with a fire-extinguishing system which in the opinion of the Administration gives equivalent protection for the cargoes carried.

Regulation 40. FIRE PATROLS, DETECTION, ALARMS AND PUBLIC ADDRESS SYSTEMS

1. [Manually operated call points] shall be fitted throughout the accommodation and service spaces to transmit an alarm immediately to the navigating bridge or main fire control station.

2. An approved fire detection or fire alarm system shall be provided which will automatically indicate at one or more suitable points or stations the presence or indication of fire and its location in any cargo space which, in the opinion of the Administration, is not accessible except where it is shown to the satisfaction of the Administration that the ship is engaged on voyages of such short duration that it would be unreasonable to apply this requirement.

3. All ships shall at all times when at sea, or in port (except when out of service), be so manned or equipped as to ensure that any initial fire alarm is immediately received by a responsible member of the crew.

4. A special alarm, operated from the navigating bridge or fire control station, shall be fitted to summon the crew. This alarm may be part of the ship's general alarm system but it shall be capable of being sounded independently of the alarm to the passenger spaces.

5. A public address system or other effective means of communication shall be available throughout the accommodation and service spaces and control stations.

6. For ships carrying more than 36 passengers an effcient patrol system shall be maintained so that an outbreak of fire may be promptly detected. Each member of the fire patrol shall be trained to be familiar with the arrangements of the ship as well as the location and operation of any equipment he may be called upon to use.

Regulation 41. SPECIAL REQUIREMENTS FOR SHIPS CARRYING DANGEROUS GOODS

The requirements of regulation 54 shall apply, as appropriate, to passenger ships carrying dangerous goods.

PART C. FIRE SAFETY MEASURES FOR CARGO SHIPS

(Regulation 54 of this part also applies to passenger ships as appropriate.)

Regulation 42. STRUCTURE

1. Subject to the provisions of paragraph 4, the hull, superstructure, structural bulkheads, [decks] and deckhouses shall be constructed of steel or other equivalent material.

2. The insulation of aluminium alloy components of "A" or "B" class divisions, except structure which in the opinion of the Administration is non-load-bearing, shall be such that the temperature of the structural core does not rise more than 200°C above the ambient temperature at any time during the applicable exposure to the standard fire test.

3. Special attention shall be given to the insulation of aluminium alloy components of columns, stanchions and other structural members required to support lifeboat and liferaft stowage, launching and embarkation areas, and "A" and "B" class divisions, to ensure:

1. That for such members supporting lifeboat and liferaft areas and class divisions, the temperature rise limitation specified in paragraph 2 shall apply at the end of one hour; and
2. That for such members required to support "B" class divisions, the temperature rise limitation specified in paragraph 2 shall apply at the end of half an hour.

4. Crowns and casings of machinery spaces of category A shall be of steel construction adequately insulated and openings therein, if any, shall be suitably arranged and protected to prevent the spread of fire.

5. One of the following methods of protection shall be adopted in accommodation and service areas:

1. Method 1C: The construction of all internal divisional bulkheading of non-combustible "B" or "C" class divisions generally without the installation of an automatic sprinkler, fire detection and fire alarm system in the accommodation and service spaces, except as required by regulation 52.1; or
2. Method IIC: The fitting of an automatic sprinkler, fire detection and fire alarm system as required by regulation 52.2 for the detection and extinction of fire in all spaces in which fire might be expected to originate, generally with no restriction on the type of internal divisional bulkheading; or
3. Method IIIC: The fitting of a fixed fire detection and fire alarm system, as required by regulation 52.3, in all spaces in which a fire might be expected to originate, generally with no restriction on the type of internal divisional bulkheading, except that in no case must the area of any accommodation space or spaces bounded by an "A" or "B" class division exceed 50 m^2. Consideration may be given by the Administration to increasing this area for public spaces.

6. The requirements for the use of non-combustible materials in construction and insulation of the boundary bulkheads of machinery spaces, control stations, service spaces, etc., and the protection of stairway enclosures and corridors will be common to all three methods outlined in paragraph 5.

Regulation 43. BULKHEADS WITHIN THE ACCOMMODATION AND SERVICE SPACES

1. All bulkheads required to be "B" class divisions shall extend from deck to deck and to the shell or other boundaries, unless continuous "B" class ceilings or linings are fitted on both sides of the bulkhead in which case the bulkhead may terminate at the continuous ceiling or lining.

2. *Method IC:* All bulkheads not required by this or other regulations of this Part to be "A" or "B" class divisions, shall be of at least "C" class construction.

3. *Method IIC:* There shall be no restriction on the construction of bulkheads not required by this or other regulations of this part to be "A" or "B" class divisions except in individual cases where "C" class bulkheads are required in accordance with table 44.1.

4. *Method IIIC:* There shall be no restriction on the construction of bulkheads not required by this Part to be "A" or "B" class divisions except that the area of any accommodation space or spaces bounded by a continuous "A" or "B" class division must in no case exceed 50 m^2 except in individual cases where "C" class bulkheads are required in accordance with table 44.1. Consideration may be given by the Administration to increasing this area for public space.

Regulation 44. FIRE INTEGRITY OF BULKHEADS AND DECKS

1. In addition to complying with the specific provisions for fire integrity of bulkheads and decks mentioned elsewhere in this part, the minimum fire integrity of bulkheads and decks shall be as prescribed in tables 44.1 and 44.2.

2. The following requirements shall govern application of the tables:

1. Tables 44.1 and 44.2 shall apply respectively to the bulkheads and decks separating adjacent spaces.
2. For determining the appropriate fire integrity standards to be applied to divisions between adjacent spaces, such spaces are classified according to their fire risk as shown in categories (1) to (11) below. The title of each category is intended to be typical rather than restrictive. The number in parentheses preceding each category refers to the applicable column or row in the tables.

(1) Control stations
- Spaces containing emergency sources of power and lighting.
- Wheelhouse and chartroom.
- Spaces containing the ship's radio equipment.
- Fire-extinguishing rooms, fire control rooms and fire-recording stations.
- Control room for propulsion machinery when located outside the machinery space.
- Spaces containing centralized fire alarm equipment.

(2) Corridors
- Corridors and lobbies.

(3) Accommodation spaces
- Spaces as defined in regulation 3.10, excluding corridors.

(4) Stairways
- Interior stairways, lifts and escalators (other than those wholly contained within the machinery spaces) and enclosures thereto.
- In this connexion, a stairway which is enclosed only at one level shall be regarded as part of the space from which it is not separated by a fire door.

(5) Service spaces (low risk)
- Lockers and store-rooms having an area of less than 2 m^2, drying rooms and laundries.

TABLE 44.1 – FIRE INTEGRITY OF BULKHEADS SEPARATING ADJACENT SPACES

Spaces	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Control stations (1)	A-0[e]	A-0	A-60	A-0	A-15	A-60	A-15	A-60	A-60	*	A-60
Corridors (2)		C	B-0	B-0 A-0[c]	B-0	A-60	A-0	A-0	A-0	*	A-30
Accommodation spaces (3)			C[a,b]	B-0 A-0[c]	B-0	A-60	A-0	A-0	A-0	*	A-30
Stairways (4)				B-0 A-0[c]	B-0 A-0[c]	A-60	A-0	A-0	A-0	* *	A-30
Service spaces (low risk) (5)					C	A-60	A-0	A-0	A-0	*	A-0
Machinery spaces of category A (6)						*	A-0	A-0[g]	A-60	*	A-60[f]
Other machinery spaces (7)							A-0[d]	A-0	A-0	*	A-0
Cargo spaces (8)								*	A-0	*	A-0
Service spaces (high risk) (9)									A-0[d]	*	A-30
Open decks (10)										–	A-0
Ro/ro cargo spaces (11)											*[h]

Notes: To be applied to both tables 44.1 and 44.2, as appropriate.

[a] No special requirements are imposed upon bulkheads in methods IIC and IIIC fire protection.

[b] In case of method IIIC "B" class bulkheads of "B-0" rating shall be provided between spaces or groups of spaces of 50 m^2 and over in area.

[c] For clarification as to which applies, see Regulations 43 and 46.

[d] Where spaces are of the same numerical category and superscript d appears, a bulkhead or deck of the rating shown in the tables is only required when the adjacent spaces are for a different purpose, e.g. in category (9). A galley next to a galley does not require a bulkhead but a galley next to a paint room requires an "A-0" bulkhead.

[e] Bulkheads separating the wheelhouse, chartroom and radio room from each other may be "B-0" rating.

[f] A-0 rating may be used if no dangerous goods are intended to be carried or if such goods are stowed not less than 3 m horizontally from such bulkhead.

[g] For cargo spaces in which dangerous goods are intended to be carried, Regulation 54.2.8 applies.

[h] Bulkheads and decks separating ro/ro cargo spaces shall be capable of being closed reasonably gastight and such divisions shall have "A" class integrity in so far as is reasonable and practicable in the opinion of the Administration.

[i] Fire insulation need not be fitted if the machinery space in category (7) in the opinion of the Administration has little or no fire risk.

* Where an asterisk appears in the tables, the division is required to be of steel or other equivalent material but is not required to be of "A" class standard.

TABLE 44.2 – FIRE INTEGRITY OF DECKS SEPARATING ADJACENT SPACES

Space below ↓ Space above →	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Control stations (1)	A-0	A-0	A-0	A-0	A-0	A-60	A-0	A-0	A-0	*	A-60
Corridors (2)	A-0	*	*	A-0	*	A-60	A-0	A-0	A-0	*	A-30
Accommodation spaces (3)	A-60	A-0	*	A-0	*	A-60	A-0	A-0	A-0	*	A-30
Stairways (4)	A-0	A-0	A-0	*	A-0	A-60	A-0	A-0	A-0	*	A-30
Service spaces (low risk) (5)	A-15	A-0	A-0	A-0	*	A-60	A-0	A-0	A-0	*	A-0
Machinery spaces of category A (6)	A-60	A-60	A-60	A-60	A-60	*	A-60 i/	A-30	A-60	*	A-60
Other machinery spaces (7)	A-15	A-0	A-0	A-0	A-0	A-0	*	A-0	A-0	*	A-0
Cargo spaces (8)	A-60	A-0	A-0	A-0	A-0	A-0	A-0	*	A-0	*	A-0
Service spaces (high risk) (9)	A-60	A-0	A-0	A-0	A-0	A-60	A-0	A-0	A-0 d/	*	A-30
Open decks (10)	*	*	*	*	*	*	*	*	*	–	*
Ro/ro cargo spaces (11)	A-60	A-30	A-30	A-30	A-0	A-60	A-0	A-0	A-30	*	* h/

(6) Machinery spaces of category A

– Spaces as defined in regulation 3.19.

(7) Other machinery spaces

– Spaces as defined in regulation 3.20 excluding machinery spaces of category A.

(8) Cargo spaces

– All spaces used for cargo (including cargo oil tanks) and trunkways and hatchways to such spaces.

(9) Service spaces (high risk)

– Galleys, pantries containing cooking appliances, paint and lamp rooms, lockers and store-rooms having an area of 2 m² or more, workshops other than those forming part of the machinery spaces.

(10) Open decks

– Open deck spaces and enclosed promenades having no fire risk. Air spaces (the space outside superstructures and deck houses).

(11) Ro/ro cargo spaces

– Spaces as defined in regulation 3.14. Cargo spaces intended for the carriage of motor vehicles with fuel in their tanks for their own propulsion.

3. Continuous "B" class ceilings or linings, in association with the relevant decks or bulkheads, may be accepted as contributing, wholly or in part, to the required insulation and integrity of a division.

4. External boundaries which are required in regulation 42.1 to be of steel or other equivalent material may be pierced for the fitting of windows and sidescuttles provided that there is no requirement for such boundaries to have "A" class integrity elsewhere in this part. Similarly, in such boundaries which are not required to have "A" class integrity, doors may be of materials to the satisfaction of the Administration.

Regulation 45. MEANS OF ESCAPE

1. Stairways and ladders shall be so arranged as to provide, from all accommodation spaces and from spaces in which the crew is normally employed, other than machinery spaces, ready means of escape to the open deck and thence to the lifeboats and liferafts. In particular the following general provisions shall be complied with:

1. At all levels of accommodation there shall be provided at least two widely separated means of escape from each restricted space or group of spaces.
   2.1. Below the lowest open deck the main means of escape shall be a stairway and the second escape may be a trunk or a stairway.
   2.2. Above the lowest open deck the means of escape shall be stairways or doors to an open deck or a combination thereof.
3. Exceptionally the Administration may dispense with one of the means of escape, due regard being paid to the nature and location of spaces and to the numbers of persons who normally might be quartered or employed there.
4. No dead-end corridors having a length of more than 7 m shall be accepted. A dead-end corridor is a corridor or part of a corridor from which there is only one escape route.
5. The width and continuity of the means of escape shall be to the satisfaction of the Administration.
6. If a radiotelegraph station has no direct access to the open deck, two means of access to or egress from such station shall be provided, one of which may be a porthole or window of sufficient size or other means to the satisfaction of the Administration, to provide an emergency escape.

2. In all ro/ro cargo spaces where the crew is normally employed the number and locations of escape routes to the open deck shall be to the satisfaction of the Administration, but shall in no case be less than two and shall be widely separated.

3. Except as provided in paragraph 4, two means of escape shall be provided from each machinery space of category A. In particular, one of the following provisions shall be complied with:

1. Two sets of steel ladders as widely separated as possible leading to doors in the upper part of the space similarly separated and from which access is provided to the open deck. In general, one of these ladders shall provide continuous fire shelter from the lower part of the space to a safe position outside the space. However, the Administration may not require the shelter if, due to the special arrangement or dimensions of the machinery space, a safe escape route from the lower part of this space is provided. This shelter shall be of steel, insulated, where necessary, to the satisfaction of the Administration and be provided with a self-closing steel door at the lower end; or
2. One steel ladder leading to a door in the upper part of the space from which access is provided to the open deck and additionally, in the lower part of the space and in a position well separated from the ladder referred to, a steel door capable of being operated from each side and which provides access to a safe escape route from the lower part of the space to the open deck.

4. In a ship of less than 1,000 tons gross tonnage, the Administration may dispense with one of the means of escape required under paragraph 3, due regard being paid to the dimension and disposition of the upper part of the space.

5. From machinery spaces other than those of category A, escape routes shall be provided to the satisfaction of the Administration having regard to the nature and location of the space and whether persons are normally employed in that space.

6. Lifts shall not be considered as forming one of the required means of escape as required by this regulation.

Regulation 46. PROTECTION OF STAIRWAYS AND LIFT TRUNKS IN ACCOMMODATION SPACES, SERVICE SPACES AND CONTROL STATIONS

1. Stairways which penetrate only a single deck shall be protected at least at one level by at least "B-0" class divisions and self-closing doors. Lifts which penetrate only a single deck shall be surrounded by "A-0" class divisions with steel doors at both levels. Stairways and lift trunks which penetrate more than a single deck shall be surrounded by at least "A-0" class divisions and be protected by self-closing doors at all levels.

2. On ships having accommodation for 12 persons or less, where stairways penetrate more than a single deck and where there are at least two escape routes direct to the open deck at every accommodation level, consideration may be given by the Administration to reducing the "A-0" requirements of paragraph 1 to "B.0".

3. All stairways shall be of steel frame construction except where the Administration sanctions the use of other equivalent material.

Regulation 47. DOORS IN FIRE RESISTING DIVISIONS

1. The fire resistance of doors shall, as far as practicable, be equivalent to that of the division in which they are fitted. Doors and door frames in "A" class divisions shall be constructed of steel. Doors in "B" class divisions shall be non-combustible. Doors fitted in boundary bulkheads of machinery spaces of category A shall be reasonably gastight and self-closing. In ships constructed according to method IC, an Administration may permit the use of combustible materials in doors separating cabins from individual interior sanitary accommodation such as showers.

2. Doors required to be self-closing shall not be fitted with hold-back hooks. However, hold-back arrangements fitted with remote release devices of the fail-safe type may be utilized.

3. In corridor bulkheads ventilation openings may be permitted only in and under the doors of cabins and public spaces. The openings shall be provided only in the lower half of a door. Where such opening is in or under a door the total net area of any such opening or openings shall not exceed 0.05 m^2. When such opening is cut in a door it shall be fitted with a grille made of non-combustible material.

4. Watertight doors need not be insulated.

Regulation 48. VENTILATION SYSTEMS

The ventilation systems of cargo ships shall be in compliance with the provisions of regulation 16, except paragraph 8.

Regulation 49. RESTRICTED USE OF COMBUSTIBLE MATERIALS

1. All exposed surfaces in corridors and stairway enclosures and surfaces including grounds in concealed or inaccessible spaces in accommodation and service spaces and control stations shall have low flame-spread characteristics.* Exposed surfaces of ceilings in accommodation and service spaces and control stations shall have low flame-spread characteristics.

2. Paints, varnishes and other finishes used on exposed interior surfaces shall not offer an undue fire hazard in the judgement of the Administration and shall not be capable of producing excessive quantities of smoke.

* Reference is made to Guidelines on the Evaluation of Fire Hazard Properties of Materials, adopted by the Organization by resolution A.166(ES.IV).

3. Primary deck coverings, if applied [ ] in accommodation and service spaces and control stations shall be of an approved material which will not readily ignite.*

Regulation 50. DETAILS OF CONSTRUCTION

1. *Method IC:* In accommodation and service spaces and control stations all linings, draught stops, ceilings and their associated grounds shall be of non-combustible materials.

2. *Methods IIC and IIIC:* In corridors and stairway enclosures serving accommodation and service spaces and control stations, ceilings, linings, draught stops and their associated grounds shall be of non-combustible materials.

3. *Methods IC, IIC and IIIC*

3.1. Except in cargo spaces or refrigerated compartments of service spaces, insulating materials shall be non-combustible. Vapour barriers and adhesives used in conjunction with insulation, as well as the insulation of pipe fittings, for cold service systems, need not be of non-combustible materials, but they shall be kept to the minimum quantity practicable and their exposed surfaces shall have qualities of resistance to the propagation of flame to the satisfaction of the Administration.

3.2. Where non-combustible bulkheads, linings and ceilings are fitted in accommodation and service spaces they may have a combustible veneer not exceeding 2.0 mm in thickness within any such space except corridors, stairway enclosures and control stations, where the veneer shall not exceed 1.5 mm in thickness.

3.3. Air spaces enclosed behind ceilings, panellings, or linings, shall be divided by close-fitting draught stops spaced not more than 14 m apart. In the vertical direction, such air spaces, including those behind linings of stairways, trunks, etc., shall be closed at each deck.

Regulation 51. ARRANGEMENT FOR GASEOUS FUEL FOR DOMESTIC PURPOSES

Where gaseous fuel is used for domestic purposes the arrangements [for the] storage, distribution and utilization of the fuel shall be such that, having regard to the hazards of fire and explosion which the use of such fuel may entail, the safety of the ship and the persons on board is preserved.

Regulation 52. FIXED FIRE DETECTION AND FIRE ALARM SYSTEMS
AUTOMATIC SPRINKLER, FIRE DETECTION AND FIRE ALARM SYSTEMS

1. In ships in which method IC is adopted, a smoke detection system in accordance with the relevant provisions of regulation 13 shall be so installed and arranged as to protect all corridors, stairways and escape routes within accommodation spaces.

2. In ships in which method IIC is adopted, an automatic sprinkler, fire detection and fire alarm system of an approved type and complying relevant provisions of regulation 12 shall be so installed and arranged as to protect accommodation spaces, galleys and other service spaces, except spaces which afford no substantial fire risk such as void spaces, sanitary spaces, etc. In addition, a smoke detection system in accordance with the relevant provisions of regulation 13 shall be so arranged and installed as to protect corridors, stairways and escape routes within accommodation spaces.

3. In ships in which method IIIC is adopted, a fixed fire detection and fire alarm system of an approved type and complying with the relevant provisions of regulation 13 shall be so installed and arranged as to detect the presence of fire in all accommodation spaces and service spaces, except spaces which afford no substantial fire risk such as void spaces, sanitary spaces, etc.

* Reference is made to Improved Provisional Guidelines on Test Procedures for Primary Deck Coverings, adopted by the Organization by resolution A.214(VII).

4. Notwithstanding the provisions of the above, the Administration need not require the installation of detectors required in accordance with the provisions of regulation 13.2.2 until 1 September 1985.

Regulation 53. FIRE PROTECTION ARRANGEMENTS IN CARGO SPACES

1. *General*

1.1. Except for cargo spaces covered in paragraphs 2 and 3, cargo spaces of ships of 2,000 tons gross tonnage and upwards shall be protected by a fixed gas fire-extinguishing system complying with the provisions of regulation 5 or by a fire-extinguishing system which gives equivalent protection.

1.2. The Administration may exempt from the requirements of paragraph 1.1 cargo spaces of any ship if constructed and solely intended for carrying ore, coal, grain, unseasoned timber and non-combustible cargoes or cargoes which, in the opinion of the Administration, constitute a low fire risk. Such exemptions may be granted only if the ship is fitted with steel hatch covers and effective means of closing all ventilators and other openings leading to the cargo spaces.

1.3. Notwithstanding the provisions of paragraph 1.1, any ship engaged in the carriage of dangerous goods shall be provided in any cargo spaces with a fixed gas fire-extinguishing system complying with the provisions of regulation 5 or [with] a fire-extinguishing system which in the opinion of the Administration gives equivalent protection for the cargoes carried.

2. *Ro/ro cargo spaces*

2.1. Fire detection

There shall be provided [a fixed] fire detection and fire alarm system. The design and arrangements of this system shall be considered in conjunction with the ventilation requirements referred to in 2.3.

2.2. Fire-extinguishing arrangements

2.2.1. Ro/ro cargo spaces capable of being sealed shall be fitted with a fixed gas fire-extinguishing system which shall comply with the provisions of regulation 5, except that:

1. If a carbon dioxide system is fitted, the quantity of gas available shall be at least sufficient to give a minimum volume of free gas equal to 45 per cent of the gross volume of the largest such cargo space which is capable of being sealed, and the arrangements shall be such as to ensure that at least two thirds of the gas required for the relevant space shall be introduced during 10 minutes;
2. A halogenated hydrocarbon system may be used only for spaces designated only for vehicles which are not carrying any cargo;
3. Any other fixed gas fire-extinguishing system or fixed high expansion foam fire-extinguishing system may be fitted provided the Administration is satisfied that an equivalent protection is achieved;
4. As an alternative, a system meeting the requirements of regulation 37.1.3 may be fitted. However, the drainage and pumping arrangements shall be such as to prevent the build-up of free surfaces. If this is not possible the adverse effect upon stability of the added weight and free surface of water shall be taken into account to the extent deemed necessary by the Administration in its approval of the stability information.* Such information shall be included in the stability information supplied to the master as required by regulation II-1/22.

2.2.2. Ro/ro cargo spaces not capable of being sealed shall be fitted with a system meeting the requirements of regulation 37.1.3. However, the drainage and pumping arrangements shall be such as to prevent the build-up of free surfaces. If this is not possible the

* Reference is made to Recommendation on Fixed Fire-Extinguishing Systems for Special Category Spaces, adopted by the Organization by resolution A.123(V).

adverse effect upon stability of the added weight and free surface of water shall be taken into account to the extent deemed necessary by the Administration in its approval of the stability information*. Such information shall be included in the stability information supplied to the master as required by regulation II-1/22.

2.2.3. There shall be provided for use in any ro/ro cargo space such number of portable fire extinguishers as the Administration may deem sufficient. At least one portable extinguisher shall be located at each access to such a cargo space.

2.2.4. Each ro/ro cargo space intended for the carriage of motor vehicles with fuel in their tanks for their own propulsion shall be provided with:

1. At least three water fog applicators;
2. One portable foam applicator unit complying with the provisions of regulation 6.4 provided that at least two such units are available in the ship for use in such ro/ro cargo spaces.

2.3. Ventilation system

2.3.1. Closed ro/ro cargo spaces shall be provided with an effective power ventilation system sufficient to provide at least six air changes per hour based on an empty hold. Ventilation fans shall normally be run continuously whenever vehicles are on board. Where this is impracticable, they shall be operated for a limited period daily as weather permits and in any case for a reasonable period prior to discharge, after which period the ro/ro cargo space shall be proved gas free. One or more portable combustible gas detecting instruments shall be carried for this purpose. The system shall be entirely separate from other ventilating systems. Ventilation ducts serving ro/ro cargo spaces capable of being effectively sealed shall be separated for each cargo space. The Administration may require an increased number of air changes when vehicles are being loaded or unloaded. The system shall be capable of being controlled from a position outside such spaces.

2.3.2. The ventilation shall be so arranged as to prevent air stratification and the formation of air pockets.

2.3.3. Means shall be provided to indicate any loss of the required ventilating capacity on the navigating bridge.

2.3.4. Arrangements shall be provided to permit a rapid shut-down and effective closure of the ventilation system in case of fire, taking into account the weather and sea conditions.

2.3.5. Ventilation ducts, including dampers, shall be made of steel and their arrangement shall be to the satisfaction of the Administration.

2.4. Precautions against ignition of flammable vapours

Closed ro/ro cargo spaces carrying motor vehicles with fuel in their tanks for their own propulsion shall comply with the following additional provisions:

1. Except as provided in paragraph 2.4.2, electrical equipment and wiring shall be of a type suitable for use in explosive petrol and air mixtures.
2. Above a height of 450 mm from the deck, electrical equipment of a type so enclosed and protected as to prevent the escape of sparks shall be permitted as an alternative on condition that the ventilating system is so designed and operated as to provide continuous ventilation of the cargo spaces at the rate of at least ten air changes per hour whenever vehicles are on board.
3. Other equipment which may constitute a source of ignition of flammable vapours shall not be permitted.

* Reference is made to Recommendation on Fixed Fire-Extinguishing Systems for Special Category Spaces, adopted by the Organization by resolution A.123(V).

4. Electrical equipment and wiring in an exhaust ventilation duct shall be of a type approved for use in explosive petrol and air mixtures and the outlet from any exhaust duct shall be sited in a safe position, having regard to other possible sources of ignition.
5. Scuppers shall not be led to machinery or other spaces where sources of ignition may be present.

3. *Cargo spaces, other than ro/ro cargo spaces, intended for the carriage of motor vehicles with fuel in their tanks for their own propulsion*

Spaces intended for the carriage of motor vehicles with fuel in their tanks for their own propulsion shall comply with requirements of paragraph 2, except that paragraph 2.2.4 need not be complied with.

Regulation 54. SPECIAL REQUIREMENTS FOR SHIPS CARRYING DANGEROUS GOODS

1. General

1.1. In addition to complying with the requirements of regulation 53 for cargo ships and with the requirements of regulations 38 and 39 for passenger ships as appropriate, ship types and cargo spaces, referred to in paragraph 1.2, intended for the carriage of dangerous goods shall comply with the requirements of this regulation, as appropriate, except when carrying dangerous goods in limited quantities* unless such requirements have already been met by compliance with the requirements elsewhere in this chapter. The types of ships and modes of carriage of dangerous goods are referred to in paragraph 1.2 and in table 54.1, where the numbers appearing in paragraph 1.2 are referred to in the top line.

1.2. The following ship types and cargo spaces shall govern the application of tables 54.1 and 54.2:

1. Ships and cargo spaces not specifically designed for the carriage of freight containers but intended for the carriage of dangerous goods in packaged form including goods in freight containers and portable tanks.
2. Purpose built container ships and cargo spaces intended for the carriage of dangerous goods in freight containers and portable tanks.
3. Ro/ro ships and ro/ro cargo spaces intended for the carriage of dangerous goods.
4. Ships and cargo spaces intended for the carriage of solid dangerous goods in bulk.
5. Ships and cargo spaces intended for carriage of dangerous goods other than liquids and gases in bulk in shipborne barges.

2. *Special requirements*

Unless otherwise specified the following requirements shall govern the application of tables 54.1, 54.2 and 54.3 to both "on deck" and "under deck" stowage of dangerous goods where the numbers of the following paragraphs are indicated in the first column.

2.1. Water supplies

2.1.1. Arrangements shall be Made to ensure immediate availability of a supply of water from the fire main at the required pressure either by permanent pressurization or by suitably placed remote starting arrangements for the fire pumps.

2.1.2. The quantity of water delivered shall be capable of supplying four nozzles of a size and at pressures as specified in regulation 4, capable of being trained on any part of the cargo space when empty. This amount of water may be applied by equivalent means to the satisfaction of the Administration.

2.1.3. Means of effectively cooling the designated under deck cargo space by copious quantities of water, either by a fixed arrangement of spraying nozzles, or flooding the cargo space with water, shall be provided. Hoses may be used for this purpose in small cargo spaces

* Reference is made to Section 18 of the General Introduction to the International Maritime Dangerous Goods Code (the IMDG Code) for a definition of the term "limited quantities".

TABLE 54.1 – APPLICATION OF THE REQUIREMENTS TO DIFFERENT MODES OF CARRIAGE OF DANGEROUS GOODS IN SHIPS AND CARGO SPACES

Wherever "x" appears in table 54.1 it means that this requirement is applicable to all classes of dangerous goods as given in the appropriate line of table 54.3, except as indicated by the notes.

Regulation 54.1.2 / Regulation 54.2	.1 Not specifically designed	.2 Container cargo spaces	.3 Closed ro/ro cargo spaces	.3 Open ro/ro cargo spaces	.3 Weather decks	.4 Solid dangerous goods in bulk	.5 Shipborne barges
.1.1	x	x	x	x	x	For application of requirements of Regulation 54 to different classes of dangerous goods – see Table 54.2	x
.1.2	x	x	x	x	x		–
.1.3	x	x	x	x	–		x
.1.4	x	x	x	x	–		x
.2	x	x	x	x	–		x[d]
.3	x	x	x	–	–		x[d]
.4.1	x	x[a]	x	–	–		x[d]
.4.2	x	x[a]	x	–	–		x[d]
.5	x	x	x	–	–		–
.6.1	x	x	x	x	x		–
.6.2	x	x	x	x	x		–
.7	x	–	–	x	x		–
.8	x	x[b]	x	x	x		–
.9	–	–	x[c]	x	–		–

Notes

[a] For classes 4 and 5.1 not applicable to closed freight containers.

For classes 2, 3, 6.1 and 8 when carried in closed freight containers the ventilation rate may be reduced to not less than two air changes. For the purpose of this requirement a portable tank is a closed freight container.

[b] Applicable to decks only.

[c] Applies only to closed ro/ro cargo spaces, not capable of being sealed.

[d] In the special case where the barges are capable of containing flammable vapours or alternatively if they are capable of discharging flammable vapours to a safe space outside the barge carrier compartment by means of ventilation ducts connected to the barges, these requirements may be reduced or waived to the satisfaction of the Administration.

TABLE 54.2 – APPLICATION OF THE REQUIREMENTS TO DIFFERENT CLASSES OF DANGEROUS GOODS FOR SHIPS AND CARGO SPACES CARRYING SOLID DANGEROUS GOODS IN BULK

Class – Chapter VII / Regulation 54.2	4.1	4.2	4.3[f]	5.1	6.1	8	9
.1.1	x	x	–	x	x[g]	x[g]	x
.1.2[e]	x	x	–	x	–	–	x
.2	x	x[g]	x	x[g]	–	–	x[g]
.4.1[h]	x[g]	x[g]	x	x[g]	–	–	x[g]
.4.2[h]	x	x[g]	x	x[g]	–	–	x[g]
.6	x	x	x	x	x	x	x
.8	x	x	x	x[g]	x[g]	x[g]	x

Notes

[e] This requirement is applicable when the characteristics of the substance call for large quantities of water for fire fighting.

[f] The hazards of substances in this class which may be carried in bulk are such that special consideration must be given by the Administration to the construction and equipment of the ships involved in addition to [meeting the requirements] enumerated in this table.

[g] Reference is made to the International Maritime Dangerous Goods Code (resolution A.81(1V)[1] as amended) or the Code of Safe Practice for Solid Bulk Cargoes (resolution A.434(X1)[2] as amended), as appropriate.

[h] At least natural ventilation is required in enclosed cargo spaces intended for carriage of solid dangerous goods in bulk. In cases where power ventilation is required in the Code of Safe Practice for Solid Bulk Cargoes (resolution A.434(X1) as amended), the use of portable ventilation units (equipment) to the satisfaction of the Administration may suffice.

[1] Inter-Governmental Maritime Consultative Organization, *Resolutions and Other Decisions, Assembly, Fourth Session*, 15-28 September 1965, p. 18.

[2] *Ibid., Eleventh Session*, 5-15 November 1979, p. 156.

TABLE 54.3 – APPLICATION OF THE REQUIREMENTS TO DIFFERENT CLASSES OF DANGEROUS GOODS EXCEPT SOLID DANGEROUS GOODS IN BULK

Class – Chapter VII / Regulation 54.2	I	2	3	4	5.1	5.2	6.1	8
.1.1	x	x	x	x[p]	x	x[p]	x	x
.1.2[i]	x	x	x	x[p]	x	x[p]	–	–
.1.3	x[k]	–	–	–	–	–	–	–
.1.4	x[k]	–	–	–	–	–	–	–
.2	x[k]	x[l]	x[m]	–	–	–	x[m,p]	x[m,p]
.3	x	x	x	x	x	–	x	x
.4.1	–	x[j]	x[m]	x[p]	x[p]	–	x[m,p]	x[m,p]
.4.2	–	x[l]	x[m]	–	–	–	x[m,p]	x[m,p]
.5	–	–	x[m]	–	–	–	x[n]	x[m]
.6	–	x	x	x	x	x[p]	x	x
.7	–	–	x	x	x	x[p]	x[p]	x[p]
.8	x[k,o]	x	x	x	x[p]	–	x[p]	x[p]
.9	x	x	x[m]	x[p]	x	–	x[m]	x[m]

Notes

[i] This requirement is applicable when the characteristics of the substance call for large quantities of water for fire fighting.

[j] Applicable to flammable or poisonous gases.

[k] Except goods of class 1 in division 1.4, compatibility group S.

[l] All flammable gases.

[m] All liquids having a flashpoint below 23°C (closed cup test).

[n] Liquids only.

[o] Goods of class 1 shall be stowed 3 m horizontally away from the machinery space boundaries in all cases.

[p] Reference is made to the International Maritime Dangerous Goods Code (resolution A.81(IV) as amended) or the Code of Safe Practice for Solid Bulk Cargoes (resolution A.434(XI) as amended), as appropriate.

and in small areas of larger cargo spaces at the discretion of the Administration. In any event the drainage and pumping arrangements shall be such as to prevent the build-up of free surfaces. If this is not possible the adverse effect upon stability of the added weight and free surface of water shall be taken into account to the extent deemed necessary by the Administration in its approval of the stability information.*

2.1.4. Provision to flood a designated under deck cargo space with suitable specified media may be substituted for the requirements in paragraph 2.1.3.

2.2. Sources of ignition

Electrical equipment and wiring shall not be fitted in enclosed cargo spaces, closed vehicle deck spaces, or open vehicle deck spaces unless it is essential for operational purposes in the opinion of the Administration. However, if electrical equipment is fitted in such spaces, it shall be of a certified safe type** for use in the dangerous environments to which it may be exposed unless it is possible to completely isolate the electrical system (by removal of links in the system, other than fuses). Cable penetrations of the decks and bulkheads shall be sealed against the passage of gas or vapour. Through runs of cables and cables within the cargo spaces shall be protected against damage from impact. Any other equipment which may constitute a source of ignition of flammable vapour shall not be permitted.

2.3. Detection system

An approved fire detection and fire alarm system shall be fitted to all enclosed cargo spaces including closed vehicle deck spaces. Where the detection system utilizes samples of atmosphere drawn from such cargo spaces provision shall be made to prevent, in the event of cargo leakage, the discharge of contaminated atmosphere through the sampling system into the space in which the detection apparatus is situated. A notice stating that the samples shall be discharged to the open air when cargoes giving off toxic fumes are being carried shall be permanently exhibited at the equipment.

2.4. Ventilation

2.4.1. Adequate power ventilation shall be provided in enclosed cargo spaces. The arrangement shall be such as to provide for at least six air changes per hour in the cargo space based on an empty cargo space and for removal of vapours from the upper or lower parts of the cargo space, as appropriate.

2.4.2. The fans shall be such as to avoid the possibility of ignition of flammable gas air mixtures. Suitable wire mesh guards shall be fitted over inlet and outlet ventilation openings.

2.5. Bilge pumping

Where it is intended to carry flammable or toxic liquids in enclosed cargo spaces the bilge pumping system shall be designed to ensure against inadvertent pumping of such liquids through machinery space piping or pumps. Where large quantities of such liquids are carried, consideration shall be given to the provision of additional means of draining those cargo spaces. These means shall be to the satisfaction of the Administration.

2.6. Personnel protection

2.6.1. Four sets of full protective clothing resistant to chemical attack shall be provided in addition to the fireman's outfits required by regulation 17. The protective clothing shall cover all skin, so that no part of the body is unprotected.

2.6.2. At least two self-contained breathing apparatuses additional to those required by regulation 17 shall be provided.

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* Reference is made to Recommendation on Fixed Fire-Extinguishing Systems for Special Category Spaces, adopted by the Organization by resolution A.123(V).

** Reference is made to Recommendations publishcd by the International Electrotechnical Commission and, in particular, Publication 92—Electrical Installations in Ships.

2.7. Portable fire extinguishers

Portable fire extinguishers with a total capacity of at least 12 kg of dry powder or equivalent shall be provided for the cargo spaces. These extinguishers shall be in addition to any portable fire extinguishers required elsewhere in this chapter.

2.8. Insulation of machinery space boundaries

Bulkheads forming boundaries between cargo spaces and machinery spaces of category A shall be insulated to "A-60" standard, unless the dangerous goods are stowed at least 3 m horizontally away from such bulkheads. Other boundaries between such spaces shall be insulated to "A-60" standard.

2.9. Water spray system

Each open ro/ro cargo space having a deck above it and each space deemed to be a closed ro/ro cargo space not capable of being sealed shall be fitted with an approved fixed pressure water-spraying system for manual operation which shall protect all parts of any deck and vehicle platform in such space, except that the Administration may permit the use of any other fixed fire-extinguishing system that has been shown by full-scale test to be no less effective. In any event the drainage and pumping arrangements shall be such as to prevent the build-up of free surfaces. If this is not possible the adverse effect upon stability of the added weight and free surface of water shall be taken into account to the extent deemed necessary by the Administration in its approval of the stability information.*

3. *Document of compliance*

The Administration shall provide the ship with an appropriate document as evidence of compliance of construction and equipment with the requirements of this regulation.

PART D. FIRE SAFETY MEASURES FOR TANKERS

(The requirements of this part are additional to those of part C except for regulations 53 and 54 which do not apply to tankers and except as provided otherwise in regulations 57 and 58.)

Regulation 55. APPLICATION

1. Unless expressly provided otherwise, this part shall apply to tankers carrying crude oil and petroleum products having a flashpoint not exceeding 60°C (closed cup test), as determined by an approved flashpoint apparatus, and a Reid vapour pressure which is below atmospheric pressure and other liquid products having a similar fire hazard.

2. Where liquid cargoes other than those referred to in paragraph 1 or liquefied gases which introduce additional fire hazards are intended to be carried, additional safety measures shall be required to the satisfaction of the Administration, having due regard to the provisions of the Bulk Chemical Code and the Gas Carrier Code.

3. This paragraph applies to all ships which are combination carriers. Such ships shall not carry solid cargoes unless all cargo tanks are empty of oil and gas freed or unless the arrangements provided in each case are to the satisfaction of the Administration and in accordance with the relevant operational requirements contained in the Guidelines for Inert Gas Systems.**

4. Tankers carrying petroleum products having a flashpoint exceeding 60°C (closed cup test) as determined by an approved flashpoint apparatus shall comply with the provisions of part C, except that in lieu of the fixed fire-extinguishing system required in regulation 53 they shall be fitted with a fixed deck foam system which shall comply with the provisions of regulation 61.

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* Reference is made to Recommendation on Fixed Fire-Extinguishing Systems for Special Category Spaces, adopted by the Organisation by resolution A.123(V).

** Reference is made to Guidelines for Inert Gas Systems, adopted by the Maritime Safety Committee at its forty-second session in May 1980 (MSC/Circ.282).

5. The requirements for inert gas systems of regulation 60 need not be applied to all chemical tankers or gas carriers when carrying cargoes described in paragraph 1, provided that alternative arrangements, to be developed by the Organization, are fitted.*

6. Chemical tankers and gas carriers shall comply with the requirements of this part, except where alternative and supplementary arrangements are provided to the satisfaction of the Administration, having due regard to the provisions of the Bulk Chemical Code and the Gas Carrier Code.

Regulation 56. LOCATION AND SEPARATION OF SPACES

1. Machinery spaces of category A other than such spaces for bow thrusters and their associated equipment shall be positioned aft of cargo tanks and slop tanks; they shall also be situated aft of cargo pump rooms and cofferdams, but not necessarily aft of the oil fuel bunker tanks. Any machinery space of category A shall be isolated from cargo tanks and slop tanks by a cofferdam, a cargo pump room, or an oil fuel bunker tank. However, the lower portion of the pump room may be recessed into machinery spaces of category A to accommodate pumps provided that the deckhead of the recess is in general not more than one third of the moulded depth above the keel except that in the case of ships of not more than 25,000 tonnes deadweight, where it can be demonstrated that for reasons of access and satisfactory piping arrangements this is impracticable, the Administration may permit a recess in excess of such height, but not exceeding one half of the moulded depth above the keel.

2. Accommodation spaces, main cargo control stations, control stations and service spaces (excluding isolated cargo handling gear lockers) shall be positioned aft of all cargo tanks, slop tanks, cargo pump rooms and cofferdams which isolate cargo or slop tanks from machinery spaces of category A. Any common bulkheads separating a cargo pump room, including the cargo pump room entrance, from accommodation and service spaces and control stations shall be constructed to "A-60" standard. Where deemed necessary, accommodation spaces, control stations, machinery spaces other than those of category A, and service spaces may be permitted forward of all cargo tanks, slop tanks, cargo pump rooms and cofferdams subject to an equivalent standard of safety and appropriate availability of fire-extinguishing arrangements being provided to the satisfaction of the Administration.

3. Where the fitting of a navigation position above the cargo tank area is shown to be necessary it shall be for navigation purposes only and it shall be separated from the cargo tank deck by means of an open space with a height of at least 2 m. The fire protection of such navigation position shall in addition be as required for control spaces as set forth in regulation 58.1 and 58.2 and other provisions, as applicable, of this part.

4. Means shall be provided to keep deck spills away from the accommodation and service areas. This may be accomplished by provision of a permanent continuous coaming of a suitable height extending from side to side. Special consideration shall be given to the arrangements associated with stern loading.

5. Exterior boundaries of superstructures and deckhouses enclosing accommodation and service spaces and including any overhanging decks which support such accommodation, shall be insulated to "A-60" standard for the whole of the portions which face cargo oil tanks and for 3 m aft of the front boundary. In the case of the sides of these superstructures and deckhouses, such insulation shall be carried as high as is deemed necessary by the Administration.

6.1. Entrances, air inlets and openings to accommodation spaces, service spaces and control stations shall not face the cargo area. They shall be located on the end bulkhead not

* Reference is made to Interim Regulation for Inert Gas Systems on Chemical Tankers Carrying Petroleum Products, adopted by the Organization by resolution A.473(XII).[1]

[1] International Maritime Organization, *Resolutions and Other Decisions, Assembly, Twelfth Session*, 9-20 November 1981, p. 135.

facing the cargo area and/or on the outboard side of the superstructure or deckhouse at a distance of at least [4] per cent of the length of the ship but not less than 3 m from the end of the supertructure or deckhouse facing the cargo area. This distance, however, need not exceed 5 m.

6.2. No doors shall be permitted within the limits mentioned in paragraph 6.1, except that doors to those spaces not having access to accommodation spaces, service spaces and control stations, such as cargo control stations, provision rooms and store-rooms may be permitted by the Administration. Where such doors are fitted, the boundaries of the space shall be insulated to "A-60" standard. Bolted plates for removal of machinery may be fitted within the limits specified in paragraph 6.1. [Wheelhouse] doors and wheelhouse windows may be located within the limits specified in paragraph 6.1 so long as they are so designed that a rapid and efficient gas and vapour tightening of the [wheelhouse] can be ensured.

6.3. Port lights facing the cargo area and on the sides of the superstructures and deckhouses within the limits specified in paragraph 6.1 shall be of the fixed (non-opening) type. Such port lights in the first tier on the main deck shall be fitted with inside covers of steel or other equivalent material.

Regulation 57. STRUCTURE, BULKHEADS WITHIN ACCOMMODATION AND SERVICE SPACES AND DETAILS OF CONSTRUCTION

1. For the application of the requirements of regulations 42, 43 and 50 to tankers, only method IC as defined in regulation 42.5.1 shall be used.

2. Skylights to cargo pump rooms shall be of steel, shall not contain any glass and shall be capable of being closed from outside the pump room.

Regulation 58. FIRE INTEGRITY OF BULKHEADS AND DECKS

1. In lieu of regulation 44 and in addition to complying with the specific provisions for fire integrity of bulkheads and decks mentioned elsewhere in this part the minimum fire integrity of bulkheads and decks shall be as prescribed in tables 58.1 and 58.2.

2. The following requirements shall govern application of the tables:

1. Tables 58.1 and 58.2 shall apply respectively to the bulkhead and decks separating adjacent spaces.
2. For determining the appropriate fire integrity standards to be applied to divisions between adjacent spaces, such spaces are classified according to their fire risk as shown in categories (1) to (10) below. The title of each category is intended to be typical rather than restrictive. The number in parentheses preceding each category refers to the applicable column or row in the tables.

(1) Control stations
- Spaces containing emergency sources of power and lighting.
- Wheelhouse and chartroom.
- Spaces containing the ship's radio equipment.
- Fire-extinguishing rooms, fire control rooms and fire-recording stations.
- Control room for propulsion machinery when located outside the machinery space.
- Spaces containing centralized fire alarm equipment.

(2) Corridors
- Corridors and lobbies.

(3) Accommodation spaces
- Spaces as defined in regulation 3.10, excluding corridors.

TABLE 58.1 – FIRE INTEGRITY OF BULKHEADS SEPARATING ADJACENT SPACES

Spaces		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Control stations	(1)	A-0[c]	A-0	A-60	A-0	A-15	A-60	A-15	A-60	A-60	*
Corridors	(2)		C	B-0	B-0 A-0[a]	B-0	A-60	A-0	A-60	A-0	*
Accommodation spaces	(3)			C	B-0 A-0[a]	B-0	A-60	A-0	A-60	A-0	*
Stairways	(4)				B-0 A-0[a]	B-0 A-0[a]	A-60	A-0	A-60	A-0	*
Service spaces (low risk)	(5)					C	A-60	A-0	A-60	A-0	*
Machinery spaces of category A	(6)						*	A-0	A-0[d]	A-60	*
Other machinery spaces	(7)							A-0[b]	A-0	A-0	*
Cargo pump rooms	(8)								*	A-60	*
Service spaces (high risk)	(9)									A-0[b]	*
Open decks	(10)										–

Notes: To be applied to tables 58.1 and 58.2, as appropriate.

[a] For clarification as to which applies, see Regulations 43 and 46 of this Chapter.

[b] Where spaces are of the same numerical category and superscript [b] appears, a bulkhead or deck of the rating shown in the tables is only required when the adjacent spaces are for a different purpose, e.g. in category (9). A galley next to a galley does not require a bulkhead but a galley next to a paint room requires an "A-0" bulkhead.

[c] Bulkheads separating the wheelhouse, chartroom and radio room from each other may be "B-0" rating.

[d] Bulkheads and decks between cargo pump rooms and machinery spaces of category A may be penetrated by cargo pump shaft glands and similar glanded penetrations, provided that gastight seals with efficient lubrication or other means of ensuring the permanence of the gas seal are fitted in way of the bulkhead or deck.

[e] Fire insulation need not be fitted if the machinery space in category (7), in the opinion of the Administration, has little or no fire risk.

* Where an asterisk appears in the tables, the division is required to be of steel or other equivalent material but is not required to be of "A" class standard.

TABLE 58.2 – FIRE INTEGRITY OF DECKS SEPARATING ADJACENT SPACES

Space below ↓ / Space above →		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Control stations	(1)	A-0	A-0	A-0	A-0	A-0	A-60	A-0	–	A-0	*
Corridors	(2)	A-0	*	*	A-0	*	A-60	A-0	–	A-0	*
Accommodation spaces	(3)	A-60	A-0	*	A-0	*	A-60	A-0	–	A-0	*
Stairways	(4)	A-0	A-0	A-0	*	A-0	A-60	A-0	–	A-0	*
Service spaces (low risk)	(5)	A-15	A-0	A-0	A-0	*	A-60	A-0	–	A-0	*
Machinery spaces of category A	(6)	A-60	A-60	A-60	A-60	A-60	*	A-60 e/	A-0	A-60	*
Other machinery spaces	(7)	A-15	A-0	A-0	A-0	A-0	A-0	*	A-0	A-0	*
Cargo pump rooms	(8)	–	–	–	–	–	A-0 d/	A-0	*	–	*
Service spaces (high risk)	(9)	A-60	A-0	A-0	A-0	A-0	A-60	A-0	–	A-0 b/	*
Open decks	(10)	*	*	*	*	*	*	*	*	*	–

(4) Stairways
- Interior stairways, lifts and escalators (other than those wholly contained within the machinery spaces) and enclosures thereto.
- In this connexion, a stairway which is enclosed only at one level shall be regarded as part of the space from which it is not separated by a fire door.

(5) Service spaces (low risk)
- Lockers and store-rooms having areas of less than 2 m², drying rooms and laundries.

(6) Machinery spaces of category A
- Spaces as defined in regulation 3.19.

(7) Other machinery spaces
- Spaces as defined in regulation 3.20 excluding machinery spaces of category A.

(8) Cargo pump rooms
- Spaces containing cargo pumps and entrances and trunks to such spaces.

(9) Service spaces (high risk)
- Galleys, pantries containing cooking appliances, paint and lamp rooms, lockers and store-rooms having an area of 2 m² or more, workshops other than those forming part of the machinery spaces.

(10) Open decks

— Open deck spaces and enclosed promenades having no fire risk. Air spaces (the space outside superstructures and deckhouses).

3. Continuous "B" class ceilings or linings, in association with the relevant decks or bulkheads, may be accepted as contributing, wholly or in part, to the required insulation and integrity of a division.

4. External boundaries which are required in regulation 57.1 to be of steel or other equivalent material may be pierced for the fitting of windows and sidescuttles provided that there is no requirement for such boundaries to have "A" class integrity elsewhere in [this part]. Similarly, in such boundaries which are not required to have "A" class integrity, doors may be of materials to the satisfaction of the Administration.

5. Permanent approved gastight lighting enclosures for illuminating cargo pump rooms may be permitted in bulkheads and decks separating car rooms and other spaces provided they are of adequate strength and the integrity and gastightness of the bulkhead or deck is maintained.

Regulation 59. VENTING, PURGING, GAS FREEING AND VENTILATION

1. *Cargo tank venting*

1.1. The venting systems of cargo tanks are to be entirely distinct from the air pipes of the other compartments of the ship. The arrangements and position of openings in the cargo tank deck from which emission of flammable vapours can occur shall be such as to minimize the possibility of flammable vapours being admitted to enclosed spaces containing a source of ignition, or collecting in the vicinity of deck machinery and equipment which may constitute an ignition hazard. In accordance with this general principle the criteria in paragraphs 1.2 to 1.10 will apply.

1.2. The venting arrangements shall be so designed and operated as to ensure that neither pressure nor vacuum in cargo tanks shall exceed design parameters and be such as to provide for:

1. The flow of the small volumes of vapour, air or inert gas mixtures caused by thermal variations in a cargo tank in all cases through pressure/vacuum valves; and
2. The passage of large volumes of vapour, air or inert gas mixtures during cargo loading and ballasting, or during discharging.

1.3.1. The venting arrangements in each cargo tank may be independent or combined with other cargo tanks and may be incorporated into the inert gas piping.

1.3.2. Where the arrangements are combined with other cargo tanks either stop valves or other acceptable means shall be provided to isolate each cargo tank. Where stop valves are fitted, they shall be provided with locking arrangements which shall be under the control of the responsible ship's officer. Any isolation must continue to permit the flow caused by thermal variations in a cargo tank in accordance with paragraph 1.2.1.

1.4. The venting arrangements shall be connected to the top of each cargo tank and shall be self-draining to the cargo tanks under all normal conditions of trim and list of the ship. Where it may not be possible to provide self-draining lines permanent arrangements shall be provided to drain the vent lines to a cargo tank.

1.5. The venting system shall be provided with devices to prevent the passage of flame into the cargo tanks. The design, testing and locating of these devices shall comply with the requirements established by the Administration which shall contain at least the standards adopted by the Organization.

1.6. Provision shall be made to guard against liquid rising in the venting system to a height which would exceed the design head of cargo tanks. This shall be accomplished by high level alarms or overflow control systems or other equivalent means, together with gauging devices and cargo tank filling procedures.

1.7. Openings for pressure release required by paragraph 1.2.1 shall:

1. Have as great a height as is practicable above the cargo tank deck to obtain maximum dispersal of flammable vapours but in no case less than 2 m above the cargo tank deck;
2. Be arranged at the furthest distance practicable but not less than 5 m from the nearest air intakes and openings to enclosed spaces containing a source of ignition and from deck machinery and equipment which may constitute an ignition hazard.

1.8. Pressure/vacuum valves required by paragraph 1.2.1 may be provided with a by-pass arrangement when they are located in a vent main or masthead riser. Where such an arrangement is provided there shall be suitable indicators to show whether the by-pass is open or closed.

1.9. Vent outlets for cargo loading, discharging and ballasting required by paragraph 1.2.2 shall:

1.1. Permit the free flow of vapour mixtures; or

1.2. Permit the throttling of the discharge of the vapour mixtures to achieve a velocity of not less than 30 m/sec;

2. Be so arranged that the vapour mixture is discharged vertically upwards;
3. Where the method is by free flow of vapour mixtures, be such that the outlet shall be not less than 6 m above the cargo tank deck or fore and aft gangway if situated within 4 m of the gangway and located not less than 10 m measured horizonally from the nearest air intakes and openings to enclosed spaces containing a source of ignition and from deck machinery and equipment which may constitute an ignition hazard;
4. Where the method is by high velocity discharge, be located at a height not less than 2 m above the cargo tank deck and not less than 10 m measured horizontally from the nearest air intakes and openings to enclosed spaces containing a source of ignition and from deck machinery and equipment which may constitute an ignition hazard. These outlets shall be provided with high velocity devices of an approved type;
5. Be designed on the basis of the maximum designed loading rate multiplied by a factor of at least 1.25 to take account of gas evolution, in order to prevent the pressure in any cargo tank from exceeding the design pressure. The master shall be provided with information regarding the maximum permissible loading rate for each cargo tank and in the case of combined venting systems, for each group of cargo tanks.

1.10. In combination carriers, the arrangement to isolate slop tanks containing oil or oil residues from other cargo tanks shall consist of blank flanges which will remain in position at all times when cargoes other than liquid cargoes referred to in regulation 55.1 are carried.

2. *Cargo tank purging and/or gas freeing*

Arrangements for purging and/or gas freeing shall be such as to minimize the hazards due to the dispersal of flamable vapours in the atmosphere and to flammable mixture in a cargo tank. Accordingly:

1. When the ship is provided with an inert gas system the cargo tanks shall first be purged in accordance with the provisions of regulation 62.13 until the concentration of hydrocarbon vapours in the cargo tanks has been reduced to less than 2 per cent by volume. Thereafter, venting may be at the cargo tank deck level.
2. When the ship is not provided with an inert gas system, the operation shall be such that the flammable vapour is initially discharged:
   2.1. Through the vent outlets as specified in paragraph 1.9; or
   2.2. With a vertical exit velocity of at least 20 m/sec through outlets at least 2 m above the cargo tank deck level and which are protected by suitable devices to prevent the passage of flame.

When the flammable [vapour] concentration in the outlet has been reduced to 30 per cent of the lower flammable limit the discharge of the [vapour] mixture may be at the cargo tank deck level.

3. *Ventilation*

3.1. Cargo pump rooms shall be mechanically ventilated and discharges from the exhaust fans shall be led to a safe place on the open deck. The ventilation of these rooms shall have sufficient capacity to minimize the possibility of accumulation of flammable vapours. The number of changes of air shall be at least 20 per hour, based upon the gross volume of the space. The air ducts shall be arranged so that all of the space is effectively ventilated. The ventilation shall be of the suction type using fans of the non-sparking type.

3.2. The arrangement of ventilation inlets and outlets and other deckhouse and superstructure boundary space openings shall be such as to complement the provisions of paragraph 1. Such vents especially for machinery spaces shall be situated as far aft as practicable. Due consideration in this regard should be given when the ship is equipped to load or discharge at the stern. Sources of ignition such as electrical equipment shall be so arranged as to avoid an explosion hazard.

3.3. In combination carriers all cargo spaces and any enclosed spaces adjacent to cargo spaces shall be capable of being mechanically ventilated. The mechanical ventilation may be provided by portable fans. An approved fixed gas warning system capable of monitoring flammable vapours shall be provided in cargo pump rooms and pipe ducts and cofferdams referred to in regulation 56.1 adjacent to slop tanks. Suitable arrangements shall be made to facilitate measurement of flammable vapours in all other spaces within the cargo [ ] area. Such measurements shall be made possible from open deck or easily accessible positions.

Regulation 60. CARGO TANK PROTECTION

1. For tankers of 20,000 tonnes deadweight and upwards the protection of the cargo tanks deck area and cargo tanks shall be achieved by a fixed deck foam system and a fixed inert gas system in accordance with the requirements of regulations 61 and 62, except that, in lieu of the above installations, the Administration, after having given consideration to the ship's arrangement and equipment, may accept other combinations of fixed installations if they afford protection equivalent to the above, in accordance with regulation 1/5.

2. To be considered equivalent, the system proposed in lieu of the deck foam system shall:

1. Be capable of extinguishing spill fires and also preclude ignition of spilled oil not yet ignited; and
2. Be capable of combating fires in ruptured tanks.

3. To be considered equivalent, the system proposed in lieu of the fixed inert gas system shall:

1. Be capable of preventing dangerous accumulations of explosive mixtures in intact cargo tanks during normal service throughout the ballast voyage and necessary in-tank operations; and
2. Be so designed as to minimize the risk of ignition from the generation of static electricity by the system itself.

4. Tankers of 20,000 tonnes deadweight and upwards constructed before 1 September 1984 which are engaged in the trade of carrying crude oil shall be fitted with an inert gas system, complying with the requirements of paragraph 1, not later than:

1. For a tanker of 70,000 tonnes deadweight and upwards 1 September 1984 or the date of delivery of the ship, whichever occurs later; and
2. For a tanker of less than 70,000 tonnes deadweight 1 May 1985 or the date of delivery of the ship, whichever occurs later except that for tankers of less than 40,000 tonnes

deadweight not fitted with tank washing machines having an individual throughput of greater than 60 m^3/hour the Administration may exempt such tankers from the requirements of this paragraph, if it would be unreasonable and impracticable to apply these requirements, taking into account the ship's design characteristics.

5. Tankers of 40,000 tonnes deadweight and upwards constructed before 1 September 1984 which are engaged in the trade of carrying oil other than crude oil and any such tanker of 20,000 tonnes deadweight and upwards engaged in the trade of carrying oil other than crude oil fitted with tank washing machines having an individual throughput of greater than 60 m^3/hour shall be fitted with an inert gas system, complying with the requirements of paragraph 1, not later than:

1. For a tanker of 70,000 tonnes deadweight and upwards 1 September 1984 or the date of delivery of the ship, whichever occurs later; and
2. For a tanker of less than 70,000 tonnes deadweight 1 May 1985 or the date of delivery of the ship, whichever occurs later.

6. All tankers operating with a cargo tank cleaning procedure using crude oil washing shall be fitted with an inert gas system complying with the requirements of regulation 62 and with fixed tank washing machines.

7. All tankers fitted with a fixed inert gas system shall be provided with a closed ullage system.

8. Tankers of less than 20,000 tonnes deadweight shall be provided with a deck foam system complying with the requirements of regulation 61.

Regulation 61. FIXED DECK FOAM SYSTEMS

1. The arrangements for providing foam shall be capable of delivering foam to the entire [cargo tanks deck area] as well as into any cargo tank the deck of which has been ruptured.

2. The deck foam system shall be capable of simple and rapid operation. The main control station for the system shall be suitably located outside the cargo [ ] area, adjacent to the accommodation spaces and readily accessible and operable in the event of fire in the areas protected.

3. The rate of supply of foam solution shall be not less than the greatest of the following:

1. 0.6 *l*/minute per square metre of cargo [tanks] deck area, where cargo [tanks] deck area means the maximum breadth of the ship multiplied by the total longitudinal extent of the cargo tank spaces;
2. 6 *l*/minute per square metre of the horizontal sectional area of the single tank having the largest such area; or
3. 3 *l*/minute per square metre of the area protected by the largest monitor, such area being entirely forward of the monitor, but not less than 1,250 *l*/minute.

4. Sufficient foam concentrate shall be supplied to ensure at least 20 minutes of foam generation in tankers fitted with an inert gas installation or 30 minutes of foam generation in tankers not fitted with an inert gas installation when using solution rates stipulated in paragraphs 3.1, 3.2 or 3.3, whichever is the greatest. The foam expansion ratio (i.e., the ratio of the volume of foam produced to the volume of the mixture of water and foam-making concentrate supplied) shall not generally exceed 12 to 1. Where systems essentially produce low expansion foam but at an expansion ratio slightly in excess of 12 to 1 the quantity of foam solution available shall be calculated as for 12 to 1 expansion ratio systems. When medium expansion ratio foam (between 50 to 1 and 150 to 1 expansion ratio) is employed the application rate of the foam and the capacity of a monitor installation shall be to the satisfaction of the Administration.

5. Foam from the fixed foam system shall be supplied by means of monitors and foam applicators. At least 50 per cent of the foam solution supply rate required in paragraphs 3.1 and 3.2 shall be delivered from each monitor. On tankers of less than 4,000 tonnes deadweight

the Administration may not require installation of monitors but only applicators. However, in such a case the capacity of each applicator shall be at least 25 per cent of the foam solution supply rate required in paragraphs 3.1 or 3.2.

6.1. The number and position of monitors shall be such as to comply with paragraph 1. The capacity of any monitor shall be at least 3 *l*/minute of foam solution per square metre of deck area protected by that monitor, such area being entirely forward of the monitor. Such capacity shall be not less than 1,250 *l*/minute.

6.2. The distance from the monitor to the farthest extremity of the protected area forward of that monitor shall not be more than 75 per cent of the monitor throw in still air conditions.

7. A monitor and hose connexion for a foam applicator shall be situated both port and starboard at the front of the poop or accommodation spaces facing the cargo deck. On tankers of less than 4,000 tonnes deadweight a hose connexion for a foam applicator shall be situated both port and starboard at the front of the poop or accommodation spaces facing the cargo deck.

8. Applicators shall be provided to ensure flexibility of action during fire-fighting operations and to cover areas screened from the monitors. The capacity of any applicator shall be not less than 400 [*l*/minute] and the applicator throw in still air conditions shall be not less than 15 m. The number of foam applicators provided shall be not less than four. The number and disposition of foam main outlets shall be such that foam from at least two applicators can be directed on to any [part of the] cargo [tanks] deck area.

9. Valves shall be provided in the foam main, and in the fire main when this is an integral part of the deck foam system, immediately forward of any monitor position to isolate damaged sections of those mains.

10. Operation of a deck foam system at its required output shall permit the simultaneous use of the minimum required number of jets of water at the required pressure from the fire main.

Regulation 62. INERT GAS SYSTEMS

1. The inert gas system referred to in regulation 60 shall be designed, constructed and tested to the satisfaction of the Administration. It shall be so designed and operated as to render and maintain the atmosphere of the cargo tanks* [non flammable] at all times, except when such tanks are required to be gas free. In the event that the inert gas system is unable to meet the operational requirement set out above and it has been assessed that it is impractical to effect a repair, then cargo discharge, deballasting and necessary tank cleaning shall only be resumed when the "emergency conditions" laid down in the Guidelines on Inert Gas Systems** are complied with.

2. The system shall be capable of:

1. Inerting empty cargo tanks by reducing the oxygen content of the atmosphere in each tank to a level at which combustion cannot be supported;
2. Maintaining the atmosphere in any part of any cargo tank with an oxygen content not exceeding 8 per cent by volume and at a positive pressure at all times in port and at sea except when it is necessary for such a tank to be gas free;
3. Eliminating the need for air to enter a tank during normal operations except when it is necessary for such a tank to be gas free;
4. Purging empty cargo tanks of hydrocarbon gas, so that subsequent gas freeing operations will at no time create a flammable atmosphere within the tank.

* Throughout this regulation the term "cargo tank" includes also "slop tanks".

** Reference is made to Guidelines for Inert Gas Systems, adopted by the Maritime Safety Committee at it forty-second session in May 1980 (MSC/Circ.282).

3.1. The system shall be capable of delivering inert gas to the cargo tanks at a rate of at least 125 per cent of the maximum rate of discharge capacity of the ship expressed as a volume.

3.2. The system shall be capable of delivering inert gas with an oxygen content of not more than 5 per cent by volume in the inert gas supply main to the cargo tanks at any required rate of flow.

4. The inert gas supply may be treated flue gas from main or auxiliary boilers. The Administration may accept systems using flue gases from one or more separate gas generators or other sources or any combination thereof, provided that an equivalent standard of safety is achieved. Such systems should, as far as practicable, comply with the requirements of this regulation. Systems using stored carbon dioxide shall not be permitted unless the Administration is satisfied that the risk of ignition from generation of static electricity by the system itself is minimized.

5. Flue gas isolating valves shall be fitted in the inert gas supply mains between the boiler uptakes and the flue gas scrubber. These valves shall be provided with indicators to show whether they are open or shut, and precautions shall be taken to maintain them gastight and keep the seatings clear of soot. Arrangements shall be made to ensure that boiler soot blowers cannot be operated when the corresponding flue gas valve is open.

6.1. A flue gas scrubber shall be fitted which will effectively cool the volume of gas specified in paragraph 3 and remove solids and sulphur combustion products. The cooling water arrangements shall be such that an adequate supply of water will always be available without interfering with any essential services on the ship. Provision shall also be made for an alternative supply of cooling water.

6.2. Filters or equivalent devices shall be fitted to minimize the amount of water carried over to the inert gas blowers.

6.3. The scrubber shall be located aft of all cargo tanks, cargo pump rooms and cofferdams separating these spaces from machinery spaces of category A.

7.1. At least two blowers shall be fitted which together shall be capable of delivering to the cargo tanks at least the volume of gas required by paragraph 3. In the system with gas generator the Administration may permit only one blower if that system is capable of delivering the total volume of gas required by paragraph 3 to the protected cargo tanks, provided that sufficient spares for the blower and its prime mover are carried on board to enable any failure of the blower and its prime mover to be rectified by the ship's crew.

7.2. Two fuel oil pumps shall be fitted to the inert gas generator. The Administration may permit only one fuel oil pump on condition that sufficient spares for the fuel oil pump and its prime mover are carried on board to enable any failure of the fuel oil pump and its prime mover to be rectified by the ship's crew.

7.3. The inert gas system shall be so designed that the maximum pressure which it can exert on any cargo tank will not exceed the test pressure of any cargo tank. Suitable shut-off arrangements shall be provided on the suction and discharge connexions of each blower. Arrangements shall be provided to enable the functioning of the inert gas plant to be stabilized before commencing cargo discharge. If the blowers are to be used for gas freeing, their air inlets shall be provided with blanking arrangements.

7.4. The blowers shall be located aft of all cargo tanks, cargo pump rooms and cofferdams separating these spaces from machinery spaces of category A.

8.1. Special consideration shall be given to the design and location of scrubber and blowers with relevant piping and fittings in order to prevent flue gas leakages into enclosed spaces.

8.2. To permit safe maintenance, an additional water seal or other effective means of preventing flue gas leakage shall be fitted between the flue gas isolating valves and scrubber or incorporated in the gas entry to the scrubber.

9.1. A gas regulating valve shall be fitted in the inert gas supply main. This valve shall be automatically controlled to close as required in paragraphs [19.3] and [19.4]. It shall also be capable of automatically regulating the flow of inert gas to the cargo tanks unless means are provided to automatically control the speed of the inert gas blowers required in paragraph 7.

9.2. The valve referred to in paragraph 9.1 shall be located at the forward bulkhead of the forwardmost gas safe space* through which the inert gas supply main passes.

10.1. At least two non-return devices, one of which shall be a water seal, shall be fitted in the inert gas supply main, in order to prevent the return of hydrocarbon vapour to the machinery space uptakes or to any gas safe spaces under all normal conditions of trim, list and motion of the ship. They shall be located between the automatic valve required by paragraph 9.1 and the aftermost connexion to any cargo tank or cargo pipeline.

10.2. The devices referred to in paragraph 10.1 shall be located in the cargo [ ] area on deck.

10.3. The water seal referred to in paragraph 10.1 shall be capable of being supplied by two separate pumps, each of which shall be capable of maintaining an adequate supply at all times.

10.4. The arrangement of the seal and its associated fittings shall be such that it will prevent backflow of hydrocarbon vapours and will ensure the proper functioning of the seal under operating conditions.

10.5. Provision shall be made to ensure that the water seal is protected against freezing, in such a way that the integrity of seal is not impaired by overheating.

10.6. A water loop or other approved arrangement shall also be fitted to each associated water supply and drain pipe and each venting or pressure-sensing pipe leading to gas safe spaces. Means shall be provided to prevent such loops from being emptied by vacuum.

10.7. The deck water seal and all loop arrangements shall be capable of preventing return of hydrocarbon vapours at a pressure equal to the test pressure of the cargo tanks.

10.8. The second device shall be a non-return valve or equivalent capable of preventing the return of vapours or liquids and fitted forward of the deck water seal required in paragraph 10.1. It shall be provided with positive means of closure. As an alternative to positive means of closure, an additional valve having such means of closure may be provided forward of the non-return valve to isolate the deck water seal from the inert gas main to the cargo tanks.

10.9. As an additional safeguard against the possible leakage of hydrocarbon liquids or vapours back from the deck main, means shall be provided to permit this section of the line between the valve having positive means of closure referred to in paragraph 10.8 and the valve referred to in paragraph 9 to be vented in a safe manner when the first of these valves is closed.

11.1. The inert gas main may be divided into two or more branches forward of the non-return devices required by paragraph 10.

11.2.1. The inert gas supply mains shall be fitted with branch piping leading to each cargo tank. Branch piping for inert gas shall be fitted with either stop valves or equivalent means of control for isolating each tank. Where stop valves are fitted, they shall be provided with locking arrangements, which shall be under the control of a responsible ship's officer.

11.2.2. In combination carriers, the arrangement to isolate the slop tanks containing oil or oil residues from other tanks shall consist of blank flanges which will remain in position at all times when cargoes other than oil are being carried except as provided for in the relevant section of the Guidelines on Inert Gas Systems.

11.3. Means shall be provided to protect cargo tanks against the effect of overpressure or vacuum caused by thermal variations when the cargo tanks are isolated from the inert gas mains.

* Gas safe space is a space in which the entry of hydrocarbon gases would produce hazards with regard to flammability or toxicity.

11.4. Piping systems shall be so designed as to prevent the accumulation of cargo or water in the pipelines under all normal conditions.

11.5. Suitable arrangements shall be provided to enable the inert gas main to be connected to an external supply of inert gas.

12. The arrangements for the venting of all vapours displaced from the cargo tanks during loading and ballasting shall comply with regulation 59.1 and shall consist of either one or more mast risers, or a number of high velocity vents. The inert gas supply mains may be used for such venting.

13. The arrangements for inerting, purging or gas freeing of empty tanks as required in paragraph 2 shall be to the satisfaction of the Administration and shall be such that the accumulation of hydrocarbon vapours in pockets formed by the internal structural members in a tank is minimized and that:

1. On individual cargo tanks the gas outlet pipe, if fitted, shall be positioned as far as practicable from the inert gas/air inlet and in accordance with regulation 59.1. The inlet of such outlet pipes may be located either at deck level or at not more than 1 m above the bottom of the tank;
2. The cross sectional area of such gas outlet pipe referred to in paragraph 13.1 shall be such that an exit velocity of at least 20 m/sec can be maintained when any three tanks are being simultaneously supplied with inert gas. Their outlets shall extend not less than 2 m above deck level;
3. Each gas outlet referred to in paragraph 13.2 shall be fitted with suitable blanking arrangements;

4.1. If a connexion is fitted between the inert gas supply mains and the cargo piping system, arrangements shall be made to ensure an effective isolation having regard to the large pressure difference which may exist between the systems. This shall consist of two shut-off valves with an arrangement to vent the space between the valves in a safe manner or an arrangement consisting of a spool-piece with associated blanks;

4.2. The valve separating the inert gas supply main from the cargo main and which is on the cargo main side shall be a non-return valve with a positive means of closure.

14.1. One or more pressure-vacuum breaking devices shall be provided on the inert gas supply main to prevent the cargo tanks from being subject to:

1. A positive pressure in excess of the test pressure of the cargo tank if the cargo were to be loaded at the maximum specified rate and all other outlets were left shut; or
2. A negative pressure in excess of 700 mm water gauge if cargo were to be discharged at the maximum rated capacity of the cargo pumps and the inert gas blowers were to fail.

14.2. The location and design of the devices referred to in paragraph 14.1 shall be in accordance with regulation 59.1.

15. Means shall be provided for continuously indicating the temperature and pressure of the inert gas at the discharge side of the gas blowers, whenever the gas blowers are operating.

16.1. Instrumentation shall be fitted for continuously indicating and permanently recording, when the inert gas is being supplied:

1. The pressure of the inert gas supply mains forward of the non-return devices required by paragraph 10.1; and
2. The oxygen content of the inert gas in the inert gas supply mains on the discharge side of the gas blowers.

16.2. The devices referred to in paragraph 16.1 shall be placed in the cargo control room where provided. But where no cargo control room is provided, they shall be placed in a position easily accessible to the officer in charge of cargo operations.

16.3. In addition, meters shall be fitted:

1. In the navigating bridge to indicate at all times the pressure referred to in paragraph 16.1.1 and the pressure in the slop tanks of combination carriers, whenever those tanks are isolated from the inert gas supply main; and
2. In the machinery control room or in the machinery space to indicate the oxygen content referred to in paragraph 16.1.2.

17. Portable instruments for measuring oxygen and flammable vapour concentration shall be provided. In addition, suitable arrangement shall be made on each cargo tank such that the condition of the tank atmosphere can be determined using these portable instruments.

18. Suitable means shall be provided for the zero and span calibration of both fixed and portable gas concentration measurement instruments, referred to in paragraphs 16 and 17.

19.1. Audible and visual alarms shall be provided to indicate:

1. Low water pressure or low water flow rate to the flue gas scrubber as referred to in paragraph 6.1;
2. High water level in the flue gas scrubber as referred to in paragraph 6.1;
3. High gas temperature as referred to in paragraph 15;
4. Failure of the inert gas blowers referred to in paragraph 7;
5. Oxygen content in excess of 8 per cent by volume as referred to in paragraph 16.1.2;
6. Failure of the power supply to the automatic control system for the gas regulating valve and to the indicating devices as referred to in paragraphs 9 and 16.1;
7. Low water level in the water seal as referred to in paragraph 10.1;
8. Gas pressure less than 100 mm water gauge as referred to in paragraph 16.1.1. The alarm arrangement shall be such as to ensure that the pressure in slop tanks in combination carriers can be monitored at all times; and
9. High gas pressure as referred to in paragraph 16.1.1.

19.2. In the system with gas generators audible and visual alarms shall be provided in accordance with 19.1.1, 19.1.3, 19.1.5 to 19.1.9 and additional alarms to indicate:

1. Insufficient fuel oil supply;
2. Failure of the power supply to the generator;
3. Failure of the power supply to the automatic control system for the generator.

19.3. Automatic shut-down of the inert gas blowers and gas regulating valve shall be arranged on predetermined limits being reached in respect of paragraphs 19.1.1, 19.1.2 and 19.1.3.

19.4. Automatic shut-down of the gas regulating valve shall be arranged in respect of paragraph 19.1.4.

19.5. In respect of paragraph 19.1.5, when the oxygen content of the inert gas exceeds 8 per cent by volume, immediate action shall be taken to improve the gas quality. Unless the quality of the gas improves, all cargo tank operations shall be suspended so as to avoid air being drawn in to the tanks and the isolation valve referred to in paragraph 10.8 shall be closed.

19.6. The alarms required in paragraphs 19.1.5, 19.1.6 and 19.1.8 shall be fitted in the machinery space and cargo control room, where provided, but in each case in such a position that they are immediately received by responsible members of the crew.

19.7. In respect of paragraph 19.1.7 the Administration shall be satisfied as to the maintenance of an adequate reserve of water at all times and the integrity of the arrangements to permit the automatic formation of the water seal when the gas flow ceases. The audible and visual alarm on the low level of water in the water seal shall operate when the inert gas is not being supplied.

19.8. An audible alarm system independent of that required in paragraph 19.1.8 or automatic shut-down of cargo pumps shall be provided to operate on predetermined limits of low pressure in the inert gas mains being reached.

20. Tankers constructed before 1 September 1984 which are required to have an inert gas system shall at least comply with the requirements of regulation 62 of chapter II-2 of the International Convention for the Safety of Life at Sea, 1974.* In addition they shall comply with the requirements of this regulation, except that:

1. Inert gas systems fitted on board such tankers before 1 June 1981 need not comply with the following paragraphs: 3.2, 6.3, 7.4, 8, 9.2, 10.2, 10.7, 10.9, 11.3, 11.4, [12, 13.1,] 13.2, 13.4.2 [, 14.2] and 19.8;
2. Inert gas systems fitted on board such tankers on or after 1 June 1981 need not comply with the following paragraphs: 3.2, 6.3, 7.4 [12, 13.1, 13.2 and 14.2.]

21. Detailed instruction manuals shall be provided on board, covering the operations, safety and maintenance requirements and occupational health hazards relevant to the inert gas system and its application to the cargo tank system.** The manuals shall include guidance on procedures to be followed in the event of a fault or failure of the inert gas system.

Regulation 63. CARGO PUMP ROOMS

1. Each cargo pump room shall be provided with one of the following fixed fire extinguishing systems operated from a readily accessible position outside the pump room. Cargo pump rooms should be provided with a system suitable for machinery spaces of category A.

1.1. Either a carbon dioxide or a halogenated hydrocarbon system complying with the provisions of regulation 5 and with the following:

1. The alarms referred to in regulation 5.1.6 shall be safe for use in a flammable cargo vapour/air mixture;
2. A notice shall be exhibited at the controls stating that due to the electrostatic ignition hazard, the system is to be used only for fire extinguishing and not for inerting purposes.

1.2. A high expansion foam system complying with the provisions of regulation 9, provided that the foam concentrate supply is suitable for extinguishing fires involving the cargoes carried.

1.3. A fixed pressure water-spraying system complying with the provisions of regulation 10.

2. Where the extinguishing medium used in the cargo pump room system is also used in systems serving other spaces, the quantity of medium provided or its delivery rate need not be more than the maximum required for the largest compartment.

CHAPTER III. LIFE-SAVING APPLIANCES, ETC.

Regulation 1. APPLICATION

The existing text of sub-paragraph (*c*)(iii)(2) is replaced by the following:

(2) Regulations II-2/28.1.5 and II-2/28.1.6; and

Regulation 27. LIFEBOATS, LIFERAFTS AND BUOYANT APPARATUS

In sub-paragraph (*c*)(iii), reference to "paragraph (*d*) of regulation 1 of chapter II-1" is amended to read: regulation II-1/1.5

In sub-paragraph (*c*)(vii), the reference to "paragraph (*d*) of regulation 1 of chapter II-1" is amended to read: regulation II-1/1.5

* The text as adopted by the International Conference on Safety of Life at Sea, 1974.

** Reference is made to Guidelines for Inert Gas Systems, adopted by the Maritime Safety Committee at its forty-second session in May 1980 (MSC/Circ.282).

Regulation 30. LIGHTING FOR DECK, LIFEBOATS, LIFERAFTS, ETC.

In paragraph (*a*), the reference to "regulation 25 of chapter II-1" is amended to read: regulation II-1/42

Regulation 38. EMERGENCY LIGHTING

The reference to "regulation 26 of chapter II-1" is amended to read: regulation II-1/43

CHAPTER IV. RADIOTELEGRAPHY AND RADIOTELEPHONY

The following new regulation is added:

Regulation 4-1. VHF RADIOTELEPHONE INSTALLATION

(*a*) Passenger ships irrespective of size and cargo ships of 300 tons gross tonnage and upwards shall be fitted with a VHF radiotelephone installation complying with the provisions of regulation 17.

(*b*) The provisions of regulation 17 shall also apply for VHF radiotelephone installations required by a Contracting Government for all ships to which chapter V applies navigating in an area under its jurisdiction and for which a VHF radiotelephone installation is not made compulsory by paragraph (*a*).

The existing text of regulation 7 is replaced by the following:

Regulation 7. WATCHES — RADIOTELEPHONE

(*a*) Each ship which is fitted with a radiotelephone station in accordance with regulation 4 shall, for safety purposes while at sea, maintain continuous watch on the radiotelephone distress frequeney in the place on board from which the ship is usually navigated, by use of a radiotelephone distress frequency watch receiver, using a loudspeaker, a filtered loudspeaker or radiotelephone auto alarm.

(*b*) Each ship referred to in paragraph (*a*) shall carry qualified radiotelephone operators (who may be the master, an officer or a member of the crew) as follows:

(i) If of 300 tons gross tonnage and upwards but less than 500 tons gross tonnage, at least one operator;

(ii) If of 500 tons gross tonnage and upwards but less than 1,600 tons gross tonnage, at least two operators. If such a ship carries one radiotelephone operator exclusively employed for duties related to radiotelephony, a second operator is not obligatory.

(*c*) Each ship which in accordance with regulation 3 or regulation 4 is fitted with a radiotelegraph station shall, while at sea, maintain continuous watch on the radiotelephone distress frequency in a place to be determined by the Administration, by use of a radiotelephone distress frequency watch receiver, using a loudspeaker, a filtered loudspeaker or radiotelephone auto alarm.

The existing text of regulation 8 is replaced by the following:

Regulation 8. WATCHES — VHF RADIOTELEPHONE

Each ship which is fitted with a VHF radiotelephone installation in accordance with regulation 4-1 shall at sea maintain a continuous listening watch on the navigating bridge:

(i) On 156.8 MHz (channel 16) when practicable; and/or

(ii) For such periods and on such channels as may be required by the Contracting Government referred to in regulation 4-1(*b*).

Regulation 10. RADIOTELEGRAPH INSTALLATIONS

The existing text of paragraph (*g*) is replaced by the following:

(*g-1*) The main and reserve transmitters shall, when connected to the main antenna, have a minimum normal range as specified below, that is to say, they must be capable of transmitting clearly perceptible signals from ship to ship by day and under normal conditions and circumstances over the specified type ranges.* (Clearly perceptible signals will normally be received if the R.M.S. value of the field strength at the receiver is at least 50 microvolts per metre.)

	Minimum normal range in miles	
	Main transmitter	*Reserve transmitter*
All passenger ships and cargo ships of 1,600 tons gross tonnage and upwards	150	100
Cargo ships below 1,600 tons gross tonnage	100	75

(*g-2*) The radiotelegraph installation shall include facilities for radiotelephone transmission and reception on the radiotelephone distress frequency. This requirement may be fulfilled by including such facilities in the main or reserve installation or other installed equipment. The transmitter power and receiver sensitivity of the radiotelephony part of the installation shall comply with regulation 16(*c*)(i) and (*f*) respectively if that part is fitted after 1 September 1986.

* In the absence of a direct measurement of the field strength the following data may be used as a guide for approximately determining the normal range:

A. In the case of antennae other than self-supporting types:

Normal range in miles	*Metre-amperes*[1]
200	128
175	102
150	76
125	58
100	45
75	34

[1] The product of the distance (in metres) from the highest part of the antenna to the deepest load water-line and the antenna current (in amperes).

The values given in the second column of the table correspond to an average value of the ratio

$$\frac{\text{effective antenna height}}{\text{maximum antenna height}} = 0.47$$

This ratio varies with local conditions of the antenna and may vary between about 0.3 and 0.7.

B. In the ease of self-supporting transmitting antennae:

Normal range in miles	*Metre-amperes*[2]
200	305
175	215
150	150
125	110
100	85
75	55

[2] The product of thc distance (in metres) from the highest part of the antenna to the deepest load water-line and the currcnt (in amperes) measured at the base of the radiating portion of the antenna. The values given in the second column are based on the propagation curves given in CCIR Recommendation 368-2 and also the method, experimental results and calculation in CCIR Report 502-1 and Opinion 43-1. The necessary value of metre-amperes varies considerably with local conditions of the antenna.

For installations fitted prior to that date, such transmitter power and receiver sensitivity shall be as determined by the Administration. The location and other conditions of the radiotelephony facilities required by this regulation shall be as determined by the Administration, except when they form part of the main or reserve radiotelegraph installation.

The existing text of sub-paragraph (*h*)(iv) is replaced by the following:

(*h*)(iv)(1) The radiotelephone transmitting facility required by paragraph (*g-2*) shall be fitted with an automatic device for generating the radiotelephone alarm signal, so designed as to prevent actuation by mistake, and complying with the requirements of regulation 16(*e*). The device shall be capable of being taken out of operation at any time in order to permit the immediate transmission of a distress message. For installations fitted prior to 1 September 1986, the fitting of automatic devices for generating the radiotelephone alarm signal shall be as determined by the Administration.

(2) Arrangements shall be made to check periodically the proper functioning of the automatic device for generating the radiotelephone alarm signal on frequencies other than the radiotelephone distress frequency using a suitable artificial antenna. An exception shall be made for radiotelephone emergency equipment having only the radiotelephone distress frequency in which case a suitable artificial antenna shall be employed.

NOTE: While all reasonable steps shall be taken to maintain the apparatus in an efficient condition, malfunction of the radiotelephone transmitting facilities required by this regulation shall not be considered as making the ship unseaworthy or as a reason for delaying the ship in ports where repair facilities are not readily available.

The existing text of sub-paragraph (*l*)(ii) is deleted.

The existing text of sub-paragraph (*m*)(iv) is replaced by the following:

(*m*)(iv) The VHF installation in accordance with the provisions of regulation 17(*c*);

Regulation 16. RADIOTELEPHONE INSTALLATIONS

The existing text of paragraph (*b*) is amended by deleting A3H, A3A and A3J.

The existing text of paragraph (*c*) is replaced by the following:

(*c*)(i) In the case of cargo ships of 300 tons gross tonnage and upwards but less than 1,600 tons gross tonnage the transmitter shall have a minimum normal range of 150 miles, i.e., it shall be capable of transmitting clearly perceptible signals from ship to ship by day and under normal conditions and circumstances over this range.* (Clearly perceptible signals will normally be received if the R.M.S. value of the field strength produced at the receiver by an unmodulated carrier is at least 25 microvolts per metre for double sideband and single sideband full carrier emissions.)

(ii) In the case of existing installations using double sideband emissions on cargo ships of 300 tons gross tonnage and upwards but less than 500 tons gross tonnage, the transmitter shall have a minimum normal range of at least 75 miles.

The existing text of sub-paragraph (*j*)(iv) is replaced by:

(iv) The VHF installation in accordance with the provisions of regulation 17(*c*).

The existing text of regulation 17 is replaced by the following:

Regulation 17. VHF RADIOTELEPHONE INSTALLATION

(*a*) The VHF radiotelephone installation shall be in the upper part of the ship complying with the provisions of this regulation and comprising a transmitter and receiver, a source of

* In the absence of field strength measurements, it may be assumed that this range will be obtained by power in the antenna of 15 watts (unmodulated carried) with an antenna efficiency of 27 per cent for double sideband emissions or 60 watts peak envelope power for single sideband full carrier emissions when 100 per cent modulated by a single sinusoidal oscillation.

energy capable of actuating them at their rated power levels, and an antenna suitable for efficient radiating and receiving signals at the operating frequencies.

(*b*) On board passenger ships irrespective of size and cargo ships of 500 tons gross tonnage and upwards it shall be possible to operate the VHF radiotelephone installation from a source of energy which is situated in the upper part of the ship and has sufficient capacity for at least six hours of operation.

(*c*) The Administration may authorize the use of the reserve source of energy of the radiotelegraph installation or the radiotelephone installation respectively referred to in regulation 10(*m*) and regulation 16(*j*) to supply the VHF radiotelephone installation. In this case the reserve source of energy is required to be of a capacity sufficient to operate simultaneously the VHF radiotelephone installation and:

(i) The reserve radiotelegraph transmitter and receiver for at least six hours unless a switching device is fitted to ensure alternate operation only; or

(ii) The radiotelephone transmitter and receiver for at least six hours unless a switching device is fitted to ensure alternate operation only.

(*d*) The VHF radiotelephone installation shall conform to the requirements laid down in the Radio Regulations[1] for equipment used in the VHF maritime mobile radiotelephone service and shall be capable of operation on those channels specified by the Radio Regulations and as may be required by the Contracting Government referred to in regulation 4-1(*b*).

(*e*) The Contracting Government referred to in regulation 4-1(*b*) shall not require the transmitter R.F. carrier power output to be greater than 10 watts. The antenna shall, in so far as is practicable, have an unobstructed view in all directions.*

(*f*) Control of the channels required for navigational safety shall be immediately available on the navigating bridge convenient to the conning position and, where necessary, facilities should be available to permit radiocommunications from the wings of the navigating bridge.

Regulation 19. RADIO LOGS

The following paragraph is added to the existing text and the existing paragraph (*c*) is relettered as paragraph (*d*):

(*c*) On each ship fitted with a VHF radiotelephone installation in accordance with regulation 4-1:

(i) The entries required by the Radio Regulations shall be recorded in the radio log in accordance with the requirements of the Administation;

(ii) A summary of all communications relating to distress, urgency and safety traffic shall be recorded in the ship's log.

CHAPTER V. SAFETY OF NAVIGATION

The existing text of regulation 12 is replaced by the following:

Regulation 12. SHIPBORNE NAVIGATIONAL EQUIPMENT

(*a*) For the purpose of this regulation, "constructed" in respect of a ship means a stage of construction where:

(i) The keel is laid; or

(ii) Construction identifiable with a specific ship begins; or

* For guidance purposes, it is assumed that each ship is fitted with a vertically polarized unity gain antenna at a nominal height of 9.15 m above water, a transmitter R.F. power output of 10 watts, and a receiver sensitivity of 2 microvolts across the input terminals for 20 dB signal-to-noise ratio.

[1] International Telecommunication Union, *Radio Regulations*, Geneva, 1959.

(iii) Assembly of that ship has commenced comprising at least 50 tonnes or 1 per cent of the estimated mass of all structural material, whichever is less.

(*b*) (i) Ships of 150 tons gross tonnage and upwards shall be fitted with:

(1) A standard magnetic compass, except as provided in sub-paragraph (iv);

(2) A steering magnetic compass, unless heading information provided by the standard compass required under (1) is made available and is clearly readable by the helmsman at the main steering position;

(3) Adequate means of communication between the standard compass position and the normal navigation control position to the satisfaction of the Administration; and

(4) Means for taking bearings as nearly as practicable over an arc of the horizon of 360°.

(ii) Each magnetic compass referred to in sub-paragraph (i) shall be properly adjusted and its table or curve of residual deviations shall be available at all times.

(iii) A spare magnetic compass, interchangeable with the standard compass, shall be carried, unless the steering compass mentioned in sub-paragraph (i)(2) or a gyro compass is fitted.

(iv) The Administration, if it considers it unreasonable or unnecessary to require a standard magnctic compass, may exempt individual ships or classes of ships from these requirements if the nature of the voyage, the ship's proximity to land or the type of ship does not warrant a standard compass, provided that a suitable steering compass is in all cases carried.

(*c*) Ships of less than 150 tons gross tonnage shall, as far as the Administration considers it reasonable and practicable, be fitted with a steering compass and have means for taking bearings.

(*d*) Ships of 500 tons gross tonnage and upwards constructed on or after 1 September 1984 shall be fitted with a gyro compass complying with the following requirements:

(i) The master gyro compass or a gyro repeater shall be clearly readable by the helmsman at the main steering position;

(ii) On ships of 1,600 tons gross tonnage and upwards a gyro repeater or gyro repeaters shall be provided and shall be suitably placed for taking bearings as nearly as practicable over an arc of the horizon of 360°.

(*e*) Ships of 1,600 tons gross tonnage and upwards, constructed before 1 September 1984 when engaged on international voyages, shall be fitted with a gyro compass complying with the requirements of paragraph (*d*).

(*f*) On ships provided with emergency steering positions, arrangements shall be made to supply heading information to such positions.

(*g*) Ships of 500 tons gross tonnage and upwards constructed on or after 1 September 1984 and ships of 1,600 tons gross tonnage and upwards constructed before 1 September 1984 shall be fitted with a radar installation.

(*h*) Ships of 10,000 tons goss tonnage and upwards shall be fitted with two radar installations, each capable of being operated independently* of the other.

(*i*) Facilities for plotting radar readings shall be provided on the navigating bridge of ships required by paragraph (*g*) or (*h*) to be fitted with a radar installation. In ships of 1,600 tons gross tonnage and upwards constructed on or after 1 September 1984 the plotting facilities shall be at least as effective as a reflection plotter.

(*j*) (i) An automatic radar plotting aid shall be fitted on:

(1) Ships of 10,000 tons gross tonnage and upwards, constructed on or after 1 September 1984;

* Reference is made to section 4 of the Recommendation on Performance Standards for Radar Equipment, adopted by the Organization by resolution A.477(XII).[1]

[1] International Maritime Organization, *Resolutions and Other Decisions, Assembly, Twelfth Session*, 9-20 November 1981, p. 160.

(2) Tankers constructed before 1 September 1984 as follows:

(*aa*) If of 40,000 tons gross tonnage and upwards by 1 January 1985;

(*bb*) If of 10,000 tons gross tonnage and upwards but less than 40,000 tons gross tonnage, by 1 January 1986;

(3) Ships constructed before 1 September 1984 that are not tankers, as follows:

(*aa*) If of 40,000 tons gross tonnage and upwards by 1 September 1986;

(*bb*) If of 20,000 tons gross tonnage and upwards, but less than 40,000 tons gross tonnage, by 1 September 1987;

(*cc*) If of 15,000 tons gross tonnage and upwards, but less than 20,000 tons gross tonnage, by 1 September 1988.

(ii) Automatic radar plotting aids fitted prior to 1 September 1984 which do not fully conform to the performance standards adopted by the Organization may, at the discretion of the Administration, be retained until 1 January 1991.

(iii) The Administration may exempt ships from the requirements of this paragraph, in cases where it considers it unreasonable or unnecessary for such equipment to be carried, or when the ships will be taken permanently out of service within two years of the appropriate implementation date.

(*k*) When engaged on international voyages ships of 1,600 tons gross tonnage and upwards constructed before 25 May 1980 and ships of 500 tons gross tonnage and upwards constructed on or after 25 May 1980 shall be fitted with an echo-sounding device.

(*l*) When engaged on international voyages ships of 500 tons gross tonnage and upwards constructed on or after 1 September 1984 shall be fitted with a device to indicate speed and distance. Ships required by paragraph (*j*) to be fitted with an automatic radar plotting aid shall be fitted with a device to indicate speed and distance through the water.

(*m*) Ships of 1,600 tons gross tonnage and upwards constructed before 1 September 1984 and [ ] ships of 500 tons gross tonnage and upwards constructed on or after 1 September 1984 shall be fitted with indicators showing the rudder angle, the rate of revolution of each propeller and in addition, if fitted with variable pitch propellers or lateral thrust propellers, the pitch and operational mode of such propellers. All these indicators shall be readable from the conning position.

(*n*) Ships of 100,000 tons gross tonnage and upwards constructed on or after 1 September 1984 shall be fitted with a rate-of-turn indicator.

(*o*) Except as provided in regulations I/7(*b*)(ii), I/8 and I/9, while all reasonable steps shall be taken to maintain the apparatus referred to in paragraphs (*d*) to (*n*) in efficient working order, malfunctions of the equipment shall not be considered as making a ship unseaworthy or as a reason for delaying the ship in ports where repair facilities are not readily available.

(*p*) When engaged on international voyages ships of 1,600 tons gross tonnage and upwards shall be fitted with a radio direction-finding apparatus complying with the provisions of regulation IV/12(*a*). The Administration may, in areas where it considers it unreasonable or unnecessary for such apparatus to be carried, exempt any ship of less than 5,000 tons gross tonnage from this requirement, due regard being had to the fact that radio direction-finding apparatus is of value both as a navigational instrument and as an aid to locating ships, aircraft or survival craft.

(*q*) When engaged on international voyages ships of 1,600 tons gross tonnage and upwards constructed on or after 25 May 1980 shall be fitted with radio equipment for homing on the radiotelephone distress frequency, complying with the relevant provisions of regulation IV/12(*b*).

(*r*) All equipment fitted in compliance with this regulation shall be of a type approved by the Administration. Equipment installed on board ships on or after 1 September 1984 shall

conform to appropriate performance standards not inferior to those adopted by the Organization. Equipment fitted prior to the adoption of related performance standards may be exempted from full compliance with those standards at the discretion of the Administration, having due regard to the recommended criteria which the Organization might adopt in connexion with the standards concerned.

(*s*) A rigidly connected composite unit of a pushing vessel and associated pushed vessel, when designed as a dedicated and integrated tug and barge combination, shall be regarded as a single ship for the purpose of this regulation.

(*t*) If the application of the requirements of this regulation necessitates structural alterations to a ship constructed before I September 1984, the Administration may allow extension of the time limit for fitting the required equipment not later than I September 1989, taking into account the first scheduled dry-docking of such a ship required by the present regulations.

(*u*) Except as provided elsewhere in this regulation, the Administration may grant to individual ships exemptions of a partial or conditional nature, when any such ship is engaged on a voyage where the maximum distance of the ship from the shore, the length and nature of the voyage, the absence of general navigation hazards, and other conditions affecting safety are such as to render the full application of this regulation unreasonable or unnecessary. When deciding whether or not to grant exemptions to an individual ship, the Administration shall have regard to the effect that an exemption may have upon the safety of all other ships.

Regulation 16. LIFE-SAVING SIGNALS

The existing text of paragraph (*d*) is replaced by the following:

(*d*) Signals used by aircraft engaged on search and rescue operations to direct ships towards an aircraft, ship or person in distress:

(i) The following manoeuvres performed in sequence by an aircraft mean that the aircraft wishes to direct a surface craft towards an aircraft or a surface craft in distress:

(1) Circling the surface craft at least once;

(2) Crossing the projected course of the surface craft close ahead at low altitude, and:

— Rocking the wings; or

— Opening and closing the throttle; or

— Changing the propeller pitch;

(Due to high noise level on board surface craft, the sound signals may be less effective than the visual signal and are regarded as alternative means of attracting attention.)

(3) Heading in the direction in which the surface craft is to be directed.

Repetition of such manoeuvres has the same meaning.

(ii) The following manoeuvre by an aircraft means that the assistance of the surface craft to which the signal is directed is no longer required:

— Crossing the wake of the surface craft close astern at a low altitude, and:

— Rocking the wings; or

— Opening and closing the throttle; or

— Changing the propeller pitch.

(Due to high noise level on board surface craft, the sound signals may be less effective than the visual signal and are regarded as an alternative means of attracting attention.)

NOTE. Advance notification of changes in these signals will be given by the Organization as necessary.

Regulation 18. VHF RADIOTELEPHONE STATIONS

The existing text of this regulation is deleted (see regulation IV/4-1(*b*)).

Regulation 19. USE OF THE AUTOMATIC PILOT

The following paragraph is added to the existing text:

(*d*) The manual steering shall be tested after prolonged use of the automatic pilot, and before entering areas where navigation demands special caution.

The following regulations are added to this chapter:

Regulation 19-1. OPERATION OF STEERING GEAR

In areas where navigation demands special caution, ships shall have more than one steering gear power unit in operation when such units are capable of simultaneous operation.

Regulation 19-2. STEERING GEAR — TESTING AND DRILLS

(*a*) Within 12 hours before departure, the ship's steering gear shall be checked and tested by the ship's crew. The test procedure shall include, where applicable, the operation of the following:

(i) The main steering gear;

(ii) The auxiliary steering gear;

(iii) The remote steering gear control systems;

(iv) The steering positions located on the navigating bridge;

(v) The emergency power supply;

(vi) The rudder angle indicators in relation to the actual position of the rudder;

(vii) The remote steering gear control system power failure alarms;

(viii) The steering gear power unit failure alarms; and

(ix) Automatic isolating arrangements and other automatic equipment.

(*b*) The checks and tests shall include:

(i) The full movement of the rudder according to the required capabilities of the steering gear;

(ii) A visual inspection of the steering gear and its connecting linkage; and

(iii) The operation of the means of communication between the navigating bridge and steering gear compartment.

(*c*) (i) Simple operating instructions with a block diagram showing the change-over procedures for remote steering gear control systems and steering gear power units shall be permanently displayed on the navigating bridge and in the steering gear compartment.

(ii) All ships' officers concerned with the operation or maintenance of steering gear shall be familiar with the operation of the steering systems fitted on the ship and with the procedures for changing from one system to another.

(*d*) In addition to the routine checks and tests prescribed in paragraphs (*a*) and (*b*), emergency steering drills shall take place at least once every three months in order to practise emergency steering procedures. These drills shall include direct control from within the steering gear compartment, the communications procedure with the navigating bridge and, where applicable, the operation of alternative power supplies.

(*e*) The Administration may waive the requirement to carry out the checks and tests prescribed in paragraphs (*a*) and (*b*) for ships which regularly engage on voyages of short duration. Such ships shall carry out these checks and tests at least once every week.

(*f*) The date upon which the checks and tests prescribed in paragraphs (*a*) and (*b*) are carried out and the date and details of emergency steering drills carried out under paragraph (*d*), shall be recorded in the log book as may be prescribed by the Administration.

CHAPTER VI. CARRIAGE OF GRAIN

PART A. GENERAL PROVISIONS

The existing text of regulation 1 is replaced by the following:

Regulation 1. APPLICATION

Unless expressly provided otherwise this chapter applies to the carriage of gain in all ships to which the present regulations apply and in cargo ships of less than 500 tons gross tonnage.

PART B. CALCULATION OF ASSUMED HEELING MOMENTS

Section V. *Alternative loading arrangements for existing ships*

(A) *General*

Amend the second paragraph to read:

For the purpose of this part the term "existing ship" means "a ship, the keel of which is laid before 25 May 1980."

(B) *Stowage of specially suitable ships*

The existing text of sub-paragraph (*a*)(ii)(2) is replaced by the following:

(2) In partly filled compartments or holds free grain surfaces settle and shift as in sub-paragraph (1) or to such larger angle as may be deemed necessary by the Administration, or by a Contracting Government on behalf of the Administration, and grain surfaces, if overstowed, with the bulk grain levelled and topped off with bagged grain or other suitable cargo tightly stowed and extending to a height of not less than 1.22 m above the top of the bulk grain within spaces divided by a longitudinal bulkhead or shifting board, and not less than 1.52 m within spaces not so divided and the bagged grain or other suitable cargo supported on suitable platforms laid over the whole surface of the bulk grain, such platforms consisting of bearers spaced not more than 1.22 m apart and 25 mm boards laid thereon spaced not more than 0.10 m apart or of strong separation cloths with adequate overlapping, will shift to an angle of 8 degrees with the original levelled surfaces. For the purpose of this paragraph shifting boards, if fitted, will be considered to limit the transverse shift of the surface of the grain;

Authentic texts of the Amendments: Chinese, English, French, Russian and Spanish.

Certified statement was registered by the International Maritime Organization on 2 October 1984.

AMENDMENTS to the Protocol of 1978[1] relating to the International Convention for the Safety of Life at Sea, 1974[2]

The amendments were adopted on 20 November 1981 by resolution MSC.2(XLV) of the Maritime Safety Committee of the International Maritime Organization, in accordance with article VIII(*b*) (IV) of the Convention and article II (1) of the Protocol.

They came into force on 1 September 1984, i.e., six months after the date on which they were deemed to have been accepted (1 March 1984, as determined by the Maritime Safety Committee), no objection having been notified to the Secretary-General of the International Maritime Organization by any Contracting Government prior to that date, in accordance with article VIII of the said Convention.

AMENDMENTS TO THE PROTOCOL OF 1978 RELATING TO THE INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974

Regulation 29 of chapter II-1. STEERING GEAR

Replace the fourth sentence of sub-paragraph (*d*)(i)(1) by the following:

Each steering gear control system, if electric, shall be served by its own separate circuit supplied from the steering gear power circuit or directly from switchboard busbars supplying that steering gear power circuit at a point on the switchboard adjacent to the supply to the steering gear power circuit.

Replace sub-paragraph (*d*)(i)(3) by the following:

(3) Means shall be provided in the steering gear compartment for disconnecting any control system operable from the navigating bridge from the steering gear it serves;.

Authentic texts of the Amendments: Chinese, English, French, Russian and Spanish.

Certified statement was registered by the International Maritime Organization on 2 October 1984.

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[1] United Nations, *Treaty Series*, vol. 1226, p. 237.

[2] *Ibid.*, vol. 1184, p. 2, and annex A in volumes 1198, 1208, 1226, 1266, 1286, 1300, 1323, 1331 and 1355.