



Australian Government
Australian Maritime Safety Authority

MARINE ORDERS

Part 25

Equipment—Life-saving

Issue 4 (Amendment)

Order No. 7 of 2004

Pursuant to subsection 425(1AA) of the *Navigation Act 1912*, I hereby make this Order amending Marine Orders Part 25, Issue 4, by omitting pages (i), (ii), 1, 2, 7, 8, 11, 12, 25, 26, 29, 30, 35, 36, 43, 44, 53, 54, 65, 66, 119 and 120 and substituting the attached pages (i), (ii), 1, 2, 7, 8, 11, 12, 25, 26, 29, 30, 35, 36, 36A, 43, 44, 53, 54, 65, 66, 119 and 120, to come into operation on 1 July 2004.

Clive Davidson
Chief Executive Officer
8 June 2004

Table of Contents

Section A General

- 1 Interpretation
- 2 Purpose
- 3 Application
- 4 Narcotic drugs and goods for therapeutic use
- 5 Control
- 6 Exemptions and equivalents
- 7 Transitional provisions
- 8 Additional appliances or equipment
- 9 Damage to appliances and equipment
- 10 Internal review of decisions
- 11 Review of decisions by the AAT

Section B Ship requirements for passenger ships and for cargo ships of 500 tons and upwards

- 12 Communications
- 13 Personal life-saving appliances
- 14 Muster list and emergency instructions
- 15 Operating instructions
- 16 Manning of survival craft and supervision
- 17 Survival craft muster and embarkation arrangements
- 18 Launching stations
- 19 Stowage of survival craft
- 20 Stowage of rescue boats
- 21 Stowage of marine evacuation systems

- 22 Survival craft launching and recovery arrangements
- 23 Rescue boat embarkation, launching and recovery arrangements
- 24 Line-throwing appliances
- 25 Abandon ship training and drills
- 26 Operational readiness, maintenance and inspections

Section C Additional requirements for passenger ships

- 27 Survival craft and rescue boats
- 28 Personal life-saving appliances
- 29 Survival craft and rescue boat embarkation arrangements
- 30 Stowage of life-rafts
- 31 Muster stations
- 32 Additional requirements for ro-ro passenger ships
- 33 Information on passengers
- 34 Helicopter landing and pick-up areas
- 35 Decision support system for masters of passenger ships
- 36 Drills

Section D Additional requirements for cargo ships of 500 tons and upwards

- 37 Survival craft and rescue boats
- 38 Personal life-saving appliances
- 39 Survival craft embarkation and launching arrangements

Section E Life-saving appliances and arrangements requirements

40 Compliance with LSA Code

Section F Miscellaneous

41 Training manual and on-board training aids

42 Instructions for on-board maintenance

43 Muster list and emergency instructions

Section G Life-saving appliances on cargo ships under 500 tons

44 Lifeboats, life-rafts and rescue boats

45 Lifebuoys

46 Life-jackets

47 Line-throwing appliances

48 Distress signals

49 Electric alarm signal

50 Emergency electrical installation

51 Stowing and launching arrangements

52 Communications

53 Limited operations

Appendix 1 Personal life-saving appliances

Appendix 2 Visual signals

Appendix 3 Survival craft

Appendix 4 Rescue boats and fast rescue boats

Appendix 5 Launching and embarkation appliances

Appendix 6 Other life-saving appliances

Appendix 7 First-aid outfits

Appendix 8 Guidelines for floor seam test supporters

Appendix 9 Fitting of retro-reflective tape on life-saving appliances

Appendix 10 Food rations

Appendix 11 121.5/243 MHz
Emergency Position
Indicating Radio Beacons***Previous issues***

Issue 1, Order No 19 of 1983

—***Amended by Order No 10 of 1986***—***Amended by Order No 1 of 1992***—***Amended by Order No 10 of 1992***

Issue 2, Order No 6 of 1992

—***Amended by Order No 11 of 1992***

Issue 3, Order No 13 of 1994

—***Amended by Order No 1 of 1997***

Issue 4, Order No 12 of 1998

—***Amended by Order No 1 of 2002***

SECTION A GENERAL

1 Interpretation

1.1 In this Part, unless the contrary intention appears, the following definitions apply:

AMSA means the Australian Maritime Safety Authority established by the *Australian Maritime Safety Authority Act 1990*;

approved, in relation to an appliance, item of equipment or arrangement, means an appliance, item of equipment or arrangement, or type thereof, approved by the Chief Marine Surveyor or a survey authority for the purposes of this Part, the approval being subject to such conditions as the Chief Marine Surveyor or the survey authority considers necessary;

certificated person means a person who holds:

- (a) a certificate of proficiency in survival craft issued in accordance with the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978, as amended in 1995; or
- (b) a certificate recognised by the Manager as equivalent to a certificate referred to in (a);

Chief Marine Surveyor means the person occupying the position of Manager, Ship Inspections, in AMSA or, in respect of any particular purpose under this Part, a suitably qualified person authorised by the Manager, Ship Inspections, for that purpose;

first-aid outfit means an outfit for use in a lifeboat or life-raft, complying with Appendix 7;

General Manager means the person occupying the position of General Manager, Maritime Operations, in AMSA;

highly visible colour means one of the following colours listed in Australian Standard 2700:

- X 15: orange;
- R 11: international orange;
- R 12: scarlet;

IMO means the International Maritime Organization;

length, in relation to a ship, means 96 per cent of the total length on a water-line at 85 per cent of the least moulded depth measured from the top of the keel or the length from the fore side of the stem to the axis of the rudder stock on that water-line, if that be

greater, except that in ships designed with a rake of keel, the water-line on which this length is measured must be parallel to the designed water-line;

lifeboat equipment means the equipment for use in a lifeboat required by 4.8 of Appendix 3 and the narcotic drugs required by 4.1;

life-raft equipment means the equipment for use in a life-raft required by 1.5 of Appendix 3 and the narcotic drugs required by 4.1;

lightest seagoing condition means the loading condition with the ship on even keel, without cargo, with 10% stores and fuel remaining and in the case of a passenger ship with the full number of passengers and crew and their luggage;

LSA Code means the International Life-Saving Appliance Code, adopted by the International Maritime Organization as resolution MSC.48(66);

Manager means the Manager, Ship Operations and Qualifications, in AMSA or, in respect of any particular purpose under this Part, a suitably qualified person authorised by the Manager, Ship Operations and Qualifications, for that purpose;

penal provision means a penal provision for the purposes of Regulation 4 of the Navigation (Orders) Regulations.

Note: Regulation 4 of the Navigation (Orders) Regulations provides that a person who contravenes a provision of an order made under subsection 425(1AA) of the Act that is expressed to be a penal provision is guilty of an offence and is punishable, upon conviction—

(a) if the offender is a natural person .by a fine not exceeding \$2,000; or

(b) if the offender is a body corporate .by a fine not exceeding \$5,000.

By virtue of sections 4AB and 4AA of the Crimes Act 1914, these penalties are now \$2,200 and \$5,500 respectively.

recovery time, for a rescue boat, is the time required to raise the boat to a position where persons on board can disembark to the deck of the ship, and:

- (a) includes the time required to make preparations for recovery on board the rescue boat such as passing and securing a painter, connecting the rescue boat to the launching appliance, and the time to raise the rescue boat;

(b) does not include the time needed to lower the launching appliance into position to recover the rescue boat;

retro-reflective tape means an approved tape or other material complying with IMO Resolution A.658(16);

SOLAS means the Safety Convention as defined in the Navigation Act;

survey authority means a survey authority approved for the purposes of the *Navigation Act 1912*;

Note: The following survey authorities are approved:

American Bureau of Shipping

Bureau Veritas

Det Norske Veritas

Germanischer Lloyd

Lloyd's Register of Shipping

Nippon Kaiji Kyokai

survival craft includes both a life-raft and a lifeboat;

tanker means a cargo ship constructed or adapted for the carriage in bulk of liquid cargoes of a flammable nature;

tons means tons gross tonnage; and

unfavourable conditions of trim, in relation to falls, launching appliances and embarkation ladders, means the maximum trim that the vessel could develop with one or more compartments open to the sea while remaining afloat.

[Continued on Page 3]

1.2 In this Part, a reference to the date on which a ship was constructed means the date on which not less than 50 tonnes or one per cent of the proposed total mass of the structural material of the ship, whichever is the less, has been assembled.

1.3 In this Part, a reference to the number of persons that a ship is certified to carry is a reference to the number of persons for whom life-saving appliances are provided as specified in the record of equipment contained in or appended to the certificate of the ship.

1.4 The expression **to the satisfaction of the Chief Marine Surveyor**, or any similar expression appearing in this Part, means that the Chief Marine Surveyor may require the fitting, material, appliance or apparatus referred to, to be demonstrated to be safe and effective for its intended purpose.

1.5 A reference to Issue 1 of this Part is a reference to Order No.19 of 1983 as amended by Order No 10 of 1986, Order No 1 of 1992 and Order No 10 of 1992.

1.6 A reference to Issue 2 of this Part is a reference to Order No 6 of 1992 as amended by Order No 11 of 1992.

1.7 A reference to Issue 3 of this Part is a reference to Order No 13 of 1994 as amended by Order No 1 of 1997.

1.8 In this Part:

- (a) headings and sub-headings are part of the Part;
- (b) each Appendix is part of the Part;
- (c) a note included in the text and printed in italics is not part of the Part;
- (d) a reference to a particular regulation of SOLAS and printed in italics is not part of the Part.

Note: Copies of IMO Resolutions or other documents referred to in this Part are available from AMSA.

2 Purpose

This Part:

- (a) for the purposes of section 191 of the Navigation Act, makes provision for and in relation to giving effect to Chapter III of SOLAS;
- (b) for the purposes of section 215, gives effect to the LSA Code;

- (c) prescribes generally, for the purposes of sections 215 and 228 of the Navigation Act, the appliances to be carried on ships for the saving of life at sea.

3 Application

3.1 Subject to 3.2 and 3.3, this Part applies to a ship that is:

- (a) a ship registered in Australia; and
- (b) a ship registered in a country other than Australia that is in the territorial sea of Australia or waters on the landward side of the territorial sea.

3.2 This Part does not apply to a ship that is a SOLAS ship registered in a country other than Australia, except to the extent that the ship fails to comply with SOLAS.

3.3 This Part does not apply to a ship that is registered in a country other than Australia that is a party to the International Convention for the Safety of Life at Sea, 1960, except to the extent that the ship fails to comply with that Convention.

3.4 A cargo ship, whenever built, that is converted to a passenger ship is to be treated as a passenger ship constructed on the date on which such conversion commences.

3.5 Where a provision of this Part requires or permits the appliances, equipment or arrangements of a ship to comply with the USL Code, one or more requirements of this Part may be replaced by the corresponding provision of the USL Code.

3.6 If a ship is to be certificated in accordance with one of the Codes referred to in Marine Orders, Part 49 (High Speed Craft) or the Code referred to in Marine Orders, Part 50 (Special Purpose Ships), and a provision of the relevant Code is inconsistent with a provision of this Part, the provision of the Code will prevail to the extent of the inconsistency.

Note: This Issue of Part 25 applies to all ships. However, certain appliances, equipment and arrangements on ships built before 1 July 1998 may, until replacement, continue to be used if they complied with Issue 3 of Part 25. See Provision 7.3.

4 Narcotic drugs and goods for therapeutic use

4.1 Narcotic drugs

4.1.1 A ship must be provided with narcotic drugs for use in survival craft on the scale of one pack per 15 persons or part thereof that the ship is certified to carry, the maximum required number being 2 packs.

4.1.2 Each pack referred to in 4.1.1 must contain:

- (a) 5 doses of Morphine Sulphate Injection 15 mg in 1 ml disposable syringe pack; or
- (b) 5 doses of Morphine Sulphate Injection 15 mg in 1 ml ampoule with five suitable sterile disposable syringes, complete with needles, per ampoule; or
- (c) 6 doses of Omnopon Tubunic 30 mg (equivalent to Anhydrous Morphine 15 mg).

4.1.3 The narcotic drugs must be stowed in one of the following alternative locations at the discretion of the master, provided that the drugs are so stowed as to be capable of ready transfer to lifeboats or life-rafts in the event of an emergency:

- (a) in the locked inner cupboard of the ship's medical cabinet;
- (b) in a secure location in the wheelhouse or normal navigating position.

4.2 Goods for therapeutic use

If articles contained in a first-aid outfit, or narcotic drugs carried on a ship for use on survival craft, are goods for therapeutic use within the meaning of the *Therapeutic Goods Act 1989* the goods must:

- (a) conform to specific standards, within the meaning of that Act, applicable to the goods; and
- (b) conform to general standards, within the meaning of that Act, applicable to the goods.

5 Control

5.1 Quality control

A manufacturer of appliances or equipment for use on a ship must institute quality control measures in relation to the manufacture, service and repair of those appliances or equipment to the satisfaction of the Chief Marine Surveyor.

5.2 Examination

For the purpose of 5.1, a surveyor must be permitted by the manufacturer to examine:

- (a) any such appliance or item of equipment during manufacture, service or repair; and
- (b) the quality control measures in relation to that appliance or equipment.

5.3 General requirements

(LSA Code, §1.2)

The manufacturer of an appliance, or the importer of an appliance not manufactured in Australia, must ensure that it:

- (a) is constructed with proper workmanship and materials;
- (b) is not damaged in stowage throughout the air temperature range -30°C to $+65^{\circ}\text{C}$;
- (c) if it is likely to be immersed in seawater during its use, operates throughout the seawater temperature range -1°C to $+30^{\circ}\text{C}$;
- (d) where applicable, is rot-proof, corrosion resistant, and is not unduly affected by seawater, oil or fungal attack;
- (e) where exposed to sunlight, is resistant to deterioration;
- (f) is of a highly visible colour on all parts where this will assist detection;
- (g) is fitted with retro-reflective material where it will assist in detection and in accordance with IMO Resolution A.658(16): *Recommendation on the Use and Fitting of Retro-Reflective Material on Life-saving Appliances*;
- (h) if it is to be used in a seaway, is capable of satisfactory operation in that environment;
- (i) is clearly marked with approval information including the Administration that approved it, and any operational restrictions; and
- (j) where applicable, is provided with electrical short circuit protection to prevent damage or injury.

5.4 Approvals

(SOLAS III-4)

5.4.1 The items of equipment specified in column 1 of Table 1 must:

- (a) be approved; and

(b) comply with the standards set out in the specified section of the Appendix referred to in column 2 of Table 1.

Table 1

<i>Item of equipment</i>	<i>Appropriate section and Appendix with which item must comply</i>
anti-exposure suit	4 of Appendix 1
buoyant smoke signal	3 of Appendix 2
EPIRB	Appendix 11
food ration	Appendix 10
hand flare	2 of Appendix 2
immersion suit	3 of Appendix 1
launching appliance	Appendix 5
lifeboat	Appendix 3
lifebuoy	1 of Appendix 1
life-jacket	2 of Appendix 1
life-jacket light	2.3 of Appendix 1
life-raft	Appendix 3
line-throwing appliance	1 of Appendix 6
marine evacuation system	2 of Appendix 5
partially enclosed lifeboat	5 of Appendix 3
rescue boat	Section A or B of Appendix 4
rocket parachute flare	1 of Appendix 2
self activating smoke signal	1.3 of Appendix 1
self igniting light	1.2 of Appendix 1
thermal protective aid	5 of Appendix 1
totally enclosed lifeboat	6 of Appendix 3

5.4.2 The Chief Marine Surveyor will not normally approve appliances, equipment or arrangements that do not comply with the requirements of this Part or, where appropriate, have not successfully passed the tests specified in IMO Resolution MSC.81(70), or, for appliances of novel design, A.520(13).

5.5 Certificate of Approval

(SOLAS III-4)

5.5.1 The Chief Marine Surveyor or survey authority may issue a document called a Certificate of Approval as evidence that a particular appliance, item of equipment or arrangement, or make or type of appliance or equipment, has been approved under this Part.

5.5.2 A Certificate of Approval remains in force until such date as is shown on the certificate, and may be renewed for a further period if the Chief Marine Surveyor or survey authority is satisfied that the appliance, item of equipment or arrangement, or make or type of appliance or equipment, continues to comply with this Part.

5.5.3 The Chief Marine Surveyor or survey authority may revoke a Certificate of Approval if satisfied that the appliance, item of equipment or arrangement, or make or type of appliance or equipment, no longer complies with this Part.

6 Exemptions and equivalents

6.1 Exemptions

(SOLAS I-4 and III-2)

6.1.1 The Chief Marine Surveyor, if satisfied that compliance with a provision of this Part would be unnecessary or unreasonable having regard to a ship, its equipment and its intended voyage, may exempt that ship from compliance with such provision to the extent specified and subject to such conditions as that officer thinks fit.

6.1.2 Provision 6.1.1 applies only to the extent that any exemption from a provision of this Part is not inconsistent with SOLAS.

6.2 Equivalents

(SOLAS I-5)

Where a provision of this Part requires a particular fitting, material, appliance or apparatus, or type thereof to be fitted or carried in a ship or a particular provision to be made in a ship, the Chief Marine Surveyor may allow any other fitting, material, appliance or apparatus, or type thereof, to be fitted or carried, or any other provision to be made, if that officer is satisfied that the other fitting, material, appliance or apparatus, or type thereof, or provision, is at least as effective as that required by that provision of this Part.

7 Transitional provisions

7.1 Exemptions

An exemption granted or continued under a provision of Marine Orders, Part 25, Issue 3, and in force immediately before this Issue of this Part came into force, is to continue in force as if granted under this Issue of this Part.

7.2 Approvals

An appliance, item of equipment or arrangement approved under a provision of Marine Orders, Part 25, Issue 3, and in service on a ship immediately before this Issue of this Part came into force, is deemed to be approved under this Issue of this Part.

7.3 Pre-1998 ships

(SOLAS III-1.4)

7.3.1 Subject to 7.3.2 and 7.3.3, if an appliance, item of equipment or arrangement on a ship constructed before 1 July 1998 does not comply with this Issue of this Part but complied with Issue 3 of this Part, it is deemed to comply with this Issue of this Part.

7.3.2 If:

- (a) an appliance, item of equipment or arrangement referred to in 7.3.1 is replaced;
or
- (b) the ship on which an appliance, item of equipment or arrangement referred to in 7.3.1 requires additional or different appliances, items of equipment or arrangements,

the replacement or additional appliances, items of equipment or arrangements must comply with this Issue of this Part. If, however, a survival craft is replaced without replacing its launching appliance, or vice versa, the replacement may be of the same type as the item replaced.

7.3.3 Provisions 12.1, 12.4.1, 12.4.2, 12.4.4, 14, 15, 16, 25, 26, 28.4.1, 32, 33, 34.1, 35, 36, 38.3, 41, 42 and 43 apply to all relevant ships irrespective of date of build.

8 Additional appliances or equipment

If a ship is provided with an appliance or item of equipment additional to the appliances and equipment required by this Part, that appliance or item of equipment must comply with the requirements of this Part as if it were an appliance or item of equipment required to be provided by this Part.

9 Damage to appliances and equipment

9.1 A person must not wilfully cause damage to any appliance or item of equipment stored in or belonging to any appliance.

This is a penal provision.

9.2 A person must not without reasonable excuse alter or deface any label or marking on an appliance or on an item of equipment stored in or belonging to a life-saving appliance.

This is a penal provision.

10 Internal review of decisions

10.1 If the Chief Marine Surveyor or the Manager makes a decision under this Part, a person affected by the decision may apply to the General Manager for review of that decision.

10.2 An application for internal review under 10.1 must be made in writing to the General Manager and must be accompanied by such information as the General Manager requires to enable that officer to make a proper decision.

10.3 The General Manager may:

- (a) affirm the original decision by the Chief Marine Surveyor or the Manager; or
- (b) make any decision that could be made by the Chief Marine Surveyor or Manager in accordance with this Part.

11 Review of decisions by the AAT

11.1 Application may be made to the Administrative Appeals Tribunal for review of a decision by the General Manager under 10.3.

11.2 The General Manager must give his or her decision in writing within 28 days of receiving the application for internal review. The notice must include a statement to the effect that, if the person is dissatisfied with the decision, application may, subject to the *Administrative Appeals Tribunal Act 1975*, be made to the Administrative Appeals Tribunal for review of the decision. The notice must also include a statement to the effect that the person may request a statement under section 28 of that Act.

11.3 Failure to comply with 11.2 in relation to a decision does not affect the validity of that decision.

SECTION B SHIP REQUIREMENTS FOR PASSENGER SHIPS AND FOR CARGO SHIPS OF 500 TONS AND UPWARDS

12 Communications

(SOLAS III-6)

12.1 Radio life-saving appliances

12.1.1 At least three approved two-way VHF radiotelephone apparatus fitted with VHF channels 6, 13, 16 and 67 must be provided.

Note: The Chief Marine Surveyor will not normally approve apparatus installed on or after 1 July 2005 if the performance standards of the apparatus are inferior to those specified in IMO Resolution MSC.149(77). For apparatus installed before 1 July 2005, the performance standards must not be inferior to those specified in Annex 1 to IMO Resolution MSC.809(19).

12.1.2 At least one approved radar transponder must be carried on each side. The transponders must be stowed:

- (a) in such locations that they can be rapidly placed in any survival craft, other than the life-raft or life-rafts required by 37.1.3; or
- (b) one transponder in each survival craft, other than the life-raft or life-rafts required by 37.1.3.

Note 1: The Chief Marine Surveyor will not normally approve transponders the performance standards of which do not conform to the performance standards for survival craft radar transponders for use in search and rescue operations, IMO Resolution A.802(19).

Note 2: On a ship equipped with a free-fall lifeboat and two or more transponders, one of the transponders is to be stowed in that lifeboat and the other(s) in the vicinity of the bridge.

12.2 Distress flares

No fewer than 12 rocket parachute flares must be carried and be stowed on or near the navigating bridge.

12.3 On-board communications and alarm systems

12.3.1 An emergency means comprised of either fixed or portable equipment or both must be provided for two-way communications between emergency control stations, muster and embarkation stations and strategic positions on board.

12.3.2 A general emergency alarm system complying with 2 of Appendix 6 must be provided and must be used for summoning passengers and crew to muster stations and to initiate the actions included in the muster list. The system must be supplemented either by a public address system complying with 2.2 of Appendix 6 or by other suitable means of communication. Entertainment sound systems must automatically be turned off when the general emergency alarm system is activated.

12.3.3 On passenger ships the general emergency alarm system must be audible on all open decks.

12.3.4 On ships fitted with a marine evacuation system, communication between the embarkation station and the platform or the survival craft must be ensured.

[Continued on Page 13]

12.4 Public address systems on passenger ships

12.4.1 In addition to the requirements of 12.3.2, and of Marine Orders, Part 15, as appropriate, all passenger ships must be fitted with a public address system.

12.4.2 The public address system must be clearly audible above the ambient noise in all spaces, as specified in 2.2.1 of Appendix 6, and must be provided with an override function controlled from one location on the navigation bridge and such other places on board as the Chief Marine Surveyor considers necessary, so that all emergency messages will be broadcast if any loudspeaker in the spaces concerned has been switched off, its volume has been turned down or the public address system is used for other purposes.

12.4.3 On passenger ships constructed on or after 1 July 1997:

(a) the public address system must have at least two loops which must be sufficiently separated throughout their length and have two separate and independent amplifiers; and

(b) the public address system and its performance standards must be approved by the Chief Marine Surveyor.

Note: The Chief Marine Surveyor will not normally approve a public address system and its cabling the performance standards of which do not conform to the performance standards specified in IMO document MSC/Circ.808.

12.4.4 The public address system must be connected to the emergency source of electrical power.

12.4.5 Ships constructed before 1 July 1997 which are already fitted with a public address system approved by the Chief Marine Surveyor which complies substantially with those required by 12.4.2 and 12.4.4 and 2.2.1 of Appendix 6, are not required to change their system.

13 Personal life-saving appliances (SOLAS III-7)

13.1 Lifebuoys

13.1.1 Lifebuoys must be:

(a) so distributed as to be readily available on both sides of the ship and as far as practicable on all open decks extending to the ship's side; at least one must be placed in the vicinity of the stern;

(b) so stowed as to be capable of being rapidly cast loose, and not permanently secured in any way.

13.1.2 At least one lifebuoy on each side of the ship must be fitted with a buoyant lifeline complying with 1.4 of Appendix 1 equal in length to not less than twice the height at which it is stowed above the water-line in the lightest seagoing condition, or 30 metres, whichever is the greater.

13.1.3 Subject to 28.1.2, not less than one half of the total number of lifebuoys must be provided with self-igniting lights. At least 2 of these must also be provided with self-activating smoke signals and be capable of quick release from the navigating bridge provided that on tugs and similar vessels that may be required to go alongside another vessel or a drilling platform as a normal part of their duties, the lifebuoys must be positioned for ready use in an emergency. Lifebuoys with lights and those with lights and smoke signals must be equally distributed on both sides of the ship and must not be the lifebuoys provided with lifelines in compliance with 13.1.2.

13.1.4 Each lifebuoy must be marked in block capitals of the Roman alphabet with the name and port of registry of the ship on which it is carried.

13.2 Life-jackets

13.2.1 There must be provided on a ship:

- (a) a life-jacket for every person on board the ship; and
- (b) a number of life-jackets suitable for persons less than 32 kg equal to 10 per cent of the number of passengers on board or such number as may be required to provide a life-jacket for each person less than 32 kg, whichever is the greater.

13.2.2 Life-jackets must be so placed as to be readily accessible and their position must be plainly indicated. If, due to the particular arrangements of the ship, the life-jackets provided in compliance with 13.2.1 may become inaccessible, alternative provisions must be made to the satisfaction of the Chief Marine Surveyor which may include an increase in the number of life-jackets to be carried.

13.2.3 The lifejackets used in totally enclosed lifeboats, except free-fall lifeboats, must not impede entry into the lifeboat or seating, including operation of the seat belts in the lifeboat.

13.2.4 Lifejackets selected for free-fall lifeboats, and the manner in which they are carried or worn, must not interfere with entry into the lifeboat, occupant safety or operation of the lifeboat.

13.3 Immersion suits and anti-exposure suits

13.3.1 Subject to 13.3.2, an immersion suit or an anti-exposure suit of an appropriate size must be provided for every person assigned to crew the rescue boat or assigned to the marine evacuation system party.

13.3.2 Provision 13.3.1 does not apply if the ship is continuously engaged on voyages between latitudes 35°S and 35°N.

14 Muster list and emergency instructions

(SOLAS III-8)

14.1 Clear instructions to be followed in the event of an emergency must be provided for every person on board. In the case of a passenger ship these instructions must be drawn up in the language or languages required by the ship's flag State and in the English language.

14.2 Muster lists complying with 43 must be exhibited in conspicuous places throughout the ship including the navigating bridge, engine room and crew accommodation spaces.

14.3 Illustrations and instructions in the English language must be posted in passenger cabins and be conspicuously displayed at muster stations and other passenger spaces to inform passengers of:

- (a) their muster station;
- (b) the essential actions they must take in an emergency; and
- (c) the method of donning life-jackets.

15 Operating instructions

(SOLAS III-9)

Posters or signs must be provided on or in the vicinity of survival craft and their launching controls and must:

- (a) illustrate the purpose of controls and the procedures for operating the appliance and give relevant instructions or warnings;
- (b) be easily seen under emergency lighting conditions; and
- (c) use symbols in accordance with IMO Resolution A.760(18), as amended by Resolution MSC.82(70).

16 Manning of survival craft and supervision

(SOLAS III-10)

16.1 There must be a sufficient number of trained persons on board for mustering and assisting untrained persons.

16.2 There must be a sufficient number of crew members, who may be deck officers or certificated persons, on board for operating the survival craft and launching arrangements required for abandonment by the total number of persons on board.

16.3 A deck officer or certificated person must be placed in charge of each survival craft to be used. However, the Manager, having due regard to the nature of the voyage, the number of persons on board and the characteristics of the ship, may permit persons practised in the handling and operation of life-rafts to be placed in charge of life-rafts in lieu of persons qualified as specified. A second-in-command must also be nominated in the case of lifeboats.

16.4 The person in charge of the survival craft must have a list of the survival craft crew and must see that the crew are acquainted with their duties. In lifeboats the second-in-command must also have a list of the lifeboat crew.

16.5 Every motorised survival craft must have a person assigned who is capable of operating the engine and carrying out minor adjustments.

16.6 The master must ensure the equitable distribution of persons referred to in 16.1, 16.2 and 16.3 among the ship's survival craft.

17 Survival craft muster and embarkation arrangements

(SOLAS III-11)

17.1 Lifeboats and life-rafts for which launching appliances are required must be stowed as close to accommodation and service spaces as possible.

17.2 Muster stations must be provided close to the embarkation stations. Each muster station must have sufficient clear deck space to accommodate all persons assigned to muster at that station, which must be at least 0.35 m² per person.

17.3 Muster and embarkation stations must be readily accessible from accommodation and work areas.

17.4 Muster and embarkation stations must be adequately illuminated by lighting supplied from the emergency source of electrical power.

17.5 Alleyways, stairways and exits giving access to the muster and embarkation stations must be lighted. Such lighting must be capable of being supplied by the emergency source of electrical power. In addition to and as part of the markings required by Marine Orders, Part 15, routes to muster stations must be indicated with the muster station symbol specified in *Symbols Related to Life-Saving Appliances and Arrangements*, adopted by IMO as Resolution A.760(18), as amended by Resolution MSC.82(70).

17.6 Davit-launched survival craft muster and embarkation stations must be so arranged as to enable stretcher cases to be placed in survival craft.

17.7 An embarkation ladder complying with 1.6 of Appendix 5 extending, in a single length, from the deck to the waterline in the lightest seagoing condition under unfavourable conditions of trim of up to 10° and a list of up to 20° either way must be provided at each launching station or at every two adjacent launching stations. However, the Chief Marine Surveyor may permit such ladders to be replaced by approved devices to afford access to the survival craft when waterborne, provided that there must be at least one embarkation ladder on each side of the ship. Other means of embarkation may be permitted for the life-rafts required by 37.1.3.

Note: An embarkation ladder is not required to be provided at the stern for a free fall lifeboat.

17.8 If a life-raft is provided in accordance with 37.1.3, a knotted lifeline, consisting of a fibre rope not less than 24 millimetres in diameter knotted at intervals not exceeding 2 metres and fitted with an eye to enable it to be rapidly secured, long enough to reach the water from the point of embarkation, must be provided for embarkation if a ladder specified in 17.7 is not provided.

17.9 If necessary, means must be provided for bringing the davit-launched survival craft against the ship's side and holding them alongside so that persons can be safely embarked.

18 Launching stations

(SOLAS III-12)

18.1 Launching stations must be in such positions as to ensure safe launching having particular regard to clearance from the propeller and steeply overhanging portions of the hull and so that, as far as possible, survival craft, except survival craft specially designed for free-fall launching, can be launched down the straight side of the ship.

18.2 If positioned forward, launching stations must be in an approved location abaft the collision bulkhead in a sheltered position.

Note: The Chief Marine Surveyor will give special consideration to the strength of the launching appliance before approving such a location.

19 Stowage of survival craft

(SOLAS III-13)

19.1 Each survival craft must be stowed:

- (a) so that neither the survival craft nor its stowage arrangements will interfere with the operation of any other survival craft or rescue boat at any other launching station;
- (b) as near the water surface as is safe and practicable and, in the case of a survival craft other than a life-raft intended for throw-overboard launching, in such a position that the survival craft in the embarkation position is not less than 2 metres above the waterline with the ship in the fully loaded condition under unfavourable conditions of trim and listed up to 20° either way, or to the angle at which the ship's weatherdeck edge becomes submerged, whichever is less;
- (c) in a state of continuous readiness so that two crew members can carry out preparations for embarkation and launching in less than 5 minutes;
- (d) fully equipped as required by this Part; and
- (e) as far as practicable, in a secure and sheltered position and protected from damage by fire and explosion. In particular, survival craft on tankers, other than the life-rafts required by 37.1.3, must not be stowed on or above a cargo tank, slop tank, or other tank containing explosive or hazardous cargoes.

19.2 Lifeboats for lowering down the ship's side must be stowed as far forward of the propeller as practicable. On cargo ships of 80 metres in length and upwards, but less than 120 metres in length, each lifeboat must be so stowed that the after end of the lifeboat is not less than the length of the lifeboat forward of the propeller. On cargo ships of 120 metres in length and upwards and passenger ships of 80 metres in length and upwards, each lifeboat must be so stowed that the after end of the lifeboat is not less than 1.5 times the length of the lifeboat forward of the propeller. If appropriate, the ship must be so arranged that lifeboats, in their stowed positions, are protected from damage by heavy seas.

19.3 Lifeboats must be stowed attached to launching appliances.

19.4.1 Every life-raft must be stowed with its painter permanently attached to the ship.

19.4.2 Each life-raft or group of life-rafts must be stowed with a float-free arrangement complying with the requirements of 1.6 of Appendix 3 so that each floats free and, if inflatable, inflates automatically when the ship sinks.

19.4.3 Life-rafts must be so stowed as to permit manual release of one raft or container at a time from their securing arrangements.

19.4.4 Provisions 19.4.1 and 19.4.2 do not apply to life-rafts required by 37.1.3.

19.5 Davit-launched life-rafts must be stowed within reach of the lifting hooks unless some means of transfer is provided which is not rendered inoperable within the limits of trim and list specified in 19.1(b) or by ship motion or power failure.

19.6 Life-rafts intended for throw-overboard launching must be so stowed as to be readily transferable for launching on either side of the ship unless life-rafts, of the aggregate capacity required by 37.1 to be capable of being launched on either side, are stowed on each side of the ship.

19.7 On ships where it is necessary, due to reduced freeboard, restricted deck space, vulnerability to heavy weather damage or otherwise to stow a life-raft inboard from the minimum of physical effort and without removing sections of side rails, chains or gates. Where a launching ramp or chute is fitted, the angle of inclination is to be not less than 25° to the horizontal.

Note: Life-rafts up to and including those with a capacity for 12 persons will be accepted as being suitable for ready transfer from one side of the ship to the other, provided that there is a clear thwartships passage available on the deck on which the life-rafts are stowed. Acceptance is subject to an inspection of the ship and its arrangements by a surveyor.

20 Stowage of rescue boats

(SOLAS III-14)

20.1 Subject to 20.2, rescue boats must be stowed:

- (a) in a state of continuous readiness for launching in not more than 5 minutes;
- (b) in a position suitable for launching and recovery;
- (c) so that neither the rescue boat nor its stowage arrangements will interfere with the operation of any survival craft at any other launching station; and

(d) if it is also a lifeboat, in compliance with 19 of this Part.

20.2 A rescue boat must not be stowed on the tank deck of a tanker except with the approval of the Chief Marine Surveyor.

Note: The Chief Marine Surveyor will normally not approve stowage on the tank deck unless satisfied that:

- (a) stowage is as far as possible from a hazardous area;*
- (b) the boat is powered by a diesel engine;*
- (c) there is a gas detection system at the stowage position; and*
- (d) the installation is intrinsically safe.*

21 Stowage of marine evacuation systems

(SOLAS III-15)

21.1 The ship's side must not have any openings between the embarkation station of the marine evacuation system and the waterline in the lightest seagoing condition and means must be provided to protect the system from any projections.

21.2 Marine evacuation systems must be in such positions as to ensure safe launching having particular regard to clearance from the propeller and steeply overhanging positions of the hull and so that, as far as practicable, the system can be launched down the straight side of the ship.

21.3 Each marine evacuation system must be stowed so that neither the passage nor platform nor its stowage or operational arrangements will interfere with the operation of any other life-saving appliance at any other launching station.

21.4 Where appropriate, the ship must be so arranged that the marine evacuation systems in their stowed positions are protected from damage by heavy seas.

22 Survival craft launching and recovery arrangements

(SOLAS III-16)

22.1 Launching and embarkation appliances must be provided for all survival craft except:

- (a) survival craft which are boarded from a position on deck which is less than 4.5 metres above the waterline in the lightest seagoing condition and which either:
 - (i) have a mass of not more than 185 kg; or**

- (ii) are stowed for launching directly from the stowed position under unfavourable conditions of trim of up to 10° and with the ship listed up to 20° either way;
- (b) survival craft that are carried in excess of the survival craft for 200% of the total number of persons on board the ship and which:
 - (i) have a mass of not more than 185 kg; or
 - (ii) are stowed for launching directly from the stowed position under unfavourable conditions of trim of up to 10° and with the ship listed up to 20° either way;
- (c) survival craft provided for use in conjunction with a marine evacuation system and stowed for launching directly from the stowed position under unfavourable conditions of trim of up to 10° and list of up to 20° either way.

22.2 Each lifeboat must be provided with an appliance which is capable of launching and recovering the lifeboat. In addition there must be provision for hanging off the lifeboat to free the release gear for maintenance.

22.3 Launching and recovery arrangements must be such that the appliance operator on the ship is able to observe the survival craft at all times during launching and, for lifeboats, during recovery.

22.4 Only one type of release mechanism may be used for similar survival craft carried on board the ship.

22.5 Preparation and handling of survival craft at any one launching station must not interfere with the prompt preparation and handling of any other survival craft or rescue boat at any other station.

22.6 Falls, if used, must be long enough for the survival craft to reach the water with the ship in its lightest seagoing condition, under unfavourable conditions of trim and with the ship listed not less than 20° either way.

22.7 During preparation and launching, the survival craft, its launching appliance, and the area of water into which it is to be launched must be adequately illuminated by lighting supplied from the emergency source of electrical power.

22.8 Means must be available to prevent any discharge of water on to survival craft during abandonment.

22.9 If there is a danger of the survival craft being damaged by the ship's stabiliser wings, means must be available, powered by an emergency source of energy, to bring

the stabilizer wings inboard; indicators operated by an emergency source of energy must be available on the navigating bridge to show the position of the stabilizer wings.

22.10 If partially enclosed lifeboats are carried, a davit span must be provided, fitted with no fewer than 2 lifelines of sufficient length to reach the water with the ship in its lightest seagoing condition, under unfavourable conditions of trim and with the ship listed not less than 20° either way.

23 Rescue boat embarkation, launching and recovery arrangements (*SOLAS III-17*)

23.1 The rescue boat embarkation and launching arrangements must be such that the rescue boat can be boarded and launched in the shortest possible time.

23.2 If the rescue boat is one of the ship's survival craft, the embarkation arrangements and launching station must comply with 17 and 18 of this Part.

23.3 Launching arrangements must comply with 22 of this Part. However, all rescue boats must be capable of being launched, if necessary utilising painters, with the ship making headway at speeds up to 5 knots in calm water.

23.4 Recovery time of the rescue boat must not be more than 5 minutes in moderate sea conditions when loaded with its full complement of persons and equipment. If the rescue boat is also a lifeboat, this recovery time must be possible when loaded with its lifeboat equipment and the approved rescue boat complement of at least 6 persons.

23.5 Rescue boat embarkation and recovery arrangements must allow for safe and efficient handling of a stretcher case. Foul weather recovery strops must be provided for safety if heavy fall blocks constitute a danger.

24 Line-throwing appliances (*SOLAS III-18*)

A line-throwing appliance must be provided.

25 Abandon ship training and drills (*SOLAS III-19*)

25.1 Manuals

25.1.1 A training manual complying with 41 must be provided in each crew mess room and recreation room or in each crew cabin.

25.1.2 On an Australian registered ship, the requirements of 25.1.1 are to be met by:

- (a) providing a copy of the publication "Survival at Sea, Instruction Manual (Third Edition)", as follows:
 - (i) one copy to be provided on board for each member of the crew; and
 - (ii) one copy to be provided in each survival craft; and
- (b) providing access on board the ship to any other relevant documents relating to the training of personnel on the use of the life-saving appliances carried on the ship.

Note: All crew should be made familiar with the existence of such documents and, in particular, with the details of any equipment that differs in any material respect from the equipment described in the Survival Manual.

25.2 Familiarity with safety installations and practice musters

25.2.1 Every crew member with assigned emergency duties must be familiar with these duties before the voyage begins.

25.2.2 On a ship engaged on a voyage where passengers are scheduled to be on board for more than 24 hours, musters of the passengers must take place within 24 hours after their embarkation. Passengers must be instructed in the use of the lifejackets and the action to take in an emergency.

25.2.3 Whenever new passengers embark, a passenger safety briefing must be given immediately before sailing, or immediately after sailing. The briefing must include the instructions required by 14.1 and 14.3, and must be made by means of an announcement, in one or more languages likely to be understood by the passengers. The announcement must be made on the ship's public address system, or by other equivalent means likely to be heard at least by the passengers who have not yet heard it during the voyage. The briefing may be included in the muster required by 25.2.2 if the muster is held immediately upon departure. Information cards or posters or video programmes displayed on ships' video displays may be used to supplement the briefing, but may not be used to replace the announcement.

25.3 Drills

25.3.1 Drills must, as far as practicable, be conducted as if there were an actual emergency.

25.3.2 Every crew member must participate in at least one abandon ship drill and one fire drill every month. The drills of the crew must take place within 24 hours of the ship leaving a port if more than 25% of the crew have not participated in abandon ship and fire drills on board that particular ship in the previous month. When a ship enters service for the first time, after modification of a major character or when a new crew is engaged, these drills must be held before sailing. The Chief Marine Surveyor may accept other arrangements that are at least equivalent for those classes of ships for which this is impracticable.

25.3.3 *Abandon ship drill*

25.3.3.1 Each abandon ship drill must include:

- (a) summoning of passengers and crew to muster stations with the alarm required 12.3.2, followed by drill announcement on the public address or other communication system and ensuring that they are made aware of the order to abandon ship;
- (b) reporting to stations and preparing for the duties described in the muster list;
- (c) checking that passengers and crew are suitably dressed;
- (d) checking that lifejackets are correctly donned;
- (e) lowering of at least one lifeboat after any necessary preparation for launching;
- (f) starting and operating the lifeboat engine;
- (g) operation of davits used for launching life-rafts;
- (h) a mock search and rescue of passengers trapped in their staterooms; and
- (i) instruction in the use of radio life-saving appliances.

25.3.3.2 Different lifeboats must, as far as practicable, be lowered in compliance with 25.3.3.1(e) at successive drills.

25.3.3.3 Except as provided in paragraphs 25.3.3.4 and 25.3.3.5, each lifeboat must be launched with its assigned operating crew aboard and manoeuvred in the water at least once every 3 months during an abandon ship drill.

25.3.3.4 Lowering into the water, rather than launching of a lifeboat arranged for free-fall launching, is acceptable where free-fall launching is impracticable, provided the lifeboat is free-fall launched with its assigned operating crew aboard and manoeuvred in the water at least once every six months. However, in cases where it is impracticable, the Chief Marine Surveyor may extend this period to 12 months

provided that arrangements are made for simulated launching which will take place at intervals of not more than 6 months.

25.3.3.5 The Chief Marine Surveyor may allow ships operating on short international voyages not to launch the lifeboats on one side if their berthing arrangements in port and their trading patterns do not permit launching of lifeboats on that side. However, all such lifeboats must be lowered at least once every 3 months and launched at least annually.

25.3.3.6 As far as is reasonable and practicable, rescue boats other than lifeboats which are also rescue boats, must be launched each month with their assigned crew aboard and manoeuvred in the water. In all cases this requirement must be complied with at least once every 3 months.

25.3.3.7 If lifeboat and rescue boat launching drills are carried out with the ship making headway, such drills must, because of the dangers involved, be practised in sheltered waters only and under the supervision of an officer experienced in such drills.

25.3.3.8 If a ship is fitted with marine evacuation systems, drills must include exercising of the procedures required for the deployment of such a system up to the point immediately preceding actual deployment of the system. This aspect of drills should be augmented by regular instruction using the on-board training aids required by 41.3. Additionally every system party member must, as far as practicable, be further trained by participation in a full deployment of a similar system into water, either on board a ship or ashore, at intervals of not longer than 2 years, but in no case longer than 3 years. This training can be associated with the deployments required by 26.7.2.

25.3.3.9 Emergency lighting for mustering and abandonment must be tested at each abandon ship drill.

25.3.4 *Fire drills*

25.3.4.1 Fire drills should be planned in such a way that due consideration is given to regular practice in the various emergencies that may occur depending on the type of ships and the cargo.

25.3.4.2 Each fire drill must include:

- (a) reporting to stations and preparing for the duties described in the muster list required by 14;
- (b) starting of a fire pump, using at least the two required jets of water to show that the system is in proper working order;
- (c) checking of fireman's outfit and other personal rescue equipment;
- (d) checking of relevant communication equipment;
- (e) checking the operation of watertight doors, fire doors, fire dampers and main inlets and outlets of ventilation systems in the drill area; and
- (f) checking the necessary arrangements for subsequent abandoning of the ship.

25.3.4.3 The equipment used during drills must immediately be brought back to its fully operational condition and any faults and defects discovered during the drills must be remedied as soon as possible.

25.4 On-board training and instructions

25.4.1 On-board training in the use of the ship's life-saving appliances, including survival craft equipment, and in the use of the ship's fire-extinguishing appliances must be given as soon as possible but not later than 2 weeks after a crew member joins the ship. However, if the crew member is on a regularly scheduled rotating assignment to the ship, such training must be given not later than 2 weeks after the time of first joining the ship. Instructions in the use of the ship's fire-extinguishing appliances, life-saving appliances, and in survival at sea must be given at the same interval as the drills. Individual instruction may cover different parts of the ship's life-saving and fire-extinguishing appliances, but all the ship's life-saving and fire-extinguishing appliances must be covered within any period of 2 months.

25.4.2 Every crew member must be given instructions which must include but not necessarily be limited to:

- (a) operation and use of the ship's inflatable life-rafts;
- (b) problems of hypothermia, first-aid treatment for hypothermia and other appropriate first-aid procedures;
- (c) special instructions necessary for use of the ship's life-saving appliances in severe weather and severe sea conditions; and
- (d) operation and use of fire-extinguishing appliances.

25.4.3 On-board training in the use of davit-launched life-rafts must take place at intervals of not more than 4 months on every ship fitted with such appliances. Whenever practicable this must include the inflation and lowering of a life-raft. This life-raft may be a special life-raft intended for training purposes only, which is not part of the ship's life-saving equipment; such a special life-raft must be conspicuously marked.

25.5 Records

The date when musters are held, details of abandon ship drills and fire drills, drills of other life-saving appliances and on board training must be recorded in the official log-book of the ship. If a full muster, drill or training session is not held at the appointed time, an entry must be made in the log-book stating the circumstances and the extent of the muster, drill or training session held.

26 Operational readiness, maintenance and inspections (SOLAS III-20)

26.1 Operational readiness

Before the ship leaves port, and at all times during the voyage, all appliances must be in working order and ready for immediate use.

26.2 Maintenance

There must be carried on a ship:

- (a) instructions for on-board maintenance of appliances, complying with 42; or
- (b) a shipboard planned maintenance programme which includes the requirements of 42,

and maintenance must be carried out accordingly.

26.3 Maintenance of falls

26.3.1 Subject to 26.3.2, falls used in launching must be turned end for end at intervals of not more than 30 months and be renewed:

- (a) when necessary due to deterioration of the falls; or
- (b) at intervals of not more than 5 years,

whichever is the earlier.

26.3.2 Falls made of material that does not corrode must be turned end for end and be renewed at intervals determined by the Chief Marine Surveyor.

26.4 Spares and repair equipment

Spares and repair equipment must be provided for life-saving appliances and their components which are subject to excessive wear or consumption and need to be replaced regularly.

26.5 Weekly inspection

The following tests and inspections must be carried out weekly:

- (a) all survival craft, rescue boats and launching appliances must be visually inspected to ensure that they are ready for use;
- (b) every lifeboat and rescue boat engine must be run for a total period of not less than 3 minutes provided the ambient temperature is above the minimum temperature required for starting and running the engine. During this period of time, it should be demonstrated that the gear box and gear box train are engaging satisfactorily. If the special characteristics of an outboard motor fitted to a rescue boat would not allow it to be run, other than with its propeller submerged, for a period of 3 minutes, it should be run for such period as prescribed in the manufacturer's handbook. In special cases the Chief Marine Surveyor may waive this requirement for ships constructed before 1 July 1986;
- (c) the general emergency alarm system must be tested.

26.6 Monthly inspections

Inspection of appliances, including lifeboat equipment, must be carried out monthly using the checklist specified in 42 to ensure that they are complete and in good order. A report of the inspection must be entered in the official log-book.

26.7 Servicing of inflatable life-rafts, inflatable life-jackets, marine evacuation systems and inflated rescue boats

26.7.1 Every inflatable life-raft, inflatable life-jacket and marine evacuation system must be serviced:

- (a) at intervals not exceeding 12 months or, if the Chief Marine Surveyor considers this impracticable, at longer periods not exceeding 17 months; and
- (b) at an approved servicing station which is competent to service them, maintains proper servicing facilities and uses only properly trained personnel.

26.7.2 In addition to or in conjunction with the servicing intervals of marine evacuation systems required by 26.7.1, each marine evacuation system should be

deployed from the ship on a rotational basis at intervals to be agreed by the Chief Marine Surveyor, provided that each system is to be deployed at least once every six years.

26.7.3 If the Chief Marine Surveyor approves new and novel inflatable life-raft arrangements, that officer may allow for extended service intervals on the following conditions:

- (a) the new and novel life-raft arrangement has proved to maintain the same standard, as required by testing procedure, during extended service intervals;
- (b) the life-raft system must be checked on board by certified personnel according to 26.7.1(a);
- (c) service at intervals not exceeding 5 years must be carried out in accordance with IMO Resolution A.761(18): *Recommendation on Conditions for the Approval of Servicing Stations for Inflatable Life-rafts*, as amended by Resolution MSC.55(66).

26.7.4 All repairs and maintenance of inflated rescue boats must be carried out in accordance with the manufacturer's instructions. Emergency repairs may be carried out on board the ship; however, permanent repairs must be effected at an approved servicing station.

26.8 Periodic servicing of hydrostatic release units

26.8.1 Subject to 26.8.2, a hydrostatic release unit must be serviced:

- (a) at intervals not exceeding 12 months or, if the Chief Marine Surveyor considers it proper and reasonable, at longer periods not exceeding 17 months; and
- (b) at a servicing station which is competent to service it, maintains proper servicing facilities and uses only properly trained personnel.

26.8.2 A hydrostatic release unit designed to be replaced in its entirety at the end of a specified life span must be replaced in accordance with the manufacturer's instructions.

26.9 Marking of stowage locations

Containers, brackets, racks, and other similar stowage locations for life-saving equipment must be marked with symbols in accordance with IMO Resolution A.760(18), as amended by Resolution MSC.82(70), indicating the devices stowed in that location for that purpose. If more than one device is stowed in that location, the number of devices must also be indicated.

26.10 Periodic servicing of launching appliances and on-load release gear

26.10.1 Launching appliances:

- (a) must be serviced at recommended intervals in accordance with instructions for on-board maintenance as required by 42;
- (b) must be subjected to a thorough examination at intervals not exceeding 5 years; and
- (c) must, upon completion of the examination in (b), be subjected to a dynamic test of the winch brake in accordance with 1.2.5(b) of Appendix 5.

26.10.2 Lifeboat on-load release gear must be:

- (a) serviced at recommended intervals in accordance with instructions for on board maintenance as required by 42;
- (b) subjected to a thorough examination and test during the surveys required by Marine Orders, Part 31, by properly trained personnel familiar with the system; and
- (c) operationally tested under a load of 1.1 times the total mass of the lifeboat when loaded with its full complement of persons and equipment whenever the release gear is overhauled. Such overhauling and test must be carried out at least once every 5 years.

Note: Attention is drawn to the Recommendation on Testing of Life-Saving Appliances, adopted by IMO as Resolution A.689(17). For life-saving appliances installed on or after 1 July 1999, refer to Revised Recommendations on testing of life-saving appliances, adopted by IMO as Resolution MSC.81(70).

26.11 Servicing of EPIRBs and radar transponders

Every 121.5/243 MHz, 406 MHz and 1.6 GHz EPIRB, and every radar transponder provided in accordance with this Part, must, at the intervals specified by the manufacturer, be inspected, tested and, if necessary, have its source of energy replaced. In the case of a 121.5/243 MHz EPIRB, the servicing interval must not exceed 12 months unless it is contained in an inflatable life-raft, in which case it must be serviced whenever the life-raft is serviced.

SECTION C

ADDITIONAL REQUIREMENTS FOR PASSENGER SHIPS

27 Survival craft and rescue boats

(SOLAS III-21)

27.1 Survival craft

27.1.1 A passenger ship, other than a passenger ship of less than 500 tons where the total number of persons on board is less than 200, must carry on each side:

- (a) partially or totally enclosed lifeboats of such aggregate capacity as will accommodate not less than 50 per cent of the total number of persons on board; or
- (b) a combination of lifeboats and life-rafts served by launching appliances equally distributed on each side of the ship, sufficient to accommodate not less than 50 per cent of the total number of persons on board, provided that there must never be fewer than a sufficient number of lifeboats on each side of the ship to accommodate 37.5 per cent of the total number of persons on board.

27.1.2 A passenger ship, other than a passenger ship of less than 500 tons where the total number of persons on board is less than 200, must carry, in addition to the requirements of 27.1.1, life-rafts of such aggregate capacity as will accommodate at least 25 per cent of the total number of persons on board. These life-rafts must be served by at least one launching appliance on each side which may be those provided in compliance with 27.1.1(b) or equivalent approved appliances capable of being used on both sides. Stowage of the additional life-rafts need not comply with 19.5.

27.1.3 A passenger ship of less than 500 tons, where the total number of persons on board is less than 200, must, if it does not comply with 27.1.1 and 27.1.2, comply with the following:

- (a) it must carry on each side life-rafts of such aggregate capacity as will accommodate the total number of persons on board;
- (b) unless the life-rafts required by (a) can be readily transferred for launching on either side of the ship, additional life-rafts must be provided so that the total capacity available on each side will accommodate 150 per cent of the total number of persons on board;
- (c) if the rescue boat required by 27.2.2 is also a lifeboat, it may be included in the aggregate capacity required by (a), provided that the total capacity available on either side of the ship is at least 150 per cent of the total number of persons on board;

(d) in the event of any one survival craft being lost or rendered unserviceable, there must be a sufficient number of survival craft available for use on each side to accommodate the total number of persons on board.

27.1.4 All survival craft required to provide for abandonment by the total number of persons on board must be capable of being launched with their full complement of persons and equipment within a period of 30 minutes from the time the abandon ship signal is given.

27.1.5 A marine evacuation system or systems may be substituted for the equivalent capacity of life-rafts and launching appliances required by 27.1.1.

27.2 Rescue boats

27.2.1 Passenger ships of 500 tons and over must carry at least one rescue boat on each side of the ship.

27.2.2 Passenger ships of less than 500 tons must carry at least one rescue boat.

27.2.3 A lifeboat that complies with the requirements for a rescue boat is acceptable as a rescue boat.

27.2.4 If an Australian registered ship is provided with a free-fall lifeboat and the owner wishes the boat to be considered also as a rescue boat, it must be demonstrated to the satisfaction of the Chief Marine Surveyor that the boat can be safely recovered at sea in moderately rough weather by the normal davit arrangements of the boat in accordance with 23.

27.3 Marshalling of life-rafts

The number of lifeboats and rescue boats carried on passenger ships must be sufficient to ensure that in providing for abandonment by the total number of persons on board not more than six life-rafts need be marshalled by each lifeboat or rescue boat.

Note: *The Chief Marine Surveyor may allow on passenger ships not engaged on international voyages up to nine life-rafts to be marshalled by each lifeboat or rescue boat.*

28 Personal life-saving appliances

(SOLAS III-22)

28.1 Lifebuoys

28.1.1 A passenger ship must carry no fewer than the number of lifebuoys specified in Table 2.

Table 2

<i>Length of ship in metres</i>	<i>Minimum number of lifebuoys</i>
Under 60 metres	8
Under 120 metres but not under 60 metres	12
Under 180 metres but not under 120 metres	18
Under 240 metres but not under 180 metres	24
Not under 240 metres	30

28.1.2 A passenger ship under 60 metres in length must carry no fewer than 6 lifebuoys provided with self-igniting lights.

28.2 Life-jackets

28.2.1 In addition to the life-jackets required by 13.2, a passenger ship must carry:

- (a) a further 5 per cent of the number of each type of life-jacket required by 13.2, stowed in conspicuous places on deck or at muster stations; and
- (b) a sufficient number of life-jackets stowed in working spaces for the use of crew members who may be required to remain on duty in those spaces.

28.2.2 Where lifejackets for passengers are stowed in staterooms which are located remotely from direct routes between public spaces and muster stations, the additional lifejackets for these passengers required under 13.2.2 must be stowed either in the public spaces, the muster stations, or on direct routes between them. The lifejackets must be stowed so that their distribution and donning does not impede orderly movement to muster stations and survival craft embarkation stations.

28.3 Lifejacket lights

28.3.1 On all passenger ships, each lifejacket must be fitted with a lifejacket light.

28.3.2 Lights fitted on lifejackets on board passenger ships prior to 1 July 1998 and not complying fully with 2.3 of Appendix 1 may be accepted by the Chief Marine

Surveyor until the lifejacket light would normally be replaced or until the first periodical survey after 1 July 2002, whichever is the earlier.

28.4 Immersion suits and thermal protective aids

28.4.1 A passenger ship must carry for each lifeboat on the ship at least 3 immersion suits and, in addition, a thermal protective aid for every person to be accommodated in the lifeboat and not provided with an immersion suit.

28.4.2 Provision 28.4.1 does not apply:

- (a) for persons to be accommodated in totally or partially enclosed lifeboats; or
- (b) where the ship is continuously engaged on voyages between latitudes 35°S and 35°N.

29 Survival craft and rescue boat embarkation arrangements

(SOLAS III-23)

29.1 On a passenger ship, survival craft embarkation arrangements must be designed for:

- (a) lifeboats to be boarded and launched either directly from the stowed position or from an embarkation deck, but not both; and
- (b) davit-launched life-rafts to be boarded and launched from a position immediately adjacent to the stowed position or from a position to which, in compliance with the requirements of 19.5, the life-raft is transferred prior to launching.

29.2 Rescue boat arrangements must be such that the rescue boat can be boarded and launched directly from the stowed position with the number of persons assigned to crew the rescue boat on board. If the rescue boat is also a lifeboat and the other lifeboats are boarded and launched from an embarkation deck, the arrangements must be such that the rescue boat can also be boarded and launched from the embarkation deck.

30 Stowage of survival craft

(SOLAS III-24)

The stowage height of a survival craft on a passenger ship must take into account the requirements of 19.1(b), the escape provisions of Marine Orders, Part 15, the size of the ship, and the weather conditions likely to be encountered in its intended area of operation. For a davit-launched survival craft, the height of the davit head with the

survival craft in embarkation position, must, as far as practicable, not exceed 15 m to the waterline when the ship is in its lightest seagoing condition.

31 Muster stations

(SOLAS III-25)

A passenger ship must, in addition to complying with the requirements of 17, have passenger muster stations which must:

- (a) be in the vicinity of, and permit ready access for the passengers to, the embarkation stations unless in the same location; and
- (b) have ample room for marshalling and instruction of the passengers, which must be at least 0.35 m² per passenger.

32 Additional requirements for ro-ro passenger ships

(SOLAS III-26)

32.1 Application

Provision 32 applies to ro-ro passenger ships as follows:

- (a) those constructed on or after 1 July 1998 are to comply with 32.2.3, 32.2.4, 32.3.1, 32.3.2, 32.3.3, 32.4 and 32.5;
- (b) those constructed on or after 1 July 1986 and before 1 July 1998 are to comply with 32.5 not later than the first periodical survey after 1 July 1998 and with 32.2.3, 32.2.4, 32.3 and 32.4 not later than the first periodical survey after 1 July 2000;
- (c) those constructed before 1 July 1986 are to comply with 32.5 not later than the first periodical survey after 1 July 1998 and with 32.2.1, 32.2.2, 32.2.3, 32.2.4, 32.3 and 32.4 not later than the first periodical survey after 1 July 2000;
- (d) those constructed before 1 July 2004 are to comply with 32.2.5 not later than the first survey on or after 1 July 2004.

32.2 Life-rafts

32.2.1 A ro-ro passenger ship's life-rafts must be served by marine evacuation systems or launching appliances, equally distributed on each side of the ship.

32.2.2 Every life-raft on ro-ro passenger ships must be provided with float-free stowage arrangements complying with 19.4.

32.2.3 Every life-raft on ro-ro passenger ships must be of a type fitted with a boarding ramp complying with 2.4.1 or 3.4.1 of Appendix 3, as appropriate.

32.2.4 Every life-raft on ro-ro passenger ships must either be automatically self-righting or be a canopied reversible life-raft which is stable in a seaway and is capable of operating safely whichever way up it is floating. Alternatively, the ship is to carry automatically self-righting life-rafts or canopied reversible life-rafts, in addition to its normal complement of life-rafts, of such aggregate capacity as will accommodate at least 50% of the persons not accommodated in lifeboats. This additional life-raft capacity is to be determined on the basis of the difference between the total number of persons on board and the number of persons accommodated in lifeboats. Every such life-raft must be approved by the Chief Marine Surveyor.

32.2.5 Liferafts carried on ro-ro passenger ships must be fitted with a radar transponder in the ratio of one transponder for every four liferafts. The transponder must be mounted inside the liferaft so its antenna is more than one metre above the sea level when the liferaft is deployed, except that for canopied reversible liferafts the transponder must be so arranged as to be readily accessed and erected by survivors. Each transponder must be arranged to be manually erected when the liferaft is deployed. Containers of liferafts fitted with transponders must be clearly marked.

Note: Refer to performance standards for survival craft radar transponders for use in search and rescue operations, adopted by IMO in Resolution A.802(19).

32.3 Fast rescue boats

32.3.1 At least one of the rescue boats on a ro-ro passenger ship must be a fast rescue boat approved by the Chief Marine Surveyor.

32.3.2 Each fast rescue boat must be served by a suitable launching appliance approved by the Chief Marine Surveyor.

32.3.3 At least two crews of each fast rescue boat must be trained and drilled regularly in all aspects of rescue, including handling, manoeuvring, operating these craft in various conditions, and righting them after capsizing.

Note: Attention is drawn to the Seafarers Training, Certification and Watchkeeping (STCW) Code and IMO Resolution A.771(18): Recommendation on Training Requirements for Crews of Fast Rescue Boats.

32.3.4 If the arrangement or size of a ro-ro passenger ship constructed before 1 July 1997 is such as to prevent the installation of the fast rescue boat required by 32.3.1, the fast rescue boat may be installed in place of an existing lifeboat which is accepted as a rescue boat or, in the case of ships constructed prior to 1 July 1986, boats for use in an emergency, provided that all of the following conditions are met:

- (a) the fast rescue boat installed is served by a launching appliance complying with 32.3.2;
- (b) the capacity of the survival craft lost by the above substitution is compensated by the installation of life-rafts capable of carrying at least an equal number of persons served by the lifeboat replaced; and
- (c) such life-rafts are served by the existing launching appliances or marine evacuation systems.

[Continued on Page 37]

32.4 Means of rescue

32.4.1 Each ro-ro passenger ship must be equipped with efficient means for rapidly recovering survivors from the water and transferring survivors from rescue units or survival craft to the ship.

32.4.2 The means of transfer of survivors to the ship may be part of a marine evacuation system, or may be part of a system designed for rescue purposes.

32.4.3 If the slide of a marine evacuation system is intended to provide the means of transfer of survivors to the deck of the ship, the slide must be equipped with handlines or ladders to aid in climbing up the slide.

32.5 Lifejackets

32.5.1 Notwithstanding 13.2 and 28.2, a sufficient number of lifejackets must be stowed in the vicinity of the muster stations so that passengers do not have to return to their cabins to collect their lifejackets.

32.5.2 In ro-ro passenger ships, each lifejacket must be fitted with a lifejacket light.

33 Information on passengers

(SOLAS III-27)

33.1 All persons on board all passenger ships must be counted prior to departure.

33.2 Details of persons who have declared a need for special care or assistance in emergency situations must be recorded and communicated to the master prior to departure.

33.3 In addition, commencing not later than 1 January 1999, the names and gender of all persons on board, distinguishing between adults, children and infants must be recorded for search and rescue purposes.

33.4 The information required by 33.1, 33.2 and 33.3 must be kept ashore and made readily available to search and rescue services when needed.

33.5 The Chief Marine Surveyor may exempt a passenger ship from the requirements of 33.3, if the scheduled voyages of such ship render it impracticable for it to prepare such records.

34 Helicopter landing and pick-up areas

(SOLAS III-28)

34.1 All ro-ro passenger ships must be provided with a helicopter pick-up area approved by the Chief Marine Surveyor.

34.2 Ro-ro passenger ships of 130 metres in length and upwards, constructed on or after 1 July 1999, must be fitted with a helicopter landing area approved by the Chief Marine Surveyor.

35 Decision support system for masters of passenger ships

(SOLAS III-29)

35.1 In all passenger ships, a decision support system for emergency management must be provided on the navigation bridge.

35.2 The system must, as a minimum, consist of a printed emergency plan or plans. All foreseeable emergency situations must be identified in the emergency plan or plans, including, but not limited to, the following main groups of emergencies:

- (a) fire;
- (b) damage to ship;
- (c) pollution;
- (d) unlawful acts threatening the safety of the ship and the security of its passengers and crew;
- (e) personnel accidents;
- (f) cargo-related accidents; and
- (g) emergency assistance to other ships.

35.3 The emergency procedures established in the emergency plan or plans must provide decision support to masters for handling any combination of emergency situations.

35.4 The emergency plan or plans must have a uniform structure and be easy to use. Where applicable, the actual loading condition as calculated for the passenger ship's voyage stability is to be used for damage control purposes.

35.5 In addition to the printed emergency plan or plans, the Chief Marine Surveyor may also accept the use of a computer-based decision support system on the navigation bridge which provides all the information contained in the emergency plan

or plans, procedures, checklists, etc., which is able to present a list of recommended actions to be carried out in foreseeable emergencies.

Note 1: A passenger ship constructed before 1 July 1997 need not be in compliance with 35 until the date of its first periodical survey after 1 July 1999.

Note 2: In preparing the plan or plans, reference should be made to IMO Resolution A.852(20): Guidelines for a structure of an integrated system of contingency planning for shipboard emergencies.

36 Drills

(SOLAS III-30)

On passenger ships, an abandon ship drill and fire drill must take place weekly. The entire crew need not be involved in every drill, but each crew member must participate in an abandon ship drill and a fire drill each month as required in 25.3.2. Passengers are to be strongly encouraged to attend these drills.

SECTION D ADDITIONAL REQUIREMENTS FOR CARGO SHIPS OF 500 TONS AND UPWARDS

37 Survival craft and rescue boats

(SOLAS III-31)

37.1 Survival craft

37.1.1 Subject to 37.1.2, a cargo ship must carry either the survival craft specified in (a) and (b) or the survival craft specified in (c) and (d):

- (a) on each side, one or more lifeboats complying with 6 of Appendix 3 of such aggregate capacity as will accommodate the total number of persons on board;
- (b) a life-raft or life-rafts capable of being launched on either side of the ship and of such aggregate capacity as will accommodate the total number of persons on board. If the life-raft or life-rafts cannot be readily transferred for launching on either side of the ship, the total capacity available on each side must be sufficient to accommodate the total number of persons on board;
- (c) one or more lifeboats capable of being free fall launched over the stern of the ship of such aggregate capacity as will accommodate the total number of persons on board;

- (d) on each side of the ship, one or more life-rafts of such aggregate capacity as will accommodate the total number of persons on board. The life-rafts on at least one side of the ship must be served by launching appliances.

37.1.2 A cargo ship of less than 85 metres in length, other than an oil tanker, a chemical tanker or a gas carrier, may, instead of carrying the survival craft specified in 37.1.1, carry survival craft as follows:

- (a) on each side of the ship, one or more life-rafts of such aggregate capacity as will accommodate the total number of persons on board;
- (b) unless the life-rafts specified in (a) can be readily transferred for launching on either side of the ship, additional life-rafts must be provided so that the total capacity available on each side will accommodate 150 per cent of the total number of persons on board;
- (c) if the rescue boat required by 37.2 is also a totally enclosed lifeboat, it may be included in the aggregate capacity required by (a), provided that the total capacity available on either side of the ship is at least 150 per cent of the total number of persons on board;
- (d) in the event of any one survival craft being lost or rendered unserviceable, there must be sufficient survival craft available for use on each side to accommodate the total number of persons on board.

37.1.3 A cargo ship where the survival craft are stowed in a position which is more than 100 metres from the stem or stern must carry, in addition to the life-rafts specified in 37.1.1(b) or (d), a life-raft stowed as far forward or aft, or one as far forward and another as far aft, as is reasonable and practicable. Notwithstanding 40, such life-raft or life-rafts may be securely fastened so as to permit manual release and need not be of the type which can be launched from an approved launching device.

37.1.4 With the exception of the survival craft referred to in 22.1(a), survival craft required to provide for abandonment by the total number of persons on board must be capable of being launched with their full complement of persons and equipment within a period of 10 minutes from the time the abandon ship signal is given.

37.1.5 Lifeboats on a chemical tanker or a gas carrier certified to carry cargoes emitting toxic vapours or gases must comply with 8 of Appendix 3.

37.1.6 Lifeboats on an oil tanker, a chemical tanker or a gas carrier certified to carry cargoes having a flash-point not exceeding 60°C (closed cup test) must comply with 9 of Appendix 3.

37.2 Rescue boats

37.2.1 A cargo ship must carry at least one rescue boat.

37.2.2 A lifeboat that complies with the requirements for a rescue boat is acceptable as a rescue boat.

38 Personal life-saving appliances*(SOLAS III-32)***38.1 Lifebuoys**

38.1.1 A cargo ship must carry no fewer than the number of lifebuoys specified in Table 3.

Table 3

<i>Length of ship in metres</i>	<i>Minimum number of lifebuoys</i>
Under 100 metres	8
Under 150 metres but not under 100 metres	10
Under 200 metres but not under 150 metres	12
Not under 200 metres	14

38.1.2 Self-igniting lights for lifebuoys on tankers must be of an electric battery type.

38.2 Life-jackets

In addition to the life-jackets required by 13.2, another life-jacket must be provided for each person that the ship is certified to carry, such life-jackets being located:

- (a) in working spaces, including the bridge, engine room and forecastle, a sufficient number for the use of crew members who may be required to remain on duty in those spaces in an emergency; and
- (b) as to the remainder, if any, in a float-free locker or lockers installed in a suitable location.

38.3 Immersion suits and thermal protective aids

38.3.1 A cargo ship exclusively engaged on voyages between 60°N and 45°S or, for longitudes between 165°E and 172°E, between 60°N and 47°S, must carry at least 3 immersion suits for each lifeboat, and one thermal protective aid for every person for whom an immersion suit is not provided.

38.3.2 A cargo ship engaged on a voyage outside the limits referred to in 38.3.1 must carry one immersion suit for each person on board.

38.3.3 Provisions 38.3.1 and 38.3.2 do not apply if the ship:

- (a) has totally enclosed lifeboats on each side of the ship of such aggregate capacity as will accommodate the total number of persons on board; or
- (b) has totally enclosed lifeboats capable of being launched by free-fall over the stern of the ship of such aggregate capacity as will accommodate the total number of persons on board and which are boarded and launched directly from the stowed position, together with life-rafts on each side of the ship of such aggregate capacity as will accommodate the total number of persons on board; or
- (c) is exclusively engaged on voyages between 35°S and 35°N.

38.3.4 In 38.3.3, **totally enclosed lifeboat** includes all totally enclosed lifeboats whether or not they comply with 6 of Appendix 3.

38.3.5 A cargo ship complying with 37.1.2 must carry immersion suits for every person on board unless the ship:

- (a) has davit-launched life-rafts; or
- (b) has life-rafts served by equivalent approved appliances capable of being used on both sides of the ship and which do not require entry into the water to board the life-raft; or
- (c) is exclusively engaged on voyages between 35°S and 35°N.

38.3.6 The immersion suits required by 38.3 may be used to comply with 13.3.

39 Survival craft embarkation and launching arrangements (*SOLAS III-33*)

39.1 Cargo ship survival craft embarkation arrangements must be so designed that lifeboats can be boarded and launched directly from the stowed position and davit-launched life-rafts can be boarded and launched from a position immediately adjacent to the stowed position or from a position to which the life-raft is transferred prior to launching in compliance with 19.5.

39.2 On a cargo ship of 20,000 tons or more, lifeboats must be capable of being launched, if necessary utilising painters, with the ship making headway at speeds up to 5 knots in calm water.

SECTION E LIFE-SAVING APPLIANCES AND ARRANGEMENTS REQUIREMENTS

40 Compliance with LSA Code

(SOLAS III-34)

40.1 Subject to 40.2, all life-saving appliances and arrangements must comply with the applicable requirements of the LSA Code.

40.2 Where a requirement specified in an appendix to this Part differs from, or is additional to, a requirement in the LSA Code, the former must be complied with.

SECTION F MISCELLANEOUS

41 Training manual and on-board training aids

(SOLAS III-35)

41.1 A training manual complying with 41.2 must be provided in each crew mess room and recreation room or in each crew cabin.

41.2 The training manual, which may comprise several volumes, must contain instructions and information, in easily understood terms, illustrated wherever possible, on the life-saving appliances provided in the ship and on the best methods of survival. Any part of such information may be provided in the form of audio-visual aids in lieu of the manual. The following must be explained in detail:

- (a) donning of lifejackets, immersion suits and anti-exposure suits, as appropriate;
- (b) muster at the assigned stations;
- (c) boarding, launching, and clearing the survival craft and rescue boats, including, where applicable, use of marine evacuation systems;
- (d) method of launching from within the survival craft;
- (e) release from launching appliances;
- (f) methods and use of devices for protection in launching areas, where appropriate;
- (g) illumination in launching areas;
- (h) use of all survival equipment;
- (i) use of all detection equipment;

- (j) with the assistance of illustrations, the use of radio life-saving appliances;
- (k) use of drogues;
- (l) use of engine and accessories;
- (m) recovery of survival craft and rescue boats including stowage and securing;
- (n) hazards of exposure and the need for warm clothing;
- (o) best use of the survival craft facilities in order to survive;
- (p) methods of retrieval, including the use of helicopter rescue gear (slings, baskets, stretchers), breeches-buoy and shore life-saving apparatus and ship's line-throwing apparatus;
- (q) all other functions contained in the muster list and emergency instructions; and
- (r) instructions for emergency repair of the life-saving appliances.

41.3 Every ship fitted with a marine evacuation system must be provided with on-board training aids in the use of the system.

42 Instructions for on-board maintenance

(SOLAS III-36)

Instructions for on-board maintenance of life-saving appliances must be easily understood, illustrated wherever possible, and, as appropriate, must include the following for each appliance:

- (a) a checklist for use when carrying out the inspections required by 26.6;
- (b) maintenance and repair instructions;
- (c) schedule of periodic maintenance;
- (d) diagram of lubrication points with the recommended lubricants;
- (e) list of replaceable parts;
- (f) list of sources of spare parts; and
- (g) log for records of inspections and maintenance.

43 Muster list and emergency instructions

(SOLAS III-37)

43.1 The muster list must specify details of the general emergency alarm and public address system specified in 2 of Appendix 6 and Marine Orders, Part 21 and also

action to be taken by crew and passengers when this alarm is sounded. The muster list must also specify how the order to abandon ship will be given.

43.2 Each passenger ship must have procedures in place for locating and rescuing passengers trapped in their staterooms.

43.3 The muster list must show the duties assigned to the different members of the crew including:

- (a) closing of the watertight doors, fire doors, valves, scuppers, sidescuttles, skylights, portholes and other similar openings in the ship;
- (b) equipping of the survival craft and other life-saving appliances;
- (c) preparation and launching of survival craft;
- (d) general preparations of other life-saving appliances;
- (e) muster of passengers;
- (f) use of communication equipment;
- (g) manning of fire parties assigned to deal with fires; and
- (h) special duties assigned in respect to the use of fire-fighting equipment and installations.

43.4 The muster list must specify which officers are assigned to ensure that life-saving and fire appliances are maintained in good condition and are ready for immediate use.

43.5 The muster list must specify substitutes for key persons who may become disabled, taking into account that different emergencies may call for different actions.

43.6 The muster list must show the duties assigned to members of the crew in relation to passengers in case of emergency. These duties are to include:

- (a) warning the passengers;
- (b) seeing that they are suitably clad and have donned their lifejackets correctly;
- (c) assembling passengers at muster stations;
- (d) keeping order in the passageways and on the stairways and generally controlling the movements of the passengers; and
- (e) ensuring that a supply of blankets is taken to the survival craft.

43.7 The muster list must be prepared before the ship proceeds to sea. After the muster list has been prepared, if any change takes place in the crew which necessitates

an alteration in the muster list, the master must either revise the list or prepare a new list.

43.8 The format of the muster list used on passenger ships must be approved by the Chief Marine Surveyor.

SECTION G

LIFE-SAVING APPLIANCES ON CARGO SHIPS UNDER 500 TONS

44 Lifeboats, life-rafts and rescue boats

44.1 A ship 85 metres or over in length must be provided with:

- (a) on each side of the ship, a lifeboat or lifeboats complying with 6 of Appendix 3, having an aggregate capacity sufficient to accommodate the number of persons that the ship is certified to carry; and
- (b) life-rafts having an aggregate capacity sufficient to accommodate half the number of persons that the ship is certified to carry.

44.2 A ship 35 metres or over in length, but less than 85 metres in length, must be provided with:

- (a) the lifeboats and life-rafts specified in 44.1; or
- (b) (i) a lifeboat having a capacity sufficient to accommodate the number of persons that the ship is certified to carry and which is capable of being launched from either side of the vessel; and
 - (ii) life-rafts having an aggregate capacity sufficient to accommodate half the number of persons that the ship is certified to carry; or
- (c) (i) unless the ship is an oil tanker, a chemical tanker or a gas carrier, life-rafts having an aggregate capacity sufficient to accommodate double the number of persons that the ship is certified to carry, no single life-raft being counted towards the aggregate capacity for more than the number of persons that the ship is certified to carry; and
 - (ii) a rescue boat.

44.3 A ship 25 metres or over in length, but less than 35 metres in length, must be provided with:

- (a) the appliances specified in 44.2; or
- (b) (i) life-rafts having an aggregate capacity sufficient to accommodate the number of persons that the ship is certified to carry; and

- (ii) a rescue boat; or
- (c) life-rafts having an aggregate capacity sufficient to accommodate double the number of persons that the ship is certified to carry, no single life-raft being counted towards the aggregate capacity for more than the number of persons that the ship is certified to carry.

44.4 A ship less than 25 metres length must be provided with life-rafts having an aggregate capacity sufficient to accommodate the number of persons that the ship is certified to carry.

44.5 Lifeboats on a chemical tanker or a gas carrier certified to carry cargoes emitting toxic vapours or gases must comply with 8 of Appendix 3.

44.6 Lifeboats on an oil tanker, a chemical tanker or a gas carrier certified to carry cargoes having a flash-point not exceeding 60°C (closed cup test) must comply with 9 of Appendix 3.

45 Lifebuoys

45.1 A ship 60 metres or over in length must be provided with at least 8 lifebuoys, of which 50 per cent must be fitted with self-igniting lights. Two of the lifebuoys with self-igniting lights must also be provided with self activating smoke signals. Of the lifebuoys without self-igniting lights, 2 must be provided with buoyant lines.

45.2 A ship 45 metres or over in length, but less than 60 metres in length, must be provided with at least 6 lifebuoys, of which 50 per cent must be fitted with self-igniting lights. Two of the lifebuoys with self-igniting lights must also be provided with self activating smoke signals. Of the lifebuoys without self-igniting lights, 2 must be provided with buoyant lines.

45.3 A ship 25 metres or over in length, but less than 45 metres in length, must be provided with at least 4 lifebuoys, of which 2 must be fitted with self-igniting lights and 2 with buoyant lines.

45.4 A ship 15 metres or over in length, but less than 25 metres in length, must be provided with at least 2 lifebuoys, of which one must be fitted with self-igniting lights and one with buoyant lines.

45.5 A ship less than 15 metres in length must be provided with at least one lifebuoy and fitted with a self-igniting light.

46 Life-jackets

46.1 There must be provided on a ship a life-jacket for each person that a ship is certified to carry, including a suitable life-jacket for each person aboard the ship who weighs less than 32 kilograms.

46.2 In addition to the life-jackets required by 46.1, a ship must carry a sufficient number of life-jackets stowed in working spaces for the use of crew members who may be required to remain on duty in those spaces.

47 Line-throwing appliances

A line-throwing appliance must be carried in a ship of 45 metres or more in length.

48 Distress signals

48.1 A ship of 25 metres or more in length must carry no fewer than 12 rocket parachute flares.

48.2 A ship that is less than 25 metres in length must carry either the signals specified in 48.1 or the following distress signals:

- (a) 6 rocket parachute flares;
- (b) 4 hand flares; and
- (c) 2 buoyant smoke signals.

49 Electric alarm signal

A ship of 25 metres or more in length must be provided with an alarm signal for summoning the crew to muster stations if efficient mustering cannot be carried out by voice.

50 Emergency electrical installation

50.1 A ship of 50 metres or more in length must be provided with a self-contained electrical installation, in addition to the main generating set, capable of simultaneously operating emergency lighting, alarm signals, navigation lights and communication equipment.

50.2 The installation referred to in 50.1 must be capable of continuous operation for:

- (a) 6 hours, in the case of ships of 125 metres or over in length; or
- (b) 3 hours, in the case of ships under 125 metres in length.

50.3 A ship under 50 metres in length must be provided with:

- (a) an electric torch or hand lamp for each crew member;
- (b) an emergency installation capable of operating navigation lights (if they are solely electric) for 3 hours; and

- (c) an emergency installation capable of operating signalling lamps (if they are normally operated from the main electrical power source) and communication equipment for 3 hours.

Note: The emergency installations referred to in (b) and (c) may be the normal starting batteries if they are suitably placed in the ship.

50.4 A ship must be provided with:

- (a) a copy of the life-saving signals referred to in the 'Table of Life-saving Signals' in Appendix 3 of the *International Code of Signals* on a waterproof card or in a waterproof container; and
- (b) one copy for each crew member of the Survival at Sea Instruction Manual, published by the Authority.

51 Stowing and launching arrangements

Arrangements for stowing and launching of lifeboats and life-rafts and embarkation from a ship into lifeboats and life-rafts must comply with 17 to 23, 25 and 26.

52 Communications

52.1 At least two approved two-way VHF radiotelephone apparatus must be provided on every cargo ship.

52.2 At least one approved radar transponder must be carried on every cargo ship.

Note: If a ship is less than 300 tons, or between 300 and 500 tons and not on an international voyage, the Chief Marine Surveyor may allow the requirements in 52 to be reduced.

53 Limited operations

The equipment requirements for a ship certificated in accordance with the Uniform Shipping Laws Code as Class 2B, 2C, 2D, 2E, 3B, 3C, 3D or 3E are as specified in Section 10 of that Code.

* * * * *

Appendix 1

Personal life-saving appliances

1 Lifebuoys

(LSA Code, §2.1)

1.1 Lifebuoy specification

A lifebuoy must:

- (a) have an outer diameter of not more than 800 millimetres and an inner diameter of not less than 400 millimetres;
- (b) be constructed of inherently buoyant material; it must not depend upon rushes, cork shavings or granulated cork, any other loose granulated material or any air compartment which depends on inflation for buoyancy;
- (c) be capable of supporting not less than 14.5 kilograms of iron in fresh water for a period of 24 hours;
- (d) have a mass of not less than 2.5 kilograms;
- (e) not sustain burning or continue melting after being totally enveloped in a fire for a period of 2 seconds;
- (f) be constructed to withstand a drop into the water from the height at which it is stowed above the water-line in the lightest seagoing condition or 30 metres, whichever is the greater, without impairing either its operating capability or that of its attached components;
- (g) if it is intended to operate the quick-release arrangement provided for the self-activated smoke signals and self-igniting lights, have a mass sufficient to operate the quick-release arrangement;
- (h) be fitted with a grabline not less than 9.5 millimetres in diameter and not less than 4 times the outside diameter of the body of the buoy in length. The grabline must be secured at four equidistant points around the circumference of the buoy to form four equal loops;
- (i) be marked in block capitals of the Roman alphabet with the name and port of registry of the ship on which it is carried; and
- (j) be fitted with retro-reflective tape, not less than 50 millimetres wide, around or on both sides of the lifebuoy at 4 equidistant points.

Note: Illustrations depicting the fitting of retro-reflective tape on lifebuoys are shown in 3 of Appendix 9.

1.2 Lifebuoy self-igniting lights

A self-igniting light must:

- (a) be such that it cannot be extinguished by water;
- (b) be of white colour and capable of either burning continuously with a luminous intensity of not less than 2 candela in all directions of the upper hemisphere or flashing (discharge flashing) at a rate of not less than 50 and not more than 70 flashes per minute with at least the corresponding effective luminous intensity;
- (c) be provided with a source of energy capable of meeting the requirement of (b) for a period of at least 2 hours;
- (d) be capable of withstanding the drop test required by 1.1(f).

1.3 Lifebuoy self-activating smoke signals

A self-activating smoke signal must:

- (a) emit smoke of a highly visible colour at a uniform rate for a period of at least 15 minutes when floating in calm water;
- (b) not ignite explosively or emit any flame during the entire smoke emission time of the signal;
- (c) not be swamped in a seaway;
- (d) continue to emit smoke when fully submerged in water for a period of at least 10 seconds;
- (e) be capable of withstanding the drop test required by 1.1(f).

1.4 Buoyant lifelines

A buoyant lifeline must:

- (a) be non-kinking;
- (b) have a diameter of not less than 8 millimetres;
- (c) have a breaking strength of not less than 5 kN.

2 Life-jackets (LSA Code, §2.2)

2.1 General requirements

2.1.1 A life-jacket must not sustain burning or continue melting after being totally enveloped in a fire for a period of 2 seconds.

2.1.2 A life-jacket for an adult must be so constructed that:

- (a) at least 75% of persons, who are completely unfamiliar with the lifejacket, can correctly don it within a period of one minute without assistance, guidance or prior demonstration;
- (b) after demonstration, all persons can correctly don it within a period of one minute without assistance;
- (c) it is clearly capable of being worn in only one way or, as far as possible, cannot be donned incorrectly;
- (d) it is comfortable to wear; and
- (e) it allows the wearer to jump from a height of at least 4.5 metres into the water without injury and without dislodging or damaging the life-jacket.

2.1.3 A life-jacket for an adult must have sufficient buoyancy and stability in calm fresh water to:

- (a) lift the mouth of an exhausted or unconscious person not less than 120 millimetres clear of the water with the body inclined backwards at an angle of not less than 20° and not more than 50° from the vertical position; and
- (b) turn the body of an unconscious person in the water from any position to one where the mouth is clear of the water in not more than 5 seconds.

2.1.4 A life-jacket for an adult must allow the person wearing it to swim a short distance and to board a survival craft.

2.1.5 A lifejacket for a child must be constructed and perform the same as a lifejacket for an adult except as follows:

- (a) donning assistance is permitted for small children;
- (b) it is only required to lift the mouth of an exhausted or unconscious wearer clear of the water a distance appropriate to the size of the intended wearer; and

(c) assistance may be given to board a survival craft, but wearer mobility must not be significantly reduced.

2.1.6 In addition to the markings required by 5.3(i) of this Part, a lifejacket for a child must be marked (see 2.4(c)) with:

- (a) the height or weight range for which the lifejacket will meet the testing and evaluation criteria specified in IMO Resolution MSC.81(70): *Revised recommendation on testing of life-saving appliances*; and
- (b) a "child" symbol as shown in the "child's lifejacket" symbol specified in IMO Resolution A.760(18): *Symbols related to life-saving appliances and arrangements*, as amended by IMO Resolution MSC.82(70).

2.1.7 A life-jacket must have buoyancy which is not reduced by more than 5 per cent after 24 hours submersion in fresh water. The minimum buoyancy after 24 hours submersion is to be 156 newtons for a life-jacket for use by a person of 32 kg body mass or more, and 67 newtons for a life-jacket for use by a person of less than 32 kg body mass.

2.1.8 A life-jacket must be fitted with a life-jacket light which must be fitted with a means of attachment to the life-jacket.

2.1.9 A life-jacket must be fitted with a whistle firmly secured by a cord.

2.1.10 If the material with which a life-jacket is covered is not retro-reflective material, it must be fitted with at least 400 square centimetres of retro-reflective tape in accordance with 4 of Appendix 9, each tape being not less than 100 millimetres long and not less than 50 millimetres wide, placed as high up on the life-jacket as possible, in no fewer than 6 places on the outside and in no fewer than 6 places on the inside of the life-jacket.

2.1.11 The covering material and any dyed fastening tapes of a life-jacket must have:

- (a) **Fastness to Light** in accordance with AS 2001. 4.2. Minimum change of colour: 6;
- (b) **Fastness to sea water** in accordance with AS 2001. 4.14. Minimum change of colour: 4, (see AS 2001. 4.1); and
- (c) **Fastness to Washing** in accordance with AS 2001. 4.15. Minimum change of colour: 4, (see AS 2001. 4.1).

2.1.12 No more than 2 types of life-jacket requiring different methods of adjustment may be carried on any one ship.

2.1.13 If 2 different types of life-jacket are carried, appropriate illustrated directions for donning of the life-jackets must be placed near the stowage position for each life-jacket.

2.2 Inflatable life-jackets

A life-jacket that depends on inflation for buoyancy must have no fewer than 2 separate compartments, must comply with 2.1 and must:

- (a) inflate automatically on immersion, be provided with a device to permit inflation by a single manual motion and be capable of being inflated by mouth;
- (b) in the event of loss of buoyancy in any one compartment be capable of complying with 2.1.2, 2.1.3 and 2.1.4; and
- (c) comply with 2.1.7 after inflation by means of the automatic mechanism.

2.3 Life-jacket lights

2.3.1 A life-jacket light must:

- (a) have a luminous intensity of not less than 0.75 candela in all directions of the upper hemisphere;
- (b) have a source of energy capable of providing a luminous intensity of 0.75 candela for at least 8 hours;
- (c) be visible over as great a segment of the upper hemisphere as is practicable when attached to a life-jacket; and
- (d) be of white colour.

2.3.2 If the light referred to in 2.3.1 is a flashing light it must, in addition:

- (a) be provided with a manually operated switch;
- (b) not be fitted with a lens or curved reflector to concentrate the beam;
- (c) flash at a rate of not less than 50 and not more than 70 flashes per minute with an effective luminous intensity of at least 0.75 candela.

2.4 Marking

A life-jacket must be indelibly marked in characters 25 millimetres or more in height, and of proportional breadth, with:

- (a) the words 'AUS AMSA Approved' together with the month and year of manufacture, e.g. 1/95;

- (b) the manufacturer's name or logo or other approved marking which identifies the maker of the life-jacket; and
- (c) on both sides of a life-jacket which provides a minimum buoyancy, after testing in accordance with 2.5 of this Appendix:
 - (i) of 156 newtons or more—'FOR PERSONS OF BODY MASS OF 32 KG OR MORE';
 - (ii) of 67 newtons, but less than 156 newtons—'FOR PERSONS OF BODY MASS OF UNDER 32 KG'.

2.5 Method for determining buoyancy

2.5.1 Apparatus

The following apparatus is required:

- (a) a suitable spring balance accurate to 0.025 kilogram;
- (b) a wire mesh cage large enough to contain the life-jacket under tests;
- (c) a tank containing freshwater, large enough to allow the cage containing the jacket or its components to be submerged without causing overflow of water;
- (d) weights for weighting down the cage if necessary;
- (e) a rig with suitable lifting tackle for positioning the cage in or out of the water.

2.5.2 Procedure

2.5.2.1 The cage must be suspended in the water in the tank so that it is completely submerged. Weights must be added to the cage where necessary. The reading must be noted to the nearest 0.10 kilogram and recorded as M1.

2.5.2.2 The cage must then be raised above the water surface. The life-jacket under test must have its outer covering cut open and the buoyancy material removed. All of the components of the life-jacket must be placed inside a muslin bag which must then be placed inside the cage.

2.5.2.3 The cage and contents must then be submerged, making sure that no air is trapped within any of the components. The top edge of the cage must be at least 5 centimetres below the surface of the water. The reading on the spring balance must be noted to the nearest 0.10 kilogram and recorded as M2.

2.5.2.4 24 hours later the reading on the spring balance must be noted to the nearest 0.10 kilogram and recorded as M3.

2.5.3 Evaluation of results

2.5.3.1 Record (M1 – M3) to the nearest 0.10 kilogram.

2.5.3.2 Calculate the buoyancy of the life-jacket in newtons by using the following equation:

$$\text{Buoyancy} = (M1 - M3) \times 9.8$$

2.5.3.3 Calculate the percentage loss of buoyancy over 24 hours by using the following equation:

$$\text{Loss of buoyancy} = \frac{M3 - M2}{M1 - M2} \times 100$$

3 Immersion suits

(LSA Code, §2.3)

3.1 General requirements for immersion suits

3.1.1 An immersion suit must be constructed with waterproof materials such that:

- (a) it can be unpacked and donned without assistance within 2 minutes, taking into account any associated clothing. If a life-jacket is to be donned after donning the immersion suit, both must be able to be donned within 2 minutes;
- (b) it will not sustain burning or continue melting after being totally enveloped in a fire for a period of 2 seconds;
- (c) it will cover the whole body with the exception of the face. Hands must also be covered unless permanently attached gloves are provided;
- (d) it is provided with arrangements to minimise or reduce free air in the legs of the suit; and
- (e) following a jump from a height of not less than 4.5 metres into the water there is no undue ingress of water into the suit.

3.1.2 An immersion suit which also complies with 2 may be classified as a life-jacket.

3.1.3 An immersion suit must permit the person wearing it, and also wearing a life-jacket if the immersion suit is to be worn in conjunction with a life-jacket, to:

- (a) climb up and down a vertical ladder at least 5 metres in length;
- (b) perform normal duties during abandonment;

- (c) jump from a height of not less than 4.5 metres into the water without damaging or dislodging the immersion suit, or being injured; and
- (d) swim a short distance through the water and board a survival craft.

3.1.4 An immersion suit which has buoyancy and is designed to be worn without a life-jacket must be fitted with a life-jacket light and a whistle.

3.1.5 If the immersion suit is to be worn in conjunction with a life-jacket, the life-jacket must be worn over the immersion suit. A person wearing such an immersion suit must be able to don a life-jacket without assistance.

3.1.6 An immersion suit must be fitted with at least 400 square centimetres of retro-reflective tape in accordance with 7 of Appendix 9.

3.2 Thermal performance requirements for immersion suits

3.2.1 An immersion suit made of material which has no inherent insulation must be:

- (a) marked with instructions that it must be worn in conjunction with warm clothing;
- (b) so constructed that, when worn in conjunction with warm clothing, and with a life-jacket if the immersion suit is to be worn with a life-jacket, the immersion suit continues to provide sufficient thermal protection, following one jump by the wearer into the water from a height of 4.5 metres, to ensure that when it is worn for a period of one hour in calm circulating water at a temperature of 5°C, the wearers body core temperature does not fall more than 2°C.

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

3.3 Buoyancy requirements

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

Note: This requirement assumes the wearer to be conscious.

4 Anti-exposure suits (LSA Code, §2.4)

4.1 General requirements for anti-exposure suits

4.1.1 An anti-exposure suit must be constructed with waterproof materials such that it:

- (a) provides inherent buoyancy of at least 70 N;
- (b) is made of material which reduces the risk of heat stress during rescue and evacuation operations;
- (c) covers the whole body with the exception of the head and hands and, where the Chief Marine Surveyor permits, feet; gloves and a hood must be provided in such a manner as to remain available for use with the anti-exposure suits;
- (d) can be unpacked and donned without assistance within 2 minutes;
- (e) does not sustain burning or continue melting after being totally enveloped in a fire for a period of 2 seconds;
- (f) is equipped with a pocket for a portable VHF telephone; and
- (g) has a lateral field of vision of at least 120°.

4.1.2 An anti-exposure suit which also complies with 2 may be classified as a lifejacket.

4.1.3 An anti-exposure suit must permit the person wearing it to:

- (a) climb up and down a vertical ladder of at least 5 metres in length;
- (b) jump from a height of not less than 4.5 metres into the water with feet first, without damaging or dislodging the suit, or being injured;
- (c) swim through the water at least 25 metres and board a survival craft;
- (d) don a lifejacket without assistance, except where the suit is classified as a lifejacket under 4.1.2; and
- (e) perform all duties associated with abandonment, assist others and operate a rescue boat.

4.1.4 An anti-exposure suit must be fitted with a light complying with 2.3 and the whistle specified in 2.1.9.

4.2 Thermal performance requirements for anti-exposure suits

An anti-exposure suit must:

- (a) if made of material which has no inherent insulation, be marked with instructions that it must be worn in conjunction with warm clothing; and
- (b) be so constructed, that when worn as marked, the suit continues to provide sufficient thermal protection following one jump into the water which totally submerges the wearer and must ensure that when it is worn in calm circulating water at a temperature of 5°C, the wearer's body core temperature does not fall at a rate of more than 1.5°C per hour, after the first half hour.

4.3 Stability requirements

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

5 Thermal protective aids

(LSA Code, §2.5)

5.1 A thermal protective aid must be made of waterproof material having a thermal conductance of not more than 7800 W/(m².K) and must be so constructed that, when used to enclose a person, it will reduce both the convective and evaporative heat loss from the wearer's body.

5.2 A thermal protective aid must:

- (a) cover the whole body of persons of all sizes wearing a life-jacket with the exception of the face. Hands must also be covered unless permanently attached gloves are provided;
- (b) be capable of being unpacked and easily donned without assistance in a survival craft or rescue boat; and
- (c) permit the wearer to remove it in the water in not more than 2 minutes, if it impairs ability to swim.

5.3 A thermal protective aid must function properly throughout an air temperature range of -30°C to +20°C.

* * * * *

Appendix 2

Visual signals

1 Rocket parachute flares

(LSA Code, §3.1)

1.1 A rocket parachute flare must:

- (a) be contained in a water-resistant casing;
- (b) have brief instructions or diagrams clearly illustrating the use of the rocket parachute flare printed on its casing;
- (c) have integral means of ignition; and
- (d) be so designed as not to cause discomfort to the person holding the casing when used in accordance with the manufacturer's operating instructions.

1.2 A rocket must, when fired vertically, reach an altitude of not less than 300 metres. At or near the top of its trajectory, the rocket must eject a parachute flare, which must:

- (a) burn with a bright red colour;
- (b) burn uniformly with an average luminous intensity of not less than 30,000 candela;
- (c) have a burning period of not less than 40 seconds;
- (d) have a rate of descent of no more than 5 metres per second; and
- (e) not damage its parachute or attachments while burning.

2 Hand flares

(LSA Code, §3.2)

A hand flare must:

- (a) be contained in a water-resistant casing;
- (b) have brief instructions or diagrams clearly illustrating the use of the hand flare printed on its casing;
- (c) have a self-contained means of ignition;
- (d) be so designed as not to cause discomfort to the person holding the casing and not endanger the survival craft by burning or glowing residues when used in accordance with the manufacturer's operating instructions;

- (e) burn with a bright red colour;
- (f) burn uniformly with an average luminous intensity of not less than 15,000 candela;
- (g) have a burning period of not less than one minute; and
- (h) continue to burn after having been immersed for a period of 10 seconds under 100 millimetres of water.

3 Buoyant smoke signals

(LSA Code §3.3)

A buoyant smoke signal must:

- (a) be contained in a water-resistant casing;
- (b) not ignite explosively when used in accordance with the manufacturer's operating instructions;
- (c) have brief instructions or diagrams clearly illustrating the use of the buoyant smoke signal printed on its casing;
- (d) emit smoke of a highly visible colour at a uniform rate for a period of not less than 3 minutes when floating in calm water;
- (e) not emit any flame during the entire smoke emission time;
- (f) not be swamped in a seaway; and
- (g) continue to emit smoke when submerged in water for a period of 10 seconds under 100 millimetres of water.

4 Life of pyrotechnic signals

Rocket parachute flares, hand flares and buoyant smoke signals must be marked with an expiry date. If:

- (a) no date of expiry is marked; or
- (b) on an Australian ship, the marked date of expiry is more than 36 months after the marked date of manufacture,

the date of expiry is deemed to be 36 months after the date of manufacture marked on the signal. If no date of manufacture or expiry is marked, the signal is deemed to be expired.

* * * * *

Appendix 3

Survival craft

1 General requirements for liferafts

(LSA Code, §4.1)

1.1 Construction of life-rafts

1.1.1 A life-raft must be so constructed as to be capable of withstanding exposure for 30 days afloat in all sea conditions.

1.1.2 A life-raft must be so constructed that when it is dropped into the water from a height of 18 metres, the life-raft and its equipment will operate satisfactorily. If the life-raft is to be stowed at a height of more than 18 metres above the water-line in the lightest seagoing condition, it must be of a type which has been satisfactorily drop-tested from at least that height.

1.1.3 A floating life-raft must be capable of withstanding repeated jumps on to it from a height of at least 4.5 metres above its floor both with and without the canopy erected.

1.1.4 A life-raft and its fittings must be so constructed as to enable it to be towed at a speed of 3 knots in calm water when loaded with its full complement of persons and equipment and with one of its sea-anchors streamed.

1.1.5 A life-raft must have a canopy to protect the occupants from exposure which is automatically set in place when the life-raft is launched and waterborne. The canopy must comply with the following:

- (a) it must provide insulation against heat and cold by means of either 2 layers of material separated by an air gap or other equally efficient means. Means must be provided to prevent accumulation of water in the air gap;
- (b) its interior must be of a colour that does not cause discomfort to the occupants;
- (c) each entrance must be clearly indicated and be provided with efficient adjustable closing arrangements which can be easily and quickly opened by persons clothed in immersion suits from inside and outside, and closed from inside, the life-raft so as to permit ventilation but exclude sea water, wind and cold. A life-raft accommodating more than 8 persons must have at least 2 diametrically opposite entrances;

- (d) it must admit sufficient air for the occupants at all times, even with the entrances closed;
- (e) it must be provided with at least one viewing port;
- (f) it must be provided with means for collecting rain water;
- (g) it must be provided with means to mount a survival craft radar transponder at a height of at least 1 metre above the sea; and
- (h) it must have sufficient headroom for sitting occupants under all parts of the canopy.

1.2 Minimum carrying capacity and mass of life-rafts

1.2.1 No life-raft will be approved which has a carrying capacity of fewer than 6 persons calculated in accordance with 2.3 or 3.3, as appropriate.

1.2.2 Unless it is to be launched by a launching appliance or is to be used in conjunction with an approved marine evacuation system and is not required to be portable, the total mass of a life-raft, its container and its equipment must not be more than 185 kg.

1.3 Life-raft fittings

1.3.1 Lifelines must be securely becketed around the inside and outside of a life-raft.

1.3.2 A life-raft must be fitted with an efficient painter of length equal to not less than 10 metres plus the distance from the stowed position to the water-line in the lightest seagoing condition or 15 metres, whichever is the greater. The breaking strength of the painter system, including its means of attachment to the liferaft, except the weak link required by 1.6, must be not less than 15.0 kN for liferafts permitted to accommodate more than 25 persons, not less than 10.0 kN for liferafts permitted to accommodate 9 to 25 persons and not less than 7.5 kN for any other liferaft.

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

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

Note: If sea-activated cells are used to provide the light required by 1.3.3 and 1.3.4, they should be fitted sufficiently close to the doorway that a person can readily remove them from the water to conserve energy if desired.

1.4 Davit-launched life-rafts

1.4.1 In addition to the above requirements, a life-raft for use with a launching appliance must:

- (a) when the life-raft is loaded with its full complement of persons and equipment, be capable of withstanding a lateral impact against the ship's side at an impact velocity of not less than 3.5 metres per second and also a drop into the water from a height of not less than 3 metres without damage that will affect its function; and
- (b) be provided with means for bringing the life-raft alongside the embarkation deck and holding it securely during embarkation.

1.4.2 A passenger ship davit-launched life-raft must be so arranged that it can be rapidly boarded by its full complement of persons.

1.4.3 A cargo ship davit-launched life-raft must be so arranged that it can be boarded by its full complement of persons in no more than 3 minutes from the time the instruction to board is given.

1.5 Equipment

1.5.1 The normal equipment of a life-raft must consist of:

- (a) a buoyant rescue quoit, attached to not less than 30 metres of buoyant line;
- (b) a knife of the non-folding type having a buoyant handle and lanyard attached and stowed in a pocket on the exterior of the canopy near the point at which the painter is attached to the life-raft. In addition, a life-raft which is permitted to accommodate 13 persons or more must be provided with a second knife which need not be of the non-folding type;
- (c) for a life-raft which is permitted to accommodate:

- (i) no more than 12 persons—one buoyant bailer;
- (ii) 13 persons or more—2 buoyant bailers;
- (d) sponges as follows:
 - (i) on an Australian registered ship—a sponge for each person included in the carrying capacity of the life-raft;
 - (ii) on any other ship—2 sponges;
- (e) 2 sea-anchors each with a shock-resistant hawser and tripping line, one being spare and the other permanently attached to the life-raft in such a way that when the life-raft inflates or is waterborne it will cause the life-raft to lie oriented to the wind in the most stable manner. The strength of each sea-anchor and its hawser and tripping line must be adequate for all sea conditions. The sea-anchor must be fitted with a swivel at each end of the line and must be of a type which is unlikely to turn inside-out between its shroud lines. The sea-anchor permanently attached to davit-launched liferafts and liferafts fitted on passenger ships must be arranged for manual deployment only. All other liferafts are to have the sea-anchor deployed automatically when the liferaft inflates;
- (f) 2 buoyant paddles;
- (g) 3 tin openers and a pair of scissors. Safety knives containing special tin-opener blades are satisfactory for this requirement;
- (h) a first-aid outfit in a waterproof case capable of being closed tightly after use;
- (i) a whistle or equivalent sound signal;
- **(j)* 4 rocket parachute flares;
- **(k)* 6 hand flares;
- **(l)* 2 buoyant smoke signals;
- (*m*) a waterproof electric torch suitable for Morse signalling together with a spare set of batteries and a spare bulb in a waterproof container;
- **(n)* an efficient radar reflector or survival craft radar transponder, and an EPIRB;
- (*o*) a daylight signalling mirror with instructions on its use for signalling to ships and aircraft;
- (*p*) a copy of the life-saving signals referred to in Marine Orders, Part 21, on a waterproof card or in a waterproof container;
- (*q*) a set of fishing tackle. On an Australian registered ship, the set of fishing tackle must be sealed in a transparent plastic bag and must include at least:

- (i) a line on a hand reel ready for use with sinker and hook fitted;
- (ii) a selection of at least 6 spare hooks; and
- (iii) a coloured lure or spinner;
- *(r) a food ration;
- *(s) watertight receptacles containing a total of 1.5 litres of fresh water for each person the life-raft is permitted to accommodate, of which 0.5 litres per person may be replaced by a de-salting apparatus capable of producing an equal amount of fresh water in 2 days or 1 litre per person may be replaced by a manually powered reverse osmosis desalinators, as described in 4.7.5, capable of producing an equal amount of fresh water in 2 days;
- (t) a rustproof graduated drinking vessel;
- (u) 6 doses of anti-seasickness medicine and a seasickness bag for each person the life-raft is permitted to accommodate. On an Australian registered ship the seasickness medicine must be tablets containing at least 300 micrograms of Hyoscine Hydrobromide and containing no anti-histamine preparations;
- *(v) instructions on how to survive;
- *(w) instructions for immediate action;
- *(x) thermal protective aids sufficient for 10 per cent of the number of persons the life-raft is permitted to accommodate or 2, whichever is the greater;
- *(y) on an Australian registered ship, 6 chemiluminescent lights; and
- *(z) on an Australian registered ship, a watertight container:
 - (i) furnished with a waterproof match striker as part of, or attached to, the container; and
 - (ii) holding no fewer than 25 matches of a type not readily extinguishable by wind.

Items marked * must be approved.

1.5.2 The marking required by 2.6.3(e) and 3.6.1(g) on life-rafts equipped in accordance with 1.5.1 is "SOLAS A PACK" in block capitals of the Roman alphabet.

1.5.3 In the case of a passenger ship engaged on voyages other than international voyages of such a nature and duration that, in the opinion of the Chief Marine Surveyor, not all the items specified in paragraph 1.5.1 are necessary, the Chief Marine Surveyor may allow the life-rafts carried on any such ships to be provided with the equipment specified in 1.5.1, with the exception of some or all of that

specified in (g) and (q) to (t) inclusive, and one half of the equipment specified in (j) to (l) inclusive.

1.5.4 The marking required by 2.6.3(e) and 3.6.1(g) on life-rafts equipped in accordance with 1.5.3 is "SOLAS B PACK", if the minimum equipment is carried, and "SOLAS B+ PACK", if the equipment carried is more than the B Pack standard but less than the A Pack standard, in block capitals of the Roman alphabet.

1.5.5 If appropriate, the equipment must be stowed in a container which, if it is not an integral part of, or permanently attached to, the life-raft, must be stowed and secured inside the life-raft and be capable of floating in water for at least 30 minutes without damage to its contents.

Note: The Chief Marine Surveyor may, in exceptional circumstances, allow some portion of the equipment to be carried in a container exterior to the life-raft container, but permanently attached to the life-raft, or to be carried in a container to be taken aboard the life-raft when it is launched.

1.6 Float-free arrangements for life-rafts

1.6.1 Painter system

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

1.6.2 Weak link

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

- (a) not be broken by the force required to pull the painter from the life-raft container;
- (b) if applicable, be of sufficient strength to permit the inflation of the life-raft; and
- (c) break under a strain of 2.2 ± 0.4 kilonewtons.

1.6.3 Hydrostatic release units

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

- (a) be constructed of compatible materials so as to prevent malfunction of the unit. Galvanizing or other forms of metallic coating on parts of the hydrostatic release unit is not acceptable;

- (b) automatically release the life-raft at a depth of not more than 4 metres;
- (c) have drains to prevent the accumulation of water in the hydrostatic chamber when the unit is in its normal position;
- (d) be so constructed as to prevent release when seas wash over the unit;
- (e) be permanently marked on its exterior with its type and serial number;
- (f) be permanently marked on the unit or identification plate securely attached to the unit stating the date of manufacture, type and serial number and whether the unit is suitable for use with a liferaft with a capacity of more than 25 persons;
- (g) be such that each part connected to the painter system has a strength of not less than that required for the painter; and
- (h) if of a disposable type, indicate in a way that cannot be removed the date by which it is to be replaced.

2 Inflatable life-rafts

(LSA Code, §4.2)

2.1 An inflatable life-raft must comply with the following provisions in addition to those in 1.

2.2 Construction of inflatable life-rafts

2.2.1 The main buoyancy chamber must be divided into no fewer than 2 separate compartments, each inflated through a non-return inflation valve on each compartment. The buoyancy chambers must be so arranged that, in the event of any one of the compartments being damaged or failing to inflate, the intact compartments are able to support, with positive freeboard over the life-raft's entire periphery, the number of persons which the life-raft is permitted to accommodate, each having a mass of 75 kg and seated in their normal positions.

2.2.2 The floor of the life-raft must be waterproof and must be capable of being sufficiently insulated against cold either:

- (a) by means of one or more compartments that the occupants can inflate, or which inflate automatically and can be deflated and re-inflated by the occupants; or
- (b) by other equally efficient means not dependent on inflation.

2.2.3 The liferaft must be capable of being inflated by one person. The life-raft must be inflated with a non-toxic gas. Inflation must be completed within a period of one

minute at an ambient temperature of between 18°C and 20°C and within a period of 3 minutes at an ambient temperature of -30°C. After inflation the life-raft must maintain its form when loaded with its full complement of persons and equipment.

2.2.4 Each inflatable compartment must be capable of withstanding a pressure equal to at least 3 times the working pressure and must be prevented from reaching a pressure exceeding twice the working pressure either by means of relief valves or by a limited gas supply. Means must be provided for fitting the topping-up pump or bellows required by 2.9.1(b) so that the working pressure can be maintained.

2.3 Carrying capacity of inflatable life-rafts

The number of persons which a life-raft is permitted to accommodate is equal to the lesser of:

- (a) the greatest whole number obtained by dividing by 0.096 the volume, measured in cubic metres, of the main buoyancy tubes (which for this purpose include neither the arches nor the thwarts if fitted) when inflated; or
- (b) the greatest whole number obtained by dividing by 0.372 the inner horizontal cross-sectional area of the life-raft measured in square metres (which for this purpose may include the thwart or thwarts, if fitted) measured to the innermost edge of the buoyancy tubes; or
- (c) the number of persons having an average mass of 75 kg, all wearing either immersion suits and lifejackets or, in the case of davit-launched liferafts, lifejackets, that can be seated with sufficient comfort and headroom without interfering with the operation of any of the liferaft's equipment.

2.4 Access into inflatable life-rafts

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

2.4.2 Entrances not provided with a boarding ramp must have a boarding ladder, the lowest step of which must be situated not less than 0.4 metres below the life-raft's light waterline.

2.4.3 There must be means inside the life-raft to assist persons to pull themselves into the life-raft from the ladder.

2.5 Stability of inflatable life-rafts

2.5.1 An inflatable life-raft must be so constructed that, when fully inflated and floating with the canopy uppermost, it is stable in a seaway.

2.5.2 The stability of the life-raft when in the inverted position must be such that it can be righted in a seaway and in calm water by one person.

2.5.3 The stability of the life-raft when loaded with its full complement of persons and equipment must be such that it can be towed at speeds of up to 3 knots in calm water.

2.5.4 The liferaft must be fitted with water pockets complying with the following requirements:

- (a) the water pockets must be of a highly visible colour;
- (b) the design must be such that the pockets fill to at least 60% of their capacity within 25 seconds of deployment;
- (c) the pockets must have an aggregate capacity of at least 220 litres for liferafts up to 10 persons;
- (d) the pockets for liferafts certified to carry more than 10 persons must have an aggregate capacity of not less than $20N$ litres, where N = number of persons carried; and
- (e) the pockets must be positioned symmetrically round the circumference of the liferaft. Means must be provided to enable air to readily escape from underneath the liferaft.

2.6 Containers for inflatable life-rafts

2.6.1 A life-raft must be packed in a container that is:

- (a) so constructed as to withstand hard wear under conditions encountered at sea;
- (b) of sufficient inherent buoyancy, when packed with the life-raft and its equipment, to pull the painter from within and to operate the inflation mechanism should the ship sink;
- (c) as far as practicable watertight, except for drain holes in the container bottom.

2.6.2 A life-raft must be packed in its container in such a way as to ensure, as far as possible, that the waterborne life-raft inflates in an upright position on breaking free from its container.

2.6.3 The container must be marked with:

- (a) maker's name or trade mark;
- (b) serial number;
- (c) name of approving authority and the number of persons it is permitted to carry;
- (d) SOLAS;
- (e) type of emergency pack enclosed;
- (f) date when last serviced;
- (g) length of painter;
- (h) maximum permitted height of stowage above water-line (depending on drop-test height and length of painter);
- (i) launching instructions.

2.7 Markings on inflatable life-rafts

2.7.1 A life-raft must be marked with:

- (a) maker's name or trade mark;
- (b) serial number;
- (c) date of manufacture (month and year);
- (d) name of approving authority;
- (e) name and place of servicing station where it was last serviced. Such marking is to be placed on a buoyancy tube inside the raft adjacent to a doorway;
- (f) number of persons it is permitted to accommodate over each entrance in characters not less than 100 millimetres in height of a colour contrasting with that of the life-raft;
- (g) name and port of registry of the ship to which it is to be fitted, in such a form that the ship identification can be changed at any time without opening the container.

2.7.2 On an Australian registered ship, 2 retro-reflective tapes not less than 50 millimetres wide must be placed on the underside of the floor of an inflatable life-raft in such a way that the tapes form a cross at the centre of the floor:

- (a) in the case of a circular inflatable life-raft of a length that is not less than half the diameter of the life-raft; or
- (b) in the case of any other inflatable life-raft of lengths that are not less than half the length and width, respectively, of the life-raft.

2.7.3 On an Australian registered ship, the canopy of an inflatable life-raft must be fitted with retro-reflective tapes not less than 50 millimetres wide in such a way that:

- (a) tapes not less than 300 millimetres long are spaced around the canopy so that the distance between the centre of a tape and the centre of the tape next in line is not greater than 500 millimetres and the distance between the lower edge of a tape and the lower edge of the canopy is not less than half the height of the canopy; and
- (b) 2 tapes form a cross at the centre of the top of the canopy, the tapes being:
 - (i) on a circular life-raft of a length that is not less than half the diameter of the life-raft; and
 - (ii) on any other life-raft of lengths that are not less than half the length and width, respectively, of the life-raft.

Note: Illustrations showing the fitting of retro-reflective tapes on life-rafts are shown in 2 of Appendix 9.

2.8 Davit-launched inflatable life-rafts

2.8.1 A life-raft for use with a launching appliance must, when suspended from its lifting hook or bridle, withstand a load of:

- (a) 4 times the mass of its full complement of persons and equipment, at an ambient temperature and a stabilised life-raft temperature of $20^{\circ} \pm 3^{\circ}\text{C}$ with all relief valves inoperative; and
- (b) 1.1 times the mass of its full complement of persons and equipment at an ambient temperature and a stabilised life-raft temperature of -30°C with all relief valves operative.

2.8.2 Rigid containers for life-rafts to be launched by a launching appliance must be so secured that the container or parts of it are prevented from falling into the sea during and after inflation and launching of the contained life-raft.

2.9 Additional equipment for inflatable life-rafts

2.9.1 In addition to the equipment required by 1.5, an inflatable life-raft must be provided with:

- (a) a repair outfit for repairing punctures in buoyancy compartments; and
- (b) a topping-up pump or bellows.

2.9.2 The knives required by 1.5.1(b) must be safety knives and the tin openers and scissors required by 1.5.1(g) must be of the safety type.

2.10 Servicing

2.10.1 A particular type or make of life-raft will not be approved for use on an Australian registered ship unless it is capable of being serviced in Australia at an approved servicing station for that type or make.

2.10.2 The Chief Marine Surveyor will not approve a servicing station unless it complies with 2.11.

2.10.3 Despite 2.10.2, the Chief Marine Surveyor may approve a servicing station without the manufacturer's accreditation when in exceptional circumstances the manufacturer is unable to accredit the station.

2.10.4 The Chief Marine Surveyor may grant temporary approval for a servicing station to service a life-raft or life-rafts subject to such conditions as are considered necessary to ensure that the level of safety is not reduced.

Note: Temporary approval will normally only be granted pending completion of approval formalities.

2.10.5 The Chief Marine Surveyor will issue a Certificate of Approval to an approved servicing station and that Certificate, together with the certificates issued by the life-raft manufacturer in respect of persons trained in the repair and servicing of those life-rafts, must be prominently displayed on the premises.

2.10.6 A life-raft must be serviced in accordance with 2.12.

2.11 Servicing stations

2.11.1 Servicing of inflatable life-rafts must be carried out in fully enclosed spaces only. There must be ample room for the number of inflatable life-rafts expected to be serviced at any one time and the ceiling must be high enough to allow the largest life-raft likely to be serviced to be turned over when inflated, or an equally efficient means to facilitate inspection of bottom seams provided.

2.11.2 The floor of the servicing space must be provided with an easily cleaned surface, sufficiently smooth to ensure that no damage will be caused to the fabric of the life-rafts.

2.11.3 The servicing space must be well lit, but direct rays of sunlight must not be allowed to enter the space.

2.11.4 The temperature and, if necessary, the relative humidity in the servicing space must be sufficiently controlled to ensure that servicing, repair and storage can be effectively carried out to the requirements of the manufacturer's service manual.

2.11.5 The servicing space must be efficiently ventilated, but be free from draughts.

2.11.6 In addition to the space provided for the servicing of life-rafts, separate areas or rooms must be provided for the following:

- (a) storage of life-rafts awaiting servicing, repair or delivery;
- (b) the repair of glass fibre containers and the painting of compressed gas cylinders;
- (c) materials or spare parts;
- (d) administrative purposes.

2.11.7 There must be sufficient space in the life-raft storage area referred to in 2.11.6(a) to ensure that life-rafts in containers or valises are neither stored on top of each other in more than two tiers unless supported by shelving nor subjected to excessive loads.

2.11.8 Spare and obsolete pyrotechnics must be stored in separate, suitable, safe and secure magazines well away from the servicing and storage spaces.

2.11.9 Sufficient tools must be available for the servicing of life-rafts and hydrostatic release gear in accordance with the requirements of the manufacturer, including:

- (a) suitable and accurate manometers or pressure gauges, thermometers and barometers which can be easily read;
- (b) one or more air pumps, each fitted with oil filter and oil trap, for inflating and deflating life-rafts, equipped with a means of cleaning and drying the air and including the necessary high-pressure hoses and adapters;
- (c) a scale for weighing inflation gas cylinders with sufficient accuracy; and
- (d) sufficient gas for blowing through the inlet system of the life-rafts;

2.11.10 All servicing equipment, including air compressors and air storage tanks, must be maintained in working order and must be accurately calibrated.

2.11.11 Procedures must be established to ensure that each gas cylinder is properly filled and gastight before fitting to a life-raft.

2.11.12 A sufficient quantity of materials and accessories must be available for repairing life-rafts, together with replacements of the emergency equipment to the satisfaction of the manufacturer.

2.11.13 Where davit-launched life-rafts are serviced, adequate means must be provided for overload testing of such life-rafts in accordance with the manufacturer's instructions.

2.11.14 Servicing and repair work must be carried out only by qualified persons who have been adequately trained in the repair and servicing of the particular type of life-raft concerned, being certified in writing by the life-raft manufacturer as competent to perform the work.

2.11.15 The person in charge of a servicing station is responsible for ensuring that all servicing personnel are made aware of changes and new techniques:

2.11.16 A servicing station must be accredited by the manufacturer of each make of life-raft to be serviced and must hold the following:

- (a) the manufacturer's servicing manuals, bulletins and instructions as updated from time to time;
- (b) proper materials and replacement parts; and
- (c) relevant notices or instructions from AMSA.

2.11.17 Smoking must not be allowed in the servicing and packing areas, and NO SMOKING notices must be displayed.

2.12 Tests and procedures

2.12.1 Inflatable life-raft servicing must be carried out in accordance with the appropriate manufacturer's servicing manual. The record of service and inspection for each life-raft (Re-inspection Certificate) must clearly state all work carried out on a life-raft and must be signed by the person carrying out the work. Necessary procedures are to include, but not be limited to, those set out in 2.12.2 to 2.12.15.

2.12.2 The container is to be inspected for damage.

2.12.3 The folded life-raft and the interior of the container are to be inspected for signs of dampness.

2.12.4 While inflated, the life-raft must be subjected to a thorough inspection inside and out in accordance with the manufacturer's instructions.

2.12.5 The floor must be inflated, checked for broken reeds and tested in accordance with the manufacturer's instructions.

2.12.6 The seams between floor and buoyancy tube must be checked for slippage or edge lifting.

2.12.7 After deflation, arch roots must be checked in accordance with the manufacturer's instructions.

2.12.8 All items of equipment must be checked to ensure that they are in good condition and that dated items are replaced at the time of servicing if there is less than 6 months remaining before the expiry date.

2.12.9 Davit-launched life-rafts must be subjected to a 10% overload suspension test at every second servicing. The floor seam strength (FSS) test need only be carried out at the intervening servicing if the overload suspension test is not conducted.

2.12.10 A check is to be made to ensure that the life-raft and the atmosphere are dry when the life-raft is being repacked.

2.12.11 The required markings are to be updated and checked.

Gas Inflation (GI) Test

2.12.12 The GI test must be carried out at 5-year intervals, and when undertaking a gas inflation test, special attention must be paid to the effectiveness of the relief valves. The folded life-raft is to be removed from its container before activating the fitted gas inflation system. After gas inflation has been initiated, sufficient time must be allowed to enable the pressure in the buoyancy tubes to become stabilised and the solid particles of CO₂ to evaporate. After this period the buoyancy tubes must, if necessary, be topped up with air, and the life-raft subjected to a pressure holding test over a period of not less than one hour during which the pressure drop will not exceed 5% of the working pressure.

Necessary Additional Pressure (NAP) Test

2.12.13 Each life-raft must be subjected to the necessary additional pressure (NAP) test as described in Table 1, at yearly intervals after the tenth year of the life-raft's life (see Table 2) unless earlier servicing is deemed necessary as a result of visual inspection. After allowing sufficient time for the life-raft to regain fabric tension at working pressure, the life-raft must be subjected to a pressure holding test over a period of not less than one hour during which the pressure drop is not to exceed 5% of the working pressure.

Table 1 Necessary Additional Pressure Test

1. The pressure release valves are to be made inoperative.
2. Gradually raise the pressure to the lesser of 2.0 times the working pressure or that sufficient to impose a tensile load on the inflatable tube fabric of at least 20% of the minimum required tensile strength.
3. During 30 minutes after the conditions have stabilized, there should be no signs of seam slippage, or rupture, or pressure drop more than 5%. Following the test, each relief valve should be tested for proper relief and reseating pressures.
4. Life-raft manufacturers should include tables in their servicing manuals of exact NAP test pressures corresponding to their particular tube sizes and fabric tensile strength requirements, calculated according to the equation:

$$p(\text{kg} / \text{cm}^2) = \frac{2 \times \text{tensile strength (kg per 5 cm)}}{25 \times \text{diameter (cm)}}$$

Working Pressure (WP) Test

2.12.14 When the NAP or GI test is not required, the WP test must be carried out (see Table 2), by inflation of the life-raft with dry compressed air, after removing it from the container shell or valise and from its retaining straps if fitted, to at least the working pressure, or to the pressure required by the manufacturer's servicing manual if higher. The life-raft must be subjected to a pressure holding test over a period of not less than one hour during which the pressure drop is not to exceed 5% of the working pressure.

Floor Seam Strength (FSS) Test

2.12.15 The FSS test is to be carried out at yearly intervals after the tenth year of the life-raft's life (see Table 2). It is to be carried out with the life-raft inflated to the working pressure and the buoyancy tube supported by a system which leaves the floor seams unsupported at a suitable height above the service floor (see Appendix 8 for guidelines). A person weighing not less than 75 kg should walk/crawl around the perimeter of the floor for the entire circumference and the floor seams should be checked again. Manufacturers may substitute any other seam test which will determine the integrity of the floor seam until the next inspection is due.

Table 2 Frequency of NAP, WP, GI and FSS Tests:

<i>Servicing intervals</i>	<i>Tests required</i>
End of first year	WP test
End of second year	WP test
End of third year	WP test
End of fourth year	WP test
End of fifth year	GI test
End of sixth year	WP test
End of seventh year	WP test
End of eighth year	WP test
End of ninth year	WP test
End of tenth year	GI & FSS tests
Eleventh to fourteenth year	NAP & FSS tests
Fifteenth year	GI, NAP & FSS tests
Sixteenth to nineteenth year	NAP & FSS tests
Twentieth year	GI, NAP & FSS tests
Twenty-first to twenty-fourth year	NAP & FSS tests
Twenty-fifth year	GI, NAP & FSS tests
etc.	

2.12.16 A record of servicing must be maintained for at least 5 years after the date of service.

2.12.17 Statistical records must be prepared on all life-rafts serviced, indicating, in particular, defects found, repairs carried out and units condemned and withdrawn from service. Such statistics should be supplied to the manufacturer and must be made available on request to AMSA.

Note 1: *In order to ensure that the servicing of inflatable life-rafts is effectively conducted to provide reliable survival craft in an emergency, manufacturers and shipowners have parallel and overlapping responsibilities. These include, but are not limited to the following:*

Manufacturers are responsible for:

- *ensuring that their life-rafts can be adequately serviced in accordance with this Appendix or with any additional requirements necessary for that particular product and design and thereto accredit a sufficient number of servicing stations.*
- *ensuring that each servicing station accredited by them for servicing and repair of their life-rafts has qualified persons whom they have adequately trained and certificated to perform such work and who are aware of any changes or new techniques.*
- *keeping AMSA fully informed as to the list of servicing stations accredited by them and any changes thereto.*
- *making available to service stations:*
 - *changes to servicing manuals, servicing bulletins and instructions;*
 - *proper materials and replacement parts;*
 - *bulletins or instructions from AMSA;*
- *keeping AMSA fully informed of any shipping casualties known to them and involving their life-rafts; and also of any failures of life-rafts, other than failures during inspections, which are known to them.*
- *informing shipowners whenever possible of any deficiency or danger known to them and related to the use of their life-rafts and taking necessary remedial measures.*

Shipowners are responsible for ensuring, as a minimum requirement, that all life-rafts fitted as life-saving equipment are approved and are serviced at the appropriate intervals at an approved servicing station. Whenever practicable, a representative of the shipowner should be in attendance during service.

Note 2: *2.10, 2.11 and 2.12 give effect to IMO Resolution A.761(18) and MSC Resolution 55(66).*

3 Rigid life-rafts

(LSA Code. §4.3)

3.1 A rigid life-raft must comply with the following provisions in addition to those of 1.

3.2 Construction of rigid life-rafts

3.2.1 The buoyancy of a life-raft must be provided by approved inherently buoyant material placed as near as possible to the periphery of the life-raft. The buoyant material must be fire-retardant or be protected by a fire-retardant covering.

3.2.2 The floor of a life-raft must prevent the ingress of water and must effectively support the occupants out of the water and insulate them from the cold.

3.3 Carrying capacity of rigid life-rafts

The number of persons which a life-raft is permitted to accommodate is equal to the lesser of:

- (a) the greatest whole number obtained by dividing by 0.096 the volume, measured in cubic metres, of the buoyancy material multiplied by a factor of $(1-SG)$ where SG is the specific gravity of that material; or
- (b) the greatest whole number obtained by dividing by 0.372 the horizontal cross-sectional area of the floor of the life-raft measured in square metres; or
- (c) the number of persons having an average mass of 75 kg, all wearing immersion suits and life-jackets, that can be seated with sufficient comfort and headroom without interfering with the operation of any of the life-rafts equipment.

3.4 Access into rigid life-rafts

3.4.1 At least one entrance must be fitted with a rigid boarding ramp to enable persons to board the life-raft from the sea. In the case of a davit-launched life-raft having more than one entrance, the boarding ramp must be fitted at the entrance opposite to the bowing and embarkation facilities.

3.4.2 Entrances not provided with a boarding ramp must have a boarding ladder, the lowest step of which must be situated not less than 0.4 metres below the life-raft's light waterline.

3.4.3 There must be means inside the life-raft to assist persons to pull themselves into the life-raft from the ladder.

3.5 Stability of rigid life-rafts

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

3.5.2 The stability of a life-raft when loaded with its full complement of persons and equipment must be such that it can be towed at speeds of up to 3 knots in calm water.

3.6 Markings on rigid life-rafts

3.6.1 A life-raft must be marked with:

- (a) name and port of registry of the ship to which it belongs;
- (b) maker's name or trade mark;
- (c) serial number;
- (d) name of approving authority;
- (e) number of persons it is permitted to accommodate over each entrance in characters not less than 100 millimetres in height of a colour contrasting with that of the life-raft;
- (f) SOLAS;
- (g) type of emergency pack enclosed;
- (h) length of painter;
- (i) maximum permitted height of stowage above water-line (drop-test height); and
- (j) launching instructions.

3.6.2 On an Australian registered ship, each canopy of a rigid life-raft must be fitted with retro-reflective tapes not less than 50 millimetres wide in such a way that:

- (a) tapes not less than 300 millimetres long are spaced around the canopy so that the distance between the centre of a tape and the centre of the tape next in line is not greater than 500 millimetres and the distance between the lower edge of a tape and the lower edge of the canopy is not less than half the height of the canopy; and
- (b) 2 tapes form a cross at the centre of the top of the canopy, the tapes being:
 - (i) on a circular life-raft of a length that is not less than half the diameter of the life-raft; and
 - (ii) on any other life-raft of lengths that are not less than half the length and width, respectively, of the life-raft.

Note: Illustrations depicting the fitting of retro-reflective tape on life-rafts are shown in 2 of Appendix 9.

3.7 Davit-launched rigid life-rafts

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

4 General requirements for lifeboats

(LSA Code, §4.4)

4.1 Construction of lifeboats

4.1.1 A lifeboat must be properly constructed and must be of such form and proportions that it has ample stability in a seaway and sufficient freeboard when loaded with its full complement of persons and equipment. A lifeboat must have a rigid hull and must be capable of maintaining positive stability when in an upright position in calm water and loaded with its full complement of persons and equipment and holed in any one location below the waterline, assuming no loss of buoyancy material and no other damage.

4.1.2 Each lifeboat must be fitted with a certificate of approval, endorsed by the Chief Marine Surveyor, containing at least the following items:

- (a) manufacturer's name and address;
- (b) lifeboat model and serial number;
- (c) month and year of manufacture;
- (d) number of persons the lifeboat is approved to carry; and
- (e) the approval information required under 5.3(i) of this Part.

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

- (f) number of the certificate of approval;
- (g) material of hull construction, in such detail as to ensure that compatibility problems in repair should not occur;
- (h) total mass fully equipped and fully manned; and
- (i) statement of approval as to 5, 6, 7, 8 or 9 of this Appendix.

4.1.3 A lifeboat must be of sufficient strength to:

- (a) enable it to be safely lowered into the water when loaded with its full complement of persons and equipment; and
- (b) be capable of being launched and towed when the ship is making headway at a speed of 5 knots in calm water.

4.1.4 Hulls and rigid covers must be fire-retardant or non-combustible.**4.1.5** Seating must be provided on thwarts, benches or fixed chairs and constructed so as to be capable of supporting:

- (a) the number of persons each weighing 100 kg for which spaces are provided in accordance with 4.2.2(b);
- (b) a load of 100 kg in any single seat location when a lifeboat to be launched by falls is dropped into the water from a height of at least 3 metres; and
- (c) a load of 100 kg in any single seat location when a free-fall lifeboat is launched from a height of at least 1.3 times its free-fall certification height.

4.1.6 Except for a free fall lifeboat, a lifeboat to be launched by falls must be of sufficient strength to withstand a load, without residual deflection on removal of that load:

- (a) in the case of boats with metal hulls—1.25 times the total mass of the lifeboat when loaded with its full complement of persons and equipment; and
- (b) in the case of other boats—twice the total mass of the lifeboat when loaded with its full complement of persons and equipment.

4.1.7 Except for a free fall lifeboat, a lifeboat to be launched by falls must be of sufficient strength to withstand, when loaded with its full complement of persons and equipment and with, where applicable, skates or fenders in position, a lateral impact against the ship's side at an impact velocity of at least 3.5 metres per second and also a drop into the water from a height of at least 3 metres.**4.1.8** The vertical distance between the floor surface and the interior of the enclosure or canopy over 50 per cent of the floor area must be:

- (a) not less than 1.3 metres for a lifeboat permitted to accommodate 9 persons or fewer;
- (b) not less than 1.7 metres for a lifeboat permitted to accommodate 24 persons or more;

- (c) not less than the distance as determined by linear interpolation between 1.3 metres and 1.7 metres for a lifeboat permitted to accommodate between 9 and 24 persons.

4.2 Carrying capacity of lifeboats

4.2.1 No lifeboat may be approved to accommodate more than 150 persons.

4.2.2 The number of persons which a lifeboat to be launched by falls is permitted to accommodate is the lesser of:

- (a) the number of persons having an average mass of 75 kg, all wearing life-jackets, that can be seated in a normal position without interfering with the means of propulsion or the operation of any of the lifeboat's equipment; or
- (b) the number of spaces that can be provided on the seating arrangements in accordance with Figure 1. The shapes may be overlapped as shown, provided footrests are fitted and there is sufficient room for legs and the vertical separation between the upper and lower seat is not less than 350 millimetres.

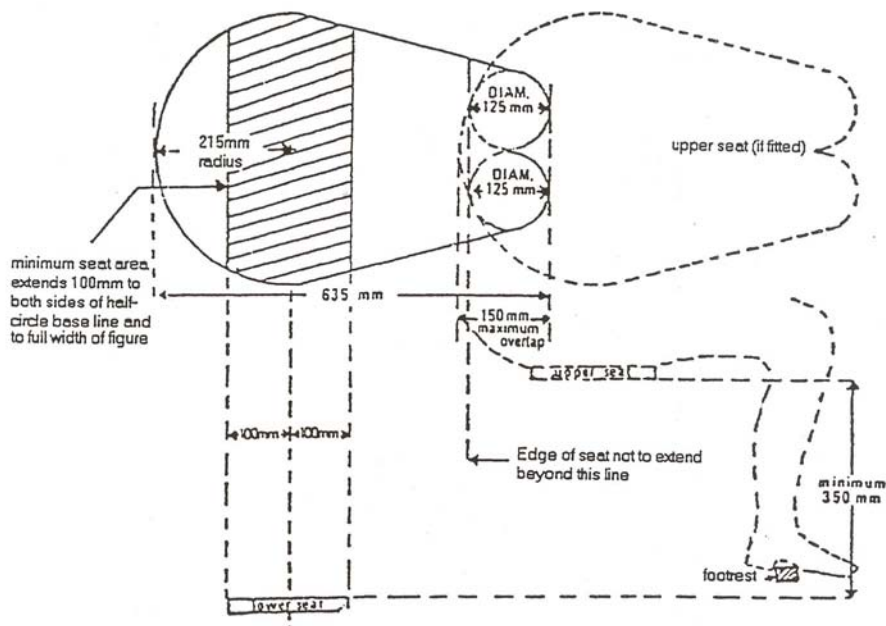


Figure 1

4.2.3 Each seating position must be clearly indicated in the lifeboat.

4.3 Access into lifeboats

4.3.1 A lifeboat on a passenger ship must be so arranged that it can be rapidly boarded by its full complement of persons. Rapid disembarkation must also be possible.

4.3.2 A lifeboat on a cargo ship must be so arranged that it can be boarded by its full complement of persons in not more than 3 minutes from the time the instruction to board is given. Rapid disembarkation must also be possible.

4.3.3 A lifeboat must have a boarding ladder that can be used on either side of the lifeboat to enable persons in the water to board the lifeboat. The lowest step of the ladder must be not less than 0.4 metres below the lifeboat's light waterline.

4.3.4 A lifeboat must be so arranged that helpless people can be brought on board either from the sea or on stretchers.

4.3.5 All surfaces on which persons might walk must have a non-skid finish.

4.4 Lifeboat buoyancy

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

4.5 Lifeboat freeboard and stability

4.5.1 A lifeboat must be stable and have a positive GM value when loaded with 50 per cent of the number of persons the lifeboat is permitted to accommodate seated in their normal positions to one side of the centre line.

4.5.2 Under the condition of loading in 4.5.1:

- (a) each lifeboat with side openings near the gunwale must have a freeboard, measured from the waterline to the lowest opening through which the lifeboat may become flooded, of at least 1.5 per cent of the lifeboat's length or 100 mm, whichever is the greater; and
- (b) each lifeboat without side openings near the gunwale must not exceed an angle of heel of 20° and must have a freeboard, measured from the waterline to the

lowest opening through which the lifeboat may become flooded, of at least 1.5 per cent of the lifeboat's length or 100 mm, whichever is the greater.

4.6 Lifeboat propulsion

4.6.1 A lifeboat must be powered by a compression ignition engine. No engine may be used for any lifeboat if its fuel has a flash-point of 43°C or less (closed cup test).

4.6.2 The engine must be provided with either a manual starting system, or a power starting system with two independent rechargeable energy sources. Any necessary starting aids must also be provided. The engine starting systems and starting aids must start the engine at an ambient temperature of -15°C within 2 minutes of commencing the start procedure unless, in the opinion of the Chief Marine Surveyor having regard to the particular voyages in which the ship carrying the lifeboat is constantly engaged, a different temperature is appropriate. The starting systems must not be impeded by the engine casing, thwarts or other obstructions.

4.6.3 The engine must be capable of operating for not less than 5 minutes after starting from cold with the lifeboat out of the water.

4.6.4 The engine must be capable of operating when the lifeboat is flooded up to the centre line of the crank shaft.

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

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

4.6.7 A lifeboat must be designed with due regard to the safety of persons in the water and to the possibility of damage to the propulsion system by floating debris.

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

4.6.9 The engine, transmission and engine accessories of a lifeboat must be enclosed in a fire-retardant casing or other suitable arrangements providing similar protection.

Such arrangements must also protect persons from coming into accidental contact with hot or moving parts and protect the engine from exposure to weather and sea. Adequate means must be provided to reduce the engine noise so that a shouted order can be heard. Starter batteries must be provided with casings which form a watertight enclosure around the bottom and sides of the batteries. The battery casings must have a tight fitting top which provides for necessary gas venting. In Australian registered ships, the batteries must be of the totally sealed type that do not emit hydrogen during charging.

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

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

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

4.7 Lifeboat fittings

4.7.1 A lifeboat, except a free-fall lifeboat, must be provided with at least one drain valve fitted near the lowest point in the hull, which must automatically open to drain water from the hull when the lifeboat is not water-borne and must automatically close to prevent entry of water when the lifeboat is water-borne. Each drain valve must be provided with a cap or plug to close the valve, which must be attached to the lifeboat by a lanyard, a chain, or other suitable means. Drain valves must be readily accessible from inside the lifeboat and their position must be clearly indicated.

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

4.7.3 Except in the vicinity of the rudder and propeller, suitable hand holds must be provided or a buoyant lifeline must be becketed around the outside of the lifeboat above the waterline and within reach of the person in the water.

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

4.7.5 A lifeboat must be fitted with sufficient watertight lockers or compartments to provide for the storage of the small items of equipment, water and provisions required by 4.8. Means must be provided for the storage of collected rainwater, and in addition if required by the Chief Marine Surveyor a means for producing drinking water from seawater with a manually powered desalinator. The desalinator must not be dependent upon solar heat, nor on chemicals other than seawater. Means must be provided for the storage of collected water.

4.7.6 A lifeboat to be launched by a fall or falls, except a free fall lifeboat, must be fitted with a release mechanism complying with the following:

- (a) the mechanism must be so arranged that all hooks are released simultaneously;
- (b) the mechanism must have two release capabilities as follows:
 - (i) a normal release capability which will release the lifeboat when it is water-borne or when there is no load on the hooks;
 - (ii) an on-load release capability which will release the lifeboat with a load on the hooks. This release must be so arranged as to release the lifeboat under any conditions of loading from no-load with the lifeboat water-borne to a load of 1.1 times the total mass of the lifeboat when loaded with its full complement of persons and equipment. This release capability must be adequately protected against accidental or premature use. Adequate protection is to include special mechanical protection not normally required for offload release, in addition to a danger sign. To prevent an accidental release during recovery of the boat, the mechanical protection (interlock) should only engage when the release mechanism is properly and completely reset. To prevent a premature on-load release, on-load operation of the release mechanism should require a deliberate and sustained action by the operator. The release mechanism must be so designed that crew members in the lifeboat can clearly observe when the release mechanism is properly and completely reset and ready for lifting.

Clear operating instructions should be provided with a suitably worded warning notice;

- (c) the release control must be clearly marked in a colour that contrasts with its surroundings;
- (d) the fixed structural connection of the release mechanism in the lifeboat must be designed with a calculated factor of safety of 6 based on the ultimate strength of the materials used, assuming the mass of the lifeboat is equally distributed between the falls;
- (e) where a single fall and hook system is used for launching a lifeboat or rescue boat in combination with a suitable painter, the requirements of (b) need not be applicable; in such an arrangement a single capability to release the lifeboat or rescue boat, only when it is fully waterborne, will be adequate.

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

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

4.7.9 A lifeboat intended for launching down the side of a ship must have skates and fenders as necessary to facilitate launching and prevent damage to the lifeboat.

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

4.7.11 A manually controlled lamp or source of light must be fitted inside the lifeboat to provide illumination for not less than 12 hours to enable reading of survival and equipment instructions; however, oil lamps are not permitted to be used for this purpose.

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

4.8 Lifeboat equipment

4.8.1 All items of lifeboat equipment, with the exception of boat-hooks which must be kept free for fending off purposes, must be secured within the lifeboat by lashings, storage in lockers or compartments, storage in brackets or similar mounting arrangements or other suitable means. The equipment must be secured in such a manner as not to interfere with any abandonment procedures. All items of lifeboat equipment must be as small and of as little mass as possible and must be packed in a suitable and compact form. Except where otherwise stated, the equipment of every lifeboat is to consist of:

- (a) except for free-fall lifeboats, a sufficient number of buoyant oars to make headway in calm seas. Thole pins, crutches or equivalent arrangements must be provided for each oar provided. Thole pins or crutches must be attached to the boat by lanyards or chains. Oars, thole pins and crutches are not required on totally enclosed lifeboats on Australian registered ships on non-international voyages;
- (b) 2 boat-hooks;
- (c) a buoyant bailer and 2 buckets;
- **(d)* a survival manual;
- (e) an operational compass which is luminous or provided with suitable means of illumination. In a totally enclosed lifeboat, the compass must be permanently fitted at the steering position; in any other lifeboat, it must be provided with a binnacle to protect it from the weather and suitable mounting arrangements. A compass for use in an Australian registered ship must comply with 10;
- (f) a sea-anchor of adequate size fitted with a shock-resistant hawser and a tripping line which provides a firm hand grip when wet. The strength of the sea-anchor, hawser and tripping line must be adequate for all sea conditions. A sea-anchor for use in an Australian registered ship must comply with 11;
- (g) 2 efficient painters of a length equal to not less than twice the distance from the stowage position of the lifeboat to the waterline in the lightest seagoing condition or 15 metres, whichever is the greater. On lifeboats to be launched by free-fall launching, both painters must be stowed near the bow ready for use. On other lifeboats, one painter attached to the release device required by

- 4.7.7 must be placed at the forward end of the lifeboat and the other must be firmly secured at or near the bow of the lifeboat ready for use;
- (h) 2 hatchets, one at each end of the lifeboat;
 - (i) watertight receptacles containing a total of 3 litres of fresh water for each person the lifeboat is permitted to accommodate, of which either 1 litre per person may be replaced by a de-salting apparatus capable of producing an equal amount of fresh water in 2 days or 2 litres per person may be replaced by a manually powered reverse osmosis desalinator as described in 4.7.5 capable of producing an equal amount of fresh water in 2 days;
 - (j) a rustproof dipper with lanyard;
 - (k) a rustproof graduated drinking vessel;
 - *(l) a food ration;
 - *(m) 4 rocket parachute flares;
 - *(n) 6 hand flares;
 - *(o) 2 buoyant smoke signals;
 - (p) a waterproof electric torch suitable for Morse signalling together with a spare set of batteries and a spare bulb in a waterproof container;
 - (q) a daylight signalling mirror with instructions for its use for signalling to ships and aircraft;
 - (r) a copy of the life-saving signals referred to in the 'Table of Life-saving Signals' in Appendix 3 of the *International Code of Signals*, on a waterproof card or in a waterproof container;
 - (s) a whistle or equivalent sound signal;
 - (t) a first-aid outfit in a waterproof case capable of being closed tightly after use;
 - (u) 6 doses of anti-seasickness medicine and one seasickness bag for each person. In an Australian registered ship, the seasickness medicine must be tablets containing at least 300 micrograms of Hyoscine Hydrobromide and containing no anti-histamine preparations;
 - (v) a jack-knife to be kept attached to the boat by a lanyard;
 - (w) 3 tin openers;
 - (x) 2 buoyant rescue quoits, attached to not less than 30 metres of buoyant line;
 - (y) if the lifeboat is not automatically self-bailing, a manual pump suitable for effective bailing. In an Australian registered ship, the manual pump must comply with 12;

- (z) a set of fishing tackle. On an Australian registered ship, the set of fishing tackle must be sealed in a transparent plastic bag and must include at least:
 - (i) a line on a hand reel ready for use with sinker and hook fitted;
 - (ii) a selection of at least 6 spare hooks;
 - (iii) a coloured lure or spinner;
- (za) sufficient tools for minor adjustments to the engine and its accessories;
- (zb) portable fire-extinguishing equipment suitable for extinguishing oil fires. A motor lifeboat on an Australian registered ship must carry 2 portable fire extinguishers capable of discharging foam or other substance suitable for quenching oil fires and complying with Australian Standard AS 1841 and 1850 relating to the type of extinguisher, provided that in the case of a foam extinguisher the size need not exceed 4.5 litres capacity and in the case of a dry powder extinguisher, the size need not exceed 2.25 kg capacity;

Note: Extinguishers should be rated as [10B]. In the compaction test for a powder extinguisher, all five samples are required to pass the test.

- (zc) a searchlight with a horizontal and vertical sector of at least 6° and a measured luminous intensity of 2500 candela which can work continuously for not less than 3 hours;
- *(zd) an efficient radar reflector or a survival craft radar transponder; and
- *(ze) thermal protective aids sufficient for 10% of the number of persons the lifeboat is permitted to accommodate or 2, whichever is the greater.

Items marked * must be approved.

4.8.2 If the Chief Marine Surveyor considers that, because of the nature and duration of voyages being undertaken by a ship, any or all of the items specified in 4.8.1(l) and (z) are unnecessary, that officer may allow such items to be dispensed with.

4.9 Lifeboat markings

4.9.1 The number of persons a lifeboat is permitted to accommodate must be marked on it in clear permanent characters.

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

4.9.3 Means of identifying the ship to which a lifeboat belongs and the number of the lifeboat must be marked in such a way that they are visible from above.

4.9.4 Lifeboats in a ship must be identified by being numbered consecutively from forward, odd numbers on the starboard side, even numbers on the port side, the identifying numbers being clearly painted on the inboard side of each bow and on the inboard quarter of the lifeboat as stowed.

4.9.5 A lifeboat on an Australian registered ship must be fitted with retro-reflective tapes of an approved type, each tape being not less than 300 millimetres long and not less than 50 millimetres wide, spaced so that the distance between the centre of the tape and the centre of the tape next in line is not greater than 500 millimetres:

- (a) on top of the gunwale of the lifeboat; and
- (b) on the outside of the lifeboat as near to the gunwale as possible.

4.9.6 The top of the cover with which a lifeboat on an Australian registered ship is equipped must be fitted with retro-reflective tapes of an approved type, each tape being not less than 300 millimetres long and not less than 50 millimetres wide:

- (a) placed in such a way that 2 tapes form a cross; and
- (b) spaced so that the distance between the centre of a cross and the centre of the cross next in line is not greater than 500 millimetres.

Note: Illustrations depicting the fitting of retro-reflective tapes on lifeboats are shown in 1 of Appendix 9.

5 Partially enclosed lifeboats

(LSA Code, §4.5)

5.1 A partially enclosed lifeboat must comply with the following provisions as well as those in 4.

5.2 A partially enclosed lifeboat must be provided with effective means of bailing or be automatically self-bailing.

5.3 A partially enclosed lifeboat must be provided with permanently attached rigid covers extending over not less than 20 per cent of the length of the lifeboat from the stem and not less than 20 per cent of the length of the lifeboat from the aftermost part of the lifeboat. The lifeboat must be fitted with a permanently attached foldable canopy which together with the rigid covers completely encloses the occupants of the lifeboat in a weatherproof shelter and protects them from exposure. The lifeboat must

have entrances at both ends and on each side. Entrances in the rigid covers must be weathertight when closed. The canopy must be so arranged that:

- (a) it is provided with adequate rigid sections or battens to permit erection of the canopy;
- (b) it can be easily erected by not more than 2 persons;
- (c) it is insulated to protect the occupants against heat and cold by means of no fewer than 2 layers of material separated by an air gap or other equally efficient means; means must be provided to prevent accumulation of water in the air gap;
- (d) its exterior is of a highly visible colour and its interior is of a colour which does not cause discomfort to the occupants;
- (e) entrances in the canopy are provided with efficient adjustable closing arrangements which can be easily and quickly opened and closed from inside or outside so as to permit ventilation but exclude sea water, wind and cold; means must be provided for holding the entrances securely in the open and closed position;
- (f) with the entrances closed, it admits sufficient air for the occupants at all times;
- (g) it has means for collecting rainwater; and
- (h) the occupants can escape in the event of the lifeboat capsizing.

5.4 The interior of a lifeboat must be of a highly visible colour.

5.5 If a fixed two-way VHF radiotelephone apparatus is fitted in the lifeboat, it must be installed in a cabin large enough to accommodate both the equipment and the person using it. No separate cabin is required if the construction of the lifeboat provides a sheltered space to the satisfaction of the Chief Marine Surveyor.

6 Totally enclosed lifeboats

(LSA Code, §4.6)

6.1 A totally enclosed lifeboat must comply with the following provisions as well as those in 4.

6.2 Enclosure

A totally enclosed lifeboat must be provided with a rigid watertight enclosure which completely encloses the lifeboat. The enclosure must be so arranged that:

- (a) it protects the occupants against heat and cold;

- (b) access to the lifeboat is provided by hatches which can be closed to make the lifeboat watertight;
- (c) except for free-fall lifeboats, hatches are positioned so as to allow launching and recovery operations to be performed without any occupant having to leave the enclosure;
- (d) access hatches are capable of being opened and closed from both inside and outside and are equipped with means to hold them securely in open positions;
- (e) for lifeboats other than free-fall lifeboats, or lifeboats on an Australian ship not on an international voyage, it is possible to row the lifeboat;
- (f) it is capable, when the lifeboat is in the capsized position with the hatches closed and without significant leakage, of supporting the entire mass of the lifeboat, including all equipment, machinery and its full complement of persons;
- (g) it includes windows or translucent panels on both sides which admit sufficient daylight to the inside of the lifeboat with the hatches closed to make artificial light unnecessary;
- (h) its exterior is of a highly visible colour and its interior of a colour which does not cause discomfort to the occupants;
- (i) handrails provide a secure handhold for persons moving about the exterior of the lifeboat, and aid embarkation and disembarkation;
- (j) persons have access to their seats from an entrance without having to climb over thwarts or other obstructions; and
- (k) during operation of the engine with the enclosure closed, the atmospheric pressure inside the lifeboat shall never be above or below the outside atmospheric pressure by more than 2 kPa.

6.3 Capsizing and re-righting

6.3.1 Except in free-fall lifeboats, a safety belt must be fitted at each indicated seating position. The safety belt must be designed to hold a person of a mass of 100 kg securely in place when the lifeboat is in a capsized position. Each set of safety belts for a seat must be of a colour which contrasts with the belts for seats immediately adjacent. Free-fall lifeboats must be fitted with a safety harness at each seat in contrasting colour designed to hold a person with a mass of 100 kg securely in place during a free-fall launch as well as with the lifeboat in capsized position.

6.3.2 The stability of the lifeboat must be such that it is inherently or automatically self-righting when loaded with its full or a partial complement of persons and

equipment and all entrances and openings are closed watertight and the persons are secured with safety belts.

6.3.3 The lifeboat must be capable of supporting its full complement of persons and equipment when the lifeboat is in the damaged condition specified in 4.1.1 and its stability must be such that in the event of capsizing, it will automatically attain a position that will provide an above-water escape for its occupants. When the lifeboat is in the stable flooded condition, the water level inside the lifeboat, measured along the seatback, must not be more than 500 mm above the seat pan at any occupant seating position.

6.3.4 The design of all engine exhaust pipes, air ducts and other openings must be such that water is excluded from the engine when the lifeboat capsizes and re-rights.

6.4 Propulsion

6.4.1 The engine and transmission must be controlled from the helmsman's position.

6.4.2 The engine and engine installation must be capable of running in any position during capsize and continue to run after the lifeboat returns to the upright or must automatically stop on capsizing and be easily restarted after the lifeboat returns to the upright. The design of the fuel and lubricating systems must prevent the loss of fuel and the loss of more than 250 millilitres of lubricating oil from the engine during capsize.

6.4.3 Air cooled engines must have a duct system to take in cooling air from, and exhaust it to, the outside of the lifeboat. Manually operated dampers must be provide to enable cooling air to be taken in from, and exhausted to, the interior of the lifeboat.

6.5 Protection against acceleration

Notwithstanding 4.1.7, a totally enclosed lifeboat, except a free-fall lifeboat, must be so constructed and fendered as to ensure that the lifeboat renders protection against harmful accelerations resulting from an impact of the lifeboat, when loaded with its full complement of persons and equipment, against the ship's side at an impact velocity of not less than 3.5 metres per second.

7 Free-fall lifeboats

(LSA Code, §4.7)

7.1 General requirements

A free-fall lifeboat must comply with the following provisions as well as those in 6.

7.2 Carrying capacity of a free-fall lifeboat

The carrying capacity of a free-fall lifeboat is the number of persons that can be provided with a seat without interfering with the means of propulsion or the operation of any of the lifeboat's equipment. The width of the seat must be at least 430 mm. Free clearance in front of the backrest must be at least 635 mm. The backrest must extend at least 1,000 mm above the seatpan.

7.3 Performance requirements

7.3.1 Each free-fall lifeboat must make positive headway immediately after water entry and must not come into contact with the ship after a free-fall launching against a trim of up to 10° and a list of up to 20° either way from the certification height when fully equipped and loaded with:

- (a) its full complement of persons;
- (b) occupants so as to cause the centre of gravity to be in the most forward position;
- (c) occupants so as to cause the centre of gravity to be in the most aft position; and
- (d) its operating crew only.

7.3.2 For oil tankers, chemical tankers and gas carriers with a final angle of heel greater than 20° calculated in accordance with the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the 1978 Protocol related thereto and the recommendations of IMO, as applicable, a lifeboat must be capable of being free-fall launched at the final angle of heel and on the base of the final waterline of that calculation.

7.3.3 The required free-fall height must never exceed the free-fall certification height.

7.4 Construction

Each free-fall lifeboat must be of sufficient strength to withstand, when loaded with its full complement of persons and equipment, a free-fall launch from a height of at least 1.3 times the free-fall certification height.

7.5 Protection against harmful acceleration

Each free-fall lifeboat must be so constructed as to ensure that the lifeboat is capable of rendering protection against harmful accelerations resulting from being launched from the height for which it is to be certified in calm water under unfavourable

conditions of trim of up to 10° and list of up to 20° either way when it is fully equipped and loaded with:

- (a) its full complement of persons;
- (b) occupants so as to cause the centre of gravity to be in the most forward position;
- (c) occupants so as to cause the centre of gravity to be in the most aft position; and
- (d) the operating crew only.

7.6 Lifeboat fittings

Each free-fall lifeboat must be fitted with a release system which must:

- (a) have two independent activation systems for the release mechanisms which may only be operated from inside the lifeboat and be marked in a colour that contrasts with its surroundings;
- (b) be so arranged as to release the boat under any condition of loading from no load up to at least 200% of the normal load caused by the fully equipped lifeboat when loaded with the number of persons for which it is to be approved;
- (c) be adequately protected against accidental or premature use;
- (d) be designed to test the release system without launching the lifeboat; and
- (e) be designed with a factor of safety of 6 based on the ultimate strength of the materials used.

7.7 Certificate of approval

In addition to the requirements of 4.1.2 the certificate of approval for a free-fall lifeboat must also state:

- (a) free-fall certification height;
- (b) required launching ramp length; and
- (c) launching ramp angle for the free-fall certification height.

8 Lifeboats with a self-contained air support system

(LSA Code, §4.8)

In addition to complying with 6 and 7 as applicable, a lifeboat with a self-contained air support system must be so arranged that, when proceeding with all entrances and openings closed, the air in the lifeboat remains safe and breathable and the engine runs

normally for a period of not less than 10 minutes. During this period the atmospheric pressure inside the lifeboat must never fall below the outside atmospheric pressure nor must it exceed it by more than 2 kPa. The system must have visual indicators to indicate the pressure of the air supply at all times.

9 Fire-protected lifeboats

(LSA Code, §4.9)

9.1 In addition to complying with 8, a fire-protected lifeboat when water-borne must be capable of protecting the number of persons it is permitted to accommodate when subjected to a continuous oil fire that envelops the lifeboat for a period of not less than 8 minutes.

9.2 Water spray system

A lifeboat that has a water spray fire-protection system must comply with the following:

- (a) water for the system must be drawn from the sea by a self-priming motor pump. It must be possible to turn "on" and turn "off" the flow of water over the exterior of the lifeboat;
- (b) the sea water intake must be so arranged as to prevent the intake of flammable liquids from the sea surface; and
- (c) the system must be arranged for flushing with fresh water and allowing complete drainage.

10 Lifeboat compasses

10.1 The materials and workmanship of the compass must be good throughout and the compass must be such as will remain efficient under sea-going conditions. The compass must be capable of functioning efficiently over a temperature range from -23°C to +49°C.

10.2 A lifeboat compass must be of the liquid type. The liquid must be a clear mixture of industrial methylated spirit and water with a specific gravity of 0.93 at 16°C, or a liquid equivalent in clarity and viscosity which is inert with respect to all parts of the compass in contact with it. The liquid must be free from sediment, cloudiness and dirt.

10.3 The magnet must have sufficient directive force to give a period between 14 and 18 seconds after a deflexion of 40° in a horizontal magnetic field of 0.25 cgs units at a temperature of 15°C.

10.4 If weights are added to the compass card system to counteract the tilting effect of the earth's vertical magnetic field in high latitudes, the weights are to be equally effective in northern and southern magnetic latitudes.

10.5 Over a temperature range of -23°C to $+49^{\circ}\text{C}$ the card system, when immersed in the compass liquid, must rest on the pivot with a force between 0.04 and 0.10 Newtons; alternatively the card system is to be so arranged that it cannot be dislodged from its proper position in rough seas.

10.6 The compass card must be marked in tens of degrees or in points and half points. The eight principal points are to be distinctively marked and rendered luminous.

10.7 The compass card must be sufficiently large to be read at a distance of one metre and must rotate freely at any angle of tilt of the compass bowl up to 10° , throughout the temperature range from -23°C to $+49^{\circ}\text{C}$.

10.8 The pivot must be of iridium, and the centre of the card must be of sapphire, or of equally hard and non-wearing materials having a similar coefficient of friction when immersed in the compass liquid.

10.9 The bowl must be provided with a suitable arrangement, if needed, to allow for the expansion and contraction of the liquid in the compass over a temperature range from -23°C to $+49^{\circ}\text{C}$ without leakage, formation of bubbles or other defects. Paint, if any, on the card or bowl must not blister.

10.10 The compass bowl must be adequately weighted and properly poised in the gimbals and, if not permanently mounted in position in a totally enclosed lifeboat, be placed in a binnacle or the like of non-magnetic material. The binnacle or mounting is to be provided with a lubber line or mark rendered luminous.

10.11 The gimbals system must be in the same horizontal plane as the point of suspension of the card, the outer gimbal pins being placed fore and aft, and the inner gimbal pins being placed thwartships. The pins and the bearings in which they engage must be perfectly smooth.

10.12 The direction of the lubber line or mark from the centre of the compass card must lie in the same vertical plane as the outer gimbal axis.

10.13 The cumulative effect of card, pivot, directional and other errors, including inaccurate positioning of the lubber line, must be such that in the earth's undisturbed magnetic field the direction, as read on the card against the lubber line, does not differ

by more than 3° from the magnetic direction of the gimbal axis for any horizontal orientation of the binnacle or compass.

10.14 The binnacle or totally enclosed lifeboat must be fitted with lighting which will illuminate the card and lubber line.

10.15 The compass bowl must be engraved, stamped, embossed or otherwise indelibly marked with the manufacturer's name or other mark identifying the manufacturer.

11 Lifeboat sea anchors

11.1 A sea anchor must be constructed of suitable material, which must be strongly sewn together and roped at the seams with bolt rope of 15 millimetres diameter, the ropes then being formed into a bridle with a thimble seized in the connecting end and the rope extending and seized into a parcelled loop to form the attachment for the tripping line.

11.2 A hawser not less than 3 times the lifeboat's length must be attached to the sea anchor by means of a shackle of suitable size to take the thimble.

11.3 A tripping line 3.5 metres longer than the hawser must be provided.

11.4 A circular sea anchor must be fitted at the mouth with a galvanised iron hoop and any other type of sea anchor must be fitted with an equivalent iron spreader on the lower edge of the mouth and with an ash spreader on the upper edge of the mouth.

11.5 For a lifeboat not exceeding 7 metres in length:

- (a) the mouth of the sea anchor must be at least 610 millimetres in diameter in the case of a circular sea anchor and at least 545 millimetres each side in the case of a non-circular folding sea anchor;
- (b) the length of the canvas bag of the anchor must be one metre;
- (c) the diameter of the hawser must be 20 millimetres; and
- (d) the diameter of the tripping line must be 12 millimetres.

11.6 For a lifeboat exceeding 7 metres in length but not exceeding 9 metres in length:

- (a) the mouth of the sea anchor must be at least 690 millimetres in diameter in the case of a circular sea anchor and at least 610 millimetres each side in the case of a non-circular folding sea anchor;
- (b) the length of the canvas bag of the anchor must be 1.2 metres;

- (c) the diameter of the hawser must be 24 millimetres; and
- (d) the diameter of the tripping line must be 16 millimetres.

11.7 For a lifeboat exceeding 9 metres in length:

- (a) the mouth of the sea anchor must be at least 800 millimetres in diameter in the case of a circular sea anchor, or if of the non-circular folding type the mouth must be at least 760 millimetres at the upper edge, at least 690 millimetres at the lower edge and at least 690 millimetres on each side;
- (b) the length of the canvas bag of the anchor must be 1.4 metres;
- (c) the diameter of the hawser must be 24 millimetres; and
- (d) the diameter of the tripping line must be 16 millimetres.

12 Lifeboat manual pumps

12.1 A lifeboat manual pump, when operated with a 1.2 metre suction head by one man must have a pumping capacity of not less than 32 litres per minute.

12.2 In its normal dry state (excluding internal grease or other assistance) a lifeboat manual pump must be readily self-priming when operated with a suction head of not less than 1.2 metres.

12.3 All parts of a lifeboat manual pump must be of non-corrodible material, unaffected by sea water.

12.4 The interior of a lifeboat manual pump, including valves, must be readily accessible for emergency cleaning and the covers for access must be capable of being easily removed without the use of a spanner or other special tool.

12.5 The branches of a lifeboat manual pump must be suitable for use with rubber hose connections of 30 millimetres bore and the metal part of the operating handles must be suitably sheathed by material other than wood so as to protect the hands of the operator when the pump is used in extreme cold.

12.6 The spindle-glands of a lifeboat manual pump must be of the spring loaded seal-ring type.

* * * * *

Appendix 4

Rescue Boats and Fast Rescue Boats

A—Rescue Boats

(LSA Code. §5.1)

1 General requirements

(LSA Code. §5.1.1)

1.1 Except as provided in this Appendix, a rescue boat must comply with 4.1 to 4.7.4 (inclusive), 4.7.6, 4.7.7, 4.7.9, 4.7.10 and 4.9 of Appendix 3. A lifeboat may be approved and used as a rescue boat if it meets all of the requirements of this section of this Appendix, if it successfully completes the testing for a rescue boat required in 5.4 of this Part, and if its stowage, launching and recovery arrangements on the ship meet all of the requirements for a rescue boat.

1.2 Notwithstanding 4.4 of Appendix 3, required buoyant material for rescue boats may be installed external to the hull, provided it is adequately protected against damage and is capable of withstanding exposure as specified in 3.3.

1.3 A rescue boat may be either of rigid or inflated construction or a combination of both and must:

- (a) be not less than 3.8 metres and not more than 8.5 metres in length; and
- (b) be capable of carrying at least 5 seated persons and a person lying on a stretcher. Notwithstanding 4.1.5 of Appendix 3, seating, except for the helmsman, may be provided on the floor, provided that the seating space analysis in accordance with 4.2.2(b) of Appendix 3 uses shapes similar to figure 1, but altered to an overall length of 1190 mm to provide for extended legs. No part of a seating space is to be on the gunwale, transom, or on inflated buoyancy at the sides of the boat.

1.4 A rescue boat which is a combination of rigid and inflated construction must comply with the appropriate requirements of this Appendix to the satisfaction of the Chief Marine Surveyor.

1.5 Unless a rescue boat has adequate sheer, it must be provided with a bow cover extending for not less than 15 per cent of its length.

1.6 A rescue boat must be capable of manoeuvring at a speed of 6 knots and maintaining that speed for a period of at least 4 hours.

1.7 A rescue boat must have sufficient mobility and manoeuvrability in a seaway to enable persons to be retrieved from the water, marshal life-rafts and tow the largest life-raft carried on a ship when loaded with its full complement of persons and equipment or its equivalent at a speed of at least 2 knots.

1.8 A rescue boat must be fitted with an inboard engine or outboard motor. If it is fitted with an outboard motor, the rudder and tiller may form part of the engine. Notwithstanding 4.6.1 of Appendix 3, a petrol-driven outboard engine with an approved fuel system may be fitted in a rescue boat provided the fuel tanks are specially protected against fire and explosion.

1.9 Arrangements for towing must be permanently fitted in a rescue boat and must be sufficiently strong to marshal or tow life-rafts as required by 1.7.

1.10 Unless expressly provided otherwise, a rescue boat must be provided with effective means of bailing or be automatically self-bailing.

1.11 A rescue boat must be fitted with weather-tight stowage for small items of equipment.

2 Rescue boat equipment

(LSA Code. §5.1.2)

2.1 All items of rescue boat equipment, with the exception of boat-hooks which must be kept free for fending off purposes, must be secured within the rescue boat by lashings, storage in lockers or compartments, storage in brackets or similar mounting arrangements, or other suitable means. The equipment must be secured in such a manner as not to interfere with any launching or recovery procedures. All items of rescue boat equipment must be as small and of as little mass as possible and must be packed in suitable and compact form.

2.2 The normal equipment of a rescue boat must consist of:

- (a) a sufficient number of buoyant oars or paddles to make headway in calm seas. Thole pins, crutches or equivalent arrangements must be provided for each oar. Thole pins or crutches must be attached to the boat by lanyards or chains;
- (b) a buoyant bailer;
- (c) a binnacle containing an efficient compass which is luminous or provided with suitable means of illumination;

- (d) a sea-anchor and tripping line with a hawser of adequate strength not less than 10 metres in length;
- (e) a painter of sufficient length and strength, attached to the release device complying with 4.7.7 of Appendix 3 and placed at the forward end of the rescue boat;
- (f) a buoyant line, not less than 50 metres in length, of sufficient strength to tow a life raft as required by 1.7;
- (g) a waterproof electric torch suitable for Morse signalling, together with a spare set of batteries and a spare bulb in a waterproof container;
- (h) a whistle or equivalent sound signal;
- (i) a first-aid outfit in a waterproof case capable of being closed tightly after use;
- (j) 2 buoyant rescue quoits, attached to not less than 30 metres of buoyant line;
- (k) a searchlight with a horizontal and vertical sector of at least 6° and a measured luminous intensity of 2500 candela which can work continuously for not less than 3 hours;
- (l) an efficient radar reflector;

Note: *The Chief Marine Surveyor will accept a radar transponder, complying with IMO Resolution A.802(19), stowed in the rescue boat as being equivalent to a radar reflector.*

- (m) thermal protective aids sufficient for 10 per cent of the number of persons the rescue boat is permitted to accommodate or 2, whichever is the greater; and
- (n) portable fire-extinguishing equipment of an approved type suitable for extinguishing oil fires.

Note: *See 4.8.1(zb) of Appendix 3.*

2.3 In addition to the equipment specified in 2.2, the normal equipment of a rigid rescue boat must include:

- (a) a boat-hook;
- (b) a bucket; and
- (c) a knife or hatchet.

2.4 In addition to the equipment specified in 2.2, the normal equipment of a inflated rescue boat must include:

- (a) a buoyant safety knife;
- (b) 2 sponges;
- (c) an efficient manually operated bellows or pump;
- (d) a repair kit in a suitable container for repairing punctures; and
- (e) a safety boat-hook.

2.5 The following equipment, or other equally efficient means, must be fitted to assist the recovery of a lifeboat which is also a rescue boat in bad weather conditions:

- (a) rope pennants attached to the lower fall blocks after launching is completed to enable the boat to be hung off, the rope pennants removed, and the lower blocks overhauled and attached to the boat so that it may be hoisted safely and expeditiously; and
- (b) wire pennants attached to the davit heads to enable the boat to be brought up into its stowed position.

3 Additional requirements for inflated rescue boats

(LSA Code. §5.1.3)

3.1 The requirements of 4.1.4 and 4.1.6 of Appendix 3 do not apply to inflated rescue boats.

3.2 An inflated rescue boat must be constructed in such a way that, when suspended by its bridle or lifting hook:

- (a) it is of sufficient strength and rigidity to enable it to be lowered and recovered with its full complement of persons and equipment;
- (b) it is of sufficient strength to withstand a load of 4 times the mass of its full complement of persons and equipment at an ambient temperature of $20^{\circ} \pm 3^{\circ}\text{C}$ with all relief valves inoperative; and
- (c) it is of sufficient strength to withstand a load of 1.1 times the mass of its full complement of persons and equipment at an ambient temperature of -30°C , with all relief valves operative.

3.3 An inflated rescue boat must be so constructed as to be capable of withstanding exposure:

- (a) when stowed on an open deck on a ship at sea; and
- (b) for 30 days afloat in all sea conditions.

3.4 In addition to complying with 4.9 of Appendix 3, inflated rescue boats must be marked with a serial number, the maker's name or trade mark and the date of manufacture.

3.5 The buoyancy of an inflated rescue boat must be provided by either a single tube subdivided into at least five separate compartments of approximately equal volume or two separate tubes neither exceeding 60 per cent of the total volume. The buoyancy tubes must be so arranged that the intact compartments must be able to support the number of persons which the rescue boat is permitted to accommodate, each having a mass of 75 kilograms, when seated in their normal positions with positive freeboard over the rescue boat's entire periphery under the following conditions:

- (a) with the forward buoyancy compartment deflated;
- (b) with the entire buoyancy on one side of the rescue boat deflated; and
- (c) with the entire buoyancy on one side and the bow compartment deflated.

3.6 The buoyancy tubes forming the boundary of an inflated rescue boat must on inflation provide a volume of not less than 0.17 cubic metres for each person the rescue boat is permitted to accommodate.

3.7 Each buoyancy compartment must be fitted with a non-return valve for manual inflation and means for deflation. A safety relief valve must also be fitted.

3.8 Underneath the bottom and on vulnerable places on the outside of the inflated rescue boat, rubbing strips must be provided to the satisfaction of the Chief Marine Surveyor.

3.9 If a transom is fitted it must not be inset by more than 20 per cent of the overall length of the rescue boat.

3.10 Suitable patches must be provided for securing the painters fore and aft and the becketed lifelines inside and outside the boat.

3.11 An inflated rescue boat must be maintained at all times in a fully inflated condition.

4 Marking

4.1 A rigid rescue boat must be fitted with retro-reflective tapes, each tape being not less than 300 millimetres long and not less than 50 millimetres wide:

- (a) on top of the gunwale of the boat;
- (b) on the outside of the boat as near to the gunwale as possible; and
- (c) on the underside of the boat on each side of the keel, spaced so that the distance between the centre of a tape and the centre of the tape next in line is not greater than 500 millimetres.

4.2 The top of any canopy or apron fitted to a rescue boat must be fitted with retro-reflective tapes, each tape being not less than 300 millimetres long and not less than 50 millimetres wide:

- (a) placed in such a way that 2 tapes form a cross; and
- (b) spaced so that the distance between the centre of a cross and the centre of the cross next in line is not greater than 500 millimetres.

Note: Illustrations depicting the fitting of retro-reflective tapes on rigid rescue boats are shown in 5 of Appendix 9.

4.3 An inflated rescue boat must be fitted:

- (a) on the outside of the boat, arranged vertically with the lower edge at the water-line, with retro-reflective tapes, each tape being not less than 150 millimetres long and not less than 50 millimetres wide, spaced so that the distance between the centre of a tape and the centre of the tape next in line is not greater than 500 millimetres;
- (b) on the bow, with a vertical strip of retro-reflective tape 600 millimetres long and 50 millimetres wide and two horizontal strips of retro-reflective tape 150 millimetres long and 50 millimetres wide, these strips being placed in the form of an arrowhead;
- (c) on the transom, above the water-line, with retro-reflective tapes, each tape being not less than 150 millimetres long and not less than 100 millimetres wide;
- (d) on each float, with retro-reflective tapes, each tape being not less than 150 millimetres long and not less than 50 millimetres wide, spaced so that the distance between the centre of a tape and the centre of the tape next in line is not less than 500 millimetres;
- (e) at the rear of each float, with a retro-reflective tape, being not less than 300 millimetres long and not less than 50 millimetres wide;
- (f) on each side of the bow cover, with retro-reflective tapes forming a cross, each tape being not less than 300 millimetres long and not less than 50 millimetres wide; and

- (g) on the underside of the boat, with retro-reflective tapes, each tape being not less than 300 millimetres long and not less than 50 millimetres wide, spaced so that the distance between the centre of a tape and the centre of the tape next in line is not less than 500 millimetres.

Note: Illustrations depicting the fitting of retro-reflective tapes on inflated rescue boats are shown in 6 of Appendix 9.

B—Fast Rescue Boats

Note: This section gives effect to IMO Resolution A.656(16). A fast rescue boat may be provided in place of a standard rescue boat.

5 General requirements

- 5.1** Except as provided in this Appendix, a rescue boat must comply with 4.1 to 4.6.7 (inclusive), 4.6.9 to 4.6.12 (inclusive), 4.7.3, 4.7.6, 4.7.7 and 4.9 of Appendix 3.
- 5.2** A fast rescue boat may be either of rigid, inflated or rigid/inflated construction and must:
- (a) be of a length adequate for its intended use; and
 - (b) be capable of carrying at least five seated persons and a person lying down.
- 5.3** A fast rescue boat which is a combination of rigid and inflated construction must comply with the appropriate requirements of this Appendix to the satisfaction of the Chief Marine Surveyor.
- 5.4** A fast rescue boat must be self-righting or capable of being readily righted by its crew.
- 5.5** Unless the fast rescue boat has adequate sheer, it must be provided with a bow cover extending for not less than 15% of its length, and be self-bailing or capable of being rapidly cleared of water.
- 5.6** A fast rescue boat must be capable of manoeuvring, for at least 4 hours, at a speed of at least 20 knots in calm water with a suitably qualified and experienced crew of at least 3 persons and at least 8 knots with a full complement of persons and equipment.
- 5.7** A fast rescue boat must have sufficient mobility and manoeuvrability in a seaway to enable persons to be retrieved from the water, marshal life-rafts and tow the largest

life-raft carried on the ship when loaded with its full complement of persons and equipment or its equivalent at a speed of at least 2 knots.

5.8 A fast rescue boat must be fitted with an inboard engine or engines or an outboard motor or motors commensurate with its speed, size and displacement. It should be steered by a wheel which is remote from the rudder, water jet or jets and outboard motor or motors and an approved form of emergency steering must be fitted. Notwithstanding 4.6.1 of Appendix 3, petrol driven outboard motors with approved fuel systems may be fitted in fast rescue boats, but special precautions must be taken to protect the fuel tanks from the effects of an explosion.

5.9 Each engine or motor in a fast rescue boat must stop automatically or be stopped by the helmsman's emergency release switch should the boat capsize. When the boat has righted, each engine or motor must be capable of being restarted, provided the helmsman's emergency release, if fitted, has been reset.

5.10 The fuel and lubricating oil systems must be so designed as to prevent the loss of more than 250 ml of fuel or lubricating oil from the propulsion system should the boat capsize.

5.11 Arrangements for towing must be permanently fitted in fast rescue boats and should be sufficiently strong to marshal or tow life-rafts, as required by 5.7.

5.12 A fast rescue boat must be fitted with weathertight stowage for small items of equipment.

5.13 If a fast rescue boat is stowed on a ship, a disengaging gear complying with 4.7.6 of Appendix 3, or its equivalent, must be fitted.

6 Fast rescue boat equipment

6.1 All items of fast rescue boat equipment, with the exception of boat-hooks which should be kept free for fending off purposes, must be secured within the rescue boat by lashings, storage in lockers or compartments, storage in brackets or similar mounting arrangements, or other suitable means. The equipment must be secured in such a manner as not to interfere with any launching or recovery procedures. All items of fast rescue boat equipment must be as small and of as little mass as possible and must be packed in suitable and compact form.

6.2 The normal equipment of every fast rescue boat must consist of:

- (a) sufficient buoyant oars or paddles to make headway in calm seas. Thole pins, crutches or equivalent arrangements must be provided for each oar and be attached to the boat by lanyards or chains;
- (b) a buoyant bailer;
- (c) a binnacle containing an efficient compass which is luminous or provided with suitable means of illumination;
- (d) a sea-anchor with a hawser of adequate strength not less than 10 metres in length;
- (e) a painter of sufficient length and strength, attached to the release device complying with 4.7.7 of Appendix 3 and placed at the forward end of the fast rescue boat;
- (f) one buoyant line, not less than 50 metres in length, of sufficient strength to tow a life-raft as required by 5.7;
- (g) one waterproof electric torch suitable for Morse signalling, together with one spare set of batteries and one spare bulb in a waterproof container;
- (h) one whistle or equivalent sound signal;
- (i) a first-aid outfit;
- (j) two buoyant rescue quoits, attached to not less than 30 metres of buoyant line;
- (k) a searchlight capable of effectively illuminating a light-coloured object at night having a width of 18 metres at a distance of 180 metres for a total period of 6 hours and of working for at least 3 hours continuously;
- (l) unless a radar transponder is stowed in the fast rescue boat, an efficient radar reflector;
- (m) thermal protective aids sufficient for 10% of the number of persons the rescue boat is permitted to accommodate or 2, whichever is the greater; and
- (n) portable fire-extinguishing equipment of an approved type suitable for extinguishing oil fires.

6.3 In addition to the equipment required by 6.2, the normal equipment of every rigid fast rescue boat must include:

- (a) a boat-hook;
- (b) a bucket; and
- (c) a knife or hatchet.

6.4 In addition to the equipment required by 6.2, the normal equipment of every rigid/inflated and every inflated fast rescue boat must include:

- (a) a buoyant safety knife;
- (b) two sponges;
- (c) an efficient manually-operated bellows or pump;
- (d) a repair kit in a suitable container for repairing punctures; and
- (e) a safety boat-hook.

6.5 A fast rescue boat on an Australian ship must be equipped with an easily operated fixed single-point suspension arrangement or equivalent.

6.6 Hooks and fastening devices for lowering and hoisting fast rescue boats must be so designed as to have a safety factor of 6 on the ultimate strength in relation to the loads occurring in a fully loaded condition.

7 Additional requirements for rigid, inflated and rigid/inflated fast rescue boats

7.1 The requirements of 4.1.4 and 4.1.6 of Appendix 3 do not apply to rigid, inflated and rigid/inflated fast rescue boats.

7.2 A rigid, inflated and rigid/inflated fast rescue boat must be constructed in such a way that, when suspended by its bridle or lifting hook:

- (a) it is of sufficient strength and rigidity to enable it to be lowered and recovered with its full complement of persons and equipment;
- (b) it is of sufficient strength to withstand a load of 4 times the mass of its full complement of persons and equipment at an ambient temperature of $20 \pm 3^{\circ}\text{C}$, with all relief valves inoperative; and
- (c) it is of sufficient strength to withstand a load of 1.1 times the mass of its full complement of persons and equipment at an ambient temperature of -30°C , with all relief valves operative.

7.3 Rigid, inflated and rigid/inflated fast rescue boats must be so constructed as to be capable of withstanding exposure:

- (a) when stowed on an open deck on a ship at sea; and
- (b) for 30 days afloat in all sea conditions.

7.4 In addition to complying with 4.9 of Appendix 3, rigid, inflated and rigid/inflated fast rescue boats must be marked with a serial number, the maker's name or trade mark and the date of manufacture.

7.5 The buoyancy of a rigid, inflated and rigid/inflated fast rescue boat must be provided by either a single tube subdivided into at least five separate compartments of approximately equal volume or two separate tubes neither exceeding 60% of the total volume. The buoyancy tubes must be so arranged that, in the event of any one of the compartments being damaged, the intact compartments are able to support the number of persons which the fast rescue boat is permitted to accommodate, each having a mass of 75 kg, when seated in their normal positions with positive freeboard over the fast rescue boat's entire periphery.

7.6 The buoyancy tubes forming the boundary of the rigid, inflated and rigid/inflated fast rescue boat must, on inflation, provide a volume of not less than 0.17 cubic metres for each person the fast rescue boat is permitted to accommodate.

7.7 Each buoyancy compartment must be fitted with a nonreturn valve for manual inflation and means for deflation. A safety relief valve should also be fitted.

7.8 Underneath the bottom and on vulnerable places on the outside of the rigid, inflated and rigid/inflated fast rescue boat, rubbing strips must be provided to the satisfaction of the Chief Marine Surveyor.

7.9 Where a transom is fitted it must not be inset by more than 20% of the overall length of the fast rescue boat.

7.10 Suitable patches must be provided for securing the painters fore and aft and the becketed lifelines inside and outside the fast rescue boat.

7.11 The inflated fast rescue boat must be maintained at all times in a fully inflated condition.

8 Marking

A fast rescue boat must be marked in accordance with 4.

* * * * *

Appendix 5

Launching and embarkation appliances

1 Launching and embarkation appliances

1.1 General requirements

(LSA Code, §6.1.1)

1.1.1 With the exception of the secondary means of launching for free-fall lifeboats, a launching appliance, together with all its lowering and recovery gear, must be so arranged that the fully equipped survival craft or rescue boat it serves can be safely lowered against a trim of up to 10° and a list of up to 20° either way:

- (a) when boarded, as required by 29 or 39, by its full complement of persons; and
- (b) with not more than the required operating crew on board.

1.1.2 Notwithstanding 1.1.1, lifeboat launching appliances for oil tankers, chemical tankers and gas carriers with a final angle of heel greater than 20° calculated in accordance with the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the 1978 Protocol related thereto and the recommendations of IMO, as applicable, must be capable of operating at the final angle of heel on the lower side of the ship, taking into consideration the final damaged waterline of the ship.

1.1.3 A launching appliance must not depend on any means other than gravity or stored mechanical power which is independent of the ship's power supplies to launch the survival craft or rescue boat it serves in the fully loaded and equipped condition and also in the light condition.

1.1.4 A launching appliance must be so constructed that a minimum amount of routine maintenance is necessary. All parts requiring regular maintenance by the ship's crew must be readily accessible and easily maintained.

1.1.5 The launching appliance and its attachments other than winch brakes must be of sufficient strength to withstand a static proof load on test of not less than 2.2 times the maximum working load.

1.1.6 Structural members and all blocks, falls, padeyes, links, fastenings and all other fittings used in connection with launching equipment must be designed with a factor of safety on the basis of the maximum working load assigned and the ultimate strength of the material used for construction. A minimum factor of safety of 4.5 must be applied

to all structural members, and a minimum factor of safety of 6 must be applied to falls, suspension chains, links and blocks.

1.1.7 A launching appliance must, as far as practicable, remain effective under conditions of icing.

1.1.8 A lifeboat launching appliance must be capable of recovering the lifeboat with its crew.

1.1.9 A rescue boat launching appliance must be fitted with a powered winch motor capable of raising the rescue boat from the water with its full rescue boat complement of persons and equipment at a rate of not less than 0.3 metres per second.

1.1.10 The arrangements of the launching appliance must be such as to enable safe boarding of the survival craft in accordance with 1.4.2, 1.4.3, 4.3.1 and 4.3.2 of Appendix 3.

1.2 Launching appliances using falls and a winch

(LSA Code, §6.1.2)

1.2.1 A launching appliance using falls and a winch, except for secondary launching appliances for free-fall lifeboats, must comply with 1.1.1 and in addition must comply with 1.2.

1.2.2 The launching mechanism must be so arranged that it may be actuated by one person from a position on the ship's deck and, except for secondary launching appliances for free-fall lifeboats, from a position within the survival craft or rescue boat. When launched by a person on the deck, the survival craft or rescue boat must be visible to that person.

1.2.3 Falls must be of rotation-resistant and corrosion-resistant steel wire rope.

***Note:** The Chief Marine Surveyor has determined that the standard of rotation resistance is to be not less than that of 6 x 36 steel wire rope, and the standard of corrosion resistance is to be not less than that of galvanized steel wire rope, properly lubricated and greased.*

1.2.4 In the case of a multiple drum winch, unless an efficient compensatory device is fitted, the falls must be so arranged as to wind off the drums at the same rate when lowering, and to wind on to the drums evenly at the same rate when hoisting.

1.2.5 The winch brakes of a launching appliance must be of sufficient strength to withstand:

- (a) a static test with a proof load of not less than 1.5 times the maximum working load; and
- (b) a dynamic test with a proof load of not less than 1.1 times the maximum working load at maximum lowering speed.

1.2.6 An efficient hand gear must be provided for recovery of each survival craft and rescue boat. Hand gear handles or wheels must not be rotated by moving parts of the winch when the survival craft or rescue boat is being lowered or when it is being hoisted by power.

1.2.7 If davit arms are recovered by power, safety devices must be fitted which will automatically cut off the power before the davit arms reach the stops in order to avoid overstressing the falls or davits, unless the motor is designed to prevent such overstressing.

1.2.8 The speed at which the survival craft or rescue boat is lowered into the water must be not less than that obtained from the formula:

$$S = 0.4 + (0.02 \times H)$$

where S = speed of lowering in metres per second

and H = height in metres from davit head to the water-line at the lightest seagoing condition.

1.2.9 The lowering speed of a fully equipped liferaft without persons onboard must be to the satisfaction of the Chief Marine Surveyor. The lowering speed of other survival craft, fully equipped but without persons on board, must be at least 70% of that required by 1.2.8.

1.2.10 The maximum lowering speed is 1.3 metres per second, or such greater speed as the Chief Marine Surveyor considers reasonable, having regard to the design of the survival craft or rescue boat, the protection of its occupants from excessive forces, and the strength of the launching arrangements taking into account inertia forces during an emergency stop. Means must be incorporated in the appliance to ensure that this speed is not exceeded.

1.2.11 A launching appliance must be fitted with brakes capable of stopping the descent of the survival craft or rescue boat and holding it securely when loaded with its full complement of persons and equipment; brake pads must, if necessary, be protected from water and oil.

1.2.12 Manual brakes must be so arranged that the brake is always applied unless the operator, or a mechanism activated by the operator, holds the brake control in the "off" position.

1.3 Float-free launching

(LSA Code, §6.1.3)

If a survival craft requires a launching appliance and is also designed to float free, the float-free release of the survival craft from its stowed position must be automatic.

1.4 Launching appliances for free-fall lifeboats

(LSA Code, §6.1.4)

1.4.1 Every free-fall launching appliance must comply with the applicable requirements of 1.1.1 and, in addition, must comply with 1.4.

1.4.2 The launching appliance must be designed and installed so that it and the lifeboat it serves operate as a system to protect the occupants from harmful acceleration forces as required by 7.5 of Appendix 3, and to ensure effective clearing of the ship as required by 7.3.1 and 7.3.2 of Appendix 3.

1.4.3 The launching appliance must be constructed so as to prevent sparking and incendiary friction during the launching of the lifeboat.

1.4.4 The launching appliance must be designed and arranged so that in its ready to launch position, the distance from the lowest point on the lifeboat it serves to the water surface with the ship in its lightest seagoing condition does not exceed the lifeboat's free-fall certification height, taking into consideration the requirements of 7.3 of Appendix 3.

1.4.5 The launching appliance must be arranged so as to preclude accidental release of the lifeboat in its unattended stowed position. If the means provided to secure the lifeboat cannot be released from inside the lifeboat, it must be so arranged as to preclude boarding the lifeboat without first releasing it.

1.4.6 The release mechanism must be arranged so that at least two independent actions from inside the lifeboat are required in order to launch the lifeboat.

1.4.7 Each launching appliance must be provided with a secondary means to launch the lifeboat by falls. Such means must comply with 1.1 (except 1.1.3) and 1.2 (except 1.2.6). It must be capable of launching the lifeboat against unfavourable conditions of trim of up to only 2° and list of up to only 5° either way and it need not comply with the speed requirements of 1.2.8 and 1.2.9. If the secondary launching appliance is not dependent on gravity, stored mechanical power or other manual means, the launching appliance must be connected both to the ship's main and emergency power supplies.

1.4.8 The secondary means of launching must be equipped with at least a single off-load capability to release the lifeboat.

1.5 Life-raft launching appliances

(LSA Code, §6.1.5)

A liferaft launching appliance must comply with the requirements of 1.1 and 1.2, except with regard to embarkation in the stowed position, recovery of the loaded liferaft and that manual operation is permitted for turning out the appliance. The launching appliance must include an automatic release hook arranged so as to prevent premature release during lowering and must release the liferaft when waterborne. The release hook must include a capability to release the hook under load. The on-load release control must:

- (a) be clearly differentiated from the control which activates the automatic release function;
- (b) require at least two separate actions to operate;
- (c) with a load of 150 kg on the hook, require a force of at least 600 and not more than 700 Newtons to release the load, or provide equivalent adequate protection against inadvertent release of the hook; and
- (d) be designed such that the crew members on deck can clearly observe when the release mechanism is properly and completely set.

1.6 Embarkation ladders

(LSA Code, §6.1.6)

1.6.1 Hand holds must be provided to ensure a safe passage from the deck to the head of the ladder and vice versa.

1.6.2 The steps of the ladder must be:

- (a) made of hardwood, free from knots or other irregularities, smoothly machined and free from sharp edges and splinters, or of suitable material of equivalent properties;
- (b) provided with an efficient non-slip surface either by longitudinal grooving or by the application of an approved non-slip coating;
- (c) not less than 480 millimetres long, 115 millimetres wide and 25 millimetres in depth, excluding any non-slip surface, grooving or coating; and
- (d) equally spaced not less than 300 millimetres nor more than 380 millimetres apart and secured in such a manner that they will remain horizontal.

1.6.3 The side ropes of the ladder must consist of two uncovered manila ropes not less than 65 mm in circumference on each side. Each rope must be continuous with no joints below the top step. Other materials may be used provided the dimensions, breaking strain, weathering, stretching and gripping properties are at least equivalent to those of manila rope. All rope ends must be secured to prevent unravelling.

Note: The Chief Marine Surveyor will approve polypropylene ropes provided that their size is not less than 20 mm in circumference and they are protected against actinic degradation. A certificate attesting to the latter must be supplied with every new embarkation ladder using polypropylene side ropes, or with every coil of such rope for use in an embarkation ladder, which must be retained on board for inspection by a surveyor.

2 Marine evacuation systems

(LSA Code, §6.2)

2.1 Construction of the marine evacuation systems

2.1.1 The passage of the marine evacuation system must provide for safe descent of persons of various ages, sizes and physical capabilities wearing approved lifejackets from the embarkation station to the floating platform or survival craft.

2.1.2 Strength and construction of the passage and platform must be to the satisfaction of the Chief Marine Surveyor.

2.1.3 The platform if fitted must be:

- (a) such that sufficient buoyancy will be provided for the working load. In the case of an inflatable platform, the main buoyancy chambers, which for this purpose include any thwarts or floor inflatable structural members, are to meet the requirements of 2 of Appendix 3 based upon the platform capacity except that the capacity is to be obtained by dividing by 0.25 the usable area given in (c);
- (b) stable in a seaway and provide a safe working area for the system operators;
- (c) of sufficient area that will provide for the securing of at least two liferafts for boarding and to accommodate at least the number of persons that at any time are expected to be on the platform. This usable platform area must be at least equal to:

20% of total number of persons that the Marine Evacuation System is certificated for m^2

4

or 10 m², whichever is the greater. However, the Chief Marine Surveyor may approve alternative arrangements which are demonstrated to comply with all the prescribed performance requirements;

Note: The Chief Marine surveyor will have regard to IMO Resolution MSC.81(70): Revised recommendation on testing of life-saving appliances.

- (d) self draining;
- (e) sub-divided in such a way that the loss of gas from any one compartment will not restrict its operational use as a means of evacuation. The buoyancy tubes must be sub-divided or protected against damage occurring from contact with the ship's side;
- (f) fitted with a stabilizing system to the satisfaction of the Chief Marine Surveyor;
- (g) restrained by a bowsing line or other positioning systems which are designed to deploy automatically and if necessary, to be capable of being adjusted to the position required for evacuation; and
- (h) provided with mooring and bowsing line patches of sufficient strength to securely attach the largest inflatable liferaft associated with the system.

2.1.4 If the passage gives direct access to the survival craft, it should be provided with a quick release arrangement.

2.2 Performance of the marine evacuation system

2.2.1 A marine evacuation system must be:

- (a) capable of deployment by one person;
- (b) such as to enable the total number of persons for which it is designed, to be transferred from the ship into the inflated liferafts within a period of 30 minutes in the case of a passenger ship and of 10 minutes in the case of a cargo ship from the time abandon ship signal is given;
- (c) arranged such that liferafts may be securely attached to the platform and released from the platform by a person either in the liferaft or on the platform;
- (d) capable of being deployed from the ship under unfavourable conditions of trim of up to 10° and list of up to 20° either way;
- (e) in the case of being fitted with an inclined slide, such that the angle of the slide to the horizontal is:

- (i) within a range of 30° to 35° when the ship is upright and in the lightest sea-going condition; and
- (ii) in the case of a passenger ship, a maximum of 55° in the final stage of flooding in accordance with Marine Orders, Part 12;
- (f) evaluated for capacity by means of timed evacuation deployments conducted in harbour;
- (g) capable of providing a satisfactory means of evacuation in a sea state associated with a wind of force 6 on the Beaufort scale;
- (h) designed, as far as practicable, to remain effective under conditions of icing; and
- (i) so constructed that only a minimum amount of routine maintenance is necessary. Any part requiring maintenance by the ship's crews must be readily accessible and easily maintained.

2.2.2 Where one or more marine evacuation systems are provided on a ship, at least 50% of such systems must be subjected to a trial deployment after installation. Subject to these deployments being satisfactory, the untried systems are to be deployed within 12 months of installation.

2.3 Inflatable liferafts associated with marine evacuation systems

Any inflatable liferaft used in conjunction with the marine evacuation system must:

- (a) conform with the requirements of 2 of Appendix 3;
- (b) be sited close to the system container but be capable of dropping clear of the deployed system and boarding platform;
- (c) be capable of release one at a time from its stowage rack with arrangements which will enable it to be moored alongside the platform;
- (d) be stowed in accordance with 19.4 of this Part; and
- (e) be provided with pre-connected or easily connected retrieving lines to the platform.

2.4 Containers for marine evacuation systems

2.4.1 The evacuation passage and platform must be packed in a container that is:

- (a) so constructed as to withstand hard wear under conditions encountered at sea; and

(b) as far as practicable watertight, except for drain holes in the container bottom.

2.4.2 The container must be marked with:

- (a) maker's name or trade mark;
- (b) serial number;
- (c) name of approval authority and the capacity of the system;
- (d) SOLAS;
- (e) date of manufacture (month and year);
- (f) date and place of last service;
- (g) maximum permitted height of stowage above waterline; and
- (h) stowage position on board.

2.4.3 Launching and operating instructions must be marked on or in the vicinity of the container.

2.5 Marking on marine evacuation systems

The marine evacuation system must be marked with:

- (a) maker's name or trade mark;
- (b) serial number;
- (c) date of manufacture (month and year);
- (d) name of approving authority;
- (e) name and place of servicing station where it was last serviced, along with the date of servicing; and
- (f) the capacity of the system.

* * * * *

Appendix 6

Other life-saving appliances

1 Line-throwing appliances

(LSA Code, §7.1)

1.1 A line-throwing appliance must:

- (a) be capable of throwing a line with reasonable accuracy;
- (b) include no fewer than 4 projectiles each capable of carrying the line at least 230 metres in calm weather;
- (c) include no fewer than 4 lines each having a breaking strength of not less than 2 kilonewtons; and
- (d) have brief instructions or diagrams clearly illustrating the use of the line-throwing appliance.

Note: If rockets are fired for practice purposes, additional rockets and lines must be carried so that at no time is the appliance equipped with fewer than the specified number of projectiles and lines.

1.2 The rocket, in the case of a pistol fired rocket, or the assembly, in the case of an integral rocket and line, must be contained in a water-resistant casing. In addition, in the case of a pistol-fired rocket, the line and rockets together with the means of ignition must be stowed in a container which provides protection from the weather.

2 General alarm and public address system

(LSA Code, §7.2)

2.1 General emergency alarm system

2.1.1 The general emergency alarm system must be capable of sounding the general emergency alarm signal consisting of seven or more short blasts followed by one long blast on the ship's whistle or siren and additionally on an electrically operated bell or klaxon or other equivalent warning system, which must be powered from the ship's main supply and the emergency source of electrical power required by Marine Orders, Part 12. The system must be capable of operation from the navigation bridge and, except for the ship's whistle, also from other strategic points. The system must be audible throughout all the accommodation and normal crew working spaces. The

alarm must continue to function after it has been triggered until it is manually turned off or is temporarily interrupted by a message on the public address system.

2.1.2 The minimum sound pressure levels for the emergency alarm tone in interior and exterior spaces must be 80 dB (A) and at least 10 dB (A) above ambient noise levels existing during normal equipment operation with the ship underway in moderate weather. In cabins without a loudspeaker installation, an electronic alarm transducer must be installed, e.g. a buzzer or similar.

2.1.3 The sound pressure levels at the sleeping position in cabins and in cabin bathrooms must be at least 75 dB (A) and at least 10 dB (A) above ambient noise levels.

Note: Refer to IMO Resolution A.830(19): Code on Alarms and Indicators.

2.1.4 A sound generating device referred to in 2.1 must not be fitted with means for varying the tone or volume of its emitted sound without the use of tools.

2.1.5 Each component of the general alarm signalling system must be of a type suitable for its intended function and use in a marine environment.

2.1.6 A general alarm signalling system is to be installed and tested to the satisfaction of a surveyor.

2.1.7 Components and wiring for a general alarm signalling system in a passenger ship must be arranged to avoid galleys and other enclosed spaces having a high risk of fire except to the extent that it is necessary to provide alarms within such spaces. This requirement does not apply to the wiring in a space that contains a source of electrical power for the alarm signalling system.

2.1.8 Subject to 2.1.12, the sound emitted by the general alarm signalling system is to be clearly audible in any part of the spaces referred to in 2.1.6 when:

- (a) those spaces are subjected to the most adverse background noise level likely to be experienced in them when the ship is at sea; and
- (b) doors which are normally closed, are closed.

2.1.9 If it is not practicable to comply with 2.1.8 because of exceptionally loud background noise, the use of hearing protection by the crew or for any other reason, visual warning devices must be provided in addition to the sound generating devices.

2.1.10 In any space where sound generating devices and visual warning devices are provided, those devices must be so located that a person within the space must, under all operating conditions at sea, be able either to see or to hear a warning device.

2.1.11 Sound generating devices referred to in 2.1, and if required by 2.1.8 visual warning devices referred to in 2.1.12, must be located in the spaces in the ship that are:

- (a) normally accessible to passengers;
- (b) crew accommodation spaces;
- (c) open decks;
- (d) spaces containing internal combustion engines which supply power for the operation of emergency generators or emergency fire pumps; and
- (e) crew's working spaces which, for the purpose of this Appendix, means spaces in which persons are engaged on duty while the ship is at sea, except that it does not include a space which during any one week of normal operating conditions is occupied less than 15 hours.

2.1.12 A visual warning device for use in a general alarm signalling system must be:

- (a) electrically operated;
- (b) capable of flashing a red light of at least 0.05 seconds duration at a rate of between one and 10 times per second; and
- (c) compatible with any flame detecting device that may be installed near it.

2.1.13 The sound generating devices and visual warning devices which make up the general alarm signalling system on a ship must be arranged for simultaneous operation by means of a single control which may be duplicated.

2.1.14 The general alarm signalling system control must be clearly and permanently labelled 'General Alarm'.

2.2 Public address system

2.2.1 The public address system must be a loudspeaker installation enabling the broadcast of messages into all spaces where crew members or passengers, or both, are normally present, and to muster stations. It must allow for the broadcast of messages from the navigation bridge and such other places on board the ship as the Chief Marine Surveyor considers necessary. It must be installed with regard to acoustically marginal conditions and not require any action from the addressee. It must be protected against unauthorized use.

2.2.2 With the ship underway in normal conditions, the minimum sound pressure levels for broadcasting emergency announcements must be:

- (a) in interior spaces—75 dB (A) and at least 20 dB (A) above the speech interference level; and
- (b) in exterior spaces—80 dB (A) and at least 15 dB (A) above the speech interference level.

* * * * *

Appendix 7

First-aid outfits

1 Contents

A first-aid outfit for a lifeboat, a life-raft or a rescue boat on an Australian ship must at least include the following:

- (a) four standard dressings No. 14, medium, measuring 15 centimetres by 10 centimetres;
- (b) four standard dressings No. 15, large, measuring 15 centimetres by 20 centimetres;
- (c) six triangular bandages with sides measuring approximately one metre;
- (d) ten open weave bandages measuring 75 millimetres by 5 metres;
- (e) one packet containing not less than a one metre continuous length of self-adhesive waterproof wound dressing of at least 60 millimetres width;
- (f) one packet containing not less than 10 paraffin gauze dressings for burns, individually wrapped, measuring approximately 10 centimetres by 10 centimetres;
- (g) two 50 gram tubes of Cetrimide cream 0.5 per cent (antiseptic cream);
- (h) fifty 500 mg Paracetamol tablets (analgesic tablets);
- (i) one pair of rustless, stainless metal scissors measuring at least 10 centimetres with one sharp and one blunt point;
- (j) 12 rustless, stainless metal safety pins of assorted sizes;
- (k) one small packet of Silica gel; and
- (l) first-aid instructions, including instructions for the use of the first aid outfit and narcotic drugs, in accordance with 4 of this Appendix, printed on linen, plastic or waterproof paper in English.

Note: *Paper bandages are not acceptable.*

2 Container

2.1 The container for a lifeboat, a life-raft or a rescue boat first-aid outfit must be:

- (a) made of a material of a strength sufficient to withstand hard wear under conditions met with at sea;
- (b) waterproof and sealed to indicate that the contents are intact;
- (c) packed in a room from which atmospheric moisture has been removed as far as possible;
- (d) rustproof;
- (e) indelibly marked on its outside with an itemised list of its contents and the date on which the first aid outfit was assembled; and
- (f) capable of being closed tightly after use.

2.2 The label of the container must show:

- (a) the supplier's name and address; and
- (b) the expiry date of the outfit, which must not be more than 2 years from the date of packing.

3 Replacement of stocks

The following articles listed in 1 are to be replaced with fresh stocks at intervals not exceeding 2 years:

- (a) self adhesive waterproof wound dressings;
- (b) paraffin gauze dressings for burns;
- (c) Cetrimide cream;
- (d) Paracetamol tablets; and
- (e) Silica gel.

4 Instructions for use of first-aid outfits

4.1 Use of contents

Wound dressings (sterile pad and bandage) medium and large sizes are provided for dressing of wounds.

Roller bandages are used to protect burns after the burn dressings have been applied. Can be used as an additional cover for wound dressings.

Triangular bandages are mainly used to make an arm sling in fractures involving the shoulder, arm or wrist. When folded, they can be used to secure splints. They make a convenient head bandage for scalp wounds.

Paraffin gauze burn dressings are used in dressing burns, where any raw area needs to be covered.

Antiseptic (Cetrimide) cream is contained in a tube. It is for application to contaminated wounds or minor cuts and abrasions.

Analgesic tablets (labelled) used to relieve pain (Directions on container).

Injections of morphine (or equivalent) Used to relieve very severe pain (Directions in 4.2).

Note: Silica gel is included as a drying agent—do not remove—not to be taken.

4.2 Treatment of very severe pain

Each pack of narcotic drugs contains one of the following:

- (a) 6 Omnopon Tubunic ampoule syringes equivalent to 15 mg of morphine stored in a screw capped metal drum, instructions for use included.
- (b) 5 Morphine Sulphate injections each 15 mg in 1 ml ampoule. To be supplied together in a sealed waterproof packet containing:
 - (i) 5 patient medication tags;
 - (ii) 5 isopropyl alcohol skin swabs;
 - (iii) 5 syringes, sterile, 2.5 ml, each with a needle; and
 - (iv) instructions for use on plastic or waterproof paper.

To use:

- (i) Remove syringe and needle from wrapping and fit needle to syringe if not already fitted.
- (ii) Hold ampoule upright, shake contents down into base, break neck of ampoule at mark, hold ampoule upright and insert needle into contents (See diagram below).
- (iii) Suck contents of ampoule into syringe by withdrawing plunger. (See diagram).

- (iv) Hold syringe with needle upright (See diagram), depress plunger a little to remove any air (a drop or two of injection should appear at tip of needle).
 - (v) Insert needle under skin, keeping the syringe as flat as possible against the limb, and inject contents (See diagram). Quickly withdraw needle—discard empty syringe.
- (c) 5 Morphine Sulphate Injection 15 mg in 1 ml disposable syringe pack.

To use:

- (i) Remove needle protector.
- (ii) Insert needle under skin, keeping the syringe as flat as possible against the limb, and inject contents. Quickly withdraw needle—discard empty syringe.

DOSE: For an adult not more than 3 injections in 24 hours.

DON'T give Morphine (or equivalent) to a person who is unconscious or semi-conscious.

After injection make person comfortable to allow sleep if possible.

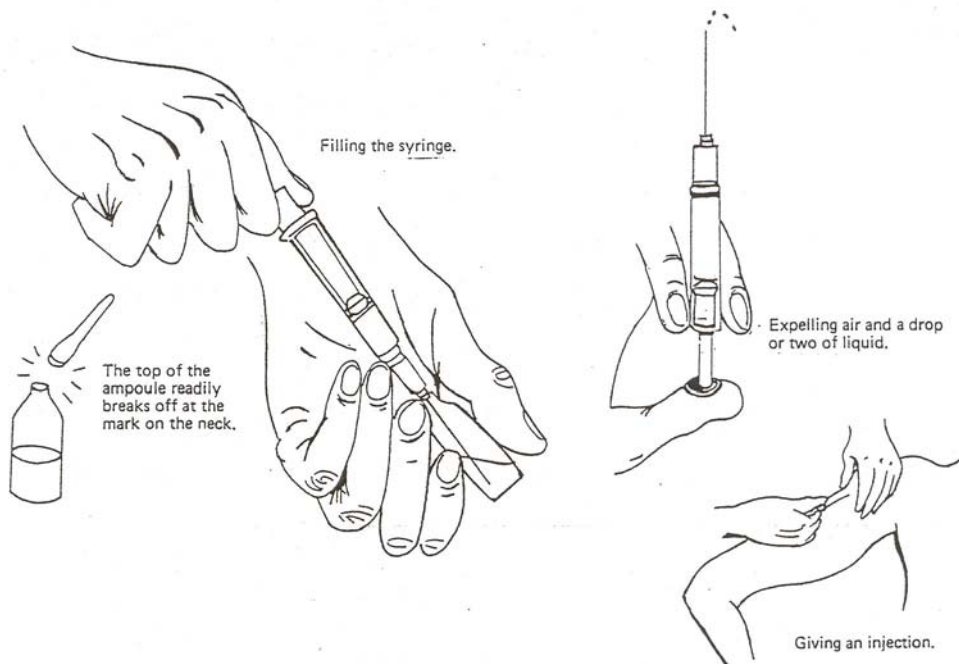


Figure 1

4.3 Treatment of wounds

Stop bleeding

Prevent infection

STERILE WOUND DRESSINGS are provided for this purpose.

PROCEDURE

1 *Expose wound*

In nearly every case bleeding can be arrested with firm DIRECT PRESSURE on the wound area by a suitable dressing. Make sure all the wound is covered by the dressing. Unless a tourniquet is correctly applied it does more harm than good, and it may increase the bleeding. Torrential bleeding from a large artery requiring a tourniquet is very rare. Firm pressure over the bleeding point with elevation of the wounded limb will often stop bleeding. Add further dressings if necessary but do not disturb original dressing.

2 *Unwrap a standard dressing*

Without touching the sterile pad of the dressing apply it firmly to the wound and fix in place with the bandage. Firm bandaging will stop the bleeding but watch must be kept for swelling of the limb, in which case the bandage must be loosened. The dressing may be reinforced with roller bandages provided.

If the wound is obviously dirty or contains foreign matter, some antiseptic cream may be applied to the dressing pad before it is used. Leave the dressing in place until medical attention is available.

Loosen bandage if it becomes too tight.

Keep the wounded part at rest as much as possible.

Wound causing severe pain and loss of blood gives rise to shock. (See 4.4 of this Appendix).

4.4 Treatment of shock

Shock is a state of collapse which may occur following severe wound, burns, scalds, blast, broken bones, extensive bruises or any serious injury.

PROCEDURE

- (i) Lay the person as flat as possible.
- (ii) Keep him or her warm (but avoid overheating).
- (iii) Give frequent drinks of water.

- (iv) Inject Morphine (or equivalent) if restless or pain is severe. (See 4.2 of this Appendix.)

4.5 Treatment of burns

If burns are severe there will be shock. For treatment of shock, see 4.4 of this Appendix.

- 1 A fresh burn is a clean wound. The aim is to prevent infection from contamination by germs.
- 2 Do not prick or remove blisters.
- 3 Take out one or more paraffin gauze dressings and apply gently to any raw areas. Cover the whole burnt area lightly with loosely applied bandages.
- 4 If all bandages have been used, cover the burnt area with clean handkerchiefs or other clean material.
- 5 Burns of the hand or arm should, after dressing, be supported in a broad sling using a triangular bandage.
- 6 Do not disturb dressings until proper medical attention is available. If swelling or constriction occurs, bandages should be loosened.

4.6 Treatment of fractures

- 1 Do not remove clothing unless necessary to treat a wound nearby.
- 2 Do not try to set the broken limb.
- 3 Immobilise the affected limb as far as possible. This should be done by applying slings or improvised splints. Folded triangular bandages can be used for binding fractured limbs to splints.
- 4 For breaks at the collar bone, shoulder, arm or wrist a sling should be applied using a triangular bandage.
- 5 Broken thigh. Bandage limb to a long splint if available or bandage both legs together using folded triangular bandages.
- 6 Broken foot or ankle. Bandage lightly and keep as still as possible.
- 7 Bandages which become too tight MUST be loosened.
- 8 If pain is severe give injection of morphine 15 mg, or equivalent (See 4.2 of this Appendix.)

4.7 Treatment of frostbite

The skin becomes pale and yellowish-white, looks opaque and becomes 'wooden' hardened. The actual freezing occurs quite suddenly. Once frozen the skin remains unchanged until it thaws, when it becomes inflamed.

PREVENTION

Avoid cramped positions. Keep moving as much as possible. Wear all available clothing. Keep socks dry. Protect ears, hands and all other exposed parts. Do not touch metals with bare skin. Be watchful for first signs of patches of frostbite. Wrinkling the face will detect areas of stiffness.

TREATMENT

Small frozen areas can be thawed by applying a bare warm hand. Larger areas, such as a foot, can be thawed by being placed inside companion's clothing. On thawing the skin will soften and become pink or red. Wrap in clean material if blistered. Cool the affected part a little with cold water if pain is severe. Morphine 15 mg or equivalent may be necessary. (See 4.2 of this Appendix.) Keep body warm but the affected part cool.

4.8 Treatment of immersion foot

This occurs when feet are immersed in cold water for many hours. The feet become swollen, white and numb and the skin may become broken and ulcerate.

PREVENTION

Keep out of contact with water. Wear seaboots. If socks become wet empty the boots, wring out socks and replace them speedily. Keep moving feet and toes.

TREATMENT

- 1 Dry feet very gently. DO NOT rub skin.
- 2 Apply antiseptic cream to any area where skin is broken.
- 3 Protect with loosely applied turns of bandages.
- 4 Keep patient warm but allow feet to warm up as slowly as possible. Keep limb elevated if possible.
- 5 Morphine 15 mg or equivalent may be given for the severe pain which may occur on recovery (See 4.2 of this Appendix).

4.9 Treatment of drowning and semi-drowning

ACT QUICKLY

SECONDS COUNT

AIR IS THE VITAL NEED

Ventilate the lungs at once by blowing air into them. Use the 'Mouth to Mouth' method (kiss of life). This is illustrated below.

Clear mouth and air passage

- 1 The airway between the mouth and lungs must be open and clear before air can enter the lungs.
- 2 Clear the mouth of any obstruction, i.e. weeds etc.
- 3 Extend the head backwards, supporting the nape of the neck. See Figure 2.
- 4 Lift the lower jaw forward by pressing forward behind the angle of the jaw below the ear. See Figure 2.
- 5 This manoeuvre lifts the tongue forward to open the airway into the lungs.
- 6 Once the airway is clear the patient may gasp and draw breath spontaneously. If this does not happen the following procedure should be followed at once.

Kiss of life

Maintain the open airway and at once ventilate the patient's lungs using your own lungs.

- 1 Take a deep breath.
- 2 Pinch the patient's nostrils together with your fingers.
- 3 Seal your lips round the patient's mouth. See Figure 2.
- 4 Blow into the patient's lungs until they are filled.
- 5 Remove your mouth and repeat.
- 6 Watch patient's chest movements to check that air is entering the lungs.



Figure 2

Time is vital. Therefore the first 3 or 4 inflations should be given as quickly as possible. For continued artificial respiration, inflations should be at the rate of ten per minute.

4.10 Pulse check

Check pulse in patient's neck. If no pulse can be felt and the patient becomes blue-grey in colour with dilated pupils, then the heart has stopped.

Strike the chest smartly once or twice over the breast bone. This stimulus may sometimes restart the heart beat.

If there is no response then External Cardiac Compression may be attempted by a trained First Aider.

Continue ventilation of the lungs using mouth to mouth respiration.

4.11 During recovery

Vomiting may occur. Turn the patient on his or her side so that any vomited material is not inhaled. Keep a close check on breathing.

* * * * *

Appendix 8

Guidelines for floor seam test supporters

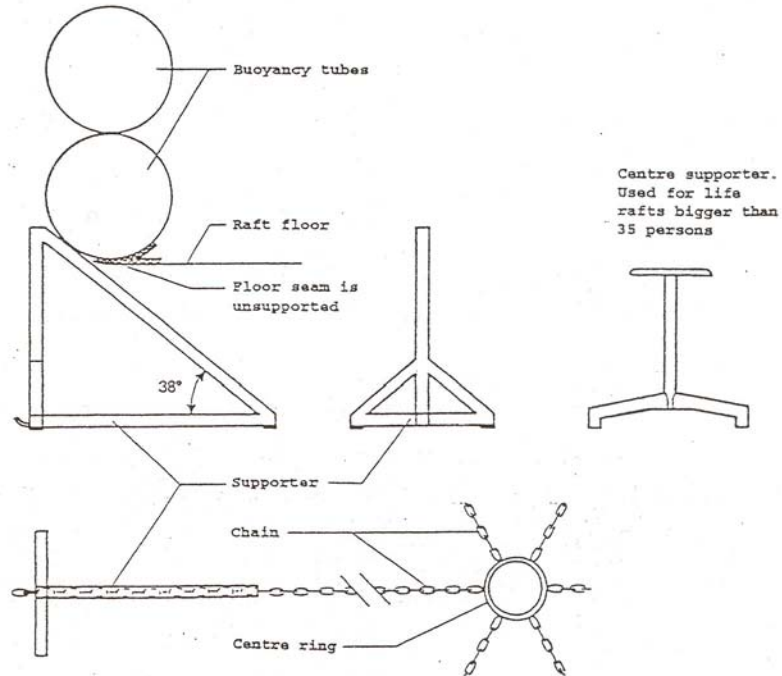


Figure 1: Illustrates recommended components for use with the Floor Seam Strength Test.

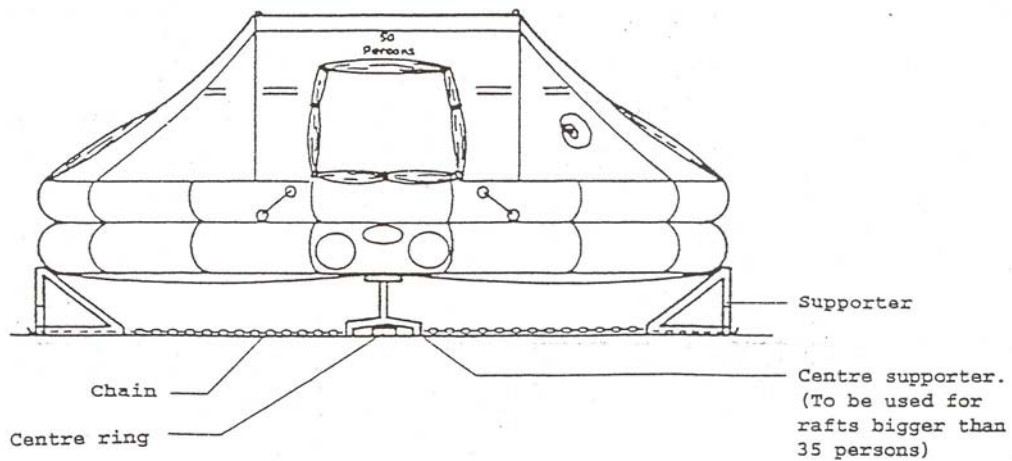


Figure 2: Illustrates the method in which a liferaft is supported for the Floor Seam Strength Test.

Appendix 9

Fitting of retro-reflective tape on life-saving appliances

1 Figures 1 and 2 illustrate the fitting of retro-reflective tape to a lifeboat as required by 4.9.5 and 4.9.6 of Appendix 3.

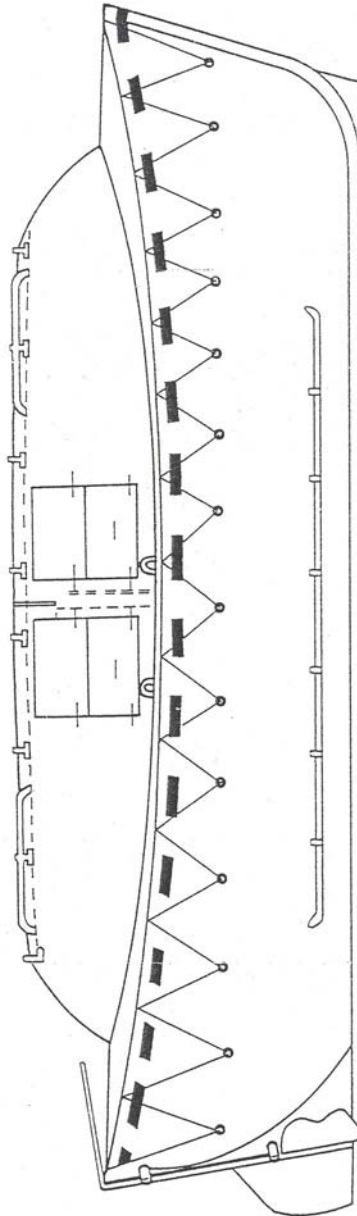


Figure 1: Side view of an enclosed lifeboat

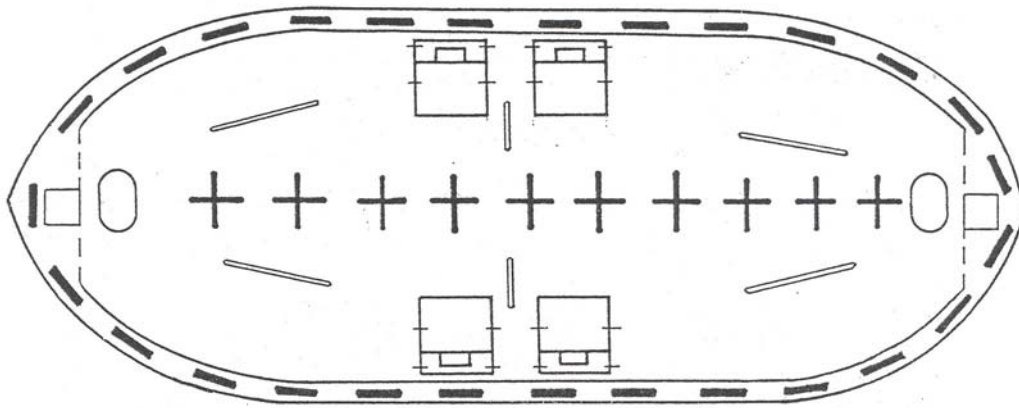


Figure 2: Plan view of an enclosed lifeboat

- 2 Figures 3 to 9 illustrate the fitting of retro-reflective tape to a life-raft as required by 2.7.2, 2.7.3 and 3.6.2 of Appendix 3.

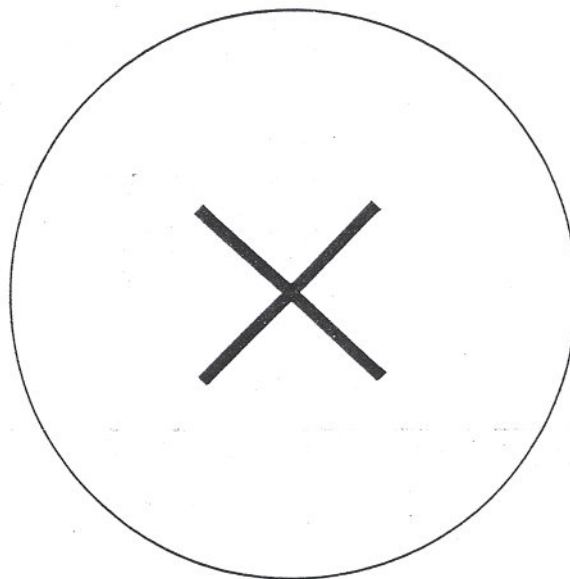


Figure 3: Bottom view of a round life-raft

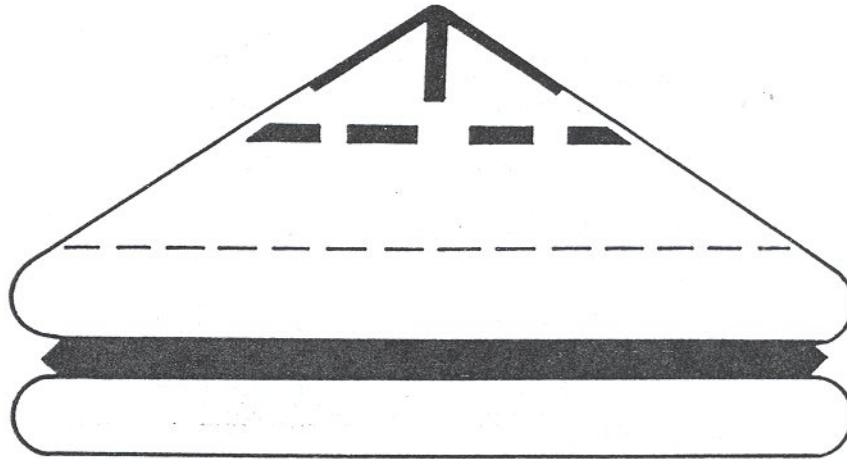


Figure 4: Side view of a round life-raft

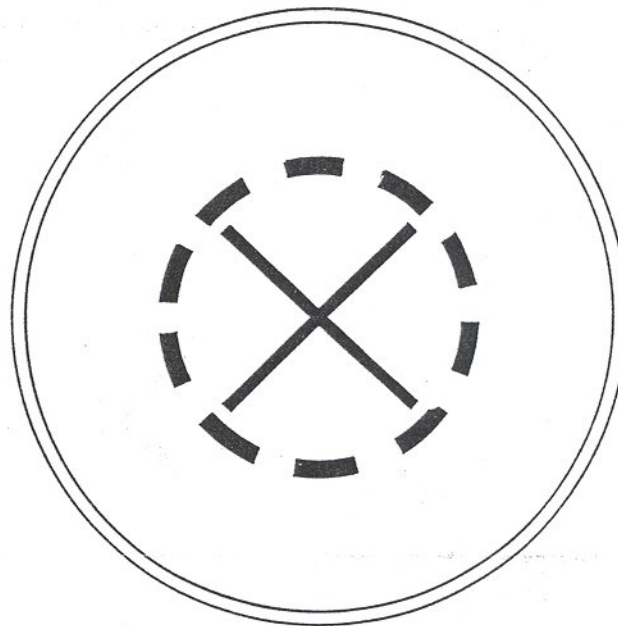


Figure 5: Plan view of a round life-raft

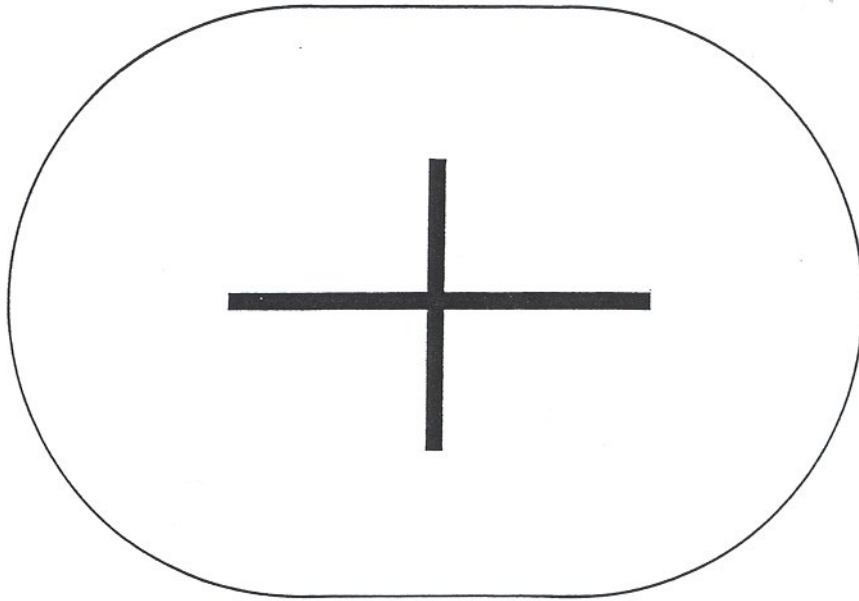


Figure 6: Bottom view of an oval life-raft

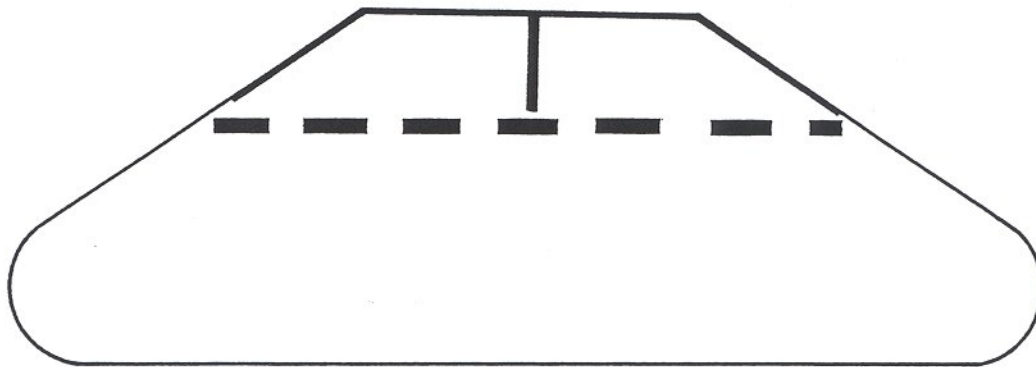


Figure 7: Side view of an oval life-raft

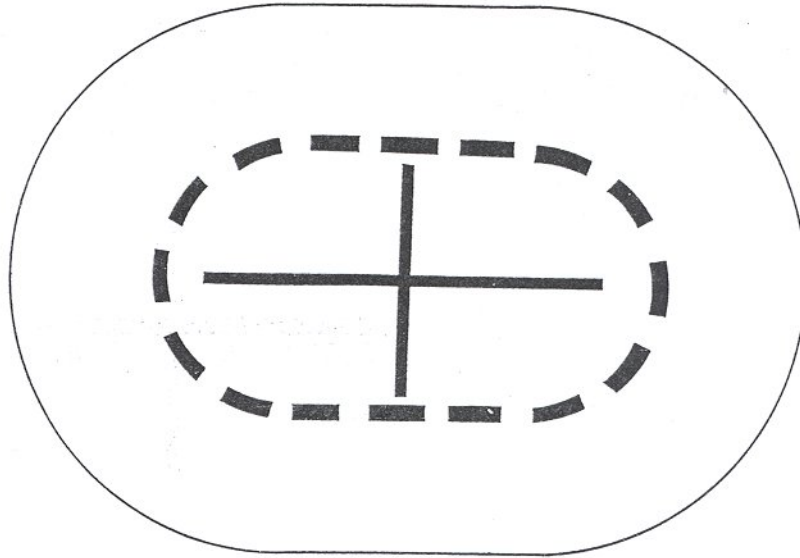


Figure 8: Plan view of an oval life-raft

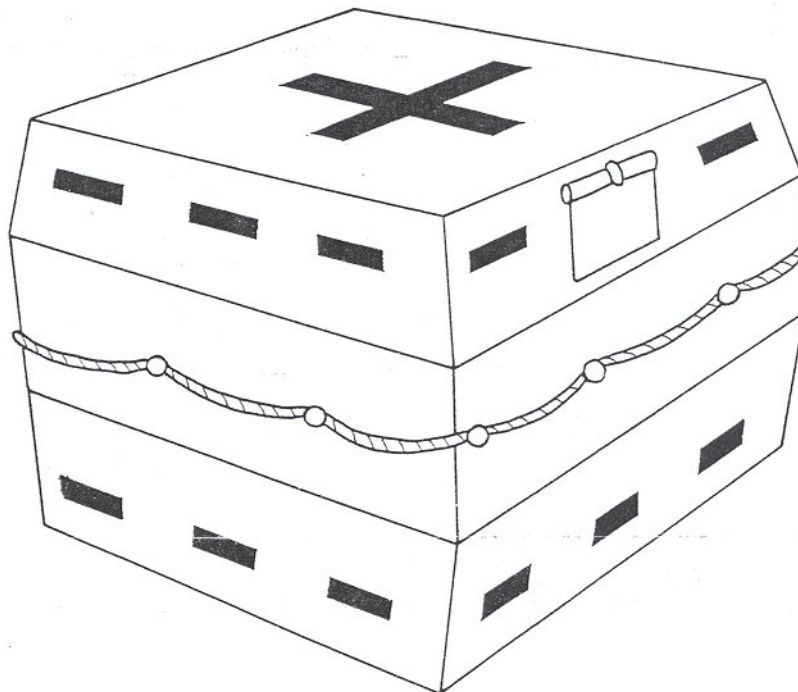


Figure 9: View of a rigid life-raft

3 Figure 10 illustrates the fitting of retro-reflective tape to a life-buoy as required by 1.1(j) of Appendix 1.

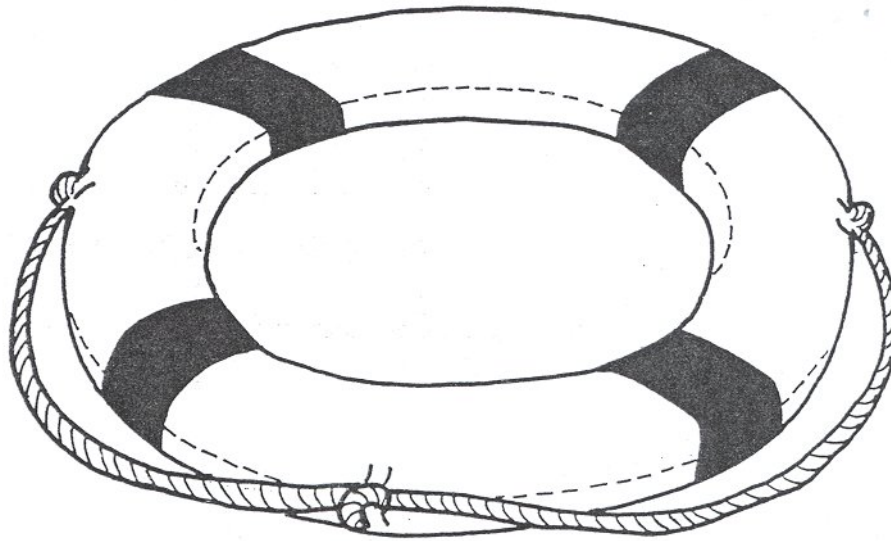


Figure 10

4 Figures 11 to 12 illustrate the fitting of retro-reflective tapes to a life-jacket as required by 2.1.10 of Appendix 1.

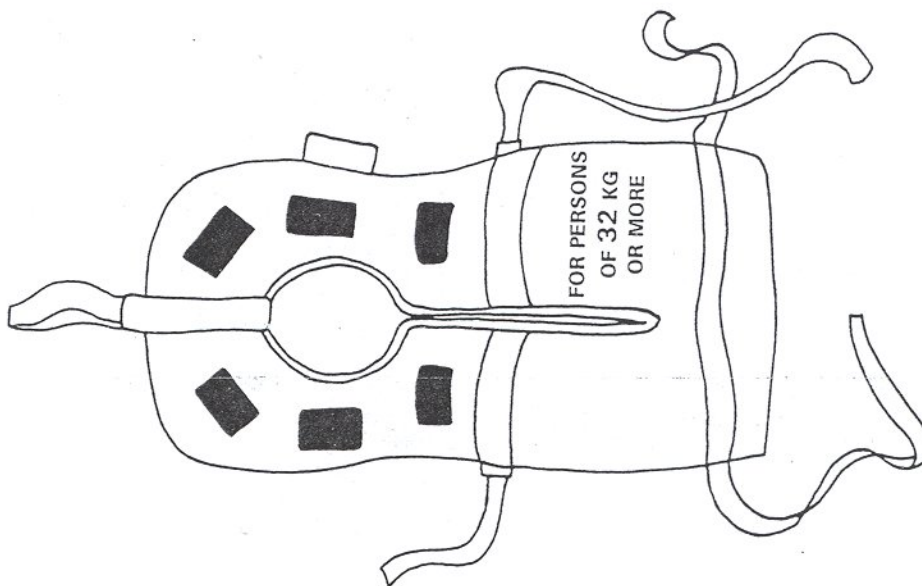


Figure 11: View of the outside of a life-jacket

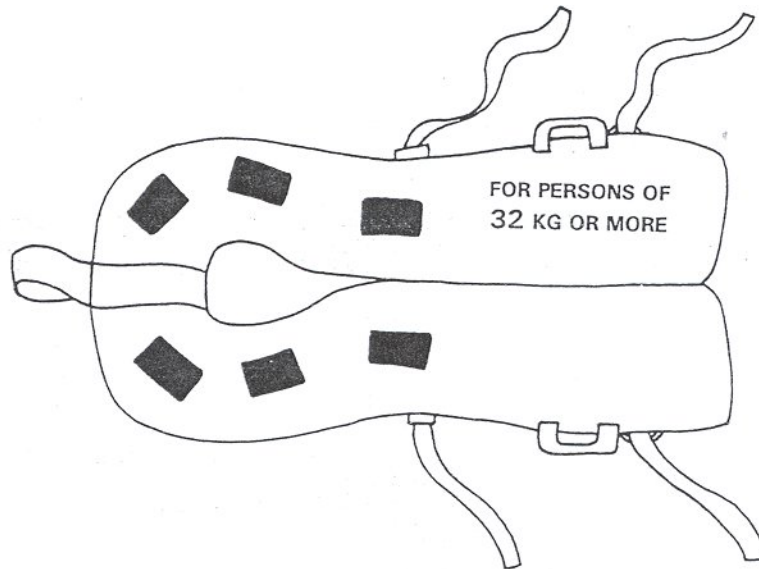


Figure 12: View of the inside of a life-jacket

5 Figures 13 to 14 illustrate the fitting of retro-reflective tapes to a rigid rescue boat as required by 4.1 and 4.2 of Appendix 4.

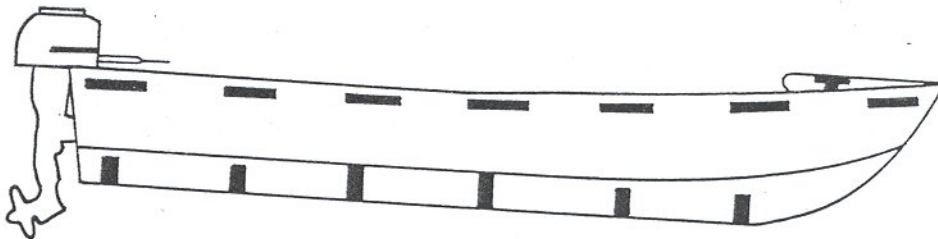


Figure 13: Side view of a rigid rescue boat

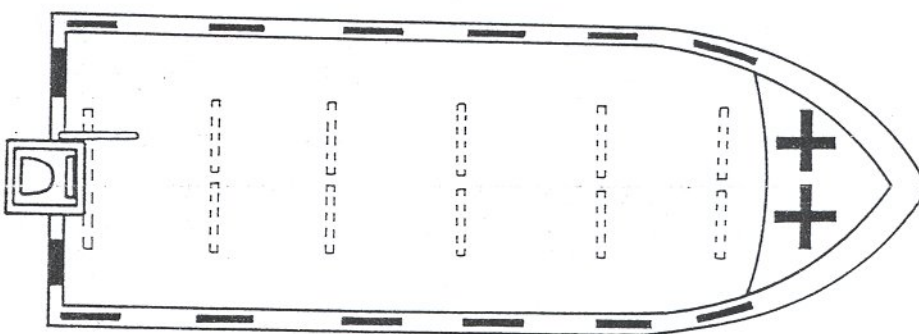


Figure 14: Plan view of a rigid rescue boat

6 Figures 15 to 19 illustrate the fitting of retro-reflective tapes to an inflated rescue boat as required by 4.3 of Appendix 4.

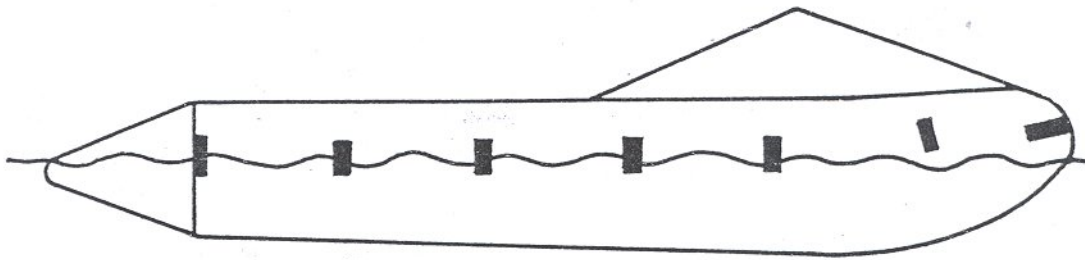


Figure 15: Side view of an inflated rescue boat

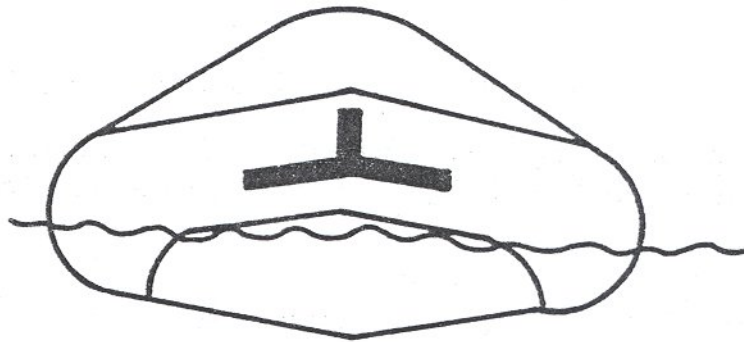


Figure 16: Bow view of an inflated rescue boat

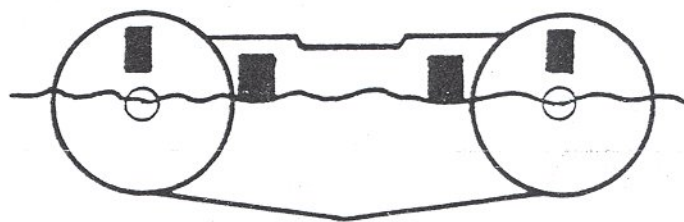


Figure 17: Transom view of an inflated rescue boat

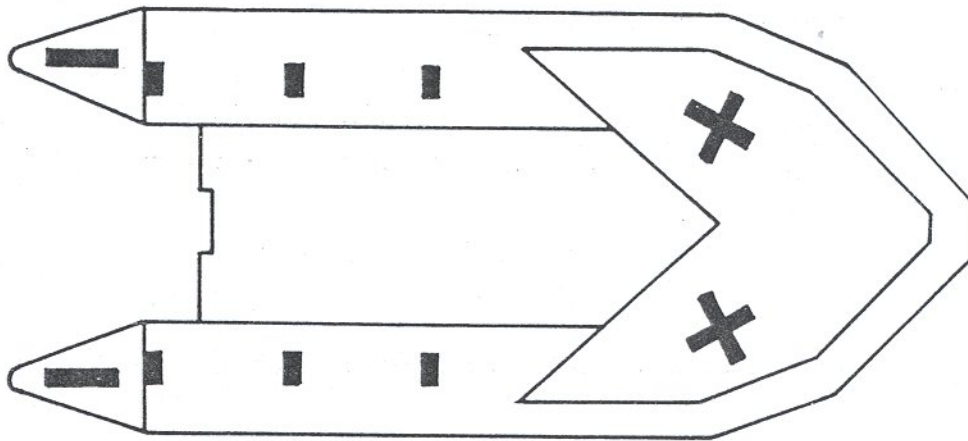


Figure 18: Plan view of an inflated rescue boat

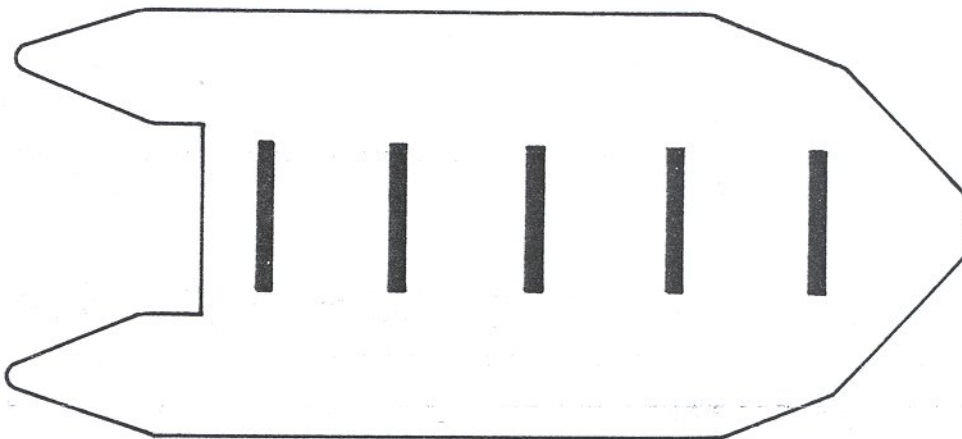


Figure 19: Bottom view of an inflated rescue boat

7 Figure 20 illustrates the fitting of retro-reflective tapes to an immersion suit as required by 3.1.6 of Appendix 1.

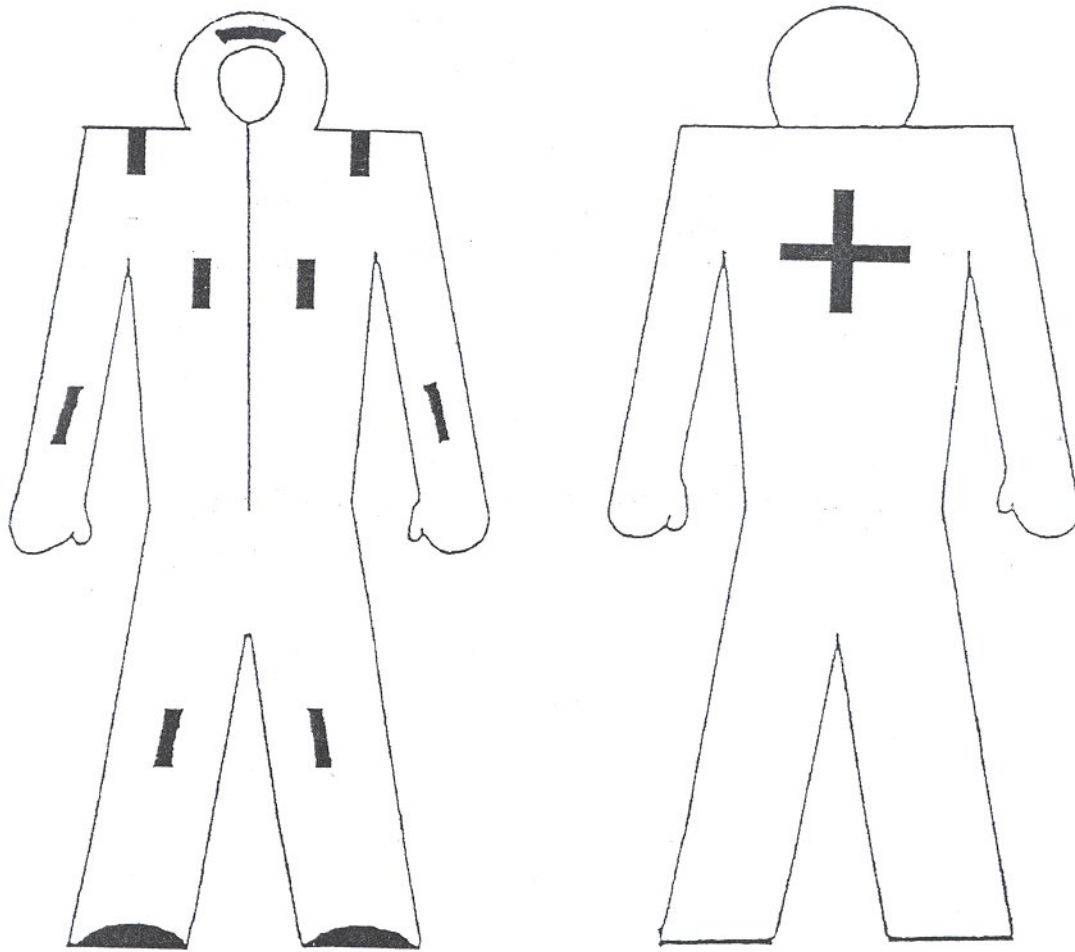


Figure 20

Appendix 10

Food rations

- 1 The ration is to be enclosed in airtight packaging, which should be hermetically sealed if a can or bottle, or vacuum packed if a flexible package.
- 2 The packaging is to be marked with an expiry date at or before which time the rations are to be replaced.
- 3 The packaging is to be easily opened and the contents are to be readily subdivided to provide individual meals either three or four times per day. The number of food pieces that constitute a meal must be marked on the package.
- 4 The composition is to be as follows:
 - (a) a maximum of 7% water by weight, minimum nil;
 - (b) a maximum of 0.2% salt by weight, minimum nil;
 - (c) a minimum of 60% carbohydrates by weight, maximum 100%, providing not less than 50% of the total energy content;
 - (d) a maximum of 23% fat by weight, minimum nil, providing not more than 43% of the total energy content;
 - (e) a maximum of 10% protein by weight, minimum nil, providing not more than 8% of the total energy content.
- 5 The ration is to be palatable and edible throughout the recommended shelf life.
- 6 The food should be packaged to provide one package containing not less than 10,000 kJ for each person, or in units of which a low whole number totals not less than 10,000 kJ, in order to enable ready evidence that the correct food ration is in the survival craft.
- 7 Each package is to be marked with the kilojoule value of the food which it contains.

* * * * *

Appendix 11

121.5/243 MHz Emergency Position Indicating Radio Beacons (EPIRBs)

1 General

1.1 Purpose of equipment

A 121.5/243 MHz EPIRB must be capable of transmitting on the frequencies of 121.5 MHz and 243.0 MHz while floating in water, thereby providing a self contained means for alerting and locating in an emergency, by space satellite and over flying aircraft.

1.2 Basic design requirements

1.2.1 The equipment is to:

- (a) consist of one integral unit, including the antenna;
- (b) be buoyant, watertight, self righting and so designed that, when floating in water, it will maintain the antenna substantially vertical so that any variations of radio propagation caused by the effects of rough water are minimised;
- (c) be finished with a highly visible orange or yellow colour;
- (d) be not more than 4 kilograms in mass; and
- (e) be constructed so as to prevent inadvertent activation.

1.2.2 Equipment reliability is to be a principal design objective.

1.3 Buoyant tether line

1.3.1 An EPIRB is to be fitted with an orange coloured, rot-proof, chafe resistant, buoyant line of at least 20 metres length with a breaking strain of not less than 245 Newtons.

1.3.2 The buoyant line is to be attached permanently to the equipment in such a manner that it will not adversely affect any of the other requirements of this specification.

1.4 Stowage considerations

1.4.1 Design and construction of an EPIRB is to be such that:

- (a) when not in operation, it has a smooth external contour with no sharp projections;
- (b) it can be conveniently stowed in any approved life-raft;
- (c) the possibility of internal or external damage during stowage or use is minimal; and
- (d) it will not cause damage to the life-raft or the life-raft equipment while it is stowed or in use.

2 Battery requirements

2.1 The EPIRB manufacturer is to declare the battery shelf life achievable at a steady temperature of 20°C. Shelf life is defined as the period of time after the date of manufacture that the battery will continue to meet the input power requirement of the EPIRB for the full operating endurance of 48 hours.

2.2 The battery is to be replaced at half the declared battery shelf life.

2.3 The date when the battery is to be replaced must be clearly and durably marked on the battery and on the outside of the EPIRB.

2.4 An EPIRB battery is to:

- (a) be leakproof under all conditions of stowage and operation;
- (b) have a minimum shelf life of 2 years and, when activated, have an operating endurance of not less than 48 hours, with the operational criteria being met throughout the temperature range of -10°C to +55°C inclusive.

3 Climatic, durability and immersion tests

3.1 Immersion test

The equipment is to be raised to a temperature of 70°C for not less than one hour and then immediately immersed for a further hour in water at a temperature of 20°C, the surface of which is at least 100 millimetres above the highest point of the equipment. The equipment must then be checked to ensure that it is effectively waterproof.

3.2 Climatic and durability tests

An EPIRB must meet the climatic and durability requirements of Marine Orders Part 26 (Equipment—Communication) and, for the purpose of that Part, an EPIRB is to be considered as class X equipment.

3.3 Drop test

3.3.1 The equipment is to operate correctly after undergoing a gravity drop of 20 metres into the water. If the equipment is to be packed in a life-raft approved for stowage at a greater height than 18 metres, the drop test is to be at least equal to that height.

3.3.2 The equipment is then to be opened and inspected to ensure that it is effectively waterproof.

4 Markings

4.1 Subject to 4.3, there must be displayed on the EPIRB:

(a) a compliance statement;

(i) indicating that the EPIRB complies with Standard MS 241, published by the Spectrum Management Agency; and

(ii) citing the type approval number shown on the compliance statement certificate issued in respect of the EPIRB under section 12 of the *Radiocommunications Act 1983*;

(b) the name of its manufacturer;

(c) the name of the country of its manufacture;

(d) its type or model designation which shall be distinctively different from that of imported equipment requiring modification before it complies with this standard;

(e) its equipment serial number; and

(f) simple operating instructions including the warning: "Not to be operated except in an emergency—improper use carries a severe penalty".

4.2 A statement or marking displayed on an EPIRB in accordance with 4.1, 8.9.7 or 8.11.3 must be clearly visible on the exterior surface of the EPIRB, indelible, durable, tamper proof and affixed in such a manner as not to be removable except by destruction or defacing.

4.3 Provision 4.1(a) does not apply to a device unless the importer, manufacturer or supplier of the device, as the case may be, has been issued with a compliance statement certificate in respect of the device.

5 Adjustment mechanisms

Any adjustment mechanism which enables the operation of the EPIRB to be altered so that the EPIRB no longer complies with this standard must be contained within the housing of the EPIRB and is to be accessible only with the use of tools such as screwdrivers and spanners.

6 Conditions of operation

The requirements of provision 8.2 to 8.8 (inclusive) must be met by a device that operates:

- (a) at an ambient temperature of between -10°C and 55°C inclusive; and
- (b) continuously for a minimum period of 48 hours.

7 Antenna

7.1 Subject to 7.3, a device is not to incorporate an antenna other than a monopole antenna of length not exceeding 0.615 metres and arranged so that, when the device is floating in water, the radiation is:

- (a) vertically polarised; and
- (b) omnidirectional in the horizontal plane.

7.2 Subject to 7.3, a device is not to incorporate, or make provision for the connection or use of, any antenna other than one which is an integral and permanent part of that device.

7.3 A device may incorporate provision for the connection of an external antenna or other facility intended solely for measurement purposes provided that the connection is only accessible with the use of tools such as screwdrivers and spanners.

8 Transmission

8.1 Nominal carrier frequency

The EPIRB must only be capable of operating simultaneously on the carrier frequencies 121.5 MHz and 243.0 MHz.

8.2 Frequency error

The carrier frequency error of a transmitter must not exceed ± 3 kHz at 121.5 MHz or ± 6 kHz at 243.0 MHz.

8.3 Radiated signal field strength

8.3.1 The peak field strength of the radiated signal, on both operating carrier frequencies of the transmitter, shall not be less than 105 dB μ V/m.

8.3.2 The field strength is to be measured in the vertical plane at a distance of 10 metres from the antenna at a height of 1.75 metres above the level of the water in which the device is floating.

8.3.3 The bandwidth of the measurement receiver is to be 12 kHz at the -3 dB points.

8.4 Type of emission

The carrier frequency emission from a transmitter is to comprise a double sideband, full carrier signal, amplitude modulated to a depth of not less than 85%.

8.5 Modulation characteristic

8.5.1 Modulation of a transmitter is to consist of an audio frequency signal swept downwards through at least 700 Hz within the range of 1600 Hz to 300 Hz with a repetition rate of between 2 Hz and 4 Hz.

8.5.2 The delay between consecutive sweeps must not exceed one-tenth of the down-sweep time.

8.6 Transmitter duty cycle

Following activation, a transmitter must operate continuously (100% duty cycle).

8.7 Emission spectrum

An emission from a transmitter must include a clearly defined carrier frequency distinct from the modulation sideband components. At least 30% of the power emitted must be contained during any modulation cycle within:

- (a) 30 Hz of the actual carrier frequency when operating on the nominal carrier frequency of 121.5 MHz; and
- (b) 60 Hz of the actual carrier frequency when operating on the nominal carrier frequency of 243.0 MHz.

8.8 Spurious radiation

8.8.1 The peak field strength of each spurious radiation from a transmitter must not exceed 75 dB μ V/m when measured at a distance of 10 metres from the antenna at a height of 1.75 metres above the level of the water in which the device is floating.

8.8.2 The bandwidth of the measurement receiver must be 12 kHz at the -3 dB points.

8.9 Operation

8.9.1 Except for test purposes, a transmitter must be capable of activation only by two simple, mechanical actions, neither of which on its own will activate the transmitter.

8.9.2 Following activation of a transmitter, there must be a clear residual indication that activation has taken place, either through the breaking of a seal, the removal of a non-replaceable cap, or other similar mechanism.

8.9.3 Following activation of a transmitter in accordance with 8.9.1, a transmitter must continue to operate automatically.

8.9.4 The mechanical actions referred to in 8.9.1 must be such as to preclude accidental operation of the transmitter.

8.9.5 The operation of the transmitter, whether initiated in accordance with 8.9.1 or 8.11.5, must be clearly indicated by a visual warning on the device.

8.9.6 A transmitter must incorporate a simple means of terminating the operation of the transmitter, whose operation thereafter may only be initiated in accordance with 8.9.1 or 8.11.5.

8.9.7 The EPIRB must be clearly labelled to indicate the actions necessary to initiate and terminate operation of the transmitter.

8.10 Protective design

8.10.1 A transmitter must be so designed and constructed as to be effectively protected from damage due to:

- (a) short circuit of the antenna when transmitting at maximum power; and
- (b) reversal of the power supply voltages.

8.11 Test facility

8.11.1 A test facility incorporated in a device must be capable of operation only by mechanical actions, switches or connections that are distinctly separate from those normally required for activation of the transmitter.

8.11.2 When a test facility incorporated in a device is activated, a visual warning on the device must clearly indicate that the transmitter is operating.

8.11.3 A device incorporating a test facility must be clearly labelled to indicate the actions necessary to initiate and terminate operation of the test facility.

8.11.4 The actions, switches and connections referred to in 8.11.1 must be designed so as to preclude accidental operation of the test facility and must be non-locking.

8.11.5 Where the operation of a test facility incorporated in a device also initiates operation of the transmitter, the device must not radiate a signal whose peak field strength exceeds 20 dB μ V/m at a distance of 10 metres from the device.

8.11.6 The bandwidth of the measurement receiver must be 12 kHz at the -3 dB points.

8.11.7 When the operation of a test facility incorporated in a device is terminated, any operation of the transmitter must also thereupon be terminated until the operation of the transmitter is initiated in accordance with 8.9.1 or 8.11.5.
