

**SECTION 10**  
**Life-Saving Appliances**

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1. This Section is divided into Parts as follows:
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### PART 1—PRELIMINARY

2. This Section should be read in conjunction with the Introduction, Definitions and General Requirements Section.
3. In this Section the definitions in the Introduction, Definitions and General Requirements Section of these uniform requirements shall apply and, unless the contrary intention appears:
  - 'Highly visible colour' means one of the following colours defined in Australian Standard 2700—1985 *Colour Standards for General Purposes*:
    - X 15—Orange
    - R 11—International Orange
    - R 12—Scarlet

### PART 2—GENERAL PROVISIONS

4. **Scales of Life-Saving Appliances**
  - 4.1 The scale of equipment to be provided in each class of vessel shall comply with the requirements detailed in Part 3 of this Section.
5. **Types of Life-Saving Appliances**
  - 5.1 All items of equipment listed in Part 3 are subject to the approval of the Authority concerned, and must conform to the standards detailed in the Appendices to this Section.
6. **Marking of Life-Saving Appliances**

(Licence numbers or registered numbers or letters may be substituted for the name and port of registration where the Authority approves).

  - 6.1 **Lifeboats**
    - 6.1.1 Lifeboats shall be identified by being numbered consecutively commencing from the forward lifeboats, each number being prefixed by the letter 'P' for lifeboats on the port side, and the letter 'S' for lifeboats on the starboard side. The identifying letters and numbers shall be clearly painted on the bluff of each bow and the inboard quarter of the lifeboat as stowed.
    - 6.1.2 The dimensions of a lifeboat, its carrying capacity and, where required, its cubic capacity shall be clearly and permanently marked on the lifeboat.
    - 6.1.3 The name and port of registry of the vessel shall be clearly painted on each side of the bow of each lifeboat. For SOLAS lifeboats, means of identifying the vessel and the number of the lifeboat shall be marked in such a way that they are visible from above.
  - 6.2 **Rigid Liferafts**
    - 6.2.1 The carrying capacity of a rigid liferaft shall be clearly and permanently marked upon it.

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6.2.2      The name and port of registry of the vessel shall be clearly painted on the liferaft.

6.3      **Inflatable Liferafts**

6.3.1      Each inflatable liferaft shall be clearly and permanently marked with a serial number and the manufacturer's name.

6.3.2      The carrying capacity of an inflatable liferaft shall be clearly and permanently marked on the liferaft and on the container in which the liferaft is packed.

6.4      **Buoyant Apparatus and Appliances**

6.4.1      The carrying capacity of buoyant apparatus and appliances shall be clearly and permanently marked upon them.

6.4.2      The name and port of registry of the vessel shall be clearly painted on buoyant apparatus and appliances.

6.5      **Lifebuoys**

6.5.1      The name and port of registry of the vessel shall be clearly painted on a lifebuoy.

6.6      **Lifejackets**

6.6.1      Lifejackets shall be marked as prescribed in Appendices R and Y of this Section.

6.7      **Dinghies**

6.7.1      The carrying capacity of a dinghy shall be clearly and permanently marked upon it.

6.7.2      The name and port of registry of the vessel shall be clearly painted on the dinghy.

7.      **Stowage of Life-Saving Appliances**

7.1      **Lifeboats and Rescue Boats**

7.1.1      Lifeboats and Rescue Boats shall be stowed in such a manner that:

- (a) with a full complement of crew and equipment they can be put in the water safely in not more than 30 minutes, even when the trim of the vessel is 10° and the vessel is listed 15° either way (except in the case of lifeboats launched by single davits, where a launching crew only is required) (20° on new Class 1A and 2A vessels);
- (b) they will not impede the rapid handling of another lifeboat, dinghy, liferaft or buoyant apparatus; and
- (c) they will not impede the marshalling of passengers to their muster stations and their embarkation into life-saving appliances.

7.1.2      A lifeboat or rescue boat shall not be carried:

- (a) in the bows of a vessel;
- (b) near the propeller of a vessel; or
- (c) near the steeply overhanging portions of the hull aft.

7.1.3      Each lifeboat or rescue boat shall be attached to a separate set of davits or davit.

7.1.4      A lifeboat or rescue boat shall be stowed so that, as far as it is practicable, the boat is capable of being launched down the straight side of the vessel.

7.1.5      Means shall be provided for illuminating the lifeboats and rescue boats and their launching gear during preparations for launching and for

illuminating the water into which the lifeboats and rescue boats are launched.

## 7.2 Liferrafts

7.2.1 Liferrafts shall be carried in such a manner that:

- (a) the liferafts can be put in the water safely in not more than 30 minutes, even when the trim of the vessel is 10° and the vessel is listed 15° either way, (20° on new Class 1A and 2A vessels);
- (b) will enable the liferafts that are not attached to launching devices to float free in the event of the vessel sinking;
- (c) will not impede the rapid handling of another liferaft, lifeboat, dinghy, or buoyant apparatus; and
- (d) will not impede the marshalling of passengers to their muster stations and their embarkation into life-saving appliances.

7.2.2 Liferrafts that are to be launched from fixed launching devices shall be carried so that they can be launched with a full complement of persons and equipment, but they shall not be stowed:

- (a) in the bows of a vessel;
- (b) near the propeller of a vessel; or
- (c) near the steeply overhanging positions of the hull aft.

7.2.3 A liferaft, other than the additional liferaft required to be carried by certain vessels of Class 2A, shall be stowed so that, as far as it is practicable, the liferaft is capable of being launched down the straight side of the vessel.

7.2.4 The additional liferaft required to be carried by certain vessels of Class 2A shall be stowed as far forward or aft in the vessel, as appropriate, as is practicable. The float-free requirements of 7.2.1 (b) shall not apply to this liferaft.

7.2.5 Means shall be provided for illuminating the stowage position of a liferaft. The liferaft stowed forward on certain vessels of Class 2A shall be provided with a battery operated hand torch or hand lamp placed as near as practicable to the position where the liferaft is stowed.

7.2.6 Where liferafts are to be launched from fixed launching devices, means shall be provided for illumination of the launching gear during preparation for launching and for illuminating the water into which the liferafts are launched.

## 7.3 Buoyant Apparatus and Appliances

7.3.1 A buoyant apparatus/appliance shall be carried in such a manner that the apparatus/appliance can be put into the water even when the trim of the vessel is 10° and the vessel is listed 15° either way.

7.3.2 A buoyant apparatus/appliance shall be stowed so that the apparatus will not impede the rapid handling of any lifeboat, dinghy, liferaft or other buoyant apparatus/appliance.

7.3.3 Means shall be provided for illuminating the stowage position of buoyant apparatus/appliances.

## 7.4 Dinghies

7.4.1 A dinghy shall be carried in such a manner that the dinghy can be put into the water, even when the trim of the vessel is 10° and the vessel is listed 15° either way.

7.4.2 A dinghy shall be stowed so that the dinghy will not impede the rapid handling of any lifeboat, liferaft, buoyant apparatus or other dinghy.

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7.4.3 Means shall be provided for illuminating the stowage position of a dinghy.

7.5 **Lifebuoys**

7.5.1 A lifebuoy shall be stowed:

- (a) in such a manner that it is not permanently secured in any way;
- (b) so as to be readily accessible to all persons on board; and
- (c) so as to be rapidly cast loose.

7.5.2 Where practicable, two lifebuoys with self-igniting lights and smoke signals attached shall be stowed so as to be capable of quick release from the navigation bridge.

7.6 **Lifejackets**

7.6.1 Lifejackets shall be stowed so as to be easily located by, and readily accessible to, the persons for whose use they are intended and such stowage shall be clearly marked.

7.6.2 On vessels of Class 1A, the additional lifejackets shall be stowed in or adjacent to service and machinery spaces where persons are required to remain on duty in an emergency.

7.6.3 On vessels of Class 2A where additional lifejackets for 100% of complement are to be carried, sufficient lifejackets shall be stowed in or adjacent to service and machinery spaces where persons are required to remain on duty in an emergency and the balance remaining are to be stowed in float-free lockers adjacent to the lifeboat/liferaft muster stations.

7.7 **Portable Radio Equipment**

7.7.1 Portable radio equipment shall be stowed in such a place that the equipment is readily accessible from the open deck of the vessel and is ready to be moved into a lifeboat or liferaft in the event of an emergency.

7.7.2 The portable radio equipment shall not be stowed in the radiotelegraphy room of a vessel.

8. **Survey of Inflatable Liferafts**

8.1 The survey of an inflatable liferaft shall be carried out at the place in which it was manufactured or at an approved place and performed by a duly certificated person.

8.2 Surveys of inflatable liferafts shall be carried out at intervals of not more than twelve months provided that, where such an arrangement is impracticable, the interval may be extended by a period not exceeding five months subject to the approval of the Authority concerned.

9. **Pyrotechnic and Smoke Signals**

9.1 All pyrotechnic and smoke signals shall be properly packed and stowed and maintained in good condition at all times.

9.2 Subject to the above requirement, pyrotechnic and smoke signals may be accepted as complying with the requirements of this Section for the following periods:

- (a) **Ship and Lifeboat/Liferaft Pyrotechnics**  
—3 years from date of manufacture;
- (b) **Lifebuoy Smoke Signals**  
—3 years from date of manufacture; and
- (c) **Lifeboat Buoyant Smoke Signals**  
—3 years from date of manufacture.

10. **Embarkation into Lifeboats and Liferafts**

10.1 Ladders

10.1.1 A vessel shall be furnished at each set of lifeboat davits with a ladder which is long enough to reach the lifeboats when afloat at the vessel's lightest sea-going draft with an adverse list of 15 degrees. Additional ladders to facilitate embarkation into the liferafts when afloat shall also be provided. (The Authority may exempt any vessel from the requirements of this clause where it is satisfied that to require compliance therewith would be unreasonable on account of the freeboard of the vessel concerned or the stowage position of the lifeboats of liferafts).

10.2 Engineeroom Discharges

10.2.1 A vessel shall be furnished with means, capable of being controlled from outside the engineeroom, to prevent any discharge of water into:

- (a) lifeboats when being launched; and
- (b) liferafts when being launched from fixed launching devices.

**PART 3—SCALES OF LIFE-SAVING APPLIANCES****CLASS 1A****PASSENGER VESSELS—UNLIMITED SEAGOING**

Reference should be made to Part 2 for marking, stowage, etc., and Part 4 for specifications of equipment.

<i>Measured Length</i>	<i>L.S.A. Requirements</i>
All lengths	<p>The requirements for provision of LIFEBOATS, RESCUE BOATS, LIFERAFTS, BUOYANT APPARATUS, PORTABLE AND FIXED SURVIVAL CRAFT RADIO EQUIPMENT, TWO WAY RADIO EQUIPMENT, DISTRESS SIGNALS, LIFEBOUYS, LIFEJACKETS, LINE THROWING APPLIANCES, IMMERSION SUITS, THERMAL PROTECTIVE AIDS, GENERAL EMERGENCY ALARM SYSTEMS, and EMERGENCY COMMUNICATIONS SYSTEMS are contained in Marine Orders Part 25.</p> <p>The requirements for EMERGENCY ELECTRICAL INSTALLATIONS are contained in Marine Orders Part 20.</p> <p>The requirements for MUSTER STATIONS are contained in Marine Orders Part 25 and 29.</p>

**CLASS 1B**  
**PASSENGER VESSELS—LIMITED SEAGOING**

*Note:*

Consistent with the type of vessel and the area of operations, a suitable scaling down of equipment may be permitted by the Authority.

Reference should be made to Part 2 for marking, stowage, etc., and Part 4 for specifications of equipment.

<i>Measured Length</i>	<i>L.S.A. Requirements</i>
	<b>LIFEBOATS AND LIFERAFTS</b>
25 metres and over	(1) Coastal lifeboat(s) for 100% complement on each side, or (2) A coastal lifeboat for 100% complement capable of being launched from either side of vessel, or (3) Coastal liferaft(s) for 100% complement plus rescue boat <i>Note:</i> Coastal lifeboat(s) for 50% complement on each side may be permitted by the Authority in vessels that are subdivided in accordance with the Construction Section of the Code.
Less than 25 metres	Coastal liferaft(s) for 100% complement
	<b>LIFEBUOYS</b>
60 metres and over	12 lifebuoys
45 metres and over but less than 60 metres	8 lifebuoys
25 metres and over but less than 45 metres	6 lifebuoys
10 metres and over but less than 25 metres	2 lifebuoys, one with light and one with line
Less than 10 metres	1 lifebuoy with light
	<b>LIFEJACKETS</b>
All lengths	(1) A SOLAS lifejacket fitted with a light and whistle for each person of mass of 32 kg and over that the vessel is certified to carry, plus (2) A SOLAS lifejacket suitable for each person aboard the vessel of mass of less than 32 kg, plus (3) 5% of (1) and 5% of (2) above stowed in a conspicuous place on deck
	<b>DISTRESS SIGNALS</b>
45 metres and over	12 parachute distress rockets
25 metres and over but less than 45 metres	6 parachute distress rockets 4 red hand flares 2 hand held orange smoke signals
Less than 25 metres	3 parachute distress rockets 2 red hand flares 1 hand held orange smoke signal



45 metres and over	<b>LINE THROWING APPLIANCE</b> Line throwing appliance with 4 rockets and lines
25 metres and over	<b>ELECTRICAL ALARM SIGNAL</b> Electrical alarm signal for mustering crew and passengers (where efficient mustering cannot be carried out by voice)
All lengths	<b>EMERGENCY ELECTRICAL INSTALLATION</b> A self-contained emergency electrical installation, in addition to main generating set, able to simultaneously operate emergency bilge pump (where electrically operated), watertight doors (where electrically operated), indicators and sound signals for power operated doors, fire protection system, emergency lighting, emergency signals, navigation lights and communications equipment and capable of providing continuous operation for 12 hours (For voyages of short duration, a shorter period of continuous operation may be permitted by the Authority)

## CLASS 1C

## PASSENGER VESSELS—RESTRICTED SEAGOING

Reference should be made to Part 2 for marking, stowage, etc., and Part 4 for specifications of equipment.

<i>Measured Length</i>	<i>L.S.A. Requirements</i>
25 metres and over	<b>LIFEBOATS AND LIFERAFTS</b> (1) Coastal lifeboat(s) for 100% complement on each side, or (2) A coastal lifeboat for 100% complement capable of being launched from either side, or (3) Coastal liferaft(s) for 100% complement plus rescue boat <i>Note:</i> Coastal lifeboat(s) for 50% complement on each side may be permitted by the Authority in vessels that are subdivided in accordance with the Construction Section.
Less than 25 metres	Coastal liferaft(s) for 100% complement
60 metres and over 45 metres and over but less than 60 metres 25 metres and over but less than 45 metres 10 metres and over but less than 25 metres Less than 10 metres	<b>LIFEBUOYS</b> 8 lifebuoys 6 lifebuoys 4 lifebuoys 2 lifebuoys, one with light and one with buoyant line 1 lifebuoy with light <p style="text-align: right;">} At least 50% to have self-igniting lights, including 2 with smoke signals. 2 of remaining lifebuoys fitted with buoyant lines</p>
All lengths	<b>LIFEJACKETS</b> A Coastal lifejacket with whistle for each adult or child aboard the vessel (each crew lifejacket shall be fitted with a light and a whistle)
45 metres and over	<b>LINE THROWING APPLIANCE</b> Line throwing appliance with 4 rockets and lines
25 metres and over Less than 25 metres	<b>DISTRESS SIGNALS</b> 6 parachute distress rockets 4 red hand flares 2 hand held orange smoke signals 3 parachute distress rockets 2 red hand flares 1 hand held orange smoke signal
25 metres and over	<b>ELECTRIC ALARM SIGNAL</b> Electric alarm signal for mustering crew and passengers (where efficient mustering cannot be carried out by voice)
All lengths	<b>EMERGENCY ELECTRICAL INSTALLATION/EQUIPMENT</b> (1) a number of electric torches or hand lamps as determined by the Authority (2) emergency installation capable of operating navigation lights (where they are solely electric) for 3 hours, and (3) emergency installation capable of operating signalling lamps (where they are normally operated from main electrical power source) and communication equipment for 3 hours <i>Note:</i> In relation to (2) and (3) above the emergency installation can be the normal starting batteries provided that they are suitably placed in the vessel

## CLASS 1D

## PASSENGER VESSELS—PARTIALLY SMOOTH WATERS

*Note:*

In the tables following—

1. in vessels fitted with internal buoyancy as prescribed by Appendix N, or
2. in vessels that are subdivided in accordance with the Construction Section

the buoyant appliances and/or lifebuoys listed below may be reduced by a percentage not exceeding 40% as approved by the Authority.

3. Reference should be made to Part 2 for marking, stowage, etc., and Part 4 for specifications of equipment.

<i>Measured Length</i>	<i>L.S.A. Requirements</i>
25 metres and over	<b>BUOYANT APPLIANCES</b> (1) A dinghy, plus (2) sufficient buoyant appliances and/or lifebuoys to provide float-off buoyancy for 100% complement, provided that— (a) each lifebuoy is assumed to provide support for two persons, (b) the following minimum number of lifebuoys shall be included in the above appliances: 6 lifebuoys 4 lifebuoys 2 lifebuoys
60 metres and over 45 metres and over but less than 60 metres 25 metres and over but less than 45 metres Less than 25 metres	Sufficient buoyant appliances and/or lifebuoys to provide float-off buoyancy for 100% complement, provided that— (a) each lifebuoy is assumed to provide support for 2 persons, (b) a dinghy may be included in the above appliances
10 metres and over less than 10 metres	<b>LIFEBUOYS</b> Additional to any lifebuoys included in 100% buoyancy above 2 lifebuoys, one with light and one with buoyant line 1 lifebuoy with light
All lengths	<b>LIFEJACKETS</b> A coastal lifejacket for each adult and child aboard the vessel
All lengths	<b>DISTRESS SIGNALS</b> 3 parachute distress rockets 2 red hand flares 1 hand held orange smoke signal (A reduction in distress signals may be permitted by the Authority consistent with the area of operations allocated to the vessel)
25 metres and over	<b>ELECTRIC ALARM SIGNAL</b> Electric alarm signal for mustering crew and passengers (where sufficient mustering cannot be carried out by voice)
All lengths	<b>EMERGENCY ELECTRICAL EQUIPMENT</b> A number of electric torches or hand lamps as determined by the Authority

**CLASS 1E**  
**PASSENGER VESSELS—SMOOTH WATERS**

Reference should be made to Part 2 for marking, stowage, etc., and Part 4 for specifications of equipment.

<i>Measured Length</i>	<i>L.S.A. Requirements</i>
All lengths	<p><b>BUOYANT APPLIANCES</b> Consistent with the area of operations allocated, the Authority may determine the percentage of lifejackets to be included in the buoyant appliances</p> <p>Sufficient buoyant appliances, lifebuoys and/or coastal lifejackets to provide for 115% complement, provided that—</p> <ul style="list-style-type: none"> <li>(a) each lifebuoy is assumed to provide support for two persons,</li> <li>(b) the following minimum number of lifebuoys shall be included in the above appliances: <ul style="list-style-type: none"> <li>6 lifebuoys</li> <li>4 lifebuoys</li> <li>2 lifebuoys</li> </ul> </li> <li>(c) a dinghy may be included in the above appliances.</li> </ul>
60 metres and over 45 metres and over but less than 60 metres 25 metres and over but less than 45 metres	
10 metres and over less than 10 metres	<p><b>LIFEBUOYS</b> Additional to any lifebuoys included in 115% buoyancy above</p> <ul style="list-style-type: none"> <li>2 lifebuoys, one with light and one with line</li> <li>1 lifebuoy with light</li> </ul>
All lengths	<p><b>DISTRESS SIGNALS</b> Distress signals, consistent with the area of operations allocated, as determined by the Authority</p>
All lengths	<p><b>EMERGENCY ELECTRICAL EQUIPMENT</b> Electric torches or hand lamps as determined by the Authority</p>

**CLASS 2A**

**NON-PASSENGER VESSELS—UNLIMITED SEAGOING**

Reference should be made to Part 2 for marking, stowage, etc. and Part 4 for specifications of equipment.

<i>Measured Length</i>	<i>L.S.A. Requirements</i>
All lengths	Refer to Table for Class 1A Vessels

## CLASS 2B

## NON-PASSENGER VESSELS—LIMITED SEAGOING

*Note:*

Consistent with type of vessel and the area of operations, a suitable scaling down of equipment may be permitted by the Authority. Reference should be made to Part 2 for stowage, marking, etc., and to Part 4 for specifications of equipment.

<i>Measured Length</i>	<i>L.S.A. Requirements</i>
	<b>LIFEBOATS AND LIFERAFTS</b>
25 metres and over	(1) Coastal lifeboat(s) for 100% complement on each side of vessel, or (2) A Coastal lifeboat for 100% complement capable of being launched from either side of the vessel, or (3) Coastal liferaft(s) for 100% complement plus rescue boat
Less than 25 metres	Coastal liferaft(s) for 100% complement
	<b>LIFEBUOYS</b>
60 metres and over	8 lifebuoys
45 metres and over but less than 60 metres	6 lifebuoys
25 metres and over but less than 45 metres	4 lifebuoys
15 metres and over but less than 25 metres	2 lifebuoys, one with light and one with buoyant line
Less than 15 metres	1 lifebuoy with light
	<i>Note:</i> All self-igniting lights in tankers to be electric battery type
	<b>LIFEJACKETS</b>
All lengths	A SOLAS lifejacket with a light and whistle for each person of mass of 32 kg and over that the vessel is certified to carry plus A SOLAS lifejacket for each person aboard the vessel of mass of less than 32 kg
	<b>DISTRESS SIGNALS</b>
45 metres and over	12 parachute distress rockets
25 metres and over but less than 45 metres	6 parachute distress rockets 4 red hand flares 2 hand held orange smoke signals
Less than 25 metres	3 parachute distress rockets 2 red hand flares 1 hand held orange smoke signal

CLASS 2B—continued

NON-PASSENGER VESSELS—LIMITED SEAGOING—continued

<i>Measured Length</i>	<i>L.S.A. Requirements</i>
25 metres and over	<p><b>ELECTRIC ALARM SIGNAL</b>                      Electric alarm signal for mustering crew (where efficient mustering cannot be carried out by voice)</p>
50 metres and over, or less than 50 metres but not less than 500 tons	<p><b>EMERGENCY ELECTRICAL INSTALLATION/EQUIPMENT</b>                      A self-contained emergency electrical installation, in addition to the main generating set, able to simultaneously operate lighting, alarm signals, navigation lights and communications equipment and capable of continuous operation for:</p>
Less than 50 metres and less than 500 tons	(1) vessels 125 metres and over, or
	(2) less than 125 metres but not less than 5000 tons } 6 hours
	(3) less than 125 metres and less than 5000 tons } 3 hours
Less than 50 metres and less than 500 tons	(1) a number of electric torches or hand lamps as determined by the Authority,
	(2) emergency installation capable of operating navigation lights (where they are solely electric) for 3 hours, and
	(3) emergency installation capable of operating signalling lamps (where they are normally operated from main electrical power source) and communication equipment for 3 hours
Less than 50 metres and less than 500 tons	<p><i>Note:</i> In relation to (2) and (3) above the emergency installation can be the normal starting batteries provided that they are suitably placed in the vessel</p>

## CLASS 2C

## NON-PASSENGER VESSELS—RESTRICTED SEAGOING

Reference should be made to Part 2 for marking, stowage, etc., and Part 4 for specifications of equipment.

<i>Measured Length</i>	<i>L.S.A. Requirements</i>
25 metres and over	<b>LIFEBOATS, LIFERAFTS AND INTERNAL BUOYANCY</b> (1) Coastal lifeboat(s) for 100% complement on each side of vessel, or (2) One coastal lifeboat for 100% complement capable of being launched from either side of vessel, or (3) Coastal liferaft(s) for 100% complement plus rescue boat (1) Coastal liferaft(s) for 100% complement, or (2) Coastal lifeboat(s) as detailed above for 25 metres and over, or (3) In the case of a vessel of less than 15 metres measured length, internal buoyancy as prescribed by Appendix N
Less than 25 metres	
60 metres and over 45 metres and over but less than 60 metres 25 metres and over but less than 45 metres 15 metres and over but less than 25 metres Less than 15 metres	<b>LIFEBUOYS</b> 8 lifebuoys 6 lifebuoys 4 lifebuoys 2 lifebuoys, one with light and one with line } At least 50% to have self-igniting lights, including 2 with smoke signals. 2 of remaining lifebuoys fitted with buoyant lines One lifebuoy with light provided that these items are not required in: (1) a vessel under 10 metres length which carries only one person, or (2) a vessel less than 5 metres length which is fitted with internal buoyancy as prescribed by Appendix N <i>Note: All self-igniting lights in tankers to be electric battery type</i>
All lengths	<b>LIFEJACKETS</b> A coastal lifejacket with a light and whistle for each person that the vessel is certified to carry
25 metres and over	<b>DISTRESS SIGNALS</b> 6 parachute distress rockets 4 red hand flares 2 hand held orange smoke signals 3 parachute distress rockets 2 red hand flares 1 hand held orange smoke signal
Less than 25 metres	
25 metres and over	<b>ELECTRIC ALARM SIGNAL</b> Electric alarm signal for mustering crew (where efficient mustering cannot be carried out by voice)
All lengths	<b>EMERGENCY ELECTRICAL INSTALLATION/EQUIPMENT</b> (1) A number of electrical torches or hand lamps as determined by the Authority (2) An emergency installation capable of operating navigation lights (where they are solely electric) for 3 hours, and (3) An emergency installation capable of operating signalling lamps (where they are normally operated from main electrical power source) and communication equipment for 3 hours <i>Note: In relation to (2) and (3) above the emergency installation can be the normal starting batteries provided that they are suitably placed in the vessel</i>

## CLASS 2D

## NON-PASSENGER VESSELS—PARTIALLY SMOOTH WATERS

Reference should be made to Part 2 for stowage, marking, etc., and Part 4 for specifications of equipment.

<i>Measured Length</i>	<i>L.S.A. Requirements</i>
25 metres and over	<b>BUOYANT APPLIANCES</b> Sufficient buoyant appliances and/or lifebuoys to provide a total float-off capacity for 100% complement, provided that— (a) each lifebuoy is assumed to provide support for two persons, (b) a dinghy shall be included in the above appliances
10 metres and over but less than 25 metres	Sufficient buoyant appliances and/or lifebuoys to provide a total float-off capacity for 100% complement, provided that— (a) each lifebuoy is assumed to provide support for two persons, (b) a dinghy may be included in the above appliances
Less than 10 metres	(1) buoyant appliances and/or lifebuoys for 100% complement, or (2) a dinghy for 100% complement, or (3) internal buoyancy as prescribed in Appendix N
15 metres and over Less than 15 metres	<b>LIFEBUOYS</b> Additional to any lifebuoys included in 100% buoyancy above 2 lifebuoys, one with light and one with buoyant line 1 lifebuoy with light
All lengths	<b>LIFEJACKETS</b> A coastal lifejacket for each person that the vessel is certified to carry
All lengths	<b>DISTRESS SIGNALS</b> 3 parachute distress rockets 2 red hand flares 1 hand held orange smoke signal <i>Note:</i> Consistent with the area of operations allocated to the vessel, a reduction in distress signals may be permitted by the Authority
All lengths	<b>EMERGENCY ELECTRICAL EQUIPMENT</b> A number of electric torches or hand lamps as determined by the Authority



## CLASS 2E

## NON-PASSENGER VESSELS—SMOOTH WATERS

Reference should be made to Part 2 for stowage, marking, etc., and Part 4 for specifications of equipment.

<i>Measured Length</i>	<i>L.S.A. Requirements</i>
15 metres and over	<b>BUOYANT APPLIANCES</b> Sufficient buoyant appliances and/or lifebuoys to provide a total float-off capacity for 100% complement provided that— (a) each lifebuoy is assumed to provide support for two persons, (b) a dinghy may be included in the above appliances.
Less than 15 metres	(1) buoyant appliances and/or lifebuoys as for 15 metres and over (above), or (2) fitted with internal buoyancy as prescribed by Appendix N
15 metres and over less than 15 metres	<b>LIFEBUOYS</b> Included in 100% buoyancy above 2 lifebuoys, at least one with light One lifebuoy with light
All lengths	<b>LIFEJACKETS</b> A coastal lifejacket for each person that the vessel is certified to carry
All lengths	<b>DISTRESS SIGNALS</b> Distress signals, consistent with the area of operations as determined by the Authority
All lengths	<b>EMERGENCY ELECTRICAL EQUIPMENT</b> Electric torches or hand lamps as determined by the Authority

## CLASS 3A

## FISHING VESSELS—UNLIMITED SEAGOING

Reference should be made to Part 2 for stowage, marking, etc. and Part 4 for specifications of equipment.

<i>Measured Length</i>	<i>L.S.A. Requirements</i>
All lengths	Refer to Table for Class 1A Vessels

## CLASS 3B

## FISHING VESSELS—LIMITED SEAGOING

Reference should be made to Part 2 for stowage, marking, etc., and Part 4 for specifications of equipment.

<i>Measured Length</i>	<i>L.S.A. Requirements</i>
25 metres and over	<b>LIFEBOATS AND LIFERAFTS</b> (1) Coastal lifeboat(s) for 100% complement on each side, or (2) Coastal lifeboat for 100% complement capable of being launched from either side of vessel, or (3) Coastal liferaft(s) for 100% complement plus rescue boat
Less than 25 metres	(1) Coastal liferaft(s) for 100% complement, or (2) Coastal lifeboat(s) as detailed above for 25 metres and over
60 metres and over 45 metres and over but less than 60 metres 25 metres and over but less than 45 metres 15 metres and over but less than 25 metres Less than 15 metres	<b>LIFEBUOYS</b> 8 lifebuoys 6 lifebuoys 4 lifebuoys 2 lifebuoys, one with light and one with line 1 lifebuoy with light At least 50% with self-igniting lights, including 2 with smoke signals. 2 of remainder with buoyant lines
All lengths	<b>LIFEJACKETS</b> A SOLAS lifejacket with a light and whistle for each person of mass of 32 kg and over that the vessel is certified to carry, plus A SOLAS lifejacket for each person aboard the vessel of mass of less than 32 kg
45 metres and over 25 metres and over but less than 45 metres Less than 25 metres	<b>DISTRESS SIGNALS</b> 12 parachute distress rockets 6 parachute distress rockets 4 red hand flares 2 hand held orange smoke signals 3 parachute distress rockets 2 red hand flares 1 hand held orange smoke signal
25 metres and over	<b>ELECTRICAL ALARM SIGNAL</b> Electrical alarm signal for summoning crew to muster stations (where efficient mustering cannot be carried out by voice)
50 metres and over, or less than 50 metres but not less than 500 tons  Less than 50 metres and less than 500 tons	<b>EMERGENCY ELECTRIC INSTALLATION/EQUIPMENT</b> A self-contained emergency electrical installation, in addition to the main generating set, able to simultaneously operate emergency lighting, alarm signals, navigation lights and communications equipment and capable of continuous operation for: (1) vessels 125 metres and over, or (2) less than 125 metres but not less than 5000 tons } 6 hours (3) less than 125 metres and less than 5000 tons } 3 hours  (1) A number of electric torches or hand lamps as determined by the Authority (2) Emergency installation capable of operating navigation lights (where they are solely electric) for 3 hours, and (3) Emergency installation capable of operating signalling lamps (where they are normally operated from main electrical power source) and communication equipment <i>Note:</i> In relation to (2) and (3) above the emergency installation can be the normal starting batteries provided that they are suitably placed in the vessel

## FISHING VESSELS—RESTRICTED SEAGOING

Reference should be made to Part 2 for stowage, marking, etc., and Part 4 for specifications of equipment.

<i>Measured Length</i>	<i>L.S.A. Requirements</i>
25 metres and over	<b>LIFERAFTS AND INTERNAL BUOYANCY</b> (1) Coastal lifeboat(s) for 100 per cent complement on each side of the vessel, or (2) One coastal lifeboat for 100 per cent complement capable of being launched from either side of the vessel, or (3) Coastal liferaft(s) for 100 per cent complement plus rescue boat (1) Coastal liferaft(s) for 100 per cent complement, or (2) Dinghy for 100 per cent complement, or (3) In the case of a vessel of less than 15 metres measured length, internal buoyancy as prescribed by Appendix N.
Less than 25 metres	
60 metres and over 45 metres and over but less than 60 metres  25 metres and over but less than 45 metres 15 metres and over but less than 25 metres Less than 15 metres	<b>LIFEBUOYS</b> 8 lifebuoys } At least 50 per cent with self-igniting lights including 2 with smoke signals. 6 lifebuoys } 2 of remainder with buoyant lines.  4 lifebuoys, 2 with lights and 2 with lines 2 lifebuoys, one with light and one with line  One lifebuoy with light (provided that these items are not required in: (1) a vessel under 10 metres length which carries only one person, or (2) a vessel less than 5 metres length which is fitted with internal buoyancy as prescribed by Appendix N)
All lengths	<b>LIFEJACKETS</b> A coastal lifejacket with a light and whistle for each person that the vessel is certified to carry
25 metres and over  Less than 25 metres	<b>DISTRESS SIGNALS</b> 6 parachute distress rockets 4 red hand flares 2 hand held orange smoke signals 3 parachute distress rockets 2 red hand flares 1 hand held orange smoke signal
25 metres and over	<b>ELECTRIC ALARM SIGNAL</b> Electric alarm signal for mustering crew (where efficient mustering cannot be carried out by voice)
All lengths	<b>EMERGENCY ELECTRICAL INSTALLATION/EQUIPMENT</b> (1) A number of electric torches or hand lamps as determined by the Authority (2) An emergency installation capable of operating navigation lights (where they are solely electric) for 3 hours, and (3) An emergency installation capable of operating signalling lamps (where they are normally operated from main electrical power source) and communication equipment for 3 hours  <i>Note:</i> In relation to (2) and (3) above the emergency installation can be the normal starting batteries provided that they are suitably placed in the vessel

## CLASS 3D

## FISHING VESSELS—PARTIALLY SMOOTH WATERS

Reference should be made to Part 2 for marking, stowage, etc., and Part 4 for specifications of equipment.

<i>Measured Length</i>	<i>L.S.A. Requirements</i>
25 metres and over	<b>BUOYANT APPLIANCES</b> Sufficient buoyant appliances and/or lifeboys to provide a total float-off capacity for 100% complement, provided that— <ol style="list-style-type: none"> <li>(a) each lifebuoy is assumed to provide support for two persons,</li> <li>(b) a dinghy shall be included in the above appliances</li> </ol>
10 metres and over but less than 25 metres	Sufficient buoyant appliances and/or lifeboys to provide a total float-off capacity for 100% complement, provided that— <ol style="list-style-type: none"> <li>(a) each lifebuoy is assumed to provide support for two persons,</li> <li>(b) a dinghy may be included in the above appliances</li> </ol>
Less than 10 metres	<ol style="list-style-type: none"> <li>(1) buoyant appliances and/or lifebuoys for 100 per cent complement, or</li> <li>(2) a dinghy for 100 per cent complement, or</li> <li>(3) internal buoyancy as prescribed by Appendix N</li> </ol>
15 metres and over 10 metres and over but less than 15 metres	<b>LIFEBUOYS</b> Included in 100% buoyancy above 2 lifebuoys, at least one with light One lifebuoy with light
All lengths	<b>LIFEJACKETS</b> A coastal lifejacket for each person that the vessel is certified to carry
All lengths	<b>DISTRESS SIGNALS</b> 3 parachute distress rockets 2 red hand flares 1 hand held orange smoke signal <i>Note:</i> Consistent with the area of operations allocated to the vessel, a reduction in distress signals may be permitted by the Authority
All lengths	<b>EMERGENCY ELECTRICAL EQUIPMENT</b> A number of electric torches or hand lamps as determined by the Authority

## CLASS 3E

## FISHING VESSELS—SMOOTH WATERS

Reference should be made to Part 2 for stowage, marking, etc., and Part 4 for specifications of equipment.

<i>Measured Length</i>	<i>L.S.A. Requirements</i>
10 metres and over	<b>BUOYANT APPLIANCES</b> Sufficient buoyant appliances and/or lifebuoys to provide a total float-off capacity for 100% complement, provided that— (a) each lifebuoy is assumed to provide support for two persons, (b) a dinghy shall be included in the above appliances
Less than 10 metres	(1) buoyant appliances and/or lifebuoys as for 10 metres and over (above), or (2) fitted with internal buoyancy as prescribed by Appendix N
15 metres and over 10 metres and over but less than 15 metres	<b>LIFEBUOYS</b> Included in 100% buoyancy above 2 lifebuoys, at least one with light One lifebuoy with light
All lengths	<b>LIFEJACKETS</b> A coastal lifejacket for each person that the vessel is certified to carry
All lengths	<b>DISTRESS SIGNALS</b> Distress signals consistent with the area of operations as determined by the Authority
All lengths	<b>EMERGENCY ELECTRICAL EQUIPMENT</b> Electric torches or hand lamps as determined by the Authority

## PART 4—Types of Life-Saving Appliances

## APPENDICES

<i>Appendix</i>	<i>Title</i>	<i>Page</i>
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B	Coastal Lifeboats	
C	Part I—Davits and Launching Arrangements for Coastal Lifeboats Part II—Launching Appliances and Launching and Recovery arrangements for SOLAS Survival Craft	
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N	Internal Buoyancy in Small Vessels	
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P	Lifebuoys, Lights, Smoke Signals and Buoyant Lifelines	
Q	SOLAS Lifejackets and Lights	
R	Coastal Lifejackets and Lifejacket Lights and Whistles	
S	Portable Radiocommunication Equipment for Survival Craft	
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X	General Requirements for SOLAS Lifesaving Appliances, Tests for Approval, and Production and Installation Tests	
Y	Approval, Specifications and Test Methods for Lifejackets and Lifejacket Materials	
Z	Survival Craft Emergency Position Indicating Radio Beacons (EPIRBS)	
ZA	Two way radiotelephone apparatus for survival craft.	

NOTE: Reference to Chapter III and Chapter IV in the Appendices are to those Chapters in the International Convention for the Safety of Life at Sea, 1974, as amended.

## APPENDIX A

## SOLAS LIFEBOATS

1. SOLAS LIFEBOATS are to comply with the requirements of Regulations 41 to 46 of Chapter III, except as noted below.
  - 1.1 In addition to the equipment prescribed by Regulation 41, there shall be carried two watertight containers, each holding at least 25 matches of a type not readily extinguishable by wind, and containing or being fitted with a surface for striking the matches on.
  - 1.2 Retro-reflective tape shall be fitted in accordance with Marine Orders Part 25.
  - 1.3 Food rations shall be not less than 1kg per person of barley sugar or other non-thirst provoking food, containing no protein or fat, and providing at least 1500 kJ for each

- 100 grams. The food should be replaced not later than 4 years after placing in the lifeboat.
- 1.4 The doses of anti-seasickness medicine shall each contain 300 micrograms of Hyoscine.

**APPENDIX B**  
**COASTAL LIFEBOATS**

**1. Construction and capacity**

- 1.1 Every coastal lifeboat shall be an open boat constructed with rigid sides.
- 1.2 The boat shall be of such form and proportions that it shall have ample stability in a seaway and sufficient freeboard when loaded with its equipment and the number of persons specified in Column (3) of 1.3.
- 1.3 The length of the boat and the number of persons for whom seating shall be provided in the boat shall be determined in accordance with the following table:

(1) <i>Number of persons on board the vessel</i>	(2) <i>Minimum length of boat in metres</i>	(3) <i>Minimum seating capacity of boat (persons)</i>
9	4.75	9
8	4.50	8
6 or 7	4.25	7
4 or 5	4.00	5
3	3.75	3
2	3.25	2

- 1.4 All thwart and side seats in the boat shall be fitted as low in the boat as practicable and bottom boards shall be fitted.
- 1.5 The boat shall be square-sterned and shall have a mean sheer at least equal to five per cent of its length.
- 1.6 The boat shall be fitted with internal buoyancy appliances which shall be so placed as to secure stability when the boat is fully laden under adverse weather conditions.
- 1.7 Every boat shall be fitted with internal buoyancy appliances which shall consist either of air cases or of buoyant material which has the properties detailed in 1 of Appendix N and has satisfactorily passed the tests detailed in Appendix O.
- 1.8 The total volume of the internal buoyancy appliances shall be such that it will be at least equal to the sum of the volumes of:
- 1.8.1 That required to float the boat and its full equipment when the boat is flooded and open to the sea so that the top of the gunwale amidships is not submerged; and
- 1.8.2 That equal to 7.5 per cent of the cubic capacity of the boat which shall be determined as prescribed in 1.9 below.

**1.9 Cubic Capacity of Lifeboats**

- 1.9.1 Subject to the provisions of 1.9.6 the cubic capacity of a lifeboat for the purposes of this Appendix shall be measured in cubic metres and shall be determined by the following formula:

$$\text{Cubic Capacity} = \frac{L}{12} (4A + 2B + 4C), \text{ where:}$$

- (a) L denotes the length of the boat in metres from the inside of the planking or plating of the stem to the corresponding point

at the stern post or, in the case of a boat with a square stern, to the inside of the transom; and

- (b) A, B and C denote, respectively, the areas of the cross-sections at the quarter length forward, amidships, and the quarter length aft, which correspond to the three points obtained by dividing L into four equal parts (for this purpose the areas corresponding to the two ends of the boat being considered negligible).

1.9.2 For the purpose of 1.9.1 (b) the areas A, B and C shall be deemed to be given in square metres by the successive application of the following formula to each of the three cross-sections:

$$\text{Area} = \frac{h}{12} (a + 4b + 2c + 4d + e), \text{ where:}$$

(a) h denotes:

- (i) the depth measured in metres inside the planking or plating from the keel to the level of the gunwale; or  
 (ii) the depth ascertained in accordance with 1.9.4 and 1.9.5, as the case requires; and

(b) a, b, c, d and e denote the horizontal breadths of the boat measured in metres inside the planking or plating at the upper and lower points of the depth and at the three points obtained by dividing h into four equal parts (a and e being the breadths at the extreme points, and c at the middle point of h).

1.9.3 For the purpose of this item the capacity of a square-sterned boat shall be calculated as if the boat had a pointed stern.

1.9.4 If the sheer of the gunwale, measured at the two points situated at a quarter of the length of the boat from the ends, exceeds one per cent of the length of the boat, the depth employed in calculating the area A or C shall be deemed to be the depth amidships plus one per cent of the length of the lifeboat.

1.9.5 If the depth of the boat amidships exceeds forty-five per cent of the breadth, the depth employed in calculating the area of the amidships cross-section B shall be deemed to be equal to forty-five per cent of the breadth, and the depth employed in calculating the area A or C is obtained by increasing this last figure by an amount equal to one per cent of the length of the boat, but so that in no case shall the depth employed in the calculation exceed the actual depth at area A or C, as the case may be.

1.9.6 Unless the owner of a lifeboat constructed by wooden planks requires the cubic capacity to be determined by exact measurement, the cubic capacity of such a boat may be assumed, for the purposes of this item to be the product of the length, the breadth and the depth multiplied by 0.6 as long as this formula does not give a greater capacity than that obtained by the formula set out in 1.9.1.

1.9.7 The dimensions for the purposes of 1.9.6 shall be measured in the following manner:

- (a) length—from the intersection of the outside of the planking with the stem to the corresponding point at the stern post, or in the case of a square-sterned boat, to the after side of the transom;  
 (b) breadth—from the outside of the planking at the point where the breadth of the boat is greatest; and  
 (c) depth—amidships inside the planking from the keel to the level of the gunwale.



- 1.9.8 For the purposes of 1.9.6 the depth measurement used in calculating the cubic capacity shall, where it exceeds forty-five per cent of the breadth, be deemed to be equal to forty-five per cent of the breadth.
- 1.9.9 For the purposes of this item the cubic capacity of a mechanically propelled lifeboat or a motor lifeboat is the cubic capacity obtained in accordance with the preceding provisions of this Part after deducting from the gross capacity a volume equal to that occupied by the motor and its accessories or the propelling gear and gearbox as the case may be, and, when carried, the searchlight and radio-telegraphy equipment and their accessories.

## 2.      **Equipment**

A coastal lifeboat shall be equipped with:

- 2.1 A single complement of buoyant oars and one spare buoyant oar provided that there shall never be less than three oars; one set of crutches attached to the boat by lanyard or chain; a boat hook;
- 2.2 Two plugs for each plug hole (except where proper automatic valves are fitted) attached to the boat by lanyards or chains; a bailer and a bucket;
- 2.3 A rudder attached to the boat and a tiller;
- 2.4 A first-aid outfit as specified below;
- 2.5 A buoyant container, conspicuously marked as such, suitable for the stowage of small items of equipment;
- 2.6 A painter of sufficient length and size secured to the forward end of the boat with strop and toggle so that it can be released;
- 2.7 Means to enable persons to cling to the boat if upturned;
- 2.8 A waterproof electric torch suitable for morse signalling together with one spare set of batteries and one spare bulb in a waterproof container;
- 2.9 One light buoyant heaving line;
- 2.10 1 litre of fresh water for each person in the carrying capacity of the lifeboat;
- 2.11 Two red hand held flares and one hand held orange smoke signal complying with the requirements of 2 and 4 respectively of Part B of Appendix V;
- 2.12 One copy of the rescue signal table used by life-saving stations, marine rescue units and vessels and persons in distress; and
- 2.13 Retro-reflective tapes of an approved type (each tape being not less than 300 millimetres long and not less than 50 millimetres wide), fitted on top of the gunwale of the lifeboat and on the outside of the lifeboat as near to the gunwale as possible and 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.

*Note:*

The small items of equipment may be kept in the buoyant container (referred to in 2.5 above), which may be stowed in a suitable position in the vessel at the discretion of the Authority.

## 3.      **First-Aid Outfit**

- 3.1 The contents of every first-aid outfit shall comply with the standards specified by the Therapeutic Goods Act 1966 where such standards are applicable to the articles and shall contain the following articles:
- 3.2 2 standard dressings no. 14, medium, measuring 15 cm by 10 cm;
- 3.3 2 standard dressings no. 15, large, measuring 15 cm by 20 cm;
- 3.4 3 triangular woven bandages with not less than 1 m sides (approximately);
- 3.5 2 open weave bandages, measuring 5 m x 75 mm;

- 3.6 1 m x 60 mm self-adhesive waterproof wound dressing;
  - 3.7 1 packet, containing not less than 10 paraffin gauze dressings for burns, individually wrapped, measuring 10 cm by 10 cm (approximately); 2 tubes of Cetrimide Cream 0.5% 50 g (antiseptic cream);
  - 3.8 50 Paracetamol tablets 500 mg (analgesic tablets);
  - 3.9 1 pair of rustless, stainless metal scissors measuring 10 cm with one sharp and one blunt point;
  - 3.10 12 rustless, stainless metal safety pins of assorted sizes;
  - 3.11 1 small packet of silica gel (drying agent); and
  - 3.12 approved instructions for use of the first-aid outfit printed on linen or waterproof paper in the English language.
4. **Construction of Coastal Motor Lifeboats and Coastal Mechanically Propelled Lifeboats**
- 4.1 A motor lifeboat shall comply with the following requirements:
    - 4.1.1 the lifeboat shall be equipped with a compression ignition engine that shall be kept at all times ready for use;
    - 4.1.2 the engine shall be capable of being started under all conditions;
    - 4.1.3 the engine shall operate properly under all conditions including at least 10° list and 10° trim;
    - 4.1.4 the circulating water pumps shall be self-priming;
    - 4.1.5 the engine and its accessories, including the fuel tank, pipes and fittings, shall be adequately protected to ensure reliable operation under conditions likely to arise at sea during heavy weather;
    - 4.1.6 where the lifeboat is made of wood, a metal tray shall be fitted under the engine;
    - 4.1.7 no part of the fuel tank or its fittings shall depend on soft solder for tightness;
    - 4.1.8 if the fuel tank is made of steel, it shall be galvanised externally;
    - 4.1.9 the fuel tank shall be substantially constructed and together with its connexions shall be capable of withstanding hydraulic pressure corresponding to a head of at least 4.5 metres of fresh water;
    - 4.1.10 the fuel tank shall be securely fixed in position and be fitted with suitable filling and relief arrangements;
    - 4.1.11 a metal tray shall be fitted under the fuel tank;
    - 4.1.12 the engine shall be covered in and the casing shall be of steel or shall be fireproofed;
    - 4.1.13 the engine and fuel tank spaces shall be efficiently ventilated;
    - 4.1.14 the shafting and other moving parts of the engine shall be fenced where necessary to protect the persons in the lifeboat from injury;
    - 4.1.15 the speed ahead shall not be less than four knots in smooth water when the lifeboat is loaded with its full complement of persons and equipment;
    - 4.1.16 fuel shall be provided sufficient for twenty-four hours continuous operation at four knots;
    - 4.1.17 the engine shall provide sufficient power for going astern; and
    - 4.1.18 the engine shall be fitted with a generator capable of re-charging all the batteries in the lifeboat.
  - 4.2 A mechanically-propelled lifeboat shall comply with the following requirements:

- 4.2.1 the lifeboat shall be propelled by an approved mechanical gear;
- 4.2.2 the mechanical propelling gear shall be so arranged that it can rapidly and easily be made ready for service and will not interfere with the rapid embarkation of persons;
- 4.2.3 if manually operated, the mechanical propelling gear shall be capable of being operated by a person untrained in its use;
- 4.2.4 the mechanical propelling gear shall be capable of being operated when the lifeboat is flooded;
- 4.2.5 the mechanical propelling gear shall be effective in propelling the lifeboat ahead and astern when the lifeboat is partially or fully loaded;
- 4.2.6 the mechanical propelling gear shall be fitted with a device enabling the helmsman at the time to cause the lifeboat to go astern whilst the propelling gear is in operation;
- 4 2.7 the mechanical propelling gear shall be of sufficient power to enable the lifeboat:
- (a) to be propelled at a speed ahead of three and one-half knots over a distance of one-quarter of a nautical mile in smooth water; and
  - (b) to hold course under adverse weather conditions;
- 4.2.8 the mechanical propelling gear shall be capable of being operated, without adjustment, by persons of different stature; and
- 4.2.9 the mechanical propelling gear shall be substantially constructed and fitted to the lifeboat in an efficient manner.

## APPENDIX C

## PART I—DAVITS AND LAUNCHING ARRANGEMENTS FOR COASTAL LIFEBOATS

## 1. Type of davits

## 1.1 Davits for Coastal Lifeboats shall be:

- 1.1.1 Of a luffing gravity or mechanically controlled single arm type, where the mass of the fully equipped lifeboat, manned ready for launching, is less than 2.3 tonnes; or
- 1.1.2 Of gravity type, where such mass exceeds 2.3 tonnes.
- 1.1.3 The mass of a lifeboat when fully loaded with persons and equipment shall not exceed 20.3 tonnes, a person being deemed for the purpose of this provision to be 75 kilograms.

## 2. Construction

## 2.1 Strength

- 2.1.1 Every davit serving a lifeboat which is required to be put into the water when loaded with its full complement of persons shall, together with its winch, falls, blocks and all other associated lowering gear, be of such strength that the lifeboat with its full equipment and manned by a launching crew of not less than two persons can be turned out and then safely lowered into the water from the embarkation position with its full complement of persons, when the vessel has a trim of up to 10° and is listed up to 15° either way.
- 2.1.2 Every mechanically controlled single-arm davit shall together with its winch, falls, blocks and all other associated lowering gear be of such strength and the operating gear shall be of such power that the lifeboat when fully equipped and manned with a launching crew of two members can be turned out and then safely lowered into the water with the vessel listed to 25°.
- 2.1.3 Every set of davits, davit or other means of launching to which a coastal lifeboat is attached, other than a davit the strength of which is specified in 2.1.1 or 2.1.2 shall together with its winch, falls, blocks and all other associated lowering gear be of such strength that the coastal lifeboat with its full equipment and manned by a launching crew of two members, can be turned out and then safely lowered into the water when the vessel has a trim of 10° and is listed up to 15°, either way.
- 2.1.4 Every set of davits, davit or other means of launching to which a coastal lifeboat is attached, together with its winch and all associated hoisting gear shall be of such strength that the boat can be safely hoisted and stowed when loaded with its full equipment and at least two persons.
- 2.2 Gravity davits. All gravity davits shall be so designed that there is a positive turning out moment during the whole of the davit travel from the inboard to the outboard position when the vessel is upright and also when the vessel is listed at any angle up to and including 25° either way from upright. In the case of gravity type davits comprising arms mounted on rollers which engage with and travel down fixed inclined trackways, the trackways shall be inclined at an angle of not less than 30° to the horizontal when the vessel is upright.
- 2.3 Luffing davits. The operating gear of all luffing type davits shall be of sufficient power to ensure that the coastal lifeboats fully equipped and manned with the launching crew, but not loaded with other persons, can be turned out against a list of at least 15°.
- 2.4 Mechanically controlled single-arm davits. The working load of any mechanically controlled single-arm davit shall not exceed 1.5 tonnes weight.
- 2.5 Stresses

- 2.5.1 In the case of davits other than mechanically controlled single-arm davits the designed stress on the davit arms, when operating under maximum load and conditions of trim and of list, shall afford an adequate factor of safety having regard to the quality of the material used, the method of construction, and the live nature of the load to which the davits are subjected.
- 2.5.2 In the case of mechanically controlled single-arm davits the designed stress on the davit when operating under maximum load and conditions of favourable list shall afford an adequate factor of safety having regard to the quality of the material used, the method of construction, and the live nature of the load to which the davit is subjected.
- 2.6 Static load test. Each davit with its arm at full out-reach shall be capable of withstanding a static load test of not less than 2.2 times that part of the working load supported by the arm.
- 2.7 Attachments at the davit head. The attachments at the davit head from which the blocks are suspended shall be capable of withstanding a proof load test of not less than 2.5 times the maximum load on the attachments.
- 2.8 Blocks
- 2.8.1 All blocks used in the operation of hoisting and lowering of coastal lifeboats shall be of a design that affords an adequate factor of safety. Lower blocks, when fitted, shall be non-toppling. The size of blocks shall be commensurate with the size of the falls.
- 2.8.2 A metal block shall be capable of withstanding a proof load test of not less than 2.5 times the maximum load it is intended to carry in service. The clearance between the sheaves, and the block cheeks of metal blocks in which wire rope is used shall be kept to a practical minimum that will prevent the rope from overriding the rim of the sheave of any block or lead sheave. Component parts of blocks other than their sheaves shall be of ductile material.
- 2.8.3 A wood block shall be capable of withstanding a proof load of not less than 2.5 times the load on the block. The width between the cheeks shall be 12 mm greater than the diameter of new cordage ropes when those ropes are 30 mm diameter, and less in proportion to the circumference of the ropes when they are smaller.
- 2.9 Wire ropes
- 2.9.1 The breaking tensile load of each wire rope used for lowering coastal lifeboats shall be not less than six times the maximum load on the wire rope when lowering, hoisting or stowing.
- 2.9.2 Wire ropes shall be securely attached to the drum of the winch, and the end attachments of the wires and other parts from which the coastal lifeboat is to be suspended shall be capable of withstanding a proof load of not less than 2.5 times the load on such attachments and other parts.
- 2.9.3 Where wire rope splices or ferrule-secured eye terminals are used they shall be capable of withstanding a proof test of not less than 2.5 times the load imposed on them in service unless samples representing each size of wire on which they are used, show a factor of safety of at least 5 when tested to destruction.
- 2.10 Winches
- 2.10.1 In the case of davits other than mechanically controlled single-arm davits, winch drums shall be arranged to keep the two falls separate and to enable them to pay out at the same rate. The leads of the wire ropes shall be such that they will wind evenly on the drums and lead blocks shall be arranged to give a fleet angle or angle of lead of not more than

5° for grooved drums and 3° for ungrooved drums. In the case of mechanically controlled single arm davits the lead of the wire rope fall shall be such that the fall winds evenly on the drum.

- 2.10.2 Winch brakes shall be of robust construction and afford complete control and limitation of speed in the operation of lowering. The hand brake shall be so arranged that it is normally in the 'ON' position and returns to the 'ON' position when the control handle is not being operated. The weight on the brake lever shall be sufficient to operate the brake effectively without additional pressure. The brake gear shall include means for automatically controlling the speed of lowering to ensure that the coastal lifeboat is lowered expeditiously without exceeding a rate of lowering consistent with safety. For this purpose, the automatic brake shall be set to give a speed of lowering of between 18 and 36 metres per minute. Ratchet gear shall be incorporated in the hand brake mechanism of lifeboat winches. Where practicable the brake gear will be positioned so the man operating the winch has the coastal lifeboat under observation during the whole process of its being launched into the water.
- 2.10.3 Each winch shall be capable of lowering and holding a test load of 1.5 times the working load as defined in 2.13.3.
- 2.10.4 Winches shall be so constructed that the crank handle or handles are not rotated by moving parts of the winch when the coastal lifeboat is being lowered or when it is being hoisted by power and provision shall be made to allow the falls to be manually unwound.
- 2.11 Cordage rope falls
- 2.11.1 Cordage rope falls shall be of manilla or some other suitable material and shall be durable, unkinkable, firm laid and pliable. They shall be able to pass freely under any conditions through a hole 10 mm larger than the nominal diameter of the rope. The breaking load of each rope used for lowering coastal lifeboats shall be not less than 6 times the maximum load on the rope when lowering or hoisting. Ropes of less than 30 mm diameter shall not be used for lifeboat falls. Winding reels or flaking boxes for the manilla rope falls shall be provided.
- 2.12 Bollards
- 2.12.1 Suitable bollards or other equally effective appliances for lowering any coastal lifeboat shall be provided in all cases where cordage rope falls are used. Such bollards or other appliances shall be sited so as to ensure that the coastal lifeboat served by them can be safely lowered, and fairleads or lead sheaves shall be fitted so as to ensure that it shall not be lifted during the process of turning out or swinging out.
- 2.13 'Working Load'. In this Appendix the expression 'working load' means:
- 2.13.1 In relation to davits to which 2.1.1 applies, the sum of the weight of the lifeboat, its full equipment, the blocks and falls, and the maximum number of persons which the lifeboat is deemed fit to carry, the weight of each person being taken to be 75 kg wt.
- 2.13.2 In relation to davits and other means of launching to which 2.1.2 or 2.1.3 applies, the sum of the weight of the coastal lifeboat, its full equipment, the blocks and falls, and a launching crew consisting of two persons, the weight of each person being taken to be 75 kg wt.
- 2.13.3 In relation to winches the maximum pull exerted by the fall or falls at the winch drum during lowering, hoisting or stowing which in any case is to be taken as not less than the working load on the davit or davits divided by the velocity ratio of the lowering tackle.

**3. Tests After Installation on Board****3.1 General.**

Tests shall be made to ensure that all coastal lifeboats attached to davits can be re-stowed from the embarkation position safely and with facility when loaded with the required equipment, and that when so loaded the coastal lifeboat can when released be lowered by gravity into the water against the frictional resistance of the winch, falls, blocks and other associated gear.

**3.2 Lowering tests**

**3.2.1** Each pair of davits to which 2.1.1 applies and any associated lifeboat winches and their brakes shall be capable of withstanding the following test:

The lifeboat at each set of davits shall be lowered from the embarkation deck into the water loaded with the equipment required by these scales and a distributed weight equal to the full number of persons which it is deemed fit to accommodate plus 10 per cent of the working load. Winch brakes exposed to the weather shall be capable of withstanding the foregoing test with the braking surface wetted.

**3.2.2** In the case of davits to which 2.1.2. or 2.1.3 applies, the coastal lifeboat shall be lowered into the water with the equipment required by these rules and a distributed weight equal to the weight of a launching crew of two persons plus 10 per cent of the working load.

**3.2.3** For the purpose of the tests required under 3.2.1 and 3.2.2 the weight of a person shall be taken to be 75 kg wt.

**4. Winches and Falls**

**4.1** Subject to 4.2 a lifeboat provided in a Class 3A vessel shall be served by wire-rope falls and winches of an approved design.

**4.2** Where the Authority is satisfied that manilla-rope falls or falls of other material, having regard to the height of the lifeboat above the water when the vessel is at her lightest sea-going draft or such other circumstances as it thinks fit, are adequate, they may permit manilla-rope falls or falls of other material, with or without winches, to be fitted.

**4.3** The falls serving a lifeboat shall be long enough to reach the water when the vessel is at her lightest sea-going draft and listed to 15° either way.

**4.4** Lower-fall blocks of falls serving a lifeboat shall be fitted with a suitable ring or long link for attaching to the lifting hooks of a lifeboat.

**4.5** Where disengaging gear is not fitted to lifeboats means shall be provided for speedily detaching the falls from those boats.

**5. Ancillary Provisions**

**5.1** Two life-lines of sufficient length to reach the water when the vessel is at her lightest sea-going draft, and listed to 15° either way, shall be fitted to the davit span of each lifeboat.

**5.2** Each lifeboat shall be fitted with a set of skates or other apparatus to facilitate launching the lifeboat against a list of 15° either way, provided that skates shall not extend above the gunwale of a lifeboat to prevent any fouling of the vessel's structure, and providing any hook over a gunwale to hold a skate in place shall be as flat as possible.

**5.3** A vessel shall be furnished with means for bringing and holding lifeboats against the vessel's side whilst persons are being embarked, providing that no bollard or cleat shall project above the gunwale on the side of a lifeboat nearest the vessel when it is being lowered.

**PART II—LAUNCHING APPLIANCES AND LAUNCHING AND RECOVERY  
ARRANGEMENTS FOR SOLAS SURVIVAL CRAFT**

Launching appliances, and launching and recovery arrangements, shall comply with Regulations 15, 16, 19, 28 and 48 of Chapter III.

**APPENDIX D**

**SOLAS RESCUE BOATS**

SOLAS rescue boats shall comply with the requirements of Regulation 47 of Chapter III, and shall be fitted with retro-reflective tape in accordance with Marine Orders Part 25.

**APPENDIX E**

**NON-SOLAS RESCUE BOATS**

**1. Construction**

A Rescue Boat shall comply with the following requirements:

- 1.1 The minimum length of the boat shall be 3.25 metres.
- 1.2 The boat is to be of such form and proportions as to have ample stability and sufficient freeboard in the loaded condition in a seaway.
- 1.3 The boat may be of the inflatable type or constructed of fibreglass, wood or metal.
- 1.4 Inflatable boats shall be provided with a suitable cover, be kept inflated at all times and be provided with a suitable motor.

**2. Equipment**

A Rescue Boat shall be equipped with:

- 2.1 A waterproof electric torch.
- 2.2 A bucket fitted with a lanyard.
- 2.3 Oars or paddles.
- 2.4 Grablines.
- 2.5 A heaving line with rescue quoit.

**3. Launching Arrangements**

- 3.1 Except where manual launching arrangements are approved, adequate means of launching and recovering the boat when loaded with 2 persons each of 75 kg weight, full equipment, and engine when fitted, shall be provided.

**4. Retro-reflective tape**

**4.1 Non Inflatable Rescue Boats**

- 4.1.1 Retro-reflective tapes of an approved type (each tape being not less than 300 millimetres long and 50 millimetres wide) shall be fitted on top of the gunwale and on the outside of the boat, including the transom, as near the gunwale as possible so that the distance between the centre of a tape and the centre of the tape next in line shall not exceed 500 millimetres.
- 4.1.2 On the bottom of the boat, similar tapes shall be placed on each side of the keel, spaced at intervals between centres of not more than 500 millimetres.
- 4.1.3 Any bow canopy or apron shall have one or more crosses made of two strips of tape not less than 300 millimetres in length and 50 millimetres in width.

**4.2 Inflatable Rescue Boats**

- 4.2.1 Retro-reflective tapes of an approved type (each tape being not less than 300 millimetres in length and not less than 50 millimetres in width) shall



be fitted on top and on the outboard sides of the buoyancy tubes, spaced so that the distance between the centre of one tape and the centre of the tape next in line is not greater than 500 millimetres.

- 4.2.2 On the bottom of the boat, similar tapes shall be placed on each side of the keel, spaced at intervals between centres of not more than 500 millimetres.
- 4.2.3 The bow canopy shall be fitted with one cross on each side of the centre line, made of two strips of tape not less than 300 millimetres in length and 50 millimetres in width.
- 4.2.4 Additional tapes not less than 150 millimetres in length and not less than 100 millimetres in width shall be fitted on the transom, and around the bow there shall be placed a horizontal strip not less than 600 millimetres in length and 50 millimetres in width, adjoining a vertical strip not less than 150 millimetres in length and 50 millimetres in width.

#### **APPENDIX F**

##### **EMBARKATION LADDERS**

Embarkation ladders and evacuation slides or other devices substituting for ladders shall comply with Regulations 11.7, 48.5 and 48.7 of Chapter III as appropriate.

#### **APPENDIX G**

##### **DINGHIES**

#### **1. Construction and Capacity**

Subject to Appendix N a dinghy shall comply with the requirements of AS 1799.

#### **2. Equipment**

A dinghy shall be equipped with:

- 2.1 Two oars or paddles;
- 2.2 One painter;
- 2.3 One bucket or bailer;
- 2.4 Means to enable persons to cling to the boat if upturned.

#### **3. Launching arrangements**

- 3.1 Except where manual launching arrangements are approved, adequate means of launching for dinghy plus equipment listed above, shall be provided.

#### **APPENDIX H**

##### **SOLAS LIFERAFTS**

- 1. SOLAS liferafts shall comply, except as provided below, with Regulations 38, 39 and 40 of Chapter III, as appropriate.
- 2. In addition to the equipment prescribed by Regulation 38 the following shall be carried:
  - 2.1 one sponge per person
  - 2.2 six chemiluminescent lights of an approved type
  - 2.3 an approved EPIRB
  - 2.4 a watertight container holding at least 25 matches of a type not readily extinguishable by wind, and containing or being fitted with a surface for striking the matches on.
- 3. Retro-reflective tape shall be fitted in accordance with Marine Orders Part 25.
- 4. Food rations shall be not less than 667 grams per person of barley sugar or other non-thirst provoking food, containing no protein or fat, and providing at least 1500 kJ per 100 grams. The food should be replaced not later than 4 years after placing in the liferaft.

5. The doses of anti-seasickness medicine shall each contain 300 micrograms of Hyoscine.
6. Servicing stations for inflatable liferafts shall comply with Marine Orders Part 25, and SOLAS Approved Liferafts shall not be serviced at other than approved service stations.
  - 6.1 Servicing personnel shall be certified every three years by the manufacturer as being competent to perform the work.

## APPENDIX J

### COASTAL LIFERAFTS (INFLATABLE)

#### 1. Construction

- 1.1 The liferaft shall be so constructed that, when fully inflated and floating with the cover uppermost, it shall be stable in a seaway.
- 1.2 The liferaft shall be so constructed that if it is dropped into the water from a height of 6 metres or from its stowed position, whichever is the greater, neither the liferaft or its equipment will be damaged.
- 1.3 The construction of the liferaft shall include a cover of a highly visible colour. This cover shall be capable of protecting the occupants against injury from exposure. The top and the inside of the cover shall be fitted with a lamp which derives its power from a sea-activated cell.
- 1.4 The liferaft shall be fitted with a painter and shall have a line securely becketed around the outside, and a life-line fitted around the inside.
- 1.5 The liferaft shall be capable of being readily righted by one person if it inflates in an inverted position.
- 1.6 The liferaft shall be fitted at each opening with efficient means to enable persons in the water to climb on board.
- 1.7 The liferaft shall be contained in a valise or other container so constructed as to be capable of withstanding hard wear under conditions met with at sea. The liferaft in such valise or container shall be inherently buoyant.
- 1.8 The buoyancy of the liferaft shall be divided into an even number of compartments, so arranged that either half of the total number of compartments is capable of supporting out of the water the number of persons in the carrying capacity of the liferaft.
- 1.9 The total mass of the liferaft and its equipment, contained in a valise or other container, shall not exceed 180 kg.
- 1.10 The floor of the liferaft shall be waterproof.
- 1.11 The liferaft shall be inflated by a gas which is not injurious to the occupants, and inflation shall take place automatically either on the pulling of a line, or by some other equally simple and efficient method. Provision shall be made for maintaining pressure with a topping-up pump or bellows.
- 1.12 The liferaft shall be of suitable material and construction, and shall be so constructed as to be capable of withstanding exposure for 30 days afloat in all sea conditions.
- 1.13 Every liferaft which is designed for use with a launching appliance shall be properly constructed for that purpose, and shall be of sufficient strength to permit it to be safely lowered into the water when loaded with its full complement of persons and equipment.
- 1.14 The liferaft shall be capable of operating through a temperature range of 66°C to -18°C.

#### 2. Capacity

2.1 The carrying capacity of an inflatable coastal liferaft shall be the largest whole number obtained from:

(a)  $\left(\frac{V}{0.096}\right)$  where V = volume of buoyancy tubes, excluding thwarts or arches, in m<sup>3</sup> when the raft is inflated.

OR

(b)  $\left(\frac{A}{0.372}\right)$  where A = surface area of floor of liferaft, including thwarts, if any, in m<sup>2</sup> when the liferaft is inflated.

whichever is the less subject to 2.2 below.

2.2 The carrying capacity of an inflatable coastal liferaft shall be not less than 4 persons, nor more than 25 persons.

### 3. Equipment

The equipment and rations to be provided in every inflatable coastal liferaft shall be as follows:

- 3.1 one sponge for each person included in the carrying capacity of the liferaft;
- 3.2 two paddles;
- 3.3 where the carrying capacity of a liferaft is thirteen persons or more, two bailers and two safety-knives, otherwise one bailer and one safety-knife;
- 3.4 one repair outfit capable of repairing punctures in buoyancy compartments;
- 3.5 one topping-up pump or bellows;
- 3.6 one waterproof electric torch suitable for morse-signalling together with one spare set of batteries and one spare bulb in a waterproof container;
- 3.7 one sea-anchor, permanently attached to the liferaft;
- 3.8 1 litre of fresh water for each person in carrying capacity of liferaft, to be contained in watertight and rustproof receptacles;
- 3.9 one safety tin-opener;
- 3.10 two red hand held flares and one hand held orange smoke signal complying with the requirements of 2 and 4 respectively of Part B of Appendix V;
- 3.11 a first-aid outfit in accordance with 3 of Appendix B;
- 3.12 one copy of the rescue signal table used by life-saving stations, marine rescue units and vessels and persons in distress;
- 3.13 500 grams of
  - (i) barley sugar; or
  - (ii) other non-thirst provoking food, containing no protein or fat and providing at least 1500 kilojoules per 100 g weight for each person included in the carrying capacity of the liferaft (being barley sugar or other food that has been in the liferaft for a period not exceeding 4 years);
- 3.14 six sea-sickness tablets for each person included in the carrying capacity of the liferaft;
- 3.15 one fishing line and six hooks;
- 3.16 one daylight-signalling mirror;
- 3.17 a watertight container—being furnished with a water-proof match-striker as part of, or attached to the container; and holding not less than 25 matches of a type that is not readily extinguishable by wind;
- 3.18 6 chemiluminescent lights of an approved type;
- 3.19 retro-reflective tape of an approved type (and being not less than 50 millimetres in width) shall be fitted to the underside of the floor of a liferaft in such a way that the tape forms a cross at the centre of the floor. The length of the tapes shall be:

- 3.19.1 for a circular liferaft—not less than half the diameter of the liferaft; and
- 3.19.2 for other liferafts—not less than half the width and length respectively, of the liferaft;
- 3.20 retro-reflective tape of an approved type (each tape being not less than 300 millimetres in length and not less than 50 millimetres in width) shall be spaced around the cover, or each of the covers, with which the liferaft is fitted in such a way that:
  - 3.20.1 the distance between the centre of one tape and the centre of the tape next in line is not greater than 500 millimetres; and
  - 3.20.2 the distance between the lower edge of the tape and the lower edge of the cover is not less than half the height of the cover; and
- 3.21 two retro-reflective tapes of an approved type (and being not less than 50 millimetres in width) shall be placed at the centre of the top of a liferaft cover in the form of a cross. The lengths of the tapes shall be:
  - 3.21.1 for a circular liferaft—not less than half the diameter of the liferaft; and
  - 3.21.2 for other liferafts—not less than half the width and length, respectively, of the liferaft.

## APPENDIX K

### COASTAL LIFERAFTS (RIGID)

#### 1. Construction

- 1.1 The liferaft shall be so constructed so that if it is dropped into the water from a height of 6 metres, or from its stowed position, whichever is the greater, neither the liferaft nor its equipment will be damaged.
- 1.2 The buoyancy of the liferaft shall be derived from a material having the properties detailed in 1 of Appendix N and which has satisfactorily passed the tests detailed in Appendix O.
- 1.3 The liferaft shall be so constructed that 75 per cent of the buoyancy material is placed around its perimeter.
- 1.4 The buoyancy material shall be covered with an approved lay up of glass reinforced plastic or a casing of marine plywood (marine plywood shall comply with Australian Standard 2272); the covering shall be of a highly visible colour.
- 1.5 The equipment of the liferaft shall be so stowed as to be readily available which ever way up the liferaft is floating or may be stowed in a buoyant cannister attached to the liferaft by a line.
- 1.6 The total mass of any liferaft shall not exceed 180 kg.
- 1.7 The liferaft shall be effective and stable when floating either way up and in no case shall the water plane area be less than 1.5 square metres.
- 1.8 The liferaft shall have a painter attached, and a life-line securely becketed round the outside. A life-line shall also be fitted round the inside of the liferaft.
- 1.9 The liferaft shall be stowed as to float free in the event of the vessel sinking.
- 1.10 The construction of the liferaft shall include a cover of a highly visible colour. This cover shall be capable of protecting the occupants against injury from exposure. The top and the inside of the cover shall be fitted with a lamp which derives its power from a sea-activated cell.

## 2. Capacity

2.1 The carrying capacity of a rigid coastal liferaft shall be the largest whole number obtained from:

(a)  $\left(\frac{1000 V - W}{0.96/96}\right)$  where V = volume of buoyancy material in m<sup>3</sup>,  
and mass of rigid liferaft in kg.

OR W =

(b)  $\left(\frac{A}{0.372}\right)$  where A = surface area of liferaft deck in m<sup>2</sup>.

whichever is the less.

## 3. Equipment

The equipment and rations to be provided in a rigid coastal liferaft shall be as follows:

- 3.1 one buoyant rescue quoit, attached to at least 30 metres of buoyant line;
- 3.2 for liferafts with a carrying capacity of 12 persons or less, one safety knife and one bailer; for liferafts with a carrying capacity of 13 persons or more, two safety knives and two bailers;
- 3.3 one sponge for each person included in the carrying capacity of the liferaft;
- 3.4 two paddles;
- 3.5 one waterproof electric torch suitable for morse signalling, together with one spare set of batteries, and one spare bulb in a waterproof container;
- 3.6 one sea-anchor which shall be permanently attached to the liferaft;
- 3.7 1 litre of fresh water for each person in carrying capacity of liferaft, to be contained in watertight and rustproof receptacles;
- 3.8 two safety tin openers;
- 3.9 two red hand flares and one hand held orange smoke signal;
- 3.10 a first-aid outfit in accordance with 3 of Appendix B;
- 3.11 one copy of the rescue signal table used by life-saving stations, marine rescue units and vessels and persons in distress;
- 3.12 500 grams of
  - (i) barley sugar, or
  - (ii) other non-thirst provoking food, containing no protein or fat and providing at least 1500 kilojoules per 100 gram weight for each person included in the carrying capacity of the liferaft (being barley sugar or other food that has been in the liferaft for a period not exceeding 4 years);
- 3.13 six sea-sickness tablets for each person included in the carrying capacity of the liferaft;
- 3.14 one fishing line and six hooks;
- 3.15 one daylight-signalling mirror;
- 3.16 a watertight container—being furnished with a water proof match-striker as part of, or attached to the container; and holding not less than 25 matches of a type that is not readily extinguishable by wind;
- 3.17 6 chemiluminescent lights of an approved type;
- 3.18 retro-reflective tape of an approved type (and being not less than 50 millimetres in width) shall be fitted to the underside of the floor of a liferaft in such a way that the tape forms a cross at the centre of the floor. The length of the tapes shall be:
  - 3.18.1 for a circular liferaft—not less than half the diameter of the liferaft; and

- 3.18.2 for other liferafts—not less than half the width and length respectively, of the liferaft;
- 3.19 retro-reflective tape of an approved type (each tape being not less than 300 millimetres in length and not less than 50 millimetres in width) shall be spaced around the cover, or each of the covers, with which the liferaft is fitted in such a way that:
- 3.19.1 the distance between the centre of one tape and the centre of the tape next in line is not greater than 500 millimetres; and
- 3.19.2 the distance between the lower edge of the tape and the lower edge of the cover is not less than half the height of the cover; and
- 3.20 two retro-reflective tapes of an approved type (and being not less than 50 millimetres in width) shall be placed at the centre of the top of a liferaft cover in the form of a cross. The lengths of the tapes shall be:
- 3.20.1 for a circular liferaft—not less than half the diameter of the liferaft; and
- 3.20.2 for other liferafts—not less than half the width and length, respectively, of the liferaft.

#### APPENDIX L

#### SOLAS FIRST AID OUTFITS

The requirements for SOLAS first aid outfits are those of Marine Orders Part 25.

#### APPENDIX M

#### BUOYANT APPLIANCES

##### Construction and capacity

1. A buoyant appliance shall be manufactured from buoyant material having the properties detailed in 1 of Appendix N, suitably enclosed.
2. The encasing material shall be a material which:
  - 2.1 retains its shape and strength when subject to the range of temperature which may be encountered in service and is durable in sea water;
  - 2.2 protects the buoyancy material from ultra violet light and physical damage;
  - 2.3 is fire retardant or painted with an approved fire retarding paint.
3. A buoyant appliance shall be capable of withstanding a drop test, the height of which shall be equivalent to that of the deck on which it is stowed above the vessel's light water line but in no case shall be less than 6 metres.
4. A buoyant appliance shall be effective and stable when floating either way up and shall not require adjustment before use.
5. Grab lines shall be fitted all round the appliance. The grab lines shall be secured to the appliance at not more than 460 mm centres nor less than 300 mm centres and interlaced to prevent movement. Each loop shall have a float and the depth of the loop when wet shall be not less than 150 mm and not more than 200 mm. The grab lines shall be of rope not less than 7 mm diameter. The fastenings securing the grab lines to the appliance shall be strong enough to permit the appliance being lifted by the grab lines.
6. The number of persons that the appliance shall be deemed fit to support shall be equal to either:
  - 6.1 the greatest whole number obtained by the equation:
 
$$N = 70 \left( V - \frac{W}{1000} \right)$$
 where N = Number of persons  
 V = Volume in cubic metres  
 W = mass of appliance in kgs;      OR
  - 6.2 the number of grab line loops,

whichever number shall be less.

7. A buoyant appliance shall be coloured a highly visible colour.
8. A buoyant appliance shall not exceed 180 kg unless suitable means are provided to enable it to be launched and, where the appliance exceeds 136 kg but does not exceed 180 kg, suitable handles or rings shall be fitted to enable it to be launched by hand.
9. The buoyant appliance shall 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) on the top and bottom of the buoyant appliance, spaced around the perimeter of the appliance 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.

## APPENDIX N

### INTERNAL BUOYANCY IN SMALL VESSELS

1. The material shall have the following properties:
  - 1.1 Density—32 kg/m<sup>3</sup> minimum
  - 1.2 Compressive Strength (at 10 per cent strain)—235 kPa minimum
  - 1.3 Closed Cell Content—92 per cent minimum
  - 1.4 Water Uptake—400 cc/m<sup>3</sup> maximum
  - 1.5 Dimensional Stability—(original linear dimension = 100)
    - 1.5.1 Temperature Cycling— -15°C to +70°C
    - 1.5.2 14 days under 100 mm head of kerosene, toluene (conforming to ASTM/D841/1977), xylene (conforming to ASTM/D843/1977) or distillate (90 minimum).
  - 1.6 Self-extinguishing to A.S.T.M. D—1692/68—Burning rate maximum 10 cm per minute.
  - 1.7 High resistance to kerosene, petrol, distillate and oils.
2. Tests to confirm the above properties shall be carried out as described in Appendix O.
3. The required quantity of material in cubic metres shall be calculated by:
  - 3.1 Wooden Vessels
 
$$\frac{1.2 \times F}{1000 - D}$$
  - 3.2 Other Vessels
 
$$\frac{1.2 (MK + F)}{1000 - D}$$

where

M = dry mass of hull material in kgs

K =  $\frac{\text{density of hull material} - \text{density of fresh water}}{\text{density of hull material}}$

F = total dry mass of fittings and equipment, and machinery installation if fitted, in kgs

D = density of buoyancy material in kg/m<sup>3</sup>

Note:

Unless otherwise determined by the Authority K may be taken as:

Aluminium 0.62

G.R.P.	0.375
Steel	0.87

4. The material shall not be sprayed in, in situ, but shall be manufactured in slab form under controlled conditions, cut to the required size and fitted into the vessel.
5. Before fitting into position, each slab of the material shall be coated on all surfaces with an approved fire retardant paint or fire retardant resin.
6. The material shall be fitted into the vessel so that:
  - 6.1 the centre of mass of the material is above the flooded centre of gravity of the vessel;
  - 6.2 it is protected from physical damage;
  - 6.3 it is protected from direct sunlight;
  - 6.4 it is at least 0.5 metres away from any dry exhaust line or other source of heat;
  - 6.5 it is secured to the satisfaction of the Surveyor.

## APPENDIX O

### TESTING OF FOAM BUOYANCY MATERIALS FOR LIFE-SAVING APPLIANCES

#### 1. General

- 1.1 The tests detailed in 2, 3 and 4 of this appendix are to be carried out on foam buoyancy materials intended for use in lifeboats, rigid rescue boats, rigid liferafts, buoyant appliances, lifejackets and lifebuoys.
  - 1.1.1 The tests need not be carried out on foam buoyancy materials intended for use in SOLAS lifeboats, rescue boats, liferafts, lifejackets or lifebuoys where the prototype articles have satisfactorily completed the tests required by Chapter III and IMO Resolution A 521 (13).
- 1.2 A foam buoyancy material shall be used solely in connection with the buoyancy of those types of life-saving appliances for which the material has been satisfactorily tested.
- 1.3 Other inherent properties, not mentioned in this appendix, may render a material unsuitable for use in certain appliances or for particular applications. For example, a material acceptable for use as buoyancy material in lifeboats may be too brittle for other applications, e.g. in lifejackets. The suitability of a material will also depend on the way in which it is to be used in relation to the appliance under consideration.
- 1.4 Except for the fire resistance test and bonding test and for those tests carried out on completed lifebuoys the tests are to be carried out on specimens (without skin or coverings) measuring initially 150 mm x 150 mm x 150 mm. However, where the standard thickness of the material as manufactured is less than 150 mm, sufficient layers of material should be bonded together with an adhesive compatible with the foam and any materials used in the tests to obtain the required test thickness.
- 1.5 The density, in kg/m<sup>3</sup> of each specimen is to be determined before test and included in the test report.
- 1.6 The tests are to be carried out by an independent testing authority, acceptable to the Authority and their report forwarded for consideration to the Authority. Wherever possible details of the precise way in which the material is intended to be used in the appliance should be included with the report.

#### 2. Lifeboats, rigid liferafts, buoyant apparatus

- 2.1 The following tests should be carried out on specimens of buoyancy materials intended for use in lifebuoys, rigid liferafts and buoyant apparatus and appliances.
  - 2.1.1 Test for Stability under Temperature Cycling
    - (a) Six specimens are to be alternately submitted to surrounding air temperatures of  $-40^{\circ} \pm 5^{\circ}\text{C}$  and  $66^{\circ} \pm 5^{\circ}\text{C}$  for periods of



8 hours each. Ten complete cycles of cooling and warming are to be carried out.

- (b) For the convenience of the testing authority, these alternating cycles need not follow immediately after each other and the following procedure is acceptable:
  - (i) An 8 hour cycle at  $66^{\circ}\text{C} \pm 1^{\circ}\text{C}$  to be completed in one day.
  - (ii) The specimens removed from the warming chamber that same day and left exposed under ordinary room conditions until the next day.
  - (iii) An 8 hour cycle at  $-40^{\circ} \pm 1^{\circ}\text{C}$  to be completed the next day.
  - (iv) The specimens removed from the cold chamber that same day and left exposed under ordinary room conditions until the next day.
  - (v) Repeated for ten cycles.
- (c) The dimensions of the specimens are to be recorded at the beginning and end of the ten cycle period. At the end of the tests the specimens are to be carefully examined externally for signs of cracking, and two of the specimens are to be cut open and examined for change of internal structure.
- (d) The remaining four specimens are to be submitted to further tests as follows:
  - (i) two specimens shall undergo the tests for water absorption; and
  - (ii) two specimens shall undergo the test for oil resistance with toluene (conforming to ASTM/D841/1977) or xylene (conforming to ASTM/D843/1977) and shall then undergo the tests for water absorption.
- (e) The test report shall include a reference to any loss of rigidity under high temperature.

#### 2.1.2 Test for Petrol and Oil Resistance

- (a) Ten additional specimens not previously subjected to any other tests are to be tested as follows:
  - (i) two specimens are to be immersed for a period of 14 days under a 100 mm head of Crude Oil;
  - (ii) two specimens are to be immersed for a period of 14 days under a 100 mm head of Fuel Oil;
  - (iii) two specimens are to be immersed for a period of 14 days under a 100 mm head of Diesel Oil;
  - (iv) two specimens are to be immersed for a period of 14 days under a 100 mm head of toluene (conforming to ASTM/D841/1977) or xylene (conforming to ASTM/D843/1977);
  - (v) two specimens are to be immersed for a period of 14 days under a 100 mm head of Kerosene.
- (b) The tests shall be carried out at normal room temperature (approximately  $20^{\circ}\text{C}$ ).
- (c) The dimensions of the specimens are to be recorded at the beginning and end of these tests.

- (d) The results should state the mass in kilograms which each specimen could support out of the liquid after 1, 7 and 14 days immersion.
- (e) The specimens should be examined on completion of the tests for evidence of attack by solvents and a report included in the final test report.
- (f) Two additional specimens which have already been subjected to the temperature cycling tests are to be tested against toluene (conforming to ASTM/D841/1977) or xylene (conforming to ASTM/D843/1977) and afterwards subjected to the water absorption test.

#### 2.1.3 Test for Water Absorption

- (a) The tests are to be carried out in fresh water and the specimens are to be immersed for a period of 14 days under a 1.2 m head of water.
- (b) The following tests are required:
  - (i) On two specimens not previously subjected to any other tests;
  - (ii) On two specimens which have been subjected to the temperature cycling test.
  - (iii) On two specimens which have been subjected to the temperature cycling test followed by the toluene or xylene test.
- (c) The dimensions of the specimens are to be recorded at the beginning and end of these tests.
- (d) The results should state the mass in kilograms which each specimen could support out of the water after 1, 7 and 14 days immersion (the selection of a test method suitable for obtaining this form of result directly or indirectly is left to the discretion of the testing authority).

#### 2.1.4 Fire Resistance

- (a) Tests should be carried out in accordance with American Standard for Testing Materials (ASTM) D 1692/68.

#### 2.1.5 Combustion Products

- (a) The test report shall include details of any gases given off on combustion, and the concentration of such gases.

#### 2.1.6 Chemical and Physical Effects

- (a) Manufacturers shall guarantee that the material does not contain any elements which would have an adverse effect on, or be adversely affected by, wood, steel, aluminium alloy, polyester/epoxide glass fibre laminates, paints or varnishes. Additionally, manufacturers shall confirm that the material contains no water soluble elements which on leaching out would adversely affect the above materials.

#### 2.1.7 Bonding Tests

- (a) The following adhesives shall be used to bond specimens of the buoyancy material 25 mm x 50 mm x 50 mm to form cubes 50 mm x 50 mm x 50 mm. Three such cubes shall be formed for each adhesive to be used in the test:
  - (i) an epoxy-resin adhesive,

- (ii) a synthetic rubber adhesive, solvent based.
  - (iii) any adhesive recommended by the manufacturer.
- (b) When the adhesive has cured, the test specimens are to be cut open perpendicular to glue line and the buoyancy material examined for any deterioration due to the adhesive.

### 3. Lifejackets

- 3.1 For buoyancy material intended for use in lifejackets the requirements of the tests in 2 are to be applied, except that:
- 3.1.1 In 2.1.1 (d) the reference to 'toluene (conforming to ASTM/D841/1977) or xylene (conforming to ASTM/D843/1977)' should be to 'diesel oil' and 'fuel oil';
  - 3.1.2 In 2.1.2 (a) (ii) and (iii) the test shall be for 24 hours and not 14 days; and
  - 3.1.3 In 2.1.3 (a) the tests shall be for 7 days and not 14 days.
- 3.2 Manufacturers of lifejackets shall guarantee to the Authority that the buoyancy material of the lifejacket is compatible with the covering material.

### 4. Lifebuoys

- 4.1 For buoyancy material intended for use in lifebuoys, all the tests specified in 2 are to be applied.
- 4.2 Alternatively, tests on two lifebuoys, complete in all respects, may be carried out as follows:
- 4.2.1 Temperature cycling tests—as in 2.1.1(a) and (b) the lifebuoys should be carefully examined for loss of rigidity under high temperature and afterwards for signs of cracking and shrinkage.
  - 4.2.2 Test for oil resistance—the lifebuoys should be immersed for a period of 24 hours under a 100 mm head of toluene (conforming to ASTM/D841/1977) or xylene (conforming to ASTM/D843/1977) at normal room temperature, and the effect, if any, on the lifebuoys reported.
  - 4.2.3. Drop Test—after completion of the tests in 4.2.1 and 4.2.2 one lifebuoy is to be drop tested by dropping from a height of 1.5 m onto a hard surface. The lifebuoy is to be dropped on edge and the height is to be measured from the lowest part of the lifebuoy. The lifebuoy is to be critically examined for distortion or cracking and is then to be cut open and examined internally for deterioration and the absorption of toluene or xylene and of fuel oil or diesel oil.
  - 4.2.4 Flotation Test—the remaining test lifebuoy should be capable of floating in fresh water for at least 24 hours with a 14.5 kg mass of iron suspended from it, both before and after the tests detailed in 4.2.1 and 4.2.2 above. (The initial mass of the lifebuoy should be determined and reported, and the maximum mass of iron which the lifebuoy is capable of supporting, both initially and after 24 hours should be reported.)
    - (a) Prior to undergoing the final flotation test, four approximately equally spaced holes of 6 mm diameter should be bored through the minor axis section of the lifebuoy.
  - 4.2.5 Drop Test of second specimen—after completion of flotation test, the remaining lifebuoy is to be drop tested and examined as per 4.2.3 above.
  - 4.2.6 A sample of the untested buoyancy material is to be submitted after the lifebuoys have satisfactorily passed all the tests for purposes of comparison.
  - 4.2.7 Manufacturers of lifebuoys shall guarantee that the completed lifebuoys would not have an adverse effect on wood, steel, aluminium alloy, glass

fibre laminates, paints or varnishes, or vice versa. Additionally they shall guarantee that the lifebuoy contains no water soluble elements (including any fire retardant additives) which on leaching out may adversely affect the above materials.

#### APPENDIX P

##### LIFEBUOYS, LIGHTS, SMOKE SIGNALS AND BUOYANT LIFELINES

The requirements for lifebuoys, lifebuoy lights, lifebuoy smoke signals and lifebuoy buoyant lifelines are those of Regulation 31 of Chapter III.

#### APPENDIX Q

##### SOLAS LIFEJACKETS AND LIGHTS

The requirements for SOLAS lifejackets and lights are those of Regulation 32 of Chapter III.

#### APPENDIX R

##### COASTAL LIFEJACKETS AND LIFEJACKET LIGHTS AND WHISTLES

#### A. COASTAL LIFEJACKETS

##### 1. Specification for a Coastal Lifejacket

###### 1.1 General Conditions

Manufacturers shall ensure that a lifejacket complies with the following minimum requirements before submitting design drawings, specifications and a sample lifejacket to the Authority for approval.

###### 1.2 Data to be Submitted for Approval

1.2.1 An application for approval of a lifejacket shall include the following information:

- (a) name and address of the manufacturer;
- (b) unique identification of the lifejacket for which approval is sought;
- (c) a detailed drawing clearly showing the construction of the lifejacket;
- (d) illustrated donning instructions;
- (e) material specifications;
- (f) details of quality control provisions, including production inspections, sampling and checking of the final unit;
- (g) the results of the tests prescribed in paragraph 18 of this specification; and
- (h) a sample lifejacket.

1.2.2 The drawing, donning instructions, certificates of tests and material specifications shall be submitted in triplicate.

###### 1.3 Criteria for Approval

It shall be so designed that it shall comply with the requirements of Annex 1 to this Appendix. It shall be constructed so that all possible risks of it being worn incorrectly, other than inside out, have been eliminated.

###### 1.4 Performance

1.4.1 The lifejacket shall be designed to bring the wearer, on entering still water, to a safe floating position, i.e. with the trunk floating inclined backwards at an angle of not less than 20° and preferably not more than

50° from the vertical, with the mouth clear of the water by at least 100 mm.

1.4.2 The lifejacket shall be capable of turning most helpless or exhausted wearers from a face down position to the safe floating position with their mouths coming clear of the water in not more than 5 seconds.

1.4.3 The requirements for performance testing are contained in Annex 1 to this Appendix.

## 1.5 Quality Control

1.5.1 The initial procedure for approval of a lifejacket will include consideration of the methods of production and quality control procedures adopted by the manufacturer. The manufacturer will be made responsible for ensuring compliance with the following requirements for the production of approved lifejackets.

(a) The materials used in production lifejackets are to be of the same specification as the samples originally tested and accepted. The manufacturer should be able to produce documentary evidence to that effect for each batch of material used from a N.A.T.A. laboratory registered for the tests involved.

(b) Each lifejacket is to be of the same design as that originally approved.

(c) The buoyancy test specified in 1.15 is to be performed on a sample of 1 per cent of the total production run or batch with a minimum of one lifejacket.

1.5.2 Inspections will be made during production by surveyors to ensure that standards are being maintained. The surveyor may require evidence of the specification of the material being used at the time of the inspection and shall satisfy himself that the workmanship is satisfactory and that the production run inspections and buoyancy tests are being conducted. At least one lifejacket of each type in production, selected at random, will be subjected to detailed examination including, if necessary, cutting open. A buoyancy test may be required.

1.5.3 Adequate advance notice as to projected production of lifejackets is to be given by the manufacturer to the office of the appropriate Authority.

## 1.6 Protection Against Oil

The lifejacket must not be adversely affected by oil or oil products.

## 1.7 Colour

It shall be of a highly visible colour within the following range:

Canary Yellow	Traffic Yellow
Lemon	Light Orange
Golden Yellow	International Orange

## 1.8 Colour Fastness

The lifejacket covering material shall have:

1.8.1 Fastness to Light in accordance with AS 2001.4.2. Minimum change of colour: 6.

1.8.2 Fastness to sea water in accordance with AS 2001.4.14. Minimum change of colour: 4.

1.8.3 Fastness to washing in accordance with AS 2001.4.15, test 4. Minimum change of colour: 4.

Note: See also AS 2001.4.1.

**1.9 Marking**

It shall be marked indelibly on one side indicating the maker's name or other means of identification, in letters of not less than 12 mm in height.

**1.10 Fittings**

It shall be fitted with a ring or loop of adequate strength to facilitate rescue.

**1.11 Material**

1.11.1 If made of cotton duck, it shall be made of cotton duck material of 270 gm/m<sup>2</sup> meeting the requirements of Australian Standard 1820-1976, which shall be rot proofed with pentachlorophenyl laurate to meet the requirements of British Standard 2087-1963, clause 16 (c) (2); and shall be pre-shrunk so that, when tested in accordance with Australian Standard 1287, Part 5—1974, the shrinkage in either direction shall not exceed 1%.

1.11.2 If made of synthetic material an equivalent standard must be obtained by means of tests as enumerated in Australian Standards 1091-1973 and 1440-1973. Unreinforced single plastic sheet will not be accepted.

**1.12 Retro-Reflective Material**

The lifejacket shall be fitted with approved retro-reflective material as follows:

1.12.1 Either the lifejacket covering material shall be of approved retro-reflective material; or

1.12.2 The lifejacket shall be fitted with retro-reflective tapes placed as high up on the lifejacket as possible in not less than six places on the inside and six places on the outside of the lifejacket, each tape being not less than 100 mm long and not less than 50 mm wide, so that not less than six tapes are always visible whichever way the lifejacket is worn.

**1.13 Thread and Stitching**

1.13.1 The thread shall be in accordance with AS 2259, paragraph 2.6.1, with the proviso that linen or cotton threads should be rot proofed to the same standard as the fabric. If the covering material is of cotton duck, the thread shall have a breaking strength of not less than 53.4N.

1.13.2 The stitching shall be in accordance with AS 2259, paragraph 2.6.2.

**1.14 Fastenings**

1.14.1 Fastening tapes shall be in accordance with AS 2259, paragraphs 2.5, 2.7, 2.8, except that the tapes must be a minimum of 25 mm in width. They may be made of any suitable material which is equally as resistant to fungal attack as the fabric of the lifejacket.

1.14.2 The method of fastening the tapes shall be such as to be easily understood and capable of being readily carried out. Metal fastenings for use shall be of a size and strength consistent with the fastening tapes, and are to be of corrosion-resistant material.

**1.15 Buoyancy Test**

Buoyancy tests will be carried out in accordance with AS 2259, Appendix A, under the supervision of a representative of the Authority.

**2. Lifejackets Other Than Those Depending on Inflation for Buoyancy**

2.1 For use as defined by the Authority for all body weight ranges. It shall be clearly marked 'LIFEJACKET' in indelible lettering not less than 25 mm high.

2.2 It must be marked with clear instructions for donning.

2.3 Written and pictorial instructions for use must accompany each lifejacket or in sufficient quantity to be exhibited in each compartment where lifejackets are stowed.

- 2.4 Each lifejacket shall be provided with a pocket or means of affixing an approved whistle and light permanently to the jacket in a position easily accessible to the wearer in the water.
- 2.5 Where the buoyancy material is kapok:
- 2.5.1 it shall contain not less than 567 grams of kapok;
- 2.5.2 the kapok shall be of good flotation quality, well teased, and shall comply with the relevant requirements for cleanliness specified in B.S.—1425 (cleanliness of fillings and stuffings);
- 2.5.3 the kapok shall be protected from the effects of oil or oily products so that the loss of buoyancy in the lifejacket, after floating in disturbed water containing a layer of not less than 3 millimetres in depth of a mixture of gas oil for a period of 48 hours, shall not exceed 2 per cent of the initial buoyancy. For the purpose of this test the lifejacket shall be loaded with weights equal to half its initial buoyancy; and
- 2.5.4 the kapok shall be contained in PVC envelopes in cases where the outer covering is not impervious to oil; these shall contain as little air as possible and comply with the following—
- (i) welding is to be by the high frequency method. Each seam to be not less than 1.5 mm wide and, where welding is not continuous, the joins shall be crosswelded or lapped;
- (ii) PVC film to be 'soft' of gravimetric thickness not less than 0.3 mm and complying with the requirements of AS 2324, PVC film and sheeting (flexible, unsupported).
- 2.6 In addition to the above, tests may be required as follows:
- 2.6.1 Colour Bleeding  
When a specimen is tested by AS. 1441.10-1973, there shall be no staining or marking of the control sample or the filter paper.
- 2.6.2 Resistance to Cold Cracking  
One specimen only to be tested in the manner prescribed by AS. 1441.14-1973. When subjected to the test, no cracks shall appear in the material on visual examination.
- 2.7 Where the buoyancy is a material other than kapok:
- 2.7.1 the buoyancy material shall have a S.G. of not more than 0.192, and shall be of good quality and clean. If the material is in pieces, the size of each piece shall be not less than 164 cm<sup>3</sup>, unless such pieces are in layer form and are fastened together with an approved adhesive;
- 2.7.2 the buoyancy material shall be chemically stable and of low flammability and be free from shrinkage; and
- 2.7.3 where buoyancy is provided by Unicellular Plastics it shall comply with AS 2259 2.2.2.

#### B. LIFEJACKET LIGHTS AND WHISTLES

##### 1. Lifejacket Lights

- 1.1 Each lifejacket light shall:
- (a) have a luminous intensity not less than 0.75 cd;
- (b) have a source of energy capable of providing a luminous intensity of 0.75 cd for a period of at least 8 hours;
- (c) be visible over as great a segment of the upper hemisphere as is practicable when attached to a lifejacket; and
- (d) (i) be fitted with a clip and lanyard for attachment to a lifejacket; or

(ii) be fitted with( some alternative means of attachment acceptable to the Authority.

1.2 If the lifejacket light is a flashing light, in addition to meeting the provisions of 1.1, it shall:

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

2. **Lifejacket Whistles**

A whistle of an approved type is to be firmly attached to each lifejacket.



## ANNEX 1—DONNING AND WATER PERFORMANCE TESTS

**1. General**

- 1.1 A prototype lifejacket shall undergo the tests prescribed in 2 and 3 of this Annex.
- 1.2 The tests shall be witnessed by a surveyor.
- 1.3 As far as possible similar criteria should be applied in the testing and assessment of lifejackets for use by children.

**2. Donning Tests**

- 2.1 As lifejackets will be used by uninitiated persons, often in adverse conditions, it is essential that risk of incorrect donning be minimized. Ties and fastenings necessary for proper performance should be few and simple. Lifejackets should readily fit all sizes of persons, both lightly and heavily clad.
- 2.2 Test Subjects
  - 2.2.1 Persons unfamiliar with the use of lifejackets should be selected to perform donning tests. The individuals chosen should include large and small persons, both male and female.
- 2.3 Clothing
  - 2.3.1 Each subject is to be tested wearing normal street clothing. The test is to be repeated with the subject wearing duffel coats or similar clothing.
- 2.4 Test
  - 2.4.1 Each subject should don the lifejacket unassisted using only the instructions provided by the manufacturer.
- 2.5 Assessment
  - 2.5.1 The observer is to note, in regard to each subject:
    - (a) the ease and speed of donning;
    - (b) the number and simplicity of fastenings;
    - (c) proper fit and adjustment; and
    - (d) the ease of movement.

**3. Water Performance Tests**

- 3.1 These tests are intended to determine the ability of the lifejacket to assist a helpless or exhausted person. All tests are to be carried out in fresh water under still conditions.
- 3.2 Test Subjects
  - 3.2.1 A total of 50 subjects are required. Both male and female of high, medium and low mass and height ranges are to be selected. Only practiced swimmers shall be test subjects since the ability to relax in the water is of major importance in assessing the results of the tests.
- 3.3 Clothing
  - 3.3.1 Subjects are to wear only swimming costumes.
- 3.4 Instructions to Subjects
  - 3.4.1 The subjects are to be sufficiently instructed so that they understand the conduct of each of the tests set out below particularly the requirement regarding relaxing and exhaling in the face-down position.
- 3.5 Tests
  - 3.5.1 Each subject should don the lifejacket unassisted, using only the manufacturer's instructions. Before proceeding with the tests the observer shall ensure that the lifejacket has been properly adjusted in accordance with the manufacturer's instructions.

## 3.5.2 Drop Test

- (a) Each subject shall enter the water by jumping or dropping vertically, feet-first, from a level at or near the surface of the water. The distance of the mouth from the water after the subject comes to rest in the safe floating position shall be not less than 100 mm.
- (b) In addition, a number of subjects shall be required to drop vertically into the water, feet-first, from a height of at least 3 metres. For the purposes of this test, the subject shall firmly grasp the lifejacket in position. The distance of the mouth from the water after the subject comes to rest in the safe floating position shall not be less than 100 mm.

## 3.5.3 Righting Test

Each subject shall swim at least three gentle strokes (breast stroke) and then, with minimum headway relax, with the head down and the lungs partially filled, simulating a state of exhaustion. The period of time starting from the completion of the last stroke until the mouth of the subject is clear of the water shall not exceed 5 seconds. The lifejacket should then bring the subject to the safe floating position without assistance. This test shall be repeated and the subject shall exhale completely on completion of the third stroke.

*Note:* On completion of the third breast stroke the subject should be completely relaxed with the head dropped forward but not forced down.

## 3.5.4 Assessment

After each of the above tests the number of subjects who come to rest in the safe floating position is to be recorded. Any dislodgement of the lifejacket during testing is to be noted, as should physical harm done to any subject.

*Note:* the term 'safe floating position' implies in each case where performance testing is carried out that the minimum required distance of the mouth from the water be attained.

## 4. Acceptance

4.1 For the lifejacket to pass the tests the following minimum results are to be obtained.

- 4.1.1 *Donning*—all subjects shall satisfactorily perform the donning test.
- 4.1.2 *Water Performance*—the tests detailed in 3 shall be performed as follows:
  - (a) *Drop Test*—at least 85% of subjects shall come to rest in the safe flotation position;
  - (b) *3 metre Drop Test*—at least 80% of subjects performing this test shall come to rest in the safe floating position;
  - (c) *Righting Test*—at least 85% of subjects shall have their mouths clear of the water in not more than 5 secs, and shall ultimately come to rest in the safe floating position.
- 4.1.3 During the water performance tests the lifejacket shall not become dislodged from, or cause physical harm to, any of the subjects.

**APPENDIX S****PORTABLE RADIOCOMMUNICATION EQUIPMENT FOR SURVIVAL CRAFT**

The requirements for the above are those of Marine Orders Part 26.

**APPENDIX T****FIXED RADIOCOMMUNICATION EQUIPMENT FOR LIFEBOATS**

The requirements for the above are those of Marine Orders Part 26.

**APPENDIX U**  
**LINE-THROWING APPLIANCES**

1. A line-throwing appliance shall comply with the following requirements:
  - 1.1 A line-throwing appliance shall consist of a rocket pistol and 4 individual rockets with 4 lines, or four separate self-contained units each of which contains a rocket and line ready for use.
  - 1.2 The line-throwing appliance shall be so constructed that the end from which the rocket is ejected can be positively identified by day or night.
  - 1.3 The lines used in line-throwing appliances shall have a breaking load of not less than 2,000 N.
  - 1.4 Every line-throwing appliance shall be capable of throwing a line a minimum of 4 mm in diameter a distance of 230 m in calm weather.
  - 1.5 Every line-throwing appliance shall be capable of throwing the line in such a manner that the lateral deflection on either side of the direction of firing does not exceed 10 per cent of the length of flight of the rocket in calm weather.
  - 1.6 The rocket (in the case of a pistol fired rocket) or the assembly (in the case of an integral rocket and line) shall function after immersion for 1 minute under a head of water of 10 cm.
  - 1.7 The rocket, in the case of a pistol fired rocket, or the assembly, in the case of a self-contained unit, shall be contained in a water resistant casing. In addition, in the case of a pistol fired rocket, the line, rockets, and means of ignition shall be stowed in a container which provides protection from the weather.
  - 1.8 All components, compositions and ingredients of the rockets and the means of igniting them shall be of such character and quality as to enable them to maintain their serviceability under good average storage conditions in the marine environment for a period of at least 3 years.
  - 1.9 The date of manufacture and the date of expiry shall be marked indelibly on the rockets and these date markings shall similarly be stamped on the cartridges.
  - 1.10 Clear and concise directions for use in the English language, supported by illustrations, shall form an integral part of the appliance.

**APPENDIX V**  
**PYROTECHNIC DISTRESS SIGNALS**

Pyrotechnic distress signals for use in vessels of Class 1A, 2A and 3A are set out in Part A of this Appendix.

Pyrotechnic signals for use in vessels of:

- Classes 1, B C D E,  
2, B C D E and  
3, B C D E

are set out in Part B of this Appendix.

**PART A**

The requirements for rocket parachute flares, hand flares, lifeboat buoyant smoke signals, and lifebuoy self-activating smoke signals are those of Regulations 35, 36, 37 and 31.3, respectively, of Chapter III.

**PART B**

1. Parachute Distress Rocket Signal for Ships, Liferrafts and Lifeboats.
  - 1.1 A parachute distress rocket signal shall comply with Part A of this Appendix.

**2. Hand Held Red Distress Flare Signal**

- 2.1 A hand held red distress flare signal shall be capable of being used from a lifeboat or liferaft without harm to the occupants and without causing discomfort to the uncovered hand of the operator.
- 2.2 A hand held red distress flare signal shall be so constructed that when fired, no burning composition will fall from the signal which might cause damage to an inflated liferaft.
- 2.3 A hand held red distress flare signal shall be capable of emitting a red light of an average intensity of not less than 15,000 candela for not less than 1 minute.
- 2.4 A hand held red distress flare signal shall be fitted with a means of firing permanently attached to the signal or with an integral means of firing, easy to operate with wet, cold or gloved hands in adverse conditions without external aid and requiring the minimum of preparation. Sealing shall not depend on adhesive tapes.
- 2.5 A hand held red distress flare signal shall be so constructed that the end from which the light is emitted can be positively identified by day or night.
- 2.6 A hand held red distress flare shall be capable of functioning after immersion for 2 hours under a head of water of 1 m.
- 2.7 In the ready-to-fire condition a hand held red distress flare signal shall function after immersion for 1 minute under a head of water of 10 cm.
- 2.8 After ignition a hand held red distress flare signal shall continue to function after immersion for 10 seconds under a head of water of 10 cm.
- 2.9 All components, compositions and ingredients shall be of such a character and quality as to enable a hand held red distress flare signal to burn evenly and maintain its serviceability under good average storage conditions in the marine environment for a period of at least 3 years.
- 2.10 The date of manufacture and the date of expiry shall be marked indelibly on a hand held red distress flare signal.
- 2.11 Clear and concise directions for use in the English language, supported by illustrations shall be printed indelibly on a hand held red distress flare signal.
- 2.12 Hand held red distress flare signals shall be individually packed in a hermetically sealed waterproof container.

**3. Lifebuoy Smoke Signals**

- 3.1 A lifebuoy smoke signal shall comply with the requirements of Part A of this Appendix.

**4. Hand Held Orange Smoke Signals**

- 4.1 A hand held orange smoke signal shall be capable of being used from a lifeboat or liferaft without harm to the occupants and without causing discomfort to the uncovered hand of the operator.
- 4.2 The hand held orange smoke signal shall be so constructed that when fired, no burning composition will fall from the signal which might cause damage to an inflated liferaft.
- 4.3 The hand held orange smoke signal shall be capable of emitting a dense orange coloured smoke for a period of not less than 1 minute.
- 4.4 The hand held orange smoke signal shall be fitted with a means of firing permanently attached to the signal or with an integral means of firing, easy to operate with wet, cold or gloved hands in adverse conditions without external aid and requiring the minimum of preparation. Sealing shall not depend on adhesive tapes.
- 4.5 The hand held orange smoke signal shall be so constructed that the end from which the smoke is emitted can be positively identified by day.
- 4.6 The hand held orange smoke signal shall be capable of functioning after immersion for 2 hours under a head of water of 1 m.

- 4.7 In the ready-to-fire condition the hand held orange smoke signal shall function after immersion for 1 minute under a head of water of 10 cm.
- 4.8 After ignition the hand held orange smoke signal shall continue to function after immersion for 10 seconds under a head of water of 10 cm.
- 4.9 All components, compositions and ingredients shall be of such a character and quality as to enable the hand held orange smoke signal to burn evenly and maintain its serviceability under good average storage conditions in the marine environment for a period of at least 3 years.
- 4.10 The date of manufacture and the date of expiry shall be marked indelibly on a hand held orange smoke signal.
- 4.11 Clear and concise directions for use in the English language, supported by illustrations, shall be printed indelibly on a hand held orange smoke signal.
- 4.12 Hand held orange smoke signals shall be individually packed in a hermetically sealed waterproof container.

#### APPENDIX W

##### IMMERSION SUITS AND THERMAL PROTECTION AIDS

The requirements for the above are those of Regulations 33 and 34 respectively of Chapter III.

#### APPENDIX X

##### GENERAL REQUIREMENTS FOR SOLAS LIFESAVING APPLIANCES, TESTS FOR APPROVAL, AND PRODUCTION AND INSTALLATION TESTS

The requirements for the above are those of Regulations 4, 5 and 30 of Chapter III, and IMO Resolution A 521 (13).

#### APPENDIX Y

##### APPROVAL, SPECIFICATIONS AND TEST METHODS FOR LIFEJACKETS AND LIFE JACKET MATERIALS

Alternative or revised Standard Specifications issued by either Australian or Overseas Authorities will be accepted where these are equivalent to the Standard Specification quoted in this Appendix.

##### SOLAS LIFEJACKETS

°The requirements for the construction, materials and testing of SOLAS Lifejackets shall be those given below.

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#### DEFINITIONS

'AS' means Australian Standard published by Standards Australia.

'BS' means British Standard published by the British Standards Institution.

'Chief Marine Surveyor' means the person for the time being occupying or performing the duties of the Chief Marine Surveyor, Department of Transport and Communications.

'Department' means the Department of Transport and Communications.

'PVC' means the material Polyvinyl Chloride

'Surveyor' means a person appointed as a surveyor under Section 190 of the Navigation Act 1912.

'NATA' means the National Association of Testing Authorities.

#### PART 1—GENERAL

1. *Scope*
  - 1.1 *This specification details the requirements for the manufacture and testing of inherently buoyant lifejackets. It does not include requirements for lifejackets the buoyancy of which depends upon inflation.*
  - 1.2 *Should production of such a lifejacket be intended, the Department should be consulted.*
2. *Application for Approval*

*Application for approval of a lifejacket by the Chief Marine Surveyor shall be made to the Department's Regional Office in the State wherein the lifejacket is to be manufactured.*
3. *Data to be Submitted for Approval*
  - 3.1 *An application for approval of a lifejacket shall include the following information:*
    - (a) *name and address of the manufacturer;*
    - (b) *unique identification of the lifejacket for which approval is sought;*
    - (c) *a detailed drawing clearly showing the construction of the lifejacket;*
    - (d) *illustrated donning instructions;*
    - (e) *material specifications;*
    - (f) *details of quality control provisions, including production inspections, sampling and checking of the final unit;*
    - (g) *the results of the tests prescribed in paragraph 17 of this specification; and*
    - (h) *a sample lifejacket.*
  - 3.2 *The drawing, donning instructions, certificates of tests and material specifications shall be submitted in triplicate.*

4. **Quality Control**

4.1 *The initial procedure for approval of a lifejacket will include consideration of the methods of production and quality control procedures adopted by the manufacturer. The manufacturer will be made responsible for ensuring compliance with the following requirements for the production of approved lifejackets.*

4.1.1 *The materials used in production lifejackets are to be of the same specification as the samples originally tested and accepted. The manufacturer should be able to produce documentary evidence to that effect for each batch of material used from a NATA laboratory registered for the tests involved.*

4.1.2 *Each lifejacket is to be of the same design as that originally approved.*

4.1.3 *The buoyancy test specified in 2.2 of the Resolution given in Appendix X is to be performed on a sample of 1 per cent of the total production run or batch with a minimum of one lifejacket.*

4.2 *Inspections will be made during production by surveyors to ensure that standards are being maintained. The surveyor may require evidence of the specification of the material being used at the time of the inspection and shall satisfy himself that the workmanship is satisfactory and that the production run inspections and buoyancy tests are being conducted. At least one lifejacket of each type in production, selected at random, will be subjected to detailed examination including, if necessary, cutting open. A buoyancy test may be required.*

4.3 *Adequate advance notice as to projected production of lifejackets is to be given by the manufacturer to the appropriate Regional Office.*

5. **Marking**

*The lifejacket shall be indelibly marked with:*

(a) *the words 'AUS DOT Approved'; together with the month and year of manufacture e.g. 7/89;*

(b) *the manufacturer's name or logo or other approved marking which identifies the maker of the lifejacket;*

(c) *particular requirements as follows.*

(i) *the marking shall be in characters not less than 25mm in height and of proportional breadth;*

(ii) *a lifejacket which provides the minimum buoyancy specified in paragraph 2.2.1 of the Resolution given in Appendix X shall be marked indelibly on both sides 'FOR PERSON OF 32 KG or MORE';*

(iii) *a lifejacket which provides the minimum buoyancy specified in paragraph 2.2.2 of the Resolution given in Appendix X shall be indelibly marked on both sides 'FOR PERSON OF UNDER 32 KG'.*

6. **Retro-reflectivity**

*The lifejacket shall be fitted with approved retro-reflective material as follows:*

6.1 *either the lifejacket covering material shall be of approved retro-reflective material; or*

6.2 *the lifejacket shall be fitted with retro-reflective tapes placed as high up on the lifejacket as possible in not less than 6 places on the outside and 6 places on the inside of the lifejacket, each tape being not less than 100 millimetres long and not less than 50 millimetres wide, so that not less than 6 tapes are always visible whichever way the lifejacket is worn.*

7. **References**

*Reference is made to the documents listed hereunder:*

*British Standards Institution*

*BS 1425—Cleanliness of Fillings and Stuffings for bedding, upholstery, toys and other domestic articles.*

*BS 2087—Preservative Textile Treatments.*

*Standards Association of Australia*

AS 2001.5.1	<i>Dimensional Change—General Requirements.</i>
AS 2324	<i>PVC Film and Sheeting.</i>
AS 2700	<i>Colour Standards for General Purposes.</i>
AS 2001.4.1	<i>Colourfastness Tests—Definitions and General Principles.</i>
AS 2001.4.14	<i>Determination of Colourfastness to Seawater.</i>
AS 2001.4.15	<i>Determination of Colourfastness to Washing.</i>
AS 2001.4.2	<i>Determination of Colourfastness to Daylight of Textile Materials.</i>
AS 1440	<i>Vinyl (PVC) Coated Fabrics for Upholstery and Other Purposes.</i>
AS 2259	<i>General Requirements for Buoyancy Aids.</i>
AS 1441.14	<i>Method of Determination of Resistance to Cold Cracking.</i>
AS 1820	<i>Loomstate Cotton Duck.</i>

## PART 2—SPECIFICATIONS AND TESTS FOR MATERIALS

### 8. *Kapok Buoyancy Material*

*Where the lifejacket buoyancy material is kapok, it shall be of good flotation quality, well teased, and shall comply with the relevant requirements for cleanliness specified in BS 1425. The kapok should be contained in PVC envelopes.*

### 9. *Other Buoyancy Materials*

*These shall have a specific gravity of not more than 0.192 and shall be of good quality and clean. If the material is in pieces, the size of each piece shall not be less than 164 cm<sup>3</sup> unless such pieces are in layer form and are fastened together with an adhesive which when set is unaffected by water. The material shall be chemically stable and preferably of low flammability. The material need not be incombustible or self-extinguishing but the design must take into account the need to protect the buoyancy material from heat and flame.*

### 10. *PVC Envelopes*

10.1 *PVC envelopes intended to contain kapok shall be of 'soft' PVC film of gravimetric thickness not less than 0.3 mm and complying with the requirements of AS 2324.*

10.2 *Where kapok is contained in PVC envelopes, they shall contain as little air as possible.*

10.3 *PVC envelopes shall be welded by the high frequency method.*

10.4 *Each envelope seam is to be not less than 1.6 mm wide, and where welding is not continuous, the joins shall be cross welded.*

### 11. *Cover Material*

#### 11.1 *The covering material:*

11.1.1 *cotton duck shall be made of material conforming to the requirements of AS 1820 applicable to CD270 material, and which shall be rot-proofed with pentachlorophenylaurate to meet the requirements of BS 2087, clause 16(c) (2);*

11.1.2 *knitted nylon shall be of the warp knit type made of nylon 6.6 semi-dull and shall be of 110 tex with 34 filaments per yarn. The material shall be of 120 g/m<sup>2</sup> with at least 8 wales/cm and 16 courses/cm;*

11.1.3 *woven nylon shall be of rip-stop nylon spinnaker cloth of 20 tex with 60 filaments per yarn. The material shall be of 110-135 g/m<sup>2</sup> with at least*



32 picks/cm and 32 ends/cm, with rip-stop threads of 40 tex at intervals of 1 centimetre;

- 11.2 the covering material shall be coloured International Orange (R11 of AS 2700) and shall retain that colour when saturated with water.

Note: One tex is numerically equal to one milligram per metre.

12. Colour Fastness of Cover Material

The lifejacket covering material shall have:

- (a) Fastness to Light in accordance with AS 2001.4.2. Minimum change of colour: 6;
- (b) Fastness to Seawater in accordance with AS 2001.4.14. Minimum change of colour: 4; (see 2001.4.1);
- (c) Fastness to Washing in accordance with AS 2001.4.15—Test 4. Minimum change of colour: 4. (see 2001.4.1).

13. Retro-reflective Material

A product submitted for approval shall be equivalent to, or of a higher standard than, any product or standard specified in Marine Orders Part 10.

14. Thread and Stitching

- 14.1 The thread and stitching shall be in accordance with AS 2259, with the proviso that linen or cotton threads should be rot proofed to the same standard as the cotton duck material.

15. Fastenings

- 15.1 Fastening tapes shall be in accordance with AS 2259, except that the tapes shall have a minimum width of 32 mm. They may be made of any suitable material which is equally as resistant to fungal attack as the lifejacket cover material. The method of fastening the tapes shall be such as to be easily understood and capable of being readily carried out. Metal fastenings for use shall be of a size and strength consistent with the fastening tapes, and shall be of a corrosion-resistant material.

- 15.2 Lifejacket fastening tapes which are dyed shall comply with paragraph 12 above:

16. Fittings

- 16.1 A lifejacket shall have a whistle of an approved type firmly attached by a lanyard of adequate length.
- 16.2 A lifejacket shall be provided with at least one ring or rescue loop to facilitate rescue which shall be of equivalent strength to that of the fastening tapes.

17. Test for Materials

- 17.1 Evidence of compliance with the tests prescribed in this Section shall be furnished in the form of certificates supplied by NATA laboratory registered for the tests concerned.

17.2 PVC Envelopes

A PVC envelope intended to contain kapok shall be subjected to the following tests:

- 17.2.1 one specimen is to be tested to determine its resistance to exudation in the following manner:

- (a) the test specimen shall measure approximately 100 mm by 50 mm;
- (b) the test shall be carried out in an air circulating oven;
- (c) a cork or rubber mat and a metal weight shall be heated in the oven to  $138^{\circ}\text{C} \pm 1^{\circ}\text{C}$ . The specimen shall be placed on the mat, coated face up, and a single piece of cigarette paper placed on the coated surface. The weight, which shall provide a pressure of 0.43 kPa shall then be placed on the paper and the assembly maintained at  $82^{\circ}\text{C} \pm 1^{\circ}\text{C}$  for 30 minutes. At the end of this period the assembly shall be removed from the oven and unloaded;

when examined in this manner, the specimen shall not transfer stains to the cigarette paper.

- 17.2.2 1 specimen is to be tested to determine its resistance to cold cracking in the manner prescribed in AS 1441.14. When subjected to this test no cracks shall appear in the material on visual examination.

### 17.3 Covering Materials

- 17.3.1 Cotton duck lifejacket covering material shall be preshrunk so that when tested in accordance with AS 2001.5.1, the shrinkage in either direction shall not exceed 1 per cent.
- 17.3.2 Woven nylon lifejacket covering material shall have a minimum breaking force per 50 mm strip of 1200 N for the length and 1100 N for the width, with a minimum tearing force of 40N in either direction and 50N at rip-stop threads.

## PART 3—METHOD FOR THE DETERMINATION OF BUOYANCY

### 18. Apparatus

- 18.1 The following apparatus is required:

- 18.1.1 a suitable spring balance accurate to 0.025 kgwt;
- 18.1.2 a wire-mesh cage large enough to contain the lifejacket under tests;
- 18.1.3 a tank containing freshwater, large enough to allow the cage containing the jacket or its components to be submerged without causing overflow of water;
- 18.1.4 weights for weighting down the cage if necessary;
- 18.1.5 a rig with suitable lifting tackle for positioning the cage in or out of the water.

### 19. Procedure

- 19.1 The cage shall be suspended in the water in the tank so that it is completely submerged. Weights shall be added to the cage where necessary, so that the reading on the spring balance is approximately 18 kgwt. The reading shall be noted to the nearest 0.05 kgwt, and recorded as M1.
- 19.2 The cage shall then be raised above the water surface. The lifejacket under test shall have its outer covering cut open and the buoyancy material removed. All the components of the lifejacket shall be placed inside a muslin bag which shall then be placed inside the cage.
- 19.3 The cage and contents shall then be submerged, making sure that no air is entrapped within any of the components. The top edge of the cage shall be at least 5 cm below the surface of the water. The reading on the spring balance shall be noted to the nearest 0.05 kgwt and recorded as M2.
- 19.4 24 hours later the reading on the spring balance shall be noted to the nearest 0.05 kgwt and recorded as M3.

### 20. Evaluation of Results

- 20.1 Record the difference between (M1-M3) to the nearest 0.05 kgwt.
- 20.2 Calculate the buoyancy of the lifejacket in newtons by using the following equation:  

$$\text{Buoyancy} = (M1-M3) \times 9.8.$$
- 20.3 Calculate the percentage loss of buoyancy over 24 hours by using the following equation:

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

The loss of buoyancy over 24 hours shall not exceed 5%.

**APPENDIX Z**

**SURVIVAL CRAFT EMERGENCY POSITION INDICATING RADIO BEACONS**

The requirements for the above are those of Regulations 14-1 and 14-2 of Chapter IV.

**APPENDIX ZA**

**TWO-WAY RADIOTELEPHONE APPARATUS FOR SURVIVAL CRAFT**

The requirements for the above are those of Regulation 14-3 of Chapter IV.