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CANADIAN LIFE SAVING APPLIANCE STANDARD

FIRST EDITION
MARCH 2010



TC-1003229



Canada

<p>Responsible Authority</p> <p>The Design, Equipment and Boating Safety Branch is responsible for this document, including any change, correction, or update.</p>	<p>Approval</p> <p>“Original signed by John Murray acting for Victor Santos-Pedro”</p> <hr/> <p>Victor Santos-Pedro Director, Design Equipment and Boating Safety Marine Safety</p> <p>Date signed: May 19, 2010</p>
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PART I - STANDARD FOR LIFE-SAVING APPLIANCES

Information note

Information contained in text boxes is provided for information purposes only and does not form part of this Standard. This material may include: notice of potential amendments to this or other standards or regulations; changes due to technological advancement; policy changes; advisory material; interpretation or guidance; or information regarding subjects under consultation.

1 CHAPTER I – GENERAL

1.1 DEFINITIONS

CGSB:

Means the Canadian General Standards Board

IMO:

Means International Maritime Organization

Information note

LSA Code:

Means International Marine Organization Resolution MSC.48(66) entitled *International Life-Saving Appliance Code (LSA Code)* and appendices, as amended.

Resolution MSC.81(70):

Means the International Marine Organization Resolution MSC.81(70) entitled *Revised Recommendation on Testing of Life-Saving Appliances* and appendices, as amended.

SOLAS:

Means the latest edition of the *International Convention for the Safety of Life at Sea, 1974*, and its Protocol of 1988: articles, annexes and certificates, as amended.

Inspector:

Means a marine safety inspector appointed pursuant to section 11 of the *Canada Shipping Act, 2001* or a person authorized under section 12 of the *Canada Shipping Act, 2001*.

1.2 GENERAL REQUIREMENTS FOR LIFE-SAVING APPLIANCES

As stated in the *Life Saving Equipment Regulations*

121. (1) Life saving equipment that is carried on a ship and is set out in column I of an item of the table to this section shall:

- (a) meet the requirements set out in the Schedule to these Regulations or the Standard, as amended from time to time, set out in column II of that item; and
- (b) be approved as having met the requirements referred to in paragraph (a).

Information note

General requirements for life-saving appliances are in section 1.2 of chapter I of the *LSA Code*, and the following Canadian modifications.

1.2.1 Canadian modifications to general requirements

Information note

Paragraph 1.2.2.6 of the *LSA Code* does not apply to Canadian life-saving appliances. Canadian life-saving appliances are to be of a highly visible colour such as:

- (a) Yellow,
- (b) Orange, or
- (c) Red

1.2.2 Approval procedures

Information note

Approval procedures for life-saving appliances requiring to be approved as per regulations, are in the *Approval Procedures for Life Saving Equipment and Structural Fire Protection Products - TP 14612 E*.

Transport Canada is reviewing the mass of the current 75 kg test subjects and may increase this to approximately 85 kg.

1.3 SCOPE

The purpose of this document is to provide a standard for all life-saving equipment placed onboard Canadian vessels.

Information note

This is the first edition of this Standard (TP 14475). Future editions will include additional life-saving appliances.

For the time being, life-saving appliances intended to be included in future editions of this Transport Canada Publication are marked as reserved.

This document contains the Canadian modifications to the International Marine Organization resolution MSC.48 (66) entitled *International Life-saving Appliance Code* and to the International Marine Organization resolution MSC.81(70) entitled *Testing and Evaluation of Life-Saving appliances* and appendices, as amended.

This Transport Canada publication also provides standards for additional Canadian life-saving appliances not part of the SOLAS Convention.

All new life-saving appliances are to meet the requirements of this Standard, as amended. Manufacturers seeking approval to this Standard for any new life-saving appliance designs are to follow the *Approval Procedures for Life Saving Equipment and Structural Fire Protection Products*, (TP 14612).

Part I of TP 14475 is the Standard for Life-saving Appliances and Part II is the Testing and Evaluation of Life-saving Appliances.

This document will change as Transport Canada proceeds with the Regulatory Reform Initiative but the format for each section will remain the same. For example, it is intended to move the schedules contained in the *Life-saving Equipment Regulations* (LSE) to this publication. The Reform Initiative calls for performance based regulations and technical details will be in standards and guidelines so that they can more easily be reviewed when necessary.

Questions, comments, requests for amendments and suggestions for this publication are to be sent to:

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330 Sparks Street, 11th Floor, Ottawa, Ontario,
K1A 0N8.

- (a) by mail to the address above, or
- (b) by email to shipshape@tc.gc.ca , or
- (c) by fax at the following fax number (613) 991-4818

2 CHAPTER II – PERSONAL LIFE-SAVING APPLIANCES

2.1 LIFEBUOYS

Information note

Standards for lifebuoys are in section 2.1 of Chapter II of the *LSA Code* with the following Canadian modifications.

2.1.1 Canadian modifications for lifebuoy colours

2.1.1.1 Lifebuoys are to be of a highly visible colour as follows:

- a. Yellow,
- b. Orange, or
- c. Red and white quartered;

2.1.2 Canadian modifications for lifebuoy markings

2.1.2.1 The marking of lifebuoys must include:

- a. The manufacturers name or logo;
- b. The lot or batch number;
- c. The height at which it was drop tested, for SOLAS lifebuoys;
- d. The mass of the lifebuoy in kilograms;
- e. The words “Approved by Transport Canada/Approuvé par Transport Canada”;
- f. Transport Canada approval number.

2.1.2.2 The marking on every lifebuoy self-activating smoke signal and lifebuoy self-igniting light is to be made of text or of illustrations where necessary, with:

- a. The manufacturers name, trade mark, or logo;
- b. The type of device, its function, and operating period;
- c. Mounting, operating and maintenance instructions, if applicable;
- d. The date of manufacture;
- d. Batch or lot number;
- f. The words “Approved by Transport Canada/Approuvé par Transport Canada”; and,
- g. Transport Canada approval number.

2.1.3 Small vessel lifebuoys

Information note

Standards for small vessel lifebuoys are in section 2.1 except paragraphs 2.1.1.1, 2.1.1.3, 2.1.1.4 and 2.1.1.7 of Chapter II of the *LSA Code* with the following Canadian modifications.

2.1.3.1 Small vessel lifebuoys are subject to the following specifications:

- a. Dimensions of lifebuoys:
 - i. outside diameter of not more than 610 mm, an inside diameter of not less than 356 mm, a major axis of 127 mm, and a minor axis of 95 mm; or
 - ii. outside diameter of 610 mm, an inside diameter of 330 mm, a major axis of 140 mm and a minor axis of 76 mm.
- b. A tolerance of +/- 5% is acceptable on lifebuoy dimensions.
- c. Be constructed of inherently buoyant material; it shall not depend upon rushes, cork shavings or granulated cork, any other loose granulated material or any air compartment which depends on inflation for buoyancy;
- d. A lifebuoy is to be capable of supporting a weight of 7.5 kg of iron in freshwater for a period of 24 hours.
- e. A lifebuoy must have a mass of not less than 1.1 kg and not more than 6 kg.
- f. In addition to the colours set out in 2.1.1 of this Standard the cover can be white.
- g. Be fitted with a grabline not less than 9.5 mm in diameter and not less than four times the outside diameter of the body of the buoy in length. The grabline shall be secured at four equidistant points around the circumference of the buoy to form four equal loops.
- h. Where a buoyant lifeline is attached to a small vessel lifebuoy as required by the regulation, it has to:
 - i. be non-kinking;
 - ii. have a diameter of not less than 8 mm;
 - iii. have a breaking strength of not less than 5 kN; and
 - iv. have a length of at least 15 metres.

2.2 LIFEJACKETS

2.2.1 SOLAS Lifejackets

Information note

The standards for SOLAS lifejackets are in section 2.2 of Chapter II of the *LSA Code*.

2.2.2 Lifejackets Class 1 and Class 2

Information note

The standards for lifejackets Class 1 and Class 2 are in the Canadian General Standards Board CAN/CGSB-65.7-2007 entitled *Life Jackets*.

2.2.2.1 Approval Marking – In addition to the marking required in section 8 of the standard CAN/CGSB-65.7-2007 the lifejacket shall be marked with the following:

- a. “Approved by Transport Canada/Approuvé par Transports Canada”
- b. Transport Canada approval number.

2.3 IMMERSION SUITS

Information note

Standards for Immersion suits are in the Canadian General Standards Board CAN/CGSB-65.16-M89 entitled: *Marine Abandonment Immersion Suit Systems*, as amended from time to time.

Refer to the *Life Saving Equipment Regulations Part III* entitled *Operational Requirements and Equipment Standards* and particular attention should be given to the Sections 114, 115, 117.

Refer to Column II of the Table in Section 121 for the appropriate testing standard.

2.4 ANTI-EXPOSURE WORK SUITS

Reserved

Information note

Refer to the *Life Saving Equipment Regulations Part III* entitled *Operational Requirements and Equipment Standards* and particular attention should be given to the Sections 114, 115, 117.

Refer to Column II of the Table in Section 121 for the appropriate testing standard.

2.5 THERMAL PROTECTIVE AIDS

Reserved

Information note

Refer to the *Life Saving Equipment Regulations Part III* entitled *Operational Requirements and Equipment Standards* and particular attention should be given to the Sections 114, 115, 117.

Refer to Column II of the Table in Section 121 for the appropriate testing standard.

2.6 PERSONAL FLOTATION DEVICES

2.6.1 Personal Flotation Devices

Information note

The standards and tests for Personal Flotation Devices are those set out in Canadian General Standards Board Standard CAN/CGSB-65.11-M88, *Personal Flotation Devices* with the following modifications.

- 2.6.1.1 Approval mark - In section 6.1 of the Standard CAN/CGSB-65.11-M88 replace “Approved by the Canadian Coast Guard, Department of Fisheries and Oceans” with “Approved by Transport Canada”. Replace “Approuvé par la Garde côtière canadienne, Ministère des Pêches et Océans” with “Approuvé par Transports Canada”.

2.6.2 Personal Flotation Devices for Children**Information note**

The standards and tests for Personal Flotation Devices intended for use by children are those set out in Canadian General Standards Board Standard CAN/CGSB-65.15-M88, *Personal Flotation Devices for Children* with the following modifications.

- 2.6.2.1 Approval mark - In section 6.1 of the Standard CAN/CGSB-65.15-M88 replace “Approved by the Canadian Coast Guard, Department of Fisheries and Oceans” with “Approved by Transport Canada”. Replace “Approuvé par la Garde côtière canadienne, Ministère des Pêches et Océans” with “Approuvé par Transports Canada”.

2.6.3 Fully Inflatable Personal Flotation Devices**Information note**

The standards and tests for Inflatable Personal Flotation Devices are those set out in Underwriters’ Laboratories, Inc. Standard UL 1180, *Fully Inflatable Recreational Personal Flotation Devices*, with the Canadian modifications set out in 2.6.4.

2.6.4 Canadian Modifications to the Standard UL 1180**Information note**

The following Canadian Modifications replace the *CANADIAN ADDENDUM TO THE STANDARD UL 1180 FOR INFLATABLE PERSONAL FLOTATION DEVICES (PFDs)* published on May 12, 2005.

- 2.6.4.1 Delete paragraph 4.6.4.1. Disregard any other requirements specific to Type V devices.
- 2.6.4.2 Sections 10 and 11 are to be disregarded and, in lieu, the provisions of section 8 of the standard CAN/CGSB 65.7-2007 *Life Jackets* is to be applied with the following modifications.
- 2.6.4.2.1 Throughout the section replace “Life Jacket” with “Personal Flotation Device”
- 2.6.4.2.2 In section 8.2:
- Replace “Class and category must be prominently marked” with “The Performance Type must be prominently marked”

- b. Replace “CAN/CGSB-65.7-2007” with “UL 1180 with the Canadian modifications/UL 1180 avec les modifications canadiennes”
- c. Add the following marking:
- “Approved by Transport Canada/Approuvé par Transports Canada”
 - Transport Canada approval number
- d. Add the following warning statements:

WARNING

- NOT for white water paddling or personal watercraft use.
- NOT to be used by persons less than 16 years old.
- Must be fitted with an unpunctured, and fully functional inflation cartridge, or be worn fully inflated.
- Must be fitted with compatible inflation mechanism parts (refer to owner’s manual). The fitting of any other part could result in the device failing to inflate or inflating improperly.

MISE EN GARDE

- NE PEUT ÊTRE UTILISÉ pour le canotage en eaux vives ou à bord d’une motomarine.
- NE PEUT ÊTRE UTILISÉ par une personne de moins de 16 ans.
- Doit être muni d’une cartouche de gonflement non perforée et en parfait état de fonctionnement, ou porté gonflé.
- Les pièces de son mécanisme de gonflement doivent être compatibles (voir manuel du propriétaire). L’utilisation d’autres pièces pourrait empêcher le bon fonctionnement ou résulter en un gonflement incomplet du dispositif.

- e. Add the following note:

NOTE

- A pouch type device is considered to be worn when securely donned around the waist.

NOTE

- Un VFI gonflable de type pochette est considéré comme étant porté lorsque bien ajusté autour de la taille, comme il se doit.

- f. Add the following paragraph:

When a device is fitted with a manual only inflator, a warning label is to appear on the device itself, in the owner’s manual and in way of a label affixed either on the cover page of the owner’s manual or on the front of the device. The warning label text shall read as follows:

WARNING

- This device will not inflate automatically upon immersion. Tab must be pulled to activate inflation mechanism.

WARNING

- Le présent dispositif ne se gonflera pas automatiquement au moment de l’immersion. La tirette doit être tirée pour activer le mécanisme de gonflement.

2.6.4.2.3 In section 8.7 add item (e) as follows:

- (e) The following text shall be inserted at the beginning of the owner's manual:

INFLATABLE PFDs

Inflatable PFDs are special devices in that the flotation of the wearer is not derived from inherently buoyant materials. In order for them to do their job, you, the wearer, must do yours! This means you have the responsibility to ensure you are familiar with the operation and maintenance requirements of your inflatable PFD! You must also be aware of the PFD's limitations and know that it is not approved under the *Small Vessel Regulations* for certain boating activities.

***READ YOUR OWNER'S MANUAL AND
THE INFORMATION LABELS ON
YOUR PFD!***

IT COULD SAVE YOUR LIFE!

VFI GONFLABLES

Le VFI gonflable est un dispositif spécial en ce sens qu'il ne dépend pas de matériaux insubmersibles pour assurer la flottabilité de l'utilisateur. Afin que ce dernier puisse faire son boulot, vous, l'utilisateur, devez faire le vôtre! Ceci veut dire que vous devez vous assurer de bien connaître le fonctionnement et l'entretien de votre VFI gonflable ! Vous devez aussi connaître ses limites et savoir pour quelles activités nautiques le port de ce type de VFI n'est pas approuvé aux termes du *Règlement sur les petits bâtiments*.

***LISEZ BIEN LE MANUEL DU
PROPRIÉTAIRE DE MÊME QUE LES
ÉTIQUETTES FIXÉES SUR VOTRE
VFI!***

**CELA POURRAIT VOUS SAUVER
LA VIE!**

2.6.4.2.4 Replace section 8.7.1 with the following: "The above instructions shall be available in an owner's manual. The owner's manual shall be attached to the device .

3 CHAPTER III – VISUAL SIGNALS

3.1 PYROTECHNIC DISTRESS SIGNALS

Information note

Standards for pyrotechnic distress signals are in Chapter III of the *LSA Code* with the following Canadian modifications.

3.1.1 Canadian modifications

- 3.1.1.1 Every pyrotechnic distress signal is permanently marked with the month and year of manufacture, as well as its lot number, on its casing.
- 3.1.1.2 The instructions for operating a pyrotechnic distress signal are to be permanently marked on its casing or the signal is to carry a diagram clearly showing the manner of operating the signal.

3.1.2 Rocket Parachute Flares

Information note

The standard for rocket parachute flares is found in Chapter III of the *LSA Code* and the Canadian modifications set out in 3.1.1 above.

3.1.3 Hand flares

Information note

The standard for hand flares is found in Chapter III of the *LSA Code* and the Canadian modifications set out in 3.1.1 above with the following Canadian modifications.

- 3.1.3.1 For non SOLAS hand flares subsections 3.2.2.2 and 3.2.2.3 of Chapter III of the *LSA Code* are replaced by the following:
 - a. The hand flare shall be capable of producing a bright red light having a luminosity of not less than 500 cd for a period of at least 2 min.

3.1.4 Buoyant smoke signals

Information note

The standard for buoyant smoke signals is found in Chapter III of the *LSA Code* and the Canadian modifications set out in 3.1.1 above.

3.1.5 Hand smoke signal

Information note

The standard for hand held smoke signals is found in subpart 160.037 of title 46, Ch. 1, of the *Code of Federal Regulations* of the United States, as amended, and the Canadian modifications set out in 3.1.1 above.

The *Code of Federal Regulations* of the United States shall be read without reference to “satisfactory to the Commandant” and “accepted by the Commandant under §159.010 of this chapter”.

3.1.6 Multi star flares

- 3.1.6.1 A multi star flare has to meet 3.1.1 and be capable of producing, in rapid succession, and at intervals not greater than 15 seconds, two or more red stars.
- 3.1.6.2 Where a visual signal produces only a single red star within the 15 second interval required, but meets the requirements of multi star flares in all other respects, the visual signal or its package is to be clearly marked to indicate that the two devices are required to be projected within the 15 seconds in order to meet the requirements of multi star flares.
- 3.1.6.3 A multi star flare must:
- a. contain a firing device capable of throwing the stars automatically; or
 - b. be provided with a cartridge-firing device that requires loading for each signal.
- 3.1.6.4 Where a multi star flare contains a cartridge-firing device, a sufficient number of cartridges to produce the number of signals required by the regulations is to be included.
- 3.1.6.5 A multi star flare visual signal, including the firing device and the cartridges, if any, are to be packed in a waterproof container.
- 3.1.6.6 Each star of a multi star flare:
- a. is to burn with a bright red colour with a luminosity of not less than 10 000 candela for a period of not less than 5.5 seconds: be capable of being projected to an altitude of not less than 60 metres;, and burn out before touching the sea, or
 - b. is to burn with a bright red colour with a luminosity of not less than 5 000 candela for a period not less than 4 seconds, be capable of being projected to an altitude of not less than 90 metres, , and burn out before touching the sea.

4 CHAPTER IV – SURVIVAL CRAFT

4.1 GENERAL REQUIREMENTS FOR SOLAS LIFERAFTS

Information note

Standards for SOLAS liferafts are in sections 4.1, 4.2 and 4.3 of Chapter IV of the *LSA Code*.

4.2 INFLATABLE LIFERAFTS

Information note

Standards for SOLAS inflatable liferafts are in sections 4.1 and 4.2 of Chapter IV of the *LSA Code*.

4.3 RIGID LIFERAFTS

Information note

Standards for rigid liferafts are in sections 4.1 and 4.3 of Chapter IV of the *LSA Code*.

4.4 REDUCED CAPACITY LIFERAFTS

Information note

Standards for a reduced capacity liferaft are in sections 4.1 except 4.1.2.1, 4.2 except 4.2.6.3.4, and 4.3 of Chapter IV of the *LSA Code*, with the following Canadian modifications.

4.4.1 Marking

- 4.4.1.1 Every reduced capacity liferaft and its container are to be marked in accordance with paragraphs 4.2.6.3 and 4.2.7.1 of chapter IV of the *LSA Code* except, there is to be no reference to SOLAS and all references to “LIFERAFT” are replaced with “**REDUCED CAPACITY LIFERAFT**”.

4.5 INFLATABLE RESCUE PLATFORMS

Information note

An inflatable rescue platform is **not** an open reversible liferaft as defined in the *International Code of Safety for High-Speed Craft, 2000 (2000 HSC Code)*, Resolution MSC.97(73), as amended.

An inflatable rescue platform meets the standards set out in paragraphs 4.1.1.2 to 4.1.1.4, 4.1.3.1, 4.1.6.1 to 4.1.6.3 and 4.2.6.1 of the *LSA Code* and section 4.1 of Part I of this Standard.

4.5.1 General

- 4.5.1.1 Every inflatable rescue platform is to be constructed so that the device is capable of performing its intended function in exactly the same manner either side up.
- 4.5.1.2 An inflatable rescue platform shall have a single layer floor mounted between the buoyancy compartments.
- 4.5.1.3 An inflatable rescue platform shall inflate with non-toxic gas within three minutes after the activation of the inflation mechanism at a core temperature of 0°C. After inflation, the platform shall maintain its form when loaded with its full complement of person and equipment.

- 4.5.1.4 Each compartment of an inflatable rescue platform shall be capable of withstanding a pressure exceeding three times the working pressure and shall be prevented from reaching a pressure exceeding twice the working pressure, by means of pressure relief valves or limited gas supply.
- 4.5.1.5 Every inflatable rescue platform is to be fitted with a painter of a length equal to not less than twice the distance from the stowed location to the waterline of the ship in its lightest seagoing condition or 15 m, whichever is the greater.

4.5.2 Capacity

- 4.5.2.1 The maximum number of persons an inflatable rescue platform may accommodate will not be greater than 150 persons and is to be calculated as the lesser of:
- the greatest whole number obtained by dividing the volume, measured in cubic metres, of the main buoyancy chamber when inflated by 0.064;
 - the greatest whole number obtained by dividing the inner horizontal cross-sectional area of the platform measured in square metres (which for this purpose may include thwarts, if fitted) measured to the innermost edge of the buoyancy chamber by 0.248;
 - the number of persons, each having an average mass of 75 kg, all wearing standard lifejackets, that can be seated with sufficient comfort without interfering with the operation of any of the liferaft's equipment.

4.5.3 Equipment

- 4.5.3.1 Equipment packs are to be accessible from both sides of the platform.
- 4.5.3.2 There will be one (1) captive safety knife, adjacent to the painter on both sides of the platform

4.5.4 Lighting Systems

- 4.5.4.1 Every inflatable rescue platform shall have an automatically activated light, complying with paragraph 4.1.3.3 of the *LSA Code* with the exception that this light will not be fixed to a canopy.

4.5.5 Fittings

- 4.5.5.1 Every inflatable rescue platform is to be provided with towing patches capable of withstanding the force required to tow the platform at a speed of at least 2 knots.
- 4.5.5.2 Water pockets are not required, but, if fitted, they are to be provided on both sides of the platform and constructed in accordance with paragraph 4.2.5.4 of the *LSA Code*.
- 4.5.5.3 If the floor includes one or more drains, each drain is to be arranged to completely drain the floor of water when the device is fully loaded and prevent water from flowing back onto the floor.

4.5.6 Boarding ramps and Ladders

- 4.5.6.1 Every inflatable rescue platform capable of accommodating up to 38 persons shall have at least one (1) semi-rigid boarding ramp to enable persons to board the platform from the sea, and, if inflated, shall be arranged to prevent deflation of the platform if the ramps are damaged. Platforms capable of accommodating more than 38 persons are to be fitted with at least two diametrically opposed boarding ramps.

- 4.5.6.2 In addition to the boarding ramps, platforms accommodating up to and including 38 persons are to be fitted with one (1) boarding ladder, while platforms accommodating more than 38 persons are to be fitted with two (2) boarding ladders.
- 4.5.6.3 The total number of boarding ramps and ladders required in 4.3.6.1 and 4.3.6.2 of this Standard refers to those ramps and ladders which are capable of being used either side up. The total number of boarding ramps and ladders required is to be doubled on those platforms where the correct function of the boarding ramp or ladder is dependent on which side of the platform is floating up.

4.5.7 Colour and passive detection

- 4.5.7.1 If the colour of the buoyancy tubes is not as set out in 1.2.1, panels of such colour are to be secured to the buoyancy chambers so that a minimum of 1 m² is visible from above the platform.
- 4.5.7.2 Every liferaft, irrespective of its colour, is to be fitted with retro-reflective tape on the upper and outer most surfaces of each buoyancy compartment so as to be visible from above and from water level.
- 4.5.7.3 The retro-reflective tape required in 4.5.7.2 above is to be in sections of not less than 50 mm in width, not less than 300 mm in length and spaced so that the distance between the centres of adjacent sections is not more than 500 mm.

4.5.8 Markings

- 4.5.8.1 Every inflatable rescue platform and its container are to be marked in accordance with paragraphs 4.2.6.3 and 4.2.7.1 of chapter IV of the *LSA Code* except, there is to be no reference to SOLAS and all references to “LIFERAFT” are replaced with “**INFLATABLE RESCUE PLATFORM**”.

4.6 OPEN REVERSIBLE LIFERAFTS

Information note

Standards for Open Reversible Liferafts are in Annex 11 of the *International Code of Safety for High-Speed Craft, 2000 (2000 HSC Code)*, Resolution MSC.97(73), as amended.

4.7 COASTAL LIFERAFTS

4.7.1 General construction requirements

- 4.7.1.1 A liferaft shall be constructed to be capable of withstanding exposure for 15 days afloat in all sea conditions.
- 4.7.1.2 A liferaft shall be constructed so that it can fully inflate in an upright position following a drop from a height of 5 m.

4.7.2 Construction fabric

- 4.7.2.1 All coated materials used on the construction of liferafts shall comply with section 5.17 of resolution MSC.81(70).

4.7.3 Buoyancy chambers

- 4.7.3.1 Every inflatable liferaft shall be constructed of a main buoyancy chamber, which is to be divided into not less than two separate compartments, or a single buoyancy chamber divided longitudinally into two equal airtight compartments.
- 4.7.3.2 Each compartment shall be inflated from an automatic gas inflation system through a non-return inflation valve.
- 4.7.3.3 The buoyancy chamber shall be arranged in such a manner that in the event of any one of the compartments being damaged or failing to inflate, the intact compartment is to be capable of supporting with positive freeboard over the entire periphery the number of persons which the liferaft may carry as determined under 4.7.7.3 of this publication.
- 4.7.3.4 Each compartment shall contribute to the total buoyancy required where the maximum designed volume of either compartment does not exceed 60% of the total volume of the buoyancy chamber.

4.7.4 Canopy and floor

- 4.7.4.1 The specifications for a liferaft canopy are as follows:
- every entrance shall be clearly indicated and shall be provided with an adjustable closing arrangement which can be easily and quickly opened from the both the inside and the outside so as to permit ventilation but exclude seawater, wind and cold;
 - it shall admit sufficient air for the occupants at all times, even with the entrances closed;
 - it shall provide sufficient headroom for sitting occupants under all parts of the canopy; and,
 - it shall erect automatically.
- 4.7.4.2 The floor of the inflatable liferaft shall be waterproof.

4.7.5 Canopy supports

- 4.7.5.1 Arches or other means for supporting the liferaft canopy shall be:
- Gas inflated automatically by a gas inflation system;
 - Fitted with a non-return valve; and,
 - Provided with a means of being manually topped-up.
- 4.7.5.2 Inflation arrangements shall be such that, should one of the buoyancy chambers of the liferaft deflate, the canopy will remain erect.

4.7.6 Cordage, webbing and thread

- 4.7.6.1 All cordage, webbing and thread used in the construction of a liferaft, or in the make-up of the fittings or equipment, shall be inherently rot-proof.
- 4.7.6.2 All cordage shall be attached to the liferaft in such a manner that, if the cordage is accidentally detached, the buoyancy tubes will not be damaged.

4.7.7 Capacity

- 4.7.7.1 A liferaft shall have a carrying capacity of not less than four (4) persons.
- 4.7.7.2 The total mass of a liferaft, its container and its equipment shall not be more than 75 kg.

- 4.7.7.3 Maximum number of persons that the liferaft can carry shall be the lesser of:
- The greatest whole number obtained by dividing the volume, measured in cubic metres of the main buoyancy chamber (which for this purpose is to not include the canopy support arches nor any thwarts, if fitted) when inflated, by 0.096;
 - The greatest whole number obtained by dividing the inner horizontal cross-sectional area of the liferaft measured in square metres (which for this purpose may include thwarts, if fitted) measured to the innermost edge of the buoyancy chamber, by 0.372; or,
 - The number of persons, each having a mass of not less than 75 kg, all wearing a marine anti-exposure work suit that meets the requirements set out in the *LSA Code*, that can be seated without interfering with the operation of any of the liferaft's equipment.

4.7.8 Entrance

- 4.7.8.1 Every inflatable liferaft shall have at least one entrance fitted with a semi-rigid boarding step to enable persons to board the liferaft from the sea and so arranged as to prevent deflation of the liferaft if the step is damaged.
- 4.7.8.2 Any entrance not fitted with a boarding step shall have a boarding ladder the lowest step of which is not less than 0.4 m below the light waterline of the liferaft.
- 4.7.8.3 The liferaft shall be provided inside with means to assist persons to pull themselves into it from the ladder or boarding step.

4.7.9 Stability

- 4.7.9.1 Every liferaft shall be constructed in such a manner that when fully inflated and floating with the canopy fully erected it is stable in a seaway.
- 4.7.9.2 Every liferaft shall be fitted with water pockets on the underside meeting or exceeding the requirements as specified in paragraph 4.2.5.4 of the *LSA Code*.
- 4.7.9.3 The stability shall be such that;
- When in the inverted position, unless self-righting, it can be righted by one person in calm water; and
 - When loaded with the number of persons that the liferaft may carry as determined under 4.7.7.3 of this publication or weights equivalent to persons and equipment, it can be towed at a speed of not less than 3 knots in calm water.

4.7.10 Coastal Liferaft fittings

- 4.7.10.1 Every liferaft shall be fitted with arrangements for securing the entrance closures in the open position, closed so as to be weather tight, and in any intermediate position between open and closed.
- 4.7.10.2 Every liferaft shall be provided with lifelines securely becketed around the inside and outside.
- 4.7.10.3 Every liferaft shall be fitted with a painter system of not less than 8 mm in diameter and of a length at least equal to but not less than twice the distance from the stowed position to the waterline in the lightest seagoing condition and that must:
- provide a connection between the vessel and raft;
 - be so arranged that the released liferaft is not dragged under by the sinking vessel; and
 - provide a weak link that will break under a strain of 2.2 +/- 0.4 kN.

- 4.7.10.4 The painter required to be fitted to every liferaft, including its means of attachment to the liferaft but excluding the weak link, shall have a breaking strength of not less than 7.5 kN.
- 4.7.10.5 In the case of vessels normally operating in waters shallower than the length of the painter system required under 4.7.10.3 of this publication, the painter system shall be capable of being shortened to a length that is equal to the depth of the deepest point of those waters.
- 4.7.10.6 The length of the painter system shall be clearly marked on the liferaft container.

4.7.11 Float-free arrangements

- 4.8.11.1 A weak link shall
- not be broken by the force required to pull the painter from the liferaft container;
 - be of sufficient strength to permit the inflation of the liferaft; and,
 - break under a strain of 2.2 +/- 0.4 kN.

4.7.12 Light systems

- 4.7.12.1 Every coastal liferaft shall have, fitted to the exterior top of its canopy, a lamp that:
- is visible at a distance of at least 2 miles for a period of at least 12 hours, on a dark night with good visibility;
 - if a flashing light, flashes at a rate of not less than 50 flashes per minute for the first two hours of the 12 hour period;
 - is powered by a dry chemical cell;
 - lights automatically when the liferaft canopy is set in place; and
 - is capable of being switched off and on conveniently.
- 4.7.12.2 The cell required by 4.7.12.1 c. above shall be of a type that does not deteriorate due to dampness or humidity in the stowed liferaft.
- 4.7.12.3 Every coastal liferaft shall be fitted inside with a lamp that:
- Is capable of continuous operation for a period of at least 12 hours;
 - Lights automatically when the canopy is set in place;
 - Is of sufficient intensity to enable reading of survival and equipment instructions; and
 - Is capable of being switched off and on conveniently.

4.7.13 Colour

- 4.7.13.1 The outer surface of the canopy shall be of a highly visible colour as per 1.2.1.
- 4.7.13.2 The inner surface of the canopy shall be of a colour that does not cause discomfort to the occupants.

4.7.14 Container, packing and marking

- 4.7.14.1 Every coastal liferaft, together with its equipment, shall be packed in a container complying with 4.7.14.2, 4.7.14.3 and 4.7.14.4 of this Standard.
- 4.7.14.2 Each container shall:

- a. be watertight except for drain holes in the container bottom;
- b. be free from sharp edges and abrasive areas on the inside;
- c. provide a neat fit for the packed liferaft so as not to cause any damage to the liferaft fabric by chafing;
- d. be constructed so as to permit the liferaft to break free on inflation;
- e. be constructed so that the opening through which the painter runs is arranged in such a manner that the container will free itself from the painter on inflation of the liferaft;
- f. be provided with a means to enable it to be carried from its place of stowage to a place of launching; and
- g. be of sufficient inherent buoyancy when packed with the liferaft and its equipment to pull the painter from within and to operate the inflation mechanism should the ship sink.

4.7.14.3 Ventilation openings and entrance closures shall be open when the liferaft inflates.

4.7.14.4 The liferaft shall be packed in its container in such a way that the waterborne liferaft inflates in an upright position on breaking free.

4.7.14.5 Every coastal liferaft and its container shall be marked in accordance paragraphs 4.2.6.3. and 4.2.7.1 of chapter IV of the *LSA Code* except, there is to be no reference to SOLAS and all references to “LIFERAFT” are to be replaced with “**COASTAL LIFERAFT**”.

4.7.15 Passive detection

4.7.15.1 Every coastal liferaft shall have affixed to it a retro-reflective medium that meets the Recommendation on the use and fittings of retro-reflective materials on life-saving appliances adopted by the International Maritime Organization by resolution A.658(16), as it may be amended and is to be arranged as shown in diagrams 1 and 2.

4.7.15.2 Except in the case of the medium forming crosses on the top and bottom of the liferaft, retro-reflective medium is to be in sections of not less than 50 mm in width nor less than 300 mm in length and spaced so that the distance between the centres of adjacent sections is not more than 500 mm.

4.7.15.3 The retro-reflective medium sections shall be fitted on the outside;

- a. Around the canopy at one-half its height;
- b. On top of the canopy at its centre in the form of a cross, which sections are to be one-half the length and one-half the breadth of the liferaft; and
- c. On the bottom of the liferaft at its centre and in the form of a cross, similar in size to that mentioned in (b) above.

4.7.16 Sea anchor

4.7.16.1 Every sea anchor with which a liferaft is required to be equipped shall meet the specifications set out in section 4.1 of the *LSA Code*.

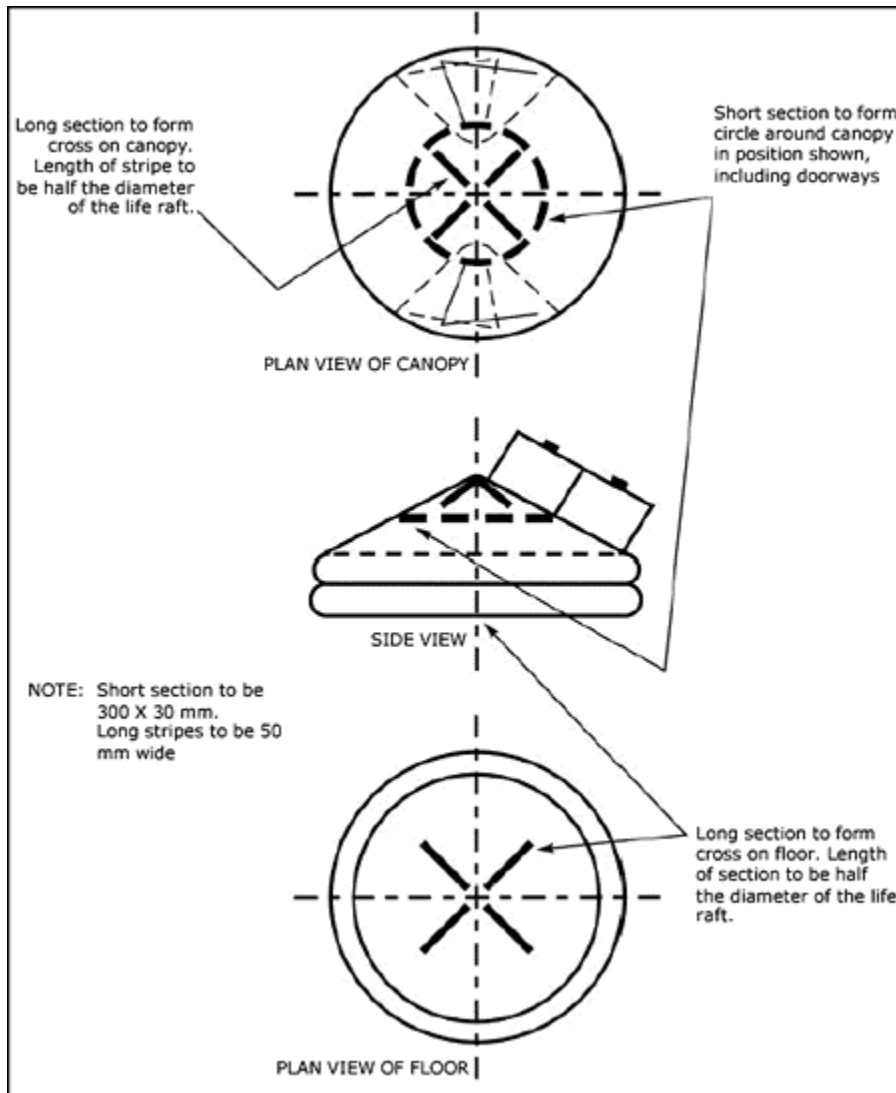


DIAGRAM 1 TYPICAL ROUND LIFERAFT ARRANGEMENT OF RETROREFLECTIVE TAPE

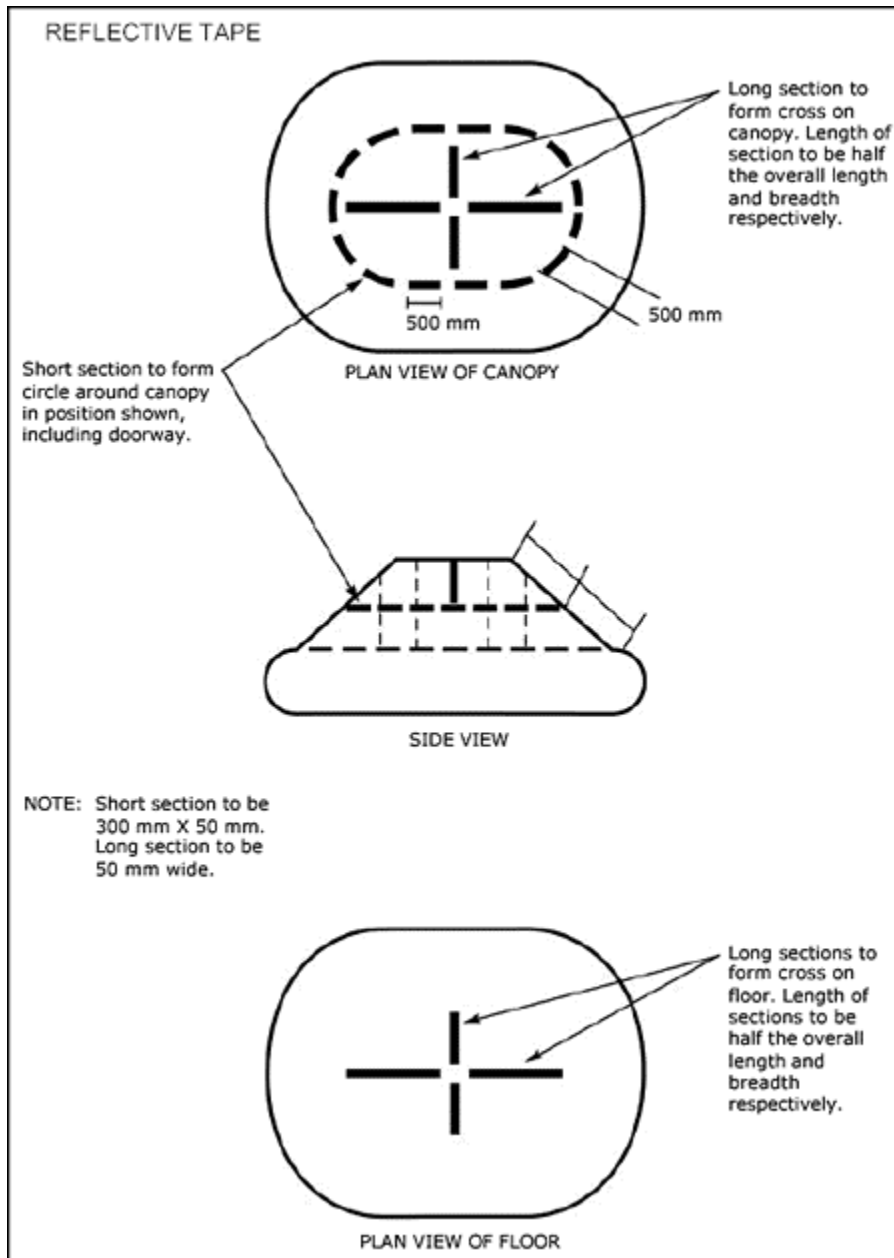


DIAGRAM 2 TYPICAL OVAL LIFERAFT ARRANGEMENT OF RETROREFLECTIVE TAPE

4.8 INFLATION SYSTEM FOR COASTAL LIFERAFTS

4.8.1 General requirements

- 4.8.1.1 The liferaft shall be constructed so that it is capable of being inflated by one person.
- 4.8.1.2 Means shall be provided whereby a topping-up pump or bellows may be used to maintain pressure in the liferaft chambers.
- 4.8.1.3 The gas cylinder and operating head for the inflation of the liferaft shall be stowed and secured to the outside of the liferaft.

4.8.1.4 The inflation hose or manifold shall be attached to a vacuum packed liferaft by means of a quick release coupling.

4.8.2 Gas

4.8.2.1 The gas used for the inflation of a liferaft shall be of a non-toxic type, provide a high rate of inflation and shall not form enough ice at the outlet during expansion to compromise compliance with the test requirements detailed in Part II, section 5.4 of this Standard.

4.8.3 Cylinders

4.8.3.1 The neck of the cylinder shall be threaded to receive a valve unit that will retain the gas in the cylinder and, in conjunction with the operating head, release the gas at the desired moment in a controlled manner to satisfy all test conditions as detailed in Part II, Section 5.4 of this Standard.

Information note

Each cylinder is to be in accordance with the requirements of paragraph 5.10 of the *Transportation of Dangerous Goods Regulations* which requires that cylinders be manufactured and used in accordance with the following Standards:

CSA-B339	<i>Cylinders, Spheres, and Tubes for the Transportation of Dangerous Goods</i>
CSA-B340	<i>Selection and Use of Cylinders, Spheres, Tubes, and Other Containers for the Transportation of Dangerous Goods, Class 2</i>

4.8.4 Operating head

- 4.8.4.1 The gas release mechanism for a cylinder used in the inflation of a liferaft shall;
- operate in such a manner that a pull on the operating line opens a valve and releases gas;
 - incorporate;
 - means of retaining the valve in the open position after it has been operated; and,
 - an indicator that shows whether or not the operating head has been operated;
 - If the cylinder valve and operating head are separate components, be a detachable operating head screwed onto the valve unit in the neck of the cylinder, the handing of the thread being so arranged that, when the operating head is screwed on, there is no tendency to slacken the valve in the cylinder; and,
 - be watertight.
- 4.8.4.2 Means shall be provided so as to prevent chafing of the liferaft fabric by the operating head.

4.8.5 High pressure hose assembly

- 4.8.5.1 A high-pressure hose or manifold shall be provided to convey the gas from the cylinder to the inflatable chambers of the liferaft.
- 4.8.5.2 The hose assembly, where fitted shall;
- have a minimum bursting pressure of at least 50% greater than the gas delivery pressure;
 - be capable of operating over a temperature range of -45°C to +70°C;
 - be capable of being bent through 180° over a form having a radius of 5 cm, after conditioning at -50°C;

- d. After having been bent as described in (c) above, be capable of passing the hydraulic test as prescribed in 5.4.6 of Part II of this Standard, and;
- e. have its hose clean and free from particles with any foreign matter.

4.8.6 Valves

- 4.8.6.1 Non-return valves shall be provided at each point where gas for the inflation of a liferaft enters an inflatable chamber from the cylinder or another inflatable chamber.
- 4.8.6.2 Each chamber of a liferaft shall be capable of withstanding a pressure equal to 3 times the nominal pressure and shall be prevented from reaching a pressure exceeding twice the nominal pressure by fitting a safety relief valve or by a limited gas supply.
- 4.8.6.3 Means shall be provided for fitting the top-up pump or bellows provided with the liferaft equipment.
- 4.8.6.4 The safety relief valve shall:
 - a. function so as to allow gas to escape should the pressure exceed that which would be safe for the chambers to carry; and,
 - b. reseal so as to maintain the nominal operating pressure to maintain the rigidity of the chambers.

4.8.7 Deflation

- 4.8.7.1 Deflation arrangements shall be fitted for deflating the fully inflated liferaft for re-packing and vacuum sealing. The capacity of this arrangement is not to exceed the minimum required for re-packing and vacuum sealing.

4.8.8 Coastal liferaft equipment

- 4.8.8.1 Minimum requirement for coastal liferafts
 - a. One buoyant rescue quoit attached to not less than 30 m of buoyant line
 - b. One non-folding safety knife with a buoyant handle and hand guard, attached and stowed in a pocket on the exterior of the canopy adjacent to the painter
 - c. One buoyant bailer
 - d. One sea anchor that is permanently attached to the liferaft
 - e. Two buoyant paddles
 - f. One rocket parachute flare and three hand red flares
 - g. One watertight flashlight suitable for Morse signaling and, in a watertight container, one spare set of batteries and one spare light bulb for the flashlight
 - h. For each occupant, six doses of anti-seasickness medicine and one seasickness bag
 - i. A survival craft first aid kit
 - j. A copy of life-saving signals
 - k. One repair kit for repairing punctures and one topping-up bellows or pump, and
 - l. One RADAR reflector

Information note

The copy of the life-saving signals is to be printed on a waterproof card or placed in a waterproof container

4.9 GENERAL REQUIREMENTS FOR LIFEBOATS

Reserved

Information note

Refer to the *Life Saving Equipment Regulations* Part III entitled *Operational Requirements and Equipment Standards* and particular attention should be given to Sections 114, 115, 117, 140, 141, 143 and 144. Refer to Column II of the Table in Section 121 for the appropriate testing standard.

5 **CHAPTER V – RESCUE BOATS**

Reserved

Information note

Standards for Rescue Boats are in section 5.1 of Chapter V of the *LSA Code*.

6 CHAPTER VI – LAUNCHING AND EMBARKATION APPLIANCES

Reserved

Information note

Refer to the *Life Saving Equipment Regulations* Part III entitled *Operational Requirements and Equipment Standards* and particular attention should be given to the following Sections: 114, 115, 117, 129, 140, 141 and 143.

7 CHAPTER VII – OTHER LIFE-SAVING APPLIANCES

7.1 LINE-THROWING APPLIANCES

Reserved

Information note

Refer to the *Life Saving Equipment Regulations* Part III entitled *Operational Requirements and Equipment Standards* and particular attention should be given to the following Sections: 114, 115, 117 and 121 column II of the table for the appropriate standard.

7.2 GENERAL ALARM AND PUBLIC ADDRESS SYSTEM

Reserved

7.3 RECOVERY BOAT

7.3.1 General requirements

7.3.1.1 All recovery boats meet the requirements of 7.3.1.2 and 7.3.1.3 of this Standard.

Information note

In addition to the requirements of this section, motorized recovery boats and recovery boats built to accommodate a motor shall meet the *Construction Standards for Small Vessels*, (TP 1332).

7.3.1.2 A recovery boat shall:

- a. carry not less than 2 persons @ 75 kg each;
- b. be not less than 3 metres in length;
- c. have suitable means of enabling the boat to be raised or lowered with full equipment;
- d. have a length to breadth ratio of not more than 2.8:1;
- e. be capable of maintaining positive stability when open to the sea and loaded with its full complement of persons and equipment;
- f. have an internal volumetric capacity of not less than 1.416 m³;
- g. If inflated, comprise of at least 3 compartments;
- h. be capable of being propelled by oars or paddles;
- i. be stable in a seaway;
- j. remain usable if fittings used to secure painters, toelines, becketed lines, or lines used to raise and lower the boat break;
- k. be fitted with retro-reflective tape;
- l. be marked with:
 - i. total capacity,
 - ii. total launching weight of boat complete with its equipment and crew,
 - iii. date of manufacture,

- m. be equipped with the following;
 - i. 1 buoyant safety knife to be secured in the vicinity of the painter,
 - ii. 1 bailer secured within boat,
 - iii. 1 set of oars/paddles with oar/paddle locks to be secured within boat,
 - iv. 1 boat hook readily accessible,
 - v. 1 painter secured forward or may incorporate quick release slip provided operation is capable while under strain,
 - vi. 1 plug for each plughole, if fitted, to be secured in the vicinity of plugholes
 - vii. 1 buoyant heaving line of not less than 15 metres in length,
 - viii. 1 flash light with spare bulb and batteries,
 - ix. 1 rustproof whistle,
 - x. 2 red hand flares, and
 - xi. In addition, inflated boats are to be equipped with 1 air pump with fittings suitable to replenish all inflated chambers.

7.3.1.3 When the equipment referred to in 7.3.1.2 above is not designated to be readily available, it shall be stowed in clean watertight lockers or similar container(s) secured within the boat.

7.4 EMERGENCY BOATS

Reserved

Information note

Refer to the *Life Saving Equipment Regulations* Part III entitled *Operational Requirements and Equipment Standards* and particular attention should be given to the following Sections: 114, 115, 117, 129, 140, 141 and 143.

7.5 SURVIVAL CRAFT FIRST AID KIT

7.5.1 Minimum requirement for a survival first aid kit:

7.5.1.1 Minimum requirements for the survival craft first aid kit shall be as follows:

- a. First aid instructions or manual
- b. a minimum of 48 doses of analgesic medication of a non-narcotic type (preferably acetaminophen)
- c. 6 x safety pins or one roll of adhesive first-aid tape
- d. 1 x bandage scissors or safety scissors
- e. 1 x resuscitation face shield
- f. 2 x pair of examination gloves
- g. Antiseptic preparations – suitable for at least 10 applications
- h. Burn preparations – suitable for at least 12 applications
- i. Adhesive plasters – 20 minimum in assorted sizes

- j. Sterile compression bandage – 10 minimum in assorted sizes
 - k. Adhesive elastic bandages – 4 metres minimum
 - l. Sterile gauze compresses – 2 minimum
 - m. Triangular bandages – 2 minimum
 - n. waterproof contents list in both French and English
- 7.5.1.2 Each survival craft first aid kit set out in 7.5.1.1 above is deemed suitable for a maximum of 75 persons.
- 7.5.1.3 First aid kits shall be packed in a waterproof case capable of being closed tightly after use.

Information note

First aid kits listed in the current *Life Saving Equipment Regulations* are under review and it is anticipated that the first aid kit set out in 7.5.1.1 of this publication will be the minimum required first aid kit.

7.6 POSITION-INDICATING LIGHTS FOR LIFE-SAVING APPLIANCES

Information note

Standards for lights for life-saving appliances are in paragraphs 2.1.2, 2.2.3, 4.1.3.3, 4.1.3.4, 4.4.7.10 and 4.4.7.11 of the *LSA Code* with the following Canadian modifications

7.6.1 Canadian modifications on instructions for use

- 7.6.1.1 Operating instructions shall be clearly marked/printed on each light and illustrations may be used.
- 7.6.1.2 Instructions are to be provided on how to attach the light.
- 7.6.1.3 Attachment and operating instructions shall be supplied in a format suitable for insertion into the vessel's training manual.

7.6.2 Canadian modifications for marking

- 7.6.2.1 Each light shall be clearly marked with:
 - a. The manufacturer's name or trademark, the model designation and lot number
 - b. Transport Canada approval number assigned to the light
 - c. Instructions on how to activate the light.
- 7.6.2.2 Power source
 - a. The power source of each light shall be permanently and legibly marked with the month and year of manufacture and expiration.
 - b. In the case of a light using disposable batteries as the power source, the words "CHANGE BATTERIES ANNUALLY" shall be permanently and legibly marked on each light.

7.7 BUOYANT APPARATUS

Information note

Standards for buoyant apparatus are in subpart 160.010 of title 46, volume 6, of the *Code of Federal Regulations* of the United States, as amended.

A buoyant apparatus shall be of a type that has been approved by the United States Coast Guard and the information contained in the nameplate shall be in English and French.

PART II - TESTING AND EVALUATION OF LIFE-SAVING APPLIANCES

1 LIFEBOUOYS

1.1 TESTS FOR LIFEBOUOYS

1.1.1 SOLAS Lifebuoys – Testing requirements

Information note

Standards for lifebuoy and for small vessel lifebuoy testing are in section 1 of Part 1 of Resolution MSC.81(70) with the following modifications:

1.1.2 Small vessel lifebuoy – Testing requirements – Canadian modifications

1.1.2.1 Subsection 1.1 of part 1 of Resolution MSC.81(70) is replaced with the following:

It is verified by measuring, weighing and inspection that the lifebuoy:

- a. is in accordance with the dimensions specified in 2.1.3.1a. of Part 1;
- b. has a mass in accordance with the value specified in 2.1.3.1e. of Part 1; and
- c. is provided with grablines in accordance with specifications given in 2.1.3.1g. of Part 1.

1.1.2.2 Drop test

In paragraph 1.3 of section 1 of part 1 of Resolution MSC.81(70) only the drop test on concrete from a height of 2 metres is required.

1.1.2.3 Flotation test for small vessel lifebuoy

- a. Subsection 1.6 of part 1 of Resolution MSC.81(70) is replaced with the following: Every small vessel lifebuoy upon completion of tests prescribed in paragraphs 1.2, 1.3, 1.4 and 1.5 of section 1 of part 1 of Resolution MSC.81(70) is to be floated in fresh water with a weight of not less than 7.5 kg of iron freely suspended from it for a period of 24 hours. At the end of the 24-hour period, each lifebuoy is to remain floating at essentially the same level as that at the commencement of the test.

2 LIFEJACKETS

2.1 TESTS FOR LIFEJACKETS

2.1.1 Lifejackets - Testing requirements

Information note

Standards for SOLAS lifejacket testing are in section 2 of part 1 of Resolution MSC.81(70)

Standards for non-SOLAS type lifejackets (Class 1 and Class 2) are in the Canadian General Standards Board CAN/CGSB-65.7-2007 entitled *Life Jackets*, as amended from time to time.

3 IMMERSION SUITS, ANTI-EXPOSURE SUITS AND THERMAL PROTECTIVE AIDS

3.1 TESTS FOR IMMERSION SUITS, ANTI-EXPOSURE SUITS AND THERMAL PROTECTIVE AIDS

3.1.1 Testing requirements for Immersion suits

Information note

Standards for immersion suits testing are in the Canadian General Standard Board CAN/CGSB-65.16-2005 entitled *Marine Abandonment Immersion Suit System*, as amended from time to time.

3.1.2 Testing requirements for Anti-exposure work suits

Reserved

Information note

Refer to the *Life Saving Equipment Regulations* Part III entitled *Operational Requirements and Equipment Standards* and particular attention should be given to Sections 114, 115, 117. Refer to Column II of the Table in Section 121 for the appropriate testing standard.

3.1.3 Testing requirements for Thermal protective aids

Reserved

Information note

Refer to the *Life Saving Equipment Regulations* Part III entitled *Operational Requirements and Equipment Standards* and particular attention should be given to Sections 114, 115, 117. Refer to Column II of the Table in Section 121 for the appropriate testing standard.

4 VISUAL SIGNALS

4.1 TESTS FOR PYROTECHNIC DISTRESS SIGNALS

Information note

The term “pyrotechnics” used in section 4 of part 1 of Resolution MSC.81(70) has the same meaning as the expression “pyrotechnic distress signals” use in this Standard.

4.1.1 Testing requirements for pyrotechnic distress signals

Information note

Testing requirements for pyrotechnic distress signals are in section 4 of part 1 of Resolution MSC.81(70) and in the following Canadian modifications.

4.1.2 Samples

- 4.1.2.1 Samples submitted for testing are to be representative of the devices as regularly manufactured and marketed.

4.2 TESTS FOR MULTI STAR FLARES

4.2.1 Temperature cycling tests

- 4.2.1.1 Samples of multi star flares visual signals are to be subjected to the following temperature cycle:
- 8 hours at 65°C, followed by
 - 16 hours at 20°C plus or minus 2°C, followed by
 - 8 hours at -30°C, followed by
 - 16 hours at 20°C plus or minus 2°C.

Following ten such consecutive cycles, the samples of multi star flares signals are to function effectively at 20°C plus or minus 2°C.

- 4.2.1.2 Samples of multi star flares signals are to function effectively at -30°C following at least 48 hours in a cold chamber at that temperature. At the time of the test the temperature must not have increased by more than 5°C.
- 4.2.1.3 Samples of multi star flares signals are to function effectively at plus 65°C following at least 48 hours in a circulating air oven at that temperature. At the time of the test the temperature must not have dropped more than 5°C.
- 4.2.1.4 Specimens of multi star flares signals are to function effectively at 20°C plus or minus 2° following:
- At least 96 hours at plus 65°C and 90% relative humidity followed by
 - 240 hours at 23°C plus or minus 2° and 65% relative humidity.
- 4.2.1.5 An insulated container is acceptable for transportation of the samples for testing in accordance with 4.2.1.2 and 4.2.1.3 above from the refrigerating or heating chamber to the test location, provided that all steps possible are taken to minimize any change of temperature. A maximum variation of +/- 5°C is acceptable.

- 4.2.1.6 The refrigerating and heating chambers are to be provided with thermostatic control devices to maintain even temperatures.
- 4.2.1.7 The samples shall not ignite spontaneously or decompose during the conditioning or the tests.

4.2.2 Water and corrosion resistance tests

- 4.2.2.1 Samples of multi star flares visual signals are to function effectively after being:
 - a. Immersed horizontally for 24 hours under 1 metre of water;
 - b. Immersed in the ready to fire condition for 5 minutes under 100 mm of water; and
 - c. Subjected to a salt-spray test (20% Sodium Chloride solution) at a temperature of plus 35°C plus or minus 3°C for at least 100 hours. The salt spray test is conducted in accordance with the requirements of ISO Standard 3768-1976 or ASTM B-117.
- 4.2.2.2 Samples of multi star flares signals, including the firing device and cartridges if any, are to function effectively after being immersed for one minute under 1 metre of water.

4.2.3 Handling safety test

- 4.2.3.1 Samples of multi star flares signals are to function effectively when activated in accordance with the manufacturer's operating instructions to establish that they can be operated without injury to the operator, or any person in close proximity, during firing or burning.

4.2.4 Visual safety inspection

- 4.2.4.1 It is to be established by visual inspection that each signal (as indicated):
 - a. is permanently marked with clear and precise instructions indicating the correct method of operation. The operating end is to be identifiable by day or night. Marking can be presented as diagrams in lieu of text.
 - b. is capable of being operated from the bottom (safe end) or contain an operational safety delay of 2 seconds.
 - c. has a simple means of ignition, which requires the minimum of preparation and can be readily operated in adverse conditions without external aid and with wet, cold, or gloved hands. This test is carried out in conjunction with the tests required in 4.2.1 and 4.2.2 of this publication and, with the gloves of an immersion suit, which meets the requirements of CAN/CGSB-65.16-2005.
 - d. does not depend on adhesive tapes or plastic envelopes for its water resistance, and
 - e. is clearly and permanently marked with the lot number and date of manufacture.
- 4.2.4.2 The inspections for marking and waterproofing specified in 4.2.4.1 above are conducted before and after the conditioning requirements of 4.2.1 and 4.2.2 of this publication for temperature, water-resistance and corrosion respectively.

4.2.5 Additional testing requirements for Multi Star Flares

- 4.2.5.1 Altitude; burning period – samples of the device shall be fired vertically and by means of accurate measuring instruments, the following shall be determined:
- The altitude at which the stars are ejected;
 - The length of the burning period of the stars;
 - The interval between ignitions of individual stars, if more than one star is produced by a single firing.
- 4.2.5.2 Rapid fire – if the flare fires only single stars, it shall be determined that a second star can be fired rapidly following the first star. The time interval between firings is noted.
- 4.2.5.3 Luminosity – samples of the flare shall be tested in order to determine the average luminous intensity.
- 4.2.5.4 Flame colour – tests shall be conducted to determine that the colour of the stars is a vivid red as defined by section 11 of the publication *Colour: Universal Language and Dictionary of Names* (Special Publication 440, *National Bureau of Standards*).
- 4.2.5.5 Test Procedures – are as follows:
- The tests in 4.2.5.1 and 4.2.5.2 above shall be conducted in clear conditions with a minimum of wind deflection.
 - The tests in 4.2.5.3 and 4.2.5.4 above shall be conducted by a suitable laboratory using a non-reflective chamber and a suitably calibrated photometer of an acceptable standard.

4.3 TESTS FOR HAND SMOKE SIGNAL

4.3.1 Testing requirements for hand smoke signals

Information note

Testing requirements for hand smoke signal are those for a hand orange smoke distress signal that are set out in subpart 160.037 (except paragraphs 160.037–5 and 160.037–7) of Title 46 chapter I of the *Code of Federal Regulations* of the United States.

5 LIFERAFTS

5.1 TESTS FOR INFLATABLE AND RIGID LIFERAFTS

5.1.1 Testing requirements for liferaft

Information note

Standards for liferafts testing are in section 5 of part 1 of Resolution MSC.81(70) with the following Canadian modifications:

5.1.2 Hose assembly

- 5.1.2.1 Each complete hose assembly shall have a test pressure of 126.5 kg/cm² applied hydrostatically for a minimum duration of one (1) minute.
- 5.1.2.2 There is to be no leakage from the hose or end fitting of the assembly after the test.

Information note

A certificate from the manufacturer of the hydraulic hose attesting to these requirements is acceptable.

5.1.3 Canadian modifications applicable to rigid liferafts

5.1.3.1 Buoyancy material test

Buoyancy material of rigid liferafts is to be submitted to the Lifeboat buoyant material test of Paragraphs 6.2.2 to 6.2.7 of Resolution MSC.81(70).

5.1.4 Canadian modifications applicable to inflatable rescue platform

- 5.1.4.1 The tests prescribed in paragraphs 5.17.3, 5.17.4, 5.17.5 and 5.17.6 of Part 1 of Resolution MSC.81(70), are replaced by an inflation test at a temperature of 0°C as follows;
- The packed platform complete with its equipment is to be placed into a cold chamber for a period time sufficient for the core of the platform to reach a temperature of 0°C; and,
 - Upon attaining such a temperature, the platform is to be inflated by pulling the painter either:
 - Within the cold chamber; or,
 - within a period of 5 minutes after removal from the cold chamber .
- 5.1.4.2 The device shall begin to inflate and reach its nominal pressure within a period of 3 minutes, from pulling the painter, and upon completion of inflation, there shall be no seam slippage, cracking or other defect in the platform and it shall be in all respects ready for use upon completion of inflation.

5.2 TESTS FOR OPEN REVERSIBLE LIFERAFTS

Information note

Tests for open reversible liferafts intended for high-speed craft, are in annex 11 of the *International Code of Safety for High-Speed Craft, 2000 (2000 HSC Code)*, Resolution MSC.97(73), as amended.

5.3 TESTS FOR COASTAL LIFERAFT

5.3.1 Drop test

- 5.3.1.1 Each size of liferaft is to be subjected to a drop test as follows:
- The liferaft in the operationally packed condition is to be suspended and dropped from a height of 5 m into the water;
 - If the liferaft is to be stowed at a height greater than 5 m, it shall be dropped from the height at which it is to be stowed;
 - During the drop test the free end of the painter is to be attached to the point of suspension, so that it pays out as the liferaft drops.
- 5.3.1.2 Upon completion of the drop the liferaft in its operationally packed condition is to be left floating for at least 30 min.
- 5.3.1.3 After the 30 minute period as 5.3.1.2, the raft shall be inflated by the pulling of the painter and shall:
- Inflate upright;
 - Inflate in the time period specified under 5.4.2 of this Standard; and,
 - Upon completion of inflation, be removed from the water and subjected to a thorough inspection, including the container, for damage as per 5.3.1.4.
- 5.3.1.4 Damage to the liferaft container, if the liferaft is normally within it when launched, is acceptable if damage to any item of equipment does not affect the operational efficiency.

5.3.2 Jump test

- 5.3.2.1 It shall be demonstrated that a person can jump into the liferaft from a height of at least 4 metres above the floor of the liferaft without damage to it.
- 5.3.2.2 The test subject is to weigh not less than 75 kg and be wearing hard bottom shoes with smooth soles and no protruding nails.
- 5.3.2.3 The number of jumps performed shall be equal to the total number of persons which the liferaft is to accommodate.

5.3.3 Towing test

- 5.3.3.1 It shall be demonstrated that the fully laden liferaft is capable of being towed at a speed of 3 knots in calm water for at least 1 km. Towing should be by a line attached to the liferaft's towing connection with the sea anchor streamed.

5.3.4 Mooring out tests

- 5.3.4.1 The liferaft shall be loaded with mass equal to the mass of the total number of persons which it is to carry and its equipment and moored in a location at sea or in a seawater harbour.
- 5.3.4.2 The liferaft shall remain afloat for a period of not less than 15 days. The pressure may be topped up once a day using the manual pump or bellows; however, within any 24-hour period the liferaft must retain its shape.
- 5.3.4.3 Upon completion of the mooring out period, the liferaft is to not have sustained any damage that would impair its performance.

5.3.4.4 Upon completion of this test, an inflatable liferaft is to be subjected to the pressure test prescribed under 5.4.5 of this Standard.

5.3.5 Painter system test

5.3.5.1 The line used as a painter for a liferaft shall be tensile tested and have a breaking strength of not less than 7.5 kN.

5.3.5.2 The weak link used in the liferaft painter system shall be tensile tested and have a breaking strength of 2.2 kN (± 0.4 kN).

5.3.6 Lighting system test

5.3.6.1 Testing and evaluation standards for coastal liferaft canopy lights and interior liferaft lights are in section 10 of part 1 of annex 6 to International Marine Organization Resolution MSC.81(70).

5.3.7 Loading and seating test

5.3.7.1 The freeboard of the liferaft in the light condition, including full equipment but not personnel, is to be recorded prior to this test.

5.3.7.2 The freeboard of the liferaft is to be recorded, with the complement, having an average mass of 75 kg and each wearing a marine anti-exposure work suit that meets the requirements set out in CGSB standard, CAN/CGSB-65.21-M89, on board and seated.

5.3.7.3 It shall be established that all the seated persons, as specified under 5.3.7.2, have space and headroom, and it shall be demonstrated that the various items of equipment can be used within the liferaft in this condition.

5.3.7.4 The freeboard of the liferaft on an even keel is to be not less than 300 mm when loaded with the complement, and equipment.

5.3.8 Boarding test

5.3.8.1 The boarding test shall be carried out in a swimming pool by a team of not less than four (4) persons, who should be of mature age, of differing physiques. At least one subject is to be less than 75 kg.

5.3.8.2 For this test, persons described in 5.3.8.1 shall be clothed in shirt and trousers or a coverall and wearing a marine anti-exposure work suit that meets the requirements set out in CGSB Standard, CAN/CGSB-65.21-M89.

5.3.8.3 Prior to boarding the liferaft, each person shall swim 100 m and upon reaching the liferaft, attempt to board it immediately.

5.3.8.4 Each person shall attempt to board the liferaft individually with no assistance from the other swimmers or persons already on board. The water should be of sufficient depth to prevent any external assistance when boarding.

5.3.8.5 Liferaft boarding arrangements shall be considered satisfactory if three of the four persons board the liferaft unaided and the fourth boards with the assistance of the others.

5.3.9 Stability test

5.3.9.1 A floating liferaft is to be boarded by the complement who sits on one side and then one end, if the liferaft is other than circular in shape, and in each case, there shall be positive freeboard from the waterline to the top surface of the uppermost main buoyancy tube at its lowest point.

5.3.9.2 The stability of a liferaft is to be determined as follows:

- a. two persons each wearing an anti-exposure work suit shall board the empty liferaft;
- b. it shall then be demonstrated that the two persons can assist from the water a third person, also wearing an anti-exposure work suit, who feigns unconsciousness;
- c. The third person shall have his or her back towards the liferaft so that he or she cannot assist the rescuers.

5.3.9.3 In this test it is to be demonstrated that the water pockets of the liferaft counteract the upsetting movement on the liferaft, and that there is no danger of the life raft capsizing.

5.3.10 Manoeuvrability test

5.3.10.1 It is to be demonstrated that the liferaft when loaded with its complement and equipment is capable of being propelled, in calm conditions, a distance of over 25 m, with the paddles provided as part of the standard equipment.

5.3.11 Swamp test

5.3.11.1 It is to be demonstrated that the liferaft, when in a fully swamped condition, is capable of supporting the number of persons it is to accommodate and remain seaworthy.

5.3.11.2 The raft shall not deform when loaded and fully swamped.

5.3.11.3 This test is to be carried out in at least 10 waves of at least 0.3m high. Waves may be produced by the wake of a boat or other suitable means.

5.3.12 Canopy closure test

5.3.12.1 To ensure the effectiveness of the canopy closures to prevent water entering the liferaft, a hose test, or other equally effective method is to be undertaken.

5.3.12.2 As a result of this test there shall be no accumulation of water inside the liferaft.

5.3.13 Wind tunnel test

5.3.13.1 The liferaft, in its packed condition with entrances open but without container, is to be inflated in a wind velocity of 30 m/s and left in this condition for not less than 10 minutes. When necessary, securely lash the raft down in place during this test.

5.3.13.2 During the conditions in 5.3.13.1 above, the liferaft shall be rotated 30° to left and right of the start position; and return to the starting position where it shall be inspected for damage as per 5.3.13.4 of this publication.

- 5.3.13.3 The liferaft shall again be subjected to the wind conditions as per 5.3.13.1 above for not less than 5 minutes in each of the following conditions:
- a. With the entrance to the wind open and the other entrances closed, if there is more than one entrance;
 - b. With the entrance to the wind closed and the other entrances open, if there is more than one entrance; and
 - c. With all entrances closed.
- 5.3.13.4 On completion there shall be no detachment of the arch support or canopy from the upper buoyancy tube or other damage, which affects the function of the raft.

5.3.14 Damage test

- 5.3.14.1 It shall be demonstrated that, in the event of any one of the buoyancy compartments being damaged or failing to inflate, the intact compartment or compartments support with positive freeboard over the liferaft's periphery, the complement seated in their positions, or an equally distributed mass.

5.3.15 Righting test

- 5.3.15.1 For this test, an inflated liferaft loaded with its equipment pack, is to be inverted in the water.
- 5.3.15.2 All entrances, ports, and other openings in the liferaft canopy are to be opened in order to allow the infiltration of water into the canopy when capsized.
- 5.3.15.3 The canopy shall be allowed to fill completely with water, if necessary, by partially collapsing the canopy support. Unless the raft is self-righting, it is to remain in this condition for not less than 10 minutes before righting is attempted.
- 5.3.15.4 The righting test shall be carried out by the same team as required for the boarding test, similarly clothed and wearing marine anti-exposure work suits that meets the requirements set out in CGSB Standard, CAN/CGSB-65.21-M89 as prescribed in 5.3.8 of this Standard document.
- 5.3.15.5 Each person shall attempt to right the liferaft unaided.
- 5.3.15.6 The water should be of sufficient depth to give no external assistance to the swimmers when mounting the inverted liferaft.
- 5.3.15.7 The righting arrangement shall be considered satisfactory if each person rights the liferaft unaided and there is no damage to the structure of the inflatable liferaft and the equipment pack remains secured in place.
- 5.3.15.8 A liferaft which can demonstrate that it will right itself when inflated upside down may dispense with the requirements of the righting test.

5.4 TESTS FOR COASTAL LIFERAFT INFLATION SYSTEM

5.4.1 Inflation test

- 5.4.1.1 A liferaft, packed in each type of container, shall be inflated by pulling the painter and the times recorded for each of the following steps:
- a. For the liferaft to become boardable, that is with buoyancy tubes inflated to full shape and diameter;
 - b. For the liferaft cover to be erect; and,

- c. For the liferaft to reach its nominal pressure when tested at;
 - i. Ambient temperature between 18°C and 20°C;
 - ii. A core temperature of -10°C; and,
 - iii. A temperature of +35°C.

5.4.2 Ambient inflation (18°- 20°C) test

- 5.4.2.1 The liferaft shall achieve total inflation in not more than 1 minute when inflated in an ambient temperature between 18 and 20°C.

5.4.3 Cold inflation (-10°C) test

- 5.4.3.1 The liferaft shall be subjected to an inflation test at a temperature of -10°C as follows:
 - a. The packed liferaft complete with its equipment shall be placed into a cold chamber for a period sufficient for the core of the packed life raft to reach a temperature of -10°C; and,
 - b. Upon attaining a core temperature of -10°C, the liferaft may be:
 - i. Inflated within the cold chamber; or,
 - ii. Removed from the cold chamber and inflated within a period of 5 minutes after removal by pulling the painter.
- 5.4.3.2 The liferaft shall begin to inflate and reaches its nominal pressure within a period of 3 minutes after pulling the painter; upon completion of inflation there shall be no seam slippage, cracking or other defects in the liferaft, and it shall be in all respects ready for use upon completion of inflation.

5.4.4 Hot inflation (+35°C) test

- 5.4.4.1 For the inflation test at +35°C, the packed liferaft shall be placed in a heating chamber at a temperature of +35°C for not less than 7 hours. Upon removal from the heating chamber the liferaft shall be immediately inflated by pulling the painter.
- 5.4.4.2 The liferaft shall begin to inflate and reaches its nominal pressure within a period of 1 minute from pulling the painter, and upon completion of inflation, there shall be no seam slippage, cracking, swelling or other defects, and the liferaft shall be in all respects ready for use upon completion of inflation.
- 5.4.4.3 Upon inflation, the gas pressure relief valves must be of sufficient capacity to prevent damage to the liferaft by excess pressure.

5.4.5 Pressure test

- 5.4.5.1 Each inflatable compartment in the liferaft shall be tested to a pressure equal to 3 times the nominal pressure, and upon completion, there shall be no evidence of seam slippage, cracking or other defects in the liferaft.
- 5.4.5.2 The pressure relief valves shall be tested to show that the pressure inside the inflated chambers of the liferaft cannot reach twice the nominal pressure of the liferaft, and upon completion, there shall be no evidence of seam slippage, cracking or other defects in the liferaft.

5.4.6 Hose assembly test

- 5.4.6.1 Each complete hose assembly shall have a test pressure of 126.5 kg/cm^2 applied hydrostatically for a minimum duration of one (1) minute.
- 5.4.6.2 There shall be no leakage from the hose or end fitting of the assembly after the test.
- 5.4.6.3 Upon completion of the test, each hose shall be:
- a. dried by blowing air through it; and,
 - b. checked for length.

Information note

A certificate from the manufacturer of the hydraulic hose attesting to these requirements is acceptable.

6 LIFEBOATS

Reserved

Information note

Refer to the *Life Saving Equipment Regulations* Part III entitled *Operational Requirements and Equipment Standards* and particular attention should be given to the following Sections: 114, 115, 117, 140, 141, 143 and 144. Refer to Column II of the Table in Section 121 for the appropriate testing standard.

7 RESCUE BOATS AND FAST RESCUE BOATS

Reserved

Information note

Refer to the *Life Saving Equipment Regulations* Part III entitled *Operational Requirements and Equipment Standards* and particular attention should be given to the following Sections: 114, 115, 117, 140, 141, 143 and 148. Refer to Column II of the Table in Section 121 for the appropriate testing standard.

8 LAUNCHING AND EMBARKATION APPLIANCES

Reserved

Information note

Refer to the *Life Saving Equipment Regulations* Part III entitled *Operational Requirements and Equipment Standards* and particular attention should be given to the following Sections: 114, 115, 117, 129, 140, 141 and 143.

9 LINE THROWING APPLIANCES

Reserved

Information note

Refer to the *Life Saving Equipment Regulations* Part III entitled *Operational Requirements and Equipment Standards* and particular attention should be given to the following Sections: 114, 115, 117. Refer to Column II of the Table in Section 121 for the appropriate testing standard.

10 POSITION-INDICATING LIGHTS FOR LIFE- SAVING APPLIANCES

10.1 TESTS FOR POSITION-INDICATING LIGHTS

Information note

Standards for Position-indicating lights for life-saving appliances are in Section 10 of Part 1 of Resolution MSC.81(70), as amended

11 HYDROSTATIC RELEASE UNITS

11.1 TESTS FOR HYDROSTATIC RELEASE UNITS

Information note

Standards for hydrostatic release units are in Section 11 of Part 1 of Resolution MSC.81(70), as amended.

12 MARINE EVACUATION SYSTEMS

Reserved

13 SEARCHLIGHTS FOR LIFEBOAT AND RESCUE BOAT

Reserved

14 OTHER LIFE-SAVING APPLIANCES

14.1 TESTS FOR BUOYANT APPARATUS

Information note

Standards for buoyant apparatus testing are in subpart 160.010 of title 46, volume 6, of the *Code of Federal Regulations* of the United States, as amended.

14.2 TESTS FOR EMERGENCY BOATS

15 MARKING

15.1 INDELIBILITY AND LANGUAGE OF MARKING

15.1.1 Rubbing test

15.1.1.1 Markings are considered indelible if they remain legible after the following test:

- a. Submerge a well-cured sample in fresh water for not less than 72 hours. Remove the sample from water and place it, with its face up, on a hard surface. Rub vigorously with the fingers for not less than 30 seconds.

15.1.2 Language of marking

15.1.2.1 Marking required by paragraphs 1.2.2.9, 1.2.3, 4.2.6.3, 4.2.7.1 and 4.3.6 of chapter I of the *LSA Code* is to be in both English and French.

15.1.2.2 Instructions, information, information manual and markings referred in this Standard are to be in both English and French.

