

SCHEDULE 4

Regulations 2(3), 5, 6, 7(3), 7(4), 8 and 9

LIFERAFTS

PART I

INFLATABLE LIFERAFTS

(SOLAS)

**General**

**1.**

**1.1.** All inflatable liferafts prescribed in this Part shall:

(1.1.1) be constructed with proper workmanship and materials;

(1.1.2) not be damaged in stowing throughout the air temperature range of  $-30^{\circ}\text{C}$  to  $+65^{\circ}\text{C}$ ;

(1.1.3) be capable of operating throughout an air temperature range of  $-30^{\circ}\text{C}$  to  $+65^{\circ}\text{C}$ , and a sea water temperature range of  $-1^{\circ}\text{C}$  to  $+30^{\circ}\text{C}$ ;

(1.1.4) be rot-proof, corrosion-resistant, and not be unduly affected by sea-water, oil or fungal attack;

(1.1.5) be resistant to deterioration from exposure to sunlight;

(1.1.6) have a canopy of a highly visible colour;

(1.1.7) be fitted with retro-reflective material where this will assist in detection and the dimensions and location of the material shall be to the satisfaction of the Secretary of State; and

(1.1.8) when fully inflated and floating with the canopy uppermost be stable in a seaway.

**Construction**

**2.**

**2.1.** Every liferaft shall be so constructed as to be capable of withstanding exposure for 30 days afloat in all sea conditions without such deterioration as would involve any loss of seaworthiness.

**2.2.** The liferaft shall be so constructed that when it is dropped into the water in its container from a height of 18 metres, the liferaft and its equipment will operate satisfactorily. If the liferaft is to be stowed at a height of more than 18 metres above the waterline in the lightest seagoing condition, it shall be of a type which has been satisfactorily drop-tested from at least that height.

**2.3.** The floating liferaft shall be capable of withstanding repeated jumps on to it from a height of at least 4.5 metres above its floor both with and without the canopy erected.

**2.4.** The liferaft and its fittings shall be so constructed as to enable it to be towed at a speed of 3 knots in calm water when loaded with its full complement of persons and equipment and with one of its sea-anchors streamed.

**2.5.** The liferaft shall have a canopy to protect the occupants from exposure which is automatically set in place when the liferaft is launched and waterborne. The canopy shall comply with the following:

(2.5.1) it shall provide insulation against heat and cold by means of either two layers of material separated by an air gap or other equally efficient means; means shall be provided to prevent accumulation of water in the air gap;;

(2.5.2) its interior shall be of a colour that does not cause discomfort to the occupants;

(2.5.3) each entrance shall be clearly indicated and be provided with efficient adjustable closing arrangements which can be easily and quickly opened from inside and outside the liferaft so as to permit ventilation but exclude seawater, wind and cold; liferafts accommodating more than eight persons shall have at least two diametrically opposite entrances;

(2.5.4) it shall admit sufficient air for the occupants at all times, even with the entrances closed;

(2.5.5) it shall be provided with at least one viewing port in liferafts accommodating up to 25 persons and at least two diametrically opposite viewing ports in liferafts accommodat ing more than 25 persons;

(2.5.6) it shall be provided with means of collecting rain water;

(2.5.7) it shall have sufficient headroom for seated occupants under all parts of the canopy.

**2.6.** The main buoyancy chamber shall be divided into:

(2.6.1) not less than two separate compartments, each inflated through a non-return inflation valve on each compartment;

(2.6.2) the buoyancy chambers shall be so arranged that in the event of one of the compartments being damaged or failing to inflate, the intact compartment shall be able to support, with positive freeboard over the liferaft's entire periphery, the number of persons which the liferaft is permitted to accommodate, each having a mass of 75 kg., and seated in their normal positions.

**2.7.** The floor of the liferaft shall be waterproof and shall be capable of being sufficiently insulated against cold either:

(2.7.1) by means of one or more compartments that the occupants can inflate, or which inflate automatically and can be deflated and reinflated by the occupants; or

(2.7.2) by other equally efficient means not dependent on inflation.

**2.8.** The liferaft shall be inflated with a non-toxic gas by an inflation system complying with the requirements of Part VIII of Schedule 4. Inflation shall be completed within a period of 1 minute at an ambient temperature of between 18°C and 20°C and within a period of 3 minutes at an ambient temperature of -30°C. After inflation the liferaft shall maintain its form when loaded with its full complement of persons and equipment.

**2.9.** Each inflatable compartment shall be capable of withstanding a pressure equal to at least 3 times the working pressure and shall be prevented from reaching a pressure exceeding twice the working pressure either by means of relief valves or by a limited gas supply. Means shall be provided for fitting the topping-up pump or bellows required by Part IV of Schedule 4 so that the working pressure can be maintained.

**2.10.** The number of persons which a liferaft shall be permitted to accommodate shall be equal to the lesser of:

(2.10.1) the greatest whole number obtained by dividing by 0.096 the volume, measured in cubic metres of the main buoyancy tubes (which for this purpose shall include neither the arches nor the thwarts if fitted) when inflated; or

(2.10.2) the greatest whole number obtained by dividing by 0.372 the inner horizontal cross-sectional area of the liferaft measured in square metres (which for this purpose may include the thwart or thwarts, if fitted) measured to the innermost edge of the buoyancy tubes; or

(2.10.3) the number of persons having an average mass of 75 kg., all wearing lifejackets, that can be seated with sufficient comfort and headroom without interfering with the operation of any of the liferaft's equipment.

**2.11.** No liferaft shall be approved which has a carrying capacity of less than six persons calculated in accordance with the requirements of paragraph 2.10.

**2.12.** Unless the liferaft is to be launched by an approved launching appliance complying with the requirements of Part III of Schedule 6 and not required to be portable, the total mass of the liferaft, its container and its equipment shall not be more than 185 kg.

### **Liferaft Fittings**

#### **3.**

**3.1.** Liferafts shall be securely becketed around the inside and outside of the liferaft.

**3.2.** The liferaft shall be provided with arrangements for adequately siting and securing in the operating position the antenna provided with the portable radio apparatus where this is to be carried.

**3.3.** The liferaft shall be fitted with an efficient painter of length equal to not less than twice the distance from the stowed position to the waterline in the lightest seagoing condition or 15 metres whichever is the greater.

**3.4.** The breaking strength of the painter system including its means of attachment to the liferaft except the weak link required by Part VI of Schedule 4 shall be:

(3.4.1) 7.5 kilonewtons for liferafts accommodating up to 8 persons;

(3.4.2) 10.0 kilonewtons for liferafts accommodating 9 to 25 persons;

(3.4.3) 15.0 kilonewtons for liferafts accommodating more than 25 persons or have a factor of safety of 3 in association with the requirement of paragraph 2.4 above whichever is the greater.

**3.5.** At least one entrance shall be fitted with a semi-rigid boarding ramp to enable persons to board the liferaft from the sea so arranged as to prevent significant deflation of the liferaft if the ramp is damaged. Liferafts accommodating more than 25 persons shall have at least two diametrically opposite entrances fitted with semi-rigid boarding ramps. In the case of davit-launched liferafts a boarding ramp shall not be fitted at the entrance where bowsing lines and embarkation facilities are fitted.

**3.6.** Entrances not provided with a boarding ramp shall have a boarding ladder, the lowest step of which shall be weighted and float at a level not less than 0.4 metres below the liferaft's light waterline.

**3.7.** There shall be means inside the liferaft to assist persons to pull themselves into the liferaft from the ladder.

**3.8.** The stability of liferafts capable of carrying 25 persons or less when in the inverted position shall be such that they can be righted in a seaway and in calm water by one person. Liferafts in excess of 25 persons capacity shall have righting facilities acceptable to the Department of Transport. The righting position of the liferaft shall be suitably marked and have a non-skid surface.

**3.9.** The stability of the liferaft when loaded with its full complement of persons and equipment shall be such that it can be towed at speeds of up to 3 knots in calm water.

(3.10.1) The liferaft shall be fitted with water pockets complying with the following requirements:

(3.10.1.1) The cross-sectional area of the pockets shall be in the shape of an isosceles triangle with the base of the triangle attached to the underside of the liferaft;

(3.10.1.2) The design shall be such that the pockets fill to approximately 60% of capacity within 15–25 seconds of deployment;

(3.10.1.3) The pockets shall normally have an aggregate capacity of between 225 litres and 250 litres for inflatable liferafts up to and including the 10 person size;

(3.10.1.4) The pockets to be fitted on liferafts certified to carry more than 10 persons shall have an aggregate capacity of  $(20 \times N)$  litres, where N = Number of persons carried.

- (3.10.1.5) The pockets shall be attached on all of their sides to the underside of the liferaft.
- (3.10.1.6) The pockets shall be distributed symmetrically round the circumference of the liferaft either side of the CO<sub>2</sub> bottle with sufficient separation between each pocket to enable air to escape readily. The minimum number of pockets shall normally be in the order of:

RAFT CAPACITY	NO OF POCKETS
6–8 inclusive	5
9–16 inclusive	7
17–25 inclusive	11

**3.11.** At least one manually controlled lamp complying with the requirements of Part VII of Schedule 4 shall be fitted to the top outside of the liferaft canopy.

**3.12.** A manually controlled lamp complying with the requirements of Part VII of Schedule 4 shall be fitted inside the liferaft.

**3.13.** Each inflatable liferaft shall be fitted with equipment complying with the relevant requirements of Part IV of this Schedule.

#### **Containers for inflatable liferafts**

##### **4.**

**4.1.** The liferaft shall be packed in a container that is:

- (4.1.1) so constructed as to withstand conditions encountered at sea;
- (4.1.2) of sufficient inherent buoyancy, when packed with the liferaft and its equipment, to pull the painter from within and to operate the inflation mechanism should the ship sink;
- (4.1.3) as far as practicable watertight, except for drain holes in the container bottom.

**4.2.** The liferaft shall be packed in its container in such a way as to ensure, as far as possible, that the waterborne liferaft inflates in an upright position on breaking free from its container.

**4.3.** The container shall be marked with:

- (4.3.1) maker's name or trade mark;
- (4.3.2) serial number;
- (4.3.3) DOT(UK) APPROVED, and the number of persons it is permitted to carry;
- (4.3.4) SOLAS 86;
- (4.3.5) type of emergency pack enclosed;
- (4.3.6) date when last serviced;
- (4.3.7) length of painter;
- (4.3.8) maximum permitted height of stowage above waterline (depending on drop-test height and length of painter); and
- (4.3.9) launching instructions.

#### **Markings on inflatable liferafts**

**5.** The liferaft shall be marked with:

- 5.1.** maker's name or trade mark;
- 5.2.** serial number;

- 5.3. date of manufacture (month and year);
- 5.4. DOT(UK) APPROVED;
- 5.5. name and place of servicing station where it was last serviced; and
- 5.6. number of persons it is permitted to accommodate over each entrance in characters not less than 100 mm, in height of a colour contrasting with that of the liferaft canopy.

#### **Davit-launched inflatable liferafts**

##### **6.**

**6.1.** In addition to the above requirements, a liferaft for use with an approved launching appliance complying with Part III of Schedule 6 shall:

(6.1.1) when the liferaft is loaded with its full complement of persons and equipment, be capable of withstanding a lateral impact against the ship's side at an impact velocity of not less than 3.5 metres per second and also a drop into the water from a height of not less than 3 metres without damage that will affect its function;

(6.1.2) be provided with means for bringing the liferaft alongside the embarkation deck and holding it securely during embarkation. The distance between the liferaft and the bowing line securing point shall be kept to a minimum to restrict movement of the liferaft during boarding;

(6.1.3) when suspended from its lifting hook or bridle withstand a load of:

(6.1.3.1) 4 times the mass of its full complement of persons and equipment, at an ambient temperature and a stabilised liferaft temperature of  $20 \pm 3^{\circ}\text{C}$  with all relief valves inoperative; and

(6.1.3.2) 1.1 times the mass of its full complement of persons and equipment at an ambient temperature and a stabilised liferaft temperature of  $-30^{\circ}\text{C}$  with all relief valves operative.

**6.2.** Rigid containers for liferafts to be launched by a launching appliance shall be so secured that the container or parts of it are prevented from falling into the sea during inflation and launching of the liferaft.

**6.3.** Every davit-launched liferaft shall be so arranged that it can be rapidly boarded by its full complement of persons.

#### **Instructions and Information**

##### **7.**

**7.1.** Instructions and information required for inclusion in the training manual specified in Part I of Schedule 11, and in the instructions for on-board maintenance specified in Part II of Schedule 11 shall be in a form suitable for inclusion in such training manual and instructions for on-board maintenance. Instructions and information shall be in English in a clear and concise form and shall include as appropriate the following:

- (7.1.1) general description of the liferaft and its equipment;
- (7.1.2) installation arrangements;
- (7.1.3) operational instructions including use of associated survival equipment;
- (7.1.4) survival instructions;
- (7.1.5) emergency repair instructions;
- (7.1.6) deployment, boarding and launching instructions;
- (7.1.7) method of launching from within the raft;

- (7.1.8) release from launching appliance;
  - (7.1.9) on board maintenance requirements; and
  - (7.1.10) servicing requirements.
- Regulations 2(3), 5, 6, 7(3), 7(4), 8 and 9

## PART II

### OPEN REVERSIBLE LIFERAFTS

#### General

**1.**

**1.1.** All liferafts shall:

- (1.1.1) be constructed with proper workmanship and materials;
- (1.1.2) not be damaged in stowage throughout the air temperature range of  $-18^{\circ}\text{C}$  to  $+65^{\circ}\text{C}$ ;
- (1.1.3) be capable of operating throughout an air temperature range of  $-18^{\circ}\text{C}$  to  $+65^{\circ}\text{C}$ , and a sea water temperature range of  $-1^{\circ}\text{C}$  to  $+30^{\circ}\text{C}$ ;
- (1.1.4) be rot-proof, corrosion-resistant, and not be unduly affected by sea-water, oil or fungal attack; and
- (1.1.5) be stable and maintain their shape when inflated and fully laden.

#### Construction

**2.**

**2.1.** The liferaft shall be so constructed that when it is dropped into the water in its container from a height of 10 metres, the liferaft and its equipment will operate satisfactorily. If the liferaft is to be stowed at a height of more than 10 metres above the waterline in the lightest seagoing condition, it shall be of a type which has been satisfactorily drop-tested from at least that height.

**2.2.** The floating liferaft shall be capable of withstanding repeated jumps on to it from a height of at least 4.5 metres.

**2.3.** The liferaft and its fittings shall be so constructed as to enable it to be towed at a speed of 3 knots in calm water when loaded with its full complement of persons and equipment, with the sea anchor deployed.

**2.4.** The liferaft when fully inflated shall be capable of being boarded from the water whichever way up it inflates.

**2.5.** The main buoyancy chamber shall be divided into:

(2.5.1) not less than two separate compartments, each inflated through a non-return inflation valve on each compartment; and

(2.5.2) the buoyancy chambers shall be so arranged that in the event of one of the compartments, being damaged or failing to inflate, the intact compartment, shall be able to support, with positive freeboard over the liferaft's entire periphery, the number of persons which the liferaft is permitted to accommodate, each having a mass of 75 kg, and seated in their normal positions.

**2.6.** The floor of the liferaft shall be waterproof.

**2.7.** The liferaft shall be inflated with a non-toxic gas by an inflation system complying with the requirements of Part VIII of Schedule 4. Inflation shall be completed within the period of 1 minute

at an ambient temperature of between 18°C and 20°C and within a period of 3 minutes at an ambient temperature of –18°C. After inflation the liferaft shall maintain its form when loaded with its full complement of persons and equipment.

**2.8.** Each inflatable compartment shall be capable of withstanding a pressure equal to at least 3 times the working pressure and shall be prevented from reaching a pressure exceeding twice the working pressure either by means of relief valves or by a limited gas supply. Means shall be provided for fitting the topping-up pump or bellows.

**2.9.** The buoyancy tubes are to be of a highly visible colour or at least 25 percent of these tubes to be of a highly visible colour. In respect of the latter it will be acceptable for the water pockets required by paragraph 3.5 to be manufactured in a highly visible colour.

**2.10.** The number of persons which a liferaft shall be permitted to accommodate shall be equal to the lesser of:

(2.10.1) the greatest whole number obtained by dividing by 0.075 the volume, measured in cubic metres of the main buoyancy tubes (which for this purpose shall not include the thwarts if fitted) when inflated; or

(2.10.2) the greatest whole number obtained by dividing by 0.304 the inner horizontal cross-sectional area of the liferaft measured in square metres (which for this purpose may include the thwart or thwarts, if fitted) measured to the innermost edge of the buoyancy tubes; or

(2.10.3) the number of persons having an average mass of 75 kg, all wearing lifejackets, that can be seated inboard of the buoyancy tubes without interfering with the operation of any of the liferaft's equipment.

**2.11.** No liferaft shall be approved with a carrying capacity of less than 4 or greater than 65 persons calculated or determined in accordance with the requirements of paragraph 2.10.

### **Liferaft Fittings**

#### **3.**

**3.1.** Lifelines shall be securely becketed around the inside and outside of the liferaft.

**3.2.** The liferaft shall be fitted with an efficient painter of a length suitable for automatic inflation on reaching the water. For liferafts accommodating more than 30 persons an additional bowsing-in line is to be fitted.

**3.3.** The breaking strength of the painter system including its means of attachment to the liferaft except the weak link required by Part VI of Schedule 4 shall be:

(3.3.1) 7.5 kilonewtons for liferafts accommodating up to 8 persons,

(3.3.2) 10.0 kilonewtons for liferafts accommodating 9 to 30 persons, and

(3.3.3) 15.0 kilonewtons for liferafts accommodating more than 30 persons.

**3.4.** The liferaft shall be fitted with at least the following number of inflated ramps to assist boarding from the sea whichever way up the raft inflates:

(3.4.1) one boarding ramp for liferafts accommodating up to 30 persons; or

(3.4.2) two boarding ramps for liferafts accommodating more than 30 persons.

**3.5.** The liferaft shall be fitted with water pockets complying with the following requirements:

(3.5.1) The cross-sectional area of the pockets shall be in the shape of an isosceles triangle with the base of the triangle attached to the underside of the liferaft;

(3.5.2) The design shall be such that the pockets fill to approximately 60% of capacity within 15–25 seconds of deployment;

(3.5.3) The pockets shall normally have aggregate capacity of between 125 litres and 150 litres for inflatable liferafts up to and including the 10 person size;

(3.5.4) The pockets to be fitted on liferafts certified to carry more than 10 persons shall have as far as practicable an aggregate capacity of  $(12 \times N)$  litres, where N = Number of persons carried;

(3.5.5) The pockets shall be attached on all their sides to each of the upper and lower surfaces of the buoyancy tubes; and

(3.5.6) The pockets shall be distributed symmetrically round the circumference of the liferaft with sufficient separation between each pocket to enable air to escape readily.

**3.6.** At least one manually controlled lamp complying with the requirements of Part VII of Schedule 4 shall be fitted on the upper and lower surfaces of the buoyancy tubes.

**3.7.** Suitable automatic drain arrangements are to be provided on each side of the floor of the liferaft in the following manner:

- (i) one for liferafts accommodating up to 30 persons; or
- (ii) two for liferafts accommodating more than 30 persons.

**3.8.** The equipment of every liferaft shall consist of:

(3.8.1) one buoyant rescue quoit, attached to not less than 30 metres of buoyant line with a breaking strain of at least 1.0 kN;

(3.8.2) two safety knives of the non-folding type having a buoyant handle and stowed in a pocket on the upper buoyancy tube adjacent to the painter and secured to the liferaft by a light line of sufficient length to enable the painter to be readily cut;

(3.8.3) one buoyant bailer;

(3.8.4) two sponges;

(3.8.5) one sea-anchor complying with the requirements of Part I of Schedule 7, and permanently attached to the liferaft in such a way as to be readily deployable when the liferaft inflates;

(3.8.6) two buoyant paddles;

(3.8.7) one first-aid outfit complying with the requirements of Part II of Schedule 7, in a waterproof case capable of being closed tightly after use;

(3.8.8) one whistle or equivalent sound signal;

(3.8.9) two hand flares;

(3.8.10) one waterproof electric torch suitable for Morse signalling together with one spare set of batteries and one spare bulb in a waterproof container;

(3.8.11) one repair outfit for repairing punctures in buoyancy compartments; and

(3.8.12) one topping-up pump or bellows.

**3.9.** Liferafts equipped in accordance with paragraph 3.8 be marked in block capitals "DOT (UK)E PACK".

**3.10.** Where appropriate the equipment shall be stowed in a container which, if it is not an integral part of, or permanently attached to the liferaft, shall be stowed and secured to the liferaft and be capable of floating in water for at least 30 minutes without damage to its contents. The line which secures the equipment container to the liferaft shall have a breaking strain of 2 kN or a breaking strain of 3:1 based on the mass of the complete equipment pack, whichever is the greater.

#### **Containers for open reversible inflatable liferafts**

#### **4.**

- 4.1.** The liferaft shall be packed in a container that is:
- (4.1.1) so constructed as to withstand conditions encountered at sea;
  - (4.1.2) of sufficient inherent buoyancy, when packed with the liferaft and its equipment, to pull the painter from within and to operate the inflation mechanism should the ship sink; and
  - (4.1.3) as far as practicable watertight, except for drain holes in the container bottom.
- 4.2.** The container shall be marked with:
- (4.2.1) maker's name or trade mark;
  - (4.2.2) serial number;
  - (4.2.3) DOT(UK) APPROVED, and the number of persons it is permitted to carry;
  - (4.2.4) Non-SOLAS REVERSIBLE;
  - (4.2.5) type of emergency pack enclosed;
  - (4.2.6) date when last serviced;
  - (4.2.7) length of painter;
  - (4.2.8) maximum permitted height of stowage above waterline (depending on drop-test height); and
  - (4.2.9) launching instructions.

#### **Markings on open reversible inflatable liferafts**

##### **5.**

- 5.1.** The liferaft shall be marked with:
- (5.1.1) maker's name or trade mark;
  - (5.1.2) serial number;
  - (5.1.3) date of manufacture (month and year);
  - (5.1.4) .DOT(UK) APPROVED;
  - (5.1.5) name and place of service station where it was last serviced; and
  - (5.1.6) number of persons it is permitted to accommodate on the top of each buoyancy tube in characters not less than 100 mm in height and of a colour contrasting with that of the tube.

#### **Instructions and Information**

##### **6.**

**6.1.** Instructions and information required for inclusion in the training manual specified in paragraph 7 of Part I of Schedule 4; and in the instructions for onboard maintenance specified in Part II of Schedule 11 shall be in a form suitable for inclusion in such training manual and instructions for onboard maintenance. Instructions and information shall be in English in a clear and concise form and shall include as appropriate the following:

- (6.1.1) general description of the liferaft and its equipment;
  - (6.1.2) installation arrangements;
  - (6.1.3) operational instructions including use of associated survival equipment;
  - (6.1.4) launching, deployment and boarding instructions; and
  - (6.1.5) servicing requirements.
- Regulation 2(3)

## PART III

### RIGID LIFERAFTS

#### General

##### 1.

1.1. All rigid liferafts prescribed in this Part shall:

- (1.1.1) be constructed with proper workmanship and materials;
- (1.1.2) not be damaged in stowage throughout the air temperature range of  $-30^{\circ}\text{C}$  to  $65^{\circ}\text{C}$ ;
- (1.1.3) be capable of operating throughout an air temperature range of  $-30^{\circ}\text{C}$  to  $+65^{\circ}\text{C}$ , and a sea water temperature range of  $-1^{\circ}\text{C}$  to  $+30^{\circ}\text{C}$ ;
- (1.1.4) be rot-proof, corrosion-resistant, and not be unduly affected by sea-water, oil or fungal attack;
- (1.1.5) be resistant to deterioration from exposure to sunlight;
- (1.1.6) have a canopy of a highly visible colour;
- (1.1.7) be fitted with retro-reflective material where this will assist in detection and the dimensions and location of the material shall be to the satisfaction of the Secretary of State; and
- (1.1.8) when floating with the canopy uppermost be stable in a seaway.

#### Construction

##### 2.

2.1. Every liferaft shall be so constructed as to be capable of withstanding exposure for 30 days afloat in all sea conditions without such deterioration as would involve any loss of seaworthiness.

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

2.3. The floating liferaft shall be capable of withstanding repeated jumps on to it from a height of at least 4.5 metres above its floor both with and without the canopy erected.

2.4. The liferaft and its fittings shall be so constructed as to enable it to be towed at a speed of 3 knots in calm water when loaded with its full complement of persons and equipment and with one of its sea-anchors streamed.

2.5. The liferaft shall have a canopy to protect the occupants from exposure which is automatically set in place when the liferaft is launched and waterborne. The canopy shall comply with the following:

(2.5.1) it shall provide insulation against heat and cold by means of either two layers of material separated by an air gap or other equally efficient means; means shall be provided to prevent accumulation of water in the air gap;

(2.5.2) its interior shall be of a colour that does not cause discomfort to the occupants;

(2.5.3) each entrance shall be clearly indicated and be provided with efficient adjustable closing arrangements which can be easily and quickly opened from inside and outside the liferaft so as to permit ventilation but exclude seawater, wind and cold; liferafts accommodating more than eight persons shall have at least two diametrically opposite entrances;

(2.5.4) it shall admit sufficient air for the occupants at all times, even with the entrances closed;

(2.5.5) it shall be provided with at least one viewing port;

(2.5.6) it shall be provided with means for collecting rain water; and

(2.5.7) it shall have sufficient headroom for seated occupants under all parts of the canopy.

**2.6.** The buoyancy of the liferaft shall be provided by approved inherently buoyant material placed as near as possible to the periphery of the liferaft. The buoyant material shall be fire-retardant or be protected by a fire-retardant covering.

**2.7.** The floor of the liferaft shall prevent the ingress of water and shall effectively support the occupants out of the water and insulate them from cold.

**2.8.** The number of persons which a liferaft shall be permitted to accommodate shall be equal to the lesser of:

(2.8.1) the greatest whole number obtained by dividing by 0.096 the volume, measured in cubic metres of the buoyancy material multiplied by a factor of 1 minus the specific gravity of that material; or

(2.8.2) the greatest whole number obtained by dividing by 0.372 the horizontal cross-sectional area of the floor of the liferaft measured in square metres; or

(2.8.3) the number of persons having an average mass of 75 kg, all wearing lifejackets, that can be seated with sufficient comfort and headroom without interfering with the operation of any of the liferaft's equipment.

**2.9.** No liferaft shall be approved which has a carrying capacity of less than six persons calculated in accordance with the requirements of paragraph 2.8.

**2.10.** Unless the liferaft is to be launched by an approved launching appliance complying with the requirements of Part III of Schedule 6 and is not required to be portable, the total mass of the liferaft, its container, and equipment shall not be more than 185 kg.

### **Liferaft Fittings**

#### **3.**

**3.1.** Lifelines shall be securely becketed around the inside and outside of the liferaft.

**3.2.** The liferaft shall be provided with arrangements for adequately siting and securing in the operating position the antenna provided with the portable radio apparatus where this is required to be carried.

**3.3.** The liferaft shall be fitted with an efficient painter of length equal to not less than twice the distance from the stowed position to the waterline in the lightest seagoing condition or 15 metres whichever is the greater.

**3.4.** The breaking strength of the painter system including its means of attachment to the liferaft except the weak link required by Part VI of Schedule 4 shall be:

(3.4.1) 7.5 kilonewtons for liferafts accommodating up to 8 persons;

(3.4.2) 10.0 kilonewtons for liferafts accommodating 9 to 25 persons;

(3.4.3) 15.0 kilonewtons for liferafts accommodating more than 25 persons or have a factor of safety of 3 in association with the requirement of paragraph 2.4 above whichever is the greater.

**3.5.** At least one entrance shall be fitted with a rigid boarding ramp to enable persons to board the liferaft from the sea. In the case of a davit-launched liferaft having more than one entrance, the boarding ramp shall not be fitted at the entrance where bowing lines and embarkation facilities are fitted.

**3.6.** Entrances not provided with a boarding ramp shall have a boarding ladder. The lowest step of which shall be weighted and float at a level not less than 0.4 metres below the liferaft's light waterline.

**3.7.** There shall be means inside the liferaft to assist persons to pull themselves into the liferaft from the ladder.

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

**3.9.** The stability of a liferaft when loaded with its full complement of persons and equipment shall be such that it can be towed at speeds of up to 3 knots in calm water.

**3.10.** At least one manually controlled lamp complying with the requirements of Part VII of Schedule 4 shall be fitted to the top outside of the liferaft canopy.

**3.11.** A manually controlled lamp complying with the requirements of Part VII of Schedule 4 shall be fitted inside the liferaft.

**3.12.** Each rigid liferaft shall be fitted with equipment complying with the relevant requirements of Part IV of this Schedule.

#### **Markings on rigid liferafts**

##### **4.**

**4.1.** The liferafts shall be marked with:

- (4.1.1) name and port of registry of the ship to which it belongs;
- (4.1.2) maker's name or trade mark;
- (4.1.3) serial number;
- (4.1.4) DOT(UK) APPROVED;
- (4.1.5) number of persons it is permitted to accommodate over each entrance in characters not less than 100mm. in height of a colour contrasting with that of the liferaft;
- (4.1.6) SOLAS 86;
- (4.1.7) type of emergency pack enclosed;
- (4.1.8) length of painter;
- (4.1.9) date of manufacture (month and year);
- (4.1.10) maximum permitted height of stowage above waterline (depending on drop-test height and length of painter); and
- (4.1.11) launching instructions.

#### **Davit-launched rigid liferafts**

##### **5.**

**5.1.** In addition to the above requirements, a rigid liferaft for use with an approved launching appliance complying with Part III of Schedule 6 shall:

(5.1.1) when suspended from its lifting hook or bridle, withstand a load of 4 times the mass of its full complement of persons and equipment;

(5.1.2) when the liferaft is loaded with its full complement of persons and equipment, be capable of withstanding a lateral impact against the ship's side at an impact velocity of not less than 3.5

metres per second and also a drop into the water from a height of not less than 3 metres without damage that will affect its function;

(5.1.3) be provided with means for bringing the liferaft alongside the embarkation deck and holding it securely during embarkation; the distance between the liferaft and the bowing line securing point shall be kept to a minimum to restrict movement of the liferaft during boarding.

**5.2.** Every davit-launched liferaft shall be so arranged that it can be rapidly boarded by its full complement of persons.

## **6. Instructions and Information**

**6.1.** Instructions and information required for inclusion in the training manual specified in Part I of Schedule 11, and in the instructions for on-board maintenance specified in Part II of Schedule 11 shall be in a form suitable for inclusion in such training manual and instructions for on-board maintenance. Instructions and information shall be in English in a clear and concise form and shall include the following:

- (6.1.1) general description of the liferaft and its equipment;
- (6.1.2) installation arrangements;
- (6.1.3) operational instructions including use of associated survival equipment;
- (6.1.4) survival instructions;
- (6.1.5) emergency repair instructions;
- (6.1.6) deployment, boarding and launching instructions;
- (6.1.7) method of launching from within the raft;
- (6.1.8) release from launching appliance;
- (6.1.9) on board maintenance requirements; and
- (6.1.10) servicing requirements.

Schedule 4, Parts I and III

## **PART IV LIFERAFT EQUIPMENT (SOLAS)**

**1.1.** Subject to the provisions of paragraph 1.3 of this Part, the equipment of every liferaft shall consist of:

(1.1.1) one buoyant rescue quoit, attached to not less than 30 metres of buoyant line with a breaking strain of at least 1.0 kN;

(1.1.2) one safety knife of the non-folding type having a buoyant handle and stowed in a pocket on the upper buoyancy tube near that entrance of the raft which is adjacent to the painter and must be secured to the liferaft by a light line of sufficient length to enable the painter to be readily cut; in addition, a liferaft which is permitted to accommodate 13 persons or more shall be provided with a second safety knife which need not be of the non folding type; the stowage position of the knives shall be highlighted;

(1.1.3) for a liferaft which is permitted to accommodate not more than 12 persons, one buoyant bailer; for a liferaft which is permitted to accommodate 13 persons or more, two buoyant bailers;

(1.1.4) two sponges;

- (1.1.5) two sea-anchors each complying with the requirements of Part I of Schedule 7, one being spare, and the other permanently attached to the liferaft in such a way as to be readily deployable when the liferaft inflates to enable the liferaft to lie oriented to the wind in the most stable manner;
- (1.1.6) two buoyant paddles;
- (1.1.7) one first-aid outfit complying with the requirements of Part II of Schedule 7, in a waterproof case capable of being closed tightly after use;
- (1.1.8) one whistle or equivalent sound signal;
- (1.1.9) two rocket parachute flares;
- (1.1.10) three hand flares;
- (1.1.11) one buoyant smoke signal;
- (1.1.12) one waterproof electric torch suitable for Morse signalling together with one spare set of batteries and one spare bulb in a waterproof container;
- (1.1.13) an efficient radar reflector;
- (1.1.14) one daylight signalling mirror with instructions on its use for signalling to ships and aircraft;
- (1.1.15) one copy of the Department of Transport Rescue Signal Table published by Her Majesty's Stationery Office;
- (1.1.16) six doses of anti-seasickness medicine and one seasickness bag for each person the liferaft is permitted to accommodate;
- (1.1.17) instructions printed in English on how to survive;
- (1.1.18) instructions for immediate action;
- (1.1.19) thermal protective aids sufficient for 10% of the number of persons the liferaft is permitted to accommodate or two, whichever is the greater;
- (1.1.20) one repair outfit for repairing punctures in buoyancy compartments; and
- (1.1.21) one topping-up pump or bellows

**1.2.** Liferafts equipped in accordance with paragraph 1.1 shall be marked in block capitals of the Roman alphabet, "SOLAS B PACK".

**1.3.** Liferafts carried onboard ships of Classes III, IV, V, VI and VI(A) may be provided with equipment specified in paragraph 3.8 of Part II of this Schedule.

**1.4.** Liferafts equipped in accordance with 1.3 shall be marked in block capitals of the Roman alphabet, "DOT (UK) E PACK".

**1.5.** Where appropriate the equipment shall be stowed in a container which, if it is not an integral part of, or permanently attached to, the liferaft, shall be stowed and secured inside the liferaft and be capable of floating in water for at least 30 minutes without damage to its contents. The line which secures the equipment container to the liferaft shall have a breaking strain of 2 kN or a breaking strain of 3 : 1 based on the mass of the complete equipment pack, whichever is the greater.

Schedule 6, Part IV

## PART V

### AUTOMATIC RELEASE HOOKS

#### Definitions

1.

**1.1.** In this Part the following definitions apply:

(1.1.1) “actuating force” means the force required to set the actuating mechanism;

(1.1.2) “actuating mechanism” means the mechanism which, when operated, allows the liferaft to be released automatically;

(1.1.3) “automatic release mechanism” means the mechanism which opens the hook automatically to release the liferaft;

(1.1.4) “hook” means a hook to be used for the launching of liferafts which can be activated to automatically release the liferaft when it is waterborne.

## **Functional criteria**

**2.**

**2.1.** The hook shall be reliable and easily handled by one person during the preparation, embarkation, launching and release of the liferaft.

**2.2.** The hook and its accessories shall be made of materials suitable for use in the marine environment.

**2.3.** A minimum factor of safety of six based on the ultimate strength of the materials used shall be applied to the design of all parts of the hook.

**2.4.** The lever for manual release and the actuating mechanism may be separate.

**2.5.** There shall be a clear and durable indicator to show if the actuating mechanism has been operated. The automatic release mechanism shall be such that positions between “safe” and “cocked” are not possible.

**2.6.** With the hook in the automatic release position the liferaft shall be released as soon as it is waterborne. The release of the liferaft shall be immediate and complete. Means shall be provided to ensure that the hook does not open when the liferaft swings, bumps into the ship’s side or is otherwise influenced by the wind during the lowering operation.

**2.7.** It shall be possible to release the hook manually after launching. The manual release mechanism shall be designed having regard to the risk of unintentional release during the preparation, embarkation and lowering of the liferaft.

## **Compatibility**

**3.**

**3.1.** The compatibility of automatic release hooks and inflatable liferafts shall be established by operational tests with each type, size and manufacture of liferaft to be carried, before a particular combination of release hook and liferaft is accepted by the Secretary of State.

## **Instructions and Information**

**4.** Instructions and information required for inclusion in the training manual specified in Part I of Schedule 11 and in the instructions for on-board maintenance specified in Part II of Schedule 11 for inclusion in such training manual and instructions for on-board maintenance. Instructions and information shall be in English in a clear and concise form and shall include the operation and maintenance of the automatic release hook.

Regulation 2(3) and 14

## PART VI

### FLOAT FREE ARRANGEMENTS

#### **General**

1. Float free arrangements shall provide for a liferaft to be released automatically in the event of a ship sinking.

#### **Painter System**

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

#### **Hydrostatic Release Unit**

3.

#### **Construction**

3.1. A hydrostatic release unit used in the float-free arrangements shall be so constructed that:

(3.1.1) the materials used are compatible so as to prevent malfunction of the unit; galvanising or other forms of metallic coating on parts of the release unit will not be accepted;

(3.1.2) it has drains to prevent the accumulation of water in the hydrostatic chamber when the unit is in its normal position;

(3.1.3) each part connected to the painter system has a strength not less than that required by the painter;

(3.1.4) it can readily be removed for replacement or annual servicing.

#### **Materials and Components**

3.2. Materials and components shall be corrosion-resistant and not affected by seawater, oil or detergents.

#### **Performance**

3.3. A hydrostatic release unit shall:

(3.3.1) function properly throughout an air temperature range of  $-30^{\circ}\text{C}$  to  $+65^{\circ}\text{C}$ ;

(3.3.2) function properly throughout a seawater temperature range of  $-1^{\circ}\text{C}$  to  $+30^{\circ}\text{C}$ ;

(3.3.3) automatically release the liferaft at a depth of not more than 4 metres;

(3.3.4) not release prematurely when seas wash over the unit;

(3.3.5) be capable of releasing a liferaft when the stowage is:

(3.3.5.1) horizontal;

(3.3.5.2) tilted  $45^{\circ}$  and  $100^{\circ}$  with the hydrostatic release unit at the upper side;

(3.3.5.3) tilted  $45^{\circ}$  and  $100^{\circ}$  with the hydrostatic release unit at the lower side;

(3.3.5.4) vertical.

## **Marking**

**3.4.** A hydrostatic release unit shall be marked permanently on its exterior with a means of identifying its type, serial number, depth at which it will release, and in addition if a type which;

(3.4.1) requires servicing with its date of manufacture and a small plate permanently attached to the unit for recording the date of servicing;

(3.4.2) is disposable, with the date at which it must be replaced.

## **Instructions and Information**

**3.5.** Instructions and information required for inclusion in the training manual specified in Part I of Schedule 11 and in the instructions for on-board maintenance specified in Part II of Schedule 11 shall be in a form suitable for inclusion in such training manual and instructions for on-board maintenance.

Instructions and information shall be in English in a clear and concise form and shall include the following:

(3.5.1) general description of the unit;

(3.5.2) installation instructions;

(3.5.3) any on board maintenance requirements;

(3.5.4) servicing requirements.

### **4. Weak Link**

## **Construction and Materials**

**4.1.** A weak link used in the float-free arrangements shall:

(4.1.1) be made from the material which is corrosion resistant and not affected by seawater, oil or detergent;

(4.1.2) when made of cordage have the ends either whipped or heat treated;

(4.1.3) when made from a flexible wire have each end looped around a thimble and secured with a locking ferrule.

## **Performance**

**4.2.** A weak link shall be of sufficient strength to:

(4.2.1) pull the painter out of the liferaft container;

(4.2.2) operate the liferaft inflation system;

(4.2.3) break under a tensile force of between 1.8 and 2.6 kNs.

Schedule 4, Parts I, II and III

# **PART VII**

## **LIFERAFT LIGHTS**

### **General**

#### **1.**

##### **1.1. Internal and External Lights**

(1.1.1) The lights shall be arranged with manual control and shall operate automatically when the liferaft inflates in the case of an inflatable liferaft and when the canopy is set in place in the case of a rigid liferaft.

(1.1.2) Each light shall be connected independently to its own power source.

(1.1.3) The external light may be of a flashing type.

## **Construction**

### **2. Internal and External Lights**

**2.1.** The complete light unit shall be constructed with proper workmanship and materials.

**2.2.** It shall be capable of withstanding the drop-test on a liferaft without damage to the light or the liferaft.

**2.3.** It shall be capable of withstanding a drop of 2 metres on to a rigidly mounted steel plate or concrete surface.

**2.4.** It shall be rot-proof, corrosion-resistant, and not be unduly affected by seawater, oil or fungal growth.

**2.5.** It shall not deteriorate due to damp or humidity when stowed with a liferaft in its container.

**2.6.** The power source shall be a sea activated or dry chemical cell battery.

**2.7.** The power source shall be proofed against leakage of any chemicals which could damage or cause deterioration of any fabrics used in the construction of the liferaft.

**2.8.** The connection between light and power source shall be suitably protected.

**2.9.** The power source in the inactive condition with the terminals covered shall be capable of being immersed for 30 days in salt water without deterioration or loss of power.

**2.10.** The lamp holder, and lens shall be so constructed to prevent the ingress of water.

**2.11.** A flashing light shall not be fitted with a lens or curved reflector to concentrate the beam.

## **Performance**

### **3.**

#### **3.1. Internal and External Lights**

(3.1.1) The lights shall have an operational endurance of not less than 12 hours.

(3.1.2) They shall not be damaged in storage and shall operate in a satisfactory manner throughout the air temperature range  $-30^{\circ}\text{C}$  to  $+65^{\circ}\text{C}$ .

(3.1.3) They shall operate in a satisfactory manner throughout a seawater temperature of  $-1^{\circ}\text{C}$  to  $+30^{\circ}\text{C}$ .

(3.1.4) They shall have a shelf life of not less than 3 years.

#### **3.2. Internal Light**

(3.2.1) The light shall be of sufficient luminous intensity to enable survival and equipment instructions to be read.

#### **3.3. External Light**

(3.3.1) The light shall be visible on a dark night with a clear atmosphere at a distance of at least 2 miles.

(3.3.2) It shall be visible through 360 degrees in a horizontal direction and over as great a segment of the upper hemisphere as is practical, when attached to a liferaft.

(3.3.3) In the case of a flashing light it shall flash at a rate of not less than 50 flashes per minute for the first 2 hours of operation.

(3.3.4) Markings

#### Internal and External Lights

**4.1.** The power source shall be marked externally with:

(4.1.1) the manufacturer's name or trade mark;

(4.1.2) the type and batch number;

(4.1.3) date of manufacture and expiry;

(4.1.4) The words "DOT (UK) APPROVED".

**4.2.** If the power source is a chemical pressurised cell it shall be clearly marked with a suitable warning notice.

Schedule 4, Part 1

## PART VIII

### GAS INFLATION SYSTEM

#### General

**1.**

**1.1.** The component parts of the gas inflation system shall be constructed with proper workmanship and materials.

**1.2.** The capacity of the gas charge shall be sufficient to achieve full working pressure in a liferaft within 1 minute at an ambient temperature of 18–20°C, and within 3 minutes at a temperature of –30°C.

**1.3.** The inflation system shall be fitted with a pressure relief arrangement capable at a temperature of +65°C of exhausting sufficient capacity of gas to prevent damage to a liferaft through overpressure.

**1.4.** The inflation system shall provide sufficient pressure to enable a liferaft to maintain its form when loaded with a full complement of persons and equipment.

**1.5.** Activation of the inflation system shall be capable of being carried out by one person with a single action.

**1.6.** The gas cylinder, valve, and operating head shall be fitted on the outside of a liferaft.

**1.7.** The inflation system shall not be damaged in stowage and shall operate in a satisfactory manner throughout the air temperature range –30°C to +65°C.

**1.8.** The inflation system shall operate in a satisfactory manner throughout a seawater temperature of –1°C to +30°C.

**1.9.** The gas cylinder, cylinder valve, and operating head shall be constructed with compatible materials, which are suitable for use in a marine environment.

**1.10.** Gas cylinders, cylinder valves, and operating heads of aluminium alloy shall not be accepted unless they have been tested in salt water to the satisfaction of the Department of Transport.

## **Gas**

### **2.**

**2.1.** The gas used in the inflation system shall be non-toxic.

**2.2.** It shall provide a high rate of inflation, and shall be sufficiently free from icing at the outlet during expansion to prevent damage or malfunction of the inflation equipment.

**2.3.** If the gas used is carbon dioxide its dryness shall comply with TYPE 1, SECTION 1 of British Standard 4105.

**2.4.** The filling ratio (weight of gas to the weight of water required to fill a cylinder at 15°C) shall comply with the requirements of British Standard BS 5355.

**2.5.** The excess gas from the relief valves must not be discharged into the liferaft.

## **Gas Cylinders**

### **3.**

**3.1.** The gas cylinder shall be acceptable to the Department of Transport and must be constructed to the standard laid down in the relevant part of British Standard 5045: Specification for Transportable Gas Containers.

**3.2.** The gas cylinder shall be periodically inspected, tested, and maintained in accordance with the relevant part of British Standard 5430.

**3.3.** Recharging of the gas cylinder shall be carried out at a filling station acceptable to the Department of Transport.

**3.4.** The neck of the gas cylinder shall be suitably threaded to take an approved type of cylinder valve.

**3.5.** If the gas used is carbon dioxide the gas passages to give maximum rate of flow must not permit expansion, and a siphoning tube shall be led from the cylinder valve into the cylinder so that the open end is immersed in liquid when the cylinder is in its operational position.

**3.6.** To allow for variation in the accuracy of scales a tolerance in the gross mass of  $\pm 14$  grams is permissible when a gas cylinder is check weighed.

**3.7.** Charged gas cylinders with a gas capacity of 1.1 kg or greater when check weighed shall not be deficient in gas by more than 56 grams. Charged cylinders with a gas content of less than 1.1 kg shall not be deficient in gas by more than 28 grams.

**3.8.** The gas cylinder shall be permanently marked with:

(3.8.1) date of manufacture, serial number, and name or mark of the manufacturer;

(3.8.2) standard or specification to which it is manufactured;

(3.8.3) date of testing and test pressure;

(3.8.4) tare mass of cylinder, and valve; and

(3.8.5) minimum designed water capacity in litres.

**3.9.** The gas cylinder after charging shall be clearly stencilled with:

(3.9.1) tare mass;

(3.9.2) details of gas charge; and

(3.9.3) total mass of cylinder, valve and contents.

## **Gas Cylinder Valve**

### **4.**

**4.1.** The cylinder valve shall be fitted with a safety relief device which will operate between 18 MPa and the test pressure of the cylinder.

**4.2.** Threads on the cylinder valve for attachment of the high pressure hoses and operating head shall be fitted with protective caps to provide protection during storage and transit.

**4.3.** A cylinder valve constructed from aluminium alloy shall be anodised.

**4.4.** The cylinder valve when attached to an approved gas cylinder and operationally charged shall be capable of being stowed for a period of 17 months without damage, metal fatigue, or leakage making due allowance for changes in temperature.

**4.5.** The cylinder valve shall be constructed of materials which will not be damaged by inflation of the liferaft, transit in a liferaft container, or routine servicing in a service station.

## **Gas Cylinder Operating Head**

### **5.**

**5.1.** The connection between the operating head and the liferaft painter shall be so arranged that the load is wholly taken by the operating mechanism until the valve has operated. When the valve has fully opened the load on the painter shall be transferred to the liferaft towing patch or bridle.

**5.2.** The operating head at a cylinder pressure of 8.6 MPa shall fully open with a force not exceeding 150 newtons and a travel of not more than 200 mm at an ambient temperature of 18–20°C.

**5.3.** The operating head shall be fitted with a positive means of retaining the valve in the open position and include an indicator which will clearly show whether or not the valve has been operated.

**5.4.** Attachment of the operating head to the gas cylinder shall be arranged so that there will be no tendency during fitting to slacken the cylinder valve.

**5.5.** The operating head shall be made from non-corrodible materials.

**5.6.** An operating head constructed from aluminium alloy shall be anodised.

**5.7.** If a pulley arrangement is used in the operating mechanism the cable shall be protected with a flexible conduit to prevent kinking of the cable, and abrasive damage to the liferaft fabric.

**5.8.** The operating head shall be sealed against the ingress of water.

## **High Pressure Hose Assembly**

### **6.**

**6.1.** A high pressure hose shall be used to connect the gas bottle to the liferaft inlet manifold on the buoyancy chambers.

**6.2.** It shall be constructed of natural or synthetic rubber or other suitable material having a smooth bore and some form of reinforcement.

**6.3.** It shall be fitted with end connectors of sufficient strength to withstand a degree of over tightening acceptable to the Department of Transport.

**6.4.** Where nipples are inserted into the ends of the hose they shall be suitably shaped to prevent damage or abrasion to the inner lining, and provide a smooth gas flow.

**6.5.** The outer casing of the hose shall be suitably protected against damage or abrasion.

**6.6.** The hose shall have a minimum bursting pressure of 21 MPa at an ambient temperature 18–20°C and 4.2 MPa at a temperature of –45°C.

**6.7.** The hose shall operate in a satisfactory manner throughout an air temperature range of –45°C to +65°C.

**6.8.** The hose shall be capable of being bent through 180 degrees over a former of 50 mm radius at a temperature of –45°C without cracking or damage.

**6.9.** The hose shall not distort or be damaged when subjected to a hydraulic pressure of 12.5 MPa.

**6.10.** Every hose shall be carefully inspected and marked by the manufacturer’s quality inspector.

**6.11.** The hose shall be marked externally with:

(6.11.1) name of manufacturer;

(6.11.2) part or serial number;

(6.11.3) test date; and

(6.11.4) mark of inspector.

## **Valves**

### **7.**

**7.1.** Non-return valves shall be provided at each position where gas from the inflation system enters an inflatable chamber either from the cylinder or another chamber.

**7.2.** A safety relief valve of sufficient flow capacity that it will not be possible to achieve twice the working pressure in the chamber shall be fitted to each chamber inflated directly from the gas cylinder.

**7.3.** A relief valve shall re-seat at a pressure sufficient to maintain rigidity in the buoyancy tubes.

**7.4.** An inlet valve shall be fitted to each chamber inflated directly from the gas cylinder to provide a means of topping up the pressure when necessary using the bellows provided in the equipment pack.

**7.5.** Deflation valves or plugs shall be fitted of sufficient number to enable the inflated chambers of the liferaft to be deflated for re-packing.

**7.6.** Non-return valves or other equivalent arrangements shall be fitted to prevent loss of pressure in the canopy support if either of the buoyancy tubes become damaged.

**7.7.** An inlet valve for topping up the pressure when necessary using the bellows provided in the liferaft equipment pack shall be fitted in the inflated arch support for the canopy.

**7.8.** An inlet valve shall be fitted to the floor so that it can be inflated using the bellows provided in the equipment pack.

**7.9.** A deflation valve or plug shall be fitted to the floor so that it can be deflated for re-packing.

**7.10.** A non return valve or other equivalent arrangement shall be fitted to maintain pressure in the buoyancy tube in the event of damage to the boarding ramp.

**7.11.** Air aspirators if fitted in the inflation system shall be of a type acceptable to the Department of Transport. They shall be suitably protected against damage and the ingress of water.