

RIGID LIFERAFT - COAST GUARD (G-MSE-4) REVIEW

Material reviewed:

1. (letter submittal)
2. (DRAWINGS: MAIN ASSEMBLIES, DIAGRAMS, LABELS)
3. (Manual)

General Comments/Notes:

REQUIREMENTS	COAST GUARD REVIEW
DRAWING LIST Lists all drawings, specifications, manuals for approval – number – revision issue/date – title	
Critical subassemblies and components which must be included:	
General:	
FRP layup Buoyancy installation & calculation (LSA 4.3.2.1) Seating arrangement	
GENERAL ARRANGEMENT	
Overall arrangement	
Principal dimensions	
Persons capacity - 6 minimum - (see seating arrangement) (LSA 4.1.2) Weight: light & with equipment	
Lifelines shall be becketed around the outside of the liferaft. (SOLAS III/38.3.1) (LSA 4.1.3.1) Lifeline of ultraviolet resistant material, or other suitable handholds, must be provided on the outside of the liferaft, above the waterline, and within easy reach of a person in the water.	

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 be fitted at the entrance opposite to the bowing and embarkation facilities. (SOLAS III/40.4.1) (LSA 4.3.4.1)

Entrances not provided with a boarding ramp shall have a boarding ladder, the lowest step of which shall be situated not less than 0.4 m below the liferaft's light waterline. (SOLAS III/40.4.2) (LSA 4.3.4.2)

There shall be means inside the liferaft to assist persons to pull themselves into the liferaft from the ladder. (SOLAS III/40.4.3) (LSA 4.3.4.3)

Free-fall raft data

- Free-fall certification height

LINES PLAN

STABILITY

(LSA Code 4.3.5)

SEATING ARRANGEMENT

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

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 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

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. (SOLAS III/40.3)

EQUIPMENT INSTALLATION AND STOWAGE PLAN



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 min without damage to its contents. (SOLAS III/38.5.4)

Approved position-indicating light.

A manually controlled lamp shall be fitted inside the liferaft, capable of continuous operation for a period of at least 12 h. It shall light automatically when the canopy is set in place and be of sufficient intensity to enable reading of survival and equipment instructions. (SOLAS III/40.6.3)

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 is not dragged under by the sinking ship. (SOLAS III/38.6.1)

The breaking strength of the painter system, including its means of attachment to the liferaft, except the weak link required by regulation 38.6, shall be not less than 10.0 kN for liferafts permitted to accommodate nine persons or more, and not less than 7.5 kN for any other liferaft. (SOLAS III/40.6.1)

[Manufacturer does not necessarily need to supply, but should specify painter, weak link, and hydrostatic release requirements.]

One knife of the non folding type having a buoyant handle and lanyard attached and stowed in a pocket on the exterior of the canopy near the point at which the painter is attached to the liferaft. (SOLAS III/38.5.1.2)

A liferaft for use with an approved launching appliance shall be provided with means for bringing the liferaft alongside the embarkation deck and holding it securely during embarkation. (SOLAS III/38.4.1.2)

4.2 Every passenger ship davit launched liferaft shall be so arranged that it can be rapidly boarded by its full complement of persons. (SOLAS III/38.4.2)

4.3 Every cargo ship davit launched liferaft shall be so arranged that it can be boarded by its full complement of persons in not more than 3 min from the time the instruction to board is given. (SOLAS III/38.4.3)

HULL CONSTRUCTION PLAN



Specification and identification of materials for critical parts such as steel, aluminum, fiberglass cloth used in the raft's manufacture. Provide copy of standard if not U.S. national standard or international standard.

Steel. Sheet steel and plate must be low carbon, commercial quality, either corrosion resistant or galvanized as per ASTM A 525, coating designation G115. Structural steel plates and shapes must be carbon steel as per ASTM A 36. All steel products, except corrosion resistant steel, must be galvanized to provide high quality zinc coatings suitable for the intended service life in a marine environment. Corrosion resistant steel shall be a standard 302 stainless steel or equal.

Steel:

- Aluminum. Aluminum and aluminum alloys must be high purity for good marine corrosion resistance, free of iron and containing not more than 0.6% copper.

Aluminum:

- Dissimilar materials. Metals in contact with each other must be either galvanically compatible or insulated with suitable non-porous materials such as plastic, rubber, or neoprene based compounds, micarta, or equivalent materials. Provisions must also be made to prevent loosening or tightening resulting from differences of thermal expansion, freezing, buckling of parts, galvanic corrosion, or other incompatibilities.

Other metals:

- Glass reinforcement. The reinforcement used in FRP construction must be a good quality "E" or electrical grade glass.

Glass reinforcement:

- Resin. Resin shall be fire-retardant and approved.

Resin:

- Buoyancy material. The buoyancy material must be approved. 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. (SOLAS III/40.2.1)

Buoyancy foam:

Balsa core:

Method of installation and buoyancy volume provided

Layup schedule

REQUIREMENTS

COAST GUARD REVIEW

Laminate - Specify

- Resin content and allowable range
- Flexural ultimate strength
- Tensile strength, lengthwise

Particulars of joins, welds (including weld size and welding procedure), seams, and other fabricating details

- Welding. Welding must be performed by welders qualified by the Commandant (G-MSE), American Bureau of Shipping, U.S. Navy, or a Coast Guard accepted independent lab/agency or 3rd party for that purpose. Only electrodes intended for use with the material being welded may be used. All welds must be checked using appropriate non-destructive tests.

Weight of finished molding (Also thickness for spray-up construction)

Welds –
Assembly seam –

Welding:

Weight --
Thickness of spray --

CANOPY CONSTRUCTION PLAN

Specification and identification of materials for critical parts such as steel, aluminum, fiberglass, cloth used in the raft's manufacture. Provide copy of standard if not U.S. national standard or international standard.

- Steel. Sheet steel and plate must be low carbon, commercial quality, either corrosion resistant or galvanized as per ASTM A 525, coating designation G115. Structural steel plates and shapes must be carbon steel as per ASTM A36. All steel products, except corrosion resistant steel, must be galvanized to provide high quality zinc coatings suitable for the intended service life in a marine environment. Corrosion resistant steel shall be a standard 302 stainless steel or equal.

Steel:

- Aluminum. Aluminum and aluminum alloys must be high purity for good marine corrosion resistance, free of iron and containing not more than 0.6% copper.

Aluminum:

- Dissimilar materials. Metals in contact with each other must be either galvanically compatible or insulated with suitable non-porous materials such as plastic, rubber, or neoprene based compounds, micarta, or equivalent materials. Provisions must also be made to prevent loosening or tightening resulting from differences of thermal expansion, freezing, buckling of parts, galvanic corrosion, or other incompatibilities.

Other metals:

REQUIREMENTS

COAST GUARD REVIEW

- Glass reinforcement. The reinforcement used in FRP construction must be a good quality "E" or electrical grade glass.

Glass reinforcement:

- Resin. Resin shall be fire-retardant and approved. Color orange.

Resin:

- Buoyancy material. The buoyancy material must be approved.

Buoyancy foam:
Balsa core:

Method of installation and buoyancy volume provided

Layup schedule

Laminate - Specify

- Resin content and allowable range
- Flexural ultimate strength
- Tensile strength, lengthwise

Particulars of joins, welds (including weld size and welding procedure), seams, and other fabricating details

- Welding . Welding must be performed by welders qualified by the Commandant (G-MVI), American Bureau of Shipping, U.S. Navy, or a Coast Guard accepted Coast Guard inspector. Only electrodes intended for use with the material being welded may be used. All welds must be checked using appropriate non-destructive tests.

Welding:

Weight of finished molding (Also thickness for spray-up construction)

CANOPY PLAN



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:

- 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 its interior shall be of a colour that does not cause discomfort to the occupants;
- 3 each entrance shall (a) be clearly indicated and (b) be provided with efficient adjustable closing arrangements which can be easily and quickly opened from inside and outside the liferaft (c) so as to permit ventilation but exclude seawater, wind and cold. (d) Liferafts accommodating more than eight persons shall have at least two diametrically opposite entrances;
- 4 it shall admit sufficient air for the occupants at all times, even with the entrances closed;
- 5 it shall be provided with at least one viewing port;
- 6 it shall be provided with means for collecting rain water;
- 7 it shall have sufficient headroom for sitting occupants under all parts of the canopy. (SOLAS III/38.1.5)

INNER LINER CONSTRUCTION PLAN



Specification and identification of materials for critical parts such as steel, aluminum, fiberglass, cloth used in the raft's manufacture. Provide copy of standard if not U.S. national standard or international standard.

REQUIREMENTS

COAST GUARD REVIEW

- Steel. Sheet steel and plate must be low carbon, commercial quality, either corrosion resistant or galvanized as per ASTM A 525, coating designation G115. Structural steel plates and shapes must be carbon steel as per ASTM A36. All steel products, except corrosion resistant steel, must be galvanized to provide high quality zinc coatings suitable for the intended service life in a marine environment. Corrosion resistant steel shall be a standard 302 stainless steel or equal.

Steel:

- Aluminum. Aluminum and aluminum alloys must be high purity for good marine corrosion resistance, free of iron and containing not more than 0.6% copper.

Aluminum:

- Glass reinforcement. The reinforcement used in FRP construction must be a good quality "E" or electrical grade glass.

Other metals:

Glass reinforcement:

- Resin. Resin shall be fire-retardant and approved. Color orange where not covered by canopy ~~or bow cover~~.

Resin:

Layup schedule

Laminate - Specify

- Resin content and allowable range
- Flexural ultimate strength
- Tensile strength, lengthwise

Weight of finished molding

RELEASE MECHANISM INSTALLATION

Approved release mechanism, if davit launched.

6:1 Safety Factor on ultimate strength of materials - review parts not included in release mechanism approval.

Specification and identification of materials for critical parts such as steel and aluminum - review parts not included in release mechanism approval. Provide copy of standard if not U.S. national standard or international standard.



REQUIREMENTS

COAST GUARD REVIEW

Steel. Sheet steel and plate must be low carbon, commercial quality, either corrosion resistant or galvanized as per ASTM A 525, coating designation G115. Structural steel plates and shapes must be carbon steel as per ASTM A 36. All steel products, except corrosion resistant steel, must be galvanized to provide high quality zinc coatings suitable for the intended service life in a marine environment. Corrosion resistant steel shall be a standard 302 stainless steel or equal.

Steel:

- Aluminum. Aluminum and aluminum alloys must be high purity for good marine corrosion resistance, free of iron and containing not more than 0.6% copper.

Aluminum:

- Dissimilar materials. Metals in contact with each other must be either galvanically compatible or insulated with suitable non-porous materials such as plastic, rubber, or neoprene based compounds, micarta, or equivalent materials. Provisions must also be made to prevent loosening or tightening resulting from differences of thermal expansion, freezing, buckling of parts, galvanic corrosion, or other incompatibilities.

Other metals:

Welding: Particulars of joins, welds (including weld size and welding procedure), seams, and other fabricating details

Welds –

- Welding. Welding must be performed by welders qualified by the Commandant (G-MSE), American Bureau of Shipping, U.S. Navy, or a Coast Guard accepted independent lab/agency or 3rd party for that purpose. Only electrodes intended for use with the material being welded may be used. All welds must be checked using appropriate non-destructive tests.

Welding:

Release lever or control must be red in color, and the area immediately surrounding the control must be a sharply contrasting light color.

PLACARDS AND LABELS

All labels, caution and danger notices, and operating, maintenance, or general instructions provided on the liferaft, must be in accordance with ASTM F 1166, Sections 27, 28, 29, 30, and 31, in terms of format, content, lettering size and spacing, color, and posted location. They must be illustrated with symbols in accordance with Resolution A.760(18), as applicable.



A corrosion-resistant nameplate must be permanently affixed to the hull. The following must be permanently marked on the nameplate:

- (1) Name and address of the manufacturer. (1)
- (2) Serial number of the raft. (2)
- (3) Identification of the inspecting laboratory. (3)
- (4) U.S. Coast Guard approval number. (4)
- (5) Year of manufacture. (5)
- (6) Material of hull construction. (6)
- (7) Number of persons for which the raft is approved. (7)
- (8) Weight without persons. (8)
- (9) The word "SOLAS" (9)
- (10) Maximum permitted height of stowage above waterline (drop test height). (10)
- (11) If the liferaft is a free-fall liferaft then the free-fall certification height (FFCH), required Launching Ramp Length (LRL) and the Launching Ramp Angle for the FFCH must also be permanently marked. (11)

Number of persons raft 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

Instructions for immediate action (SOLAS III/38.5.1.23)

Illustrated launching instruction plate or placard.

The release gear and its components must be labeled, as required, to aid in understanding and operation also of the system.

Drawings of "Hazard" and "Instruction" signs, showing actual inscription, format, color, size, and location.

Weatherproof equipment list must be permanently mounted in a conspicuous and prominent location on a stowage locker or compartment, or on inside of canopy. The list must include a stowage plan, oriented such that the stowage location of each item of loose equipment is readily apparent.

RETROREFLECTIVE MATERIAL INSTALLATION

Approved under 164.018

IMO Resolution A.658(16) arrangement

OTHER UNIQUE SYSTEMS**MANUALS**

The manufacturer shall make an operation, maintenance and training manual available to purchasers of approved liferafts to enable vessel operators to meet Regulations III/18.2, 19.3, 51, and 52 of SOLAS 74/83.

The material must include a complete discussion of operation, maintenance, and safety procedures to be followed in the use of liferafts and associated components and equipment.

The material presented must be clear, sufficiently detailed, and unambiguous. The material must be in English though additional languages are acceptable. Wherever possible, the material must be

- Explained with the help of diagrams
- Presented in short numbered paragraphs
- Written in the active voice.

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

Boarding, launching, and clearing the survival craft and rescue rafts;

release from launching appliances;

use of all survival equipment;

use of all detection equipment;

use of drogues;

best use of the survival craft facilities in order to survive;

Instructions for emergency repair of the lifesaving appliances.

Instructions for onboard maintenance of lifesaving appliances shall be easily understood, illustrated wherever possible, and, as appropriate, shall include the following for each appliance:

a checklist for use when carrying out the inspections required by regulation 19.7;

Maintenance and repair instructions;

Schedule of periodic maintenance;

diagram of lubrication points with the recommended lubricants;

list of replaceable parts;

list of sources of spare parts;
log for records of inspections and maintenance.

QUALITY SYSTEM

Quality control procedures
– inspections / quality teams
– inventory control
– welding inspection/control

Record keeping
- material certifications

The manufacturer shall:
- Institute a quality control procedure to ensure that all production liferafts are produced to the same standard, and in the same manner as the prototype boat approved. The manufacturer's quality control personnel shall not work directly under the department or person responsible for either production or sales.
- Ensure that all required tests are performed.

Other Notes:
Number of copies of documentation –

