INTERNATIONAL MARITIME ORGANIZATION

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43rd session
Agenda item 18

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REPORT TO THE MARITIME SAFETY COMMITTEE

Attached is Part 2 of annex 2 to the report of the forty-third session of the Sub-Committee (DE 43/18), containing section 4 of the annex to the draft MSC circular on Standardized life-saving appliance evaluation and test report forms. Parts 1 and 3 of annex 2 are attached to documents DE 43/18/Add.2 and DE 43/18/Add.4 respectively.

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ANNEX 2 (Part 2)

DRAFT MSC CIRCULAR

STANDARDIZED LIFE-SAVING APPLIANCE EVALUATION AND TEST REPORT FORMS

ANNEX (continued)

4 SURVIVAL CRAFT

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4.1 INFLATABLE LIFERAFTS

EVALUATION AND TEST REPORT

Manufacturer	
Type	
Date	
Place	
Name Surveyor printed	
Signature	
Approving Organization	

Inflatable Liferafts	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.1.1 Submitted drawings, reports and documents

Submitted drawings and documents			**Status**
Drawing No.	**Revision No. & date**	**Title of drawing**	

Submitted reports and documents			**Status**
Report/Document No.	**Revision No. & Date**	**Title of report / document**	
		Maintenance Manual -	
		Operations Manual -	

Inflatable Liferafts	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.1.1.1 General Data and Specifications	**Regulations: -**
Cylinder:	
Release head:	
Fabric:	

Inflatable Liferafts	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.1.2 Quality Assurance	**Regulations: -**
Except where all appliances of a particular type are required by Chapter III of the International Convention for the Safety of Life at Sea, 1974, as amended, to be inspected, representatives of the Administration should make random inspections of manufacturers to ensure that the quality of life-saving appliances and materials used comply with the specification of the approved prototype life-saving appliance. Manufacturers should be required to institute a quality control procedure to ensure that life-saving appliances are provided to the same standard as the prototype life-saving appliance approved by the Administration and to keep records of any production tests carried out in accordance with the Administration's instructions.	Quality Assurance Standard Used: - _____ Quality Assurance Procedure: _____ Quality Assurance Manual: -_____ Description of System. Quality Assurance System acceptable Yes/No Comments/Observations

Inflatable Liferafts	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.1.3 Visual inspection	**Regulations: LSA Code IV/4.2; MSC.81(70) 1/4.1**	
Test Procedure	Acceptance Criteria	Significant Test Data
The liferaft should be subjected to a thorough visual inspection. The following items should be confirmed during the inspection: - proper workmanship - suitable materials - rot proof, corrosion resistant - not affected by sea water, oil or fungal attack - resistant to sunlight - highly visible colour - retro reflective tape - safely used in a seaway -certification -whether the light is activated when carrying out insulation test	All materials should be properly certificated	Passed _____ Failed _____ Comments/Observations

Inflatable Liferafts	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.1.4 Drop test		**Regulations: LSA Code IV/4.1.1.2; MSC.81(70) 1/5.1.1 - .4.2**
Test Procedure	Acceptance Criteria	Significant Test Data
Each type of liferaft should be subjected to a minimum of two drop tests. Where the liferaft in its operational condition is packed in a container or valise, one type of container or valise in which the manufacturer proposes to mark it. The liferaft, in the operational packed condition, should be suspended and then dropped from a height of 18 m into the water. If it is to be stowed at a height greater than 18 m, it should be dropped from the height at which it is to be stowed. The free end of the painter should be attached to the point of suspension so that it pays out as the liferaft drops, thus simulating actual conditions. The liferaft should be left floating for 30 min. It should then be inflated. The liferaft should be lifted from the water to permit thorough inspection of the liferaft, the contents of the equipment container and, where applicable, the container or valise.	The liferaft should inflate upright and in the time prescribed in 4.1.20. Damage to the container or valise, if the liferaft is normally within it when launched, is acceptable provided the Administration is satisfied that it would not be a hazard to the liferaft. Damage to any item of equipment is acceptable subject to the Administration being satisfied that the operational efficiency has not been impaired. Damage to fresh water receptacles may be accepted provided they do not leak. However, for drop tests from heights exceeding 18 m leakage from up to 5% of the receptacles may be accepted provided that: .1 the equipment list for the liferaft specifies the carriage of 5% excess water or means of desalination adequate to produce an equivalent amount; or .2 the water receptacles are contained in a waterproof overwrap. * If any additional equipment was placed in the liferaft for this test, e.g. SART, state type and condition of the equipment after the test. Unless a davit-launched type or to be fitted on a passenger ship does the sea anchor deploy automatically upon inflation?	Container details: - Type of emergency pack Inflation system details: Height of drop _____ m Painter length _____ m Floating position: Inflation times: Container open after _____ sec Boardable after _____ sec Relief valves venting: _____ sec Internal lights activates after _____ sec External lights activates after _____ sec Condition: Container Liferaft *Equipment Passed _____ Failed _____ NA Comments/Observations

Inflatable Liferafts	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.1.5 Jump test		**Regulations: LSA Code IV/4.1.1.3; MSC.81(70) 1/5.2.1 - .4**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be demonstrated that a person can jump on to the liferaft, with and without the canopy erected, from a height above the floor of at least 4.5 m without damaging the liferaft. The test subject should weigh not less than 75 kg and should be wearing hard bottom shoes with smooth soles and no protruding nails. The number of jumps performed should be equal to the total number of persons for which the liferaft is to be approved. The jump test may be simulated by dropping a dummy that represent a human being with shoes on. Unless the configurations of both sides of a canopied reversible liferaft are identical, this test should be repeated for both sides of the liferaft.	There should be no torn fabric, or damage to seams as a result of the test.	Number of jumps _____ Height of jump _____ Weight of dummy Condition of raft during and after test: Tested both sides ? Yes _____ No _____ Comments/Observations Passed _____ Failed _____

4.1.6 Weight test		**Regulations: LSA Code IV/4.1.2.2; MSC.81(70) 1/5.3**
Test Procedure	Acceptance Criteria	Significant Test Data
The fully packed liferaft container should be weighed to determine whether its mass exceeds 185 kg. The weight test should be performed on the heaviest variation of the liferaft, considering different containers and equipment packs, which may be used. If the mass exceeds 185 kg, the different combinations of containers and equipment packs should be weighed to determine which will and which will not exceed 185 kg.		Type A Type B Emergency pack type: _____ _____ Measured liferaft weight _____ _____kg Comments/Observations

Inflatable Liferafts	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.1.7 Towing test		**Regulations: LSA Code IV/4.1.1.4; MSC.81(70) 1/5.4**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be demonstrated by towing that the fully loaded and equipped liferaft is capable of being satisfactorily towed at speeds of up to 3 knots in calm water. Towing should be by a line attached to the liferaft's towing connection. The sea anchor should be streamed while the liferaft is towed. The liferaft should be towed for a distance of at least 1 km. Record the towing strain at 2 knots and 3 knots and include on the Type Approval certificate.	It should be shown that the liferaft can be satisfactorily towed at a speed of up to 3 knots with the anchor streamed without significant damage.	Speed during test _____knots Sea anchor streamed: Yes_____ No _____ Raft towing connections: - Distance covered: - Total Load in raft: - Towing strain at 2 knots _____ kN Towing strain at 3 knots _____ kN Sea state _____ Comments/Observations Passed _____ Failed _____

Inflatable Liferafts	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.1.8 Mooring out tests		**Regulations: LSA Code IV/4.1.1.1; MSC.81(70) 1/5.5**
Test Procedure	Acceptance Criteria	Significant Test Data
The liferaft should be loaded with mass equal to the mass of the total number of persons for which it is to be approved and its equipment and moored in a location at sea or in a seawater harbour. The liferaft should remain afloat in that location for 30 days. In the case of an inflatable liferaft, the pressure may be topped up once a day using the manual pump; however, during any 24 h period the liferaft should retain its shape.	The liferaft should not sustain any damage that would impair its performance. After this test, the inflatable liferaft should be subjected to the pressure test prescribed in 4.1.21.	Location _____ Mooring out period _____ days Number of times pressure topped up and dates:_____ Condition of liferaft: Pressure test results: Comments/Observations Pressure test results: _____ Passed _____ Failed _____

4.1.9 Liferaft painter system test		**Regulations: LSA Code IV/4.1.6.1; MSC.81(70) 1/5.6**
Test Procedure	Acceptance Criteria	Significant Test Data
The painter system including attachments should be tensile tested.	Liferaft painter system and attachments should have a breaking strain as follows: - Not less than 7.5 kN for liferafts to carry up to 8 persons Not less than 10.0 kN for liferafts to carry 9 to 25 persons Not less than 15.0 kN for liferafts to carry 26 persons or more	Number of persons: - Testing strain on painter system: Comments/Observations Passed _____ Failed _____

Inflatable Liferafts	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.1.10 Weak link strength test		**Regulations: LSA Code IV/4.1.6.2; MSC.81(70) 1/5.15**
Test Procedure	Acceptance Criteria	Significant Test Data
The weak link should be tensile tested.	A weak link in the painter system should have a breaking strain of 2.2 ± 0.4 kN (Refer to HRU test form 4.3.1.11)	Measured breaking strain of weak link: _____ kN Comments/Observations Passed _____ Failed _____

4.1.11 Loading and seating test		**Regulations: LSA Code IV/4.2.3; MSC.81(70) 1/5.7**
Test Procedure	Acceptance Criteria	Significant Test Data
The freeboard of the liferaft in the light condition, including its full equipment but no personnel, should be recorded. The freeboard of the liferaft should again be recorded when the number of persons for which the liferaft is to be approved, having an average mass of 75 kg, and each wearing immersion suit and a lifejacket, have boarded and are seated. It should be established that all the seated persons have sufficient space and headroom and it should be demonstrated that the various items of equipment can be used within the liferaft in this condition and, in the case of an inflated liferaft, with the floor inflated. Unless the configurations of both sides of a canopied reversible liferaft are identical, this test should be repeated for both sides of the liferaft.	All the seated persons should have sufficient space and headroom and the various items of equipment can be used within the liferaft in this condition and, in the case of an inflated liferaft, with the floor inflated. The freeboard, when loaded with the mass of the number of persons for which it is to be approved and its equipment, with the liferaft on an even keel and, in the case of an inflatable liferaft, with the floor not inflated, should not be less than 300 mm.	Type of lifejackets used? Inherent buoyancy_____ Inflatable _____ Immersion suits used? Insulated _____ Uninsulated _____ Freeboards: Light 12 o'clock _____ mm 3 o'clock _____ mm 6 o'clock _____ mm 9 o'clock _____ mm Loaded 12 o'clock _____ mm 3 o'clock _____ mm 6 o'clock _____ mm 9 o'clock _____ mm Number of persons seated _____ Equipment accessible and usable? YES_____ NO_____ Comments/Observations Passed _____ Failed _____

Inflatable Liferafts	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.1.12 Boarding test		**Regulations: LSA Code IV/4.2.4; MSC.81(70) 1/5.8**
Test Procedure	Acceptance Criteria	Significant Test Data
The boarding test should be carried out in a swimming pool by a team of not more than four persons who should be of mature age and of differing physiques as determined by the Administration. Preferably they should not be strong swimmers. For this test they should be clothed in shirt and trousers or a boiler suit and should wear approved lifejackets suitable for an adult. They must each swim about 100 m before reaching the liferaft for boarding. There must be no rest period between the swim and the boarding attempt. Boarding should be attempted by each person individually with no assistance from other swimmers or persons already in the liferaft. The water should be of a depth sufficient to prevent any external assistance when boarding the liferaft. If the liferaft is of the canopied reversible type, then both sides should be tested, unless the configuration of both sides are identical.	The arrangements will be considered satisfactory if three of the persons board the liferaft unaided and the fourth boards with the assistance of any of the others.	Record particulars of persons: Age Height Weight P1 _____ Y _____ m _____ kg P2 _____ Y _____ m _____ kg P3 _____ Y _____ m _____ kg P4 _____ Y _____ m _____ kg Boarded unaided _____persons Boarded aided _____Persons Comments/Observations Passed _____ Failed _____

Inflatable Liferafts	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.1.13 Closing arrangement test		**Regulations: LSA Code IV/4.1.1.5.3; MSC.81(70) 1/5.8**
Test Procedure	Acceptance Criteria	Significant Test Data
The boarding test should be repeated with persons clothed in immersion suits and lifejackets. After the boarding test a person clothed in approved immersion suit should demonstrate that the entrance can be easily and quickly closed in 1 minute and can be easily and quickly opened from inside and outside in 1 minute.	3 out of 4 persons wearing immersion suit and lifejackets must board the liferaft unaided. The entrance should be easily closed in less than 1 min. by a person wearing an approved immersion suit. The entrance should be easily opened from inside in less than 1 min. by a person wearing an approved immersion suit. The entrance should be easily opened from outside in less than 1 min. by a person wearing an approved immersion suit.	Record particulars of persons: Age Height Weight P1 _____ Y _____ m _____ kg P2 _____ Y _____ m _____ kg P3 _____ Y _____ m _____ kg P4 _____ Y _____ m _____ kg Boarded unaided _____ persons Boarded aided _____ Persons Closing time _____ sec Open time inside _____ sec Open time outside _____ sec Comments/Observations Passed _____ Failed _____

Inflatable Liferafts	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.1.14 Stability test		**Regulations: LSA Code IV/4.2.5; MSC.81(70) 1/5.9.1 & .2**
Test Procedure	Acceptance Criteria	Significant Test Data
1) The number of persons for which the liferaft is to be approved should be accommodated on one side and then at one end and in each case the freeboard should be recorded. Under these conditions the freeboard should be such that there is no danger of the liferaft being swamped. 2) The stability of the liferaft during boarding may be ascertained as follows: - two persons each wearing approved lifejackets should board the empty liferaft. It should then be demonstrated that the two persons in the liferaft can readily assist from the water a third person who is required to feign unconsciousness. The third person must have his back towards the entrance so that he cannot assist the rescuers.	1) Each freeboard measurement should be taken from the waterline to the top surface of the uppermost main buoyancy tube at its lowest point. 2) It should be demonstrated that the water pockets adequately counteract the upsetting moment on the liferaft and there is no danger of the liferaft capsizing.	Freeboards with all persons on one side: 12 o'clock _____ mm 3 o'clock _____ mm 6 o'clock _____ mm 9 o'clock _____ mm Observations when boarding:: - 2 persons: _____ unconscious person: _____ Effect of water pockets: Comments/Observations Passed _____ Failed _____

Inflatable Liferafts	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.1.15 Manoeuvrability test		**Regulations: LSA Code IV/4.1.5.1.6; MSC.81(70) 1/5.10**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be demonstrated that with the paddles provided, the liferaft is capable of being propelled when fully laden in calm conditions over a distance of at least 25 m.	The liferaft should be capable of being propelled when fully laden in calm conditions over a distance of at least 25 m.	Distance manoeuvred: _____ m Comments/Observations Passed _____ Failed _____

4.1.16 Swamp test		**Regulations: LSA Code; MSC.81(70) 1/5.11**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be demonstrated that when the liferaft is fully swamped, it is capable of and remains supporting the number of persons for which it is to be approved and remains seaworthy. The liferaft should not seriously deform in this condition. The swamped inflatable liferaft should be tested in at least 10 waves at least 0.9 m high. The waves may be produced by the wake of a boat, or by other acceptable means. During this test self-draining arrangements fitted in the floor of the liferaft are to be closed to prevent the ingress of water	The liferaft when fully swamped, should be capable of supporting the number of persons for which it is to be approved. The liferaft should not seriously deform in this condition. Unless the configuration of both sides of a canopied reversible liferaft are identical, this test should be repeated for both sides of the liferaft.	Loaded liferaft swamped Freeboards: 12 o'clock _____ mm 3 o'clock _____ mm 6 o'clock _____ mm 9 o'clock _____ mm Wave height _____ m Deformation _____ If self-bailing, time to self bail: _____ min Comments/Observations Passed _____ Failed _____

Inflatable Liferafts	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.1.17 Canopy closure test		**Regulations: LSA Code IV/4.1.1.5; MSC.81(70) 1/5.12**
Test Procedure	Acceptance Criteria	Significant Test Data
To ensure the effectiveness of the canopy closures in preventing water entering the liferaft, the efficiency of the closed entrances should be demonstrated by means of a hose test or by any other equally effective method. The requirement for the hose test is that about 2,300 l of water per minute be directed at and around the entrances through a 63.5 mm hose from a point 3.5 m away and 1.5 m above the level of the buoyancy tubes for a period of 5 min.	There should be no significant accumulation of water inside the liferaft. Unless the configuration of both sides of a canopied reversible liferaft are identical, this test should be repeated for both sides of the liferaft.	Capacity of water hose _____l/min Condition of canopy during test _____ _____ _____ _____ _____ _____ Comments/Observations Passed _____ Failed _____

4.1.18 Buoyancy of float-free liferafts test		**Regulations: LSA Code; MSC.81(70) 1/5.13**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be demonstrated that the liferafts packed in containers, which are float-free, have sufficient inherent buoyancy to inflate the liferaft by means of the actuating line in the event of the ship sinking. The combination of equipment and container or valise should be that which produces the maximum packed weight.	The liferaft packed in container should have sufficient inherent buoyancy to inflate the liferaft by means of the actuating line in the event of the ship sinking.	Comments/Observations Passed _____ Failed _____

Inflatable Liferafts	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.1.19 Damage test		**Regulations: LSA Code; MSC.81(70) 1/5.17.1**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be demonstrated that, in the event of any one of the buoyancy compartments being damaged or failing to inflate, the intact compartment or compartments should support, with positive freeboard over the liferaft's periphery, the number of persons for which the liferaft is to be approved. This can be demonstrated with persons each having a mass of 75 kg and seated in their normal positions or by an equally distributed mass.	The intact compartments should support, with positive freeboard over the liferaft's periphery, the number of persons for which the liferaft is to be approved, with any one of the buoyancy compartments deflated. _____=> Compartment deflated: _____ Freeboards: 12 o'clock _____ mm 3 o'clock _____ mm 6 o'clock _____ mm 9 o'clock _____ mm Compartment deflated: _____ Freeboards: 12 o'clock _____ mm 3 o'clock _____ mm 6 o'clock _____ mm 9 o'clock _____ mm	Compartment deflated: _____ Freeboards: 12 o'clock _____ mm 3 o'clock _____ mm 6 o'clock _____ mm 9 o'clock _____ mm Compartment deflated: _____ Freeboards: 12 o'clock _____ mm 3 o'clock _____ mm 6 o'clock _____ mm 9 o'clock _____ mm Comments/Observations Passed _____ Failed _____

Inflatable Liferafts	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.1.20 Righting test (conventional liferaft)	**Regulations: LSA Code IV/4.2.5.2; MSC.81(70) 1/5.17.2.1 - .4**	
Test Procedure	Acceptance Criteria	Significant Test Data
For this test the liferaft should be inverted so as to simulate inverted inflation. 1) the inflatable liferaft should be loaded with its heaviest equipment pack. All of the entrances, ports, and other openings in the liferaft canopy should be open in order to allow the infiltration of water into the canopy when capsized. 2) the canopy of the liferaft should then be completely filled with water, if necessary by partially collapsing the canopy support, or alternatively the uninflated liferaft should be flaked out onto the surface of the water upside down and inflation initiated. An automatically self-righting lifraft should self-right in this condition. If the inflatable liferaft, other than automatically self-righting lifrafts, does not self-right, it should be allowed to remain in an inverted position for at least 10 min before righting is attempted. 3) the righting test should be carried out by the same team of persons required for the boarding test similarly clothed and wearing lifejackets and after completing the swim required in 4.1.12. At least one of the persons righting the inflatable liferaft should weigh less than 75 kg. Each person should attempt to right the liferaft unaided. The water should be of sufficient depth to give no external assistance to the swimmers when mounting the inverted liferaft.	The righting arrangements will be considered satisfactory if each person rights the liferaft unaided. There should be no damage to the structure of the inflatable liferaft, and the equipment pack should remain secured in its place. (Se form 4.1.31 for selfrighting)	1st person righting test _____ 2nd person righting test _____ 3rd person righting test _____ 4th person righting test _____ results with pack A and B Damage to raft _____ Details of persons Comments/Observations Passed _____ Failed _____

Inflatable Liferafts	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.1.21 Inflation test		**Regulations: LSA Code; MSC.81(70) 1/5.17.4 - .6**
Test Procedure	Acceptance Criteria	Significant Test Data
A liferaft, packed in each type of container, should be inflated by pulling the painter and the time recorded:- 1) for it to become boardable, i.e. when buoyancy tubes are inflated to full shape and diameter. 2) for the cover to be erect; and 3) for the liferaft to reach its full operational pressure when tested: .1 at an ambient temperature of between 18^{0}C and 20^{0}C; .2 at a temperature of -30^{0}C; and .3 at a temperature of +65^{0}C. For the inflation test at -30^{0}C the packed liferaft should be kept at room temperature for at least 24 h, then placed in a refrigerated chamber at a temperature of –30^{0}C for 24 h prior to inflation by pulling the painter. Two liferafts should be subject to an inflation test at this temperature. For the inflation test at +65^{0}C the packed liferaft should be kept at room temperature for at least 24 h, then placed in a heating chamber at a temperature of +65^{0}C for not less than 7 h prior to inflation by pulling the painter. Force to pull out painter should be measured at ambient temperature.	When inflated in an ambient temperature of between 18^{0}C and 20^{0}C it should achieve total inflation in not more than 1 min. In the case of automatic self-righting liferaft, the liferaft should achieve total inflation and be boardable in the upright position in not more than 1 min, regardless of the orientation in which the liferaft inflates. When inflated at -30^{0}C the liferaft should reach working pressure in 3 min. There should be no seam slippage, cracking, or other defect in the liferaft and it should be ready for use after the tests. When inflated at +65^{0}C the gas pressure relief valves must be of sufficient capacity to prevent damage to the liferaft by excess pressure and to prevent the maximum pressure during the inflation from reaching twice the re-seat pressure of the release valve. There must be no seam slippage, cracking or other defect in the liferaft. The force to pull out the painter should not be more than 150 N.	1) Force to pull the painter _____ N Inflation times: - Air temperature _____^{0}C Container open _____sec Boardable _____sec Relief valves: Upper open _____sec Lower open _____sec Lights int./ext. _____/_____sec Working Pressure _____MPa 2) Cold temperature _____^{0}C Hours: _____ h Inflation times: - Raft 1 Raft 2 Air temperature _____^{0}C Container open _____sec Boardable _____sec Relief valves: Upper open _____sec Lower open _____sec Lights int./ext. _____/_____sec Working Pressure _____MPa 3) Hot temperature _____^{0}C Hours: _____ h Inflation times: - Air temperature _____^{0}C Container open _____sec Boardable _____sec Relief valves: Upper open _____sec Lower open _____sec Lights int./ext. _____/_____sec Working Pressure _____Mpa Peak pressure _____Mpa Comments/Observations Passed _____ Failed _____

Inflatable Liferafts	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.1.22 Pressure test		**Regulations: LSA Code; MSC.81(70) 1/5.17.7 & 5.17.8**
Test Procedure	Acceptance Criteria	Significant Test Data
Each inflatable compartment in the liferaft should be tested to a pressure equal to three times the working pressure. Each pressure relief valve should be made inoperative, compressed air should be used to inflate the inflatable liferaft and the inflation source removed. The test should continue for at least 30 min. The measurement of pressure drop due to leakage can be started when it has been assumed that compartment rubber material has been completed stretching due to the inflation pressure and stabilized. This test should be conducted after equilibrium condition has been achieved. The term “operational pressure” has the same meaning as the term “working pressure”; i.e. the pressure determined by the designed reseat pressure of the relief valves, if fitted, except that, if the actual reseat pressure of the relief valves, determined by testing, exceeds the designed reseat pressure by more than 15%, the higher figure should be used.	The pressure should not decrease by more than 5% as determined without compensating for temperature and atmospheric pressure changes, and there should be no seam slippage, cracking or other defects in the liferaft.	Design WP _____ Design temp _____ ^{0}C Design atmos. _____bar 3 times WP _____ Pressure drop after 30 min _____ Above should cover each compartments 1, 2 3, etc. Damage recorded: _____ _____ Floor: Design pressure _____ Pressure drop after 1 hour _____ Comments/Observations Passed _____ Failed _____

Inflatable Liferafts	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.1.23 Detailed inspection		**Regulations: LSA Code IV/4.2; MSC.81(70) 1/5.14**
Test Procedure	Acceptance Criteria	Significant Test Data
The liferaft should be subjected to a detailed inspection to verify that it complies with to requirements of the LSA-code.	The liferaft should comply with the requirements of the LSA-code in all respects including: interior not to cause discomfort to occupants at least one viewing port means for collection rain water sufficient headroom 8 persons at least two entrances equipment to be stowed inside liferaft, but capable of floating at least 30 minutes in water without damage to content at least one boarding ramp means to assist a person to pull themselves into the liferaft container markings marking on raft	If provided, boarding ladders: - interior not to cause discomfort to occupants _____ at least one viewing port _____ means for collection rain water _____ sufficient headroom _____ 8 persons at least two entrances _____ equipment to be stowed inside liferaft, but capable of floating at least 30 minutes in water without damage to content _____ at least one boarding ramp _____ means to assist a person to pull themselves into the liferaft _____ container markings _____ marking on raft _____ means to change ship's name & Port of Registry withou opening containers? YES/ NO Comments/Observations Passed _____ Failed _____

Inflatable Liferafts	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.1.24 Lifting components strength test		**Regulations: LSA Code IV/4.2.8; MSC.81(70) 1/5.16**
Test Procedure	Acceptance Criteria	Significant Test Data
The breaking strength of the webbing or rope and the attachments to the liferaft used for the lifting bridle should be established by tests on three separate pieces of each different item.	The combined strength of the lifting bridle components should be at least six times the mass of the liferaft when loaded with the number of persons for which it is to be approved and its equipment.	Combined strength of lifting bridle components: _____ Mass of liferaft when loaded with the number of persons for which it is to be approved: _____ Calculated safety factor: _____ Method of determining safety factor: Comments/Observations Passed _____ Failed _____

4.1.25 Impact test		**Regulations: LSA Code; MSC.81(70) 1/5.16.2**
Test Procedure	Acceptance Criteria	Significant Test Data
The liferaft should be loaded with a mass equal to the mass of the number of persons for which it is to be approved and its equipment. With the liferaft in a free hanging position it should be pulled laterally to a position so that when released it will strike a rigid vertical surface at a velocity of 3.5 m/s. The liferaft should then be released to impact against the rigid vertical surface. Note: The liferaft should be lifted up 650 mm.	After this test the liferaft should show no signs of damage which would affect its efficient functioning.	Comments/Observations Passed _____ Failed _____

Inflatable Liferafts	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.1.26 Drop test		**Regulations: LSA Code; MSC.81(70) 1/5.16.3**
Test Procedure	Acceptance Criteria	Significant Test Data
The liferaft, loaded with a mass equal to the mass of the number of persons for which it is to be approved and its equipment, should be suspended from an on-load release at a height of 3 m above the water, be released and allowed to fall freely into the water. The liferaft should then be examined.	The liferaft should sustain no damage, which would affect its efficient functioning.	Comments/Observations Passed _____ Failed _____

Inflatable Liferafts	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.1.27 Davit-launched liferaft boarding test		**Regulations: LSA Code; MSC.81(70) 1/5.16.4**
Test Procedure	Acceptance Criteria	Significant Test Data
A davit-launched liferaft should, in addition to the boarding test prescribed in 4.1.12, be subjected to the following test. The liferaft, hanging from a launching appliance and bowsed in to the ship' s side or simulated ship's side, should be boarded by the number of persons for which it is to be approved of average mass 75 kg. There should be no undue distortion of the liferaft. The bowsing should then be released and the liferaft left hanging for 5 min. It should then be lowered to the sea or floor and unloaded. At least three tests are required in succession, with the hook of the lowering appliance so positioned that its distance from the ship's side is: .1 half the beam of the liferaft +150 mm; .2 half the beam of the liferaft; and .3 half the beam of the liferaft -150 mm. The boarding, which is intended to simulate actual shipboard conditions, should be timed and the time recorded.	There should be no undue distortion of the liferaft. The boarding should be timed and the time recorded.	Test 1: Boarding time: Distortion: Test 2: Boarding time: Distortion: Test 3: Boarding time: Distortion: Comments/Observations Passed _____ Failed _____

Inflatable Liferafts	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.1.28 Davit-launched inflatable liferafts – strength test		**Regulations: LSA Code; MSC.81(70) 1/5.17.10**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be demonstrated by an overload test on the liferaft hanging from its centre support that the bridle system has an adequate factor of safety as follows: .1 the liferaft should be placed in a temperature of 20±3^{0}C for a period of at least 6 h; .2 following this period of conditioning, the liferaft should be suspended from its lifting hook or bridle and the buoyancy chambers (not including an inflatable floor) inflated; .3 when fully inflated and when the relief valves have re-seated themselves, all relief valves should be made inoperative; .4 the liferaft should then be lowered and loaded with a distributed mass equivalent to four times the mass of the number of persons for which it is to be approved and its equipment, the mass of each person being taken as 75 kg. .5 the liferaft should then be raised and remain suspended for at least 5 min; .6 the pressure before and after the test after the weight is removed and while it remains suspended, should be recorded; and .7 any dimensional deflections or distortions of the liferaft should be recorded.	During the test and after its completion, the inflatable liferaft should remain suitable for its intended use.	Conditioning: temperature:_____^{0}C time in temperature _____h number of persons _____ load _____kg time suspended _____min pressure before loading pressure suspended/loaded pressure after test after unloading dimensional deflections or distortions: Comments/Observations Passed _____ Failed _____

Inflatable Liferafts	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.1.29 Cold overload test		**Regulations: LSA Code; MSC/Circ.809 Annex3; MSC.81(70) 1/5.17.11**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be demonstrated, after a period of 6 h in a chamber at a temperature of -30°C, that the liferaft will support a load of 1.1 times the number of persons for which it is to be approved and its equipment with all relief valves operative. The liferaft should be loaded with the test weight in the refrigerated chamber. The floor should not be inflated. The loaded inflatable liferaft should remain suspended for at least 5 min. If the inflatable liferaft must be removed from the chamber in order to suspend it, the inflatable liferaft should be suspended immediately upon removal from the chamber.	During the test and after it its completion, the inflatable liferaft should remain suitable for its intended use.	Conditioning: time in cold chamber: temperature in cold chamber: number of persons: test weight: (Relief valves operative/floor not inflated) time suspended: _____ min. Comments/Observations Passed _____ Failed _____

4.1.30 Lowering abrasion test		**Regulations: LSA Code; MSC/Circ.809 Annex3; MSC.81(70) 1/5.17.12**
Test Procedure	Acceptance Criteria	Significant Test Data
The inflatable liferaft should be loaded with a weight equal to the mass of its heaviest equipment pack and the number of persons for which it is to be approved, the mass of each person being taken as 75 kg. Except for the floor, which should not be inflated, the inflatable liferaft should be fully inflated with all relief valves operative. A liferaft should be lowered for a distance of at least 4.5 m in continuous contact against a structure erected to represent the side of a ship having a 20^0 adverse list. The height of the point from which the hook is suspended should be comparable to that of a shipboard launching appliance	During the test and after its completion, the liferaft should not sustain damage or distortion, or assume a position, which would render it unsuitable for its intended purpose.	Number of persons load: _____ kg Height of the head sheave _____ mm Comments/Observations Passed _____ Failed _____

Inflatable Liferafts	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.1.31 Self-righting test (self-righting liferafts only)	**Regulations: MSC/Circ.809 Annex3; MSC.81(70) 1/5.18**	
Test Procedure	Acceptance Criteria	Significant Test Data
A suitable means should be provided to rotate the liferaft about a longitudinal axis to any angle of heel in calm water and then release it. The liferaft should be fully inflated and fully equipped, with no one on board, with entrances and openings in the as-packed condition. The liferaft should be incrementally rotated to angles of heel up to and including 180° and should be released.	After release the liferaft should automatically return to the upright position without assistance. Righting action should be positive and continuous, and complete righting should occur within the time difference between the liferaft reaching boardable shape, as determined by 4.1.20 at ambient temperature and at 1 minute	The liferaft returned to upright position from the following angles of heel:

+ 45°		- 45°	
+ 90°		- 90°	
+ 135°		- 135°	
+ 180°			

Comments/Observations

Righting action: -

Passed _____ Failed _____

Inflatable Liferafts	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.1.32 Submergence test (self-righting liferafts only)		**Regulations: MSC/Circ.809 Annex3; MSC.81(70) 1/5.19**
Test Procedure	Acceptance Criteria	Significant Test Data
The liferaft in its packed condition, should be submerged to a depth of at least 4 m. A rigid liferaft should be released at this depth, and, if an inflatable liferaft, initiate inflation at this depth, so as to simulate automatic float-free operation. The liferaft should float to the surface and come to its designed operational condition ready to be boarded from the sea in a sea state of at least 2 metres significant wave height in association with a wind force of Beaufort force 6.	The liferaft should float to the surface and come to its designed operational condition ready to be boarded.	Significant wave height Method of determining Significant wave height: _____ wind force _____ Beaufort depth submerged Comments/Observations Passed _____ Failed _____

4.1.33 Wind velocity test		**Regulations: MSC/Circ.809 Annex 3; MSC.81(70) 1/5.20.1 & .2**
Test Procedure	Acceptance Criteria	Significant Test Data
The Administration should from a range of liferafts require at least: one liferaft from a range of 6 to 25 persons capacity provided the material construction arrangements are similar; and each liferaft greater than 25 persons capacity, except in the case where it can be shown that the material and construction arrangements deem this unnecessary: The liferaft or liferafts in the packed condition with the entrance so arranged that it will be open on inflation, but without the container, be inflated in a wind velocity of 30 m/s and should be left in this condition for 10 minutes.	The liferaft or liferafts should show no sign of damage affecting its efficient function as a result of this test.	Passed _____ Failed _____ Continued/…

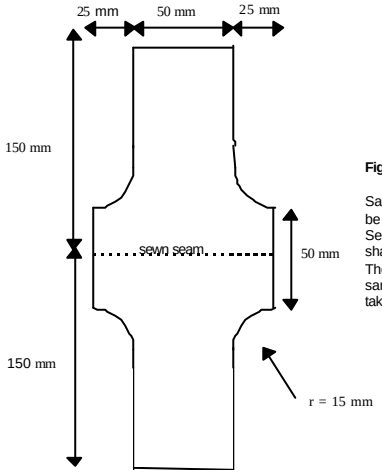
Inflatable Liferafts	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.1.33 Wind velocity test (continued)		**Regulations: MSC/Circ.809 Annex3; MSC.81(70) 1/5.20.3 to .5.3**
Test Procedure	Acceptance Criteria	Significant Test Data
During the above-mentioned conditions, whenever practicable, the liferaft or liferafts should be swung over approximately 30^0 to starboard, from that position to approximately 30^0 to port and return to the starting position. On completion of these first stage tests there should be no detachment of the arch support or canopy from the upper buoyancy tube or other damage which affects the efficient function of the liferaft. Then the liferaft or liferafts should be exposed to the above-mentioned wind velocity for 5 minutes in each of the following conditions: .5.1 with the entrance to the wind open and the other closed, if there is more than one entrance; .5.2 with the entrance to the wind closed and the other entrances open, if there is more than one entrance; .5.3 with all entrances closed.	The liferaft or liferafts should show no sign of damage affecting its efficient function as a result of this test.	Wind velocity measured: _____m/s Time in high winds: _____sec Comments/Observations .5.1 Passed _____ Failed _____ .5.2 Passed _____ Failed _____ .5.3 Passed _____ Failed _____

Inflatable Liferafts	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.1.34 Self draining test (self-righting liferafts only)	**Regulations: MSC.81(70) 1/5.21**	
Test Procedure	Acceptance Criteria	Significant Test Data
Water should be pumped into the interior of the liferaft, while it is afloat, at a rate of 2300 l per minute for 1 min. If a liferaft is divided into separate areas, by thwarts or other means, each such area should be subjected to the test.	After the water has been shut off and has drained, there should be no appreciable accumulation of water in the liferaft.	Hose delivery rate: _____l/min Period of delivery of water: _____min Area of liferaft: _____m2 Area of drainage point: _____m2 Draining area sufficient to remove water: YES/NO: _____ Comments/Observations Passed _____ Failed _____

Inflatable Liferafts	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.1.35 Seam Strength Test	**Regulations: LSA Code IV/4.2; MSC.81(70) 1/5.17.9.1 & .2**	
Test Procedure	Acceptance Criteria	Significant Test Data
Seam Strength Test	1 It should be demonstrated that sample seams, prepared in the same condition as in production, can withstand a test load equal to the minimum specified liferaft fabric tensile strength. Sewn seams on outer canopy fabric should withstand a test load of at least 70% of the minimum specified fabric tensile strength when tested by the method described in ISO 1421 and by using test samples as shown in fig.1 below.  **Fig.1 Sample specification for sewn canopy seams** Samples of all types of sewing used in production shall be tested. Seam constructions in both warp and weft direction shall be tested. The test specimens shall be cut out from pre-sewn samples of fabric-and no locking of thread ends shall take place. 2 Weld strength 2.1 When tested by the method prescribed below, the load required to initiate failure of the weld should be not less than 175 N; 2.2 Specimens should be prepared and tested as given in .3.3 below:	Fabric minimum specified liferaft tensile: - strength .....…..... N/50 mm. Seam strength .....…..... N/50 mm. Outer canopy minimum specified tensile: - strength .....…..... N/50 mm. Seam strength ..... N/50 mm. Weld strength .....N Comments/Observations Passed _____ Failed _____

Inflatable Liferafts	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.1.35 Seam Strength test (continued)	**Regulations: LSA Code IV/4.2; MSC.81(70) 1/5.17.9.3**	
Test Procedure	Acceptance Criteria	Significant Test Data
	3 Hydrolysis tests should be conducted on sample welded seams where thermoplastic-coated materials are to be used. The tests should be conducted as follows: - .3.1 When tested by the method prescribed below, the weld strength of the sample seam should achieve 125 N/25 mm minimum. 3.2 Test method: .1 Store the test specimens for 12 weeks over water in a closed container at 93°C ± 2°C. .2 After the conditioning as above, dry the specimens for 1 h at 80 ± 2°C, 65% RH for 24 h. 3.3 Welded test samples should be prepared as follows: Two samples of fabric 300 mm x 200 mm, cut with the short side parallel to the warp direction, should be superimposed face to back for double coated fabrics, or coated face to coated face for single or asymmetrically coated fabrics. They should be welded with a tool 10 ± 1 mm width of convenient length. 25 mm wide test specimens should be cut transversely to the line of the weld. The test samples should be mounted in a test machine as in ISO 1421. The maximum peel load should be recorded.	Weld strength .....N Comments/Observations Passed _____ Failed _____

4.2 RIGID LIFERAFTS

EVALUATION AND TEST REPORT

4.2.1 Submitted drawings, reports and documents
4.2.1.1 General data and specifications

4.2.2 Quality assurance

4.2.3 Visual inspection

4.2.4 Drop test

4.2.5 Jump test

4.2.6 Weight test

4.2.7 Towing test

4.2.8 Mooring out tests

4.2.9 Liferaft painter system test

4.2.10 Loading and seating test

4.2.11 Boarding test

4.2.12 Closing arrangement test

4.2.13 Stability test

4.2.14 Manoeuvrability test

4.2.15 Swamp test

4.2.16 Canopy closure test

4.2.17 Detailed inspection

4.2.18 Weak link strength test

4.2.19 Lifting components strength test

4.2.20 Impact test

4.2.21 Drop test

4.2.22 Davit-launched liferaft boarding test

4.2.23 Self-righting test (self-righting liferafts only)

4.2.24 Submergence test (self-righting liferafts only)

4.2.25 Wind velocity test

4.2.26 Self draining test (self-righting liferafts only)

4.2.27 Inherently buoyant material

4.2 RIGID LIFERAFTS

EVALUATION AND TEST REPORT

Manufacturer	
Type	
Date	
Place	
Name Surveyor printed	
Signature	
Approving Organization	

Rigid Liferafts	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.2.1 Submitted drawings, reports and documents

Submitted drawings and documents			**Status**
Drawing No.	**Revision No. & date**	**Title of drawing**	

Submitted reports and documents			**Status**
Report/Document No.	**Revision No. & Date**	**Title of report / document**	
		Maintenance Manual -	
		Operations Manual -	

Rigid Liferafts	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.2.1.1 General Data and Specifications	**Regulations: -**
Cylinder:	
Release head:	
Fabric:	

	Manufacturer:_____	Date:_____	Time:_____
Rigid Liferafts	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.2.2 Quality Assurance	**Regulations: -**
Except where all appliances of a particular type are required by Chapter III of the International Convention for the Safety of Life at Sea, 1974, as amended, to be inspected, representatives of the Administration should make random inspections of manufacturers to ensure that the quality of life-saving appliances and materials used comply with the specification of the approved prototype life-saving appliance. Manufacturers should be required to institute a quality control procedure to ensure that life-saving appliances are provided to the same standard as the prototype life-saving appliance approved by the Administration and to keep records of any production tests carried out in accordance with the Administration's instructions.	Quality Assurance Standard Used: - _____ Quality Assurance Procedure: -_____ Quality Assurance Manual: - _____ Description of System. Quality Assurance System acceptable Yes/No Comments/Observations

Rigid Liferafts	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.2.3 Visual inspection		**Regulations: LSA Code; MSC.81(70)**
Test Procedure	Acceptance Criteria	Significant Test Data
The liferaft should be subjected to a thorough visual inspection. The following items should be confirmed during the inspection:		
- proper workmanship		Passed _____ Failed _____
- suitable materials		Passed _____ Failed _____
- rot proof, corrosion resistant		Passed _____ Failed _____
- not affected by sea water, oil or fungal attack		Passed _____ Failed _____
- resistant to sunlight		Passed _____ Failed _____
- highly visible colour		Passed _____ Failed _____
- retro-reflective tape		Passed _____ Failed _____
- safely used in a seaway		Passed _____ Failed _____
		Comments/Observations

Rigid Liferafts	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.2.4 Drop test	**Regulations: LSA Code IV/4.1.1.2; MSC.81(70) 1/5.1**	
Test Procedure	Acceptance Criteria	Significant Test Data
(Overload test) Each type of liferaft should be subjected to a minimum of two drop tests. Where the liferaft in its operational condition is packed in a container or valise, one type of container or valise in which the manufacturer proposes to mark it. The liferaft, in the operational packed condition, should be suspended and then dropped from a height of 18 m into the water. If it is to be stowed at a height greater than 18 m, it should be dropped from the height at which it is to be stowed. The free end of the painter should be attached to the point of suspension so that it pays out as the liferaft drops, thus simulating actual conditions. The liferaft should be left floating for 30 min. The liferaft should be lifted from the water to permit thorough inspection of the liferaft, the contents of the equipment container and, where applicable, the container or valise.	Damage to the container or valise, if the liferaft is normally within it when launched, is acceptable provided the Administration is satisfied that it would not be a hazard to the liferaft. Damage to any item of equipment is acceptable subject to the Administration being satisfied that the operational efficiency has not been impaired. Damage to fresh water receptacles may be accepted provided they do not leak. However, for drop tests from heights exceeding 18 m, leakage from up to 5% of the receptacles may be accepted provided that: .1 the equipment list for the liferaft specifies the carriage of 5% excess water or means of desalination adequate to produce an equivalent amount; or .2 the water receptacles are contained in a waterproof overwrap. *) If any additional equipment was placed in the liferaft for this test, e.g. SART, state type and condition of the equipment after the test.	Container details: Type of emergency pack Height of drop _____ m Painter length _____ m Floating position: Condition: Container Liferaft *) Equipment Comments/Observations Passed _____ Failed _____

Rigid Liferafts	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.2.5 Jump test		**Regulations: LSA Code IV/4.1.1.3; MSC.81(70) 1/5.2**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be demonstrated that a person can jump on to the liferaft, with and without the canopy erected, from a height above the floor of at least 4.5 m without damaging the liferaft. The test subject should weigh not less than 75 kg and should be wearing hard bottom shoes with smooth soles and no protruding nails. The number of jumps performed should be equal to the total number of persons for which the liferaft is to be approved. The jump test may be simulated by dropping a suitable and equivalent mass.	There should be no torn fabric, or damage to seams as a result of the test.	Number of jumps _____ Height of jump _____ Comments/Observations Passed _____ Failed _____

4.2.6 Weight test		**Regulations: LSA Code IV/4.1.2.2; MSC.81(70) 1/5.3**
Test Procedure	Acceptance Criteria	Significant Test Data
The fully packed liferaft container should be weighed to determine whether its mass exceeds 185 kg. The weight test should be performed on the heaviest variation of the liferaft, considering different containers and equipment packs, which may be used. If the mass exceeds 185 kg, the different combinations of containers and equipment packs should be weighed to determine which will and which will not exceed 185 kg.		Emergency pack type: _____ Measured liferaft weight _____kg Comments/Observations Passed _____ Failed _____

Rigid Liferafts	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.2.7 Towing test		**Regulations: LSA Code IV/4.1.1.4; MSC.81(70) 1/5.4**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be demonstrated by towing that the fully loaded and equipped liferaft is capable of being satisfactorily towed at speeds of up to 3 knots in calm water. Towing should be by a line attached to the liferaft's towing connection. The sea anchor should be streamed while the liferaft is towed. The liferaft should be towed for a distance of at least 1 km. Record the towing strain of 2 knots and at 3 knots and record also on the Type Approval certificate.		Speed during test _____knots Raft towing connections: - Distance covered: - Total Load in raft: - Towing strain at 2 knots _____ kN Towing strain at 3 knots _____ kN Comments/Observations Passed _____ Failed _____

Rigid Liferafts	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.2.8 Mooring out tests		**Regulations: LSA Code IV/4.1.1.1; MSC.81(70) 1/5.5**
Test Procedure	Acceptance Criteria	Significant Test Data
The liferaft should be loaded with mass equal to the mass of the total number of persons for which it is to be approved and its equipment and moored in a location at sea or in a seawater harbour. The liferaft should remain afloat in that location for 30 days.. The liferaft should not sustain any damage that would impair its performance.	The liferaft should not sustain any damage that would impair its performance.	Location _____ Mooring out period _____ days Condition of liferaft: Pressure test results: Comments/Observations Passed _____ Failed _____

4.2.9 Liferaft painter system test		**Regulations: LSA Code IV/4.1.6.1; MSC.81(70) 1/5.6**
Test Procedure	Acceptance Criteria	Significant Test Data
The painter system including attachments should be tensile tested.	Liferaft painter system and attachments should have a breaking strain as follows: - 7.5 kN for liferafts to carry up to 8 persons 10.0 kN for liferafts to carry 9 to 25 persons 15.0 kN for liferafts to carry 26 persons or more	Number of persons: - Breaking strain of painter system: Comments/Observations Passed _____ Failed _____

Rigid Liferafts	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.2.10 Loading and seating test		**Regulations: LSA Code IV/4.2.3; MSC.81(70) 1/5.7**
Test Procedure	Acceptance Criteria	Significant Test Data
The freeboard of the liferaft in the light condition, including its full equipment but no personnel, should be recorded. The freeboard of the liferaft should again be recorded when the number of persons for which the liferaft is to be approved, having an average mass of 75 kg, and each wearing immersion suit and a lifejacket, have boarded and are seated. It should be established that all the seated persons have sufficient space and headroom and it should be demonstrated that the various items of equipment can be used within the liferaft in this condition.	All the seated persons should have sufficient space and headroom and the various items of equipment can be used within the liferaft in this condition. The freeboard, when loaded with the mass of the number of persons for which it is to be approved and its equipment, with the liferaft on an even keel, should not be less than 300 mm.	Lifejackets used? YES_____ NO_____ Immersion suits used? YES_____ NO_____ Freeboards: Light 12 o'clock _____ mm 3 o'clock _____ mm 6 o'clock _____ mm 9 o'clock _____ mm Loaded 12 o'clock _____ mm 3 o'clock _____ mm 6 o'clock _____ mm 9 o'clock _____ mm Number of persons seated _____ Equipment accessible/usable? YES_____ NO_____ Comments/Observations Passed _____ Failed _____

Rigid Liferafts	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.2.11 Boarding test		**Regulations: LSA Code IV/4.2.4; MSC.81(70) 1/5.8**
Test Procedure	Acceptance Criteria	Significant Test Data
The boarding test should be carried out in a swimming pool by a team of not more than four persons who should be of mature age and of differing physiques as determined by the Administration. Preferably they should not be strong swimmers. For this test they should be clothed in shirt and trousers or a boiler suit and should wear approved lifejackets suitable for an adult. They must each swim about 100 m before reaching the liferaft for boarding. There must be no rest period between the swim and the boarding attempt. Boarding should be attempted by each person individually with no assistance from other swimmers or persons already in the liferaft. The water should be of a depth sufficient to prevent any external assistance when boarding the liferaft.	The arrangements will be considered satisfactory if three of the persons board the liferaft unaided and the fourth boards with the assistance of any of the others.	Record particulars of persons: Age Height Weight P1 _____ Y _____ m _____ kg P2 _____ Y _____ m _____ kg P3 _____ Y _____ m _____ kg P4 _____ Y _____ m _____ kg Boarded unaided _____persons Boarded aided _____Persons Comments/Observations Passed _____ Failed _____

Rigid Liferafts	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.2.12 Closing arrangement test		**Regulations: LSA Code IV/4.1.1.5.3; MSC.81(70) 1/5.8**
Test Procedure	Acceptance Criteria	Significant Test Data
The boarding test should be repeated with persons clothed in immersion suits and lifejackets. After the boarding test a person clothed in approved immersion suit should demonstrate that the entrance can be easily and quickly closed in 1 minute and can be easily and quickly opened from inside and outside in 1 minute.	3 out of 4 persons wearing immersion suit and lifejackets must board the liferaft unaided. The entrance should be easily closed in less than 1 min. by a person wearing an approved immersion suit. The entrance should be easily opened from inside in less than 1 min. by a person wearing an approved immersion suit. The entrance should be easily opened from outside in less than 1 min. by a person wearing an approved immersion suit.	Record particulars of persons: Age Height Weight P1 _____ Y _____ m _____ kg P2 _____ Y _____ m _____ kg P3 _____ Y _____ m _____ kg P4 _____ Y _____ m _____ kg Boarded unaided _____ persons Boarded aided _____ Persons Closing time _____ sec Open time inside _____ sec Open time outside _____ sec Comments/Observations Passed _____ Failed _____

Rigid Liferafts	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.2.13 Stability test		**Regulations: LSA Code IV/4.2.5; MSC.81(70) 1/5.8**
Test Procedure	Acceptance Criteria	Significant Test Data
1) The number of persons for which the liferaft is to be approved should be accommodated on one side and then at one end and in each case the freeboard should be recorded. Under these conditions the freeboard should be such that there is no danger of the liferaft being swamped. 2) The stability of the liferaft during boarding may be ascertained as follows: - Two persons each wearing approved lifejackets should board the empty liferaft. It should then be demonstrated that the two persons in the liferaft can readily assist from the water a third person who is required to feign unconsciousness. The third person must have his back towards the entrance so that he cannot assist the rescuers.	1) Each freeboard measurement should be taken from the waterline to the top surface of the uppermost main buoyancy tube at its lowest point. 2) It should be demonstrated that the water pockets adequately counteract the upsetting moment on the liferaft and there is no danger of the liferaft capsizing.	Freeboards with all persons on one side: 12 o'clock _____ mm 3 o'clock _____ mm 6 o'clock _____ mm 9 o'clock _____ mm Observations when boarding:: - 2 persons: _____ unconscious person: _____ Effect of water pockets: Comments/Observations Passed _____ Failed _____

Rigid Liferafts	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.2.14 Manoeuvrability test		**Regulations: LSA Code IV/4.1.5.1.6; MSC.81(70) 1/5.10**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be demonstrated that with the paddles provided, the liferaft is capable of being propelled when fully laden in calm conditions over a distance of at least 25 m.	The liferaft should be capable of being propelled when fully laden in calm conditions over a distance of at least 25 m within a reasonable timescale.	Distance manoeuvred: _____ m Approx. speed: _____ knots Comments/Observations Passed _____ Failed _____

4.2.15 Swamp test		**Regulations: LSA Code; MSC.81(70) 1/5.11**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be demonstrated that if the liferaft is fully swamped, it is capable of and remains supporting the number of persons for which it is to be approved seaworthy. The liferaft should not seriously deform in this condition. The swamped liferaft should be tested in at least 10 waves at least 0.9 m high. The waves may be produced by the wake of a boat, or by other acceptable means.	The liferaft when fully swamped, should be capable of supporting the number of persons for which it is to be approved. The liferaft should not deform in this condition. During this test self-draining arrangements fitted in the floor of the liferaft are to be closed to prevent the ingress of water	Loaded liferaft swamped Freeboards: 12 o'clock _____ mm 3 o'clock _____ mm 6 o'clock _____ mm 9 o'clock _____ mm Maximum depth of water measured inside the liferaft: - _____ mm Wave height _____ m Deformation _____ If self-bailing, time to self bail: _____ min Comments/Observations Passed _____ Failed _____

Rigid Liferafts	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.2.16 Canopy closure test		**Regulations: LSA Code IV/4.1.1.5; MSC.81(70) 1/5.12**
Test Procedure	Acceptance Criteria	Significant Test Data
To ensure the effectiveness of the canopy closures in preventing water entering the liferaft, the efficiency of the closed entrances should be demonstrated by means of a hose test or by any other equally effective method. The requirement for the hose test is that about 2,300 l of water per minute be directed at and around the entrances through a 63.5 mm hose from a point 3.5 m away and 1.5 m above the level of the buoyancy tubes for a period of 5 min.	There should be no significant accumulation of water inside the liferaft.	Capacity of water hose _____l/min Condition of canopy during test _____ _____ _____ _____ _____ _____ Comments/Observations Passed _____ Failed _____

Rigid Liferafts	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.2.17 Detailed inspection		**Regulations: LSA Code; MSC.81(70) 1/5.14**
Test Procedure	Acceptance Criteria	Significant Test Data
The liferaft should be subjected to a detailed inspection to verify that it complies with to requirements of the LSA-code.	The liferaft should comply with the requirements of the LSA-code in all respects including: interior not to cause discomfort to occupants at least one viewing port means for collection rain water sufficient headroom 8 persons at least two entrances equipment to be stowed inside liferaft, but capable of floating at least 30 minutes in water without damage to content at least one boarding ramp means to assist a person to pull themselves into the liferaft container markings marking on raft	Interior not to cause discomfort to occupants _____ At least one viewing port _____ Means for collection rain water _____ Sufficient headroom _____ 8 persons at least two entrances _____ Equipment to be stowed inside liferaft, but capable of floating at least 30 minutes in water without damage to content _____ At least one boarding ramp _____ Means to assist a person to pull themselves into the liferaft _____ Container markings _____ Marking on raft _____ Comments/Observations Passed _____ Failed _____

Rigid Liferafts	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.2.18 Weak link strength test		**Regulations: LSA Code IV/4.1.6.2; MSC.81(70) 1/5.15**
Test Procedure	Acceptance Criteria	Significant Test Data
The weak link should be tensile tested.	A weak link in the painter system should have a breaking strain of 2.2 ± 0.4 kN (Refer to HRU test form 4.3.1.11)	Measured breaking strain of weak link: _____ kN Comments/Observations Passed _____ Failed _____

4.2.19 Lifting components strength test		**Regulations: LSA Code; MSC.81(70) 1/5.16**
Test Procedure	Acceptance Criteria	Significant Test Data
The breaking strength of the webbing or rope and the attachments to the liferaft used for the lifting bridle should be established by tests on three separate pieces of each different item.	The combined strength of the lifting bridle components should be at least six times the mass of the liferaft when loaded with the number of persons for which it is to be approved and its equipment.	Combined strength of lifting bridle components: - _____ Mass of liferaft when loaded with the number of persons for which it is to be approved: - _____ Calculated safety factor: -_____ Comments/Observations Passed _____ Failed _____

Rigid Liferafts	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.2.20 Impact test		**Regulations: LSA Code; MSC.81(70) 1/5.16.2**
Test Procedure	Acceptance Criteria	Significant Test Data
The liferaft should be loaded with a mass equal to the mass of the number of persons for which it is to be approved and its equipment. With the liferaft in a free hanging position it should be pulled laterally to a position so that when released it will strike a rigid vertical surface at a velocity of 3.5 m/s. The liferaft should then be released to impact against the rigid vertical surface. Note: The liferaft should be lifted up 650 mm.	After this test the liferaft should show no signs of damage which would affect its efficient functioning.	Comments/Observations Passed _____ Failed _____

4.2.21 Drop test		**Regulations: LSA Code; MSC.81(70) 1/5.16.3**
Test Procedure	Acceptance Criteria	Significant Test Data
The liferaft, loaded as prescribed in 4.2.19, should be suspended from an on-load release at a height of 3 m above the water, be released and allowed to fall freely into the water. The liferaft should then be examined.	The liferaft should sustain no damage, which would affect its efficient functioning.	Comments/Observations Passed _____ Failed _____

	Manufacturer:_____	Date:_____	Time:_____
Rigid Liferafts	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.2.22 Davit-launched liferaft boarding test		**Regulations: LSA Code; MSC.81(70) 1/5.16.4**
Test Procedure	Acceptance Criteria	Significant Test Data
A davit-launched liferaft should, in addition to the boarding test prescribed in 4.2.11, be subjected to the following test. The liferaft, hanging from a launching appliance and bowsed in to the ship' s side or simulated ship's side, should be boarded by the number of persons for which it is to be approved of average mass 75 kg. There should be no undue distortion of the liferaft. The bowsing should then be released and the liferaft left hanging for 5 min. It should then be lowered to the sea or floor and unloaded. At least three tests are required in succession, with the hook of the lowering appliance so positioned that its distance from the ship's side is: .1 half the beam of the liferaft +150 mm; .2 half the beam of the liferaft; and .3 half the beam of the liferaft -150 mm. The boarding, which is intended to simulate actual shipboard conditions, should be timed and the time recorded.	There should be no undue distortion of the liferaft. The boarding should be timed and the time recorded.	Boarding time 1: Distortion test 1: Boarding time2: Distortion test 2: Boarding time 3: Distortion test 3: Comments/Observations Passed _____ Failed _____

Rigid Liferafts	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.2.23 Self-righting test (self-righting liferafts only)		**Regulations: LSA Code IV/4.1.6.3; MSC.81(70) 1V/4.3.3**			
Test Procedure	Acceptance Criteria	Significant Test Data			
A suitable means should be provided to rotate the liferaft about a longitudinal axis to any angle of heel in calm water and then release it. The liferaft should be fully equipped, with no one on board, with entrances and openings in the as-packed condition. The liferaft should be incrementally rotated to angles of hull up to and including 180^0 and should be released.	After release the liferaft should automatically return to the upright position without assistance. Righting action should be positive and continuous.	The liferaft returned to upright position from the following angles of heel:			
		$+ 10^0$		$- 10^0$	
		$+ 20^0$		$- 20^0$	
		$+ 30^0$		$- 30^0$	
		$+ 40^0$		$- 40^0$	
		$+ 50^0$		$- 50^0$	
		$+ 60^0$		$- 60^0$	
		$+ 70^0$		$- 70^0$	
		$+ 80^0$		$- 80^0$	
		$+ 90^0$		$- 90^0$	
		$+ 100^0$		$- 100^0$	
		$+ 110^0$		$- 110^0$	
		$+ 120^0$		$- 120^0$	
		$+ 130^0$		$- 130^0$	
		$+ 140^0$		$- 140^0$	
		$+ 150^0$		$- 150^0$	
		$+ 160^0$		$- 160^0$	
		$+ 170^0$		$- 170^0$	
		$+ 180^0$		$- 180^0$	
		Comments/Observations Passed _____ Failed _____			

Rigid Liferafts	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.2.24 Submergence test (self-righting liferafts only)		**Regulations: MSC/Circ.809 Annex3; MSC.81(70) 1/5.19**
Test Procedure	Acceptance Criteria	Significant Test Data
The liferaft should be submerged to a depth of at least 4 m. A rigid liferaft should be released at this depth, and, if an inflatable liferaft, initiate inflation at this depth, so as to simulate automatic float-free operation. The liferaft should float to the surface and come to its designed operational condition ready to be boarded from the sea in a sea state of at least 2 metres significant wave height in association with a wind force of Beaufort force 6.	The liferaft should float to the surface and come to its designed operational condition ready to be boarded.	Significant wave height Method of determining Significant wave height: _____ wind force _____ Beaufort depth submerged Comments/Observations Passed _____ Failed _____

Rigid Liferafts	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.2.25 Wind velocity test		**Regulations: LSA Code; MSC.81(70) 1/5.20**
Test Procedure	Acceptance Criteria	Significant Test Data
The Administration should from a range of liferafts require at least: one liferaft from a range of 6 to 25 persons capacity provided the material construction arrangements are similar; and each liferaft greater than 25 persons capacity, except in the case where it can be shown that the material and construction arrangements deem this unnecessary: The liferaft or liferafts in the packed condition with the entrance so arranged that it will be open, but without the container, in a wind velocity of 30 m/s and should be left in this condition for 10 minutes. During the above-mentioned conditions, whenever practicable, the liferaft or liferafts should be swung over approximately 30^0 to starboard, from that position to approximately 30^0 to port and return to the starting position.	The liferaft or liferafts should show no sign of damage affecting its efficient function as a result of this test. On completion of these first stage tests there should be no detachment of the arch support or canopy from the upper buoyancy tube or other damage which affects the efficient function of the liferaft.	Comments/Observations Passed _____ Failed _____ Passed _____ Failed _____ Passed _____ Failed _____ Continued/…

Rigid Liferafts	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.2.25 Wind velocity test (continued)		**Regulations: LSA Code; MSC.81(70) 1/5.20**
Test Procedure	Acceptance Criteria	Significant Test Data
Then the liferaft or liferafts should be exposed to the above-mentioned wind velocity for 5 minutes in each of the following conditions: .1 with the entrance to the wind open and the other closed, if there is more than one entrance; .2 with the entrance to the wind closed and the other entrances open, if there is more than one entrance; .3 with all entrances closed.	The liferaft or liferafts should show no sign of damage affecting its efficient function as a result of this test.	Wind velocity measured: _____m/s Time in high winds: _____sec Comments/Observations Passed _____ Failed _____

Rigid Liferafts	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.2.26 Self draining test (self-righting liferafts only)		**Regulations: MSC.81(70) 1/5.21**
Test Procedure	Acceptance Criteria	Significant Test Data
Water should be pumped into the interior of the liferaft, while it is afloat, at a rate of 2300 l per minute for 1 min. If a liferaft is divided into separate areas, by thwarts or other means, each such area should be subjected to the test.	After the water has been shut off and has drained, there should be no appreciable accumulation of water in the liferaft.	Hose delivery rate: _____l/min Period of delivery of water: _____min Area of liferaft: _____m2 Area of drainage point: _____m2 Draining area sufficient to remove water: YES/NO: _____ Comments/Observations Passed _____ Failed _____

4.2.27 Inherently Buoyant Material		**Regulations: LSA Code 4.3.2.1; MSC.81(70) 1/6.2.2**
Test Procedure	Acceptance Criteria	Significant Test Data
The buoyancy of the rigid liferaft should be by inherently buoyant material tested according to the test in form 4.3.3.		Comments/Observations Passed _____ Failed _____

4.3.1 HYDROSTATIC RELEASE UNITS

EVALUATION AND TEST REPORT

4.3.1.1 Submitted drawings, reports and documents

4.3.1.2 Quality assurance

4.3.1.3 Visual and dimensional examination

4.3.1.4 Corrosion resistance test

4.3.1.5 Temperature tests

4.3.1.6 Submergence and manual release test

4.3.1.7 Strength test

4.3.1.8 Technical tests on the membrane – 1

4.3.1.9 Technical tests on the membrane – 2

4.3.1.10 Performance test

4.3.1.11 Weak link test

4.3.1 HYDROSTATIC RELEASE UNITS

EVALUATION AND TEST REPORT

Manufacturer	
Type (serviceable/disposable)	
Date	
Place	
Name Surveyor printed	
Signature	
Approving Organization	

Hydrostatic Release Units	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.3.1.1 Submitted drawings, reports and documents

Submitted drawings and documents			**Status**
Drawing No.	**Revision No. & date**	**Title of drawing**	

Submitted reports and documents			**Status**
Report/Document No.	**Revision No. & Date**	**Title of report / document**	
		Maintenance Manual -	
		Operations Manual -	

Hydrostatic Release Units	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.3.1.2 Quality Assurance	**Regulations: -**
Except where all appliances of a particular type are required by Chapter III of the International Convention for the Safety of Life at Sea, 1974.3, as amended, to be inspected, representatives of the Administration should make random inspections of manufacturers to ensure that the quality of life-saving appliances and materials used comply with the specification of the approved prototype life-saving appliance. Manufacturers should be required to institute a quality control procedure to ensure that life-saving appliances are provided to the same standard as the prototype life-saving appliance approved by the Administration and to keep records of any production tests carried out in accordance with the Administration's instructions.	Quality Assurance Standard Used: - _____ Quality Assurance Procedure: - _____ Quality Assurance Manual: - _____ Description of System. Quality Assurance System acceptable Yes/No Comments/Observations

Hydrostatic Release Units	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.3.1.3 Visual and dimensional examination		**Regulations: LSA Code IV/4.3.1.6.3.1; MSC.81(70) 1/11.1**
Test Procedure	Acceptance Criteria	Significant Test Data
Two samples of hydrostatic release units should be given a visual and dimensional examination. If the devices conform with the manufacturer's drawings and specifications, they should be accepted and assembled for further testing under the technical and performance tests as prescribed below. The examination should include proper markings, clear instructions (indelible), expiry date and confirmation that the materials are : - Compatible; and not.galvanized or otherwise metallic coated. The lifespan should be determined.	The units should be examined and must conform to the manufacturer's drawings and specifications.	Comments/Observations Lifespan: _____ Passed _____ Failed _____

Hydrostatic Release Units	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.3.1.4 Corrosion resistance test		**Regulations: LSA Code IV/4.3.1.6.3.1; MSC.81(70) 1/11.2.1**
Test Procedure	Acceptance Criteria	Significant Test Data
A hydrostatic release unit should be exposed to a salt water spray test (5% natrium chloride solution) at a temperature of 35 ± 3^0C for 160 h without interruption. (not stated)	After completion of the test the hydrostatic release unit should show no corrosion which could affect its efficient functioning.	Salt water solution: _____ _____ Time exposed to spray _____ hrs Comments/Observations Passed _____ Failed _____

Hydrostatic Release Units	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.3.1.5 Temperature tests	**Regulations: LSA Code I/1.2.2.2; MSC.81(70) 1/11.2.2**	
Test Procedure	Acceptance Criteria	Significant Test Data
The hydrostatic release units should then be subjected to the temperature cycling test. The units should be alternately subjected to surrounding temperatures of -30^{0}C and +65^{0}C. These alternating cycles need not follow immediately after each other and the following procedure, repeated for a total of 10 cycles, is acceptable: .1 an 8 h cycle at + 65^{0}C to be completed in one day; .2 the specimens removed from the warm chamber that same day and left exposed under ordinary room conditions until the next day; .3 an 8 h cycle at -30^{0}C to be completed the next day; and .4 the specimens removed from the cold chamber that same day and left exposed under ordinary room conditions until the next day.	The hydrostatic release unit should not be damaged in stowage throughout the air temperature range -30°C to +65°C. There should be no sign of loss of rigidity under high temperatures and after the tests, the unit should show no sign of damage such as shrinking cracking swelling dissolution or change of mechanical qualities, and it should operate as before the test. Following temperature cycling: - One HRU should be taken from a stowage temerature of –30°C and should then operate in seawter at a temperature of –1°C. The other HRU should be taken from a stowage temperature of +65°C and should then operate at a temperature of +30°C.	Comments/Observations Passed _____ Failed _____

Hydrostatic Release Units	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.3.1.6 Submergence and manual release test		**Regulations: LSA Code IV/4.3.1.6.3; MSC.81(70) 1/11.2.3**
Test Procedure	Acceptance Criteria	Significant Test Data
The hydrostatic release unit should then be tested by applying a buoyant load equal to its designed capacity while the device is submerged in a water or in a water-filled pressure testing tank. It should release at a depth of not more than 4.0 m. On completion of these tests and resetting, the hydrostatic release unit should be capable of being released manually if it is designed to allow manual release of the unit.	The unit should release the buoyant load at a depth of not more than 4.0 m. After being reset the unit should be capable of being manually released if it is designed for manual release. It should be opened for inspection and should show no significant signs of corrosion or degradation.	Comments/Observations Depth of release: _____ Passed _____ Failed _____

Hydrostatic Release Units	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.3.1.7 Strength test		**Regulations: LSA Code IV/4.3.1.6.3.7; MSC.81(70) 1/11.4.3**
Test Procedure	Acceptance Criteria	Significant Test Data
The unit should be subjected to a tensile test of at least 10 kN for a period of 30 minutes. (15 kN if fitted to a raft for more than 25 persons).	If it is designed to allow manual release of the unit it should then be capable of being operated manually. There should be no change of mechanical properties.	Tensile test load _____ kN Tensile test time_____ minutes. Operated manually _____yes/ _____no Comments/Observations Passed _____ Failed _____

4.3.1.8 Technical tests on the membrane - 1		**Regulations: LSA Code I/1.2.2.2; MSC.81(70) 1/11.5.1 & 11.5.2**
Test Procedure	Acceptance Criteria	Significant Test Data
Resistance to cold: Number of specimens 2 membranes Temperature -30^0C Exposure time 30 min Flex testing 180^0 with both inside and outside stretched. **Resistance to heat:** Number of specimens 2 membranes Temperature $+65^0$C Exposure time 7 days	**Resistance to cold:** The membranes should show no visible cracking. **Resistance to heat:** The membranes should show no visible cracking.	Comments/Observations (Cold): - Passed _____ Failed _____ Comments/Observations (Heat): - Passed _____ Failed _____

Hydrostatic Release Units	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.3.1.9 Technical tests on the membrane - 2		**Regulations: LSA Code I/1.2.2.4.3; MSC.81(70) 1/11.5.3 – 11.5.5**
Test Procedure	Acceptance Criteria	Significant Test Data
Test for surface resistance to oil: Number of specimens 2 membranes Temperature $+18^0$C to $+20^0$C Type of oil A mineral oil meeting the following requirements: Aniline point: $120^0 \pm 5^0$C Flashpoint: minimum 240^0C Viscosity: 10-25 cSt at 99.0^0C The following oils may be used: ASTM Oil No.1, ASTM Oil No.5, ISO Oil No. 1 Testing Period 3 h on each side	**Test for surface resistance to oil:** The material should show no deterioration.	Comments/Observations (oil) Passed _____ Failed _____
Resistance to natrium Chloride: Two membranes should be immersed for 7 days in 5% natrium chloride solution Test temperature $+18^0$C to $+20^0$C	**Resistance to sea-water:** The material should show no deterioration.	Comments/Observations (sea-water) Passed _____ Failed _____
Resistance to detergents: Two membranes should be immersed for 7 days in detergents commonly used on board ships. Test temperature $+18^0$C to $+20^0$C	**Resistance to detergents:** The membranes should not be affected by the detergents.	Comments/Observations (detergents) Types used: - Passed _____ Failed _____

Hydrostatic Release Units	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.3.1.10 Performance test	**Regulations: LSA Code IV/4.3.1.6.3; MSC.81(70) 1/11.3.1 & 11.3.2.1 - .4.3**	
Test Procedure	Acceptance Criteria	Significant Test Data
This test should be performed using the smallest and the largest liferafts with which the hydrostatic release unit may be used. If the occupant range between the smallest and largest liferaft exceeds 25 persons, then the intermediate size liferaft should also be tested. The liferaft should be placed horizontally on a rack or platform of sufficient weight to submerge the liferaft. The hydrostatic release unit and painter should be installed as aboard a ship. The following tests should be carried out in a suitable depth of water. The platform should be lowered into the water as follows: Raft horizontal Raft tilted 45^0 with the HRU at the lower side. Raft tilted 100^0 with the HRU at the lower side. Raft tilted 45^0 with the HRU at the upper side. Raft tilted 100^0 with the HRU at the upper side. Raft vertically.	In all tests the hydrostatic release unit should release the liferaft at a depth of less than 4.0 m.	Release in the following positions: Raft horizontal: _____ Passed/Failed Raft tilted 45^0 with the HRU at the lower side: - _____ Passed/Failed Raft tilted 100^0 with the HRU at the lower side: - _____ Passed/Failed Raft tilted 45^0 with the HRU at the upper side: - _____ Passed/Failed Raft tilted 100^0 with the HRU at the upper side: - _____ Passed/Failed Raft vertically: _____ Passed/Failed Comments/Observations Passed _____ Failed _____

Hydrostatic Release Units	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.3.1.11 Weak link test	**Regulations: LSA Code IV/4.3.1.6.2; MSC.81(70) 1/5.15**	
Test Procedure	Acceptance Criteria	Significant Test Data
The weak link should be strength tested (if not tested together with the liferaft painter system).	A weak link in the painter system should have a breaking strain of 2.2 ±0.4kN.	Measured breaking strain: - Comments/Observations Passed _____ Failed _____

4.3.2 LIFEBOAT AND RESCUE BOAT INBOARD ENGINES

EVALUATION AND TEST REPORT

4.3.2.1 Submitted drawings, reports and documents

4.3.2.2 Quality assurance

4.3.2.3 Cold engine starting test

4.3.2.4 Engine-out-of-water test

4.3.2.5 Submerged engine test

4.3.2.6 Engine inversion test

4.3.2 LIFEBOAT AND RESCUE BOAT INBOARD ENGINES

EVALUATION AND TEST REPORT

Manufacturer	
Engine type	
Serial number	
Fuel type	
Design power output (kW)	
Propeller diameter and pitch	
Gear box type and No.	
Required battery capacity	
Starting aids	
Date	
Place	
Name and signature of surveyor	
Approval Organization	

Inboard Engines	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.3.2.1 Submitted drawings, reports and documents

Submitted drawings and documents			Status
Drawing No.	**Revision No. & date**	**Title of drawing**	

Submitted reports and documents			Status
Report/Document No.	**Revision No. & Date**	**Title of report / document**	
		Maintenance Manual -	
		Operations Manual -	

Inboard Engines	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.3.2.2 Quality Assurance	**Regulations: MSC.81(70) 2/1.1 and 1.2**
Except where all appliances of a particular type are required by chapter III of the International Convention for the Safety of Life at Sea, 1974, as amended, or the International Life-Saving Appliance (LSA) Code, to be inspected, representatives of the Administration should make random inspection of manufacturers to ensure that the quality of life-saving appliances and the materials used comply with the specification of the approved prototype life-saving appliance. Manufacturers should be required to institute a quality control procedure to ensure that life-saving appliances are produced to the same standard as the prototype life-saving appliance approved by the Administration and to keep records of any production tests carried out in accordance with the Administration's instructions.	Quality Assurance Standard Used: - _____ Quality Assurance Procedure: - _____ Quality Assurance Manual: - _____ Description of System. Quality Assurance System acceptable Yes/No Comments/Observations

Inboard Engines	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.3.2.3 Cold engine starting test		**Regulations: LSA Code 4.4.6.2 ; MSC.81(70) 1/6.10.2 - 6.10.4**
Test Procedure	Acceptance Criteria	Significant Test Data
The engine may be removed from the lifeboat for this test, however, it should be equipped with accessories and the transmission that will be used in the lifeboat. The engine, along with its fuel and coolant and starting power sources and any necessary starting aids should also be provided and should be placed in a chamber at a temperature of –15^{0}C. The temperature of the fuel, lubricating oil and cooling fluid (if any) should be measured at the beginning of this test and should not be higher than -15^{0}C. Samples of each fluid at this temperature should be collected in a container for observation. The engine should be started three times. The first two times, the engine should be allowed to operate long enough to demonstrate that it runs at operating speed. After the first two starts the engine should be allowed to stand until all parts have again reached chamber temperature. After the third start, the engine should be allowed to continue to run for a least 10 min and during this period the transmission should be operated through its gear positions.	The engine should be provided with either a manual starting system, or a power starting system with two independent rechargeable energy sources. The engine starting systems and starting aids should start the engine at an ambient temperature of -15°C within 2 min of commencing the start procedure unless, in the opinion of the Administration having regard to the particular voyages in which the ship carrying the lifeboat is constantly engaged, a different temperature is appropriate.	Starting power source: Starting aids used: Measured temperatures : Chamber : _____ ^{o}C Fuel : _____ ^{o}C Lubricant oil : _____ ^{o}C Cooling fluid : _____ ^{o}C Number of starts : _____ times Duration of first run: min. Duration of second run : _____ min Duration of last run: min. Required capacity starting battery ? Administration's limit on operating temperature range? Passed/ Failed Comments/Observations

Inboard Engines	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.3.2.4 Engine-out-of-water test		**Regulations: LSA Code 4.4.6.3; MSC.81(70) 1 /6.10.5**
Test Procedure	Acceptance Criteria	Significant Test Data
The engine should be operated for at least 5 min at idling speed under conditions simulating normal storage.	The engine should be capable of operating for not less than 5 min after starting from cold with the lifeboat out of the water. The engine should not be damaged as a result of this test.	Boat placed in normal storage position? yes / no Temperature of storage location: °C Duration : _____ min Any damage after this test? Passed/ Failed Comments/Observations

4.3.2.5 Submerged engine test		**Regulations: LSA Code 4.4.6.4; MSC.81(70) 1 /6.10.6**
Test Procedure	Acceptance Criteria	Significant Test Data
The engine should be operated for at least 5 min while submerged in water to the level of the centreline of the crankshaft with the engine in a horizontal position.	The engine should be capable of operating when the lifeboat is flooded up to the centreline of the crankshaft. The engine should not be damaged as a result of this test.	Engine flooded up to centreline of crankshaft? Yes / No Duration : _____ min Any damage after this test? Passed /Failed Condition of engine oil? Passed/ Failed Comments/Observations

Inboard Engines	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.3.2.6 Engine inversion test		**Regulations: LSA Code 4.6.4.2; MSC.81(70) 1 /6.14.6 - 6.14.8**
Test Procedure	Acceptance Criteria	Significant Test Data
The engine and its fuel tank should be mounted on a frame that is arranged to rotate about an axis equivalent to the longitudinal axis of the boat. A pan should be located under the engine to collect any oil which may leak from the engine so that the quantity of such oil can be measured. The following procedure should be followed during this test: .1 start the engine and run it at full speed for 5 min; .2 stop the engine and rotate it in a clockwise direction through 360^0; .3 restart the engine and run it at full speed for 10 min; .4 stop the engine and rotate it in a counter-clockwise direction through 360^0; .5 restart the engine, run it at full speed for 10 min, and then stop the engine; .6 allow the engine to cool; .7 restart the engine and run it at full speed for 5 min;	The engine and engine installation should be capable of running in any position during capsize and continue to run after the lifeboat returns to the upright or should automatically stop on capsizing and be easily restarted after the lifeboat returns to the upright. The design of the fuel and lubricating systems should prevent the loss of fuel and the loss of more than 250 ml of lubricating oil from the engine during capsize. During these tests, the engine should not overheat, fail to operate or leak more than 250 ml of oil during any one inversion. When examined after being dismantled the engine should show no evidence of overheating or excessive wear.	Passed _____ Failed _____ Comments/Observations

	Manufacturer:_____	Date:_____	Time:_____
Inboard Engines	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.3.2.6 Engine inversion test (cont'd)		**Regulations: LSA Code 4.6.4.2 ; MSC.81(70) 1/6.14.6 - 6.14.8**
Test Procedure	Acceptance Criteria	Significant Test Data
The following procedure should be followed during this test (Continued): .8 slowly rotate the running engine in a clockwise direction through 180^0, hold at the 180^0 position for 10 s, and then rotate it 180^0 further in a clockwise direction to complete one revolution; .9 if the engine is arranged to stop automatically when inverted, restart it; .10 allow the engine to continue to run at full speed for 10 min; .11 shut the engine down and allow it to cool; .12 repeat the procedure in .7 through .11 above, except that the engine should be turned in a counter-clockwise direction; .13 restart the engine and run it at full speed for 5 min; .14 rotate the engine in a clockwise direction through 180^0 and stop the engine. Rotate it 180^0 further to complete a full clockwise revolution; .15 restart the engine and run it at full speed for 10 min; .16 repeat the procedure in .14 above, turning the engine counter-clockwise; .17 restart the engine, run it at full speed for 10 min and then shut it down; and .18 dismantle the engine for examination.	During these tests, the engine should not overheat, fail to operate or leak more than 250 ml of oil during any one inversion. When examined after being dismantled the engine should show no evidence of overheating or excessive wear.	Are all the tests carried out according to the procedure as prescribed? Passed/ Failed Does the engine stop when turned in either direction? Passed/ Failed If it stops, does it easily restart? Passed/ Failed Does the engine fulfil the requirements after the tests have been carried out according to the procedure? Passed/ Failed Amount of oil lost from engine during each inversion: .2 : ml .4 : ml .8 : ml .12 : ml .14 : ml .16 : ml Total amount of oil lost from engine: ml Evidence of overheating or excessive wear? Passed/ Failed Amount of oil lost from engine ..... ml Comments/Observations

4.3.3 LIFEBOAT BUOYANT MATERIAL

EVALUATION AND TEST REPORT

4.3.3.1 Submitted drawings, reports and documents

4.3.3.1.1 Quality assurance

4.3.3.2 Measure dimensions

4.3.3.3 Temperature cycling test

4.3.3.4 Examination of internal structure

4.3.3.5 Temperature cycling and water absorption test

4.3.3.6 Temperature cycling, high octane petroleum spirit and water absorption test

4.3.3.7 Tests for water absorption

4.3.3.8 Crude oil test

4.3.3.9 Marine fuel oil test (Grade C)

4.3.3.10 Diesel oil test (Grade A)

4.3.3.11 High octane petroleum spirit test

4.3.3.12 Kerosene test

4.3.3 LIFEBOAT BUOYANT MATERIAL

EVALUATION AND TEST REPORT

Manufacturer	
Type/Model	
Date of Approval	
Place	
Name Surveyor printed	
Signature	
Approving Organization	

Lifeboat Buoyant Material	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.3.3.1 Submitted drawings, reports and documents

Submitted drawings and documents			**Status**
Drawing No.	**Revision No. & date**	**Title of drawing**	

Submitted reports and documents			**Status**
Report/Document No.	**Revision No. & Date**	**Title of report / document**	
		Maintenance Manual -	
		Operations Manual -	

Lifeboat Buoyant Material	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.3.3.1.1 Quality Assurance	**Regulations: - SOLAS III/4**
Except where all appliances of a particular type are required by Chapter III of the International Convention for the Safety of Life at Sea, 1974, as amended, to be inspected, representatives of the Administration should make random inspections of manufacturers to ensure that the quality of life-saving appliances and materials used comply with the specification of the approved prototype life-saving appliance. Manufacturers should be required to institute a quality control procedure to ensure that life-saving appliances are provided to the same standard as the prototype life-saving appliance approved by the Administration and to keep records of any production tests carried out in accordance with the Administration's instructions.	Quality Assurance Standard Used: - _____ Quality Assurance Procedure: - _____ Quality Assurance Manual: - _____ Description of System. Quality Assurance System acceptable Yes/No Comments/Observations

Lifeboat Buoyant Material	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

TEST ITEMS	REFERENCES									REMARKS	
CONDITIONING SEQUENCE	1-2	3-4	5-6	7-8	9-10	11-12	13-14	15-16	17-18	MSC 70/23/Add.1	
Measure dimensions (4.3.3.2)	A	A	A	A	A	A	A	A	A		
Temperature cycling test (4.3.3.3)	B	B	B								
Measure dimensions at end of temperature cycling test. (4.3.3.3)	C	C	C								
Examination of internal structure (4.3.3.4)	D										
Measure initial buoyancy		D	D	D	D	D	D	D	D		
High octane petroleum spirit (4.3.3.6) & (4.3.3.11)			E					E			
Crude oil (4.3.3.8)					E						
Marine fuel oil (Grade C) (4.3.3.9)						E					
Diesel oil (Grade A) (4.3.3.10)							E				
Kerosene (4.3.3.12)									E		
Measure dimensions			F		F	F	F	F	F		
Fresh water absorption test (4.3.3.5) & (4.5.2.7)		G	G	G	G	G	G	G	G		
Measure dimensions		H	H	H	H	H	H	H	H		
Measure final buoyancy		I	I	I	I	I	I	I	I		

Lifeboat Buoyant Material	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.3.3.2 Measure Dimensions	**Regulations: LSA Code 1.2; MSC.81(70) 1 /6.2 and 2.7**		
Test Procedure	Acceptance Criteria	Significant Test Data	
Measure the dimensions of the specimens The specimens should be at least 300 mm square and be of the same thickness as used in the lifejacket.		1 ____ X ____ X ____	11 ____ X ____ X ____
		2 ____ X ____ X ____	12 ____ X ____ X ____
		3 ____ X ____ X ____	13 ____ X ____ X ____
		4 ____ X ____ X ____	14 ____ X ____ X ____
		5 ____ X ____ X ____	15 ____ X ____ X ____
		6 ____ X ____ X ____	16 ____ X ____ X ____
		7 ____ X ____ X ____	17 ____ X ____ X ____
		8 ____ X ____ X ____	18 ____ X ____ X ____
		9 ____ X ____ X ____	19 ____ X ____ X ____
		10 ____ X ____ X ____	20 ____ X ____ X ____
		Passed _____	Failed _____
		Comments/Observations	

Lifeboat Buoyant Material	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.3.3.3 Temperature cycling test		**Regulations: LSA Code** 1.2**; MSC.81(70) 1 /6.2.2 and 2.7.1**
Test Procedure	Acceptance Criteria	Significant Test Data
Six specimens should be subjected for 8 hours to surrounding temperatures of -30°C and + 65°C. These alternating cycles need not follow immediately after each other and the following procedure, repeated for ten cycles is acceptable: An 8 h cycle at +65°C to be completed in one day; and the specimens removed from the warm chamber that same day and left exposed under ordinary room conditions until the next day; and an 8 h cycle at -30°C to be completed the next day; and The specimens removed from the cold chamber that same day and left exposed under ordinary room conditions until the next day.	The dimensions of the specimens should be recorded at the end of the ten-cycle period. The specimens should be carefully examined and should not show any sign of external change of structure or of mechanical qualities.	Dimensions before test / Dimensions after test 1 ____ X ____ X ____ / ____ X ____ X ____ 2 ____ X ____ X ____ / ____ X ____ X ____ 3 ____ X ____ X ____ / ____ X ____ X ____ 4 ____ X ____ X ____ / ____ X ____ X ____ 5 ____ X ____ X ____ / ____ X ____ X ____ 6 ____ X ____ X ____ / ____ X ____ X ____ Passed _____ Failed _____ Comments/Observations

4.3.3.4 Examination of internal structure		**Regulations: LSA Code 1.2; MSC.81(70) 1 /6.2.2, 2.7.1 and 2.7.2**
Test Procedure	Acceptance Criteria	Significant Test Data
Following the temperature cycling test, two of the specimens should be cut open and examined.	Neither of the two specimens cut open should show any sign of internal change of structure.	Specimen No. 1 Internal condition (Passed/Failed) Specimen No. 2 Internal condition (Passed/Failed) Comments/Observations

Lifeboat Buoyant Material	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.3.3.5 Temperature cycling and Water absorption test		**Regulations: LSA Code 1.2; MSC.81(70) 1 /2.7.1, 2.7.8 & 6.2.2**
Test Procedure	Acceptance Criteria	Significant Test Data
The test should be carried out on two specimens which have been subjected to the temperature cycling test. The test should be carried out in fresh water and the specimens should be immersed for a period of seven days under a 1.25 m head of water. The results should state the mass in kilograms which each specimen could support out of the water after one and seven days immersion (the selection of a test method suitable for obtaining this result directly or indirectly is left to the discretion of the testing authority).	The reduction of buoyancy should not exceed 5%. The specimens should show no signs of damage such as shrinking, cracking swelling, dissolution or change of mechanical qualities.	Dimensions before test — Dimensions after test 3 ____ X ____ X ____ — ____ X ____ X ____ 4 ____ X ____ X ____ — ____ X ____ X ____ <u>% change in dimensions</u> 3 _____% — 4 _____% Buoyancy after 1 day — Buoyancy after 7 day 3 _____ — _____ 4 _____ — _____ <u>% change in buoyancy</u> 3 _____% — 4 _____% Comments/Observations Passed _____ Failed _____

Lifeboat Buoyant Material	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.3.3.6 Temperature cycling, high octane petroleum spirit & water absorption test	**Regulations: LSA Code 1.2; MSC.81(70) 1 /2.7.1, 6.2.2 & 6.2.5**

Test Procedure	Acceptance Criteria	Significant Test Data
The test should be carried out on two specimens which have been subjected to the temperature cycling test followed by being immersed horizontally for a period of 24 hr under 100 mm head of high octane petroleum spirit at normal room temperature. After completing the above the test should be carried out in fresh water and the specimens should be immersed for a period of seven days under a 1.25 m head of water. The dimensions should be recorded at the beginning and end of these tests. The results should state the mass in kilograms which each specimen could support out of the water after one and seven days immersion (the selection of a test method suitable for obtaining this result directly or indirectly is left to the discretion of the testing authority).	The reduction of buoyancy should not exceed 16%. The specimens should show no sign of damage such as shrinking, cracking swelling, dissolution or change of mechanical qualities.	Dimensions before test — Dimensions after test 5 ____ X ____ X ____ — ____ X ____ X ____ 6 ____ X ____ X ____ — ____ X ____ X ____ <u>% change in dimensions</u> 5 _____% — 6 _____% Buoyancy after 1 day — Buoyancy after 7 day 5 _____ — _____ 6 _____ — _____ <u>% change in buoyancy</u> 5 _____% — 6 _____% Comments/Observations Passed _____ Failed _____

Lifeboat Buoyant Material	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.3.3.7 Tests for water absorption		**Regulations: LSA Code 1.2; MSC.81(70) 1 / 6.2.2 & 6.2.8**
Test Procedure	Acceptance Criteria	Significant Test Data
The test should be carried out on two specimens as supplied. The dimensions should be recorded at the beginning and end of these tests. The test should be carried out in fresh water and the specimens should be immersed for a period of seven days under a 1.25 m head of water. The results should state the mass in kilograms which each specimen could support out of the water after one and seven days immersion (the selection of a test method suitable for obtaining this result directly or indirectly is left to the discretion of the testing authority).	The reduction of buoyancy should not exceed 5%. The specimens should show no sign of damage such as shrinking, cracking swelling, dissolution or change of mechanical qualities.	Dimensions before test / Dimensions after test 7 ____ X ____ X ____ / ____ X ____ X ____ 8 ____ X ____ X ____ / ____ X ____ X ____ <u>% change in dimensions</u> 7 _____% 8 _____% Buoyancy after 1 day / Buoyancy after 7 day 7 _____ / _____ 8 _____ / _____ <u>% change in buoyancy</u> 7 _____% 8 _____% Comments/Observations Passed _____ Failed _____

Lifeboat Buoyant Material	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.3.3.8 Crude oil test	**Regulations: LSA Code 1.2; MSC.81(70) 1 /6.2.2, 6.2.3.1, 6.2.7 & 2.7.8**	
Test Procedure	Acceptance Criteria	Significant Test Data
Two specimens of the material should be immersed in crude oil for a period of 14 days under a 100 mm head. The specimens should be tested as supplied by the manufacturer and at normal room temperature (approximately 18°C). After completing the above immersion the two specimens should be immersed for a period of seven days under a 1.25 m head of water. The results should state the mass in kilograms which each specimen could support out of the water after one and seven days immersion (the selection of a test method suitable for obtaining this result directly or indirectly is left to the discretion of the testing authority).	The reduction of buoyancy must not exceed 5%. The two specimens should show no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical qualities.	Dimensions before test / Dimensions after test 9 ____ X ____ X ____ / ____ X ____ X ____ 10 ____ X ____ X ____ / ____ X ____ X ____ <u>% change in dimensions</u> 9 _____% / 10 _____% Buoyancy after 1 day / Buoyancy after 7 day 9 _____ / _____ 10 _____ / _____ <u>% change in buoyancy</u> 9 _____% / 10 _____% Comments/Observations Passed _____ Failed _____

Lifeboat Buoyant Material	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.3.3.9 Marine fuel oil test (Grade C)*		**Regulations: LSA Code 1.2; MSC.81(70) 1 /6.2.2, 6.2.3.2, 6.2.7 & 2.7.8**
Test Procedure	Acceptance Criteria	Significant Test Data
Two specimens of the material should be immersed in marine fuel oil (grade C) for a period of 14 days under a 100 mm head. The specimens should be tested as supplied by the manufacturer and at normal room temperature (approximately 18°C). After completing the above immersion the two specimens should be immersed for a period of seven days under a 1.25 m head of water. The results should state the mass in kilograms which each specimen could support out of the water after one and seven days immersion (the selection of a test method suitable for obtaining this result directly or indirectly is left to the discretion of the testing authority). * Refer to ISO standards ISO 8216 and ISO 8217 – Petroleum products.	The reduction of buoyancy must not exceed 5%. The specimen should show no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical qualities.	Dimensions before test / Dimensions after test 11 ____ X ____ X ____ / ____ X ____ X ____ 12 ____ X ____ X ____ / ____ X ____ X ____ <u>% change in dimensions</u> 11 _____% 12 _____% Buoyancy after 1 day / Buoyancy after 7 day 11 _____ / _____ 12 _____ / _____ <u>% change in buoyancy</u> 11 _____% 12 _____% Comments/Observations Passed _____ Failed _____

Lifeboat Buoyant Material	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.3.3.10 Diesel oil test (Grade A)*		**Regulations: LSA Code 1.2; MSC.81(70) 1 /6.2.2, 6.2.3.3, 6.2.7 & 2.7.8**
Test Procedure	Acceptance Criteria	Significant Test Data
Two specimens of the material should be immersed in diesel oil (grade A) for a period of 14 days under a 100 mm head. The specimens should be tested as supplied by the manufacturer and at normal room temperature (approximately 18°C) After completing the above immersion the two specimens should be immersed for a period of seven days under a 1.25 m head of water. The results should state the mass in kilograms which each specimen could support out of the water after one and seven days immersion (the selection of a test method suitable for obtaining this result directly or indirectly is left to the discretion of the testing authority). * Refer to ISO standards ISO 8216 and ISO 8217 – Petroleum products.	The reduction of buoyancy must not exceed 5% The specimen should show no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical qualities.	Dimensions before test / Dimensions after test 13 ____ X ____ X ____ / ____ X ____ X ____ 14 ____ X ____ X ____ / ____ X ____ X ____ % change in dimensions 13 _____% / 14 _____% Buoyancy after 1 day / Buoyancy after 7 day 13 _____ / _____ 14 _____ / _____ % change in buoyancy 13 _____% / 14 _____% Comments/Observations Passed _____ Failed _____

Lifeboat Buoyant Material	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.3.3.11 High octane petroleum spirit test		**Regulations: LSA Code 1.2; MSC.81(70) 1 /6.2.2, 6.2.3.4, 6.2.7 & 2.7.8**
Test Procedure	Acceptance Criteria	Significant Test Data
Two specimens of the material should be immersed in high octane petroleum spirit for a period of 14 days under a 100 mm head. The specimens should be tested as supplied by the manufacturer and at normal room temperature (approximately 18°C). After completing the above immersion the two specimens should be immersed for a period of seven days under a 1.25 m head of water. The results should state the mass in kilograms which each specimen could support out of the water after one and seven days immersion (the selection of a test method suitable for obtaining this result directly or indirectly is left to the discretion of the testing authority).	The reduction of buoyancy must not exceed 5%. The specimen should show no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical qualities.	Dimensions before test / Dimensions after test 15 ____ X ____ X ____ / ____ X ____ X ____ 16 ____ X ____ X ____ / ____ X ____ X ____ <u>% change in dimensions</u> 15 _____% 16 _____% Buoyancy after 1 day / Buoyancy after 7 day 15 _____ / _____ 16 _____ / _____ <u>% change in buoyancy</u> 15 _____% 16 _____% Comments/Observations Passed _____ Failed _____

Lifeboat Buoyant Material	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.3.3.12 Kerosene test	**Regulations: LSA Code 1.2; MSC.81(70) 1 /6.2.2, 6.2.3.5, 6.2.7 & 2.7.8**	
Test Procedure	Acceptance Criteria	Significant Test Data
Two specimens of the material should be immersed in kerosene for a period of 14 days under a 100 mm head. The specimens should be tested as supplied by the manufacturer and at normal room temperature (approximately 18°C). After completing the above immersion the two specimens should be immersed for a period of seven days under a 1.25 m head of water. The results should state the mass in kilograms which each specimen could support out of the water after one and seven days immersion (the selection of a test method suitable for obtaining this result directly or indirectly is left to the discretion of the testing authority).	The reduction of buoyancy must not exceed 5%. Specimen should show no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical qualities.	Dimensions before test — Dimensions after test 17 ____ X ____ X ____ — ____ X ____ X ____ 18 ____ X ____ X ____ — ____ X ____ X ____ <u>% change in dimensions</u> 17 _____% — 18 _____% Buoyancy after 1 day — Buoyancy after 7 day 17 _____ — _____ 18 _____ — _____ <u>% change in buoyancy</u> 17 _____% — 18 _____% Comments/Observations Passed _____ Failed _____

4.3.4 INFLATABLE LIFERAFT MATERIALS

EVALUATION AND TEST REPORT

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4.3.4.15 Tensile Strength (Fabrics used for outer canopies)

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4.3.4 INFLATABLE LIFERAFT MATERIALS

EVALUATION AND TEST REPORT

Manufacturer	
Type	
Date of Approval	
Place	
Name Surveyor printed	
Signature	
Approving Organization	

Inflatable Liferaft Materials	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.3.4.0 Submitted drawings, reports and documents

Submitted drawings and documents			**Status**
Drawing No.	**Revision No. & date**	**Title of drawing**	

Submitted reports and documents			**Status**
Report/Document No.	**Revision No. & Date**	**Title of report / document**	

Inflatable Liferaft Materials	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.3.4.1 Quality Assurance	**Regulations: -**
Except where all appliances of a particular type are required by Chapter III of the International Convention for the Safety of Life at Sea, 1974, as amended, to be inspected, representatives of the Administration should make random inspections of manufacturers to ensure that the quality of life-saving appliances and materials used comply with the specification of the approved prototype life-saving appliance. Manufacturers should be required to institute a quality control procedure to ensure that life-saving appliances are provided to the same standard as the prototype life-saving appliance approved by the Administration and to keep records of any production tests carried out in accordance with the Administration's instructions.	Quality Assurance Standard Used: - _____ Quality Assurance Procedure: - _____ Quality Assurance Manual: - _____ Description of System. Quality Assurance System acceptable Yes/No Comments/Observations

Inflatable Liferaft Materials	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.3.4.2 Fabric Marking & Selection		**Regulations: LSA Code IV/4.2; MSC.81(70) 1/5.17.13.1**
Test Procedure	Acceptance Criteria	Significant Test Data
	The fabric should be marked in such a manner as to allow traceability of the fabric manufacturer and production LOT number.	Is the fabric marked? YES _____ NO Marking Schedule_____ Comments/Observations Passed _____ Failed _____

4.3.4.3 Tensile Strength		**Regulations: LSA Code IV/4.2; MSC.81(70) 1/5.17.13.2.2.1**
Test Procedure	Acceptance Criteria	Significant Test Data
Tensile Strength ISO 1421	When tested by the method described in ISO 1421 the tensile strength should be a minimum of 2255 N/50 mm width for warp and weft. Maximum elongation, for the above should be 30% over a 200 mm gauge length, the elongation should be expressed as a percentage of the initial test length between the jaws. Where two layers of floor fabric are provided to form an inflatable floor the main floor should be as specified. The inner/outer layer may have a minimum tensile strength of 1470 N/50 mm widths in warp and weft direction	Warp tensile strength .....N/50mm Weft tensile strength .....N/50mm Warp elongation ..... % Weft elongation ..... % The floor inner/outer layer tensile strength: - Warp ..... N/50mm Weft ..... N/50mm Comments/Observations Passed _____ Failed _____

Inflatable Liferaft Materials	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.3.4.4 Tear Strength	**Regulations: LSA Code IV/4.2; MSC.81(70) 1/5.17.13.2.2**	
Test Procedure	Acceptance Criteria	Significant Test Data
Tear Strength ISO 1421	When tested with the apparatus described in ISO 1421, the tear strength should be : Minimum warp and weft 1030 N. Where two layers of the floor fabric are provided to form an inflatable floor, the main floor should be as specified. The inner/outer layer may have a minimum tear strength of 735 N in warp and weft direction The preparation of the test specimens should be as follows: .1 from the test sample cut 3 specimens each in warp and weft directions, 76 mm ± 1 mm wide and 400 mm long, with the length closely parallel to the warp and weft yarns. Space the selection across the full length and width of the sample. Make a 12.5 mm cut across the middle of each specimen at right angles to the length. .2 grip the specimen under test securely and evenly in the grips, which should be 200 mm apart, so that the specimen length is closely in the direction of the pull. Operate the machine in accordance with ISO 1421. The maximum load sustained is recorded as the wound tear strength, and the average for the 3 specimens is calculated	<u>Tear strength</u> Warp..... N Weft..... N (record for samples 1,2, 3 and average) <u>The floor inner/outer layer tear strength</u> Warp..... N Weft..... N (record for samples 1,2, 3 and average) Comments/Observations Passed _____ Failed _____

Inflatable Liferaft Materials	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.3.4.5 Surface Receptiveness and Adhesion of Surface Coating	**Regulations: LSA Code IV/4.2; MSC.81(70) 1/5.17.13.2.2.3**	
Test Procedure	Acceptance Criteria	Significant Test Data
Surface Receptiveness and Adhesion of Surface Coating ISO 2411	.1 When tested by the method described in ISO 2411 the Surface Receptiveness on either face should not be less than 75 N/50 mm width. .2 For dry Surface Coating Adhesion a minimum of 75 N/50 mm is required. .3 For wet Surface Coating Adhesion as described in 4.3.4.5.8 below a minimum of 50 N/50 mm is required. .4 Each coated face should be tested. The specimens should be made up as in ISO 2411 bonding like-coated face to like-coated face. .5 The bonding used and the method of application should be agreed between the liferaft manufacturer and the finished fabric manufacturer, and should be the same as those used during the manufacture of the liferaft. .6 On each test specimen the bonding between the adhesive or weld and the coating should be initially measured to determine the surface receptivity. .7 The adhesion of the coating to the base textile is then measured by cutting through one coating layer to initiate the required mode of separation. .8 After testing in .4 above for adhesion of coating to the base textile the specimen should be immersed for 24 hours in a 3% aqueous solution of sodium chloride at 20°C ± 2°C. At the end of the immersion period the specimen should be removed from the solution and, while still wet, tested by the method specified in ISO 2411.	Surface receptiveness Face 1 ..... N/50 mm Face 2 ..... N/50 mm Dry surface-coating adhesion ..... N/50 mm Wet surface-coating adhesion ..... N/50 mm Comments/Observations Passed _____ Failed _____

Inflatable Liferaft Materials	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.3.4.6 Effects of Ageing	**Regulations: LSA Code IV/4.2; MSC.81(70) 1/5.17.13.2.2.4**	
Test Procedure	Acceptance Criteria	Significant Test Data
Effects of Ageing ISO 4892-4:1994	1 Folding Test - when tested as prescribed below there should be no cracks, separation of plies or brittleness visible when the samples are inspected under a magnification of 4.3.4.6.2. 2 Tensile Test - when tested as prescribed below the tensile strength after ageing should be not less than 90% of the original tensile strength before ageing. 3.1 Ultra-Violet Resistance - this test should be performed in accordance with the methods specified in ISO 4892-4:1994 - Open-flame carbon-arc lamps, as follows: .1 Expose the conditioned samples to an enclosed carbon arc lamp without "Corex D" filters for 100 h. The carbons should be Copper Clad Sunshine Arc Type, No. 22 for the upper pair and No. 13 for the lower pair, or equivalent. Only the intended outside surface of the fabric is to be exposed to the arc in the testing apparatus. The specimens should be exposed to water spray, with the apparatus operated so that the specimens are exposed to successive cycles of 102 min of light without spray and 18 min of light with spray. The black panel temperature should be 80°C ± 5°C. The total exposure time should be 100h. .2 Test the tensile strength of the material after exposure following the procedure in 4.3.4.3. The tensile strength should be not less than 90% of the original tensile strength before ageing. .3 The exposed material should be bent, more heavily coated side out, around a 3.2 mm mandrel and examined visually for cracking. There should be no cracking.	Folding test : Were there cracks, separation of plies or brittleness visible YES..... NO..... Tensile test : Tensile strength after ageing.....%. Dimensional stability Air.....% Over water.....% Comments/Observations % change: - Passed _____ Failed _____

Inflatable Liferaft Materials	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.3.4.6 Effects of Ageing (continued)	**Regulations: LSA Code IV/4.2; MSC.81(70) 1/5.17.13.2.2.4**	
Test Procedure	Acceptance Criteria	Significant Test Data
	3.2 Alternatively, this test may be performed in accordance with the methods specified in ISO 4892-2 - Xenon Arc type testing. The specimens should be exposed under conditions specified below, using a controlled irradiance water-cooled Xenon Arc apparatus for a total exposure time of 150 h. Exposure conditions — Dark cycle (1 hour) — Light cycle (2 hours) Automatic irradiance (Filter Q/B) — Nil — 0.55 W/m² -nm at 340 nm Black panel temperature — 38°C ± 2°C — 70°C ± 2°C Dry bulb temperature — 38°C ± 2°C — 47°C ± 2°C Relative humidity — 95 ± 5% — 50 ± 5% Conditioning water — 40°C ± 4°C — 45°C ± 4°C Water spray — 60 min on front and back of specimen — 40 min/20 min/60 min Nil /Front of/Nil specimen only Only the intended outside surface of the fabric should be exposed to the arc. The tensile strength of the material should be tested after exposure following the procedure in 4.3.4.3. The tensile strength should be not less than 90% of the original strength before ageing. The exposed material should be bent, with heavily coated side out, around a 3.2 mm mandrel and each coated face examined visually for cracking. There should be no cracking during this examination.	Inspect for: - Stickiness/cracks? YES/NO Separation of piles? YES/NO Brittleness? YES/NO Sample 1 2 Average Dry aged specimen Wet aged specimen Tensile strength after exposure..…….....% Were there cracks in material ? YES.....…..... NO..…….....

Inflatable Liferaft Materials	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.3.4.6 Effects of Ageing (continued)	**Regulations: LSA Code IV/4.2; MSC.81(70) 1/5.17.13.2.2.4**	
Test Procedure	Acceptance Criteria	Significant Test Data
	The performance requirements specified in this subparagraph relate to the behaviour of individual specimens under particular conditions of test. As the spectrum of light from the Carbon Arc differs from that of the Xenon Arc, caution should be exercised in interpreting the test results of both methods. 4 Three separate specimens should be tested as follows: .1 Dimensional Stability .2 Folding and .3 Tensile Strength For 4.3.4.6.4.1 and 4.3.4.6.4.2 cut from the test sample 4 specimens at least 100 mm square with the sides closely parallel to the warp and weft threads. Measure the dimensions of two specimens accurately for 4.3.4.6.4.1. For 4.3.4.6.4.3 cut two sets of specimens as in 4.3.4.3. 5 When tested as below the difference in dimensions of the sample before and after ageing should not differ by more than 2%. 6 Ageing of specimens test procedure: .1 Freely suspend one specimen each for 4.3.4.6.4.1 and 4.3.4.6.4.2, and one set of specimens for 4.3.4.6.4.3 in air for 7 days at 70°C ± 2°C. Suspend the other specimens above water in a loosely closed vessel for 7 days at 70°C ± 2°C. .2 Remove the two measured specimens from the ageing oven. After 15 min at room temperature measure the dimensions and report the percentage changes in warp and weft directions.	% change: - Inspect for: - Stickiness/cracks? YES/NO Separation of piles? YES/NO Brittleness? YES/NO Sample 1 2 Average Dry aged specimen Wet aged specimen Comments/Observations Passed _____ Failed _____

Inflatable Liferaft Materials	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.3.4.6 Effects of Ageing (continued)		**Regulations: LSA Code IV/4.2; MSC.81(70) 1/5.17.13.2.2.4**
Test Procedure	Acceptance Criteria	Significant Test Data
	.3 Remove the other two specimens. After 15 min at room temperature fold the specimens consecutively in two directions parallel to the edges at right angles to each other so as to reduce the exposed area of each specimen to one quarter of its original size. Unfold and refold along the same creases but with each fold reversed in direction. After each folding, press the fold by rubbing fingers and thumb along it: inspect the specimens for cracks, separation of plies, stickiness or brittleness; .4 For the Tensile Strength Test remove the two sets of specimens from the ageing oven. Dry the wet aged specimens for 1 h in air at 70°C ± 2°C, and then condition both sets for 24 h. Test in accordance with paragraph 4.3.4.3.	

Inflatable Liferaft Materials	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.3.4.7 Low Temperature Flexing	**Regulations: LSA Code IV/4.2; MSC.81(70) 1/5.17.13.2.2.5**	
Test Procedure	Acceptance Criteria	Significant Test Data
Low Temperature Flexing ISO 4675	1 When tested at a temperature not higher than -50°C by the method prescribed below, there should be no visible cracking of the sample when inspected under a magnification of 2. The test should be independently applied to each face of the coated fabric. 2 The apparatus, preparation of test specimens and test procedure should be as described in ISO 4675, except that: .1 when tested at the specified low temperature no specimen should show cracks; and .2 there should be 6 test specimens, 3 cut with the long side closely parallel to the warp and 3 cut with the long side closely parallel to the weft direction.	Was there any visible cracking under a magnification of x2 YES .....……..... NO ....……..... Specimen No. Pass _____ Fail _____ Pass _____ Fail _____ Pass _____ Fail _____ Pass _____ Fail _____ Pass _____ Fail _____ Pass _____ Fail _____ Comments/Observations Passed _____ Failed _____

Inflatable Liferaft Materials	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.3.4.8 Flex Cracking		**Regulations: LSA Code IV/4.2; MSC.81(70) 1/5.17.13.2.2.6**
Test Procedure	Acceptance Criteria	Significant Test Data
Flex Cracking ISO 7854	After the specimen has been conditioned by exposing the outer face to a 3% aqueous solution of sodium chloride for seven days at 20°C ± 2°C, it should be tested as described in ISO 7854. After 200,000 flexings no cracking or delamination should be visible when inspected under a magnification of 2.	After flexing was there any cracking or delamination under a magnification of 2? YES .....…..... NO .....……..... Comments/Observations Passed _____ Failed _____

4.3.4.9 Porosity		**Regulations: LSA Code IV/4.2; MSC.81(70) 1/5.17.13.2.2.7.1**
Test Procedure	Acceptance Criteria	Significant Test Data
Porosity ISO TR 6065	When tested by the method described below and with a pressure of 27.5 kPa applied and maintained beneath the fabric, there should be no signs of any leakage over a minimum period of 5 min. .1 Test for porosity A specimen of the fabric should be prepared and tested in accordance with ISO TR 6065 paragraph A.2.10.2.	Was there any leakage? YES .....……..... NO .....…..... Comments/Observations Passed _____ Failed _____

Inflatable Liferaft Materials	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.3.4.10 Oil resistance		**Regulations: LSA Code IV/4.2; MSC.81(70) 1/5.17.13.2.2.8.1 - .3**
Test Procedure	Acceptance Criteria	Significant Test Data
Oil resistance ISO TR 6065	.1 When tested by the method prescribed below, after exposing the outer surface to oil ASTM No. 1, for 2 h at 20°C ± 2°C, there should be no separation of coating from textile and no residual tackiness when two exposed faces are pressed together. The coating should not smear when rubbed with a single pass of the finger. .2 The test should be carried out not less than 16 h after vulcanization or curing. .3 The apparatus, preparation of specimens and test procedure should be in accordance with ISO TR 6065, paragraph A.2.5. Each coated face should be tested.	Was there any separation of coating or residual tackiness YES ..... NO ..... (Face 1) YES ..... NO ..... (Face 2) Comments/Observations Passed _____ Failed _____

4.3.4.11 Weft Distortion		**Regulations: LSA Code IV/4.2; MSC.81(70) 1/5.17.13.2.2.9**
Test Procedure	Acceptance Criteria	Significant Test Data
Weft Distortion	The weft distortion should be not more than the equivalent of 100 mm maximum over a fabric width of 1.5 m. A line should be drawn across the fabric at right angles to the selvedge. The weft distortion, skew and/or bow should be measured.	Weft distortion .....……..... mm. Comments/Observations Passed _____ Failed _____

Inflatable Liferaft Materials	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.3.4.12 Resistance to Blocking		**Regulations: LSA Code IV/4.2; MSC.81(70) 1/5.17.13.2.2.10**
Test Procedure	Acceptance Criteria	Significant Test Data
Resistance to Blocking ISO 5978	.1 When tested by the method prescribed below the 100 g weight should not be lifted. .2 The preparation of specimens and test procedure should be in accordance with ISO 5978 except that the temperature of test should be 70°C ± 2°C and the duration of time under load should be 7 days.	Was the weight lifted YES ..... NO ..... Comments/Observations Passed _____ Failed _____

Inflatable Liferaft Materials	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.3.4.13 Hydrolysis Resistance for Thermoplastic Coated Materials only	**Regulations: LSA Code IV/4.2; MSC.81(70) 1/5.17.13.2.2.11**	
Test Procedure	Acceptance Criteria	Significant Test Data
Hydrolysis Resistance for Thermoplastic Coated Materials only	.1 When tested by the methods prescribed below, the following performance values should be achieved: .1.1 Coating adhesion 50 N/50 mm minimum .1.2 Blocking resistance 100 g maximum .1.3 Folding test - No cracks, delamination or visual deterioration .2 The following test requirements apply to fabrics or test specimens, which have been stored for 12 weeks over water in a closed container at 93°C. .3 The following test should be performed after drying the specimens for 1 h at 80°C ± 2°C, and conditioning at 20°C ± 2°C, 65% RH for 24 h. .4 The coating adhesion of the stored material specimen should be made up and tested in accordance with 4.3.4.5 after the requirements of 4.3.4.13.2 above have been carried out. .5 The blocking resistance should be tested in accordance with 4.3.4.12. .6 Two test samples 100 mm ± 2 mm square should be cut from the stored material. The samples should be folded as defined in 4.3.4.6.6.3 and examined for evidence of cracks, ply separation, stickiness or brittleness.	Coating adhesion ..... N/50 mm. Blocking Test:- Was the weight lifted? YES .....…..... NO .....…..... Folding Test:- Were there any cracks, delamination or visual deterioration after folding test? YES .....…..... NO .....…..... Comments/Observations Passed _____ Failed _____

Inflatable Liferaft Materials	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.3.4.14 Ozone resistance	**Regulations: LSA Code IV/4.2 MSC.81(70) 1/5.17.13.2.2.12**	
Test Procedure	Acceptance Criteria	Significant Test Data
Ozone resistance ISO 3011	.1 When tested by the method prescribed below, no cracks should be visible at a magnification of 5. .2 The preparation of samples and test procedure should be in accordance with specification ISO 3011. The following conditions should apply: - .1 Ozone concentration 50 ppm .2 Temperature 20°C ± 2°C .3 Exposure time 8 h .4 Mandrel diameter 6 x sample thickness	Were there any cracks visible at a magnification of 5 YES .....…..... NO .....…..... Comments/Observations Passed _____ Failed _____

Inflatable Liferaft Materials	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.3.4.15 Tensile Strength (Fabrics used for outer canopies)	**Regulations: LSA Code IV/4.2; MSC.81(70) 1/5.17.13.2.3.1**	
Test Procedure	Acceptance Criteria	Significant Test Data
Tensile Strength	When tested by the method prescribed in 4.3.4.3, the tensile strength should be: - Minimum: For warp and weft 930N/50mm of width	Tensile strength: - Warp ..... N/50 mm Weft ..... N/50 mm Comments/Observations Passed _____ Failed _____

4.3.4.16 Tear Strength (Fabrics used for outer canopies)	**Regulations: LSA Code IV/4.2; MSC.81(70) 1/5.17.13.2.3.2**	
Test Procedure	Acceptance Criteria	Significant Test Data
Tear Strength	When tested by the method prescribed in paragraph 4.3.4.4, the tear strength should be: - Minimum: For warp and weft 490 N	Tear strength Warp ..... N Weft ..... N Comments/Observations Passed _____ Failed _____

Inflatable Liferaft Materials	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.3.4.17 Low Temperature Flexing (Fabrics used for outer canopies)		**Regulations: LSA Code IV/4.2; MSC.81(70) 1/5.17.13.2.3.3**
Test Procedure	Acceptance Criteria	Significant Test Data
Low Temperature Flexing	When tested at a temperature not higher than -30°C by the method prescribed in 4.3.4.7, there should be no visible cracking of the sample when inspected under a magnification of 2. The test should be independently applied to each face of the coated fabric.	Was there visible cracking of the sample? YES .....……..... NO .....……..... (Face 1) YES .....……..... NO .....……..... (Face 2) Comments/Observations Passed _____ Failed _____

4.3.4.18 Waterproofness (Fabrics used for outer/inner canopies)		**Regulations: LSA Code IV/4.2; MSC.81(70) 1/5.17.13.2.3.4**
Test Procedure	Acceptance Criteria	Significant Test Data
Waterproofness	1 When tested by the method prescribed below, no water should pass through the cone within 30 min. The coated fabric should not contain any material that is known to be injurious to a survivor drinking rainwater collected from the canopy. Fabrics may be coated on one or both sides. 2 The test specimen should be cut to a size of 300 mm x 300 mm and tested in accordance with the following procedure: Fold the specimen twice at right angles and open it out into the form of a cone. Secure the cone with a paper clip and insert it into a suitable funnel supported on a flask. Pour 500 ml of water into the cone. Record any penetration of water to the outside of the cone after 30 min	Did water pass through the cone? YES .....……..... NO .....…….....
		Comments/Observations Passed _____ Failed _____

Inflatable Liferaft Materials	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.3.4.19 Surface Receptiveness and Adhesion of Surface Coating (Fabrics used for outer canopies)	**Regulations: LSA Code IV/4.2; MSC.81(70) 1/5.17.13.2.3.5**	
Test Procedure	Acceptance Criteria	Significant Test Data
Surface Receptiveness and Adhesion of Surface	When tested by the method prescribed in 4.3.4.5, the surface receptiveness on either face should not be less than 25N/50 mm width surface. For coating adhesion a minimum of 25N/50 mm is required.	Surface receptiveness on each face? YES .....……..... NO .....……..... Face 1 ..... N/50 mm Face 2 ..... N/50 mm Coating adhesion ..... N/50 mm Comments/Observations Passed _____ Failed _____

4.3.4.20 Colour (Fabrics used for outer canopies)	**Regulations: LSA Code IV/4.2; MSC.81(70) 1/5.17.13.2.3.6**	
Test Procedure	Acceptance Criteria	Significant Test Data
Colour	The liferaft canopy should be evaluated after the mooring out test in 4.18 or an equivalent method using artificial light to determine whether the coating is sufficiently colour fast.	Reference should be made to mooring out test. Comments/Observations Passed _____ Failed _____

Inflatable Liferaft Materials	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.3.4.21 Effects of Ageing (Fabrics used for outer canopies)		**Regulations: LSA Code IV/4.2; MSC.81(70) 1/5.17.13.2.3.7**
Test Procedure	Acceptance Criteria	Significant Test Data
Effects of Ageing -	.1 Folding Test - when tested by the method prescribed in 4.3.4.6.1 there should be no cracks, separation of plies or brittleness visible when the samples are inspected under a magnification of 2. .2 Tensile Test - when tested by the method prescribed in 4.3.4.6.2 at least 90% of the original tensile strength should be retained in both warp and weft direction.	Were there any cracks, separation of plies or brittleness visible? YES .....……..... NO .....……..... Tensile strength after ageing .....……..... % Warp ..……..... % Weft Comments/Observations Passed _____ Failed _____

4.3.4.22 Tensile Strength (Fabrics used for inner canopies)		**Regulations: LSA Code IV/4.2; MSC.81(70) 1/5.17.13.2.4.1**
Test Procedure	Acceptance Criteria	Significant Test Data
Tensile Strength	When tested by the method prescribed in 4.3.4.3 should be: - Minimum: Warp and weft 100N/50 mm of width	Tensile strength Warp ..... N/50 mm Weft ..... N/50 mm Comments/Observations Passed _____ Failed _____

Inflatable Liferaft Materials	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.3.4.23 Porosity (Fabrics used for inner canopies)	**Regulations: LSA Code IV/4.2; MSC.81(70) 1/5.17.13.2.4.2**	
Test Procedure	Acceptance Criteria	Significant Test Data
	As the inner canopy serves as a barrier to provide a static layer of air, it should either be of a close weave construction or have a low porosity to air.	Comments/Observations Passed _____ Failed _____

4.3.5 SEARCH LIGHTS FOR LIFEBOATS AND RESCUE BOATS

EVALUATION AND TEST REPORT

4.3.5.0 General Information

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4.3.5 SEARCH LIGHTS FOR LIFEBOATS AND RESCUE BOATS

EVALUATION AND TEST REPORT

Manufacturer	
Type	
Date	
Place	
Name Surveyor printed	
Signature	
Approving Organization	

Searchlights	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.3.5.0.1 General Data and Specifications	**Regulations: LSA Code / Res. MSC.81(70)**	
General Information	Search Light Dimensions	Search Light Weight

Searchlights	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.3.5.0.2 Submitted drawings, reports and documents

Submitted drawings and documents			Status
Drawing No.	**Revision No. & date**	**Title of drawing**	

Submitted reports and documents			Status
Report/Document No.	**Revision No. & Date**	**Title of report / document**	
		Maintenance Manual -	
		Operations Manual -	

Searchlights	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.3.5.0.3 Quality Assurance	**Regulations: -**
Except where all appliances of a particular type are required by Chapter III of the International Convention for the Safety of Life at Sea, 1974, as amended, to be inspected, representatives of the Administration should make random inspections of manufacturers to ensure that the quality of life-saving appliances and materials used comply with the specification of the approved prototype life-saving appliance. Manufacturers should be required to institute a quality control procedure to ensure that life-saving appliances are provided to the same standard as the prototype life-saving appliance approved by the Administration and to keep records of any production tests carried out in accordance with the Administration's instructions.	Quality Assurance Standard Used: - _____ Quality Assurance Procedure: - _____ Quality Assurance Manual: - _____ Description of System. Quality Assurance System acceptable Yes/No Comments/Observations

Searchlights	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.3.5.1 Visual Inspection	**Regulations: LSA Code 1.2.2.1/1.2.2.9/1.2.2.10/1.2.3/4.4.6.11; MSC.81(70) 1/ 13.1/13.3**	
Test Procedure	Acceptance Criteria	Significant Test Data
One search light should be examined in detail for the following items :	The search light should :	
Approval marking	- be clearly marked with approval information including the Administration which approved it, and any operational restrictions;	Passed _____ Failed _____
Manufacturer's label	- be marked with the voltage and power consumption;	Passed _____ Failed _____
Additional markings	- provide the following information : - serial number; - identification of the manufacturer; - easily understandable symbols for on/off switching; - where applicable, information on proper battery disposal by the words : "DO NOT INCINERATE / DO NOT RECHARGE / DO NOT TAMPER";	Passed _____ Failed _____
Electrical short circuit protection	- where applicable, be provided with electrical short circuit protection to prevent damage or injury;	Passed _____ Failed _____ Comments/Observations

Searchlights	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.3.5.1 Visual Inspection (continued)		**Regulations: LSA Code 1.2.2.1/1.2.2.9/1.2.2.10/1.2.3/4.4.6.11; MSC.81(70) 1 13.1/13.3**
Test Procedure	Acceptance Criteria	Significant Test Data
	Search lights should :	
Construction and materials	- be constructed with proper workman-ship and materials and in such a way that the accumulation of condensed water in hazardous quantities is avoided;	Passed _____ Failed _____
	- be designed in such a way that the illuminant is safely fitted in the search light without using screwed sockets and can easily be replaced also in darkness;	Passed _____ Failed _____
	- be made of non-magnetic material;	Passed _____ Failed _____
	- be constructed to avoid accidental access to dangerous voltages;	Passed _____ Failed _____
	- be constructed in such a way that outer parts do not reach temperatures during operation which restrict their manual use;	Passed _____ Failed _____
Operational controls	- have operational controls in compliance with A.694(17) paragraph 3, IEC 447, and IEC 945 paragraphs 6.3, 6.4, 6.5 and 6.6.	Passed _____ Failed _____
After having passed the visual inspection the searchlight should be subjected next to the temperature tests.		Comments/Observations

Searchlights	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.3.5.2 Temperature Tests		**Regulations: LSA Code I/1.2.2.1, 1.2.2.2; MSC.81(70) 1/ 13.2/13.2.1**
Test Procedure	Acceptance Criteria	Significant Test Data
The search light which has passed the visual inspection should be subjected to a dry heat test according to IEC 945, paragraph 8.2, followed by a damp heat test (8.3), a low temperature test (8.4), and thermal shock (8.5). After having passed the temperature tests the searchlight should be subjected next to the vibration test.	The searchlight should not be damaged in stowage throughout the air temperature range of -30^0 $+65^0$C. After these tests, the search light should show no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical qualities and should be capable of being operated.	Results: Comments/Observations Passed _____ Failed _____

4.3.5.3 Vibration Test		**Regulations: LSA Code I/1.2.2.1, 1.2.2.8; MSC.81(70) 1/13.2/13.2.2**
Test Procedure	Acceptance Criteria	Significant Test Data
The searchlight, which has passed the temperature tests, should be subjected to a vibration test according to IEC 945, paragraph 8.7. After having passed the vibration test the searchlight should be subjected next to the corrosion and rain test.	The searchlight should be constructed with proper workmanship and materials. The searchlight should function after the test.	Results: Comments/Observations Passed _____ Failed _____

Searchlights	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.3.5.4 Corrosion and Rain Test		**Regulations: LSA Code 1.2.2.1/1.2.2.4; MSC.81(70) 1/ 13.2/13.2.3**
Test Procedure	Acceptance Criteria	Significant Test Data
The search light which has passed the vibration test should, where applicable, be subjected to a corrosion test according to IEC 945, paragraph 8.12, and a rain test according to IEC 945, paragraph 8.8. After having passed the corrosion and rain test the searchlight should be subjected next to the interference test.	The searchlight should be constructed with proper workmanship and materials, and, where applicable, be rot-proof, corrosion resistant and not be unduly affected by seawater. After the tests, the searchlight should show no sign of damage and should be capable of being operated.	Results: Comments/Observations Passed _____ Failed _____

4.3.5.5 Interference Test		**Regulations: MSC.81(70) 1/ 13.2/13.2.4;**
Test Procedure	Acceptance Criteria	Significant Test Data
The search light which has passed the corrosion and rain test should be subjected to the interference test for unwanted electromagnetic emission according to resolution A. 694(17) and IEC 945, paragraph 9. After having passed the interference test the searchlight should be subjected next to the power supply test.	The search light should not radiate unwanted electromagnetic emission according to IEC 945, paragraph 9 to ensure electromagnetic compatibility between search light and other radiocommunication and navigational equipment carried on board.	Results: Comments/Observations Passed _____ Failed _____

Searchlights	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.3.5.6 Power Supply Test		**Regulations: MSC.81(70) 1/ 13.2/13.2.5**
Test Procedure	Acceptance Criteria	Significant Test Data
The searchlight, which has passed the interference test, should be subjected to the power supply test. The search light should be operated with 12 V or 24 V and should be tested for extreme power supply according to resolution A. 694(17) and IEC 945, paragraph 7.1 and excessive conditions according to paragraph 7.2. After having passed the power supply test the searchlight should be subjected next to the light tests.	The search light should continue to operate also in the presence of variations of the power supply according to IEC 945, paragraphs 7.1 and 7.2. Means should be incorporated for the protection of the search light from the effects of excessive current and voltage, transient and accidental reversal of power supply polarity or phase sequence according to IEC 945, paragraph 7.2. If provision is made for operating the search light from more than one source of electrical energy, arrangements for rapidly changing from one source to the other should be provided but not necessarily incorporated in the searchlight.	Results: Comments/Observations Passed _____ Failed _____

Searchlights	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.3.5.7 Light Tests		**Regulations: LSA Code 4.4.8.29/5.1.2.2.11; MSC.81(70) 1/ 10.4.9/13.4/13.4.1/13.4.2**
Test Procedure	Acceptance Criteria	Significant Test Data
The searchlight, which has passed the power supply test, should be subjected to light tests. The voltage of the test unit should be monitored continuously for the specific time. To make sure that the test unit provides a light distribution and a luminous intensity of not less than the specified luminous intensity after the specified time of operation, the following test should be performed : It must be demonstrated that the light reaches the light distribution and the required luminous intensity when using a photometer which is calibrated to the photometric standards of the appropriate National or State Standard Institute (Note: CIE Publ. No. 70 contains further information). Luminous intensity should be measured by a photometer directed at the center of the light source with the test light on a rotating table. Luminous intensity should be measured in a horizontal direction at the level of the center of the light source and continuously recorded through a 360° rotation. These measurements should be taken in the azimuth angle at 0.5° intervals above the horizon up to 3°. Luminous intensity should be measured in a vertical direction, beginning at the center of the light source at the point of lowest recorded light output, and continuously recorded through an arc of 6°.	The luminous intensity of the searchlight should be at least 2.5×10^3 cd. The axial luminous intensity should be at least 90 % of the maximum luminous intensity. The luminous intensity should be at a maximum in the center of the luminous intensity distribution. A homogenous luminous intensity distribution should be ensured. The effective light emission sector should be circular and reach vertically and horizontally at least 6^0. The searchlight should be suitable for a permanent operation of not less than 3 h. During this period the requirements of light distribution and luminous intensity should be fulfilled.	Results: All measured data of luminous intensity and voltage should be documented. Comments/Observations Passed _____ Failed _____

4.3.6 SURVIVAL CRAFT EXTERIOR LIGHTS

EVALUATION AND TEST REPORT

Definitions

Survival craft lights are liferaft lights and lifeboat lights.
Survival craft exterior lights are liferaft exterior lights (liferaft canopy lights) and lifeboat exterior lights (lifeboat enclosure lights or lifeboat cover lights).
Survival craft interior lights are liferaft interior lights and lifeboat interior lights.

Remark

Rescue boat exterior lights should be treated as lifeboat exterior lights.

4.3.6.0 General Information

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- 4.3.6.0.2 Submitted drawings, reports and documents
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4.3.6.1 Visual Inspection

- 4.3.6.1.1 Approval Marking
- 4.3.6.1.2 Expiry Marking
- 4.3.6.1.3 Additional Markings
- 4.3.6.1.4 Electrical Short Circuit Protection
- 4.3.6.1.5 Construction and Materials
- 4.3.6.1.6 Fitting
- 4.3.6.1.7 Lights

4.3.6.2 Temperature Cycling Test

4.3.6.3 Light Tests

4.3.6.4 Chromaticity Test

4.3.6.5 Switch Arrangement Test

4.3.6.6 Vibration Test

4.3.6.7 Mould Growth Test

4.3.6.8 Corrosion and Seawater Resistance Test

4.3.6.9 Solar Radiation Test (not for Survival Craft Interior Lights)

4.3.6.10 Test for Oil Resistance (not for Survival Craft Interior Lights)

4.3.6.11 Rain Test and Watertightness Test

4.3.6.12 Fire Test (not for Survival Craft Interior Lights)

4.3.6 SURVIVAL CRAFT EXTERIOR LIGHTS

EVALUATION AND TEST REPORT

Manufacturer	
Date	
Type	
Place	
Name Surveyor printed	
Signature	
Approving Organization	

Survival Craft Exterior Lights	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.3.6.0.1 General Data and Specifications	**Regulations: LSA Code / Res. MSC.81(70)**

General Information	Survival Craft Light Dimensions	Survival Craft Light Weight
TYPE OF SWITCHING: Automatic Manual FLASHING LIGHT STEADY LIGHT		Comments/Observations

Survival Craft Exterior Lights	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.3.6.0.2 Submitted drawings, reports and documents

Submitted drawings and documents			**Status**
Drawing No.	**Revision No. & date**	**Title of drawing**	

Submitted reports and documents			**Status**
Report/Document No.	**Revision No. & Date**	**Title of report / document**	
		Maintenance Manual -	
		Operations Manual -	

	Manufacturer:_____	Date:_____	Time:_____
Survival Craft Exterior Lights	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.3.6.0.3 Quality Assurance	**Regulations: -**
Except where all appliances of a particular type are required by Chapter III of the International Convention for the Safety of Life at Sea, 1974, as amended, to be inspected, representatives of the Administration should make random inspections of manufacturers to ensure that the quality of life-saving appliances and materials used comply with the specification of the approved prototype life-saving appliance. Manufacturers should be required to institute a quality control procedure to ensure that life-saving appliances are provided to the same standard as the prototype life-saving appliance approved by the Administration and to keep records of any production tests carried out in accordance with the Administration's instructions.	Quality Assurance Standard Used: - _____ Quality Assurance Procedure: - _____ Quality Assurance Manual: - _____ Description of System. Quality Assurance System acceptable Yes/No Comments/Observations

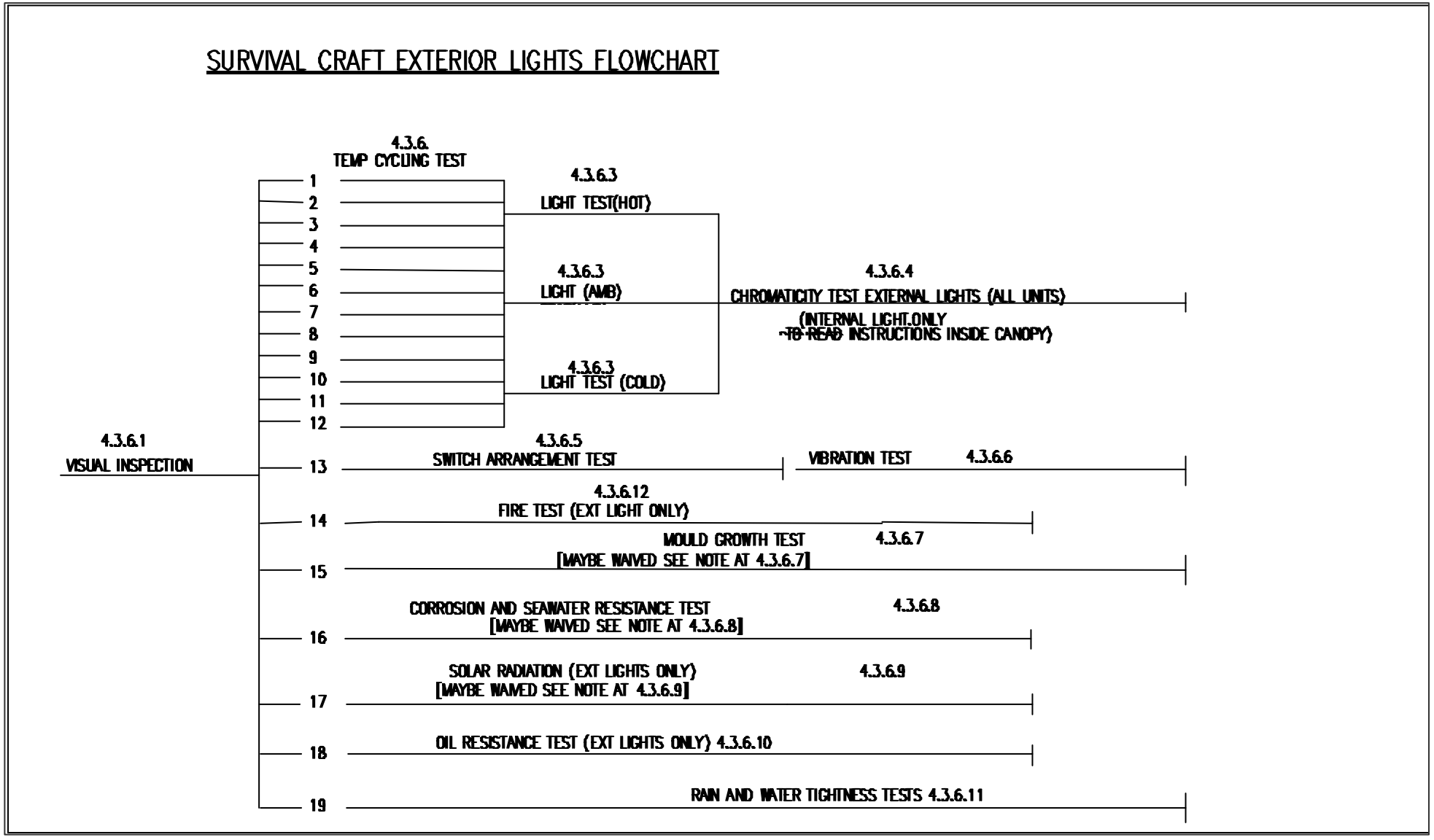
Survival Craft Exterior Lights	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.3.6.1 Visual Inspection		**Regulations: LSA Code 1.2.2.1/1.2.2.9/1.2.2.10/1.2.3/4.1.3.4/4.4.7.11**
Test Procedure	Acceptance Criteria	Significant Test Data
Nineteen survival craft exterior or sixteen interior lights (as the case may be) should be detailed examined for the following items :	The survival craft lights should:	
Approval marking	- be clearly marked with approval information including the Administration which approved it, and any operational restrictions;	Results: PASS: FAIL:
Expiry marking	- be marked with the date of expiry; - the Administration should determine the period of acceptability, due to deterioration with age. The established life must be justified by the manufacturer.	Results: PASS: FAIL:
Additional markings	provide the following information : - precise definition of intended use (e.g. "Exterior light for inflatable liferafts"); - serial number; - identification of the manufacturer; easily understandable symbols for on/off switching; - where applicable, information on proper battery disposal by the words: "DO NOT INCINERATE / DO NOT RECHARGE / DO NOT TAMPER",	Results: PASS: FAIL: Comments/Observations

Survival Craft Exterior Lights	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.3.6.1 Visual Inspection (continued)		**Regulations: LSA Code 1.2.2.1/1.2.2.9/1.2.2.10/1.2.3/4.1.3.4/4.4.7.11**
Test Procedure	Acceptance Criteria	Significant Test Data
Nineteen survival craft exterior or sixteen interior lights (as the case may be) should be detailed examined for the following items (continued):	The survival craft lights should:	
Electrical short circuit protection	- be provided with electrical short circuit protection to prevent damage or injury;	Results: PASS: FAIL:
Construction and materials	- be constructed with proper workmanship and materials.	Results: PASS: FAIL:
Fitting	Survival craft interior lights should : - be fitted inside the survival craft: - be fitted to the top of the survival craft to ensure a light emission in all directions of the upper hemisphere.	Results: PASS: FAIL:
Lights	- only be electric lights.	Results: PASS: FAIL: Comments/Observations

	Manufacturer:_____	Date:_____	Time:_____
Survival Craft Exterior Lights	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	



Survival Craft Exterior Lights	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.3.6.2 Temperature Cycling Test	**Regulations: LSA Code 1.2.2.2; MSC.81(70) 1/ 1.2/1.2.1/1.2.2/10.1/10.1.1**	
Test Procedure	Acceptance Criteria	Significant Test Data
Twelve survival craft exterior or interior lights (as the case may be) which have passed the visual inspection should be subjected to temperature cycling. The following test should be carried out on twelve survival craft lights : The survival craft lights should be alternately subjected to surrounding temperatures of not less than -30^{0}C and +65^{0}C. These alternating cycles need not follow immediately after each other and the following procedure, repeated for a total of not less than 10 cycles, is acceptable : 1. at least an 8 h cycle at not less than +65^{0}C to be completed in one day; and 2. the specimens removed from the warm chamber that same day and left exposed under ordinary room conditions until the next day; 3. at least an 8 h cycle at not less than 30°C to be completed the next day; and 4. the specimens removed from the cold chamber that same day and left exposed under ordinary room conditions until the next day.	The survival craft lights should not be damaged in stowage throughout the air temperature range of –30^{0}C to +65^{0}C. The survival craft lights should show no sign of loss of rigidity under high temperatures and, after the tests, should show no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical qualities and should function after the test.	Results: Attach temperature cycling chart to record times spent at each temperature PASS: FAIL: Comments/Observations

Survival Craft Exterior Lights	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.3.6.2 Temperature Cycling Test (continued)	**Regulations: LSA Code 1.2.2.2; MSC.81(70) 1/ 1.2/1.2.1/1.2.2/10.1/10.1.1**	
Test Procedure	Acceptance Criteria	Significant Test Data
If the lifeboat enclosure light, lifeboat cover light or lifeboat interior light is connected to the lifeboat's electrical network and can be supplied with electrical power from any of the lifeboat's batteries as well as from the lifeboat's engine-driven generator set, the light should only be subjected to the test as far as practicable. After having passed the temperature cycling test the lights should be subjected next to the light tests.		Comments/Observations

Survival Craft Exterior Lights	Manufacturer:_____	Date:_____ Time:_____
	Model:_____	Surveyor:_____
	Lot/Serial Number:_____	Organization:_____

4.3.6.2	**Temperature cycling test – Test data**		**Regulations: LSA Code 1.2.2.2; MSC.81(70) 1/ 1.2/1.2.1/1.2.2/10.1/10.1.1**	
	HOT CYCLE		***COLD CYCLE***	
Cycle 1	Date In: _____ Time In : _____ Temperature : _____ ^{0}C	Date Out: _____ Time Out: _____ Duration : _____ hours	Date In: _____ Time In : _____ Temperature : _____ ^{0}C	Date Out: _____ Time Out: _____ Duration : _____ hours
Cycle 2	Date In: _____ Time In : _____ Temperature : _____ ^{0}C	Date Out: _____ Time Out: _____ Duration : _____ hours	Date In: _____ Time In : _____ Temperature : _____ ^{0}C	Date Out: _____ Time Out: _____ Duration : _____ hours
Cycle 3	Date In: _____ Time In : _____ Temperature : _____ ^{0}C	Date Out: _____ Time Out: _____ Duration : _____ hours	Date In: _____ Time In : _____ Temperature : _____ ^{0}C	Date Out: _____ Time Out: _____ Duration : _____ hours
Cycle 4	Date In: _____ Time In : _____ Temperature : _____ ^{0}C	Date Out: _____ Time Out: _____ Duration : _____ hours	Date In: _____ Time In : _____ Temperature : _____ ^{0}C	Date Out: _____ Time Out: _____ Duration : _____ hours
Cycle 5	Date In: _____ Time In : _____ Temperature : _____ ^{0}C	Date Out: _____ Time Out: _____ Duration : _____ hours	Date In: _____ Time In : _____ Temperature : _____ ^{0}C	Date Out: _____ Time Out: _____ Duration : _____ hours
Cycle 6	Date In: _____ Time In : _____ Temperature : _____ ^{0}C	Date Out: _____ Time Out: _____ Duration : _____ hours	Date In: _____ Time In : _____ Temperature : _____ ^{0}C	Date Out: _____ Time Out: _____ Duration : _____ hours
Cycle 7	Date In: _____ Time In : _____ Temperature : _____ ^{0}C	Date Out: _____ Time Out: _____ Duration : _____ hours	Date In: _____ Time In : _____ Temperature : _____ ^{0}C	Date Out: _____ Time Out: _____ Duration : _____ hours
Cycle 8	Date In: _____ Time In : _____ Temperature : _____ ^{0}C	Date Out: _____ Time Out: _____ Duration : _____ hours	Date In: _____ Time In : _____ Temperature : _____ ^{0}C	Date Out: _____ Time Out: _____ Duration : _____ hours
Cycle 9	Date In: _____ Time In : _____ Temperature : _____ ^{0}C	Date Out: _____ Time Out: _____ Duration : _____ hours	Date In: _____ Time In : _____ Temperature : _____ ^{0}C	Date Out: _____ Time Out: _____ Duration : _____ hours
Cycle 10	Date In: _____ Time In : _____ Temperature : _____ ^{0}C	Date Out: _____ Time Out: _____ Duration : _____ hours	Date In: _____ Time In : _____ Temperature : _____ ^{0}C	Date Out: _____ Time Out: _____ Duration : _____ hours

Survival Craft Exterior Lights	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.3.6.3 Light Tests	**Regulations: LSA Code 4.1.3.3/4.1.3.4/4.4.7.10/4.4.7.11/5.1.1.1; MSC.81(70) 1 / 10.1.2/10.1.3/10.1.4/10.4/10.4.9**	
Test Procedure	Acceptance Criteria	Significant Test Data
In the case of sea-activated power sources, four survival craft lights which have passed the temperature cycling test should be taken from a stowage temperature of -30°C and be operated immersed in seawater at a temperature of -1°C; four survival craft lights which have passed the temperature cycling test should be taken from a stowage temperature of +65°C and be operated immersed in seawater at a temperature of +30°C; and four survival craft lights which have passed the temperature cycling test should be taken from ordinary room conditions and be operated immersed in fresh water at ambient temperature. In the case of dry-activated power sources, provided that they will not come into contact with seawater, four survival craft lights which have passed the temperature cycling test should be operated at an air temperature of -30°C, four survival craft lights which have passed the temperature cycling test should be operated at an air temperature of +65°C, and four survival craft lights which have passed the temperature cycling test should be operated at ambient temperature. If the voltage at 5 min of operation is lower than the recorded voltage at the end of life it is permissible to use a lamp from the same build standard for the light output test.	Survival craft lights should continue to provide a luminous intensity of not less than 4.3 cd in all directions of the upper hemisphere for a period of not less than 12 h. In the case of a flashing light it should be established that the rate of flashing for the 12 h operative period is not less than 50 flashes and not more than 70 flashes per minute and that the effective luminous intensity is at least 4.3 cd in all directions of the upper hemisphere. (See formula below to calculate the effective luminous intensity). Survival craft interior lights should provide sufficient luminous intensity to read survival instructions and equipment instructions for a period of not less than 12 h.	Results: All luminous intensity data is to be attached here. PASS: FAIL: Results: PASS: FAIL: Comments/Observations

Survival Craft Exterior Lights	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.3.6.3 Light Tests (continued)	**Regulations: LSA Code 4.1.3.3/4.1.3.4/4.4.7.10/4.4.7.11/5.1.1.1; MSC.81(70) 1 / 10.1.2/10.1.3/10.1.4/10.4/10.4.9**	
Test Procedure	Acceptance Criteria	Significant Test Data
Using the lowest recorded voltage a light output test can be carried out as described below. The voltage of the 12 test units should be monitored continuously for 12 h. To make sure that all these test units provide a luminous intensity of not less than 4.3 cd in all directions of the upper hemisphere for 12 h operation, the following test should be performed : It must be demonstrated that at least one light from each of the specified temperature ranges reaches the required luminous intensity in all directions of the upper hemisphere when using a photometer which is calibrated to the photometric standards of the appropriate National or State Standard Institute (Note: CIE Publ. No. 70 contains further information.). The lowest voltage light of the cold temperature test sample lot, the highest voltage light of the high temperature test sample lot and the mean voltage light of the ambient temperature sample lot should be selected. These three lights must be used for the light output tests. In the event that a lamp filament burns out during the light output test, a second light from the same performance test lot may be used. Luminous intensity should be measured by a photometer directed at the center of the light source with the test light on a rotating table.	The effective luminous intensity is to be found from the formula : $$\left[\frac{\int_{t_1}^{t_2} I dt}{0.2 + (t_2 - t_1)}\right]_{max}$$ where : I is the instantaneous intensity, 0.2 is the Blondel - Rey constant and t_1 and t_2 are time - limits of integration in seconds. Note: Flashing lights with a flash duration of not less than 0.3 s at or above 4.3 cd, not including incandescence time, may be considered as fixed lights for the measurement of luminous intensity. Such lights should provide the required luminous intensity in all directions of the upper hemisphere. (Incandescence time is the time interval between switch on and the luminous intensity reaching the required minimum luminous intensity.)	Comments/Observations

Survival Craft Exterior Lights	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.3.6.3 Light Tests (continued)	**Regulations: LSA Code 4.1.3.3/4.1.3.4/4.4.7.10/4.4.7.11/5.1.1.1; MSC.81(70) 1 / 10.1.2/10.1.3/10.1.4/10.4/10.4.9**	
Test Procedure	Acceptance Criteria	Significant Test Data
Luminous intensity should be measured in a horizontal direction at the level of center of the light source and continuously recorded through a 360° rotation. The first measurements should be taken at 0° (horizontal) and should continue to be taken in the azimuth angle at 5° intervals to a single measurement at 90° (vertical). Luminous intensity should be measured in a vertical direction, beginning at the center of the light source at the point of lowest recorded light output, and continuously recorded through an arc of 180°. All measured data of luminous intensity and voltage should be documented. After having passed the light tests, the lights should be subjected next to the chromaticity test.		Comments/Observations

Survival Craft Exterior Lights	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.3.6.4 Chromaticity Test		**Regulations: LSA Code 4.1.3.3/4.1.3.4/4.4.7.10/4.4.7.11/5.1.1.1; MSC.81(70) 1/10.4/10.4.10**
Test Procedure	Acceptance Criteria	Significant Test Data
The 12 survival craft lights which have passed the light tests should be tested for chromaticity to determine that it lies within the boundaries of the area "white" of the diagram specified for each colour by the International Commission on Illumination (CIE). The chromaticities of the survival craft lights should be measured by means of colorimetric measurement equipment which is calibrated to the appropriate National or State Standards Institute (Note: CIE Publ. No. 15.2 contains further information.). Measurement on at least four points of the upper hemisphere should be taken.	The measured chromaticity coordinates should fall within the boundaries of the area of the diagram as per CIE. The boundaries of the area for white lights are given by the following corner coordinates : x 0.500 0.500 0.440 0.300 0.300 0.440 y 0.382 0.440 0.433 0.344 0.278 0.382 (International Standard on Colours of Light Signals, with colour tables to be developed by CIE.)	Results: All chromaticity data is to be attached here. PASS: FAIL: Comments/Observations

4.3.6.5 Switch Arrangement Test		**Regulations: LSA Code 4.1.3.3/4.1.3.4/4.4.7.10/4.4.7.11/5.1.1.1; MSC.81(70) 1/10.4/10.4.3**
Test Procedure	Acceptance Criteria	Significant Test Data
One survival craft exterior or interior light (as the case may be) which has passed the visual inspection should be subjected to the switch arrangement test. A test person, wearing immersion suit gloves, must be able to switch the survival craft light in its normal operational position on and off three times. After having passed the switch arrangement test the light should be subjected next to the vibration test.	The survival craft exterior or interior light (as the case may be) must function properly.	Results: PASS: FAIL: Comments/Observations

Survival Craft Exterior Lights	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.3.6.6 Vibration Test	**Regulations: LSA Code 1.2.2.1/1.2.2.8; MSC.81(70) 1 10.4/10.4.1**	
Test Procedure	Acceptance Criteria	Significant Test Data
The survival craft exterior or interior light (as the case may be) which has passed the switch arrangement test should be subjected to a vibration test according to IEC 945, paragraph 8.7.	The survival craft light should be constructed with proper workmanship and materials, The survival craft light should function after the test.	Results: PASS: FAIL: Comments/Observations

Survival Craft Exterior Lights	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.3.6.7 Mould Growth Test	**Regulations: LSA Code 1.2.2.4; MSC.81(70) 1/ 10.4/10.4.2**	
Test Procedure	Acceptance Criteria	Significant Test Data
One survival craft exterior or interior light (as the case may be) which has passed the visual inspection should be subjected to the mould growth test. The survival craft light should be inoculated by spraying with an aqueous suspension of mould spores containing all the following cultures : Aspergillus niger; Aspergillus terreus; Aureobasidium pullulans; Paecilomyces variotii; Penicillium funiculosum; Penicillium ochro-chloron; Scopulariopsis brevicaulis; and Trichoderma viride. The survival craft light should then be placed in a mould growth chamber which should be maintained at a temperature of 29^0C +/- 1^0C and a relative humidity of not less than 95 %. The period of incubation should be 28 days. After this period the survival craft light should be inspected. (Note: The mould growth test may be waived where the manufacturer is able to produce evidence that the external materials employed will satisfy the test.)	The survival craft light should be rot-proof and not be unduly affected by fungal attack. There should be no mould growth visible to the naked eye and the survival craft light should function after the test.	Results: PASS: FAIL: Comments/Observations

Survival Craft Exterior Lights	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.3.6.8 Corrosion and Seawater Resistance Test		**Regulations: LSA Code 1.2.2.4/4.1.3.3/4.1.3.4; MSC.81(70) 1/ 10.4/10.4.4**
Test Procedure	Acceptance Criteria	Significant Test Data
One survival craft exterior or interior light (as the case may be) which has passed the visual inspection should be subjected to a corrosion and seawater resistance test according to IEC 945, paragraph 8.12. (Note : .1 If there are no exposed metal parts the Corrosion and Seawater Resistance Test need not be conducted. .2 The Corrosion and Seawater Resistance Test may be waived where the Manufacturer is able to produce evidence that the external metal parts employed will satisfy the test. .3 Automatic activated version should be prevented from switching during the test)	The survival craft light should be corrosion resistant and not be unduly affected by seawater. In a stowed condition, batteries should be of a type that does not deteriorate due to dampness or humidity. Furthermore, the survival craft light should comply with the requirements of IEC 945, paragraph 8.12.2. There should be no undue deterioration of metal parts and the survival craft light should function after the test. Where the exposed metal is part of the automatic switch sensor, the function test after the 28day test cannot be done.	Results: PASS: FAIL: Comments/Observations

Survival Craft Exterior Lights	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.3.6.9 Solar Radiation Test (not for Survival Craft Interior Lights)		**Regulations: LSA Code 1.2.2.5; MSC.81(70) 1/ 10.4/10.4.5**
Test Procedure	Acceptance Criteria	Significant Test Data
One survival craft exterior light which has passed the visual inspection should be subjected to a solar radiation test according to IEC 945, paragraph 8.10. (Note: The Solar Radiation Test may be waived where the manufacturer is able to produce evidence that the materials employed will satisfy the test, i.e. UV stabilized.)	The survival craft exterior light should be resistant to deterioration by sunlight. Furthermore, the mechanical properties and labels should be resistant to harmful deterioration by sunlight and the survival craft exterior light should function after the test.	Results: PASS: FAIL: Comments/Observations

4.3.6.10 Test for Oil Resistance (not for Survival Craft Interior Lights)		**Regulations: LSA Code 1.2.2.4; MSC.81(70) 1/ 10.4/10.4.6**
Test Procedure	Acceptance Criteria	Significant Test Data
One survival craft exterior light which has passed the visual inspection should be subjected to the test for oil resistance according to IEC 945, paragraph 8.11. Automatic activated version should be prevented from switching during the test.	After this test the survival craft exterior light should not be unduly affected by oil and should show no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical qualities. The survival craft exterior light should function after the test.	Results: PASS: FAIL: Comments/Observations

Survival Craft Exterior Lights	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.3.6.11 Rain Test and Watertightness Test		**Regulations: LSA Code 1.2.2.4/1.2.2.8/4.1.3.3/4.1.3.4; MSC.81(70) 1/10.4/10.4.7**
Test Procedure	Acceptance Criteria	Significant Test Data
One survival craft exterior or interior light (as the case may be) which has passed the visual inspection, including its complete power source should be subjected to a rain test according to IEC 945, paragraph 8.8. After having passed the rain test the survival craft light, including its complete power source, should be immersed horizontally under not less than 300 mm of fresh water for at least 24 h. Automatic activated version should be prevented from switching during the test.	The survival craft light should be rot-proof The survival craft light should comply with the requirements of IEC 945, paragraph 8.8.2 and should function after the rain test. Additionally, after the water-tightness test the survival craft light should function and there should be no evidence of water inside the survival craft light.	Results: PASS: FAIL: Comments/Observations

4.3.6.12 Fire Test (not for Survival Craft Interior Lights)		**Regulations: LSA Code 4.9.1; MSC.81(70) 1/10.4/10.4.8**
Test Procedure	Acceptance Criteria	Significant Test Data
One survival craft exterior light which has passed the visual inspection should be subjected to a fire test. A test pan not less than 30 cm x 35 cm x 6 cm should be placed in an essentially draught-free area. Water should be put in the bottom of the test pan to a depth of at least 1 cm followed by enough petrol to make a minimum total depth of not less than 4 cm. The petrol should then be ignited and allowed to burn freely for at least 30 s. The survival craft exterior light should then be moved through the flames, facing them, with the survival craft exterior light not more than 25 cm above the top edge of the test pan so that the duration of exposure to the flames is at least 2 s.	The survival craft exterior light should not sustain burning or continue melting after being totally enveloped in a fire for a period of at least 2 s and after being removed from the flames. The survival craft exterior light should function after the test.	Results: PASS: FAIL: Comments/Observations

4.4 DAVIT-LAUNCHED LIFEBOATS

EVALUATION AND TEST REPORT

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4.4 DAVIT-LAUNCHED LIFEBOATS

EVALUATION AND TEST REPORT

Manufacturer	
Date	
Type	
Place	
Name Surveyor printed	
Signature	
Approving Organization	

	Manufacturer:_____	Date:_____	Time:_____
Davit-Launched Lifeboats	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.4.0.1 General Data and Specifications	**Regulations: LSA Code 4.4, 4.5, 4.6, 4.8 & 4.9**

General Information	Lifeboat Dimensions	Lifeboat Weight
Construction Material: Hull Canopy: **Lifeboat Inherent Buoyancy** Material: Weight: Volume: **Engine Installed:** Manufacturer: Type: Power: Gear Ratio: Propeller: **Release Mechanism:** Manufacturer: Type: SWL: **Occupancy:** Persons (75 kg each): (150 max.)	**Molded Dimensions:** Length: Breadth: Depth:	**Design Weight:** Unloaded Boat: Loose Equipment: Food: Water: Fuel: Persons: **Calculated Loaded Weight:** Fully Equipped: With Persons: **Weight As Tested:** Fully Equipped: Comments/Observations Passed _____ Failed _____

Davit-Launched Lifeboats	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.4.0.2 Submitted drawings, reports and documents

Submitted drawings and documents			**Status**
Drawing No.	**Revision No. & date**	**Title of drawing**	

Submitted reports and documents			**Status**
Report/Document No.	**Revision No. & Date**	**Title of report / document**	
		Maintenance Manual -	
		Operations Manual -	

	Manufacturer:_____	Date:_____	Time:_____
Davit-Launched Lifeboats	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.4.0.3 Quality Assurance	**Regulations: -**
Except where all appliances of a particular type are required by Chapter III of the International Convention for the Safety of Life at Sea, 1974, as amended, to be inspected, representatives of the Administration should make random inspections of manufacturers to ensure that the quality of life-saving appliances and materials used comply with the specification of the approved prototype life-saving appliance. Manufacturers should be required to institute a quality control procedure to ensure that life-saving appliances are provided to the same standard as the prototype life-saving appliance approved by the Administration and to keep records of any production tests carried out in accordance with the Administration's instructions.	Quality Assurance Standard Used: - _____ Quality Assurance Procedure: - _____ Quality Assurance Manual: - _____ Description of System. Quality Assurance System acceptable: Passed ____ Failed _____ Comments/Observations

Davit-Launched Lifeboats	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.4.1.1 Visual Inspection—Occupant Space	**Regulations: LSA Code 4.4.1.8, 4.4.2.2/3, 4.4.3.5**	
Test Procedure	Acceptance Criteria	Significant Test Data
Visually inspect the lifeboat. Conduct measurements and verify clearances as required.	**Interior Floor to Canopy Height** Over 50% of the floor area the height should be not less than 1.3m for lifeboats carrying 9 or fever persons and 1.7m for lifeboats carrying 24 or more persons. Linear interpolation for occupancy between 9 and 24 persons is permitted.	Height: _____ m
	Seating Space Width – at least 430 mm Depth – at least 100mm each side of a point 215mm from the back Knee Space (Seating on seats) at least 635 mm from the back Knee Width – at least 250 mm Leg Space (Seating on floor) – at least 1190 mm from the back Overlapping Seat Vertical Separation – at least 350 mm Seat Horizontal Overlap – 150 mm maximum Each seating position should be clearly indicated.	Typically: Width: _____ mm Depth: _____ mm Knee Space: _____ mm Knee Width: _____ mm Leg Space: _____ mm Vert. Separation: _____ mm Overlap: _____mm Position Indication: Passed_____Failed _____ Number of seats provided _____
	Walkway Surfaces The surfaces on which persons might walk should have a non-skid finish.	Non Skid Surface: Passed _____ Failed _____ Comments/Observations

Davit-Launched Lifeboats	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.4.1.2 Visual Inspection—Fittings, Provisions, and Ladders (1 of 4)	**Regulations: LSA Code 4.4.7.3/4/5/8/10/11/12**	
Test Procedure	Acceptance Criteria	Significant Test Data
Visually inspect the lifeboat. Conduct measurements and verify clearances as required.	Fittings and Provisions	
	Suitable handholds or buoyant lifeline becketed around the lifeboat above the waterline and within reach of a person in the water, except in the vicinity of the rudder and propeller	Passed _____ Failed _____
	On other than self-righting lifeboats, handholds on the underside arranged to break away without damaging the lifeboat when subjected to an sufficient impact	Passed _____ Failed _____ Not Applicable
	Sufficient watertight lockers, compartments or arrangements to provide for storage of the small items of equipment water and provision.	Passed _____ Failed _____
	Means provided for collecting rainwater.	Passed _____ Failed _____
	Means provided for storing collected water.	Passed _____ Failed _____
	Means provided for siting and securing antenna in operating position (If Required)	Passed _____ Failed _____
	Approved position-indicating lights with 12 h capacity provided	Passed _____ Failed _____
	Approved light with 12 h capacity sufficient for reading provided inside.	Passed _____ Failed _____
	Adequate view on all sides for safe launching and maneuvering	Passed _____ Failed _____
		Comments/Observations

Davit-Launched Lifeboats	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.4.1.2 Visual Inspection—Fittings, Provisions, and Ladders (2 of 4)	**Regulations: LSA Code 4.4.8, 4.5.2.1/4, 4.5.2/3/4, 4.6.2.8**	
Test Procedure	Acceptance Criteria	Significant Test Data
	Exterior of the lifeboat is of a highly visible color and its interior of a color which does not cause discomfort for the occupants.	Colour of canopy: _____Colour of hull:_____ Passed _____ Failed _____
	Sufficient buoyant oars to make headway in calm seas.	Passed _____ Failed _____
	Provided with a manual pump suitable for effective bailing or be automatically self-bailing.	Passed _____ Failed _____
	Partially enclosed lifeboats	
	Provided with permanently attached rigid covers extending over not less than 20% of the length of the lifeboat from the stem and not less than 20% of the length of the lifeboat from the after-most part of the lifeboat.	Passed _____ Failed _____
	Fitted with permanently attached foldable canopy which together with the rigid covers completely encloses the occupants of the lifeboat in a weatherproof shelter and protects them from exposure	Passed _____ Failed _____
	Entrances at both ends and on each side are provided.	Passed _____ Failed _____
	Entrances in the rigid covers should be weather tight when closed.	Passed _____ Failed _____
	The lifeboat is of a highly visible colour where it will assist detection.	Passed _____ Failed _____
	The canopy should be so arranged that:	
	.1 it is provided with adequate rigid sections or battens to permit erection of the canopy;	Passed _____ Failed _____
		Comments/Observations

Davit-Launched Lifeboats	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.4.1.2 Visual Inspection—Fittings, Provisions, and Ladders (3 of 4)	**Regulations: LSA Code 4.5.2.3/5/6/8, 4.5.4, 4.6.2.2/3/4/5**	
Test Procedure	Acceptance Criteria	Significant Test Data
	.2 it is insulated to protect the occupants against heat and cold by means of not less than two layers of material separated by an air gap or other equally efficient means; means should be provided to prevent accumulation of water in the air gap;	Passed _____ Failed _____
	.3 entrances in the canopy are provided with efficient adjustable closing arrangements which can be easily and quickly opened and closed from inside or outside so as to permit ventilation but exclude seawater, wind and cold; means should be provided for holding the entrances securely in the open and closed position;	Passed _____ Failed _____
	.4 with the entrances closed, it admits sufficient air for the occupants at all times;	Passed _____ Failed _____
	.5 the occupants can escape in the event of the lifeboat capsizing.	Passed _____ Failed _____
	If the lifeboat is intended to have a fixed two-way VHF radiotelephone apparatus, the lifeboat should either have a cabin large enough to accommodate both the equipment and the person using it, or else the construction of the lifeboat must provide a sheltered space	Passed _____ Failed _____
	Totally Enclosed Lifeboats The enclosures should be so arranged that:	
	.1 access to the lifeboat is provided by hatches which can be closed to make the lifeboat watertight;	Passed _____ Failed _____
	.2 hatches are positioned so as to allow launching and recovery operations to be performed without any occupant having to leave the enclosure;	Passed _____ Failed _____
	.2.1 access hatches can be opened and closed from both inside and outside the lifeboat	Passed _____ Failed _____
	.2.2 access hatches have means to hold them securely in the open position.	Passed _____ Failed _____
		Comments/Observations:

Davit-Launched Lifeboats	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.4.1.2 Visual Inspection—Fittings, Provisions, and Ladders (4 of 4)	**Regulations: LSA Code 4.4.4, 4.6.2.7/9/10, 4.6.3.1/3, 4.6.4.1/3**	
Test Procedure	Acceptance Criteria	Significant Test Data
	.3 it is possible to row the lifeboat;	Passed _____ Failed _____
	.4 handrails provide a secure handhold for persons moving about the exterior of the lifeboat, and aid embarkation and disembarkation;	Passed _____ Failed _____
	.5 persons have access to their seats from an entrance without having to climb over thwarts or other obstructions;	Passed _____ Failed _____
	.6 windows or translucent panels to make artificial light unnecessary in day light	Passed _____ Failed _____
	Each seating space is fitted with a safety belt.	Passed _____ Failed _____
	The safety belt is of a color contrasting with the belts for seats immediately adjacent and with the seat on which it is fitted	Passed _____ Failed _____
	Engine and transmission are controlled from the helmsman position	Passed _____ Failed _____
	Air-cooled engines have a duct system to take in cooling air from, and exhaust it to, the outside of the lifeboat. Manually operated dampers provided to enable cooling air to be taken in from, and exhausted to, the interior of the lifeboat.	Passed _____ Failed _____
	Lifeboat Ladders Ladders that can be used at any boarding entrance should be on board and the lowest step when in place should not be less than 0.4 m below the light waterline.	Passed _____ Failed _____
	Other Provisions No buoyant material should be installed external to the hull of the lifeboat except in addition to buoyant material required to float the flooded lifeboat.	Passed _____ Failed _____ Comments/Observations

Davit-Launched Lifeboats	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.4.1.3 Visual Inspection—Engine and Starting System	**Regulations: LSA Code 4.4.6.2/5/6/7/9/11/12**	
Test Procedure	Acceptance Criteria	Significant Test Data
Visually inspect the lifeboat. Conduct measurements and verify clearances as required.	Type of starting system	Manual ☐ Power ☐
	Two independent rechargeable energy sources available for power starting systems	YES _____ NO _____ NA
	Any required starting aids provided	Passed _____ Failed _____
	Starting system is not impeded by engine casing, thwarts, or other obstructions	Passed _____ Failed _____
	Propeller arranged to be disengaged from the engine	Passed _____ Failed _____
	Provision for ahead and astern propulsion	Passed _____ Failed _____
	Exhaust arranged to prevent water from entering engine in normal operation	Passed _____ Failed _____
	The lifeboat is designed with due regard to the safety of persons in the water and to the possibility of damage to the propulsion system by floating debris	Passed _____ Failed _____
	Engine casing made of fire retardant material or other suitable arrangements providing similar protection	Fire retardant materials used:_____ Passed _____ Failed _____
	Personnel are protected from hot and moving parts	Passed _____ Failed _____
	Shouted order can be heard with engine running at speed necessary for 6 knot operation	Passed _____ Failed _____
	Watertight casing around bottom and sides of starter batteries with a tightly fitting top which provides for necessary gas venting	Passed _____ Failed _____
	Means for recharging engine starting, radio, and searchlight batteries provided by solar charge or ships power supply	Passed _____ Failed _____
	Radio batteries not used to provide power for engine starting	Passed _____ Failed _____
	Recharging means provided for lifeboat batteries (not exceeding 50 V) from ship's power supply can be disconnected at the lifeboat embarkation station	Passed _____ Failed _____
	Instructions for starting and operating engine are water resistant and mounted in a conspicuous place near the engine starting controls	Passed _____ Failed _____
		Comments/Observations

Davit-Launched Lifeboats	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.4.1.4 Visual Inspection—Steering Mechanism	**Regulations: LSA Code 4.4.7.2**	
Test Procedure	Acceptance Criteria	Significant Test Data
Visually inspect the lifeboat. Conduct measurements and verify clearances as required.	A tiller should be capable of controlling the rudder	Passed _____ Failed _____
	Rudder permanently attached to the lifeboat	Passed _____ Failed _____
	Except when remote steering is provided, the tiller is permanently attached or linked to the rudder stock	Passed _____ Failed _____
	Rudder and tiller arranged so as not to be damaged by operation of the release mechanism or propeller	Passed _____ Failed _____
		Comments/Observations

Davit-Launched Lifeboats	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.4.1.5 Visual Inspection—Release Mechanism	**Regulations: LSA Code 4.4.7.6.2.2, 4.4.7.6.3/5**	
Test Procedure	Acceptance Criteria	Significant Test Data
Visually inspect the lifeboat. Conduct measurements and verify clearances as required.	Clear operating instructions	Passed _____ Failed _____
	Suitably worded danger sign for on load release	Passed _____ Failed _____ N/A
	On-load release:	
	The mechanical protection (interlock) engages only when mechanism is completely and properly reset, to prevent accidental release during recovery of the boat	Passed _____ Failed_____ N/A
	On-load release mechanism needs deliberate and sustained action by the operator	Passed _____ Failed_____ N/A
	Mechanical protection provided beyond that normally required for off load release	Passed _____ Failed _____
	Release control marked in a color that contrasts with the surroundings	Passed _____ Failed _____
	Where a single fall system is provided: Off-load release: where a single fall and hook system is used for launching a lifeboat or rescueboat in combination with a suitable painter, the requirements of onload release capability need not be applicable; in such an arrangement a single capability to release the lifeboat or rescueboat, only when it is fully waterborne, will be adequate.	Passed _____ Failed_____ N/A Comments/Observations

Davit-Launched Lifeboats	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.4.1.6 Visual Inspection—Drain Valve	**Regulations: LSA Code 4.4.7.1**	
Test Procedure	Acceptance Criteria	Significant Test Data
Visually inspect the lifeboat. Conduct measurements and verify clearances as required. (not applicable for self-bailing boats)	Fitted near lowest point on the hull	Passed _____ Failed _____
	Automatically opens to drain water from the hull when the boat is not waterborne and closes to prevent entry of water when the boat is waterborne	Passed _____ Failed _____
	Cap or plug attached to the boat by a lanyard, chain or other suitable means	Passed _____ Failed _____
	Readily accessible from inside the lifeboat	Passed _____ Failed _____
	Position clearly indicated	Passed _____ Failed _____
		Comments/Observations

Davit-Launched Lifeboats	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.4.2.1 Flooded Stability Test	**Regulations: LSA Code 4.4.1.1, 4.6.3.3; MSC.81(70) 1/ 6.8.1/2/3**	
Test Procedure	Acceptance Criteria	Significant Test Data
The lifeboat should be loaded with its equipment. If provision lockers, water tanks and fuel tanks cannot be removed, they should be flooded or filled to the final waterline resulting from this test. Lifeboats fitted with watertight stowage compartments to accommodate individual drinking water containers should have these containers aboard and placed in the stowage compartments, which should be sealed watertight during the flooding tests. Ballast of equivalent weight and density should be substituted for the engine and any other installed equipment that can be damaged by water. Weights representing persons who would be in the water when the lifeboat is flooded may be omitted. Weights representing persons who would not be in the water when the lifeboat is flooded should be placed in the normal seating positions of such persons.	When loaded as specified, the lifeboat should have positive stability when filled with water to represent flooding which would occur when the lifeboat is holed in any one location below the waterline assuming no loss of buoyancy material and no other damage.	Passed _____ Failed _____ Trim:_____ List:_____ Comments/Observations

Davit-Launched Lifeboats	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.4.2.2 Freeboard Test		**Regulations: LSA Code 4.4.5.1/2.1/2; MSC.81(70) I/ 6.8.4/5**
Test Procedure	Acceptance Criteria	Significant Test Data
The lifeboat with its engine should be loaded with a mass equal to that of all the equipment. One half of the number of persons for which the lifeboat is to be approved should be seated in a proper seating position on one side of the centreline. The freeboard should then be measured on the low side.	Each lifeboat with side openings near the gunwale should have a freeboard measured from the waterline to the lowest opening through which the lifeboat may become flooded, of at least 1.5% of the lifeboats length or 100 mm, whichever is the greater; and Each lifeboat without side openings near the gunwale should not exceed an angle of heel of 20° and should have a freeboard, measured from the waterline to the lowest opening through which the lifeboat may become flooded, of at least 1.5% of the lifeboats length or 100 mm, whichever is the greater.	Measured Freeboard: _____ mm 1.5% of Boat's Length: _____ mm Angle of heel, if applicable: _____Deg. Passed _____ Failed _____ Comments/Observations

Davit-Launched Lifeboats	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.4.2.3 Self-Righting Test (Totally Enclosed Lifeboats)		**Regulations: LSA Code 4.6.3.2/4, 4.6.4.2; MSC.81(70) I/ 6.14.1/1.1/1.2/2/2.1/2.2**
Test Procedure	Acceptance Criteria	Significant Test Data
A suitable means should be provided to rotate the lifeboat about a longitudinal axis to any angle of heel and then release it. The lifeboat, in the enclosed condition, should be incrementally rotated to angles of heel up to and including 180° and should be released. These tests should be conducted in the following conditions of load: .1 when the lifeboat with its engine is loaded in the normal position with properly secured weights representing the fully equipped lifeboat with a full complement of persons on board. The weight used to represent each person, assumed to have an average mass of 75 kg, should be secured at each seat location and have its center of gravity approximately 300 mm above the seat pan so as to have the same effect on stability as when the lifeboat is loaded with the number of persons for which it is to be approved; and .2 when the lifeboat is in the light condition.	After release, the lifeboat should always return to the upright position without the assistance of the occupants. At the beginning of these tests, the engine should be running in neutral position and: .1 unless arranged to stop automatically when inverted, the engine should continue to run when inverted and for 30 min after the lifeboat has returned to the upright position; and .2 if the engine is arranged to stop automatically when inverted, it should be easily restarted and run for 30 min after the lifeboat has returned to the upright position. Water does not enter the engine	Loaded: Passed _____ Failed _____ Light: Passed _____ Failed _____ Passed _____ Failed _____ Passed _____ Failed _____ Comments/Observations Passed_____ Failed _____

Davit-Launched Lifeboats	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.4.2.4 Flooded Capsizing Test (Totally Enclosed Lifeboats)		**Regulations: LSA Code 4.1.6.3; MSC.81(70) 1/ 6.14.3-5**
Test Procedure	Acceptance Criteria	Significant Test Data
The lifeboat should be placed in the water and fully flooded until the lifeboat can contain no additional water. All entrances and openings should be secured to remain open during the test. For the purpose of this test, the mass and distribution of the occupants may be disregarded. However, the equipment, or equivalent mass, should be secured in the lifeboat in the normal operating position. Using a suitable means, the lifeboat should be rotated about a longitudinal axis to a heel angle of 180° and then released.	After release, the lifeboat should attain a position that provides an above-water escape for the occupants. In case of totally enclosed lifeboats, water level measured along each seatback in stable flooded condition is not more than 500 mm above the seat pan at any occupant seating position. *Note*: Several tests may have to be conducted if holes in different areas would create different flooding conditions.	Passed _____ Failed _____ Max water level above seat pan: _____ mm Angel of trim:_____ deg Angle of list: _____deg Passed _____ Failed _____ Comments/Observations

4.4.3.1 Seating Strength Test		**Regulations: LSA Code 4.4.1.5.1; MSC.81(70) I/ 6.6.1**
Test Procedure	Acceptance Criteria	Significant Test Data
The seating should be loaded with a mass of 100 kg in each position allocated for a person to sit in the lifeboat. For a totally enclosed lifeboat, the seat belts should be demonstrated to be capable of holding a person with a mass of 100 kg securely in place with the lifeboat in the capsized position. This test may be conducted in connection with the righting test.	The seating should be able to support this loading without any permanent or damage The seat belts should hold a mass of 100 kg securely in place with the lifeboat in the capsized position.	Passed _____ Failed _____ Passed _____ Failed _____ Comments/Observations

Davit-Launched Lifeboats	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.4.3.2 Seating Space Test		**Regulations: LSA Code 4.4.2.2.1, 4.4.3.1/2; MSC.81(70) I/ 6.7.1**
Test Procedure	Acceptance Criteria	Significant Test Data
The lifeboat should be fitted with its engine and its equipment. The number of persons for which the lifeboat is to be approved, having an average mass of 75 kg and wearing a lifejacket and any other essential equipment should board the lifeboat as quickly as possible. The lifeboat should then be maneuvered and all equipment on board tested by an individual to demonstrate that the equipment can be operated without difficulty and without interference with the occupants.	The number of persons should be able to board the lifeboat and be properly seated within a period of 3 min in the case of a lifeboat intended for a cargo ship and as rapidly as possible in the case of a lifeboat intended for a passenger ship. The boat can be maneuvered and all equipment can be operated without difficulty or interference with the occupants.	Cargo Ship: Boarding Time: _____ min Passed _____ Failed _____ Passenger Ship: Passed _____ Failed _____ N/A Passed _____ Failed _____ SOLAS inherently buoyancy lifejacket worn : Yes/No Comments/Observations

4.4.4.1 Release Mechanism Tests—Simultaneous Release		**Regulations: LSA Code 4.4.7.6, 4.4.7.6.1/2/2.1/2.2/5; MSC.81(70) I/ 6.9.1/2**
Test Procedure	Acceptance Criteria	Significant Test Data
Every lifeboat to be launched by fall or falls, with its engine fitted should be suspended from the release mechanism just clear of the ground or the water. The lifeboat should be loaded so that the total mass equals 1.1 times the mass of the lifeboat, all its equipment and the number of persons for which the lifeboat is to be approved. The lifeboat release control should be activated The test should be repeated with the lifeboat waterborne in the light condition and in a 10% overload condition.	It should be confirmed that the lifeboat will simultaneously release from each fall which it is connected without binding or damage to any part of the lifeboat or the release mechanism. It should be confirmed that the lifeboat will simultaneously release from each fall to which it is connected when fully waterborne in the light condition and in a 10% overload condition. Single fall systems not intended for on-load operation are exempt from this test	1.1 x Loaded Weight: _____ N On load release: 1.1 load Passed_____ Failed Waterborne release : 1.1 load: Passed _____ Failed _____ Light condition: Passed _____ Failed _____ Comments/Observations

Davit-Launched Lifeboats	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.4.4.2 Release Mechanism Tests – Load Test		**Regulations: LSA Code 4.4.7.6.4; MSC.81(70) I/ 6.9.3**
Test Procedure	Acceptance Criteria	Significant Test Data
The release mechanism should be mounted on a tensile strength testing device. The load should be increased to at least six times the working load of the release mechanism. (Testing to failure is suggested, but not required.)	The release mechanism should not fail at load less than or equal to six times the working load. (If tested to failure, working load may be taken as1/6 the failure load.)	Working Load: _____ N Force Applied: _____ N Passed _____ Failed _____ Comments/Observations

Davit-Launched Lifeboats	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.4.4.3 Release Mechanism Tests — Towing Release Test		**Regulations: LSA Code 4.4.7.6.5; MSC.81(70) I/ 6.9.4, 6.9.4.1/2/3**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be demonstrated that the release mechanism can release the fully equipped lifeboat when loaded with weights equal to the mass of the number of persons for which the lifeboat is to be approved, when the lifeboat is being towed at speeds up to 5 knots. In lieu of a waterborne test, this test may be conducted as follows: .1 A force equal to the force necessary to tow the lifeboat at a speed of 5 knots should be applied to the hook in the lengthwise direction of the boat at an angle of 45° to the vertical. This test should be conducted in the afterward as well as the forward direction, depending upon the design of the release hook; .2 A force equal to the safe working load of the hook should be applied to the hook in an afterward direction at an angle of 20° to the vertical. This test should be conducted on both sides. .3 A force equal to the safe working load of the hook should be applied to the hook in a direction half-way between the positions of tests 1 and 2 and within the ellipse segment formed by 1 and 2. This test should be conducted in four positions.	The lifeboat is released satisfactorily-by the release mechanism. Single fall systems not intended for on-load operation are exempt from this test	Type of Test: Waterborne / Non-Waterborne <u>Waterborne Test</u>: Towing Speed: _____ kts Passed Failed <u>Non-Waterborne Test</u> .1 Force applied: _____ N 45^0 Forward: Passed Failed 45^0 Aft: Passed Failed .2 Force applied: _____ N 20^0 to port: Passed Failed 20^0 to starboard: Passed Failed .3 Force applied _____ N 20^0 to forward/port: Passed Failed 20^0 to forward/starboard: Passed Failed 20^0 to aft/port: Passed Failed 20^0 to aft/starboard: Passed Failed Passed _____ Failed _____ Comments/Observations

Davit-Launched Lifeboats	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.4.5.1 Operational Tests—Manoeuvring		**Regulations: LSA Code 1.2.2.8; MSC.81(70) I/ 6.10.1**
Test Procedure	Acceptance Criteria	Significant Test Data
The lifeboat should be loaded with weights equal to the mass of its equipment and the number of persons for which the lifeboat is to be approved. The engine should be started and the lifeboat manoeuvred for a period of at least 4 h to demonstrate satisfactory operation.	The lifeboat should manoeuvre and operate satisfactorily.	Passed _____ Failed _____ Comments/Observations

4.4.5.2 Operational Tests—Liferaft Towing		**Regulations: LSA Code 4.4.6.8; MSC.81(70) I/ 6.10.1**
Test Procedure	Acceptance Criteria	Significant Test Data
The lifeboat should be loaded with weights equal to the mass of its equipment and the number of persons for which the lifeboat is to be approved. It should be demonstrated that the lifeboat can tow a 25-person Liferaft loaded with the number of persons or equivalent mass for which it is to be approved and its equipment at a speed of 2 knots in calm water. Alternatively satisfactory bollard pull force can be used to demonstrate the ability to tow a raft. The fitting designated for towing other craft should be secured to a stationary object by a towrope. The engine should be operated ahead at full speed for a period of at least 2 minutes.	The lifeboat can successfully tow the Liferaft as described in the procedure. There should be no damage to the towing fitting or its supporting structure.	Liferaft Used: _____ Speed Maintained: _____ knots Or alternatively Bollard Pull: _____ N Passed _____ Failed _____ Passed _____ Failed _____ Comments/Observations

Davit-Launched Lifeboats	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.4.5.3 Operational Tests—Endurance, Speed & Fuel Consumption		**Regulations: LSA Code 4.4.6.8; MSC.81(70) I/ 6.10.1**
Test Procedure	Acceptance Criteria	Significant Test Data
The lifeboat should be loaded with weights equal to the mass of its equipment and the number of persons for which the lifeboat is to be approved. The lifeboat should be run at a speed of not less than 6 knots for a period, which is sufficient to ascertain the fuel consumption and to establish that the fuel tank has the required capacity.	The speed of a lifeboat when proceeding ahead in calm water when loaded with its full complement of persons and equipment and with all engine-powered auxiliary equipment in operation, should be at least 6 knots. Sufficient fuel, suitable for use thought out the temperature ranged expected in the area in which the ship operates, should be provided to run the fully loaded lifeboat at 6 knots for a period of not less than 24 h.	Measured Speed (without spray system): _____ knots Measured Speed (with spray system): _____ knots Passed_____ Failed _____ Consumption: _____ L/h Tank Capacity: _____ L Endurance: _____ hrs Sufficient tank capacity Passed _____Failed_____ Comments/Observations

4.4.5.4 Operational Tests—Engine Out of Water		**Regulations: LSA Code 4.4.6.3; MSC.81(70) I/ 6.10.5**
Test Procedure	Acceptance Criteria	Significant Test Data
The engine should be operated for at least 5 min at idling speed under conditions simulating normal storage.	The engine should not be damaged as a result of this test.	Passed _____ Failed _____ Comments/Observations

Davit-Launched Lifeboats	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.4.5.5 Operational Tests—Compass Test		**Regulations: LSA Code 4.4.8.5; MSC.81(70) I/ 6.10.7**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be determined that the compass performance is satisfactory and that it is not unduly affected by magnetic fittings and equipment in the lifeboat.	The compass operates satisfactorily.	Passed _____ Failed _____ Comments/Observations

4.4.5.6 Operational Tests — Helpless Person Recovery		**Regulations: LSA Code 4.4.3.4; MSC.81(70) I/ 6.10.8**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be demonstrated by test that it is possible to bring helpless people on board the lifeboat from the sea.	Helpless people can be brought on board the lifeboat from the sea.	Passed _____ Failed _____ Comments/Observations

Davit-Launched Lifeboats	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.4.6.1 Towing & Painter Tests—Towing Test		**Regulations: LSA Code 4.4.7.7; MSC.81(70) I/ 6.11.1**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be demonstrated that the fully equipped lifeboat, loaded with a properly distributed mass equal to the mass of the number of persons for which it is to be approved, can be towed at a speed of not less than 5 knots in calm water and on an even keel.	The lifeboat should not exhibit unsafe or unstable characteristics. There should be no damage to the lifeboat or its equipment as a result of this test.	Passed _____ Failed _____ Comments/Observations

4.4.6.2 Towing & Painter Tests – Painter Release Test		**Regulations: LSA Code 4.4.7.7; MSC.81(70) I/ 6.11.1/2/3**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be demonstrated that the painter release mechanism can release the painter on a fully equipped and loaded lifeboat that is being towed at a speed of not less than 5 knots in calm water. The painter release mechanism should be tested in several distinct directions of the upper hemisphere not obstructed by the canopy or other constructions in the lifeboat. The directions specified in test 4.4.4.3 should be used if possible.	The painter should release and there should be no damage to the lifeboat or its equipment as a result of this test.	Passed _____ Failed _____ Test Direction _____ Passed _____ Failed _____ Passed _____ Failed _____ Passed _____ Failed _____ Passed _____ Failed _____ Passed _____ Failed _____ Passed _____ Failed Comments/Observations

Davit-Launched Lifeboats	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.4.7.1 Strength Tests--Impact Test (1 of 3)		**Regulations: LSA Code 4.4.1.7, 4.6.5; MSC.81(70) I/ 6.4.1/2, 6.4.5, 6.4.7.1/2/3/4/5, 6.17**
Test Procedure	Acceptance Criteria	Significant Test Data
In case of lifeboats launched by falls; The fully equipped lifeboat, including its engine, should be loaded with weights equal to the mass of the number of persons for which the lifeboat is to be approved. The weights should be distributed to represent the normal loading in the lifeboat. Skates or fenders, if required, should be in position. The lifeboat, in a free hanging position, should be pulled laterally to a position so that when released it will strike a fixed rigid vertical surface at a velocity of 3.5 m/s (keel is raised 0.624 m above the free hanging position). The boat should be released to impact against the rigid vertical surface. In the case of totally enclosed lifeboats, the acceleration forces should be measured and evaluated at different positions within the prototype lifeboat to determine the most severe occupant exposure to acceleration considering the effects of fenders, lifeboat elasticity, and seating arrangement. In case of totally enclosed lifeboats, representative safety belts and fastenings which will experience high loads as a result of the impact should be secured about weights equal to 100 kg to simulate holding a person during the test.	The impact test should be considered successful if : .1 no damage has been sustained that would affect the lifeboat's efficient functioning; .2 machinery and other equipment has operated to full satisfaction; .3 no significant ingress of seawater has occurred; and .4 accelerations measured during the impact and subsequent rebound, if required during the impact test, are in compliance with the criteria of the “Emergency Limits” specified in table 2 or table 3, respectively.	CDRR Index: ___ N/A CAR Index: ____ N/A Final Evaluation: Passed _____ Failed _____ Comments/Observations

	Manufacturer:_____	Date:_____	Time:_____
Davit-Launched Lifeboats	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.4.7.1 Strength Tests ¾ Impact Test (2 of 3)	**Regulations: LSA Code 4.6.5; MSC.81(70) I/ 6.17.1/1.1/1.2/1.3/2/3/4/5/6/7/8/9/10/11 /12/13/14**
Measuring and Evaluating Acceleration Force **Selection, placement and mounting of accelerometers** The accelerometers used to measure the acceleration forces in the lifeboat should: 1 have adequate frequency response for the test in which they are to be used but the frequency response should at least be in the range of 0 to 200 Hz; 2 have adequate capacity for the acceleration forces that will occur during the tests; 3 have an accuracy of ± 5% Accelerometers should be placed in the lifeboat, parallel to the principal axes of the lifeboat, at those locations necessary to determine the worst occupant exposure to acceleration. The accelerometers should be mounted on a rigid part of the interior of the lifeboat in a manner to minimize vibration and slipping. A sufficient number of accelerometers should be used at each location at which acceleration forces are measured so that all likely acceleration forces at that location can be measured. The selection, placement, and mounting of the accelerometers should be to the satisfaction of the Administration. **Recording method and rate** The measured acceleration forces may be recorded on magnetic media as either an analog or a digital signal or a paper plot of the acceleration signal may be produced. If acceleration forces are to be recorded and stored as a digital signal, the sampling rate should be at least 500 samples per second. Whenever an analogue acceleration signal is converted to a digital signal, the sampling rate should be at least 500 samples per second.	**Evaluation with the dynamic response model** The dynamic response model is the preferred method to evaluate potential for the occupant in a lifeboat to be injured by exposure to acceleration forces. In the dynamic response model, the human body is idealized as a single-degree-of-freedom spring-mass acting in each coordinate direction as shown in figure 1. The response of the body mass relative to the seat support, which is excited by the measured accelerations, can be evaluated using a procedure acceptable to the Administration. The parameters to be used in the analysis are shown in table 1 for each coordinate direction. Before performing the dynamic response analysis, the measured accelerations should be oriented to the primary axes of the seat. The desired outcome from the dynamic response analysis is the displacement time-history of the body mass relative to the seat support in each coordinate direction. At all times, the following expression should be satisfied: $$\textbf{CDRR} = \sqrt{\left(\frac{d_x}{S_x}\right)^2 + \left(\frac{d_y}{S_y}\right)^2 + \left(\frac{d_z}{S_z}\right)^2} \quad £ \ \mathbf{1}$$ where d_x, d_y and d_z are the concurrent relative displacements of body mass with respect to the seat support, in the x, y and z body axes, as computed from the dynamic response analysis and S_x, S_y, and S_z, are relative displacements which are presented in table 2 for the appropriate launch condition. **Evaluation using the SRSS method** In lieu of the evaluation with the dynamic response model, the potential for an occupant in a lifeboat to become injured by an acceleration can be evaluated using the SRSS method. Before performing the SRSS analysis, the measured accelerations should be oriented to the primary axes of the seat.

	Manufacturer:_____	Date:_____	Time:_____
Davit-Launched Lifeboats	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.4.7.1 Strength Tests ¾ Impact Test (3 of 3)	**Regulations: - LSA Code 4.6.5; MSC.81(70) I/ 6.17.9/12/13/14/15/16/17**

Figure 1 – Independent Single-Degree-of-Freedom Representation of the Human Body

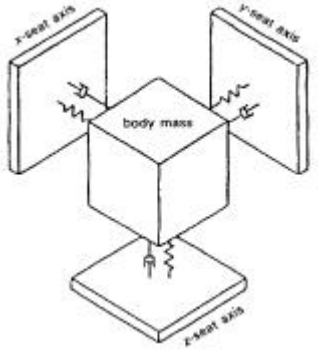

Table 1 – Parameters of the Dynamic Response Model

Co-ordinate Axis	Natural Frequency (rad/s)	Damping Ratio
X	62.8	0.100
Y	58.0	0.090
Z	52.9	0.224

Table 2 – Suggested Displacements Limits for Lifeboats

	Acceleration Direction	Displacement (cm) Training Emergency
+X = Eyeballs In	6.96	8.71
-X = Eyeballs Out	6.96	8.71
+Y = Eyeballs Right	4.09	4.95
-Y = Eyeballs Left	4.09	4.95
+Z = Eyeballs Down	5.33	6.33
-Z = Eyeballs Up	3.15	4.22

Full-scale acceleration data should be filtered with no less than the equivalent of a 20 Hz low-pass filter. Any filtering procedure acceptable to the Administration may be used.

Acceleration data measured on a model should be filtered with a low-pass filter having a frequency not less than that obtained with the following expression:

$$f_{\text{mod}\,el} = \frac{20}{\sqrt{\dfrac{L_{\text{mod}\,el}}{L_{prototype}}}}$$

Where $f_{\text{mod}\,el}$ is the frequency of the filter to be used, $L_{\text{mod}\,el}$ is the length of the model lifeboat, and $L_{prototype}$ is the length of the prototype lifeboat.

At all times, the following expression should be satisfied:

$$\textbf{CAR} = \sqrt{\left(\frac{g_x}{G_x}\right)^2 + \left(\frac{g_y}{G_y}\right)^2 + \left(\frac{g_z}{G_z}\right)^2} \;\; £ \; \mathbf{1}$$

where g_x, g_y, and g_z are the concurrent accelerations in the x, y and z seat axes, and G_x, G_y, and G_z are allowable accelerations, which are presented in table 3 for the appropriate launch condition.

Table 3 – SRSS Acceleration Limits for Lifeboats

	Acceleration Direction	Acceleration *(G)* Training Emergency
+X = Eyeballs In	15.0	18.0
-X = Eyeballs Out	15.0	18.0
+Y = Eyeballs Right	7.0	7.0
-Y = Eyeballs Left	7.0	7.0
+Z = Eyeballs Down	7.0	7.0
-Z = Eyeballs Up	7.0	7.0

Davit-Launched Lifeboats	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.4.7.2 Strength Tests—Drop Test		**Regulations: LSA Code 4.4.1.7; MSC.81(70) I/ 6.4.3/4/5, 6.4.7.1/2/3/4**
Test Procedure	Acceptance Criteria	Significant Test Data
The fully equipped lifeboat, with its engine, should be loaded with weights equal to the mass of the maximum number of persons for which the lifeboat is to be approved. The weights should be distributed to represent the normal loading condition but need not be placed 300 mm above the seat pan. The lifeboat should then be suspended above the water so that the distance from the lowest point of the lifeboat to the water is 3 m. The lifeboat should then be released so that it falls freely into the water. The drop test should be conducted with the lifeboat that was used in the impact test. A load of 100 kg should be added in any single seat location during the drop test.	The drop test should be considered successful if: .1 no damage has been sustained that would affect the lifeboat's efficient functioning; .2 the damage caused by the drop tests has not increased significantly as a result of the test 4.5.7.3; .3 machinery and other equipment has operated to full satisfaction; and .4 no significant ingress of seawater has occurred.	Passed _____ Failed _____ Comments/Observations

4.4.7.3 Strength Tests—Operation After Drop/Impact Test		**Regulations: LSA Code 4.4.1.7; MSC.81(70) I/ 6.4.5, 6.4.7.2, 6.10.1**
Test Procedure	Acceptance Criteria	Significant Test Data
After the impact and drop tests, the lifeboat should be carefully examined to detect the position and extent of damage that may have occurred as a result of these tests, and an operational test should be conducted in accordance with 4.4.5.3 Then the lifeboat should be unloaded, cleaned and carefully examined to detect the position and extent of additional damage that may have occurred as a result of the drop and impact tests.	The damage caused by the impact and drop tests has not increased significantly as a result of the operational test.	Passed _____ Failed _____ Comments/Observations

Davit-Launched Lifeboats	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.4.7.4 Strength Tests—Overload Test (1 of 3)	**Regulations: LSA Code 4.4.1.6/6.2; MSC.81(70) I/ 6.3.1/2/3/4/4.1/4.2/4.3/4.4/5**	
Test Procedure	Acceptance Criteria	Significant Test Data
In case of lifeboat's launched by falls; The unloaded lifeboat should be placed on blocks or suspended from the lifting hooks and sights should be erected for measuring keel sag. The following measurements should then be made. 1 deflection of keel amidships ♦ (K); 2 change in length as measured between the top of stem and stern posts ♦ (L); 3 change in breadth over the gunwale at the quarter length forward, amidships and the quarter length aft ♦ (B); and 4 change in depth measured from gunwale to keel ♦ (D). The lifeboat should then be loaded with properly distributed weights to represent the fully equipped lifeboat loaded with the full complement of persons for which it is to be approved. The measurements should again be made. Additional weights should then be added so that the suspended load is 25%, 50%, 75% and 100% greater than the weight of the fully equipped and loaded lifeboat. In the case of metal lifeboats, the testing should stop at 25% overload.	The keel deflection amidships and change in breadth over the gunwale at the quarter length forward, amidships and aft should not exceed 1/400th of the lifeboat's length when the lifeboat is subjected to 25% overload.	Unloaded (Initial measurement): K _____ L _____ L/400 _____ B _____ D _____ Full Load: K _____ ♦ K _____ L _____ ♦ L _____ B _____ ♦ B _____ D _____ ♦ D _____ 25% Overload: K _____ ♦ K _____ L/400 ≥ ♦ K? YES (Pass) _____ NO (Fail) _____ L _____ ♦ L _____ B _____ ♦ B _____ D _____ ♦ D _____ Comments/Observations

Davit-Launched Lifeboats	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.4.7.4 Strength Tests—Overload Test (2 of 3)	**Regulations: LSA Code 4.4.1.6/6.2; MSC.81(70) I/ 6.4.3/4/5/6**	
Test Procedure	Acceptance Criteria	Significant Test Data
The weights for the various overload conditions should be distributed in proportion to the loading of the lifeboat in its service condition, but the weights used to represent the persons need not be placed 300 mm above the seatpan. Testing by filling the lifeboat with water should not be accepted as this method of loading does not give the proper distribution of weight. Machinery may be removed in order to avoid damage to it, in which case weights should be added to the lifeboat to compensate for the removal of such machinery. At each incremental overload, the measurements should be made. The weights should then be removed and the dimensions of the lifeboat checked. If the lifeboat is made of GRP, such measurement should be taken after a lapse of time sufficient to permit the GRP to recover its original form (approximately 18 h).	The results at 100% overload, if required, should be approximately in proportion to those obtained at 25% overload. No significant residual deflection should result. Any permanent deflection as a result of these tests should be recorded.	50% Overload: K _____ ♦K _____ L _____ ♦L _____ B _____ ♦B _____ D _____ ♦D _____ 75% Overload: K _____ ♦K _____ L _____ ♦L _____ B _____ ♦B _____ D _____ ♦D _____ 100% Overload: K _____ ♦K _____ ♦K 100% ≤≅ 4 x ♦K 25% Passed _____ Failed _____ L _____ ♦L _____ ♦L 100% ≤≅ 4 x ♦L 25% Passed _____ Failed _____ B _____ ♦B _____ Comments/Observations

Davit-Launched Lifeboats	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.4.7.4 Strength Tests—Overload Test (3 of 3)	**Regulations: LSA Code 4.4.1.6/6.2; MSC.81(70) I/ 6.4.5**	
Test Procedure	Acceptance Criteria	Significant Test Data
		♦ B100% ≤≅ 4 x ♦ B 25% Passed _____ Failed _____ D _____ ♦D _____ ♦ D100% ≤≅ 4 x ♦ D 25% Passed _____ Failed _____ Unloaded (Final measurement): K _____ ♦K _____ K (Initial) ≅ K(Final) Passed _____ Failed _____ L _____ ♦L _____ L (Initial) ≅ L (Final) Passed _____ Failed _____ B _____ ♦B _____ B (Initial) ≅ B (Final) Passed _____ Failed _____ D _____ ♦D _____ D (Initial) ≅ D (Final)? Passed _____ Failed _____ Final measurement taken __ h/min after removal of the weights Passed _____ Failed _____ Comments/Observations

Davit-Launched Lifeboats	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.4.8.1 Air Supply Test	**Regulations: LSA Code 4.8; MSC.81(70) I/ 6.15**	
Test Procedure	Acceptance Criteria	Significant Test Data
All entrances and openings of the lifeboat should be closed, the air supply to the inside of the lifeboat turned on and the engine run at full speed for a period of 10 min. During this time the atmospheric pressure within the enclosure should be continuously monitored. After 10 min. test the engine should be stopped and the atmospheric pressure should be monitored.	It should be ascertained that a small positive air pressure is maintained within the lifeboat and to confirm that noxious gases cannot enter. Even if the engine should stop, the internal air pressure should never fall below the outside atmospheric pressure nor should it exceed outside atmospheric pressure by more than 20 mbar during the test. It should be ascertained that when the air supply is depleted automatic means are activated to prevent dangerously low pressure being developed within the lifeboat. The system should have visual indicators to indicate the pressure of the air supply at all times.	Test Duration with Positive Air Pressure: _____ min Engine stopped; Overpressure: _____ mbar Air Supply depleted Underpressure: _____ mbar Passed _____ Failed _____ Passed _____ Failed _____ Comments/Observations

Davit-Launched Lifeboats	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.4.8.2 Fire Test (1 of 3)	**Regulations: LSA Code 4.9.1; MSC.81(70) I/ 6.16.1/2/3/4/4.1/4.2/4.3/7**	
Test Procedure	Acceptance Criteria	Significant Test Data
The lifeboat should be moored in the centre of an area which is not less than five times the maximum projected plan area of the lifeboat. Sufficient kerosene should be floated on the water within the area so that when ignited it will sustain a fire, which completely envelops the lifeboat for 8 min. The boundary of the area should be capable of completely retaining the fuel. The engine should be run at full speed; however, the propeller need not be turning. The gas and fire-protective systems should be in operation throughout the fire test. The kerosene should be ignited. It should continue to burn and envelop the lifeboat for 8 min. During the fire test, the temperature should be measured and recorded as a minimum at the following locations: .1 at not less than 10 positions on the inside surface of the lifeboat; .2 at not less than 5 positions inside the lifeboat at locations normally taken by occupants and away from the inside surface; .3 on the external surface of the lifeboat. The positions of such temperature recorders should be to the satisfaction of the Administration. The method of temperature measurement should allow the maximum temperature to be recorded.	At the conclusion of the fire test, the condition of the lifeboat should be such that it could continue to be used in the fully loaded condition.	Temperatures inside surface of the lifeboat: 1 _____ 6 _____ 2 _____ 7 _____ 3 _____ 8 _____ 4 _____ 9 _____ 5 _____ 10 _____ Temperatures inside the lifeboat at locations normally taken by occupants and away from the inside surface: 11 _____ 12 _____ 13 _____ 14 _____ 15 _____ Temperature on the external surface _____ Comments/Observations

Davit-Launched Lifeboats	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.4.8.2 Fire Test (2 of 3)	**Regulations: LSA Code 4.9.1; MSC.81(70) I/ 6.16.5**	
Test Procedure	Acceptance Criteria	Significant Test Data
The atmosphere inside the lifeboat should be continuously sampled and representative retained samples should be analysed for the presence and quantity of essential, toxic, and injurious gases or substances. The analysis should cover the range of anticipated gases or substances that may be produced and which can vary according to the materials and fabrication techniques used to manufacture the lifeboat.	The analysis of gases should indicate that there is sufficient oxygen and no dangerous levels of toxic or injurious gases or substances.	Analysis of gasses Gas Level Acceptable Oxygen _____ Passed ___ Failed ___ _____ _____ Passed ___ Failed ___ _____ _____ Passed ___ Failed ___ _____ _____ Passed ___ Failed ___ _____ _____ Passed ___ Failed ___ _____ _____ Passed ___ Failed ___ _____ _____ Passed ___ Failed ___ _____ _____ Passed ___ Failed ___ _____ _____ Passed ___ Failed ___ _____ _____ Passed ___ Failed ___ _____ _____ Passed ___ Failed ___ Comments/Observations

Davit-Launched Lifeboats	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.4.8.2 Fire Test (3 of 3)	**Regulations: LSA Code 4.9.1; MSC.81(70) I/ 6.16.6/7**	
Test Procedure	Acceptance Criteria	Significant Test Data
The pressure inside the lifeboat should be continuously recorded to confirm that a positive pressure is being maintained inside the lifeboat. The protective system should be as effective as that of the lifeboat tested. The water delivery rate and film thickness at various locations around the hull and canopy should be equal to or exceed the measurements made on the lifeboat originally fire tested. *Note*: The Administration may waive this test for any totally enclosed lifeboat which is identical in construction to another lifeboat which has successfully completed this test, provided the lifeboat differs only in size, and retains essentially the same form.	A positive pressure should be maintained inside the lifeboat.	Internal pressure range Min. _____ Max. _____ Passed _____ Failed _____ Comments/Observations Reference to previous test, if applicable;_____

Davit-Launched Lifeboats	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.4.8.3 Water Spray Test	**Regulations: LSA Code 4.9.2/2.1/2.2/2.3; MSC.81(70) I/ 6.16.8/8.1/8.2/9/10**	
Test Procedure	Acceptance Criteria	Significant Test Data
Start the engine and the spray pump. With the engine running at its designed output, the following should be measured to obtain the rated value and speed: 1 the rpm of the engine and the pump to obtain the rated speed; 2 the pressure at the suction and delivery side of the pump to obtain the rated water pressure. With the lifeboat in an upright position, on an even keel and in the light condition, run the pump at the rated speed. Measure the delivery rate of water or the thickness of the sprayed water film at the external surface of the lifeboat. Successively trim the lifeboat 5° by the head and 5° by the stern, and heel it 5° to port and 5° to starboard.	Water for the system should be drawn from the sea by a self-priming motor pump. It should be possible to turn “on” and turn “off” the flow of water over the exterior of the lifeboat. The seawater intake should be so arranged as to prevent the intake of flammable liquids from the sea surface. The system should be arranged for flushing with fresh water and allowing complete drainage. The delivery rate of water or the sprayed water film thickness over the lifeboat should be to the satisfaction of the Administration. In each condition the sprayed water film should cover the whole surface of the lifeboat.	Engine RPM:_____ Pump RPM: _____ Suction Pressure: _____ Pa Delivery Pressure: _____ Pa Film Thickness: _____ mm Delivery Rate: _____ L/h Trim or Heel Water Film Covering Surface 5° Head Passed _____ Failed _____ 5° Stern Passed _____ Failed _____ 5° Port Passed _____ Failed _____ 5° Starboard Passed _____ Failed _____ Comments/Observations

Davit-Launched Lifeboats	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.4.9.1 Canopy Closure Test	**Regulations: LSA Code 4.5.2.2; MSC.81(70) I/ 6.13.1/2**	
Test Procedure	Acceptance Criteria	Significant Test Data
This test is required only for partially enclosed lifeboats. During the test the lifeboat should be loaded with the number of persons for which it is to be approved. It should be demonstrated that the canopy can be easily erected by not more than two persons.	The canopy can be easily erected by not more than two persons.	Passed _____ Failed _____ Comments/Observations

4.5 FREE-FALL LIFEBOATS

EVALUATION AND TEST REPORT

4.5.0 General Information

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4.5.8 Additional Tests for Fire-Protected Lifeboats

- 4.5.8.1 Air Supply Test
- 4.5.8.2 Fire Test
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4.5 FREE-FALL LIFEBOATS

EVALUATION AND TEST REPORT

Manufacturer	
Date	
Type	
Place	
Name Surveyor printed	
Signature	
Approving Organization	

Free-Fall Lifeboats	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.5.0.1 General Data and Specifications		**Regulations: LSA Code 4.4, 4.5, 4.6, 4.8 & 4.9**
General Information	Lifeboat Dimensions	Lifeboat Weight
Construction Material: Hull: Canopy: **Lifeboat Inherent Buoyancy** Material: Weight: Volume: **Engine Installed:** Manufacturer: Type: Power: Gear Ratio: Propeller: **Release Mechanism:** Manufacturer: Type: SWL: **Occupancy:** Persons (75 kg each): (150 max.)	**Molded Dimensions:** Length: Breadth: Depth: **Free-Fall Certification Characteristics:** Free-Fall Height: _____ Launch Angle: _____ Minimum ramp length:_____ Tested angle of list, if exceeding 20°:_____	**Design Weight:** Unloaded Boat: Loose Equipment: Food: Water: Fuel: Persons: **Calculated Loaded Weight:** Fully Equipped: With Persons: **Weight As Tested:** Fully Equipped: Comments/Observations Passed _____ Failed _____

Free-Fall Lifeboats	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.5.0.2 Submitted drawings, reports and documents

Submitted drawings and documents			**Status**
Drawing No.	**Revision No. & date**	**Title of drawing**	

Submitted reports and documents			**Status**
Report/Document No.	**Revision No. & Date**	**Title of report / document**	
		Maintenance Manual -	
		Operations Manual -	

Free-Fall Lifeboats	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.5.0.3 Quality Assurance	**Regulations: -**
Except where all appliances of a particular type are required by Chapter III of the International Convention for the Safety of Life at Sea, 1974, as amended, to be inspected, representatives of the Administration should make random inspections of manufacturers to ensure that the quality of life-saving appliances and materials used comply with the specification of the approved prototype life-saving appliance. Manufacturers should be required to institute a quality control procedure to ensure that life-saving appliances are provided to the same standard as the prototype life-saving appliance approved by the Administration and to keep records of any production tests carried out in accordance with the Administration's instructions.	Quality Assurance Standard Used: - _____ Quality Assurance Procedure: - _____ Quality Assurance Manual: - _____ Description of System. Quality Assurance System acceptable: Passed_____Failed _____ Comments/Observations

Free-Fall Lifeboats	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.5.1.1 Visual Inspection—Occupant Space	**Regulations: LSA Code 4.4.1.8, 4.4.2.2/3, 4.4.3.5**	
Test Procedure	Acceptance Criteria	Significant Test Data
Visually inspect the lifeboat. Conduct measurements and verify clearances as required.	**Interior Floor to Canopy Height** Over 50% of the floor area the height should be not less than 1.3m for lifeboats carrying 9 or fever persons and 1.7m for lifeboats carrying 24 or more persons. Linear interpolation for occupancy between 9 and 24 persons is permitted.	Height: _____ m
	Seating Space Width – at least 430 mm Free clearance in front of the backrest at least 635 mm The backrest should extend at least 1ooo mm above the seat pan.	Typical: Width: _____ mm Free clearance: _____ mm Extend of backrest: _____ mm Number of seats provided: ____
	Walkway Surfaces The surfaces on which persons might walk should have a non-skid finish.	Non Skid Surface: Passed _____ Failed _____ Comments/Observations Passed _____ Failed _____

Free-Fall Lifeboats	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.5.1.2 Visual Inspection — Fittings, Provisions, and Ladders (1 of 2)	**Regulations: LSA Code 4.4.7.3/5/8/10/11/12, 4.4.8.25**	
Test Procedure	Acceptance Criteria	Significant Test Data
Visually inspect the lifeboat. Conduct measurements and verify clearances as required.	Fittings and Provisions	
	Suitable handholds or buoyant lifeline becketed around the lifeboat above the waterline and within reach of a person in the water, except in the vicinity of the rudder and propeller	Passed _____ Failed _____
	Sufficient watertight lockers, compartments or arrangements to provide for storage of the small items of equipment water and provision.	Passed _____ Failed _____ Not Applicable
	Means provided for collecting rainwater.	Passed _____ Failed _____
	Means provided for storing collected water.	Passed _____ Failed _____
	Means provided for siting and securing antenna in operating position (If Required)	Passed _____ Failed _____
	Approved position-indicating lights light with 12 h capacity provided	Passed _____ Failed _____
	Approved light with 12 h capacity sufficient for reading provided inside.	Passed _____ Failed _____
	Adequate view on all sides for safe launching and maneuvering	Passed _____ Failed _____
	Provided with a manual pump suitable for effective bailing or be automatically self-bailing	Passed _____ Failed _____
	Windows or translucent panels to make artificial light unnecessary in daylight.	Passed _____ Failed _____
		Comments/Observations

Free-Fall Lifeboats	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.5.1.2 Visual Inspection — Fittings, Provisions, and Ladders (2 of 2)	**Regulations: LSA Code 4.4.3.3, 4.4.4, 4.6.2.1/2/4/7/8/9/10, 4.6.3.1**	
Test Procedure	Acceptance Criteria	Significant Test Data
	Exterior of the of the lifeboat is of a highly visible color and its interior of a color, which does not cause discomfort to the occupants.	Colour of canopy:_____ Colour of hull:_____ Passed _____ Failed _____
	Hand rails for persons moving about exterior of lifeboat and to aid embarkation and disembarkation The enclosures should be so arranged that: 1 access to the lifeboat is provided by hatches which can be closed to make the lifeboat watertight; 1.1 access hatches can be opened and closed from both inside and outside the lifeboat. 1.2 access hatches have means to hold them securely in the open position. 2 persons have access to their seats from an entrance without having to climb over thwarts or other obstructions;	Passed _____ Failed _____
	Each seat is fitted with a safety harness.	Passed _____ Failed _____
	The adjacent safety harnesses are to be of contrasting color.	Passed _____ Failed _____
	Lifeboat Ladders Ladders that can be used at any boarding entrance should be on board and the lowest step when in place should not be less than 0.4 m below the light waterline.	Passed _____ Failed _____
	Other Provisions No buoyant material should be installed external to the hull of the lifeboat except in addition to buoyant material required to float the flooded lifeboat.	Passed _____ Failed _____ Comments/Observations

Free-Fall Lifeboats	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.5.1.3 Visual Inspection—Engine and Starting System	**Regulations: LSA Code 4.4.6.2, 4.4.6.5/6/7/9/11/12, 4.6.4.1/3**	
Test Procedure	Acceptance Criteria	Significant Test Data
Visually inspect the lifeboat. Conduct measurements and verify clearances as required.	Type of starting system	Manual ☐ Power ☐
	Two independent rechargeable energy sources available for power starting systems	YES _____ NO _____ NA
	Any required starting aids provided	Passed _____ Failed _____
	Starting system is not impeded by engine casing, thwarts, or other obstructions	Passed _____ Failed _____
	Propeller arranged to be disengaged from the engine	Passed _____ Failed _____
	The engine and transmission should be controlled from the helmsman's position.	Passed _____ Failed _____
	Provision for ahead and astern propulsion	Passed _____ Failed _____
	Exhaust arranged to prevent water from entering engine in normal operation	Passed _____ Failed _____
	The lifeboat is designed with due regard to the safety of persons in the water and to the possibility of damage to the propulsion system by floating debris	Passed _____ Failed _____
	Engine casing made of fire retardant material or other suitable arrangements providing similar protection	Passed _____ Failed _____
	Personnel are protected from hot and moving parts	Passed _____ Failed _____
	Shouted order can be heard with engine running at speed necessary for 6 knot operation	Passed _____ Failed _____
	Watertight casing around bottom and sides of starter batteries with a tightly fitting top which provides for necessary gas venting	Passed _____ Failed _____
	Means for recharging engine starting, radio, and searchlight batteries provided by solar charge or ships power supply	Passed _____ Failed _____
	Radio batteries not used to provide power for engine starting	Passed _____ Failed _____
	Recharging means provided for lifeboat batteries (not exceeding 50 V) from ship's power supply can be disconnected at the lifeboat embarkation station	Passed _____ Failed _____
	Instructions for starting and operating engine are water resistant and mounted in a conspicuous place near the engine starting controls	Passed _____ Failed _____
		Comments/Observations

Free-Fall Lifeboats	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.5.1.4 Visual Inspection—Steering Mechanism	**Regulations: LSA Code 4.4.7.2**	
Test Procedure	Acceptance Criteria	Significant Test Data
Visually inspect the lifeboat. Conduct measurements and verify clearances as required.	Air-cooled engines have a duct system to take in cooling air from, and exhaust it to, the outside of the lifeboat. Manually operated dampers provided to enable cooling air to be taken in from, and exhausted to, the interior of the lifeboat.	Passed _____ Failed _____
	A tiller should be capable of controlling the rudder	Passed _____ Failed _____
	Rudder permanently attached to the lifeboat	Passed _____ Failed _____
	Except when remote steering is provided, the tiller is permanently attached or linked to the rudder stock	Passed _____ Failed _____
	Rudder and tiller arranged so as not to be damaged by operation of the release mechanism or propeller	Passed _____ Failed _____
		Comments/Observations

Free-Fall Lifeboats	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.5.1.5 Visual Inspection—Release Mechanism	**Regulations: LSA Code 4.7.6.1/3/4**	
Test Procedure	Acceptance Criteria	Significant Test Data
Visually inspect the lifeboat. Conduct measurements and verify clearances as required.	General Has two independent activation systems for the release mechanism which may only be operated from the inside the lifeboat	Passed _____ Failed _____
	Release control marked in a color that contrasts with the surroundings	Passed _____ Failed _____
	Release capability is adequately protected against accidental and premature use.	Passed _____ Failed _____
	Designed to test the release system without launching the lifeboat.	Passed _____ Failed _____
		Comments/Observations

Free-Fall Lifeboats	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.5.2.1 Flooded Stability Test	**Regulations: LSA Code 4.4.1.1, 4.6.3.3; MSC.81(70) 1/ 6.8.1/2/3**	
Test Procedure	Acceptance Criteria	Significant Test Data
The lifeboat should be loaded with its equipment. If provision lockers, water tanks and fuel tanks cannot be removed, they should be flooded or filled to the final waterline resulting from this test. Lifeboats fitted with watertight stowage compartments to accommodate individual drinking water containers should have these containers aboard and placed in the stowage compartments, which should be sealed watertight during the flooding tests. Ballast of equivalent weight and density should be substituted for the engine and any other installed equipment that can be damaged by water. Weights representing persons who would be in the water when the lifeboat is flooded may be omitted. Weights representing persons who would not be in the water when the lifeboat is flooded should be placed in the normal seating positions of such persons. *Note*: Several tests may have to be conducted if holes in different areas would create different flooding conditions.	The lifeboat should have positive stability when filled with water to represent flooding which would occur when the lifeboat is holed in any one location below the waterline assuming no loss of buoyancy material and no other damage.	Passed _____ Failed _____ Comments/Observations

Free-Fall Lifeboats	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.5.2.2 Freeboard Test		**Regulations: LSA Code 4.4.5.1/2.1/2; MSC.81(70) I/ 6.8.4/5**
Test Procedure	Acceptance Criteria	Significant Test Data
The lifeboat with its engine should be loaded with a mass equal to that of all the equipment. One half of the number of persons for which the lifeboat is to be approved should be seated in a proper seating position on one side of the centreline. The freeboard should then be measured on the low side.	Each lifeboat with side openings near the gunwale should have a freeboard measured from the waterline to the lowest opening through which the lifeboat may become flooded, of at least 1.5% of the lifeboats length or 100 mm, whichever is the greater; and Each lifeboat without side openings near the gunwale should not exceed an angle of heel of 20° and should have a freeboard, measured from the waterline to the lowest opening through which the lifeboat may become flooded, of at least 1.5% of the lifeboats length or 100 mm, whichever is the greater.	Measured Freeboard: _____ mm 1.5% of Boat's Length: _____ mm Angle of heel, if applicable:_____Deg. Passed _____ Failed _____ Comments/Observations

Free-Fall Lifeboats	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.5.2.3 Self-Righting Test		**Regulations: LSA Code 4.6.3.2/4, 4.6.4.2; MSC.81(70) I/ 6.14.1/1.1/1.2/2/2.1/2.2**
Test Procedure	Acceptance Criteria	Significant Test Data
A suitable means should be provided to rotate the lifeboat about a longitudinal axis to any angle of heel and then release it. The lifeboat, in the enclosed condition, should be incrementally rotated to angles of heel up to and including 180° and should be released. These tests should be conducted in the following conditions of load: .1 when the lifeboat with its engine is loaded in the normal position with properly secured weights representing the fully equipped lifeboat with a full complement of persons on board. The weight used to represent each person, assumed to have an average mass of 75 kg, should be secured at each seat location and have its center of gravity approximately 300 mm above the seat pan so as to have the same effect on stability as when the lifeboat is loaded with the number of persons for which it is to be approved; and .2 when the lifeboat is in the light condition.	After release, the lifeboat should always return to the upright position without the assistance of the occupants. At the beginning of these tests, the engine should be running in neutral position and: .1 unless arranged to stop automatically when inverted, the engine should continue to run when inverted and for 30 min after the lifeboat has returned to the upright position; and .2 if the engine is arranged to stop automatically when inverted, it should be easily restarted and run for 30 min after the lifeboat has returned to the upright position. Water does not enter the engine	Loaded; Passed _____ Failed _____ Light; Passed _____ Failed _____ Passed _____ Failed _____ Passed _____ Failed _____ Comments/Observations Passed _____ Failed

Free-Fall Lifeboats	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.5.2.4 Flooded Capsizing Test		**Regulations: LSA Code 4.4.1.1, 4.6.3.3; MSC.81(70) I/ 6.14.3/4/5**
Test Procedure	Acceptance Criteria	Significant Test Data
The lifeboat should be placed in the water and fully flooded until the lifeboat can contain no additional water. All entrances and openings should be secured to remain open during the test. For the purpose of this test, the mass and distribution of the occupants may be disregarded. However, the equipment, or equivalent mass, should be secured in the lifeboat in the normal operating position. Using a suitable means, the lifeboat should be rotated about a longitudinal axis to a heel angle of 180° and then released.	After release, the lifeboat should attain a position that provides an above-water escape for the occupants. In case of totally enclosed lifeboats, water level measured along each seatback in stable flooded condition is not more than 500 mm above the seat pan at any occupant seating position.	Passed _____ Failed _____ Max water level above seat pan: _____ mm Angel of trim:_____ deg Angle of list: _____deg Passed _____ Failed _____ Comments/Observations

Free-Fall Lifeboats	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.5.3.1 Seating Strength Test	**Regulations: LSA Code 4.4.1.5.3, 4.6.3.1; MSC.81(70) I/ 6.6.2**	
Test Procedure	Acceptance Criteria	Significant Test Data
The seats experiencing the highest acceleration forces, and those seats which are supported in a manner different from the other seats in the lifeboat, should be loaded with a mass of 100 kg. The load should be arranged in the seat so that both the seatback and the seat pan are affected. This test may be conducted as part of the free-fall lifeboat overload test.	The seating should be able to support this load during a free-fall launch from a height of 1.3 times the approved height without any permanent deformation or damage.	Passed _____ Failed _____
For a totally enclosed lifeboat, the seat belts should be demonstrated to be capable of holding a person with a mass of 100 kg securely in place with the lifeboat in the capsized position. This test may be conducted in connection with the righting test.	The seat belts should hold a mass of 100 kg securely in place with the lifeboat in the capsized position.	Passed _____ Failed _____ Comments/Observations

Free-Fall Lifeboats	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.5.3.2 Seating Space Test		**Regulations: LSA Code 4.4.2.2.1, 4.4.3.1/2; MSC.81(70) I/ 6.7.1**
Test Procedure	Acceptance Criteria	Significant Test Data
The lifeboat should be fitted with its engine and its equipment. The number of persons for which the lifeboat is to be approved, having an average mass of 75 kg and wearing a lifejacket and any other essential equipment should board the lifeboat as quickly as possible. The lifeboat should then be maneuvered and all equipment on board tested by an individual to demonstrate that the equipment can be operated without difficulty and without interference with the occupants.	The number of persons should be able to board the lifeboat and be properly seated within a period of 3 min in the case of a lifeboat intended for a cargo ship and as rapidly as possible in the case of a lifeboat intended for a passenger ship. The boat can be maneuvered and the equipment can be operated without interference with the occupants.	Cargo Ship: Boarding Time: _____ min Passed _____ Failed _____ Passed _____ Failed _____ SOLAS inherently buoyancy lifejacket worn : Yes/No Comments/Observations

4.5.4.1 Release Mechanism Tests - Release test		**Regulations: LSA Code 4.7.6.2; MSC.81(70) I/ 6.9.5**
Test Procedure	Acceptance Criteria	Significant Test Data
The free-fall release mechanism should be loaded with a force equal to at least 200% of the normal load caused by the fully equipped lifeboat when loaded with the number of persons for which it is to be approved.	It should be demonstrated that the free-fall release mechanism should operate effectively when loaded as described in the procedure.	Passed _____ Failed _____ Comments/Observations

Free-Fall Lifeboats	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.5.4.2 Release Mechanism Tests - Load test		**Regulations: LSA Code 4.7.6.5; MSC.81(70) I/ 6.9.6**
Test Procedure	Acceptance Criteria	Significant Test Data
The release mechanism should be mounted on a tensile strength testing device. The load should be increased to at least six times the working load of the release mechanism. (Testing to failure is suggested, but not required.)	The release mechanism should not fail at load less than or equal to six times the working load. (If tested to failure, working load may be taken as1/6 the failure load.)	Working Load: _____ N Force Applied: _____ N Passed _____ Failed _____ Comments/Observations

4.5.5.1 Operational Tests--Manoeuvring		**Regulations: LSA Code 1.2.2.8; MSC.81(70) I/ 6.10.1**
Test Procedure	Acceptance Criteria	Significant Test Data
The lifeboat should be loaded with weights equal to the mass of its equipment and the number of persons for which the lifeboat is to be approved. The engine should be started and the lifeboat manoeuvred for a period of at least 4 h to demonstrate satisfactory operation.	The lifeboat should maneuver and operate satisfactorily.	Passed _____ Failed _____ Comments/Observations

Free-Fall Lifeboats	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.5.5.2 Operational Tests—Liferaft Towing		**Regulations: LSA Code 4.4.6.8; MSC.81(70) I/ 6.10.1**
Test Procedure	Acceptance Criteria	Significant Test Data
The lifeboat should be loaded with weights equal to the mass of its equipment and the number of persons for which the lifeboat is to be approved. It should be demonstrated that the lifeboat can tow a 25-person liferaft loaded with the number of persons or equivalent mass for which it is to be approved and its equipment at a speed of 2 knots in calm water. Alternatively satisfactory bollard pull force can be used to demonstrate the ability to tow a raft. The fitting designated for towing other craft should be secured to a stationary object by a towrope. The engine should be operated ahead at full speed for a period of at least 2 minutes.	The lifeboat can successfully tow the liferaft as described in the procedure. There should be no damage to the towing fitting or its supporting structure.	Liferaft Used: _____ Speed Maintained: _____ kts OR alternatively Bollard Pull: _____ N Passed _____ Failed _____ Comments/Observations

Free-Fall Lifeboats	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.5.5.3 Operational Tests—Endurance, Speed & Fuel Consumption		**Regulations: LSA Code 4.4.6.8; MSC.81(70) I/ 6.10.1**
Test Procedure	Acceptance Criteria	Significant Test Data
The lifeboat should be loaded with weights equal to the mass of its equipment and the number of persons for which the lifeboat is to be approved. The lifeboat should be run at a speed of not less than 6 knots for a period, which is sufficient to ascertain the fuel consumption and to establish that the fuel tank has the required capacity.	The speed of a lifeboat when proceeding ahead in calm water when loaded with its full complement of persons and equipment and with all engine-powered auxiliary equipment in operation, should be at least 6 knots. Sufficient fuel, suitable for use thought out the temperature ranged expected in the area in which the ship operates, should be provided to run the fully loaded lifeboat at 6 knots for a period of not less than 24 h.	Measured Speed (without spray system): _____ knots Measured Speed (with spray system): _____ knots Passed _____ Failed Consumption: _____ L/h Tank Capacity: _____ L Endurance: _____ hrs Sufficient tank capacity Passed Failed Comments/Observations

Free-Fall Lifeboats	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.5.5.4 Operational Tests—Engine Out of Water		**Regulations: LSA Code 4.4.6.3; MSC.81(70) I/ 6.10.5**
Test Procedure	Acceptance Criteria	Significant Test Data
The engine should be operated for at least 5 min at idling speed under conditions simulating normal storage.	The engine should not be damaged as a result of this test.	Passed _____ Failed _____ Normal storage angle tested: _____ deg. Comments/Observations

4.5.5.5 Operational Tests—Compass Test		**Regulations: LSA Code 4.4.8.5; MSC.81(70) I/ 6.10.7**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be determined that the compass performance is satisfactory and that it is not unduly affected by magnetic fittings and equipment in the lifeboat.	The compass operates satisfactorily.	Passed _____ Failed _____ Comments/Observations

Free-Fall Lifeboats	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.5.5.6 Operational Tests — Helpless Person Recovery		**Regulations: LSA Code 4.4.3.4; MSC.81(70) I/ 6.10.8**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be demonstrated by test that it is possible to bring helpless people on board the lifeboat from the sea.	Helpless people can be brought on board the lifeboat from the sea.	Passed _____ Failed _____ Comments/Observations

4.5.6 Towing Test		**Regulations: LSA Code 4.4.7.7; MSC.81(70) I/ 6.11.1**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be demonstrated that the fully equipped lifeboat, loaded with a properly distributed mass equal to the mass of the number of persons for which it is to be approved, can be towed at a speed of not less than 5 knots in calm water and on an even keel.	The lifeboat should not exhibit unsafe or unstable characteristics. There should be no damage to the lifeboat or its equipment as a result of this test	Passed _____ Failed _____ Passed _____ Failed _____ Comments/Observations

Free-Fall Lifeboats	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.5.7.1 Free-Fall Test (1 of 4)		**Regulations: LSA Code 4.7.5; MSC.81(70) I/ 6.5.1/2/3/3.1/3.2/3.3/3.4/4/4.1/4.2/4.3, 6.17**
Test Procedure	Acceptance Criteria	Significant Test Data
A lifeboat design for free-fall launching should be subjected to test launches conducted from the height at which the lifeboat is intended to be stowed taking into account conditions of unfavourable list and trim, unfavourable locations of the centre of gravity, and extreme conditions of load. During the free-fall launches required in this section, acceleration forces should be measured and the data evaluated in accordance with tables 2 and 3 at different locations in the lifeboat to determine the worst occupant exposure to acceleration taking into consideration the seating arrangement. The tests required in this section may be conducted with correctly scaled models that are at least 1m in length. As a minimum, the dimensions and mass of the lifeboat, the location of its centre of gravity, and its second moment of mass, must be scaled in a reasonable manner. Depending on the construction and behavior of the free-fall lifeboat, other parameters may also have to be reasonably scaled to effect correct behavior of the model. If models are used, sufficient full-scale tests should be conducted to verify the accuracy of the model measurements. *(continued)*	The free-fall tests required in this section should be considered acceptable if: .1 the acceleration are in compliance with the "Training" condition specified in tables 2 and 3 during the launch, free-fall, and subsequent water entry for those tests with the ship on even keel; .2 the acceleration forces are in compliance with the "Emergency" condition specified in tables 2 and 3 during the launch, free-fall, and subsequent water entry for those tests with the ship under unfavorable conditions of list and trim; and .3 the lifeboat makes positive headway immediately after water entry.	Complete data for this test are to be recorded on the form provided. Summary of Test Data: Free-Fall Height: _____ m Maximum CDRR: _____ N/A, OR Maximum CAR: _____ N/A Was Model Used: YES NO Which Tests: _____ Model Scale: _____ Weight: _____ kg $\frac{\text{Radius of Gyration}}{\text{Loa}}$: % Free-Fall Height: _____ m Positive Headway: Pass _____ Fail Comments/Observations

Free-Fall Lifeboats	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.5.7.1 Free-Fall Test (1 of 4) [*continued*]		**Regulations: LSA Code 4.7.5; MSC.81(70) I/ 6.5.1/2/3/3.1/3.2/3.3/3.4/4/4.1/4.2/4.3, 6.17**
Test Procedure	Acceptance Criteria	Significant Test Data
As a minimum, the following full-scale tests should be conducted with the ship on an even keel using the same type of launching arrangement as the production lifeboat and from the height for which the lifeboat is to be approved: .1 lifeboat fully loaded; .2 lifeboat loaded with its required equipment and minimum launching crew only; .3 lifeboat loaded with its required equipment and one half of the full complement of persons distributed in the forward half of the seating positions of the lifeboat; and .4 lifeboat loaded with its required equipment and one half of the full complement of persons seated in the after half of the seating positions of the lifeboat.		Comments/Observations

	Manufacturer:_____	Date:_____	Time:_____
Free-Fall Lifeboats	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.5.7.1 Free-Fall Tests (2 of 4)	**Regulations: LSA Code 4.7.5; MSC.81(70) I/ 6.17.1/1.1/1.2/1.3/2/3/4/5/6/7/8/9/10/11/12/13/14**
Measuring and Evaluating Acceleration Forces **Selection, placement and mounting of accelerometers** The accelerometers used to measure the acceleration forces in the lifeboat should: 1 have adequate frequency response for the test in which they are to be used but the frequency response should at least be in the range of 0 to 200 Hz; 2 have adequate capacity for the acceleration forces that will occur during the tests; 3 have an accuracy of ± 5% Accelerometers should be placed in the lifeboat, parallel to the principal axes of the lifeboat, at those locations necessary to determine the worst occupant exposure to acceleration. The accelerometers should be mounted on a rigid part of the interior of the lifeboat in a manner to minimize vibration and slipping. A sufficient number of accelerometers should be used at each location at which acceleration forces are measured so that all likely acceleration forces at that location can be measured. The selection, placement, and mounting of the accelerometers should be to the satisfaction of the Administration. **Recording method and rate** The measured acceleration forces may be recorded on magnetic media as either an analog or a digital signal or a paper plot of the acceleration signal may be produced. If acceleration forces are to be recorded and stored as a digital signal, the sampling rate should be at least 500 samples per second. Whenever an analogue acceleration signal is converted to a digital signal, the sampling rate should be at least 500 samples per second.	**Evaluation with the dynamic response model** The dynamic response model is the preferred method to evaluate potential for the occupant in a lifeboat to be injured by exposure to acceleration forces. In the dynamic response model, the human body is idealized as a single-degree-of-freedom, spring-mass acting in each coordinate direction as shown in figure 1. The response of the body mass relative to the seat support, which is excited by the measured accelerations, can be evaluated using a procedure acceptable to the Administration. The parameters to be used in the analysis are shown in table 1 for each coordinate direction. Before performing the dynamic response analysis, the measured accelerations should be oriented to the primary axes of the seat. The desired outcome from the dynamic response analysis is the displacement time-history of the body mass relative to the seat support in each coordinate direction. At all times, the following expression should be satisfied: $$\textbf{CDRR} = \sqrt{\left(\frac{d_x}{S_x}\right)^2 + \left(\frac{d_y}{S_y}\right)^2 + \left(\frac{d_z}{S_z}\right)^2} \quad £ \ \mathbf{1}$$ where d_x, d_y and d_z are the concurrent relative displacements of body mass with respect to the seat support, in the x, y and z body axes, as computed from the dynamic response analysis and S_x, S_y, and S_z, are relative displacements which are presented in table 2 for the appropriate launch condition. **Evaluation using the SRSS method** In lieu of the evaluation with the dynamic response model, the potential for an occupant in a lifeboat to become injured by an acceleration can be evaluated using the SRSS method. Before performing the SRSS analysis, the measured accelerations should be oriented to the primary axes of the seat.

	Manufacturer:_____	Date:_____	Time:_____
Free-Fall Lifeboats	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.5.7.1 Free-Fall Tests (3 of 4)	**Regulations: LSA Code 4.7.5; MSC.81(70) I/ 6.17.9/12/13/14/15/16/17**

Figure 1 - Independent Single Degree-of-Freedom Representation of the Human Body

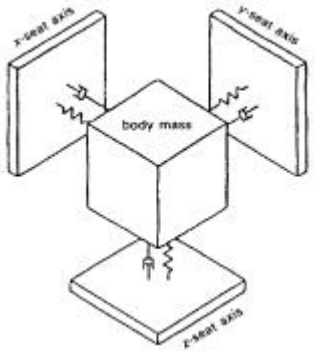

Table 1 – Parameters of the Dynamic Response Model

Coordinate Axis	Natural Frequency (rad/s)	Damping Ratio
X	62.8	0.100
Y	58.0	0.090
Z	52.9	0.224

Table 2 – Suggested Displacements Limits for Lifeboats

	Acceleration Direction	Displacement (cm) Training Emergency
+X = Eyeballs In	6.96	8.71
-X = Eyeballs Out	6.96	8.71
+Y = Eyeballs Right	4.09	4.95
-Y = Eyeballs Left	4.09	4.95
+Z = Eyeballs Down	5.33	6.33
-Z = Eyeballs Up	3.15	4.22

Full-scale acceleration data should be filtered with no less than the equivalent of a 20 Hz low-pass filter. Any filtering procedure acceptable to the Administration may be used.

Acceleration data measured on a model should be filtered with a low-pass filter having a frequency not less than that obtained with the following expression:

$$f_{\text{model}} = \frac{20}{\sqrt{\dfrac{L_{\text{model}}}{L_{prototype}}}}$$

Where f_{model} is the frequency of the filter to be used, L_{model} is the length of the model lifeboat, and $L_{prototype}$ is the length of the prototype lifeboat.

At all times, the following expression should be satisfied:

$$\textbf{CAR} = \sqrt{\left(\frac{g_x}{G_x}\right)^2 + \left(\frac{g_y}{G_y}\right)^2 + \left(\frac{g_z}{G_z}\right)^2} \;\; £ \; \mathbf{1}$$

where g_x, g_y, and g_z are the concurrent accelerations in the x, y and z seat axes, and G_x, G_y, and G_z are allowable accelerations, which are presented in table 3 for the appropriate launch condition.

Table 3 – SRSS Acceleration Limits for Lifeboats

	Acceleration Direction	Acceleration *(G)* Training Emergency
+X = Eyeballs In	15.0	18.0
-X = Eyeballs Out	15.0	18.0
+Y = Eyeballs Right	7.0	7.0
-Y = Eyeballs Left	7.0	7.0
+Z = Eyeballs Down	7.0	7.0
-Z = Eyeballs Up	7.0	7.0

Free-Fall Lifeboats	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.5.7.1 Free-Fall Tests (4 of 4)						**Regulations: LSA Code 4.7.5; MSC.81(70) I/ 6.17.9/12/13/14/15/16/17**					
Launch	Load	List/Trim	CDRR	CAR	Headway	Launch	Load	List/Trim	CDRR	CAR	Headway
Full 1	Total	0/0				5	50% Fwd	20/+10 *			
Full 2	50% Fwd	0/0				6	50% Fwd	20/-10 *			
Full 3	50% Aft	0/0				7	50% Aft	0/0			
Full 4	Op Crew	0/0				8	50% Aft	20/+10 *			
1	Total	0/0				9	50% Aft	20/-10 *			
2	Total	20/+10 *				10	Op Crew	0/0			
3	Total	20/-10 *				11	Op Crew	20/+10 *			
4	50% Fwd	0/0				12	Op Crew	20/-10 *			

* If the free fall lifeboat is tested to larger angle of list than the SOLAS minimum requirement (20°):
Tested list:_____

Comments/Observations

NOTE: Tests Full-1, Full-2, Full-3, and Full-4 must be conducted with the full-scale lifeboat. The other tests can be conducted either with a properly constructed model or with the full-scale lifeboat

Free-Fall Lifeboats	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.5.7.2 Overload Test		**Regulations: LSA Code 4.7.4; MSC.81(70) I/ 6.3.7/8/9, 6.10.1**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be demonstrated that the lifeboat has sufficient strength to withstand the forces acting upon it when loaded with a distributed mass equal to the mass of the number of persons for which it is to be approved and its equipment when free-fall launched from a height of 1.3 times the height for which it is to be approved. If the lifeboat is normally ramp-launched, and a ramp is not available, this test may be conducted by dropping the lifeboat vertically with the keel at the same angle that normally occurs during water entry. After this test the lifeboat should be unloaded, cleaned and carefully examined to detect the position and extent of damage that may have occurred as a result of this test. An operational test should then be conducted in accordance with 4.6.5.3. After this test the lifeboat should again be unloaded, cleaned, and inspected for possible damage.	This test should be considered successful if the lifeboat passes the operational test to the satisfaction of the Administration and there is no significant damage to it.	Passed _____ Failed _____ Comments/Observations

Free-Fall Lifeboats	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.5.8.1 Air Supply Test		**Regulations: LSA Code 4.8; MSC.81(70) I/ 6.15**
Test Procedure	Acceptance Criteria	Significant Test Data
All entrances and openings of the lifeboat should be closed, the air supply to the inside of the lifeboat turned on and the engine run at full speed for a period of 10 min. During this time the atmospheric pressure within the enclosure should be continuously monitored. After 10 min. test the engine should be stopped and the atmospheric pressure should be monitored.	It should be ascertained that a small positive air pressure is maintained within the lifeboat and to confirm that noxious gases cannot enter. Even if the engine should stop, the internal air pressure should never fall below the outside atmospheric pressure nor should it exceed outside atmospheric pressure by more than 20 mbar during the test. It should be ascertained that when the air supply is depleted automatic means are activated to prevent dangerously low pressure being developed within the lifeboat. The system should have visual indicators to indicate the pressure of the air supply at all times.	Test duration with positive air pressure: _____ min Engine stopped; Overpressure: _____ mbar Air supply depleted; Underpressure: _____ mbar Passed _____ Failed _____ Passed _____ Failed _____ Comments/Observations

Free-Fall Lifeboats	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.5.8.2 Fire Test (1 of 3)	**Regulations: LSA Code 4.9.1; MSC.81(70) I/ 6.16.1/2/3/4/4.1/4.2/4.3/7**	
Test Procedure	Acceptance Criteria	Significant Test Data
The lifeboat should be moored in the centre of an area which is not less than five times the maximum projected plan area of the lifeboat. Sufficient kerosene should be floated on the water within the area so that when ignited it will sustain a fire, which completely envelops the lifeboat for 8 min. The boundary of the area should be capable of completely retaining the fuel. The engine should be run at full speed; however, the propeller need not be turning. The gas and fire-protective systems should be in operation throughout the fire test. The kerosene should be ignited. It should continue to burn and envelop the lifeboat for 8 min. During the fire test, the temperature should be measured and recorded as a minimum at the following locations: .1 at not less than 10 positions on the inside surface of the lifeboat; .2 at not less than 5 positions inside the lifeboat at locations normally taken by occupants and away from the inside surface; .3 *on* the external surface of the lifeboat. The positions of such temperature recorders should be to the satisfaction of the Administration. The method of temperature measurement should allow the maximum temperature to be recorded.	At the conclusion of the fire test, the condition of the lifeboat should be such that it could continue to be used in the fully loaded condition.	Temperatures inside surface of the lifeboat: 1 _____ 6 _____ 2 _____ 7 _____ 3 _____ 8 _____ 4 _____ 9 _____ 5 _____ 10 _____ Temperatures inside the lifeboat at locations normally taken by occupants and away from the inside surface: 11 _____ 12 _____ 13 _____ 14 _____ 15 _____ Temperature on the external surface _____ Comments/Observations

Free-Fall Lifeboats	Manufacturer:_____	Date:_____	Time:_____
	Model:_____	Surveyor:_____	
	Lot/Serial Number:_____	Organization:_____	

4.5.8.2 Fire Test (2 of 3)	**Regulations: LSA Code 4.9.1; MSC.81(70) I/ 6.16.5**	
Test Procedure	Acceptance Criteria	Significant Test Data
The atmosphere inside the lifeboat should be continuously sampled and representative retained samples should be analysed for the presence and quantity of essential, toxic, and injurious gases or substances. The analysis should cover the range of anticipated gases or substances that may be produced and which can vary according to the materials and fabrication techniques used to manufacture the lifeboat.	The analysis of gases should indicate that there is sufficient oxygen and no dangerous levels of toxic or injurious gases or substances.	Analysis of gasses Gas Level Acceptable Oxygen _____ Passed ___ Failed ___ _____ _____ Passed ___ Failed ___ _____ _____ Passed ___ Failed ___ _____ _____ Passed ___ Failed ___ _____ _____ Passed ___ Failed ___ _____ _____ Passed ___ Failed ___ _____ _____ Passed ___ Failed ___ _____ _____ Passed ___ Failed ___ _____ _____ Passed ___ Failed ___ _____ _____ Passed ___ Failed ___ _____ _____ Passed ___ Failed ___ Comments/Observations

4.5.8.2 Fire Test (3 of 3)		**Regulations: LSA Code 4.9.1; MSC.81(70) I/ 6.16.6/7**
Test Procedure	Acceptance Criteria	Significant Test Data
The pressure inside the lifeboat should be continuously recorded to confirm that a positive pressure is being maintained inside the lifeboat. The protective system should be as effective as that of the lifeboat tested. The water delivery rate and film thickness at various locations around the hull and canopy should be equal to or exceed the measurements made on the lifeboat originally fire tested. *Note*: The Administration may waive this test for any totally enclosed lifeboat which is identical in construction to another lifeboat which has successfully completed this test, provided the lifeboat differs only in size, and retains essentially the same form.	A positive pressure should be maintained inside the lifeboat.	Internal pressure range Min. _____ Max. _____ Passed _____ Failed _____ Comments/Observations Reference to previous test, if applicable;_____

4.5.8.3 Water Spray Test		**Regulations: LSA Code 4.9.2/2.1/2.2/2.3; MSC.81(70) I/ 6.16.8/8.1/8.2/9/10**
Test Procedure	Acceptance Criteria	Significant Test Data
Start the engine and the spray pump. With the engine running at its designed output, the following should be measured to obtain the rated value and speed: 1 the rpm of the engine and the pump to obtain the rated speed; 2 the pressure at the suction and delivery side of the pump to obtain the rated water pressure. With the lifeboat in an upright position, on an even keel and in the light condition, run the pump at the rated speed. Measure the delivery rate of water or the thickness of the sprayed water film at the external surface of the lifeboat. Successively trim the lifeboat 5° by the head and 5° by the stern, and heel it 5° to port and 5° to starboard.	Water for the system should be drawn from the sea by a self-priming motor pump. It should be possible to turn “on” and turn “off” the flow of water over the exterior of the lifeboat. The seawater intake should be so arranged as to prevent the intake of flammable liquids from the sea surface. The system should be arranged for flushing with fresh water and allowing complete drainage. The delivery rate of water or the sprayed water film thickness over the lifeboat should be to the satisfaction of the Administration. In each condition the sprayed water film should cover the whole surface of the lifeboat.	Engine RPM:_____ Pump RPM: _____ Suction Pressure: _____ Pa Delivery Pressure: _____ Pa Film Thickness: _____ mm Delivery Rate: _____ L/h Trim or Heel Water Film Covering Surface 5° Head Passed _____ Failed _____ 5° Stern Passed _____ Failed _____ 5° Port Passed _____ Failed _____ 5° Starboard Passed _____ Failed _____ Comments/Observations

_____