

ANNEX 15

RESOLUTION MSC.54(66)
(adopted on 30 May 1996)

**ADOPTION OF AMENDMENTS TO THE RECOMMENDATION ON TESTING
OF LIFE-SAVING APPLIANCES (RESOLUTION A.689(17))**

(Link: SOLAS III/19.8, A.689)

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

RECALLING ALSO that the Assembly, when adopting resolution A.689(17) on Testing of life-saving appliances, authorized the Committee to keep the Recommendation on testing of life-saving appliances under review and to adopt, when appropriate, amendment thereto,

RECOGNIZING the need to introduce more precise testing requirements in the testing of life-saving appliances,

HAVING CONSIDERED the recommendations made by the Sub-Committee on Life-Saving, Search and Rescue, at its twenty-sixth session, and the Sub-Committee on Ship Design and Equipment, at its thirty-ninth session, upon review of the Recommendation,

1. ADOPTS amendments to the Recommendation on Testing of Life-Saving Appliances (annex to resolution A.689(17)) set out in the Annex to the present resolution;

2. RECOMMENDS Governments to ensure that life-saving appliances are subjected to:

- .1 the tests recommended in the Annex to resolution A.689(17) as amended by the present resolution; or
- .2 such tests as the Administration is satisfied are substantially equivalent to those recommended by the above resolution.

ANNEX

AMENDMENTS TO THE RECOMMENDATION ON TESTING OF LIFE-SAVING APPLIANCES (RESOLUTION A.689(17), ANNEX)

Part 1 - Prototype testing for life-saving appliances

1 Replace the present text of subparagraph 2.8.2 by the following:

"2.8.2 These tests should be carried out with at least six able-bodied persons of the following heights and weights:

Height	Weight
1.40 m - 1.60 m	1 person under 60 kg 1 person over 60 kg
1.60 m - 1.80 m	1 person under 70 kg 1 person over 70 kg
over 1.80 m	1 person under 80 kg 1 person over 80 kg

.1 at least one and not more than two of the persons should be females with not more than one female in the same height range;

.2 for the approval of the lifejackets, the test results obtained from each of the participating subjects should be acceptable except as provided otherwise."

2 Replace the present text of subparagraph 2.9.2 by the following:

"2.9.2 These tests should be carried out with at least six persons as described in 2.8.2. Only good swimmers should be used, since the ability to relax in the water is rarely otherwise obtained."

3 Insert "or anti-exposure suit" after "immersion suit" in subparagraphs 3.1.2 to 3.1.5, 3.1.7 to 3.1.13, 3.1.15 to 3.1.18.

4 Change the heading of paragraph 3 to read as follows:

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

5 Add "and anti-exposure suits" to the heading of subparagraph 3.1.

6 Replace the present text of subparagraph 3.1.1 by the following:

"3.1.1 These tests should be carried out with at least six persons as described in 2.8.2."

7 Add at the end of the subparagraph 3.1.5 the following sentence:

"The diameter of the pencil shall be 8-10 mm."

8 Replace the present text of subparagraph 3.1.7 by the following:

"3.1.7 When wearing the immersion suit, or anti-exposure suit, in conjunction with a life-jacket if required, the test subjects should float face-up with their mouths clear of the water by at least 120mm and be stable in that position. The freeboard should be measured from the water surface to the nose and mouth with the test subject at rest. The freeboard of the anti-exposure suit without a life-jacket should be at least 50 mm."

9 Add at the end of subparagraph 3.1.10 the following sentence:

"It should be established by questioning the test subject that the suit does not injure the wearer as a result of this test."

10 Replace the present text of subparagraph 3.1.11 by the following:

- .1 The ingress of water into the pre-wetted suit should not exceed a mass of 200g following:
 - .1 a period of flotation in calm water for 1 h; or
 - .2 swimming for 20 min for a distance of at least 200 m;
- .2 The mass of water ingress should be measured by weighing the test subject and the suit in accordance with the method prescribed in subparagraph 3.1.9."

11 Replace the present text of subparagraph 3.1.18 by the following:

"3.1.18 The immersion suit or AES should be subjected to the body strength tests prescribed in 2.6.1, except the load applied should be 1350N. The immersion suit or anti-exposure suit may be cut if necessary to accommodate the test device."

12 Replace the present text of paragraphs 3.2 and 3.3 by the following:

"3.2 Thermal protective tests

3.2.1 General

3.2.1.1 These tests should be performed as described below. The thermal protective qualities may be measured using a thermal manikin, when such a method is required by an Administration and has been demonstrated to provide test results which correlate satisfactorily in all aspects to test results using human subjects.

3.2.1.2 If the test should be performed by human subjects, they should be medically examined before being accepted for participation in the tests. Each design of immersion suit or anti-exposure suit is to be tested by the test subjects specified in subparagraph 3.1.1.

3.2.1.3 Where human subjects are used, the tests should always be conducted under the supervision of a physician. Emergency resuscitation equipment should be available during all tests. For safety reasons, ECG should be monitored during every test. Testing should be stopped at the wish of the test subjects, if the falling rate of the core temperature is more than 1.5 °C per hour after the first half hour, if the skin temperature of the hand, foot or lumbar region should fall below 10 °C, or if the attending physician considers it advisable.

3.2.1.4 When testing with human subjects, continuous body core temperature (rectal temperature) and skin temperatures of lumbar region, both hands, calves, feet (foot instep) and heels, should be measured. The accuracy of the measuring system should be ± 0.2 °C. Appropriate corresponding measurements should be taken if a manikin is used in lieu of human subjects.

3.2.1.5 Prior to the tests, the same amount of water resulting from the jump test in paragraph 3.1.9 should be poured into the dry immersion suit or anti-exposure suit worn over the dry test clothing specified in 3.2.2 by the test subject lying down.

Test clothing

3.2.2 The test subjects should wear a standard range of clothing consisting of:

- .1 underwear (short sleeved, short legged);
- .2 shirt (long sleeved);
- .3 trousers(not woollen); and
- .4 woolen socks.

3.2.3 If the immersion suit or AES is to be worn in conjunction with a lifejacket, the lifejacket should be worn during the thermal protective tests.

Specific tests for non-insulated immersion suits

3.2.4 In addition to the clothing specified in paragraphs 3.2.2 and 3.2.3, the test subject should wear two woollen pullovers.

3.2.5 Each test subject should wear an immersion suit previously subjected to the jump test in paragraph 3.1.10. Following a 1 h period of immersion, with the hands gloved, in circulation calm water at +5 °C, each test subject's body core temperature should not fall more than 2 °C below the normal level of the subject's temperature.

3.2.6 Immediately on leaving the water after completion of the test prescribed in 3.2.5, the test subject should be able to pick up a pencil as specified in paragraph 3.1.5 and write.

Specific tests for insulated immersion suits

3.2.7 Each test subject should wear an immersion suit previously subjected to the jump test in paragraph 3.1.10. Following a 6 h period of immersion, with the hands gloved, in circulating calm water at between 0 ° and +2 , each test subject's body core temperature should not fall more than 2 below the normal level of the test subject's temperature.

3.2.8 The immersion suit should provide sufficient thermal protection to ensure that immediately on leaving the water after a 1 h period of immersion, with hands gloved, in circulating calm water at +5 , each test subject can pick up a pencil as specified in paragraph 3.1.5 and write. Alternatively, at the manufacturer's option, the ability to pick up a pencil as specified in paragraph 3.1.5 and write may be demonstrated immediately on leaving the water after completion of the test prescribed in 3.2.7.

Specific test for anti-exposure suits

3.2.9 Each test subject should wear an anti-exposure suit previously subjected to the jump test in paragraph 3.1.10. Following a 1 h period of immersion, with the hands gloved and hood donned, in circulating calm water at a temperature of +5 , each test subject's body core temperature should not fall more than 2 below the normal level of the test subject's temperature.

3.2.10 Immediately on leaving the water after completion of the test prescribed in paragraph 3.2.9, the test subject should be able to pick up a pencil as specified in paragraph 3.1.5 and write."

13 Replace the present text of paragraph 5.2.2 by following:

"5.2.2 The jump test may be simulated by dropping a suitable and equivalent mass, arranged to as to impact the liferaft with shoes as described in 5.2.1."

14 Replace the present text of paragraph 5.6 by the following:

"5.6 Liferaft painter system test

The breaking strength of the painter system, including its means of attachment to the liferaft should be as follows:

- .1 not less than 7.5 kN for liferafts accommodating up to 8 persons;
- .2 not less than 10.0 kN for liferafts accommodating 9 to 25 persons;
- .3 not less than 15.0 kN for liferafts accommodating more than 25 persons."

15 Replace the present text of paragraph 5.7 by following:

"5.7 Loading and seating test

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 75kg, and each wearing an immersion suit and 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. 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."

16 Replace the present text of paragraph 5.8 by the following:

"5.8 Boarding and closing arrangement test

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 100m 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. The above mentioned test should be carried out also with persons clothed in immersion suits and lifejackets. After the boarding test, it should be demonstrated by a person clothed in an approved immersion suit that the canopy entrance can be easily and quickly closed in 1 minute and can be easily and quickly opened from inside and outside in 1 minute."

17 Replace the present text of paragraph 5.11 by following:

"5.11 Swamp test

It should be demonstrated that when the liferaft is fully swamped it remains seaworthy. The swamped inflatable liferaft should be tested in at least 10 waves at least 0.9m high. The waves may be produced by the wake of a boat, or by other acceptable means. The liferaft should not seriously deform in this condition."

18 Replace the present text of paragraph 5.17.4 by the following:

"5.17.4 When inflated in an ambient temperature of between 18 °C and 20 °C, it should achieve total inflation in not more than 1 min. The force required to pull the painter and start inflation should not exceed 150 N."

19 Add a new paragraph 5.18 after subparagraph 5.17.13, as follows:

"5.18 Liferaft light tests

The liferaft lights should be subjected to the tests prescribed in 10.1."

20 Replace the present text of paragraph 7.1.1 by the following:

"7.1.1 Rigid rescue boats should be subjected to the tests prescribed in 6.2 to 6.13 except 6.5.2 and 6.8.1, and to the test prescribed in 7.2.4.2 and 7.2.10, and if the boats are provided with

outboard motors, 7.2.11."

21 Replace the present text of paragraph 7.2.1 by the following:

"7.2.1 The inflated rescue boats should be subjected to the tests prescribed in 6.3,6.5.1,6.7.1,6.10.1 to 6.10.4,6.11,6.12,6.13,7.1.2 and 7.1.3."

22 Replace the heading of subparagraph 7.2.10 "Manoeuvrability and towing tests" by "Manoeuvrability tests".

23 Add a new subparagraph 7.3.10 after subparagraph 7.3.9, as follows:

"7.3.10 Engine-out-of-water test

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."

24 In the first line of subparagraph 9.1, replace "4.3.1.1" and "4.3.1.3" by "4.3.1" and "4.3.3" respectively.

25 Replace the title subparagraph 10.1 "Survival craft light tests" by "Survival craft and rescue boats light tests".

26 Replace the present text of subparagraphs 10.1.2 to 10.1.4 by the following:

"10.1.2 In the case of sea-activated power sources, four survival craft lights of each type should, following at least ten complete temperature cycles be taken from a stowage temperature of -30 and be operated immersed in seawater at a temperature of -1 ; four of each type should be taken from a stowage temperature of +65 and be operated immersed in seawater at a temperature of 30 ; and four of each type should be taken from ordinary room conditions and operated immersed in fresh water at ambient temperature. The canopy, enclosure or cover lights should be of white colour and should 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 12h. The interior lights should provide sufficient luminous intensity to read survival instructions and equipment instructions for a period of not less than 12 h.

10.1.3 In the case of dry-activated power sources, provided they will not come into contact with seawater, four survival craft lights of each type should, following at least ten complete temperature cycles be operated at an air temperature of -30 , four of each type at an air temperature of +65 , and four of each type at ambient temperature. The canopy, enclosure or cover lights should be white in colour and should provide 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. The interior lights should provide sufficient luminous intensity to read survival instructions and equipment instructions for a period of not less than 12 h.

10.1.4 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 the effective luminous intensity is at least 4.3 cd (see 10.2.2)."

27 Replace the present text of subparagraph 10.2.2 by the following:

"10.2.2 After at least ten complete temperature cycles, one self-igniting light should then be taken from a stowage temperature of -30 and operated immersed in seawater at a temperature of -1 , and another should be taken from a stowage temperature of +65 and operated immersed in seawater at a temperature of +30 . Both lights should be of white colour and should continue to provide a luminous intensity of not less than 2 cd in all directions of the upper hemisphere or, in the case of a flashing light, flash at a rate of not less than 50 flashes and not more than 70 flashes per minute with at least the corresponding effective luminous intensity for a period of not less than 2 h. 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 t1 and t2 are time-limits of integration in seconds

Note: Flashing lights with a flash duration of not less than 0.3 seconds, 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 luminous intensity reaching the required minimum luminous intensity).

At the end of the first hour of operation the lights should be immersed to a depth of 1m for 1 min. The lights should not be extinguished and should continue operating for at least an hour longer."

28 Replace the present text of subparagraph 10.3.2 by the following:

"10.3.2 After at least ten temperature cycle, four of these lifejacket lights should be taken from a stowage temperature of -30 and then be operated immersed in seawater at a temperature of -1 . Four should be taken from a stowage temperature of +65 and then immersed in seawater at a temperature of +30 and four should be taken from ordinary room conditions and operated immersed in freshwater at ambient temperature. Water activated lights should commence functioning within 2 min and have reached a luminous intensity of 0.75 cd within 5 min in seawater. In freshwater a luminous intensity of 0.75 cd should have been attained within 10 min. At least 11 out of the 12 lights, which should all be of white colour, should continue to provide a luminous intensity of not less than 0.75 cd in all directions of the upper hemisphere for a period of at least 8 h."

Add a new subparagraph 10.3.4 after existing subparagraph 10.3.3 as follows:

"10.3.4 One light should be dropped from a height of 2 metres onto a rigidly mounted steel plate or concrete surface. The light should not suffer damage and should be capable of providing a luminous intensity of not less than 0.75 candela for a period of at least eight hours when operated immersed in fresh water at ambient temperature."

29 Replace the present number and text of subparagraph 10.3.4 by following:

"10.3.5 In the case of a flashing light it should be established that:

- .1 the light can be operated by a manual switch
- .2 the rate of flashing is not less than 50 flashes and not more than 70 flashes per minute; and
- .3 the effective luminous intensity is at least 0.75 cd (see 10.2.2)."

30 Replace the present text of subparagraph .2, .4 and .5.5 of paragraph 11.2 by the following:

".2 Temperature tests

The hydrostatic release units should then be subjected to the temperature cycling prescribed in 1.2.1. Following temperature cycling as prescribed in 1.2.1, one hydrostatic release unit should be taken from a stowage temperature of -30 and should then operate in seawater at a temperature of -1 . The other hydrostatic release unit should be taken from a stowage temperature of +65 , and should then operate in seawater at a temperature of +30 .

.4 Strength test

After reassembly the hydrostatic release unit, if forming part of the painter system, should be subjected to a tensile test of at least 10 for a period of 30 minutes. If the release unit is to be fitted to a liferaft for more than 25 persons it should be subjected to a tensile test of at least 15 kN. After the tensile test the unit, if designed to allow manual release should then be capable of being operated manually.

.5 Technical tests on the membrane

Resistance to detergents

- .5.5 Two membranes should be immersed for 7 days in detergents commonly used on board ship:

Test temperature +18 to +20

Requirements: The membranes should show no signs of deterioration."

Insert a new paragraph 12 after subparagraph 11.3.2, as follows:

"12 MARINE EVACUATION SYSTEMS

12.1 Materials

Materials used in the construction of marine evacuation systems are to be tested to the standards laid down in paragraph 5.17.13 where applicable.

12.2 Marine evacuation system container

12.2.1 It should be demonstrated that the passage and platform if fitted, or liferafts in any other

case, can be deployed from the container by one person in a sequence prescribed in the manufacturer's instruction. If more than one action is necessary to operate the system means should be provided to prevent incorrect operation.

12.2.2 A static load of 2.2 times the maximum load on the system should be applied to its structural attachment to the ship for a period of 30 minutes. This static load is to be equivalent to the calculated load imposed by the maximum number and size of fully loaded liferafts for which the system is designed, attached to the loaded platform with the ship moving through the water at 3 knot against a head wind of force 10 on the Beaufort scale. There should be no evidence of significant deformation or other damage as a result of this factory test.

12.2.3 The exterior of the container as installed should be hose tested in a similar manner to the canopy closure test in paragraph 5.12 to ensure that it is reasonably weathertight to prevent the ingress of water.

12.2.4 The release and securing arrangements for any internal or external doors are to be satisfactorily tested by 5 dry release operations carried out consecutively.

12.2.5 It should be demonstrated by 2 dry deployments of the system, with the container angled back to simulate an unfavourable trim of up to 10 ° and list of up to 20 ° either way, that the outer door, the passage and platform (if fitted), will not suffer damage which will render it unusable for its intended purpose.

12.3 Marine evacuation passage

12.3.1 For an inclined inflated passage the following requirements are to be complied with:

- .1 a fully inflated passage should be arranged on solid base at the height at which it is to be stowed on board. When loaded at mid length with a weight of 150 kg for each single slide path the passage must not become unduly distorted;
- .2 a fully inflated passage should be subjected to individual sliding operations twice the number for which it is to be certificated. For this test actual persons of varied physique and weight should be used. On completion the slide path must remain in a serviceable condition;
- .3 it should be demonstrated using actual persons that the loss of pressure in any one section of the passage will not limit its use as a means of evacuation;
- .4 a static load of 2.2 times the maximum to which the system is to be designed, in accordance with paragraph 12.2.2, should be applied for a period of 30 minutes to the connection between the passage and the container. On completion there must be no signs of any fracture or standing of its connections;
- .5 the uninflated passage with its gas cylinders should be placed in a cold chamber at a temperature of -30 °. After a period of not less than 24 h at this temperature the shute should reach its working pressure within 5 min. The components must show no sign of cracking, seam slippage or their defects;

- .6 the uninflated passage with its gas cylinders should be placed in a hot chamber at a temperature of +65 for not less than 7 h. On inflation the pressure relief valves on the passage should be of sufficient capacity to prevent pressure in excess of twice the designed working pressure;
- .7 it should be demonstrated with at least 10 sliding operations on a slide path thoroughly wetted with water to simulate wet weather conditions, that the speed of descent is not excessive or dangerous; and
- .8 a pressure test is to be carried out in accordance with paragraphs 5.17.7 and 5.17.8.

12.3.2 For vertical passage systems the following requirements are to be complied with:

- .1 the passage(s) should be subjected to individual descent operations twice the number for which it is to be certificated. For this test actual persons of varied physique and weight should be used. On completion the passage path should remain in a serviceable condition;
- .2 a load of 2.2 times the maximum to which the system is to be designed, in accordance with paragraph for a period of 30 min to the connection between the passage and the container. On completion there must be no signs of any fracture or standing of its connections;
- .3 the stowed passage should be placed in a cold chamber at a temperature of -30 . After a period of 24 h at this temperature the passage should show no signs of cracking or other defects;
- .4 it should be demonstrated with at least 10 descent operations, in the case of open vertical passages with the path thoroughly wetted with water to simulate wet weather conditions, that the speed of descent is not excessive or dangerous.

12.4 Marine evacuation platform, if fitted

12.4.1 The platform should be inflated and loaded with the number of persons carried in accordance with the number specified by paragraph 6.2.1.3.3 of the Code, all wearing an approved lifejacket. Freeboards are to be measured all round, and should not be less than 300 mm.

12.4.2 It should be demonstrated that in the event of the loss of 50% of the buoyancy in the tubes the platform should be capable of supporting, with a positive freeboard all round, the number of persons specified in paragraph 6.2.1.3.3 of the LSA Code.

12.4.3 It should be demonstrated that the platform is self draining with no possibility of a build up of water.

12.4.4 The platform with its inflation system should be placed in a cold chamber at a temperature of -30 . After a period of not less than 24 h at this temperature the platform on being inflated should achieve its normal working pressure in not more than 5 min. There should be no seam slippage, cracking or other defects on the platform, and it should be ready for use on completion of the test.

12.4.5 The platform with its inflation system should be placed in a hot chamber at a temperature of +65 for not less than 7 h. On being inflated the pressure relief valves should be of sufficient capacity to prevent pressure in excess of twice the designed working pressure.

12.4.6 A pressure test is to be carried out in accordance with paragraphs 5.17.7 and 5.17.8 of the Code.

12.5 Associated inflatable liferafts

12.5.1 Liferafts used in conjunction with the marine evacuation system should conform and be prototype tested to the requirements of paragraph 5.

12.5.2 It should be demonstrated that the liferafts can be deployed from their stowage position, and moored alongside the platform, if fitted, before being inflated, and bowsed in ready for boarding.

12.5.3 It should be demonstrated that the liferafts can be deployed from their stowage positions independently of the marine evacuation system.

12.5.4 It should be demonstrated that the liferafts will float free from their from their stowage positions, inflate and then break free in the event of the ship sinking.

12.5.5 If the passage is to give direct access to the liferaft(s), it should be demonstrated that it can be easily and quickly detached.

12.6 Performance

12.6.1 It should be demonstrated in harbour by a full deployment of a system, including the launching and inflation of all the associated liferafts, that the system will provide a satisfactory means of evacuation. For this trial the number of persons to be used should be that for which the system is to be certificated. The various stages of this trial should be timed so as to permit the calculation of the number of persons that can be evacuated in any specified period.

12.6.2 It should be demonstrated at sea by a full deployment of a system, including the launching and inflation of all the associated liferafts, that the system will provide a satisfactory means of evacuation in a sea state associated with a wind of force 6 on the Beaufort scale, and in association with a significant wave height of at least 3 m. The demonstration should be carried out in accordance with the following procedures:

.1 Phase 1 - Initial deployment of system

- .1 with the ship in a simulated "dead ship" condition, and the bow into the wind the system (passage and platform or any other configuration) should be deployed in its normal design manner; and
- .2 the platform and passage are to be observed from the ship to verify in this condition that it forms a stable evacuation system for the platform crew to descend and carry out their initial duties in preparation for evacuation;

.2 Phase 2-Lee side trial

- .1 the ship to be manoeuvred to place the system on the lee side and then allowed to freely drift;
 - .2 where the system employs platform, the nominated number of the platform crew are to descend via the passage and retrieve at least two liferafts which have been launched separately;
 - .3 where the system employs a passage giving direct access to the lifeaft, the nominated number of liferaft boarding crew are to descend via the passage. If additional liferafts are employed with the system, then they should be launched separately and be retrieved by the liferaft crew; and
 - .4 after the liferafts have been satisfactorily deployed, dependant upon safety consideration 20 persons in suitable protective clothing are to evacuate to the liferafts through the passage;
- .3 Phase 3 - Loaded trial lee side
- .1 the platform, if fitted, and the required number of liferafts are to be loaded to their certified capacity with weights representing 75 kg/person; and
 - .2 when loaded with the required weights the system is to be observed for a period of 30 minutes, with the ship free to drift, to confirm the system continues to provide a safe and stable evacuation system;
- .4 Phase 4 - Loaded trial weather side
- .1 the trials in paragraphs 12.6.2.2 and 12.6.2.3 should be repeated with the system deployed on the weather side of the ship. The lee side trial and the weather side trial may be conducted in any convenient order;
 - .2 where ship manoeuvres are required to place the system on any one side, any damage or failure sustained during this manoeuvre should not constitute a failure of the system; and
 - .3 the system should be tested, as far as practicable, on vessel having similar characteristics to the types of ships the equipment is to be fitted to."

Part 2 - Production and installation tests

32 Add a new subparagraph 2.2 after subparagraph 2.1.2, as follows:

"2.2 IMMERSION AND-EXPOSURE SUITS

Every immersion and anti-exposure suit should be tested with a constant air pressure for a period of at least 15 min and checked for leaks using a leak detection fluid. The air pressure should be appropriate to the type of material used in the manufacture of the suit and should never be less than 0.02 bar. All leaks shall be repaired before the suit leaves the factory."

33 Replace the existing text of subparagraph 5.1.4 by the following:

"5.1.4 Each liferaft produced should be inflated with air to the lesser of 2.0 times its working pressure or that sufficient to impose a tensile load on the inflatable tube fabric of at least 20% of the minimum required tensile strength. Relief valves should be inoperative for this test. After 30 min the liferaft should not show any signs of seam slippage or rupture, nor should the pressure decrease by more than 5%. The measurement of the pressure drop due to leakage can be started when it has been assumed that the compartment rubber material has completed stretching due to the inflation pressure and stabilized. This test should be conducted after equilibrium condition has been achieved. Following the test each relief valve should be tested for proper relief and reseating pressure."

34 Add after subparagraph 5.1.6 a new subparagraph 5.17, as follows:

"5.1.7 Exact NAP-test pressures can be calculated in accordance with the following equation:

$$p(\text{kg/cm}^2) = \frac{2 \times \text{tensile strength (kg per cm)}}{25 \times \text{diameter tube (cm)}}$$

35 Add after subparagraph 6.2.7 a new paragraph 7, as follows:

"7 MARINE EVACUATION SYSTEMS

7.1 Installation tests

7.1.1 On the installation of a marine evacuation system on a ship, at least 50% of such systems should be subjected to a harbour trial deployment. At least one of these systems should be deployed in association with at least two of the inflatable liferafts to establish that correct launching and subsequent retrieving, bousing-in and inflation procedures have been correctly installed.

7.1.2 Subject to the above deployments being satisfactory, untried system should be similarly deployed within 12 months of the installation date.

7.1.3 For first of the above deployments, in association with the launching of the liferafts, a partial evacuation trial should be carried to ensure that:

- .1 the system does not interfere with the launching of other life-saving equipment fitted onboard; and
- .2 the system and associated liferafts are clear of all possible obstructions or dangers such as stabilisers or the ship's propellers."