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PERFORMANCE STANDARDS AND PERFORMANCE TESTS FOR MANUALLY POWERED REVERSE OSMOSIS DESALINATORS

1 The Maritime Safety Committee, at its seventy-fifth session (15 to 24 May 2002), having noted that the relevant requirements of the International Life-Saving Appliance (LSA) Code specify the provision of desalinators in liferafts and lifeboats and having recognised the need for the desalinators to be manufactured and tested in accordance with uniform performance standards, approved the Performance standards and performance tests for manually powered reverse osmosis desalinators, set out in the annex.

2 Member Governments are invited:

.1 to apply the annexed Performance standards and performance tests, in conjunction with the provisions of paragraphs 4.1.5.1.19, 4.4.7.5 and 4.4.8.9 of the LSA Code; and

.2 to bring the annexed Performance standards and performance tests to the attention of shipowners, shipbuilders, ship manufacturers and other interested parties for use as appropriate.

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ANNEX

PERFORMANCE STANDARDS AND PERFORMANCE TESTS FOR MANUALLY POWERED REVERSE OSMOSIS DESALINATORS

1 General

These performance standards and performance tests should be applied to manually powered reverse osmosis desalinators referred to in paragraphs 4.1.5.1.19, 4.4.7.5 and 4.4.8.9 of the LSA Code.

2 Performance standards

2.1 The device should not contain any materials causing harmful effects to health when in contact with water.

2.2 Appropriate biocide should be provided to prevent the growth of bacillus or mould during storage.

2.3 The device should be easily operated by a person in a survival craft.

2.4 The manual force required to operate the device should not be excessive for one person. In general, the required force should be less than 52 N.

2.5 A device intended for stowage in an inflatable liferaft container should continue to function properly after being subjected to the liferaft drop test in accordance with paragraph 3.1.8.

2.6 The device should produce potable water with a salt rejection rate of not less than 95% from sea water, at a rate within the range specified by the manufacturer, but not less than 0.5 litres per hour, when tested in accordance with paragraph 3.1.5.

3 Performance tests

3.1 At least three specimens of manually powered reverse osmosis desalinators should be subjected to the following tests in the order specified.

.1 Temperature cycling test

The specimens should be subject to the temperature cycling as prescribed in paragraph 1.2.1 of the Annex to resolution MSC.81(70) and then to external examination. The specimens should show no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical qualities.

.2 Humidity test

The specimens should be subject to a temperature of +65°C and relative humidity of 90% for at least 96 h, followed by ten days at 20°C to 25°C at 65% relative humidity, and then to external examination. The specimens should show no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical qualities.

.3 Vibration test

The specimens should be mounted to a vibration testing machine and the following tests should be conducted in three mutually perpendicular directions. The specimens should show no sign of damage and should continue to function effectively.

.3.1 Resonance search vibration test

The specimens should be vibrated at frequencies from 5 Hz to 16 Hz, at a single amplitude of 1 mm in a period of 10 min. Then the specimens should be vibrated at frequencies from 16 Hz to 60 Hz, at an acceleration of 1 G in a period of 10 min. The frequencies and directions at which resonance occurred should be recorded.

.3.2 Endurance vibration test

The specimens should be vibrated for at least 1.5 h at the resonant frequencies, or if no resonance was observed, at 16 Hz at a single amplitude of 1 mm.

.4 Corrosion resistance test

The specimens should be exposed to a salt water spray test (5% NaCl by weight) at a temperature of 35 ±3°C for 100 h without interruption. After completion of the test the specimens should show no corrosion which could affect their efficient functioning.

.5 Rate of production and potability test

Using salt water solution (3.4% NaCl by weight) at a temperature of 20 to 25°C, the specimens should be operated continuously for at least 14 hours according to the manufacturer's instruction. The device should then be shut down for 12 hours and the procedure repeated. The product water flow rate and salinity in ppm should be measured every 60 min. The salt rejection rate should be not less than 95%. The capacity for 48 hours of use should be calculated based on the measured flow rate.

.6 Manual power test

The amount of manual power required to operate the device should be measured and recorded.

.7 Drop test to the floor

The specimens should be dropped from a height of 2 m onto a rigid steel plate (about 16 mm thickness) on a concrete floor so as to hit the floor with the specimen's major axis perpendicular, horizontal and inclined at 45° to the floor. After the test, the specimens should show no damage which could affect their efficient functioning.

.8 Drop test with liferaft

For a device intended for stowage in an inflatable liferaft container, each specimen should be stowed inside the packed inflatable liferaft container, and dropped into water from a height of 18 m or the maximum stowage height of the liferaft, whichever is greater. The test should be conducted two times, and the specimens and liferafts should show no damage which could affect their efficient functioning.

.9 Pressure test

The maximum operating pressure specified by the manufacturer should be applied to each port of the device for a period of 10 min with the other port plugged. The specimens should show no leakage or damage.

.10 Relief valve test

The operating pressure of the relief valve should be measured, and the relief valve should operate at a pressure in accordance with the manufacturer's specification.

.11 High temperature performance test

The specimens should be taken from a stowage temperature of +65°C and then operated at ambient temperature using +30°C salt water solution (3.4% NaCl by weight) for a period of 30 min. The product water flow rate and salinity should be measured. The flow rate should be not less than the manufacturer's specification, and the salt rejection rate should be not less than 95%.

.12 Low temperature performance test

The specimens should be taken from a stowage temperature of -30°C and then operated at ambient temperature using 0°C salt water solution (3.4% NaCl by weight) for a period of 30 min. The product water flow rate and salinity should be measured. The flow rate should be not less than the manufacturer's specification, and the salt rejection rate should be not less than 95%.

.13 Endurance test

The specimens should be operated continuously for at least 500 h according to the manufacturer's instruction. Performance data should be measured twice daily on each specimen. The specimens should show no sign of damage and should continue to function effectively.