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## U.S. Coast Guard

### Lifesaving and Fire Safety Standards Division (G-MMS-4)

# Guidelines for Approval of Emergency Drinking Water for Lifeboats and Liferrafts November 1981

## Guideline 26--Emergency Drinking Water (in Hermetically Sealed Containers)

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1 Scope. This specification describes emergency drinking water approved by the U.S. Coast Guard for lifeboats and liferafts.

3 Incorporations by reference.

(a) The following Federal Specification and Standard are incorporated by reference into this specification:

(1) TT-L-32A - Lacquer; Cellulose Nitrate, Gloss for Aircraft Use, with Amendment 1, dated 9 March 1973.

(2) Federal Test Method Standard 101C, Method 5009.1 - Leaks in Containers, dated 13 March 1980.

(b) The following Military Specification is incorporated by reference into this specification:

(1) MIL-B-131F - Barrier Materials, Watervaporproof, Flexible, Heat-Sealable, with Amendment 3 dated 9 June 1976.

(c) The following standard of the American Society for Testing and Materials (ASTM) is incorporated by reference into this specification:

(1) ASTM B 117-73 - Standard Method of Salt Spray (Fog) Testing, reapproved 1979.

(d) In addition to the requirements of this specification, emergency drinking water must meet the applicable requirements of the Federal Food, Drug, and Cosmetic Act and regulations issued under the authority of that Act.

## 5 General requirements for emergency drinking water.

- (a) Each container of water must be marked as containing some unit fraction (such as 1/2, 1/3, 1/4, etc.) of either a U.S. quart or a liter of water. The actual quantity of water in the container must not be less than the indicated quantity.
- (b) Water packed in metal cans without a corrosion resisting lining, must contain a suitable corrosion inhibitor (such as sodium silicate for steel cans).
- (c) The water must meet the applicable government standards for drinking water in effect at the place where it is packed. In addition the water must not contain more than -
  - (i) 500 mg/l of salt (NaCl).
- (d) The water in the container must be sterile and free from organic matter, sediment and odor.
- (e) The water must be suitable for storage in the container and retaining its sterility for a period of five years in temperatures ranging from -30°C to +65°C (-22°F to +149°F).
- (f) The place where the water is packed must be clean and sanitary. Standard aseptic procedures must be followed in filling the containers.

## 10 Containers for emergency drinking water.

- (a) Emergency drinking water must be in hermetically sealed containers that are of corrosion resistant material or are treated to be corrosion resistant.
- (b) If the container is a can, it must be double seamed and, if lined, be lined with a material that is compatible with the water.
- (c) If the container is a steel can, in addition to the requirements of paragraph (b) of this section, it must -
  - (i) have not less than .75 (lb./base box) electrolytic tin plating on its exterior surfaces, and
  - (ii) after filling and sealing, be dip-coated with one coat of clear lacquer meeting TT-L-32 using a process that assures complete coating of the exterior of the can.
- (d) A can which does not meet the requirements of paragraph (c) of this section can be approved if it has corrosion resistant properties equivalent to the can described in paragraph (c).
- (e) If the container is a flexible package, the package material must meet MIL-B-131, or the following requirements of MIL-B-131:
  - (i) Seam strength.

(ii) Resistance to aging.

(iii) Water vapor transmission rate.

(f) Each water container must have a method of spillproof reclosure, or else individual portions containing not more than 125 ml (4 oz.) of water each must be provided. If the method of closure is a removable lid, one lid must be provided for each 1.5 l (48 oz.) of water in each shipping container.

(g) Emergency drinking water and containers must be capable of passing the tests and inspections prescribed in 25(b).

#### 15 Marking and instructions.

(a) The container must be clearly and permanently marked with -

(i) the name and address of the approval holder,

(ii) the Coast Guard approval number,

(iii) the quantity of water in both U.S. quarts and liters (see 5(a)),

(iv) the lot number,

(v) the month and year the water was packed, and

(vi) identification as emergency drinking water.

(b) The water must include waterproof instructions for use assuming consumption of approximately 250 ml (8 oz.) per day. If the container is not a vacuum-packed can, instructions must also be provided on how to check the hermetic sealing of the container.

#### 20 Independent laboratory.

The approval and production tests in this specification must be conducted by or under the supervision of an independent laboratory accepted by the Coast Guard under Subpart 159.010.

#### 25 Procedure for approval.

(a) Emergency drinking water is approved by the Coast Guard under the procedures in Subpart 159.005.

(b) The following tests and inspections must be performed on samples from the first lot of emergency drinking water offered for Coast Guard approval:

(i) Chemical and biological analysis. Evidence must be provided that the water meets the government requirements for drinking water in effect at the place the water is packed. Two containers of water must be analyzed for -

- (1) sterility,
- (2) salt content, and
- (3) presence of organic matter, sediment, and odor.

(ii) Low and high temperature storage. Two empty sample containers must be prepared and sealed in the same manner as is used for regular water containers. If the containers are flexible packages, they must be sealed in such a way as to contain as much air as possible. The two empty samples, and two filled samples must be placed in a chamber at the low temperature specified in 5(e) for 24 hours, followed by 24 hours at the high temperature. At the end of this period each container must be examined. There must be no evident deterioration of the container, any protective coating on the container, the sealing of the container, or the required markings on the container.

(iii) Leakage. The two empty samples from the low and high temperature storage test must be subjected to the leakage test as described in Federal Test Method Standard 101, Method 5009, using the hot water technique for cans and the squeeze technique for flexible packages. There must be no leakage evident as a result of this test.

(iv) Water immersion. The two filled samples from the high and low temperature test must be immersed in salt water having the approximate salinity of sea water for 24 hours. At the end of this period the container must be examined. There must be no evident deterioration of the container, the required markings on the container, or the sealing of the container.

(v) Durability. When completely dry, the two samples from the water immersion test must be placed in a tumble tester as shown in Figure 25(b)(v) which must be rotated at approximately 10 rpm for a total of 100 revolutions. At the end of this period, each container must be examined. If the container is not a can as described in 10(d), then each container must be opened and the contents examined. There must be no evident deterioration of the sealing of the container, or the water inside.

(vi) External corrosion. If the container is a can as described in 10(d), the two samples from the durability test, must be subjected to a salt spray test for 120 hours as described in ASTM B 117. At the same time, two reference cans meeting 10(c) which have also been subjected to the low and high temperature storage, immersion and durability tests, must also be subjected to the salt spray test procedure. The seams of the cans must face the salt spray mist during the test. At the end of the test period, each sample container must be examined, then the container must be opened and the contents examined. There must be no evident deterioration of the sealing of the sample container, or the water inside. The sample containers must not have more corrosion than the reference containers.

(vii) Drop. Two full containers must be dropped onto a concrete surface from a height of 3m

(10 ft.). One of the containers must strike the surface on its end, and the other must strike the surface on its side. There must be no evident deterioration of the sealing of the containers as a result of this test.

NOTE: Emergency water is carried in lifeboats and liferafts which may be dropped into the water from great heights. This test is intended to make sure that the container will survive such a drop. If actual experience with lifeboats and liferafts is unsatisfactory, modifications and additional tests may be required.

(viii) Flexible package material. Flexible package material which does not meet MIL-B-131 must be tested for conformance with 10(e).

(ix) Internal corrosion. If the container is a metal can, two filled and sealed cans of water must be immersed in boiling water for 6 to 8 hours. At the end of the boiling period they must be cooled to room temperature. The cans must then be placed upright in a freezing compartment at approximately -20\_C (-4\_F) for 16 hours. The cycle of alternating boiling and freezing must be continued until six cycles have been completed. After the freezing portion of the cycle, the frozen cans may be immersed directly in the boiling water for the next cycle, or held at room temperature until it is convenient to start the next cycle. At the completion of the six cycles, the water in the cans, and the water in two cans not subjected to the temperature cycling must be chemically analyzed. The water in the cycled cans must not show an increase in products of corrosion as compared to the uncycled cans.

### 30 Methods of sampling, inspections and tests.

(a) Production tests must be conducted under the procedures in Subpart 159.007. For each lot of water produced, an inspector from the independent laboratory must inspect the place of manufacture, observe the sanitary conditions and the various operations involved in the preparation of the water, and determine that they are in accordance with the plans and specifications submitted by the manufacturer and approved by the Commandant. Results of a government health inspection may be accepted for the sanitation portion of this inspection.

(b) A production lot consists of the water offered for inspection at one time. A new lot must be started with any change in materials or production methods, or when discontinued production is resumed. (Stopping of production over nights or weekends is not considered discontinued production.) Samples for production tests must be selected at random from each lot. The required sample size for various lot sizes is given in Table 30(b).

Table 30(b) - Sample size for various lot sizes

<u>Lot Size</u>	<u>Sample Size</u>	<u>Acceptance Number</u>
35- 800	35	0
801-1,300	50	1
1,301-3,200	75	2
3,201-8,000	110	3
8,001 and over	150	4

(c) The independent laboratory inspector must select the required number of samples at random. The inspector must verify that the packages and the markings on the packages of the samples selected are in accordance with the plans and specifications submitted by the manufacturer and approved by the Commandant. The number of samples found not to comply must not exceed the acceptance number in Table 30(b).

(d) The independent laboratory inspector must select at random a set of 11 filled sample containers, or if the lot consists of more than 3,200 containers, the inspector must select at random two sets of 11 containers. Nine containers of each set must be subjected to the chemical and biological analysis described in 25(b)(i). Each sample must meet the applicable requirements of this specification. If the container is a metal can, the two remaining cans in each set must be subjected to the internal corrosion testing specified in 25(b)(ix). The results of the chemical analysis of the uncycled cans on a previous lot test may be used as the standard for comparison unless it is evident that the character of the water has changed. If it has, then the water from two additional cans not subjected to the temperature cycling must be analyzed to provide the basis of comparison.

(e) The packer must hold the containers for two weeks after they are filled and sealed, then must check each one for hermetic sealing by the "slap test" in the case of vacuum packed cans, or by the method described in 15(b) for other containers. Containers which are not sealed must be removed from the lot.(v)

[Figure 1. Tumble Test Apparatus](#)