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NAVIGATION AND VESSEL INSPECTION CIRCULAR NO. 01-08

Subj: SHIPBOARD INSPECTION AND TESTING OF IMMERSION SUITS

Ref: a. Title 46 of the Code of Federal Regulations (46 CFR) Parts 109, 131, and 199
b. International Maritime Organization (IMO), Maritime Safety Committee (MSC) Circulars 1047 and 1114

1. PURPOSE. This circular promulgates the recommendations of the International Maritime Organization (IMO), in Maritime Safety Committee (MSC) Circulars 1047 and 1114, concerning periodic inspection and testing of immersion suits by ships' crews.

2. ACTION.

   a. Officers in Charge, Marine Inspection (OCMIs) are encouraged to bring this circular to the attention of the marine industry within their areas of responsibility. This circular will be distributed by electronic means only and is available on the World Wide Web at **http://www.uscg.mil/hq/g-m/nvic/index.htm**. Internet release is authorized.

   b. Ship owners and operators, Coast Guard marine inspectors, classification societies acting on behalf of the Coast Guard, and other involved parties are encouraged to review the guidance contained in this Circular when evaluating the operational readiness of immersion suits in service.

3. DIRECTIVES AFFECTED. None.

DISTRIBUTION SDL No. 148

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4. BACKGROUND. Research, long term operational experience, and data from repair stations have shown that the seams and closures of immersion suits experience deterioration over time. The rate and severity of deterioration may vary widely, depending upon the specific components and procedures employed in the manufacture of the suit, and the conditions under which the suit is stored. However, even under ideal conditions, the materials and adhesives used have a finite service life, and will inevitably experience reductions in strength, buoyancy, and/or watertightness with age. On an annual inspection of a U.S. flag vessel in September 2006, 36 out of 66 immersion suits failed due to separation around the inflation tubes. The suits were approximately 14 years old and the manufacturer had recommended their suits over 10 years old receive annual inflation testing, preferably at one of their service centers. If the manufacturer's recommendations are followed, defects may be discovered and repaired, rather than resulting in "no sail" deficiencies. On uninspected commercial fishing vessels, recent immersion suit repair station data reflects an average suit age of 18 years and a condemnation rate of over 40%. When carried out effectively, periodic inspections and tests can identify repairable suits as well as those beyond economical repair and ready for replacement.

5. DISCUSSION.

   a. 46 CFR 199.190(e), 46 CFR 109.301(e) (MODU's), 46 CFR 131.565(a) (OSV's), and SOLAS regulation III/20.7 require monthly inspections of all life-saving appliances to ensure that their operational readiness is maintained in service. For uninspected commercial fishing industry vessels, 46 CFR 28.140 requires annual inspection, cleaning, and repair of immersion suits. To assist mariners in performing these inspections effectively for immersion suits, in 2002 the IMO approved *Guidelines for monthly shipboard inspections of immersion suits by ships' crews* as set out in MSC Circular 1047. These IMO guidelines have been re-formatted for easy use, but the substance of the recommendations remains unchanged. An inspection checklist based on the circular is provided as enclosure (1).

   b. Although the guidelines for shipboard inspections of immersion suits in enclosure (1) are very helpful in identifying obvious problems with a suit and ensuring its basic functioning, they do not adequately address deterioration of seams and closures (zippers, etc.) which may not be readily apparent by visual inspection. Such deterioration can best be detected by pressurization of the suit with air, and testing of the seams and closures for leaks with a soapy water solution.

   c. Recognizing that shipboard inspections of immersion suits carried out in accordance with MSC Circular 1047 and enclosure (1) may not be adequate to detect deterioration of seams and closures of the suits due to ageing of adhesives and materials, in May 2004 the IMO approved *Guidelines for periodic testing of immersion suit seams and closures*, as set out in MSC Circular 1114, which is provided in Enclosure (2).

6. IMPLEMENTATION

   a. To ensure that shipboard inspections of immersion suits are carried out effectively, the inspection procedures in enclosure (1) are recommended.

   b. To ensure the adequate strength and watertightness of seams and closures of in-service immersion suits, it is recommended that each suit be subjected to an air pressure test as

described in enclosure (2), at intervals not exceeding three years, or more frequently for suits over ten years of age (consult manufacturer's recommendations).

c. Immersion suits which are found to be unsatisfactory based on the tests and inspections described above and that cannot be economically repaired must be removed from service and the Coast Guard approval markings removed.

7. DISCLAIMER. This guidance is not a substitute for applicable legal requirements, nor is it itself a rule. It is not intended to nor does it impose legally-binding requirements on any party. It represents the Coast Guard's current thinking on this topic and may assist industry, mariners, the general public, and the Coast Guard, as well as other federal and state regulators, in applying statutory and regulatory requirements. You can use an alternative approach for complying with these requirements if the approach satisfies the requirements of the applicable statutes and regulations. If you want to discuss an alternative approach (you are not required to do so), you may contact LCDR Vince Gamma, Lifesaving & Fire Safety Division, COMDT (CG-5214), 2100 2nd St. SW Washington, DC 20593-0001, Ph: 202-372-1396 / Fax: 202-372-1924, Vincent.A.Gamma@uscg.mil who is responsible for implementing this guidance.

8. CHANGES. This NVIC will be posted on the web at http://www.uscg.mil/hq/g-m/nvic/. Changes to this NVIC will be issued as necessary. Questions or suggestions for improvements to this NVIC should be submitted in writing to Commandant (CG-521).

9. FORMS AND REPORTS. None.

BRIAN M. SALERNO
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Assistant Commandant for Marine
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Encl: (1) Checklist for shipboard inspections of immersion suits by ships' crews
(2) Guidelines for periodic testing of immersion suit seams and closures

GUIDELINES FOR SHIPBOARD INSPECTION OF IMMERSION SUITS BY SHIPS' CREWS

When carrying out monthly inspections of immersion suits as required by 46 CFR 199.190(e), 46 CFR 109.301(e) (MODU's), 46 CFR 131.565(a) (OSV's), and SOLAS regulation III/20.7, or annually as required by 46 CFR 28.140 (uninspected commercial fishing industry vessels) the following procedure is recommended:

____ 1. Examine storage bag
- General condition / closures
- Ease of removal of suit
- Donning instructions are legible
- Confirm that suit is the type and size identified on the bag

____ 2. Place the suit on a clean, flat surface
- Make sure the suit is dry inside and out
- Visually check for damage.
- Rips, tears or punctures should be repaired in accordance with the manufacturer's instructions by a suitable repair station*

____ 3. Check the zipper
- Slide up and down and check for ease of operation
- Lubricate front and back of the zipper and the slide fastener using lubricant recommended by the manufacturer
- If the zipper is not functional, the suit must be removed from service and discarded or returned for repair to the manufacturer or a suitable repair station*

____ 4. Inflatable head support and/or buoyancy ring, if fitted
- Check for damage / ensure it is properly attached
- Check inflation hose(s) for deterioration
- At least quarterly, the head support/buoyancy ring should be inflated and tested for leaks (this test does not apply to integral inflatable lifejackets)
- Leaks should be repaired in accordance with the manufacturer's instructions by a suitable repair station*

____ 5. Check retroreflective tape for condition and adhesion. Replace if necessary.

____ 6. Check whistle and expiration date of light and battery (if fitted).

____ 7. Replace the suit in the bag with the zippers fully opened.

____ 8. Training: take the opportunity during monthly inspections for the crew to practice donning the immersion suits.

*A "suitable repair station" is one authorized by the suit manufacturer and/or acceptable to the OCMI as being qualified to repair an immersion suit in accordance with the manufacturer's instructions.

GUIDELINES FOR PERIODIC TESTING OF IMMERSION SUIT SEAMS AND CLOSURES

1. A suitable head piece, fitted with a means to inject air into the suit, should be inserted into the face orifice of the suit and secured so as to minimize leakage around the face seal. A low-pressure monitoring device, either integral to the fitting for air injection or as a separate device, should also be inserted. If the suit is fitted with detachable gloves and/or boots, the wrists and/or cuffs should be sealed by inserting a short length of suitable diameter plastic pipe and securing the gloves and/or boots with suitable wire ties or hose clamps. The zipper should be fully zipped, and any face flap closed. The suit should then be inflated to a pressure of 0.7 to 1.4 kPa (0.1 to 0.2 psi). If an auxiliary inflatable means of buoyancy is provided, it should be inflated through the oral valve to a pressure of 0.7 kPa (0.1 psi) or until firm to the touch.

2. Each seam and closure of the suit, oral tube and attachment points, and joint or valve of any auxiliary inflatable means of buoyancy should then be covered with a soapy water solution containing enough soap to produce bubbles if there is a leak. If leakage is noted at a foot valve to the extent that air pressure cannot be maintained, the valves should be sealed for the test.

3. If leaks are revealed by the propagation of bubbles at seams or closures, the leaking areas should be marked and, after cleaning the suit thoroughly with fresh water and drying it, repaired in accordance with the suit manufacturer's recommendations by a suitable repair station*.

4. It is recommended that the air pressure test be performed at a suitable shore-based facility equipped to make any necessary repairs in accordance with the manufacturer's recommendations. In view of the wide variety of materials and adhesives used in immersion suits, it is strongly recommended that any repairs to a suit be carried out by a facility which has access to the original manufacturer's recommended servicing instructions, parts and adhesives, and suitably trained personnel. The air pressure test may be carried out on board ship if suitable equipment is available.

*A "suitable repair station" is one authorized by the suit manufacturer and/or acceptable to the OCMI as being qualified to repair an immersion suit in accordance with the manufacturer's instructions.