



INFORMATION BULLETIN No. 76

Carriage of Immersion Suits

Guidance and Instructions for Bahamas Recognised Organisations,
Bahamas Approved Nautical Inspectors, Ship Owners, Managers and
Masters

1. Purpose

- 1.1. This Bulletin provides guidance on the carriage requirements for immersion suits, anti-exposure suits and thermal protective aids (TPAs).

2. Application

- 2.1. This Bulletin applies to all ships, except:

- 2.1.1. Paragraph 4 applies to cargo ships only, including Mobile Offshore Drilling Units/Mobile Offshore Units (MODUs/MOUs); and

- 2.1.2. Paragraph 5 applies to passenger ships only.

3. Introduction

- 3.1. Chapter III of the International Convention for the Safety of Life at Sea, 1974, as amended (SOLAS), requires ships to be provided with immersion suits, anti-exposure suits and thermal protective aids.

- 3.2. An immersion suit is a protective suit which reduces the body heat loss of a person wearing it in cold water, complying with the requirements of section 2.3 of the International Life Saving Appliance Code (LSA Code).

- 3.3. An anti-exposure suit is a protective suit designed for use by rescue boat crews and marine evacuation system parties, complying with section 2.4 of the LSA Code.

- 3.4. A thermal protective aid (TPA) is a bag or suit made of waterproof material with low thermal conductance, complying with section 2.5 of the LSA Code.
- 3.5. The Bahamas Maritime Authority (BMA) occasionally receives requests for interpretation on the carriage requirements and the following comments are intended to provide guidance to meet the minimum requirements. However, the Company¹ is reminded of its obligation to provide all crew members with a safe working environment and place additional suits on board where necessary.
4. Carriage of immersion suits - cargo ships and MODUs/MOUs
- 4.1. Regulation 32.3 of Chapter III of the International Convention for the Safety of Life at Sea, 1974, as amended (SOLAS), requires one immersion suit to be provided for each person on board a cargo ship with additional suits to be provided at work and watch-keeping stations which are **"remotely located" from the immersion suit storage**.
- 4.2. One immersion suit shall be provided for each person on board. In any case, the number of suits must be not less than the number of persons shown on the **ship's** Safety Equipment Certificate (or equivalent). The suits must be of approved type and provided in sizes appropriate to the crew and supernumeraries on board (if any), including children.
- 4.3. The immersion suits should be stored in one or more central locations adjacent to lifeboat stations or can be distributed throughout the crew cabins. Therefore, both the navigating bridge and the machinery space are regarded as "remotely located".
- 4.4. The minimum number of additional suits to be provided shall cover the numbers of persons on watch on the navigating bridge and the main machinery space. The BMA considers two (2) additional suits on the navigating bridge, and two (2) additional suits within the machinery space to be the minimum required. On smaller ships where there is only one engine room watch-keeper the number of additional immersion suits in the machinery space may be reduced to one (1).
- 4.5. Additional immersion suits shall be provided at every remotely located work and/or watch station. The BMA interpretation of a remotely located

¹ The "Company" is the entity responsible for the management of the ship in accordance with the ISM Code. For ships to which the ISM Code is not applicable, the Company is the Managing Owner in accordance with Section 52 of the Merchant Shipping Act.

work and/or watch station is a location where a person may be positioned on a regular or systematic basis, but not at a location where a person may be present only occasionally. The Company, in consultation with the Master, of the ship, is responsible for identifying and declaring such locations to the Recognised Organisation which issues the **ship's Safety Equipment** certificate, or equivalent.

- 4.6. To illustrate the above principle: a machinery space which is normally operated in the unmanned mode (UMS) would require two (2) additional immersion suits² to account for periods when watch keepers are in attendance but would not require additional suits for other crew that may be working within the machinery space during the day.
- 4.7. Attention is drawn to MSC.1/Circ.1490/Rev.1 *Revised Unified Interpretation of SOLAS Regulation III/31.1.4*³ in respect of additional immersion suits to be carried for remotely located survival craft. A minimum of two immersion suits should be provided for remotely located survival craft.

5. Carriage of immersion suits on passenger ships

- 5.1. Regulation 7.3 of Chapter III of the International Convention for the Safety of Life at Sea, 1974, as amended (SOLAS), requires an immersion suit complying with the requirements of section 2.3 of the LSA Code or an anti-exposure suit complying with section 2.4 of the LSA Code, of an appropriate size, to be provided for every person assigned as the crew of a rescue boat or assigned to the marine evacuation system party of a passenger ship.
- 5.2. All passenger ships shall carry for each lifeboat on the ship at least three immersion suits complying with the requirements of section 2.3 of the LSA Code and, in addition, a thermal protective aid complying with the requirements of section 2.5 of the LSA Code for every person to be accommodated in the lifeboat and not provided with an immersion suit.
- 5.3. The immersion suits and thermal protective aids referenced in 5.2 need not be carried:
- i. for persons to be accommodated in totally or partially enclosed lifeboats; or

² Which may be reduced to one (1) in accordance with paragraph 4.4

³ See Annex 5

- ii. if the ship is constantly engaged on voyages in warm climates where, in the opinion of the BMA, they are unnecessary⁴.
6. Carriage of immersion suits in warm climates
- 6.1. SOLAS Regulation III/32.3.2 permits exemptions from the carriage of immersion suits for ships other than bulk carriers, as defined in SOLAS Regulation IX/1, that operate exclusively within warm climates where, in the opinion of the flag State, immersion suits are unnecessary.
 - 6.2. Having considered the guidance provided in MSC/Circ.1046 *Guidelines for the Assessment of Thermal Protection*⁵, **the BMA considers "warm climates"** to be between latitudes 30° N and 30° S;
 - 6.3. The BMA will not exempt any ship operating outside these limits from the immersion suit carriage requirements, irrespective of the duration of the proposed voyage.
 - 6.4. Bulk carriers, as defined in SOLAS Regulation IX/1 must carry sufficient immersion suits at all times and cannot be exempted from the carriage requirements even if operating in warm climates.
7. Storage and familiarisation
- 7.1. Immersion suits and anti-exposure suits must be stored in readily accessible and clearly marked locations. The conditions inside storage facilities must ensure that suits are maintained in good condition.
 - 7.2. All crew must be familiar with the location(s) of the suits and the methods of donning them. Drill procedures and activities shall incorporate demonstrations and practice to ensure that all crew can safely use an immersion suit or anti-exposure suit immediately when required. Training manuals, muster lists and instructions for on-board maintenance must be updated as necessary.
 - 7.3. In general, immersion suits should not be worn when boarding totally enclosed lifeboats. While abandon ship drills are a good opportunity to examine and demonstrate the use of immersion suits, crew training during these drills should emphasise that immersion suits are intended primarily

⁴ Refer to section 6

⁵ See Annex 1

to ensure thermal protection in cases where the totally enclosed lifeboat cannot be embarked on⁶.

8. Inspection and maintenance

- 8.1. **The manufacturer's inspection and maintenance** recommendations must be followed to ensure that the condition of each immersion suit and anti-exposure suit remains suitable for immediate use. In this respect, attention is drawn to MSC/Circ.1047 *Guidelines for monthly shipboard inspection of immersion suits and anti-exposure suits by ships' crews*⁷ and MSC/Circ.1114 *Guidelines for periodic testing of immersion suit and anti-exposure suit seams and closures*⁸.
- 8.2. The BMA recognises that approved immersion suits are being offered in sealed air tight vacuum packaging. These suits cannot be unpacked and inspected as required by MSC/Circ.1047 and MSC/Circ.1114. The BMA accepts this type of packaging and considers that such immersion suits fulfil the requirements of SOLAS Regulations III/7.3, 22.4 and 32.3.
- 8.3. In accepting immersion suits in air tight vacuum packaging as described in 8.2 above, the following requirements must be adhered to:
- i. A suitable number of standard packaged immersion suits must be available for use for training by the ship's crew. The Company is responsible for assessing and providing a suitable number of immersion suits for training, but there should not be less than one.
 - ii. The packaging of the vacuum sealed immersion suits must be inspected monthly. Should any damage be found, or the seal broken, or the vacuum lost, the suit must be either removed from the package and inspected as per MSC/Circ.1047 or sent for inspection and repackaging at an approved service station.
 - iii. The airtight packing must be transparent to allow for visual inspection without unpacking the immersion suit.
- 8.4. Notwithstanding paragraph 8.3 above, the air pressure test required by MSC/Circ.1114 should be conducted by a manufacturer approved service station at 3 year intervals, after which the suit should be repackaged in a

⁶ Refer to MSC.1/Circ.1278 *Guidance on wearing immersion suits in totally enclosed lifeboats*. See Annex 4

⁷ See Annex 2

⁸ See Annex 3

sealed vacuum package. All immersion suits older than 10 years of age should be serviced annually at an approved service station.

- 8.5. Where a sealed vacuum packaged suit is removed from its packaging for any reason, it should thereafter be treated as an unpackaged suit in respect of the inspections required under SOLAS Chapter III until such time that it is repackaged in a sealed vacuum package by an approved service station.

9. Revision History

Rev.3 (09 October 2018) – Complete revision

Rev.2 (25 July 2011) – Section 4.4 added re vacuum packed suits

Rev.1 (09 July 2008) - 2.1 Clarification of base number of suits required; 2.6 added; additional minor editorial changes throughout.

Rev.0 (06 July 2005) – First issue

ANNEX

GUIDELINES FOR ASSESSMENT OF THERMAL PROTECTION

1 Introduction

In considering appropriate thermal protective equipment for use on ships operating in various climatic conditions, Administrations and ship operators should take into account all of the relevant risk factors, to include type of ship, type of survival craft, number of persons on board, environmental conditions in the operational area, and availability of SAR services. The purpose of these Guidelines is to provide information to assist in the assessment of the impact of environmental factors, and specifically water temperature on equipment selection. In the context of the medical threat of hypothermia, the IMO publication “A Pocket Guide to Cold Water Survival” should be referred.

2 THERMAL PROTECTIVE PERFORMANCE

In addition to the performance requirements specified in the International Life-Saving Appliance (LSA) Code, there are some data available which illustrate the performance of the equipment at different water temperatures. Thermal protective performance for the various types of equipment at these temperatures is defined as the time to reach a deep body temperature of 35°C or reduce a deep body temperature by 2°C, which is the point at which a significant degree of incapacitation is expected to occur. These data were obtained by a combination of theoretical and experimental methods. While based upon the best information available, they are provided for comparison purposes only. Individual results may vary greatly based on sea conditions, body type, etc.

Table 1: Thermal protective performance by type of personal life-saving appliances

Thermal protective means. (Clothing is generally included)	IMO minimum test requirements		Time (hrs) for core temperature drop of 2°C or to 35°C when exposed to water of temperature			
	Time (h)	Water temp. (°C)	0° C	5° C	10° C	20° C
Lifejacket	~*	-	-	0.5 h	0.8 h	1.7 h
Thermal protective (TP) lifejacket	2 h	10	0.5 h	0.75 h	2 h	4 h
Anti-exposure suit	1 h	5	1.5 h	2 h	4 h	10 h
Immersion suit uninsulated	1 h	5	1.5 h	2 h	5 h	>12 h
Immersion suit insulated	6 h	2	6 h	>12 h	>12 h	>12 h

* No IMO requirements

3 Temperature range and geographical sectors

The sea areas subject to these temperatures vary greatly throughout the year and do not always uniformly follow specified latitudes. Table 2 illustrates the approximate variation of water temperature with latitude during the coldest months of the year in the northern and southern hemispheres. More exact information on seawater temperature can be found at www.nodc.noaa.gov/dsdt/oisst/index.html or appropriate local sources.

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MSC/Circ.1046

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Table 2: *Variation of seawater temperature with latitude*

Temperature range (°C)	Geographical sectors (degree latitude)	
	(North)	(South)
Above 20	0-30	0-30
20 – 10	30-50	30-45
10 – 5	50-60	45-50
Below 5*	60-70	50-60

* All areas of icing conditions as defined in resolution A.749(18) - Code on Intact Stability, should be included in this range.

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GUIDELINES FOR MONTHLY SHIPBOARD INSPECTION OF IMMERSION SUITS AND ANTI-EXPOSURE SUITS BY SHIPS' CREWS

When carrying out the inspection of immersion suits and anti-exposure suits required by SOLAS regulation III/20.7, the following procedure is recommended.

- 1 Check closures on storage bag as well as general condition of bag for ease of removal of suit. Ensure donning instructions are legible. Confirm that suit is the type and size identified on the bag.
- 2 Lay 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 manufacturer's instructions by a suitable repair station*.
- 3 Check the zipper by sliding it up and down to check for ease of operation. Using lubricant recommended by the manufacturer, lubricate the front and back of the zipper and the slide fastener. If the zipper is not functional, the suit should be removed from service and discarded or returned to the manufacturer or a suitable repair station.
- 4 If fitted, check inflatable head support and/or buoyancy ring for damage and ensure that 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 manufacturers' instructions by a suitable repair station.
- 5 Check retro reflective tape for condition and adhesion. Replace if necessary.
- 6 If fitted, check whistle and expiration date of light and battery.
- 7 Replace suits in the bag with zippers fully opened.
- 8 The opportunity should be taken at such monthly inspections for the crew to practise donning the immersion suits or anti-exposure suits.

* A "suitable repair station" is one authorized by the suit manufacturer and/or acceptable to the Administration.

ANNEX**GUIDELINES FOR PERIODIC TESTING OF IMMERSION SUIT AND
ANTI-EXPOSURE SUIT SEAMS AND CLOSURES**

1 Research performed by several Member Governments has demonstrated that the seams and closures of immersion suits and anti-exposure 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 a reduction in strength and/or loss of watertightness with age.

2 The Guidelines for monthly shipboard inspection of immersion suits and anti-exposure suits (MSC/Circ.1047) are very helpful in identifying obvious problems with a suit, but do not adequately address deterioration of seams and closures (zippers, etc.) which may not be readily apparent by visual inspection. Such deterioration can be detected by pressurization of the suit with air, and testing of the seams and closures for leaks with a soapy water solution.

3 To ensure the maintenance of adequate strength and watertightness of seams and closures of immersion suits and anti-exposure suits with age, it is recommended that each suit be subjected to an air pressure test such as the following, at intervals not exceeding three years, or more frequently for suits over ten years of age:

- .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 - and each seam, 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 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.

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MSC/Circ.1114

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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 and anti-exposure 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.

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MSC.1/Circ.1278
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GUIDANCE ON WEARING IMMERSION SUITS IN TOTALLY ENCLOSED LIFEBOATS

1 The Maritime Safety Committee, at its eighty-fourth session (7 to 16 May 2008), considered the recommendations made by the Sub-Committee on Ship Design and Equipment at its fifty-first session, with regard to potential risks of overheating and dehydration associated with the wearing of immersion suits inside totally enclosed lifeboats, and approved the following guidance.

2 Experience gained during the January 2007 abandonment of the containership **MSC Napoli** during a winter storm in the English Channel highlighted the potential risks of wearing of immersion suits in totally enclosed lifeboats. Although outside temperatures were frigid, a number of crew wearing immersion suits suffered from overheating and dehydration. In document DE 51/INF.8, the Republic of Korea reported similar experience with immersion suits worn during abandon ship drills in moderate conditions, where crew experienced discomfort in a very short period of time, due both to overheating and to interference with seating arrangements.

3 Totally enclosed lifeboats have long been considered to provide adequate protection from hypothermia without the need for the occupants to wear immersion suits. The revised SOLAS regulation III/32 (as amended by resolution MSC.152(78)) requires to carry immersion suits for all persons on board cargo ships, regardless of carriage of totally enclosed lifeboats, stemming from reports of casualties in which the ship sank too quickly for crew to access the lifeboats. Immersion suits were required in order to ensure that thermal protection is available in the event that members of the crew are unable, for whatever reason, to embark on the lifeboats.

4 In general, immersion suits should not be worn when boarding totally enclosed lifeboats. While abandon ship drills are a good opportunity to examine and demonstrate the use of immersion suits, crew training during these drills should emphasize that immersion suits are intended primarily to ensure thermal protection in cases where the totally enclosed lifeboat cannot be embarked on.

5 Member Governments are invited to use the aforementioned guidance and to bring it to the attention of all parties concerned.

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ANNEX**UNIFIED INTERPRETATION OF SOLAS REGULATION III/31.1.4****Arrangements for remotely located survival craft**

1 Liferrafts required by SOLAS regulation III/31.1.4 should be regarded as "remotely located survival craft" with regard to SOLAS regulation III/7.2.1.4.

2 The area where these remotely located survival craft are stowed should be provided with:

- .1 a minimum number of two lifejackets and two immersion suits;
- .2 adequate means of illumination complying with SOLAS regulation III/16.7, either fixed or portable, which should be capable of illuminating the liferaft stowage position, as well as the area of water into which the liferaft should be launched; portable lights, when used, should have brackets to permit their positioning on both sides of the vessel; and
- .3 an embarkation ladder or other means of embarkation enabling descent to the water in a controlled manner¹ as per SOLAS regulation III/11.7.

3 With regard to the distance between the embarkation station and stowage location of the liferaft as required by SOLAS regulation III/31.1.4 (remotely located survival craft), the embarkation station should be so arranged that the requirements of regulation III/13.1.3 can be satisfied.

4 Exceptionally, the embarkation station and stowage position of the liferaft (remotely located survival craft) may be located on different decks provided that the liferaft can be launched from the stowage deck using the attached painter to relocate it to the embarkation ladder positioned on the other deck (traversing a stairway between different decks with the liferaft carried by crew members is not acceptable).

5 Notwithstanding paragraph 2, where the exceptional cases mentioned in paragraph 4 exist, the following provisions should be applied:

- .1 the lifejackets and the immersion suits required by paragraph 2.1 may be stowed at the embarkation station;
- .2 adequate means of illumination complying with paragraph 2.2 should also illuminate the liferaft stowage position, embarkation station and area of water where the liferaft is to be embarked;
- .3 the embarkation ladder or other means of embarkation as required by paragraph 2.3 may be stowed at the embarkation station; and
- .4 notwithstanding the requirements in paragraph 4.1.3.2 of the LSA Code, the painter should be long enough to reach the relevant embarkation station.

¹ Controlled manner: a knotted rope is not acceptable for this purpose.