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COVER NOTE

From:	Secretary-General of the European Commission, signed by Mr Jordi AYET PUIGARNAU, Director
date of receipt:	11 February 2019
To:	Mr Jeppe TRANHOLM-MIKKELSEN, Secretary-General of the Council of the European Union
No. Cion doc.:	SWD(2019) 24 final
Subject:	COMMISSION STAFF WORKING DOCUMENT For the Council Shipping Working Party IMO - Union submission to be submitted to the 101st session of the Committee on Maritime Safety (MSC 101) of the IMO in London from 5 – 14 June 2019 concerning a proposal for a new output to review the LSA Code and Resolution MSC.81(70) to address the in-water performance of SOLAS lifejackets

Delegations will find attached document SWD(2019) 24 final.

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Brussels, 11.2.2019
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COMMISSION STAFF WORKING DOCUMENT

For the Council Shipping Working Party

IMO - Union submission to be submitted to the 101st session of the Committee on Maritime Safety (MSC 101) of the IMO in London from 5 – 14 June 2019 concerning a proposal for a new output to review the LSA Code and Resolution MSC.81(70) to address the in-water performance of SOLAS lifejackets

COMMISSION STAFF WORKING DOCUMENT
For the Council Shipping Working party

IMO - Union submission to be submitted to the 101st session of the Committee on Maritime Safety (MSC 101) of the IMO in London from 5 – 14 June 2019 concerning a proposal for a new output to review the LSA Code and Resolution MSC.81(70) to address the in-water performance of SOLAS lifejackets

PURPOSE

The document in Annex contains a draft Union submission to the 101st session of the Committee on Maritime Safety (MSC 101) of the IMO, taking place in London from 5 – 14 June 2019, concerning a proposal for a new output to review the LSA Code and Resolution MSC.81(70) to address the in-water performance of SOLAS lifejackets. It is hereby submitted to the appropriate technical body of the Council with a view to achieving agreement on transmission of the document to the IMO prior to the required deadline of 5 March 2019[1].

Lifejackets are included in Commission Implementing Regulation (EU) 2018/773 of 15 May 2018 on design, construction and performance requirements and testing standards for marine equipment and repealing Implementing Regulation (EU) 2017/306[2]. Reference is made in that Implementing Regulation to the LSA Code and to resolution MSC.81(70) in relation to item MED/1.4 as regards lifejackets. This equipment therefore falls in the scope of Directive 2014/90/EU of the European Parliament and of the Council of 23 July 2014 on marine equipment and repealing Council Directive 96/98/EC[3] and therefore the said draft Union submission falls under EU exclusive competence.

1 The submission of proposals or information papers to the IMO, on issues falling under external exclusive EU competence, are acts of external representation. Such submissions are to be made by an EU actor who can represent the Union externally under the Treaty, which for non-CFSP (Common Foreign and Security Policy) issues is the Commission or the EU Delegation in accordance with Article 17(1) TEU and Article 221 TFEU. IMO internal rules make such an arrangement absolutely possible as regards existing agenda and work programme items. This way of proceeding is in line with the General Arrangements for EU statements in multilateral organisations endorsed by COREPER on 24 October 2011.

2 OJ L 133, 30.5.2018, p. 1.

3 OJ L 257, 28.8.2014, p. 146.

MARITIME SAFETY COMMITTEE
101th Session
Agenda Item 21

MSC 101/21/x
Date 05/03/2019
Original: English

WORK PROGRAMME

Proposal for a new output to review the LSA Code and Resolution MSC.81(70) to address the in-water performance of SOLAS lifejackets

Submitted by European Commission on behalf of the European Union

SUMMARY

Executive Summary:	Compelling evidence obtained shows that the IMO requirements for the design and testing of lifejackets will not provide consistent assurance of the in-water performance of SOLAS lifejackets. This paper proposes the establishment of a new Output for the Committee to review the in-water performance of SOLAS lifejackets.
Strategic Direction: if applicable	Other Work
Output:	Not yet assigned
Action to be taken:	Paragraph 34
Related documents:	Resolution A.1111(30), MSC-MEPC.1/Circ.5, MSC-MEPC.7/Circ1, and MSC 101/xx/INF.xx

1. This paper is submitted in accordance with MSC-MEPC.1/Circ.5 "Organization and Method of Work of the Maritime Safety Committee and the Marine Environment Protection Committee and their Subsidiary Bodies" on the submission of proposals for new Outputs

Introduction

2. Evidence has been obtained which shows that the IMO requirements for the design and testing of lifejackets may not provide assurance of the in-water performance of SOLAS lifejackets.

Background

3. In July 2017 the United Kingdom's Marine Accident Investigation Branch reported on the deaths of three seafarers who had drowned whilst wearing SOLAS lifejackets. The sea and environmental conditions were calm, however these seafarers were found by the rescue services in a face down position.

4. After a detailed review to confirm that these lifejackets held valid approval documentation and to confirm that the approval tests were conducted in the correct manner, an investigatory group was assembled to identify the root causes affecting the in-water performance of these lifejackets. The investigatory group was chaired by the United

Kingdom's Maritime & Coastguard Agency and consisted of members from the Maritime Accident Investigation Branch, the Royal National Lifeboat Institution, the International Life-saving Appliance Manufacturers' Association (ILAMA) and technical experts on human physiology and sea survival.

5. The investigatory group was primarily tasked with reviewing the capability of a SOLAS lifejacket to retain a person's airways clear of the water and the level of safety offered by existing SOLAS lifejackets. In total, the investigatory group conducted three ordered sets of in-water lifejacket tests against the requirements within the LSA Code and Resolution MSC.81(70), which included 2856 righting tests and 1060 freeboard measurements.

6. The group recognised during these investigations that there is a strong correlation between the clothing worn by a person and the in-water performance provided by a lifejacket, and that the current IMO requirements do not consider the effects of clothing. The final set of in-water testing was performed using eight SOLAS lifejackets and 14 test subjects wearing standardised clothing. 10 out of the 14 test subjects recorded one or more test results where they would not turn to clear their airways of the water surface. Another portion of test subjects would turn in a time which exceeded the 5 second original requirement from Resolution MSC.81(70) (before adoption of the amendments to the revised recommendation on testing of life-saving appliances contained within MSC200(80)).

7. Based on this technical evidence the investigatory group concluded that the international requirements for the design and testing of lifejackets within the LSA Code and Resolution MSC.81(70) did not provide consistent assurance of the in-water performance of SOLAS lifejackets. The investigatory group developed proposals which would alleviate the issues which had been identified, including a proposal to incorporate a new in-water test with a form of standardised clothing to be worn by the test subjects. The investigatory group made formal assessments of the repeatability of the in-water tests by repeating many of the tests on two occasions and by comparing results which were obtained from previous in-water tests using the reference test device (RTD). This work concluded with verification testing of these proposals against eight SOLAS lifejackets, which showed that an acceptable performance may already be achieved by some existing SOLAS lifejackets.

IMO objectives

8. Within the IMO's mission statement we strive to promote safe shipping by adopting the highest practicable standards of maritime safety. The evidence gathered whilst reviewing the in-water performance of SOLAS lifejackets has indicated that improvements are necessary to maintain this highest practicable standard to ensure maritime safety.

Need

9. All SOLAS vessels are required to provide a lifejacket for every person on board which complies with the requirements of the LSA Code. Lifejackets are associated mainly with abandonment, however they are also utilised as a safety measure in many scenarios on board of SOLAS vessels; including survival craft drills, operations on a weather deck, tendering operations & crew transfer operations or any other activity where there is a greater risk of a person entering the water. If a person enters the water, there is general expectation that a SOLAS lifejacket can maintain a person's airways clear of the water surface.

10. MSC 101/INF.X contains a timeline of events which were conducted to assess the in-water performance of SOLAS lifejackets. This evidence supports that achieving a baseline performance equivalent to that provided by the reference test device will not guarantee an

acceptable level of in-water performance for a lifejacket when used in an emergency situation.

Analysis of the Issue

11. During the gathering of evidence and from consultations with stakeholders, the investigatory group became aware that some stakeholders believed that a lifejacket would maintain the airways clear of the water and right a person regardless of the subject's physical attributes, or anything that might be worn on their body. The IMO does not currently issue guidance with respect to the in-water performance of lifejackets, however the development of such an MSC Circular could help stakeholders to make more informed decisions regarding the safety of persons who might be expected to be immersed in water. Similar information is already presented in another international lifejacket standard.

12. The current in-water performance of SOLAS lifejackets has been the subject of detailed deliberations. During these deliberations many options were considered for how to rectify the perceived issues with in-water performance of a lifejacket. The investigatory group deemed it impossible to improve the in-water performance by simply applying a single "safety factor" to the existing requirements within the LSA Code and Resolution MSC.81(70) and hence the group concluded that a number of amendments must be established jointly. The proposal measures detailed below have been carefully considered so that collectively they achieve the necessary enhancements to lifejacket performance and to the safety of persons immersed in water.

1. To provide lifejacket end users with an enhanced understanding of the capabilities of a lifejacket, it is necessary to introduce a new requirement for SOLAS lifejackets to be marked with important safety information and manufacturer's details. Such information may include simple donning instructions or the proven compatibility of the lifejacket with other safety equipment. This requirement already exists within ISO 12402: Personal Flotation Devices, and such markings are common on other safety equipment.

2. The existing in-water testing requirements for turning time allow a "no-turn" result to be recorded by a lifejacket if the same test subject also recorded a "no-turn" whilst wearing the RTD (reference test device). It is proposed that this provision should no longer be permitted, and in the event that a test subject records a "no turn" in a lifejacket, a two-test subject substitution method should be employed. If either of these two test subjects also records a "no turn" then the lifejacket will have failed.

3. Instances have been identified when a lifejacket has turned a test subject to a position where the mouth is clear of the water, however the test subject has not concluded the test in a face-up position. It is believed that the righting test should only be deemed successful if the test subject subsequently attains the safe static balance, face-up position.

4. The in-water testing conducted by the investigatory group was conducted against the RTD and eight samples of existing SOLAS lifejackets. The RTD is used within all SOLAS in-water performance tests as a comparative testing tool for righting performance as well as freeboard and static balance measurements. The RTD has an inherent buoyancy of approximately 148 Newton however with test subjects wearing standardised clothing the RTD has shown a questionable in-water performance.

5. The eight existing SOLAS lifejackets had buoyancy values of 137, 147, 156, 173, 179, 180, 187, 191 Newton. The investigatory group concluded that there is a correlation between the buoyancy of a lifejacket and its in-water performance, and that this correlation is already the fundamental basis for performance levels within ISO 12402. Two of the tested lifejackets presented an in-water performance in clothing which achieved both the righting and static balance assessment criteria without recording no-turns. These lifejackets provided 173 Newton and 191 Newton of inherent buoyancy. After reviewing the results from the other lifejackets, it is believed that to attain an acceptable in-water performance level for SOLAS lifejackets, it would certainly not be possible to achieve this with a buoyancy value of less than 150 Newtons. In order to align with other industry standards such as ISO 12402 and so ensure that lifejacket designs are not unduly restricted, this minimum buoyancy value should be introduced.

6. As highlighted by the initial discussions of the investigatory group, the existing SOLAS in-water performance tests for lifejackets are conducted with test subjects wearing swimwear, and that this condition is not representative of a real emergency scenario. The subsequent testing by the group has repeatedly shown that the wearing of clothing has a substantial effect on the in-water righting performance of a lifejacket, and therefore it is proposed that an extra requirement is introduced for SOLAS lifejackets to turn an unconscious, face-down persons in the water to a position where the mouth is clear of the water in an average time not exceeding 5 seconds, whilst wearing standardised clothing. This test will be conducted as a new test, in addition to the current righting tests conducted against the RTD. To support this proposal, a new definition is introduced for the standardized clothing within a draft new Annex 4 to Resolution MSC.81(70).

13. The proposals detailed above, and the performance increases that they provide can be implemented using simple amendments to the existing provisions within SOLAS as shown in the Annex to this paper. Further, these amendments were verified by the testing of eight existing SOLAS lifejackets which showed that there are lifejackets currently available on the market and currently carried on SOLAS vessels which already achieve this improved performance. It should be noted that the investigatory group considers that the proposed actions achieve the necessary improvements for in-water performance when they are applied collectively.

14. During the work of the investigatory group, attention was drawn to the general requirements for life-saving appliances within chapter 1.2 of the LSA Code which requires all life-saving appliances, “if they are to be used in a seaway, be capable of satisfactory operation in that environment.” On this basis, the investigatory group highlighted two additional misalignments between the LSA Code and industry standards, one related to the fitting of spray hoods and the other fitting of retention devices. The investigatory group gathered evidence which strongly supported the introduction of these components to improve the safety level offered by SOLAS lifejackets and hence these are proposed as follows:

1. A retention device is intended to provide additional support to prevent the lifejacket riding upwards over the wearers head in a seaway and thereby promote the correct static balance position and freeboard measurement for the airways. The existing in-water tests are conducted in calm fresh water and hence the only method of currently assessing the lifejacket securing mechanism(s) is via the 1 metre jump test. A new requirement should be introduced for SOLAS lifejackets to be fitted with a retention device.

2. In the event that a person enters the water in a seaway and that the person successfully rights into a face-up position with adequate freeboard, the next hierarchal survival needs are for the person to be able to breathe comfortably without water ingress into their airways and for them to be able to observe their surroundings to seek rescue. Spray hoods can be a simple addition to a lifejacket and can be paramount to a person's survival when they tire and cannot prevent the natural orientation of their body to the direction of the waves. It is proposed that a new requirement is introduced for SOLAS lifejackets to be fitted with a spray hood with reference to existing industry standards.

Analysis of implications

15. As discussed in paragraph 11, the proposed MSC Circular on "Guidance on the in-water performance of lifejackets and considerations to be taken into account when selecting a lifejacket" would result in an improved understanding of the performance of a SOLAS lifejacket and would have no additional costs or administrative burdens associated with its implementation. An improved stakeholder understanding will ensure that unrealistic expectations are not placed on the capabilities of a lifejacket, and hence there would be an increase to the safety of life at sea.

16. The proposals in this document which seek to amend the standards for design and testing of lifejackets within the LSA Code and Resolution MSC.81(70) were tested by the investigatory group using eight existing SOLAS lifejackets. This data has provided an initial verification of the proposals within this paper, however it is envisaged that further verification testing may be deemed necessary in the future at IMO approved test houses; such verification testing was conducted for previous amendments to the IMO lifejacket standards.

17. The proposals in this document would require manufacturers to test their lifejackets at IMO approved test houses against the amended requirements. As noted previously, two of the eight lifejackets passed all of the proposed in-water tests and it is expected that there may be several SOLAS lifejackets already on the market which would also pass these tests. There are however other lifejackets which may require manufacturers to modify their designs to improve the in-water performance before they are able to pass these tests. The procedures followed by the manufacturer to seek testing and approval would not change.

18. With the addition of new safety features for spray protection and retention of the lifejacket, there is expected to be a small cost implication for revising the existing lifejacket standards. It is expected that the approval of a spray hood and a retention device would incur costs to the manufacturer of approximately 2000 Euros, with the subsequent cost to the end user being under 10 Euros per lifejacket. It should be noted that a number of SOLAS lifejackets are already fitted with spray hoods and retention devices, with some manufacturers choosing to offer these as optional extras.

19. For existing ships, the risk of not taking any action is recognised, and it is therefore proposed that a phase out period for existing SOLAS lifejackets is applied starting from [2024]. After this date, existing ships may be required to carry new lifejackets after the date of their first dry-docking. There is a possibility that some lifejacket designs may increase in size and this may need to be considered by the owner/operator of an existing ship.

20. The administrative requirements and burdens checklist is included in Annex D to this document.

Benefits

21. The output proposed by this document will present improvements to the safety of life at sea by preventing drownings and in general enhancing the in-water performance of lifejackets to mitigate the risks associated with one or more seafarers becoming immersed in water whilst wearing SOLAS lifejackets.

22. The outputs proposed include amendments to the LSA Code and Resolution MSC.81(70) which will provide a greater alignment to the industry standards contained in the series of ISO 12402: Personal Flotation Devices.

23. The outputs in this paper will also raise the awareness of lifejacket users such as crew, passengers, ship operators and other maritime stakeholders so that they are better informed to make decisions regarding the safety of persons who may be at risk of being immersed in water.

Industry Standards

24. The International Organization for Standardization produced guidance on the design and application of personal flotation devices for persons engaged in activities, whether in relation to their work or their leisure, in or near water. ISO 12402: Personal Floatation Devices provides guidance on personal flotation devices and the LSA Code already utilises a reference to Part 7 of the ISO 12402 series with regards to tests of components other than buoyancy materials and tensile strength tests.

25. The ISO 12402 series of documents openly states that personal floatation devices "manufactured, selected, and maintained to this standard should give a reasonable assurance of safety from drowning to a person who is immersed in water." ISO 12402 also defines lifejackets as those personal flotation devices "which provide face up in-water support to the user regardless of physical conditions."

26. When reviewing the expectation of maritime stakeholders with respect to the in-water performance of SOLAS lifejackets, it was acknowledged that the ISO 12402 series explicitly states several of the issues, such as the wearing of heavy weather clothing, which may impact the performance of lifejackets.

27. It should also be recognised that for an adult of mass above 70kg, ISO 12402 considers 150 Newtons buoyancy as being the smallest size for a lifejacket to "turn an unconscious person into a safe position and requires no subsequent action by the user to maintain this position."

28. The proposed outputs within this paper have been considered with respect to the requirements within ISO 12402 and have been aligned to these international standards wherever possible.

29. There is awareness that ISO 12402 includes a standard for a 275 Newton lifejacket which has a much improved in-water performance compared to the existing SOLAS lifejacket standard. Lifejackets with this volume of buoyancy are invariably of the gas inflation type. It is acknowledged that although gas inflation lifejackets provide several benefits, including those related to in-water performance, there are some compromises such as the requirement for annual servicing and the increased complexity when compared with inherent buoyant foam lifejackets.

Output

30. To promote safe shipping through adoption of the highest practicable standards of maritime safety, by ensuring a suitable in-water performance of lifejackets for the safety of seafarers, it is proposed that the following outputs are considered:

1. Development of an MSC Circular on “Guidance on the in-water performance of lifejackets and considerations for selection of a lifejacket” which could be completed in one session of the Ship Systems and Equipment sub-committee if the draft text in Annex A is used as the basis for further discussion;
2. Development of amendments to the life-saving appliances code and the revised recommendation on testing of life-saving appliances to implement the proposals in paragraph 122. These amendments could be finalised in two sessions of the Ship Systems and Equipment sub-committee if the draft text provided in Annex B and Annex C is used as the basis for further discussion;

3. Development of consequential amendments to MSC/Circ.980 in collaboration with the existing output on Revision of the Standardized life-saving appliance evaluation and test report forms (MSC/Circ.980 and addenda).

31. **Human Element**

32. A completed Checklist for considering human element issues by IMO bodies (MSC-MEPC.7/Circ.1) is attached at Annex E.

Urgency

33. Based on the information provided in this paper and the supporting evidence provided in MSC 101/INF.X, it is considered that revision of the existing standards for the design and testing of lifejackets is an urgent requirement and it is therefore requested that consideration is given for inclusion of this new work item in the current work programme for the next biennial agenda. Accordingly, this item should be passed to the sixth session of the Ship Systems and Equipment sub-committee in 2020.

Action Required

34. It is proposed that the Committee establish a new output on its Work Programme for the next biennium, for coordination by the Sub-Committee on Ship Systems and Equipment, on "Review of the LSA Code and Resolution MSC.81(70) to address the in-water performance of SOLAS lifejackets“, with 2 sessions required to complete.

Action requested of the Committee

35. The Committee is invited to consider the information provided above and the proposal for a new output in paragraph 344.

Annex A

MSC Circular on "Guidance on the in-water performance of lifejackets and considerations for selection of a lifejacket"

Requirements for lifejackets on large, commercial seagoing ships; for offshore work and emergency abandonment are regulated by the International Maritime Organization (IMO) under the International Convention for the Safety of Life at Sea (SOLAS).

SOLAS Lifejackets manufactured, selected, and maintained to this standard should give a reasonable assurance of safety from drowning and self-righting to a person who is immersed in water.

The buoyancy of a lifejacket can be provided by a wide variety of materials or designs, (e.g. inflation of chambers by gas from a cylinder or inherent buoyancy).

There are a number of levels of support, types of buoyancy, activation methods for inflatable devices, and auxiliary items (such as location aids), all of which will affect the user's probability of survival. Hybrid lifejackets always provide some buoyancy but rely on the same methods as inflatable lifejackets to achieve full buoyancy. With inherently buoyant lifejackets, the user only needs to put the lifejacket on to achieve the performance. In every circumstance, the user should ensure that the operation of the PFD is suited to the specific application.

The conformity of a lifejacket to SOLAS does not imply that it is suitable for all circumstances.

The relative amount of required inspection and maintenance is another factor of paramount importance in the choice and application of specific lifejackets.

This Circular is intended to serve as a guide to manufacturers, purchasers, and users of such safety equipment in ensuring that the equipment provides an effective standard of performance in use.

The primary function of a lifejacket is to support the user with a reasonable degree of safety in the water. Within the different types, alternative attributes make some lifejackets better suited to some circumstances than others, or make them easier to use and care for than others. Important alternatives allowed by SOLAS are the following:

— to provide higher levels of support (e.g. buoyancy levels nearer to 275 Newtons) that generally float the user with greater water clearance, when required for increasingly severe conditions; or to provide lighter or less bulky lifejackets (e.g. lifejackets with buoyancy levels nearer to 150 Newtons);

— to provide the kinds of flotation (inherently buoyant foam, hybrid, and inflatable) that will accommodate the sometimes conflicting needs of reliability and durability, in-water performance, and continuous wear;

— to provide automatically operating (inherently buoyant or automatically inflated) lifejackets that float users without any intervention on their part, except in initially donning the lifejacket (and regular inspection and rearming of inflatable types), or to provide user control of the inflatable lifejackets; and

- to assist in detection (location aids such as a light; whistle, retro-reflectors) and recovery of the user.

Lifejackets provide various degrees of buoyancy in garments that are light in weight and only as bulky and restrictive as needed for their intended use. They will need to be secure when worn, in order to provide positive support in the water and to allow the user to swim or actively assist herself/himself or others.

The lifejacket selected ensures that the user is supported with the mouth and nose clear of the water under the expected conditions of use and the user's ability to assist.

Under certain conditions (such as rough water and waves), the use of watertight and multilayer clothing, which provide (intentionally or otherwise) additional buoyancy, or the use of equipment with additional weight (such as tool belts) will likely alter the performance of the lifejacket. Users, owners and employers need to ensure that this is taken into account when selecting a lifejacket.

Similarly, lifejackets may not perform as well in extremes of temperature.

Lifejackets may also be affected by other conditions of use, such as chemical exposure and welding, and may require additional protection to meet the specific requirements of use. If the user intends exposing a lifejacket to such conditions, she/he should be assured that the lifejacket will not be adversely affected.

A lifejacket can also be an integral part of a safety harness, or an integral part of a garment with other uses, for example to provide thermal protection during immersion, in which case the complete assembly as used is required to conform to SOLAS and be appropriate for the selected end use.

In considering the attributes required of a lifejacket, consideration should also be given to the potential length of service and level of wear that the user might expect. Whilst a lifejacket needs to be of substantial construction and materials, its potential length of service often depends on the conditions of use and storage, which are the responsibility of the owner, user and/or employer. Appropriate procedures should be in place to verify the condition of lifejackets and the need for repair or replacement.

Furthermore, whilst the performance tests included in the SOLAS requirements are believed to assess relevant aspects of performance in real-life use, they do not accurately simulate all conditions of use. For example, the fact that a device passes the self-righting tests in swimming attire, as described herein, does not guarantee that it will self-right an unconscious user wearing clothing; neither can it be expected to completely protect the airway of an unconscious person in rough water; neither can it be guaranteed to be compatible with other LSA such as survival craft.

Waterproof or buoyant clothing, such as oil skins; floatation suits; dry suits; immersion suits, can trap air and further impair the self-righting action of a lifejacket.

It is essential that owners, users and employers choose those lifejackets that meet the correct performance level for the circumstances in which they will be used, and it may be deemed necessary to conduct in-water tests with individuals wearing their normal working attire such as clothing, personal protective equipment and tools. Changes to the operational use of a lifejacket may require a reassessment of the in-water performance.

Owners, employers and users should consult maritime administrations, manufacturers and those selling lifejackets for advice regarding the product properties, alternative choices and the limitations to normal use, prior to the purchase of such lifejackets.

Similarly, those framing legislation regarding the use of these garments should consider carefully which class and performance levels are most appropriate for the foreseeable conditions of use, allowing for the higher risk circumstances. These higher risk circumstances should account for the highest probabilities of occurrence of accidental immersion and the expected consequences in such emergencies.

Annex B

Amendments to the International Life-Saving Appliance (LSA) Code, resolution MSC.48(66), as amended by MSC.368(93), MSC.320(89), MSC.81(70) and A.520(13).

2.2 Lifejackets

2.2.1 *General requirements for lifejackets*

2.2.1.1 Lifejackets shall maintain a minimum buoyancy of 150 Newton for the duration of the buoyancy test as detailed in the recommendations of the Organization.

2.2.1.~~1~~2 A lifejacket shall not sustain burning or continue melting after being totally enveloped in a fire for a period of 2 s.

2.2.1.3 Lifejackets shall be marked with the following information:

.1 Identification of the manufacturer or representative and their mailing address;

.2 The size range of the lifejacket, e.g. range of chest girth and user's body mass;

.3 The buoyancy provided in Newtons;

.4 Simple instructions for use, including donning and adjustment instructions;;

.5 The manufacturer's model, designation, serial number, and month and year of manufacture. NOTE Months are given as Arabic numerals (1 to 12), starting from 1st January.

.6 Pictograms or words indicating other risks catered for or not provided for;

.7 The text “Do not use as a cushion”;

.8 The text “Train yourself in the use of the device”;

.9 A space where servicing dates can be marked,

.10 Compatibility with the intended safety harnesses, clothing or additional equipment as relevant - specific equipment to be listed;

.11 The text “Full performance may not be achieved using waterproof clothing or in other circumstances. Refer to the leaflet”;

.12 Storage, care, cleaning and maintenance instructions in brief;

2.2.1.4 In addition to the requirements of 2.2.1.3, inflatable lifejackets shall also be marked with the following information:

.1 a statement that it is not a lifejacket until fully inflated;

.2 the correct filled gas mass of the cylinder (in g). This information shall appear near the place where the cylinder is actually fitted;

.3 a warning that gas cylinders are dangerous goods, and that they shall be kept away from children and not misused;

.4 The text “WARNING. Freezing temperatures will affect the performance of the lifejacket and oral top up may be required after the gas cylinders have been discharged. Refer to leaflet".

2.2.1.~~2~~5 Lifejackets shall be provided in three sizes in accordance with table 2.1. If a lifejacket fully complies with the requirements of two adjacent size ranges, it may be marked with both size ranges, but the specified ranges shall not be divided. Lifejackets shall be marked by either weight or height, or by both weight and height, according to table 2.1.

Table 2.1 – Lifejacket sizing criteria

Lifejacket marking	Infant	Child	Adult
User’s size:			
Weight (kg)	less than 15	15 or more but less than 43	43 or more
Height (cm)	less than 100	100 or more but less than 155	155 or more

2.2.1.~~3~~6 If an adult lifejacket is not designed to fit persons weighing up to 140 kg and with a chest girth of up to 1,750 mm, suitable accessories shall be available to allow it to be secured to such persons.

2.2.1.~~4~~7The in-water performance of a lifejacket shall be evaluated by comparison to the performance of a suitable size standard reference lifejacket, i.e. reference test device (RTD) complying with the recommendations of the Organization.[4]

2.2.1.~~5~~8 An adult lifejacket shall be so constructed that:

.1 at least 75% of persons who are completely unfamiliar with the lifejacket can correctly don it within a period of 1 min without assistance, guidance or prior demonstration;

.2 after demonstration, all persons can correctly don it within a period of 1 min without assistance;

.3 it is clearly capable of being worn in only one way or inside-out and, if donned incorrectly, it is not injurious to the wearer;

.4 the method of securing the lifejacket to the wearer has quick and positive means of closure that do not require tying of knots;

.5 it is comfortable to wear; and

4 Refer to the Revised Recommendation on testing of life-saving appliances (resolution MSC.81(70)), as amended.

.6 it allows the wearer to jump into the water from a height of at least 4.5 m while holding on to the lifejacket, and from a height of at least 1m with arms held overhead, without injury and without dislodging or damaging the lifejacket or its attachments.

2.2.1.~~6~~9 When tested according to the recommendations of the Organization on at least 12 persons, adult lifejackets shall have sufficient buoyancy and stability in calm fresh water to:

.1 lift the mouth of exhausted or unconscious persons by an average height of not less than the average provided by the adult RTD minus 10 mm;

.2 turn the body of unconscious, face-down persons in the water to a position where the mouth is clear of the water in an average time not exceeding that of the RTD plus 1 s. , ~~with the number of persons not turned by the lifejacket no greater than that of the RTD; The~~ person should finish in a face-up position.

.3 incline the body backwards from the vertical position for an average torso angle of not less than that of the RTD minus 10˚;

.4 lift the head above horizontal for an average faceplane angle of not less than that of the RTD minus 10°; and

.5 return at least as many wearers to a stable face-up position after being destabilized when floating in the flexed foetal position[5] as with the RTD when tested on the wearers in the same manner.

.6 turn the body of unconscious, face-down persons in the water to a position where the mouth is clear of the water in an average time not exceeding 5 seconds whilst wearing standardised clothing according to the recommendations of the Organization. The person should finish in a face-up position.

2.2.1.~~7~~10 An adult lifejacket shall allow the person wearing it to swim a short distance and to board a survival craft.

2.2.1.~~8~~11 An infant or child lifejacket shall perform the same as an adult lifejacket except as follows:

.1 donning assistance is permitted for small children and infants;

.2 the appropriate child or infant RTD shall be used in place of the adult RTD;

.3 assistance may be given to board a survival craft, but wearer mobility shall not be reduced to any greater extent than by the appropriate size RTD.

.4 for infants the jump and drop tests shall be exempted;

.5 for children, five of the nine subjects shall perform the jump and drop tests; and

.6 in lieu of paragraph 2.2.1.~~8.5~~11.5, manikins may be substituted for human test subjects.

5 Refer to the illustration on page 9 of the *IMO Pocket Guide for Cold Water Survival,* 2010 Edition, and to the Revised Recommendation on testing of life-saving appliances (resolution MSC.81(70), as amended).

2.2.1.~~9~~12 With the exception of freeboard and self-righting performance, the requirements for infant lifejackets may be relaxed, if necessary, in order to:

.1 facilitate the rescue of the infant by a caretaker;

.2 allow the infant to be fastened to a caretaker and contribute to keeping the infant close to the caretaker;

.3 keep the infant dry, with free respiratory passages;

.4 protect the infant against bumps and jolts during evacuation; and

.5 allow a caretaker to monitor and control heat loss by the infant.

2.2.1.~~10~~13 In addition to the markings required by paragraph 1.2.2.9, an infant or child lifejacket shall be marked with:

.1 the size range in accordance with paragraph 2.2.1.2; and

.2 an “infant” or “child” symbol as shown in the “infant’s lifejacket” or “child’s lifejacket” symbol adopted by the Organization.[6]

2.2.1.~~11~~14 A lifejacket shall have buoyancy which is not reduced by more than 5% after 24 h submersion in fresh water.

2.2.1.~~12~~15 The buoyancy of a lifejacket shall not depend on the use of loose granulated materials.

2.2.1.~~13~~16 Each lifejacket shall be provided with means of securing a lifejacket light as specified in paragraph 2.2.3 such that it shall be capable of complying with paragraphs 2.2.1.5.6 and 2.2.3.1.3.

2.2.1.~~14~~17 Each lifejacket shall be fitted with a whistle firmly secured by a lanyard.

2.2.1.~~15~~18 Lifejacket lights and whistles shall be selected and secured to the lifejacket in such a way that their performance in combination is not degraded.

2.2.1.~~16~~19 A lifejacket shall be provided with a releasable buoyant line or other means to secure it to a lifejacket worn by another person in the water.

2.2.1.~~17~~20 A lifejacket shall be provided with a suitable means to allow a rescuer to lift the wearer from the water into a survival craft or rescue boat.

2.2.1.21 In addition to the requirements for securing arrangements in 2.2.1.5.4, a lifejacket shall be provided with a retention device to minimise displacement of the lifejacket from the original fitted position on the wearer when subject to dynamic forces such as waves.

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6 Refer to Symbols related to life-saving appliances and arrangements, adopted by the Organization by resolution A.760(18), as

amended.

2.2.1.22 A lifejacket shall be provided with a spray hood complying with the requirements of an international standard acceptable to the Organization.[7]

7 Refer to the recommendations of the International Organization for Standardization, in particular publication ISO 12402-8:2006+A1:2011 Personal flotation devices – Part 8: Accessories -Safety requirements and test methods.

Annex C

Resolution MSC.81(70) (adopted on 11 December 1998)
As amended by MSC.200(80), MSC.226(82),MSC.274(85), MSC.295(87), MSC.321(89), MSC.323(89), MSC.378(93)

2 LIFEJACKETS

2.1 Temperature cycling test

A lifejacket should be subjected to the temperature cycling as prescribed in 1.2.1 and should then be externally examined. If the buoyancy material has not been subjected to the tests prescribed in 2.7, the lifejacket should also be examined internally. The lifejacket materials should show no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical qualities.

2.2 Buoyancy test

The buoyancy of the lifejacket should be measured before and after 24 h complete submersion to just below the surface in fresh water. The difference between the initial buoyancy and the final buoyancy should not exceed 5% of the initial buoyancy. Both buoyancy measurements should be greater than 150 Newtons.

2.3 Fire test

A lifejacket should be subjected to the fire test prescribed in 1.5. The lifejacket should not sustain burning for more than 6 s or continue melting after being removed from the flames.

2.4 Tests of components other than buoyancy materials

All the materials, other than buoyancy materials, used in the construction of the lifejacket, including the cover, tapes, seams and closures should be tested to an international standard acceptable to the Organization[8] to establish that they are rot-proof, colour-fast and resistant to deterioration from exposure to sunlight and that they are not unduly affected by seawater, oil or fungal attack.

2.5 Strength tests

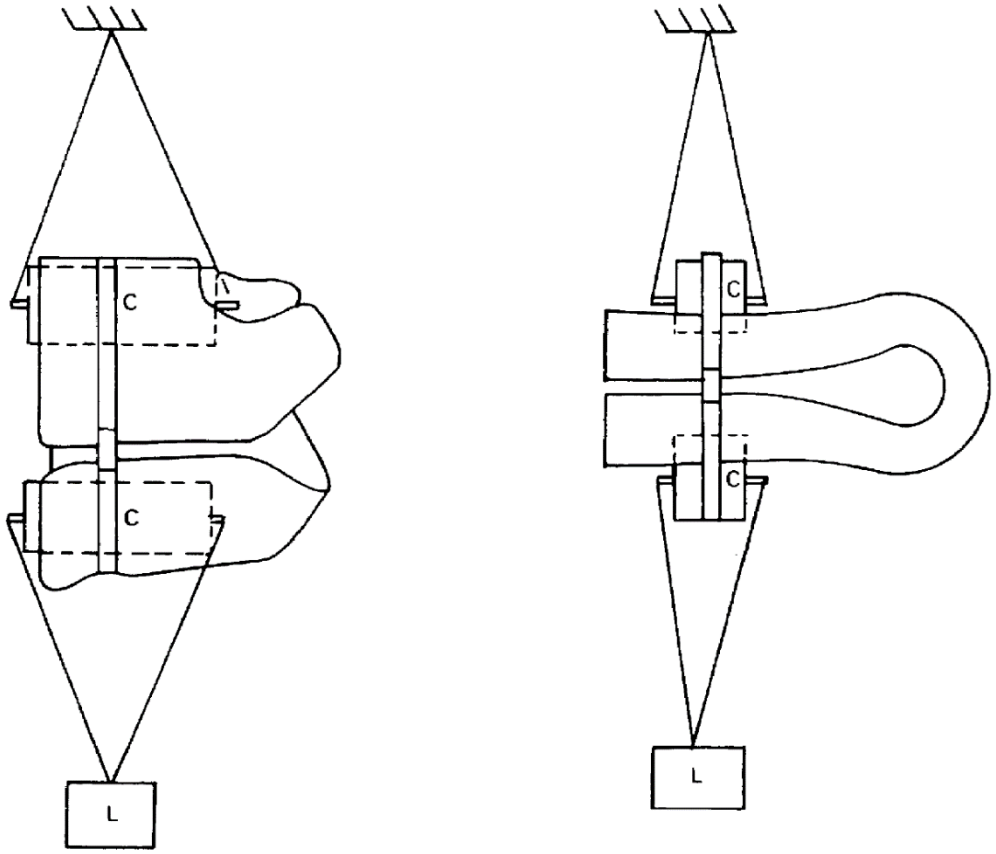
Body or lifting loop strength tests

2.5.1 The lifejacket should be immersed in water for a period of 2 min. It should then be removed from the water and closed in the same manner as when it is worn by a person. A force of not less than 3,200 N (2,400 N in the case of a child or infant-size lifejacket) should be applied for 30 min to the part of the lifejacket that secures it to the body of the wearer (see figure 1) and separately to the lifting loop of the lifejacket. The lifejacket should not be damaged as a result of this test. The test should be repeated for each encircling closure.

Shoulder lift test

8 Refer to the recommendations of the International Organization for Standardization, in particular publication ISO 12402-7:2006 *Personal flotation devices - Part 7: Materials and components - Safety requirements and test methods*.

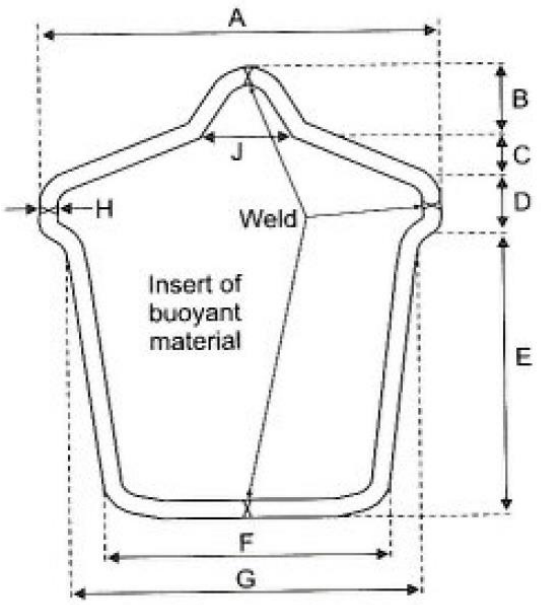
2.5.2 This test shall be conducted both with and without the ride-up prevention system correctly fitted. The lifejacket should be immersed in water for a period of 2 min. It should then be removed from the water and closed on a form as shown in figure 2, in the same manner as when it is worn by a person. A force of not less than 900 N (700 N in the case of a child- or infant-size lifejacket) should be applied for 30 min across the form and the shoulder section of the lifejacket (see figure 3). The lifejacket should not be damaged as a result of this test. The lifejacket should remain secured on the form during this test.



Vest-type lifejacket **Yoke or over-the-head-type lifejacket**

C - Cylinder
125 mm diameter for adult sizes
50 mm diameter for child sizes
L - Test load

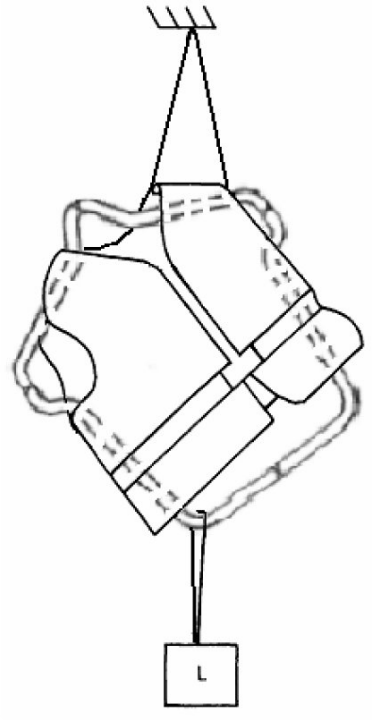
Figure 1 - Body strength test arrangement for lifejackets



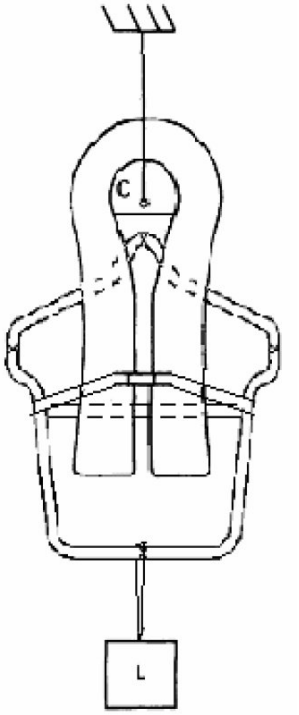
Dimensions in mm

Size	A	B	C	D	E	F	G	H	J
Adult	610	114	76.2	127	381	432	508	25.4	178
Child	508	102	76.2	102	279	330	406	22.2	152
Infant	305	63.5	38.1	63.5	191	203	241	19.1	76.2

Figure 2 - Test form for shoulder lift test for lifejackets



Vest-type lifejacket



Yoke or over-the-head-type lifejacket

C - Cylinder
125 mm diameter for adult sizes
50 mm diameter for child sizes
L - Test load

Figure 3 - Shoulder lift test arrangement for lifejackets

2.6 Tests for lifejacket buoyancy material

The tests specified in 2.6.1 to 2.6.7 should be carried out on eight specimens of each lifejacket-buoyancy material. A further four specimens of each lifejacket-buoyancy material should be prepared for the test specified in 2.6.8. The specimens should be at least 300 mm square and be of the same thickness as used in the lifejacket. In the case of kapok, the entire lifejacket should be subjected to the test. The dimensions should be recorded at the beginning and end of these tests. Where multiple layers of materials are used to achieve the total thickness desired for the lifejacket, the specimens should be of the thinnest material used.

Test for stability under temperature cycling

2.6.1 Six specimens should be subjected to temperature cycling as prescribed in 1.2.1.

2.6.2 The dimensions of the specimens (except kapok) should be recorded at the end of the last cycle. The specimens should be carefully examined and should not show any sign of external change of structure or of mechanical qualities.

2.6.3 Two of the specimens should be cut open and should not show any sign of internal change of structure.

2.6.4 Four of the specimens should be used for compression and water absorption tests, two of which should be so tested after they have also been subjected to the diesel oil test as prescribed in 1.4.

Tests for compression and water absorption

2.6.5 The tests should be carried out in fresh water and the specimens should be immersed for a period of seven days under a 1.25 m head of water.

2.6.6 The tests should be carried out:

.1 on two specimens as supplied;

.2 on two specimens which have been subjected to the temperature cycling as prescribed in 2.6.1; and

.3 on two specimens which have been subjected to the temperature cycling as prescribed in 2.6.1 followed by the diesel oil test as prescribed in 1.4.

2.6.7 The results should state the buoyant force in N which each specimen exerts when submerged in water after one and seven days' immersion. The reduction of buoyancy should not exceed 10% for specimens which have been exposed to the diesel oil conditioning and must not exceed 5% for all other specimens. The specimens should show no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical qualities.

Tensile strength test

2.6.8 The tensile strength at break of the material should be measured before and after the combined exposure described in 2.6.6.3. When tested according to an international standard acceptable to the Organization[9], the materials should have a minimum tensile strength of 140 kPa before exposure, which should not be reduced by more than 25% following the combined exposures. In the case of kapok, the protective cover should have a minimum breaking strength of 13 kPa before exposure, which should not be reduced by more than 25% following the combined exposures.

2.7 Donning test

2.7.1 To minimize the risk of incorrect donning by uninitiated persons, often in adverse conditions, lifejackets should be examined for the following features and tested as follows:

.1 fastenings necessary for proper performance should be few and simple, and provide quick and positive closure that does not require tying of knots;

9 Refer to the recommendations of the International Organization for Standardization, in particular publication ISO 12402-7:2006, Personal flotation devices – Part 7: Materials and components – Safety requirements and test methods.

.2 adult lifejackets should readily fit various sizes of adults, both lightly and heavily clad; and

.3 all lifejackets should be capable of being worn inside-out, or clearly in only one way.

Test subjects

2.7.2 These tests should be carried out with at least 12 able-bodied persons who are completely unfamiliar with the lifejacket and selected according to the heights and weights in table 2.1 and the following:

.1 small test subjects need not be adults;

.2 at least 1/3, but not more than 1/2 of test subjects should be females, including at least 1 per height category but excluding the tallest height;

.3 at least one male should be from the lowest and highest weight group and one female should be from the lowest weight group and one female should be more than 80 kg and 1.8 m;

.4 at least one subject should be selected from each cell containing a .1.; and

.5 enough additional subjects should be selected from cells containing a "X" to total the required number of test subjects, with no more than one subject per cell. A uniform distribution across weight ranges should be maintained.

Table 2.1 − Test subject selection for adult lifejackets

	Weight range – kg							
Height range (m)	40 - 43	43 - 60	60 - 70	70 - 80	80 - 100	100 - 110	110 - 120	>120
< 1.5	1	X	X	X				
1.5 - 1.6	X	1	1	X	X			
1.6 - 1.7		X	X	1	X	X		
1.7 - 1.8			X	X	1	X	X	X
1.8 - 1.9			X	X	X	1	1	X
> 1.9					X	X	X	1

Clothing

2.7.3 Each test subject should be tested wearing the clothing specified for the test and appropriate to their size as follows:

.**1** *Normal clothing* means normal indoor clothing, which would not normally interfere with the donning of a lifejacket; and

.2 *Heavy-weather clothing* means the attire appropriate for a hostile environment, including a hooded arctic parka and warm cotton gloves.

2.7.4 Each test should be timed from when the order is given until the test subject declares that donning is complete. For assessment purposes donning is considered complete when

the subject has donned and securely adjusted all methods of securing the lifejacket to the extent needed to meet the in-water performance requirements, including inflation, if needed.

Test without instruction

2.7.4.1 The test subjects may be tested individually or as a group. Wearing normal clothing, the first attempt should be with no assistance, guidance or prior demonstration. The lifejacket, with closures in the stored condition, should be placed on the floor, face up, in front of the test subject. The instruction provided should be identical for each subject and should be equivalent to the following: .PLEASE DON THIS LIFEJACKET AS QUICKLY AS POSSIBLE AND ADJUST IT TO A SNUG FIT SO YOU CAN ABANDON SHIP.. The lifejacket should be capable of being donned by at least 75 % of the subjects, and within 1 min. If a subject dons the lifejacket substantially correctly but fails to secure and/or adjust all closures, the jump test in 2.8.8 and in-water performance tests in 2.8.5 and 2.8.6 should be performed with the lifejacket as donned to establish whether the performance is acceptable and the donning is successful.

Test after instruction

2.7.4.2 For each subject whose first attempt exceeds 1 min or is incomplete, after demonstration or instruction to familiarize the subject with the donning procedure, the test subject should then don the lifejacket without assistance while wearing normal clothing, using the same instruction and timing method as in 2.7.4.1. Each subject should correctly don the lifejacket within a period of 1 min.

Heavy-weather clothing test

2.7.4.3 Each subject should then don the lifejacket without assistance while wearing heavy-weather clothing, using the same instruction and timing method as in 2.7.4.1. Each subject should don the lifejacket correctly within a period of 1 min.

2.8 Water performance tests

2.8.1 This portion of the test is intended to determine the ability of the lifejacket to assist a helpless person or one in an exhausted or unconscious state and to show that the lifejacket does not unduly restrict movement. The in-water performance of a lifejacket is evaluated by comparison to the performance of a suitable size standard reference lifejacket, i.e. Reference Test Device (RTD) as specified in appendices 1 to 3. All tests should be carried out in fresh water under still conditions. Each test for a candidate lifejacket and the relevant RTD should be conducted on the same day.

Test subjects

2.8.2 These tests should be carried out with at least 12 persons as described in 2.7.2. Only good swimmers should be used, since the ability to relax in the water is rarely otherwise obtained.

2.8.3 In the event that a “no turn” is recorded by a candidate lifejacket during righting tests within 2.8.6 or 2.8.9, the test subject which incurred the “no turn” may be replaced with two additional test subjects from the same height and weight category and in accordance with 2.7.2. No further “no turn” shall be recorded by any test subject. This provision for the replacement of a test subject may be applied on one occasion only. A no-turn is a turning

time greater than 10s for the mouth of the test subject to come clear of the water during the righting tests.

~~*Clothing*~~

~~**2.8.3** Subjects should wear only swimming costumes.~~

Preparation for water performance tests

2.8.4 The test subjects should be made familiar with each of the tests set out below, particularly the requirement regarding relaxing and exhaling in the face-down position. The test subject should don the lifejacket, unassisted, using only the instructions provided by the manufacturer. Prior to taking the measurements in 2.8 and 2.9, the proper fit, donning, and fastening of the RTD on the subject should be checked and corrected as necessary. After entering the water, care should be taken to ensure that there is no significant amount of air unintentionally trapped in the lifejacket or swimming costume.

Righting tests in swimwear

2.8.5 Subjects should wear only swimming costumes.

2.8.~~5~~6 Each test subject should assume a prone, face down position in the water, but with the head lifted up so the mouth is out of the water. The subject's feet should be supported, shoulder width apart, with the heels just below the surface of the water. After assuming a starting position with the legs straight and arms along the sides, the subject should then be instructed in the following sequence to allow the body to gradually and completely relax into a natural floating posture: allow the arms and shoulders to relax; allow the legs to relax; and then the spine and neck, letting the head fall into the water while breathing out normally. During the relaxation phase, the subject should be maintained in a stable face down position. Immediately after the subject has relaxed with the face in the water, simulating a state of utter exhaustion, the subject's feet should be released. The period of time until the mouth of the test subject comes clear of the water should be recorded to the nearest 1/10 of a second, starting from when the subject's feet are released. The above test should be conducted for a total of six times, and the highest and lowest times discarded. The test should then be conducted for a total of six times in the RTD and the highest and lowest times discarded.

Static balance measurements

2.8.~~6~~7 At the conclusion of the righting tests without making any adjustments in body or lifejacket position, measurements should be made with the subject floating in the relaxed face-up position of static balance resulting from the preceding tests. The following measurements should be made (see figure 4):

.1 freeboard − the distance measured perpendicularly from the surface of the water to the lowest point of the subject.s mouth where respiration may be impeded, if the mouth were not held shut. The lowest side of the mouth should be measured if the left and right sides are not level;

.2 faceplane angle − the angle, relative to the surface of the water, of the plane formed between the most forward part of the forehead and the chin;

.3 torso angle − the angle, relative to vertical, of the line formed by the forward points of the shoulder and hipbone (ilium portion of the pelvis); and

.4 list angle − the angle relative to the surface of the water and a line between the left and right shoulder or a line through the ears if only the head is tilted.

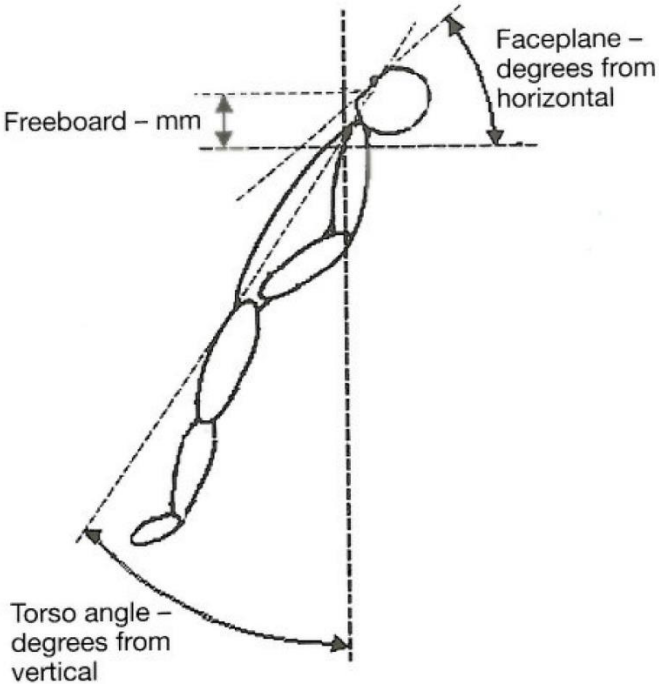


Figure 4 - Static balance measurements

Righting tests in standardised clothing

2.8.8 Subjects should wear the standardised clothing as defined in Annex 4.

2.8.9 Each test subject should perform the righting test defined in 2.8.5.

Assessment

2.8.~~7~~10 After the water tests described in 2.8.~~5~~6 ~~and .6~~ to 2.8.9 above:

.1 *Turning time in swimwear:* The average turn time for all subjects in the candidate lifejacket should not exceed the average time in the RTD plus 1 s~~,~~. ~~and the number of "no-turns", if any, should not exceed the number in the RTD~~; and at the end of each righting test each test subject should attain a face-up position;

.2 *Freeboard:* The average freeboard of all the subjects should not be less than the average for the RTD minus 10 mm;

.3 *Torso angles:* The average of all subjects. torso angles should be not less than the average for the RTD minus 10°;

.4 *Faceplane (head) angles:* The average of all subjects. faceplane angles should be not less than the average for the RTD minus 10°;

.5 *Lifejacket light location:* The position of the lifejacket light should permit it to be visible over as great a segment of the upper hemisphere as is practicable.

.6 *Turning time in standardised clothing*: The average turn time for all subjects in the candidate lifejacket should not exceed 5 s, and at the end of each righting test each test subject should attain a face-up position.

Jump and drop tests

2.8.~~8~~11 Without readjusting the lifejacket, the test subject should jump vertically into the water, feet first, from a height of at least 1 m while holding the arms over the head. Upon entering the water, the test subject should relax to simulate a state of utter exhaustion. The freeboard to the mouth should be recorded after the test subject comes to rest. The test should be repeated from a height of at least 4.5 m but, when jumping into possible injury. Upon entering the water, the test subject should relax to simulate a state of utter exhaustion. The freeboard to the mouth should be recorded after the test subject comes to rest. The lifejacket and its attachments should be examined for any damage. If injury is believed likely from any jump or drop test the lifejacket should be rejected or the test delayed until tests from a lower height or with additional precautions demonstrate that the risk from the required test is acceptable.

Assessment

2.8.~~9~~12 Following the drop test, the lifejacket should:

.1 surface the test subject in a face up position with an average freeboard for all the subjects of not less than the average determined for the RTD after the turning test in accordance with 2.8.6 minus 15 mm;

.2 not be dislodged or cause harm to the test subject;

.3 have no damage that would affect its in-water performance or buoyancy; and

.4 have no damage to its attachments.

Stability test

2.8.~~10~~13 The test subject should attain a relaxed face-up position of static balance in the water. The subject should be instructed to assume a foetal position as follows: .place your elbows against your sides, your hands on your stomach, under the lifejacket if possible, and bring your knees up as close to your chest as possible.. The subject should be rotated clockwise around the longitudinal axis of the torso by grasping the subject's shoulders or upper areas of the lifejacket so that the subject attains a 55 ± 5 degree list. The subject should then be released. The subject should return to a stable face-up position. The test should then be conducted with the subject rotated counter-clockwise. The entire test should then be repeated with the test subject wearing the RTD. The candidate lifejacket should not roll any subject face down in the water. The number of subjects who are returned to the stable face-up foetal position in the candidate lifejacket should be at least equal to the number who are returned to the stable face-up foetal position in the RTD.

Swimming and water emergence test

2.8.~~11~~14 All test subjects, without wearing the lifejacket, should attempt to swim 25 m and board a liferaft or a rigid platform with its surface 300 mm above the water surface. All test subjects who successfully complete this task should perform it again wearing the lifejacket. At least two thirds of the test subjects who can accomplish the task without the lifejacket should also be able to perform it with the lifejacket.

36. **Annex 4**

Clothing to be worn during the lifejacket righting tests in standardised clothing

1. Standardised clothing shall consist of:

.1 underwear (short sleeved, short legged);
Composition: 100 % cotton, single jersey
Weight: greater than 210 g/m^2
Thickness: greater than 1 mm

.2 shirt (long sleeved);
Composition: 100 % cotton, single jersey
Weight: greater than 220 g/m^2
Thickness: greater than 1 mm

.3 trousers (not woollen);
Composition: 100 % cotton, single jersey
Weight: greater than 450 g/m^2
Thickness: greater than 1.2 mm

.4 athletics shoes
Composition: 100 % cotton, single jersey
Weight: greater than 210 g/m^2
Thickness: greater than 1 mm

.5 woollen sweater;
Composition: at least 75% wool, at least 15% acrylic (2x2 knit)
Weight: greater than 640 g/m^2
Thickness: greater than 4 mm

.6 waterproof jacket; and
Composition: exterior shell – polyester/polyamide/polyurethane
Inner lining - polyester
Weight: greater than 500g/m^2
Thickness: greater than 2mm

.7 woollen socks;
Composition: at least 75% wool, at least 15% polyamide, at least 2% elastane (knit)
Weight: greater than 210 g/m^2
Thickness: greater than 1 mm

2. The long sleeved shirt, woollen jumper, trousers, woollen socks, waterproof jacket and training shoes shall each be provided in a full range of sizes to appropriately fit the individual sizes of test subjects in accordance with Table 2.1, such that the test subject is comfortable and is not restricted in their manoeuvrability. Clothing of different sizes shall be comparable in design and construction.

Annex D

CHECKLIST FOR IDENTIFYING ADMINISTRATIVE REQUIREMENTS AND BURDENS

The Checklist for Identifying Administrative Requirements and Burdens should be used when preparing the analysis of implications required of submissions of proposals for inclusion of unplanned outputs. For the purpose of this analysis, the terms "administrative requirements" and "burdens" are defined as in Resolution A1043(27), i.e. administrative requirements are defined as an obligation arising from future IMO mandatory instruments to provide or retain information or data, and administrative burdens are defined as those administrative requirements that are or have become unnecessary, disproportionate or even obsolete.

Instructions:

(A) If the answer to any of the questions below is **YES**, the Member State proposing an unplanned output should provide supporting details on whether the burdens are likely to involve start-up and/or ongoing costs. The Member State should also make a brief description of the requirement and, if possible, provide recommendations for further work (e.g. would it be possible to combine the activity with an existing requirement?).

(B) If the proposal for the unplanned output does not contain such an activity, answer **NR** (Not required)

1. Notification and reporting? Reporting certain events before or after the event has taken place, e.g. notification of voyage, statistical report for IMO Members, etc.	**NR** **X**	Yes • Start-up • Ongoing
Description: (if the answer is yes)		
2. Keeping statutory documents up to date, e.g. records of accidents, records of cargo, records of inspections, records of education, etc.	**NR** **X**	Yes • Start-up
Description: (if the answer is yes)		
3. Producing documents for third parties, e.g warning signs, registration displays, publication of results of testing, etc.	**NR** **X**	Yes • Start-up
Description: (if the answer is yes)		
4. Permits or applications? Applying for and maintaining permission to operate, e.g. certificates, classification society costs, etc.	**NR** **X**	Yes • Start-up
Description: (if the answer is yes)		
5. Other identified burdens?	**NR** **X**	Yes • Start-up
Description: (if the answer is yes)		

***

Annex E

CHECKLIST FOR CONSIDERING HUMAN ELEMENT ISSUES BY IMO BODIES (MSC-MEPC.7/Circ.1)

Instructions:
If the answer to any of the questions below is:
(A) YES, the preparing body should provide supporting details and/or recommendation for further work.
(B) NO, the preparing body should make proper justification as to why human element issues were not considered.
(C) NA (Not Applicable), the preparing body should make proper justification as to why human element issues were not considered applicable.

Subject Being Assessed: (e.g. Resolution, Instrument, Circular being considered)

New Unplanned Output to review the Life Saving Appliances Code and Resolution MSC.81(70).

Responsible Body: (e.g. Committee, Sub-committee, Working Group, Correspondence Group, Member State)

Maritime Safety Committee and the Sub-Committee for Ship Systems and Equipment

1.	Was the human element considered during development or amendment process related to this subject?	Yes	No	✔	NA
2.	Has input from seafarers or their proxies been solicited?	Yes	No	✔	NA
3.	Are the solutions proposed for the subject in agreement with existing instruments? (Identify instruments considered in comments section)	Yes	No	✔	NA
4.	Have human element solutions been made as an alternative and/or in conjunction with technical solutions?	Yes	No	✔	NA
5.	Has human element guidance on the application and/or implementation of the proposed solution been provided for the following:	Yes	No	✔	NA
	• Administrations?	Yes	No	✔	NA
	• Ship owners/managers?	Yes	No	✔	NA
	• Seafarers?	Yes	No	✔	NA
	• Surveyors?	Yes	No	✔	NA
6.	At some point, before final adoption, has the solution been reviewed or considered by a relevant IMO body with relevant human element expertise?	Yes	No	✔	NA
7.	Does the solution address safeguards to avoid single person errors?	Yes	No	✔	NA
8.	Does the solution address safeguards to avoid organizational errors?	Yes	No	✔	NA
9.	If the proposal is to be directed at seafarers, is the information in a form that can be presented to and is easily understood by the seafarer?	Yes	No	✔	NA
10.	Have human element experts been consulted in development of the solution?	Yes	No	✔	NA

11.	**HUMAN ELEMENT**: **Has the proposal been assessed against each of the factors below?**				
❑	CREWING. The number of qualified personnel required and available to safely operate, maintain, support, and provide training for system.	Yes	No	✔	NA
❑	PERSONNEL. The necessary knowledge, skills, abilities, and experience levels that are needed to properly perform job tasks.	Yes	No	✔	NA
❑	TRAINING. The process and tools by which personnel acquire or improve the necessary knowledge, skills, and abilities to achieve desired job/task performance	Yes	No	✔	NA
❑	OCCUPATIONAL HEALTH AND SAFETY. The management systems, programmes, procedures, policies, training, documentation, equipment, etc. to properly manage risks.	Yes	No	✔	NA
❑	WORKING ENVIRONMENT. Conditions that are necessary to sustain the safety, health, and comfort of those on working on board, such as noise, vibration, lighting, climate, and other factors that affect crew endurance, fatigue, alertness and morale.	Yes	No	✔	NA
❑	HUMAN SURVIVABILITY. System features that reduce the risk of illness, injury, or death in a catastrophic event such as fire, explosion, spill, collision, flooding, or intentional attack. The assessment should consider desired human performance in emergency situations for detection, response, evacuation, survival and rescue and the interface with emergency procedures, systems, facilities and equipment.	Yes	No	✔	NA
❑	HUMAN FACTORS ENGINEERING. Human-system interface to be consistent with the physical, cognitive, and sensory abilities of the user population.	Yes	No	✔	NA

Comments:

This proposal for a new unplanned output seeks a review of the existing standards contained within the LSA Code and Resolution MSC.81(70) for lifejackets. This review could allow for a greater alignment with the industry standards contained in ISO 12402-10:2006 Personal Flotation Devices selection and application of personal flotation devices and other relevant devices. Being a new proposal, it is not yet significantly mature to involve human element experts at this stage, however several aspects of human interaction have been assessed during the investigations.

All responses are marked as not applicable at this stage, however it is foreseen that further consideration may be given to human element issues depending on the solutions that are put forward.

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Annex F

CHECK/MONITORING SHEET FOR THE PROCESS OF AMENDMENTS TO THE CONVENTION AND RELATED MANDATORY INSTRUMENTS (PROPOSAL / DEVELOPMENT)

Part I – Submitter of the proposal (refer to section 3.2.1.1)*

1	*Submitted by (Document Number and submitter)* **[MSC 101/21/X]**
2	*Meeting session* **101st meeting of the Maritime Safety Committee**
3	*Date (date of the submission)* **[5 March 2019]**

Part II – Details of the proposed amendment(s) or new mandatory instrument (refer to sections 3.2.1.1 and 3.2.1.2)*

1	*Strategic direction*
	Other work
2	*Title of the output*
	Proposal for a new output to review the LSA Code and Resolution MSC.81(70) to address the in-water performance of SOLAS lifejackets
3	*Recommended type of amendments* (MSC.1/Circ.1481) (delete as appropriate)
	Exceptional circumstances
4	*Intended instrument(s) to be amended (SOLAS, …..)*
	The Life Saving Appliance Code and Resolution MSC.81(70)
5	*Intended application (scope, size, type, tonnage/length restriction, service (International/non-international), activity, etc.)*
The proposed amendments would apply to the construction of new lifejackets.	
6	*Application to new/existing ships (i.e. if intended to be a retro-active application)*
	The carriage of lifejackets constructed to this new standard would apply to all new ships, [with the potential to apply to existing ships].
7	*Proposed coordinating sub-committee*
	Sub-Committee on Ship Systems and Equipment (SSE)
8	*Anticipated supporting sub-committees*
	n/a
9	*Time scale for completion*
	[2019]
10	*Expected date(s) for entry into force and implementation/application*
	[1 January 2024]
11	*Any relevant decision taken or instruction given by the Committee*
	n/a

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