

INTERNATIONAL MARITIME ORGANIZATION

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REVISED STANDARDIZED LIFE-SAVING APPLIANCE EVALUATION AND TEST REPORT FORMS (PERSONAL LIFE-SAVING APPLIANCES)

1 The Maritime Safety Committee, at its 102nd session (4 to 11 November 2020), approved the *Revised standardized life-saving appliance evaluation and test report forms* (MSC.1/Circ.1628).

2 The original forms, as set forth in the *Standardized life-saving appliance evaluation and test report forms* (MSC/Circ.980) and its addenda, were developed on the basis of the requirements of the International Life-Saving Appliance (LSA) Code and the *Revised recommendation on testing of life-saving appliances* (resolution MSC.81(70)) by the Maritime Safety Committee, at its seventy-third session in 2001, with a view to providing guidance on how to conduct tests, record test data and verify tests. The Committee adopted several amendments to the LSA Code and to resolution MSC.81(70). These amendments were incorporated in the original forms which, owing to their volume, were presented in six separate circulars, i.e. MSC.1/Circ.1628, MSC.1/Circ.1629, MSC.1/Circ.1630, MSC.1/Circ.1631, MSC.1/Circ.1632 and MSC.1/Circ.1633, pertaining to the equipment addressed in chapters II to VII of the LSA Code, respectively.

3 The forms annexed to this circular apply to the equipment addressed in chapter II of the LSA Code, i.e. personal life-saving appliances (lifebuoys and associated equipment; lifejackets and associated equipment; immersion suits and associated equipment; anti-exposure suits; and thermal protective aids).

4 The Committee, at its 107th session (31 May to 9 June 2023), approved amendments to the evaluation and test report forms emanating from amendments to resolution MSC.81(70) on thermal manikin tests, for dissemination as MSC.1/Circ.1628/Rev.1.

5 The Committee, at its 108th session (15 to 24 May 2024), approved amendments to the evaluation and test report forms with respect to the in-water performance of lifejackets, emanating from amendments to the LSA Code and resolution MSC.81(70), for dissemination as MSC.1/Circ.1628/Rev.2.

6 The Committee, at its 109th session (2 to 6 December 2024), approved amendments to the evaluation and test report forms with respect to retro-reflective materials used on personal life-saving appliances. The text of the *Revised standardized life-saving appliance evaluation and test report forms (personal life-saving appliances)* is set out in the annex.

7 The use of the revised forms will continue to be of benefit to Administrations and other parties, such as manufacturers, test facilities, owners and surveyors; and will be a major help in mutually accepting the type approval of appliances approved by other Administrations.

8 Member Governments are invited to bring the annexed revised forms to the attention of all parties concerned with approving, manufacturing and testing life-saving appliances, and to encourage them to use the forms. 9 This circular applies to personal life-saving appliances installed on or after 15 August 2025.

10 This circular supersedes MSC.1/Circ.1628/Rev.2 as of 15 August 2025.

ANNEX

REVISED STANDARDIZED LIFE-SAVING APPLIANCE EVALUATION AND TEST REPORT FORMS (PERSONAL LIFE-SAVING APPLIANCES)

INTRODUCTION

Reference

These standardized life-saving appliance evaluation and test report forms have been revised on the basis of the requirements of the International Life-Saving Appliance (LSA) Code, as amended through resolution MSC.425(98), *the Revised recommendation on testing of life-saving appliances* (resolution MSC.81(70)), as amended by resolutions MSC.427(98) and MSC.544(107), and the *Recommendation on means of rescue on ro-ro passenger ships* (MSC/Circ.810).

Status

In general, the tests described in the Revised recommendation (resolution MSC.81(70)) constitute the test procedures and the LSA Code sets the acceptance criteria. The evaluation and test report forms are guidelines on how to conduct tests, record test data and verify tests. These forms are not intended to change the standards given in the LSA Code and resolution MSC.81(70), as amended. In the case of inconsistency between the forms and the LSA Code or the Revised recommendation, the text of the Code/resolution should prevail over that of the forms.

Layout

Each Administration may use electronically distributed evaluation and test report forms as the basis for customizing the layout to reflect the profile of the approving body, without changing the original contents.

Internal references

The evaluation and test report forms should be stand-alone documents. Therefore, all internal references in the original text from the LSA Code or resolution MSC.81(70) have been replaced by either the full-length text or a reference to other relevant evaluation and test report forms. However, in some of the forms, external references are kept for updating purposes.

Documentation of tests

For approval purposes, all detailed records of test data are to be enclosed with the report forms.

Verification of tests

Each test is to be verified, as passed or failed, by an Administration representative's initials (e.g. recognized organization or surveyor) and date of testing. Each page is to be verified on completion by the Administration representative's signature and its date of completion.

Reporting of type approval

To facilitate unified reporting procedures, the completed evaluation and test report forms are to be seen as a documented verification of required type approval tests for each type of equipment. When documentation of type approval is required by a third party, the verified evaluation and test report forms should constitute the complete documentation of the type approval together with the relevant approval certificates.

REVISED STANDARDIZED LIFE-SAVING APPLIANCE EVALUATION AND TEST REPORT FORMS (PERSONAL LIFE-SAVING APPLIANCES)

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2.1.1 LIFEBUOYS

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2.1.1 LIFEBUOYS

EVALUATION AND TEST REPORT

Manufacturer	
Туре	
Date	
Place	
Surveyor's name (printed)	
Signature	
Approving organization	

Lifebuoys	Model: _	lurer:	Surveyor:	
2.1.1.1	Submitted	drawings, reports and		0
			Submitted drawings and documents	Status
Drawing	g No.	Revision No. & date	Title of drawing	
			Submitted reports and documents	Status
Report/Doc	ument No.	Revision No. & date	Title of report / document	
			Maintenance Manual -	
			Operations Manual -	

Lifebuoys Manufacturer: Model: Lot/Serial Number:	Date: Surveyor: Organization:	
2.1.1.2 Quality assurance	Regulations: MSC.81(70) 2/1.1, 1.2	
Except where all appliances of a particular type are required by chapter III of the International Convention for the Safety of Life at Sea, 1974, as amended,	Quality Assurance Standard Used:	Passed/ Failed
or the International Life-Saving Appliance (LSA) Code, to be inspected, representatives of the Administration should make random inspection of	Quality Assurance Procedure:	Passed/ Failed
manufacturers to ensure that the quality of life-saving appliances and the materials used comply with the specification of the approved prototype life-saving appliance.	Quality Assurance Manual:	Passed/ Failed
Manufacturers should be required to institute a quality control procedure to ensure that life-saving appliances are produced to the same standard as the prototype life-saving appliance approved by the Administration and to keep records of any production tests carried out in accordance with the Administration's instructions.		

Lifebuoys	Model:		Date: Surveyor: Organization:		
2.1.1.3	/isual inspection		Regulations: LSA Co	de 1.2.2	
	Test Procedure	Acceptance C	Criteria	Signi	ficant Test Data
	pect the lifebuoy. Conduct ts and verify characteristics as	comparably highly visible colour on all parts where this will assist detection at sea.		Colour(s): Passed Quantity:	Failed Spacing:
Retro-reflectiv	ve tape	Fitted with approved retro-re sufficient width (approximately or on both sides of the body evenly spaced points i resolution MSC.481(102). Clearly marked with approval i organization that approved it a restrictions.	y 5 cm) applied around of the lifebuoy at four in compliance with	Width	re tape: Failed ictions? Failed

	Manufacturer:		Date:	Time:	
Model:		Surveyor:			
Lifebuoys	Lot/Serial Number:		Organization:		
2.1.1.3	Visual inspection (continued)	-	Regulations: LS	SA Code 2.1.1	
	Test Procedure	Acceptance Crite	eria	Significant Test Data	
It should be	established by measurement,	Be constructed of inherently b	ouoyant material;	Construction materials:	
weighing and	inspection that:	it should not depend upo	n rushes, cork		
		shavings or granulated cork,	any other loose	Outer diameter: mm	
		granulated material or any a		Inner diameter: mm	
		which depends on inflation for	buoyancy.		
Measure the	inner and outer diameter.			Mass: kg	
		Should have an outer diameter of not more			
		than 800 mm and an inner diameter of not		Type (description of quick release arrangement)	
Weigh the lifebuoy.		less than 400 mm		Type / description of quick release arrangement:	
If it is intended to operate the quick-release arrangement provided for a self-activated		Not designed for quick release: Should have a mass of not less than 2.5 kg		Does the lifebuoy have sufficient mass to activate the quick-release arrangement for a self-activated smoke signal and self-igniting light? Passed/ Failed	
	and self-igniting light, conduct	If it is intended to operate the quick-release			
the test in 2.1	.1.10.	arrangement provided for a self-activated		Weight: kg	
		smoke signal and self-igniting light, the lifebuoy has a mass of not less than 4 kg.		Grab-line diameter: mm	
Measure the lifebuoy grab-line diameter and length and assess how it is secured.		Be fitted with a grab-line not le	ess than 9.5 mm	Grab-line length: mm	
		in diameter and not less than four times the outside diameter of the body of the buoy in length.		Buoy outer diameter times four: mm Grab-line four times the outer diameter of body? Passed/ Failed	
		The grab-line should be s equidistant points around the	circumference of	Grab-line secured in four equal loops? Passed/ Failed	
		the buoy to form four equal loc	ops.	Comments/Observations	

Lifebuoys	Lifebuoys Manufacturer: Model: Lot/Serial Number:		Date: Time: Surveyor: Organization:		
2.1.1.4	Temperature cycling test		Regulations: LSA Code 1.2.2	2; MSC.81(70) 1 / 1.2	
	Test Procedure	Acceptan	ce Criteria	Significant Test Data	
The following two lifebuoys	test should be carried out on .	Not be damaged in stowage t range -30°C to + 65°C	throughout the air temperature	Passed Failed	
subjected to	bys should be alternately surrounding temperatures of	The lifebuoys should show no s	sign of loss of rigidity under high	(See following page for test data)	
-30°C and +6	55°C.	temperatures and, after the t	ests, should show no sign of	Intact after this test?	
immediately	ating cycles need not follow after each other and the cedure, repeated for a total of acceptable:	damage such as shrinking, cracking, swelling, dissolution of change of mechanical qualities.		r Lifebuoy No. 1 Observations on rigidity under high temp	
	sure at a minimum temperature be completed in one day			Observations after testing for shrinking, cracking etc.	
chamber tha under ordin	ens removed from the warm t same day and left exposed ary room conditions at a			Lifebuoy No. 2 Observations on rigidity under high temp	
temperature day	of 20°C ± 3°C until the next			Observations after testing for shrinking, cracking etc.	
	ure at a maximum temperature e completed the next day			Intact after these tests?	
chamber that	ens removed from the cold at same day and left exposed ary room conditions at a			lifebuoy No.1: Passed/ Failed	
	of $20^{\circ}C \pm 3^{\circ}C$ until the next			lifebuoy No.2: Passed/ Failed	
				Comments/Observations	

Lifebuoy					Date: Surveyor: Organization:			
2.1.1.4	Temperature cycli				Regulations: LSA Code I/1.2.			
			IOT CYCLE				D CYCLE	
Cycle 1	Date In: Time In: Temperature:	0 ⁰ C	Date Out: Time Out: Duration:	hours	Date In: Time In: Temperature:	0 ⁰ C	Date Out: Time Out: Duration:	
Cycle 2	Date In: Time In: Temperature:		Date Out: Time Out: Duration:	hours	Date In: Time In: Temperature:		Date Out: Time Out: Duration:	
Cycle 3	Date In: Time In: Temperature:	C	Date Out: Time Out: Duration:		Date In: Time In: Temperature:		Date Out: Time Out: Duration:	
Cycle 4	Date In: Time In: Temperature:	0C	Date Out: Time Out: Duration:		Date In: Time In: Temperature:		Date Out: Time Out: Duration:	
Cycle 5	Date In: Time In: Temperature:	C	Date Out: Time Out: Duration :		Date In: Time In: Temperature:		Date Out: Time Out: Duration:	
Cycle 6	Date In: Time In : Temperature :	C	Date Out: Time Out: Duration :		Date In: Time In: Temperature:		Date Out: Time Out: Duration:	
Cycle 7	Date In: Time In : Temperature :	⁰ C	Date Out: Time Out: Duration:		Date In: Time In: Temperature:	0 ⁰	Date Out: Time Out: Duration:	
Cycle 8	Date In: Time In: Temperature:	0 ⁰ C	Date Out: Time Out: Duration:		Date In: Time In: Temperature:		Date Out: Time Out: Duration:	
Cycle 9	Date In: Time In: Temperature:	C	Date Out: Time Out: Duration:		Date In: Time In: Temperature:		Date Out: Time Out: Duration:	
Cycle 10	Date In: Time In: Temperature:		Date Out: Time Out: Duration:		Date In: Time In: Temperature:		Date Out: Time Out: Duration:	

	Manufacturer:		Date:	Time:
Lifebuoys Model: Lot/Serial Number:			Surveyor:	
			Organization:	
2.1.1.5	Drop test		Regulations: LSA Code	2.1.1.6; MSC.81(70) 1 / 1.3
	Test Procedure	Acceptance	Criteria	Significant Test Data
upper edge v lower edge of which it is inte their lightest whichever is the water with In addition, or suspended fro device so that	r should be suspended from its ia a release device so that the f the lifebuoy is at the height at ended to be stowed on ships in seagoing condition, or 30 m, the greater, and dropped into nout suffering damage. The lifebuoy should be form its upper edge via a release to the lower edge of the lifebuoy of 2 m, and dropped three concrete floor.	Be constructed to withstand a the height at which it is stowed lightest seagoing condition or greater, without impairing either that of its attached components The lifebuoy should withstand of 2m on to a concrete floor wit	drop into the water from above the waterline in the 30 m, whichever is the r its operating capability or s.	Number of lifebuoys:

2.1.1.6 Test for oil resistance Regulations: LSA Code 1.2.2; MSC.81(70) 1 / 1.4 Test Procedure Acceptance Criteria Significant Test Data One of the lifebuoys should be immersed horizontally for a period of 24 h under a 100 mm head of diesel oil at normal room temperature. After this test the lifebuoy should show no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical qualities. Lifebuoy No. Duration: mm Duration: hours Signs of damage? Passed Failed Comments/Observations Comments/Observations	Lifebuoys	Manufacturer:		Date: Surveyor: Organization:		
One of the lifebuoys should be immersed horizontally for a period of 24 h under a 100 mm head of diesel oil at normal room temperature. After this test the lifebuoy should show no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical qualities. Lifebuoy No. Duration: mm Duration: hours Signs of damage? Passed Failed	2.1.1.6	Fest for oil resistance	Regulations: LSA	Code 1.2.2; MSC.81(70) 1 / 1.4		
for a period of 24 h under a 100 mm head of diesel oil at normal room temperature. damage such as shrinking, cracking, swelling, dissolution or change of mechanical qualities. Diesel oil head:mm Duration:hours Signs of damage? Passed Failed		Test Procedure	Ac	cceptance Criteria	Significant Test Data	
	for a period o	ebuoys should be immersed horizontally f 24 h under a 100 mm head of diesel oil	After this test the damage such as	lifebuoy should show no sign of shrinking, cracking, swelling,	Lifebuoy No. Diesel oil head:mm Duration:hours Signs of damage? Passed Failed	

Lifebuoys	Model:		Date: Time: Surveyor: Organization:		
2.1.1.7	Fire test		Regulations: LSA Cod	e 2.1.1.5; MSC.81(70) 1/1.5	
	Test Procedure	Acceptance C	Criteria	Significant Test Data	
fire test. A ter should be draught-free the bottom of followed by minimum tota The petrol s allowed to bu The lifebuoy s flames in an position, with 25 cm above	buoy should be subjected to a st pan 30 cm x 35 cm x 6 cm placed in an essentially area. Water should be put in the test pan to a depth of 1 cm enough petrol to make a I depth of 4 cm. should then be ignited and rn freely for 30 s. should then be moved through upright, forward, free-hanging a the bottom of the lifebuoy the top edge of the test pan so ion of exposure to the flames	The lifebuoy should not susta melting after being removed fro		Lifebuoy No. Dimensions test pan: xx cm Water depth:cm Depth incl. petrol:cm Exposure time:seconds Sustain burning or continue melting after being removed from the flame Passed/ Failed Comments/Observations	

Lifebuoys	Model:		Date: Surveyor: Organization:			
2.1.1.8 Flotation test		Regulations: LSA Cod	e 2.1.1.3; MSC.81(70) 1/	1.6		
	Test Procedure	Acceptance C	Criteria	Signific	ant Test Data	
tests should not less than	buoys subjected to the above be floated in fresh water with 14.5 kg of iron suspended from and should remain floating for h.	There should be no breaks, cracks or permanent deformation. The lifebuoys should float throughout the 24 h test period.		Lifebuoy no. 1 Lifebuoy no. 2		
2.1.1.9	Strength test		Regulations: LSA Cod	e 1.2.2; MSC.81(70) 1/1.	7	
	Test Procedure	Acceptance C	Criteria	Signific	ant Test Data	
50 mm wide s passed aroun with a 90 kg	dy should be suspended by a strap. A similar strap should be d the opposite side of the body mass suspended from it. After e lifebuoy body should be	There should be no breaks, cracks or permanent deformation.		Lifebuoy No. Suspended mass:kg Suspension duration:min Passed/Failed Comments/Observations		

Lifebuovs	Manufacturer: Model:	Date: Time: Surveyor:
Lifebuoys	Lot/Serial Number:	Organization:

2.1.1.10 Test for operation with a light	and smoke signal	Regulations: LSA Co	ode 2.1.1.7; MSC.81(70) 1/1.8
Test Procedure	Acceptance C	riteria	Significant Test Data
The tests should be carried out if the lifebuoy is intended for quick release with a light and smoke signal. The lifebuoy should be arranged in a manner simulating its installation on a ship for release from the navigating bridge. A lifebuoy light and smoke signal should be attached to the lifebuoy in the manner recommended by the manufacturers.	The lifebuoy should be release both the light and the smoke si The weight of the lifebuoy shou	gnal.	Lifebuoy No. Type / description of quick activating arrangement: Type of light and smoke signal: Light activated? Passed/ Failed Smoke activated? Passed/ Failed, Weight of the lifebuoykg Length of the line connected to the lifebuoy m Passedm Comments/Observations

2.1.2 LIFEBUOY SELF-IGNITING LIGHTS EVALUATION AND TEST REPORT

Remark: If a lifebuoy self-igniting light is a combined light/smoke signal it should be treated as a sole lifebuoy self-igniting light.

- 2.1.2.0 Quality assurance
- 2.1.2.1 General information
 - 2.1.2.1.1 General data and specifications
 - 2.1.2.1.2 Submitted drawings, reports and documents
- 2.1.2.2 Visual inspection
 - 2.1.2.2.1 Approval marking
 - 2.1.2.2.2 Expiry marking
 - 2.1.2.2.3 Additional markings
 - 2.1.2.2.4 Electrical short circuit protection
 - 2.1.2.2.5 Construction and materials
 - 2.1.2.2.6 Colour of lifebuoy light
- 2.1.2.3 Temperature cycling test
- 2.1.2.4 Light tests
- 2.1.2.5 Chromaticity test
- 2.1.2.6 Rain test and watertightness test
- 2.1.2.7 Case resistance test
- 2.1.2.8 Lens drop test
- 2.1.2.9 Floatation test
- 2.1.2.10 Drop test
- 2.1.2.11 Fitting test
- 2.1.2.12 Release and operation test
- 2.1.2.13 Vibration test
- 2.1.2.14 Mould growth test
- 2.1.2.15 Corrosion and seawater resistance test
- 2.1.2.16 Solar radiation test
- 2.1.2.17 Test for oil resistance
- 2.1.2.18 Fire test

2.1.2 LIFEBUOY SELF-IGNITING LIGHTS EVALUATION AND TEST REPORT

Manufacturer	
Туре	
Date	
Place	
Surveyor's name (printed)	
Signature	
Approving organization	

Lifebuoy self-igniting lights	Manufacturer: Model: Lot/Serial Number:		Date: Time: Surveyor: Organization:		
2.1.2.0 Quality assurance	ce	Regula	tions: MSC.81(70) 2/1.1, 1.2		
Except where all appliances of the International Convention for or the International Life-Savi representatives of the Admin manufacturers to ensure that materials used comply with life-saving appliance. Manufacturers should be requ ensure that life-saving appliance	f a particular type are required by chapter III of or the Safety of Life at Sea, 1974, as amended, ing Appliance (LSA) Code, to be inspected, instration should make random inspection of the quality of life-saving appliances and the the specification of the approved prototype nired to institute a quality control procedure to ces are produced to the same standard as the e approved by the Administration and to keep tests carried out in accordance with the	Quality Quality	tions: MSC.81(70) 2/1.1, 1.2 Assurance Standard Used: Assurance Procedure: Assurance Manual:	Passed/ Failed Passed/ Failed Passed/ Failed	

Lifebuoy self-igniting lights	Manufacturer: Model: Lot/Serial Number:	er: Date: Time: umber: Surveyor: Organization:		
2.1.2.1.1 General data an	d specifications	Regulations: LSA Code; M	SC.81(70)	
General Informati	ion Lifejacket	Lifebuoy Light Dimensions	Lifejacket Lifebuoy Light Weight	
TYPE OF SWITCHING			Details of Bulb, Battery & Voltages:	
FLASHING LIGHT			Comments/Observations	
STEADY LIGHT				

lights	elf-igniting	Manufacturer: Model: Lot/Serial Number: wings, reports and documents		Date: Surveyor: Organization:		
2.1.2.1.2 Ou		wings, reports	Submitted drawings and docum	ients		Statua
Drawing No	. Revi date	sion No. &		Title of drawing		Status
			Submitted reports and docume	ents		
Report/Docume No.	nt Revi date	sion No. &	Title of report / document			Status
			Maintenance Manual -			
			Operations Manual -			

Lifebuoy self-igniting lights	Manufacturer: Model: Lot/Serial Number:			Surveyor:		
2.1.2.2 Visual Inspectio	n		Regulatio	ns: LSA Code 1.2	.2.1/1.2.2.6/1.2.2.9/1.2.2.10/1	.2.3
Test Procedure		Acceptance (Criteria		Significant	Test Data
Thirteen lifebuoy self-igniting lights should be examined in detail for the following items: Approval marking		 The lifebuoy self-igniting lights should: be clearly marked with approval information including the Administration which approved it, and any operational 		<u>Results:</u> PASS:	FAIL:	
		restrictions;be marked with a date of expiry;		PASS:	FAIL:	
Expiry marking		 The Administration should determine the: period of acceptability, owing to deterioration with age. The established life must be justified by the manufacturer. 		<u>Results:</u> PASS:	FAIL:	
Additional markings		Be provided the following information: precise definition of intended use (e.g. "Lifebuoy self- igniting light"); serial number; identification of the manufacturer; where applicable, information on proper battery disposal by the words: "DO NOT INCINERATE / DO NOT RECHARGE / DO NOT TAMPER";		<u>Results:</u> PASS: PASS: PASS: PASS:	FAIL: FAIL: FAIL: FAIL:	
Electrical short circuit protection - be provided with electrical short circuit damage or injury;			circuit prote	ection to prevent	Results: PASS: Comments/Observations	FAIL:

2.1.2.2 Visual Inspection (conti	inued) Regula	Regulations: LSA Code 1.2.2.1/1.2.2.6/1.2.2.9/1.2.2.10/1.2.3				
Test Procedure	Acceptance Criter	ia Sig	nificant Test Data			
	The lifebuoy self-igniting lights should	: <u>Results:</u>				
Construction and materials	 be constructed with proper workman 	nship and materials. PASS:	FAIL:			
Colour of lifebuoy light	 be of an international or vivid reddis comparably highly visible colour on will assist detection at sea 	all parts where this PASS:	FAIL:			
		Comments/Observa	ations			

_ifebuoy self-igniting	Manufacturer: Model: Lot/Serial Number:		Date: Surveyor: Organization:				
ights	Lot/Senal Number:		Organization	-			
Lifebuoy self-igniting light	esting flow chart						
	light 1 temp cycle test 2.1.2.3	then light 1 performs Li 2.1.2.4	ght test (hot)	light 1 the 2.1.2.5	en performs Chromaticity Test		
	light 2 temp cycle test 2.1.2.3	then light 2 performs Light test (co 2.1.2.4		light 2 the 2.1.2.5	n performs Chromaticity Test		
	light 3 temp cycle test 2.1.2.3						
	light 4 Case Resistance Test 2.1.2.7						
	light 5 Lens Drop Test 2.1.2.8 (if fitted)						
Visual Inspection	light 6 24 hr Floatation Test 2.1.2.9						
(all 13 lights) 2.1.2.1	light 7 30 m drop test (x 2) 2.1.2	2.10 light 7 the 2.1.2.11			light 7 then performs Release/Op 2.1.2.12	eration Test	
	light 8 Vibration Test 2.1.2.13						
	light 9 Mould growth test (may be waived) 2.1.2.14						
	light 10 corrosion and sea water resistance test 2.1.2.15						
	light 11 Solar radiation test (may be waived) 2.1.2.16						
	light 12 Oil resistance test 2.1.2	.17					
	light 13 Fire test 2.1.2.18						

Lifebuoy self-igniting lights	Model:	er: umber:		Date: Surveyor: Organization:	Time:
2.1.2.3 Temperature cyc	ling test		Regulation	s: LSA Code 1.2.2.2	2; MSC.81(70) 1/ 1.2, 1.2.1, 1.2.2, 10.2, 10.2.1
Test Procedure		Acceptanc	e Criteria		Significant Test Data
 Three lifebuoy self-igniting I be alternately subjected to temperatures -30°C and at I These alternating cycles need immediately after each oth following procedure, repeated not less than 10 cycles, is accord. 1. an 8 h exposure at temperature of +65 completed in one day; 2. the specimens remove warm chamber that sat left exposed under or conditions at a temperature of -30 completed the next day. 3. an 8 h exposure at temperature of -30 completed the next day. 4. the specimens remove cold chamber that sat left exposed under or conditions at a temperature of -30 completed the next day. 4. the specimens remove cold chamber that sat left exposed under or conditions at a temperature of -30 completed the next day. 	surrounding east +65°C. ed not follow er and the for a total of ceptable: a minimum f°C to be and ed from the me day and dinary room ature of 20°C /; a maximum f°C to be /; and ed from the me day and dinary room ature of 20°C	The lifebuoy self-igniting light stowage throughout the air t +65°C. The lifebuoy self-ignitin of loss of rigidity under high tests, should show no sign of cracking, swelling, dissolution qualities and should function a	s should no temperature ng lights sho temperatur f damage s n or chang	e range -30°C to buld show no sign es and, after the uch as shrinking, je of mechanical	

Lifebuo lights	y self-igniting	Manufacturer: Model: Lot/Serial Number:			Surveyor:	Date: Time: Surveyor: Organization:				
2.1.2.3	Temperature cycl		est data OT CYCLE		Regulations: LSA Code I/1.2.		1/1.2 LD CYCLE			
Cycle 1	Date In: Time In: Temperature:		Date Out: Time Out: Duration:		Date In: In: Temperature:		Date Out: Time Out: Duration:			
Cycle 2	Date In: Time In: Temperature:		Date Out: Time Out: Duration:		Date In: In: Temperature:		Date Out: Time Out: Duration:			
Cycle 3	Date In: Time In: Temperature:	⁰ C	Date Out: Time Out: Duration:	hours	Date In: In: Temperature:	0 ⁰	Date Out: Time Out: Duration:	hours		
Cycle 4	Date In: Time In: Temperature :	0	Date Out: Time Out: Duration:	hours	Date In: In: Temperature:	0 ⁰	Date Out: Time Out: Duration:	hours		
Cycle 5	Date In: Time In: Temperature :	0C	Date Out: Time Out: Duration:	hours	Date In: In: Temperature:	0 ⁰ C	Date Out: Time Out: Duration:	hours		
Cycle 6	Date In: Time In: Temperature:	⁰ C	Date Out: Time Out: Duration:	hours	Date In: In : Temperature :	0 ⁰	Date Out: Time Out: Duration:	hours		
Cycle 7	Date In: Time In: Temperature:	<u></u> C	Date Out: Time Out: Duration:	hours	Date In: In: Temperature:	Time ⁰ C	Date Out: Time Out: Duration:			
Cycle 8	Date In: Time In: Temperature:	0	Date Out: Time Out: Duration:		Date In: In: Temperature:	Time 0C	Date Out: Time Out: Duration:			
Cycle 9	Date In: Time In: Temperature:	<u></u> C	Date Out: Time Out: Duration:		Date In: In: Temperature:	Time 0C				
Cycle 10	Date In: Time In: Temperature:	C	Date Out: Time Out: Duration:		Date In: In: Temperature:	Time 0C	Date Out: Time Out: Duration:			

Lifebuoy self-igniting lights	Manufacturer: Model: Lot/Serial Number:			Surveyor:	Time:	
2.1.2.4 Light tests			Regulatio 10.4.9	ns: LSA Code 2.1	.2/2.1.2.2/2.1.2.3; MSC.81(70)	1/ 10.2.2, 10.4,
Test Procedure		Acceptanc	e Criteria		Significant T	est Data
One lifebuoy self-igniting ligh passed the temperature of should be taken from a temperature of -30°C and operated immersed in sear temperature of -1°C, another l igniting light which has p temperature cycling test should from a stowage temperature of be operated immersed in sear temperature of +30°C, and should be taken from ord condition and operated immer water at ambient temperature of the first hour of operation self-igniting lights should be i a depth of 1 m for 1 min. If the voltage at 5 min of operat than the recorded voltage at the it is permissible to use a lar same build standard for the test. Using the lowest recorder light output test can be car described below. The voltage units should be monitored con 2 h. To make sure that all the provide a luminous intensity than 2 cd in all directions of	eycling test a stowage d then be water at a ifebuoy self- bassed the ild be taken f +65°C and awater at a a third light inary room sed in fresh . At the end the lifebuoy mmersed to tion is lower he end of life np from the light output d voltage, a ried out as of the 3 test tinuously for he test units of not less	After immersion, all the lifebuoy be extinguished and should co hour longer. All of the lights should be of a continue to provide a luminou cd in all directions of the upper of a flashing light, flash at a rate and not more than 70 flashes corresponding effective lumin 2 cd for at least 2 h. (see for effective luminous intensity.) The effective luminous intensity.) The effective luminous intensity. $\left(\frac{\int_{t_1}^{t_2} Id}{0.2 + (t_2)}\right)$ where: I is the instantaneous intensity 0.2 is the Blondel-Rey constant of integration in seconds.	ntinue operative white colour is intensity of the single of not less a per minute ous intensit rmula below asity is to be $\left(\frac{t}{t-t_1}\right)_{max}$	ating for at least an r and they should of not less than 2 ere or, in the case as than 50 flashes e with at least the y of not less than w to calculate the be found from the	All luminous intensity data is PASS: F Comments/Observations	to be attached here.

hemisphere for 2 h operation test should be performed:	, the following			
Lifebuoy self-igniting lights	Model:	er:	Surveyor:	on:
2.1.2.4 Light tests (co	ntinued)		Regulations: LSA Co 10.4.9	de 2.1.2/2.1.2.2/2.1.2.3; MSC.81(70) 1/ 10.2.2, 10.4,
Test Procedure	•	Acceptance	Criteria	Significant Test Data
It must be demonstrated th unit lights reach the requi intensity in all directions hemisphere when using a which is calibrated to the standards of the appropriat State Standard Institute (No No. 70 contains further Luminous intensity of all te should be measured by a directed at the center of the with the test light on a r Luminous intensity should be a horizontal direction at the center of the light source and recorded through a 360° rota measurement should be (horizontal) and should co taken in the azimuth angle a to a single measurement at Luminous intensity should be a vertical direction, beginning of the light source at the p recorded light output, and recorded through an arc of the	red luminous of the upper a photometer photometer e National or ote: CIE Publ. information.). est unit lights a photometer e light source otating table. e measured in e level of the d continuously ation. The first taken at 0° ntinue to be at 5° intervals 90° (vertical).	Flashing lights with a flast than 0.3 s may be considered the measurement of their lights should provide the requ all directions of the upper interval between switching required luminous intensity (all time spent below the re- when the light switches of (see figure 10.4.1.) Figure 10.4.1 "On-time" n	d as fixed/steady lights for luminous intensity. Suc uired luminous intensity r hemisphere. The tim y on and reaching the (incandescence time) ar quired luminous intensit f should be disregarded neasurement diagram	 Comments/Observations All lights operated for first one hour and immersed to a depth of 1m for 1 min as mentioned below 1) Light 1, taken from -30°C, immersed in seawater temperature -10°C ty a) Light 2 taken from 165°C immersed in seawater

Lifebuoy self-igniting lights	Model:	nber:		Surveyor:	Time:	
		Implementation Organization: Regulations: LSA Code Acceptance Criteria The measured chromaticity coordinates should fall within the boundaries of the area of the diagram as per CIE. The boundaries of the area for white lights are given by the following corner coordinates:		2.1.2.2; MSC.81(70) 1/10.2.2, 10.4, 10.4.10 Significant Test Data Results: All chromaticity data is to be attached here. PASS: FAIL: Comments/Observations		
further information.). Measure least four points of the upper should be taken.						

Lifebuoy self-igniting Model	cturer:	Surveyor:	Time:	
2.1.2.6 Rain test and Watertigh	ness Test	Regulations: LSA Code 1.2 10.4.7	2.2.8; MSC.81(70) 1/ 10.2.5,	
Test Procedure	Acceptan	Acceptance Criteria		Test Data
One lifebuoy self-igniting light which passed the temperature cycling should be subjected to the rain according to IEC 60945:2002, parag 8.8. After having passed the rain test lifebuoy self-igniting light and its comp power source should be imme horizontally under not less than 300 m fresh water for at least 24 h. After that test, the lifebuoy self-ign light should be tested for function. A having tested its function, and if it is electric light, it should be disassem and examined for the presence of wat Automatic activated version should prevented from switching during th tests.	est is to be used in a seaway operation in that environment aph the The lifebuoy self-igniting immersion under water. Sed n of The lifebuoy self-igniting light requirements of IEC 60945:2 ing There should be no evidence self-igniting light. an led er.	light should function after ght should comply with the	PASS: Comments/Observations	FAIL:

Lifebuoy self-igniting lights	Model:	Surveyor:		Time:		
2.1.2.7 Case resistance	etest	Regulations: MSC.81(70) 1/		10.2.7	10.2.7	
Test Procedure		Acceptance Criteria		Significant Test Data		
placed on its side on a rigid surface and a way that wou steel sphere having a mass of 500 g should be dropped from a height of 1.3 m		way that would affect its wate	should not break or crack, or be distorted in a would affect its watertightness.		Results: PASS: FAIL: Comments/Observations	
2.1.2.8 Lens drop test			Regulatio	ns: MSC.81(70) 1/	10.2.6	
Test Procedure		Acceptance Criteria		Significant Test Data		
If a lifebuoy self-igniting light h should be subjected to the dor The lifebuoy self-igniting ligh cooled to -18°C and dropped height of 1 m on to a rigidly m plate or concrete surface. T should be measured from the lens to the impact surface. self- igniting light should strike on the top centre of the lens.	ne drop test. t should be twice from a ounted steel he distance e top of the The lifebuoy	The lens should not break or crack. The lifebuoy self-igniting light should function after the test.		<u>Results:</u> PASS: Comments/Observa	FAIL: ations	

2.1.2.9 Floatation test	Regulations: LSA Code	Regulations: LSA Code 1.2.2.8; MSC.81(70) 1/ 10.2.4			
Test Procedure	Acceptance Criteria	Significant Test Data			
One lifebuoy self-igniting light should be subjected to the floatation test. If the unit has an automatic activation, it should be	The lifebuoy self-igniting light should be capable of satisfactory operation in a seaway.	<u>Results:</u>			
disabled during this test. The lifebuoy self-igniting light should be	The lifebuoy self-igniting light should function after the test and there should be no evidence of water inside the lifebuoy self-igniting light.	est PASS: FAIL:			
allowed to float in water in its normal operating position for 24 h.		Comments/Observations			
If the lifebuoy self-igniting light is an electric light, it should be disassembled at the end of the tests and examined for the presence of water.					

Lifebuoy self-igniting lights	Manufacturer: Model: Lot/Serial Number:		Surveyor:	Surveyor:		
2.1.2.10 Drop test		Regulations: LSA Code 2.1.2.4/2.1.1.6; MSC.81(70) 1/ 1.3, 10.2.3				
Test Proce	dure	Acceptance Criteria			Significant Test Data	
One lifebuoy self-igniting light which has passed the visual inspection should be subjected to the drop test. The lifebuoy self-igniting light should be subjected to at least two drop tests as follows: The lifebuoy self-igniting light should be dropped into water, such that the lower edge of the light is at a height at which it is intended to be stowed on ships in their lightest sea going condition, or 30 m, whichever is greater. The lifebuoy self-igniting light should be dropped twice, first by itself and then attached to a lifebuoy. On sea activated lights this test should be carried out with the sealing plugs fitted to prevent the ingress of		this test without in capability or that c The lifebuoy self-i	The lifebuoy self-igniting light should withstand this test without impairing either its operating capability or that of its attached components. The lifebuoy self-igniting light should not suffer damage and should operate satisfactorily after each drop.		FAIL:	
2.1.2.11 Fitting test			Regulations: MSC.81(70)	1/ 10.2.8		
Test Proce	dure	Acceptance Criteria			Significant Test Data	
The lifebuoy self-igniting light which has passed the drop test should be subjected to the fitting test.		Neither the fitting and lanyard nor the lifebuoy self-igniting light should be damaged as a result of this test.			FAIL:	
A force of 225 N should be applied to the fitting and lanyard that attaches the lifebuoy self-igniting light to a lifebuoy.		The lifebuoy self-igniting light should function after the test.				
After having passed the fitting subjected to the release and c						

Lifebuoy self-igniting lights	Manufacturer:		Surveyor:	Time:		
2.1.2.12 Release and ope	eration test	Regulatio	ns: LSA Code 2.1	.1.7; MSC.81(70) 1/1.8		
Test Proced	dure	Acceptance Criteria		Significant Test Data		
One lifebuoy intended for quick release with the lifebuoy self-igniting light which has passed the fitting test and a smoke signal should be given this test. The		The lifebuoy should activa self-igniting light.	te the lifebuoy	<u>Results:</u>		
chemical material intended to should be substituted by	o produce the smoke an equivalent non-			PASS:	FAIL:	
dangerous material. The lifebuoy should be arranged in a manner simulating its installation on a ship for release from the navigating bridge. The lifebuoy self- igniting light and a smoke signal should be attached to the lifebuoy in the manner recommended by the manufacturer. The lifebuoy should be released.				Comments/Observations		
2.1.2.13 Vibration test		Regulations: LSA Code 1.2.2.1/1.2.2.8; MSC.81(70) 1/ 10.4, 10.4.1				
Test Proced	dure	Acceptance Criteria		Significant Test Data		
One lifebuoy self-igniting light which has passed the visual inspection should be subjected to a vibration test according to IEC 60945:2002 paragraph 8.7.		The lifebuoy self-igniting light should be constructed with proper workmanship and materials.		<u>Results:</u> PASS:	FAIL:	
		The lifebuoy self-igniting ligh after the test.	t should function	Comments/Observations		

Lifebuoy self-igniting	Manufacturer: Model: Lot/Serial Number:			Date: Surveyor: Organization:			
2.1.2.14 Mould growth tes	2.1.2.14 Mould growth test			ns: LSA Code 1.2	.2.4; MSC.81(70) 1/1	0.4, 10.4.2	
Test Procedu	ure	Acceptance Criteria		Significant Test Data			
One lifebuoy self-igniting light which has passed the visual inspection should be subjected to the mould growth test.		proof and not be unduly affected by fungal		<u>Results:</u> PASS:	FAIL:		
spraying with an aqueous su spores containing all the following Aspergillus niger; Aspergillus ter Aureobasidium pullulans; Paecil Penicillium funiculosum; Penicill Scopulariopsis brevicaulis; and The lifebuoy self-igniting craft placed in a mould growth charr maintained at a temperature of relative humidity of not less than incubation should be 28 days. lifebuoy self-igniting light should (Note: The mould growth test m the manufacturer is able to produce	One lifebuoy self-igniting light which has passed the visual inspection should be subjected to the mould			wth visible to the self-igniting light	Comments/Obse	ervations	

Lifebuoy self-igniting lights	Manufacturer: Model: Lot/Serial Number:			Date: Time: Surveyor: Organization:			
2.1.2.15 Corrosion and s	eawater resistance test		Regulation	s: LSA Code 1.2.2.4; M	SC.81(70) 1/ 10	.4, 10.4.4	
Test Proc	cedure		Acceptance	Criteria		Significant Test Data	
 and Seawater Resist conducted. .2 The Corrosion and Sea be waived where the produce evidence the employed will satisfy the employe	bjected to a corrosion and ording to IEC 60945:2002, d metal parts the Corrosion ance Test need not be water Resistance Test may manufacturer is able to nat the external metals e test. rsion should be prevented	resistant and Furthermore, comply with the paragraph 8.1 There should parts and the function after Where the ex	not be unduly the lifebuoy he requireme 2.2. be no undure lifebuoy s the test. cposed metal , the function	ght should be corrosion affected by seawater. self-igniting light should nts of IEC 60945:2002, e deterioration of metal elf-igniting light should is part of the automatic test after the 28-day test	Results: PASS: FAIL: Comments/Observations		
2.1.2.16 Solar radiation	test		Regulation	s: LSA Code 1.2.2.5; M	SC.81(70) 1/ 10	.4, 10.4.5	
Test Proc	cedure		Acceptance	Criteria		Significant Test Data	
One lifebuoy self-igniting lig visual inspection should be su test according to IEC 60945:2 (Note: The solar radiation test manufacturer is able to pr materials employed will satisfy	bjected to a solar radiation 002, paragraph 8.10. t may be waived where the oduce evidence that the	The lifebuoy self-igniting light should be resistant to deterioration by sunlight. Furthermore, the mechanical properties and labels should be resistant to harmful deterioration by sunlight and the lifebuoy self-igniting light should function after the test.			<u>Results:</u> PASS: Comments/Ot	FAIL: oservations	

Lifebuoy self-igniting lights	Model:	ber:		Date: Time: Surveyor: Organization:			
2.1.2.17 Test for oil resis	stance		Regulatio	ns: LSA Code 1.2	.2.4; MSC.81(70) 1/ 1	10.4, 10.4.6	
Test Procedure		Acceptanc	e Criteria		Sig	nificant Test Data	
One lifebuoy self-igniting light passed the visual inspection subjected to the test for oil according to IEC 6 paragraph 8.11. Automatic version should be preven switching during the test.	should be un resistance su 0945:2002 of activated	fter this test the lifebuoy sel nduly affected by oil and sho uch as shrinking, cracking, sy f mechanical qualities. he lifebuoy self-igniting light s	uld show n velling, diss	<u>Results:</u> PASS: Comments/Observa	FAIL: ations		
2.1.2.18 Fire rest			10.4, 10.4.8				
Test Procedure		Acceptance Criteria			Significant Test Data		
One lifebuoy self-igniting light passed the visual inspection subjected to a fire test. A test p than 30 cm x 35 cm x 6 cm placed in an essentially draugh Water should be put in the bo test pan to a depth of at 1 followed by enough petrol to minimum total depth of not less The petrol should then be a allowed to burn freely for at lea lifebuoy self- igniting light should then through the flames, facing the lifebuoy self-igniting light not 25 cm above the top edge of t so that the duration of expos flames is at least 2 s.	should be co pan not less n should be fla there area. ottom of the The least 1 cm to make a s than 4 cm. ignited and list 30 s. The more than the test pan	he lifebuoy self-igniting light s ontinue melting after being to eriod of not less than 2 s and ames. he lifebuoy self-igniting light s	tally envelo after being	ped in a fire for a removed from the	<u>Results:</u> PASS: Comments/Observa	FAIL: ations	

2.1.3 LIFEBUOY SELF-ACTIVATING SMOKE SIGNALS EVALUATION AND TEST REPORT

- 2.1.3.1 Submitted drawings, reports and documents
 - 2.1.3.1.1 Quality assurance
 - 2.1.3.1.2 Visual inspection
 - 2.1.3.1.3 General data and specification
- 2.1.3.2 Temperature cycling test
- 2.1.3.3 Low temperature conditioning test
- 2.1.3.4 High temperature conditioning test
- 2.1.3.5 Ambient temperature conditioning and drop test
- 2.1.3.6 Humidity conditioning
- 2.1.3.7 Water and corrosion resistance test
 2.1.3.7.1 Immersed for 24 h under 1 m
 2.1.3.7.2 10 cm immersion ready-to-fire for 5 mins. test
 2.1.3.7.3 Salt spray conditioning
- 2.1.3.8 Heptane test
- 2.1.3.9 Laboratory smoke obscuration test
- 2.1.3.10 Wave test
- 2.1.3.11 Attachment fitting strength test
- 2.1.3.12 Safety inspection

2.1.3 LIFEBUOY SELF-ACTIVATING SMOKE SIGNALS EVALUATION AND TEST REPORT

Manufacturer	
Type/Model	
Date	
Place	
Surveyor's name (printed)	
Signature	
Approving organization	

Lifebuoy self-activating Model:			nber:	S	urveyor:	Time:				
2.1.3.1 Submitte	ed drawing	gs, reports a	nd documents							
	Submitted drawings and documents									
Drawing No.	Revisio date	on No. &		Title of drawing						

	Submitted reports and documents								
Report/Document No.	Revision No. & date	•							
		Maintenance Manual -							
		Operations Manual -							

Lifebuoy self-activating smoke signals	Manufacturer: Model: Lot/Serial Number:	Surveyor:							
2.1.3.1.1 Quality assurance	ce	Regulations: - MSC.81(70) 2/1.1, 1.2							
of the International Convention amended, or the international L representatives of the Administ manufacturers to ensure that materials used comply with the saving appliance. Manufacturers should be require ensure that life-saving applian the prototype life-saving appliant	f a particular type are required by chapter III on for the Safety of Life at Sea, 1974, as Life-Saving Appliance Code, to be inspected, stration should make random inspections of t the quality of life-saving appliances and e specification of the approved prototype life- red to institute a quality control procedure to aces are produced to the same standard as ance approved by the Administration and to on tests carried out in accordance with the	Quality Assurance Standard Used: - Quality Assurance Procedure: - Quality Assurance Manual: - Description of System.							
		Quality Assurance System acceptable: Yes/No Comments/Observations							

Lifebuoy self-activating smoke signals	Model:	umber:		Surveyor:	ne:		
2.1.3.1.2 Visual inspec	tion		Regulation	.2; MSC.81(70) 1/	2; MSC.81(70) 1/1.9 and 4.5		
Test Procedure	9	Acceptanc				Significant Test Data	
Visual examination		Lifebuoy Self-Activating Smok	e Signal sho	ould:-			
Approval markings		be clearly marked with appro Administration which approver expiry and operational restr indelible;	d it, date of	Passed	Failed		
Operating instructions		be provided with brief instr illustrating the use of the lifebug printed on the casing also the	by self-activation	ating smoke signal	Passed	Failed	
Outer casing		not depend on adhesive tape water-resistant properties;	s or plastic	envelopes for its	Passed		
Ignition system		be fitted with an integral mean	s of ignition;		Passed	Failed	
Fitted with light		if fitted with lights be test requirements of Lifebuoy Self-			Passed		
Acceptable life		The administration should acceptability of the unit which with age.					

Lifebuoy self-activating smoke signals	Model:	Surveyor:			Time:				
2.1.3.1.3 General data an	d specifications	Regulations: LSA Code I/1.2 & III/3.3; MSC.81(70) 1 /4.8							
General Informati	ion	Di	mensions		Weight				
Construction Material:		Dimensions:							
Casing:		Length of Casing:			Design Weight:				
Top cover (If applicable):		Maximum Diamete	er of Casing:		Weight as Tested:				
Bottom Cover (If applicable):		Minimum Diameter of Casing			Weight of Smoke Material				
Method of Ignition	Method of Ignition				Comments/Observations				
Operational Safety Delay (i	f Applicable)								
Number of lights (if Applicable)									
Type of lens dome									
Amperage of Bulb	Amperage of Bulb								
Number of Batteries:									
Voltage of Batteries:									
Acceptable life of the item:	yrs								

LIFEBUOY SELF-ACTIVATING SMOKE SIGNAL CONDITIONING & SEQUENCE TEST CHART

TEST ITEMS CONDITIONING SEQUENCE									REFERENCES	REMARKS
Specimen No>	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22	MSC.81(70)	
Measuring dimensions and mass	А	A	A	A	A	А	А	А		
Temperature cycling test (2.1.3.2)	В	В	В						1.9.1 & 1.2.1.	
Low temperature conditioning (2.1.3.3)	С								1.9.2	
High temperature conditioning (2.1.3.4)		С							1.9.2	
Ambient temperature conditioning (2.1.3.5)			С						1.9.3	
Operate Immersed under 25mm for 10 secs (2.1.3.4)	С	С							1.9.2	
Humidity conditioning (2.1.3.6)				С					1.9.4 & 4.2.4	
1 metre for 24 hours (2.1.3.7.1)					С				1.9.4 & 4.3.1	
Salt water spray (2.1.3.7.2)						С			1.9.4 & 4.3.3	
Safety inspection (2.1.3.12)	D	D	D	D	D	D	D	D	4.5 & 1.9.4	
Operation at ambient temperature			E		Е	Е	Е	E	1.9.3, 4.3.1	

Specimen No>	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22	References	Remarks
Operate at conditioning Temperature	Е	E		E					1.9.2, 4.2.4	
Heptane test (2.1.3.8)							F		1.9.4 & 4.8.2	
Attachment fitting strength (2.1.3.11)	Ŀ	F							10.2.8 & 1.9.6	May be carried out by an independent laboratory acceptable to the administration and report submitted. Use specimens 1 and 4.
Wave height test (2.1.3.10)								F	1.9.5	
30 m drop test (2.1.3.5)			Н						1.9.3	
Smoke colour and emission time 15 minutes minimum	G	G	G	G	G	G	G	G	1.9.2 & 1.9.3	
Smoke obscuration (2.1.3.9)									4.8.3 & 1.9.4	May be carried out by an independent laboratory acceptable to the administration and report submitted.

LIFEBUOY SELF-ACTIVATING SMOKE SIGNAL CONDITIONING & SEQUENCE TEST CHART (continued)

Note: The letters in the above 'boxes' refer to the sequence of testing of each specimen lifebuoy self-activating smoke signal.

Lifebuoy self-activating smoke signals	Model:	Surveyor:			Time:			
2.1.3.2 Temperature cy	cling test	Regulations: LSA Code I/1.2.2; MSC.81(70) I/1.2.1						
Test Procedure		Acceptanc	e Criteria			Significant	Test Data	
Nine self-activating smoke sig be alternately subjected to temperatures of -30°C and + alternating cycles need immediately after each oth following procedure, repeated 10 cycles, is acceptable:	surrounding 65°C. These not follow er and the	After 10 cycles each specim should show no sign of damag swelling, dissolution or change	e such as sl	nrinking, cracking,	<u>Specim</u> 1. 2. 3.	en No. Passed Passed Passed	Failed	
 an 8 h exposure at temperature of +65°C to b in one day; and 					4. 5.	Passed		
 the specimens removed from chamber that same date exposed under ordin conditions at a temperature 3°C until the next day; 	ly and left lary room				6. 7. 8.	Passed Passed Passed	Failed	
 3. an 8 h exposure at a temperature -30°C to be conext day; and 4. the specimen removed fruction of the same date exposed under ordinic conditions at a temperature 3°C until the next day. 	ompleted the om the cold y and left ary room					Passed	Failed	

Lifebuoy self-activating smoke signals	Manufacture Model: Lot/Serial N	er:		Date: Surveyor: Organization:					
2.1.3.3 Low temperature	e conditionin	g test	Regulatio	ns: LSA Code I/1.2	.2; MSC.81(70) 1	/1.9.2			
Test Procedure		Acceptano	ce Criteria			Significant Test Da	ata		
After at least 10 complete		The three specimens should for	unction effect	tively.	Specimen Numb	per			
cycles the first three smoke sin be subjected to a temperature		Each specimen should show	no sian of	damage such as	1	2	3		
at least 48 h, then taken from	this stowage	shrinking, cracking, swelling	, dissolutio	n or change of	Condition after (Conditioning (Pass	/Fail)		
temperature be activated and seawater at a temperature of		mechanical properties after conditioning.	er comple	ing the -30°C					
function effectively at that temp	perature.	<u> </u>		Smoke emission time (min/sec)					
		The signal should not ignite dangerous to persons close by							
		entire smoke emission time of at least 15 min.			Smoke emission quality (Pass/Fail)				
				Smalka aalaur (F					
		The colour of the smoke should be orange as defined by sections 34, 48, 49 or 50 of the publication Colour: Universal Language and Dictionary of Names.*			Smoke colour (F	ass/raii)			
					Smoke emissions during submergence (Pass/Fail)				
		*Special Publication 440, Na	ational Bure	au of Standards,					
		Washington, DC 20402, USA.			Comments/Obs	ervations			
		After the smoke signals have minutes, the smoke-emitting should be immersed to a dept released the smoke signals sh quantity of smoke of a highly for a period of not less than 15 water.	ends of th h of 25 mm ould continu visible colou	Passed	Failed				

Lifebuoy self-activating smoke signals	Model:	Manufacturer: Model: Lot/Serial Number:		Surveyor:	eyor: Time: eyor: anization:			
2.1.3.4 High temperatur	e conditionir	ng test	Regulation	ns: LSA Code I/1.2	2.2 and II/2.1.3; M	SC.81(70) 1/1.9.2		
Test Procedure		Acceptano	ce Criteria			Significant Test Da	ata	
After at least 10 complete		The three specimens should f	unction effec	ctively.	Specimen Numb	per		
cycles, the next three smoke signals should be subjected to a temperature of +65°C for at least 48 h, then taken from this stowage temperature be activated and operated in seawater at a temperature of +30°C, and function effectively at that temperature.		Each specimen should show no sign of damage such as			4	5	6	
		shrinking, cracking, swelling	, dissolutio	n or change of	Condition after 0	Conditioning (Pass/	/Fail)	
		mechanical properties after completing the +65°C conditioning.						
					Smoke emission time (min/sec)			
		The smoke signal should not manner dangerous to persons during the entire smoke emiss	close by nor	bse by nor emit any flame Smoke emission quality (Pass/Fail))	
		After the smoke signals ha	nittina smoke for	Smoke colour (F	Pass/Fail)			
		7 minutes, the smoke-emitting	g ends of th	ne smoke signals	`			
		should be immersed to a dept released the smoke signals sh			Smoke emissior	during submerger	nce (Pass/Fail)	
		quantity of smoke of a highly for a period of not less than 15 water.	isible colou	r at a uniform rate	Comments/Obse	Smoke colour (Pass/Fail) Smoke emission during submergence (Pass/Fail) Comments/Observations		
		The colour of the smoke sho sections 34, 48, 49 or 50 of the Language and Dictionary of N *Special Publication 440, Na Washington, DC 20402, USA.	e publication ames.* ational Bure	Colour: Universal	Passed	Failed		

Lifebuoy self-activating smoke signals	Manufacturer: Model: Lot/Serial Number:			Surveyor:	Time:			
2.1.3.5 Ambient Temper	rature Condit	ioning & Drop Test	Regulatio	ns: LSA Code I/1.2	2.2 & II/2.1.1.6; M	SC.81(70) 1/1.9.3		
Test Procedure		Acceptano	ce Criteria			Significant Test Da	ata	
After at least 10 complete temperature cycles, the last three smoke signals taken from ordinary room conditions and attached by a line to a lifebuoy having a mass of not more than 4 kg should undergo the drop test into water prescribed in MSC.81(70) 1/1.3. The lifebuoy should		The three specimens should for of at least 15 min.	ctively for a period	Specimen No. 7	8	9		
			Each specimen should show no sign of damage such as				/Fail)	
		shrinking, cracking, swelling mechanical properties after of conditions at a temperature of	etre)					
have both a smoke signal an light attached in the manner re	nd a lifebuoy			Ũ				
by the manufacturers and be c		The encluse since the solution			Smoke emission	n time (min/sec)		
a quick-release fitting. The smoke signals should not be damaged and should		The smoke signal should not manner dangerous to persons during the entire smoke emiss	s close by n		Smoke emission	Smoke emission quality (Pass/Fail)		
function for a period of at least	. 13 mm.	The smoke signal should not b	e damaged	after the drop test.				
A lifebuoy and the smoke sign		5	0	·	Smoke colour (I	Pass/Fail)		
dropped each into the water from the height at which they are intended to be stowed on ships in their lightest seagoing condition, or 30 m, whichever is the greater, without suffering damage The lifebuoy and smoke signals should be dropped from a quick release fitting used			e colour of the smoke should be orange as defined by ctions 34, 48, 49 or 50 of the publication Colour: Universal				test (Pass/Fail)	
		*Special Publication 440, National Bureau of Standards, Washington, DC 20402, USA.		ervations				
for housing the signals.	a nung used				Passed	Failed		

Lifebuoy self-activating smoke signals	Manufacturer: Model: Lot/Serial Number:			Surveyor:		ne:		
2.1.3.6 Humidity condit	ioning		Regulatio	ns: LSA Code I/1.	2.2 & II/2.1.3; MS(C.81(70) 1/4.2.4, 1	.9.4	
Test Procedure		Acceptano	ce Criteria			Significant Test Da	ata	
Three specimens of smoke si		The three specimens should fu	unction effect	ctively.	Specimen No.			
be subjected to a temperatu and 90% relative humidity for a		Each specimen should show no sign of damage such as			10	11	12	
followed by 10 days at 20°C to		shrinking, cracking, swelling,	dissolutior	n or change of	Condition after 0	Conditioning (Pass	/Fail)	
relative humidity.		mechanical properties after co +65°C and 90% relative humid						
After the humidity test the		by 10 days at 20°C to 25°C at 65% relative humidity			Smoke emission time (min/sec)			
should be subjected to the fur ambient temperature.	nction test at	conditioning.	conditioning.					
		The smoke signal should not ignite explosively or in a			Smoke emission	n quality (Continuo	us/Intermittent)	
		manner dangerous to persons during the entire smoke emiss		r emit any flame	Smoke emissior	Smoke emission colour: (Passed/Failed)		
		Each specimen should emit	smoke of					
		colour at a uniform rate for 15 minutes when floating in ca	a period o		Comments/Obs	ervations		
The colour of the smoke should be of sections 34, 48, 49 or 50 of the Universal Language and Dictionary of *Special Publication 440, National B Washington, DC 20402, USA.		of the pub onary of Nar ional Burea	lication Colour: nes.*	Passed	Failed			

Lifebuoy self-activating smoke signals	Manufacturer: Model: Lot/Serial Number:			Date: Surveyor: Organization:				
2.1.3.7.1 Immersed for 24	h under 1 m		Regulatio	ns: LSA Code I/1.2.	2 and II/2.1.3; MS	C.81(70) 1/4.3.1,	1.9.4	
Test Procedure		Acceptan	ce Criteria		5	Significant Test Da	ata	
Three specimens of smoke s		The three specimens should s			Specimen No.			
be immersed horizontally for 1 m of water.	24 h under	shrinking, cracking, swelling mechanical properties.	g, dissoluti	on or change of	13	14	15	
			he signals should establish that it can be operated effectively			Conditioning (Pass	/Fail)	
After this test the speciment subjected to the function tes			The signals should establish that it can be operated effectively without injury to the operator, or any person in close proximity,					
temperature.		during firing or burning.			Smoke emission	time (min/sec)		
	The specimen signal should not ignite explosively or in a			Smoke emission	I n quality (Continuo	us/Intermittent)		
		during the entire smoke emission time. They should emit					,	
		smoke of a highly visible color of not less than 15 minutes wi	Smoke emission colour: Passed/Failed					
		of not less than 15 minutes wi	len noaung	in califi water.				
section		The colour of the smoke sh sections 34, 48, 49 or 50 of th Language and Dictionary of N	ne publicatio		Comments/Obse	Comments/Observations		
		*Special Publication 440, N Washington, DC 20402, USA.		eau of Standards,				
					Passed	Failed		

Lifebuoy self-activating smoke signals	Model:	Surveyor:				ne:		
2.1.3.7.2 10 cm immersion ready-to-fire		e for 5 mins. test	Regulation	ns: LSA Code I/1.2	2.2 & II/2.1.3; MS	C.81(70) 1/4.3.2		
Test Procedure		Acceptan	ce Criteria			Significant Test D	ata	
Three specimens of smoke sig		The three specimens should show no sign of damage such			Specimen No	•		
be made ready-to-fire, sub 10 cm of water for 5 min.	omerged in	as shrinking, cracking, swell mechanical properties.	ing, dissolut	ion or change of	16	17	18	
			Condition after Conditioning (Pass/Fail)					
The three signals should be ambient temperature in accord		The signals should establis effectively without injury to the						
the manufacturer's operating i		close proximity, during firing o			Smoke emission time (min/sec)			
		The specimen signal should	he specimen signal should not ignite explosively or in a					
		manner dangerous to persons	s close by, n	or emit any flame	Smoke emission quality (Continuous/Intermittent)			
		during the entire smoke emission time. They should emit smoke of a highly visible colour at a uniform rate for a period			Smoko omissior	L colour: Dassad/E		
		of not less than 15 minutes wh			Smoke emission colour: Passed/Failed			
		The colour of the smoke sho sections 34, 48, 49 or 50 of the Language and Dictionary of N	e publication		Comments/Observations			
		*Special Publication 440, Na Washington, DC 20402, USA.		au of Standards,				
					Passed	Failed		

Lifebuoy self-activating smoke signals	Model:	er:		Date: Surveyor: Organization:			
2.1.3.7.3 Salt spray cond	itioning		Regulatio	ns: LSA Code I/1.2	2.2 & II/2.1.3; MSC	C.81(70) 1/1.9.4, 4	.3.3
Test Procedure		Acceptan	ce Criteria			Significant Test D	ata
Three specimens of smoke signals should		The three specimens should show no sign of damage such			Specimen No		
be subjected to a salt spray (chloride solution) at a tem		as shrinking, cracking, swelling, dissolution or change of mechanical properties.			19	20	21
+35±3°C for at least 100 h.					Condition after C	Conditioning (Pass	/Fail)
The three signals should be	activated at	The signals should establis effectively without injury to the					
ambient temperature in acco	ordance with	close proximity, during firing o		Smoke emission time (min/sec)			
the manufacturer's operating i	instructions.	The specimen signal should not ignite explosively or in a					
		manner dangerous to persons	Smoke emission	quality (Continuo	us/Intermittent)		
		during the entire smoke emission time. They should emit smoke of a highly visible colour at a uniform rate for a period			Smoke emission	Landour: Deceed/E	oilod
		of not less than 15 minutes wh			Smoke emission colour: Passed/Failed		
		The colour of the smoke should be orange as defined by sections 34, 48, 49 or 50 of the publication Colour: Universal Language and Dictionary of Names.*			Comments/Observations		
		*Special Publication 440, Na Washington, DC 20402, USA.		au of Standards,			
				Passed	Failed		

Lifebuoy self-activating smoke signals	Model:	er: umber:		Surveyor:		ne:	
2.1.3.8 Heptane test Reg			ions	s: LSA Code I/1.2	2.2 & II/2.1.3.1; M	SC.81(70) 1/4.8.2,	, 1.9.4
Test Procedure		Acceptance Criteria	l			Significant Test D	ata
Three smoke signals should function in water covered by 2 mm layer of heptane		The three specimens should not ignite the heptane.		Specimen No		[
floating on a layer of water.		The specimen signal should not ignite explosively or in a			22	23	24
signal should be allowed completely.	d to burn	manner dangerous to persons close by during the entire smoke emission time.	, no	r emit any flame	Heptane ignition	(Passed/Failed)	
		They should emit smoke of a highly visible colour at a uniform rate for a period of not less than 15 minutes when		Smoke emissior	n time (min/sec)		
		floating in calm water.		5 minutes when	Smoke emission	Smoke emission quality (Continuous/Intermittent)	
		The colour of the smoke should be orange as defined by			Official childsion		
		sections 34, 48, 49 or 50 of the publicati Language and Dictionary of Names.*	on C	Colour: Universal	Smoke emission colour: (Passed/Failed)		
							<u> </u>
		*Special Publication 440, National Bu Washington, DC 20402, USA.	ecial Publication 440, National Bureau of Standards, Shington, DC 20402, USA.		Comments/Obs	Comments/Observations	
					Passed	Failed	

Lifebuoy self-activating smoke signals				Surveyor:	Time:
2.1.3.9 Laboratory smo	ke obscuration t	est	Regulatio	ns: LSA Code I/1.2	2.2 & II/2.1.3; MSC.81(70) 1/4.8.3, 1.9.4
Test Procedure		Accepta	nce Criteria		Significant Test Data
The smoke density and colousignal should be determined testing conducted at a water +20°C to +25°C as follows: The smoke should be draw apparatus consisting of a 199 duct with a fan capable of entrance air flow of 18.4 m3/m a light source with at least 10 of the tunnel and a photoeled other side the density of the should be recorded. If the pho- the total emitted light from the then the smoke density is zero means that no smoke is pass tunnel. The smoke density is to to be 100% when the photoced pick up any light of the light sou passing smoke in the tunnel. F of light which the photocell is the smoke density should Before each measurement, th of the 100% value should be measurement should be record	temperature of wn through an 0 mm diameter producing an in. By means of cd on one side ctric cell on the passing smoke otocell picks up he light source, o per cent which ing through the then considered ell is not able to urce through the rom the amount able to pick up be calculated. he light intensity checked. Each	Smoke density should be minimum emission time. The colour of the orange s means of visual comparis comparison chart contain orange colours. The colour a gloss or matte finish, and five orange colour chips, co orange (Munsell notation orange (Munsell notation orange (Munsell notation orange (Munsell notation orange (Munsell notation from reddish orange to yell at least one side to the edge should be at least 50 mm x Note 1: A typical acceptable 6/14; 10 R 6/14; 1.25 YR 6/ Note 2: ASTM D1535-97 s between Munsell notation a	moke shoul son, in day ing the ran comparison I consist of a overing the r 8.75 R 6 YR MAX) i s. The colou nother, in or lowish orang of the char 100 mm in progressio (14; 3.75 YR specifies a r	d be evaluated by light, to a colour ge of acceptable chart should have a series of at least ange from reddish /14) to yellowish n gradual steps of ar chips should be der of progression ge, and extend on t. Each colour chip size. n would be 8.75 R MAX; 5 YR MAX.	Laboratory Testing Report No. Report acceptable (Yes/No) Smoke obscuration rate achieved at -30°C % Burning time of smoke signal sec Smoke obscuration rate achieved at +20°C to +25°C% Burning time of smoke signal sec Smoke obscuration rate achieved at +65°C% Burning time of smoke signal sec Colour of smoke achieved Comments/Observations Passed Failed

Lifebuoy self-activating Model:		er: umber:		Surveyor:	ate: Time: urveyor: rganization:		
2.1.3.10 Wave test			Regulatio	ns: LSA Code I/1.2	2.2 & II/2.1.3; MSC.81(70) 1/1.9.5		
Test Procedure		Acceptance	ce Criteria		Significant Test Data		
at least 300 mm high. swa The main dur It si rate to v The mean con colo or r colo or r colo or r to v Not 10 AST		manner dangerous to persons close by, nor emit any flame			Specimen No. 25 Smoke emission timesec Smoke emission quality		
		It should emit smoke of a hig rate for a period of not less that to waves of at least 300 mm h	an 15 minute				
		The colour of the orange sm means of visual compariso comparison chart containing th colours. The colour comparis or matte finish, and consist of a colour chips, covering the (Munsell notation 8.75 R 6/14) notation 5 YR MAX) in gradu lightness. The colour chips s one another, in order of progra yellowish orange, and extend o of the chart. Each colour chip 100 mm in size.	n, in daylighe range of a on chart she a series of a range from to yellowis al steps of hould be se ession from on at least or	ght, to a colour acceptable orange build have a gloss t least five orange reddish orange n orange (Munsell nue, chroma, and cured adjacent to reddish orange to he side to the edge	Smoke emission colour: Passed/Failed Comments/Observations		
		Note: A typical acceptable prog 10 R 6/14; 1.25 YR 6/14; 3.79 ASTM D1535-97 specifies a Munsell notation and CIE coor	5 YR MAX; method to	5 YR MAX. Note:	PassedFailed		

Lifebuoy self-activating smoke signals	Manufacturer: Model: Lot/Serial Number:			Date: Surveyor: Organization:			
2.1.3.11 Attachment fittin	ng strength te	est	Regulatio	ns: LSA Code I/1.	2.2, II/2.1.3 & II/2.1.1.6; MSC.81(70) 1/1.9.6 & 10.2.8		
Test Procedure Accepta		Acceptano	ce Criteria		Significant Test Data		
A force of 225 N should be ap fitting that attaches the self-ac smoke signal to the lifebuoy. T be carried out at temperatures and +65°C.	tivating The test is to	The smoke signal or the fitting result of the test.		be damaged as a			
					Passed Failed		

ifebuoy self-activating Manufacturer: moke signals Model: Lot/Serial Number: Model:				Surveyor:	Time:		
2.1.3.12 Safety inspectio	n		Regulations: LSA Code I/1.2.2, MSC.81(70) 1/ 1.9.4/ 4.5				
Test Procedure		Acceptanc	ce Criteria		Significant Test Data		
It should be established inspection that the self-active signal:							
 is indelibly marked with clear and precise instructions on how it should be operated and mounted and that the danger end can be identified by day or night; 		marked on the smoke signal.		Markings and identification of signal: Passed Failed			
 does not depend on adhes plastic envelopes for its wa properties; and 		Adhesive tapes or plastic envelopes are not used to maintain water-resistant properties.		Water-resistant without the use of envelopes or adhesive tape. Passed Failed			
3. can be indelibly marked with means of determining its age. Date of manufactur on the outside.		Date of manufacturing and dat on the outside.	e of expiry i	ndelible printed	Smoke signal indelible date stamped Passed Failed Comments/Observations		

2.2 LIFEJACKETS AND ASSOCIATED EQUIPMENT 2.2.1 INHERENTLY BUOYANT LIFEJACKETS EVALUATION AND TEST REPORT

- 2.2.1.1 Submitted drawings, reports and documents
- 2.2.1.2 Quality assurance
- 2.2.1.3 Visual inspection
- 2.2.1.4 General data and specification
- 2.2.1.5 Temperature cycling test
- 2.2.1.6 Buoyancy test
- 2.2.1.7 Fire test
- 2.2.1.8 Oil resistance test
- 2.2.1.9 Tests of components other than buoyancy materials
- 2.2.1.10 Strength tests Body or lifting loop strength tests
- 2.2.1.11 Strength tests Shoulder lift test
- 2.2.1.12 Tests for lifejacket buoyancy material Stability under temperature cycling
- 2.2.1.13 Tests for lifejacket buoyancy material Compression and water absorption test
- 2.2.1.14 Tests for lifejacket buoyancy material Tensile strength test
- 2.2.1.15 Donning test
- 2.2.1.16 Water performance tests Preparation for water performance tests
- 2.2.1.17 Water performance tests Righting tests
- 2.2.1.18 Water performance tests Static balance measurements
- 2.2.1.19 Water performance tests Jump and drop tests
- 2.2.1.20 Water performance tests Stability test
- 2.2.1.21 Water performance tests Swimming and water emergence test
- 2.2.1.22 Infant and children's lifejacket Test subjects selection
- 2.2.1.23 Infant and children's lifejacket Water performance tests Righting test
- 2.2.1.24 Infant and children's lifejacket Water performance tests Static balance measurements
- 2.2.1.25 Children's lifejacket Water performance tests Jump and drop test
- 2.2.1.26 Infant and children's lifejacket Water performance tests Stability test
- 2.2.1.27 Infant and children's lifejacket Mobility test

2.2.1 INHERENTLY BUOYANT LIFEJACKETS EVALUATION AND TEST REPORT

Manufacturer	
Туре	
Date	
Place	
Surveyor's name (printed)	
Signature	
Approving organization	

Inherently buoyant Manufacture Iifejackets Model: 2.2.1.1 Submitted drawings, reports and		er: umber:	Date: Time: Surveyor: Organization:			
Submitted drawings and documents						
Drawing No. Revision No. & date			e of drawing	Status		
		Submitted reports and documents		Status		
Report/Document No.	Revision No. & date	Title of r	eport / document			
		Maintenance Manual -				
		Operations Manual -				

Inherently buoyant lifejackets	Manufacturer: Model: Lot/Serial Number:		Surveyor:	Time:		
2.2.1.2 Quality assurance		Regulations: - MSC.81(70) 2/1.1, 1.2				
Except where all appliances of a particular type are required by chapter III of the International Convention for the Safety of Life at Sea, 1974, as amended, or the international Life-Saving Appliance (LSA) Code, to be inspected, representatives of the Administration should make			Quality Assurance Standard Used:			
random inspections of manufacturers to ensure that the quality of life-saving appliances and materials used comply with the specification of the approved prototype life-saving appliance. Manufacturers should be required to institute a quality control procedure to ensure that life-saving appliances are produced to the same standard as the prototype life-saving appliance approved by the Administration and to keep records of any production tests carried out in accordance with the Administration's instructions.		Quality Assurance Procedure:				
		Quality Assurance Manual:				
		Description of System.				
		Quality Assurance System acceptable YesNo				
		Comments/Observations				

	erently buoyant ackets				Time:		
2.2.*	1.3 Visual inspection		Regulations: LSA Code I/1.2.2 2.2.1.5.5, 2.2.1.10, 2.2.1.13, 2.2.	2.2.1, 1.2.2.6, 1.2.2.7, 1.2.2.9, 1.2.3; LSA Code II/ 2.2.1.14, 2.2.1.5.3 2.1.16 &2.2.1.17			
	Test Procedure		Acceptance Criteria		Significant	Test Data	
.1 Approval markings be clearly marked with approval inform Administration which approved it, date of operational restrictions, and (if an infan the appropriate symbol according to rest			manufacturer any or child lifejacket)	Passed	Failed		
.2	Retro-reflective tape	with a resolu lifejact matter	ed with approved patches of retro- a total area of at least 400 c tion MSC.481(102). In the case ket, the arrangement should be which way the lifejacket is put o I be placed as high on the lifejacke	cm ² according to of a reversible complied with no on. Such material	Tape sizes (LXB) Total tape area Passed	 Failed	
.3	Lifejacket light	have p	provision to be fitted with a light;		Passed	Failed	
.4	Donning and comfort	or is donne	constructed that it is capable of bein clearly capable of being worn in d incorrectly, it is not injurious to the e comfortable to wear;	one way and, if	Passed	Failed	
.5	Whistle	be fitte lifejac	ed with a whistle firmly secured by ket;	y a lanyard to the	Passed	Failed	
.6	Colour of lifejacket		nternational or vivid reddish orang visible colour.	e or a comparably	Passed	Failed	

.7 weare	•	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. 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 a rescue boat.	Passed	Failed
.8	Oversized lifejacket	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.	Passed Comments/Observations	Failed

Inherently buoyant lifejackets	Manufacturer: Model: Lot/Serial Number:			Surveyor:		ne:
2.2.1.4 General data and s	pecifications		Regulation	s: LSA Code / M	SC.81(70)	
Construction Material:		Additional equipment	:		Donning instruct	ions:
Fabric produced by: Type: Buoyant material produced by: 		Retro reflective materia Type: Whistle: - Type: Light (if fitted):	YES	□NO □NO □NO	□ YES	□NO
туре		Туре:			Passed	Failed

Inherently buoyant lifejackets	Manufacturer: Model: Lot/Serial Number:			Surveyor:	Time:	
2.2.1.5 Temperature cyclin	ig test		Regulation	s: LSA Code I/1./	2.2.2; MSC.81(70) 1/2.1	
Test Procedu	re	Accept	ance Criteria		Significant Test Data	
 A lifejacket should be subjected cycling test of surrounding term and +65°C. These alternating follow immediately after each following procedure, repeated 10 cycles, is acceptable: 1. an 8 h exposure at a minim +65°C to be completed in ordinary room temperature of 20°C ± 3°C 3. an 8 h exposure at a max of -30°C to be completed the specimen removed from that same day and left ordinary room conditions a 20°C ± 3°C until the next dependence of the specimen removed from that same day and left ordinary room conditions a 20°C ± 3°C until the next dependence of the specimen removed from that same day and left ordinary room conditions a 20°C ± 3°C until the next dependence of the specimen removed from that same day and left ordinary room conditions a 20°C ± 3°C until the next dependence of the specimen removed from that same day and left ordinary room conditions a 20°C ± 3°C until the next dependence of the specimen removed from that same day and left ordinary room conditions a 20°C ± 3°C until the next dependence of the specimen removed from the specimen removed from the specimen removed from that same day and left ordinary room conditions a 20°C ± 3°C until the next dependence of the specimen removed from the specimen removed from the specimen removed from the specimen removed from that same day and left ordinary room conditions a 20°C ± 3°C 	ed to a temperature aperatures of -30°C g cycles need not ch other and the ed for a total of num temperature of one day; and from the warm and left exposed conditions at a until the next day; timum temperature he next day; and n the cold chamber t exposed under at a temperature of	The lifejacket materia damage such as sh dissolution or changes	l should sh irinking, crae	ow no sign of cking, swelling,	(See following page for test data)	ed
The lifejacket should then be e examined.	externally					

2.2.1.5	.1.5 Temperature cycling test – Test data Regulat		ulations: LSA Code I/1.2.2.2; MSC.81(7	tions: LSA Code I/1.2.2.2; MSC.81(70) 1/2.1		
	НОТ	CYCLE	COLL	D CYCLE		
Cycle 1	Date In:	Date Out: Time Out: Duration: hou	Date In: Time In: rs Temperature: °C	Date Out:		
Cycle 2	Date In:	Date Out: Time Out: Duration: hou	Date In: Time In: rs Temperature: °C	Date Out: Time Out: Duration: hours		
Cycle 3	Date In: Time In: Temperature:°C	Date Out: Time Out: Duration: hou	Date In:	Date Out: Time Out: Duration: hours		
Cycle 4	Date In:	Date Out: Time Out: Duration: hou	Date In:	Date Out:		
Cycle 5	Date In:	Date Out: Time Out: Duration: hou	Date In: Time In: rs Temperature: °C	Date Out:		
Cycle 6	Date In: Time In: Temperature:°C	Date Out: Time Out: Duration: hou	Time In:	Date Out: Time Out: Duration: hours		
Cycle 7	Date In: Time In: Temperature:°C	Date Out: Time Out: Duration: hou	Date In:	Date Out: Time Out: Duration:hours		
Cycle 8	Date In: Time In: Temperature:°C	Date Out: Time Out: Duration: hou	Date In:	Date Out: Time Out: Duration: hours		
Cycle 9	Date In: Time In: Temperature:°C	Date Out: Time Out: Duration: hou	Date In: Time In: rs Temperature:°C	Date Out: Time Out: Duration: hours		
Cycle 10	Date In: Time In: Temperature:°C	Date Out: Time Out: Duration: hou	Date In: Time In: rs Temperature:°C	Date Out:		

Inherently buoyant lifejackets	Manufacturer: Model: Lot/Serial Number:			Surveyor:		Time:	
2.2.1.6 Buoyancy test			Regulation	s: LSA Code II	/2.2.1.11; MSC.81	1(70) 1/2.2	
Test Procedu	ure	Accepta	ance Criteria			Significant Test D	ata
The two lifejackets subjected cycling and the hot and cold in then be used for the buoyancy The buoyancy of the two lifej measured before and after submersion to just below the water. The test to be repeate as necessary to perform the te compartment in the uninflated	flation test should y test. ackets should be 24 h complete e surface in fresh ed as many times est once with each	The difference betwee the final buoyancy sho initial buoyancy.			Start (time): Temperature: _ Finish (time): Temperature: _ Buoyancy 1	Buoyancy 2 kg	%difference % ed

Inherently buoyant lifejackets	Manufacturer: Model: Lot/Serial Number:			Date: Time: Surveyor: Organization:		
2.2.1.7 Fire test			Regulation	s: LSA Code II/2	.2.1.1; MSC.81(70) 1/1.5, 2.3	
Test Procedu	re	Accept	ance Criteria		Significant Te	est Data
A test pan 30 cm x 35 cm x 6 cm should be placed in an essentially draught-free area. Water should be put into the bottom of the test pan to a depth of 1 cm followed by enough petrol to make a minimum total depth of 4 cm. The petrol should then be ignited and allowed to burn freely for 30s. The lifejacket should then be moved through the flames in an upright, forward, free-hanging position, with the bottom of the lifejacket 25 cm above the top edge of the test pan so that the duration of exposure to the flames is 2 s.		The lifejacket should not sustain burning for more than 6 s or continue melting after being removed from the flames.		Passed	Failed	
2.2.1.8 Oil resistance test		Regulations: LSA Code II/1			.2.2; MSC.81(70) 1/1.4	
Test Procedu	re	Acceptance Criteria		Significant Test Data		
The lifejacket should be imm for a period of 24 h under 100 oil at normal room temperature	mm head of diesel	After this test, the lifeja damage such as sh dissolution or change c	rinking, crac	king, swelling,	Passed	Failed

Inherently buoyant	Manufacturer: Model: _ot/Serial Number:		Surveyor:
2.2.1.9 Tests of components	other than buoyancy materials ((Continued)	Regulations: LSA Code I/1.2.2; MSC.81(70) 1/2.4
Test Procedure	Acceptance Criteria		Significant Test Data
All the materials, other the buoyancy materials, used in construction of the lifejact including the cover, tapes, sea and closures should be tested establish that they are: .1 rot-proof, .2 colour-fast and .3 resistant to deterioration from exposure to sunlight and that they are not unduly affected by .4 seawater, .5 oil or .6 fungal attack	the acceptable to 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 (to be published)	(new materi Tear streng .1 Tens Meth (N/25 (% re .2 Resis Cycle .3 Tens Weat (N/25 (% re Acceptable .4 Tens Meth (N/25	Cover: Tapes: Seams: Additional equipment: angth as received all (N/25 mm width) :

2.2.1.9 Tests of components othe	r than buoyancy materials (Co	ontinued)	Regulations: LSA Code I/1.2.2; MSC.81(70) 1/2.4
Test Procedure	Acceptance Criteria		Significant Test Data
		Type (N/25 (% re .6 Tensi	le strength after exposure to oil of oil:
		(N/25	of oil: Duration: mm width) tained strength)
		Acceptable:	4) 🗆 Yes 🗈 No 5) 🗆 Yes 🗀 No 6) 🗆 Yes 🗆 No

Inherently buoyant lifejackets	Manufacturer: Model: Lot/Serial Number:			_ Surveyor:					
2.2.1.10 Strength tests - Bo	dy or lifting loop strength	tests	sts Regulations: LSA Code I/1.2.2; MSC.81(70) 1/2.5.1						
Test Proc	edure	Ace	ceptance Crite	eria	S	Significant Test Da	ta		
The lifejacket should be immer of 2 min. It should then be rer closed in the same manner person. A force of not less that case of a child or infant-size life for 30 min to the part of the lifej body of the wearer (see figure lifting loop of the lifejacket.	noved from the water and as when it is worn by a an 3,200 N (2,400 N in the ejacket) should be applied jacket that secures it to the a 1) and separately to the a 1) a 1)	result of this tes	st. uld be repe	damaged as a ated for each	Time: Slippage: Closure(s) tested	l: acket lifting loop te Passed	est arrangement if		

Inherently buoyant Mode	facturer: l: erial Number:			Date: Surveyor: Organization:				
2.2.1.11 Strength tests - Shoulder I	ft test		Regulation	s: LSA Cod	le I/1.2.	2; MSC	2.81(70) 1/2.5.2	
Test Procedure			eptance Crite				Significant Test Data	
The lifejacket should be immersed if for a period of 2 min. It should the removed from the water and closed on as shown in figure 2 in the same may when it is worn by a person. A force less than 900 N (700 N in the case of or infant-size lifejacket) should be ap 30 min across the form and the set section of the lifeiacket (see figure 3).	hen be a form ner as e of not a child blied for houlder he- jacket nt for It sizes The lifejacket sh Size A Adult Size A A Adult Adult Size A A Adult Size A A Adult Adult Size A A Adult Size A A Adult	B C 14 76,2 02 76,2 3,5 38,1		the form du	H 25,4 22,2 19,1	J 178 152 76,2	Force applied: Shoulder tested: Test result: Passed Failed Comments/Observations	

Inherently buoyant lifejackets	Model:	•		Date: Surveyor: Organization:					
2.2.1.12 Tests for lifejack temperature cycling	et buoyancy mat	erial – Stability under	Regula	tions:	LSA Code I/1.2.2; MSC.	81(70) 1/2.6	6 (2.6.1-2	2.6.4)	
Test Procedure	Э	Acceptance Criteria			Si	ignificant Tes	t Data		
The following tests should be of specimens of each lifejacket b A further four specimens of buoyancy material should be tensile strength test in 2.2.1.14 The specimens should be at lea and be of the same thickness lifejacket. The specimen should be dimension should be recorded the case of kapok, the entire life subjected to the test. The dim recorded at the beginning and Where multiple layers of material achieve the total thickness lifejacket, the specimens solit thinnest material used.	buoyancy material. f each lifejacket- prepared for the ast 300mm square is as used in the labelled and the prior to the test. In fejacket should be ensions should be end of these tests. erials are used to desired for the	The specimens should not s of internal and external chan structure or of mechanical qu	ge of	sign	Dimensions prior to test Specimen No. 1 Specimen No. 2 Specimen No. 3 Specimen No. 4 Specimen No. 5 Specimen No. 6 Dimensions after test Specimen No. 1 Specimen No. 2 Specimen No. 3 Specimen No. 4 Specimen No. 5 Specimen No. 5 Specimen No. 6	Length	Width	Height	
 ← Six specimens should temperature cycling as prescril ↑ The dimensions of the specimenk should be recorded at cycle. The specimens sho examined. 	pecimens (except the end of the last				Pass Specimen No.1 Specimen No.2 Specimen No.3 Specimen No.4 Specimen No.5 Mechanical qualities		and	Fail	

2.2.1.12 Tests for lifejacket buoyancy mat temperature cycling	erial – Stability under Regulations:	ations: LSA Code I/1.2.2; MSC.81(70) 1/2.6 (2.6.1-2.6.4)				
Test Procedure	Acceptance Criteria	Significant Test Data				
		 ↑ Passed Failed → Passed Failed ↓ Passed Failed 				
		Comments/Observations				
		(See following page for test data)				
 →Two of the specimens should be cut open and should be carefully examined. ↓ 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 2.2.1.8. 	The specimens should not show any sign of internal change of structure.					

Inherentl lifejacket	ly buoyant ts	Model:	nber:		Surveyor:		Time:				
2.2.1.12	Temperature cy	cling test – Test d	ata	Regul	ations: LSA Code I/1.2	ns: LSA Code I/1.2.2; MSC.81(70) 1/2.1					
		НОТ	CYCLE	•		CO	LD CYCLE				
	Date In:		Date Out:		Date In:		Date Out:				
Cycle 1	Time In:		Time Out:		Time In:		Time Out:				
-	Temperature:	O°	Duration:	hours	Temperature:		Duration:	hours			
	Date In:		Date Out:		Date In:		Date Out:				
Cycle 2	Time In:		Time Out:		Time In:		Time Out:				
-	Temperature:	°C	Duration:	hours	Temperature:		Duration:	hours			
	Date In:		Date Out:		Date In:		Date Out:				
Cycle 3	Time In:		Time Out:		Time In:		Time Out:				
-	Temperature:		Duration:	hours	Temperature:		Duration:	hours			
	Date In:		Date Out:		Date In:		Date Out:				
Cycle 4	Time In:		Time Out:		Time In:		Time Out:				
-	Temperature:	°C	Duration:	hours	Temperature:	°C	Duration:	hours			
	Date In:		Date Out:		Date In:		Date Out:				
Cycle 5	Time In:		Time Out:		Time In:		Time Out:				
-	Temperature:	°C	Duration:	hours	Temperature:	°C	Duration:	hours			
	Date In:		Date Out:		Date In:		Date Out:				
Cycle 6	Time In:		Time Out:		Time In:		Time Out:				
	Temperature:	°C	Duration:	hours	Temperature:		Duration:	hours			
	Date In:		Date Out:		Date In:		Date Out:				
Cycle 7	Time In:		Time Out:		Time In:		Time Out:				
	Temperature:	°C	Duration:	hours	Temperature:	°C	Duration:	hours			
	Date In:		Date Out:		Date In:		Date Out:				
Cycle 8	Time In:		Time Out:		lime In:		Time Out:				
	Temperature:		Duration:	hours	Temperature:	°C	Duration:	hours			
	Date In:		Date Out:		Date In:		Date Out:				
Cycle 9	Time In:		Time Out:		Time In:		Time Out:				
	Temperature:		Duration:	hours	Temperature:	°C	Duration:				
	Date In:		Date Out:		Date In:		Date Out:				
Cycle 10	Time In:		Time Out:		Time In:		Time Out:				
	Temperature:	°C	Duration:	hours	Temperature:	°C	Duration:	hours			

Inherently buoyant lifejackets	Model:	er:	Surv	eyor:	Time: on:				
2.2.1.13 Tests for lifejacket	buoyancy material	- Compression and water absorption	test	Regula	tions: LSA Code I/1.2.2; MSC.81(70) 1/2.6 (2.6.5-2.6.7)				
Test Procedu	re	Acceptance Criteria			Significant Test Data				
The following tests should be specimens of each type of lif material. The tests should be fresh water and the specin immersed for a period of sev 1.25 m head of water.	ejacket buoyancy be carried out in mens should be	The specimens should show no sign such as shrinking, cracking, swelling, change of mechanical qualities. The results should state the buoyan which each specimen exerts when s	ution or e in N,	<u>Test results</u> : Test results:	(As supplied s After 1 day (Specimens s	After 7 d			
The tests should be carried o	out:	water after 1 and 7 days immersion.		-	cycling)			-	
 .1 on two specimens as s .2 on two specimens w subjected to the tempe prescribed in 2.2.1.12; .3 on two specimens w subjected to the tempe prescribed in 2.2.1.12 diesel oil test as prescri 	wpplied; which have been erature cycling as and which have been erature cycling as followed by the	The reduction of buoyancy should not for specimens which have been exp diesel oil conditioning and should not e all specimens.	osed	to the	Specimen No. Passed Specimen No. Passed Test results: Specimen No. Passed Specimen No. Passed Comments/Obs	4 (Specimens s cycling and 5N 6N	Failed N Failed bil exposur N Failed	N % mperature re) N %	

Inherently buoyant lifejackets	Model:	ial Number:		Date: Surveyor: Organization:				
2.2.1.14 Tests for lifejack	et buoyaı	ncy material – Tensile strength test	Regulations: LSA Code I/1.2.2; MSC.81(70) 1/ 2.6.8					
Test Procedure	Test Procedure Acceptance Criteria			Significant Test Data				
Four specimens of each lif buoyancy material should be The tensile strength at break material should be measured and after the combined e described in 2.6.6.3. of MSC.	tested. k of the before xposure	When tested according to an internat standard, ISO 12402-7:2006 Pers flotation devices – Part 7: Materials components – Safety requirements and methods, acceptable to the Organization materials should have a minimum te strength of 140 kPa before exposure, w should not be reduced by more than following the combined exposures. In the case of kapok, the protective of should have a minimum breaking streng 13 kPa before exposure, which should not reduced by more than 25% following combined exposures.	sonal and I test t, the ensile vhich 25% cover gth of ot be	Test Results: (Specimens before exposure) Min. Tensile Strength =140kPa (?) Specimen No 1 Yes No Passed Failed Specimen No 2 Yes No Passed Failed Test Results: (Specimens after combined exposure) Reduction in Tensile Strength $\leq 25\%$ Specimen No 1 Yes No Passed Failed Specimen No 2 Yes No Passed Failed Test Results: (Protective cover for kapok before exposure) Min. Breaking Strength =13 kPa (?) Specimen No 1 Yes No Passed Failed Specimen No 2 Yes No Passed Failed Specimen No 2 Yes No Passed Failed Test Results: (Protective cover for kapok after combined exposure) Reduction in Breaking Strength $\leq 25\%$ Specimen No 1 Yes No Passed Failed Test Results: (Protective cover for kapok after combined exposure) Reduction in Breaking Strength $\leq 25\%$ Specimen No 1 Yes No Passed Failed Specimen No 2 Yes No Specimen No 2 Yes No Specimen N				

	rently buoyant ickets	Manufacturer: Model: Lot/Serial Number:		Surveyor:	Date: Time: Surveyor: Organization:						
2.2.1	1.15 Donning Test			Regulations: LSA Code II/2.2.1.5; MSC.81(70) 1/2.7.1 to 2.7.4.3							
	Tes	st Procedure	Acc	eptance Criteria	Significant Test Data						
ofte the Tes The pers	minimize the risk of income on in adverse conditions following features and t at subjects test should be carried sons who are complete	rrect donning by uninitiated persons, , lifejackets should be examined for rested as follows: d out with at least 12 able-bodied ly unfamiliar with the lifejacket and heights and weights in table 2.1 and	Fastenings performanc simple and positive cl require tying Adult lifejad various size and heavil should be	necessary for prop e should be few a d provide quick a osure that does r	er nd nd fit tly ets orn						
.2 .3 .4	be females, including excluding the tallest h at least one male sho weight group and one and 1.8 m; at least one subject containing a "1"; and enough additional sub containing a "X" to subjects, with no more	nore than 1/2 of test subjects should a t least 1 per height category but eight; buld be from the lowest and highest e female should be from the lowest e female should be more than 80 kg should be selected from each cell bjects should be selected from cells total the required number of test e than one subject per cell. A uniform ight ranges should be maintained.									

2.2.1.15 Donning Test							Regulations: LSA Code II/2.2.1.5; MSC.81(70) 1/2.7.1 to 2.7.4.3							
		Test Pro	cedure			Ac	ceptance C	riteria	Significant Test Data					
				Weight	range - kg									
Height range (m)	40 -43	43 - 60	60 -70	70 – 80	80 - 100	100 – 110	110 – 120	> 120	Comments/Observations:					
< 1,5	1	Х	Х	Х										
1,5 – 1,6	Х	1	1	X	Х									
1,6 – 1,7		Х	Х	1	Х	Х								
1,7 -,1,8			Х	Х	1	Х	Х	Х						
1,8 – 1,9			Х	Х	Х	1	1	Х						
> 1,9					Х	Х	Х	1						
Т	able – Tes	t subject sel	ection for a	dult lifejacke	ets				Subj	SEX (M/F)	HEIGHT (m)	WEIGHT (kg)	Good Swimmer? (Yes/No)	
									1					
									2					
									3					
									4					
									5					
									6					
									7					
									8					
									9					
									10				1	
									11					
													1	
									12	1		l		

2.2.1.15 Donning Test (Continued)	Regulations: LSA Code II/2.2.1.5; MSC	.81(70) 1/2.7.1 to 2.7.4.3
Test Procedure	Acceptance Criteria	Significant Test Data
 Clothing Each test subject should be tested wearing the clothing specified for the test and appropriate to their size, as follows: .1 <i>Normal clothing</i> means normal indoor clothing, which would not normally interfere with the donning of a lifejacket; .2 <i>Heavy-weather clothing</i> means the attire appropriate for a hostile environment, including a hooded arctic parka and warm cotton gloves. 		See following page for test data
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 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 minute. If a subject dons the lifejacket substantially correctly but fails to secure and/or adjust all closures, the jump test in 2.8.8 of MSC.81(70) and in-water performance tests in 2.8.5 of MSC.81(70) and 2.8.6 of MSC.81(70) should be performed with the lifejacket as donned to establish whether the performance is acceptable and the donning is successful.	Total number of subjects: # of subjects successful: # of subjects successful: Pass / Fail

2.2.1.15 Donning Test (Continued)	F	Regulations: LSA Code II/2.2.1.5; MSC.81(70) 1/2.7.1 to 2.7.4.3						
Test Procedure		Acceptance Criteria	Significant Test Data					
Test after instruction								
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 above.	within a p	bject should correctly don the lifejacket period of 1 min.	Pass / Fail					
Heavy-weather clothing test								
Each subject should then don the lifejacket without assistance while wearing heavy-weather clothing, using the same instruction and timing method as above.		bject should don the lifejacket correctly period of 1 min.	Pass / Fail					

Inherently buoyant Manufacturer: Iifejackets Model: Lot/Serial Number: Model:						Surveyor:					
2.2.1.15 Do	onning Test – Tes				Organization:						
		Test	without inst	ruction	Test after instruction Heavy weather clo						
Subject	Donning time (se	ec) All closures (Y/N)	secured?	Jump test (P/F)) In-	water test (P/F)	Donning Time (sec)	Donning time (sec)			
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
Comments/C	Observations:										

Inherently buoyant	Manufacturer: Model:											
lifejackets	Model: Lot/Serial Number:			Organiza	 ition:							
2.2.1.16 Water performance	tests- Preparation for water pe	erformance tests						5 & 2.: 1/Circ.1470	2.1.3 – 2.2.4	1.4;		
Test Pi	rocedure	Acceptance	Crite	ia	Significant Test Data							
the lifejacket to assist a h	nded to determine the ability of elpless person or one in an te and to show that the lifejacket ment.					-	da da					
comparison to the performan	f a lifejacket is evaluated by ice of a suitable size standard erence Test Device (RTD) as .	The RTD should and calibrated MSC.81(70), an validated acc MSC.1/Circ.1470.	accor nex cording	ding to 1, and	Calibra Test si	ated by:		dat 2.2.1.15?				
All tests should be carried conditions. Each test for a can RTD should be conducted on				Subj	SEX (M/F)	HEIGHT (m)	WEIGHT (kg)	Good Swimmer? (Yes/No)				
mentioned in paragraph 2.2.1.	out with at least 12 persons as 15. Only good swimmers should o relax in the water is rarely				1 2 3							
The test subjects should wear	only swimming costumes.				4							
Each test subject should be tests in 2.2.1.17 and 2.2.1.18 regarding relaxing and exhalir				5 6 7								
only the instructions provided taking measurements, the pro	the lifejacket, unassisted, using l by the manufacturer. Prior to per fit, donning, and fastening of d be checked and corrected as				7 8 9							
necessary.	e RTD on the subject should be checked and corrected as cessary.				10							

2.2.1.16 Water performance tests- Preparation for water pe	Regulations: MSC.81(70) 1/		Code 8.4, Ann	II/2.2.1.2.5 ex 1, MSC.1/		2.2.1.3 470	-	2.2.1.4;	
Test Procedure	Acceptance	e Criteria			Significar	t Test	Data		
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. If a "no turn" is recorded for a test subject wearing the RTD during the righting tests, the test subject may be replaced with one additional test subject from the same height and weight category.			11 12						

Inherently buoyant	Manufacturer: Model:					Date: Surve	evor:				Time:					
lifejackets	Model: Lot/Serial Number:					Orga	nizatio	n:								
2.2.1.17 Water performance te									.2.1.6.2;							
Test Procedure	Acceptance Criteria							Signifi	icant Te	st Dat	а					
Each test subject should assur a prone, face down position in t	ne the mouth of the test			CAN	DIDA	TE DEV TRI/	ICE TI	ME (se	c)		REF	ERENC	E VE TRIA	ST TIME	(sec)	
water, but with the head lifted so the mouth is out of the wat	er. subject comes clear of	Subj	#1	#2	#3	#4	#5	#6	AVG *	#1	#2	#3	#4	#5	#6	AV G *
The subject's feet should supported, shoulder width apa	rt recorded to the nearest	1														
with the heels just below t surface of the water.	from when the subject's	2														
	feet are released.	3														
After assuming a starting positi with the legs straight and an	ns conducted a total of six	4														
along the sides, the subjuct should then be instructed in t	times, and the highest															
following sequence to allow t																
body to gradually and complete	bly should then be conducted	_														
relax into a natural floati posture: allow the arms a		8														
shoulders to relax; allow the le	gs lowest times discarded	9														
to relax; and then the spine a neck, letting the head fall into t		10														
water while breathing of	Turning time: the average	11														
normally.	turn time for all subjects in the candidate lifejacket	12														
During the relaxation phase, t subject should be maintained ir	ne should not exceed the		Ave	ade c	andid	ate tur	n time	(sec):			Ave	erage R	RTD fu	Irn time	(sec):	
stable face down position.	a average time in the RTD plus 1 s, and at the end of		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,								,,,,,					
Immediately after the subject h	each righting test each	st each # of candidate no turns (NT): # of RTD no turns (NT):														
relaxed, with the face in the wat simulating a state of ut	er, face-up position where er the nose and mouth are	(* Delet Average						RTD tu	rn time R	TD +1:	s Pas	sed		_ Faile	d	
exhaustion, the subject's fe should be released.	et clear of the water.	Average candidate turn time < Average RTD turn time RTD +1s														

Inherently buoyant lifejackets	Manufacturer: Model: Lot/Serial Number:				Date: Surveyor: Organization:								
2.2.1.18 Water performanc						Code II/ 2.2.1.							
Test Proced	lure	Ac	ceptand	ce Criteria			Sign	ificant Test D	Data				
At the conclusion of the rig making any adjustments in	body or lifejacket	Freeboard (mm)			Facep	lane (deg)	Torso an	gle (deg)	Light				
position, the following meas made with the subject floating	in the relaxed face-up		CLJ	RTD	CLJ	RTD	CLJ	RTD	Visible?				
position of static balance preceding tests.	resulting from the	1											
		2											
	3												
		4											
		5					-						
		6											
		7			-								
		8			-								
		10											
		11											
		12											
	Avg							XXXXX					
		CLJ – Candi RTD – Refer		•									

2.2.1.18 Water performance tests-Static balance	emeasurements	Regulations: LSA	Code II/ 2.2.1.4; MSC.81(70) 1/ 2.8.6 and 2.8.7					
Test Procedure	Acceptano	ce Criteria	Significant Test Data					
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.	Freeboard: the aver the subjects should average for the RTE	not be less than the	Average freeboard, all subjects <u>></u> average freeboard for RTD minus 10 mm Passed Failed					
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 chin.	Faceplane Angles: subjects' faceplane not less than the ar minus 10°.	angles should be	Average faceplane angle, all subjects <u>></u> average for RTD minus 10° Passed Failed					
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).	Torso Angles: the subjects' torso ang less than the ave minus 10º.	gles should be not	Average torso angles, all subjects <u>></u> average for RTD minus 10º Passed Failed					
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.	Lifejacket light locat the lifejacket light sl visible over as grea upper hemisphere a	nould permit it to be at a segment of the	Does the location of the lifejacket light permit it to be visible over as great a segment of the upper hemisphere as practicable? Comments/Observations					

	/lodel:	mber:		Date: Surveyor: Organization:
2.2.1.19 Water performance t	tests – Jum	p and drop tests	Regulati	ons: LSA Code II/ 2.2.1.5.6; MSC.81(70)1/2.8.8 and 2.8.9
Test Procedure		Acceptance Criteria		Significant Test Data
Without readjusting the lifejacke subject should jump vertically into feet first, from a height of at leas holding the arms over the he entering the water, the test subj relax to simulate a state of utter e The freeboard to the mouth a recorded after the test subject con The test should be repeated from at least 4.5 m. When jumping into the water, the t should hold on to the lifejacket du entry to avoid possible injury. Upo the water, the test subject shou simulate a state of utter exhauss freeboard to the mouth should be after the test subject comes to res The lifejacket and its attachments examined for any damage. If believed likely from any jump or dru lifejacket should be rejected o delayed until test from a lower hei additional precautions demonstra risk from the required test is accept NOTE: JUMP TESTS <u>SHOULD</u> REPEATED IN THE RTD.	at, the test of the water, st 1m while ead. Upon ject should exhaustion. should be mes to rest. a height of test subject uring water on entering ild relax to stion. The re recorded st. a should be f injury is rop test, the or the test right or with ate that the ptable.	 Following the jump and 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 2.2.1.18 minus 15 mm; .2 not be dislodged or cause harm to the test subject; .3 have no damage that would affect its in-wate performance or buoyance and .4 have no damage to its attachments. 	1 m Ju Average (B) - (C) Did the buoyar Did the buoyar Average (B) - (C) (B) - (C) Did the buoyar (B) - (C) (B) - (C) (mp le freeboard, all subjects: mm (A) le freeboard for RTD (from 2.2.1.18): mm (B) A)= ≤ 15 mm Pass / Fail lifejacket become dislodged or cause harm to the test subject?: No lifejacket have damage that would affect its in-water performance or hce?: Yes / No lifejacket have damage to its attachments?: Yes / No

Inherently lifejackets	y buoyant s	Manufacturer Model: Lot/Serial Nur	nber:		Date: Time: Surveyor: Organization:
2.2.1.19	Water performant				Regulations: LSA Code II/ 2.2.1.5.6; MSC.81(70)1/2.8.8 and 2.8.9
TEST DAT	「A SHEET (1 m Jum				
Subj	Subject surfaced faceup? (Yes/No)	Freeboard (mm)	Lifejacket became dislodged (Yes/No)	Subject wa harmed? (Yes/No)	Pas Damage to Comments/ Observations lifejacket or attachments (Yes/No)
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					

Inherently lifejackets		Manufacturer: _ Model: Lot/Serial Numb	per:		Time:		
2.2.1.19	Water performant					ons: LSA Coo	e II/ 2.2.1.5.6; MSC.81(70)1/2.8.8 and 2.8.9
TEST DATA	A SHEET (4.5 m Ju	mp)					
Subj	Subject surfaced faceup? (Yes/No)	Freeboard (mm)	Lifejacket became dislodged (Yes/No)	Subject was harmed? (Yes/No)	lifej atta	mage to acket or achments s/No)	Comments/ Observations
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							

Inherently buoyant lifejackets	Model:	urer: Number:		Surveyo	or:									
2.2.1.20 Water performan	ce tests – Sta	ability test	Regulation	s: LSA C	ode II/2.2	2.1.4; N	/ISC.81()	70) 1/2.	.8.10					
Test Procedure	Acceptance Criteria	Significant Test Data												
The test subject should atta face-up position of static ba water. The subject should b to assume a foetal position	lance in the e instructed	The candidate lifejacket should not roll any subject face down in the water.		Did	the subj down?				the subj able face (Ye					
"place your elbows against your hands on your stomacl		(a) + (b) = 0		Can	didate	R	TD	Can	didate	F	RTD			
lifejacket if possible, and	bring your	The number of subjects who are returned to the stable face-	Subj	CW	ccw	CW	CCW	cw	ccw	CW	CCW			
knees up as close to your chest as possible." 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		2												
		3												
by grasping the subject's supper areas of the lifejacket	shoulders or	face-up foetal position in the RTD.	4											
subject attains a $55 \pm 5 \text{ deg}$ subject should then be rel	ree list. The	(e) ≤ (g)	5											
subject should return to a sta position.		And	6											
		(f) ≤ (h)	8											
The test should then be cor the subject rotated countercl			9											
The entire test should then	be repeated		10											
The entire test should then be repeated with the test subject wearing the RTD.		11												
			12											
			Total "No"	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)			

Inherently buoyant lifejackets	Model:	er:		Date: Time: Surveyor: Organization:						
2.2.1.21 Water performance test	tests - swim	ming and water emergence	Regulations	s: LSA Co	de II/2.2	2.1.4; MSC.8	31(70) 1/2.8.11			
Test Procedure		Acceptance C	Criteria				Significant Te	st Data		
All test subjects, without w lifejacket, should attempt to and board a liferaft or rigid pl its surface 300 mm above surface. All test subjects who s complete this task should perfe	swim 25 m latform with the water successfully	At least two-thirds of the accomplish the task without also be able to perform it with $(b) \ge 2/3$ (a)	the lifejacke	t should	Liferaf	t or Rigid Pla I whether tea		n successfully board liferaft		
complete this task should performed wearing the lifejacket.	orm it again				Subj 1 2 3 4 5 6 7 8 9 10 11 12	Without lifejacket	With lifejacket	(b) 2/3 (a) Passed / Failed		
					Total Comm	_(a) ents/Observ	(b) ations]		

Inherently buoyant lifejackets	Manufactur Model: Lot/Serial N									[3 (Date: Surve Drgan	yor: izati	on:		Tir	ne:		
2.2.1.22 Infant and children																1/2.9 – 2.9		
Test Procedure					A	ccep	tance	e Crit	eria						S	ignificant To	est Data	
As far as possible, similar tes adult tests) should be ap approval of lifejackets sui	oplied for	Heigh	Та	ble 2.	2 - S(ge (kg)		bjects	5		Size: Ir	nfant / C	hild		
infants and children.		t range	14 -	17 -	20 -	22	25 -	28 -	30 -	33	-	38	-					
For child-size lifejackets, tes be carried out with at leas		(cm) 79-	17	20 X	22	25	28	30	33	36	38	41	43	Subj	SEX (M/F)	HEIGHT (m)	WEIGHT (kg)	Manikin? (Yes*/No)
bodied persons, and for i	nfant-size	105												1				
lifejackets, tests should be c with at least 5 able-bodied pe		90- 118		Х	1									2				
All test subjects should be	selected	102- 130				1	х							3				
according to table 2.2 or tab follows:		112- 135					х	1						4 5				
.1 One subject should be sel each cell containing a "1".		122- 150							1	1	х			6				
C C		145- 165									х	1	1	7				
.2 Remaining subjects sl selected from cells cont														8				
"X", without repeating a ce	ell.													9				
.3 At least 40% of the subject																		
be male and at least 40%	temale.																	
.4 Devices for infants should on infants as small as 6 kg															<u> </u>			
	-													*Manikir	n descrip	tion:		

2.2.1.22 Infant and children's lifejacket -	Test subjects sele	ction	Regulat	ions: LSA	Code II/2.	2.1.8; MSC.81(70) 1/2.9 – 2.9.1
Test Procedure		Acceptanc	e Criteria	а		Significant Test Data
.5 A manikin or manikins may be substituted for test subjects if the	Table 2.3 -	Selection of	f Infant T	est Subjec	ts	
manikin or manikins have been	Height range		Weight F	Range (kg)	1	
demonstrated to provide representative results compared to	(cm)	Less tha	n 11	11-14	14-17	
human subjects.	Less than 83	1		Х		
	79-105	Х		1	1	
	90-118				Х	

Inherently buoyant lifejackets	Manufacturer: Model: Lot/Serial Number:			Date: Time: Surveyor: Organization:							
	Idren's lifejacket – nance tests – Righting test		Regulations: LSA Code II/ 2.2.1.8; MSC.81(70)1/ 2.9.2-2.9.3, Annex 2, A								
Test Pro	ocedure	A	cceptance Cri	teria	Significant test data						
This portion of the test is inte of the lifejacket to assist a h exhausted or unconscious lifejacket does not unduly res	elpless person or one in an state and to show that the	calibrated	according	constructed and to resolution s applicable to the	RTD Size: Infant / Child RTD Constructed by: date:						
The in-water performance or comparison to the perform standard reference lifejacket (RTD) as specified in append	mance of a suitable size t, i.e. Reference Test Device				Validated by: date: Calibrated by: date:						
All tests should be carried of conditions. Each test for a relevant RTD should be con-	candidate lifejacket and the										
The tests may be modified to 12 years of age who are not to ensure their safety and co	comfortable in water, so as										
Prior to taking measurement and fastening of the RTD checked and corrected as not	on the subject should be										
After entering the water, car that there is no significant a trapped in the lifejacket or sy	amount of air unintentionally										

Inherently buoyant	Anufacturer:						Date: Time:									
lifejackets	Model: Lot/Serial Number:					Surveyor: Organization:										
	Lot/Serial Number:					0	rganiza	tion: _								
2.2.1.23 Infant and children's Righting test (Contin	ance tes	ts –	Regu	latior	is: L	SA Coo	de II/ 2	2.2.1.8;	MSC.8	31(70)	1/ 2.9.	2-2.9.	3, Ann	ex 2, A	nnex 3	
Test Procedure	Acceptance Criteria	Acceptance Criteria Significant Test Data														
Each test subject should assume a prone, face down position in the water, but with the head lifted up	the mouth of the test	• • •		CAN	CANDIDATE DEVICE TIME (sec) TRIAL REFERENCE VEST TIME (sec) TRIAL							:)				
water, but with the head lifted up so the mouth is out of the water	subject comes clear of	Subj	#1	#2	#3	#4	#5	#6	AVG *	#1	#2	#3	#4	#5	#6	AVG *
The subject's feet should be supported, shoulder width apart,	recorded to the nearest	1														
with the heels just below the		2														
surface of the water.	-	3														
After assuming a starting position with the legs straight and arms	released.	4														
		5														
along the sides, the subject should then be instructed in the	conducted a total of six times, and the highest	6														
following sequence to allow the	and lowest times	7														
body to gradually and completel relax into a natural floating		8														
posture: allow the arms an		9														
shoulders to relax; allow the leg																
to relax; and then the spine and neck, letting the head fall into the																
water while breathing ou																
normally. During the relaxation phase, the subject should be maintained in a stable face down position.	Turning time: the average turn time for all		Aver	age ca	ndida	te tu	rn time	(sec):			Ave	erage R	TD tu	rn time	(sec):	
	subjects in the candidate			# of c	andid	ate r	o turns	(NT):				# of	RTD n	no turns	(NT):	
	a lifejacket should not exceed the average time in the RTD plus 1 s.	(* Delet	e high					•							•	
		Average	e canc	lidate t	urn tin	ne <u><</u> A	Verage	RTD tu	urn time l	RTD +	1s Pa	assed _		Fai	led	
		# of car	ndidate	e no tu	rns (N	Г): <u><</u>	# of RTE) no tur	ms (NT):		Pa	assed _		Fai	led	

2.2.1.23 Infant and children's li Righting test (Continue		ance tests – Regulations: LSA Code II/ 2.2.1.8; MSC.81(70)1/ 2.9.2-2.9.3, Annex 2, Annex 3
Test Procedure	Acceptance Criteria	Significant Test Data
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.	turns", if any, should not	Commenta/Observations.

Inherently buoyant lifejackets	Manufacturer: Model: Lot/Serial Number:				Date: Surveyor: Organization:								
2.2.1.24 Infant and children's lifejacket – Water performance test – Static balance measurements					e tests Regulations: LSA Code II/ 2.2.1.8; MSC.81(70)1/ 2.8.6, 2.9.2-2.9.3, Annex 2 & 3								
Test Procedure			Significant Test Data										
At the conclusion of the rightir any adjustments in body or following measurements sho	lifejacket position, the		Free	eboard (mm)		Faceplar	Faceplane (deg)		gle (deg)	Light			
subject floating in the relaxed f balance resulting from the pred	ace-up position of static		CLJ		RTD	CLJ	RTD	CLJ	RTD	Visible?			
c .	°	1											
Infant lifejackets should meet the turning time and freeboard requirements, however, the requirements for		2											
torso angle, faceplane and mo		3											
necessary in order to:		4											
.1 contribute to the rescue	e of the infant by a	5											
caretaker;		6											
.2 allow the infant to be faste		7											
contribute to keeping th caretaker;	e mant close to the	8											
.3 keep the infant dry, with free	e reeniratory passages:	9											
.4 protect the infant against the evacuation; and	bumps and jolts during												
.5 allow a caretaker to monitor and control heat loss by the infant.		Avg								XXXXX			
		CLJ – Candi RTD – Refei											

	Inherently buoyant Manufacturer: lifejackets Model: Lot/Serial Number: Model:					Date: Time: Surveyor: Organization:					
2.2	2.1.24 Infant and children's Static balance mea			Regulatio 3	ns: L	: LSA Code II/ 2.2.1.8; MSC.81(70)1/ 2.8.6, 2.9.2-2.9.3, Annex 2 &					
	Test Procedure		Acceptance Criteria			Significant Test Data					
 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 			subjects should not be less than the average for the RTD minus 10 mm								
2.	side of the mouth should be the left and right sides are re- Faceplane angle – The and the surface of the water, formed between the most of the forehead and chin.	not level. ngle, relative to of the plane	Faceplane Angles: The av subjects' faceplane angles s less than the average for the P	should be	not	$t \mid_{100}$					
3.	Torso angle – The ang vertical, of the line formed points of the shoulder and portion of the pelvis).	by the forward	Torso Angles: the average of torso angles should be not average for the RTD minus 10	less than							
4.	List angle – The angle is surface of the water and a lin left and right shoulder or a lin ears if only the head is tilted	ne between the ine through the	Lifejacket light location: the lifejacket light should permit over as great a segment hemisphere as is practicable.	it to be vis of the up	ible	Does the location of the lifejacket light permit it to be visible over as great a segment of the upper hemisphere as practicable?					
						Comments/Observations:					

Inherently buoyant lifejackets	Manufacturer: _ Model: Lot/Serial Numl	Der:	Date: Time: Surveyor: Organization:
2.2.1.25 Children's lifejack test	et – Water perfor	mance tests – Jump and drop	Regulations: LSA Code II/2.2.1.8, 2.2.1.5.6; MSC.81(70) 1/ 2.9, 2.8.8, 2.8.9
Test Procedu	re	Acceptance Criteria	Significant Test Data
Without readjusting the life subject should jump vertical feet first, from a height of a holding the arms over the hea the water, the test subject simulate a state of utter e freeboard to the mouth sho after the test subject comes should be repeated from a 4.5m.	lly into the water, at least 1m while ad. Upon entering t should relax to exhaustion. The ould be recorded to rest. The test	Five of the nine subjects should perform the jump and drop test. When conducting water performance tests under 2.8, infant and child-size lifejackets should meet the following requirements for their critical flotation stability characteristics.	See following page for test data 1 m Jump Average freeboard, all subjects: mm (A) Average freeboard for RTD (from 2.2.18) : mm (B) (B) – (A)= \leq 15 mm Pass / Fail Did the lifejacket become dislodged or cause harm to the test subject?: Yes / No
When jumping into the wate should hold on to the lifejac entry to avoid possible injur the water, the test subject simulate a state of utter freeboard to the mouth sho after the test subject comes to The lifejacket and its attach examined for any damage. It likely from any jump or drop should be rejected or the test from a lower height or precautions demonstrate that required test is acceptable.	cket during water ry. Upon entering t should relax to exhaustion. The build be recorded to rest. ments should be f injury is believed test, the lifejacket t delayed until test with additional	 Following the jump and 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 2.2.1.23 minus 15 mm; .2 not be dislodged or cause harm to the test subject; 	 4.5 m Jump Average freeboard, all subjects: mm (A) Average freeboard for RTD (from 2.2.18) : mm (B) (B) - (A)= ≤ 15 mm Pass / Fail Did the lifejacket become dislodged or cause harm to the test subject?: Yes / No
<u>NOTE</u> : JUMP AND DROP T <u>NOT</u> BE REPEATED IN THE			Did the lifejacket have damage that would affect its in-water performance or buoyance?: Yes / No

2.2.1.25 Children's lifejacket – Water perfor test	mance tests – Jump and drop	Regulations: LSA Code II/2.2.1.8, 2.2.1.5.6; MSC.81(70) 1/ 2.9, 2.8.8, 2.8.9
Test Procedure	Acceptance Criteria	Significant Test Data
Note: Water tests using children should avoid causing distress or risk to the child. Consideration should be taken of their age and ability.	performance or buoyance;	Did the lifejacket have damage to its attachments?: Yes / No Comments/Observations

Inherently buoyant Manufacturer: lifejackets Model: Lot/Serial Number: Model:						Surveyor:	Time:				
2.2.1.25 C	hildren's lifejacket	- Water perform		Organization:							
J	ump and drop tests	5									
	A SHEET (1 m Jump	/									
Subj	Subject surfaced faceup? (Yes/No)	Freeboard (mm)	Lifejacket became dislodged (Yes/No)			nage to lifejacket or chments (Yes/No)	Comments/ Observations				
1											
2 3											
4											
5											
-											
	hildren's lifejacket ump and drop tests		mance tests – R	Regulations: LSA Code II/ 2.2.1.8, 2.2.1.5.6; MSC.81(70)1/2.9, 2.8.8 and 2.8.9							
TEST DAT	A SHEET (4.5 m Jur	np)	ľ								
Subj	Subject surfaced faceup? (Yes/No)	Freeboard (mm)	Lifejacket became dislodged (Yes/No)	Subject was harmed? (Yes/No)		nage to lifejacket or chments (Yes/No)	Comments/ Observations				
1											
2											
3											
4 5											
5				+							
				1							

Inherently buoyant lifejackets	Model: _	urer:		Surveyo	or:							
2.2.1.26 Infant and children's lifejacket – Water performance tests – Stability test			Regulations: LSA Code II/2.2.1.8, 2.2.1.4; MSC.81(70) 1/2.8.10, 2.9									
Test Procedure Acceptance Criteria			Significant Test Data									
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:		The candidate lifejacket should not roll any subject face down in the water.			the subj down?(the subj Ible face (Ye			
"place your elbows against your sides, your hands on your stomach, under the	(a) + (b) = 0		Can	didate	RTD		Candidate		RTD			
lifejacket if possible, and I knees up as close to your possible." The subject should be rotated around the longitudinal axis of by grasping the subject's sh upper areas of the lifejacket subject attains a 55 ± 5 degre subject should then be rele subject should return to a stat position.	bring your chest as d clockwise of the torso noulders or so that the ee list. The based. The ble face-up	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. (e) \leq (g) And (f) \leq (h)	Subj 1 2 3 4 5 6 7 8									
the subject rotated counterclo The entire test should then be with the test subject wearing	ockwise. e repeated		9 Total "No"	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	

Inherently buoyant lifejackets	Manufactur Model: Lot/Serial N	er:		Surveyor:	Time:				
2.2.1.27 Infant and children	's lifejacket ·	- Mobility test	Regulation	egulations: LSA Code II/2.2.1.8; MSC.81(70) 1/2.9.2.5					
Test Procedure		Acceptanc	e Criteria		Significant Test Data				
To be considered in and out of Mobility of the subject both in the water should be given considetermining the acceptability for approval and should be c mobility when wearing the size RTD when climbing out c going up and down stairs, pic article from the floor, and the from a cup.	and out of sideration in of a device ompared to appropriate of the water, cking up an	Assistance may be given to wearer mobility should not be than by the appropriate size R	reduced to an		Does the lifejacket provide for acceptable mobility of the test subjects both in and out of the water and is comparative to the mobility of wearing the RTD? YES NO Passed Failed Method of evaluation: Comments/Observations				

2.2.2 INFLATABLE LIFEJACKETS (ADULTS & CHILD) EVALUATION AND TEST REPORT

- 2.2.2.1 Submitted drawings, reports and documents
- 2.2.2.2 Quality assurance
- 2.2.2.3 Visual inspection
- 2.2.2.4 General data and specification
- 2.2.2.5 Temperature cycling test 2.2.2.5.1 Inflation system function 2.2.2.5.2 Test data
- 2.2.2.6 Buoyancy test
- 2.2.2.7 Fire test
- 2.2.2.8 Oil resistance test
- 2.2.2.9 Test of materials for inflatable bladders, inflation systems and components
 - 2.2.2.9.1 Coated fabrics test
 - 2.2.2.9.2 Operating head load test
 - 2.2.2.9.3 Pressure test
 - 2.2.2.9.4 Compression test
 - 2.2.2.9.5 Test of metallic components
 - 2.2.2.9.6 Inadvertent inflation test
- 2.2.2.10 Strength tests Body or lifting loop strength test
- 2.2.2.11 Strength tests Shoulder lift test
- 2.2.2.12 Donning test (Uninflated situation)
- 2.2.2.13 Donning test (Inflated situation)
- 2.2.2.14 Water performance tests Preparation for water performance test
- 2.2.2.15 Water performance tests Righting test
- 2.2.2.16 Water performance tests Static balance measurements
- 2.2.2.17 Water performance tests Jump and drop test
- 2.2.2.18 Water performance tests Stability test
- 2.2.2.19 Water performance tests Swimming and water emergence test
- 2.2.2.20 Infant and children's lifejacket Test subjects
- 2.2.2.21 Infant and children's lifejacket Water performance tests Righting test
- 2.2.2.22 Infant and children's lifejacket Water performance tests Static balance measurements
- 2.2.2.23 Children's lifejacket Water performance tests Jump and drop test
- 2.2.2.24 Infant and children's lifejacket Water performance tests Stability test
- 2.2.2.25 Infant and children's lifejacket Mobility test

2.2.2 INFLATABLE LIFEJACKETS (ADULTS & CHILD) EVALUATION AND TEST REPORT

Manufacturer	
Туре	
Date	
Place	
Surveyor's name (printed)	
Signature	
Approving organization	

Inflatable lifejackets (Adults & Child) Manufacturer:			Surveyor:				
2.2.2.1 Submitted	drawings, reports and	d documents					
	Submitted drawings and documents						
Drawing No.	Revision No. & date		Title of drawing				
		Submitted reports and docu		Status			
Report/Document No.	Revision No. & date	Ti	itle of report / document				
		Maintenance Manual -					
		Operations Manual -					

	Manufacturer: Model: Lot/Serial Number:	Surveyor:				
2.2.2.2 Quality assurance		Regulations	: - MSC.81(70) 2/1.1, 1.2			
Except where all appliances of a of the International Convention amended, or the international L inspected, representatives of th inspections of manufacturers to appliances and materials used approved prototype life-saving a Manufacturers should be required to ensure that life-saving appliant as the prototype life-saving appliant	a particular type are required by chapter III for the Safety of Life at Sea, 1974, as Life-Saving Appliance (LSA) Code to be he Administration should make random to ensure that the quality of life-saving d comply with the specification of the appliance. ed to institute a quality control procedure nces are produced to the same standard iance approved by the Administration and on tests carried out in accordance with the	Quality Assur Standard Use Quality Assur Quality Assur Description o	rance ed: rance Procedure: rance Manual: if System: rance System acceptable	Yes/No		

Model:		Manufacturer: Model:			Time:		
(Adults &	Child)	Lot/Serial Number:		Organization: _			
2.2.2.3	Visual inspection		Regulations	LSA Code I/1.2	2.2 & II/2.2		
	Test Procedure	Acceptan	ice Criteria		Significar	nt Test Data	
		Inflatable lifejackets should:					
1. Appr	oval markings	be clearly marked with appr Administration which approve any operational restrictions;			Passed	Failed	
2. Retro	o-reflective tape	with a total area of at l resolution MSC.481(102). Ir	be fitted with approved patches of retro-reflective material with a total area of at least 400 cm ² according to resolution MSC.481(102). In the case of a reversible lifejacket, the arrangement should be complied with no			 Failed	
		matter which way the lifejac should be placed as high on	cket is put on.	Such material	Passed		
3. Lifeja	acket light	have provision to be fitted wit	h a light;		Passed	Failed	
4. Donr	ning and comfort	be so constructed that it is can or is clearly capable of being incorrectly, it is not injurious to comfortable to wear;	worn in one way	and, if donned	Passed	Failed_	
5. Whis	stle	be fitted with a whistle firmly lifejacket;	y secured by a	lanyard to the	Passed	Failed	
6. Colo	ur of lifejacket	be of international or vivid re highly visible colour.	ddish orange o	a comparably	Passed	Failed	

7. Buoyant Line & Means to lift the wearer	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. 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.	Passed	Failed
8. Oversized lifejacket	If an adult life jacket is not designed to fit persons weighing up to 140 kg and with a chest girth of up to 1750 mm, suitable accessories shall be available to allow it to be secured to such persons.	Passed	Failed
9. Damaged in stowage and operation	A lifejacket shall not be damaged in stowage throughout the air temperature range -30°C to +65°C and remain operational throughout the air temperature range -15°C to +40°C. (After testing of temperature cycling.)	Passed	Failed
		Comments/Observations	

Inflatable lifejackets (Adults & Child)	Model:	rer: Number:		Surveyor:		Time:		
2.2.2.4 General data and specifications			Regulation	Regulations: LSA Code II/2.2; MSC.81(70)				
Construction Material:		Additional equipment:			Donning instrue	ctions:		
Fabric produced by:		Retro reflective material: -		□NO		□NO		
		Туре:						
Туре:		Whistle: - Type:	□ YES	□NO				
Inflation system produced by:		Light (if fitted):	□ YES	□NO				
Туре:		Туре:						
Cover fabric produced by:		Marked	size	range:				
Туре:								
Fabric for the inflatable of Produced by:	hamber	Proper marking for infants a lifejacket:	and children's	□NO	Passed	Failed		
Туре:								
Size and type of gas:								
Means of activating the inflation system:								

Inflatable lifejackets (Adults & Child)	Model: Surveyor:				Time:		
2.2.2.5 Temperature cycling	g test		Regulations:		.2.2 & 1.2.2.3; MSC.81(70) 1/2.10.1.1		
Test Procedure		Acce	otance Criteria		Significant Test Data		
 Two inflatable lifejackets sho to a temperature cycling test temperatures of -30°C and uninflated condition. These a need not follow immediately and the following procedure total of 10 cycles, is acceptab 1. an 8 h exposure at a minimi +65°C to be completed in of 2. the specimens removed chamber that same day under ordinary room of temperature of 20°C ± 3°C for 3. an 8 h exposure at a maxim -30°C to be completed the r 4. the specimen removed from that same day and left exposing that same day and left exposing that same day and left exposing the specimen at a tem ± 3°C until the next day; 	at of surrounding d +65°C in the alternating cycles after each other , repeated for a le: um temperature of ne day; and from the warm and left exposed conditions at a until the next day; um temperature of next day; and n the cold chamber sed under ordinary	Two uninflated inflata of the temperature externally. The inflata show no signs of cracking, swelling mechanical qualities. Temperature test data	cycling should able lifejacket m damage such dissolution or	be examined aterials should as shrinking, changes of	Examination 1. Lifejacket No. 1 Passed Failed 2. Lifejacket No. 2 Passed Failed 3. Cold inflation test, auto inflation Temperature of water°C. Time to inflate and relief valves blowing sec. Auto inflation PassedFailed 4. Cold inflation test, manual inflation Temperature of water°C. Time to inflate and relief valves blowing sec Manual inflation PassedFailed		

Model: Surveyor:				Surveyor:	Time:		
2.2.2.5.1 Temperature cycling					2.2 & 1.2.2.3; MSC.81(70) 1/2.10.1.1 - 2.10.1.3		
Test Procedur	e	Acceptance Criteria			Significant Test Data		
 The automatic and manual is should each be tested immediate temperature cycling test as foll 1. After a high temperature inflatable lifejackets should be stowage temperature of + 6 be activated using the ausystem by placing it in temperature of + 30°C and th activated using the manual in 2. After a low temperature inflatable lifejackets should be stowage temperature of -30° activated using the automatic by placing it in seawater at a 1°C and the other should be the manual inflation system. After exposure to a temperature period of at least 8 h, two lifejactivated using the manual infl should fully inflate. 	diately after each lows: cycle, the two be taken from the 55°C. One should utomatic inflation seawater at a ne other should be inflation system. cycle, the two be taken from the C. One should be c inflation system a temperature of - e activated using ure of -15°C for a ejacket should be lation system and re of +40 °C for a ackets should be	The lifejackets should f tests. Each should fully The lifejackets should f tests. Each should fully	y inflate.		 .5 Hot inflation test, automatic inflation Temperature of water°C. Time to inflate and relief valves blowing sec Automatic inflation PassedFailed .6 Hot inflation test, manual inflation Temperature of water°C. Time to inflate and relief valves blowing sec Manual inflation PassedFailed .7 Exposure to temperature of -15°C for 8h Did the two lifejackets fully inflate using the manual inflation system? Passed Failed .8 Exposure to temperature of +40°C for 8h Did the two lifejackets fully inflate using the manual inflation system? Passed Failed 		

Inflatable lifejackets (Adults & Child) Manufacturer: Model: Lot/Serial Number:				Surveyor:		Time:		
2.2.2.5.2 Temperature cycling test – Test data Regulations: LSA Code I/1.2.2.2 & 1.2.2.3; MSC.81(70) 1/2.10.1.1							0.1.1	
		HO	T CYCLE			COL	LD CYCLE	
Cycle 1	Date In: Time In: Temperature:		Date Out: Time Out: Duration:		Date In: Time In: Temperature:		Date Out: Time Out: Duration:	
Cycle 2	Date In: Time In: Temperature:		Date Out: Time Out: Duration:		Date In: Time In: Temperature:		Date Out: Time Out: Duration:	
Cycle 3	Date In: Time In: Temperature:		Date Out: Time Out: Duration:		Date In: Time In: Temperature:		Date Out: Time Out: Duration:	
Cycle 4	Date In: Time In: Temperature:		Date Out: Time Out: Duration:		Date In: Time In: Temperature:		Date Out: Time Out: Duration:	
Cycle 5	Date In: Time In: Temperature:		Date Out: Time Out: Duration:		Date In: Time In: Temperature:		Date Out: Time Out: Duration:	
Cycle 6	Date In: Time In: Temperature:		Date Out: Time Out: Duration:		Date In: Time In: Temperature:		Date Out: Time Out: Duration:	
Cycle 7	Date In: Time In: Temperature:		Date Out: Time Out: Duration:		Date In: Time In: Temperature:		Date Out: Time Out: Duration:	
Cycle 8	Date In: Time In: Temperature:		Date Out: Time Out: Duration:		Date In: Time In: Temperature:		Date Out: Time Out: Duration:	
Cycle 9	Date In: Time In: Temperature:		Date Out: Time Out: Duration:		Date In: Time In: Temperature:		Date Out: Time Out: Duration:	
Cycle 10	Date In: Time In: Temperature:		Date Out: Time Out: Duration:		Date In: Time In: Temperature:		Date Out: Time Out: Duration:	

Inflatable lifejackets (Adults & Child)	Manufacturer: Model: Lot/Serial Number:			Surveyor:	Time:		
2.2.2.6 Buoyancy test		Regulations: LSA Code II/2.2.2.3, 2.2.2; MSC.81(70) 1/2.2, 2.10.1.1					
Test Pr	ocedure	Acc	eptance Cr	iteria	Significant Test Data		
 and cold inflation test should test. The buoyancy of the two lifejacl and after 24 h complete submining fresh water. The test to be necessary to perform the test of the uninflated condition. A lifejacket subjected to the automatically with one comparishes and be repeated until each of the uninflated condition. (The following equipment alternatives may be used to callifejacket: 1. a mesh basket or tray large of and adequate weights to on lifejacket; 2. a tank of fresh water large 	vercome the buoyancy of the enough to accommodate the cket with the uppermost part of he surface of the water; and 0 ± 0.015 kg. corded at the start of each test	buoyancy a should not e buoyancy.	nd the fir exceed 5% er should t	en the initial hal buoyancy of the initial be fitted with	1. Lifejacket No.1 Weight of the mesh basket with the lifejack Weight of the mesh basket without the lifej Buoyancy of front chamber at start Buoyancy of front chamber at 24 hr Difference in buoyancy < 5%	jacket:Kg. Kg. Kg. Kg. Kg. Kg. Kg. Kg. Kg. Kg. Kg.	

Inflatable lifejackets (Adults & Child)	Manufacturer: Model: Lot/Serial Number:			Date: Surveyor: Organization:	Time:			
2.2.2.7 Fire test			Regulatio	ons: LSA Code II/2.2	2.1.1; MSC.81(70) 1/2.3, 2.10.1	.1		
Test Pr	ocedure	/	Acceptance	Criteria	Significant Tes	Significant Test Data		
and cold inflation test should the lifejacket should be inflated and A test pan 30 cm x 35 cm x essentially draught-free area. bottom of the test pan to a de petrol to make a minimum total then be ignited and allowed the lifejackets, one inflated the of moved through the flames in a position, with the bottom of the	with correct gas cylinder: temperature cycling and the hot ten be used for the fire test. One d one uninflated during the test. 6 cm should be placed in an Water should be placed in an Water should be put into the pth of 1 cm followed by enough depth of 4 cm. The petrol should o burn freely for 30 s. The two ther uninflated, should then be in upright, forward, free-hanging e lifejacket 25 cm above the top the duration of exposure to the	burning for melting after The inflated a result of pa	more than being remo lifejacket sh assing throu	hould not sustain 6 s or continue ved from the flame. hould not deflate as gh the flames. ould remain inflated t.	Size of pan x 1. Lifejacket No.1 Passed 2. Lifejacket No.2 Passed Comments/Observations	x cm. Failed		

Inflatable lifejackets (Adults & Child)	Manufacturer: Model: Lot/Serial Number:			Date: Surveyor: Organization:			
2.2.2.8 Oil resistance test		Regulations: LSA Code I/1.2.2.4; MSC.81(70) 1/2.4					
Test Pr	ocedure	ŀ	Acceptance	Criteria	Significant Test Data		
resistance test. The lifejacket should be immer	s should be subjected to the oil rsed horizontally for a period of of diesel oil at normal room	examined ex sign of dama	xternally an age such as dissolution	ejacket should be d should show no shrinking, cracking, or change of	Condition of Lifejacket No.1 after 24 hours. Passed Failed Condition of Lifejacket No.2 after 24 hours. Passed Failed Comments/Observations		

Model:				n:		
2.2.2.9 Tests of materials for inflatable bladders, inflation systems and components			ns: LSA Co	de I/1.2.2.1	1, 1.2.2.4 & 1.2.2.5;	MSC.81(70) 1/2.4, 2.10.4 -
Test Procedure	Acceptance Criteria			Si	gnificant Test Data	
All the materials used in the construction of the lifejacket, including the cover, tapes, seams and closures, inflatable bladders, inflation systems & components should be tested to establish that they are: .1 rot – proof, .2 colour-fast; and .3 resistant to deterioration from exposure to sunlight, and that they are not unduly affected by .4 seawater; .5 oil; or .6 fungal attack	the International Organization for Standardization, in particular publication ISO 12402-7:2006	<u>Cover</u> :		<u>Seams:</u>	Additional)

	latable lifejackets dults & Child)	Model:	Surveyor:			Time:				
2.2	2.2.9.1 Coated fabrics test			Regulations:	LSA Code I/1.	2.2.1, 1.2.2.4 & 1.2.2.5; MSC.81(70) 1/2.10.4.1.1-4				
	Test Procedure		Acceptance Criteria			Significant Test Data				
Coated fabrics used in the construction of inflatable buoyancy chambers should comply with the following requirements:										
 Coating adhesion should be tested in accordance with ISO 2411:2000 using the method described at paragraph 5.1 at 100mm/min 			(1) After being tested accord coating adhesion should not by width.				Coating Adhesic N,		· Test Results in th Weft Failed	
2.	when wet following ageing a ISO 188:2007 with an expo \pm 0.5 h in fresh water at (70 following which the meth	when wet following ageing according to SO 188:2007 with an exposure of 336 0.5 h in fresh water at (70.0 ± 1.0) °C blowing which the method at ISO 411:2000, paragraph 5.1 should be			ording to ISO 188:2007, the should not be less than 40 N Warp Pass			()	- Test Results in th Weft Failed	
3.	tear strength should be accordance with ISO 4674- ISO 4674-2:1998 using met	1:2003 and	(3) After being tested accord ISO 4674-2:1998, method A1 be less than 35 N.			3. Passec 4.	Tear strength:		Failed	_N
4.	resistance to flex cracking tested in accordance 7854:1995 method A using cycles.	with ISO	(4) After being tested accordir A there should be no visible c		Passec	ents/Observations	S	Failed		

	atable lifejackets lults & Child)	Model:	er:		Surveyor:	Time:			
2.2	.2.9.1 Coated fabric test (c	continued)		Regulations	LSA Code I/1.	2.2.1, 1.2.2.4 & 1.2.2.5; MSC.81(70) 1/2.10.4.1.5-8			
	Test Procedure		Acceptance Criteria			Significant Test Data			
5.	breaking strength should I accordance with ISO 1421 the CRE or CRT methor conditioning for 24 \pm 0.5 temperature and should than 200 N per 50 mm wice	:1998 using d, following h at room not be less	(5) After being tested accor breaking strength should not b width.			5. Break Strength (dry)N: Passed Failed			
6.	breaking strength should I accordance with ISO 1421 the CRE or CRT method conditioning immersed in for 24 ± 0.5 h at room temp should not be less than 50 mm width.	:1998 using d, following fresh water perature and	(6) After being tested accor breaking strength when wet s per 50 mm width.			6. Break Strength (wet)N: Passed Failed			
7.	elongation to break shoul in accordance with ISO using the CRE or CF following conditioning temperature for 24 ± 0.5 h	1421:1998 RT method at room	(7) After being tested accordir temperature the elongation 60%.			7. Elongation (dry)%: Passed Failed			
8.	elongation to break shoul in accordance with ISO using the CRE or CF following conditioning im fresh water at room temper ± 0.5 h.	1421:1998 RT method nmersed in	(8) After being tested accordir water at room temperature th not exceed 60%.			8. Elongation (wet) %: Passed Failed Comments/Observations			

	atable lifejackets ults & Child)	Model:	er: umber:		Surveyor:	Time: on:			
2.2.	2.9.1 Coated fabric test (c	ontinued)		Regulations:	LSA Code I/1.2	2.2.1, 1.2.2.1.4 & 1.2.2.1.5; MSC.81(70) 1/2.10.4.1.9-11			
	Test Procedure		Acceptance Criteria			Significant Test Data			
9.	the resistance to exposit when tested in accordance 105-B02: 2013.		with ISO 105 – B02:2013, the contrast between the unexposed and exposed samples should not be less than			9. Accelerated light test Class Passed			
 the resistance to wet and dry rubbing when tested in accordance with ISO 105-X12: 2001. 			(10) After being wet and dry rubbed in accordance with ISO 105- X12:2001, the staining of the rubbed samples should not be less than class 3.			10. Wet staining after rubbing Class . . Passed Failed			
11.	the resistance to seawater be less than class 4 in a with ISO 105 EO2: 1994.		(11) After being tested in EO2:1994, the change in cannot less than class 4.			 11. Dry staining after rubbing Class Passed Failed Comments/Observations 			

Inflatable lifejackets (Adults & Child)	Model:	er: lumber:		Date: Time: Surveyor:					
2.2.2.9.2 Operating head loa	d test		Regulations		2.2.1, 1.2.2.4 & 1.2.2.5; MSC.81(70) 1/2.10.4.2				
Test Procedure		Acceptance	ce Criteria		Significant Test Data				
The operating head load test carried out using two life lifejacket to be conditioned a 8 hours and the other at +65°C After mounting on the maniki form the lifejacket should be in steady force of (220±10) N a operating head as near as po point where it enters the chamber. This load should be for 5 minutes during which the angle in which it is applied continuously varied.	jackets one at -30°C for C for 8 hours. n or the test iflated, and a pplied to the essible to the buoyancy e maintained direction and	On completion of the test, intact and should hold its pres			 Security of operating head -30°C(Jacket 1) Load applied N. Visible damage Passed Failed Security of operating head +65°C (Jacket 2) Load applied N. Visible damage Passed Failed Visible damage Passed Failed Pressure at the beginning of the test at -30°C and after 30 min. Jacket 1 at the beginning after 30 min Pressure at the beginning of the test at +65°C and after 30 min. Jacket 2 at the beginning after 30 min Comments/Observations 				

Inflatable lifejackets (Adults & Child)	Model:	Surveyor			Time: on:			
2.2.2.9.3 Pressure test (1)			Regulations	LSA Code II/2	2.2.2.2; MSC.81(70) 1/2.10.4.3.1			
Test Procedure		Acceptanc	ce Criteria		Significant Test Data			
Overpressure test The inflatable buoyancy chamble be capable of withstanding an in- pressure at ambient tempe chambers of a lifejacket should using the manual method of infl inflation the relief valves should l and a fully charged gas cylinde to the manufacturers recom- should be fitted to the same infla and fired. All fully charged ga used in this test should be sized to the markings on lifejacket.	nternal over rature. All be inflated lation, after be disabled r according nmendation ation device s cylinders	The lifejacket should remain pressure for 30 minutes. The lifejackets should show a cracking, swelling or changes that there has been no signifi inflation component.	no signs of dai s of mechanica	mage such as I qualities and	Size of Duratio 2. 3. 4. 5. 6.	Double charge test. grams. gas bottle min. min. Chamber 1 - Pressure at the beginning of the test and after 30 min. at the beginning after 30 min Chamber 2 - Pressure at the beginning of the test and after 30 min. at the beginning after 30 min Chambers 2 - Pressure at the beginning of the test and after 30 min. at the beginning after 30 min Chambers 3 - Pressure at the beginning of the test and after 30 min. at the beginning after 30 min Chamber 4 - Pressure at the beginning of the test and after 30 min. at the beginning after 30 min Damage to lifejacket PassedFailed Failed		

Inflatable lifejackets (Adults & Child)	Model:	er: lumber:		Time:				
2.2.2.9.3 Pressure test (2)			Regulations	: LSA Code; M	ISC.81(70) 1/2.10.4.3.2			
Test Procedure		Acceptance Criteria			Significant Test Data			
Relief valve test With one buoyancy chamber operating head on the opposit chamber should be fired manu fully charged gas cylinder accor manufacturer's recommenda operation of the relief valves noted to ensure that the excess relieved.	te buoyancy ally, using a prding to the tions. The should be	The lifejacket should remain pressure for 30 minutes. The lifejackets should show cracking, swelling or changes that there has been no signifi inflation component.	no signs of da s of mechanica	mage such as I qualities and	1. Chamber 1 Size of gas bottle grams. Pressure at the beginning of the test and after 30 min.			

2.2.2.9.3 Pressure test (2) Continued		Regulations: LSA Co	egulations: LSA Code; MSC.81(70) 1/2.10.4.4.2				
Test Procedure	Acceptance C	riteria	Significant Test Data				
			7. Chamber 3 Size of gas bottle grams. Pressure at the beginning of the test and after 30 min.				

Inflatable lifejackets M	anufacturer: odel: ot/Serial Number:	Surveyor:							
2.2.2.9.3 Pressure test (3)		Regulations: LSA Code; MSC.81(70) 1/2.10.4.3.3							
Test Procedure	Acceptance Criteria	Significant Test Data							
Air retention test One inflation chamber of a lifeja filled with air until air escapes fro over-pressure valve or, if the life does not have an over-pressure until its design pressure, as stated plans and specifications, is reached test is then repeated as many tir necessary to test a different chamb each chamber has been tested manner. The pressure release valve sho settled when the measurement sta	om the ejacket valve, d in the d. This nes as ber until in this uld be								

Inflatable lifejackets (Adults & Child)	Model:	nrer: Number:		Surveyor:	Time: on:			
2.2.2.9.4 Compression test			Regulations:	LSA Code; M	MSC.81(70) 1/2.10.4.4			
Test Procedure		Acceptance Criteria			Significant Test Data			
The inflatable lifejacket, pac normal manner, should be table. A bag containing 75 k and having a base of 320 mr should be lowered onto the from a height of 150 mm in a t This should be repeated 10 t which the bag should rema jacket for not less than 3 hour	laid on a kg of sand n diameter e lifejacket time of 1 s. times, after ain on the	and should inflate fully, the jacket to be inspected to ensure that no swelling or change of mechanical properties has occurred, the jacket should be checked for leaks			Area of sand bag mm	_		
2.2.2.9.5 Test of metallic con	nponents		Regulations: LSA Code; MSC.81(70) 1/2.10.4.5					
Test Procedure		Acceptano	ce Criteria		Significant Test Data			
Metal parts and components of a lifejacket should be corrosion resistant to seawater and should be tested in accordance with ISO 9227:2006 for a performance of the lifejacket.			corrosion, or affend	ect any other		_		
period of 96 h. Metal components should no magnetic compass of a type us boats by more than 5°, when p distance of 500 mm from it.	ed in small	The lifejacket should not affect the magnetic compass by more than 5°.			2. Magnetic Test on Components. Passed Failed Comments/Observations			

Inflatable lifejackets Mode	nufacturer: del: /Serial Number:		Date: Time: Surveyor: Organization:					
2.2.2.9.6 Inadvertent inflation test	t	Regulations: I		SC.81(70) 1/2.10.4.6				
Test Procedure	Acce	ptance Criteria		Significant Test Data				
The resistance of an automatic inflat inadvertent operation should be a exposing the entire lifejacket to spray fixed period. The lifejacket should be fitted correct standing manikin of adult size, with shoulder height of 1500 mm (see alternatively to an appropriately siz shown in figure 2. The lifejacket deployed in the mode in which it is w use but not deployed as used in the w is equipped with a cover which is no closed, then the cover should be cl test). Two sprays should be installed so as t water onto the lifejacket, as shown in One should be positioned 500 mm highest point of the lifejacket. The should be installed horizontally at a 500 mm from the bottom line of the life be pointed directly at the lifejacket. The should have a spray cone of 30°, each 1.5 ± 0.1 mm in diameter, and the tota orifice should be 50 ± 5 mm ² , the evenly spread over the spray nozzle a	assessed by ays of water for ectly to a free th a minimum e figure 5), or sized form as et should be worn ready for e water (i.e. if it normally worn closed for the s to spray fresh in the diagram. Im above the at an angle of he manikin and he other nozzle a distance of lifejacket, and These nozzles ch orifice being btal area of the e orifice being	-	P 2. A P C	. Inadvertent Inflation. Passed Auto inflation test. Auto inflation system operable. Passed Comments/Observations	Failed			

Inflatable lifejackets (Adults & Child)	Date: Time: Surveyor:													
2.2.2.9.6 Inadvertent inflation	Regulations: LSA Code; MSC.81(70) 1/2.10.4.6													
Test Procedure		Acceptance Cr	iteria					Sign	ificant	Test D	Data			
The air temperature should be water should be supplied to nozzles at a flow of 600 l/h temperature of 18°C to 20°C.	The lifejacket should not infla	C C		1. Passed			t Inflatio		ailed					
 After completing this test immersed in water to versist inadvertent inflation: .1 5 minutes with the high spray on the front of the lifejacket; .2 5 minutes with the high spray on the left side of the lifejacket; 					2. Auto in Time to Passed Commo	flation o inflate	9:	n opera	Se	ec. ⁻ailed				
 .3 5 minutes with the high s back of the lifejacket; and .4 5 minutes with the high s right side of the lifejacket. During exposures .1, .2 the horizontal spray should be 10 periods of 3 sec each to the right sides (but not back) as w spray. 	pray on the and .4 applied for front, left or	Figure – Alternative form			Figure Size Adult Child Infant	А	B 114 102	C 76,2 76,2 38,1	D 127 102 63,5	E 381 279 191	F 432 330 203	G 508 406 241	H 25,4 22,2 19,1	J 178 152 76,2

Inflatable lifejackets (Adults & Child)	Model:	Surve				n:				
2.2.2.10 Strength tests - Boo	ly or lifting le	oop strength test		Regulations:	LSA Code; M	SC.81(70) 1/2.5.1, 2.10.1.1				
Test Procedure		Acceptance Criteria				Significant Test Data				
The lifejacket should be immers for a period of 2 min. It shour removed from the water and c same manner as when it is person. A force of not less th (2,400 N in the case of a child of lifejacket) should be applied for the part of the lifejacket that s the body of the wearer (see separately to the lifting loop of the The test should be repeated encircling closure. The two lifejackets sub temperature cycling and the h inflation test should then be u strength test.	uld then be losed in the worn by a an 3,200 N or infant-size or 30 min to secures it to figure) and he lifejacket. d for each bjected to ot and cold	,	Yoke or rangeme 125 mm	over-the-head ent for lifejacket diameter for a diameter for a	r type lifejacket ts dult sizes		Passed _	op test arrangement if		

Inflatable lifejackets (Adults & Child)	Manufacturer: Model: Lot/Serial Number:	Surveyor:											
2.2.2.11 Strength tests - Sh	oulder lift test	Regulations: LSA Code; MSC.81(70) 1/2.5.					.2, 2.10.1.1					-	
Test	Procedure	Acceptance Criteria				Significant Test Data							
2.2.2.7, 2.2.2.8 and 2.2.2.10 shoulder strength test. The lifejacket should be imme should then be removed from shown in figure 2 in the sam person. A force of not less that	ected to the tests in 2.2.2.5, 2.2.2.6, above should be subjected to the resed in water for a period of 2 min. It in the water and closed on a form as the manner as when it is worn by a in 900 N (700 N in the case of a child ld be applied for 30 min across the of the lifejacket (see figure).	Figure 2 lifejacket	Dimens	d rema t. VEB	in sect	ured o	n the	Time Sign Pass	force a of dam	applied _			
Vest-type lifejacket Yoke Figure - Shoulder lift test arrar lifejackets C– Cylinder; 125mm diameter 50mm diameter for infant L– Test load	Adult 6 Child 5	10 114 08 102 05 63,5	-	127 102 63,5	∟ 381 279 191	432 330 203	508 406 241	25,4 22,2 19,1	178 152 76,2				

Inflatable lifejackets (Adults & Child)	Model:			Date: Surveyor: Organization:						Time:				
2.2.2.12 Donning Test (Uninf	lated situation	ı)		Regulations:	LSA Cod	de II/2.2	2.1.5; MSC.8	1(70) 1/	2.7.1 to	2.7.4.3, 2.1	0.2			
Test F	rocedure			Ac	ceptance	e Criteri	a	Significant Test Data						
To minimize the risk of incorre often in adverse conditions, life following features and tested a The test should be carried out v who are completely unfamilia	d for the persons selected	Fastenings performance s provide quick a not require tyir Adult lifejacke	and positivng of knot ets should	few an ve clos ts. d readi	ly fit various									
according to the heights and we	0	.1 and the fo		sizes of adults All lifejackets worn inside-ou	should b	ecapa	able of being	Subj	SEX (M/F)	HEIGHT (m)	WEIGHT (kg)	Good Swimmer? (Yes/No)		
.1 small test subjects need not .2 at least 1/3, but not more t		aubiaata ak				ing in O	Thy one way.	1				(100,110)		
females, including at least 1								2						
the tallest height;								3						
.3 at least one male should be group and one female shou								4						
and one female should be m	ore than 80 kg	and 1.8 m;	° ,					5						
.4 at least one subject should be	e selected from	each cell co	ontaining					6						
a "1"; and .5 enough additional subjects	s should be s	selected fro	om cells						7					
containing a "X" to total the	he required number of test subjects,				5,					8				
with no more than one sub across weight ranges should			tribution			9								
		t selection f	or adult life	ackets				10						
			ight range -	<u> </u>	110 – 1		-	11						
Ht range (m) 40 - 43 43 -		70 – 80	80 – 100	100 – 110	> 120	12								
< 1,5 1 X 1,5 - 1,6 X 1	X 1	X X												
1,5-1,6 X 1 1,6-1,7 X		<u> </u>												
1,7 -,1,8	<u> </u>	X	1											
1,8 – 1,9	Х	Х	Х	1	1		Х							
> 1,9			Х	Х	Х		1							

Inflatable lifejackets (Adults & Child)	Manufacturer: Model: Lot/Serial Number:			Surveyor:		_ Time:
2.2.2.12 Donning Test (Uni	nflated situation)	Regulation	s: LSA Code II/2.2.	1.5; MSC.81(70) 1/2	2.7.1 to 2.7.4	4.3, 2.10.2
Clothing Each test subject should be t for the test and appropriate to .1 <i>Normal clothing</i> means n not normally interfere with	o their size, as follows: normal indoor clothing, v	which would	complete when the securely adjusted lifejacket to the example.	urposes donning is one subject has do all methods of se all needed to me ce requirements,	See following page for test data	
.2 Heavy-weather clothing n hostile environment, includ cotton gloves.				ld be capable of bei of the subjects,		
Each test should be timed for test subject declares that dor <i>Test without instruction</i> The test subjects may be Wearing normal clothing, th assistance, guidance or prior closures in the stored condit face up, in front of the test should be identical for each a the following: "PLEASE DON AS POSSIBLE AND ADJUST ABANDON SHIP."	tested individually or a tested individually or a first attempt should demonstration. The life tion, should be placed of subject. The instruction subject and should be e N THIS LIFEJACKET AS	as a group. be with no ejacket, with on the floor, on provided equivalent to S QUICKLY	correctly but fails closures, the jump and in-water per MSC.81(70) and 2 performed with t establish whether and the donning is Each subject show within a period of 1	uld correctly don the min. Id don the lifejacke	adjust all ISC.81(70) 2.8.5 of should be donned to acceptable e lifejacket	Total number of subjects: # of subjects successful: # of subjects successful: Pass / Fail Pass / Fail

Inflatable lifejackets (Adults & Child)	Manufacturer: Model: Lot/Serial Number:			Date: Surveyor: Organization:					
2.2.2.12 Donning Test (Uni	nflated situation)	Regulation	s: LSA Code II/2.2.1.5; MSC.81(70) 1/2.7.1 to 2.7.4.3, 2.10.2						
Test after instruction									
For each subject whose fin incomplete, after demonstrat subject with the donning proc don the lifejacket without clothing, using the same instr	tion or instruction to far cedure, the test subject assistance while wear	niliarize the should then ing normal							
Heavy-weather clothing test									
Each subject should then do while wearing heavy-weather and timing method as above.	clothing, using the same								

Inflatable lifejackets (Adults & Child)	Manufacturer: Model: Lot/Serial Number:		Date: Time: Surveyor: Organization:					
2.2.2.13 Donning Test (Ir	flated situation)		Regulations: LSA Cod	e II/2.2.1.5; MSC.81(70) 1/2.7.1 to 2.7.4.3				
	Test Procedure	Ac	ceptance Criteria	Significant Test Data				
 in adverse conditions, lifeja features and tested as follo The test should be carried of are completely unfamiliar with the heights and weights in the small test subjects need .1 small test subjects need .2 at least 1/3, but not more including at least 1 per height; .3 at least one male should and one female should female should be more t .4 at least one subject should "1"; and .5 enough additional subjet a "X" to total the required 	orrect donning by uninitiated persons, often ackets should be examined for the following ws: but with at least 12 able-bodied persons who with the lifejacket and selected according to table 2.1 and the following: not be adults; e than 1/2 of test subjects should be females, r height category but excluding the tallest be from the lowest and highest weight group be from the lowest weight group and one	Fastenin proper p few and quick an does not Adult life fit variou lightly a lifejacket being	gs necessary for erformance should be simple and provide d positive closure that require tying of knots. jackets should readily s sizes of adults, both nd heavily clad. All is should be capable of worn inside-out, or only one way.					

			Test subje		for adult lifeja				0				
					eight range -				Comm	nents/O	bservations		
Ht range (m)	40 -43	43 – 60	60 -70	70 – 80	80 – 100	100 – 110	110 – 120	> 120					
< 1,5	1	Х	Х	Х									
1,5 – 1,6	Х	1	1	Х	Х								
1,6 – 1,7		Х	Х	1	Х	Х						T	
1,7 -,1,8			X	X	1	X	X	X	Subj	SEX (M/F)	HEIGHT (m)	WEIGHT (kg)	Good Swimmer?
1,8 – 1,9	-		Х	Х	X	1	1	X	┨┝────	(-)	(11)	(rg)	(Yes/No)
> 1,9					Х	Х	Х	1	1				
									2				
									3				
									4				
									5				
									6				
									7				
									8				
									9				
									10				
									11				
									12				
												•	-

Inflatable lifejackets (Adults & Child)	Manufacturer: Model: Lot/Serial Number:		Date: Surveyor: Organization:	Fime:		
2.2.2.13 Donning test (Inf	lated situation) (Continued)	Regu	lations: LSA Code II/2.2.1.5; MSC	.81(70) 1/2.7.1 to 2.7.4.3, 2.10.2		
	Test Procedure		Acceptance Criteria	Significant Test Data		
 test and appropriate to their .1 Normal clothing means normally interfere with the .2 Heavy-weather clothing environment, including gloves. 	s normal indoor clothing, which would not e donning of a lifejacket; means the attire appropriate for a hostile a hooded arctic parka and warm cotton from when the order is given until the test	complete whe securely adjust lifejacket to th	ent purposes donning is considered en the subject has donned and sted all methods of securing the ne extent needed to meet the in - mance requirements, including eded.	See following page for test data		
normal clothing, the first atte or prior demonstration. T condition, should be placed subject. The instruction pro and should be equivalent	ested individually or as a group. Wearing mpt should be with no assistance, guidance he lifejacket, with closures in the stored d on the floor, face up, in front of the test ovided should be identical for each subject to the following: "PLEASE DON THIS (AS POSSIBLE AND ADJUST IT TO A BANDON SHIP."		should be capable of being donned 5 % of the subjects, and within	Total number of subjects: # of subjects successful: # of subjects successful:		

	Regulations: LSA Code II/2.2.1.5; MSC.	81(70) 1/2.7.1 to 2.7.4.3, 2.10.2
	Acceptance Criteria	Significant Test Data
correc closure in-wate MSC.8 perfore establi	tly but fails to secure and/or adjust all es, the jump test in 2.8.8 of MSC.81(70) and er performance tests in 2.8.5 of 81(70) and 2.8.6 of MSC.81(70) should be med with the lifejacket as donned to ish whether the performance is acceptable	Pass / Fail
		Pass / Fail
		Pass / Fail
	correct closur in-wat MSC.8 perform establ and th Each within	

	able lifejack ts & Child)	tets	Manufac Model: _ Lot/Seria	turer: al Number: ₋			Date: Time: Surveyor: Organization:							
2.2.2.	12 – 2.2.2.1	3 Donning				Regulations: LSA Code II/2.2.1.5 – 2.2.1.7; MSC.81(70) 1/2.7.1 to 2.7.4.3								
			Uninfla	ted situatio	n									
	Test without instruction Test after instruction					Heavy weather clothing		Test withou	t instruction		Test after instruction	Heavy weather clothing		
Subj	Donning time (sec)	All closures secured? (Y/N)	Jump test (P/F)	In-water test (P/F)	Donning Time (sec)	Donning Time (sec)	Donning time (sec)All closures secured? (Y/N)Jump test (P/F)In-water test (P/F)Dor Time					Donning Time (sec)		
1														
2														
3														
4														
5														
6														
7														
8														
9														
10														
11														
12														
						Comments/O	bservation	IS:						

Inflatable lifejackets (Adults & Child)	Manufacturer: Model: Lot/Serial Number:		Date: Surveyor: Organization:					
2.2.2.14 Water performance water performance te		Regulations: LSA Code II/2 MSC.1/Circ.1470	_					
Test Proce	edure	Acceptance Criteria				Significant ⁻	Test Data	
This portion of the test is intend of the lifejacket to assist a help exhausted or unconscious sta lifejacket does not unduly restrice The in-water performance of a comparison to the performance reference lifejacket, i.e. Referer specified in appendices 1 to 3. All tests should be carried out conditions. Each test for a ca relevant RTD should be conduct These tests should be carried o as mentioned in paragraph 2.2. should be used, since the abili rarely otherwise obtained. The test subjects should wear of Each test subject should be made tests in 2.2.2.15 and 2.2.2.16, par regarding relaxing and exhaling The test subjects should don using only the instructions prov Prior to taking measurements, th fastening of the RTD on the subj corrected as necessary.	led to determine the ability oless person or one in an te and to show that the et movement. lifejacket is evaluated by of a suitable size standard nee Test Device (RTD) as in fresh water under still ndidate lifejacket and the ted on the same day. ut with at least 12 persons 1.15. Only good swimmers ity to relax in the water is nly swimming costumes. de familiar with each of the articularly the requirements in the face-down position. the lifejacket, unassisted, ided by the manufacturer. he proper fit, donning, and	The RTD should be construct calibrated according to MSC and validated according to M	ted and 81(70), annex 1,	Validat Calibra Test su	construct red by: ated by: __ ubjects s	ed by:	da da dat 2.2.2.12?	te:

2.2.2.14 Water performance tests- Preparation for water performance tests	Regulations: LSA Code II/2.2.1.2.5 & 2.2.1.3 - MSC.1/Circ.1470	- 2.2.1.4;	; MSC.8 [,]	1(70) 1/2.8	to 2.8.4, 2.10	0.3. Annex 1,
Test Procedure	Acceptance Criteria	Significant Test Data				
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.		11 12				

Inflatable lifejackets (Adults & Child)	Model:	·	Surveyor:	Time: n:					
2.2.2.15 Water performance to	ests – Righting test	Regulations: LSA Code II/ 2.2.1	.3.2; MSC.81	(70)1/ 2.8.5, 2.10.3					
Test Procedu		Acceptance Criteria		Significant Tes	Significant Test Data				
Each test subject should ass down position in the water, but up so the mouth is out of the v feet should be supported, sho with the heels just below the su	with the head lifted vater. The subject's oulder width apart,	The period of time until the mouth subject comes clear of the water recorded to the nearest 1/10 of a sec from when the subject's feet are relea	should be ond, starting	See following pages for test data. Average candidate turn time \leq Average RTD turn time RTD +1s					
After assuming a starting pos straight and arms along the should then be instructed sequence to allow the body completely relax into a natura allow the arms and shoulders legs to relax; and then the spir the head fall into the water w normally. During the relaxation phase, the maintained in a stable face dow Immediately after the subject h face in the water, simulating exhaustion, the subject's feet s The test should be conducted u have been inflated both manually, and also with one of	sition with the legs sides, the subject in the following to gradually and al floating posture: to relax; allow the ne and neck, letting while breathing out e subject should be wn position. as relaxed, with the g a state of utter should be released. using lifejackets that automatically and	The test should be conducted a total and the highest and lowest times dis test should then be conducted a total in the RTD and the highest and I discarded. Turning time: the average turn time for in the candidate lifejacket should no average time in the RTD plus 1 s. The number of "no-turns", if any, exceed the number in the RTD. The test should be repeated compartment deflated until each com been tested in the uninflated condition	scarded. The I of six times owest times or all subjects t exceed the should not with one partment has	Chamber #3: Automatic: Passed Failed Chamber #4: Automatic: Passed Failed # of candidate no turns (NT): ≤ # of R All Chambers: Automatic: Passed Failed Chamber #1: Automatic: Passed Failed Chamber #2: Automatic: Passed Failed Chamber #3: Automatic: Passed Failed Chamber #4: Automatic:	Manual: Passed Failed Manual: Passed Failed Manual: Passed Failed Passed Failed RTD no turns (NT): Manual: Passed Failed Manual: Passed Failed Manual: Passed Failed Manual:				
uninflated.				Comments/Observations:					

	ole lifejad & Child		Mc	odel:	er: umber:					- 	Surve	eyor:				_					
2.2.2.15	Water p	performan	ce tests	- Righti	ng test				Regu	ulatio	ns: LS	A Cod	e II/ 2.	2.1.3.2;	MSC.	81(70)	1/ 2.8.	5, 2.1	0.3		
							Sig	gnifica	nt Te	st Da	ta										
					E TIME (se c inflation)							/ICE TII al inlfla		,		REF	ERENO	CE VE TRIA	ST TIME L	(sec)	
Subj	#1	#2	#3	#4	#5	#6	AVG *	#1	#2	#3	#4	#5	#6	AVG *	#1	#2	#3	#4	#5	#6	AVG *
1																					
2																					
3																					
4																					
5																					
6																					
7																					
8																					
9																					
10																					
11																					
12																					
			Avera		date turn t lidate no t			Ave				rn time o turns				Av			irn time no turns		
Àverage # of cane	candidate	and lowest v e turn time turns (NT): vations:	Average	RTD turn	time RTD ·	+1s Pass			ailed _				<u>, (NT):</u>	<u> </u>	<u>I</u>		# 01			<u>((())</u>	L

Inflatable lifejackets (Adults & Child)	Model:	nrer:		Date: _ Survey Organi	/or:	Tir	me:		
2.2.2.16 Water performance	e tests – Sta	atic balance measurements	Regulations	: LSA C	Code II/2.2.2, 2.	2.1.4; MSC.8	31(70) 1/ 2	.8.6 and 2.8.7	7, 2.10.3
Test Procedure		Acceptance Cr	iteria			Signif	icant Test D	ata	
At the conclusion of the righ without making any adjustments lifejacket position, the		Freeboard: The average freebo should not be less than the a minus 10 mm			See following	pages for tes	st data.		
measurements should be made subject floating in the relaxed position of static balance res	ed face-up				Average freet minus 10 mm	ooard, all sul	ojects <u>></u> ave	rage freeboa	rd for RTD
the preceding tests.	н. <i>с</i>				All Chambers: Chamber #1:	Automatic:	Failed	Manual:	Failed
 Freeboard – The measured perpendicute the surface of the way 	larly from ater to the				Chamber #2:	Automatic: Passed	Failed Failed	Manual: Passed	Failed Failed
lowest point of the subje where respiration impeded, if the mouth	may be				Chamber #3: Chamber #4:	Automatic:	Failed	Manual: Passed Manual: Passed	Failed Failed
held shut. The lowest mouth should be meas left and right sides are	sured if the					1 23360		1 asseu	
 Faceplane angle – The ang to the surface of the water, of 		Faceplane angles: The average faceplane angles should be not	less than the	5'	Average facer 10º	plane angle, a	all subjects <u>></u>	≥ average for	RTD minus
formed between the most for of the forehead and chin.		average for the RTD minus 10°			All Chambers: Chamber #1:	Automatic: Passed Automatic:	Failed	Manual: Passed Manual:	Failed
					Chamber #2:	Passed Automatic:	Failed	Passed Manual:	Failed
					Chamber #3:		Failed	Passed Manual:	Failed
						Passed	Failed	Passed	Failed
					Chamber #4:	Automatic: Passed	Failed	Manual: Passed	Failed

2.2.2.16 Water performance tests – Sta	atic balance measurements	Regulations: LSA C	Code II/2.2.2, 2.	2.1.4; MSC.8	81(70) 1/2	2.8.6 and 2.8	3.7, 2.10.3
Test Procedure	Acceptance Cr	iteria		Signit	ficant Test D	Data	
 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). 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. 	Torso angles: the average o angles should be not less than RTD minus 10°. Lifejacket light location: the pos light should permit it to be vis segment of the upper hemisphe	sition of the lifejacket ible over as great a	Average torso All Chambers: Chamber #1: Chamber #2: Chamber #3: Chamber #4: Does the loca as great a seg	Automatic: Passed Automatic: Passed Automatic: Passed Automatic: Passed Automatic: Passed tion of the life	Failed Failed Failed Failed Failed	Manual: Passed Manual: Passed Manual: Passed Manual: Passed Passed	_ Failed _ Failed _ Failed _ Failed _ Failed

Inflatable lifejackets (Adults & Child)	Manut Mode Lot/Se	facturer: l: erial Nur	nber:						Date: _ Survey Organi	yor: _ izatio	on:		Time:				
2.2.2.16 Water performance								lations					MSC.81(7				
Test Procedure													Significa	nt Test D	ata		
The test should be repeated witl compartment deflated until	h one				Aut	omatic	Inflatior	ı					Mar	nual Inlfa	tion		
compartment denated until compartment has been tested i uninflated condition.			Freeb (m			plane eg)		angle eg)	Ligł	ht	Freet (m		Facer (de		Torso (de	•	Light
			CLJ	RTD	CLJ	RTD	CLJ	RTD	Visib	le?	CLJ	RTD	CLJ	RTD	CLJ	RTD	Visible?
		1															
		2															
		3															
		4															
		5															
		6															
		7															
		8															
		9															
		10															
		11															
		12 Avg							XXXX	x							XXXX
			l Candida	te Lifeia	acket				/////	`		1	1	1	1	1	/////
			Referen	-		е											

2.2.2.17 Water performance test Test Procedure Without readjusting the lifejacket, the should jump vertically into the water from a height of at least 1m while I arms over the head. Upon entering the test subject should relax to simul of utter exhaustion. The freeboard to should be recorded after the test sub	te test subject ter, feet first, e holding the ng the water,	Acceptance Criteria Following the jump and dro lifejacket should:		s: LSA Code II/ 2.2.1.5.6; MSC.81(70)1/2.8.8 and 2.8.9, 2.10.3 Significant Test Data See following page for test data
Without readjusting the lifejacket, the should jump vertically into the water from a height of at least 1m while I arms over the head. Upon entering the test subject should relax to simul of utter exhaustion. The freeboard to should be recorded after the test sub	ter, feet first, e holding the ng the water,	Following the jump and dro lifejacket should:		
should jump vertically into the water from a height of at least 1m while I arms over the head. Upon entering the test subject should relax to simul of utter exhaustion. The freeboard to should be recorded after the test sub	ter, feet first, e holding the ng the water,	lifejacket should:	p test, the	See following page for test data
to rest. The test should be repeat height of at least 4.5 m. When jumping into the water, the te should hold on to the lifejacket during to avoid possible injury. Upon en water, the test subject should relax to state of utter exhaustion. The freeb mouth should be recorded after the t comes to rest. The lifejacket and its attachments examined for any damage. If injury likely from any jump or drop test, th should be rejected or the test delayed from a lower height or with additional p demonstrate that the risk from the re- is acceptable. The test should be conducted using that have been inflated both automa- manually, and also with one of the cor	ubject comes eated from a e test subject ng water entry entering the to simulate a eboard to the e test subject ts should be ry is believed the lifejacket al precautions required test mg lifejackets matically and	 position with an average from all the subjects of not less average determined for the the turning test in accord 2.2.2.16 minus 15 mm; .2 not be dislodged or cause h test subject; 	eeboard for is than the e RTD after dance with harm to the ld affect its byance; and hments.	1 m Jump Average freeboard, all subjects: mm (A) Average freeboard for RTD (from 2.2.2.16) : mm (B) (B) – (A)= ≤ 15 mm Pass / Fail Did the lifejacket become dislodged or cause harm to the test subject?: Yes / No Did the lifejacket have damage that would affect its in-water performance or buoyance?: Yes / No Did the lifejacket have damage to its attachments?: Yes / No

Inflatable (Adults &	lifejackets Child)	Manufacturer: Model: Lot/Serial Num	ber:			Date: Surveyor: Organization	Time: :
2.2.2.17	Water performance						de II/ 2.2.1.5.6; MSC.81(70)1/2.8.8 and 2.8.9, 2.10.3
TEST DAT	A SHEET (1 m Jum	p)					
Subj	Subject surfaced faceup? (Yes/No)	Freeboard (mm)	Lifejacket became dislodged (Yes/No)	Subject wa harmed? (Yes/No)	lifej atta	nage to acket or ichments s/No)	Comments/Observations
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							

Inflatable (Adults &	lifejackets Child)	Manufacturer: Model: Lot/Serial Nun	nber:		Date: Time: Surveyor: Organization:
2.2.2.17	Water performance				Regulations: LSA Code II/ 2.2.1.5.6; MSC.81(70)1/2.8.8 and 2.8.9, 2.10.3
	ΓΑ SHEET (4.5 m Ju	mp)			
Subj	Subject surfaced faceup? (Yes/No)	Freeboard (mm)	Lifejacket became dislodged (Yes/No)	Subject wa harmed? (Yes/No)	as Damage to Comments/Observations lifejacket or attachments (Yes/No)
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					

Inflatable lifejackets (Adults & Child)	Model:	urer: Number:		Surveyo	or:						
2.2.2.18 Water performance	tests – Sta	bility test	Regulation	s: LSA C	ode II/2.2	2.1.4; N	/ISC.81(70) 1/2.	.8.10		
Test Procedure		Acceptance Criteria				Sign	ificant T	est Dat	а		
The test subject should attain face-up position of static balar water. The subject should be ins assume a foetal position as	nce in the structed to s follows:	The candidate lifejacket should not roll any subject face down in the water.			the subj down?				the subj Ible face (Ye		
blace your elbows against your side our hands on your stomach, under t fejacket if possible, and bring your kne p as close to your chest as possible."		(a) + (b) = 0		Can	didate	R	TD	Can	didate	F	RTD
lifejacket if possible, and bring y up as close to your chest as pos- The subject should be rotated around the longitudinal axis of by grasping the subject's sho upper areas of the lifejacket s subject attains a 55 ± 5 degree subject should then be relea subject should return to a stable	our knees ssible." clockwise the torso pulders or o that the e list. The used. The	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. (e) \leq (g) And	Subj 1 2 3 4 5 6	CW		CW		cw		CW	
position. The test should then be condu- the subject rotated counterclock The entire test should then be with the test subject wearing the The test should be conduct lifejackets that have been infl automatically and manually, and one of the compartments uninfla	$(f) \leq (h)$ ucted with kwise. e repeated e RTD. ted using lated both d also with	7 8 9 10 11 12 Total "No"	(a)	(b)	(C)	(d)	(e)	(f)	(g)	(h)	

Inflatable lifejackets (Adults & Child)	Model:	er:		Surveyor	:			
2.2.2.19 Water performance test	tests – Swin	nming and water emergence	Regulations	: LSA Co	de II/2.2	.1.4; MSC.8	1(70) 1/2.8.11	
Test Procedure		Acceptance C	Criteria				Significant Te	est Data
All test subjects, without w lifejacket, should attempt to swi board a liferaft or rigid platfor surface 300 mm above the wa All test subjects who successfu	im 25 m and orm with its ater surface. Ily complete	At least two-thirds of the accomplish the task without th be able to perform it with the li (b) ≥ 2/3 (a)	e lifejacket sho		Liferat	t or Rigid Pla whether te		n successfully board liferaft
this task should perform it ag the lifejacket. The test should be condu lifejackets that have been ir automatically and manually, ar one of the compartments uninfl	cted using offlated both and also with				or platt Subj 1 2 3 4 5 6 7 8 9 10 11 12 Total	Without lifejacket	With lifejacket	(b) 2/3 (a) Passed / Failed Comments/Observations

Inflatable lifejackets (Adults & Child)	Manufactur Model: Lot/Serial N																	
2.2.2.20 Infant and children's	s lifejacket te	ests – To	est s	ubjec	cts		I	Regu	latio	ns: L	.SA (Code	II/2.2	.1.8; MSC.	81(70) 1	/2.9 – 2.9.1	, 2.10	
Test Procedure					A	ccep	tance	e Crit	eria						S	ignificant T	est Data	
As far as possible, similar te adult tests) should be applied f of lifejackets suitable for in children.	or approval nfants and	eight range (cm)	14	17	20	22	Weigh 25 -	t Rang 28 -	d Tes t ge (kg) 30 -	33 -	36	38 -	41	Size: I	nfant / C	hild		
For child-size lifejackets, tests carried out with at least 9 a persons, and for infant-size	able-bodied	79-	17	20 X	22	25	28	30	33	36	38	41	43	Subj	SEX (M/F)	HEIGHT (m)	WEIGHT (kg)	Manikin? (Yes*/No)
tests should be carried out w		105												1				
5 able-bodied persons. All test subjects should be		90- 118		Х	1									2				
according to table 2.2 or ta follows:	ble 2.3 as	102- 130				1	х							3				
.1 One subject should be s each cell containing a "1".	elected per	112- 135					х	1						4				
.2 Remaining subjects should	be colocted	122- 150							1	1	х			6				
from cells containing an " repeating a cell.		145- 165									х	1	1	7				
			Та	ble 2	3 - Se	electi	on of	Infan	t Tes	t Sub	jects		· · · ·	8				
.3 At least 40% of the subject male and at least 40% fema		Hei	ight ra	nde				Weigl	ht Rar	nge (kg)			9				Γ Manikin? (Yes*/No)
.4 Devices for infants should b			(cm)			Les	s tha	n 11		11-1	4	14-	·17					
infants as small as 6 kg mas		Les	s thai	n 83			1			Х								
.5 A manikin or manikins substituted for test subje			79-10	5			Х			1		1						
manikin or manikins h demonstrated to provide rep results compared to human	ave been presentative		90-11	8								×	(*Manikin	l descript	tion:		

Inflatable lifejackets (Adults & Child)	Manufacturer: Model: Lot/Serial Number:			Surveyor:	Time:	
2.2.2.21 Infant and childr – Righting test	ren's lifejacket – Water perfo	rmance tests	Regulation 2.10.3		2.1.8; MSC.81(70)1/ 2.9.2-2.9.3	
Test Pro	ocedure	ŀ	Acceptance C	Criteria	Significant test	data
This portion of the test is intend the lifejacket to assist a hel exhausted or unconscious s lifejacket does not unduly restr	lpless person or one in an tate and to show that the		MSC.81(70),	and calibrated annex 2 or 3, as	RTD Size: Infant / Child RTD Constructed by:	date:
The in-water performance of comparison to the performance reference lifejacket, i.e. Reference specified in appendices 2 to 3.	e of a suitable size standard rence Test Device (RTD) as				Validated by:	
All tests should be carried or conditions. Each test for a relevant RTD should be condu	candidate lifejacket and the					
The tests may be modified for years of age who are not co ensure their safety and cooper	mfortable in water, so as to					
Prior to taking measurements fastening of the RTD on the su corrected as necessary.						
After entering the water, care s there is no significant amount o the lifejacket or swimming cost	of air unintentionally trapped in					
The test should be conducted been inflated both automatical with one of the compartments	y and manually, and also					

	Manufacturer: Model: Lot/Serial Number:						Surveyo	or:									
	lifejacket – Water performa			1	latio				.2.1.8; N							nex 3,	
Test Procedure	Acceptance Criteria							Sign	ificant T	est Da	ata						
Each test subject should assume a prone, face down	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 test should be conducted a total of six t times, and the highest 6	CANDIDATE DEVICE TIME (sec) TRIAL						REFERENCE VEST TIME (sec) TRIAL									
position in the water, but with the head lifted up so the mouth is		subject comes clear of the water should be	Subj	#1	#2	#3	#4	#5	#6	AVG *	#1	#2	#3	#4	#5	#6	AVG *
out of the water. The subject's feet should be supported.		1															
het should be supported, houlder width apart, with the beels just below the surface of he water.																	
After assuming a starting position with the legs straight																	
and arms along the sides, the subject should then be	discarded. The test	7															
instructed in the following		8															
sequence to allow the body to gradually and completely relax	 a total of six times in the RTD and the highest and lowest times discarded. 	9															
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		Average candidate turn time (sec): Average RTD turn time (sec):															
breathing out normally.			# of candidate no turns (NT): # of RTD no turns (NT):														

2.2.2.21 Infant and children's I Righting test (Continu	lifejacket – Water performa ued)		Regulations: LSA Code II/ 2.2.1.8; MSC.81(2.10.3	(70)1/ 2.9.2-2.9.3, annex 2, annex 3,
Test Procedure	Acceptance Criteria		Significant Test Data	a
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.	Turning time: the average turn time for all subjects in the candidate lifejacket should not exceed the average time in the RTD plus 1 s. The number of "no-turns", if any, should not exceed the number in the RTD.	Average cand	test and lowest value) didate turn time \leq Average RTD turn time RTD +1s e no turns (NT): \leq # of RTD no turns (NT): bservations:	Passed Failed Passed Failed

Inflatable lifejackets (Adults & Child)	Manufacturer: Model: Lot/Serial Number:					Surveyor:			ne:		,
2.2.2.22 Infant and childre – Static balance	en's lifejacket - Water per measurements	formance tes	sts	Regulations: LSA Code II/ 2.2.1.8; MSC.81(70)1/ 2.8.6, 2.9.2-2.9.3, 2.10.3, Annex 2 & 3						×	
Test Proce	dure					Sig	nificant Tes	t Data			
At the conclusion of the righting tests, without making any adjustments in body or lifejacket position, the following measurements should be made with the			Free	eboard	(mm)	Faceplar	Faceplane (deg)		gle (deg)	Light	
subject floating in the relaxed f balance resulting from the prec	face-up position of static		CLJ		RTD	CLJ	RTD	CLJ	RTD	Visible?	
salaries resulting from the proc		1									
Infant lifejackets should mee	t the turning time and	2									
freeboard requirements, however torso angle, faceplane and mo		3									
necessary in order to:	bolinty may be relaxed in	4									
.1 contribute to the rescue of t	he infant by a caretaker	5						_			
	·	6									
.2 allow the infant to be faste contribute to keeping the		7									
caretaker;		8									
.3 keep the infant dry, with free	e respiratory passages;	9									
1 protect the infent excinct by	man and jolto during the										
.4 protect the infant against bu evacuation; and	imps and joils during the										
.5 allow a caretaker to monitor	and control heat loss by	Avg									
the infant.	infant.		• .							XXXXX	
		CLJ – Candi RTD – Refer		•							

Model:	urer: Number:	Su	Date: Surveyor: Organization:			
2.2.2.22 Infant and children's lifejacke Static balance measurements		Regulations: Annex 2 & 3	LSA Code II/ 2.2.1.8; MSC.81(70)1/ 2.8.6, 2.9.2-2.9.3, 2.10.3,			
Test Procedure	Acceptance Crite	eria	Significant Test Data			
 Freeboard – The distance meas perpendicularly from the surface of water to the lowest point of the subju- mouth where respiration may be imperimented. 	the subjects should not be less th ct's for the RTD minus 10 mm.		Average freeboard, all subjects ≥ average freeboard for RTD minus 10 mm			
 mouth where respiration may be imperify the mouth were not held shut. Iowest side of the mouth should measured if the left and right sides are level. 2. Faceplane angle – The angle, relative the surface of the water, of the provide the formed between the most forward part the forehead and chin. 3. Torso angle – The angle, relative vertical, of the line formed by the formed by the formed by the shoulder and hipbone (in portion of the pelvis). 4. List angle – The angle relative to surface of the water and a line between the left and right shoulder or a line through the left and right should be the left and right should be the left and the	The be not Faceplane angles: The a subjects' faceplane angles less than the average for the to f to ard um the ben Lifejacket light location: the	should be not RTD minus 10°. of all subjects' t less than the 10°. e position of the i t to be visible of the upper				

Inflatable lifejackets (Adults & Child)	Model:	Der:	0
2.2.2.23 Children's lifejac test	cket – Water perfor	mance tests – Jump and drop	Regulations: LSA Code II/2.2.1.8, 2.2.2.21; MSC.81(70) 1/ 2.9, 2.8.8, 2.8.9, 2.10.3
Test Proced	lure	Acceptance Criteria	Significant Test Data
Without readjusting the li subject should jump vertica feet first, from a height of holding the arms over t entering the water, the te relax to simulate a state o The freeboard to the r recorded after the test subj The test should be repeate at least 4.5m.	ally into the water, at least 1m while the head. Upon est subject should of utter exhaustion. mouth should be ject comes to rest.	Five of the nine subjects should perform the jump and drop test. When conducting water performance tests under 2.8, infant and child-size lifejackets should meet the following requirements for their critical flotation stability characteristics.	See following page for test data 1 m Jump Average freeboard, all subjects: mm (A) Average freeboard for RTD (from 2.2.18) : mm (B) (B) – (A)= \leq 15 mm Pass / Fail Did the lifejacket become dislodged or cause harm to the test subject?: Yes / No
When jumping into the wat should hold on to the lifeja entry to avoid possible inju the water, the test subject simulate a state of utter freeboard to the mouth sh after the test subject comes The lifejacket and its attact examined for any damage. likely from any jump or drop should be rejected or the test from a lower height precautions demonstrate the required test is acceptable.	acket during water ury. Upon entering ct should relax to r exhaustion. The hould be recorded s to rest. chments should be If injury is believed b test, the lifejacket test delayed until or with additional hat the risk from the	 Following the jump and 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 2.2.1.23 minus 15 mm; .2 not be dislodged or cause harm to the test subject; 	Did the lifejacket have damage that would affect its in-water performance or buoyance?: Yes / No Did the lifejacket have damage to its attachments?: Yes / No 4.5 m Jump Average freeboard, all subjects: mm (A) Average freeboard for RTD (from 2.2.18): mm (B) $(B) - (A) = \ \leq 15 \text{ mm} \text{ Pass } / \text{ Fail}$ Did the lifejacket become dislodged or cause harm to the test subject?: Yes / No
<u>NOTE</u> : JUMP AND DROP <u>NOT</u> BE REPEATED IN TH			Did the lifejacket have damage that would affect its in-water performance or buoyance?: Yes / No

2.2.2.23 Children's lifejacket – Water perfort test	mance tests – Jump and drop	Regulations: LSA Code II/2.2.1.8, 2.2.2.21; MSC.81(70) 1/ 2.9, 2.8.8, 2.8.9, 2.10.3		
Test Procedure	Acceptance Criteria	Significant Test Data		
Note: Water tests using children should avoid causing distress or risk to the child. Consideration should be taken of their age and ability. The test should be conducted using lifejackets that have been inflated both automatically and manually, and also with one of the compartments uninflated.	 .3 have no damage that would affect its in-water performance or buoyance; and .4 have no damage to its attachments. 	, in the second s		

Inflatable li (Adults & C		Manufacturer: Model: Lot/Serial Number:				Date: Surveyor: Organization:			
2.2.2.23 drop tests	Children's lifejacl	ket – Water perfo	ormance tests – Ju	ump and	Regulati 2.10.3	ions: LSA Cod	e II/ 2.2.1.8, 2.1.5.6; MSC.81(70)1/2.9, 2.8.8, 2.8.9and		
TEST DATA	SHEET (1 m Jum								
Subj	Subject surfaced faceup? (Yes/No)	Freeboard (mm)	Lifejacket became dislodged (Yes/No)	harmed? lif (Yes/No) at		mage to jacket or achments æs/No)	Comments/Observations		
1									
2 3 4									
3									
5									
drop tests	-	-	ormance tests – Ju	ump and	Regulati 2.8.9	ions: LSA Cod	e II/ 2.2.1.8, 2.2.1.2.5; MSC.81(70)1/2.9, 2.8.8 and		
	SHEET (4.5 m Ju		1						
Subj	Subject surfaced faceup? (Yes/No)	Freeboard (mm)	Lifejacket became dislodged (Yes/No)	Subject wa harmed? (Yes/No)	life atta	mage to jacket or achments es/No)	Comments/Observations		
1									
1 2 3 4									
3									
4									
5									

	Model:	urer: Number:		Surveyo	or:						
2.2.2.24 Infant and children's I stability test	lifejacke	t – Water performance tests –	Regulation	s: LSA Co	ode II/2.2	2.1.8, 2	2.2.1.4; N	ISC.81	(70) 1/2.8	3.10, 2.9	9.2, 2.10.3
Test Procedure		Acceptance Criteria				Signi	ficant Te	st Data	l		
The test subject should attain a relaxed face-up position of static balance in the water. The subject should be instructed		The candidate lifejacket should not roll any subject face down in the water.			the subj down?			Did the subje stable face-u (Yes			
to assume a foetal position as f "place your elbows against your		(a) + (b) = 0		Can	didate	F	TD	Can	didate	F	RTD
your hands on your stomach, une	der the		Subj	cw	CCW	CW	ccw	cw	CCW	cw	ccw
lifejacket if possible, and bring knees up as close to your ch possible." The subject should be rotated clo around the longitudinal axis of the by grasping the subject's should upper areas of the lifejacket so ti subject attains a 55 ± 5 degree life subject should then be released subject should return to a stable for position. The test should then be conducted the subject rotated counterclockw The entire test should then be re- with the test subject wearing the The test should be conducted lifejackets that have been inflate automatically and manually, an with one of the compar	est as ockwise e torso ders or hat the ist. State ist. State is	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. (e) \leq (g) And (f) \leq (h)	1 2 3 4 5 6 7 8 9 9 	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)

Inflatable lifejackets (Adults & Child)	Model:	er:		Date: Time: Surveyor: Organization:				
2.2.2.25 Infant and children	's lifejacket	- Mobility test Regulations: LSA Code II/2.			.2.1.8; MSC.81(70) 1/2.9.2.5, 2.10.3			
Test Procedure		Acceptance Criteria			Significant Test Data			
To be considered in and out of Mobility of the subject both in the water should be given considerermining the acceptability for approval and should be c mobility when wearing the size RTD when climbing out c going up and down stairs, pic article from the floor, and the from a cup.	and out of sideration in of a device compared to appropriate of the water, cking up an	Assistance may be given to wearer mobility should not be than by the appropriate size F	reduced to an		Does the lifejacket provide for acceptable mobility of the test subjects both in and out of the water and is comparative to the mobility of wearing the RTD? YES NO Passed Failed Method of evaluation: Comments/Observations			

2.2.3 LIFEJACKET/IMMERSION SUIT LIGHTS EVALUATION AND TEST REPORT

Remarks: If an immersion suit is designed to be worn without a lifejacket, it should be fitted with a light complying with the requirements for lifejacket lights. The immersion suit light should be treated as a lifejacket light.

2.2.3.1	General ir	formation				
2.2.0.1		General data and specifications				
		Submitted drawings, reports and documents				
2.2.3.2	Visual insp 2.2.3.2.1 2.2.3.2.2 2.2.3.2.3 2.2.3.2.4 2.2.3.2.5 2.2.3.2.6	Approval marking Expiry marking Additional markings Electrical short circuit protection Visibility when attached to a lifejacket				
2.2.3.3	Temperature cycling test					
2.2.3.4	Light tests					
2.2.3.5	Chromatic	ity test				
2.2.3.6	Drop test					
2.2.3.7	2 m light d	rop test				
2.2.3.8	Switch arra	angement test				
2.2.3.9	Vibration to	est				
2.2.3.10	Mould grov	wth test				
2.2.3.11	Corrosion	and seawater resistance test				
2.2.3.12	Test for oil	resistance				
2.2.3.13	Rain test a	and watertightness test				
2.2.3.14	Fire test					

2.2.3 LIFEJACKET/IMMERSION SUIT LIGHTS EVALUATION AND TEST REPORT

Manufacturer	
Туре	
Date	
Place	
Surveyor's name (printed)	
Signature	
Approving organization	

Lifejacket/immersion su lights	it Manufacturer: Model: Lot/Serial Number: _	Surveyor:	
2.2.3.1.1 General dat	a and specifications	Regulations: LSA Code; MSC.81(70)	
General Infor	rmation	Lifejacket Light Dimensions Lifejacket Light Weight	
	itomatic anual	Details of Bulb, Battery & Voltages Comments/Observations	
FLASHING			
LIGHT STEADY			
LIGHT			

Lifejacket/immersion lights	n suit	Manufacture Model: Lot/Serial Nu	er: umber:	Date: Time: Surveyor: Organization:			
2.2.3.1.2 Submitt	ed draw	/ings, reports	and documents				
			Submitted drawings and documen	ts		Status	
Drawing No.	Revis date	sion No. &	Tit	Title of drawing			
			Submitted reports and documents	8			
Report/Document No.	Revis date	sion No. &		report / document		Status	
			Maintenance Manual -				
			Operations Manual -				

Lifejacket/immersion suit lights	ersion suit Manufacturer: Model: Lot/Serial Number:			Surveyor:			
2.2.3.2 Visual Inspection	on		Regulation	ns: LSA Code 1.2	.2.1/1.2.2.6/1.2.2.9/1.2	.2.10/1.2.3/2.2.3.1.3	
Test Procedure		Acceptanc	ce Criteria		Signi	ificant Test Data	
Twenty lifejacket lights should be examined in detail for the following items:		The lifejacket lights should:			<u>Results:</u>		
Approval marking		 be clearly marked including the Adminis any operational restrict 	tration which		PASS:	FAIL:	
Expiry marking		 be marked with a date of expiry; The Administration should determine the period of acceptability, owing to deterioration with age. The established life must be justified by the manufacturer. 			PASS: <u>Results:</u> PASS:	FAIL: FAIL:	
Additional markings		 Be provided with the following information: precise definition of intended use (e.g. "Lifejacket light"); serial number; identification of the manufacturer; easily understandable symbols for on/off switch where applicable, information on proper batt disposal by the words: "DO NOT INCINERAT DO NOT RECHARGE / DO NOT TAMPER". 		(e.g. r on/off switching; n proper battery ⊂ INCINERATE /	PASS:	FAIL: FAIL: FAIL: FAIL: FAIL:	
					Comments/Observati	ons	

Lifejacket/immersion suit lights	Model:	er: umber:	Surveyor:				
2.2.3.2 Visual Inspection	on (continued	d)	Regulatio	ns: LSA Code 1.2	.2.1/1.2.2.6/1.2.2.9/1.2	2.2.10/1.2.3/2.2.3.1.3	
Test Procedure		Acceptanc	ce Criteria		Significant Test Data		
		The lifejacket lights should:	e lifejacket lights should:				
Electrical short circuit protecti	on	 be provided with elect to prevent damage or 		circuit protection	PASS:	FAIL:	
Visibility when attached to a lifejacket Construction and materials		 be visible over as gre hemisphere as is prac lifejacket; 			PASS:	FAIL:	
		 be constructed with p materials; and 	roper workn	nanship and	PASS:	FAIL:	
		 if the light is a flashing manually operated sw 		rovided with a	PASS:	FAIL:	
Colour of lifejacket light		 be of an international comparably highly vis this will assist detection 	ible colour o		PASS:	FAIL:	
					Comments/Observat	ions	

Lifejacket/immersion suit		Manufacturer:	Date:		Time:		
lights	sion suit	Model:	Surve				
iigiits		Lot/Serial Number:	ot/Serial Number: Organiz				
Lifejacket and imr	nersion su	it light test flow chart					
				lights 1 through 4:	Light test (hot) 2.2.3.3		
		erature Cycling (12 lights in groups of 4)		lights 5 through 8:	light test (cold) 2.2.3.3		
	2.2.3.2	2:		lights 9 through 12:	light test (ambient) 2.2.3.3		
	Any one c	of the 12 lights - Chromaticity Test 2.2.3.4					
Visual	Any one c		me light: romatici	y Test			
Inspection (all 12	Any one c		ime light hromatic				
lights) 2.2.3.1	Any one c 2.2.3.7	of the 12 lights - Switch arrangement testsame light subjected	tion test 2.2.3.8				
		of the 12 lights - 28 day mould growth test vaived) 2.2.3.9					
	•	of the 12 lights - Corrosion and seawater e test (may be waived) 2.2.3.10					
	Any one c	of the 12 lights - Oil resistance test 2.2.3.11					
	Any one c	of the 12 lights - rain test and watertightness test 2.2.3.12					
	Any one c	of the 12 lights - fire test 2.2.3.13					

Lifeja lights	acket/immersion suit	Manufacturer: Model: Lot/Serial Number:			Date: Surveyor: Organization:				
2.2.3	.3 Temperature cycling	test		Regulations: LSA Code 1.2.2.2; MSC.81(70) 1/ 1.2/1.2.1/1.2.2/10.3/10.3.1/10.3.2					
	Test F	Procedure		Accepta	ance Criteria		Significant Test Data		
Twelve lifejacket lights which have passed the visual inspection should be subjected to temperature cycling. The following test should be carried out on 12 lifejacket lights:					hould not be damaged the air temperature ran	ge			
The lifejacket lights should be alternately subjected to surrounding temperatures of -30°C and at least +65°C. These alternating cycles need not follow immediately after each other and the following procedure, repeated for a total of not less than 10 cycles, is acceptable:			loss of rigidity under high temperatures and, after the tests, should show no sign of damage			of id, ge Attach tempera ig, times spent at	PASS: FAIL: Attach temperature cycling chart to record times spent at each temperature.		
.1	8 h exposure at a mini completed in 1 day; and	mum temperature of +65°C to be							
.2	same day and left expos	ed from the warm chamber that sed under ordinary room conditions $C \pm 3^{\circ}C$ until the next day;							
.3	an 8 h exposure at a ma completed the next day	aximum temperature of -30°C to be ; and							
.4		d from the cold chamber that same nder ordinary room conditions at a 3°C until the next day.							
	having passed the ten Id be subjected next to th	nperature cycling test, the lights e light tests.							

Lifejack lights						Surveyor:		ime:		
2.2.3.3	Temperature cyc		est data OT CYCLE		Regulations: L	Regulations: LSA Code 1.2.2.2; MSC.81(70) 1/ 1.2/1.2.1/1.2.2/10.3/10.3.1/10.3.2 COLD CYCLE				
Cycle 1	Date In: Time In: Temperature:		Date Out: Time Out: Duration:		In :	n:	Time	Date Out: Time Out: Duration:		
Cycle 2	Date In: Time In: Temperature:		Date Out: Time Out: Duration:		In:	n: erature:	Time °C	Date Out: Time Out: Duration:		
Cycle 3	Date In: Time In: Temperature:		Date Out: Time Out: Duration:		In:	n: erature:		Date Out: Time Out: Duration:		
Cycle 4	Date In: Time In: Temperature:		Date Out: Time Out: Duration:		In:	n: erature:		Date Out: Time Out: Duration:		
Cycle 5	Date In: Time In: Temperature:		Date Out: Time Out: Duration:		In:	n: erature:		Date Out: Time Out: Duration:	<u>.</u>	
Cycle 6	Date In: Time In: Temperature:		Date Out: Time Out: Duration:		In:	n: erature:		Date Out: Time Out: Duration:		
Cycle 7	Date In: Time In: Temperature:		Date Out: Time Out: Duration:		In:	n: erature:		Date Out: Time Out: Duration:		
Cycle 8	Date In: Time In: Temperature:		Date Out: Time Out: Duration:		In:	n: erature:		Date Out: Time Out: Duration:		
Cycle 9	Date In: Time In: Temperature:	C	Date Out: Time Out: Duration:		In:	n: erature:	Time C	Date Out: Time Out: Duration:		
Cycle 10	Date In: Time In: Temperature:	C	Date Out: Time Out: Duration:	hours	In:	n: erature:	Time C	Date Out: Time Out: Duration:		

Lifejacket/immersion suit lights	Model:	umber:		Date: Surveyor: Organization:		
2.2.3.4 Light tests				ns: LSA Code 1.2 3.5/ 10.3.5.2/10.3.5		/2.2.3.2.2; MSC.81(70) 1/
Test Procedure		Acceptano	ce Criteria		Sign	ificant Test Data
Four lifejacket lights which have temperature cycling test sho from a stowage temperature then be operated immersed in a temperature of -1°C, four lif which have passed the tempe test should be taken from temperature of +65°C and immersed in seawater at a te +30°C, and four lifejacket light passed the temperature cyclin be taken from ordinary room c be operated immersed in f ambient temperature. If the voltage at 5 min of oper than the recorded voltage at t it is permissible to use a la same build standard for the test. Using the lowest record light output test can be ca described below. The voltage units should be monitored con 8 h. To make sure that all test a luminous intensity of no 0.75 cd in all directions o hemisphere for 8 h operation, test should be performed.	uid be taken of -30°C and o seawater at ejacket lights rature cycling a stowage be operated mperature of s which have g test should onditions and reshwater at ation is lower he end of life mp from the light output ed voltage a rried out as of all 12 test ntinuously for units provide ot less than f the upper	Water-activated lifejacket functioning within 2 min and intensity of not less than 0.75 of freshwater a luminous intensis should have been attained wit the 12 lifejacket lights should of intensity of not less than 0.75 of hemisphere for a period of at I In the case of a flashing light it rate of flashing for the 8 h op 50 flashes and not more than the effective luminous intensis directions of the upper hemis calculate the effective luminous	d have rea cd within 5 n sity of not le thin 10 min. continue to p cd in all direc east 8 h. should be ea erative perio 70 flashes p ity is at lea phere. (See	ched a luminous nin in seawater. In ess than 0.75 cd At least 11 out of rovide a luminous ctions of the upper stablished that the rod is not less than er minute and that ast 0.75 cd in all	PASS: Recorded voltage at Voltage at 5 min of o Lowest recorded volt Details of three lights Al luminous intensity details, colour of ligh attached here for ead a) Taken form - b) Taken from +	peration: age: s selected for light output test: , hours of operation, flash t and Voltage data is to be ch light 30°C: -65°C: ordinary room conditions:

Lifejacket/immersion suit lights	Model:	er: umber:		Surveyor:	Time:
2.2.3.4 Light tests (continue	2.2.3.4 Light tests (continued)			ns: LSA Code 1.2 3.5/ 10.3.5.2/10.3.	2.2.3/2.2.3.1.1/2.2.3.1.2/2.2.3.2.2; MSC.81(70) 1/ 5.3/10.4/10.4.9
Test Procedure		Acceptane	ce Criteria		Significant Test Data
It must be demonstrated that light from each of the specified ranges reaches the requir intensity in all directions of hemisphere when using a which is calibrated to the standards of the appropriate State Standard Institute (Nor No.70 contains further inform lowest voltage light of the color test sample lot, the highest we the high temperature test sa the mean voltage light of temperature sample lot should These three lights must be use output tests. In the event filament burns out during the test, a second light from performance test lot may Luminous intensity should be a photometer directed at the light source with the test light table. Luminous intensity measured in a horizontal dir level of the center of the light continuously recorded thro rotation.	d temperature ed luminous of the upper photometer photometer photometric e National or te: CIE Publ. mation.). The d temperature oltage light of imple lot and the ambient d be selected. ed for the light that a lamp e light output n the same / be used. measured by center of the on a rotating should be rection at the nt source and	The effective luminous intensiformula: $\begin{bmatrix} \int_{t_1}^{t_2} Id \\ 0.2 + (t_2) \end{bmatrix}$ where: I is the instantaneous intensity 0.2 is the Blondel-Rey constant t_1 and t_2 are time limits of integrations of the test of test of the test of test o	$\left[\frac{t}{t} - t_1\right]_{max}$		Comments/Observations

Lifejacket/immersion suit lights	Model:	el: Sur			Time:	
2.2.3.4 Light tests (continued)			Regulations: LSA Code 1.2.2.3/2.2.3.1.1/2.2.3.1.2/2.2.3.2.2; MSC.81(70) 1/ 10.3.2/10.3.5/ 10.3.5.2/10.3.5.3/10.4/10.4.9			
Test Procedure		Acceptanc	ce Criteria		Significant Test Data	
		fixed/steady fixed/steady intensity. Sub intensity in all of interval between nous intensity (the required lur should be dis	lights for the ch lights should directions of the en switching on (incandescence minous intensity sregarded (see	Comments/Observations		

Lifejacket/immersion suit lights	Manufacturer: Model: Lot/Serial Number:			Date: Surveyor: Organization:				
2.2.3.5 Chromaticity test			Regulatio	ns: LSA Code 2.2.	3.1.4; MSC.81(70) 1/ 10.3.2/10.4/10.4.10			
Test Proced One lifejacket light which has		•	tance Criter		Significant Test Data			
One lifejacket light which has should be tested for chromatic lies within the boundaries of th diagram specified for each colo Commission on Illumination (C The chromaticities of the lifeji measured by means of colori equipment which is calibrate National or State Standards Publ. No.15.2 contains f Measurement on at least fou hemisphere should be taken.	ity to determine that it he area "white" of the ur by the International IE). acket light should be metric measurement d to the appropriate Institute (Note: CIE urther information).	The measured chroma within the boundaries per CIE. The boundari are given by the follow x 0.500 0.500 0.440 y 0.382 0.440 0.433 (International Standard with colour tables to b	of the area c les of the are ving corner c 0.300 0.300 0.344 0.278 d on Colours	f the diagram as a for white lights oordinates: 0 0.440 3 0.382 of Light Signals,	Results: All chromaticity data is to be attached here. PASS: FAIL: Comments/Observations			

Lifejacket/immersion suit lights	Model:	r: Date: Surveyor: mber: Organization:			Time:	
2.2.3.6 Drop test			Regulatio	ns: LSA Code 2.2.	.1.5.6; MSC.81(70) 1/	10.3.3
Test Procedure		Acceptan	ce Criteria		Significa	ant Test Data
One lifejacket light which has visual inspection should be at lifejacket and then be subjected test as follows: Without readjusting the lifejac subject should jump vertica water, feet first, from a heigh 4.5 m. When jumping into the test subject should hold on to t during water entry to avoid post For the approval of the lifejact test result obtained from the subject should be acceptable provided otherwise. After this drop test the light taken from ordinary room cor operate immersed in free ambient temperature. The light should then be subj- light tests (see 2.2.3.3).	tached to a ed to a drop ket, the test lly into the t of at least e water, the he lifejacket ssible injury. ket light, the participating e except as should be nditions and shwater at	The lifejacket light should not dislodged from the lifejacket, and should be switched on ar conspicuous while the test sul Water-activated lights should 2 min and have reached a lu than 0.75cd within 5 min ir luminous intensity of not less the attained within 10 min. The lig a luminous intensity of not less of the upper hemisphere for further details see Light Tests	suffer damag should not in d seen to be oject is still in commence f uminous inte n seawater. han 0.75 cd s ht should co s than 0.75 c a period of a	njure the wearer, e illuminated and in the water. unctioning within ensity of not less In freshwater a should have been intinue to provide id in all directions	Results: PASS: Comments/Observations	FAIL:

Lifejacket/immersion suit lights	Model:	umber:		Date: Time: Surveyor: Organization:			
2.2.3.7 2 m light drop test		Regulations: MSC.81(70) 1/			10.3.4		
Test Procedure		Acceptanc	ce Criteria		Sign	ificant Test Data	
One lifejacket light which has passed the visual inspection should be dropped from a height of 2 m onto a rigidly mounted steel plate or concrete surface. After this test the light should be taken from ordinary room conditions and operate immersed in freshwater at ambient temperature.		The lifejacket light should not capable of providing a lumino 0.75 cd for a period of at least in freshwater at ambient tempe Light Tests at 2.2.3.3).	ous intensity 8 h when op	of not less than erated immersed	<u>Results:</u> PASS: Comments/Observati	FAIL:	
The light should be subjected light tests (see 2.2.3.3).			Population	NO. MCC 91/70) 1/	10.3.5/10.3.5.1/10.4/10	0.4.2	
Test Procedure	lesi	Acceptance Criteria				ificant Test Data	
If a manual switch is fitted, arrangement test should be ca		The light must function proper			Results:		
One lifejacket light which has visual inspection should be sub switch arrangement test.					PASS:	FAIL:	
A test person wearing imr gloves, must be able to switch light in its normal operational and off three times.	the lifejacket				Comments/Observati	ions	
After having passed t arrangement test the light subjected next to the vibration	should be						

Lifejacket/immersion suit lights	Model:	er: umber:		Surveyor:		:
2.2.3.9 Vibration test	2.2.3.9 Vibration test			ns: LSA Code 1.2	2.2.1/1.2.2.8; MSC.81	(70) 1/ 10.4/10.4.1
Test Procedure		Acceptano	ce Criteria		Sig	gnificant Test Data
The lifejacket light which has passed the switch arrangement test should be subjected to a vibration test according to IEC 60945:2002, paragraph 8.7.		The lifejacket light should be o workmanship and materials.	constructed v	with proper	<u>Results:</u>	
		The lifejacket light should function after the test.			PASS:	FAIL:
					Comments/Observ	rations

Lifejacket/immersion suit lights	Model:	er:		Date: Time: Surveyor: Organization:				
2.2.3.10 Mould growth test	2.2.3.10 Mould growth test		Regulations: LSA Code 1.2.2.4; MSC.81(70) 1/ 10.4/10.4.2					
Test Procedure		Acceptanc	e Criteria			Significant Test	Data	
One lifejacket light which has visual inspection should be the mould growth test. The lit	subjected to	The lifejacket light should be affected by fungal attack.	rot-proof ar	nd not be unduly	<u>Results:</u>			
should be inoculated by spraying with an aqueous suspension of mould spores				PASS:	FA	NL:		
containing all the following cultures: Aspergillus niger; Aspergillus terreus; Aureobasidium pullulans; Paecilomyces variotii; Penicillium funiculosum, Penicillium ochro- chloron; Scopulariopsis brevicaulis; and Trichoderma viride. The lifejacket light should then be placed in a mould growth chamber which should be maintained at a temperature of 29°C +/- 1°C and a relative humidity of not less than 95 %. The period of incubation should be 28 days. After this period the lifejacket light should be inspected. (Note: The mould growth test may be waived where the manufacturer is able to produce evidence that the external materials employed will satisfy the test.)				Comments/Obse	ervations			

Lifejacket/immersion suit Model: S			Date: Time: Surveyor: Organization:				
2.2.3	.11 Corrosion and s	eawater resis	stance test	Regulatior	ns: LSA Code 1.2.	2.4; MSC.81(70) 1/ 1	0.4/10.4.4
	Test Procedure		Acceptanc	ce Criteria		Sig	nificant Test Data
visua	lifejacket light which has I inspection should be su sion and seawater res	bjected to a	The lifejacket light should be ounduly affected by seawater.	corrosion res	istant and not be	<u>Results:</u>	
acco	according to IEC 60945:2002, paragraph 8.12.		Furthermore, the lifejacket li requirements of IEC 60945:20			PASS:	FAIL:
(Note .1	e: If there are no exposed the Corrosion and Resistance Test nee conducted.	Seawater	There should be no undue de the lifejacket light should funct			Comments/Observa	ations
.2	The Corrosion and Resistance Test may where the manufacture produce evidence that metals employed will test.	be waived or is able to the external					
.3	Automatic activated ver be prevented from swite the test.)						
.4	Where the exposed me the automatic switch function test after the cannot be done.	sensor, the					

Lifejacket/immersion suit Manufacturer: lights Model: Lot/Serial Number:				Date: Time: Surveyor: Organization:			
2.2.3.12 Test for oil resistance			Regulation	ns: LSA Code 1.2.	2.4; MSC.81(70) 1/ 10	.4/10.4.6	
Test Procedure		Acceptano	ce Criteria		Sigr	nificant Test Data	
One lifejacket light which has passed the visual inspection should be subjected to the test for oil resistance according to IEC 60945:2002, paragraph 8.11. Automatic activated version should be prevented from switching during the test.		by oil and should show no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical qualities.		<u>Results:</u> PASS: Comments/Observat	FAIL:		
2.2.3.13 Rain test and wa	atertightness	s test Regulations: LSA Code 1.2.2		2.4/1.2.2.8; MSC.81(70) 1/ 10.4/10.4.7			
Test Procedure		Acceptance Criteria		Significant Test Data			
One lifejacket light which has visual inspection should be su rain test according to IEC paragraph 8.8.	bjected to a	The lifejacket light should be r The lifejacket light should com IEC 60945:2002, paragraph 8 the rain test.	ply with the		<u>Results:</u> PASS:	FAIL:	
After having passed the ra lifejacket light and the com source should be immersed under not less than 300 mm of for at least 24 h. Automatic activated version prevented from switching durin	plete power horizontally f fresh water should be	After the water-tightness test the lifejacket light should function and there should be no evidence of water inside the lifejacket light.		Comments/Observat	tions		

Model:		er:			ime:
2.2.3.14 Fire Test		Regulatio	ons: LSA Code 2.	2.1.1; MSC.81(7	0) 1/ 10.4/10.4.8
Test Procedure		Acceptance Criteria			Significant Test Data
One lifejacket light which has passed the visual inspection should be subjected to a fire test. A test pan not less than 30 cm x 35 cm x 6 cm should be placed in an essentially draught-free area. Water should be put in the bottom of the test pan		The lifejacket light should not sustain b melting after being totally enveloped in a at least 2 s and after being removed fror	fire for a period of	<u>Results:</u>	
		The lifejacket light should function after t	the test.	PASS:	FAIL:
to a depth of at least 1 cm enough petrol to make a mi depth of not less than 4 cm should then be ignited and allo freely for at least 30 s. The lif should then be moved through facing them, with the lifejach more than 25 cm above the the test pan so that the exposure to the flames is at le	followed by nimum total . The petrol wed to burn ejacket light o the flames, ket light not top edge of duration of			Comments/Obse	rvations

2.2.4 REFERENCE TEST DEVICE (RTD) CONSTRUCTION VALIDATION AND CALIBRATION

- 2.2.4.1 Adult Lifejacket RTD
 - 2.2.4.1.1 Buoyancy calibration
 2.2.4.1.2 Construction validation General
 2.2.4.1.3 Construction Validation Fabric and Webbing measurements
- 2.2.4.2 Child Lifejacket RTD
 - 2.2.4.2.1 Buoyancy calibration
- 2.2.4.3 Infant Lifejacket RTD
 - 2.2.4.3.1 Buoyancy calibration

2.2.4	REFERENCE TEST DEVICE (RTD)
CONSTRUC	TION VALIDATION AND CALIBRATION

Manufacturer	
Serial number	
Size (Adult/Child/Infant)	
Date of construction	
Place of construction	
Date of validation/calibration	
Place of validation/calibration	
Signature	

Reference test device (RTD)	nce test device Manufacturer: Model: Lot/Serial Number:			Date: Time: Surveyor: Organization:			
2.2.4.1.1 Buoyancy calib	ration	Re	gulations: LSA	Code 2.2.1.4	4; MSC.81(70) A	Annex 1, Appendix	
Test Procedu	ure		Acceptance (Criteria		Significant Test Data	
To achieve repeatability in hu the overall buoyancy and dist between the front and back of maintained within a tight tolera The buoyancy of a new RT allowable tolerance range shrinkage or compression of stabilizes. Until the buoyancies have stabilized, buoyancy and be checked at regular interval and then at least monthly the used for testing, whichever is may require more frequent of with buoyancies within toleran for certification testing.	ribution of buoyancy of the RTD must be ance. D may exceed the until the normal of the foam inserts s of the foam inserts d distribution should ls (perhaps weekly), reafter or whenever longer (frequent use checks). Only RTDs	Front Buoyancy ¹ Back Buoyancy Total Buoyancy Distribution ² ¹ values at or pressure	Design 103 N 46 N 149 N 69% in front corrected to s	Max 107 N 48 N 155 N 70.5% in front	Min 100 N 45 N 145 N 67.5% in front perature and	Left front buoyancy: N Right front buoyancy: N Total front buoyancy: N Total back buoyancy: N Total buoyancy: N Buoyancy distribution: % in front	
At the time of manufacture distribution of buoyancy in the adjusted to be within 1.3 N achieve this tolerance, thin lay -up" inserts) may have been in front and inside front foam ins may need to increase the siz inserts from time to time to kee within tolerance, or may need the back or collar inserts (or the back insert has not shrunk as	the front inserts was of each other. To yers of foam ("make inserted between the erts. The test house is of these make-up ep these parameters to add buoyancy to trim buoyancy, if the	 ² buoyancy distribution is calculated by dividing the front buoyancy by the total buoyancy After a full sheet of 6.5 mm thick foam is required in any one of the four major areas, an inside front or back insert probably needs to be replaced. If the front buoyancy is under the minimum value, measure the buoyancy of the right and left sides so that the proper distribution of buoyancy (no more than a 1.3 N difference) between the right and left front panels can be maintained. 		Make-up inserts added/removed: Foam inserts replaced: Comments:			

Reference test device (RTD)	Model:	rer: Number:	Date: Surveyor: Organization:			
2.2.4.1.2 Construction va	lidation – G	eneral Regulations: LSA	A Code 2.2.1.4	4; MSC.81(70), annex 1, table A.4; MSC.1/Circ.1470, 2.1		
Test Procedure		Acceptance Criteria		Significant Test Data		
Spot check foam inserts. Whi necessary to conduct a full c the dimensions of the foam, a s of one out of every five RTDs made of a representative sa foam pieces against the dime the appropriate annex to the recommendation on testing of appliances (resolution MSC.8)	heck of all spot check should be ampling of ensions in e Revised life-saving	The values should be within ± 6 mm.		 a. Front foam insert (figure A.27) Pass Fail b. Inside front foam insert (figure A.28) Pass Fail c. Collar foam insert (figure A.29) Pass Fail d. Back foam insert (figure A.30) Pass Fail Comments/observations: 		

Reference test device (RTD)		Surveyor:				
2.2.4.1.3 Construction Vali measurements	dation – Fabric and Webbing	Regulation	s: LSA Code 2	2.2.1.4; MSC.81(70) Annex 1; MSC.1/Circ.1470, 3		
Test Pr	ocedure	Acceptance Cri	teria	Significant Test Data		
Establish reference point on the shoulder seam. Place a small mark on the shoulder seam 44.5 mm from the inside edge of the neck seam.		This mark will be the reference point for measuring distances on the front and back panels.				
Vertical webbing. Measure for vertical webbing.	rom the reference point to the	The vertical webbing should be within ± 6.5 mm of this point.		Vertical webbing distance: mm Pass Fail		
Shoulder loop. Measure the distance from the reference point to the location where the inside edge of the yellow webbing first passes under the black shoulder loop.		This distance should be 73 \pm 6 mm.		Shoulder loop distance: mm Pass Fail		
Chest strap. Measure the distance from the reference point to the top of the chest strap.		This distance should be 168 ± 6 mm.		Chest strap distance: mm Pass Fail		
Waist belt. Measure the distance from the reference point to the top of the waist belt.		This distance should be	16 ± 3 mm.	Waist belt distance: mm Pass Fail		
Front panel length. Measure the distance from the reference point to the bottom of the foam.		This distance should be	189 ± 6 mm.	Front panel length mm Pass Fail		
Back panel length. Measure the distance from the reference point to the bottom of the back panel.		This distance should be 550 ± 6 mm.		Back panel length mm Pass Fail		

2.2.4.1.3 Construction Validation – Fabric and Webbing measurements	Regulations: LSA Code 2	2.2.1.4; MSC.81(70) Annex 1; MSC.1/Circ.1470, 3
Test Procedure	Acceptance Criteria	Significant Test Data
Collar attachment location. To check the collar attachment location, hold the RTD by the collar, keeping the collar level so the RTD hangs freely. Measure from the top back edge of the foam down to the centre of the neck seam.	This distance should be 342 ± 6 mm.	Collar attachment location: mm Pass Fail
Webbing attachment to collar. To check the location of the vertical webbing attachment to the collar, measure the distance from the edge of the foam (at the end opposite from the zipper) to the front seams of the box-X stitching.	This distance should be 111 ± 6 mm.	Webbing attachment to collar location: mm Pass Fail
Webbing length (chest strap to collar attachment). To check the length of the vertical webbing from the top of the chest strap to the attachment at the collar, measure the inside distance between the box-X stitches located on the chest strap (front panel) and on the underside of the collar.	This distance should be 263 ± 6 mm.	Webbing length: mm Pass Fail
Finished waist belt assembly length. To check the finished length of the waist belt assembly, measure the overall length with the buckle unfastened and the adjustments in the full open position (maximum length). Lay the RTD on a flat surface and measure the fully extended length of the assembly. For consistency, measure the distance from where the snap hook fastens in the D-Ring.	This distance should be 1700 ± 12 mm.	Finished waist belt assembly length: mm Pass Fail

2.2.4.1.3 Construction Validation – Fabric and Webbing measurements						
Test Procedure	Acceptance Criteria	Significant Test Data				
Finished neck size. A suitably sized cone (such as a traffic cone) should be used to check the finished neck size. The cone should be rigid, have a slope of $8.5^{\circ} \pm 1.5^{\circ}$, and be tall enough to allow the RTD to fit snugly. If a flexible cone (such as a plastic traffic safety cone) is used it should be filled with rigid foam, concrete, or similar substance to make it rigid.	The circumference should be 395 ± 6 mm.	Finished neck size: mm Pass Fail				
With both chest and waist belt buckles fastened and the waist belt adjusted to the full open position, place the RTD on the cone with just enough force so it will fit snug to the cone, but not forcing it down.						
Place a mark on both sides of the cone where the shoulder seam contacts the cone. This mark may be used to facilitate subsequent validations. Measure the circumference around the cone at the mark.						

Reference test device Manufacturer: Model: Lot/Serial Number:			Surve Organ	Surveyor:		
2.2.4.2.1 Buoyancy calib	oration		Regulation	ons: LSA Cod	e 2.2.1.4; MSC.81	(70) Annex 3, Appendix
Test Procedur	e	_	Accepta	nce Criteria		Significant Test Data
To achieve repeatability in	human subject		Design	Max	Min	
testing, the overall buoyancy of buoyancy between the fron RTD must be maintained	and distribution t and back of the	Front Buoyancy ¹	63 N	65.4 N	60.6 N	Left front buoyancy: N
tolerance.	within a tight	Back	25 N	26.2 N	23.8 N	Right front buoyancy: N
The buoyancy of a new RTD	may exceed the	Buoyancy				Total front buoyancy: N
allowable tolerance range until the normal shrinkage or compression of the foam inserts stabilizes. Until the buoyancies of the foam inserts have stabilized, buoyancy and distribution should be checked at regular	the foam inserts	Total Buoyancy	88 N	91.6 N	84.4 N	Total back buoyancy: N
	buoyancy and	Buoyancy Distribution ²	71.5% in front	73% in front	70% in front	Total buoyancy: N
intervals (perhaps weekly), a monthly thereafter or whe	ind then at least	¹ values at or co		Buoyancy distribution: % in front		
testing, whichever is longer (frequire more frequent check		² buoyancy distribute by the total bud		СУ		
with buoyancies within tolerance should be used for certification testing.		At the time of man in the front inserts				
To check buoyancy tolerance need to be removed from the	To achieve this to achieve the cum					
care that all trapped air is removed when checking buoyancy and that layers are maintained in their proper sequence when		device exceeds the be altered or replaced house may need	aced to bring t to add make	Foam inserts replaced:		
reinstalled (considerable e needed to remove entrapped intact device).	maintain the front-to-back and side-to-side insert tolerances. If the front buoyancy is under the minimum value, measure the buoyancy of the right and left sides so that the proper distribution of buoyancy (no more than a 1. 3 N difference) between the right and left front panels can be maintained.					

Infant Lifejacket Reference test device (RTD)	Model:			yor:	Time:	
2.2.4.3.1 Buoyancy cali	bration		70) Annex 3, Appendix			
Test Procedu	ire		Accept	ance Criteria		Significant Test Data
To achieve repeatability in testing, the overall buoyance of buoyancy between the fro RTD must be maintained tolerance. The buoyancy of a new RTE allowable tolerance range shrinkage or compression of stabilizes. Until the buoyant inserts have stabilized, distribution should be chea- intervals (perhaps weekly), monthly thereafter or what testing, whichever is longer of require more frequent chea- with buoyancies within tole used for certification testing. To check buoyancy toleran- need to be removed from care that all trapped air is checking buoyancy and maintained in their proper reinstalled (considerable needed to remove entrappe intact device).	h human subject y and distribution nt and back of the d within a tight D may exceed the until the normal f the foam inserts cies of the foam buoyancy and ecked at regular and then at least enever used for (frequent use may cks). Only RTDs erance should be ces, foam inserts the device. Take s removed when that layers are sequence when effort would be	² buoyancy dist the total buoy At the time of ma the front inserts achieve this tolera the cumulative in the upper limits replaced to bring to add make -up and side -to-side minimum value, in that the proper	Design 42 N 29 N 71 N 59.2 % in front 59.2 % in front orrected to stan ribution is calcu ancy nufacture the le was adjusted to ance, the layers sert buoyancy. I , one layer pe the unit into co layers from time insert tolerance measure the bu distribution of	Max 44.4 N 30.2 N 74.6 N 60.7 % in front dard temperat lated by dividir eft-to-right distr be within 1.3 were individua if buoyancy of r compartmer mpliance. The to time to mai es. If the front oyancy of the buoyancy (no	Min 39.6 N 27.8 N 67.4 N 57.7 % in front ure and pressure ng the front buoyancy anew device exceed t may be altered e test house may ne intain the front-to-ba buoyancy is under t right and left sides o more than a 1.3	Left front buoyancy:N Right front buoyancy:N Total front buoyancy:N Total back buoyancy:N Total buoyancy:N Buoyancy distribution:N Buoyancy distribution:N Buoyancy distribution:N Make-up inserts added/removed: y by Make-up inserts replaced: Comments: A

2.3 IMMERSION SUITS AND ASSOCIATED EQUIPMENT

2.3.1 IMMERSION SUITS (NON-INSULATED) EVALUATION AND TEST REPORT

- 2.3.1.1 General data and specifications
- 2.3.1.2 Submitted drawings, reports and documents
- 2.3.1.3 Quality assurance
- 2.3.1.4 Visual inspection
- 2.3.1.5 Test subjects
- 2.3.1.6 Test with a lifejacket
- 2.3.1.7 Test clothing
- 2.3.1.8 Donning tests 1 & 2
- 2.3.1.9 Ergonomic test
- 2.3.1.10 Field of vision test
- 2.3.1.11 Flotation test
- 2.3.1.12 Righting test
- 2.3.1.13 Water ingress and jump test
- 2.3.1.14 Jump test
- 2.3.1.15 Leak test
- 2.3.1.16 Swimming and water emergence test
- 2.3.1.17 Oil resistance test
- 2.3.1.18 Alternative oil resistance test
- 2.3.1.19 Fire test
- 2.3.1.20 Temperature cycling test
- 2.3.1.21 Temperature cycling test Test data
- 2.3.1.22 Buoyancy test
- 2.3.1.23 Strength test
- 2.3.1.24 Thermal protective test (General)
- 2.3.1.25 Thermal protective test (Continued)
- 2.3.1.26 Test sheets for temperatures during immersion tests

2.3.1 IMMERSION SUITS (NON-INSULATED) EVALUATION AND TEST REPORT

Manufacturer	
Туре	
Date	
Place	
Surveyor's name (printed)	
Signature	
Approving organization	

Immersion suits (non-insulated)	Model:	er:		Surveyor:			
2.3.1.1 General data an	d specifications		Regulatio	ns: LSA Code II/2	2.3; MSC.81	(70) /3.1 & 3.2	2
Construction Material:		Additional equipment:					Donning instructions:
		produced by:			_ Type:		□ YES □ NO
Type: Buoyant material produced by:		Whistle produced by (if fitted):			_ Туре:		
Туре:		Life-line produced by (if fit	ted):		_Туре		
		Light produced by (if fitted			Туре:		

Immersion suits (non-insulated)	Model:	r: imber:	Surveyor:					
2.3.1.2 Submitt	ed drawings, reports	and documents						
	Submitted drawings and documents							
Drawing No.	Revision No. & date		Title of drawing					
		Submitted reports and docum	nents		01-1-1-			
Report/Document No.	Revision No. & date	Titl	e of report / document		Status			
		Maintenance Manual -						
		Operations Manual -						

	Manufacturen		Deta: Time:
Immersion suits	Manufacturer:		Date: Time:
(non-insulated)	Model:		Surveyor:
	Lot/Serial Number:		Organization:
2.3.1.3 Quality assurance	ce	Regulatio	ons: - MSC.81(70) 2/1.1, 1.2
of the International Conventi as amended, or the internation inspected, representatives of inspections of manufacturers appliances and materials us approved prototype life-saving Manufacturers should be requi to ensure that life-saving appli as the prototype life- saving appli	f a particular type are required by chapter III ion for the Safety of Life at Sea, 1974, hal Life-Saving Appliance (LSA) Code, to be the Administration should make random to ensure that the quality of life-saving sed comply with the specification of the appliance. ired to institute a quality control procedure fances are produced to the same standard pliance approved by the Administration and ion tests carried out in accordance with the	Quality As Quality As	Assurance I Used: Assurance Procedure: Assurance Manual: on of System:
		Quality As	Assurance System acceptable Yes No
		Comments	nts/Observations

	nersion suits n-insulated)	Model:	mber:		Surveyor:	Time: tion:	
2.3	.1.4 Visual inspection		Regulati	lations: LSA Code I/1.2.2, II/2.3.1.1.3 & 2.3.1.1.4			
	Test Procedure		Acceptance Cr	iteria		Significant Test Data	
Nor .1	n-insulated immersion suit s be clearly marked w information including the which approved it, date of and any operational restri	vith approval Administration f manufacturer				Passed Failed	
.2						Passed Failed	
.3	be fitted with retro-reflecti	ive tape.	Be fitted with approved patch material with a total area o distributed so as to be useful and surface craft from a with 100 cm ² on the back if automatically turn the wearer to resolution MSC.481(102).	f at least for searc all directi the suit	400 cm ² h from air ons and does not	Tape sizes (LXB) Total tape area Does the suit automatically turn the Yes/No If No, tape area on back Passed Failed Comments/Observations	wearer face up: -

Immersion suits (non-insulated)	Manufacturer: Model: Lot/Serial Number:			Date: Surveyor: Organization:		
2.3.1.4 Visual inspection (C	ontinued)	Reç	gulations: LSA Code I/1.2.2, II/2	3.1.1.3	& 2.3.1.1.4, 2.3.1.4, 2.3.1.5, 2	2.3.1.6
Test Procedure			Acceptance Criteria		Signific	cant Test Data
Does the non-insulated imm whole body with the exception		the	Be of an international or vivid orange, or a comparably highly		Passed	Failed
Are the hands covered, or immersion suit equipped with gloves?			colour on all parts where this wildetection at sea.		Passed	Failed
Are their arrangements to pre in the legs?	vent excessive free	e air			Passed	Failed
Is the non-insulated immersic colour?	on suit of highly vis	ible			Passed	Failed
Is the non-insulated immersion worn without a lifejacket? If yes Is the non-insulated immersion complying with paragraph 2.2.	n suit fitted with a l	ight			Passed	Failed
	e non-insulated immersion suit fitted with a le complying with paragraph 2.2.1.14 of the LSA				Passed Passed	Failed
Fitted with releasable buoyant lifeline or other means to secure it to a suit worn by another person in the water and provided with a suitable means to allow rescuer to lift the wearer from the water into survival		the llow			Passed	Failed
or rescue craft.	the water into surv	IVAI			Comments/Observations	

Immersion suits (non-insulated)	Manufacturer: Model: Lot/Serial Number:			Surveyor:	Time: ion:		
2.3.1.5 Test subjects		Regulations: LS	SA Code II/2.3.1.1.	5, 2.3.1.3.1	4; MSC.81(70) 1/3.1.1 & 2	2.8.2	
Test Procedure		Acc	eptance Criteria		Significan	t Test Data	
At least six able-bodied pers females of the following he should be used. At least one two of the persons should b more than one female in the s	eights and weights and not more than e females with not	<u>Height</u> 1.4 m - 1.6 m; 1.6 m - 1.8 m over 1.8 m	Weight 1 person under 1 person over 6 1 person under 1 person over 70 1 person under 1 person over 8	0 kg 70 kg	Male/Female Subject No.1 Subject No.2 Subject No.3 Subject No.4 Subject No.5 Subject No.6 Comments/Observations		

Immersio (non-insu		Model:	·	Surveyor:	Time: on:		
2.3.1.6	Test with a lifeja		Regulations: LSA Code II/2.3.1.5;	-			
	Test Procedu		Acceptance Criteria		Significant Test Data		
lifejacket,	it is to be worn in the lifejacket should e tests prescribed in	d be worn over the			Manufacturer of lifejacket:	Туре:	
					Manufacturer of lifejacket:	_	
					Туре:	-	
					Manufacturer of lifejacket:	Туре:	
					Comments/Observations		
2.3.1.7	Test clothing		Regulations: LSA Code II/2.3.1.1.	1; MSC.81(7	0) 1/3.2.6 to 3.2.8		
	Test Procedu	ire	Acceptance Criteria		Significant Test Data		
	subjects should wear consisting of	a standard range			Did all test subject use the specified test clothing		
.2 shirt (.3 trouse .4 in ad should therm .5 If a s lifejac	rwear (short sleeved, long sleeved) ers (not woollen) and dition to the clothing d wear two woollen p hal protective tests. suit is to be worn in cket, the lifejacket sho ermal protective tests	woollen socks g, the test subject pullovers during the conjunction with a puld be worn during			□ YES □ NO Comments/Observations		

Immersion suits (non-insulated)	Model:		Surveyor:		Time:				
2.3.1.8 Donning test (1)		Regulations: LSA Coc	Regulations: LSA Code II/2.3.1.1.1; MSC.81(70) 1/3.1.3						
Test Procedu	re	Acceptanc	Acceptance Criteria		Significant Test Data				
Following a demonstration, each test subject should be able to unpack, don and secure the immersion suit over their test clothing without assistance in less than 2 min. This time should include the time to don any associated clothing, inflate any orally inflated chambers if fitted and don a lifejacket, if such is to be worn in conjunction with the immersion suit, and the test subjects should be able to don such lifejacket without assistance.		the don and secure the im out test clothing (see 2.3.1. less than 2 min. This ti time to don any associa orally inflated chamber ion lifejacket, if such is to with the immersion suit.	time to don any associated clothing, inflate any orally inflated chambers if fitted, and don a lifejacket, if such is to be worn in conjunction with the immersion suit.		Donning time Time Pass Fail Subject No.1sec Subject No.2sec Subject No.3sec Subject No.3sec Subject No.4sec Subject No.5sec Subject No.5sec Subject No.6sec Subject No.6sec Comments/Observations Subject No.6sec Subject No.6sec				
2.3.1.8 Donning test (2)			Regulations: LSA Co	ode I/2.3	3.1.1.1; MSC.81(70) 1/3.1.4				
Test Procedure		Acceptan	ce Criteria		Significant Test Da	ta			
The immersion suit should be being donned in 5 min at temperature as low as -30°C donning test the packed imis should be kept in a refrigerated a temperature of -30°C for 24	an ambient 5 . Before the mersion suit d chamber at	The test subject should be a 5 min.	able to complete this t	ask in	Donning time at - 30°C Time Passe Subject No.1sec Subject No.2sec Subject No.3sec Subject No.4sec Subject No.5sec Subject No.6sec Comments/Observations	d Failed			

Immersion suits (non-insulated)	Manufacturer: Model: Lot/Serial Number:	Date: Time: Surveyor: Organization:	
2.3.1.9 Ergonomic Test	t	Regulations: LSA Code II/2.3.1.3.1, 2.3.1.3.2; MSC.	81(70) 1/3.1.5
Test Procedure	Acceptan	e Criteria Signifi	cant Test Data
 When wearing the immersion subjects should be able to: .1 climb up and down a v of at least 5 m in length .2 perform all duties ass abandonment; and .3 to pick up a pencil and 	rertical ladder n; sociated with	er of the pencil should be movement: \[\]YES \[]NO All the test subjects we and write: \[]YES \[]NO All the test subjects we lifejacket without assist \[]YES \[]NO All the test subjects we associated with abanded operate a rescue boat: \[]YES \[]NO	ere able to pick up a pencil ere able to put on the tance: ere able to perform all duties onment, assist others and ere able to climb up and of 5 meter in length:

Immersion suits (non-insulated)	Manufacturer: Model: Lot/Serial Number:		Date: Time: Surveyor: Organization:						
2.3.1.10 Field of vision test	Regulations: LSA Code II/2.3.1.1.3; MSC	.81(70) 1/3.1.							
Test Procedure	Acceptance Criteria		Significant	Test Data					
Each test subject should be	The lateral field of vision should be at least		F	ield of vision angle:	≥ <u>120°</u>				
seated with the head in a fixed position, and the lateral field of vision measured.	120°.	Subject No.1 Subject No.2 Subject No.3 Subject No.4 Subject No.5 Subject No.6		Passed		Failed			
		Comments/Observations							
2.3.1.11 Flotation test	Regulations: LSA Code II/2.3.1.1; MSC.8	1(70) 1/3.1.7							
Test Procedure	Acceptance Criteria		Significant			•			
With the test subject floating at rest, wearing the suit in conjunction with a lifejacket if required, the freeboard should be measured from the water surface to the nose or mouth.	The test subject should float face-up with their mouths clear of the water by at least 120 mm and be stable in that position. The position of the lifejacket light should permit it to be visible over as great a segment of the upper hemisphere as is practicable.	Subject No.1 Subject No.2 Subject No.3 Subject No.4 Subject No.5 Subject No.6		Mouth Freeboard	Nose Freeboard	Light Postion (Y/N)	ok?		
		Comments/O	bservations						

Immersion suits (non-insulated)	Model:	er: umber:			Time:	
2.3.1.12 Righting test			Regulations	: LSA Code II/2.3.	1.2; MSC.81(70) 1/3.1.8	
Test Procedure Accept			ce Criteria		Significant Test D	ata
The test subjects in fresh water wearing either a non-insulated immersion suit or a non-insulated immersion suit with a lifejacket should each demonstrate that they can turn themselves from a face-down to a face-up position in not more than 5 s.		will right the te ach demons	est subjects within trate that they can	Passed Failed Subject No.1 Subject No.2 Subject No.3 Subject No.4 Subject No.5 Subject No.6 Comments/Observations		
2.3.1.13 Water ingress and	jump test		Regulatio	ns: MSC.81(70) 1/3	.1.9	
Test Procedure		Acceptan	ce Criteria		Significant Test D	ata
The test subjects should p non-insulated immersion suit weighed. Following a jump in from a height sufficient to tota the body, each test subject weighed again. Weighing should be perfor machine accurate to ± 100g.	and then be to the water ally immerse should be	The difference in the combine the suit should not exceed 50		e test subject and	Mass difference ≤ 500gPassFailSubject No.1Subject No.2Subject No.3Subject No.4Subject No.5Subject No.6Comments/Observations	

Immersion suits	Model:	er:		Surveyor:	Tin			
(non-insulated)	Lot/Serial Number:			Organization:				
2.3.1.14 Jump test			Regulations: LSA Code II/2.3.1.3.3; MSC.81(70) 1/3.1.10					
Test Procedure		Acceptano	ce Criteria			Significant	Test Data	
The test subjects should jump and lifejacket if required from 4.5m vertically into the wate jump, the suit and its attachm be examined for damage or dis the test subject should be concerning whether the suit injury to the wearer.	a height of er. After the nents should slodging, and questioned	The suit and its attachments s dislodged in any way. The te injured by the suit.			Subject No.1 Subject No.2 Subject No.3 Subject No.4 Subject No.5 Subject No.6 Comments/Obser	Passed		Failed
2.3.1.15 Leak test			Regulation	ns: LSA Code II/2	2.3.1.1.1; MSC.81(7	70) 1/3.1.11		
Test Procedure		Acceptano	ce Criteria			Significant	Test Data	
 The test subject should primmersion suit and be weight subject should then be instruct of the following: .1 a period of flotation in calman 1h; or .2 swimming for 20 min for a at least 200 m The test subject should be we after the task. The weighing machine should to ± 100g. 	ed. The test ted to do one n water of distance of eighed again	The ingress of water into the p exceed a mass of 200g.	pre-wetted su	uit should not	Water ingress ≤ 2	ative 1 200g Passed 	Ϋ́Alternative 2 	2 Failed

Immersion suits (non-insulated)	Model:	umber:		Surveyor:	Time: n:			
2.3.1.16 Swimming and water emerge			Regulation	_	3.1.3.4; MSC.81(70) 1/3.1.12			
Test Procedure		Acceptanc			Significant T	est Data		
All test subjects, each wearing	a lifeiacket	All qualified test subjects shou	ld be able to	board the liferaft	1) 25m swim and board	ing without lifejacket.		
but not the suit, should atter 25 m and board a liferaft or r with its surface 300 mm abov surface. Test subjects who successfu	npt to swim igid platform ve the water Ily complete	or platform while wearing the r			Passed Subject No.1 Subject No.2 Subject No.3 Subject No.4 Subject No.5			
this task should also perform it suit.	wearing the				Subject No.6 2) 25 m swim and boa	arding with suit		
If designed to be used with a life non-insulated immersion suit tested with the subject also lifejacket.	should be				Passed Subject No.1 Subject No.2 Subject No.3 Subject No.4 Subject No.5 Subject No.6			
					 25 m swim and boarding w if required 	vith suit and a lifejacket,		
					Passed Subject No.1	Failed		

					Comments/Observations
Immersion suits (non-insulated)	Model:	umber:		Surveyor:	Time:
2.3.1.17 Oil resistance te	est		Regulatio	ns: LSA Code; N	ISC.81(70) 1/3.1.13
Test Procedure		Acceptano	ce Criteria		Significant Test Data
After all its apertures have be non- insulated immersion su immersed for a period of 100 mm head of diesel oil at temperature. The surface oil should then I and the immersion suit subject prescribed in 2.3.1.15.	it should be 24 h under normal room be wiped off	The ingress of water should no	ot exceed a	mass of 200g.	Indicate which alternative is used. YAlternative 1 YAlternative 2 Water ingress ≤ 200g Passed Failed Subject No.1

Immersion suits (non-insulated)	Manufacturer: Model: Lot/Serial Number:			Surveyor:	Time		
2.3.1.18 Alternative oil res	istance test		Regulation	ns: LSA Code; MS	SC.81(70) 1/3.1.14.1	& .2	
Test Proce	edure	Acce	otance Criter	ia	Sigi	nificant Test D	ata
In lieu of the test for oil re 2.3.1.17 either of the foll conducted. After all apertures have non-insulated immersion su for a period of 24 h under 10 at normal room temperatu weights to keep suit subme should then be wiped off immersion suit turned inside then be laid on a table suit draining off any leakage an neck aperture by a suitable suit should then be filled wi which should be 300mm aboor Representative samples of seams should be immersed diesel oil for 24 h. After representative samples should be wiped off to the following tests: .1 a hydrostatic test of a fill	lowing tests may be e been sealed, the it should be immersed 0 mm head of diesel oil re if necessary using erged. Any surface oil and the non-insulated e out. The suit should able for collecting and d be supported at the designed hanger. The ith water to neck level we the table. the exterior fabric and under 100mm head of moval from the oil the before being subjected 1m water head; and	After 1h in this positic exceeding a mass of The seam strength st The samples should s of water	on there shou 200g hould be not	uld be no leakage less than 150 N	Indicate which alte YAlternat Water ingress ≤ 20 Passed Subject No.1 Subject No.2 Subject No.3 Subject No.5 Subject No.6 Strength > 150N The samples shou Comments/Observ	rnative is used tive 1 YAh D0g Failed Passed Passed Id support a 1	d. ternative 2

Immersion suits (non-insulated)	Model:	turer:		Surveyor:	Time:
. ,	Lot/Senal No	umber			
2.3.1.19 Fire test			-	ns: LSA Code II/2.	3.1.1.2; MSC.81(70) 1/3.1.15
Test Procedure		Acceptanc	e Criteria		Significant Test Data
A test pan 30 cm x 35 cm x 6 c placed in an essentially draug Water should be put in the bo test pan to make a minimum to 1 cm followed by enough petro minimum depth of 4 cm. The p then be ignited and allowed to for 30 s. If necessary the im- should be draped over a hang the whole of the suit is enve flames, with the bottom of the above the top edge of the test the duration of exposure to is 2 s.	ht-free area. ottom of the otal depth of ol to make a betrol should o burn freely mersion suit ler to ensure loped in the e suit 25 cm t pan so that	The non-insulated immersion s for more than 6 s or continue from exposure to the flames.			Did the immersion suit sustain burning for more than 6 s or continue melting after being removed from the flames? YES NO Comments/Observations

Immersion suits	Model:	urer: Number:		Surveyor:	Time:
2.3.1.20 Temperature cycling	g test		Regulation	ns: LSA Code I/1.2	2.2.2; MSC.81(70) 1/3.1.16
Test Procedure		Acceptano	ce Criteria		Significant Test Data
 The following test should be can two immersion suits The non-insulated immersion s be alternately subjected to s temperatures of -30°C and +65 alternating cycles need n immediately after each other following procedure, repeated for 10 cycles, is acceptable: .1 an 8 h exposure at a temperature of +65°C to be in one day; and .2 the specimens removed warm chamber that same of exposed under ordina conditions at a temperature of -30°C to be the next day; and .4 the specimens removed for chamber that same day exposed under ordina conditions at a temperature of -30°C to be the next day; and .4 the specimens removed for chamber that same day exposed under ordina conditions at a temperature of -30°C to be the next day; and 	suits should surrounding 5°C. These not follow r and the or a total of a minimum e completed I from the day and left ary room erature of lay; maximum e completed om the cold y and left ary room erature of		suits should		(See following page for test data) Passed Failed Comments/Observations

Immersi (non-ins	ion suits sulated)	Model:			Surveyor:		Time:	
2.3.1.21	Temperature c				Regulations: LSA Code	1		
			HOT CYCLE				DLD CYCLE	
Cycle 1	Date In: Time In: Temperature:	0C	Date Out: Time Out: Duration:	hours	Date In: Time In: Temperature:	C	Date Out: Time Out: Duration:	
Cycle 2	Date In: Time In: Temperature:	C	Date Out: Time Out: Duration:		Date In: Time In: Temperature:	C	Date Out: Time Out: Duration:	
Cycle 3	Date In: Time In: Temperature:	0	Date Out: Time Out: Duration:		Date In: Time In: Temperature:		Date Out: Time Out: Duration:	
Cycle 4	Date In: Time In: Temperature:		Date Out: Time Out: Duration:		Date In: Time In: Temperature:		Date Out: Time Out: Duration:	
Cycle 5	Date In: Time In: Temperature:		Date Out: Time Out: Duration:		Date In: Time In: Temperature:		Date Out: Time Out: Duration:	
Cycle 6	Date In: Time In: Temperature:		Date Out: Time Out: Duration:		Date In: Time In: Temperature:		Date Out: Time Out: Duration:	
Cycle 7	Date In: Time In: Temperature:		Date Out: Time Out: Duration:		Date In: Time In: Temperature:		Date Out: Time Out: Duration:	
Cycle 8	Date In: Time In: Temperature:		Date Out: Time Out: Duration:		Date In: Time In: Temperature:		Date Out: Time Out: Duration:	
Cycle 9	Date In: Time In: Temperature:	C	Date Out: Time Out:		Date In: Time In: Temperature:		Date Out: Time Out: Duration:	
Cycle 10	Date In: Time In: Temperature:	0C	Date Out: Time Out: Duration:	hours	Date In: Time In: Temperature:	0C	Date Out: Time Out: Duration:	

Immersion suits (non-insulated)	Model:	Manufacturer: Model: Lot/Serial Number:		Date: Surveyor: Organization:	Time:	
2.3.1.22 Buoyancy test			Regulation	ns: LSA Code II/2.	3.1.8; MSC.81(70) 1/3.1.17	
Test Procedure		Acceptanc	e Criteria		Significant Test Data	
The buoyancy of a n immersion suit designed to be a lifejacket should be measured after 24 h complete submer below the surface in fresh wate The buoyancy shall not depend of loose granulated materials	worn without d before and sion to just er.	The difference between the ini buoyancy should not exceed 5			Buoyancy 1 Buoyancy 2 %difference kg kg % Passed Failed Comments/Observations	
2.3.1.23 Strength test		Regulations: LSA Code II; M			NSC.81(70) 1/3.1.18	
Test Procedure		Acceptance Criteria			Significant Test Data	
The non-insulated immersion be immersed in water for a per It should then be removed fro and closed in the same manr worn by a person A force of n 3200 N should be applied to th and a force of not less than 13 be applied to the parts other th loop for 30 min. The non-inflated immersion sui if necessary to accommodate device.	iod of 2 min. m the water her as when not less than he lifting loop 50 N should han the lifting	The non-insulated immersion s as a result of this test.	suit should n		Passed Failed Comments/Observations	
			-пеай туре шејаске			

Immersion suits (non-insulated)	Manufacturer: Model: Lot/Serial Number:	Surveyor:	Time:
2.3.1.24 Thermal protect	ive test (General)	Regulations: LSA Code II/2	2.3.2.1; MSC.81(70) 1/3.2.1 – 3.2.4
Tes	t Procedure	Acceptance Criteria	Significant Test Data
The thermal protective qualitie manikin, when such a method has been demonstrated to satisfactorily in all aspects to t If human subjects are used, before being accepted for the is to be tested by test subjects Where human subjects are conducted under the sup resuscitation equipment shou safety reasons, ECG should b should be stopped at the wis temperature of hand, foot or for more than 15 minutes, or	es may be measured using a thermal d is required by an Administration and provide test results which correlate test results using human subjects. they should be medically examined tests. Each design of immersion suit		Comments/Observations
temperature (rectal temperature region, both hands, calves, for measured. The accuracy of	subjects, continuous body core ure) and skin temperature of lumbar bot (foot instep) and heels, should be if the measuring system should be nding measurements should be taken numan subjects.		

Immersion suits (non-insulated)	IVIOOEI			Surveyor:	Time:			
2.3.1.25 Thermal Protect	ive test (Cont	tinued)	Regulatio	ons: LSA Code II/2.3.2.1.2; MSC.81(70) 1/3.2.9 & 3.2.10				
Test Procedure		Acceptanc	e Criteria		Signific	ant Test Data		
Prior to tests, the same amore resulting from the water ingreatest in 2.3.1.13 should be point.	ss and jump ured into the	Following immersion each temperature should not fall mo level of the subject's temperature	re than 2°C		Same amount of wate ingress and jump test in be poured into the dry s	n paragraph 2.3.1		
dry suit worn over the dry specified in 2.3.1.7 by the test down. Each test subject should w insulated immersion suit subjected to the jump test Following a 1 h period of imm	subject lying vear a non- previously in 2.3.1.14.				Beginning of test Subject No.1 Subject No.2 Subject No.3 Subject No.4 Subject No.5 Subject No.6		ormal nperature	
hands gloved, in circulating ca 5° C, each test subject's temperature should not fall m below the normal level of t temperature.	body core ore than 2°C				Passed Pick up a pencil and immersion:	Failed write after 1 h		
The non-insulated immersion provide sufficient thermal p ensure that immediately on water after completion o prescribed above each test pick up a pencil as specified in write.	f the test subject can				Subject No 1YYESSubject No 2YYESSubject No 3YYESSubject No 4YYESSubject No 5YYESSubject No 6YYES	S YNO S YNO S YNO S YNO		
					Passed Comments/Observation See attached test sheet the immersion tests.	S	s during	

Immersion suits (non-insulated) Manufacturer: Model: Lot/Serial Number:					Date: Time: Surveyor: Organization:			
2.1.3.26 Test sheets for te	emperatures during imme	ersion tests	Regu	lations:	LSA Code II/2.	3.2.1.2; MSC.81(70) 1/3.2.9	& 3.2.10	
SUBJECT 1	SUBJECT 2	SUBJECT 3		SU	BJECT 4	SUBJECT 5	SUBJECT 6	
Rectal temp after 1 hr:	Rectal temp after 1 hr:	Rectal temp after 1	hr:_	Rectal te	mp after 1 hr:_	Rectal temp after 1 hr:	Rectal temp after 1 hr:	
Skin temp at lumbar region after 1 hr:	Skin temp at lumbar region after 1 hr:	Skin temp at lumba region after 1 hr: _				Skin temp at lumbar region after 1 hr:	Skin temp at lumbar region after 1 hr:	
Skin temp at left hand after 1 hr:	Skin temp at left hand after 1 hr:			-		Skin temp at left hand after 1 hr:	Skin temp at left hand after 1 hr:	
Skin temp at right hand after 1 hr:	Skin temp at right hand after 1 hr:			Skin temp at right hand after 1 hr:		Skin temp at right hand after 1 hr:	Skin temp at right hand after 1 hr:	
Skin temp at calves after 1 hr:	Skin temp at calves after 1 hr:	Skin temp at calves after 1 hr:			p at calves	Skin temp at calves after 1 hr:	Skin temp at calves after 1 hr:	
Skin temp at left foot (foot instep) after 1 hr:	Skin temp at left foot (foot instep) after 1 hr:	Skin temp at left foot (foot instep) after 1 hr:		Skin tem foot (foot after 1 h	instep)	Skin temp at left foot (foot instep) after 1 hr: 	Skin temp at left foot (foot instep) after 1 hr:	
Skin temp at right foot (foot instep) after 1 hr:	Skin temp at right foot (foot instep) after 1 hr:	foot (foot instep) foot (fo		foot (foot	p at right instep) r:	Skin temp at right foot (foot instep) after 1 hr:	Skin temp at right foot (foot instep) after 1 hr:	
Skin temp at left heel after 1 hr:	Skin temp at left heel after 1 hr:	Skin temp at left he after 1 hr:			p at left heel	Skin temp at left heel after 1 hr:	Skin temp at left heel after 1 hr:	

2.3.2 IMMERSION SUITS (INSULATED)

EVALUATION AND TEST REPORT

- 2.3.2.1 General data and specifications
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- 2.3.2.4 Visual inspection
- 2.3.2.5 Test subjects
- 2.3.2.6 Test with a lifejacket
- 2.3.2.7 Test clothing
- 2.3.2.8 Donning tests 1 & 2
- 2.3.2.9 Ergonomic test
- 2.3.2.10 Field of vision test
- 2.3.2.11 Flotation test
- 2.3.2.12 Righting test
- 2.3.2.13 Water ingress and jump test
- 2.3.2.14 Jump test
- 2.3.2.15 Leak test
- 2.3.2.16 Swimming and water emergence test
- 2.3.2.17 Oil resistance test
- 2.3.2.18 Alternative oil resistance test
- 2.3.2.19 Fire test
- 2.3.2.20 Temperature cycling test
- 2.3.2.21 Temperature cycling test Test data
- 2.3.2.22 Buoyancy test
- 2.3.2.23 Strength test
- 2.3.2.24 Thermal protective test (General)
- 2.3.2.25 Thermal protective test (Continued)
- 2.3.2.26 Test sheets for temperatures during immersion tests

2.3.2 IMMERSION SUITS (INSULATED)

EVALUATION AND TEST REPORT

Manufacturer	
Туре	
Date	
Place	
Surveyor's name (printed)	
Signature	
Approving organization	

Immersion suits (insulated)	Manufacturer: Model: Lot/Serial Number:	Surveyor:		
2.3.2.1 General data and sp	ecifications	Regulations: LSA Code 2.3		
Construction Material:	Additional equipment:			Donning instructions:
Fabric produced by:			Туре:	
Туре:				
Buoyant material produced by:			Туре:	
Туре:	Life-line produced by (if fit	ted):T	_уре	
	Light produced by (if fitted	I):T	уре:	

Immersion suits (insulated)	Manufacture Model: Lot/Serial Nu	r: ımber:	Date: Surveyor: Organization:				
2.3.2.2 Submitted d	rawings, reports and	documents					
	Submitted drawings and documents						
Drawing No.	Revision No. & date						
		Submitted reports and docu	iments		Chatria		
Report/Document No.	Revision No. & date	Т	itle of report / document		Status		
		Maintenance Manual -					
		Operations Manual -					

Immersion suits (insulated)	Manufacturer: Model: Lot/Serial Number:	Date: Time: Surveyor: Organization:					
2.3.2.3 Quality assurance		Regulations: MSC.81(70) 2/1.1, 1.2					
Except where all appliances of of the International Conventi amended, or the international inspected, representatives of inspections of manufacturers appliances and materials u approved prototype life-saving Manufacturers should be requ to ensure that life-saving app as the prototype life- saving app	of a particular type are required by chapter III on for the Safety of Life at Sea, 1974, as al Life-Saving Appliance (LSA) Code, to be f the Administration should make random s to ensure that the quality of life-saving sed comply with the specification of the g appliance. uired to institute a quality control procedure liances are produced to the same standard opliance approved by the Administration and ction tests carried out in accordance with the	Quality Assurance Quality Assurance Quality Assurance Description of Sys	Standard Used: - Procedure: - Manual: - tem. System acceptable	e Yes/No			

Immersion suits (insulated)	Model:	ər: umber:		Surveyor:	Time: on:		
2.3.2.4 Visual inspection			Regulations	: LSA Code I/1.2.2	2, & II/2.3.1.1.3 & 2.3.1.1.4		
Insulated Immersion suit sho .1 be clearly marked wit					Passed	Failed	
information including the Administration which approved it, date of manufacturer and any operational restrictions;							
.2 be provided with labels giving operating instructions, general information and manufacturers details as appropriate; and					Passed	Failed	
with a total area of at lea useful for search from air and with 100 cm ² on			batches of retro-reflective materia st 400 cm ² distributed so as to be and surface craft from all directions the back if the suit does no		Total tape area Does the suit automatically t	urn the wearer face up:	
		automatically turn the wearer MSC.481(102).			If No, tape area on back		
					Passed	Failed	
					Comments/Observations		

Immersion suits (insulated)	Manufacturer: Model: Lot/Serial Number:			Surveyor:	Time:	
2.3.2.4 Visual Inspecti	ion (continued)		Regulations	: LSA Code I/1.2.2	2, & II/2.3.1.1.3 & 2.3.1.1.4	l, 2.3.1.4-6
Test Procedure	9	Acceptan	ce Criteria		Significan	t Test Data
Does the immersion suit cov body with the exception of th		Be of an international or comparably highly visible col assist detection at sea.			Passed	Failed
Are the hands covered, or is immersion suit equipped with attached gloves?					Passed	Failed
Are their arrangements excessive free air in the legs					Passed	Failed
Is the immersion suit of					Passed	Failed
colour?	nighty visible				Passed	Failed
Is the immersion suit design without a lifejacket?	ed to be worn					
If yes,					Passed	Failed
Is the immersion suit fitted complying with paragraph 2.2					Passed	Failed
Is the immersion suit fitted complying with paragraph 2. Code?						
Fitted with releasable buoy other means to secure it to					Passed	Failed
another person in the water 8 a suitable means to allow res wearer from the water int rescue craft.	k provided with scuer to lift the				Comments/Observations	3

Immersion suits				Date: Surveyor:				
(insulated)	Lot/Serial N	umber:			Organization:			
2.3.2.5 Test subjects				Regulation	ns: LSA Code I/; I	MSC.81(70) 1/3.1.1		
Test Procedure			Acceptan	ce Criteria		Significant Test Data		
At least six able-bodied persons both male and females of the following heights and weights should be used. At least one and not more than two of the persons should be females with not more than one female in		<u>Height</u> 1.4 m - 1.6 m;	<u>Weig</u>	l <u>ht</u> under 60kg		Male/FemaleHeight Weight Subject No.1		
		1.4 m - 1.0 m,		over 60kg		Subject No.2Subject No.3		
the same height range.		1.6 m - 1.8 m		under 70kg over 70kg		Subject No.3		
		over 1.8 m 1 person under 80kg 1 person over 80kg			Comments/Observations			
2.3.2.6 Test with a lifejacket				Regulations: LSA Code 2.3.1.7; MSC.81(70) 1/3.1.2				
Test Procedure		Acceptance Criteria				Significant Test Data		
If the suit is to be worn in con						Manufacturer of lifejacket:		
a lifejacket, the lifejacket sho over the suit for the tests p 2.3.2.8 to 2.3.2.16.					Туре:			
						Manufacturer of lifejacket:		
						Type:		
						Manufacturer of lifejacket:		
						Туре:		

Immersion suits (insulated)	Model:	er:		Surveyor:	Time:		
2.3.2.7 Test clothing			Regulation	ns: LSA Code II/2.3	3.1.1.1; MSC.81(70) 1/3.2.6, 3.2.7		
Test Procedure		Acceptance	ce Criteria		Significant Test Data		
 The test subjects should wear a standard range clothing consisting of .1 underwear (short sleeved, short legged) .2 shirt (long sleeved) .3 trousers (not woollen) and woollen socks .4 If a suit is to be worn in conjunction with a lifejacket, the lifejacket should be worn during the thermal protective 					Did all test subject use the specified test clothing? YES NO Comments/Observations		
tests. 2.3.2.8 Donning test (1)			Pogulation		2 4 4 4. MSC 94/70\ 1/2 4 2		
Test Procedure		Regulations: LSA Code II/2.			Significant Test Data		
Following a demonstration, each test subject should be able to unpack, don and secure the suit over their test clothing without assistance in less than 2 min. This time should include the time to don any		Each test subjects should be a the immersion suit over the without assistance in less th include the time to don any lifejacket, if such is to be w immersion suit.	ble to unpac ir test cloth nan 2 min. v associated	ing (see 2.3.2.7) This time should clothing, and a	Donning time normal clothing Time Pass Fail Subject No.1sec sec Subject No.2sec sec Subject No.3sec Subject No.4sec Subject No.5sec sec Subject No.6sec Subject No.6sec Comments/Observations Subject No.6sec		

Immersion suits (insulated)	Model:	er: umber:			Surveyor:	Time:
2.3.2.8 Donning test (2)				Regulation	ns: LSA Code II/2	2.3.1.1.1; MSC.81(70) 1/3.1.4
Test Procedure		Ac	ceptand	ce Criteria		Significant Test Data
The immersion suit should be being donned in 5 min at temperature as low as -30°C donning test the packed im should be kept in a refrigerated a temperature of -30°C for 24	an ambient Before the mersion suit d chamber at	5 min.			e this task in	Donning time at - 30°C TimePassFailSubject No.1secsecSubject No.2secsecSubject No.3secsecSubject No.5secsubject No.6secSubject No.6secSubject No.6secComments/ObservationsSubject No.6sec
2.3.2.9 Ergonomic Test				Regulation	s: LSA Code II/2.	3.1.3.2; MSC.81(70) 1/3.1.5
Test Procedure		Acceptance Criteria		S	Significant Test Da	ita
 When wearing the immersion subjects should be able to: .1 Climb up and down a veore of at least 5 m in length .2 Perform all duties assorabandonment; and .3 To pick up a pencil and diameter of the pencil 8-10 mm. 	ertical ladder ; ociated with d write. The	There should be no restriction in walking, bending over or arm movement.	All the All the All the All the All the others	ES NC test subject test subject ES NC test subject and operate test subject	S s were able to pic s were able to put S s were able to per a rescue boat:	r or arm movement: k up a pencil and write: YES NO on the lifejacket without assistance: form all duties associated with abandonment, assist YES NO hb up and down a vertical ladder of 5 meter in
			Com	ES DNC ments/Obser	-	

Immersion suits (insulated)	Model:	Surveyor:			Time:		
2.3.2.10 Field of vision test			Regulation	ns: LSA Code II/2.	3.1.1.3; MSC.8	1(70) 1/3.1.6	
Test Procedure		Acceptanc	ce Criteria		Significant Test Data		
Each test subject should be seated with the head in a fixed position, and the lateral field of vision measured.		The lateral field of vision shou	ld be at leas	t 120°.	Field of vision angle ② 120° Passed Failed Subject No.1		
2.3.2.11 Flotation test			Regulatio	ns: LSA Code II/2.	3.1.1; MSC.81	(70) 1/3.1.7	
Test Procedure		Acceptano	ce Criteria		Significant Test Data		
With the test subject floati wearing the suit in conjunc lifejacket if required, the freeb be measured from the water s nose or mouth.	otion with a board should	of the water by at least 120mm For a buoyant insulated imm lifejacket, an auxiliary mean orally inflated bladder behind used to obtain this freeboard obtained without the auxilian least 50 mm. The position of the lifejacket	face-up with their mouths clear im and be stable in that position. mmersion suit worn without a ans of buoyancy such as an ind the wearer's head may be rd, provided that the freeboard iary means of buoyancy is at set light should permit it to be ment of the upper hemisphere		Subject No.3 Subject No.4 Subject No.5		Nose Freeboard = ↓

Immersion suits (insulated)	Model:	:mber:		Surveyor:	Time:		
2.3.2.12 Righting test		Regulati	ons: LSA Code II/2.	3.1.2; MSC.81(
Test Procedure		Acceptant	ce Criteria			Significant Test Dat	а
The test subjects, in fresh water wearing either an immersion suit or an immersion suit with lifejacket, should each demonstrate that they can turn themselves from a face-down to a face-up position in not more than 5 s. Except where it has been demonstrated that the insulated immersion suit will right the test subjects within 5 s, the test subjects should each demonstrate that they can turn themselves from a face-down to a face-up position in not more than 5 s. Righting time = Subject No.1 Subject No.2 Subject No.3 Subject No.4 Subject No.5 Subject No.6			Passed	Failed			
2.3.2.13 Water ingress and	jump test		Regulati	ons: MSC.81(70) 1/3	9.1.9		
Test Procedure		Acceptant	Acceptance Criteria		Significant Test Data		
The test subjects should immersion suit and then Following a jump into the wate sufficient to totally immerse th test subject should be weigher Weighing should be performed accurate to ± 100g.	be weighed. r from a height ne body, each d again.	The difference in the combine the suit should not exceed 500		the test subject and	Subject No.4 Subject No.5	Passed	Failed

Immersion suits (insulated)	Model:		Date: Surveyor: Organization:						
2.3.2.14 Jump test		Regulations: LSA Code II/2.3.1.3.3; MSC.81(70) 1/3.1.10							
Test Proced	ure	Acceptance Criter	ia	-	Significant	Test Data			
The test subjects should jump with the suit and lifejacket if required from a height of 4.5m vertically into the water. After the jump, the immersion suit and its attachments should be examined for damage or dislodging, and the test subject should be questioned concerning whether the suit caused any injury to the wearer.		The test subject should not be injured by the suit.		Subject No.1 Subject No.2 Subject No.3 Subject No.4 Subject No.5 Subject No.6 Comments/Ob		-	Failed		
2.3.2.15 Leak test		Regulations: LSA Code II/2.3.1.1.1; MSC.81(70) 1/3.1.11							
Test Proced	dure	Acceptance Crite	eria	Significant Test Data					
 The test subject should pre-we and be weighed. The test subject instructed to do one of the follo .1 a period of flotation in calm .2 swimming for 20 min for a 200 m The test subject should be we task. The weighing machine shoul 100g. 	bject should then be owing: water of 1h; or distance of at least ighed again after the	The ingress of water into the pre- not exceed a mass of 200g.			ernative 1 ≤ 200g Passed	ΥAlternativ	e 2 Failed		

Immersion suits (insulated)	Ilated) Lot/Serial Number:				Date: Surveyor: Organization:				
2.3.2.16 Swimming and v	water emerge	nce test	Regulations	: LSA Code II/2.:	3.1.3.4; MSC.81	(70) 1/3.1.12			
Test Procedure		Acceptan	ace Criteria Significant Test Data				Data		
Test Procedure All test subjects, each wearing but not the immersion suit, sh to swim 25 m and board a lif platform with its surface 300 m water surface. Test subjects who successfu this task should also perform it immersion suit. If designed to be used with a life immersion suit should be tes subject also wearing a lifejacke	ould attempt eraft or rigid im above the lly complete t wearing the ejacket, then ted with the	Acceptan All qualified test subjects sho or platform while wearing the	uld be able to		Subject No.1 Subject No.2 Subject No.3 Subject No.4 Subject No.5 Subject No.6 2) 25 m swim Subject No.1 Subject No.2 Subject No.3 Subject No.4	and boarding with Pass and boarding with Pass and boarding with Pass	nout lifejacket. Fail		
					Subject No.5 Subject No.6				
					Comments/Ob	servations			

Immersion suits (insulated)	Model:	r: ımber:		Date: Time: Surveyor:				
2.3.2.17 Oil resistance test			Regulatio	ons: LSA Code; M	SC.81(70) 1/3.1.13			
Test Procedure Acceptance			ce Criteria		Significant Test Data			
After all its apertures have be immersion suit should be im period of 24 h under 100 mm l oil at normal room temperatur. The surface oil should then be the immersion suit subjected prescribed in 2.3.1.15.	mersed for a head of diesel e. wiped off and	The ingress of water should no	ot exceed a	mass of 200g.	Subject No.1	2 Fail		

Immersion suits (insulated)	Model:	umber:		Surveyor: _	Time: on:			
2.3.2.18 Alternative oil resi	stance test		Regulations: LSA Code; MSC.81(70) 1/3.1.14					
Test Procedure		Acceptance (Criteria		Significant Test Data			
In lieu of the test for o prescribed in 2.3.2.17 eit following tests may be conduct After all apertures have been immersion suit should be im period of 24 h under 100 mm h oil at normal room temperature using weights to keep suit sub surface oil should then be wipp immersion suit turned inside should then be laid on a tabl collecting and draining off any be supported at the neck a suitable designed hanger. The then be filled with water to new should be 300mm above the to Representative samples of fabric and seams should be under 100mm head of diese After removal from the oil should be wiped off before be to the following tests: .1 a hydrostatic test of a 1m and .2 a tensile test of represent	ther of the cted. In sealed, the mersed for a head of diesel e if necessary omerged. Any ed off and the out. The suit e suitable for r leakage and perture by a he suit should ck level which table. The exterior be immersed I oil for 24 h. the samples ing subjected	After 1h in this position there s exceeding a mass of 200g. The samples should successful of water. The seam strength should be	ully support 1	m head	Indicate which alternative is used. YAlternative 1 YAlternative 2 Water ingress ≤ 200g Pass Fail Subject No.1 Subject No.2 Subject No.3 Subject No.4 Subject No.6 Strength > 150N Pass Fail The samples should support a 1 m head of water Pass Fail Comments/Observations			

Immersion suits	N A	er:		Date:	
(insulated)		umber:		Organization:	
2.3.2.19 Fire test			Regulation	ns: LSA Code II/2.	3.1.1.2; MSC.81(70) 1/3.1.15
Test Procedure		Acceptanc	ce Criteria		Significant Test Data
A test pan 30 cm x 35 cm x 6 c placed in an essentially draug Water should be put in the b test pan to make a minimum t 1 cm followed by enough petro minimum depth of 4 cm. The p then be ignited and allowed to for 30 s. If necessary, the im should be draped over a hang the whole of the suit is enve flames, with the bottom of the above the top edge of the test the duration of exposure to is 2 s.	ht-free area. ottom of the otal depth of ol to make a betrol should o burn freely mersion suit er to ensure loped in the e suit 25 cm t pan so that	The immersion suit should not 6 s or continue melting after b to the flames.			Did the immersion suit continue to burn for more than 6 s or continue melting after being removed from the flames? PES NO Comments/Observations

Immersion suits (insulated)	Model:	r: umber:	Sur	veyor:	Time:		
2.3.2.20 Temperature cy	cling test		Regulations: L	SA Code I/1.2	2.2.2; MSC.81(70) 1/3.1.16		
Test Procedure		Acceptanc	ce Criteria		Significant Test Data		
 The following test should be on two immersion suits. The immersion suits should subjected to surrounding tem 30°C and +65°C. These alteneed not follow immediate other and the following proceed for a total of 10 cycles, is acc .1 an 8 h exposure at temperature of +6 completed in one day; .2 the specimens remove warm chamber that saleft exposed under of conditions at a temperature of -3°C until the next day. .3 an 8 h exposure at temperature of -3°C completed the next day. .4 the specimens remove cold chamber that same exposed under or conditions at a temperature of +3°C until the next day. 	carried out be alternately peratures of - rnating cycles ly after each dure, repeated eptable: a minimum 5°C to be and ved from the ame day and ordinary room rature of 20°C y; a maximum 0°C to be y; and ved from the he day and left dinary room rature of 20°C	Acceptance The immersion suits should sh as shrinking, swelling dissolution qualities.	now no signs of da		Significant Test Data (See following page for test data) Passed Failed Comments/Observations		

Immersion suits (insulated)	Manufacturer: Model: Lot/Serial Nun			Sur	e: veyor: janization:		9:					
2.3.2.21 Tem	perature cycling test - Tes	t data		Regulations: L	.SA Code I/1.2.1.2; M	ISC.81(70) 1	1/3.1.16	hours hours hours hours				
		HO	T CYCLE			COLL	CYCLE					
	Date In:		Date Out:		Date In:		Date Out:					
Cycle 1	Time In:		Time Out:		Time In:		Time Out:					
	Temperature:		Duration:	hours	Temperature:		Duration:	hours				
	Date In:		Date Out:		Date In:		Date Out:					
Cycle 2	Time In :		Time Out:		Time In:		Time Out:					
	Temperature :	0C	Duration:	hours	Temperature:	0C	Duration:	hours				
	Date In:		Date Out:		Date In:		Date Out:					
Cycle 3	Time In:		Time Out:		Time In:		Time Out:					
	Temperature:		Duration :	hours	Temperature:	°C	Duration:	hours				
	Date In:		Date Out:		Date In:		Date Out:					
Cycle 4	Time In:		Time Out:		Time In:		Time Out:					
	Temperature:	°C	Duration:		Temperature:	•	Duration:					
	Date In:		Date Out:		Date In:		Date Out:					
Cycle 5	Time In:		Time Out:		Time In:		Time Out:					
,	Temperature:		Duration :		Temperature:	0	Duration:					
	Date In:		Date Out:		Date In:		Date Out:					
Cycle 6	Time In:		Time Out:		Time In:		Time Out:					
	Temperature:	°C	Duration:		Temperature:	0 ⁰	Duration:	hours				
	Date In:		Date Out:		Date In:		Date Out:					
Cycle 7	Time In:		Time Out:	_	Time In:		Time Out:					
,	Temperature:	0 ⁰	Duration :		Temperature:	0 ⁰	Duration:					
	Date In:				Date In:		Date Out:					
Cycle 8	Time In:		Time Out:		Time In:		Time Out:					
,	Temperature:	0 ⁰	Duration :	hours	Temperature:	0 ⁰	Duration:	hours				
	Date In:				Date In:		Date Out:					
Cycle 9	Time In:		Time Out:	_	Time In:		Time Out:					
	Temperature:	0	Duration:	hours	Temperature:	O ₀	Duration:	hours				
	Date In:				Date In:		Date Out:					
Cycle 10	Time In:		Time Out:		Time In:		Time Out:					
	Temperature:	0 0	Duration:	hours	Temperature:	O⁰	Duration:	hours				

Immersion suits (insulated)	Model:	er:	Date: Surveyor: Organization:	Time:				
2.3.2.22 Buoyancy test	-		Regulation	s: LSA Code II/2.3	3.1.8; MSC.81(70) 1/3.1.17		
Test Procedure		Acceptanc	ce Criteria			Significant Tes	st Data	
The buoyancy of an immersion suit designed to be worn without a 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			kg % Pa	Buoyancy 2 kg assed d Comments/C	%difference Dbservations	
2.3.2.23 Strength test			Regulations: LSA Code; MSC.81(70) 1/3.1.18					
Test Procedure		Acceptanc	Significant Test Data					
The immersion suit 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 worn by a person. A force of not less than 3200 N should be applied to the lifting loop and a force of not less than 1350N should be applied to the parts other than the lifting loop for 30 min. The immersion suit may be cut if necessary to accommodate to the test device.		The immersion suit should not test.	be damaged		Passed		ailed	

Immersion suits (insulated)	Manufacturer: Model: Lot/Serial Number:	Surveyor:	Time:
2.3.2.24 Thermal protect	ctive test (General)	Regulations: LSA Code I	I/2.3.2.2; MSC.81(70) 1/3.2.1 – 3.2.5
Tes	st Procedure	Acceptance Criteria	Significant Test Data
manikin, when such a method has been demonstrated to satisfactorily in all aspects to If human subjects are used, before being accepted for the is to be tested by test subject Where human subjects are conducted under the sup resuscitation equipment sho safety reasons, ECG shou Testing should be stopped a falling rate of the core temp after the first half hour, if the lumbar region should fall be or if the attending physician of When testing with humar temperature (rectal temperat region, both hands, calves, for measured. The accuracy of	a used, the tests should always be ervision of physician. Emergency uld be available during all tests. For ld be monitored during every test. at the wish of the test subjects, if the erature is more than 1.5° C per hour skin temperature of the hand, foot or low 10° C for more than 15 minutes, considers it advisable.		Comments/Observations

Immersion suits (insulated)	Model:		Date: Time: Surveyor: Organization:					
2.3.2.25 Thermal Protect	ctive test (Continued)	Regulations: LSA Code II/2.3.2.2; MSC.81(70) 1/, 3.2.11 & 3.2.12						& 3.2.12
Test Proce	edure	Acceptar	nce Criteria			Signific	ant Test D	Data
Prior to tests, the same am from the water ingress paragraph 2.3.2.13 should be worn over the dry test clothin the test subject lying down. Each test subject wearing previously subjected to paragraph 2.3.2.14. Followin immersion, with hands glov water at between 0°C and +2 body core temperature should below the normal level of the	and jump test in e poured into the dry suit g specified in 2.3.2.7 by g an immersion suit the jump test in ng a 6 h period of red, in circulating calm 2°C, each test subject's d not fall more than 2°C	Same mass of water from test 2.3.2.13, sl the immersion suit. Following immersion body core temperatu than 2°C below the subject's temperatur	hould be por n each tes ire should no e normal le	ured into t subject's ot fall more	should be pour Beginn of test Subject No 1 Subject No.2 Subject No.3 Subject No.4 Subject No.5 Subject No.6 Passed	ed into the ing	immersion End of test Failed	normal
The immersion suit should pr protection to ensure that imm water after a 1 hr period of hands, in water circulating at can pick up a pencil as specif and write. Alternatively, at the manufact to pick up a pencil and	nediately on leaving the immersion, with gloved ± +5°C each test subject ied in paragraph 2.3.2.9 turers' option, the ability	The test subjects sho a pencil and write.	ould be able	to pick up	Subject No 1 Subject No 2 Subject No 3 Subject No 4 Subject No 5 Subject No 6 Passed Pick up a penci			period of immersion:
paragraph 2.3.2.9 above may be demonstrating immediately after leaving the water upon complet of the above (6 hr) test.	nay be demonstrated	See attached test sh during the immersior Comments/Observat	n tests:	peratures	Subject No 1 Subject No 2 Subject No 3 Subject No 4	YYES YYES YYES YYES	YNO YNO YNO YNO	
					Subject No 5 Subject No 6 Passed	YYES	Ϋ́NO Ϋ́NO Failed	l

2.3.2.25	Thermal Protective test (Continued)	Regulations: LSA Code II/2.3.2.2; MSC.81(70) 1/, 3.2.11 & 3.2.12						
	Test Procedure	Acceptance Criteria Significant Test Data						
			See attached test sheets for temperatures during the immersion tests: Comments/Observations					

Immersion (insulated)	Suits	Manufacturer: Model: Lot/Serial Number:		Date: Surveyor: Organization:		
2.3.2.26 Te tests	est sheets for tempe	eratures during immersion	Regulations: LSA Coo	de II/2.3.2.2; MSC.81(70) 1	1/, 3.2.11 & 3.2.12	
Subject 1	Rectal temp after 1 hr:_ Skin temp at lumbar region after 1 hr : Skin temp at left hand after 1 hr: Skin temp at right hand after 1 hr: Skin temp at calves after 1 hr: Skin temp at left foot (foot instep) after 1 hr: Skin temp at right foot (foot instep) after 1 hr: Skin temp at left heel after 1 hr:	Skin temp at lumbar region after 2 hr: Skin temp at left hand after 2 hr: Skin temp at right hand after 2 hr: Skin temp at calves after 2 hr: Skin temp at left foot (foot instep) after 2 hr: Skin temp at right foot (foot instep) after 2 hr: Skin temp at right foot (foot Skin temp at left heel after	Rectal temp after 3 hr: Skin temp at lumbar region after 3 hr : Skin temp at left hand after 3 hr: Skin temp at right hand after 3 hr: Skin temp at calves after 3 hr: Skin temp at left foot (foot instep) after 3 hr: Skin temp at right foot(foot instep) after 3 hr: Skin temp at left heel after 3 hr:		Rectal temp after 5 hr: Skin temp at lumbar region after 5 hr: Skin temp at left hand after 5 hr: Skin temp at right hand after 5 hr: Skin temp at calves after 5 hr: Skin temp at left foot (foot instep) after 5 hr: Skin temp at right foot(foot instep) after 5 hr: Skin temp at left heel after 5 hr:	Rectal temp after 6 hr: Skin temp at lumbar region after 6 hr : Skin temp at left hand after 6 hr: Skin temp at right hand after 6 hr: Skin temp at calves after 6 hr: Skin temp at left foot (foot instep) after 6 hr: Skin temp at right foot (foot instep) after 6 hr: Skin temp at left heel after 6 hr:
Subject 2	Rectal temp after 1 hr:_ Skin temp at lumbar region after 1 hr : Skin temp at left hand after 1 hr: Skin temp at right hand after 1 hr: Skin temp at calves after 1 hr: Skin temp at left foot (foot instep) after 1 hr: Skin temp at right foot (foot instep) after 1 hr: Skin temp at left heel after 1 hr:	Skin temp at lumbar region after 2 hr : Skin temp at left hand after 2 hr: Skin temp at right hand after 2 hr: Skin temp at calves after 2 hr: Skin temp at left foot (foot instep) after 2 hr: Skin temp at right foot (foot instep) after 2 hr: Skin temp at right foot (foot Skin temp at left heel after	Rectal temp after 3 hr: Skin temp at lumbar region after 3 hr : Skin temp at left hand after 3 hr: Skin temp at right hand after 3 hr: Skin temp at calves after 3 hr: Skin temp at left foot (foot instep) after 3 hr: Skin temp at right foot (foot instep) after 3 hr: Skin temp at left heel after 3 hr:	Skin temp at right foot	Rectal temp after 5 hr: Skin temp at lumbar region after 5 hr: Skin temp at left hand after 5 hr: Skin temp at right hand after 5 hr: Skin temp at calves after 5 hr: Skin temp at left foot(foot instep) after 5 hr: Skin temp at right foot (foot instep) after 5 hr: Skin temp at left heel after 5 hr:	Rectal temp after 6 hr: Skin temp at lumbar region after 6 hr : Skin temp at left hand after 6 hr: Skin temp at right hand after 6 hr: Skin temp at calves after 6 hr: Skin temp at left foot (foot instep) after 6 hr: Skin temp at left heel after 6 hr:

Immersion (insulated)	suits	Manufacturer: Model: Lot/Serial Number:	Surveyor:				
2.3.2.26 Test sheets for temperatures during immersion tests (continued)			Regulations: LSA Code II/2.3.2.2; MSC.81(70) 1/, 3.2.11 & 3.2.12				
Subject 3	Rectal temp after 1 hr:_ Skin temp at lumbar region after 1 hr : Skin temp at left hand after 1 hr:_ Skin temp at right hand after 1 hr:_ Skin temp at calves after 1 hr:_ Skin temp at left foot (foot instep) after 1 hr:_ Skin temp at right foot (foot instep) after 1 hr:_ Skin temp at left heel after 1 hr:_	Skin temp at lumbar region after 2 hr : Skin temp at left hand after 2 hr: Skin temp at right hand after 2 hr: Skin temp at calves after 2 hr: Skin temp at left foot (foot instep) after 2 hr: Skin temp at right foot (foot instep) after 2 hr: Skin temp at left heel after	Rectal temp after 3 hr: Skin temp at lumbar region after 3 hr : Skin temp at left hand after 3 hr: Skin temp at right hand after 3 hr: Skin temp at calves after 3 hr: Skin temp at left foot (foot instep) after 3 hr: Skin temp at right foot (foot instep) after 3 hr: Skin temp at left heel after 3 hr:	Rectal temp after 4 hr: Skin temp at lumbar region after 4 hr : Skin temp at left hand after 4 hr: Skin temp at right hand after 4 hr: Skin temp at calves after 4 hr: Skin temp at calves after 4 hr: Skin temp at left foot (foot instep) after 4 hr: Skin temp at right foot(foot instep) after 4 hr: Skin temp at left heel after 4 hr:	Rectal temp after 5 hr: Skin temp at lumbar region after 5 hr : Skin temp at left hand after 5 hr: Skin temp at right hand after 5 hr: Skin temp at calves after 5 hr: Skin temp at left foot (foot instep) after 5 hr: Skin temp at right foot(foot instep) after 5 hr: Skin temp at left heel after 5 hr:	Rectal temp after 6 hr: Skin temp at lumbar region after 6 hr : Skin temp at left hand after 6 hr: Skin temp at right hand after 6 hr: Skin temp at calves after 6 hr: Skin temp at left foot (foot instep) after 6 hr: Skin temp at right foot(foot instep) after 6 hr: Skin temp at left heel after 6 hr:	
Subject 4	Rectal temp after 1 hr:_ Skin temp at lumbar region after 1 hr : Skin temp at left hand after 1 hr: Skin temp at right hand after 1 hr: Skin temp at calves after 1 hr: Skin temp at left foot (foot instep) after 1 hr: Skin temp at left foot (foot instep) after 1 hr: Skin temp at left heel after 1 hr:	Skin temp at lumbar region after 2 hr : Skin temp at left hand after 2 hr: Skin temp at right hand after 2 hr: Skin temp at calves after 2 hr: Skin temp at left foot (foot instep) after 2 hr: Skin temp at right foot (foot instep) after 2 hr: Skin temp at left heel after	Rectal temp after 3 hr: Skin temp at lumbar region after 3 hr : Skin temp at left hand after 3 hr: Skin temp at right hand after 3 hr: Skin temp at calves after 3 hr: Skin temp at left foot (foot instep) after 3 hr: Skin temp at right foot(foot instep) after 3 hr: Skin temp at left heel after 3 hr:	Rectal temp after 4 hr: Skin temp at lumbar region after 4 hr : Skin temp at left hand after 4 hr: Skin temp at right hand after 4 hr: Skin temp at calves after 4 hr: Skin temp at left foot (foot instep) after 4 hr: Skin temp at right foot(foot instep) after 4 hr: Skin temp at left heel after 4 hr:	Rectal temp after 5 hr: Skin temp at lumbar region after 5 hr : Skin temp at left hand after 5 hr: Skin temp at right hand after 5 hr: Skin temp at calves after 5 hr: Skin temp at left foot (foot instep) after 5 hr: Skin temp at right foot(foot instep) after 5 hr: Skin temp at left heel after 5 hr:	Rectal temp after 6 hr: Skin temp at lumbar region after 6 hr : Skin temp at left hand after 6 hr: Skin temp at right hand after 6 hr: Skin temp at calves after 6 hr: Skin temp at left foot (foot instep) after 6 hr: Skin temp at right foot(foot instep) after 6 hr: Skin temp at left heel after 6 hr:	

Immersion (insulated)	suits	Manufacturer: Model: Lot/Serial Number:	Surveyor:					
2.3.2.26 Test sheets for temperatures during immersion tests (continued)			Regulations: LSA Code II/2.3.2.2; MSC.81(70) 1/, 3.2.11 & 3.2.12					
Subject 5	Rectal temp after 1 hr: Skin temp at lumbar region after 1 hr : Skin temp at left hand after 1 hr: Skin temp at right hand after 1 hr: Skin temp at calves aft 1 hr: Skin temp at left foot (foot instep) after 1 hr: Skin temp at right foot (foot instep) after 1 hr: Skin temp at left heel after 1 hr:	Rectal temp after 2 hr: Skin temp at lumbar region after 2 hr : Skin temp at left hand after 2 hr: Skin temp at right hand er Skin temp at calves after 2 hr: Skin temp at left foot (foot instep) after 2 hr: Skin temp at left foot (foot instep) after 2 hr: Skin temp at right foot(foot instep) after 2 hr:	Rectal temp after 3 hr: Skin temp at lumbar region after 3 hr: Skin temp at left hand after 3 hr: Skin temp at right hand after 3 hr: Skin temp at calves after 3 hr: Skin temp at left foot (foot instep) after 3 hr: Skin temp at left foot (foot instep) after 3 hr: Skin temp at left foot (foot instep) after 3 hr: Skin temp at left heel after 3 hr:	Skin temp at lumbar region after 4 hr : Skin temp at left hand after 4 hr: Skin temp at right hand after 4 hr: Skin temp at calves after 4 hr: Skin temp at left foot(foot instep) after 4 hr:	Rectal temp after 5 hr: Skin temp at lumbar region after 5 hr : Skin temp at left hand after 5 hr: Skin temp at right hand after 5 hr: Skin temp at calves after 5 hr: Skin temp at left foot (foot instep) after 5 hr: Skin temp at right foot(foot instep) after 5 hr: Skin temp at left heel after 5 hr:	Rectal temp after 6 hr: Skin temp at lumbar region after 6 hr : Skin temp at left hand after 6 hr: Skin temp at right hand after 6 hr: Skin temp at calves after 6 hr: Skin temp at left foot (foot instep) after 6 hr: Skin temp at right foot (foot instep) after 6 hr: Skin temp at left heel after 6 hr:		
Subject 6	Rectal temp after 1 hr: Skin temp at lumbar region after 1 hr : Skin temp at left hand after 1 hr: Skin temp at right hand after 1 hr: Skin temp at calves aft 1 hr: Skin temp at left foot (foot instep) after 1 hr: Skin temp at right foot (foot instep) after 1 hr: Skin temp at left heel after 1 hr:	Skin temp at lumbar region after 2 hr: Skin temp at left hand after 2 hr: Skin temp at right hand after 2 hr: Skin temp at calves after 2 hr: Skin temp at left foot (foot instep) after 2 hr: Skin temp at right foot (foot	Rectal temp after 3 hr: Skin temp at lumbar region after 3 hr : Skin temp at left hand after 3 hr: Skin temp at right hand after 3 hr: Skin temp at calves after 3 hr: Skin temp at left foot (foot instep) after 3 hr: Skin temp at right foot (foot instep) after 3 hr: Skin temp at left heel after 3 hr:	foot(foot instep) after	Rectal temp after 5 hr: Skin temp at lumbar region after 5 hr : Skin temp at left hand after 5 hr: Skin temp at right hand after 5 hr: Skin temp at calves after 5 hr: Skin temp at left foot (foot instep) after 5 hr: Skin temp at right foot (foot instep) after 5 hr: Skin temp at left heel after 5 hr:	Rectal temp after 6 hr: Skin temp at lumbar region after 6 hr : Skin temp at left hand after 6 hr: Skin temp at right hand after 6 hr: Skin temp at calves after 6 hr: Skin temp at left foot (foot instep) after 6 hr: Skin temp at right foot(foot instep) after 6 hr: Skin temp at left heel after 6 hr:		

2.4 ANTI-EXPOSURE SUITS

EVALUATION AND TEST REPORT

- 2.4.1 General data and specifications
- 2.4.2 Submitted drawings, reports and documents
- 2.4.3 Quality assurance
- 2.4.4 Visual inspection
- 2.4.5 Test subjects
- 2.4.6 Test with a lifejacket
- 2.4.7 Test clothing
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- 2.4.13 Water ingress and jump test
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- 2.4.19 Fire test
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- 2.4.22 Buoyancy test
- 2.4.23 Strength test
- 2.4.24 Thermal protective test (General)
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- 2.4.26 Test sheets for temperatures during immersion tests

2.4 ANTI-EXPOSURE SUITS EVALUATION AND TEST REPORT

Manufacturer	
Туре	
Date	
Place	
Surveyor's name (printed)	
Signature	
Approving organization	

Anti-exposure suits Manufacturer: Model: Lot/Serial Number: 2.4.1 General data and specifications			Surveyor:				
			Regulations: LSA Code 2.3; MSC.81(70);				
Construction Material: Additional equipme			:			Donning instruction	ns:
Fabric produced by:		Retro reflective materia	l:	YYES	ΎNO	YYES	Ϋ́ΝΟ
Туре:		Whistle produced:		YYES	ΎNO		
Buoyant material produced by:		Life-line:		YYES	ΎNO		
		Light:		YYES	Ϋ́ΝΟ		
Туре:							

Anti-exposure suits 2.4.2 Submitted d	Model:	r: imber: documents	Date: Surveyor: Organization:	
		Submitted drawings ar	nd documents	Status
Drawing No. Revision No. & date			Title of drawing	
		Submitted reports and	d documents	Ctatura
Report/Document No.	Revision No. & date		Title of report / document	Status
		Maintenance Manual -		
		Operations Manual -		

Anti-exposure suits Manufacturer: Model: Lot/Serial Number:			Date: Time: Surveyor: Organization:				
2.4.3 Quality assurance		Regulations: - MSC.81(70) 2/1.1, 1.2					
Except where all appliances of a particular type are required by chapter III of the International Convention for the Safety of Life at Sea, 1974, as amended, or the international Life-Saving Appliance (LSA) Code, to be inspected, representatives of the Administration should make random inspections of manufacturers to ensure that the quality of life-saving appliances and materials used comply with the specification of the approved prototype life-saving appliance. Manufacturers should be required to institute a quality control procedure to ensure that life-saving appliances are produced to the same standard or the same standard be required to the same standard.			Quality Assurance Standard Used: Quality Assurance Procedure: Quality Assurance Manual:				
	appliance approved by the Administration roduction tests carried out in accordance uctions.	Description of System.					
		Quality As	ssurance System				
		acceptable Yes/No					
		Comment	s/Observations				

Anti-exposure suits Model:		Surveyor:		Surveyor:	Time:	
2.4.4 Visual inspection			Regulati	ons: LSA Code I/1.	2.2, II/2.4.1.1.3 & 2.4.1.1	.4
Test Procedure		Acceptano	ce Criteria		Significa	nt Test Data
Anti-Exposure suit should: Be clearly marked with approvincluding the Administra approved it, date of manufact operational restrictions. Be provided with labels give details and intervals betwee operating instructions, gener and manufacturers details. Be fitted with retro-reflective t	ation which sturer and any ving servicing een servicing, al information	Be fitted with approved patch with a total area of at least 40 useful for search from air directions and with 100 cm ² o automatically turn the wea resolution MSC.481(102).	0 cm ² dist and surfa n the back	tributed so as to be ace craft from all if the suit does not	Total tape area	Failed e tape: ically turn the wearer face ck Failed

2.4.4 Visual Inspection (continued)		Regulations: LSA Code I/1.2	2.2, II/2.4.1.3			
Test Procedure	Acceptanc	e Criteria	Significant Test Data			
Is the anti-exposure suit of highly visible colour?	Covers the whole body except permits, the feet; covering for provided by separate gloves ar	the hands and head may be nd a hood, both of which shall	Passed	Failed		
Is the anti-exposure suit designed to be worn without a lifejacket?	be permanently attached to the	Suit.	Passed	Failed		
If yes,	highly visible colour on all parts	ddish orange, or a comparably s where this will assist detection				
Is the anti-exposure suit fitted with a light complying with paragraph 2.2.3 of LSA Code?	at sea.		Passed	Failed		
Is the anti-exposure suit fitted with a whistle complying with paragraph 2.2.1.14 of LSA Code?			YYES YNO			
Is the anti-exposure suit specified as must be worn in conjunction with a lifejacket?			Passed	Failed		
Is the anti-exposure suit equipped with a pocket for a portable VHF telephone?			Passed	Failed		
			Passed	Failed		
			Passed	Failed		
			Comments/Observations			

					Time:				
Anti-exposure suits	Model:				Surveyor:				
-	Lot/Serial N	umber:			Organizat	ion:			
2.4.5 Test subjects			Regulations: LSA Code						
Test Procedure Acceptance Criteria			Criteria		Significan	t Test Dat	а		
At least six able-bodied persor and females of the following weights should be used. At le not more than two of the per be females with not more than in the same height range.	<u>Height</u> 1.40m - 1.60m; 1.60m - 1.80m over 1.80m	Weight 1 person under 60kg 1 person over 60kg 1 person under 70kg 1 person over 70kg 1 person under 80kg 1 person over 80kg		I	Male/Female Subject No.1 Subject No.2 No.3 Subject No.4 Subject No.5 Subject No.6 Comments/Observations	2 			
2.4.6 Test with a lifejack	et			Regulatio	ns: LSA C	⊥ ode II/2.3.1.5; MSC.81(70) 1/3	3.1.2		
Test Procedure		Acceptance Criteria				Significant Test Data			
If the anti-exposure suit is to conjunction with a lifejacket, t should be worn over the a suit for the tests prescribed 2.4.16.	the lifejacket nti-exposure					Manufacturer of lifejacket: _ Type: Manufacturer of lifejacket: _ Type: Manufacturer of lifejacket: _ Type: Comments/Observations			

Anti-exposure suits	Model:	rer: Number:		Date: Time: Surveyor: Organization:				
2.4.7 Test clothing			Regulatio	ns: LSA Code II/;	MSC.81(70) 1/3.2.6 & 3.2	2.7		
Test Procedure		Acceptane	ce Criteria		Significar	Significant Test Data		
 The test subjects should wear a standard range clothing consisting of .1 underwear (short sleeved, short legged) .2 shirt (long sleeved) .3 trousers (not woollen) and woollen socks .5 If a suit is to be worn in conjunction with a lifejacket, the lifejacket should be worn during the thermal protective test. 				Did all test subject use the specified test clothing YYES YNO Comments/Observations				
2.4.8 Donning test (1)			Regulatio	ns: LSA Code II/2	2.4.1.1.4; MSC.81(70) 1/3	1.3		
Test Procedure		Acceptant	ce Criteria		Significar	nt Test Data		
It can be unpacked and donned without assistance within 2 min, taking into account test clothing 2.4.7 and a lifejacket if the anti-exposure suit is to be worn in conjunction with a lifejacket.		Following a demonstration, the test subjects st to unpack, don and secure the anti-exposure st test clething (con 2.4.7) without assistance is		ure suit over their ice in less than 2 me to don any lated chambers if	Donning time with norm Time Subject No.1 Subject No.2 Subject No.3 Subject No.4 Subject No.5	Pass	Fail	

				Subject No.6 sec Comments/Observations
Anti-exposure suits	Model:	er: lumber:	Surveyor: Organization:	Time:
2.4.8 Donning test (2)			ns: LSA Code I/2	.4.1.1.4; MSC.81(70) 1/3.1.4
Test Procedure		Acceptance Criteria		Significant Test Data
The test subjects should be al and don in 5 mins the anti-exp ambient temperature of -30°C donning test the anti-exposur be kept in a refrigerated cl temperature of -30°C for 24 h	Dosure suit in C. Before the e suit should namber at a	The test subject should be able to comp 5 min.	olete this task in	Donning time at - 30°C Time Pass Fail Subject No.1 sec

Anti-exposure suits Mo	nufacturer: del: /Serial Number:	Surveyor:	Time:		
2.4.9 Ergonomic test		Regulations: LSA Code II/2.4.1.2; MSC.81(70) 1/3.1.5			
Test Procedure	· · · · · · · · · · · · · · · · · · ·	ce Criteria	Significant Test Data		
 When wearing the anti-exposure stest subjects should be able to: .1 climb up and down a vertica of at least 5 m in length; .2 perform all duties associate abandonment, assist othe operate a rescue boat; and .3 pick up a pencil and writ diameter of the pencil should be able to: 	suit, the There should be no restrictio arm movement. The diame 8-10 mm. ed with er and te. The	n in walking, bending over or ter of the pencil should be	Restriction in walking, bending over or arm		

Anti-exposure suits	Lot/Serial Number:			Date: Surveyor: Organization:						
2.4.10 Field of vision test			Regulation	ons: LSA Code II/2.4.1.7; MSC.81(70) 1/3.1.6						
Test Procedure		Acceptance Criteria				Signi	ificant Test	Data		
Each test subject should be seated with the head in a fixed position, and the lateral field of vision measured.		The lateral field of vision should be at least 120°.		Field of vision angle ≥ 120° Angle(degs.) Pass Fail Subject No.1						
2.4.11 Flotation test			Regulation	s: LSA (Code; MSC.81(7	70) 1/3.1.7				
Test Procedure		Acceptance C	riteria		Significant Test Data					
		When wearing the anti-				With life	jacket	Without	t lifejacket	
		conjunction with a lifejacket if required subject should float face-up with the clear of the water by at least 120mr stable in that position. The freeboard a measured from the water surface to the mouth with the test subject at rest. The of the anti-exposure suit without a should be at least 50 mm. The position of the lifejacket light shoul to be visible over as great a segment of hemisphere as is practicable.		mouths and be build be se and eboard ejacket ermit it	Freeboard				(mm)	

		er:		Date:		Time:		
Anti-exposure suits	Model: Lot/Serial N	umber:		Organizatior	ח:			
2.4.12 Righting test			Regulations		II/2.4.3; MSC.81(70) 1/3.1.8			
Test Procedure		Acceptance Criteria				Significant Test	Data	
Test subjects in fresh water wearing an anti-exposure suit complying with the requirements of this section should be able to turn from a face-down to a face-up position in not more than 5 s and should be stable face-up. The suit should have no tendency to turn the wearer face-down in moderate sea condition.		Except where it has been demonstrated that the anti-exposure suit will right the test subjects within 5 s.		Righting time = : Subject No.1 Subject No.2 Subject No.3 Subject No.4 Subject No.5 Subject No.6 Comments/Obse	Time (s)	Pass	Fail	
2.4.13 Water ingress and	l jump test		Regulatio	ns: MSC.81(7				
Test Procedure		Acceptance	Criteria	•		Significant Test	Data	
The test subjects should p Anti-Exposure suit and then Following a jump into the v height sufficient to totally i body, each test subject should again. Weighing should be perfor machine accurate to ± 100g.	be weighed. water from a immerse the d be weighed	The difference in the com subject and the suit should no			Mass difference Subject No.1 Subject No.2 Subject No.3 Subject No.4 Subject No.5 Subject No.6 Comments/Obse	Pass	Fail 	

Anti-exposure suits	Model:	er:		Surveyor:			
	Lot/Serial N	umber:		Organization:			
2.4.14 Jump test		Regulations: LSA Code II/2			.4.1.1.2; MSC.81(70) 1/3.1.10		
Test Procedure		Acceptance	ce Criteria		Sig	nificant Te	est Data
The test subjects should jump with the Anti-Exposure suit and lifejacket if required from a height of 4.5m vertically into the water. After the jump, the anti- exposure suit and its attachments should be examined for damage or dislodging, and the test subject should be questioned concerning whether the suit caused any injury to the wearer.		The Anti - Exposure suit and its attachments should not be damaged or dislodged in any way. The test subject should not be injured by the suit. The light, if fitted, should not injure the test subject.		Subject No.1 Subject No.2 Subject No.3 Subject No.4 Subject No.5 Subject No.6 Comments/Obser		Fail	
2.4.15 Leak test			Regulatio	ns: LSA Code II/2	4.1.1; MSC.81(70)	1/3.1.11	
Test Procedure		Acceptanc	ce Criteria		Sig	nificant Te	est Data
 The test subject should p anti-exposure suit and be we test subject should then be i do one of the following: .1 a period of flotation in calm or .2 swimming for 20 min for a at least 200 m The test subject should be we after the task. 	eighed. The nstructed to water of 1h; distance of	The ingress of water into th exceed a mass of 200g.	e pre-wette	d suit should not	Indicate which alto ƳAlterna Water ingress ≤ 2 Subject No.1 Subject No.2 Subject No.3 Subject No.4 Subject No.5 Subject No.6	ative 1 00g Pass 	used. YAlternative 2 Fail
The weighing machine should to \pm 100g.	be accurate				Comments/Obser	valions	

Anti-exposure suits	Lot/Serial Number:			Surveyor:				
2.4.16 Swimming and wa	ater emergent	test	Regulations: LSA Code II/2.4.1.2.3 MSC.81(70) 1/3.1.12					
Test Procedure		Acceptan	ce Criteria		S	ignificant Te	st Data	
All test subjects, each wearin but not the anti-exposure attempt to swim 25 m and bo or rigid platform with its surf above the water surface. Test subjects who successfu this task should also perform i anti-exposure suit. If designed to be used with then anti-exposure suit shou with the subject also wearing	suit, should bard a liferaft ace 300 mm ully complete it wearing the a lifejacket, uld be tested	All qualified test subjects shou or platform while wearing the			Subject No.1 Subject No.2 Subject No.3 Subject No.4 Subject No.5 Subject No.6	Pass	g with immersion suit	

Anti-exposure suits	er:		Surveyor:	Time:			
2.4.17 Oil resistance to		Regulations: LSA Code; MSC.81(70) 1/3.1.13					
Test Procedure		Accepta	nce Criteria		Significant Test Data		
After all its apertures have bee anti-exposure suit should be in a period of 24 h under 100 n diesel oil at normal room temp The surface oil should then the and the suit subjected to prescribed in 2.4.15.	mmersed for mm head of perature. be wiped off	The ingress of water should	not exceed a	mass of 200g.	Indicate which alternative is used. YAlternative 1 YAlternative 2 Water ingress ≤ 200g Pass Fail Subject No.1		

Anti-exposure suits	Manufacturer:			Surveyor:				
2.4.18 Alternative oil r	esistance test		Regulations: LSA Code; MSC.81(70) 1/3.1.14					
Test Procedu	ıre	Accept	tance Criteri	а	Si	gnificant T	est Data	
In lieu of the test for oil resis 2.4.17 either of the follow conducted. After all apertures have I anti-exposure suit should be period of 24 h under 100 mm at normal room temperature weights to keep suit submerg should then be wiped off and suit turned inside out. The s laid on a table suitable for coll off any leakage and be supp aperture by a suitable designed	ving tests may be been sealed, the e immersed for a n head of diesel oil if necessary, using ed. Any surface oil I the anti-exposure uit should then be ecting and draining ported at the neck				Subject No.1 Subject No.2 Subject No.3 Subject No.4	ve 1 1 Og Pass	Alternative 2	
The suit should then be filled level which should be 300mm Representative samples of t and seams should be immers head of diesel oil for 24 h. A the oil the samples should be being subjected to the followin .1 a hydrostatic test of a 1m .2 a tensile test of represen	with water to neck above the table. he exterior fabric sed under 100mm after removal from e wiped off before ing tests: -	The seam strength sho The samples should su of water.				d support Pass _	Fail a 1 m head of water Fail	

Anti-exposure suits	Model:	er: umber:			Time:		
2.4.19 Fire test	•		Regulations: LSA Code II/2.4.1.1.5; MSC.81(70) 1/3.1.15				
Test Procedure		Acceptance Criteria			Significant Test Data		
A test pan 30 cm x 35 cm x be placed in an essentially area. Water should be put in t the test pan to make a mi depth of 1 cm followed by end make a minimum depth of 4 cr should then be ignited and all freely for 30 s. If necessa exposure suit should be dra hanger to ensure the whole enveloped in the flames , wit of the suit 25 cm above the top test pan so that the duration to the flames is 2 s.	draught-free the bottom of inimum total ough petrol to m. The petrol owed to burn ary the anti- aped over a of the suit is h the bottom p edge of the	The anti-exposure suit should than 6 s or continue melting a flames.			Did the anti-exposure suit continue to burn for more than 6 s or continue melting after being removed from the flames?		

		Manufacture	er:			Time:		
Anti-	exposure suits	Model:	umber:		Surveyor:			
2.4.2	0 Temperature cy				_	2.2.2; MSC.81(70) 1/3.1.16		
Test Procedure			Accentar			Significant Test Data		
The f	ollowing test should be c	parried out	Acceptance Criteria					
	o immersion suits		The anti-exposure suit's shou such as shrinking, swelling			(See following page for test data)		
alterr	anti-exposure suits nately subjected to	surrounding	mechanical qualities.			PassedFailed		
temp alterr imme follov	eratures of -30°C and + nating cycles need ediately after each oth ving procedure, repeated rcles, is acceptable:	65°C. These not follow her and the				Comments/Observations		
.1	an 8 h exposure at temperature of +65 completed in one day;	5°C to be						
.2	the specimens remove warm chamber that sa left exposed under or conditions at a tempera ± 3°C until the next day	ame day and dinary room ature of 20°C						
.3	an 8 h exposure at temperature of -30 completed the next day	°C to be						
.4	the specimens remove cold chamber that say left exposed under or conditions at a tempera ± 3°C until the next day	me day and dinary room ature of 20°C						

Anti-ex	posure suits	Model:	acturer: rial Number:	 	Surveyor:		Time:			
2.4.21	Temperatur		st – Test Data HOT CYCLE	Regulatio	Regulations: LSA Code I/1.2.1; MSC.81(70) 1/3.1.16 COLD CYCLE					
Cycle 1	Date In: Time In: Temperature:		Date Out: Time Out: Duration:	 Tim	e In: e In: nperature:		Date Out: Time Out: Duration:			
Cycle 2	Date In: Time In: Temperature:	0C	Date Out: Time Out: Duration:	 Tim	e In: e In: nperature:		Date Out: Time Out: Duration:			
Cycle 3	Date In: Time In: Temperature:	0C	Date Out: Time Out: Duration:	 Tim	e In: e In: nperature:	<u></u> 0	Date Out: Time Out: Duration:			
Cycle 4	Date In: Time In: Temperature:	0C	Date Out: Time Out: Duration:	 Tim	e In: e In: nperature:	0C	Date Out: Time Out: Duration:			
Cycle 5	Date In: Time In: Temperature:	0C	Date Out: Time Out: Duration:	 Tim	e In: e In: nperature:		Date Out: Time Out: Duration:			
Cycle 6	Date In: Time In: Temperature:		Date Out: Time Out: Duration:	 Tim	e In: e In: nperature:		Date Out: Time Out: Duration:			
Cycle 7	Date In: Time In: Temperature:		Date Out: Time Out: Duration:	 Tim	e In: e In: nperature:		Date Out: Time Out: Duration:			
Cycle 8	Date In: Time In: Temperature:		Date Out: Time Out: Duration:	Tim	e In: e In: nperature:	0C	Date Out: Time Out: Duration:			
Cycle 9	Date In: Time In : Temperature:		Date Out: Time Out: Duration:	Tim	e In: e In: nperature:	⁰ C	Date Out: Time Out: Duration:			
Cycle 10	Date In:		Date Out:	Date Tim	e In: e In: nperature:	D ₀	Date Out: Time Out: Duration:			

Anti-exposure suits	Model:	Surveyor:			Time:		
2.4.22 Buoyancy test				-	4.1.1.1; MSC.81(70) 1/3.1.17		
Test Procedure		Acceptance Criteria			Significant Test Data		
The Anti-exposure suit should have inherent buoyancy of at least 70 N		The difference between the initial buoyancy and the final buoyancy should not exceed 5% of the initial buoyancy.			Buoyancy 1 Buoyancy 2 %difference kgkg%		
The buoyancy of an anti-exposure suit designed to be worn without a lifejacket should be measured before and after 24 h complete submersion to just below the surface in fresh water.					PassedFailed Comments/Observations		
2.4.23 Strength test			Regulatio	ns: LSA Code II; N	MSC.81(70) 1/3.1.18		
Test Procedure		Acceptance Criteria		Significant Test Data			
The anti-exposure suit immersed in water for a perio should then be removed fro and closed in the same man worn by a person. A force of 3200 N should be applied to th and a force of not less than 13 be applied to the parts other th loop for 30 min.	d of 2 min. It m the water ner as when not less than ne lifting loop 350 N should	The anti-exposure suit should of this test.	I not be dam	naged as a result	PassedFailed		
The anti-exposure suit man necessary to accommodat device.		Vest-type lifejacket Yoke or o	ver-the-head ty	/pe lifejacket			

Anti-exposure suits	Manufacturer: Model: Lot/Serial Number:	Surveyor:	Time:
2.4.24 Thermal prot	ective test (General)	Regulations: LSA Code	II/2.4.2; MSC.81(70) 1/3.2.1 – 3.2.5
	t Procedure	Acceptance Criteria	Significant Test Data
thermal manikin, when s Administration and has be	alities may be measured using a uch a method is required by an een demonstrated to provide test atisfactorily in all aspects to test cts.		Comments/Observations
examined before being acc	used, they should be medically cepted for the tests. Each design of sted by test subjects specified in		
conducted under the sup resuscitation equipment sl For safety reasons, ECG test. Testing should be subjects, if the falling rate of 1.5° C per hour after th temperature of hand, foot	e used, the tests should always be ervision of physician. Emergency hould be available during all tests. should be monitored during every stopped at the wish of the test f the core temperature is more than he first half hour. or if the skin or lumbar region should fall below nutes, or if the attending physician		
temperature (rectal temperature lumbar region, both hand heels, should be measure system should be +/- 0	n subjects, continuous body core erature) and skin temperature of ds, calves, foot (foot instep) and d. The accuracy of the measuring 0.2°C. Appropriate corresponding raken if a manikin is used in lieu of		
jump test in paragraph 2.4	mount of water resulting from the .15 should be poured into the dry clothing specified in 2.4.7 by the		

Anti-exposure suits	Model:	er: umber:		Su	irveyor:			
2.4.25 Thermal Protec	tive test (Co	ntinued)	Regulatio	ns:	LSA Code II/2.4.	2; MSC.8 ⁻	1(70) 1/3.2	2.13, 3.2.14
Test Procedure		Acceptance Criter	ia			Sig	nificant Tes	st Data
Each test subject should w exposure suit previously sub- water ingress and jump test i 2.4.13. Following a 1 h immersion, with hands glove donned, in circulating calm wa each test subject's body core should not fall more than 2° normal level of the subject's t Immediately on leaving the completion of the test prescrift each test subject should be at a pencil as specified in para and write. The anti-exposure suit sho constructed, that when worn the suit continues to provis thermal protection following of the water which totally subme subject and should ensure th worn in calm water at a ter 5°C, the test subject's temperature does not fall at a than 1.5°C per hour, after the	jected to the in paragraph period of ed and hood ater at + 5°C, temperature C below the emperature. water after bed in 2.4.24 ble to pick up agraph 2.4.9 build be so as marked, de sufficient ine jump into inges the test at when it is inperature of body core rate of more	Same mass of water which from test 2.4.15, should be p immersion suit. See attached test sheets for during the immersion tests: Comments/Observations	ooured into t	he	be poured into t Beginni of test Subject No 1 Subject No.2 Subject No.3 Subject No.4 Subject No.5 Subject No.6 Passed Pick up a pencil Subject No 1 Subject No 2 Subject No 3 Subject No 3 Subject No 4 Subject No 5 Subject No 6 Passed	the immer ing I and write YYES YYES YYES YYES YYES YYES	sion suit End of test Failed after 1 h YNO YNO YNO YNO YNO YNO YNO YNO YNO YNO	

2.4.25	Thermal Protective test (Cor	ntinued) Reg	Regulations: LSA Code II/2.4.2; MSC.81(70) 1/3.2.13, 3.2.14			
Test Procedure		Acceptance Criteria	Significant Test Data			
			Passed Failed			
			See attached test sheets for temperatures during the immersion tests:			
			Comments/Observations			

Anti-exposure suits	Manufacturer: Model: Lot/Serial Number:			Surveyor:	Time:	
2.4.26 Test sheets for te	emperatures during imme	ersion tests	Regulation	ns: LSA Code II	/2.4.2.1.2; MSC.81(70) 1/3.2	2.13 & 3.2.14
SUBJECT 1	SUBJECT 2	SUBJECT 3	SU	BJECT 4	SUBJECT 5	SUBJECT 6
Rectal temp after 1 hr:	Rectal temp after 1 hr:	Rectal temp after 1 h	r: Rectal t	emp after 1 hr:	Rectal temp after 1 hr:	Rectal temp after 1 hr:
Skin temp at lumbar region after 1 hr :	Skin temp at lumbar region after 1 hr :	Skin temp at lumbar region after 1 hr :		np at lumbar fter 1 hr :	Skin temp at lumbar region after 1 hr :	Skin temp at lumbar region after 1 hr :
Skin temp at left hand after 1 hr:		Skin temp at left h after 1 hr:	after		Skin temp at left hand after 1 hr:	Skin temp at left hand after 1 hr:
Skin temp at right hand after 1 hr:	after	Skin temp at right h after 1 hr:	and	np at right hand	Skin temp at right hand after 1 hr:	Skin temp at right hand after 1 hr:
Skin temp at calves after 1 hr:	Skin temp at calves after	Skin temp at calves a	1 hr:	an at ach an aftar	Skin temp at calves after 1 hr:	Skin temp at calves after 1 hr:
Skin temp at left foot (foot instep) after 1 hr:	1 hr: Skin temp at left foot (foot instep) after 1 hr:	1 hr: Skin temp at left foot (foot instep) after 1 h	1 hr:	np at calves after	Skin temp at left foot (foot instep) after 1 hr:	Skin temp at left foot (foot instep) after 1 hr:
Skin temp at right foot (foot instep) after 1 hr:	Skin temp at right foot (foot instep) after 1 hr:	Skin temp at right foc (foot instep) after 1 h	(foot ins	tep) after 1 hr:	Skin temp at right foot (foot instep) after 1 hr:	Skin temp at right foot (foot instep) after 1 hr:
Skin temp at left heel after 1 hr:	Skin temp at left heel after 1 hr:		(foot ins	tep) after 1 hr:	Skin temp at left heel after 1 hr:	Skin temp at left heel after 1 hr:
Did the wearer's body core temperature fall at a rate more than 1,5°C per hour, after the first 0,5 h?	Did the wearer's body core temperature fall at a rate more than 1,5°C per hour, after the first 0,5 h?	1 hr: Did the wearer's bo core temperature fall	after 1 hr: ody I at Did the 5°C core ter	wearer's body	Did the wearer's body core temperature fall at a rate more than 1,5°C per hour, after the first 0,5 h?	more than 1,5°C per hour, after the first 0,5 h?
ΥΥes ΥΝο	ΥYes ΥΝο	per hour, and the f 0,5 h? Υ Yes Υ No		r, after the first		Ϋ́Yes Ϋ́No

2.5 THERMAL PROTECTIVE AIDS

EVALUATION AND TEST REPORT

- 2.5.1 General data and specifications
- 2.5.2 Submitted drawings, reports and documents
- 2.5.3 Quality assurance
- 2.5.4 Visual inspection
- 2.5.5 Fabric test Water resistance
- 2.5.6 Fabric test Thermal conductance
- 2.5.7 Temperature cycling test
- 2.5.8 Test subjects
- 2.5.9 Test clothing
- 2.5.10 Donning test 1
- 2.5.11 Donning test 2 at low temperature
- 2.5.12 Discarding test
- 2.5.13 Oil resistance test

2.5 THERMAL PROTECTIVE AIDS EVALUATION AND TEST REPORT

Manufacturer	
Туре	
Date	
Place	
Surveyor's name (printed)	
Signature	
Approving organization	

Thermal protective aids	Model:	Surveyor:			Time:		
2.5.1 General data and sp	ecifications		Regulations: LSA Code II/2.5; MSC.81(70) 1/ 3.3				
General Informat	tion						
Construction Material:					Donning instructions:		
Fabric manufactured by:					YYES	Ϋ́ΝΟ	
Туре:							
Is the TPA of highly visible co	lour?				YYES	Ύ ΝΟ	

Thermal protective aids Manufacturer: Model: Lot/Serial Num		Manufacture Model: Lot/Serial Nu	r: Date: Time: umber: Organization:							
2.5.2 Submitted drawings, reports and documents										
	Submitted drawings and documents									
Drawing No.	D. Revision No. & Title of drawing date									
			Submitted reports and documents		Otatura					
Report/Document No.	Revis date	ion No. &	Title of I	report / document	Status					
			Maintenance Manual -							
			Operations Manual -							

Thermal protective aids	Manufacturer: Model: Lot/Serial Number:	Surveyor:				
2.5.3 Quality Assurance		Regulatio	tions: - MSC.81(70) 2/1.1, 1.2			
of the International Convention amended, of the international inspected, representatives of inspections of manufacturers appliances and materials us approved prototype life-saving Manufacturers should be required to ensure that life-saving appliances and materials	If a particular type are required by chapter III on for the Safety of Life at Sea, 1974, as I Life-Saving Appliances (LSA) Code, to be f the Administration should make random is to ensure that the quality of life-saving sed comply with the specification of the g appliance. Uired to institute a quality control procedure liances are produced to the same standard pliance approved by the Administration and tion tests carried out in accordance with the	Quality As Quality As Description Quality As	Assurance Standard Used: - Assurance Procedure: - Assurance Manual: - tion of System. Assurance System acceptable: Yes/No nts/Observations			

Thermal protective aids	Model:	umber:		Surveyor:		Time:
2.5.4 Visual Inspection			Regulatio	ns: LSA Code I/1.2.	2, II/2.5; MSC	. 81(70);
Test Procedure		Acceptanc	ce Criteria			Significant Test Data
Is the thermal protection aid o colour?	f high visible	Be of an international or vivid re high visible colour on all parts at sea.			□Yes □No	
Does the thermal protection a	aid cover the	Cover the whole body of pe	preone of a	Il sizos wearing a	□Yes □No	
whole body of the weare exception of the face?	er with the	lifejacket with the exception of		ii sizes wearing a	□Yes	□No
If provided with arms, are covered, or are permanen gloves provided?						
Be clearly marked with information including the A which approved it, date of man any operational restrictions. with labels giving servicing intervals between servicing instructions, general inforr manufacturer's details.	dministration ufacture and Be provided details and , operating					

	Manufacture	er:		Date:	Time		
Thermal protective aids	Model:	Sur			Surveyor:		
merma protective alus	Lot/Serial N			Organization:			
2.5.5 Fabric Test - Water r	esistance		Regulatio	ns: LSA Code ; M	SC.81(70) 1/3.3.1		
Test Procedure		Acceptan	ce Criteria		Sig	nificant Test Data	
The fabric from which the thermal protective aid is constructed should be tested to determine its resistance to penetration by a 2m head of water.		supporting a column of water 2 m high.		high ƳYES	upport a column of water of 2 m Ƴ NO		
					Test method used:		
					Comments/Observa	ations	
2.5.6 Fabric test - Thermal	l conductanc	e	Regulation	Ilations: LSA Code II/2.5.1; MSC.81(70) 1/3.3.2			
Test Procedure		Acceptan	ce Criteria	Significant Test Data			
The thermal conductance of the fabric of The which the thermal protective aid is manufactured should be measured.		The fabric should have a ther than 7800 W/m ² K and shall used to enclose a person, it sh and evaporative heat loss from	be so const all reduce be	ructed that, when oth the convective	Passed	iched here.	

Thermal protective aids Model:			Surveyor:			Time:
2.5.7	Temperature cy	cling test		Regulatio	ns: LSA Code II/1.	2.2.2; MSC.81(70) 1/3.3.3
	Test Procedure		Acceptanc	e Criteria		Significant Test Data
			The thermal protective aid sho such as shrinking, swelling mechanical qualities		5	See following page for test data. PassedFailed
.1	.1 an 8 h exposure at a minimum temperature of +65°C to be completed in one day; and					Comments/Observations
.2	the specimens remove warm chamber that sate left exposed under of conditions at a temperative ± 3°C until the next day	ame day and rdinary room ature of 20°C				
.3	an 8 h exposure at temperature of -30 completed the next day	0°C to be				
.4	.4 the specimen removed from the cold chamber that same day and left exposed under ordinary room conditions at a temperature of 20°C ± 3°C until the next day;					

Thermal protective aids Manufacturer: Model: Lot/Serial Number:				Surveyo	or:	Time:			
2.5.7	Temperature of	cycling test – Test data		Regulations: LSA C	Code I/1.2.2.2; M	SC.81(70) 1/3.3.3			
		HOT CYCLE			С	OLD CYCLE			
	Date In:	Date Out:		Date In:	Date In: Date Out:				
Cycle 1	Time In:	Time Out:		Time In:		Time Out:			
	Temperature:	0C Duration:	hours	Temperature:	0 ⁰	Duration:	hours		
	Date In:	Date Out:		Date In:		Date Out:			
Cycle 2	Time In:	Time Out:		Time In:		Time Out:			
	Temperature:	⁰ C Duration:		Temperature:	0C	Duration:			
	Date In:	Date Out:		Date In:		Date Out:			
Cycle 3	Time In:	Time Out:		Time In:		Time Out:			
	Temperature:	⁰ C Duration:		Temperature:		Duration:			
	Date In:	Date Out:		Date In:		Date Out:			
Cycle 4	Time In:	Time Out:		Time In:		Time Out:			
	Temperature:		hours	Temperature:		Duration:			
	Date In:	Date Out:		Date In:		Date Out:			
Cycle 5	Time In:	Time Out:		Time In:		Time Out:			
	Temperature:		hours	Temperature:		Duration:	hours		
	Date In:	Date Out:		Date In:		Date Out:			
Cycle 6	Time In:	Time Out:		Time In:		Time Out:			
	Temperature:		hours	Temperature:	⁰ C	Duration:	hours		
	Date In:	Date Out:		Date In:		Date Out:			
Cycle 7	Time In:	Time Out:		Time In:		Time Out:			
	Temperature:	⁰ C Duration:	hours	Temperature:	<u>0</u> °C	Duration:	hours		
	Date In:	Date Out:		Date In:		Date Out:			
Cycle 8	Time In:	Time Out:		Time In:		Time Out:			
	Temperature:	⁰ C Duration:	hours	Temperature:	0C	Duration:	hours		
	Date In:	Date Out:		Date In:		Date Out:			
Cycle 9	Time In:	Time Out:		Time In:		Time Out:			
	Temperature:	⁰ C Duration:	hours	Temperature:		Duration:	hours		
	Date In:	Date Out:		Date In:		Date Out:			
Cycle 10	Time In:	Time Out:		Time In:		Time Out:			
	Temperature:	⁰ C Duration:	hours	Temperature:	O ⁰	Duration:	hours		

Thermal protective aids	cturer:al Number:		Date: Time: Surveyor: Organization:							
2.5.8 Test subjects						ons: LSA Code II/2.5.2; MSC.81(70) 1/3.3.4				
Test Procedure		Acceptance Criteria				Significant Test Data				
For these tests a group of at least six test subjects of different ages, both male and female in the large, medium and small size range should be selected.		Test subject range:HeightWeight1.4 m - 1.6 m1 person under 60 kg1.6 m - 1.8 m1 person over 60 kg1 person over 70 kgover 1.8 m1 person under 80 kg1 person over 80 kg)	Subject 1 Subject 2 Subject 3 Subject 4 Subject 5	ts/Observations Male/Female				
2.5.9 Test clothing	Regulations: LSA Code II/2.5; MSC.81(70) 1/3.3.5, 3.2.6 & 3.2.8									
Test Procedure		Acceptance Criteria				Significant Test Data				
The test subjects should wear range clothing consisting of .1 underwear (short sleeved, .2 shirt (long sleeved) .3 trousers (not woollen) socks .4 in addition to the cloth subjects should wear pullovers during the tests 2.5.10; 2.5.11 and 2.5.12.	short legged) and woollen ing, the test two woollen					YYES	st subject use the ƳNO ts/Observations	specified tes	st clothing	

Thermal protective aids	Model:	er:		Surveyor:	Time:		
2.5.10 Donning test (1)					II/2.5.2.; MSC.81(70) 1/3.3.6		
Test Procedure		Acceptance Criteria			Significant Test Data		
Following a demonstration, the test subjects should be able to unpack and don the thermal protection aids over a lifejacket when seated in a survival craft or a rescue boat.		The test subjects should be a thermal protection aid.	ble to unpac	k and don the	TimePassedFailedSubject No.1secSubject No.2secSubject No.3secSubject No.4secSubject No.5secSubject No.6secSubject No.6sec		
2.5.11 Donning test (2) at	low temperat	ure Regulations: LSA Code II/2.5.3; MSC.81(70) 1/3.3.7					
Test Procedure	Test Procedure		Criteria		Significant Test Data		
The thermal protective aid capable of being unpacked an an ambient temperature of -3 the donning test the thermal p should be kept in a refrigerated a temperature of -30°C for 24	ad donned at 80°C. Before protective aid d chamber at	The test subjects should be able to successfully u and don the thermal protective aid without assista a survival craft or rescue boat. The thermal protective aid shall function pu throughout an air temperature range of -30°C to +		assistance in tion properly	TimePassed Failed Subject No.1 sec Subject No.2 sec Subject No.3 sec Subject No.4 sec Subject No.5 sec Subject No.6 sec Subject No.6 sec		

Thermal protective aids	Model:	er:		Surveyor:	Time:		
2.5.12 Discarding Test	Lotrocharin				II/2.5; MSC.81(70) 1/3.3.8		
Test Procedure		Acceptance Criteria			Significant Test Data		
If the thermal protective aid impairs the ability of the test subjects to swim, it should be demonstrated that it can be discarded by the test subjects, when immersed in water, in not more than 2 min.		The test subject should be able to complete this task in less than 2 min.		ete this task in	TimePassedFailedSubject No.1secSubject No.2secSubject No.3secSubject No.4secSubject No.5secSubject No.6secSubject No.6sec		
2.5.13 Oil resistance test		Regulations: LSA Code I/1.2.2.4; MSC.81(70) 1/3.3.9					
Test Procedure		Acceptance Criteria			Significant Test Data		
After all its apertures have be thermal protective aid should I under 100 mm head of diesel The surface oil should then and it should be established conductance of the material.	be immersed oil for 24 h. be wiped off	After this test the thermal prot signs of damage, such as shr dissolution or change of m thermal conductance shou 7800 W/m ² K.	ective aid should show no inking, cracking, swelling, echanical qualities. The		Is the thermal conductance of the thermal protective aid not more than 7800 W/m ² K? YYES YNO Is there any sign of damage, such as shrinking, cracking, swelling, dissolution or change of mechanical qualities? YYES YNO		
					Comments/Observations		