

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*.

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 has since adopted seven amendments to the LSA Code and eight amendments to resolution MSC.81(70). These amendments have been incorporated in the original forms which, due to their volume, are now 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. 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).

3 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.

4 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.

5 This circular supersedes MSC/Circ.980.

SUSTAINABLE SHIPPING FOR A SUSTAINABLE PLANET

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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 through resolution MSC.427(98), 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 customising 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 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	
Name Surveyor printed	
Signature	
Approving Organization	

Lifebuoys	Manufacturer: Model: Lot/Serial Number:		Date: Time: Surveyor: Organization:	
2.1.1.1	Submitted	drawings, reports and		
			Submitted drawings and documents	Status
Drawing	No.	Revision No. & date	Title of drawing	
			Submitted reports and documents	Status
Report/Docu	ument No.	Revision No. & date	Title of report / document	
			Maintenance Manual -	
			Operations Manual -	

Lifebuoys Manufacturer: Model: Lot/Serial Number:	Date: Time: 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	Manufacturer: Model: Lot/Serial Number:		Date: Time: 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	Be of international or vivid reduced comparably highly visible color will assist detection at sea.		Colour(s): Passed	Failed
·				Quantity:	Spacing:
		Fitted with approved retro-reflective material in compliance with resolution A.658(16).		Passed	Failed
				Any operational restrictions?	
		Clearly marked with approval information from the organization that approved it and any operational		Passed	Failed
		restrictions.		Comments/Observati	ons

	Manufacturer:		Date:	Time:	
	Model:		Survevor:		
Lifebuoys	Lot/Serial Number:		Organization:		
2.1.1.3	I 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 upon	n rushes, cork		
		shavings or granulated cork,		Outer diameter: mm	
		granulated material or any a		Inner diameter: mm	
		which depends on inflation for	buoyancy.	Maaa	
Measure the	inner and outer diameter.	Chauld have an autor diameter	a of motions and	Mass: kg	
		Should have an outer diameter of not more than 800 mm and an inner diameter of not			
Weigh the life	buoy.	less than 400 mm		Type / description of quick release arrangement:	
	ed to operate the quick-release 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 arrangement provided for a self-activated smoke signal and self-igniting light, the lifebuoy has a mass of not less than 4 kg.		Weight: kg	
				Grab-line diameter: mm	
Measure the	lifebuoy grab-line diameter and	Be fitted with a grab-line not le	ess than 9.5 mm	Grab-line length: mm	
outside dia length. The grab-		in diameter and not less that outside diameter of the body 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 loo	ps.	Comments/Observations	

Lifebuoys	Manufacturer: Model: Lot/Serial Number:		Date: Time: Surveyor: Organization:		
2.1.1.4	Temperature cycling test		Regulations: LSA Code 1.2.	2; MSC.81(70) 1 / 1.2	
	Test Procedure	Acceptano	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	hroughout the air temperature	Passed Failed	
	ys should be alternately surrounding temperatures of 5°C.		sign of loss of rigidity under high ests, should show no sign of	(See following page for test data)	
immediately	ating cycles need not follow after each other and the cedure, repeated for a total of acceptable:		acking, swelling, dissolution or		
	ure 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.	
	osure at a maximum temperature be completed the next day			Intact after these tests?	
chamber tha under ordin	ens removed from the cold t same day and left exposed ary room conditions at a of $20^{\circ}C \pm 3^{\circ}C$ until the next	ne day and left exposed room conditions at a		lifebuoy No.1: Passed/ Failed lifebuoy No.2: Passed/ Failed	
day.				Comments/Observations	

Lifebuoy	Model:	Lot/Serial Number:			Date: Surveyor: Organization:			
2.1.1.4	Temperature cyclir				Regulations: LSA Code I/1.2.			
		Н	OT CYCLE			COL	D CYCLE	
Cycle 1	Date In: Time In: Temperature:		Date Out: Time Out: Duration:	hours	Date In: Time In: Temperature:		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:		Date Out: Time Out: Duration:	hours	Date In: Time In: Temperature:		Date Out: Time Out: Duration:	
Cycle 4	Date In: Time In: Temperature:		Date Out: Time Out: Duration:	hours	Date In: Time In: Temperature:		Date Out: Time Out: Duration:	
Cycle 5	Date In: Time In: Temperature:	0	Date Out: Time Out: Duration :		Date In: Time In: Temperature:		Date Out: Time Out: Duration:	
Cycle 6	Date In: Time In : Temperature :	0C	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:	hours	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:	

Lifebuoys	Manufacturer: Model: Lot/Serial Number:		Date: Time: 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 o which it is inte their lightest whichever is the water with In addition, or suspended fre 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 om its upper edge via a release 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 eithe that of its attached components The lifebuoy should withstand of 2m on to a concrete floor with	above the waterline in the 30 m, whichever is the r its operating capability or s. three drops from a height	Number of lifebuoys:	

Lifebuoys Manufacturer Model: Lot/Serial Nu			Date: Surveyor: Organization:		
2.1.1.6 Test for oil res	sistance	Regulations: LSA	Code 1.2.2; MSC.81(70) 1 / 1.4		
Test Pro	cedure	Ac	ceptance Criteria	Significant Test Data	
One of the lifebuoys should for a period of 24 h under a at normal room temperature	l be immersed horizontally 100 mm head of diesel oil	After this test the damage such as	lifebuoy should show no sign of shrinking, cracking, swelling, e of mechanical qualities.		

Lifebuoys	Manufacturer: Model: Lot/Serial Number:		Date: 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 test should be draught-free the bottom of followed by minimum tota The petrol st allowed to bu The lifebuoy st 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: xxcm 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	Manufacturer: Model: Lot/Serial Number:		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 (Criteria	Signific	cant Test Data	
tests should I not less than 2	uoys subjected to the above be floated in fresh water with 14.5 kg of iron suspended from and should remain floating for h.	h deformation. The lifebuoys should float throughout the 24 h test period.		Lifebuoy no. 1Lifebuoy no. 2Suspended mass:kgFloat duration:minminminIntact after this test?Passed/ FailedFloat for entire test period?Passed/ FailedComments/ObservationsValue		
2.1.1.9 9	Strength test		Regulations: LSA Cod	e 1.2.2; MSC.81(70) 1/1.	.7	
	Test Procedure	Acceptance (Criteria	Significant Test Data		
50 mm wide s passed aroun with a 90 kg r	dy should be suspended by a trap. 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, cra deformation.	acks or permanent	Lifebuoy No. Suspended mass: Suspension duration: Passed/Failed Comments/Observation	min	

	Manufacturer:		_ Date: Time:					
Lifebuoys	Model:		Surveyor:					
Lifebuoys	Lifebuoys Model: 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	Criteria	Significant Test Data				
lifebuoy is int light and smo The lifebuoy manner simu for release fro A lifebuoy ligh attached to	hould be carried out if the ended for quick release with a	· · · ·	ed and should activate ignal.	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 Passed Failed 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	
Name Surveyor printed	
Signature	
Approving Organization	

Lifebuoy self-igniting lights	Manufacturer: Model: Lot/Serial Number:		Date: Surveyor: Organization:	_ Time:
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-Savin representatives of the Admin manufacturers to ensure that materials used comply with life-saving appliance. Manufacturers should be require ensure that life-saving appliance	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, istration should make random inspection of the quality of life-saving appliances and the the specification of the approved prototype irred 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:	Surveyor:	Time:		
2.1.2.1.1 General data and	d specifications	Regulations: LSA Code;	MSC.81(70)		
General Informati	on	Lifejacket Lifebuoy Light Dimensions	Lifejacket Lifebuoy Light Weight		
TYPE OF SWITCHING			Details of Dulls Dettery (9.) (alternation		
			Details of Bulb, Battery & Voltages:		
FLASHING LIGHT			Comments/Observations		
STEADY LIGHT					

Lifebuoy self-ignitin	g lights	Manufacture Model: Lot/Serial Nu	r:	Date: Time: Time: Organization:	
2.1.2.1.2 Submitt	ed drawi	ngs, reports	and documents		
			Submitted drawings and document	S	Status
Drawing No.	Revis date	ion No. &	Titl	le of drawing	
	-				
			Submitted reports and documents	5	0 1.1
Report/Document No.	Revis date	ion No. &	Title of	report / document	Status
			Maintenance Manual -		
			Operations Manual -		
	<u> </u>				
	<u> </u>				

Model:		acturer: : rial Number:		Surveyor:	Time:	
2.1.2.2 Visual Inspection	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 C	criteria		Significant	Test Data
Thirteen lifebuoy self-igniting li should be examined in detail fo following items:	•	The lifebuoy self-igniting lights shoul		·	<u>Results:</u> PASS:	FAIL:
Approval marking Expiry marking		 be clearly marked with approve Administration which approved restrictions; be marked with a date of expiry; 			PASS:	FAIL:
		 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. light"); serial number; identification of the manufacturer; where applicable, information on pr words: "DO NOT INCINERATE / DO TAMPER";	g. "Lifebuo <u>y</u> oper batter	y disposal by the	<u>Results:</u> PASS: PASS: PASS: PASS:	FAIL: FAIL: FAIL: FAIL:
Electrical short circuit protectio	'n	 be provided with electrical short of damage or injury; 	ircuit prote	ction to prevent	<u>Results:</u> PASS: Comments/Observations	FAIL:

2.1.2.2 Visual Inspection (continued) 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 Criteria	Significant Test Data
	The lifebuoy self-igniting lights should:	<u>Results:</u>
Construction and materials	- be constructed with proper workmanship and materials.	PASS: FAIL:
Colour of lifebuoy light	- be of an international or vivid reddish orange, or a comparably highly visible colour on all parts where this will assist detection at sea	PASS: FAIL: Comments/Observations

	Manufacturer:		Date:					
ifebuoy self-igniting lights	Model:	Surveyor:	Surveyor:					
nebuoy sen-iginting lights	Lot/Serial Number:	Organizatio	Organization:					
ifebuoy self-igniting light te	esting flow chart							
	light 1 temp cycle test 2.1.2.3	then light 2.1.2.4	1 performs Light test (hot)	light 1 the 2.1.2.5	en performs Chromaticity Test			
	light 2 temp cycle test 2.1.2.3	then light 2.1.2.4	2 performs Light test (cold)	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	light 7 then performs Fittii 2.1.2.11	ng Test	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							

Lifebu	uoy self-igniting lights	Model:	umber:		Date: Surveyor: Organization:		
		Lot Condition					
2.1.2.3	Temperature cycli	ng test		Regulation	s: LSA Code 1.2.2.2	; MSC.81(70) 1/ 1.2, 1.2.1,	1.2.2, 10.2, 10.2.1
	Test Procedure		Acceptan	ce Criteria		Significa	ant Test Data
alterna tempe These immed follow not les	Test Procedure lifebuoy self-igniting ligh ately subjected to eratures - 30°C and at I e alternating cycles nee diately after each othe ing procedure, repeated ss than 10 cycles, is acce an 8 h exposure at temperature of +65 completed in one day; a the specimens remove warm chamber that sat left exposed under ore conditions at a tempera ± 3°C until the next day; an 8 h exposure at temperature of -30°C to the next day; and the specimens remove cold chamber that same	surrounding least +65°C. d not follow er and the for a total of eptable: a minimum °C to be ind ed from the me day and dinary room ture of 20°C ; a maximum be completed ed from the	The lifebuoy self-igniting light stowage throughout the air +65°C. The lifebuoy self-igniti of loss of rigidity under high ter should show no sign of damag swelling, dissolution or chang should function after the test.	ts should no temperature ng lights sho nperatures a ge such as sl	e range -30°C to buld show no sign nd, after the tests, hrinking, cracking,	Results:	rcling chart to record times ature. FAIL:
	exposed under ordi conditions at a tempera ± 3°C until the next day.	nary room ture of 20°C					

Lifebuo	y self-igniting lights	Model:	urer: Number:	Surveyor:		_ Time:	· · · · · · · · · · · · · · · · · · ·	
2.1.2.3 Temperature cycling test – Test data Regulations: LSA Code I/1.2.2; MSC.81(70) 1/1.2								
			OT CYCLE				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:	<u> </u>	Date In: In: Temperature:		Date Out: Time Out: Duration:	
Cycle 3	Date In: Time In: Temperature:		Date Out: Time Out: Duration:		Date In: In: Temperature:	Time	Date Out: Time Out: Duration:	
Cycle 4	Date In: Time In: Temperature :		Date Out: Time Out: Duration:		Date In: In: Temperature:		Date Out: Time Out: Duration:	
Cycle 5	Date In: Time In: Temperature :		Date Out: Time Out: Duration:		Date In: In: Temperature:	Time	Date Out: Time Out: Duration:	
Cycle 6	Date In: Time In: Temperature:		Date Out: Time Out: Duration:		Date In: In : Temperature :		Date Out: Time Out: Duration:	
Cycle 7	Date In: Time In: Temperature:	0 -	Date Out: Time Out: Duration:		Date In: In: Temperature:	Time	Date Out: Time Out: Duration:	
Cycle 8	Date In: Time In: Temperature:		Date Out: Time Out: Duration:		Date In: In: Temperature:	Time		
Cycle 9	Date In: Time In: Temperature:		Date Out: Time Out: Duration:		Date In: In: Temperature:	Time	Date Out: Time Out: Duration:	
Cycle 10	Date In:		Date Out: Time Out: Duration:		Date In: In: Temperature:	Time	Date Out: Time Out: Duration:	

Lifebuoy self-igniting lights	Lifebuoy self-igniting lights Manufacturer: Lot/Serial Number:			Date: Surveyor: Organization:	Time:	
2.1.2.4 Light tests			Regulatio	ns: LSA Code 2.1.	2/2.1.2.2/2.1.2.3; MSC.81((70) 1/ 10.2.2, 10.4, 10.4.9
Test Procedure		Acceptance	ce Criteria		Significa	nt Test Data
One lifebuoy self-igniting ligh passed the temperature cycling be taken from a stowage tem 30°C and then be operated is seawater at a temperature of - lifebuoy self-igniting light which the temperature cycling test taken from a stowage tem +65°C and be operated in seawater at a temperature of + third light should be taken fr room condition and operated fresh water at ambient temper end of the first hour of op lifebuoy self-igniting lights immersed to a depth of 1 m for	g test should berature of - mmersed in 1°C, another has passed should be perature of nmersed in 30°C, and a om ordinary immersed in ature. At the beration the should be	After immersion, all the lifebuo be extinguished and should co hour longer. All of the lights should be of continue to provide a luminous in all directions of the upper h flashing light, flash at a rate o not more than 70 flashes p corresponding effective lumin 2 cd for at least 2 h. (see for effective luminous intensity.) The effective luminous intensity.	white colours intensity of emisphere of f not less the per minute ous intensity ormula below	ating for at least an r and they should not less than 2 cd or, in the case of a an 50 flashes and with at least the y of not less than w to calculate the	All luminous intensity dat PASS: Comments/Observations	a is to be attached here. FAIL:
If the voltage at 5 min of operation 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 hemisphere for 2 h operation, test should be performed:	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 f the upper	$\left(\frac{\int_{t_1}^{t_2} Id}{0.2 + (t_2)}\right)$ where: I is the instantaneous intensity 0.2 is the Blondel-Rey constant of integration in seconds.	, max	t ₂ are time - limits		

Lifebuoy self-igniting lights	Model:	umber:		Surveyor:	Time:
2.1.2.4 Light tests (conti	inued)		Regulatio	ns: LSA Code	2.1.2/2.1.2.2/2.1.2.3; MSC.81(70) 1/ 10.2.2, 10.4, 10.4.9
Test Procedure		Acceptance	Criteria		Significant Test Data
It must be demonstrated that all lights reach the required lumino in all directions of the upper when using a photometer calibrated to the photometric s the appropriate National or Sta Institute (Note: CIE Publ. No. further information.). Luminous all test unit lights should be me photometer directed at the ce light source with the test light of table. Luminous intensity measured in a horizontal dire level of the center of the light continuously recorded throug rotation. The first measurement taken at 0° (horizontal) and sho to be taken in the azimuth a intervals to a single measurer (vertical). Luminous intensity should be re a vertical direction, beginning a of the light source at the point recorded light output, and co recorded through an arc of 180	bus intensity hemisphere which is standards of the Standard 70 contains intensity of easured by a enter of the on a rotating should be action at the source and gh a 360° ht should be uld continue angle at 5° ment at 90° measured in at the center nt of lowest continuously	Flashing lights with a flast than 0.3 s may be considered the measurement of their lumi should provide the required directions of the upper hemis between switching on and luminous intensity (incandes spent below the required lum light switches off sho (see figure 10.4.1 "On-time" m	as fixed/ste nous intensi luminous in sphere. The reaching cence time) ninous inten buld be neasuremen	eady lights for ty. Such lights ntensity in all time interval the required and all time sity when the disregarded	 PassedFailed 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 2) Light 2, taken from +65°C, immersed in seawater of +30°C 3) Light 3, taken from ordinary temperature, immersed in fresh water at ambient temperature After immersion as mentioned above, all lifebuoy self-igniting lights continue operated for at least an hour longer: Yes/ No Comments/Observations

		er: umber:		Surveyor:		Time:
2.1.2.5 Chromaticity tes	st			s: LSA Code		0) 1/10.2.2, 10.4, 10.4.10
All measured data of lumino and voltage should be docume One lifebuoy self-igniting ligh passed the light tests should l chromaticity to determine that the boundaries of the area "w diagram specified for each of International Commission on (CIE). The chromaticities of the igniting light should be measure of colorimetric measurement which is calibrated to the National or State Standar (Note: CIE Publ. No.15.2 corr information.). Measurement on points of the upper hemisphe taken.	bus intensity ented. at which has be tested for it lies within white" of the colour by the Illumination elifebuoy self- ed by means t equipment appropriate rds Institute itains further at least four	Acceptance The measured chromaticity coo the boundaries of the area of th The boundaries of the area for the following corner coordinates x 0.500 0.500 0.440 0.300 y 0.382 0.440 0.433 0.344 (International Standard on Colo colour tables to be developed b	Criteria ordinates sho le diagram as white lights a s: 0.300 0.44 0.278 0.38 ours of Light S	uld fall within per CIE. re given by 0 2	Results:	Significant Test Data ata is to be attached here. FAIL:

Lifebuoy self-igniting lights	Iights Manufacturer: Model: Lot/Serial Number:			Date: Time: Surveyor: Organization:			
2.1.2.6 Rain test and Wa	atertightness	Test Regulations: LSA Code 1.2.2 10.4.7			2.8; MSC.81(70) 1/ 10.2.5,		
Test Procedure		Acceptano	ce Criteria		Significan	t Test Data	
One lifebuoy self-igniting ligh passed the temperature cycling be subjected to the rain test IEC 60945:2002, paragraph having passed the rain test, self- igniting light and its com source should be immersed under not less than 300 mm of for at least 24 h. After that test, the lifebuoy self- should be tested for function. tested its function, and if it is light, it should be disasse examined for the presence of the Automatic activated version prevented from switching d tests.	g test should according to 8.8. After the lifebuoy plete power horizontally f fresh water -igniting light After having s an electric embled and water. should be	The lifebuoy self-igniting light to be used in a seaway, be ca in that environment. The lifebuoy self-igniting immersion under water. The lifebuoy self-igniting lig requirements of IEC 60945:20 There should be no evidence self-igniting light.	should be ro pable of sati light should jht should 02, paragraj	sfactory operation d function after comply with the ph 8.8.2.		FAIL:	

Lifebuoy self-igniting lights	by self-igniting lights Manufacturer: Model: Lot/Serial Number:			Date: Time: Surveyor: Organization:				
2.1.2.7 Case resistance	test	Regulations: MSC.81(70) 1/ 10.2.7						
Test Procedure		Acceptance Criteria		Sig	Significant Test Data			
One lifebuoy self-igniting light should be placed on its side on a rigid surface and a steel sphere having a mass of 500 g should be dropped from a height of 1.3 m on to the case at least three times. The sphere should strike the case near its centre on one drop, approximately 12 mm from one end of the case on another drop and approximately 12 mm from the other end of the case on the third drop.		way that would affect its water	e case should not break or crack, or be distorted in a ay that would affect its watertightness.		Results: PASS: FAIL: Comments/Observations			
2.1.2.8 Lens drop test			Regulations: MSC.81(7	70) 1/ 10.2.6				
Test Procedure		Acceptance Criteria		Sig	Significant Test Data			
If a lifebuoy self-igniting light h should be subjected to the dom The lifebuoy self-igniting light cooled to -18°C and dropped to height of 1 m on to a rigidly me plate or concrete surface. T should be measured from the lens to the impact surface. T self- igniting light should strike on the top centre of the lens.	t should be wice from a ounted steel he distance top of the The lifebuoy	The lens should not break or crack. The lifebuoy self-igniting light should function after the test.		est. PASS: Comments/Observa	FAIL:			

2.1.2.9 Floatation test	Regulations: LSA Code 1.2	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.	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:		Date:	Time:		
	Model:		Surveyor:			
	Lot/Serial Number:		Organization:			
2.1.2.10 Drop test		Regulation	ns: LSA Code 2.1.	2.4/2.1.1.6; MSC	0.81(70) 1/ 1.3, 10.2.3	
Test Proce	Acceptance Criteria		Significant Test Data			
One lifebuoy self-igniting light which has passed the		The lifebuoy self-igniting light should withstand		Results:		
visual inspection should be sul		this test without impairing either its operating				
The lifebuoy self-igniting light s	bould be subjected to at	The lifebuoy self-igniting light should not suffer damage and should operate satisfactorily after				
least two drop tests as follows:				PASS:	FAIL:	
The lifebuoy self-igniting light	should be dropped into			Comments/Observations		
water, such that the lower edge		each drop.			Comments/Observations	
at which it is intended to be s	stowed on ships in their					
lightest sea going condition,	or 30 m, whichever is					
greater.						
The lifebuoy self-igniting light s						
first by itself and then attached to a lifebuoy.						
On sea activated lights this te						
with the sealing plugs fitted to prevent the ingress of						
water which will cause the light to operate.						
2.1.2.11 Fitting test			Regulatio	ns: MSC.81(70) 1/	10.2.8	
Test Procedure		Acce	Acceptance Criteria Significant Test		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		Results:		
		of this test.		PASS:	FAIL:	
A force of 225 N should be a						
lanyard that attaches the lifebuoy self-igniting light to a		The lifebuoy self-ig	niting light s	hould function after	Comments/Observations	
lifebuoy.		the test.				
After having passed the fitting test the light should be						
subjected to the release and operation test.						

Lifebuoy self-igniting lights			Survey	or:		Fime:			
			· · · · · · · ·	Organiz					
2.1.2.12 Release and ope		Regulation	ns: LSA	Code 2.1.	1.7; MSC.81(70) 1/1.8			
Test Procedure		Acce	eptance Crit	eria		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 sh self-igniting light.	ould activa	ite the	lifebuoy	<u>Results:</u>			
chemical material intended to produce the smoke should be substituted by an equivalent non- dangerous material. The lifebuoy should be arranged in a manner						PASS:	FAIL:		
simulating its installation on a simulating bridge. The lifebuoy smoke signal should be attach manner recommended by the lifebuoy should be released.					Comments/Ob	oservations			
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 Procedure		Acce	eptance Crit	eria		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 <u>Results:</u> constructed with proper workmanship and							
		materials.				PASS:	FAIL:		
	The lifebuoy self-igniting light should function Comments/C after the test.			oservations					
Lifebuoy self-igniting lights	Manufacturer: Model: Lot/Serial Number:			Date: Time: Surveyor: Organization:					
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2.1.2.14 Mould growth te	st	_	Regulations: LSA Code 1.2.2.4; MSC.81(70) 1/10.4, 10.4.2						
Test Proce	dure	Acc	eptance Crite	eria	S	Significant Test Data			
One lifebuoy self-igniting light visual inspection should be su growth test.		The lifebuoy self-ig and not be unduly			<u>Results:</u> PASS:	FAIL:			
The lifebuoy self-igniting light spraying with an aqueous susp containing all the following cult Aspergillus niger; Aspergillus t	bension of mould spores tures: erreus; Aureobasidium	There should be r naked eye and t should function aff	he lifebuoy		Comments/O	bservations			
pullulans; Paecilomyces variot funiculosum; Penicillium ochro brevicaulis; and Trichoderma	chloron; Scopulariopsis /iride.								
The lifebuoy self-igniting craiplaced in a mould growth charmaintained at a temperature relative humidity of not less the incubation should be 28 day lifebuoy self-igniting light shout (Note: The mould growth test	amber which should be of 29°C +/- 1°C and a ian 95 %. The period of s. After this period the ld be inspected.								
the manufacturer is able to pro external materials employed w									

Lifebuoy self-igniting lights	Manufacturer: Model: Lot/Serial Number:			Date: Surveyor: Organization:			
2.1.2.15 Corrosion and s	eawater resistance test		Regulation	s: LSA Code 1.2.2.4; MS	C.81(70) 1/ 10.4	, 10.4.4	
Test Prod	cedure		Acceptance	e Criteria		Significant Test Data	
 One lifebuoy self-igniting light inspection should be subjected as a subject of the seawater resistance test according paragraph 8.12. (Note: .1 If there are no exposed and Seawater Resist conducted. .2 The Corrosion and Seawater the produce evidence that the will satisfy the test. .3 Automatic activated very from switching during the subject of the su	resistant and r Furthermore, comply with t paragraph 8.1 There should parts and th function after Where the ex	not be unduly the lifebuoy he requireme 2.2. be no undu le 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	PASS:			
2.1.2.16 Solar radiation t	est		Regulation	s: LSA Code 1.2.2.5; MS	C.81(70) 1/ 10.4	, 10.4.5	
Test Proc	cedure		Acceptance	e Criteria		Significant Test Data	
One lifebuoy self-igniting light inspection should be subject according to IEC 60945:2002, (Note: The solar radiation tes	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			<u>Results:</u> PASS: Comments/Obs	FAIL:		
manufacturer is able to pr materials employed will satisfy	oduce evidence that the	sunlight and the lifebuoy self-igniting light should function after the test.					

Lifebuoy self-igniting lights	Model:	er: umber:		Date: Time: Surveyor: Organization:				
2.1.2.17 Test for oil resis	tance		Regulations: LSA Code 1.2.2.4; MSC.81(70) 1/ 10.4, 10.4.6					
Test Procedure		Acceptanc	ce Criteria		Sigr	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 resistance 0945:2002 activated	After this test the lifebuoy se unduly affected by oil and sho such as shrinking, cracking, s of mechanical qualities. The lifebuoy self-igniting light s	ould show no welling, disso	Results:PASS:FAIL:Comments/Observations				
2.1.2.18 Fire rest			Regulation	1.5; MSC.81(70) 1/ 10	1.5; MSC.81(70) 1/ 10.4, 10.4.8			
Test Procedure		Acceptanc	ce Criteria	Significant Test Data				
One lifebuoy self-igniting ligh passed the visual inspection subjected to a fire test. A test than 30 cm x 35 cm x 6 cm placed in an essentially draug Water should be put in the b test pan to a depth of at least 1 by enough petrol to make a m depth of not less than 4 cm should then be ignited and allo freely for at least 30 s. T self- igniting light should then through the flames, facing the lifebuoy self-igniting light not 25 cm above the top edge of so that the duration of expo flames is at least 2 s.	a should be pan not less n should be ht-free area. ottom of the cm followed inimum total . The petrol owed to burn The lifebuoy n be moved em, with the cmore than the test pan	The lifebuoy self-igniting light continue melting after being to period of not less than 2 s and flames. The lifebuoy self-igniting light s	otally envelop I after being r	bed in a fire for a emoved from the	<u>Results:</u> PASS: Comments/Observa	FAIL: tions		

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 of Approval	
Place	
Name Surveyor printed	
Signature	
Approving Organization	

Lifebuoy self-activat smoke signals	ing	Manufacturer Model: Lot/Serial Nu	: mber:		Date: Surveyor: Organization:	Time:				
2.1.3.1 Submitted drawings, reports and documents										
	Submitted drawings and documents									
Drawing No.	Revis date	sion No. &		Title of drawing						

Submitted reports and documents								
Report/Document No.	Revision No. & date	Title of report / document						
		Maintenance Manual -						
		Operations Manual -						

Lifebuoy self-activating smoke signals	Manufacturer: Model: Lot/Serial Number:	Surveyor:				
2.1.3.1.1 Quality assuran	ce	Regulation	ons: - 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 appliant 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- ired 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.				
			ssurance System acceptable: Yes/No s/Observations			

Lifebuoy self-activating smoke signals	Model:	er:	Surveyor:							
2.1.3.1.2 Visual inspec	tion		Regulations: LSA Code I/1.2; MSC.81(70) 1/1.9 and 4.5							
Test Procedure	Э	Acceptan	ce Criteria			Significant Test Data				
Visual examination		Lifebuoy Self-Activating Smok	e Signal sho	uld: -						
Approval markings		be clearly marked with appro Administration which approve expiry and operational restr indelible;	d it, date of	Passed	Failed					
Operating instructions.		be provided with brief instr illustrating the use of the lifebu printed on the casing also the	oy self-activa	Passed	Failed					
Outer casing.		not depend on adhesive tape water-resistant properties	es or plastic	Passed						
Ignition System.		be fitted with an integral mean	is of ignition;	Passed	Failed					
Fitted with light		if fitted with lights be test requirements of Lifebuoy Self-				Failed				
Acceptable life		The administration should determine the period of acceptability of the unit which are subject to deterioration with age.			Comments/Observations					

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 Informat	ion	Din	nensions		Weight					
Construction Material:		Dimensions:								
Casing:		Length of Casing:			Design Weight:					
Top cover (If applicable):		Maximum Diameter	of Casing:		Weight as Tested:					
Bottom Cover (If applicable	»):	Minimum Diameter	of Casing _		Weight of Smoke Material					
Method of Ignition					Comments/Observations					
Operational Safety Delay (i	f Applicable)									
Number of lights (if Applica	ble)									
Type of lens dome										
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	A	A	A	А	А	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	E	Е		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)	F	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:	er: umber:	Date: Surveyor: Organization:					
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				Significant	Test Data	
Nine self-activating smoke sig be alternately subjected to temperatures of -30°C and +0 alternating cycles need immediately after each oth following procedure, repeated	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.	Passed	Failed	
10 cycles, is acceptable:					3.	Passed	Failed	
 an 8 h exposure at temperature of +65°C to b in one day; and 					4.	Passed	Failed	
					5.	Passed	Failed	
 the specimens removed from chamber that same date exposed under ordinal 	y and left				6.	Passed	Failed	
conditions at a temperatur					7.	Passed	Failed	
3°C until the next day;					8.	Passed	Failed	
3. an 8 h exposure at a temperature -30°C to be co					9.	Passed	Failed	
next day; and	·				Comme	nts/Observations		
 the specimen removed from chamber that same date exposed under ordin conditions at a temperatur 3°C until the next day. 	ly and left lary room				Passed	Failed		

Lifebuoy self-activating smoke signals	Manufacture Model: Lot/Serial N	er:	Date: Surveyor: Organization:	Tin	ne:		
2.1.3.3 Low temperature	e conditionin	g test	test Regulations: LSA Code I/1.2.2; MSC.81(70) 1/1.9.2				
Test Procedure		Acceptance	ce Criteria			Significant Test D	ata
After at least ten complete		The 3 specimens should function effectively.		Specimen Numb	per	•	
cycles the first three smoke si be subjected to a temperature		Each specimen should show no sign of damage such as			1	2	3
at least 48 h, then taken from temperature be activated and	this stowage l operated in	shrinking, cracking, swelling mechanical properties afte	, dissolutio	on or change of	Condition after 0	Conditioning (Pass	s/Fail)
seawater at a temperature of function effectively at that tem		conditioning.			Smoke emission time (min/sec)		
,	•	The signal should not ignite explosively or in a manner dangerous to persons close by, nor emit any flame during the entire smoke emission time of at least 15 min. 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 emission	<u>n quality (Pass/Fai</u>	I)
					Smoke colour (F	Pass/Fail)	T
					Smoke emissions during submergence (Pass/Fail)		
		*Special Publication 440, National Bureau of Standards,					
		Washington, DC 20402, USA.			Comments/Observations		
		After the smoke signals have been emitting smoke for 7 minutes, the smoke-emitting ends of the smoke signals should be immersed to a depth of 25 mm for 10 s. On being released the smoke signals should continue to emit a steady quantity of smoke of a highly visible colour at a uniform rate for a period of not less than 15 minutes when floating in calm water.		Passed	Failed		

Lifebuoy self-activating smoke signals	Model:	er: umber:		Date: Surveyor: Organization:	Time:			
2.1.3.4 High temperatur	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 3 specimens should funct	ion effective	ly.	Specimen Numb	per		
cycles, the next three smoke si be subjected to a temperature		Each specimen should show	no sign of	damage such as	4	5	6	
at least 48 h, then taken from	this stowage	shrinking, cracking, swelling	, dissolutio	n or change of	Condition after C	Conditioning (Pass	/Fail)	
temperature be activated and seawater at a temperature of		mechanical properties after conditioning.	er complet	ing the +65°C				
function effectively at that tem		conditioning.		Smoke emission time (min/sec)				
		The smoke signal should not ignite explosively or in a						
		manner dangerous to persons close by nor emit any flame			Smoke emission	quality (Pass/Fail)	
		during the entire smoke emission time.						
		After the smoke signals have been emitting smoke for			Smoke colour (F	ass/Fail)		
		7 minutes, the smoke-emitting should be immersed to a dept						
		released the smoke signals sh			Smoke emission	during submerge	nce (Pass/Fail)	
		quantity of smoke of a highly						
		for a period of not less than 15 water.	minutes who	en floating in caim	Comments/Obse	ervations		
		The colour of the smoke sho						
		sections 34, 48, 49 or 50 of the Language and Dictionary of N		Colour: Universal				
					Passed	Failed		
	*Special Publication 440, National Bureau of Standards, Washington, DC 20402, USA.							

Lifebuoy self-activating smoke signals	Model:	mber: Organization: _			Time:			
2.1.3.5 Ambient Tempe	rature Condit	tioning & Drop Test	ning & Drop Test Regulations: LSA Code I/1.2.2 & II/2.1.1.6; MSC.81(70) 1/1.9.3					
Test Procedure		Acceptan	ce Criteria			Significant Test Da	ata	
After at least ten complete		The 3 specimens should function effectively for a period of at least 15 min. Each specimen should show no sign of damage such as			Specimen No.			
cycles, the last three smoke s from ordinary room cond					7	8	9	
attached by a line to a lifebu	loy having a				Condition after	Conditioning (Pass	/Fail)	
mass of not more than 4 kg sho the drop test into water p		shrinking, cracking, swelling						
MSC.81(70) 1/1.3. The life		mechanical properties after completing the ordinary room conditions at a temperature of 20°C ± 3°C conditioning.			Drop height (metre)			
have both a smoke signal ar								
light attached in the manner re by the manufacturers and be o		The smoke signal should not ignite explosively or in a manner dangerous to persons close by nor emit any flame during the entire smoke emission time.			Smoke emissio	n time (min/sec)		
a quick-release fitting. The sr	noke signals							
should not be damaged function for a period of at least					Smoke emissio	n quality (Pass/Fail)	
		The smoke signal should not b	e damaged	after the drop test.				
A lifebuoy and the smoke sign dropped each into the water fro					Smoke colour (Pass/Fail)			
at which they are intended to b		The colour of the smoke sho			Smoke signal d	amaged after drop	test (Pass/Fail)	
ships in their lightest seagoing		sections 34, 48, 49 or 50 of the Language and Dictionary of N		Colour: Universal				
30 m, whichever is the great suffering damage	ater, without				Comments/Obs	ervations		
		*Special Publication 440, Na		au of Standards,				
	ne lifebuoy and smoke signals should be Washington, DC 20402, USA.							
for housing the signals.								
					Passed	Failed		

Lifebuoy self-activating smoke signals		er: umber:		Surveyor:	Tin			
2.1.3.6 Humidity condit	ioning		Regulations: LSA Code I/1.2.2 & II/2.1.3; MSC.81(70) 1/4.2.4, 1.9.4					
Test Procedure		Acceptanc	ce Criteria			Significant Test D	ata	
Three specimens of smoke si		The 3 specimens should function effectively.		Specimen No.				
be subjected to a temperatu and 90% relative humidity for		Each specimen should show	Each specimen should show no sign of damage such as		10	11	12	
followed by ten days at 20°0		shrinking, cracking, swelling,	dissolutior	or change of	Condition after C	Conditioning (Pass	/Fail)	
65% relative humidity.		mechanical properties after co +65°C and 90% relative humid						
After the humidity test the		by ten days at 20°C to 25°C at 65% relative humidity		Smoke emission time (min/sec)				
should be subjected to the fun ambient temperature.	nction test at	conditioning.						
		The smoke signal should not ignite explosively or in a			Smoke emission	quality (Continuo	ous/Intermittent)	
		manner dangerous to persons close by nor emit any flame during the entire smoke emission time.		Smoke emission	Smoke emission colour: (Passed/Failed)			
		Each specimen should emit smoke of a highly visible colour at a uniform rate for a period of not less than 15 minutes when floating in calm water.						
					Comments/Observations			
		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.* *Special Publication 440, National Bureau of Standards, Washington, DC 20402, USA.		PassedFailed				

Lifebuoy self-activating smoke signals	Manufacture Model: Lot/Serial Nu	lel: Surve			Time:			
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		Acceptar	ce Criteria			Significant Test Da	ata	
Three specimens of smoke s		The three specimens should show no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical properties.					-	
be immersed horizontally for 1 m of water.	24 h under				13	14	15	
					Condition after 0	Conditioning (Pass	/Fail)	
After this test the specimen subjected to the function test		The signals should establish the without injury to the operator, of						
temperature.	at ambiont	during firing or burning.	Smoke emission	n time (min/sec)	1			
		The specimen signal should	not ignite	explosively or in a			1	
		manner dangerous to person	nal should not ignite explosively or in a s to persons close by, nor 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					<u> </u>	
		of not less than 15 minutes w			Smoke emissior	n colour: Passed/F I	ailed	
							<u> </u>	
		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.*						
		*Special Publication 440, N Washington, DC 20402, USA		eau of Standards,				
					Passed	Failed		

Lifebuoy self-activating smoke signals	Manufacture Model: Lot/Serial N	umber: Surveyor: Organization:		Time:			
2.1.3.7.2 10 cm immersio	n ready-to-fir	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.	ng, dissolut	ion or change of	16	17	18
					Condition after 0	Conditioning (Pass	/Fail)
The three signals should be activated at The signals should establish that it can be operated ambient temperature in accordance with effectively without injury to the operator, or any person in							
the manufacturer's operating in		close proximity, during firing o	Smoke emission time (min/sec)				
	The specimen signal should not ignite explosively or in a manner dangerous to persons close by, nor emit any flame during the entire smoke emission time. They should emit			Smoke emission quality (Continuous/Intermittent)			
		smoke of a highly visible colour at a uniform rate for a period			Smoke emissior	n colour: Passed/F	ailed
		of not less than 15 minutes wh	ien floating i	n calm water.			
		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			nber: Organization:			ne:		
2.1.3.7.3 Salt spray cond	itioning		Regulatio	ns: LSA Code I/1.2	2.2 & II/2.1.3; MS	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, swell mechanical properties.	as shrinking, cracking, swelling, dissolution or change of		19	20	21	
+35±3°C for at least 100 h.					Condition after 0	Conditioning (Pass	s/Fail)	
The three signals should be	activated at	The signals should establis						
ambient temperature in acco	ordance with		effectively without injury to the operator, or any person in close proximity, during firing or burning.			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 close by, nor emit any flame during the entire smoke emission time. They should emit smoke of a highly visible colour at a uniform rate for a period of not less than 15 minutes when floating in calm water.						
					Smoke emission	n quality (Continuo I	us/Intermittent)	
							<u> </u>	
					Smoke emission	n colour: Passed/F I	ailed	
		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,				
						Failed		

Lifebuoy self-activating smoke signals	Manufacture Model: Lot/Serial N	Manufacturer: Model: Lot/Serial Number:		Date: Surveyor: Organization:	Tir	ne:		
2.1.3.8 Heptane test			Regulation	gulations: LSA Code I/1.2.2 & II/2.1.3.1; MSC.81(70) 1/4.8.2, 1.9.4				
Test Procedure		Acceptanc	e Criteria			Significant Test Da	ata	
Three smoke signals should water covered by 2 mm layer		The three specimens should not ignite the heptane.		Specimen No				
floating on a layer of water.		The specimen signal should	not ignite e	xplosively or in a	22	23	24	
signal should be allowed completely.	d to burn	manner dangerous to persons close by, nor emit any flame during the entire smoke emission time.		Heptane ignitior	(Passed/Failed)			
		uniform rate for a period of not less than 15 minutes when		Smoke emissior	n time (min/sec)			
				15 minutes when	Smoko omissior	n quality (Continuo		
		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.*		SITIONE ETTISSIO		us/internittent/		
				Smoke emissior	n colour: (Passed/F	ailed)		
		*Special Publication 440, Na Washington, DC 20402, USA.		au of Standards,	Comments/Observations			
					Passed	Failed		

Lifebuoy self-activating Model: smoke signals Lot/Serial Num		ber:		Date: Surveyor: Organization:	Time:
2.1.3.9 Laboratory smo	ke obscuration t	test	Regulation	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 19 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 phy the total emitted light from the then the smoke density is zero means that no smoke is pass tunnel. The smoke density is 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	A by laboratory 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 percent 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 5 hue, chroma, and lightness secured adjacent to one ar from reddish orange to yel 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 shouk son, in day ing the ran comparison l consist of a overing the ran 8.75 R 6 YR MAX) in 5. The colour tother, in orce lowish orang of the chart 100 mm in e progressio 14; 3.75 YR specifies a r	d be evaluated by ight, to a colour ge of acceptable chart should have a series of at least ange from reddish 14) to yellowish a gradual steps of r chips should be der of progression ge, and extend on . 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 smoke signals	Model:	Surveyor:		Surveyor:	Time:			
2.1.3.10 Wave test			Regulatio	gulations: LSA Code I/1.2.2 & II/2.1.3; MSC.81(70) 1/1.9.5				
Test Procedure		Acceptanc	ce Criteria		Significant Test Data			
Test Procedure A smoke signal should be tes at least 300 mm high.	ted in waves	Acceptance The specimen should funct swamped. The smoke signal should ne manner dangerous to persons during the entire smoke emiss It should emit smoke of a hig rate for a period of not less that to waves of at least 300 mm h The colour of the orange sm means of visual compariso comparison chart containing th colours. The colour comparis or matte finish, and consist of 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	tion effective ot ignite ex s close by, n ion time. hly visible c an 15 minute igh. noke should n, in daylig the range of a son chart sh a series of a range from) to yellowist al steps of hould be se ession from	plosively or in a or emit any flame blour at a uniform as when subjected be evaluated by ght, to a colour acceptable orange ould have a gloss t least five orange reddish orange n orange (Munsell hue, chroma, and cured adjacent to reddish orange to				
		of the chart. Each colour chip should be at least 50 mm x 100 mm in size. Note: A typical acceptable progression would be 8.75 R 6/14; 10 R 6/14; 1.25 YR 6/14; 3.75 YR MAX; 5 YR MAX. Note: ASTM D1535-97 specifies a method to convert between Munsell notation and CIE coordinates.			PassedFailed			

Lifebuoy self-activating smoke signals	Model:	umber: Organizatio			Time:
2.1.3.11 Attachment fitti	ng strength to	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		Acceptance 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.			
					Passed Failed

Lifebuoy self-activating smoke signals	Manufacture Model: Lot/Serial N	er: umber:	Date: Time: Surveyor: Organization:		
2.1.3.12 Safety inspectio	n	Regulations: LSA Code I/1.2			2.2, MSC.81(70) 1/ 1.9.4/ 4.5
Test Procedure		Acceptance	ce Criteria		Significant Test Data
It should be established inspection that the self-active signal:					
 is indelibly marked with clean instructions on how it should and mounted and that the can be identified by day or n 	be operated danger end	marked on the smoke signal.		Markings and identification of signal: Passed Failed	
 does not depend on adhesive tapes or plastic envelopes for its water resistant 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	
. can be indelibly marked with means of determining its age. Date of manufacturing and date on the outside.			te 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	
Name Surveyor printed	
Signature	
Approving Organization	

Inherently buoyant lifejackets 2.2.1.1 Submitted c	Lot/Serial N	r: umber: I documents	Organization:			
	Submitted drawings and documents					
Drawing No.	Revision No. & date					
		Submitted reports and docum	nents		Status	
Report/Document No.	Revision No. & date	Title	e of report / document			
		Maintenance Manual -				
		Operations Manual -				

Inherently buoyant lifejackets							
2.2.1.2 Quality assurance		Regulation	s: - MSC.81(70) 2/1.1, 1.2	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.			Quality Assurance Standard Used:				
			Quality Assurance Procedure:				
to ensure that life-saving appli as the prototype life-saving app	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 Manual:				
		Description of System.					
		Quality Assurance System acceptable					
		YesNo					
		Comments/Observations					

Inherently buoyant Model:			Surveyor:		e:	
2.2.′	1.3 Visual inspection		Regulations: LSA Code I/1.2.2.1, 1.2.2.6, 1.2.2.7, 1.2.2.9, 1.2.3; LSA C 2.2.1.5.5, 2.2.1.10, 2.2.1.13, 2.2.1.16 & 2.2.1.17		A Code II/ 2.2.1.14, 2.2.1.5.3 &	
	Test Procedure		Acceptance Criteria	a	Sign	nificant Test Data
.1	Approval markings Retro-reflective tape	be cle Admir operat the ap be fitte with a resolu the ar	ntly buoyant lifejackets should: arly marked with approval inforr istration which approved it, date ional restrictions, and (if an infai propriate symbol according to re ed with approved patches of retr a total area of at least 400 tion A.658(16). In the case of a rangement should be complied v	of manufacturer any nt or child lifejacket) solution A.760(18). ro-reflective material cm ² according to reversible lifejacket, with no matter which	Passed	
.3	Lifejacket light	as hig	e lifejacket is put on. Such mater h on the lifejacket as possible. provision to be fitted with a light	iai snouid de placed	Passed	Failed
.4	Donning and comfort	or is donne	constructed that it is capable of b clearly capable of being worn d incorrectly, it is not injurious to e comfortable to wear;	in one way and, if	Passed	_ Failed
.5	Whistle	be fitte lifejac	ed with a whistle firmly secured ket.	by a lanyard to the	Passed	_ Failed
.6	Colour of lifejacket		nternational or vivid reddish orar visible colour.	nge or a comparably	Passed	Failed

.7 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 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.		Failed

Inherently buoyant Manufacturer: Inherently buoyant Model: fejackets Lot/Serial Number:			Date: Surveyor: Organization:		me:	
2.2.1.4 General data and specifications			Regulation	s: LSA Code / M	SC.81(70)	
Construction Material:		Additional equipment	:		Donning instruc	tions:
Fabric produced by:		Retro reflective materia Type: Whistle: -			□ YES	□NO
Buoyant material produced by:		Туре:				
Туре:		Light (if fitted): Type:		□NO		
					Passed	Failed

Inherently buoyant lifejackets	Model:	Date: Time: Surveyor: Organization:				
2.2.1.5 Temperature cyclin	ng test		Regulation	s: LSA Code I/1.	2.2.2; MSC.81(70) 1/2.1	
Test Procedu	ire	Accept	ance Criteria		Significant 7	Test Data
A lifejacket should be subjected to a temperature cycling test of surrounding temperatures of -30°C and +65°C. These alternating cycles need not follow immediately after each other and the following procedure, repeated for a total of 10 cycles, is acceptable:		damage such as shrinking, cracking, swelling, dissolution or changes of mechanical qualities.		(See following page for test Passed	data) Failed	
 an 8 h exposure at a minin +65°C to be completed in 						
2. the specimens removed chamber that same day under ordinary room temperature of 20°C ± 3°C	and left exposed conditions at a				Comments/Observations	
3. an 8 h exposure at a max of -30°C to be completed t						
 the specimen removed from that same day and let ordinary room conditions a 20°C ± 3°C until the next of 	ft exposed under at a temperature of					
The lifejacket should then be examined.	externally					

2.2.1.5	Temperature cycling test – Test of	lata Regu	lations: LSA Code I/1.2.2.2; MSC.81(7	itions: LSA Code I/1.2.2.2; MSC.81(70) 1/2.1			
	НОТ	CYCLE	COLL	COLD CYCLE			
Cycle 1	Date In: Time In: Temperature:°C	Date Out: Time Out: Duration: hours	_ Date In: Time In: Temperature:°C	Date Out:			
Cycle 2	Date In: Time In: Temperature:°C	Date Out: Time Out: Duration: hours	_ Date In: Time In: Temperature:°C	Date Out:			
Cycle 3	Date In: Time In: Temperature:°C	Date Out: Time Out: Duration: hours	_ Date In: Time In: Temperature:°C	Date Out: Time Out: Duration: hours			
Cycle 4	Date In: Time In: Temperature:°C	Date Out: Time Out: Duration: hours	_ Date In: Time In: Temperature:°C	Date Out:			
Cycle 5	Date In: Time In: Temperature:°C	Date Out: Time Out: Duration: hours	_ Date In: Time In: Temperature:°C	Date Out:			
Cycle 6	Date In: Time In: Temperature:°C	Date Out: Time Out: Duration: hours	_ Date In: Time In: Temperature:°C	Date Out:			
Cycle 7	Date In: Time In: Temperature:°C	Date Out: Time Out: Duration: hours	_ Date In: Time In:°C	Date Out: Time Out: Duration: hours			
Cycle 8	Date In: Time In: Temperature:°C	Date Out: Time Out: Duration: hours	_ Date In: Time In: Temperature:°C	Date Out: Time Out: Duration: hours			
Cycle 9	Date In: Time In: Temperature:°C	Date Out: Time Out: Duration: hours	_ Date In: Time In: Temperature:°C	Date Out: Time Out: Duration: hours			
Cycle 10	Date In: Time In: Temperature:°C	Date Out: Time Out: Duration: hours	_ Date In: Time In: Temperature:°C	Date Out:			

Inherently buoyant lifejackets				Surveyor:			
2.2.1.6 Buoyancy test			Regulation	s: LSA Code II	/2.2.1.11; MSC.8	31(70) 1/2.2	
Test Proced	ure	Accepta	ance Criteria			Significant Test	Data
The two lifejackets subjecter cycling and the hot and cold in then be used for the buoyand The buoyancy of the two lifer measured before and after submersion to just below the water. The test to be repeater as necessary to perform the te compartment in the uninflated	figure for the set should be for 24 h complete for 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 Fai	%difference % led

Inherently buoyant lifejackets	oyant Manufacturer: Model: Lot/Serial Number:		· · · · · · · · · · · · · · · · · · ·	Surveyor:		e:	
2.2.1.7 Fire test	4		Regulations	s: LSA Code II/2	.2.1.1; MSC.81(70) 1	/1.5, 2.3	
Test Procedu	re	Accept	ance Criteria		Sigi	nificant Test 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.		than 6s or continue melting after being removed from the flames.		Passed			
2.2.1.8 Oil resistance test		Regulations: LSA Code II/1.			.2.2; MSC.81(70) 1/1	2.2; MSC.81(70) 1/1.4	
Test Procedu	re	Acceptance Criteria		Significant Test Data			
The lifejacket should be immersed horizontally for a period of 24 h under 100 mm head of diesel oil at normal room temperature.		nrinking, crac	king, swelling,	Passed			
Inherently buoyant lifejackets	Manufacturer: Model: Lot/Serial Number:		Surveyor:				
--	---	--	---				
2.2.1.9 Tests of component	s 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 buoyancy materials, used in construction of the lifeja including the cover, tapes, see and closures should be tester establish that they are: .1 rot-proof, .2 colour-fast and .3 resistant to deterioration to exposure to sunlight and that they are not unduly affected by .4 seawater, .5 oil or .6 fungal attack	acket 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)	Tensile stren (new materia Tear strengt .1 Tensi Metho (N/25 (% re .2 Resis Cycle .3 Tensi Weat (N/25 (% re Acceptable: .4 Tensi Metho (N/25	Cover: Tapes: Seams: Additional equipment: ngth as received all (N/25 mm width) :				

.5 Tensile strength after exposure to oil Type of oil: Duration: (N/25 mm width)
.6 Tensile strength after fungal attach. Type of oil: Duration: (N/25 mm width)
Acceptable: 4) □ Yes □ No 5) □ Yes □ No 6) □ Yes □ No

Inherently buoyant lifejackets	Manufacturer: Model: Lot/Serial Number:			Date: Surveyor: Organization: _	Time:			
2.2.1.10 Strength tests - Bo	dy or lifting loop strength	tests	Regulations	s: LSA Code I/1.	2.2; MSC.81(70) 1/	2.5.1		
Test Proc	edure	Ac	ceptance Crit	eria	S	ignificant Test [Data	
The lifejacket should be imme of 2 min. It should then be refi- closed in the same manner person. A force of not less that case of a child or infant-size lift for 30 min to the part of the lifej body of the wearer (see figur lifting loop of the lifejacket.	moved from the water and as when it is worn by a an 3,200 N (2,400 N in the fejacket) should be applied jacket that secures it to the e 1) and separately to the e 1) and separately to the	result of this te	st. uld be repe	damaged as a ated for each	Force applied: _ Time: _ Slippage: Closure(s) tested:	acket lifting loop	test arrangement if	

Inherently buoyant lifejackets	nt Manufacturer:					Date: Time: Surveyor:						
2.2.1.11 Strength tests - Sho	oulder lift test					Regu	ulation	s: LS/	A Cod	e I/1.2.	2; MSC	2.81(70) 1/2.5.2
Test Procedure	•				Acc	eptanc	e Crite	eria				Significant Test Data
Vest-type lifejacket Yoke of	hould then be losed on a form ame manner as A force of not case of a child d be applied for d the shoulder gure 3).	Size Adult Child Infant	A 610 508 305	B 114 63,5	C 76,2 38,1	or Beyent reference D 127 102 63,5 Densio	E 381 279 191 ns in n	F 432 330 203	orm 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:	r:		Date: Surveyor: Organization:					
2.2.1.12 Tests for lifejack temperature cycling	tet buoyancy mat	erial – Stability under	Regula	ations:	LSA Code I/1.2.2; MSC.8	1(70) 1/2.6	(2.6.1-2.	.6.4)	
Test Procedur	e	Acceptance Crite	Sig	nificant Test	Data				
The following tests should be of specimens of each lifejacket to A further four specimens of buoyancy material should be tensile strength test in 2.2.1.14 The specimens should be at le 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 mat achieve the total thickness lifejacket, the specimens so thinnest material used. ← Six specimens should temperature cycling as prescri	carried out on eight buoyancy material. of each lifejacket- e prepared for the 4. ast 300mm square ss as used in the labelled and the prior to the test. In ifejacket should be end of these tests. erials are used to desired for the hould be of the	The specimens should not s of internal and external char structure or of mechanical q	how any ige 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. 6 Passed Specimen No.2 Specimen No.2 Specimen No.2 Specimen No.3	Length	Width		
↑ The dimensions of the s kapok) should be recorded at cycle. The specimens sho examined.	the end of the last				Specimen No.4 Specimen No.5 Specimen No.6 Mechanical qualities		and p	procedure	used:

2.2.1.12 Tests for lifejacket buoyancy mate temperature cycling	erial – Stability under F	Regulations:	lations: LSA Code I/1.2.2; MSC.81(70) 1/2.6 (2.6.1-2.6.4)				
Test Procedure	Acceptance Criteria	a	Signific	ant 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. 	Acceptance Criteria	now any sign	Signific ↑ Passed → Passed ↓ Passed Comments/Observations (See following page for test of the second seco	Failed Failed Failed			

Inherenti lifejacket	ly buoyant ts	Model:	nber:		Date: Surveyor: Organization:							
2.2.1.12	Temperature cy	cling test – Test d	ata	Regula	ations: LSA Code I/1.2							
		НОТ	CYCLE	•	COLD CYCLE							
Cycle 1	Date In: Time In: Temperature:	°C	Date Out: Time Out: Duration:	hours	Date In: Time In: Temperature:	°C	Date Out: Time Out: Duration:	hours				
Cycle 2	Date In: Time In: Temperature:		Date Out: Time Out: Duration:	hours	Date In: Time In: Temperature:		Date Out: Time Out: Duration:	hours				
Cycle 3	Date In: Time In: Temperature:	°C	Date Out: Time Out: Duration:	hours	Date In: Time In: Temperature:	°C	Date Out: Time Out: Duration:	hours				
Cycle 4	Date In: Time In: Temperature:	°C	Date Out: Time Out: Duration:	hours	Date In: Time In: Temperature:	°C	Date Out: Time Out: Duration:	hours				
Cycle 5	Date In: Time In: Temperature:	°C	Date Out: Time Out: Duration:	hours	Date In: Time In: Temperature:	°C	Date Out: Time Out: Duration:	hours				
Cycle 6	Date In: Time In: Temperature:	°C	Date Out: Time Out: Duration:	hours	Date In: Time In: Temperature:	°C	Date Out: Time Out: Duration:	hours				
Cycle 7	Date In: Time In: Temperature:	°C	Time Out: Duration:	hours	Date In: Time In: Temperature:	°C	Date Out: Time Out: Duration:	hours				
Cycle 8	Date In: Time In: Temperature:	°C	Date Out: Time Out: Duration:	hours	Date In: Time In: Temperature:	°C	Date Out: Time Out: Duration:	hours				
Cycle 9	Date In: Time In: Temperature:	°C	Date Out: Time Out: Duration:	hours	Date In: Time In: Temperature:	°C	Date Out: Time Out: Duration:	hours				
Cycle 10	Date In: Time In: Temperature:		Date Out: Time Out: Duration:		Date In: Time In: Temperature:	°C	Date Out: Time Out: Duration:	hours				

Inherently buoyant lifejackets	Manufacturer: Model: Lot/Serial Numb	er:	Date: Surveyor: Organization:					
2.2.1.13 Tests for lifejacket k	ouoyancy material	- Compression and water absorption	Regula	tions: LSA Code I/1.2.2; MSC.81(70) 1/2.6 (2.6.5-2.6.7)				
Test Procedur	e	Acceptance Criteria		Significant T	est Data			
The following tests should be specimens of each type of life material. The tests should b fresh water and the specin immersed for a period of sev	ejacket buoyancy e carried out in nens should be	The specimens should show no sig such as shrinking, cracking, swelling, change of mechanical qualities. The results should state the buoyar	ution or	<u>Test results</u> :	(As supplied s After 1 day		ays %diff.	
1.25 m head of water. The tests should be carried o	ut:	which each specimen exerts when submerged in water after 1 and 7 days immersion.			<u>Test results</u> : (Specimens subjected to temperature cycling)			temperature
.1 on two specimens as si	upplied;	The reduction of buoyancy should not for specimens which have been ex	Specimen No.					
.2 on two specimens window subjected to the temper prescribed in 2.2.1.12;	rature cycling as	diesel oil conditioning and should not exceed 5% for all specimens.			Passed			N %
.3 on two specimens w	hich have been				Passed		Failed _	,
subjected to the tempe prescribed in 2.2.1.12 diesel oil test as prescri	rature cycling as followed by the				<u>Test results</u> :	(Specimens si cycling and		
					Specimen No.	5 <u> </u> N	I	N %
					Passed		Failed _	
					Specimen No.	6N	I	N %
					Passed		Failed _	
					Comments/Obs	servations		

Inherently buoyant lifejackets	Manufacturer: Model: Lot/Serial Number:	Surveyor:
2.2.1.14 Tests for lifejacke	et buoyancy material – Tensile strength test	t Regulations: LSA Code I/1.2.2; MSC.81(70) 1/ 2.6.8
Test Procedure	Acceptance Criteria	Significant Test Data
Four specimens of each life buoyancy material should be to The tensile strength at break material should be measured and after the combined ex described in 2.6.6.3. of MSC.8	standard, ISO 12402-7:2006 F flotation devices – Part 7: Materi components – Safety requirements methods, acceptable to the Organiza	Personal Min. Tensile Strength =140kPa (?) rials and Specimen No 1 Yes No and test Failed ation, the Specimen No 2 Yes No m tensile Specimen No 2 Yes No re, which Failed han 25% Test Results: (Specimens after combined exposure) Reduction in Tensile Strength <25%

Inher lifeja	ently buoyant ckets	Manufacturer: Model: Lot/Serial Number:		Surveyor:	Date: Time: Surveyor: Organization:						
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							
	Tes	st Procedure	Acc	eptance Criteria	Significant Test Data						
ofter the f	n in adverse conditions following features and t	rrect donning by uninitiated persons, , lifejackets should be examined for rested as follows:	performance simple and	necessary for proper e should be few and l provide quick and osure that does not							
	t subjects		require tying								
pers sele	ons who are complete	d out with at least 12 able-bodied by unfamiliar with the lifejacket and heights and weights in table 2.1 and	various size and heavily should be o	kets should readily fit s of adults, both lightly / clad. All lifejackets capable of being worn or clearly in only one							
.1	small test subjects ne	ed not be adults;	way.								
.2		nore than 1/2 of test subjects should at least 1 per height category but eight;									
.3	weight group and one	ould be from the lowest and highest e female should be from the lowest e female should be more than 80 kg									
.4	at least one subject containing a "1"; and	should be selected from each cell									
.5	5 enough additional subjects should be selected from cells containing a "X" to total the required number of test subjects, with no more than one subject per cell. A uniform distribution across weight ranges should be maintained.										

2.2.1.15 Donning Test Regulations: LS							ons: LSA Co	ode II/2.2.1.5; MSC.81(70) 1/2.7.1 to 2.7.4.3					
		Test Pro	cedure			Ac	cceptance Criteria 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	Х	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				
									11				
									12				
									14			I	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.	Total number of aubicates
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)		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	subject should correctly don the lifejacket a 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.		subject should don the lifejacket correctly a period of 1 min.	Pass / Fail		

Inherently buoyant Manufacturer: lifejackets Model: Lot/Serial Number:						Date: Time: Surveyor: Organization:						
2.2.1.15 D	onning Test – Te					gulations: LSA Code II/2.2.1.5; MSC.81(70) 1/2.7.1 to 2.7.4.3						
		Tes	st without inst	ruction		Heavy weather clothing test						
Subject	Donning time (sec) All closures secured? Jump test (P/F (Y/N)) In-	water test (P/F)	Donning Time (sec)	Donning time (sec)					
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
Comments/0	Observations:											

Inherently buoyant lifejackets	Manufacturer: Model: Lot/Serial Number:		Date: Time: Surveyor: Organization:							
2.2.1.16 Water performance	tests- Preparation for water pe	erformance tests			LSA Code II/2.2.1.2.5 & 2.2.1.3 – 2.2.1.4; /2.8 to 2.8.4, Annex 1, MSC.1/Circ.1470					
Test Pr	rocedure	Acceptance	ia	Significant Test Data						
the lifejacket to assist a hi exhausted or unconscious stat does not unduly restrict moved The in-water performance of comparison to the performan reference lifejacket, i.e. Refe specified in appendices 1 to 3 All tests should be carried conditions. Each test for a relevant RTD should be condu These tests should be carried mentioned in paragraph 2.2.1. be used, since the ability to otherwise obtained. The test subjects should wear Each test subject should be tests in 2.2.1.17 and 2.2.1.18 regarding relaxing and exhalin The test subjects should don only the instructions provided taking measurements, the prop	f a lifejacket is evaluated by ice of a suitable size standard erence Test Device (RTD) as out in fresh water under still a candidate lifejacket and the ucted on the same day. out with at least 12 persons as 15. Only good swimmers should b relax in the water is rarely ronly swimming costumes.	The RTD should and calibrated MSC.81(70), an validated act MSC.1/Circ.1470.	be cor accor inex cording	nstructed ding to 1, and	Validat Calibra Test si	ted by: _ ated by: _ ubjects s	ed by:	da da da 2.2.1.15?	ate: te:	

2.2.1.16 Water performance tests- Preparation for water pe	Regulations: MSC.81(70) 1/			II/2.2.1.2.9 Nex 1, MSC.2			-	2.2.1.4;		
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							

	lodel.	facturer: l: erial Number:						Date: Time: Surveyor: Organization:								
2.2.1.17 Water performance tes				Regu	ulatio				.2.1.6.2;							
Test Procedure	Acceptance Criteria							Signifi	icant Te	st Dat	a					
Each test subject should assum a prone, face down position in th	e the mouth of the test	Quiki		CAN	DIDA	TE DE\ TRI	/ICE TI AL	ME (se	c)		REF	EREN	NCE VEST TIME (sec) TRIAL			
water, but with the head lifted u so the mouth is out of the wate The subject's feet should b	subject comes clear of	Subj	#1	#2	#3	#4	#5	#6	AVG *	#1	#2	#3	#4	#5	#6	AV G *
supported, shoulder width apar with the heels just below th	frecorded to the hearest 1/10 of a second, starting from when the subject's feet are released.															
surface of the water. After assuming a starting position		2 3														
After assuming a starting position with the legs straight and arms along the sides, the subject should then be instructed in the following sequence to allow the	conducted a total of six t times, and the highest and lowest times	4														
		5 6														
body to gradually and completed relax into a natural floatin	y should then be conducted	7														
posture: allow the arms an shoulders to relax; allow the leg	d RTD and the highest and s lowest times discarded.	8 9														
to relax; and then the spine an neck, letting the head fall into th	d e	10														
water while breathing ou normally.	turn time for all subjects in	11 12														
During the relaxation phase, th subject should be maintained in		12	Ave	age c	andic	ate tur	n time	(sec):			Av	erage F	RTD tu	ırn time	(sec):	
stable face down position.	plus 1 s.			# of	cand	idate n	o turns	s (NT):				# of	RTD	no turns	s (NT):	
Immediately after the subject ha relaxed, with the face in the wate simulating a state of utte exhaustion, the subject's fee should be released.	r, if any, should not exceed r the number in the RTD.	(* Delet Average # of car	e cand ndidate	idate t no tu	urn tir rns (N	ne <u><</u> A\	/érage l	RTD tui) no turr	rn time R าร (NT) :	RTD +1	s Pas Pa	ssed issed		_ Faile _ Faile	d ed	

Inherently buoyant lifejackets	Manufacturer: Model: Lot/Serial Number:				Date: Surveyor: Organization:						
2.2.1.18 Water performanc					ns: LSA Code II/ 2.2.1.4; MSC.81(70)						
Test Proced	lure	Aco	ceptanc	e Criteria			Pata				
At the conclusion of the rig making any adjustments in	body or lifejacket		Freebo	ard (mm)	Facep	olane (deg)	Torso ang	le (deg)	Light		
position, the following meas made with the subject floating position of static balance	in the relaxed face-up		CLJ	RTD	CLJ	RTD	CLJ	RTD	Visible?		
preceding tests.		1									
		2									
		3									
	4										
		5									
		6									
		7			-						
		8									
		9			-						
		11									
		12									
		Avg							XXXXX		
	CLJ – Candio RTD – Refero										

2.2.1.18 Water performance tests-Static balance	e measurements	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 10º.	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).		e average of all gles should be not erage for the RTD	Average torso angles, all subjects ≥ average for RTD minus 10° Passed Failed
 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. 		hould 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

Inherently buoyant lifejackets	Model:	: mber:		Date: Surveyor: Organization:							
2.2.1.19 Water performance	ce tests – Jum	p and drop tests	Regulations: 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 lifejac subject should jump vertically i feet first, from a height of at le holding the arms over the li- entering the water, the test s relax to simulate a state of utter The freeboard to the mout recorded after the test subject of The test should be repeated from at least 4.5 m. When jumping into the water, the should hold on to the lifejacker entry to avoid possible injury. If the water, the test subject sh simulate a state of utter exha freeboard to the mouth should after the test subject comes to The lifejacket and its attachme examined for any damage. believed likely from any jump or lifejacket should be rejected delayed until test from a lower additional precautions demons risk from the required test is ac	into the water, east 1m while head. Upon subject should er exhaustion. h should be comes to rest. om a height of he test subject t during water Upon entering hould relax to austion. The d be recorded rest. ents should be If injury is r drop test, the I or the test height or with strate that the cceptable.	 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 Jur Average (B) - (A) Did the Yes / N Did the buoyan Did the 4.5 m J Average (B) - (A) Did the buoyan Did the Quertage (B) - (A) Did the buoyan Did the Did the Duoyan	ump ige freeboard, all subjects: mm (A) ige freeboard for RTD (from 2.2.1.18): mm (B) (A)= ≤ 15 mm Pass / Fail ie lifejacket become dislodged or cause harm to the test subject?: No ie lifejacket have damage that would affect its in-water performance or ance?: Yes / No ie lifejacket have damage to its attachments?: Yes / No jump ige freeboard, all subjects: mm (A) ige freeboard for RTD (from 2.2.1.18) : mm (B) (A)= ≤ 15 mm Pass / Fail ie lifejacket become dislodged or cause harm to the test subject?: Yes /							
NOTE: JUMP TESTS <u>SHOU</u> REPEATED IN THE RTD.	<u>ILD NOT</u> BE			e lifejacket have damage to its attachments?: Yes / No nents/Observations							

Inherently lifejackets	y buoyant s	Manufacturer Model: Lot/Serial Nur	nber:	Date: Surveyor: Organization:	Time:						
2.2.1.19	Water performance				egulations: 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	p)									
Subj	Subject surfaced faceup? (Yes/No)	Freeboard (mm)	Lifejacket became dislodged (Yes/No)	Subject wa harmed? (Yes/No)	Damage to Comments/ Obs lifejacket or attachments (Yes/No)	servations					
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											

Inherently lifejackets	buoyant	Manufacturer: _ Model: Lot/Serial Numb	per:		Surveyor:	Time:	
2.2.1.19	Water performan	ce tests – Jump a	and drop tests (Co	ontinued)	Regulatio	ons: LSA Coo	de 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)	lifeja attao	nage to acket or chments s/No)	Comments/ Observations
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							

Inherently buoyant lifejackets	Model:	urer: Number:		Surveyo	r:							
2.2.1.20 Water performanc	e tests – Sta	ability test	Regulations: LSA Code II/2.2.1.4; MSC.81(70) 1/2.8.10									
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: "place your elbows against your sides,	ance in the e instructed	The candidate lifejacket should not roll any subject face down in the water.			the subj down?				the subj ble face (Ye			
'place your elbows against /our hands on your stomach		ides, (a) + (b) = 0		Can	didate	R	TD	Can	didate	F	RTD	
lifejacket if possible, and knees up as close to you possible." The subject should be rotate around the longitudinal axis by grasping the subject's sl upper areas of the lifejacket subject attains a 55 ± 5 degr subject should then be rele subject should return to a sta position.	bring your r chest as d clockwise of the torso houlders or so that the ee list. The eased. 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 (f) \leq (h)	Subj 1 2 3 4 5 6 7	CW	CCW					CW	CCW	
The test should then be con the subject rotated counter-c The entire test should then b	Id then be conducted with ated counter-clockwise.	8 9 10										
with the test subject wearing	the RTD.		11									
		12										
			Total "No"	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	

Inherently buoyant lifejackets	Model:	er:		Surveyo	r:		Time:		
2.2.1.21 Water performance test	tests -swim	ming and water emergence	Regulations				31(70) 1/2.8.11		
Test Procedure		Acceptance C		Significant Test 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 wearing the lifejacket.	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) ≥ 2/3 (a)	the lifejacke	t should	Liferat	ft or Rigid Pla		n successfully board liferaft	
					1			(b) (a)	
					2			Passed / Failed	
					4				
					5 6				
					7				
					8			-	
					9 10				
					11				
					12				
				Total Comm	(a) ents/Observ	(b) ations			

Inherently buoyant lifejackets	Manufactur Model: Lot/Serial N									[5 (Date: Surve Drgan	yor: iizatio	on:	Time:						
2.2.1.22 Infant and children'	s lifejacket	- Test sı	ıbjec	ts se	electi	on	I	Regu	latio	ns:	LSA	Code	e II/2.2	/2.2.1.8; MSC.81(70) 1/2.9 – 2.9.1						
Test Procedure		Acceptance Criteria									Significant Test Data									
As far as possible, similar tests (to the adult tests) should be applied for approval of lifejackets suitable for infants and children.		Heigh	Та				Weigh	t Rang	ge (kg))	bjects	s		Size: Infant / Child						
		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 carried out with at least 5 able-bodied persons.		90- 118		х	1									2						
All test subjects should be		102- 130				1	х							3						
according to table 2.2 or tab follows:		130 112- 135					х	1						4 5						
.1 One subject should be sel each cell containing a "1".	lected per	122- 150							1	1	x			6						
C		145- 165									х	1	1	7						
.2 Remaining subjects sh selected from cells conta														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														*Manikir	n descrip	tion:				

2.2.1.22 Infant and children's lifejacket - Test subjects selection				tions: LSA	Code II/2.	2.1.8; MSC.81(70) 1/2.9 – 2.9.1
Test Procedure		Acceptan	ce Criteri	а		Significant Test Data
.5 A manikin or manikins may be substituted for test subjects if the	Table 2.3 -	Selection of	of Infant T	fest Subjec		
manikin or manikins have been	Height range		Weight F	Range (kg)		
demonstrated to provide representative results compared to	(cm)	Less the	an 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:				Time:							
	dren's lifejacket – ance tests – Righting test		Regulations: LSA Code II/ 2.2.1.8; MSC.81(70)1/ 2.9.2-2.9.3, Annex 2, Annex 3									
Test Proc	cedure	A	cceptance Crit	teria	Significant test data							
This portion of the test is inten of the lifejacket to assist a he exhausted or unconscious si lifejacket does not unduly rest	elpless person or one in an tate and to show that the	calibrated	according	constructed and to resolution applicable to the	RTD Size: Infant / Child RTD Constructed by:	date:						
The in-water performance of comparison to the perform standard reference lifejacket, (RTD) as specified in appendi	ance of a suitable size i.e. Reference Test Device				Validated by:							
All tests should be carried ou conditions. Each test for a c relevant RTD should be condu	andidate lifejacket and the											
The tests may be modified for 12 years of age who are not o to ensure their safety and coo	comfortable in water, so as											
Prior to taking measurement and fastening of the RTD o checked and corrected as neo	on the subject should be											
After entering the water, care that there is no significant an trapped in the lifejacket or swi	nount of air unintentionally											

initerentity subjunt	Manufacturer: Model: Lot/Serial Number:					Date: Surveyor: Organization:										
	lifejacket – Water performa		ce 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													
Each test subject should assum a prone, face down position in th	The period of time until the mouth of the test	Subj		CAN	DIDA	TE DEN TRI		ME (se	c)		RE	FERE		EST TII IAL	/IE (sec)
so the mouth is out of the water. The subject's feet should be supported, shoulder width apart,	subject comes clear of	Subj	#1	#2	#3	#4	#5	#6	AVG *	#1	#2	#3	#4	#5	#6	AVG *
	recorded to the hearest	1														
with the heels just below the		2														
surface of the water.	subject's feet are	3														<u> </u>
After assuming a starting positio		4														
with the legs straight and arm along the sides, the subject		5														ļ
should then be instructed in the		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	times in the RTD and the															
to relax; and then the spine an neck, letting the head fall into the																
water while breathing ou																
normally.	Turning time: the		Aver	age ca	andid	ate tur	n time	(sec):			Ave	erage F	RTD tu	rn time	(sec):	
During the relaxation phase, the subject should be maintained in a	subjects in the candidate			# of	candi	date n	o turns	(NT):				# of	RTD n	o turns	(NT):	
stable face down position.						est valu	,	-								
		Averag	e cano	lidate	turn tir	ne <u><</u> A	verage	RTD tu	Irn time	RTD +	1s Pa	assed _		Fai	led	
					rns (N	T): <u><</u> #	of RTE) no tur	ms (NT):		Pa	assed_		Fai	led	

2.2.1.23 Infant and children's lit 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.	The number of "no- turns", if any, should not exceed the number in the RTD.	

Inherently buoyant lifejackets	Manufacturer: Model: Lot/Serial Number:		· · · · · ·		Surveyor: _	n:		ne:			
2.2.1.24 Infant and children' – Static balance		formance test	mance 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 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		ard (mm)	Facepla	ne (deg)	Torso an	gle (deg)	Light		
subject floating in the relaxed f	Ving measurements should be made with the oct floating in the relaxed face-up position of static ice resulting from the preceding tests.		CLJ	RTD	CLJ	RTD	CLJ	RTD	Visible?		
c .	°	1									
Infant lifejackets should mee freeboard requirements, howey		2									
torso angle, faceplane and mo necessary in order to:	ngle, faceplane and mobility may be relaxed if										
-		4			_						
.1 contribute to the rescue caretaker;	e of the infant by a	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									
.4 protect the infant against l the evacuation; and	bumps and jolts during										
.5 allow a caretaker to monito by the infant.	Avg							XXXXX			
-	CLJ – Candidate Lifejacket RTD – Reference Test Device										

Inherently buoyant lifejackets	Manufacturer: Model: Lot/Serial Nun			Date: Time: Surveyor: Organization:					
2.2.1.24 Infant and children's Static balance mea			Regulatio 3	ns: L	s: LSA Code II/ 2.2.1.8; MSC.81(70)1/ 2.8.6, 2.9.2-2.9.3, Annex 2 &				
Test Procedure	1	Acceptance Crite	ria		Significant Test Data				
 Freeboard – The distar perpendicularly from the water to the lowest point of mouth where respiration ma if the mouth were not held s side of the mouth should be 	surface of the of the subject's ay be impeded, hut. The lowest	Freeboard: the average freek subjects should not be less the for the RTD minus 10 mm							
 the left and right sides are in 2. Faceplane angle – The are the surface of the water, formed between the most the forehead and chin. 	ngle, relative to , of the plane	Faceplane Angles: The a subjects' faceplane angles less than the average for the l	should be	not	Average faceptate angle, all subjects \geq average for RTD fillings 10°				
 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						
 List angle – The angle surface of the water and a li left and right shoulder or a l ears if only the head is tilter 	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	ket – 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	ire	Acceptance Criteria	Significant Test Data
Without readjusting the lift subject should jump vertical feet first, from a height of holding the arms over the he the water, the test subject simulate a state of utter freeboard to the mouth sh after the test subject comes should be repeated from a 4.5m.	Illy 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.	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?:
When jumping into the water 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 attack examined for any damage. I 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 ould be recorded to rest. ments should be lf 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; 	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)= ≤ 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 THI			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.	 .3 have no damage that would affect its in-water performance or buoyance; and .4 have no damage to its attachments. 	Did the lifejacket have damage to its attachments?: Yes / No Comments/Observations

Inherently lifejackets	buoyant	Manufacturer: _ Model: Lot/Serial Num	ber:			Date: Surveyor: Organization:	Time:				
Ju	hildren's lifejacket - ump and drop tests	- Water perforr			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 DATA	A SHEET (1 m Jump										
Subj	Subject surfaced faceup? (Yes/No)	Freeboard (mm)	Lifejacket became dislodged (Yes/No)	Subject was harmed? (Yes/No)		age to lifejacket or hments (Yes/No)	Comments/ Observations				
1											
2											
3											
4 5											
5											
	hildren's lifejacket - ump and drop tests		nance tests – R	egulations: LS	SA Co	de II/ 2.2.1.8, 2.2.1.	5.6; MSC.81(70)1/2.9, 2.8.8 and 2.8.9				
TEST DATA	A SHEET (4.5 m Jur	ıp)									
Subj	Subject surfaced faceup? (Yes/No)	Freeboard (mm)	Lifejacket became dislodged (Yes/No)	Subject was harmed? (Yes/No)		age to lifejacket or hments (Yes/No)	Comments/ Observations				
1											
2											
3											
4					ļ						
5											
					<u> </u>						

Inherently buoyant lifejackets	Model:	urer:		Surveyo	or: ation:			Time:					
2.2.1.26 Infant and children Stability test	n's lifejacke	t – Water performance tests –	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 face-up position of static bala water. The subject should be to assume a foetal position a	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 y your hands on your stomach,		(a) + (b) = 0		Can	didate	F	RTD	Can	didate	RTD			
lifejacket if possible, and t knees up as close to your	oring your	The number of subjects who are returned to the stable face-	Subj	CW	CCW	CW	CCW	CW	CCW	CW	CCW		
possible."	up foetal position in the candidate lifejacket should be		2										
The subject should be rotated clockwise at least equal to the number	at least equal to the number who are returned to the stable	3											
by grasping the subject's sh upper areas of the lifejacket s	so that the	face-up foetal position in the RTD.	4										
subject attains a 55 ± 5 degre subject should then be rele	ased. The	(e) ≤ (g)	5 6										
subject should return to a stat position.	ole face-up	And (f) ≤ (h)	7										
The test should then be cond		$(\cdot) = (\cdot)$	8										
the subject rotated counter-cl			9										
The entire test should then be with the test subject wearing													
			Total "No"	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)		

Inherently buoyant lifejackets	Model:	er: lumber:		Date: Surveyor: Organization:	Time:			
2.2.1.27 Infant and children	's lifejacket	- Mobility test	Regulation	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 comobility when wearing the size RTD when climbing out of 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 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			
2.2.2 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	
Name Surveyor printed	
Signature	
Approving Organization	

Inflatable lifejackets (Adults & Child)	Manufacturer: Model: Lot/Serial Number:		Date: Surveyor: Organization:	Time:	
	drawings, reports and				·····
	arawings, reports and	Submitted drawings and docum	nents		
		·			Status
Drawing No.	Revision No. & date		Title of drawing		
	1	Submitted reports and docume	ents		Status
Report/Document No.	Revision No. & date	Title	e of report / document		
		Maintenance Manual -			
		Operations Manual -			

Inflatable lifejackets (Adults & Child)	Manufacturer: Model: Lot/Serial Number:		Date: Time: Surveyor: Organization:			
2.2.2.2 Quality assurance		Regulations	ns: - MSC.81(70) 2/1.1, 1.2			
of the International Convention amended, or the international 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	a particular type are required by Chapter III on for the Safety of Life at Sea, 1974, as Life-Saving Appliance (LSA) Code to be the Administration should make random to ensure that the quality of life-saving ed 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 Assurance Standard Used: Quality Assurance Procedure: Quality Assurance Manual: Description of System:				
Administration's instructions.		Quality Assurance System acceptable Yes/No				
		Comments/Observations				

Inflatable lifejackets (Adults & Child)	Manufacturer: Model: Lot/Serial Number:	Surveyor:	Time:	
2.2.2.3 Visual inspection		Regulations: LSA Code I/1.2	2.2 & II/2.2	
Test Procedure	Acceptanc	e Criteria	Signific	cant Test Data
1. Approval markings	Inflatable lifejackets should: be clearly marked with appro	val information including the	Passed	Failed
	Administration which approved any operational restrictions	l it, date of manufacturer and		
2. Retro-reflective tape	be fitted with approved patche with a total area of at lea resolution A.658(16). In the ca the arrangement should be co way the lifejacket is put on. Su as high on the lifejacket as pos	ast 400 cm ² according to ase of a reversible lifejacket, omplied with no matter which ich material should be placed	Passed	Failed
3. Lifejacket light	have provision to be fitted with	a light.	Passed	Failed
4. Donning and comfort	be so constructed that it is cap or is clearly capable of being w incorrectly, it is not injurious to comfortable to wear;	orn in one way and, if donned	Passed	Failed_
5. Whistle	be fitted with a whistle firmly lifejacket.	secured by a lanyard to the	Passed	Failed
6. Colour of lifejacket	be of international or vivid red highly visible colour	dish orange or a comparably	Passed	Failed
			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	Deeped	Failed
		Fasseu	
	water into a survival craft or rescue boat.		
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		
		Passed	Failed
	secured to such persons.	Fasseu	
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		
		Commonte/Observations	
	-15°C to +40°C. (After testing of temperature cycling.)	Comments/Observations	

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

Inflatable lifejackets (Adults & Child)	Model:	:		Date: Surveyor: Organization:		
2.2.2.5 Temperature cycling					2.2 & 1.2.2.3; MSC.81(70) 1/2.10.1.1	
Test Procedur	e	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 acceptable 1. an 8 h exposure at a minimut +65°C to be completed in or 2. the specimens removed chamber that same day under ordinary room of temperature of 20°C ± 3°C to 3. an 8 h exposure at a maximut-30°C to be completed the r 4. the specimen removed from that same day and left exposion conditions at a tem ± 3°C until the next day; 	t of surrounding I +65°C in the Ilternating 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 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	

Inflatable lifeicekate	Manufacturer:			Date:	Time:
Inflatable lifejackets (Adults & Child)	Model: Lot/Serial Number	r: Organization:			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	е	Acce	ptance Criteria		Significant Test Data
 The automatic and manual should each be tested immediate temperature cycling test as fol 1. After a high temperature inflatable lifejackets should I stowage temperature of + 6 be activated using the automatic system by placing it in temperature of + 30°C and th activated using the manual i 2. After a low temperature inflatable lifejackets should I stowage temperature of -30° activated using the automatic by placing it in seawater at a 1°C and the other should b the manual inflation system. After exposure to a temperature period of at least 8 h, two life activated using the manual inflate. After exposure to a temperature period of at least 8 h, two life activated using the manual 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 ic 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 jackets should be	The lifejackets should fully The lifejackets should fully The lifejackets should fully	y inflate. function satisfac		 .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

	ilatable lifejackets Manufacturer: dults & Child) Lot/Serial Number:			Date: Surveyor: Organization: _		Time:		
2.2.2.5.2	Temperature cycl	ing test – Test o	data	Regul	lations: LSA Code I/1.2.	2.2 & 1.2.2.3;	; MSC.81(70) 1/2.1	0.1.1
			T CYCLE				LD CYCLE	
Cycle 1	Date In: Time In: Temperature:		Date Out: Time Out: Duration:		Date In: Time In: Temperature:	°C	Date Out: Time Out: Duration:	
Cycle 2	Date In: Time In: Temperature:		Date Out: Time Out: Duration:		Date In: Time In: Temperature:	°C	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:		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			Regulatio		II/2.2.2.3, 2.2.2; MSC.81(70) 1/2.2, 2.10.1.1
Test Pr	ocedure	Acc	ceptance Cr	iteria	Significant Test Data
 and cold inflation test should test. The buoyancy of the two lifejac and after 24 h complete submin fresh water. The test to be necessary to perform the test the uninflated condition. A lifejacket subjected to automatically with one compashould be repeated until each of the uninflated condition. (The following equipment alternatives may be used to califejacket: 1. a mesh basket or tray large and adequate weights to califejacket; 2. a tank of fresh water large basket or tray and the lifejacket 50 mm below 3. a spring balance accurate to the uninflated condition. 	cket with the uppermost part of the surface of the water; and o \pm 0.015 kg. corded at the start of each test	buoyancy a should not buoyancy.	ind the fir exceed 5% er should l	en the initial hal buoyancy of the initial be fitted with	1. Lifejacket No.1 Weight of the mesh basket with the lifejacket:Kg Buoyancy of front chamber at startKg. Buoyancy of front chamber at 24 hrKg. Difference in buoyancy < 5%Kg

Inflatable lifejackets (Adults & Child)	Manufacturer: Model: Lot/Serial Number:			Date: Surveyor: Organization:		
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	t 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. a 6 cm 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 o 6 s or continue wed 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:			Date: Surveyor: Organization:	Time:
2.2.2.8 Oil resistance test			Regulatio	ns: LSA Code I/1.2	2.4; MSC.81(70) 1/2.4
Test Pi	rocedure		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 e sign of dama	xternally an age such as dissolution	ejacket should be id 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

Mod	facturer: : erial Number:									
2.2.2.9 Tests of materials for infla components	able bladders, inflation systems and	Regulations: LSA Code I/1.2.2.1, 1.2.2.4 & 1.2.2.5; MSC.81(70) 1/2.4, 2.10.4 2.10.4.1								
Test Procedure	Acceptance Criteria	Significant Test Data								
All the materials used in the construct of the lifejacket, including the con- tapes, seams and closures, inflata bladders, inflation systems components should be tested establish that they are: .1 rot – proof, .2 colour-fast; and .3 resistant to deterioration fro exposure to sunlight, and that they are not unduly affected by .4 seawater; .5 oil; or .6 fungal attack	r, 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. The results should be acceptable to the International Organization for Standardization, in particular publication ISO 12402-7:2006 Personal flotation devices – Part 7: Materials and components – Safety	or Ar 6 <u>Cover: Tapes: Seams: Additional</u> 7: y 0 0 0 0 0 0 0 7: 1 1 1 1 1 1 1 1 1 1 1 1 1								

	ilatable lifejackets dults & Child)	Model:	Surveyor:		Surveyor:							
2.2	2.2.9.1 Coated fabrics test			Regulations	LSA Code I/1.	.2.2.1, 1.2	2.2.1, 1.2.2.4 & 1.2.2.5; MSC.81(70) 1/2.10.4.1.1-4					
Test Procedure			Acceptanc	ce Criteria		Significant Test Data						
Coated fabrics used in the construction of inflatable buoyancy chambers should comply with the following requirements:		should										
			(1) After being tested accor coating adhesion should not width.				Coating Adhesion N, I	,	ts in the : N			
2.	coating adhesion should when wet following ageing a ISO 188:2007 with an expo \pm 0.5 h in fresh water at (70 following which the meth 2411:2000, paragraph 5.1 applied at 100mm/min.	according to osure of 336 0.0 ± 1.0) ^{°C} ood at ISO					Coating Adhesion N, I	. ,	lts in the : N			
3.	tear strength should be accordance with ISO 4674- ISO 4674-2:1998 using me	-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 according to ISO 7854:1995, method A there should be no visible cracking or deterioration.				Failed				

			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 Ac			Acceptanc	e Criteria			Significant Te	st Data			
5.	breaking strength should accordance with ISO 1421 the CRE or CRT methor conditioning for 24 ± 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 accord breaking strength should not b width.				eak Strength (dry). <u>.</u>		N:		
6.	breaking strength should accordance with ISO 1421 the CRE or CRT methor 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 accord breaking strength when wet s per 50 mm width.				ak Strength (wet)		N:		
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 t 60%.				ngation (dry)	Failed			
8.	elongation to break shoul in accordance with ISO using the CRE or CF following conditioning in 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%.			Passed	ngation (wet) Observations	Failed			

Model: Surveyor:					Surveyor:	Time:					
2.2	.2.9.1 Coated fabric test (o	continued)		Regulations: LSA Code I/1.2.2.1, 1.2.2.1.4 & 1.2.2.1.5; MSC.81(70) 1/2.10.4.1							
	Test Procedure		Acceptan	ce Criteria		Significant Test Data					
9. the resistance to exposure to light when tested in accordance with ISO 105-B02: 2013.		(9) After being exposed to lig with ISO 105 – B02:2013 unexposed and exposed sar class 5.	, the contrast	between the	9. Accelerated light test Class Passed Failed						
10.	the resistance to wet and when tested in accord ISO 105-X12: 2001.		(10) After being wet and dry r 105- X12:2001, the staining not be less than class 3.			10. Wet staining after rubbing Class Passed Failed					
11.	the resistance to seawate be less than class 4 in with ISO 105 EO2: 1994.			11) After being tested in accordance with O2:1994, the change in colour of the specin ot less than class 4.		11. Dry staining after rubbing Class . Passed Failed					
						Comments/Observations					

Inflatable lifejackets (Adults & Child)	Model:	er: lumber:		Surveyor:	Time: :				
2.2.2.9.2 Operating head load	d test		Regulations:	Regulations: LSA Code I/1.2.2.1, 1.2.2.4 & 1.2.2.5; MSC.81(70) 1/					
Test Procedure		Acceptanc	ce Criteria		Significant Test Data				
The operating head load tes carried out using two lifej lifejacket to be conditioned a 8 hours and the other at +65°C After mounting on the manikir form the lifejacket should be in steady force of (220±10) N ap operating head as near as po point where it enters the chamber. This load should be for 5 minutes during which the o angle in which it is applied continuously varied.	ackets one at -30°C for c for 8 hours. n or the test flated, and a oplied to the ssible to the e buoyancy e maintained direction and	On completion of the test, intact and should hold its pre-			 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 after 30 min. Jacket 1 at the beginning after 30 min Pressure at the beginning of the test at +65°C after 30 min. Jacket 2 at the beginning after 30 min Comments/Observations 	and			

Inflatable lifejackets	Model:	Surveyor:			Time:					
(Adults & Child)	Lot/Serial N	lumber:		Organization:						
2.2.2.9.3 Pressure test (1)		Regulations: LSA Code II			2.2.2.2; MSC.81(70) 1/2.10.4.3.1					
Test Procedure		Acceptance Criteria			Significant Test Data					
Overpressure test The inflatable buoyancy cham be capable of withstanding an in pressure at ambient tempe chambers of a lifejacket should using the manual method of in inflation the relief valves should and a fully charged gas cylinde to the manufacturers recon- should be fitted to the same infl and fired. All fully charged ga used in this test should be size to the markings on lifejacket.	internal over erature. All d be inflated flation, after l be disabled er according mmendation lation device as cylinders	The lifejacket should remain pressure for 30 minutes. The lifejackets should show n 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	 Double charge test. Size of gas bottle gram: Duration of test min. Chamber 1 - Pressure at the test and after 30 min. at the beginn after 30 min. Chamber 2 - Pressure at the test and after 30 min. Chamber 2 - Pressure at the test and after 30 min. at the beginn after 30 min. Chambers 3 - Pressure at the test and after 30 min. Chamber 4 - Pressure at the test and after 30 min. Chamber 4 - Pressure at the test and after 30 min. Damage to lifejacket PassedFailed Comments/Observations 	he beginning of the hing he beginning of the hing the beginning of the hing				

Inflatable lifejackets (Adults & Child)	Model:	Surveyo			Time:					
	Lot/Serial N	umber:		Organization:						
2.2.2.9.3 Pressure test (2)		F	Regulations:	LSA Code; M	SC.81(70) 1/2.10.4.3.2					
Test Procedure		Acceptance Criteria			Significant Test Data					
Relief valve test With one buoyancy chamber i operating head on the opposit chamber should be fired manua fully charged gas cylinder acco manufacturer's recommendat operation of the relief valves noted to ensure that the excess relieved.	e buoyancy ally, using a ording to the tions. The should be	The lifejacket should remain in pressure for 30 minutes. The lifejackets should show no cracking, swelling or changes of that there has been no significat inflation component.	signs of dar	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 Code; MSC.81(70) 1/2.10.4.4.2					
Test Procedure	Acceptance C	riteria	Significant Test Data				
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.				
			Comments/Observations				

Model:	turer:al 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 lifejacket is filled with air until air escapes from the over-pressure valve or, if the lifejacked does not have an over-pressure valve until its design pressure, as stated in the plans and specifications, is reached. This test is then repeated as many times as necessary to test a different chamber until each chamber has been tested in this manner. The pressure release valve should be settled when the measurement starts.									

Inflatable lifejackets (Adults & Child)	Model:	nrer: Number:		Surveyor:	n:				
2.2.2.9.4 Compression test			Regulations:	Regulations: LSA Code; MSC.81(70) 1/2.10.4.4					
Test Procedure		Acceptano	ce Criteria		Significant Test Data				
The inflatable lifejacket, packed in the normal manner, should be laid on a table. A bag containing 75 kg of sand and having a base of 320 mm diameter should be lowered onto the lifejacket from a height of 150 mm in a time of 1 s. This should be repeated ten times, after which the bag should remain on the jacket for not less than 3 hours.			cket to be inspec of mechanical pr	ted to ensure operties has	Weight of sand bag Area of sand bag Drop Height Drop Time No. of Drops Length of test Passed Comments/Observations	mm mm sec			
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 Te	est Data			
Metal parts and compone lifejacket should be corrosion r seawater and should be accordance with ISO 9227:2 period of 96 h.	resistant to tested in	be significantly affected by c parts of the lifejacket ar	The metal components should be inspected and should not be significantly affected by corrosion, or affect any other parts of the lifejacket and should not impair the performance of the lifejacket.			nponents. Failed			
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 affe more than 5°.	ect the magnetic compass by		 Magnetic Test on Comp Passed Comments/Observations 	oonents. Failed			

Inflatable lifejackets (Adults & Child)	Manufacturer: Model: Lot/Serial Number:		Date: Surveyor: Organization:	te: Time: rveyor: ganization:				
2.2.2.9.6 Inadvertent inflation	i test	Regulations:	ations: LSA Code; MSC.81(70) 1/2.10.4.6					
Test Procedur	Test Procedure Acce			Significant Test Data				
The resistance of an automatic inadvertent operation should exposing the entire lifejacket to fixed period. The lifejacket should be fitted standing manikin of adult size shoulder height of 1500 mm alternatively to an appropriate shown in figure 2. The life deployed in the mode in which use but not deployed as used in is equipped with a cover which closed, then the cover should test). Two sprays should be installed a water onto the lifejacket, as sho One should be positioned 50 highest point of the lifejacket, 15° from the vertical centre line the bottom line of the lifejacket should be installed horizontall 500 mm from the bottom line of be pointed directly at the lifejac should have a spray cone of 30° 1.5 ± 0.1 mm in diameter, and t orifice should be 50 ± 5 mm ² evenly spread over the spray me	be assessed by sprays of water for correctly to a free e, with a minimum (see figure 5), or ely sized form as ejacket should be it is worn ready for n the water (i.e. if it h is normally worn be closed for the so as to spray fresh own in the diagram. 20 mm above the and at an angle of of the manikin and . The other nozzle y at a distance of f the lifejacket, and kket. These nozzles f^{2} , each orifice being the total area of the f^{3} , the orifice being	-	2. Au Pa	assed Failed				

Inflatable lifejackets (Adults & Child)	Model [.]	S			te: Time: rveyor: ganization:									
2.2.2.9.6 Inadvertent inflation				tions: LSA Code; MSC.81(70) 1/2.10.4.6										
Test Procedure Acceptance C		Acceptance Cr	iteria					Sign	ificant ⁻	Test D)ata			
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 spray	The lifejacket should not infla	te during the te	est	1. Passed			t Inflatio		ailed				
The sprays should be turned lifejacket should be expos following series of test to asses of the jacket to resist inadverte .1 5 minutes with the high s	ed to the ss the ability nt inflation:	After completing this test, the immersed in water to verify th system is working.			2. Auto in Time to Passed	flation o inflate	e:	n opera	Se	ec. ⁻ ailed				
 front of the lifejacket; .2 5 minutes with the high s left side of the lifejacket; .3 5 minutes with the high s back of the lifejacket; and .4 5 minutes with the high s right side of the lifejacket. 	spray on the				Commo			tions						
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.	and .4 applied for front, left or	Figure – Alternative form			Size Adult Child Infant	A 610 508 305	B 114 102 63,5	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)		er: lumber:			Surveyor:							
2.2.2.10 Strength tests - Boo	ly or lifting l	oop strength test		Regulations:	LSA Code; N	ISC.81(70) 1/2.5.1, 2.10.1.1						
Test Procedure		A	Acceptanc	ce 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 repeater 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 ojected to not and cold	The lifejacket or lifti result of this test.	Yoke or rrangeme	r over-the-head ent for lifejacket diameter for a n diameter for a	type lifejacket ts dult sizes	Time: Slippage: Closure(s) testec	Passed _	p test arrangement if				

Inflatable lifejackets (Adults & Child)	Manufacturer: Model: Lot/Serial Number:			Time:							
2.2.2.11 Strength tests - S		Regulations: LSA									
Tes	at Procedure	Accepta	nce Criteria					Signifi	cant Test	Data	
2.2.2.7, 2.2.2.8 and 2.2.2.1 shoulder strength test. The lifejacket should be imm should then be removed fror shown in figure 2 in the sat person. A force of not less the or infant-size lifejacket) shou	pjected to the tests in 2.2.2.5, 2.2.2.6, 0 above should be subjected to the ersed in water for a period of 2 min. It m the water and closed on a form as me manner as when it is worn by a an 900 N (700 N in the case of a child uld be applied for 30 min across the n of the lifejacket. (see figure).	The lifejacket should result of this test. The lifejacket should form during this test under the state of the	d remain sect		n the	Time Sign Pass	force a of dam ed	applied _			
Vest-type lifejacket Yoke Figure - Shoulder lift test arra lifejackets C– Cylinder; 125mm diamete 50mm diameter for infant L– Test load	Size A B Adult 610 114 Child 508 102 Infant 305 63,5	C D 76,2 127 76,2 102 38,1 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)	Manufacturer Model: Lot/Serial Nu				5	Surveyc	or: ation:			9:		
2.2.2.12 Donning Test (Unin	lated situation	ı)		Regulations: LSA Code II/2.2.1.5; MSC.81(70) 1/2.7.1 to 2.7.4.3, 2.10.2								
Test F	Procedure			Ac	ceptance	e Criteri	ia			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 w who are completely unfamilia	jackets should s follows: vith at least 12 a r with the lifej	d for the persons selected	Fastenings necessary for proper performance should be few and simple and provide quick and positive closure that does not require tying of knots. Adult lifejackets should readily fit various sizes of adults, both lightly and heavily clad.							:		
according to the heights and we	eights in table 2	.1 and the fo	, in the second s	sizes of adults, All lifejackets worn inside-ou	should b	be [°] capa	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		aubicata ak				any in O	illy one way.	1				(100/110)
females, including at least 2					2							
the tallest height;			-					3				
.3 at least one male should be group and one female shou								4				
and one female should be n	ore than 80 kg	and 1.8 m;	U .					5				
.4 at least one subject should b a "1"; and	e selected from	each cell co	ontaining					6				
.5 enough additional subject	s should be s	selected fro	om cells					7				
containing a "X" to total the								8				
with no more than one sub across weight ranges should			tribution					9				
	Test subject		or adult life	jackets				10				
	-		ight range -					11				
Ht range (m) 40 -43 43 -		70 – 80	80 – 100	100 – 110	110 – 1	120	> 120	12				
<pre>< 1,5 1 X</pre>	X 1	X X	X									
1,5-1,0 X 1 1,6-1,7 X		1	X	Х								
1,7 -,1,8	X	X	1	X	X	<	Х					
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:			Date: Surveyor: Organization:	_ Time:
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
Clothing Each test subject should be to for the test and appropriate to .1 <i>Normal clothing</i> means no not normally interfere with	o their size, as follows: ormal indoor clothing, v	vhich would	complete when t securely adjusted lifejacket to the ex	urposes donning is considered he subject has donned and all methods of securing the ktent needed to meet the in - ce requirements, including	
.2 Heavy-weather clothing r hostile environment, incluc cotton gloves.				ld be capable of being donned of the subjects, and within	
Each test should be timed from test subject declares that don <i>Test without instruction</i> The test subjects may be Wearing normal clothing, the assistance, guidance or prior closures in the stored condit face up, in front of the test should be identical for each so the following: "PLEASE DON AS POSSIBLE AND ADJUST ABANDON SHIP."	tested individually or a tested individually or a e first attempt should demonstration. The life sion, 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 quivalent 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 2	uld correctly don the lifejacket I min. uld don the lifejacket correctly	Total number of subjects: # of subjects successful: # of subjects successful: Pass / Fail

Inflatable lifejackets (Adults & Child)	Manufacturer: Model: Lot/Serial Number:			Date: Surveyor: Organization:	Time:
2.2.2.12 Donning Test (Uni	nflated situation)	Regulations	: LSA Code II/2.2.	1.5; MSC.81(70) 1/2.7.1 t	o 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: Surveyor: Organization: _		_ Time:		
2.2.2.13 Donning Test (Infla	ted situation)		Regulations: LSA Code II/2.2.1.5; MSC.81(70) 1/2.7.1 to 2.7.4					
Τe	est Procedure	Ac	ceptanc	e Criteria		Significant Test	Data	
 in adverse conditions, lifejacke features and tested as follows: The test should be carried out are completely unfamiliar with the heights and weights in tabl .1 small test subjects need not .2 at least 1/3, but not more that including at least 1 per he height; .3 at least one male should be female should be more than .4 at least one subject should "1"; and .5 enough additional subjects a "X" to total the required nu 	with at least 12 able-bodied persons who a the lifejacket and selected according to le 2.1 and the following: t be adults; an 1/2 of test subjects should be females, eight category but excluding the tallest from the lowest and highest weight group from the lowest weight group and one	few and quick and does not Adult life fit various lightly an lifejackets	erforma simple d positi require jackets s sizes nd hea s should vorn i	ecessary for nce should be and provide ve closure that tying of knots. should readily of adults, both wily clad. All d be capable of nside-out, or ne way.				

Weight range - kg Ht range (m) 40 -43 43 - 60 60 - 70 70 - 80 80 - 100 100 - 110 110 - 120 > 120 <1.5 1 X X X Image - kg Image - kg </th <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th>ct selection f</th> <th>Test subje</th> <th></th> <th></th> <th></th>										ct selection f	Test subje			
< 1,5			servations:	ients/OI	Comr	Weight range - kg 40 42								
$\begin{array}{c c c c c c c c c c c c c c c c c c c $						> 120	110 – 120	100 – 110	80 – 100	70 – 80	60 -70	43 – 60	40 -43	Ht range (m)
1.6 - 1.7 X X 1 X X I 1.7 - 1.8 X X X 1 X X X 1.8 - 1.9 X X X 1 1 X >1.9 X X X 1 1 X >1.9 X X X X 1 1											Х	Х	1	< 1,5
1,7 -,1,8 X X X 1 X X X 1,8 - 1,9 X X X 1 1 X >1,9 X X X X 1 1 X >1,9 X X X X X 1 1 >1,9 X X X X X 1 >1,9 X X X X 1 1 X X X X X 1 1 >1,9 X X X X X 1 X X X X X 1 1 X X X X X 1 X X X X X 1 X X X X X 1 X X X X X 1 X X X X X 1 X X X X X 1 X X X X X 1 X X X X X X X X X </td <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>Х</td> <td>Х</td> <td>1</td> <td>1</td> <td>Х</td> <td>1,5 – 1,6</td>									Х	Х	1	1	Х	1,5 – 1,6
1.8 - 1.9 X X X X 1 1 X > 1.9 X X X X X 1 1 X > 1.9 X X X X X 1 1 X 2 X X X X X X 1 1 3 X X X X X X 1 4 X X X X X X X 5 X X X X X X X 6 X X X X X X X 10 X X X X X X								Х	Х	1	Х	Х		1,6 – 1,7
X X X I I X >1,9 X X X X I 2 I I I 3 I I 4 I 5 I 6 I 7 I 8 I 9 I 10 I	Good Swimmer?			SEX (M/F)	Subj									
2 2 3 3 4 3 5 3 6 3 7 3 8 3 9 3 10 3	(Yes/No)	(19)	(,	. ,						X	X			
3		_			1		X	X	X					> 1,9
4					2									
5					3									
5					4									
6														
7	+													
8														
9					7									
10					8									
					9									
					10									
		1												
12	<u> </u>				12									

Inflatable lifejackets (Adults & Child)	Manufacturer: Model: Lot/Serial Number:		Surveyor:	Time:		
2.2.2.13 Donning test (In	flated situation) (Continued)	Regu	Ilations: LSA Code II/2.2.1.5; MS			
	Test Procedure	ure Acceptance Criteria				
 test and appropriate to their .1 Normal clothing means normally interfere with th .2 Heavy-weather clothing environment, including gloves. 	s normal indoor clothing, which would not the donning of a lifejacket; y means the attire appropriate for a hostile a hooded arctic parka and warm cotton from when the order is given until the test	complete wh securely adju lifejacket to t	ent purposes donning is considere en the subject has donned an usted all methods of securing th he extent needed to meet the in rmance requirements, includin eded.	d e -		
normal clothing, the first atte or prior demonstration. To condition, should be place subject. The instruction pr and should be equivalent	tested individually or as a group. Wearing empt should be with no assistance, guidance The lifejacket, with closures in the stored d on the floor, face up, in front of the test ovided should be identical for each subject t to the following: "PLEASE DON THIS Y AS POSSIBLE AND ADJUST IT TO A BANDON SHIP."		should be capable of being donne 75 % of the subjects, and withi			

2.2.2.13 Donning test (Inflated situation) (Continued)	F	Regulations: 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
<i>Test after instruction</i> 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.	correctly closures, in-water MSC.81(performe establish	bject dons the lifejacket substantially but fails to secure and/or adjust all the jump test in 2.8.8 of MSC.81(70) and performance tests in 2.8.5 of 70) and 2.8.6 of MSC.81(70) should be ad with the lifejacket as donned to whether the performance is acceptable donning is successful.	Pass / Fail
<i>Heavy-weather clothing test</i> 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 correctly don the lifejacket period of 1 min.	Pass / Fail
		bject should don the lifejacket correctly period of 1 min.	Pass / Fail

Inflata (Adult	Inflatable lifejackets (Adults & Child) Manufacturer: Date: Time: Inflatable lifejackets (Adults & Child) Date: Time: Inflatable lifejackets (Adults & Child) Date: Time: Inflatable lifejackets (Adults & Child) Date: Time: Inflatable lifejackets Organization:												
2.2.2.	12 – 2.2.2.1	3 Donning	Tests – Te	est Data		Regulations: LSA Code II/2.2.1.5 – 2.2.1.7; MSC.81(70) 1/2.7.1 to 2.7.4.3							
Uninflated situation							Inflated situation						
		Test without i	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)	Donning Time (sec)	Donning Time (sec)	
1													
2													
3													
4													
5													
6													
7													
8													
9													
10													
11													
12													
						Comments/O	bservation	IS:					

Inflatable lifejackets	Manufacturer: Model:		Date:		Tir	me:					
(Adults & Child)	Lot/Serial Number:		Surveyor: Organization:					· · · · · · · · · · · · · · · · · · ·			
2.2.2.14 Water performance water performance	e tests- Preparation for	Regulations: LSA Code II/2.2.1.2.5 & 2.2.1.3 – 2.2.1.4; MSC.81(70) 1/2.8 to 2.8.4, 2.10.3. Annex 1, MSC.1/Circ.1470									
Test Proc	edure	Acceptance Cri	teria			Significant	Test Data				
This portion of the test is inten- of the lifejacket to assist a he exhausted or unconscious sta- lifejacket does not unduly restri The in-water performance of a comparison to the performance reference lifejacket, i.e. Refere specified in appendices 1 to 3. All tests should be carried ou conditions. Each test for a ca- relevant RTD should be conduct These tests should be carried ou conditioned in paragraph 2.2 should be used, since the abi- rarely otherwise obtained. The test subjects should wear of Each test subject should be ma- tests in 2.2.2.15 and 2.2.2.16, p regarding relaxing and exhaling The test subjects should don using only the instructions pro Prior to taking measurements, fastening of the RTD on the sub- corrected as necessary.	Ipless person or one in an ate and to show that the ct movement. a lifejacket is evaluated by e of a suitable size standard ence Test Device (RTD) as t in fresh water under still andidate lifejacket and the cted on the same day. but with at least 12 persons .1.15. Only good swimmers lity to relax in the water is only swimming costumes. ade familiar with each of the particularly the requirements g in the face-down position. the lifejacket, unassisted, vided by the manufacturer. the proper fit, donning, and	The RTD should be construct calibrated according to MSC and validated according to M	81(70), annex 1,	Validat Calibra Test si	ted by: _ ated by: __ ubjects s		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).3. Annex 1,					
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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)			Surveyor:	Time:						
2.2.2.15 Water performance te	ests – Righting test	Regulations: LSA Code II/ 2.2.1								
Test Procedu		Acceptance Criteria		Significant Test Data						
Each test subject should assu down position in the water, but up so the mouth is out of the w 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 <u><</u> 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 v normally.	sition with the legs sides, the subject in the following to gradually and al floating posture: to relax; allow the ne and neck, letting	The test should be conducted a total and the highest and lowest times dis test should then be conducted a tota in the RTD and the highest and I discarded. Turning time: the average turn time for in the candidate lifejacket should not average time in the RTD plus 1 s.	carded. The l of six times owest times r all subjects	All Chambers: Automatic: Manual: Passed Failed Passed Chamber #1: Automatic: Manual: Passed Failed Passed Chamber #1: Automatic: Manual: Passed Failed Passed Chamber #2: Automatic: Manual: Passed Failed Passed Chamber #3: Automatic: Manual: Passed Failed Passed Chamber #4: Automatic: Manual: Passed Failed Passed						
During the relaxation phase, the maintained in a stable face dow Immediately after the subject ha face in the water, simulating exhaustion, the subject's feet s The test should be conducted us have been inflated both manually, and also with one of uninflated.	wn position. as relaxed, with the g a state of utter should be released. using lifejackets that automatically and	The number of "no-turns", if any, exceed the number in the RTD. The test should be repeated compartment deflated until each comp been tested in the uninflated condition	with one partment has	<pre># of candidate no turns (NT): ≤ # of RTD no turns (NT): All Chambers: Automatic: Manual: Passed Failed Passed Failed Chamber #1: Automatic: Manual: Passed Failed Passed Failed Chamber #2: Automatic: Manual: Passed Failed Passed Failed Chamber #3: Automatic: Manual: Passed Failed Passed Failed Chamber #4: Automatic: Manual: Passed Failed Passed Failed Chamber #4: Automatic: Manual: Passed Failed Passed Failed Chamber #4: Automatic: Manual: Passed Failed Passed Failed Comments/Observations:</pre>						

	le lifejac & Child)	Model.										Lot/Serial Number: Organization:											
2.2.2.15	Water p	erforman	ce tests	– Rightir	ng test				Regu	ulatio	ns: LS	A Cod	le II/ 2.	2.1.3.2;	MSC.	81(70)	1/ 2.8.	5, 2.1	0.3				
							Sig	gnifica	int Te	st Da	ta												
		C			E TIME (se c inflation)							/ICE TI al inlfla		C)		REF	ERENG	CE VE TRIA	ST TIME	(sec)			
Subj	#1	#2	#3	#4	#5	#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																							
					date turn t lidate no ti			Ave				rn time o turns	<u>, </u>			Av			urn time no turns				
Àverage	candidate		<u>Average</u>		time RTD - (NT):		ed																
	its/Observ	· · ·	<u>></u> # 01 K I L	no lums	(111).	rass	eu	F	alleu _														
Commer	IIS/ODSEIV	auvus.																					

Inflatable lifejackets (Adults & Child)	Model:	Irer:		Survey	vor: zation:									
2.2.2.16 Water performance	e tests – Sta	atic balance measurements	Regulations	: LSA C	ode II/2.2.2, 2.	2.1.4; MSC.8	31(70) 1/2	2.8.6 and 2.8.7	7, 2.10.3					
Test Procedure		Acceptance Cr	iteria		Significant Test Data									
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	erage freeboa	rd for RTD					
the preceding tests. 1. Freeboard – The	distance				All Chambers: Chamber #1:	Automatic:	Failed	Manual:	Failed					
measured perpendicu the surface of the wa	larly from				Chamber #2:	Passed Automatic: Passed	Failed Failed	Manual:	Failed Failed					
lowest point of the subjection where respiration	ect's mouth				Chamber #3:	Automatic: Passed	Failed	Manual:	Failed					
impeded, if the mouth held shut. The lowest mouth should be meas left and right sides are	were not side of the sured if the				Chamber #4:	Automatic: Passed	Failed	Manual:	Failed					
 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 facep 10º	blane angle, a	all subjects :	≥ average for l	RTD minus					
formed between the most for of the forehead and chin.		average for the RTD minus 10°			All Chambers:	Automatic: Passed	Failed	Manual: Passed	Failed					
or the lorenead and chin.					Chamber #1:	Automatic: Passed	Failed	Manual:	Failed					
					Chamber #2:	Automatic:		Manual:						
					Chamber #2:	Passed	Failed	Passed	Failed					
					Chamber #3:	Automatic: Passed	Failed	Manual: Passed	Failed					
					Chamber #4:	Automatic: Passed	Failed	Manual: Passed	Failed					

2.2.2.16 Water performance tests – Sta	tic balance measurements	Regulations: LSA C	Code II/2.2.2, 2.	2.1.4; MSC.8	81(70) 1/	2.8.6 and 2.8	.7, 2.10.3
Test Procedure	Acceptance Cr	iteria		Signi	ficant Test	Data	
 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). 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. 	Torso angles: the average o angles should be not less than RTD minus 10º.		Average torso All Chambers: Chamber #1: Chamber #2: Chamber #3: Chamber #4:	Automatic: Passed Automatic: Passed Automatic: Passed Automatic: Passed Automatic:	Failed Failed Failed Failed	Manual: Passed Manual: Passed Manual: Passed Manual: Passed Manual:	_ Failed Failed Failed Failed
	Lifejacket light location: the pos light should permit it to be vis segment of the upper hemisphe	ible over as great a	Does the loca as great a sec Comments/O	gment of the	ejacket light	permit it to be	

Inflatable lifejackets (Adults & Child)	Manut Model Lot/Se	facturer: : erial Nur	nber:						Date: _ Survey Organi	/or: _ izatio	n:	· · · · · · · · · ·	Time:		· · · · · ·		
2.2.2.16 Water performance	e tests-	Static b	alance	measu	rement	s	Regu	lations	Organization: s: LSA Code II/2.2.2, 2.2.1.4; MSC.81(70) 1/ 2.8.6 and 2.8.7, 2.10.3								
Test Procedure									Significant Test Data								
The test should be repeated wit compartment deflated until			Automatic Inflation										Mar	ual Inlfa	tion		
compartment denated until compartment has been tested uninflated condition.			Freeb (m		Face (de	plane eg)		o angle eg)	Ligh	nt	Freeb (m		Facep (de		Torso (de	•	Light
			CLJ	RTD	CLJ	RTD	CLJ	RTD	Visibl	le?	CLJ	RTD	CLJ	RTD	CLJ	RTD	Visible?
		1															
		2															
		3															
		4															
		5															
		6							_								
		7															
		8															
		9															
		10															
		11															
		12 Avg							xxxx	/							XXXX
		Avg	Candida	to Lifeir	neket				1 ~~~~					<u> </u>		<u> </u>	~~~~
			Referen	-		0											
		RID-	Releien	ice res		e											

	Manufacturer: _ Model: Lot/Serial Numb	er:		Date: Time: Surveyor: Organization:
2.2.2.17 Water performance	tests – Jump a	nd drop tests	Regulatio	ns: LSA Code II/ 2.2.1.5.6; MSC.81(70)1/2.8.8 and 2.8.9, 2.10.3
Test Procedure		Acceptance Criteria	l	Significant Test Data
Without readjusting the lifejacket, should jump vertically into the w from a height of at least 1m wh arms over the head. Upon enter the test subject should relax to so of utter exhaustion. The freeboar should be recorded after the test to rest. The test should be re- height of at least 4.5 m. When jumping into the water, to should hold on to the lifejacket due to avoid possible injury. Upo water, the test subject should rela- state of utter exhaustion. The fir mouth should be recorded after comes to rest. The lifejacket and its attachme examined for any damage. If in likely from any jump or drop test should be rejected or the test de from a lower height or with addition demonstrate that the risk from the is acceptable. The test should be conducted up that have been inflated both au manually, and also with one of the uninflated.	water, feet first, hile holding the ering the water, simulate a state and to the mouth t subject comes epeated from a the test subject aring water entry on entering the ax to simulate a reeboard to the the test subject ents should be jury is believed st, the lifejacket elayed until test onal precautions he required test using lifejackets tomatically and	 lifejacket should: .1 surface the test subject in position with an average freadly 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; 	a face up eeboard fo ss than the e RTD afte dance with harm to the harm to the byance; and hments.	 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						e 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 was harmed? (Yes/No)	lifej atta	nage to acket or chments s/No)	Comments/ Observations
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							

Inflatable (Adults &	lifejackets Child)	Manufacturer: Model: Lot/Serial Nur	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
TEST DAT	TA 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:	ırer: Number:	Date: Time: Surveyor: Organization:											
2.2.2.18 Water performance t	tests – Stal	bility test	Regulations: LSA Code II/2.2.1.4; MSC.81(70) 1/2.8.10											
Test Procedure		Acceptance Criteria	Significant Test Data											
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	The candidate lifejacket should not roll any subject face down in the water.			the subj down?				the subj able face (Ye					
"place your elbows against yo		(a) + (b) = 0		Can	didate	R	TD	Can	ndidate	I	RTD			
your hands on your stomach, 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 so subject attains a 55 ± 5 degree subject should then be releas subject should return to a stabl position. The test should then be condu- the subject rotated counter-close	our knees ssible." clockwise the torso bulders or o that the e list. The lsed. The le 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	CW	CCW	CW		CW		CW				
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	repeated e RTD. ted using ated both d also with		9 10 11 12 Total "No"	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)			

Inflatable lifejackets (Adults & Child)	Model:	er: umber:	Surveyor:									
2.2.2.19 Water performance t test	ests – Swin	nming and water emergence	Regulations: LSA	Code II/2.2	ode II/2.2.1.4; MSC.81(70) 1/2.8.11							
Test Procedure		Acceptance C	Criteria			Significant To	est Data					
All test subjects, without w lifejacket, should attempt to swi board a liferaft or rigid platfo surface 300 mm above the wa All test subjects who successful this task should perform it aga the lifejacket. The test should be condu- lifejackets that have been in automatically and manually, ar one of the compartments uninfl	m 25 m and rm with its ter surface. ly complete ain wearing cted using flated both ad also with	At least two-thirds of the accomplish the task without th be able to perform it with the lit $(b) \ge 2/3$ (a)	e subjects who c le lifejacket should a	Iso Lifera		atform	n successfully board liferaft (b) 2/3 (a) Passed / Failed Comments/Observations					

Inflatable lifejackets (Adults & Child)	Manufactur Model: Lot/Serial N	er: lumber: _								C S C)ate: Surve Organ	yor: _ izatio	on:		Tim	le:					
2.2.2.20 Infant and children's																/2.9 – 2.9.1					
Test Procedure					A	Ассер	tanc	e Crit	eria					Significant Test Data							
As far as possible, similar ter adult tests) should be applied for of lifejackets suitable for in children.	or approval fants and	eight range 14 17 20 i be 17 20 22				22						38	41	Size: I	nfant / C	hild					
For child-size lifejackets, tests carried out with at least 9 a persons, and for infant-size	ble-bodied				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 wi		79- 105	1	X										1		(,	(
5 able-bodied persons. All test subjects should be	e selected	90- 118		х	1									2							
according to table 2.2 or tab follows:	ole 2.3 as	102- 130				1	х							3							
.1 One subject should be se	elected per	112- 135					х	1						4							
each cell containing a "1".		122- 150							1	1	х			5 6							
.2 Remaining subjects should b from cells containing an "2		145-									x	1	1	7							
repeating a cell.		165	Та	ble 2	.3 - S	electi	on of	Infan	it Tes	t Sub	ojects	;		8							
.3 At least 40% of the subjects male and at least 40% femal								Weigl	ht Ra	nge ((kg)			9							
		Hei	ght ra (cm)			Les	s tha	n 11		11-1	4	14-	-17								
.4 Devices for infants should be tested o infants as small as 6 kg mass.		Les	s tha	n 83			1			Х											
.5 A manikin or manikins may be			79-10	5			Х			1		1	1								
substituted for test subje manikin or manikins ha demonstrated to provide rep results compared to human	ave been resentative										>	<	*Manikin	descrip	tion:						

Inflatable lifejackets (Adults & Child)			Date: Surveyor: Organization:	Time:				
2.2.2.21 Infant and childr – Righting test	rmance tests	rmance tests Regulations: LSA Code II/ 2.2.1.8; MSC.81(70)1/ 2.9.2-2.9.3, Annex 2, 2.10.3						
Test Pro	ocedure	ŀ	Acceptance (Criteria	Significant tes	t data		
This portion of the test is intend the lifejacket to assist a hel exhausted or unconscious s lifejacket does not unduly restr		MSC.81(70)	ucted 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. Refer specified in appendices 2 to 3.				Validated by:				
All tests should be carried o 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								
The test should be conducted to been inflated both automaticall with one of the compartments	y and manually, and also							

	Manufacturer: Model: Lot/Serial Number:						Date: Surveyor: Organization:									
	lifejacket – Water performa				Ilatio				.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 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.			CAN	DIDA		E DEVICE TIME (sec) TRIAL				RE	FERE			IE (sec))
position in the water, but with the head lifted up so the mouth is		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, shoulder width apart, with the heels just below the surface of the water.		1														
		3														
After assuming a starting position with the legs straight	The test should be conducted a total of six times, and the highest															
and arms along the sides, the subject should then be	discarded. The test should then be conducted a total of six times in the	7														
instructed in the following sequence to allow the body to gradually and completely relax		8 9														
into a natural floating posture: allow the arms and shoulders to	lowest times discarded.															
relax; allow the legs to relax; and then the spine and neck, letting																
the head fall into the water while breathing out normally.			Ave				<u>rn time</u> no turns			Average RTD turn time (sec): # of RTD no turns (NT):						

2.2.2.21 Infant and children's I Righting test (Continu	ifejacket – Water performa ıed)		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	est and lowest value) lidate turn time ≤ Average RTD turn time RTD +1s e no turns (NT): ≤ # of RTD no turns (NT): oservations:	Passed Failed Passed Failed

Inflatable lifejackets (Adults & Child)	Manufacturer: Model: Lot/Serial Number:					Date: Surveyor: Organization:				
2.2.2.22 Infant and childre – Static balance	Regu 2 & 3		: LSA Code	II/ 2.2.1.8; I	MSC.81(70)1	/ 2.8.6, 2.9.2	-2.9.3, 2.10.3, Ann	iex		
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 subject floating in the relaxed face-up position of static balance resulting from the preceding tests.		Fr	eeboard	(mm)	Faceplar	Faceplane (deg)		gle (deg)	Light	
		CI	J	RTD	CLJ	RTD	CLJ	RTD	Visible?	
		1								
Infant lifejackets should meet the turning time and freeboard requirements, however, the requirements for torso angle, faceplane and mobility may be relaxed if		2								
		3					-			
necessary in order to:		4								
.1 contribute to the rescue of the	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								
.4 protect the infant against bu	mps and jolts during the									
evacuation; and	inpo una jono duning the									
.5 allow a caretaker to monitor and control heat loss by the infant.		Avg							XXXXX	
		CLJ – Candida RTD – Referen	-							

Inflatable lifejackets (Adults & Child)	Model:		Survevor:					
2.2.2.22 Infant and children Static balance mea				s: 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	9	Acceptance Crite	ria	Significant Test Data				
 Freeboard – The distant perpendicularly from the water to the lowest point of mouth where respiration m if the mouth were not h lowest side of the mouth measured if the left and rig level. Faceplane angle – The art the surface of the water formed between the most the forehead and chin. Torso angle – The ang vertical, of the line formed points of the shoulder and portion of the pelvis). 	surface of the of the subject's ay be impeded, neld shut. The uth should be ht sides are not ngle, relative to , of the plane forward part of gle, relative to by the forward	Freeboard: the average freeb subjects should not be less the for the RTD minus 10 mm. Faceplane angles: The av subjects' faceplane angles less than the average for the F Torso angles: the average of torso angles should be not average for the RTD minus 10	an the averag verage of a should be no RTD minus 10 of all subject less than th	Average freeboard, an subjects ≥ average freeboard for RTD minus 10 mm Passed Failed All ot o. Average faceplane angle, all subjects ≥ average for RTD minus 10° Passed Failed s' Failed				
 List angle – The angle surface of the water and the left and right shoulder of the ears if only the head is 	a line between or a line through	Lifejacket light location: the lifejacket light should permit over as great a segment hemisphere as is practicable.	it to be visible of the upper	Does the location of the lifejacket light permit it to be visible over				

Inflatable lifejackets (Adults & Child)	Manufacturer: _ Model: Lot/Serial Num	oer:	Date: Time: Surveyor: Organization:
2.2.2.23 Children's lifejac test	ket – 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 Procedu	ıre	Acceptance Criteria	Significant Test Data
Without readjusting the li subject should jump vertical feet first, from a height of holding the arms over the entering the water, the te relax to simulate a state of The freeboard to the m recorded after the test subj The test should be repeate at least 4.5m.	ally into the water, at least 1m while he head. Upon st subject should f utter exhaustion. nouth should be ect 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)= ≤ 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 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. I likely from any jump or drop should be rejected or the test from a lower height precautions demonstrate th required test is acceptable.	acket during water iry. Upon entering et should relax to exhaustion. The bould be recorded to rest. hments should be if injury is believed test, the lifejacket test delayed until or 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; 	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
NOTE: JUMP AND DROP NOT BE REPEATED IN TH		.3 have no damage that would affect its in-water performance or buoyance;	Did the lifejacket have damage that would affect its in-water performance or buoyance?: Yes / No

2.2.2.23 Children's lifejacket – Water perform test	nance 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.	and .4 have no damage to its attachments.	Did the lifejacket have damage to its attachments?: Yes / No Comments/Observations				

(Adults	le lifejackets & Child)	Manufacturer:					Time:
2.2.2.23 drop tes		ket – Water pe	rformance tests	– Jump and	Regula 2.10.3	tions: LSA Co	ode II/ 2.2.1.8, 2.1.5.6; MSC.81(70)1/2.9, 2.8.8, 2.8.9and
TEST DA	ATA SHEET (1 m Jum	(ar					
Subj	Subject surfaced faceup? (Yes/No)		Lifejacket became dislodged (Yes/No)	Subject was harmed? (Yes/No)		amage to ejacket or tachments ′es/No)	Comments/ Observations
1						•	
2							
3							
4							
5							
2.2.1.23 drop tes	Children's lifejac ts ATA SHEET (4.5 m Ju	-	rformance tests	– Jump and	Regula 2.8.9	tions: LSA Co	ode II/ 2.2.1.8, 2.2.1.2.5; MSC.81(70)1/2.9, 2.8.8 and
Subj	Subject surfaced		Lifejacket	Subject wa		amage to	Comments/ Observations
Subj	faceup? (Yes/No)	(mm)	became dislodged (Yes/No)	harmed? (Yes/No)	life at	einage to ejacket or tachments ′es/No)	
1							
2							
3							
4							
5							

(A dulta 8 Obilet)	ufacturer: el: Serial Number:		Surveyo	or:				· · · · · · · · · ·			
2.2.2.24 Infant and children's life stability test	Regulations: LSA Code II/2.2.1.8, 2.2.1.4; MSC.81(70) 1/2.8.10, 2.9.2, 2.10.3										
Test Procedure	Acceptance Criteria				Signi	ficant Te	est Data	I			
The test subject should attain a rela face-up position of static balance ir water. The subject should be instru	the not roll any subject face down in ted the water.				oject roll face- ? (Yes/No)		Did the subject retu stable face-up posi (Yes/No)				
to assume a foetal position as foll "place your elbows against your si			Can	didate	F	TD	Can	didate	RTD		
your hands on your stomach, under	the	Subj	cw	ccw	cw	ccw	cw	ccw	cw	ccw	
lifejacket if possible, and bring knees up as close to your ches possible." The subject should be rotated clock around the longitudinal axis of the t by grasping the subject's shoulder upper areas of the lifejacket so tha subject attains a 55 ± 5 degree list. subject should then be released. subject should then be released. subject should then be conducted the subject rotated counter-clockwis The entire test should then be repe with the test subject wearing the RT The test should be conducted u lifejackets that have been inflated automatically and manually, and with one of the compartm	as 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) (f) \leq (h) with e. ted D. sing oth llso	1 2 3 4 5 6 7 8 9 9 	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	

Inflatable lifejackets (Adults & Child)	Model:	rer: Number:		Surveyor:	Time:			
2.2.2.25 Infant and children	's lifejacket	- Mobility test	Regulation	.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 considetermining the acceptability for approval and should be comobility when wearing the size RTD when climbing out co going up and down stairs, pic article from the floor, and the from a cup.	n 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	nformation				
	2.2.3.1.1	General data and specifications				
	2.2.3.1.2	Submitted drawings, reports and documents				
2.2.3.2	Visual insp	pection				
	2.2.3.2.1	Approval marking				
		Expiry marking				
	2.2.3.2.3	Additional markings				
	2.2.3.2.4	•				
	2.2.3.2.5	5				
	2.2.3.2.6	Construction and materials				
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	lrop test				
2.2.3.8	Switch arr	angement test				
2.2.3.9	Vibration t	est				
2.2.3.10	Mould gro	wth test				
2.2.3.11	Corrosion	and seawater resistance test				
2.2.3.12	Test for oi	l resistance				
2.2.3.13	Rain test and watertightness test					
2.2.3.14	Fire test					

2.2.3 LIFEJACKET/IMMERSION SUIT LIGHTS EVALUATION AND TEST REPORT

Manufacturer	
Туре	
Date	
Place	
Name Surveyor printed	
Signature	
Approving Organization	

Lifejacket/immersion suit lights Manufacturer: Model: Lot/Serial Number:			Date: Surveyor: Organization:	Time:				
2.2.3.1.1 General data and specifications				Regulations: LSA Code; MSC.81(70)				
General Ir	nformatio	on	Life	jacket Light Dimensions	Lifejacket Light Weight			
TYPE OF SWITCHING:	Autom Manua				Detail of Buld, Battery & Voltages Comments/Observations			
FLASHING								
LIGHT STEADY								
LIGHT								

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Lifejacket/immersion suit Manufacturer: Model: Model: Lot/Serial Number: Lot/Serial Number:			Date: Surveyor: Organization:	Time:		
2.2.3.1.2 Submitte	d drawin	igs, reports and				
			Submitted drawings and documer	ts		Status
Drawing No.	Revis	ion No. & date	Т	itle of drawing		

	01-11-1		
Report/Document No.	Revision No. & date	Title of report / document	Status
		Maintenance Manual -	
		Operations Manual -	

Lifejacket/immersion suit lights	Model:	umber:	Surveyor:	Date: Time: Surveyor: Organization:			
2.2.3.2 Visual Inspection	า		Regulations: 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		Acceptance	ce Criteria	Si	ignificant Test Data		
Twenty lifejacket lights should in detail for the following items:		The lifejacket lights should:		<u>Results:</u>			
Approval marking			approval information including hich approved it, and any ;		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 switching; where applicable, information on proper battery disposal by the words: "DO NOT INCINERATE / DO NOT RECHARGE / DO NOT TAMPER". 			FAIL: FAIL: FAIL: FAIL: FAIL:		
				Comments/Obser	vations		

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Model:		r: ımber:		Date: Surveyor: Organization:		·
2.2.3.2 Visual Inspection	(continued)		Regulation	s: 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	e Criteria		Si	ignificant Test Data
		The lifejacket lights should:			<u>Results:</u>	
Electrical short circuit protection	n	- be provided with electric prevent damage or injur		iit protection to	PASS:	FAIL:
Visibility when attached to a life	jacket	 be visible over as great hemisphere as is praction lifejacket; 			PASS:	FAIL:
Construction and materials		- be constructed with prop materials; and	per workman	ship and	PASS:	FAIL:
		- if the light is a flashing li manually operated swite		ded with a	PASS:	FAIL:
Colour of lifejacket light		- be of an international or comparably highly visibl will assist detection at s	le colour on a	orange, or a Il parts where this	PASS:	FAIL:
					Comments/Observ	vations

Lifejacket/immer	sion suit	Manufacturer:	-	ate:	Time:			
lights	Sion Suit	Model:		Surveyor:				
•	· ·	Lot/Serial Number:		rganization:				
lifejacket and imi	mersion sui	t light test flow chart						
				lights 1 through 4:	Light test (hot) 2.2.3.3			
		rature Cycling (12 lights in groups of 4)		lights 5 through 8:	light test (cold) 2.2.3.3			
	2.2.3.2			lights 9 through 12:	light test (ambient) 2.2.3.3			
	Any one of	f the 12 lights - Chromaticity Test 2.2.3.4						
Visual	Any one of	f the 12 lights - 4.5 m drop test 2.2.3.5 Same light: Light sau test (ambient) Ch	ime light: promaticity	y Test				
Inspection (all 12	Any one of		ame light: Chromaticit	ty test				
lights) 2.2.3.1	Any one of 2.2.3.7	f the 12 lights - Switch arrangement testsame light subjected	d to Vibrati	ion test 2.2.3.8				
		f the 12 lights - 28 day mould growth test aived) 2.2.3.9						
		f the 12 lights - Corrosion and seawater test (may be waived) 2.2.3.10						
	Any one of	f the 12 lights - Oil resistance test 2.2.3.11						
	Any one of	f the 12 lights - rain test and watertightness test 2.2.3.12						
	Any one of	f the 12 lights - fire test 2.2.3.13						

Lifejacket/immersion suit lights	Manufacturer:			Date: Surveyor: Organization:			
2.2.3.3 Temperature cycling	test	-	Regulatio	ons: LSA Code 1.2.2.2; MS	SC.81(70) 1/ 1.2/1.2.	1/1.2.2/10.3/10.3.1/10.3.2	
Test	Procedure		Accept	ance Criteria	Si	gnificant 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 twelve lifejacket lights:						FAIL:	
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:			rigidity unde tests, shou as shrinkii ion or chang	s should show no sign of er high temperatures and, ld show no sign of damage ng, cracking, swelling, ge of mechanical qualities after the test.	times spent at eac	e cycling chart to record h temperature.	
.1 8 h exposure at a min completed in 1 day; and	imum temperature of +65°C to be d						
same day and left expo	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 the specimens 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.							
After having passed the tempe be subjected next to the light	erature cycling test the lights should tests.						

Lifejack lights	et/immersion suit	Model:	urer:		Date: Surveyor: Organization:		ime:	
2.2.3.3 Temperature cycling test – Test data HOT CYCLE					Regulations: LSA Code 1.2.2	.2; MSC.81(70) 1/ 1. COLD C		1/10.3.2
Cycle 1	Date In: Time In: Temperature:		Date Out: Time Out: Duration:		Date In: In : Temperature :	Time	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:		Date Out: Time Out: Duration:		Date In: In: Temperature:	Time <u>°</u> C	Date Out: Time Out: Duration:	
Cycle 4	Date In: Time In: Temperature:		Date Out: Time Out: Duration:		Date In: In: Temperature:		Date Out: Time Out: Duration:	
Cycle 5	Date In: Time In: Temperature:		Date Out: Time Out: Duration:		Date In: In: Temperature:		Date Out: Time Out: Duration:	
Cycle 6	Date In: Time In: Temperature:		Date Out: Time Out: Duration:		Date In: In: Temperature:		Date Out: Time Out: Duration:	
Cycle 7	Date In: Time In: Temperature:		Date Out: Time Out: Duration:	hours	Date In: In: Temperature:		Date Out: Time Out: Duration:	
Cycle 8	Date In: Time In: Temperature:		Date Out: Time Out: Duration:		Date In: In: Temperature:		Date Out: Time Out: Duration:	
Cycle 9	Date In: Time In: Temperature:		Date Out: Time Out: Duration:		Date In: In: Temperature:		Date Out: Time Out: Duration:	
Cycle 10	Date In: Time In: Temperature:		Date Out: Time Out: Duration:	hours	Date In: In: Temperature:		Date Out: Time Out: Duration:	hours

Lifejacket/immersion suit lights	Model:	umber:		Date: Time: 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		Acceptan	ce Criteria		Signi	ficant 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 life which have passed the temper 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 cycline be taken from ordinary room co be operated immersed in f ambient temperature. If the voltage at 5 min of oper than the recorded voltage at to it is permissible to use a las same build standard for the test. Using the lowest record light output test can be ca described below. The voltage units should be monitored cor 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.	uld be taken of -30°C and n seawater at ejacket lights rature cycling a stowage be operated mperature of s which have og test should onditions and reshwater at ation is lower he end of life mp from the e 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 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 l 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 es 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 id is not less than er minute and that ast 0.75 cd in all	PASS: Recorded voltage at t Voltage at 5 min of op Lowest recorded volta Details of three lights Al luminous intensity, detai8ls, color of light attached here for eac a) Taken form -3 b) Taken from +6	peration: age: selected for light output test hours of operation, flash and Voltage data is to be h light 50°C: 55°C: rdinary room conditions:

Lifejacket/immersion suit lights	Model:	er: umber:		Date: Surveyor: Organization:		
2.2.3.4 Light tests (continu	ed)		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		Acceptano	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 (No No.70 contains further inform lowest voltage light of the cold test sample lot, the highest ver 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 the 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 second s	$\left[\frac{t}{t}-t_{1}\right]_{max}$		Comments/Observations	

Lifejacket/immersion suit lights	Manufacture Model: Lot/Serial N	er: umber:	Surv	: eyor: inization:	Time:
2.2.3.4 Light tests (continue	ed)		Regulations: LS 10.3.2/10.3.5/ 10		.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		Acceptanc	ce Criteria		Significant Test Data
The first measurement should 0° (horizontal) and should co taken in azimuth angle at 5° single measurement at 90 Luminous intensity should be a vertical direction, beginning of the light source at the por recorded light output, and recorded through an arc measured data of luminous voltage should be documente After having passed the light t should be subjected to the test.	ontinue to be intervals to a 0° (vertical). measured in at the center oint of lowest _continuously of 180°. All intensity and d. ests one light	Flashing lights with a flash du may be considered as f measurement of their luminous upper hemisphere. The time i and reaching the required lumi time) and all time spent below t when the light switches off figure 10.4.1.) Figure 10.4.1 "On time" measu	fixed/steady light s intensity. Such li intensity in all direc- interval between s nous intensity (inca the required lumino should be disreg	s for the ghts should ctions of the witching on andescence bus intensity	Comments/Observations

Lifejacket/immersion suit lights	Manufacturer: Model: Lot/Serial Number: _	 	Date: Time: Surveyor:		
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	
2.2.3.5 Chromaticity test Test Proced One lifejacket light which has should be tested for chromatici lies within the boundaries of th diagram specified for each colo Commission on Illumination (C The chromaticities of the lifeja measured by means of colori equipment which is calibrate National or State Standards Publ. No.15.2 contains for Measurement on at least four hemisphere should be taken.	ure passed the light tests ty 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).	aticity coordi of the area c ies of the area ving corner c 0.300 0.300 0.344 0.278 d on Colours	ns: LSA Code 2.2. ia nates should fall of the diagram as a for white lights oordinates: 0 0.440 3 0.382 of Light Signals,		

Lifejacket/immersion suit lights	Manufacturer: Model: Lot/Serial Number:			Date: Time: Surveyor: Organization:		
2.2.3.6 Drop test			Regulations: LSA Code 2.2.1.5.6; MSC.81(70) 1/ 10.3.3			
Test Procedure		Acceptance Criteria		Significant Test Data		
				jure the wearer, e illuminated and n the water. unctioning within ensity of not less In freshwater a should have been ntinue to provide d in all directions		
	Manufacture	er:		Date:	Time:	
--	---	--	-------------	--------------------------	--------------------------	-----------------
Lifejacket/immersion suit lights	Model:			Surveyor:		
	Lot/Serial N	umber:	i . i	Organization:		······
2.2.3.7 2 m light drop test			Regulation	ns: MSC.81(70) 1/	10.3.4	
Test Procedure		Acceptano	ce Criteria		Signifi	icant 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.		capable of providing a luminous intensity of not less than 0.75 cd for a period of at least 8 h when operated immersed		<u>Results:</u> PASS:	FAIL:	
After this test the light should b ordinary room conditions a immersed in freshwater temperature.	ind operate	g colo di			Comments/Observatio	ons
The light should be subjected light tests (see 2.2.3.3).	I next to the					
2.2.3.8 Switch arrangement	test		Regulation	ns: MSC.81(70) 1/	10.3.5/10.3.5.1/10.4/10.	.4.3
Test Procedure		Acceptano	ce Criteria		Signifi	icant Test Data
If a manual switch is fitted, arrangement test should be ca		The light must function proper	ly.		<u>Results:</u>	
One lifejacket light which has visual inspection should be sub switch arrangement test.					PASS:	FAIL:
A test person wearing imm gloves, must be able to switch light in its normal operational and off three times. After having passed t arrangement test the light subjected next to the vibration	the lifejacket position on he switch should be				Comments/Observatio	ons

Lifejacket/immersion suit lights	Model:	er: umber:	Surveyor:	Time:	
2.2.3.9 Vibration test		Regulat	ions: LSA Code 1	.2.2.1/1.2.2.8; MSC.81(70) 1/ 10.4/10.4.1
Test Procedure		Acceptance Criteria		Sig	nificant Test Data
The lifejacket light which has switch arrangement test subjected to a vibration test	should be	The lifejacket light should be constructed workmanship and materials	d with proper	<u>Results:</u>	
IEC 60945:2002, paragraph 8	.7.	The lifejacket light should function after	the test.	PASS:	FAIL:
				Comments/Observa	ations

Lifejacket/immersion suit lights	Model:	er:				ne:
2.2.3.10 Mould growth test			Regulatior	s: LSA Code 1.2.	2.4; MSC.81(70) 1	/ 10.4/10.4.2
Test Procedure		Acceptanc	e Criteria		5	Significant Test Data
One lifejacket light which has visual inspection should be the mould growth test. The lif	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 spra aqueous suspension of mo containing all the following cul	ying with an ould spores	There should be no mould gra and the lifejacket light should t			PASS:	FAIL:
Aspergillus niger; Aspergi Aureobasidium pullulans; I variotii; Penicillium Penicillium ochro- chloron; S brevicaulis; and Trichodern The lifejacket light should then a mould growth chamber whic maintained at a temp 29°C +/- 1°C and a relative hu less than 95 %. The period of should be 28 days. After this lifejacket light should be inspe (Note: The mould growth to waived where the manufactur produce evidence that th materials employed will satisfy	Paecilomyces funiculosum, copulariopsis na viride. be placed in ch should be erature of midity of not of incubation s period the cted. est may be er is able to ne external				Comments/Obse	rvations

Lifeja lights	acket/immersion suit s	Model:	er: umber:		Date: Surveyor: Organization:	Time	:
2.2.3	.11 Corrosion and s	eawater resi	stance test	Regulatior	s: LSA Code 1.2.	2.4; MSC.81(70) 1/ 1	0.4/10.4.4
	Test Procedure		Acceptanc	e Criteria		Sig	nificant Test Data
visua corro	lifejacket light which has I inspection should be su sion and seawater res	ibjected to a istance test	The lifejacket light should be ounduly affected by seawater.			<u>Results:</u>	
accor parag	rding to IEC graph 8.12.	60945:2002,	Furthermore, the lifejacket li requirements of IEC 60945:20			PASS:	FAIL:
(Note .1	e: If there are no exposed the Corrosion and Resistance Test new 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 er is able to the external					
.3	Automatic activated ve be prevented from swit the test.)						
.4	Where the exposed me the automatic switch function test after the cannot be done.	sensor, the					

Lifejacket/immersion suit lights	Model:	er: umber:		Surveyor:		
2.2.3.12 Test for oil resis	tance		Regulation	ns: LSA Code 1.2.	2.4; MSC.81(70) 1/ 1	0.4/10.4.6
Test Procedure		Acceptanc	ce Criteria		Sigi	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/Observa	FAIL: tions	
2.2.3.13 Rain test and wa	itertightness	test	Regulation	ns: LSA Code 1.2.	2.4/1.2.2.8; MSC.81(7	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. After having passed the ra lifejacket light and the com source should be immersed under not less than 300 mm o for at least 24 h. Automatic activated version prevented from switching durin	bjected to a 60945:2002, ain test the plete power horizontally f fresh water should be	The lifejacket light should be rot-proof The lifejacket light should comply with the requiremen IEC 60945:2002, paragraph 8.8.2 and should function the rain test. After the water-tightness test the lifejacket light should function and there should be no evidence of water ins the lifejacket light.		uld function after light should	<u>Results:</u> PASS: Comments/Observa	FAIL: tions

Lifejacket/immersion suit lights	Manufactur Model: Lot/Serial N	er: lumber:	Date: Surveyor: Organization: _		
2.2.3.14 Fire Test		Regulation	ons: LSA Code 2.	2.1.1; MSC.81(70) 1	/ 10.4/10.4.8
Test Procedure		Acceptance Criteria		Signi	ficant Test Data
Test Procedure One lifejacket light which has visual inspection should be su fire test. A test pan not less th 35 cm x 6 cm should be p essentially draught-free ar should be put in the bottom of 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 lifejack more than 25 cm above the the test pan so that the exposure to the flames is at lease	bjected to a han 30 cm x laced in an rea. Water the test pan followed by nimum total . The petrol bwed to burn ejacket light o the flames, ket light not top edge of duration of	Acceptance Criteria The lifejacket light should not sustain b melting after being totally enveloped in a at least 2 s and after being removed from The lifejacket light should function after	a fire for a period of m the flames.	Signi <u>Results:</u> PASS: Comments/Observati	FAIL:

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) CONSTRUCTION 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) Manufacturer: Model: Lot/Serial Number:					Surveyor:		Time:
2.2.4.1.1	Buoyancy cali		R	egulations: L			Annex 1, Appendix
	Test Proce	dure		Acceptance	e Criteria		Significant Test Data
the overall between the maintained The buoya allowable shrinkage stabilizes. I have stabili be checked and then a used for te may require with buoya for certifica At the time distribution adjusted to achieve the -up" inserts front and in may need inserts from within toler the back o	buoyancy and dia he front and back d within a tight tole ancy of a new F tolerance range or compression Until the buoyanc lized, buoyancy a d at regular intervant testing, whichever i re more frequent ancies within toler ation testing. me of manufac n of buoyancy in o be within 1.3 is tolerance, thin I s) may have been nside front foam in to increase the s n time to time to k rance, or may nee	RTD may exceed the e until the normal of the foam inserts ies of the foam inserts and distribution should vals (perhaps weekly), hereafter or whenever s longer (frequent use checks). Only RTDs rance should be used ture the left-to-right the front inserts was N of each other. To layers of foam ("make inserted between the heserts. The test house size of these make-up eep these parameters ed to add buoyancy to r trim buoyancy, if the	² buoyancy dis	tribution is cal the total buoyan of 6.5 mm thick or areas, an is o be replaced. I ue, measure th t the proper d I difference) be	culated by div ncy foam is requir inside front o f the front buoy le buoyancy of listribution of l	r back insert vancy is under f the right and buoyancy (no	Left front buoyancy: N Right front buoyancy: N Total front buoyancy: N Total back buoyancy: N Total buoyancy: N Buoyancy distribution: % in front Make-up inserts added/removed: Foam inserts replaced: Comments:

Reference test device (RTD)	Manufacturer: Model: Lot/Serial Number:		Surveyor:	Time:
2.2.4.1.2 Construction va	alidation – General	Regulations: LS	A Code 2.2.1.4	; 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. Wh necessary to conduct a full of the dimensions of the foam, a of one out of every five RTDs made of a representative sa foam pieces against the dim the appropriate annex to th recommendation on testing of appliances (resolution MSC.8	heck of all spot check should be ampling of ensions in e Revised life-saving	hould 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)	Manufacturer: Model: Lot/Serial Number:		Surveyor:	Time: on:
2.2.4.1.3 Construction Valic measurements	dation – Fabric and Webbing	Regulations	: LSA Code 2	2.2.1.4; MSC.81(70) Annex 1; MSC.1/Circ.1470, 3
Test Pro	ocedure	Acceptance Crit	eria	Significant Test Data
Establish reference point on small mark on the shoulder se edge of the neck seam.		This mark will be the refe for measuring distances and back panels.		
Vertical webbing. Measure fro vertical webbing.	The vertical webbing shout ± 6.5 mm of this point.	uld be within	Vertical webbing distance: mm Pass Fail	
Shoulder loop. Measure the point to the location where the webbing first passes under the	he inside edge of the yellow	This distance should be 7	3 ± 6 mm.	Shoulder loop distance: mm Pass Fail
Chest strap. Measure the distant to the top of the chest strap.	ance from the reference point	This distance should be 1	68 ± 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 416 ± 3 mm.		Waist belt distance: mm Pass Fail
Front panel length. Measu reference point to the bottom		This distance should be 4	89 ± 6 mm.	Front panel length mm Pass Fail
Back panel length. Measu reference point to the bottom		This distance should be 5	50 ± 6 mm.	Pass Pail 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	Regulations: LSA Code 2.2.1.4; MSC.81(70) Annex 1; MSC.1/Circ.1470, 3					
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 (RTD) Manufacturer: Model: Lot/Serial Number:				Surveyor:					
2.2.4.2.1 Buoyancy calib	oration		Regulatio	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	t and back of the	Front Buoyancy ¹	63 N	65.4 N	60.6 N	Left front buoyancy: N			
tolerance.	wiunin a ugni	Back	25 N	26.2 N	23.8 N	Right front buoyancy: N			
The buoyancy of a new RTD		Buoyancy				Total front buoyancy: N			
allowable tolerance range u shrinkage or compression of	the foam inserts	Total Buoyancy	88 N	91.6 N	84.4 N	Total back buoyancy: N			
stabilizes. Until the buoyanc inserts have stabilized, distribution should be chec	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 when	ind then at least	¹ values at or co	prrected to stan	e Buoyancy distribution:% in front					
testing, whichever is longer (fir require more frequent check	requent use may	² buoyancy distr by the total bue		ancy					
with buoyancies within toler used for certification testing.		At the time of mar in the front inserts	s was adjusted	er.					
To check buoyancy tolerance need to be removed from th		To achieve this to achieve the cum	ulative insert b	buoyancy. If b	uoyancy of a n	ew			
care that all trapped air is checking buoyancy and t maintained in their proper reinstalled (considerable e	hat layers are sequence when	device exceeds the upper limits, one layer per compartment may be altered or replaced to bring the unit into compliance. The test house may need to add make -up layers from time to time to maintain the front-to-back and side-to-side insert tolerances. If the				est Foam inserts replaced: to			
needed to remove entrapped intact device).	front buoyancy buoyancy of the r of buoyancy (no r and left front pane	ight and left sid nore than a 1.	des so that the 3 N difference	proper distribut	ion				

Deference test device Model		per:		Time:		
2.2.4.3.1 Buoyancy calib			Regulatio	ons: LSA Cod	e 2.2.1.4; MSC.81(7	70) Annex 3, Appendix
Test Procedu	re		Accept	ance Criteria		Significant Test Data
To achieve repeatability in testing, the overall buoyancy of buoyancy between the from RTD must be maintained tolerance. The buoyancy of a new RTD allowable tolerance range shrinkage or compression of stabilizes. Until the buoyand inserts have stabilized, distribution should be che- intervals (perhaps weekly), a monthly thereafter or whe testing, whichever is longer (f require more frequent cheo with buoyancies within toler used for certification testing. To check buoyancy tolerand need to be removed from t care that all trapped air is checking buoyancy and f maintained in their proper reinstalled (considerable e needed to remove entrapped intact device).	human subject y and distribution at and back of the within a tight may exceed the until the normal the foam inserts cies of the foam buoyancy and cked at regular and then at least never used for frequent use may sks). Only RTDs rance should be	the total buoys 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, n that the proper	Design 42 N 29 N 71 N 59.2 % in front orrected to stand ibution is calcul 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 temperatu lated by dividir ated	Min 39.6 N 27.8 N 67.4 N 57.7 % in front ure and pressure ng the front buoyancy a new device exceed a new device exceed intain the front-to-bac buoyancy is under the right and left sides so 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 in front y by Make-up inserts added/removed: % Foam inserts replaced: comments: k

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	
Name Surveyor printed	
Signature	
Approving Organization	

Immersion suits (non-isolated) Manufacturer:								
2.3.1.1 General data an	d specifications	Regulations: LSA Code II/2.3; MSC.81(70) I/3.1 & 3.2						
Construction Material:		Additional equipment:					Donning instructions:	
Fabric produced by:		Retro reflective material produced by:			Type:		□ YES □ NO	
Туре:		Whistle produced by (if fitted):			Type:			
Buoyant material produced by:		Life-line produced by (if fit	ted):		_Туре			
Туре:		Light produced by (if fitted):		_ Туре:			

Immersion suits (non-isolated)	n-isolated) Lot/Serial Number:		Date: Surveyor: Organization:	_ Time:			
2.3.1.2 Submitte	ed drawings, reports a						
	Submitted drawings and documents						
Drawing No.	Revision No. & date	Tit	le of drawing				
		Submitted reports and documents	6		0 1 1		
Report/Document No.	Revision No. & date	Title of	report / document		Status		
		Maintenance Manual -					
		Operations Manual -					

	Manufacturar		Data: Tima:				
Immersion suits	Manufacturer:		Date: Time:				
(non-isolated)	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 Convent 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, nal 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. irred to institute a quality control procedure fances are produced to the same standard pliance approved by the Administration and tion tests carried out in accordance with the	Quality Ass Quality Ass	ssurance Used: ssurance Procedure: ssurance Manual: on of System:				
			ssurance System acceptable Yes No s/Observations				

Immersion suits (non-isolated) Manufacturer: Model: Lot/Serial Number:			Surveyor:	Date: Time: Surveyor: Organization:		
2.3.1.4 Visual inspection		Regul	ations: LSA C	Code I/1.2.2, II/2.3.1.1.3 & 2.3.1	1.1.4	
Test Procedure		Acceptance Criteria		Significan	it Test Data	
Non-insulated immersion suit a .1 be clearly marked w information including the which approved it, date of and any operational restric	vith approval Administration ⁻ manufacturer			Passed	Failed	
instructions, general info	.2 be provided with labels giving operating instructions, general information and manufacturers details as appropriate;			Passed	Failed	
.3 be fitted with approved patches of retro- reflective material with a total area of at least 400 cm ² and with 100 cm ² on the back if the suit does not automatically turn the wearer face up according to resolution A.658(16).				Passed	Failed	
				Comments/Observations		

Immersion suits (non-isolated)			Surveyo		Tir or: zation:	ne:
2.3.1.4 Visual inspection (C	ontinued)	Reg	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,	2.13.1.6
Test Procedu	re		Acceptance Criteria		Signifi	cant Test Data
Does the non-insulated imm whole body with the exception		the	Be of an international or vivid or a comparably highly		Passed	Failed
Are the hands covered, or immersion suit equipped with gloves?			colour on all parts where this wi detection 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	
Is the non-insulated immersion suit fitted with a whistle complying with paragraph 2.2.1.14 of the LSA Code?					Passed Passed	
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.					Comments/Observations	

Immersion suits (non-isolated)	Manufacturer: Model: Lot/Serial Number:			Date: Surveyor: Organization:			
2.3.1.5 Test subjects		Regulations: L	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 Procedu	ıre	Ac	ceptance Criteria		Significan	t Test Data	
At least six able-bodied perse 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> 1.4m - 1.6m; 1.6m - 1.8m over 1.8m	Weight 1 person under 1 person over 6 1 person under 1 person under 1 person over 8	ölkg	Male/Female Subject No.1 Subject No.2 Subject No.3 Subject No.4 Subject No.5 Subject No.6 Comments/Observations	<u>Height</u>	<u>Weight</u>

Model:		·	Surveyor:	Dr: Time: Dr: zation:					
2.3	.1.6 Test with a lifeja	acket	Regulations: LSA Code II/2.3.1.5; MSC.81(70) 1/3.1.2						
	Test Procedu	ıre	Acceptance Criteria		Significant Test Data				
life	he suit is to be worn in jacket, the lifejacket should t for the tests prescribed in	d be worn over the			Manufacturer of lifejacket:	Туре:			
					Manufacturer of lifejacket:	_			
					Туре:	_			
					Manufacturer of lifejacket:	_Type:			
					Comments/Observations	-			
2.3	.1.7 Test clothing		Regulations: LSA Code II/2.3.1.1.	0) 1/3.2.6 to 3.2.8					
	Test Procedu	ıre	Acceptance Criteria		Significant Test Data				
	e test subjects should wear thing consisting of	a standard range			Did all test subject use the specified test clothing				
 .1 underwear (short sleeved, short legged) .2 shirt (long sleeved) .3 trousers (not woollen, and .4 woollen socks 				□ YES □ NO					
.5 in addition to the clothing the test subject should wear two woollen pullovers during the thermal protective tests.				Comments/Observations					
.6	If suit is to be worn in lifejacket, the lifejacket sho the thermal protective test	ould be worn during							

Immersion suits Model:		ber:	Date:							
2.3.1.8 Donning test (1)		Regulations: LSA Cod	Regulations: LSA Code II/2.3.1.1.1; MSC.81(70) 1/3.1.3							
Test Procedu	ire	Acceptanc	ce 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 test clothing (see 2.3.1.) less than 2 min. This ti time to don any associa orally inflated chamber lifejacket, if such is to b with the immersion suit.	don and secure the immersion suit over their test clothing (see 2.3.1.7) 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.		Donning time Time Pass Fail Subject No.1sec sec Subject No.2sec sec Subject No.3sec sec Subject No.4sec sec Subject No.5sec sec Subject No.6sec Subject No.6sec Comments/Observations Subject No.6sec					
2.3.1.8 Donning test (2)			Regulations: LSA C	ode I/2.	2.3.1.1.1; MSC.81(70) 1/3.1.4					
Test Procedure		Acceptan	ce Criteria		Significant Test Data					
The immersion suit should be capable of The		The test subject should be a	Acceptance Criteria test subject should be able to complete this ta n.		Donning time at - 30°C Time Subject No.1sea Subject No.2sea Subject No.3sea Subject No.4sea Subject No.5sea Subject No.6sea		d Failed			

Immersion suits (non-isolated)	Manufacturer: Model: Lot/Serial Number:	Surveyor:	Time:
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	Acceptar	nce Criteria	Significant 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 	vertical ladder n; sociated with	on in walking, bending over or eter of the pencil should be	Restriction in walking, bending over or arm movement: YES NO All the test subjects were able to pick up a pencil and write: YES NO All the test subjects were able to put on the lifejacket without assistance: YES NO All the test subjects were able to put on the lifejacket without assistance: YES NO All the test subjects were able to perform all duties associated with abandonment, assist others and operate a rescue boat: YES NO All the test subjects were able to climb up and down a vertical ladder of 5 meter in length: YES NO All the test subjects were able to climb up and down a vertical ladder of 5 meter in length: YES NO

Immersion suits (non-isolated)	Manufacturer: Model: Lot/Serial Number:		Date: 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: ≥	: 120°			
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 120mm 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.5 Subject No.6 Comments/O		Mouth Freeboard	Nose Freeboard	Light P (Y/N)	Postion	ok?

Immersion suits (non-isolated)	Manufacturer: Model: Lot/Serial Number:			Date: Surveyor: Organization:	Time:		
2.3.1.12 Righting test			Regulations	: LSA Code II/2.3.	3.1.2; MSC.81(70) 1/3.1.8		
Test Procedure		Acceptan	ce Criteria		Significant Test Data		
either a non-insulated immersion suit or a non-insulated in non-insulated immersion suit with a 5 s, the test sul		Except where it has be non-insulated immersion suit v 5 s, the test subjects should e turn themselves from a face-de more than 5 s.	vill right the te ach demonst	est subjects within trate that they can	Subject No.1 Subject No.2		
2.3.1.13 Water ingress and j	jump test		Regulations: MSC.81(70) 1/3.1.9				
Test Procedure		Acceptan	ce Criteria		Significant Test Data		
The test subjects should pre-w non-insulated immersion suit a weighed. Following a jump into from a height sufficient to total the body, each test subject sho weighed again. Weighing should be perfor machine accurate to ± 100g.	and then be o the water ly immerse ould be	The difference in the combine the suit should not exceed 500		e test subject and	Mass difference ≤ 500g Pass Fail Subject No.1		

Immersion suits (non-isolated)	Model:	Surveyor:			Time:		
2.3.1.14 Jump test	1		Regulation	ns: LSA Code II/	2.3.1.3.3; MSC.81(70) 1/3.1.10		
Test Procedure		Acceptan	ce Criteria		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 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.		dislodged in any way. The test subject should not be		Passed Subject No.1 Subject No.2 Subject No.3 Subject No.4 Subject No.5 Subject No.6 Comments/Observations	Failed		
2.3.1.15 Leak test		Regulations: LSA Code II/2.3.1.1.1; MSC.81(70) 1/3.1.11					
Test Procedure		Acceptance Criteria		Significant Test Data			
 The test subject should immersion suit and be weigh 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	Indicate which alternative is used ☐Alternative 1 ☐Alterna Water ingress ≤ 200g Passed Subject No.1 Subject No.2 Subject No.3 Subject No.4 Subject No.5 Subject No.6 Comments/Observations		

Immersion suits (non-isolated)	Model:	er:		Date: Surveyor:			
	Lot/Serial N	umber: Organization:					······································
2.3.1.16 Swimming and v	vater emerge	nce test	Regulation	ns: LSA Code II/2.	.3.1.3.4; MSC.8	81(70) 1/3.1.12	
Test Procedure		Acceptanc	e Criteria			Significant Te	
All test subjects, each wearing	n a lifeiacket	All qualified test subjects shou	ld be able to	board the liferaft	1) 25m s	swim and boardir	ng without lifejacket.
but not the suit, should atter 25 m and board a liferaft or ri	npt to swim	or platform while wearing the r			Subject No.1	Passed	Failed
with its surface 300 mm abov					Subject No.1 Subject No.2		
surface.					Subject No.3		
					Subject No.4		
Test subjects who successfu					Subject No.5		
this task should also perform it	wearing the				Subject No.6		
suit.					2) 25 ı	m swim and boar	rding with suit
If designed to be used with a life						Passed	Failed
non-insulated immersion suit tested with the subject also					Subject No.1		
lifejacket.	wearing a				Subject No.2		
					Subject No.3 Subject No.4		
					Subject No.4 Subject No.5		
					Subject No.6		
					3) 25 m swim if required	•	th suit and a lifejacket,
						Passed	Failed
					Subject No.1		
					Subject No.2		
					Subject No.3 Subject No.4		
					Subject No.5		
					Subject No.6		
					Comments/Ob	servations	

Immersion suits (non-isolated)	Model:	umber:	Date: Surveyor: Organization:				
2.3.1.17 Oil resistance t	est	Regulatio	ns: LSA Code; M	SC.81(70) 1/3.1.13			
Test Procedure		Acceptance Criteria		Significant Test Data			
After all its apertures have b non- insulated immersion su immersed for a period of 100 mm head of diesel oil at temperature. The surface oil should then and the immersion suit subject prescribed in 2.3.1.15.	uit should be 24 h under normal room be wiped off	The ingress of water should not exceed a	mass of 200g.	Indicate which alternative is used. □Alternative 1 □Alternative 2 Water ingress ≤ 200g Passed Failed Subject No.1			

Immersion suits (non-isolated)	Manufacturer: Model: Lot/Serial Number:		Date: Surveyor: Organization:	Time:				
2.3.1.18 Alternative oil resis	stance test		Regulation	ns: LSA Code; MS	SC.81(70) 1/3.1.14.1 & .2			
Test Proced	lure	Acce	otance Criter	ia	Significant Test Data			
In lieu of the test for oil res 2.3.1.17 either of the follo conducted. After all apertures have non-insulated immersion suit for a period of 24 h under 100 at normal room temperature weights to keep suit submer should then be wiped off a immersion suit turned inside then be laid on a table suita draining off any leakage and neck aperture by a suitable of suit should then be filled with which should be 300mm abov Representative samples of th seams should be immersed u diesel oil for 24 h. After rem samples should be wiped off b to the following tests: .1 a hydrostatic test of a 1r .2 a tensile test of represent	been sealed, the should be immersed mm head of diesel oil if necessary using ged. Any surface oil nd the non-insulated out. The suit should ble for collecting and be supported at the lesigned hanger. The n water to neck level e the table. The exterior fabric and inder 100mm head of ioval from the oil the lefore being subjected m water head; and	After 1h in this position exceeding a mass of The seam strength sh The samples should so of water	200g nould be not	less than 150 N	Indicate which alternative is used. ☐Alternative 1 ☐Alternative 2 Water ingress ≤ 200g Passed Failed Subject No.1			

Immersion suits	Manufacture Model:	er:		Date: Time: Surveyor:			
(non-isolated) Lot/Serial Number:				Organization:			
2.3.1.19 Fire test			Regulation	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 b test pan to make a minimum t 1 cm followed by enough petr 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 tes the duration of exposure to is 2 s.	ht-free area. bottom of the cotal depth of ol to make a petrol should o burn freely mersion suit ger to ensure eloped 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.		er being removed	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 (non-isolated)	Model:	er: umber:		Date: Surveyor: Organization:	Time:
2.3.1.20 Temperature cycling	g test		Regulatio	ns: LSA Code I/1.2	2.2.2; MSC.81(70) 1/3.1.16
Test Procedure		Acceptanc	e Criteria		Significant Test Data
Test Procedure The following test should be ca two immersion suits The non-insulated immersion so be alternately subjected to so temperatures of -30°C and +6 alternating cycles need in 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 exposed under ordin conditions at a temp 20°C ± 3°C until the next of .3 an 8 h exposure at a temperature of -30°C to be the next day; and .4 the specimens removed fr chamber that same da exposed under ordin conditions at a temp 20°C ± 3°C until the next of .4 the specimens removed fr chamber that same da exposed under ordin conditions at a temp 20°C ± 3°C until the next of .4 the specimens removed fr chamber that same da exposed under ordin conditions at a temp 20°C ± 3°C until the next of .4 the specimens removed fr .4 the specimens removed fr chamber that same da exposed under ordin conditions at a temp 20°C ± 3°C until the next of .4 the specimens removed fr .4 the specimens removed fr .4 the specimens removed fr .5 and .4 the specimens removed fr .5 and .4 the specimens removed fr .5 and .5 and .	suits should surrounding 5°C. These not follow er and the for a total of a minimum e completed d from the day and left hary room berature of day; a maximum e completed rom the cold ay and left hary room berature of	The non-insulated immersion damage such as shrinking, sv of mechanical qualities.	suits should		

Immersion suits (non-isolated) Manufacturer:						Surveyor:			
2.3.1.21	Temperature cy				Regulation	s: LSA Code	,	31(70) 1/3.1.16	
			HOT CYCLE					LD CYCLE	
Cycle 1	Date In: Time In: Temperature:	0	Date Out: Time Out: Duration:		Time	ln: ln: erature:		Date Out: Time Out: Duration:	
Cycle 2	Date In: Time In: Temperature:		Date Out: Time Out: Duration:		Time	In: In: erature:	C	Date Out: Time Out: Duration:	
Cycle 3	Date In: Time In: Temperature:		Date Out: Time Out: Duration:		Time	In: In: erature:		Date Out: Time Out: Duration:	
Cycle 4	Date In: Time In: Temperature:		Date Out: Time Out: Duration:		Time	In: In: erature:		Date Out: Time Out: Duration:	
Cycle 5	Date In: Time In: Temperature:		Date Out: Time Out: Duration:		Time	In: In: erature:		Date Out: Time Out: Duration:	
Cycle 6	Date In: Time In: Temperature:		Date Out: Time Out: Duration:		Time	In: In: erature:		Date Out: Time Out: Duration:	
Cycle 7	Date In: Time In: Temperature:		Date Out: Time Out: Duration:		Time	In: In: erature:		Date Out: Time Out: Duration:	
Cycle 8	Date In: Time In: Temperature:		Date Out: Time Out: Duration:		Time	In: In: erature:		Date Out: Time Out: Duration:	
Cycle 9	Date In: Time In: Temperature:		Date Out: Time Out: Duration:		Time	In: In: erature:		Date Out: Time Out: Duration:	
Cycle 10	Date In: Time In: Temperature:	0C	Date Out: Time Out: Duration:	hours	Time	In: In: erature:		Date Out: Time Out: Duration:	

Immersion suits (non-isolated)	Manufacture Model: Lot/Serial N	er: umber:		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 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; MS			ISC.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 hot 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	
		Vest-type lifejacket Yoke or over-the	-head type lifejacket			
Immersion suits (non-isolated)	Manufacturer: Model: Lot/Serial Number:	Surveyor:	Time:			
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2.3.1.24 Thermal protect	tive test (General)	Regulations: LSA Code	∋ II/2.3.2.1; MSC.81(70) 1/3.2.1 – 3.2.4			
Tes	t 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 subjects Where human subjects are conducted under the sup resuscitation equipment shous safety reasons, ECG should b should be stopped at the wis temperature of hand, foot or I or if the attending physician co When testing with human temperature (rectal temperat region, both hands, calves, for measured. The accuracy of	used, the tests should always be pervision of physician. Emergency uld be available during all tests. For be monitored during every test. Testing sh of the test subjects, or if the skin umbar region should fall below 10° C, onsiders it advisable. In subjects, continuous body core ure) and skin temperature of lumbar pot (foot instep) and heels, should be f the measuring system should be nding measurements should be taken		Comments/Observations			

Immersion suits (non-isolated)	Manufacturer: Model: Lot/Serial Number:			Surveyor:	Time:		
2.3.1.25 Thermal Protect	ive test (Con	tinued)	Regulatio	ns: LSA Code II/2.	3.2.1.2; MSC.81(70) 1/3	.2.9 & 3.2.10	
Test Procedure		Acceptanc	e Criteria			cant Test Data	
Prior to tests, the same amount of water resulting from the water ingress and jump test in 2.3.1.13 should be poured into the		Following immersion each test subject's body core		Same amount of wate ingress and jump test is be poured into the dry s	in paragraph 2.3		
dry suit worn over the dry specified in 2.3.1.7 by the test down.					Beginning of test Subject No.1		normal mperature
Each test subject should w insulated immersion suit subjected to the jump test	previously				Subject No.2 Subject No.3 Subject No.4 Subject No.5		
Following a 1 h period of imm hands gloved, in circulating ca 5° C, each test subject's	nersion, with Im water at +				Subject No.6 Passed	Failed	
temperature should not fall mo below the normal level of t temperature.	ore than 2° C				Pick up a pencil and immersion:		
The non-insulated immersion provide sufficient thermal p ensure that immediately on water after completion o prescribed above each test	f the test subject can				Subject No 1 UYES Subject No 2 YES Subject No 3 YES Subject No 4 YES Subject No 5 YES	□NO □NO □NO □NO □NO	
pick up a pencil as specified ir write.	n 2.3.1.9 and				Subject No 6 _YES Passed	□NO Failed	
					See attached test shee the immersion tests.		es during

Immersion suits (non-isolated)				Surveyor:	Time:		
2.1.3.26 Test sheets for to	emperatures during imm	ersion tests	Regu	ulations:	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	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:				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 ha after 1 hr:			ip at left hand	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		Skin tem	ip at right hand r:	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		Skin terr	np 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:	after 1 hr: Skin temp at left foot (foot instep) after 1 hr:		Skin tem foot (foo after 1 h	ıp at left t 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 left heel after	Skin temp at right foot (foot instep) after 1 hr: Skin temp at left heel	Skin temp at right foot (foot instep) after 1 hr:		Skin tem foot (foo after 1 h	• •	Skin temp at right foot (foot instep) after 1 hr: Skin temp at left heel after	Skin temp at right foot (foot instep) after 1 hr:
1 hr:	after 1 hr:	Skin temp at left he after 1 hr:	el	Skin tem after 1 h	ip at left heel r:	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
- 2.3.2.2 Submitted drawings, reports and documents
- 2.3.2.3 Quality assurance
- 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	
Name Surveyor printed	
Signature	
Approving Organization	

Immersion suits (insulated)	Model:	ıber:		Surveyor:		Time:	
2.3.2.1 General data and sp	pecifications		Regulation	s: LSA Code 2	.3; MSC.81(70) 1	/3.1 & 3.2	
Construction Material:		Additional equipment:				Donni	ng instructions:
Fabric produced by:		Retro reflective material produced by:			Туре:	□YES	□NO
Туре:		Whistle produced by (if fitted):			Туре:		
Buoyant material produced by:		Life-line produced by (if fitted	d):		Туре		
Туре:		Light produced by (if fitted):_			Туре:		

Immersion suits (insulated) Manufacturer: Model: Lot/Serial Num 2.3.2.2 Submitted drawings, reports and do		r:	Surveyor:	Time:	
2.3.2.2 Submitted di	rawings, reports and o				
		Submitted drawings and	documents		Status
Drawing No.	Revision No. & date		Title of drawing		
		Submitted reports and o	documents		
Report/Document No.	Revision No. & date		Title 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 o of the International Conventi- amended, or 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	f a particular type are required by Chapter III on for the Safety of Life at Sea, 1974, as I 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 iances are produced to the same standard opliance approved by the Administration and tion 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					

Immersion suits (insulated)	Manufacturer: Model: Lot/Serial Number:		Surveyor:	Time:	
2.3.2.4 Visual inspection	·	Regulations	s: LSA Code I/1.2.2	2, & II/2.3.1.1.3 & 2.3.1.1.4	
Insulated Immersion suit sho	uld:				
.1 be clearly marked wit information including the Ad which approved it, date of r and any operational restrict	dministration nanufacturer			Passed	Failed
				Passed	Failed
 .2 be provided with labels givi instructions, general informanufacturers details as and .3 be fitted with approved patereflective material with a toreleast 400 cm² and with 100 back if the suit does not a statement of the suit does not a statem	rmation and appropriate; ches of retro- tal area of at 0 cm ² on the automatically			Passed	Failed
turn the wearer face up a resolution A.658(16).	according to			Comments/Observations	

Immersion suits (insulated)	Manufacturer: Model: Lot/Serial Number:			Surveyor:		
2.3.2.4 Visual Inspection	on (continued)		Regulations	s: LSA Code I/1.2.2	2, & II/2.3.1.1.3 & 2.3.1.1.4,	2.3.1.4-6
Test Procedure		Acceptar	nce Criteria		Significant	Test Data
Does the immersion suit cove body with the exception of the		Be of an international or vivid reddish ora comparably highly visible colour on all parts wh assist detection at sea.			Passed	Failed
Are the hands covered, or is t immersion suit equipped with attached gloves?					Passed	Failed
Are their arrangements excessive free air in the legs?					Passed	Failed
Is the immersion suit of h					Passed	Failed
colour?	ingring violoic				Passed	Failed
Is the immersion suit designe 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 w complying with paragraph 2.2 Code?						
Fitted with releasable buoya other means to secure it to a					Passed	Failed
another person in the water & a suitable means to allow reso wearer from the water into rescue craft.	cuer to lift the				Comments/Observations	

Immersion suits (insulated)	Model:			Surveyor:	Time:	
2.3.2.5 Test subjects			Regula	tions: LSA Code I/; M	MSC.81(70) 1/3.1.1	
Test Procedure			Acceptance Criteri	a	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 the same height range.		<u>Height</u> 1.4 m - 1.6 m; 1.6 m - 1.8 m over 1.8 m	HeightWeight1.4 m - 1.6 m;1 person under 60kg 1 person over 60kg1.6 m - 1.8 m1 person under 70kg 1 person over 70kg		Male/FemaleHeightWeightSubject No.1Subject No.2Subject No.3Subject No.4Subject No.5Subject No.6Comments/Observations	
			1 person over 80	(g		
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		a	Significant Test Data	
If the suit is to be worn in con a lifejacket, the lifejacket sho over the suit for the tests p 2.3.2.8 to 2.3.2.16.	uld be worn				Manufacturer of lifejacket:	
					Manufacturer of lifejacket:	
					Manufacturer of lifejacket:	

Immersion suits (insulated)	Manufacturer: Model: Lot/Serial Number:			Date: Surveyor: Organization:	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		Acceptan	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 .4 woollen socks .5 If 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)			Regulation	ns: LSA Code II/2.3	3.1.1.1; MSC.81(70) 1/3.1.3		
Test Procedure		Acceptance Criteria			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 associated clothing, inflate any orally inflated chambers if fitted, and don a lifejacket, if such is to be worn in conjunction with the suit, and the test subjects should be able to don such lifejacket without assistance.			ble to unpac ir test cloth nan 2 min. / associated	ing (see 2.3.2.7) This time should I clothing, and a	Donning time normal clothing Time Pass Fail Subject No.1sec Subject No.2sec Subject No.3sec Subject No.4sec Subject No.5sec Subject No.6sec Subject No.6sec Subject No.6sec		

Immersi (insulate	ion suits ed)	Model:	er: umber:		Surveyor:	Time:	
2.3.2.8	Donning test (2)			Reg	ulations: LSA Code	e II/2.3.1.1.1; MSC.81(70) 1/3.1.4	
	Test Procedure		Ac	ceptance Crit	eria	Significant Test Data	
The immersion suit should be capable of being donned in 5 min at an ambient temperature as low as -30° C. Before the donning test the packed immersion suit should be kept in a refrigerated chamber at a temperature of -30° C for 24 h.		The test subject should 5 min.	d be able to c	omplete this task in	Donning time at - 30°C Time Pass Fail Subject No.1sec sec Subject No.2sec Subject No.3sec Subject No.4sec Subject No.5sec Subject No.6sec Subject No.6sec Subject No.6sec		
2.3.2.9	Ergonomic Test		•	Regu	lations: LSA Code	II/2.3.1.3.2; MSC.81(70) 1/3.1.5	
	Test Procedure		Acceptance Criteria	Significant Test Data			
subjects .1 Cl of .2 Pe	earing the immersion should be able to: limb up and down a ve f at least 5 m in length erform all duties ass	ertical ladder ı;	There should be no restriction in walking, bending over or arm movement.	□YES □ All the test s All the test s □YES □	NO ubjects were able to ubjects were able to NO	over or arm movement: pick up a pencil and write: □YES □NO put on the lifejacket without assistance:	
	bandonment; and				operate a rescue boa	t: DYES DNO	
di	o pick up a pencil an iameter of the penci -10 mm.			All the test subjects were able to climb up and down a vertical ladder of 5 meter in length: YES INO Comments/Observations			

Immersion suits (insulated)	Model:	er: umber:		Date: Surveyor: Organization:		Time:		
2.3.2.10 Field of vision test			Regulations: LSA Code II/2.3.1.1.3; MSC.81(70) 1/3.1.6					
Test Procedure A		Acceptano	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.				Field of vision angle 120° Passed Failed Subject No.1				
2.3.2.11 Flotation test			Regulatio	ns: LSA Code II/2.	3.1.1; MSC.81	I(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	The test subject should float fa of the water by at least 120mm For a buoyant insulated imi lifejacket, an auxiliary mear orally inflated bladder behind used to obtain this freeboard obtained without the auxiliar least 50 mm. The position of the lifejacke visible over as great a segm as is practicable.	n and be stat mersion suit ns of buoya d the weare l, provided th ry means of t light should	ble in that position. worn without a ncy such as an r's head may be nat the freeboard f buoyancy is at d permit it to be	Subject No.3 Subject No.4 Subject No.5		Nose Freeboard = ↓ 	

Immersion suits (insulated)	Model:	mber:		Surveyor:			
2.3.2.12 Righting test			Regulations: LSA Code II/2.3.1.2; MSC.81(70) 1/3.1.8				
Test Procedure		Acceptano	ce Criteria			Significant Test D	ata
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.		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 Comments/Ol	Passed	Failed	
2.3.2.13 Water ingress and	jump test		Regulati	ons: MSC.81(70) 1/3	5.1.9		
Test Procedure		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	Mass differen Subject No.1 Subject No.2 Subject No.3 Subject No.4 Subject No.5 Subject No.6 Comments/Ol	Passed	Failed

Immersion suits (insulated)	Manufacturer: Model: Lot/Serial Number:		Date: Time: 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 Procedure		Acceptance Criter	ia	Significant Test Data	a				
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.		Passed Subject No.1 Subject No.2 Subject No.3 Subject No.4 Subject No.5 Subject No.6 Comments/Observations	Failed				
2.3.2.15 Leak test		Regulations: LSA Code II/2.3.1.1	.1; MSC.81(70) 1/3	3.1.11					
Test Proced	dure	Acceptance Crite	eria	Significant Test Data					
 The test subject should pre-wand be weighed. The test subject should pre-wand be weighed. The test subject of the follow. .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 shou 100g. 	bject should then be owing: water of 1h; or a distance of at least ighed again after the	The ingress of water into the pre- not exceed a mass of 200g.		Indicate which alternative is used. □Alternative 1 □Alternative Water ingress ≤ 200g Passed Subject No.1 Subject No.2 Subject No.3 Subject No.4 Subject No.5 Subject No.6 Comments/Observations	2 Failed				

Immersion suits Manufacturer:			Date: Surveyor: Organization:		Time:				
2.3.2.16 Swimming and v	water emerge	ence test	Regulations	egulations: LSA Code II/2.3.1.3.4; MSC.81(70) 1/3.1.12					
Test Procedure		Acceptar	ice Criteria			Significant Test D	ata		
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 lif immersion suit should be test subject also wearing a lifejack	iould attempt feraft or rigid in above the ally complete t wearing the fejacket, then sted with the		uld be able to		Subject No.1 Subject No.2 Subject No.3 Subject No.4 Subject No.5 Subject No.6	and boarding witho Pass Pass and boarding with i Pass Pass	ut lifejacket. Fail 		

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Immersion suits (insulated)	Model:	r: ımber:		Date: Time: Surveyor: Organization:				
2.3.2.17 Oil resistance test			Regulations: LSA Code; MSC.81(70) 1/3.1.13					
Test Procedure Acceptan		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 temperature The surface oil should then be the immersion suit subjected prescribed in 2.3.1.15.	mersed for a nead of diesel e. wiped off and	The ingress of water should no	ot exceed a	mass of 200g.	Indicate which alternative is used. □Alternative 1 □Alternative 2 Water ingress ≤ 200g □Pass Fail Subject No.1			

Immersion suits (insulated)	Model:	umber:		Surveyor:				
2.3.2.18 Alternative oil resis	stance test		Regulation		de; MSC.81(70) 1/3.1.14			
Test Procedure		Acceptance (Criteria		Significant Test Data			
In lieu of the test for or prescribed in 2.3.2.17 eit following tests may be conduct After all apertures have beer immersion suit should be immersion suit should be immersion of 24 h under 100 mm h oil at normal room temperature using weights to keep suit sub surface oil should then be wipe immersion suit turned inside should then be laid on a table collecting and draining off any be supported at the neck a suitable designed hanger. Th then be filled with water to nec should be 300mm above the to Representative samples of fabric and seams should be under 100mm head of diesel After removal from the oil should be wiped off before bei to the following tests: .1 a hydrostatic test of a 1m and .2 a tensile test of representation is to the following tests of the test of test of the test of test of the test of	her of the sted. In sealed, the mersed for a lead of diesel e if necessary merged. Any ed off and the out. The suit e suitable for leakage and perture by a e suit should ck level which able. The exterior re immersed oil for 24 h. the samples ing subjected water head	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 1 □Alternative 2 Water ingress ≤ 200g Pass Pass Fail Subject No.1			

Immersion suits (insulated)	Manufacture Model: Lot/Serial No	: Date: Surveyor: mber: Organization:						
2.3.2.19 Fire test			Regulations: 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 placed in an essentially draw Water should be put in the fit test pan to make a minimum 1 cm followed by enough pet minimum depth of 4 cm. The then be ignited and allowed for 30 s. If necessary, the ir should be draped over a han 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.	ght-free area. bottom of the total depth of rol to make a petrol should to burn freely nmersion suit ger to ensure eloped in the ne suit 25 cm st 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? □YES □NO Comments/Observations			

-	ersion suits lated)	Model:	er: umber:	Surveyor:		
2.3.2.20 Temperature cycling test				Regulation	ns: LSA 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 carried out on two immersion suits.		arried out	The immersion suits should sh as shrinking, swelling dissoluti qualities.			(See following page for test data) Passed Failed
The immersion suits should be alternately subjected to surrounding temperatures of - 30°C and +65°C. These alternating cycles need not follow immediately after each other and the following procedure, repeated for a total of 10 cycles, is acceptable:					Comments/Observations	
.1	an 8 h exposure at temperature of +65 completed in one day; a	°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;	me 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 same exposed under ordi conditions at a tempera ± 3°C until the next day.	e day and left inary room ature of 20°C				

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

Immersion suits (insulated)	Model:	er: umber:	Date: Surveyor: Organization:	Time:				
2.3.2.22 Buoyancy test			Regulatio	ns: LSA Code II/2.3	3.1.8; MSC.81(70) 1/3.1.17		
Test Procedure		Acceptanc	e Criteria			Significant Test D	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.					kg % Pa	Buoyancy 2 kg assed d Comments/Obs	%difference servations	
2.3.2.23 Strength test			Regulations: LSA Code; MSC.81(70) 1/3.1.18					
Test Procedure		Acceptance Criteria			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.		test.	be damage		Passed		ed	

Immersion suits (insulated)	Manufacturer: Model: Lot/Serial Number:	Date: Surveyor: Organization:	
2.3.2.24 Thermal prote	ctive test (General)		
Те	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 falling rate of the core temp after the first half hour, if the lumbar region should fall bell considers it advisable. When testing with human temperature (rectal temperat region, both hands, calves, for measured. The accuracy of	e used, the tests should always be bervision of physician. Emergency buld be available during all tests. For all be monitored during every test. at the wish of the test subjects, if the berature is more than 1.5°C per hour e skin temperature of the hand, foot or ow 10° C, or if the attending physician in subjects, continuous body core atture) and skin temperature of lumbar foot (foot instep) and heels, should be of the measuring system should be sponding measurements should be		Comments/Observations

Immersion suits (insulated)	Manufacturer: Model: Lot/Serial Number:			Surveyor:	on: T		
2.3.2.25 Thermal Protect	ctive test (Continued)				de II/2.3.2.2; MSC.81(7		
Test Proce	edure	Acceptar	nce Criteria		Sig	nificant 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 wearin previously subjected to paragraph 2.3.2.14. Followi immersion, with hands glow water at between 0°C and + body core temperature should below the normal level of the	and jump test in e poured into the dry suit ing specified in 2.3.2.7 by ag an immersion suit the jump test in ing a 6 h period of ved, in circulating calm 2°C, each test subject's Id not fall more than 2°C	Same mass of water from test 2.3.2.13, st the immersion suit. Following immersion body core temperatu than 2°C below the subject's temperatur	hould be pou n each test ire should no e normal le	ured into subject's ot fall more	Same mass of water w should be poured into Beginning 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 and w	the immersio End of test Failed	normal temperature
The immersion suit should p 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.	nediately on leaving the immersion, with gloved t +5°C each test subject fied 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 UYES Subject No 2 YES Subject No 3 YES Subject No 4 YES Subject No 5 YES Subject No 6 YES Passed	-	period of immersion:
to pick up a pencil and write as specified i paragraph 2.3.2.9 above may be demonstrate immediately after leaving the water upon completio of the above (6 hr) test.		See attached test sh during the immersior		peratures	Subject No 1 □YES Subject No 2 □YES Subject No 3 □YES	□NO □NO □NO	
		Comments/Observat	tions		Subject No 4□YESSubject No 5□YESSubject No 6□YESPassed□	□NO □NO □NO Failed	

2.3.2.25 Thermal Protective test (Continued) Regulations: LSA Code II/2.3					2; MSC.81(70) 1/,	3.2.11 & 3.2.12	
Test Procedure		Acceptance Criteria			Significant Test Data		
				immersion t		for temperatures	during the

(ineulated) Mod		Manufacturer: Model: Lot/Serial Number:		Date: Surveyor: Organization:			
2.3.2.26 Test sheets for temperatures during immersion tests			Regulations: LSA Coo	Regulations: LSA Code II/2.3.2.2; MSC.81(70) 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 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: er 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 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:	Skin temp at lumbar region after 4 hr : Skin temp at left hand after 4 hr: Skin temp at right hand	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 aft 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: 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: 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:	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	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:	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: Skin temp at left heel after 6 hr:	

Immersion suits (insulated) Manufacturer: Model: Lot/Serial Number:			Surveyor:					
2.3.2.26 Test sheets for temperatures during immersion tests (continued)			Regulations: LSA Coo	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 aff 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 foot (foot Skin temp at left 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 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 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 aff 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 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:	Skin temp at lumbar region after 4 hr : Skin temp at left hand	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 suits Manufacturer: (insulated) Model:		Surveyor:			1 · · · · · · · · · · · · · · · · · · ·
2.3.2.26 Test sheets for temperatures during immersion tests (continued)		Regulations: LSA Cod	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 left 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 after 2 hr: Skin temp at right hand after 2 hr: Skin temp at calves 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:	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 left 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 left heel 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 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:	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 Skin temp at left foot (foot instep) after 4 hr: Skin temp at left foot (foot instep) after 4 hr: Skin temp at left heel after 4 Skin temp at left heel after 4 Kin temp at left heel 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
2.4.8	Donning tests 1 & 2
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2.4.10	Field of vision test
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2.4.13	Water ingress and jump test
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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	
Name Surveyor printed	
Signature	
Approving Organization	

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Anti-exposure suits Manufacturer: Model: Lot/Serial Number:			Date: Time: Surveyor: Organization:				
2.4.1 General data and s	pecifications		Regulations: LSA Code 2.3; MSC.81(70);				
Construction Material:		Additional equipment:				Donning instructio	ns:
Fabric produced by:		Retro reflective material	:	□YES		□YES	
Туре:		Whistle produced:		□YES			
Buoyant material produced by:		Life-line:		□YES			
		Light:		□YES			
Туре:							

Anti-exposure suits 2.4.2 Submitted du	ure suits Manufacturer: Model: Lot/Serial Number: bmitted drawings, reports and documents		Surveyor:	Time:	
	iuwingo, reporto unu (Submitted drawings an	d documents		Status
Drawing No.	Drawing No. Revision No. & date		Title of drawing		
	T	Submitted reports and	l documents		Status
Report/Document No.	Revision No. & date		Title of report / document		Status
		Maintenance Manual -			
		Operations Manual -			

Anti-exposure suits	Manufacturer: Model: Lot/Serial Number:		Surveyor:	_ Time:		
	Lot/Serial Number:		Organization:			
2.4.3 Quality assurance			ns: - MSC.81(70) 2/1.1, 1.2			
of the International Convention for the Safety of Life at Sea, 1974, as			Quality Assurance Standard Used: -			
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.		Quality Assurance Procedure:				
Manufacturers should be requ	ired to institute a quality control procedure	Quality Assurance Manual:				
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.			Description of System.			
		Quality Assurance System acceptable				
		Yes/No				
		Comments/Observations				

Anti-exposure suits	Model:	per:		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)	Acceptanc	ce Criteria		Significant Test Data	
Anti-Exposure suit should:						
Be clearly marked with appro including the Administration w it, date of manufacturer and a restrictions.	which approved				Passed	Failed
Be provided with labels giving servicing details and intervals between servicing, operating instructions, general information and manufacturers details.					Passed	Failed
Be fitted with approved pat reflective material with a total 400 cm ² and with 100 cm ² on suit does not automatically to face up according to resolutio	area of at least the back if the urn the wearer				Passed Comments/Observations	Failed

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2.4.4 Visual Inspection (continued)		Regulations: LSA Code I/1.2	_SA Code I/1.2.2, II/2.4.1.3						
Test Procedure	Acceptanc	ce Criteria	Significant Test Data						
Is the anti-exposure suit of highly visible colour?	Covers the whole body excep permits, the feet; covering for provided by separate gloves an be permanently attached to the	nd a hood, both of which shall	Passed	Failed					
Is the anti-exposure suit designed to be worn without a lifejacket?		sour.	Passed	Failed					
lf yes,	Be of international or vivid red highly visible colour on all parts								
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?			□YES □NO						
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						
Anti-exposure suits	umber:			Surveyor:	Time: : tion:				
---	--	---	--------------	--	--	---	--	--	--
2.4.5 Test subjects Regu					ns: LSA Co	ode II/2.3.1.1.5 & 2.3.1.3.14; MSC.81(70) 1/3.1.1 & 2.8.2			
Test Procedure		Δ	Acceptance C	Criteria		Significant Test Data			
At least six able-bodied perso and females of the following weights should be used. At le not more than two of the perso females with not more than o the same height range.	HeightWeight1.40m - 1.60m;1 person under 60kg1 person over 60kg1.60m - 1.80m1 person under 70kg1 person over 70kgover 1.80m1 person under 80kg1 person over 80kg			Male/FemaleHeightWeightSubject No.1Subject No.2Subject No.3Subject No.4Subject No.5Subject No.6Comments/Observations					
2.4.6 Test with a lifejack	et			Regulatio	ons: LSA Code II/2.3.1.5; MSC.81(70) 1/3.1.2				
Test Procedure		Α	Acceptance C	Criteria		Significant Test Data			
If the anti-exposure suit is to conjunction with a lifejacket, should be worn over the anti-e for the tests prescribed in 2.4.	the lifejacket exposure suit					Manufacturer of lifejacket: Type: Manufacturer of lifejacket: Type: Manufacturer of lifejacket: Type: Manufacturer of lifejacket: Comments/Observations			

Anti-exposure suits	Model:			Date: Surveyor: Organization:	Time:	
2.4.7 Test clothing					MSC.81(70) 1/3.2.6 & 3.2.7	
Test Procedure		Acceptanc	e 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 .4 woollen socks .5 if suits 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 □YES □NO Comments/Observations		
2.4.8 Donning test (1)			Regulation	ns: LSA Code II/2.4	4.1.1.4; MSC.81(70) 1/3.1.3	
Test Procedure		Acceptanc	e Criteria		Significant Test Data	
It can be unpacked and don assistance within 2 min, taking test clothing 2.4.7 and a lifej anti-exposure suit is to b conjunction with a lifejacket.	into account acket if the	Following a demonstration, the to unpack, don and secure the test clothing (see 2.4.7) withou This time should include the clothing, inflate any orally infla a lifejacket, if such is to be anti-exposure suit.	e anti-expos t assistance time to do ted chamber	ure suit over their in less than 2 min. n any associated s if fitted, and don	Donning time with normal clothing TimePassFailSubject No.1secSubject No.2secSubject No.3secSubject No.4secSubject No.5secSubject No.6secComments/Observations	

Anti-exposure suits	Model:	er: umber:	Surveyor:	Date: Surveyor: Organization:		
Anti-exposure suits 2.4.8 Donning test (2) Test Procedur The test subjects should be and don in 5 mins the anti-e ambient temperature of -30° donning test the anti-expos be kept in a refrigerated temperature of -30°C for 24	Lot/Serial N e able to unpack xposure suit in ' C. Before the ure suit should chamber at a		Organization: tions: LSA Code I/2.	4.1.1.4; MSC.81(70) 1/3.1.4	Pass c c c c c c c	Fail

Anti-exposure suits Model:		umber:			Time:	
2.4.9	Ergonomic test			Regulatio	ns: LSA Code II/2.4	4.1.2; MSC.81(70) 1/3.1.5
	Test Procedure		Acceptanc	e Criteria		Significant Test Data
	vearing the anti-exposubjects should be able to climb up and down a ve of at least 5 m in length perform all duties assist abandonment, assist operate a rescue boat; a pick up a pencil and diameter of the penci 8-10 mm.	ertical ladder ociated with other and and write. The	There should be no restriction arm movement. The diamete 8-10 mm.	n in walking		Restriction in walking, bending over or arm movement: □YES □NO All the test subjects were able to pick up a pencil and write: □YES □NO All the test subjects were able to put on the lifejacket without assistance: □YES □NO All the test subjects were able to put on the lifejacket without assistance: □YES □NO All the test subjects were able to perform all duties associated with abandonment, assist others and operate a rescue boat:
						 ☐YES □NO All the test subjects were able to climb up and down a vertical ladder of 5 meter in length: □YES □NO Comments/Observations

Anti-exposure suits	Model:	Surveyo		Time: yor: iization:						
2.4.10 Field of vision test	•		Regulations	s: LSA (LSA Code II/2.4.1.7; MSC.81(70) 1/3.1.6					
Test Procedure		Acceptance C	riteria			Sign	nificant Te	est 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			Regulations	s: LSA (Code; MSC.81(70) 1/3.1.7					
Test Procedure		Acceptance C	riteria		Significant Test Data					
		When wearing the anti- conjunction with a lifejacket subject should float face-up w of the water by at least 120n that position. The freeboard s from the water surface to the n the test subject at rest. The fine exposure suit without a lifejack 50 mm. The position of the lifejacket to be visible over as great a s hemisphere as is practicable.	if required, their mouth ith their mouth nm and be st should be me nose and mou reeboard of the ket should be light should p segment of the	he test as clear able in asured uth with he anti- at least ermit it	Freeboard Subject No.1 Subject No.2 Subject No.3 Subject No.4		Nose (mm) 	Without lifejac Mouth (mm)	n Nose (mm) 	

Anti-exposure suits	Model:	er:		Date: Surveyor: Organization:		ime:		
2.4.12 Righting test			Regulations	s: LSA Code II/2.4.	.3; MSC.81(70)	1/3.1.8		
Test Procedure		Acceptar	nce Criteria			Significant Te	st Data	
Test subjects in fresh water anti-exposure suit complyir requirements of this section sl to turn from a face-down t position in not more than 5 s a stable face-up. The suit sho tendency to turn the wearer moderate sea condition.	ng with the hould be able to a face-up and should be build have no	Except where it has be anti-exposure suit will right th			Righting time = Subject No.1 Subject No.2 Subject No.3 Subject No.4 Subject No.5 Subject No.6 Comments/Obs	Time (s)	Pass 	Fail
2.4.13 Water ingress and	jump test	-		ns: MSC.81(70) 1/3				
Test Procedure			nce Criteria			Significant Te	st Data	
The test subjects should pre-v Exposure suit and then the Following a jump into the v height sufficient to totally it body, each test subject should again. Weighing should be perform achine accurate to ± 100g.	be weighed. vater from a immerse the d be weighed	The difference in the combine the suit should not exceed 50		e test subject and	Mass difference Subject No.1 Subject No.2 Subject No.3 Subject No.4 Subject No.5 Subject No.6 Comments/Obs	Pass		

Anti-exposure suits	Model:	er:		Date: Surveyor: Organization:			
2.4.14 Jump test	Lot/Senal N	umber:	Regulation		4.1.1.2; MSC.81(70) 1/3.1.10		
Test Procedure		Acceptan	ce Criteria		S	Significant Te	st 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.		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/Obs		Fail	
2.4.15 Leak test			Regulations: LSA Code II/2.4.1.1; MSC.81(70) 1/3.1.11				
Test Procedure		Acceptan	ce Criteria		S	Significant Te	st Data
 The test subject should anti-exposure suit and be we test subject should then be instone of the following: .1 a period of flotation in calmor .2 swimming for 20 min for a cleast 200 m The test subject should be we after the task. The weighing machine should to ± 100g. 	eighed. The tructed to do water of 1h; listance of at eighed again	The ingress of water into th exceed a mass of 200g.	e pre-wette	d suit should not	Indicate which a ☐Alter Water ingress ≤ Subject No.1 Subject No.2 Subject No.3 Subject No.4 Subject No.5 Subject No.6 Comments/Obs	native 1 ⊡Alte 200g Pass 	

Anti-exposure suits	Model:	er: umber:		Date: Surveyor: Organization:			
2.4.16 Swimming and wa	ter emergent t	test	Regulatio	ns: LSA Code II/2.4			
Test Procedure		Acceptano	ce Criteria			Significant Te	st Data
All test subjects, each wearin but not the anti-exposure attempt to swim 25 m and boa rigid platform with its surfa above the water surface. Test subjects who successfu this task should also perform i anti-exposure suit. If designed to be used with a li anti-exposure suit should be to subject also wearing a lifejack	suit, should and a liferaft or ace 300 mm ully complete it wearing the fejacket, then ested with the	All qualified test subjects shou or platform while wearing the a	lld be able to		1) 25m swim Subject No.1 Subject No.2 Subject No.3 Subject No.4 Subject No.5 Subject No.6	n and boarding	g with immersion suit

Anti-exposure suits	Model:	Manufacturer: Model: Lot/Serial Number:		Date: Time: Surveyor: Organization:		
2.4.17 Oil resistance te	est	Regulat	ions: LSA Code; M	SC.81(70) 1/3.1.13		
Test Procedure		Acceptance Criter	ia	Significant Test Data		
After all its apertures have be anti-exposure suit should be it a period of 24 h under 100 diesel oil at normal room temp The surface oil should then and the suit subjected to the te in 2.4.15.	immersed for mm head of perature. be wiped off	The ingress of water should not excee	d a mass of 200g.	Indicate which alternative is used. △Alternative 1 △Alternative 2 Water ingress ≤ 200g Pass Fail Subject No.1		

Anti-exposure suits Model:		Surveyor:		Time:
2.4.18 Alternative oil re			lations: LSA Code; M	
Test Procedu	ure	Acceptance C	Criteria	Significant Test Data
		After 1h in this position the leakage exceeding a mass of a		Indicate which alternative is used. □Alternative 1 □Alternative 2
After all apertures have anti-exposure suit should be period of 24 h under 100 mm normal room temperature if weights to keep suit submerg should then be wiped off and suit turned inside out. The suit on a table suitable for collecti any leakage and be suppo aperture by a suitable designed	e immersed for a head of diesel oil at necessary, using led. Any surface oil d the anti-exposure should then be laid ing and draining off orted at the neck			Water ingress ≤ 200g Pass Fail Subject No.1
The suit should then be filled level which should be 300mm	above the table.	The seam strength should be	not less than 150 N.	Strength > 150N Pass Fail The samples should support a 1 m head of water
Representative samples of the seams should be immersed u of diesel oil for 24 h. After re the samples should be wiper	nder 100mm head moval from the oil d off before being	The samples should successfully support 1 m head of water.		Pass Fail
subjected to the following test .1 a hydrostatic test of a 1m .2 a tensile test of representa	water head and			Comments/Observations

Anti-exposure suits Model:		umber:	Date: Surveyor: Organization:	Time:
2.4.19 Fire test		Regulation	s: LSA Code II/2.4	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 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 petr minimum depth of 4 cm. The p then be ignited and allowed to for 30 s. If necessary the anti- should be draped over a hang the whole of the suit is enve flames , with the bottom of th above the top edge of the test the duration of exposure to t 2 s.	ht-free area. ottom of the otal depth of ol to make a petrol should o burn freely exposure suit ger to ensure eloped in the e suit 25 cm t pan so that	The anti-exposure suit should not sustain than 6 s or continue melting after being re flames.		Did the anti-exposure suit continue to burn for more than 6 s or continue melting after being removed from the flames? □ YES □ NO Comments/Observations

Anti-exposure suits Model:			er:		Date: Surveyor: Organization:	
2.4.20) Temperature cyc		amber	Regulation		2.2.2; MSC.81(70) 1/3.1.16
	Test Procedure	ing toot	Acceptanc			Significant Test Data
on tw The alterr temp	ollowing test should be ca o immersion suits anti-exposure suits lately subjected to eratures of -30°C and +6	should be surrounding 65°C. These	The anti-exposure suit's shou such as shrinking, swelling mechanical qualities.			(See following page for test data) PassedFailed Comments/Observations
imme follow	ating cycles need diately after each oth ring procedure, repeated cles, is acceptable:	er and the				
.1	an 8 h exposure at temperature of +65 completed in one day; a	°C to be				
.2	the specimens remove warm chamber that sat left exposed under ord conditions at a tempera ± 3°C until the next day;	me day and dinary room ture of 20°C				
.3	an 8 h exposure at a temperature of -30° completed the next day;	°C to be				
.4	the specimens remove cold chamber that same exposed under ordi conditions at a tempera	day and left nary room				

±	3°C until the next of	day.							
Anti-ex	posure suits	Model:	acturer: ial Number:					Time:	
2.4.21	Temperature		t – Test Data HOT CYCLE		Regulation	s: LSA Code I	/1.2.1; MSC.81 CO	(70) 1/3.1.16 LD CYCLE	
Cycle 1	Date In: Time In: Temperature:	0 ⁰	Date Out: Time Out: Duration:		Time	In: In: perature:	C	Date Out: Time Out: Duration:	
Cycle 2	Date In: Time In: Temperature:		Date Out: Time Out: Duration:		Time	In: In: perature:		Date Out: Time Out: Duration:	
Cycle 3	Date In: Time In: Temperature:		Date Out: Time Out: Duration:		Date Time	In: In: perature:		Date Out: Time Out: Duration:	
Cycle 4	Date In: Time In: Temperature:		Date Out: Time Out: Duration:		Date Time	In: In: perature:		Date Out: Time Out: Duration:	
Cycle 5	Date In: Time In: Temperature:		Date Out: Time Out: Duration:		Time	In: In: perature:	C	Date Out: Time Out: Duration:	
Cycle 6	Date In: Time In: Temperature:	0 ⁰	Date Out: Time Out: Duration:	hours	Time	In: n: perature:	0C	Date Out: Time Out: Duration:	
Cycle 7	Date In: Time In: Temperature:		Date Out: Time Out: Duration:		Time	In: n: perature:		Date Out: Time Out: Duration:	
Cycle 8	Date In: Time In: Temperature:		Date Out: Time Out: Duration:		Time	In: n: perature:		Date Out: Time Out: Duration:	
Cycle 9	Date In: Time In : Temperature:		Date Out: Time Out: Duration:		Time	In: n: perature:		Date Out: Time Out: Duration:	
	Date In:		Date Out:		Date	In:		Date Out:	

Cycle 10 Time In: Tim Temperature: ⁰ C Dur	e Out: ation:hours	Time	n: perature:		Time Out: Duration:	hours
	er:		Date: Surveyor: Organization:		Time:	
2.4.22 Buoyancy test		Regulation	ns: LSA Code II/2.4	4.1.1.1; MSC.	81(70) 1/3.1.17	
Test Procedure	Acceptan	ce Criteria			Significant Tes	t Data
The Anti-exposure suit should have inherent buoyancy of at least 70 N	The difference between the buoyancy should not exceed s				l Buoyancy 2 gkg	%difference %
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.				Passed Comments/C	Faile Dbservations	d
2.4.23 Strength test	Regulations: LSA Code II; MSC.81(70) 1/3.1.18					
Test Procedure	Acceptance Criteria				Significant Tes	t Data
The anti-exposure suit should be immersed in water for a period of 2 min. It should then be removed from the water and closed in	The anti-exposure suit should this test.	not be dama	aged as a result of	Passed	Failed	
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 1350 N should be applied to the parts other than the lifting loop for 30 min. The anti-exposure suit may be cut if necessary to accommodate the test	Vest-type lifejacket Yoke or ov	Ver-the-head typ	e lifejacket	Comments/C	Dbservations	
device.						

Anti-exposure suits	Manufacturer: Model: Lot/Serial Number:	Date: Time: Surveyor: Organization:					
2.4.24 Thermal prote	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 su Administration and has be	alities may be measured using a uch a method is required by an een demonstrated to provide test factorily in all aspects to test results		Comments/Observations				
	they should be medically examined he tests. Each design of immersion ubjects specified in 2.4.5						
conducted under the sup resuscitation equipment sh For safety reasons, ECG test. Testing should be stop if the falling rate of the cor per hour after the first half	e used, the tests should always be ervision of physician. Emergency nould be available during all tests. should be monitored during every ped at the wish of the test subjects, e temperature is more than 1.5° C hour. or if the skin temperature of n should fall below 10° C, or if the ers it advisable.						
temperature (rectal temperature) lumbar region, both hands, should be measured. The should be +/- 0.2°C. Approp	a subjects, continuous body core erature) and skin temperature of calves, foot (foot instep) and heels, accuracy of the measuring system priate corresponding measurements in is used in lieu of human subjects.						
jump test in paragraph 2.4.	ount of water resulting from the 15 should be poured into the dry clothing specified in 2.4.7 by the						

Anti-exposure suits	Anti-exposure suits Model: St			Date: Time: Surveyor: Organization:		
2.4.25 Thermal Protec		inued)		s: LSA Code II/2.4.2; MSC.81(70) 1/3.2.13, 3.2.14		
Test Procedure		Acceptance Criteri	ia	Significant Test Data		
Each test subject should w exposure suit previously sub water ingress and jump test 2.4.13. Following a 1 h immersion, with hands glow donned, in circulating calm w 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 prescri each test subject should be a a pencil as specified in paragr write. The anti-exposure suit sh constructed, that when worr the suit continues to prov thermal protection following of the water which totally submo subject and should ensure th worn in calm water at a tempe the test subject's body core does not fall at a rate of mon per hour, after the first 0.5 h.	pjected to the in paragraph n period of ed and hood ater at + 5°C, te temperature °C below the emperature. e water after ibed in 2.4.24 ble to pick up raph 2.4.9 and hould be so n as marked, ide sufficient one jump into erges the test nat when it is erature of 5°C, te temperature	Same mass of water which of from test 2.4.15, should be p immersion suit. See attached test sheets for during the immersion tests: Comments/Observations	ooured into the	e of test of test temperature Subject No.2		

2.4.25 Thermal Protective test (Continued)				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 tests:	test sheets for temperatures during the immersion		
				Comments/Ob	oservations		

Anti-exposure suits Manufacturer: Model: Lot/Serial Number:				Surveyor:				
2.4.26 Test sheets for te	mperatures during imme	rsion tests	Regulations: LSA Code II/2.4.2.1.2; MSC.81(70) 1/3.2.13 & 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 te	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	mp at left hand	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	after	and Skin ter		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 a 1 hr:	1 hr: <u> </u>	np at calves after	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	r: Skin tem	np at left foot	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 foo (foot instep) after 1 hr	t r: Skin terr	tep) after 1 hr: np at right foot	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:	after	heel Skin te	tep) after 1 hr: mp at left heel	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? □ Yes □ No	core temperature fall at a rate more than 1,5°C per	Did the wearer's bo	1 hr: ody at a Did the per core tem i h? rate mor	perature fall at a	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? □ Yes □ No		

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	
Name Surveyor printed	
Signature	
Approving Organization	

Thermal protective aids	Manufacturer: Model: Lot/Serial Number:	Surveyor:				
2.5.1 General data and s		Regulations: LSA Code II/2.5; MSC.81(70) 1/ 3.3				
General Informa	ation					
Construction Material:		Donning instructions:				
Fabric manufactured by:						
Туре:						
Is the TPA of highly visible c	olour?	□YES □ NO				

Thermal protective aids Manufacturer: Model: Lot/Serial Nur		r: umber:	Date: Time: Surveyor: Organization:					
2.5.2 Submitted d								
			Submitted drawings and document	S		Status		
Drawing No.	Revisio date	n No. &	Titl	e of drawing				
			Submitted reports and documents			01-1-1-2		
Report/Document No.	Revisio date	n No. &	Title of I	report / document		Status		
			Maintenance Manual -					
			Operations Manual -					

Thermal protective aids	Manufacturer: Model: Lot/Serial Number:		Date: Time: Surveyor: Organization:				
2.5.3 Quality Assurance		Regulations: - MSC.81(70) 2/1.1, 1.2					
Except where all appliances of of the International Conventi amended, of the international inspected, representatives of inspections of manufacturer appliances and materials u approved prototype life-saving Manufacturers should be require to ensure that life-saving app as the prototype life-saving app	of a particular type are required by Chapter III ion for the Safety of Life at Sea, 1974, as al Life-Saving Appliances (LSA) Code, to be of the Administration should make random is to ensure that the quality of life-saving used comply with the specification of the g appliance. uired to institute a quality control procedure blances are produced to the same standard opliance approved by the Administration and otion tests carried out in accordance with the	Quality As Quality As Quality As Description Quality As	surance Standard Used: - surance Procedure: - surance Manual: - n of System. surance System acceptable: s/Observations	Yes/No			

Thermal protective aids	Model:	er:		Date: Surveyor: Organization:		_ Time:
2.5.4 Visual Inspection			Regulatio	ns: LSA Code I/1.2.2		SC. 81(70):
Test Procedure		Acceptanc				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		Cover the whole body of pe		ll sizes wearing a	□Yes	□No
whole body of the weare exception of the face?	er with the	lifejacket with the exception of	the face.		□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 mar any operational restrictions. with labels giving servicing intervals between servicing instructions, general inform manufacturer's details.	tly attached n approval dministration pufacture and Be provided details and g, operating					

Thermal protective aids	nermal protective aids Manufacturer: Model: Lot/Serial Number:			Date: Surveyor: Organization:			
2.5.5 Fabric Test - Water r	esistance		Regulation	ns: LSA Code ; MS	SC.81(70) 1/3.3.1		
Test Procedure		Acceptano	ce Criteria		9	Significant 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.		Does the material support a column of water of 2 r high _YES _ NO Test method used: Comments/Observations			
2.5.6 Fabric test - Therma	conductanc	<u>م</u>	Regulation	egulations: LSA Code II/2.5.1; MSC.81(70) 1/3.3.2			
Test Procedure		Acceptan			Significant Test Data		
The thermal conductance of t which the thermal protecti manufactured should be meas	The fabric should have a ther than 7800 W/m²K and shall l used to enclose a person, it sh and evaporative heat loss from	mal conduct be so consti all reduce bo	ucted that, when oth the convective	Passed	attached here.		

Thermal protective aids Model:		Number:		Date: Time: Surveyor: Organization:				
2.5.7 Temperature cycling test			Regulations: LSA Code II/1.2.2.2; MSC.81(70) 1/3.3.3					
	Test Procedure		Acceptance Criteria		Significant Test Data		ta	
A thermal protective aid should be subjected to surrounding temperatures of -30°C and +65°C. These alternating cycles need not follow immediately after each other and the following procedure, repeated for a total of 10 cycles, is acceptable:			The thermal protective aid sho such as shrinking, swelling mechanical qualities			See following	g page for test data. Failed	
.1	an 8 h exposure at temperature of +65 completed in one day;	5°C to be				Comments/C	Observations	
.2	the specimens remove warm chamber that sate left exposed under of conditions at a temperate ± 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	°C to be						
.4	the specimen removed chamber that same exposed under ord conditions at a tempera ± 3°C until the next day	day and left linary room ature of 20°C						

Therma	al protective aids	Manufacturer: Model: Lot/Serial Number:		Surveyo	or:	Time:				
2.5.7	Temperature of	cycling test – Test data		Regulations: LSA C	lations: LSA Code I/1.2.2.2; MSC.81(70) 1/3.3.3					
		HOT CYCLE			COLD CYCLE					
	Date In:	Date Out:		Date In:	In: Date Out:					
Cycle 1	Time In:	Time Out:		Time In:		Time Out:				
	Temperature:	0C Duration:	hours	Temperature:		Duration:	hours			
	Date In:	Date Out:		Date In:		Date Out:				
Cycle 2	Time In:	Time Out:		Time In:		Time Out:				
	Temperature:	⁰ C Duration:	hours	Temperature:		Duration:				
	Date In:			Date In:		Date Out:				
Cycle 3	Time In:	Time Out:		Time In:		Time Out:				
	Temperature:			Temperature:	0 ⁰	Duration:	hours			
	Date In:	Date Out:		Date In:		Date Out:				
Cycle 4	Time In:	Time Out:		Time In:	Time In:		Time Out:			
	Temperature:	⁰ C Duration:	hours	Temperature:	0C	Duration:	hours			
	Date In:	Date Out:		Date In:		Date Out:				
Cycle 5	Time In:	Time Out:		Time In:		Time Out:				
	Temperature:			Temperature:		Duration:				
	Date In:	Date Out:		Date In:		Date Out:				
Cycle 6	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 7	Time In:	Time Out:		Time In:		Time Out:				
	Temperature:			Temperature:		Duration:	hours			
	Date In:	Date Out:		Date In:		Date Out:				
Cycle 8	Time In:	Time Out:		Time In:		Time Out:				
	Temperature:	⁰ C Duration:		Temperature:		Duration:				
	Date In:	Date Out:		Date In:		Date Out:				
Cycle 9	Time In:	Time Out:		Time In:		Time Out:				
	Temperature:	⁰ C Duration:	hours	Temperature:	0 <mark>0</mark>	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:	0	Duration:	hours			

Thermal protective aids	Model:	r: umber:		Date: Surveyor: Organization:	Time:			
2.5.8 Test subjects			Regulatio	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]	Comments/Observations Male/Female Subject 1 Subject 2 Subject 3 Subject 4 Subject 5 Subject 6			
2.5.9 Test clothing			Regulatio	ns: 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 a standard range clothing consisting of .1 underwear (short sleeved, short legged) .2 shirt (long sleeved) .3 trousers (not woollen, and woollen socks .4 in addition to the clothing the test subjects should wear two woollen pullovers during the tests prescribed in 2.5.10; 2.5.11 and 2.5.12. 					Did all test subject use the s □YES □NO Comments/Observations	specified tes	t clothing	

	Manufacturer:			Date: Time:			
Thermal protective aids	Model: Lot/Serial Number:		· · · · · · · · · · · · · · · · · · ·	Surveyor:			
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 able to unpack and do thermal protection aid.		k and don the	TimePassedFailedSubject No.1secSubject No.2secSubject No.3secSubject No.4secSubject No.5secSubject No.6secComments/Observations		
2.5.11 Donning test (2) at	low temperat	ture Regulations: LSA Code II/2.5.3; MSC.81(70) 1/3.3.7					
Test Procedure		Acceptance Criteria			Significant Test Data		
The thermal protective aid capable of being unpacked an an ambient temperature of -30 the donning test the thermal p should be kept in a refrigerated a temperature of -30°C for 24	nd donned at 0° C. Before protective aid d chamber at	The test subjects should be able to successfully unpack and don the thermal protective aid without assistance in a survival craft or rescue boat. The thermal protective aid shall function properly throughout an air temperature range of -30°C to +20°C.		assistance in the second secon	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	Manufacture Model:	urer:		Date: Survevor:	Time:		
	Lot/Serial Number:		·····	Organization:			
2.5.12 Discarding Test			Regulations: LSA Code 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.		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			Regulatio	ns: LSA Code	l/1.2.2.4; MSC.81(70) 1/3.3.9		
Test Procedure		Acceptance Criteria			Significant Test Data		
After all its apertures have been sealed, a thermal protective aid should be immersed under 100 mm head of diesel oil for 24 h. The surface oil should then be wiped off and it should be established the thermal		signs of damage, such as shrinking dissolution or change of mechan thermal conductance should be		king, swelling, qualities. The	Is the thermal conductance of the thermal protective aid not more than 7800 W/m² K? □YES □NO		
conductance of the material.					Is there any sign of damage, such as shrinking, cracking, swelling, dissolution or change of mechanical qualities?		
					□YES □NO		
					Comments/Observations		