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13 ABSTRACT

Describes a method for evaluation of life saving equipment operational and functional performance characteristics of life saving equipment. Designates procedures for preoperational inspection, operator training and familiarization, photographic coverage, physical characteristics, safety, performance tests, environmental testing, transportability, human factors evaluation, reliability, durability, maintenance evaluation, and value analysis. Discusses data required and analytical plans. Not applicable to service testing or environmental testing at climatic test sites.

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KEY WORDS	LINK A		LINK B		LINK C	
	ROLE	WT	ROLE	WT	ROLE	WT
Life Saving Equipment						
Rescue Equipment						
Life Boat						
Life Preserver						
Life Raft						

U. S. ARMY TEST AND EVALUATION COMMAND
SYSTEM ENGINEERING TEST OPERATIONS PROCEDURES

AMSTE-RP-702-109

*Test Operations Procedure 10-2-200 4 March 1972

LIFESAVING EQUIPMENT

		Paragraph	Page
Section I.	GENERAL		
	Purpose and Scope	1	1
	Background	2	2
	Equipment and Facilities	3	2
II.	TEST PROCEDURES		
	Supporting Tests	4	2
III.	SUPPLEMENTARY INSTRUCTIONS		
	Belt Buckle and Web Strength (Life Preservers)	5	4
	Buoyancy (Life Boats and Rafts	6	4
APPENDIX.	REFERENCES		6

SECTION I
GENERAL

1. Purpose and Scope. This TOP describes test procedures for evaluating the operational and performance characteristics of lifesaving equipment. Equipment covered includes: lifeboats, liferafts, (inflatable) and life preservers. From the tests listed in Section II and III, the test director can select those that will satisfy the requirements for the particular test item and the particular test type (i.e., engineering test, initial production test, etc.). Test objectives are to determine conformance of the test items to QMR, MN, or other suitability criteria. The scope of testing will be as selected from II and III to satisfy requirements of the particular test item and test type. For engineering tests, scope will be dependent on the criteria stated in the governing QMR or MN. For initial production tests, scope will be in accordance with the contractual provisions of the applicable military specification and suitability criteria as established by the test directive. This procedure is a basic guide in preparing actual test plans, and may require modification to suit special items.

*This TOP supersedes MTPs 10-2-193 (25 April 1969), 10-2-194 (3 December 1968), and 10-2-195 (12 September 1968), including all changes.

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2. Background. Required equipment for any waterway/marine operation includes life saving or survival gear. The requirement exists for survival equipment capable of storage in relatively small places, which will be sufficient for one man or crew size. In case of disaster the equipment must be readily at hand and capable of saving the lives of the survivors. In an abandon ship situation, life preservers provide only a temporary survival capability, time-in-water considerations necessitate some type of craft to keep survivors out of the water. Where storage space is not a limiting factor, life boats provide the needed capability in most cases. Life boats are more suitable for propulsion than life rafts and when properly equipped, offer more possibilities for survival than that of a floating platform alone. Where storage space is a limiting factor, inflatable life boats, essentially life rafts, are usually utilized. Life saving equipment, because of its emergency nature, will be subjected to long periods of disuse, during which time it must be maintained to the highest degree of operational reliability. Engineering tests, to assure technical conformance to established requirements for life saving equipment must be performed to insure this operational reliability.

3. Equipment and Facilities. Equipment and facilities required are defined in the documents listed in Section II.

SECTION II
TEST PROCEDURES

4. Supporting Tests. Common Engineering MTPs/TOPs, Military Standards, and other published documents to be considered in formulating a test plan are as follows:

	TEST SUBJECT TITLE	PUBLICATION NO.
a.	Pre-operational Inspection	10-3-500
(1)	Inspection Methods	MIL-L-5567D MIL-L-24047 Para 4.7
(2)	Operator Training and Familiarization	10-2-501
(3)	Photographic Coverage	7-3-519
b.	Physical Characteristics	10-2-500
(1)	Tension Testing of Metallic Materials	ASTM STD E8-69
(2)	Flange adhesion	MIL-L-5567D Para 4.7.1
(3)	Adhesion	FED-STD-601 Method 8011
(4)	Strength of seam	FED-STD-191 Method 5100

	TEST SUBJECT TITLE	PUBLICATION NO.
(5)	Seam Separation	MIL-L-5567D Para 4.7.9.2
(6)	Strength of attachments	MIL-L-5567D Para 4.7.10 FED STD 191 Method 5100
(7)	Porosity	MIL-L-16383G Para 4.10.6.1
(8)	Tensile	Para 4.10.6.2
(9)	Belt Buckle and Web Strength (Life Preservers) (Refer to para 5)	
c.	Safety	10-2-508
d.	Performance Tests	
(1)	Life Boat (noninflatable)	
	(a) Waterborne Stability	9-2-251 Para 7
	(b) Watertightness	MIL-B-52515 Para 4.5.2.3
(2)	Life Raft (Inflatable)	
	(a) 4 and 7 man	MIL-L-5567D Paras 4.7.4 thru 4.7.6
	(b) 20 man	MIL-L-9131F Paras 4.7.5 thru 4.7.7
(3)	Life Preservers	
	(a) SCUBA	MIL-L-24047 Para 4.11
	(b) Underarm	MIL-L-38484 Para 4.6
	(c) Underwater Demolition Team	MIL-L-16383G Para 4.10
(4)	Buoyancy (Life Boats and Rafts) (Refer to para 6)	
(5)	Propulsion Characteristics (Boats and Rafts)	9-2-251 Para 6
e.	Environmental Testing	
(1)	Temperature Storage	AR 70-38 MIL-L-5567D Para 4.7.11
(2)	Sunshine	4-2-826
(3)	Rain	2-2-815
(4)	Humidity	4-2-820
(5)	Fungus	4-2-818

TEST SUBJECT TITLE	PUBLICATION NO.
(6) Salt Fog	FED-STD-151B Method 811
f. Transportability	
(1) Road, Rail, Marine	10-2-503
(2) Air	7-2-515
g. Human Factors Evaluation	10-2-505
(1) Anthropometric Requirements	HEL-STD
(2) Donning and Doffing	S-4-65
h. Reliability Confidence Intervals and Sample Size	AMCP 702-3 3-1-002
i. Durability (Endurance Testing)	10-2-502
j. Maintenance Evaluation	10-2-507
k. Value Analysis	USAMC SUPPL 1 to AR 11-26

SECTION III
SUPPLEMENTARY INSTRUCTIONS

5. Belt Buckle and Web Strength. (Life Preservers) The belt buckle and stitching is subjected to a 500-pound load, suspended from a belt webbing loop (over the buckle ring) for a minimum of 10 minutes. The buckle and stitching is inspected at the end of the suspension period and any evidence of failure recorded.

6. Buoyancy. (Life Boats and Rafts)

a. Objective. To determine the buoyancy characteristics of the test item.

b. Method. The test item is placed in water of sufficient depth and then swamped or overturned. Sufficient weight is loaded on or attached to the test item to represent rated capacity. The length of time the test item remains afloat in the swamped or overturned condition, fully weighed to rated capacity, is determined and recorded.

c. Data Required.

(1) Nomenclature and type of test item.

(2) Total weight loaded or attached.

(3) Specific gravity of flotation water.

(4) Total time test item remained afloat.

d. Analytical Plan. The required data are summarized, analyzed and compared with the requirements of the MN to determine conformance to specifications.

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APPENDIX
REFERENCES

1. AR 70-38, "Research, Development, Test, and Evaluation of Materiels for Extreme Climatic Conditions."

2. USAMC Supplement 1 to AR 11-26, "Value Engineering."

3. AMCP 702-3, "Quality Assurance - Reliability Handbook."

4. FED-STD-151B, "Metal, Test Methods."

5. FED-STD-191, "Textile Test Methods", including change 1.

6. FED-STD-601, "Rubber, Sampling and Testing", including change 5.

7. MIL-B-52515, "Boat, Assault; M2, Plywood."

8. MIL-L-5567D, "Life Rafts, Inflatable - 4 and 7 Man."

9. MIL-L-9131F, "Life Rafts, Inflatable, Twenty Man."

10. MIL-L-16383G, "Life Preserver, CO_2, Inflatable, Underwater Demolition Team", including amendment 2 and supplement 10.

11. MIL-L-24047, "Life Preserver, Yoke Type, SCUBA, U.S. Navy Mark 3", including amendment 2.

12. MIL-L-38484, "Life Preservers, Underarm, Pneumatic."

13. American Society for Testing and Materials (ASTM). STD E8-69, "Tension Testing of Metallic Materials."

14. HEL-STD-S-4-65, "Human Factors Engineering Requirements for the Development of U.S. Army Materiel."