LIFESAVING SYSTEMS CORPORATION

LSC Test Report Number: F-730-490
Revision: A

MOLLE Pocket Retention Test

(P/N: 490)



PROPRIETARY & CONFINDENTIAL

THIS DOCUMENT CONTAINS PROPRIETARY INFORMATION OWNED BY LIFESAVING SYSTEMS AND MAY NOT BE DUPLICATED, COMMUNICATED TO OTHER PARTIES OR USED FOR ANY PURPOSE WITHOUT THE EXPRESS WRITTEN PERMISSION OF LIFESAVING SYSTEMS CORP.

Prepared by: Thomas Beach
Thomas Beach, Engineering

Date: 01/21/2020

Reviewed by: Mario Vittone
Mario Vittone, Management

Date: 01/21/2020

Document History				
Revision	Issue Date	Description of Revision/Modification	Revised by	Approved by
A	01/21/2020	Initial release	-	MV

Table of Contents

PURPOSE: 4
ACRONYMS AND ABBREVIATIONS: 4
TEST FACILITY: 4
EQUIPMENT UNDER TEST: 4
SUMMARY OF TESTS PERFORMED & RESULTS: 5
SECTION 1- TEST CONDITIONS & EQUIPMENT: 6
1.1 ENVIRONMENTAL CONDITIONS 6
1.2 TOLERANCES 6
1.3 INSTRUMENTS AND EQUIPMENT 6
1.4 CALIBRATION 6
SECTION 2- VISUAL INSPECTION: 7
2.1 SCOPE 7
2.2 ANALYSIS OF RESULTS 7
SECTION 3- LOAD TEST: 8
3.1 SCOPE 8
3.2 PROCEDURE 8
3.3 ANALYSIS OF RESULTS 9
3.4 PHOTOGRAPHS 10
SECTION 4- FIELD OPERATIONAL TEST: 12
4.1 SCOPE 12
4.2 PROCEDURE 12
4.3 ANALYSIS OF RESULTS 12
4.4 PHOTOGRAPHS 13
APPENDIX A: 16

PURPOSE:

This report describes the methods used for testing pocket attachment strengths integrated on the Triton II rescue harness and vest. The testing was conducted to determine maximum loads associated with each MOLLE and pocket configuration. Successful completion confirms the pockets attached to the MOLLE system are structurally suitable for use during maritime rescue operations.

ACRONYMS AND ABBREVIATIONS:

LSC – Lifesaving Systems Corp.
N/A – Not Applicable
P/N – Part Number
S/N – Serial Number
Lbf – Pound-Force
MOLLE – Modular Lightweight Load-carrying Equipment
PALS – Pouch Attachment Ladder System

TEST FACILITY:

Testing and inspection were performed at Lifesaving Systems Corporation's manufacturing facility located in Apollo Beach, Florida and Brandon Sports & Aquatic Center located in Brandon, Florida by LSC personnel.

EQUIPMENT UNDER TEST:

Part Number	Description	Serial Number
490-HL	Triton II Harness	3248
490-VO	Triton II Vest	281
745-P8	MOLLE f/Icom Radio	-
745-P3	MOLLE Utility Pocket, Small	-
745-P2	MOLLE Utility Pocket, Large	-

SUMMARY OF TESTS PERFORMED & RESULTS:

Section	Test Description	Results
3.3	Load Test	3-strap pockets can withstand a 50lb pull force in all directions without detaching from the MOLLE system. 2-strap pockets can withstand a 50lb pull force in all direction except the vertical upward orientation. The pocket detaches from the MOLLE system at 36lbf.
4.3	Field Operational Test	Pockets do not detach from MOLLE system and hold all equipment from a jump height of 3-meters into water.

SECTION 1- TEST CONDITIONS & EQUIPMENT:

1.1 ENVIRONMENTAL CONDITIONS

Load tests shall be performed at a temperature of 75 ±10°F, and a relative humidity of 50 ±15%. The temperature and humidity shall be recorded at time of test for reference.

1.2 TOLERANCES

All test conditions shall be maintained within all applicable specified tolerances.

Load cell tolerance ± 2lbf.

1.3 INSTRUMENTS AND EQUIPMENT

The primary test equipment consists of the following:

LSC Tool No.	Test Equipment	Description	Cal. Date	Cal. Due
91	Pull Tester	TL-440 Handheld Pull Tester	5/30/2018	5/30/2020
57	RH/Temp Monitor	Temp and Humidity Monitor	6/3/2019	6/4/2020

1.4 CALIBRATION

The instruments and equipment are calibrated according to manufacturer's specifications and calibration is traceable to the National Institute of Standards and Technology (NIST). Calibration records are maintained on file at Lifesaving Systems Corp. Photographs of the calibration stickers can be found in Appendix A. of this report.

SECTION 2- VISUAL INSPECTION:

2.1 SCOPE

A visual inspection of the harness and vest shall be performed prior to load testing. Workmanship shall conform to the quality standards referenced in LSC's quality manual. The quality management system is certified and conforms to AS9100 Rev. D and ISO 9001:2015 standards.

2.2 ANALYSIS OF RESULTS

Description	Pass/Fail	Comments
Material Imperfections-Foreign Object Debris (FOD)	PASS	
Webbing - unclean, cut, malformed or containing nicks or other flaws	PASS	
Component missing, fractured, malformed, or otherwise damaged	PASS	
Component loose or otherwise not securely retained	PASS	
Incorrect assembly or improper positioning of components and pockets	PASS	
Functioning part that works with difficulty	PASS	
Faulty workmanship that would materially reduce performance, reliability, or durability	PASS	

SECTION 3- LOAD TEST:

3.1 SCOPE

The load test is performed to determine the strength and effectiveness of each pocket integration in the Triton vest MOLLE system.

3.2 PROCEDURE

Step 1. Attach each pocket to the front vest listed in Table 1.

Step 2. Lace each pocket to the harness and vest MOLLE system in accordance with the proper PALS lacing methods.

Step 3. Using a clamping fixture, mount the harness to the table in a vertical downward orientation. Insert a tether around the pocket and attach the hook from the pull tester to the tether.

Step 4. Increase the force until 50lbf has been reached or pocket releases from the vest.

Step 5. Record the force at which the pocket strap released and visually inspect the harness and pocket for additional damage.

Step 6. Repeat test for each pocket in the vertical upward, horizontal right and left configurations. Record results.

Table 1.

Part Number	Description	Placement
745-P8	MOLLE f/Icom Radio	Vest, front
745-P3	MOLLE Utility Pocket, Small	Vest, front

3.3 ANALYSIS OF RESULTS

Vertical Downward Orientation:

Part Number	No. of MOLLE Straps	Load Reading (lbf)	Comment
745-P8	2-Strap	55.6	PASS
745-P3	3-Strap	52.4	PASS

Vertical Upward Orientation:

Part Number	No. of MOLLE Straps	Load Reading (lbf)	Comment
745-P8	2-Strap	36.0	Snaps released from pocket
745-P3	3-Strap	52.6	PASS

Horizontal Left Orientation:

Part Number	No. of MOLLE Straps	Load Reading (lbf)	Comment
745-P8	2-Strap	56.6	PASS
745-P3	3-Strap	59.0	PASS

Horizontal Right Orientation:

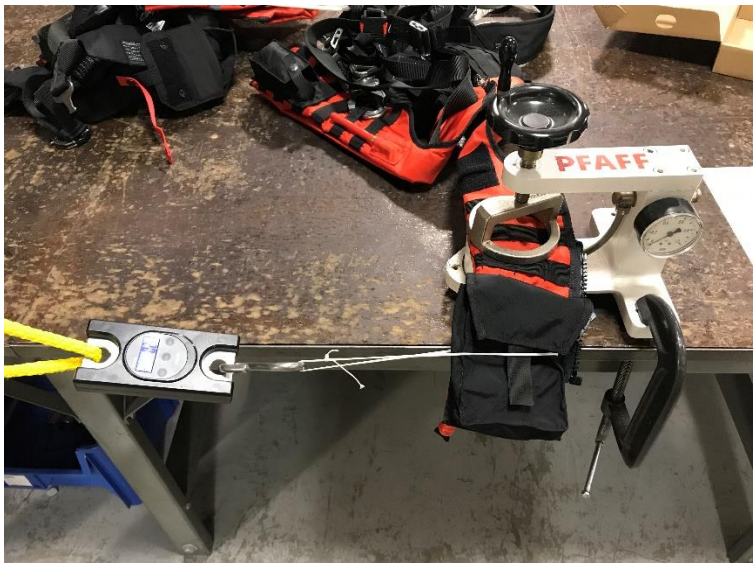
Part Number	No. of MOLLE Straps	Load Reading (lbf)	Comment
745-P8	2-Strap	58.8	PASS
745-P3	3-Strap	62.4	PASS

NOTE: Temp/RH reading at time of test: 74.2°F and 51% RH

3.4 PHOTOGRAPHS



3-Strap Pocket



3-Strap Pocket: Typical Setup and Horizontal Pull



3-Strap Pocket: Typical Setup and Vertical Pull



No Damage



2-Strap Pocket: Typical Setup and Horizontal Pull



Typical Load Cell Reading



2-Strap Pocket: Snaps released at 36.0lbf

In the vertical upward orientation.



No Damage

SECTION 4- FIELD OPERATIONAL TEST:

4.1 SCOPE

The field operational test is performed to provide a degree of confidence that the MOLLE system can physically withstand forces typical of that experienced in the field.

4.2 PROCEDURE

Step 1. Lace all MOLLE pockets to the Triton II rescue harness and vest using proper lacing techniques.

Step 2. Properly don the harness and vest assembly. Refer to the donning procedures illustrated in the owner's manual for proper use.

Step 3. Load each appropriate pocket with an EPIRB, radio, and flashlight.

Step 4. Jump into a body of water from a height of 3-meters – feet first and head first attitudes.

Step 5. Repeat the jump 3 times and record any loss of equipment or loosening of straps that may occur after impact. Record results as Pass or Fail.

4.3 ANALYSIS OF RESULTS

Part Number	No. of MOLLE Straps	Pass/Fail	Comment
745-P8	2-Strap	PASS	No loosening of straps, EPRIP and flashlight in pockets
745-P3	3-Strap	PASS	No loosening of straps, EPRIP and radio in pockets
745-P2	6-Strap	PASS	No loosening of straps, radio in pockets.

4.4 PHOTOGRAPHS

(Video of jump tests available from LSC)



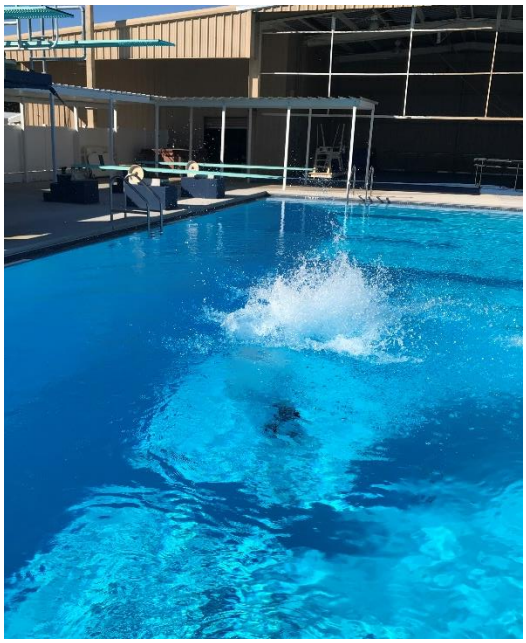
- 3-Strap Pocket: Radio and Flashlight
- 2-Strap Pocket: EPIRB



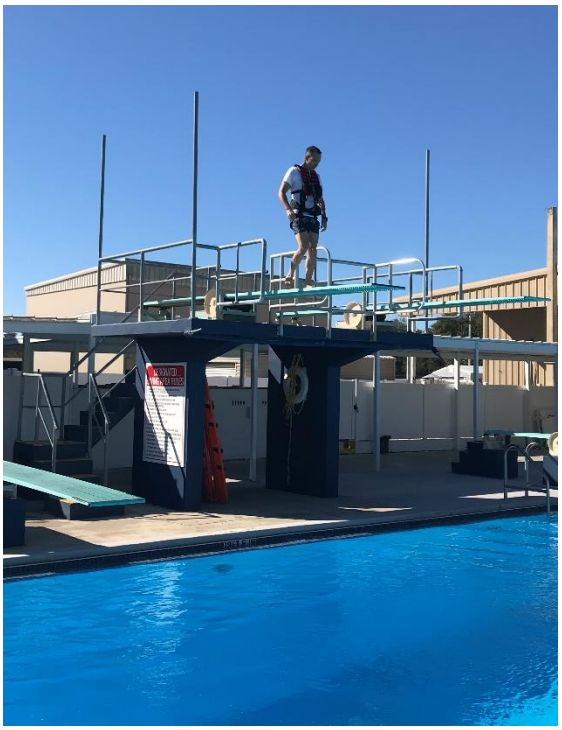
- 2-Strap Pocket: EPIRB (Vest)
- 6-Strap Pocket: Radio (Harness-side)

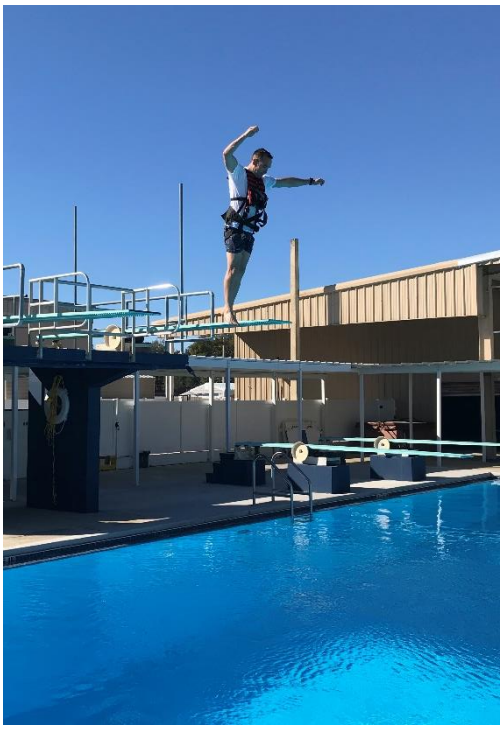


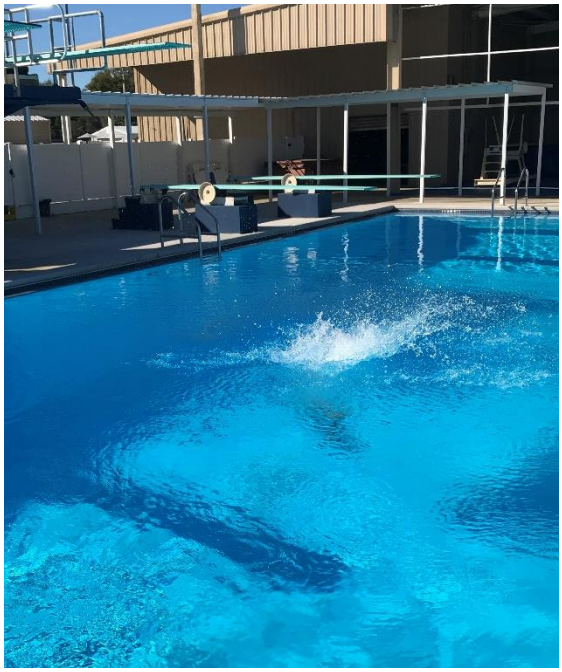


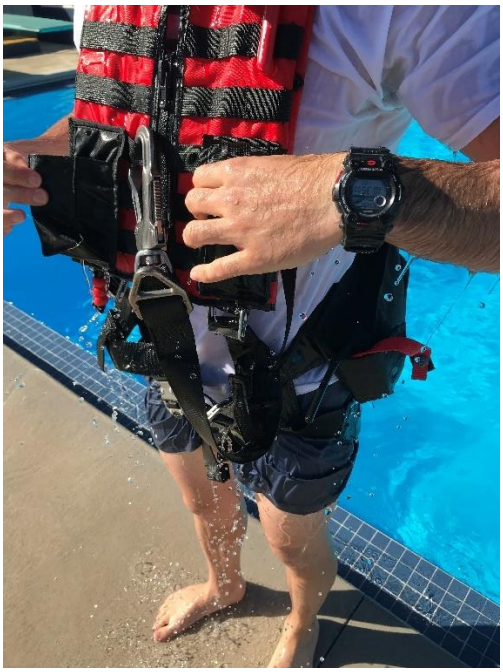












APPENDIX A:



Calibration Sticker on Load Cell