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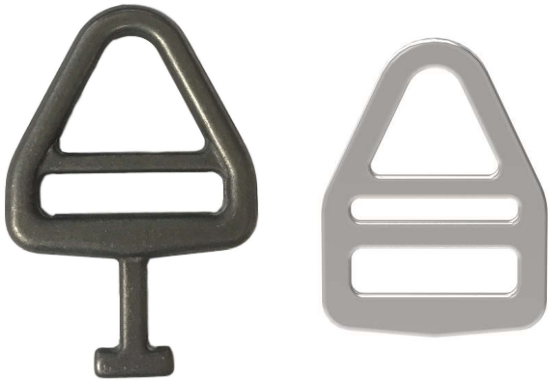
V-Ring Environmental Test Report

Part Number: 487-13F and 487-13S



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Document History

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Contents

INTRODUCTION 4
DESCRIPTION 4
ACRONYMS AND ABBREVIATIONS 4
SECTION 1 - SPECIFICATIONS 5
SECTION 2 – ENVIRONMENTAL TEST 6
2.1 Equipment 6
2.2 Equipment Calibration 6
2.3 Procedure 7
SECTION 3 - RESULTS 8
SECTION 4 – SUMMARY 13

INTRODUCTION

The purpose of this report is to show the strength of the 487-13F and 487-13S load bearing V-Ring. Successful completion shall confirm the 487-13F and 487-13S demonstrates the suitability and safety for use on products designed to aid during helicopter hoist operations, including the deployment and recovery of both equipment and persons.

DESCRIPTION

The #487-13F V-Ring is made of forged corrosion resistant stainless steel and the #487-13S V-Ring is made of stamped stainless steel. The V-Ring is sewn into the webbing loop of the design and serves as the load bearing lifting attachment point on equipment such as rescue harnesses and quick strops.



Quick Strop



Harness

ACRONYMS AND ABBREVIATIONS

°C: Degrees Celsius
°F Degrees Fahrenheit
IAW: In Accordance With
kN: KiloNewton
lbf: Pound-Forces
LSC: Lifesaving Systems Corp.

SECTION 1 - SPECIFICATIONS

487-13F Technical Specifications	
Process:	Forged
Material:	17-4PH Stainless Steel
Heat Treatment:	Solution Heat Treatment and Descaled IAW SAE-AMS 5643
Non-Destructive Proof Load:	4,000lbs (1,814kg)
Finish:	Aluminum Oxide Blast
Passivate:	Remove Surface Contamination & Maximize Corrosion Resistance
Size:	2.40” x 3.5” x .313” (thick) 60.9mm x 88.9mm x 7.95mm (thick)

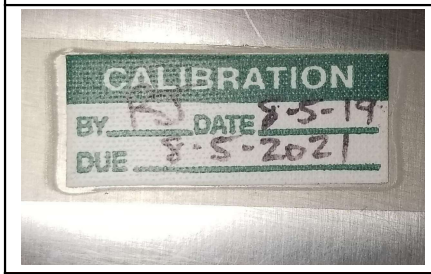
487-13S Technical Specifications	
Process:	Stamped
Material:	T-304 Stainless Steel
Size:	2.40” x 3.24” x .187” (thick) 60.9mm x 82.3mm x 4.7mm (thick)

SECTION2 - ENVIRONMENTAL TEST

2.1 Equipment

No.	Test Equipment	Description
1	Climate Test Chamber	Temperature Control
2	Hydraulic Pull Tester	Force Application
3	10k S-Beam Load Cell	Force Measurement
4	Digital Caliper	Dimensional Measurement

2.2 CALIBRATION

Test Equipment	Description	Calibration Due Date
Climate Test Chamber	Temperature Control	08/05/2021
	• Temperature Control: PLC temperature controller with a range of -70°C to 150°C.	
Test Equipment	**Description**	**Calibration Due Date**
10k S-Beam Load Cell	Force Measurement	07/24/2021
	• Force Measurement: 10,000lb S-Beam load cell (transducer) with one (I) each 0-10,000lbs. • Calibration certification number: 136826 • Sampling rate of 60 Hz	

Test Equipment	Description	Calibration Due Date
Digital Caliper	Dimension Measurement	01/04/2022
	• Measurement: VINCA DCLA-0605 Electronic Digital Caliper.	

2.3 Procedure

1. Pre-Test: Measure the length of V-Ring to be cold conditioned using a digital caliper. Record the measurement.

2. The V-Ring shall be cooled to a temperature of -40°F (-40°C) for 4 hours.

3. The V-Ring shall be attached to the shackles inside the load tester.

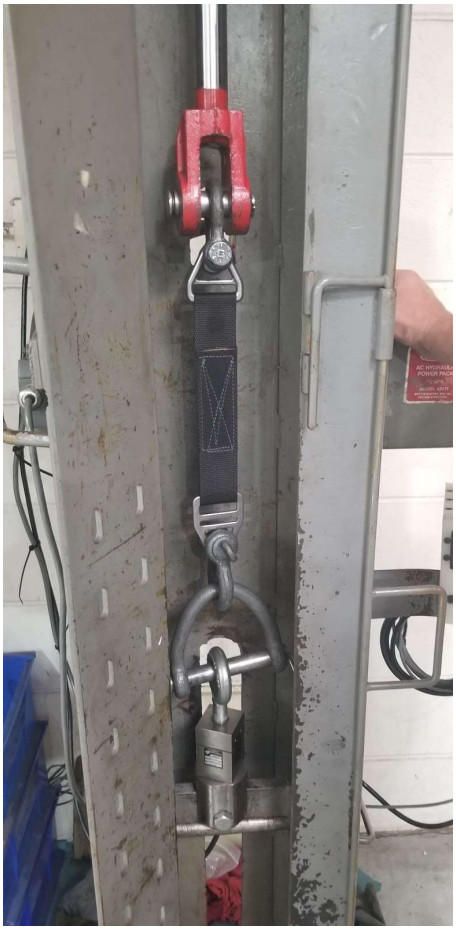
4. Apply a force to the V-Ring in increments of 250lbf every 3 seconds until the target load is reached.

5. After the target load is reached, the force shall be dropped to zero and the V-Ring shall be visually inspected for cracks, deformation, and any defects.

6. The results shall be recorded.

7. The next target load shall be applied or until ultimate failure is reached. Results shall be recorded.

SECTION 3 - RESULTS

487-13F				
Load Force 5,000lbf (22.2 kN)	Measurement		Pass/Fail	Material Distortion (Yes/No)
	Pre-Test	Post-Test		
5,080 lbf (22.6 kN)	3.508”	3.508”	Pass	No
 Reading on Pull Tester (5,080 lbf > 5,000 lbf)	 Post-Test: Dimensional Measurement (inches)		 Post-Test: Pull Tester	

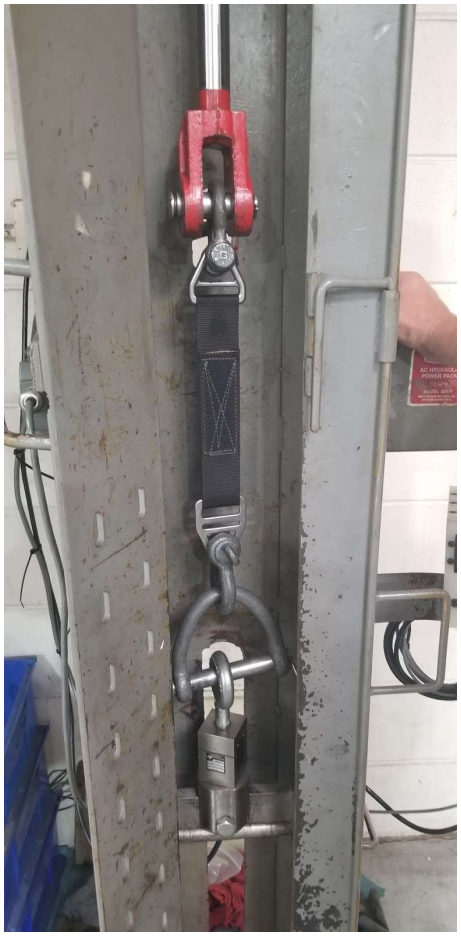
487-13S				
Load Force 5,000 lbf (22.2 kN)	Measurement		Pass/Fail	Material Distortion (Yes/No)
	Pre-Test	Post-Test		
5,080 lbf (22.6 kN)	3.239”	3.254”	Pass	Yes



Reading on Pull Tester
(5,080 lbf > 5,000 lbf)



Post-Test: Dimensional Measurement (inches)



Post-Test: Pull Tester

Pre-Test



Temperature Display with V-rings in Climate Chamber

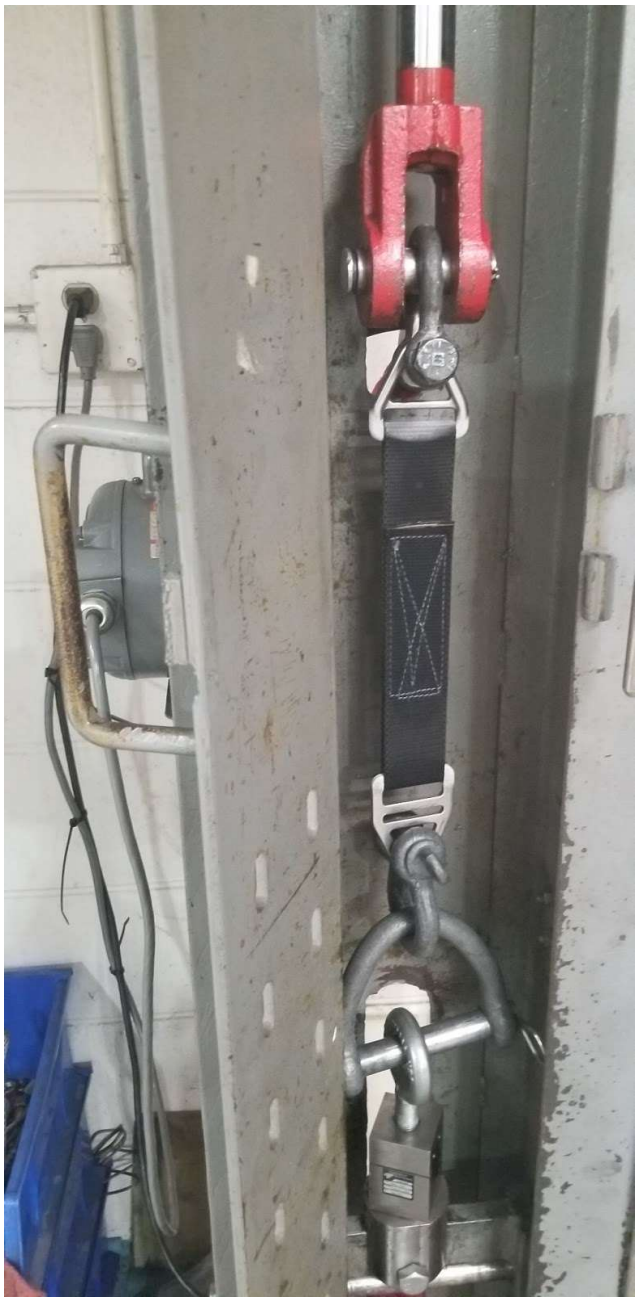


V-Ring in Load Tester

3,000 lbf Result



Force Reading of 3,017 lbf (13.4 kN)



3,000 lbf Result

5,000 lbf Result



Force Reading of 5,080 lbf (22.6 kN)



5,000 lbf Result



Post-test Result

SECTION 4 – SUMMARY

The 487-F and 487-S V-rings can withstand a load force of 5,080lbs without failure when cooled to a temperature of -40℉ (-40℃).