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ENVIRONMENTAL TEST REPORT

Part Number: 384-2-F and 384-S



PROPRIETARY & CONFINDENTIAL

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A	16-JUN-2021	Initial Release	-	

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INTRODUCTION

The purpose of this report is to prove the performance capabilities of the 384-2-F Forged 17-4 Stainless Steel V-Ring and 384-S Stamped 304 Stainless Steel V-Rings in extreme cold conditions. Successful completion shall confirm that both V-Rings demonstrate 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, in harshly cold environments.

The expected outcomes of this test will be deformation of the384-S V-Ring and minimal distortion of the 384-2-F V-Ring. So long as catastrophic failure does not occur, the V-Rings will be given a cold operating temperature limit of -40 ℃.

This test was performed on June 16th, 2021.

ACRONYMS AND ABBREVIATIONS

℃: Degrees Celsius
℉ Degrees Fahrenheit
IAW: In Accordance With
kN: KiloNewton
lbf: Pound-Forces
LSC: Lifesaving Systems Corp.

SECTION 1 - SPECIFICATIONS

384-2-F Technical Specifications	
Process:	Forged
Material:	17-4PH Stainless Steel
Non-Destructive Proof Load:	2,500 lbs (1,134 kg)
Size:	2.25” x 3.60” x .188” (thick) 57.2mm x 91.4mm x 4.8mm (thick)

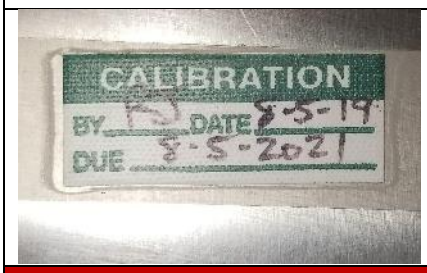
384-S Technical Specifications	
Process:	Stamped
Material:	T-304 Stainless Steel
Size:	2.51” x 2.27” x .16” (thick) 63.8mm x 57.7mm x 4.1mm (thick)

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	07/03/2021
	• 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-Rings shall be cooled to a temperature of -40°F (-40°C) for 4 hours.

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

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

5. After the target load is reached it shall be held for one minute, then the force shall be dropped to zero and the V-Ring shall be visually inspected for cracks, deformation, and any defects, and then measured again to determine the extent deformation.

6. The results shall be recorded.

SECTION 4 - RESULTS

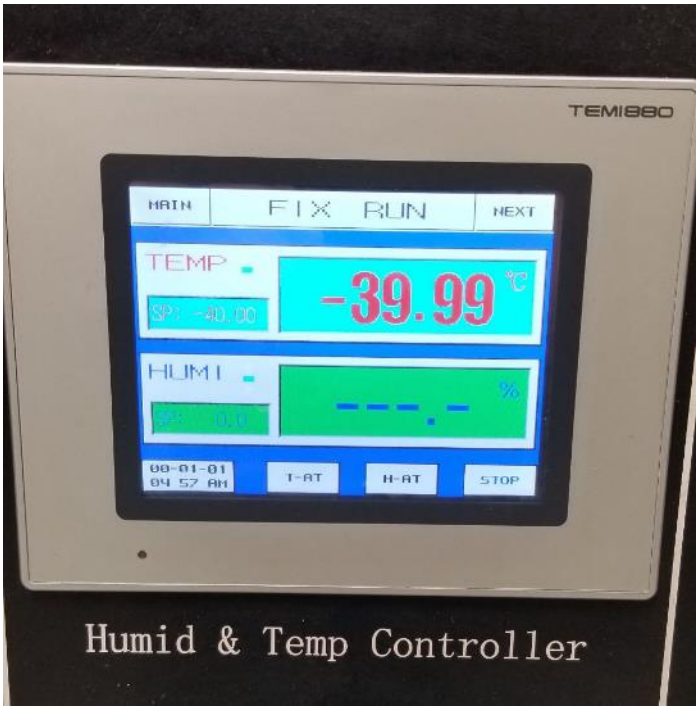
<table>
<tr><th colspan="4">384-2-F</th></tr>
<tr><th rowspan="2">Load Force
5,000lbf
(22.2 kN)</th><th colspan="2">Measurement</th><th rowspan="2">Pass/Fail</th><th rowspan="2">Material Distortion (Yes/No)</th></tr>
<tr><th>Pre-Test</th><th>Post-Test</th></tr>
<tr><td>5,032 lbf (22.38 kN)</td><td>3.330”</td><td>3.330”</td><td>Pass</td><td>No</td></tr>
<tr><td>

Reading on Pull Tester (5,032lbf) > 5,000lbf</td><td colspan="2">
Post-Test: Dimensional Measurement (inches)</td><td colspan="2">
Post-Test: Pull Tester</td></tr>
</table>

<table>
<tr><th colspan="4">384-S</th></tr>
<tr><th rowspan="2">Load Force
5,000lbf
(22.2 kN)</th><th colspan="2">Measurement</th><th rowspan="2">Pass/Fail</th><th rowspan="2">Material Distortion (Yes/No)</th></tr>
<tr><th>Pre-Test</th><th>Post-Test</th></tr>
<tr><td>5,032 lbf (22.38 kN)</td><td>2.305”</td><td>2.893”</td><td>Pass</td><td>Yes</td></tr>
<tr><td>

Reading on Pull Tester (5,032lbf) > 5,000lbf</td><td colspan="2">
Post-Test: Dimensional Measurement (inches)</td><td colspan="2">
Post-Test: Pull Tester</td></tr>
</table>

Pre-test



Temperature Display with V-rings in Climate Chamber



V-Ring in Load Tester

3,000lbf Result



Force reading of 3,163 lbf



3,000 lbf Result

5,000 lbf Result



Force Reading of 5,032 lbf



5,000 lbf Result



Post-Test Result

SECTION 5 – SUMMARY

The 193 (series) litter sling performed as expected and exhibited no damage beyond minor deformation after being pulled to 5,000 lbs (2,268 kg) at – 40 degrees centigrade.

A cold operating temperature limit of -40 ℃ will be set for these devices and associated components.

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Final Audit Report 2021-06-30

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