LIFESAVING SYSTEMS CORPORATION

Report Number: F-730-402
Revision: A

AIRWORTHY SPECIFICATION & STANDARDS REPORT

MEDEVAC LITTER

P/N: #402 (Stainless Steel)

P/N: #402-TI (Titanium)



PROPRIETARY & CONFINDENTIAL

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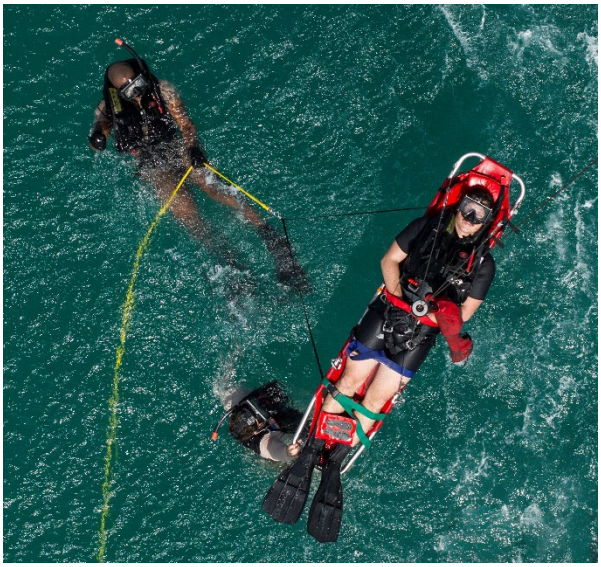
Table of Contents

1.0 INTRODUCTION: 4
2.0 DESIGN STANDARDS: 5
3.0 REFERENCES: 5
4.0 LITTER DESIGN: 6
5.0 DESIGN AND CONSTRUCTION: 7
5.1 FRAME SPECIFICATIONS 7
5.2 RESTRAINT BELTS 8
5.3 COVER 9
5.4 HEAD RESTRAINT 9
6.0 FLOTATION 10
7.0 HOIST SLING 11
8.0 IDENTIFICATION: 13
9.0 TEST REQUIREMENTS 14
9.1 TEST ARTICLE 15
9.2 EQUIPMENT 16
9.3 CALIBRATION 16
10.0 LOAD TESTS 17
10.1 STATIC LOADS 17
10.1.1 LIMIT LOADS: 18
10.1.2 ULTIMATE LOADS: 19
10.2 EXTERNAL LOAD 20

1.0 INTRODUCTION:



Ideally suited for confined area rescues, LSC's Medevac litter is currently carried as required equipment onboard all US Navy surface vessels and SAR helicopters, as well as US Coast Guard cutters and other rescue agencies worldwide. Narrow design permits easy transfer through hatches and doorways of marine vessels. The Medevac litter is engineered to withstand the conditions encountered in remote operations, such as in-water rescue, submarine/shipboard rescue, mountain rescue, and other restricted areas requiring a versatile, narrow, and low-profile litter.

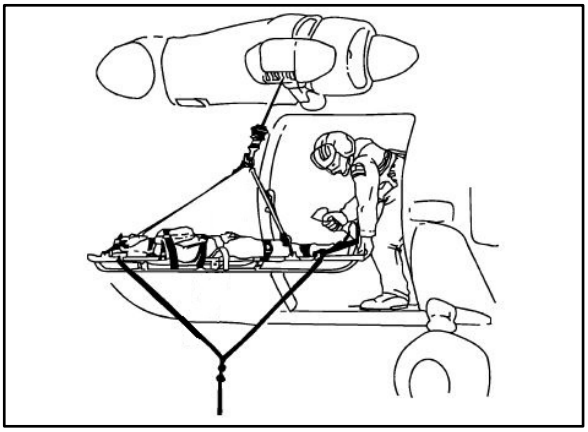
Integrated flotation designed to self-right and float with the patient's head slightly reclined to provide maximum freeboard. Includes stowage case with backpack harness for easy transport & two carrying harnesses to allow personnel free use of their hands while carrying litter and patient. Tubular stainless steel or lightweight titanium frame & skid construction. Fast action, sliding couplers secure the two halves of the litter and are locked in place within seconds. The Medevac litter may be hoisted in either vertical or horizontal positions. For horizontal hoisting, use LSC #193 Litter Hoisting Sling, sold separately.

*****The Department of the United States Army has approved this product per the Airworthiness Release (AWR) for Rescue Hoist Equipment on UH/HH-60 Helicopters (AWR 980).**

2.0 DESIGN STANDARDS:

NFPA 1983: Litter- An apparatus, also called a stretcher, designed to secure, protect, and transport a patient vertically or horizontally.

14 CFR § 133.45 specifies limitations for external-load operations as rotorcraft-load combination Class D, the certification requirements for HEC operations are found in 14 CFR § 27.865 or 14 CFR § 29.865, as applicable.



3.0 REFERENCES:

SAE ASTM A554, Standard Specification for Welded Stainless-Steel Mechanical Tubing

SAE ASTM B338, Standard Specification for Seamless and Welded Titanium

National Fire Protection Association (NFPA) 1983, “Standard on Fire Service Life Safety Rope and System Components,” 2012 edition.

14 CFR 25.853 Fire Test to Aircraft Material – Horizontal Flammability Test (v)

FAR Part 29 effective Feb 1, 1965 plus amendments 29-1 through 29-16. Airworthiness Standards: Transport Category Rotorcraft

Lifesaving Systems #402-TIS-StaticLoadTest-20131218

U.S. Army AWR980

4.0 SPECIFICATIONS:

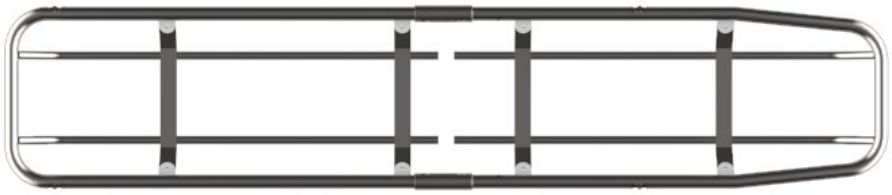
Working Load Limit (WLL)	600lbs / 270kg
Maximum Tested Load Limit	3,000lbs / 1361kg
Stainless Steel Litter Weight	32lbs / 14.5kg and 39lbs/ 17.6kg with Flotation
Titanium Litter Weight	24lbs/10.8kg and 31lbs/14kg with Flotation
Dimensions	16-1/2” W x 7-1/2” D x 80” L
Dimensions (Stowed)	16” W x 10” D x 41” L
Service Life	Metal: 20 years after being placed in service or 25 years sate of manufacture (D.O.M.), whichever occurs first. Material: 12 years after being placed in service or 15 years D.O.M, whichever occurs first.
NSN:	6530-01-187-0104 (Stainless steel version)





5.0 DESIGN AND CONSTRUCTION:

5.1 FRAME SPECIFICATIONS



Flat Bar:

ALLOY: Stainless Steel T304 per ASTM A240
Or
Titanium Grade 5 per ASTM B265
Sizes: 0.125” x 1.50”

Tubular:

ALLOY: Stainless Steel T304 per ASTM A554
Or
Titanium Grade 9 per ASTM B338
Size: 0.75” OD x 0.065” nominal wall
Size: 1.25” OD x 0.065” nominal wall

Meets Specifications:

NFPA 1983: 6.8.1 Litters shall not be designed or constructed in a manner that allows self-destructive action.

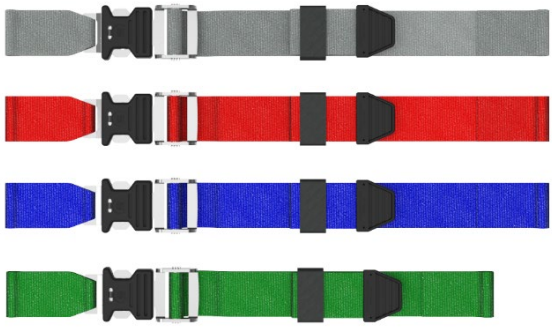
NFPA 1983: 6.8.2 Litters designed to split apart shall have an integral connection system.

Welding shall be performed using the Gas tungsten arc welding (GTAW), also known as TIG (tungsten, inert gas). Welding shall be durable, sound, and in accordance with the applicable recommendation of the Welder’s Handbook, American Welding Society and AWS D17.1.

Acceptable welds shall have no cracks or voids, and thorough fusion shall exist between adjacent layers of weld metal and base metal.

*Note: Supplier certificate of conformance for material is on file at Lifesaving Systems Corp.

5.2 RESTRAINT BELTS



Webbing:

Material: Solution Dyed Polyester, 1.75” width

Colors: Gray, Red, Blue, Green

Max Breaking Strength: 7,480lbs / 3,400kgs

Stitching:

Material: Anefil ® Nylon Thread

Size: TEX 135

Construction: 420d x 3

Strength: 23.8lbs / 10.8kg

Buckle and Adjuster Key:

Material: Stainless Steel T304

Buckle Housing: Acetal

Breaking Strength: 1,400lbs / 635kg

5.3 COVER



Material: 420 Denier Nylon

Fabric Meets Specifications:

14 CFR 25.853 Fire Test to Aircraft Material – Horizontal Flammability Test (v)
(15 Sec Horizontal Test, 4in/min)- PASS

5.4 HEAD RESTRAINT



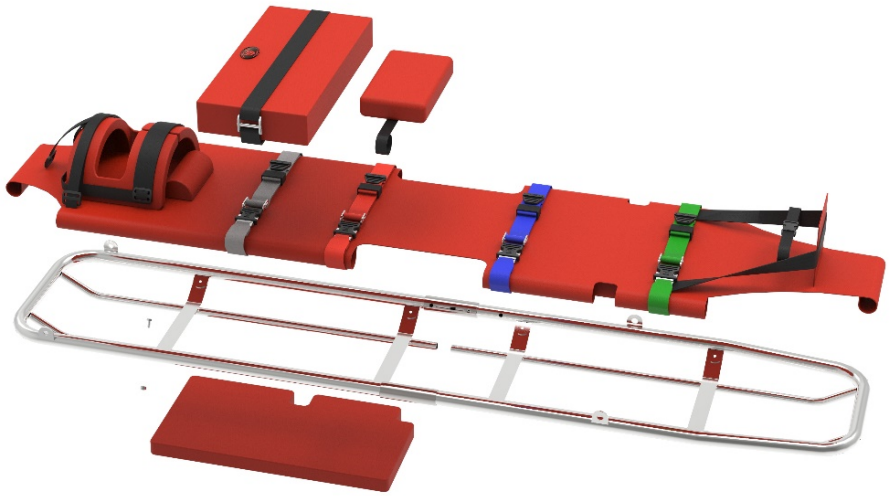
Fabric Material: 420 Denier Nylon Cover

Foam Material: Closed Cell Polyethylene Foam

Fabric Meets Specifications:

14 CFR 25.853 Fire Test to Aircraft Material – Horizontal Flammability Test (v)
(15 Sec Horizontal Test, 4in/min)- PASS

6.0 FLOTATION



#402-3: Front Flotation Pad

#402-4: Rear Flotation Pad

#402-6: Chest Pad

Fabric Cover: 420 Denier Nylon Cover

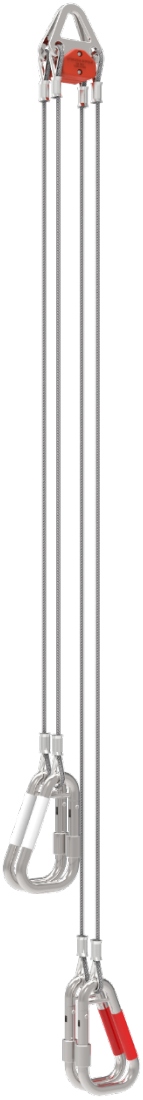
Foam Material: Closed Cell Polyethylene Foam

Total Buoyancy: Approximately 30lbs / 133.5N

Fabric Meets Specifications:

14 CFR 25.853 Fire Test to Aircraft Material – Horizontal Flammability Test (v)
(15 Sec Horizontal Test, 4in/min)- PASS

7.0 HOIST SLING





Specifications:

V-Ring:
Material: Stainless Steel T304
Size: 8 Ga
Process: Laser Cut and Tumbled
Breaking Strength: 5,000lbf (22.2kN)

Cable:
Material: Stainless Steel T304
Diameter: 5/32”
Construction: 7 x 19 (Mil-W-83420 Type I, Class A)
MIN Breaking Strength: 2,400lbf (10.6kN)

Sleeve:
Material: Brass, Zinc Plated
Size: 5/32”
Type: Duplex Swage
Meets U.S. Military Standard MS-51844

Snap Hook:
Material: Stainless Steel 316
Type: Screw Lock
Breaking Strength: 4,400lbs

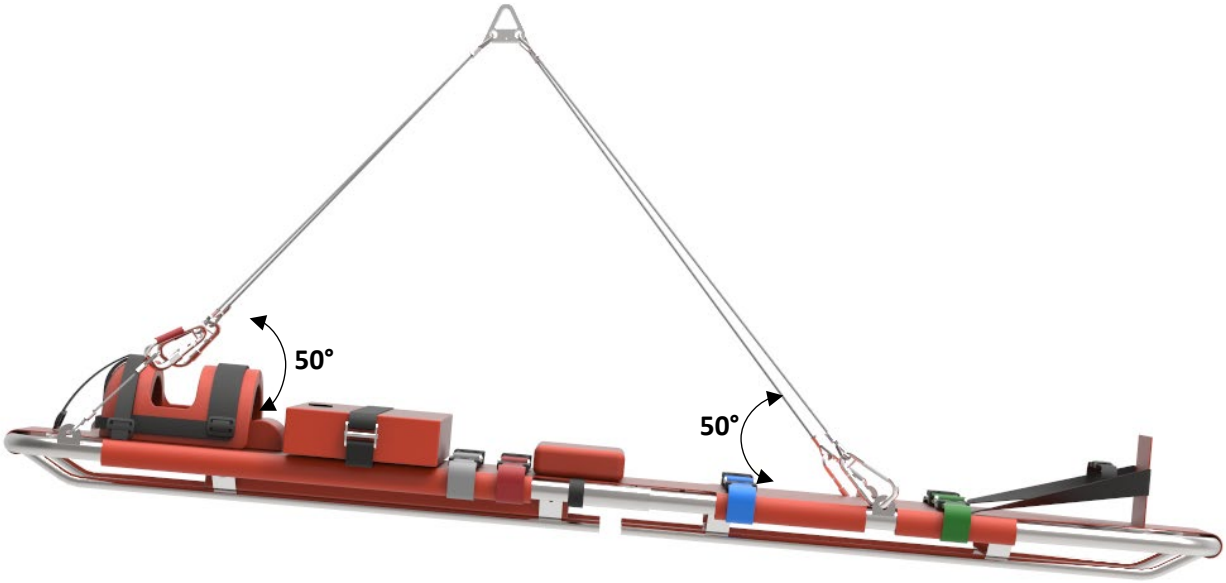
Magnetic Coupling:
Magnets: Neodymium (NdFeB)
Grade: N52
Surface Field: 5,235 Gauss
Size: 0.5 Diameter x 0.25 in

Horizontal Orientation

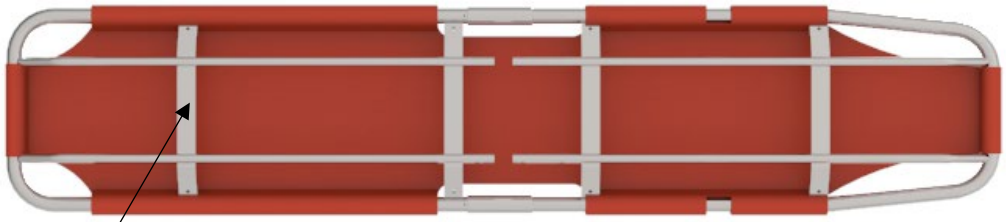
Load Calculations:

Load Factor (50°) = .7660 (2,400lb) cable rating x (.766) = 1,838.4lbs

Load Configuration: (2,078.4lbs x 4 legs) = 7,353.6lbs



8.0 IDENTIFICATION:



Lifesaving Systems Corporation
P/N: DOM:
S/N:
NSN: 6530-01-187-0104
Made in USA

Each litter shall have a product label stamped, engraved, or otherwise permanently marked.

The following information shall be printed legibly on the litter. All letters shall be at least 2 mm (5⁄64”) high.

(1) Manufacturer’s name
(2) Country of manufacture
(3) Manufacturer’s product identification
(4) Serial number
(5) Date of manufacture

9.0 TEST REQUIREMENTS

FAR § 29.305, strength and deformation, during load testing:

(a) The test item must be able to support limit loads without detrimental permanent deformation.

(b) The test item must be able to support ultimate loads without failure.

(i) Apply ultimate loads to the structure in a static test for at least three (3) seconds.

14 CFR § 29.865 - External loads.

(ii) Withstand a limit static load equal to 3.5 multiplied by the maximum external load for which authorization is requested.

(iii) Load applied in the vertical direction.

9.1 TEST ARTICLE

Testing and inspection were performed at Lifesaving Systems Corporation's (LSC) manufacturing facility located in Apollo Beach, Florida by LSC personnel. The static loading referenced in this report occurred on December 18th, 2013.

Full report can be found in Lifesaving Systems #402-TIS-StatiLoadTest-20131218.



Test Specimen: LSC #402-TIS
DATE: 12-18-2013

9.2 EQUIPMENT

The primary testing equipment consisted of the following items:

1. Force Application: Physical weights consisting of lead shot in fabric bags and/or lead bars.

2. Force Measurement: 10,000lbs S-beam load cell (transducer) with one (1) each 0-10,000lbs digital gauge.

3. A commercial grade shipping scale will be used to independently verify the weight of each physical specimen added to the basket for force application.

4. Fixtures: Shackles, pins, and custom fixtures as required to suspend the basket with physical weights.

5. Miscellaneous Measurement Instruments: Rulers, tape measures, calipers & 10X magnifying glass as required for supplemental measurement information.

9.3 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. Refer to the original test reports for previous calibration dates that may be referenced in this report.

10.0 LOAD TESTS

10.1 STATIC LOADS

Weights will be pre-weighed, and evenly distributed across the litter a minimum of three times, beginning with 600lbs, then increasing to 1,000lbs, 2,500lbs, and finally 3,000lbs. Each load shall be briefly suspended until stable and then lowered to the deck. Following the load testing the litter shall be inspected visually and deformities shall be noted.

(i) Litter shall be subjected to limit loads of 600lbs and 1,000lbs.

(ii) Litter shall be subjected to ultimate loads of 2,500lbs and 3,000lbs.

(iii) Litter must support loads without failure or deformation of the structural element of more than 50 mm ± 5 mm (2 in. ± 0.2 in.).

(iv) Litter shall be capable of withstanding ultimate loads without failure for at least three (3) seconds.



10.1.1 LIMIT LOADS:

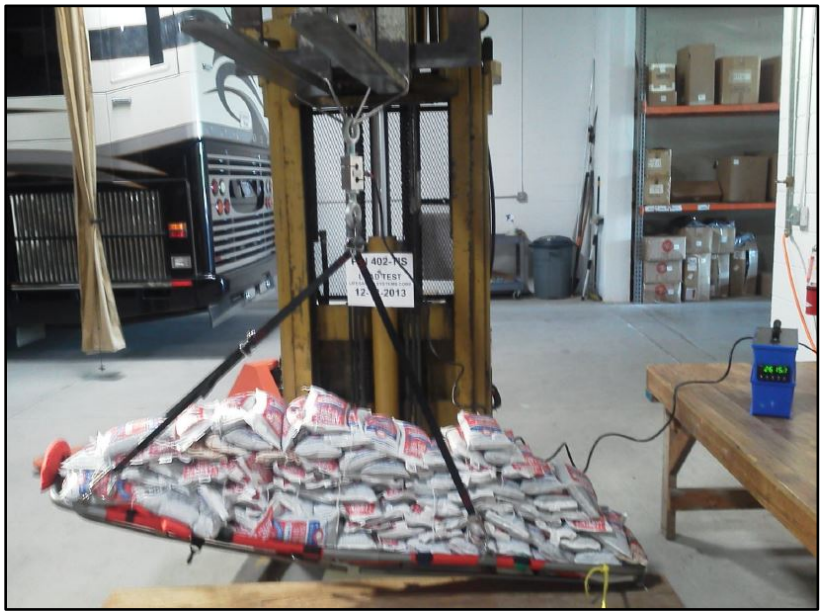


Limit Load: 600lbs (No Permanent Deformation)



Limit Load: 1,000lbs (No Permanent Deformation)

10.1.2 ULTIMATE LOADS:



Ultimate Load: 2,500lbs (No Permanent Deformation)

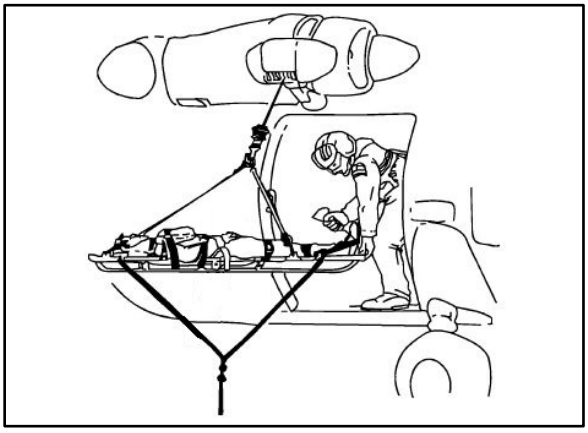


Ultimate Load: 3,000lbs (No Permanent Deformation)

10.2 EXTERNAL LOAD

14 CFR § 29.865 - External loads

It must be shown by analysis, test, or both that the rotorcraft external load attaching means and corresponding personnel carrying device system for rotorcraft-load combinations to be used for human external cargo applications can withstand a limit static load equal to 3.5 multiplied by the maximum external load for which authorization is requested. The load for any rotorcraft-load combination class, for any external cargo type, must be applied in the vertical direction.



Calculation:

(Working Load Limit) x 3.5 = (600lbs) x (3.5) = 2,100lbs

Ultimate Load = 3,000lbs > 2,100lbs