



ENGINEERING AND TEST DIVISION
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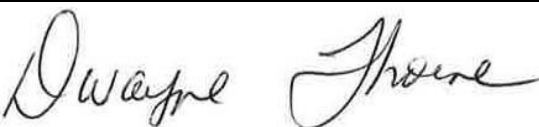
TEST REPORT NO.: 419282-04-04-R24-0125

DAYTON T. BROWN, INC. JOB NO.: 419282-04-000

CUSTOMER:	NOVAVISION, LLC 524 EAST WOODLAND CIRCLE BOWLING GREEN, OH 43402 USA
SUBJECT:	FREIGHT CONTAINER MECHANICAL SEAL CLASSIFICATION TESTING PER ISO 17712:2013 (E) CLAUSE 5, CONDUCTED ON 25 BARRIER SEALS, MODEL NO. SEALOCK SL-X, SERIAL NOS. C-LOC073601 THROUGH C-LOC073625
PURCHASE ORDER NO.:	PO-52175

ATTENTION: STEPHANIE BOWE / BILL SCHOENHERR

SEAL CLASSIFICATION: HIGH SECURITY

TEST ADMINISTRATOR	 J. BENINCASA
QUALITY DEPARTMENT	 D. THORNE
DATE	13 FEBRUARY 2024

INFORMATION CONTAINED HEREIN MAY BE SUBJECT TO EXPORT CONTROL LAWS. REFER TO INTERNATIONAL TRAFFIC IN ARMS REGULATION (ITAR) OR THE EXPORT ADMINISTRATION REGULATION (EAR) OF 1979. IT IS THE RESPONSIBILITY OF THE RECIPIENT TO OBTAIN ANY REQUIRED LICENSES TO EXPORT ANY CONTROLLED DATA.

THE DATA CONTAINED IN THIS REPORT WAS OBTAINED BY TESTING IN COMPLIANCE WITH THE APPLIBARRIER TEST SPECIFICATION AS NOTED



REVISION HISTORY

Revision	Date	Section Affected	Change
--	02/13/2024	--	--

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1.0 ABSTRACT

This test report details the results of freight container mechanical seal classification testing conducted on Barrier Seals, under reference (a) to the requirements of reference (c).

As per ISO 17712:2013(E) Clause 5.1.2, "Testing is to be done once every two years". Therefore, this report expires 2 years from the test completion date.

Results of the tests are detailed in the following text.

Test data pertinent to this program will remain on file at Dayton T. Brown, Inc. for 90 days.

The testing and results contained in this report are in accordance with the testing requirements called out in ISO 17712:2013 and are only applicable to the samples as received and to the specific units identified in the test report and do not address any individual manufacturer's compliance or non-compliance with all the requirements of ISO 17712:2013 which are the sole responsibility of each manufacturer and not part of the testing performed and recorded in this test report.

Dayton T. Brown, Inc. is not involved in any production quality inspections. All tests are based on the samples that are selected by the manufacturer and provided to Dayton T. Brown, Inc. without any Dayton T. Brown, Inc. involvement in said selection.

Dayton T. Brown, Inc. performs testing to ISO 17712:2013 under laboratory conditions. These tests do not measure and are not intended to measure all possible applications or installations of the seal assembly or components. In that event, the report will describe the particular application tested in detail. Dayton T. Brown, Inc. is not responsible for actual performance of any seal assembly as installed in any application.

This report shall not be reproduced, except in full, without the written approval of Dayton T. Brown, Inc.

2.0 REFERENCES

- (a) Customer Purchase Order No.: PO-52175
- (b) Dayton T. Brown, Inc. Job No.: 419282-04-000
- (c) Test Specifications: ISO 17712:2013 (E) Clause 5

3.0 SEAL CLASSIFICATION

ISO 17712:2013 (E): (H)-High Security for Clause 5

4.0 ADMINISTRATIVE INFORMATION

<u>Customer</u>	NovaVision, LLC 524 East Woodland Circle Bowling Green, OH 43402 USA
Sample Type	Barrier Seal
Sample Name	Barrier Seal (as provided by customer)
Part/Model No.	SEALOCK SL-X (as provided by customer)
Serial Nos.	C-LOC073601 through C-LOC073625
Quantity Received	30
Quantity Tested	25
Date Received	22 January 2024
Dates Tested	9 through 12 February 2024

5.0 TEST PROGRAM OUTLINE

Test	Test Item Description	Results
Tensile	Model No. Sealock SL-X Barrier Seals, Serial Nos. C-LOC073601 through C-LOC073605	See Page 6.
Shear	Model No. Sealock SL-X Barrier Seals, Serial Nos. C-LOC073606 through C-LOC073610	See Page 8.
Bending	Model No. Sealock SL-X Barrier Seals, Serial Nos. C-LOC073611 through C-LOC073615	See Page 10.
Impact	Model No. Sealock SL-X Barrier Seals, Serial Nos. C-LOC073616 through C-LOC073625	See Pages 12 and 13.
Test Equipment List and Test Item Photo	Model No. Sealock SL-X Barrier Seal	See Pages 15 and 16.

6.0 TEST RESULTS

Tensile Test and Results

TEST REQUIREMENT

The tensile test shall be conducted in accordance with reference (c).

TEST RESULTS

A pretest visual inspection of the test items revealed no anomalies.
 All testing was performed in accordance with the referenced specification.
 The pulling speed during the test was 50.8 mm/min.
 Test room ambient conditions: 19.9° C and 40.3% RH

TEST DATA

Date: 9 February 2024

Tensile Test at Room Temperature			
Specimen No.	Load (kN)	Class Rating	Remarks
C-LOC073601	12.14	H	*
C-LOC073602	15.42	H	*
C-LOC073603	12.31	H	*
C-LOC073604	10.44	H	*
C-LOC073605	15.38	H	*

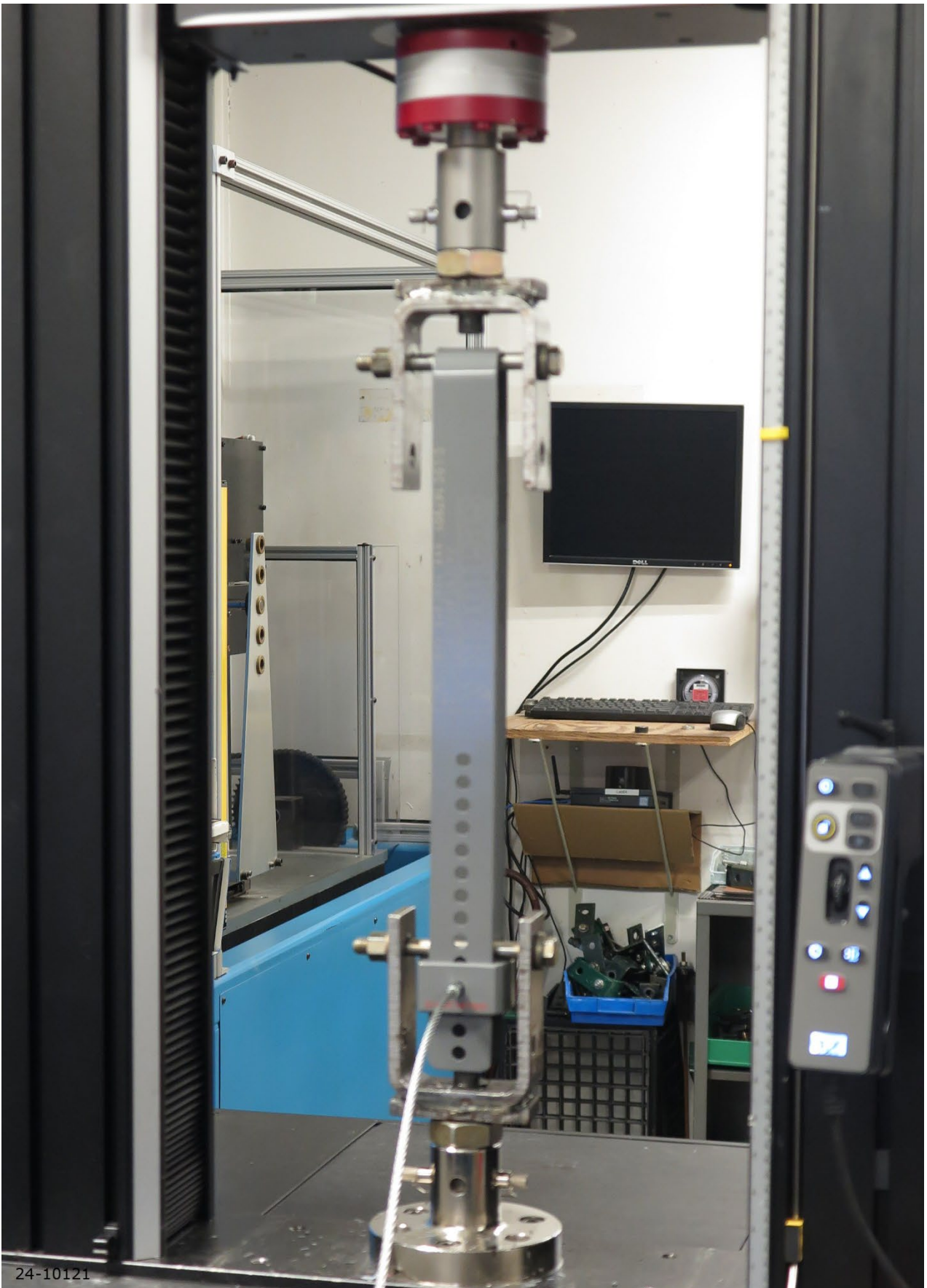
Tech: JT

* A post-test visual inspection of the test item revealed that the lock of the seal rotated forward bending the bar until the front bar broke near the lock mechanism due to testing.

Classification Key

Rating Load to Failure

High Security (H): 10.0 kN
 Security (S): 2.27 kN
 Indicative (I): <2.27 kN



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TYPICAL PHOTO OF THE TENSILE TEST SETUP

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Shear Test and Results

TEST REQUIREMENT

The shear test shall be conducted in accordance with reference (c).

TEST RESULTS

A pretest visual inspection of the test items revealed no anomalies.
 All testing was performed in accordance with the referenced specification.
 The travel rate during the test was 12.5 mm/min.
 Test room ambient conditions: 19.3° C and 40.3% RH

TEST DATA

Date: 9 February 2024

Shear Test at Room Temperature			
Specimen No.	Load (kN)	Class Rating	Remarks
C-LOC073606	8.896	H	*
C-LOC073607	8.896	H	*
C-LOC073608	8.896	H	*
C-LOC073609	8.896	H	*
C-LOC073610	8.896	H	*

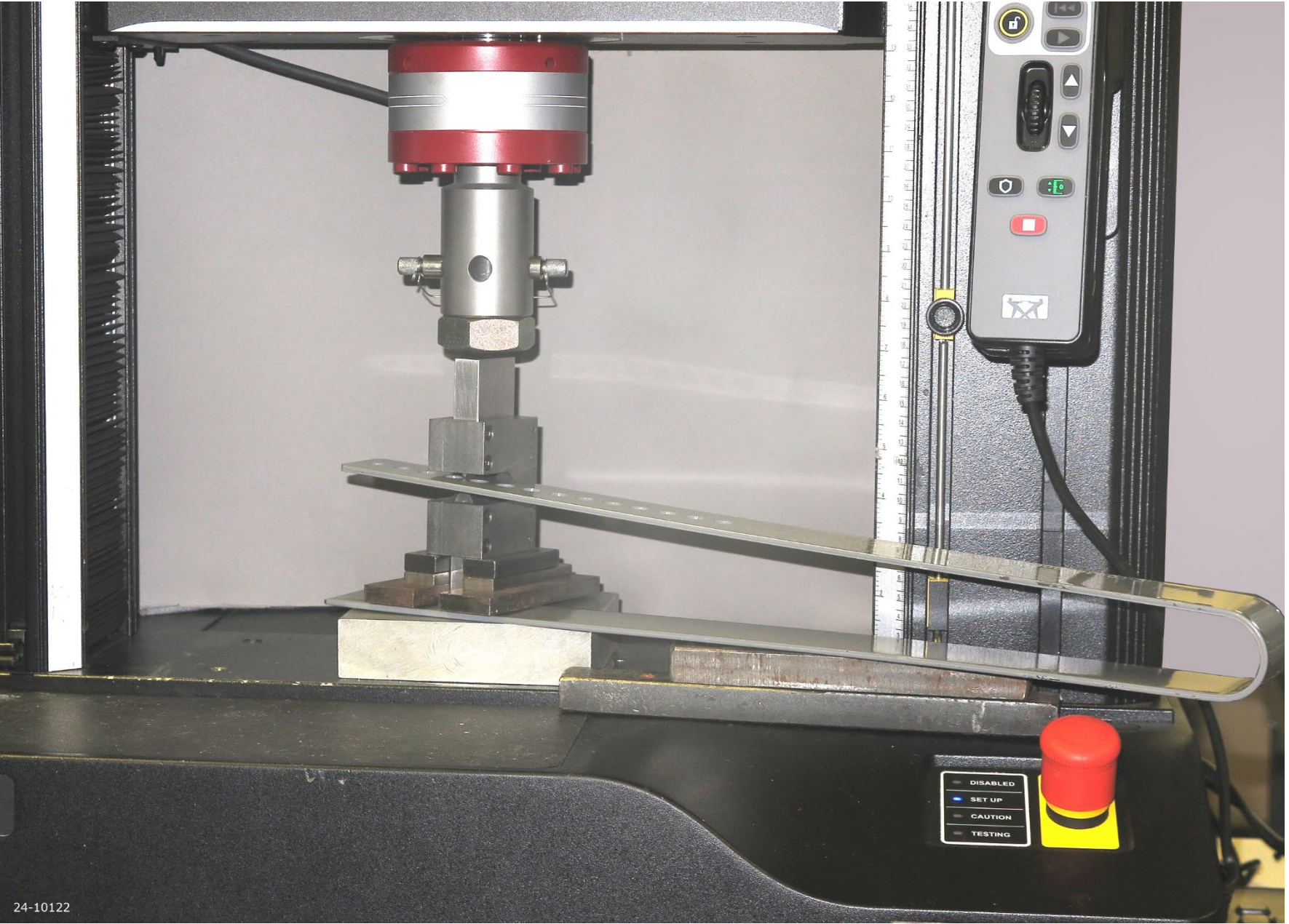
Tech: JT

* A post-test visual inspection of the test item revealed a slight indent on the bar due to testing.

Classification Key

Rating	Load to Failure
High Security: (H):	3.336 kN
Security (S):	2.224 kN
Indicative (I):	<2.224 kN

SAFETY PRECAUTIONS – Do not exceed a shear force greater than 8900 N (2001 lbf). If the specimen has not failed at that force, halt the test and unload the test equipment. Record a shear force of 8896 N (2000 lbf). Sudden and violent rupture of the test specimen can endanger personnel, equipment and property.



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TYPICAL PHOTO OF THE SHEAR TEST SETUP

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Bending Test and Results

TEST REQUIREMENT

The bending test shall be conducted in accordance with reference (c).

TEST RESULTS

A pretest visual inspection of the test items revealed no anomalies.
 All testing was performed in accordance with the referenced specification.
 The test was performed using a .300 m moment arm with a pull speed of 3 seconds.
 Test room ambient conditions: 19.9° C and 40.5% RH

TEST DATA

Date: 9 February 2024

Bending Test at Room Temperature				
Specimen No.	Bending Moment (Nm)	Load Force (N)	Class Rating	Remarks
C-LOC073611	300.0	1000.0	H	*
C-LOC073612	300.0	1000.0	H	*
C-LOC073613	300.0	1000.0	H	*
C-LOC073614	300.0	1000.0	H	*
C-LOC073615	300.0	1000.0	H	*

Tech: JT

* A post-test visual inspection of the test item revealed no anomalies due to testing.
 Note: The maximum limit of the pull scale was reached; the test was stopped at that point.

Classification Key

	Rigid Seals
Rating	Moment to Failure
High Security (H):	50 Nm
Security (S):	22 Nm
Indicative (I):	<22 Nm



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TYPICAL PHOTO OF THE BENDING TEST SETUP

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Impact Test and Results

TEST REQUIREMENT

The impact test shall be conducted in accordance with reference (c).

TEST RESULTS

A pretest visual inspection of the test items revealed no anomalies.
 All testing was performed in accordance with the referenced specification.
 Nonfunctional plastic portions of the seal were removed in order to fit into the fixture.
 Test chamber conditions: 18.8° C and 28.6% RH

TEST DATA

Date: 11 February 2024

Impact Test at Room Temperature (required 18 ± 3°C)					
Specimen No.	Number of Successful Impacts Per Load (J)			Class Rating	Remarks
	13.56	27.12	40.68		
C-LOC073616	5	5	5	H	*
C-LOC073617	5	5	5	H	*
C-LOC073618	5	5	5	H	*
C-LOC073619	5	5	5	H	*
C-LOC073620	5	5	5	H	*

Tech: JB

* A post-test visual inspection of the test item revealed that portions of the seal deformed due to testing. The bolt and lock of the seal remained intact.

Classification Key

Rating	Load to Failure (5 impacts at each load)	Dead Blow Weight (4 kg) Drop Height
High Security (H):	40.68 J	1.037 m
Security (S):	27.12 J	0.691 m
Indicative (I):	<27.12 J	0.346 m

Impact Test and Results

Test chamber conditions: -26.7° C and 56.3% RH

TEST DATA – (Continued)

Date: 12 February 2024

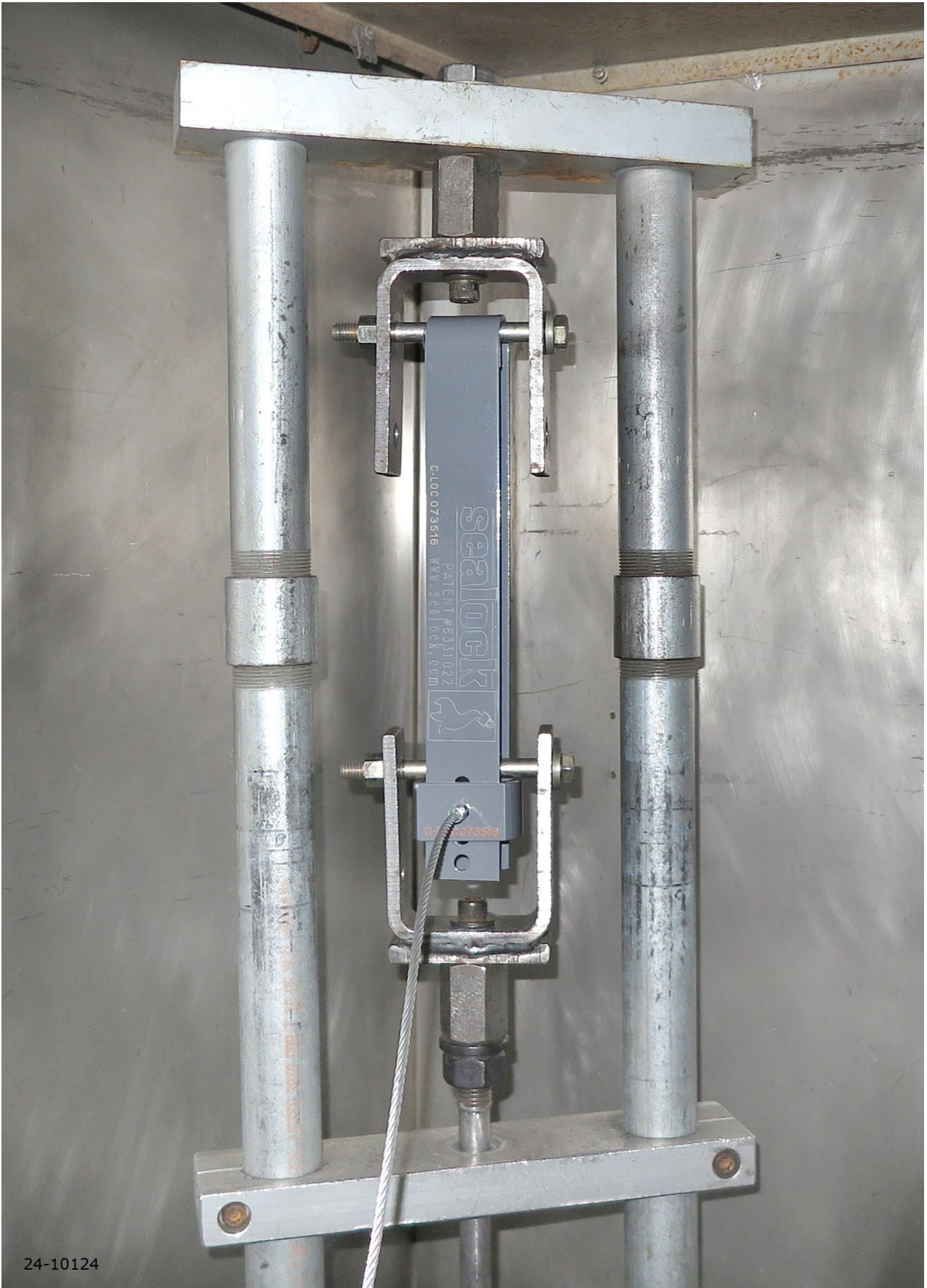
Impact Test at Reduced Temperature (required -27 ± 3°C)					
Specimen No.	Number of Successful Impacts Per Load (J)			Class Rating	Remarks
	13.56	27.12	40.68		
C-LOC073621	5	5	5	H	*
C-LOC073622	5	5	5	H	*
C-LOC073623	5	5	5	H	*
C-LOC073624	5	5	5	H	*
C-LOC073625	5	5	5	H	*

Tech: JT

* A post-test visual inspection of the test item revealed that portions of the seal deformed due to testing. The bolt and lock of the seal remained intact.

Classification Key

Rating	Load to Failure (5 impacts at each load)	Dead Blow Weight (4 kg) Drop Height
High Security (H):	40.68 J	1.037 m
Security (S):	27.12 J	0.691 m
Indicative (I):	<27.12 J	0.346 m



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TYPICAL PHOTO OF THE IMPACT TEST SETUP

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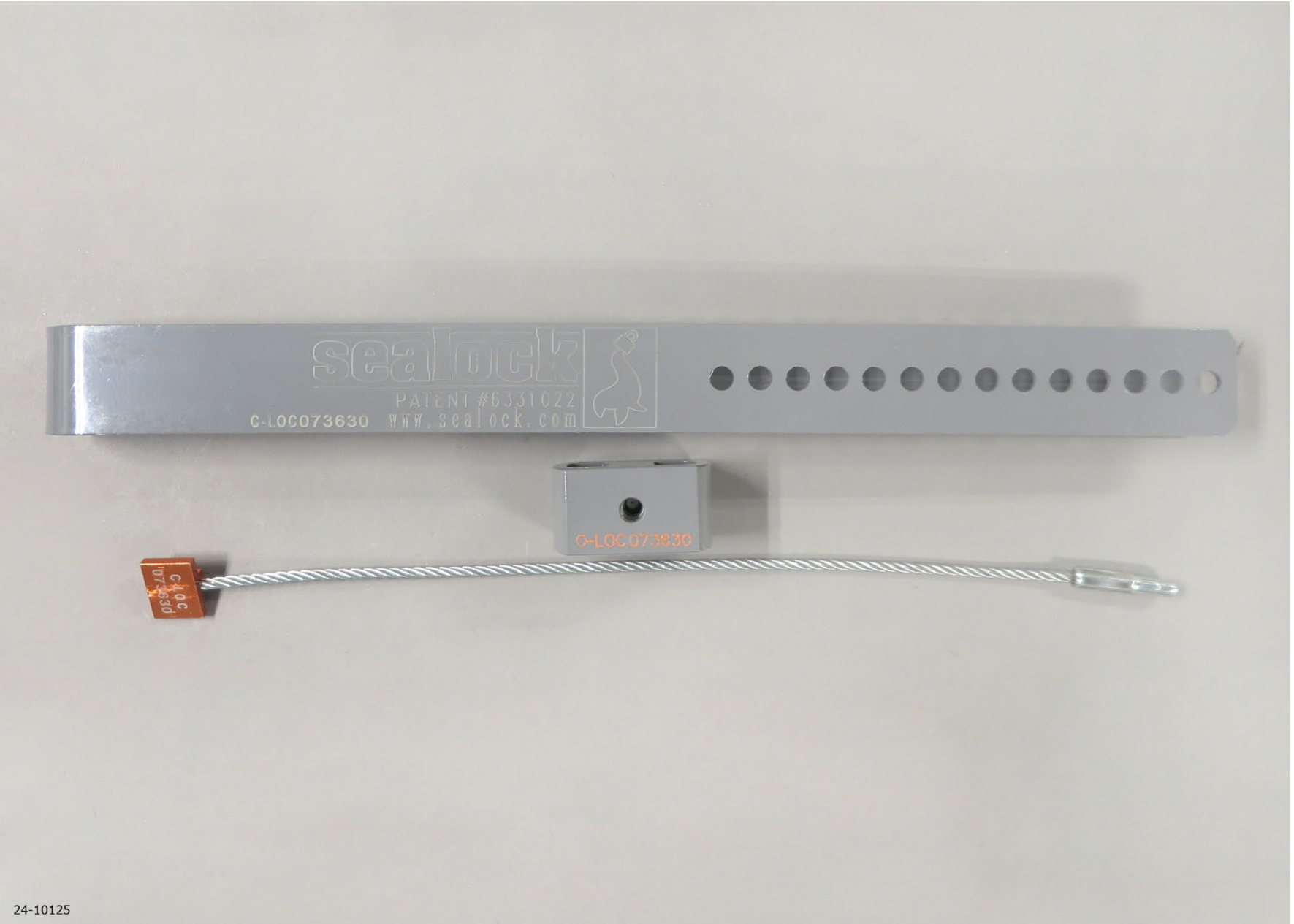
Test equipment utilized for the program reported herein was within its assigned interval of calibration. Details are on file at Dayton T. Brown, Inc. and will be made available upon request.



Job Sub: 419282-04 TEST: FREIGHT CONTAINER MECHANICAL SEAL CLASSIFICATION TESTING

<u>ITEM</u>	<u>MANUFACTURER</u>	<u>MODEL</u>	<u>DTB NO.</u>	<u>ACCURACY</u>	<u>CAL DUE DATE</u>	<u>LAST CAL DATE</u>
THERMOTRON, 275	THERMOTRON	FX-82-CHV-25-25	04E-006	-	N.C.R.	-
CONDITIONING ROOM	DAYTON T. BROWN	N/A	04S-001	-	N.C.R.	-
DATA ACQUISITION SYSTEM, THERMOCOUPLE TYPE "T"	NATIONAL INSTRUMENTS	NI-4351	10-189	Mfr	04/07/2024	04/12/2023
RECORDER, CHART TRULINE	HONEYWELL	DR4500	12-12	Type T ± 0.7°F	03/17/2024	09/19/2023
CONTROLLER, ENVIRONMENTAL SYSTEM	JC SYSTEMS	620	25-55	RTD ± 1.08°F; RH ± 1% RH	03/17/2024	03/20/2023
TEST SYSTEM, DUAL COLUMN TABLE MODEL	INSTRON	68TM-50	29-70	Mfr	08/11/2024	08/17/2023
TRANSMITTER, HUMIDITY AND TEMPERATURE	VAISALA	HMP235	31-132	± 2% 10 to 95% RH	02/18/2024	08/24/2023
TRANSMITTER, TEMPERATURE & HUMIDITY	VAISALA	HMT335	31-178	± 1% RH (0 to 90 % RH) ± 1.7% RH (90 to 100 % RH)	04/21/2024	10/24/2023
WEIGHT, DEAD BLOW	DAYTON T. BROWN	JB-1	38-55	± 0.01 kilograms	05/26/2024	06/01/2022
TIMER, DIGITAL	FISHER SCIENTIFIC	14-649-17	47-55	± 8.64 Sec/24 hr	01/26/2025	01/31/2024
IMPACT TESTER, FREIGHT CONTAINER MECHANICAL	DAYTON T. BROWN	ISO 17712:2013	61-10	-	N.C.R.	-
GAUGE, DIGITAL FORCE 200 LB	CHATILLON	DFS2-200	61-14	± 0.1% of F.S.	06/16/2024	06/21/2023
PROTRACTOR, DIGITAL	PRO PRODUCTS	PRO 3600	68-279	± 0.05° (0° to 10°) ± 0.1° (80° to 90°)	01/19/2025	01/24/2024
TAPE MEASURE, 16'5m X 3/4"	LUFKIN	HV1035CME	68-349	± 0.03125"	03/16/2025	03/16/2023
FIXTURE, SHACKLE CUTTING AND 2 BLADES	DAYTON T. BROWN	ISO 17712:2013	68-492	Mfr	01/12/2025	01/17/2024

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MODEL NO. SEALOCK SL-X CABLE SEAL

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