



ENGINEERING AND TEST DIVISION  
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TEST REPORT NO.: 418700-01-04-R23-0088

DAYTON T. BROWN, INC. JOB NO.: 418700-01-000



**CUSTOMER:** LEGHORNGROUP SRL  
34-36 VIA DEGLI ARROTINI  
LIVORNO  
ITALY 57121

**SUBJECT:** FREIGHT CONTAINER MECHANICAL SEAL CLASSIFICATION TESTING  
PER ISO 17712:2013 (E) CLAUSE 5,  
CONDUCTED ON 25 BARRIER SEALS, MODEL NO. BLOCKBAR,  
SERIAL NOS. 0002246 THROUGH 0002270

**PURCHASE ORDER NO.:** 2209007

ATTENTION: ALESSANDRO DELLA BELLA

SEAL CLASSIFICATION: HIGH SECURITY

TEST ADMINISTRATOR	 J. BENINCASA
QUALITY DEPARTMENT	 M. DER ARIS
DATE	22 FEBRUARY 2023

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 APPLICABLE TEST SPECIFICATION AS NOTED



REVISION HISTORY

Revision	Date	Section Affected	Change
--	02/22/2023	--	--

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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.: 2209007
- (b) Dayton T. Brown, Inc. Job No.: 418700-01-000
- (c) Test Specification: ISO 17712:2013 (E) Clause 5

## 3.0 SEAL CLASSIFICATION

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

#### 4.0 ADMINISTRATIVE INFORMATION

<b>Customer</b>	LeghornGroup Srl 34-36 Via Degli Arrotini Livorno Italy 57121
Sample Type	Barrier Seal
Sample Name	BLOCKBAR (as provided by customer)
Model No.	Blockbar
Serial Nos.	0002246 through 0002270
Quantity Received	30
Quantity Tested	25
Date Received	17 January 2023
Dates Tested	30 and 31 January 2023

#### 5.0 TEST PROGRAM OUTLINE

Test	Test Item Description	Results
Tensile	Barrier Seals, Serial Nos. 0002246 through 0002250	See Page 6.
Shear	Barrier Seals, Serial Nos. 0002251 through 0002255	See Page 8.
Bending	Barrier Seals, Serial Nos. 0002256 through 0002260	See Page 10.
Impact	Barrier Seals, Serial Nos. 0002261 through 0002270	See Pages 12 and 13.
Test Equipment List and Test Item Photo	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: 20.8° C and 59.9% RH

#### TEST DATA

Date: 30 January 2023

Tensile Test at Room Temperature			
Specimen No.	Load (kN)	Class Rating	Remarks
0002246	24.27	H	*
0002247	21.72	H	*
0002248	26.03	H	*
0002249	24.89	H	*
0002250	17.11	H	*

Tech: JB

\* A post-test visual inspection of the test item revealed that the rear fork broke at the lock pin due to testing.

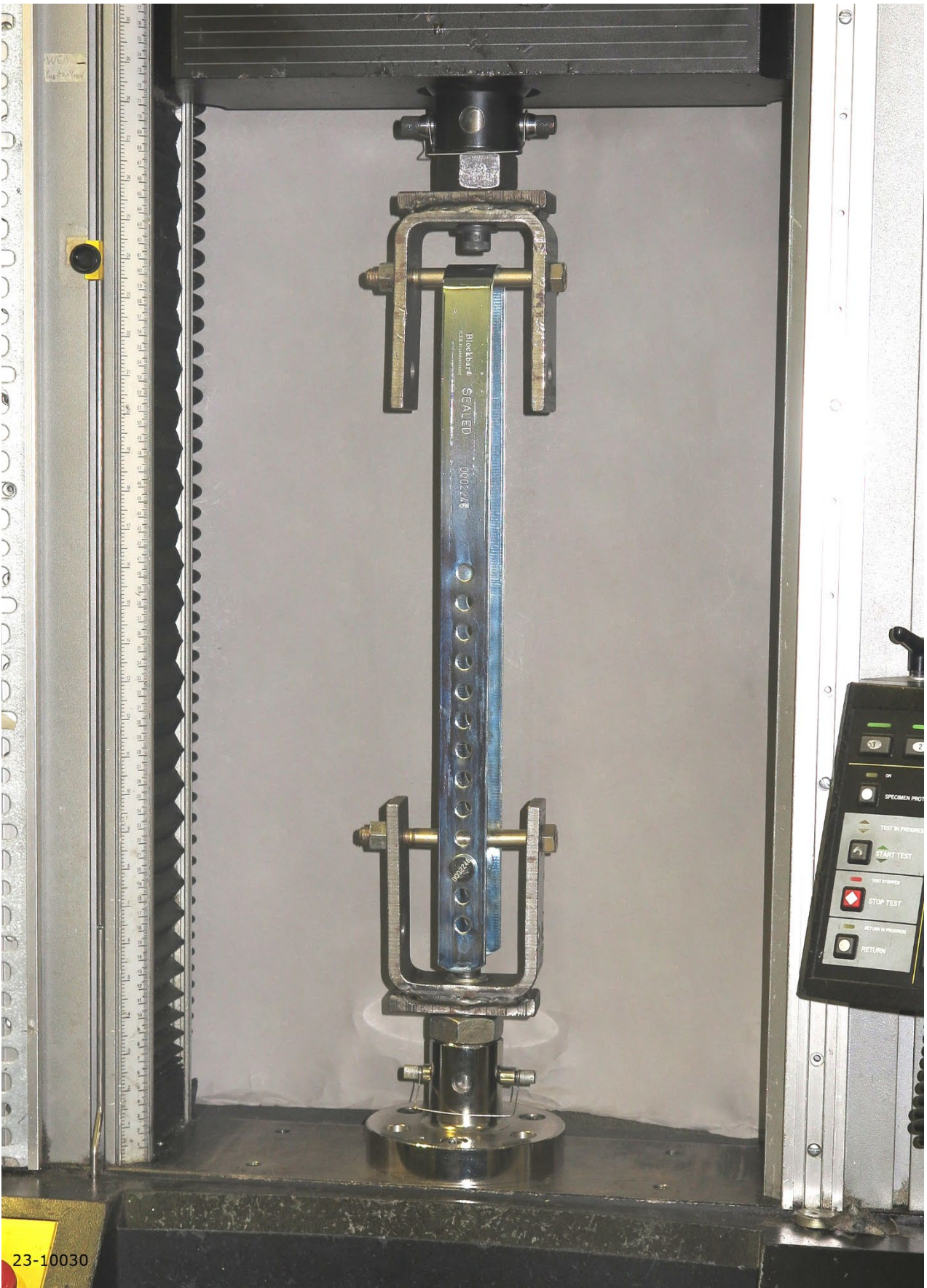
#### Classification Key

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: 19.7° C and 56.9% RH

### TEST DATA

Date: 31 January 2023

Shear Test at Room Temperature			
Specimen No.	Load (kN)	Class Rating	Remarks
0002251	7.197	H	*
0002252	7.515	H	*
0002253	7.656	H	*
0002254	7.824	H	*
0002255	7.891	H	*

Tech: JB

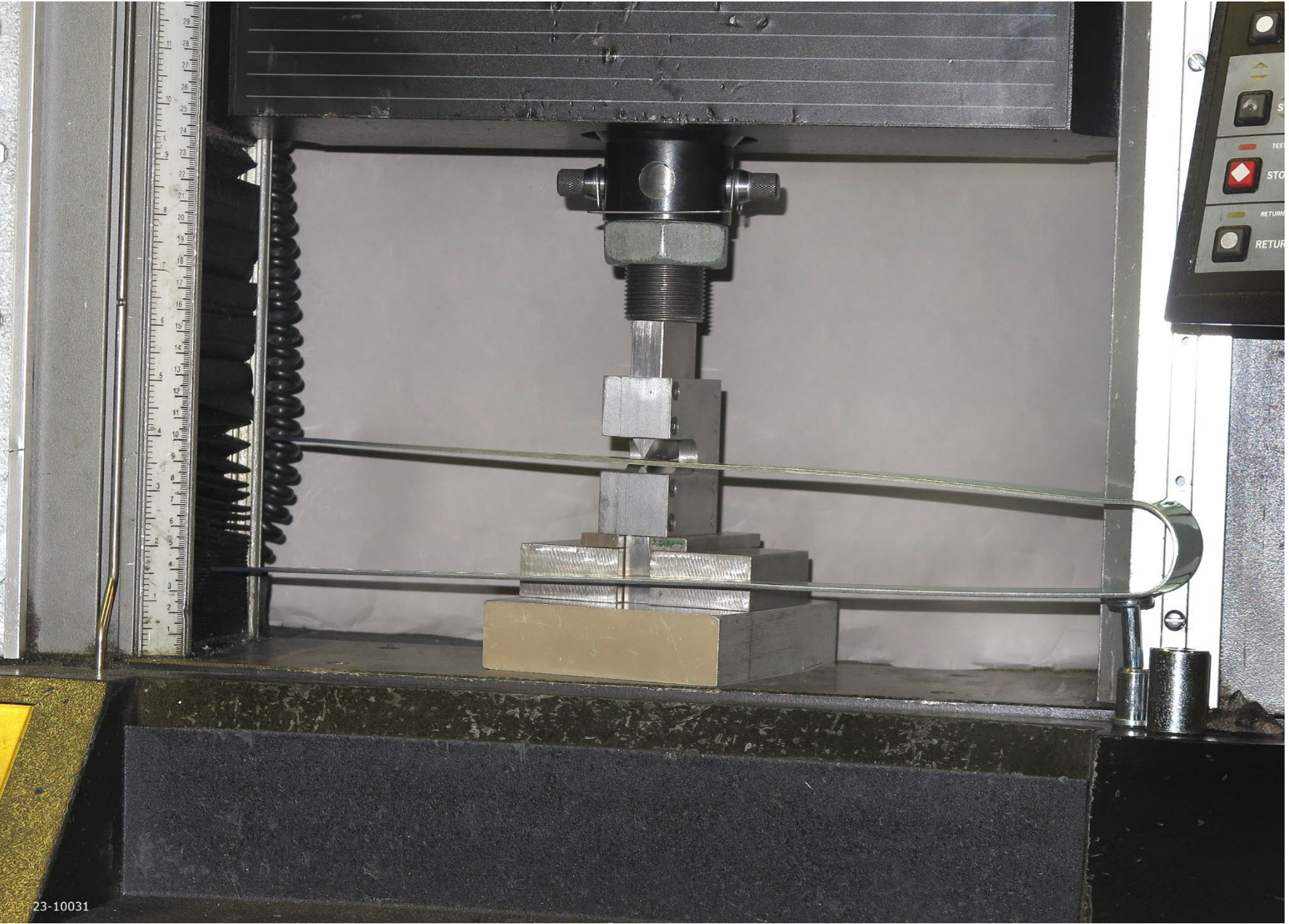
\* A post-test visual inspection of the test item revealed that the cutting blades severed the bar of the seal due to testing.

### 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 0.300m moment arm with a pull speed of 3 seconds.  
 Test room ambient conditions: 19.6° C and 56.5% RH

### TEST DATA

Date: 31 January 2023

Bending Test at Room Temperature				
Specimen No.	Bending Moment (Nm)	Load Force (N)	Class Rating	Remarks
0002256	196.05	653.5	H	*
0002257	213.03	710.1	H	*
0002258	218.85	729.5	H	*
0002259	214.26	714.2	H	*
0002260	221.55	738.5	H	*

Tech: JB

\* A post-test visual inspection of the test item revealed that the bar of the seal bent due to testing.

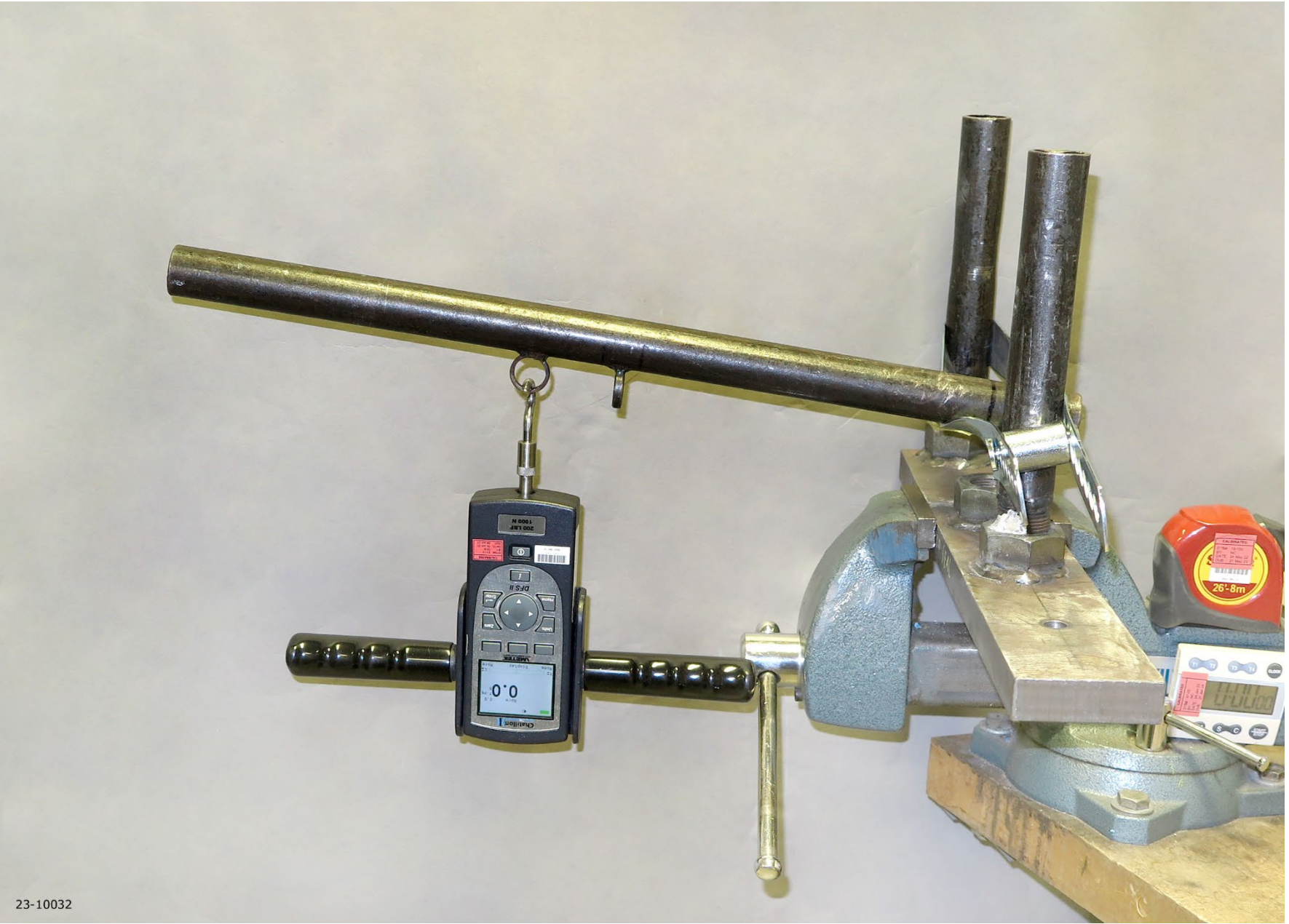
### Classification Key

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 portions of the seal were removed in order to fit into the fixture.  
 Test chamber conditions: 17.6° C and 49.2% RH

### TEST DATA

Date: 30 January 2023

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		
0002261	5	5	5	H	*
0002262	5	5	5	H	*
0002263	5	5	5	H	*
0002264	5	5	5	H	*
0002265	5	5	5	H	*

Tech: JB

\* A post-test visual inspection of the test item revealed that portions of the seal broke or deformed due to testing. The cable 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: -26.2° C and 79.5% RH

TEST DATA – (Continued)

Date: 30 January 2023

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		
0002266	5	5	5	H	*
0002267	5	5	5	H	*
0002268	5	5	5	H	*
0002269	5	5	5	H	*
0002270	5	5	5	H	*

Tech: JB

\* A post-test visual inspection of the test item revealed that portions of the seal broke or deformed due to testing. The cable 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.



**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.	-
RECORDER, CHART TRULINE	HONEYWELL	DR4500	12-12	Type T ± 0.7°F	09/24/2023	09/29/2022
LOGGER, RH AND TEMPERATURE	FLUKE	1620A	12-39	59 to 95°F ± 0.75°F; 10 to 70% RH ± 2% RH	02/01/2023	01/06/2022
TAPE MEASURE, 26 FEET/8 METERS	STARRETT	TX1-26ME	15-100	± 1 mm	05/21/2023	05/24/2022
CONTROLLER, ENVIRONMENTAL SYSTEM	JC SYSTEMS	620	25-55	RTD ± 1.08°F; RH ± 1% RH	03/12/2023	03/18/2022
TESTER, UNIVERSAL TENSILE W/STATIC LOAD CELLS (2)	INSTRON	5569	29-2	± 1% of reading	06/18/2023	06/20/2022
TRANSMITTER, TEMPERATURE & HUMIDITY	VAISALA	HMT337	31-66	Mfr	07/16/2023	01/17/2023
WEIGHT, DEAD BLOW	DAYTON T. BROWN	JB-1	38-55	± 0.01 kgrams	05/26/2024	06/01/2022
TIMER, DIGITAL	FISHER SCIENTIFIC	14-649-17	47-55	± 8.64 Sec/24 hr	01/21/2024	01/24/2023
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.	06/04/2023	06/06/2022
PROTRACTOR, DIGITAL	PRO PRODUCTS	PRO 3600	68-279	± 0.05° (0° to 10°) ± 0.1° (80° to 90°) ± 0.2° (10° to 80°)	01/21/2024	01/26/2023
CALIPER, DIGITAL 4"	MITUTOYO	500-195-20	68-466	± 0.001"	07/23/2023	07/25/2022
FIXTURE, SHACKLE CUTTING AND 2 BLADES	DAYTON T. BROWN	ISO 17712:2013	68-492	Mfr	12/17/2023	12/09/2019
MICROMETER, DIGIMATIC OUTSIDE 1" COOLANT PROOF	MITUTOYO	293-335-30	68-502	± 0.00005"	10/22/2023	10/26/2021

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MODEL NO. BLOCKBAR BARRIER SEAL

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