



財團法人金屬工業研究發展中心  
機械測試實驗室

40768 台中市工業區 37 路 25 號 TEL : (04)23502169  
Metal Industries Research & Development Centre  
Mechanical Testing Laboratory  
No.25, 37th Road, Industrial Park, Taichung City 40768, Taiwan (R.O.C.)



Testing Laboratory  
0099

Date : 2022/03/11  
Accreditation No. : 111TD0311-022-C01

**Certificate of Conformance for Freight Container Mechanical Seal Testing**  
**Seal Classification: High Security Seal**

Customer :  
Unisto AG  
Seestrasse 7, CH-9326 Horn, Switzerland  
Name of Article: Unisto Hi-Genius  
Type: Hi-Genius  
Serial No. : 0000001~0000026  
Specification No. : ISO 17712:2013(E)  
Test Dates : 2022/03/03~2022/03/11

MIRDC ,Certifies that 26 samples, 5 for each test and 1 for measurements, of the seal referenced above were subjected to the following tests.

Test Item	Section Number	Classification
Evidence of Tampering (Minimum Diameter)	4.1.3	Pass
Tensile Test	5.2	High security seal (H)
Shear Test	5.3	High security seal (H)
Bending Test	5.4	High security seal (H)
Impact Test room temp	5.5	High security seal (H)
Impact Test reduced temp	5.5	High security seal (H)

**Results :** The above listed tests were completed with no discrepancies noted. Refer to test report number L0303022-T01 for complete details.

The test results contained herein pertain only to the specimens listed in this report. This report shall not be reproduced, except in full, without the written approval of MIRDC

Approved Signatory : CHIANG, Ching-Liu	
Engineer : SU, Yuan-Da	





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試驗報告 TEST REPORT



Testing Laboratory  
0099

Test Report No. : L0303022-T01

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Customer :

Unisto AG

Seestrasse 7, CH-9326 Horn, Switzerland

SUBJECT : Freight containers Mechanical seals classification Testing

Name of Article: Unisto Hi-Genius

Type: Hi-Genius

Received Date : 2022/03/03

Test Dates : 2022/03/03~2022/03/11

Date Issued : 2022/03/11

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CHIANG, Ching-Liu

報告簽署人 (Report Authorized Person)

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SU, Yuan-Da

檢驗員 (Inspector)

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試驗報告 TEST REPORT

Test Report No. : L0303022-T01

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1. ABSTRACT

Customer :

Unisto AG

Seestrasse 7, CH-9326 Horn, Switzerland

Name of Article: Unisto Hi-Genius

Type: Hi-Genius

Serial No. : 0000001~0000026

Quantity Tested : 26

Inspection Reference : ISO 17712:2013(E)

Test Item	Section Number	Serial No.	Results
Evidence of Tampering (Minimum Diameter)	4.1.3	0000026	See Page 3
Tensile Test	5.2	0000001~0000005	See Page 4
Shear Test	5.3	0000006~0000010	See Page 6
Bending Test	5.4	0000011~0000015	See Page 7
Impact Test room temp	5.5	0000016~0000020	See Page 8
Impact Test reduced temp	5.5	0000021~0000025	See Page 8



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2. Evidence of tampering Test :

Ambient Temp. : 21°C ; 54% R.H.

Inspection Reference : ISO 17712:2013(E)

Result :

**Evidence of tampering Section 4.1.3**

Specimen No.	Measurement (mm)		Pass/Fail
0000026	Pin Head	19.15	Pass
	Lock Body	18.13	Pass

Requirement :

The minimum diameter (or minimum widest cross-dimension) for the metal components of a bolt seal shall be 18 mm.



Pin Head



Lock Body



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Test Report No. : L0303022-T01

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3. Tensile Test :

Testing Instrument : Universal Testing Machine (No.TG0103)

Ambient Temp. : 21°C ; 54% R.H

Inspection Reference : ISO 17712:2013(E)

Result :

**Tensile Test Section 5.2**

The seal was gripped in a tensile machine and a pull force applied.

Specimen No.	Requirement Load to failure	Result kN	Seal classification
0000001	10.0 kN : High security seal 2.27 kN : Security seal < 2.27 kN : Indicative seal	18.3	High security seal (H)
0000002		17.8	High security seal (H)
0000003		17.3	High security seal (H)
0000004		16.2	High security seal (H)
0000005		17.8	High security seal (H)



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Universal Testing Machine



Tensile Set up





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試驗報告 TEST REPORT

Test Report No. : L0303022-T01

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4. Shear Test

Testing Instrument : Universal Testing Machine (No.TG0103)

Ambient Temp. : 21°C ; 54% R.H.

Inspection Reference : ISO 17712:2013(E)

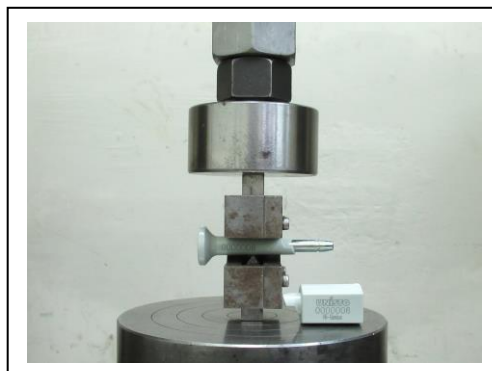
Result :

**Shear Test Section 5.3**

The seal was fixed in a universal testing machine to withstand cutting with shearing blades and a compressive load applied slowly until the seal is severed.

Specimen No.	Requirement Load to failure	Result kN	Seal classification
0000006	3.336 kN : High security seal 2.224 kN : Security seal <2.224 kN : Indicative seal	8.896	High security seal (H)
0000007		8.896	High security seal (H)
0000008		8.896	High security seal (H)
0000009		8.896	High security seal (H)
0000010		8.896	High security seal (H)

Shear Set up



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



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## 5. Bending Test

Testing Instrument : FORCE GAURE

Ambient Temp. : 21°C ; 54% R.H

Inspection Reference : ISO 17712:2013(E)

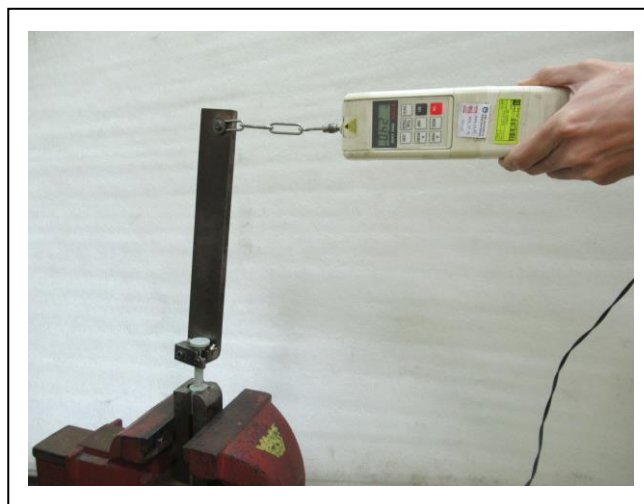
Result :

### Bending Test Section 5.4

Fix the locking end on the universal testing machine in a horizontal position.

Apply a load on the remaining portion of the seal at a distance (the moment arm) above the fixed end so as to bend the seal 90 degrees.

Specimen No.	Requirement Bending moment to failure	Result Nm	Seal classification
0000011	50 Nm : High security seal 22 Nm : Security seal < 22 Nm : Indicative seal	53.7	High security seal (H)
0000012		52.2	High security seal (H)
0000013		51.5	High security seal (H)
0000014		51.6	High security seal (H)
0000015		53.3	High security seal (H)



Bend Set up





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6. Impact Test

Testing Instrument :

1. Impact Tester

2. Programmable Low Temp. Tester (No.SG5501)

Inspection Reference : ISO 17712:2013(E)

**Impact Test Section 5.5**

The impact test is performed at 18 degrees C and minus 27 degrees C of temperature.

The impact load is applied at the locking mechanism of the seal in the direction opposite the direction used in locking the seal.

**Result :**

Impact Test at 18 °C					
Specimen No.	Requirement	Result Joule			Seal classification
		13.56	27.12	40.68	
0000016	40.68J : High security seal 27.12J : Security seal <27.12J : Indicative seal <b>5 impacts at each load</b>	Pass	Pass	Pass	High security seal (H)
0000017		Pass	Pass	Pass	High security seal (H)
0000018		Pass	Pass	Pass	High security seal (H)
0000019		Pass	Pass	Pass	High security seal (H)
0000020		Pass	Pass	Pass	High security seal (H)

Impact Test at -27 °C					
Specimen No.	Requirement	Result Joule			Seal classification
		13.56	27.12	40.68	
0000021	40.68J : High security seal 27.12J : Security seal <27.12J : Indicative seal <b>5 impacts at each load</b>	Pass	Pass	Pass	High security seal (H)
0000022		Pass	Pass	Pass	High security seal (H)
0000023		Pass	Pass	Pass	High security seal (H)
0000024		Pass	Pass	Pass	High security seal (H)
0000025		Pass	Pass	Pass	High security seal (H)



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Impact Set up



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Name of Article : Unisto Hi-Genius

Type : Hi-Genius

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試驗報告 TEST REPORT

Customer :  
Unisto AG  
Seestrasse 7, CH-9326 Horn, Switzerland

檢測編號 : L0303022-T02  
Application No  
收件日期 : 2022/03/03  
Received Date  
試驗日期 : 2022/03/10  
Test Date  
簽發日期 : 2022/03/11  
Date Issued  
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- (1). 試樣名稱 Name of Article : Unisto Hi-Genius 型號 Type : Hi-Genius  
 (2). 試驗項目 Test Item : 抗旋轉測試 Anti rotation test  
 (3). 測試規範 Inspection Reference : CNS 17712 (2014) 5.1.2  
 (4). 測試方法 Testing method : 子彈型封條以手動進行扭轉測試,於鎖桿插入鎖座扣合上鎖後,組合元件於未使用工具時,以相反方向旋轉或扭轉。  
 The Bolt seals will undergo rotation test manually. And after the locking mechanism of the seal is locked, it will be turned or twisted in opposite direction by hand without using any tools.

(5). 試驗結果 Result :

抗扭轉 Anti-rotation	扭轉角度 Rotation angle	
有效/無效 Valid /fail	測試值 Test result	規範要求 Requirement
有效 Valid	22°	< 360°

判定：符合抗旋轉要求(合格)。

Conclusion : The test sample met the requirement of anti -rotation regulation (Qualified).

原樣品  
Sample



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