



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.)

Date : 2021/04/20

Accreditation No. : 110TD0420-062-C01



Testing Laboratory

0099

Certificate of Conformance for Freight Container Mechanical Seal Testing
Seal Classification: Indicative seal

Customer :

LEGHORNGROUP S.R.L.

34/36, VIA DEGLI ARROTINI 57121 LIVORNO, ITALY

Name of Article : TWISTSEAL

Type : CABLE SEAL

Serial No. : 0001586~0001610

Specification No. : ISO 17712:2013(E)

Test Dates : 2021/04/13~2021/04/20

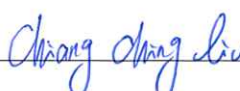





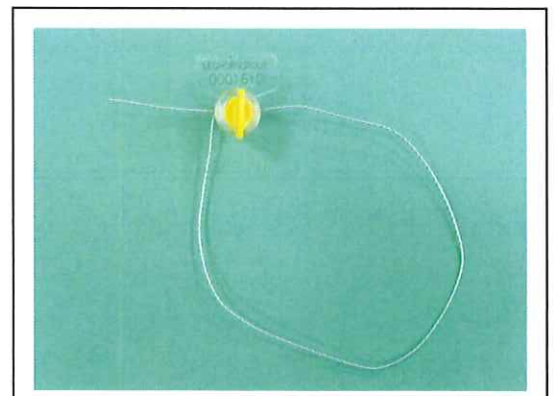
MIRDC , certifies that 25 samples, 5 for each test, of the seal referenced above were subjected to the following tests.

Test Item	Section Number	Classification
Tensile Test	5.2	Indicative seal
Shear Test	5.3	Indicative seal
Bending Test	5.4	Indicative seal
Impact Test room temp	5.5	Indicative seal
Impact Test reduced temp	5.5	Indicative seal

Results : The above listed tests were completed with no discrepancies noted. Refer to test report number K0413062-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. : K0413062-T01

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Customer :

LEGHORNGROUP S.R.L.

34/36, VIA DEGLI ARROTINI 57121 LIVORNO, ITALY

SUBJECT : Freight containers Mechanical seals classification Testing

Name of Article : TWISTSEAL

Type : CABLE SEAL

Received Date : 2021/04/13

Test Dates : 2021/04/13~2021/04/20

Date Issued : 2021/04/20



Chiang Ching-Liu



CHIANG, Ching-Liu

報告簽署人 (Report Authorized Person)

Su, Yuan-Da



SU, Yuan-Da

檢驗員 (Inspector)

Note :

- (1) The operation and testing of MIRDC laboratory are in conformity to the requirements of ISO/IEC 17025 : 2017
(Taiwan Accreditation Foundation , Accreditation No. : 0099)
- (2) This report is responsible for designated samples only.
- (3) Reproduction of all or parts this report without a written approval is strictly prohibited.
- (4) Decision rules of conformance statement of this test report, do not consider uncertainty of measurement.



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1. ABSTRACT

Customer :

LEGHORNGROUP S.R.L.

34/36, VIA DEGLI ARROTINI 57121 LIVORNO, ITALY

Name of Article : TWISTSEAL

Type : CABLE SEAL

Serial No. : 0001586~0001610

Quantity Tested : 25

Specification No. : ISO 17712:2013(E)

Test Item	Section Number	Results
Tensile Test	5.2	See Page 3
Shear Test	5.3	See Page 5
Bending Test	5.4	See Page 6
Impact Test room temp	5.5	See Page 7
Impact Test reduced temp	5.5	See Page 7



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2. Tensile Test :

Testing Instrument : Universal Testing Machine (No.TG0103)

Ambient Temp. : 20°C ; 54% R.H.

Specification No. : 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 N	Seal classification
0001586	10.0 kN : High security seal	156	Indicative seal
0001587	2.27 kN : Security seal	155	Indicative seal
0001588	< 2.27 kN : Indicative seal	153	Indicative seal
0001589		143	Indicative seal
0001590		151	Indicative seal



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Universal Testing Machine



Tensile Set up





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3. Shear Test

Testing Instrument : Universal Testing Machine (No.TG0103)

Ambient Temp. : 20°C ; 54% R.H.

Specification No. : 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 N	Seal classification
0001591	3.336 kN : High security seal	163	Indicative seal
0001592	2.224 kN : Security seal	144	Indicative seal
0001593	<2.224 kN : Indicative seal	155	Indicative seal
0001594		140	Indicative seal
0001595		154	Indicative seal

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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4. Bending Test

Testing Instrument : Bending Tester

Ambient Temp. : 20°C ; 54% R.H.

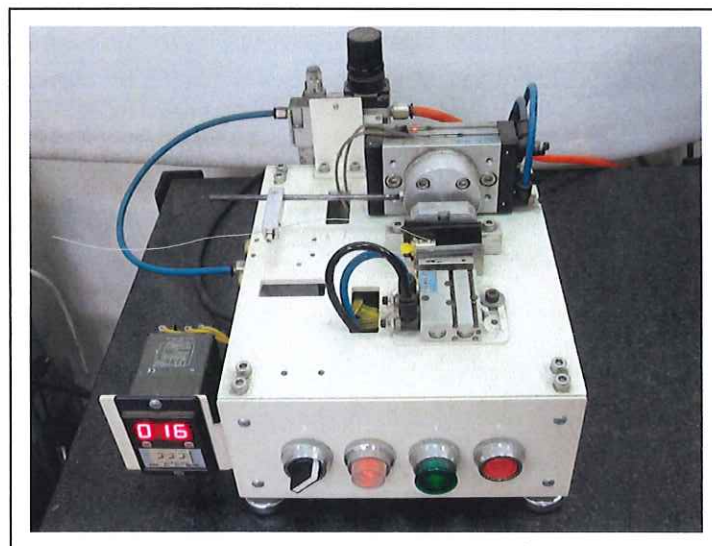
Specification No. : ISO 17712:2013(E)

Result :

Bending Test Section 5.4

Fix the locking end and flex the material adjacent to this fixed end repeatedly through an arc of 180° until failure

Specimen No.	Requirement Cycles to failure	Result Cycles	Seal classification
0001596	501 : High security seal	< 251	Indicative seal
0001597	251 : Security seal	< 251	Indicative seal
0001598	<251 : Indicative seal	< 251	Indicative seal
0001599		< 251	Indicative seal
0001600		< 251	Indicative seal



Bend Set up



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5. Impact Test

Testing Instrument :

5.1. Impact Tester

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

Specification No. : 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	
0001601	40.68J : High security seal	Fail	Indicative seal
0001602	27.12J : Security seal	Fail	Indicative seal
0001603	<27.12J : Indicative seal	Fail	Indicative seal
0001604	5 impacts at each load	Fail	Indicative seal
0001605		Fail	Indicative seal

Impact Test at -27 °C

Specimen No.	Requirement	Result Joule	Seal classification
		13.56	
0001606	40.68J : High security seal	Fail	Indicative seal
0001607	27.12J : Security seal	Fail	Indicative seal
0001608	<27.12J : Indicative seal	Fail	Indicative seal
0001609	5 impacts at each load	Fail	Indicative seal
0001610		Fail	Indicative seal



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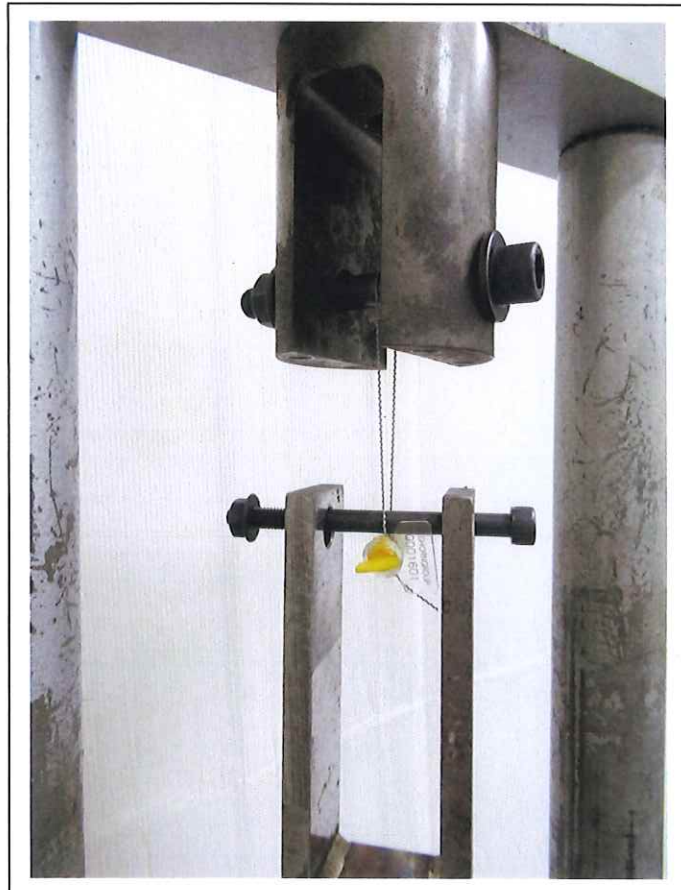
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Impact Set up



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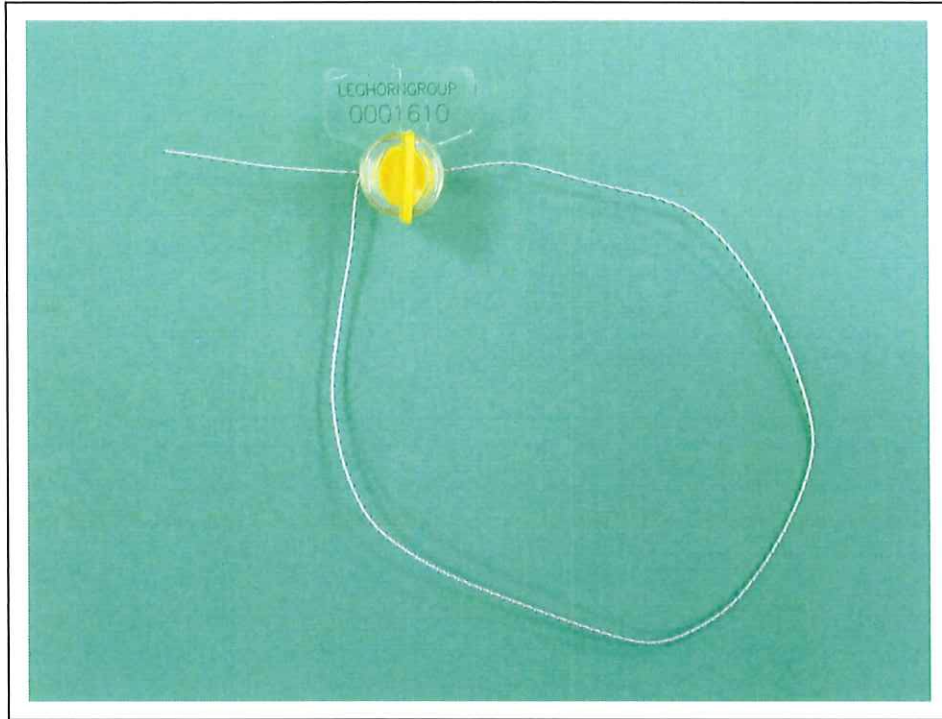
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Name of Article : TWISTSEAL

Type : CABLE SEAL

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