

LIV BUILDING PRODUCTS TEST REPORT

SCOPE OF WORK

ULTIMATE LOAD TESTING OF FASCIA MOUNTED INVISIRAIL® POSTS AND LIVE LOADS
RESISTANCE TESTING OF FASCIA MOUNTED INVISIRAIL® GUARD SYSTEM TO IRC 2018

REPORT NUMBER

103542752TOR-002A

TEST DATE(S)

07/06/18 - 07/26/18

ISSUE DATE

08/29/18

RECORD RETENTION END DATE

08/17/23

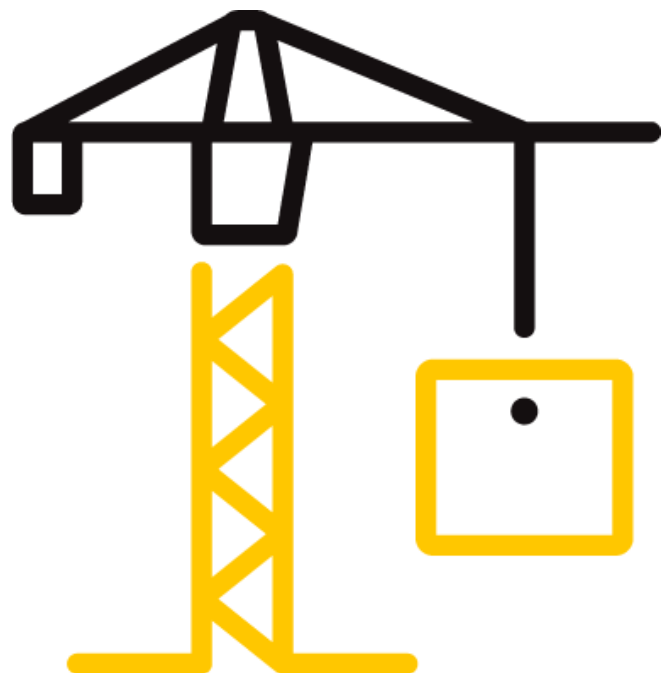
PAGES

22

DOCUMENT CONTROL NUMBER

GFT-OP-10C

© 2017 INTERTEK



TEST REPORT FOR LIV BUILDING PRODUCTS

Report No.: 103542752TOR-002A

Date: 08/29/18

REPORT ISSUED TO

LIV BUILDING PRODUCTS

6050 Owen Road
Uxbridge ON, L6P 1R1
Canada

SECTION 1

SCOPE

Intertek Building & Construction (B&C) was contracted by LIV Building Products (LIV) to conduct load testing of the Fascia Mounted InvisiRail® Guard System and posts. The scope of the testing was to determine the ultimate load resistance of individual stainless steel and Aluminium posts and to assess the guard system resistance to the specified Live Loads as prescribed in the following code:

- 2018 International Residential Code (IRC), Sentence R301.5 d, f, h, and Table R301.5.



Testing was conducted at Intertek test facility in Mississauga, ON, from July 7th, 2018 to July 26th 2018.

SECTION 2

SUMMARY OF TEST RESULTS

The LIV Fascia Mounted InvisiRail® Guard System and posts, achieved the results presented in section 7 of this report.

For INTERTEK B&C:

COMPLETED BY:	Tyrone Williams	REVIEWED BY:	Joe DeRose, P. Eng.
TITLE:	Technician Building Products	TITLE:	Project Engineer, Evaluation Services
SIGNATURE:		SIGNATURE:	
DATE:	08/29/18	DATE:	08/29/18

TEST REPORT FOR LIV BUILDING PRODUCTS

Report No.: 103542752TOR-002A

Date: 08/29/18

SECTION 3

TEST METHOD(S)

The samples were evaluated in accordance with the following:

- 2018 International Residential Code (IRC), Sentence R301.5 d, f, h, and Table R301.5.

SECTION 4

EQUIPMENT

Calibration of test equipment was performed by Intertek B&C in accordance with ISO 17025 requirements.

Equipment Calibration		
Instrument/Equipment	Asset #	Calibration Due Date
2K Load Cell with Digital Indicator	280-01-0774	Jan-15-2019
2K Load Cell with Digital Indicator	280-01-0773	Jan-15-2019
Stop Watch	273-01-1201	Apr-13-2019
600mm Scale	280-01-1234	Mar-26-2019
Tape Measure	280-01-1222	Aug-7-2019
Powerfist 24" stroke Hydraulic Ram	N/A	N/A
Electric Hydraulic Pump	N/A	N/A

SECTION 5

TEST SAMPLE

5.1 SAMPLE SELECTION

Posts and an assembled guard system installed on a wooden deck frame were submitted to Intertek directly from the client. Samples were not independently selected for testing. Tests were performed at the Intertek laboratory in Mississauga, Ontario.

5.2 SAMPLE DESCRIPTION AND ASSEMBLY

5.2.1 Guard

The guard system consisted of one fascia mounted stainless steel post with side base and one fascia mounted stainless steel corner post, a stainless steel tube top rail, an infill of 10 mm tempered glass, and four stainless steel brackets. The posts had a welded stainless steel base. The post base plates had six (6) 12mm dia. holes and were installed using six (6) 3/8 in. x 6 in U2 Construction Screw™. As installed on a wooden deck frame, the guard length, inside-to-inside post, measured 1835 mm. The posts were spaced 1855 mm on center and the top rail was 1100 mm up from the deck floor surface. The overall dimension of the deck measured 1500 mm x 2840 mm and was constructed with 2 in x 6 in SPF lumber.

TEST REPORT FOR LIV BUILDING PRODUCTS

Report No.: 103542752TOR-002A

Date: 08/29/18

5.2.2 Individual Posts

Inline and corner, stainless steel and Aluminium posts with welded base plates were installed on a SPF wooden deck frame provided the client. The post base plates had six (6) 12mm dia. holes and were anchored using six (6) 3/8 in. x 6 in. U2 Construction Screw™

5.3 ASSEMBLY DESCRIPTION

5.3.1 Guard System

The Fascia Mounted InvisiRail Guard System component descriptions and key dimensions are summarized in table below.

	Guard Assembly Description					
Drawing Number	Drawing Title	Part Description	Part Dimensions (mm)			Reported Material
			Length	Width	Nominal Thickness	
1406.2728	SS Post with Side Base in 1245 mm	Post welded to 139 x 64 mm x 10mm thick plate consisting of six(6) 12 mm dia. holes	1245	85 to 38 taper	8	Stainless Steel
1511.0562	SS corner Post in 1245 mm	Post welded to 139 x 64 mm x 10mm thick 90° bracket consisting of six (6) 12mm dia. holes.	1245	67 to 38 taper	8	Stainless Steel
1707.1346	SS Header for Pipe D42 mm	Left SS brackets and SS clamps are fitted to SS Post with side base using a single 5/16 in x 1 in socket head bolt with nut. SS Headers, SS angled block spacers and SS clamps are fitted to the SS corner post using a single 1-1/2 in x 5/16 in socket head bolt with nut.	See Drawings for Dimensions			Stainless Steel
1707.1321	Left SS Bracket for Pipe D42 mm		See Drawings for Dimensions			Stainless Steel
1707.1962	SS angled Block Spacer		See Drawings for Dimensions			Stainless Steel
1110.3096	SS clamp Notch 10 mm	Clamps (4 per section) located 70 mm up from lower edge of glass, and 61 mm down from upper edge of glass on both sides.	64	45	6.3	Stainless Steel
1412.3678	SS Multi fittings for pipe D42 mm	Bolted to SS header using 5/16 in x 1 in socket head bolt	See Drawings for Dimensions			Stainless Steel
1603.0611	SS Hand Rail Pipe D42 mm	Secured to left SS bracket using two (2) 3/16 in x 3/4 in screws and secured to SS multi-fittings using one (1) 3/16 in. x 3/4 in. screw.	1880	42 OD	1.6 Wall Thickness	Stainless Steel
	Glass Lite	10mm thick Glass top and bottom height above surface	1775	987	10	Tempered Glass
		Glass Retaining Pin	20 by 8 OD			Stainless Steel
		Retaining Pin Bushing	8 by 12 OD			Plastic
		SS clamp Notch 10 mm Fasteners (2 each)	M6x1.0 Countersink 10mm screw type			Stainless Steel

TEST REPORT FOR LIV BUILDING PRODUCTS

Report No.: 103542752TOR-002A

Date: 08/29/18

5.3.2 Individual posts

Post Description						
Drawing Number	Drawing Title	Part Description	Part Dimensions (mm)			Reported Material
			Length	Width	Nominal Thickness	
1406.2728	SS Post with Side Base in 1245 mm	Post welded to 139 x 64 mm x 10mm thick plate consisting of six(6) 12 mm dia. holes	1245	85 to 38 taper	8	Stainless Steel
1511.0562	SS corner Post in 1245 mm	Post welded to 139 x 64 mm x 10mm thick 90° bracket consisting of six (6) 12mm dia. holes.	1245	67 to 38 taper	8	Stainless Steel
1512.1639	Aluminium Sided Post & Base Part (Aluminium side post)	Post welded to 140 x 95 mm x 26 mm thick plate consisting of six(6) 12 mm dia. holes	1245	72 to 48 taper	10	Aluminium
1512.1826	Aluminium corner Post & Base Part (Aluminium corner post)	Post welded to 140 x 94 mm x 26 mm thick plate consisting of six(6) 12 mm dia. holes	1245	72 to 48 taper	10	Aluminium

SECTION 6

TESTING AND EVALUATION

6.1 SAMPLE PREPARATION

The guard system was received assembled and individual posts were installed by an Intertek technician at the Intertek laboratory in Mississauga, Ontario, no sample preparation was required since the samples were tested as received.

6.2 CONDITIONING

Samples were tested in the laboratory under ambient conditions. No specific conditioning parameters were required before testing.

6.3 PROCEDURE

6.3.1 Post testing

Ultimate Load Test

Unsupported individual posts with the fascia mount base fastened to the wooden frame were tested by applying a horizontal load outward on the post, at the top rail height, until the ultimate load was reached. The ultimate load and mode of failure was recorded.

TEST REPORT FOR LIV BUILDING PRODUCTS

Report No.: 103542752TOR-002A

Date: 08/29/18

6.3.2 Guard Testing

Infill Load Test

Test Loads were applied over a 300 mm x 300 mm square platen normal to the in-fill at the top edge mid-span of the in-fill. Live loads and factored loads were applied inward, outward and held for one (1) minute, whereupon deflection of the in-fill at the point of maximum deflection was recorded. After release of the load the system was evaluated for failure, evidence of disengagement and visible cracks in any component.

Concentrated Load Test

Concentrated loads were applied horizontally and vertically along the top of the guard at various points; loads were applied separately and sequentially and did not act concurrently with any other live load requirements. Live loads and factored live loads were applied over a 300 mm x 300 mm square platen and held for one (1) minute, whereupon deflection was recorded at the point of application of the load. After release of the load, the system was evaluated for failure, evidence of disengagement and visible cracks in any component.

Factored loads

The applicable factored loads to be applied were based on the Live loads in Table R301.5 of the 2018 International Residential Code increased by a safety factor of 4.0 for glass infill glazing. The applicable factored load applied to the metal top rail and post was based on a safety factor of 2.5 for metal guard systems.

SECTION 7

TEST RESULTS

7.1 Ultimate Load Test of Individual Posts.

Drawing Number	Drawing Title	Ultimate load (lbf)	Failure mode
1406.2728	SS Post with Side Base in 1245 mm	348	Buckling and twisting near the base
1511.0562	SS corner Post in 1245 mm	104	Buckling and twisting near the base
1512.1639	Aluminium Sided Post & Base Part (Aluminium side post)	524	Buckling and twisting near the base
1512.1826	Aluminium corner Post & Base Part (Aluminium corner post)	114	Buckling and twisting near the base

TEST REPORT FOR LIV BUILDING PRODUCTS

Report No.: 103542752TOR-002A

Date: 08/29/18

7.2 IRC live Load test of Fascia Mounted InvisiRail® Guard System.

Load Type	IRC Specified Load	Applicable Safety Factor	Required/Applied Factored Load	Deflection (mm) at IRC Specified load		Live Load Resistance
				Outward	Inward	
In-fill Load Top Edge of Glass Mid Span	0.224 kN (50 lbf)	4	0.89 kN (200 lbf)	11	65	Passed
Vertical Concentrated Load Top Rail Mid Span	0.89 kN (200 lbf)	2.5	2.22 kN (500 lbf)	116		Passed
Vertical Concentrated Load Top of Glass Mid Span	0.89 kN (200 lbf)	4	3.56 kN (800 lbf)	1		Passed
Horizontal Concentrated Load Top Rail Corner Condition.	0.89 kN (200 lbf)	2.5	2.22 kN (500 lbf)	5		Passed
Horizontal Concentrated Load Top Rail Mid Span	0.89 kN (200 lbf)	2.5	2.22 kN (500 lbf)	55	55	Passed
Horizontal Concentrated Load Top Rail adjacent to post	0.89 kN (200 lbf)	2.5	2.22 kN (500 lbf)	69	47	Passed
Horizontal Concentrated Load Top of corner post	0.89 kN (200 lbf)	2.5	2.22 kN (500 lbf)	97	76	Passed
Horizontal Concentrated Load Top of inline post	0.89 kN (200 lbf)	2.5	2.22 kN (500 lbf)	62	100	Passed

After release of the load there was no evidence of disengagement or visible cracks in any components of the guard rail system.

TEST REPORT FOR LIV BUILDING PRODUCTS

Report No.: 103542752TOR-002A

Date: 08/29/18

SECTION 8

CONCLUSION

Intertek has conducted testing for LIV Building Products on the Fascia Mounted InvisiRail® Guard System. The scope of the testing was to assess the ability of the guard system to resist the specified Live Loads as prescribed in the 2018 International Residential Code, Sentence R301.5 d, f, h, and Table R301.5. Safety factors as outlined in this report were applied to the specified Live Loads.

The LIV Fascia Mounted InvisiRail® Guard System, using the components detailed in Section 5.3 of this report, and a maximum post span of 1835 mm on center, demonstrated resistance to the Live Loads prescribed in the 2018 International Residential Code (IRC), as documented in this report.

The conclusions of this test report may not be used as part of the requirements for Intertek product certification. Authority to Mark must be issued for a product to become certified.

TEST REPORT FOR LIV BUILDING PRODUCTS

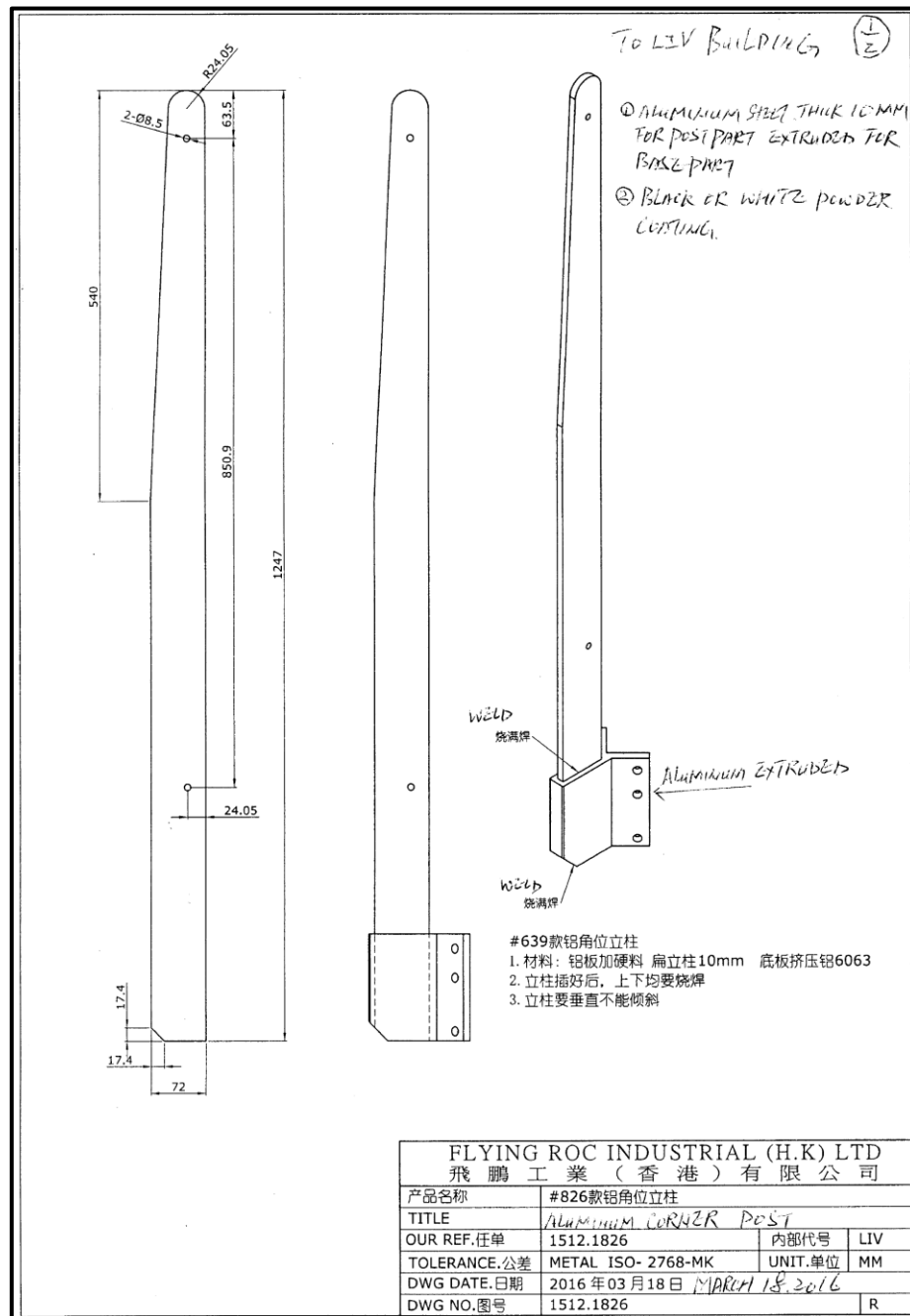
Report No.: 103542752TOR-002A

Date: 08/29/18

SECTION 9

APPENDIX -DRAWINGS

Aluminium corner Post

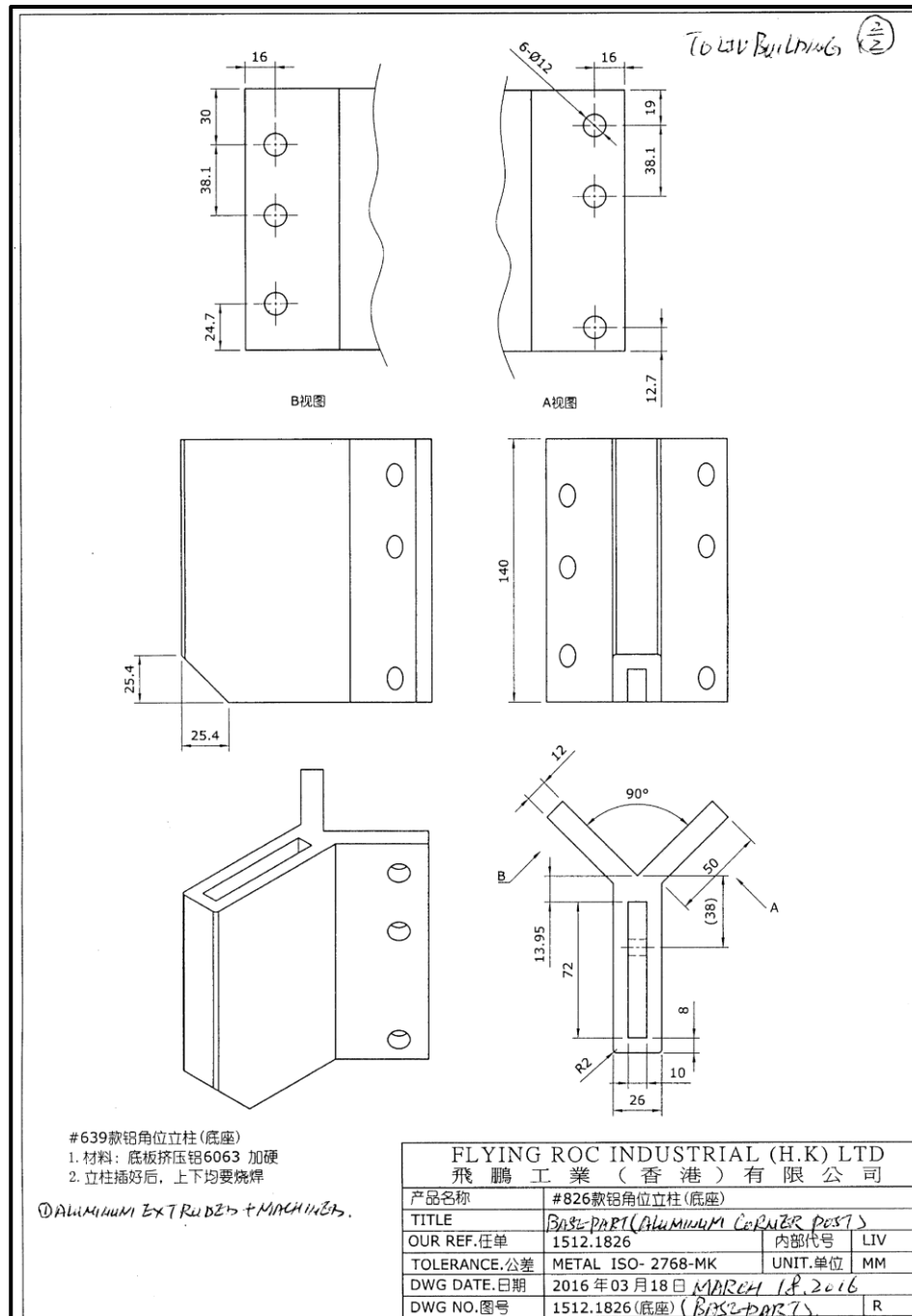


TEST REPORT FOR LIV BUILDING PRODUCTS

Report No.: 103542752TOR-002A

Date: 08/29/18

Base Part (Aluminium corner post)

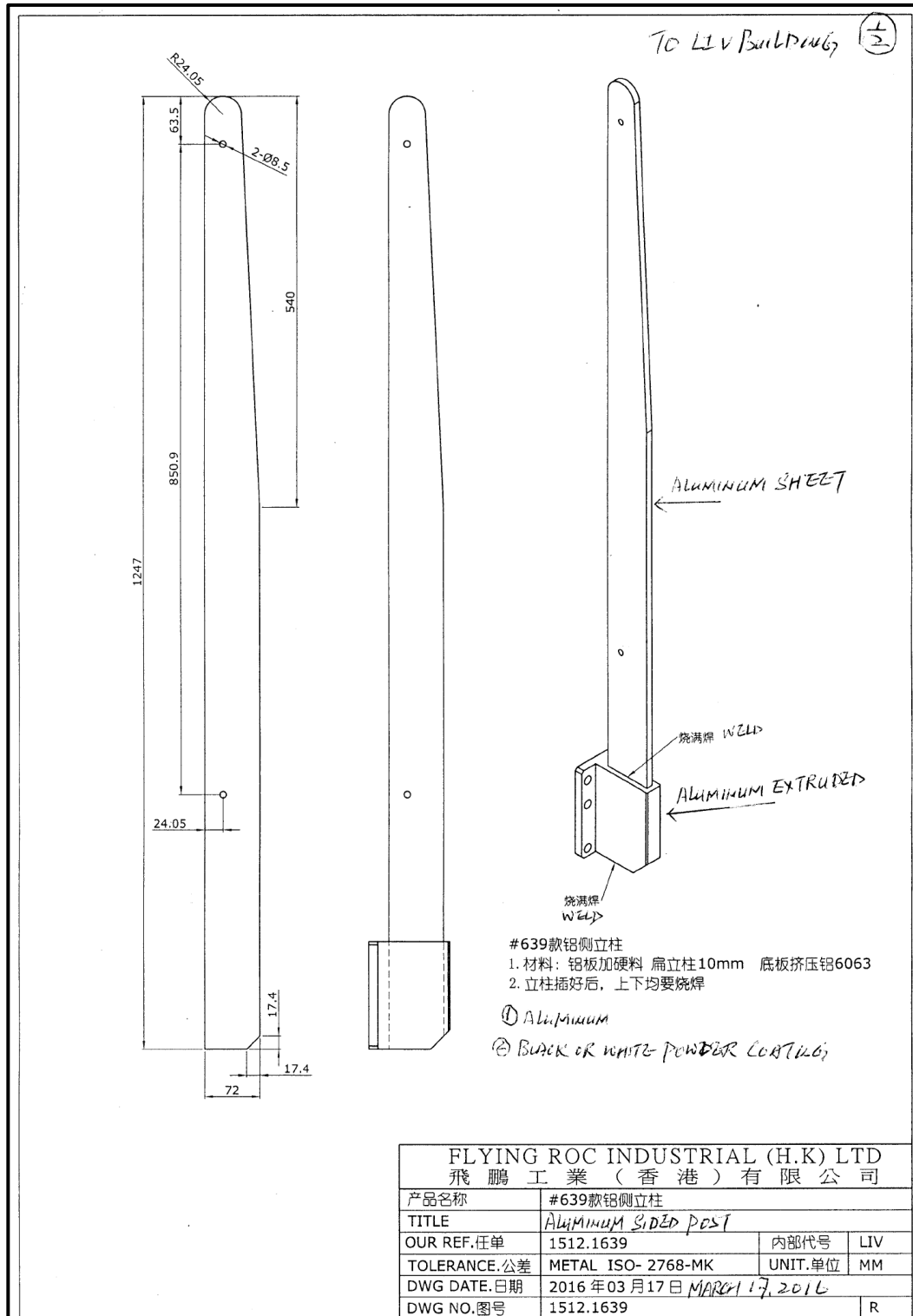


TEST REPORT FOR LIV BUILDING PRODUCTS

Report No.: 103542752TOR-002A

Date: 08/29/18

Aluminium Sided Post

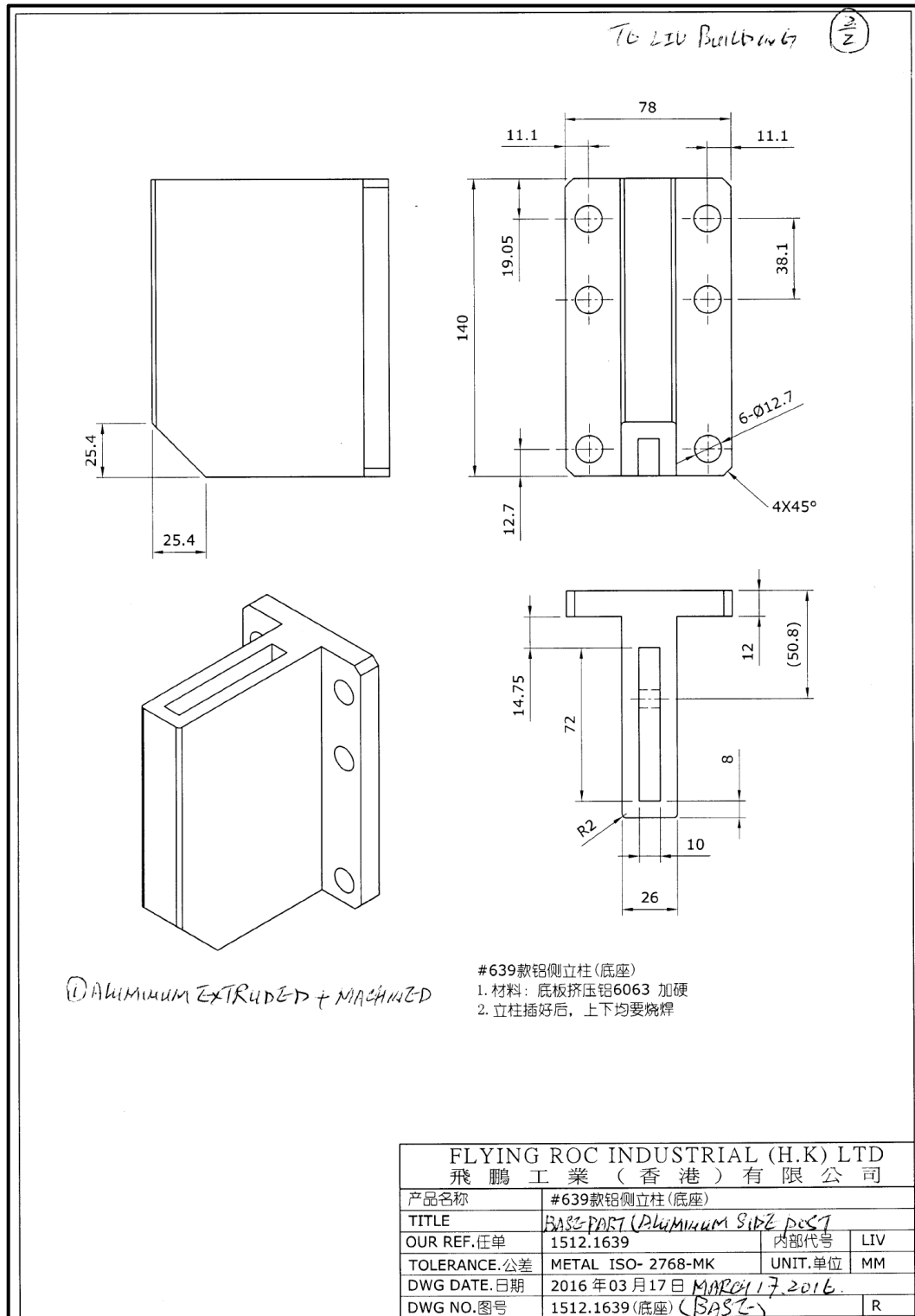


TEST REPORT FOR LIV BUILDING PRODUCTS

Report No.: 103542752TOR-002A

Date: 08/29/18

Base Part (Aluminium side post)

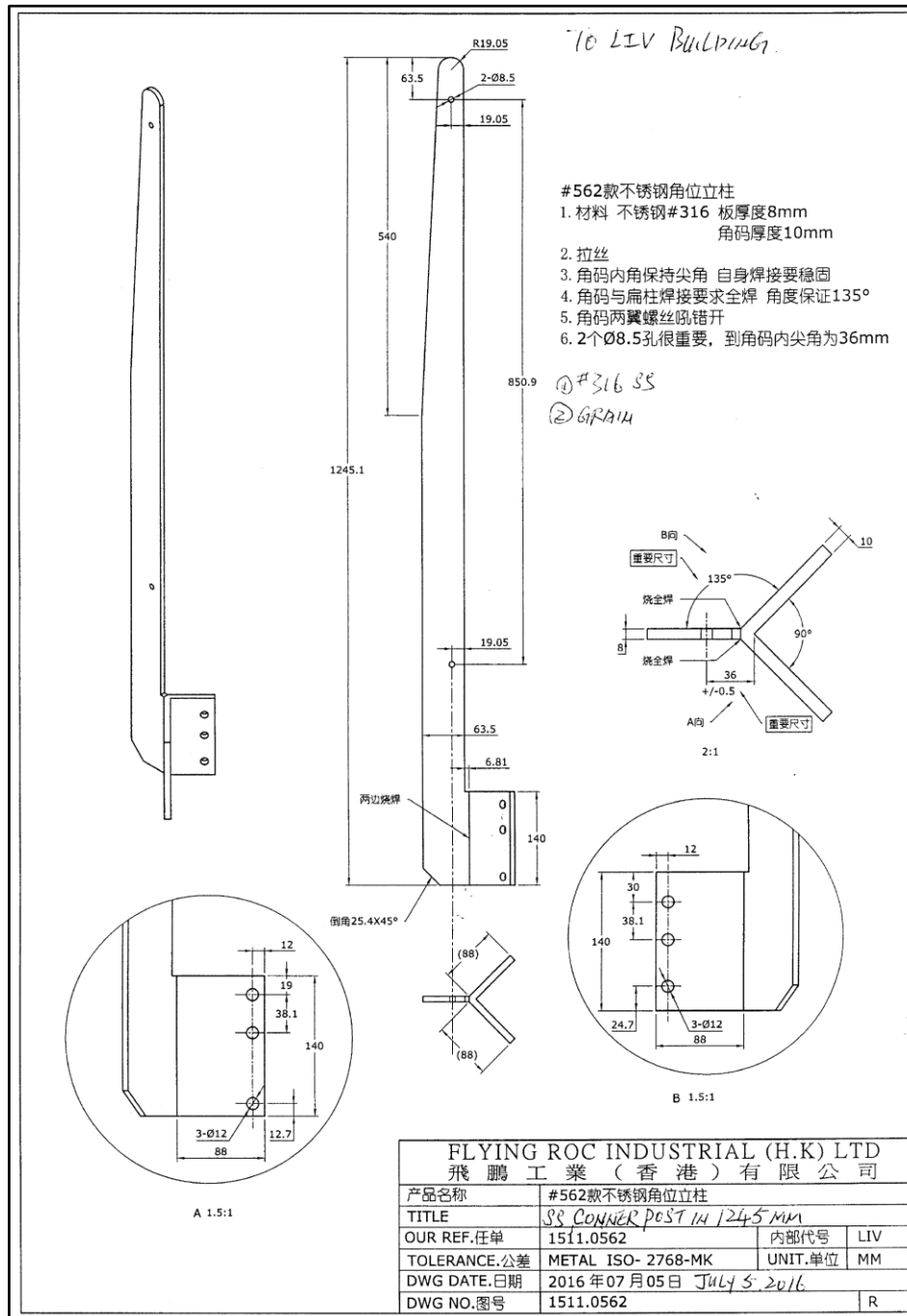


TEST REPORT FOR LIV BUILDING PRODUCTS

Report No.: 103542752TOR-002A

Date: 08/29/18

SS Corner Post in 1245 mm

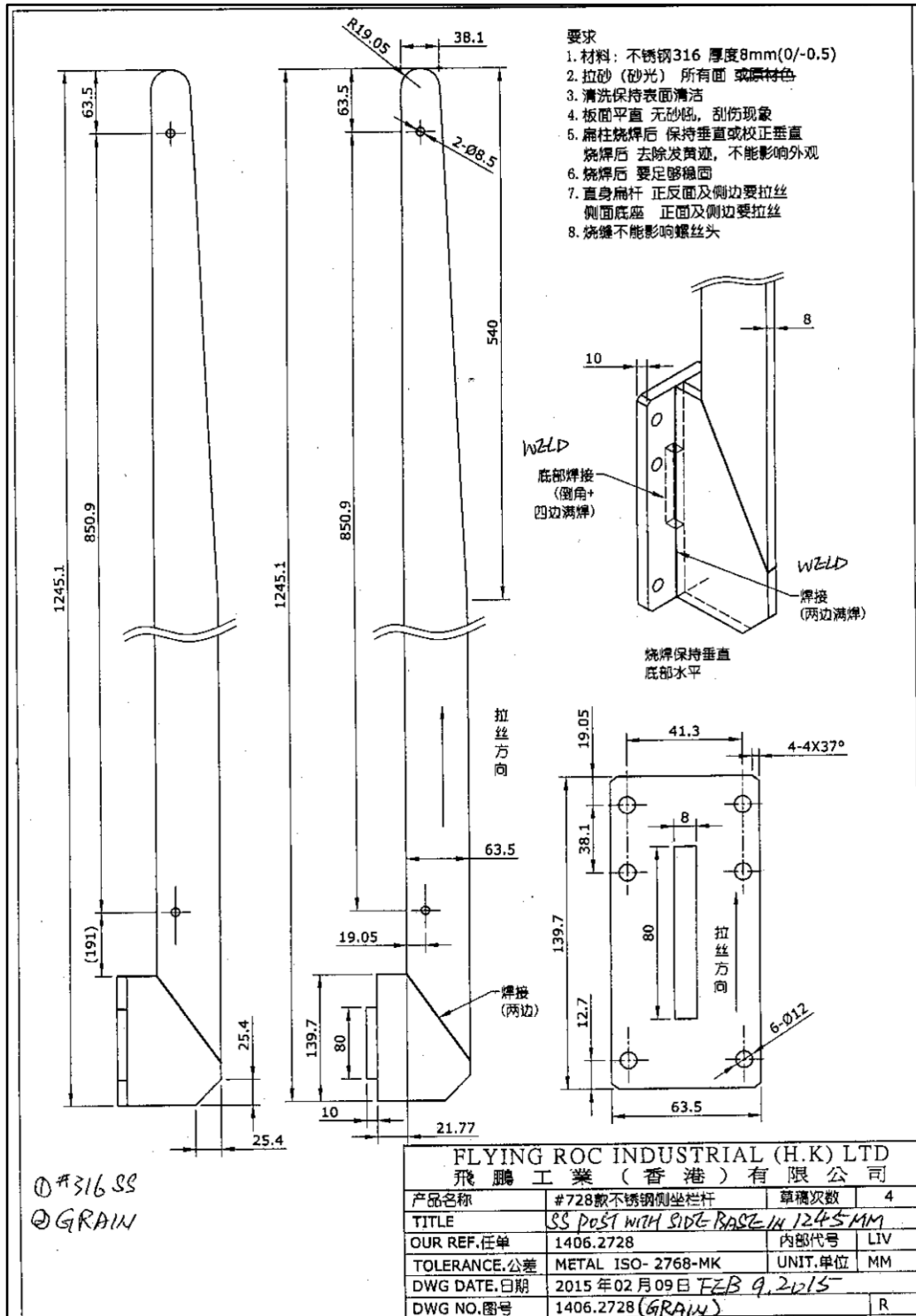


TEST REPORT FOR LIV BUILDING PRODUCTS

Report No.: 103542752TOR-002A

Date: 08/29/18

SS Post with side base in 1245 mm

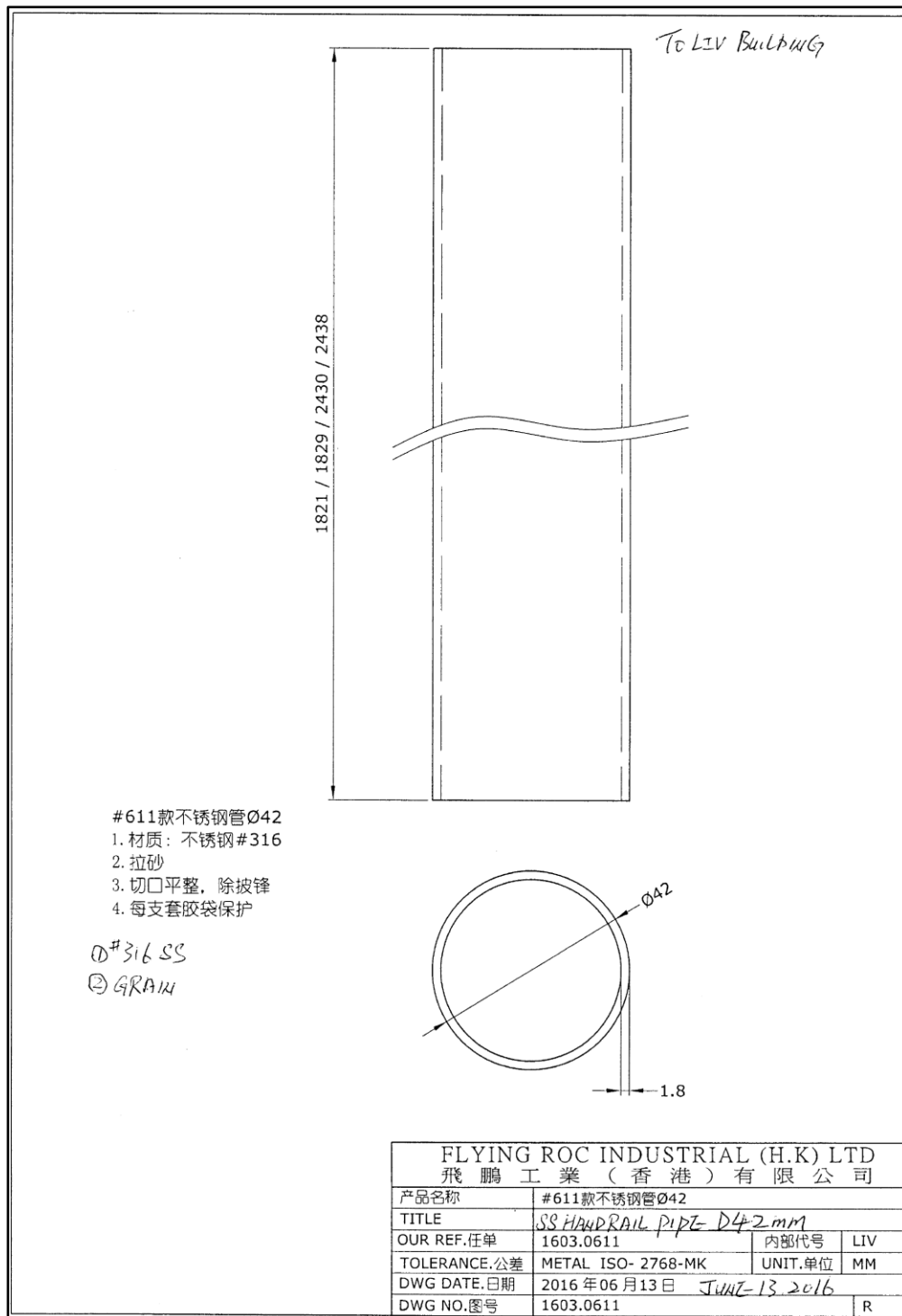


TEST REPORT FOR LIV BUILDING PRODUCTS

Report No.: 103542752TOR-002A

Date: 08/29/18

SS Handrail pipe D42 mm

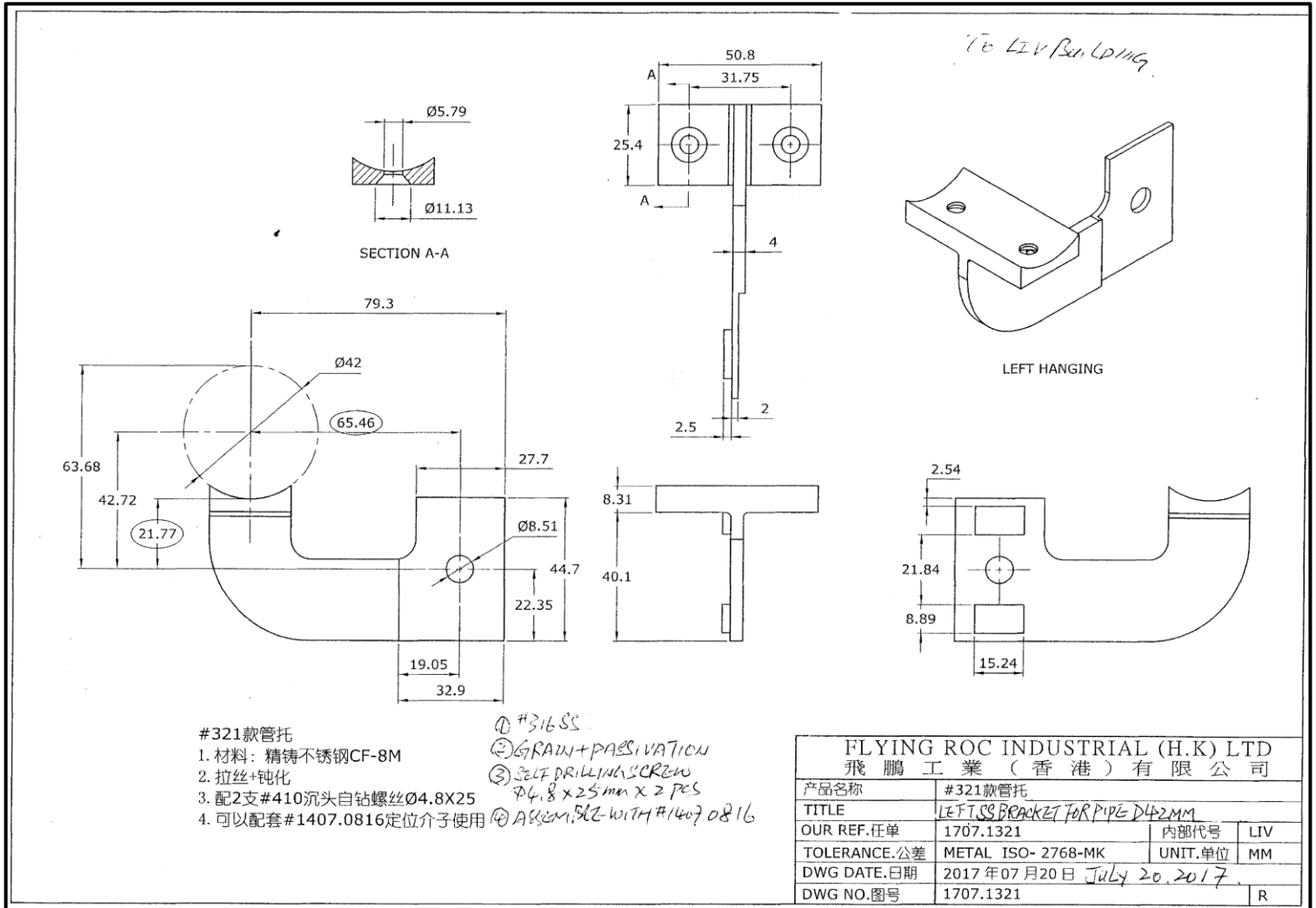


TEST REPORT FOR LIV BUILDING PRODUCTS

Report No.: 103542752TOR-002A

Date: 08/29/18

Left SS Bracket for pipe D42 mm

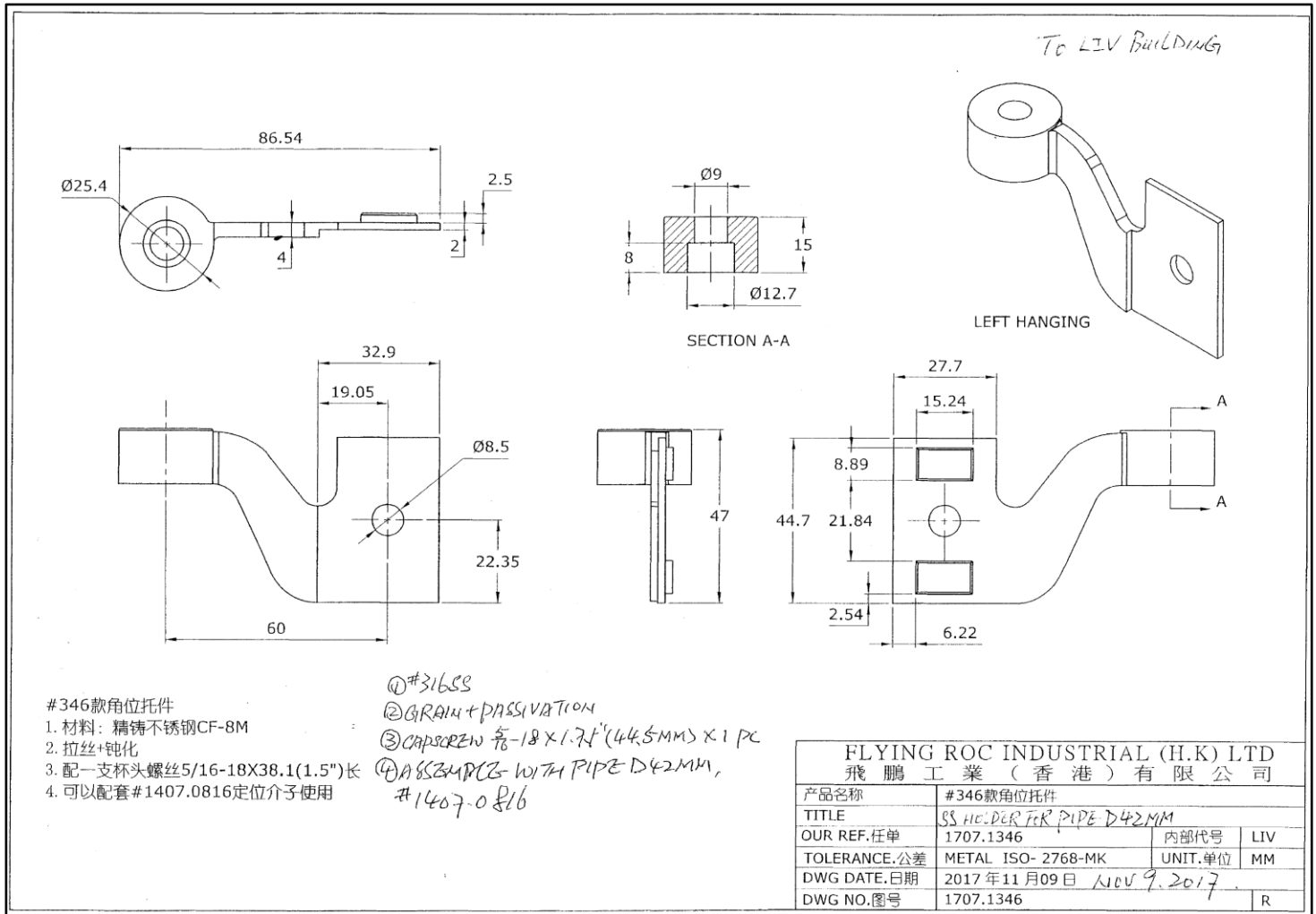


TEST REPORT FOR LIV BUILDING PRODUCTS

Report No.: 103542752TOR-002A

Date: 08/29/18

SS Header for pipe D42mm

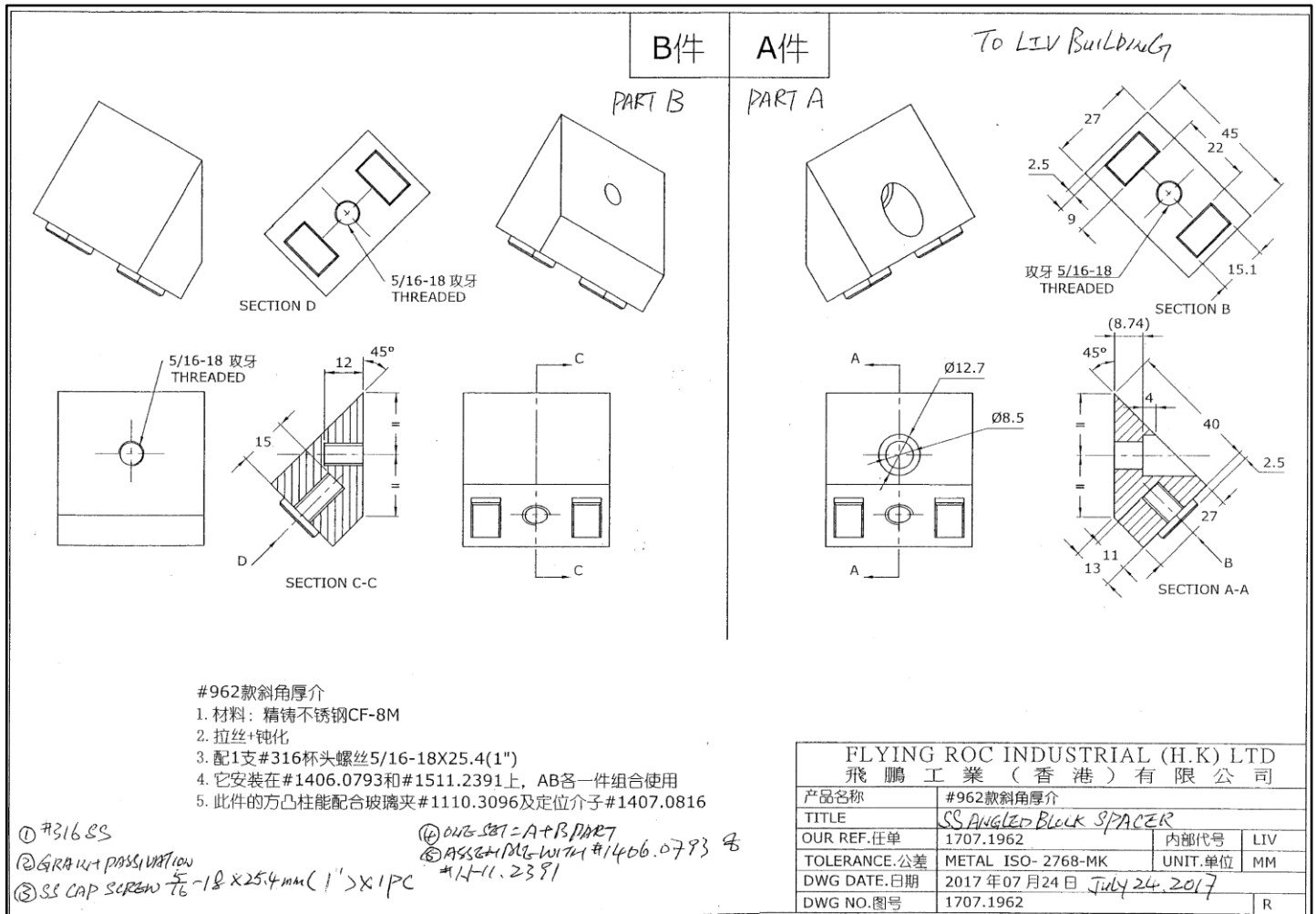


TEST REPORT FOR LIV BUILDING PRODUCTS

Report No.: 103542752TOR-002A

Date: 08/29/18

SS Angled Block Spacer

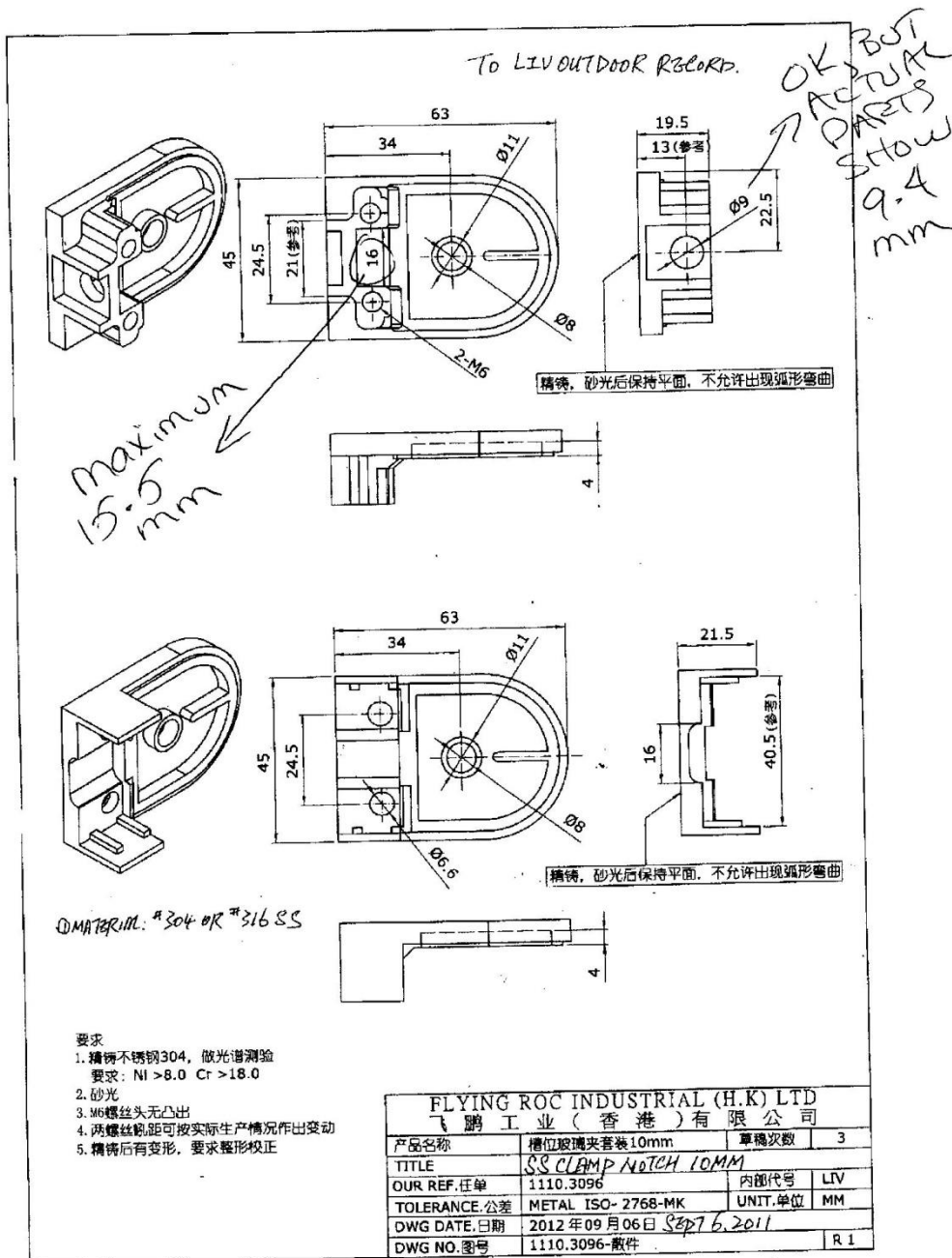


TEST REPORT FOR LIV BUILDING PRODUCTS

Report No.: 103542752TOR-002A

Date: 08/29/18

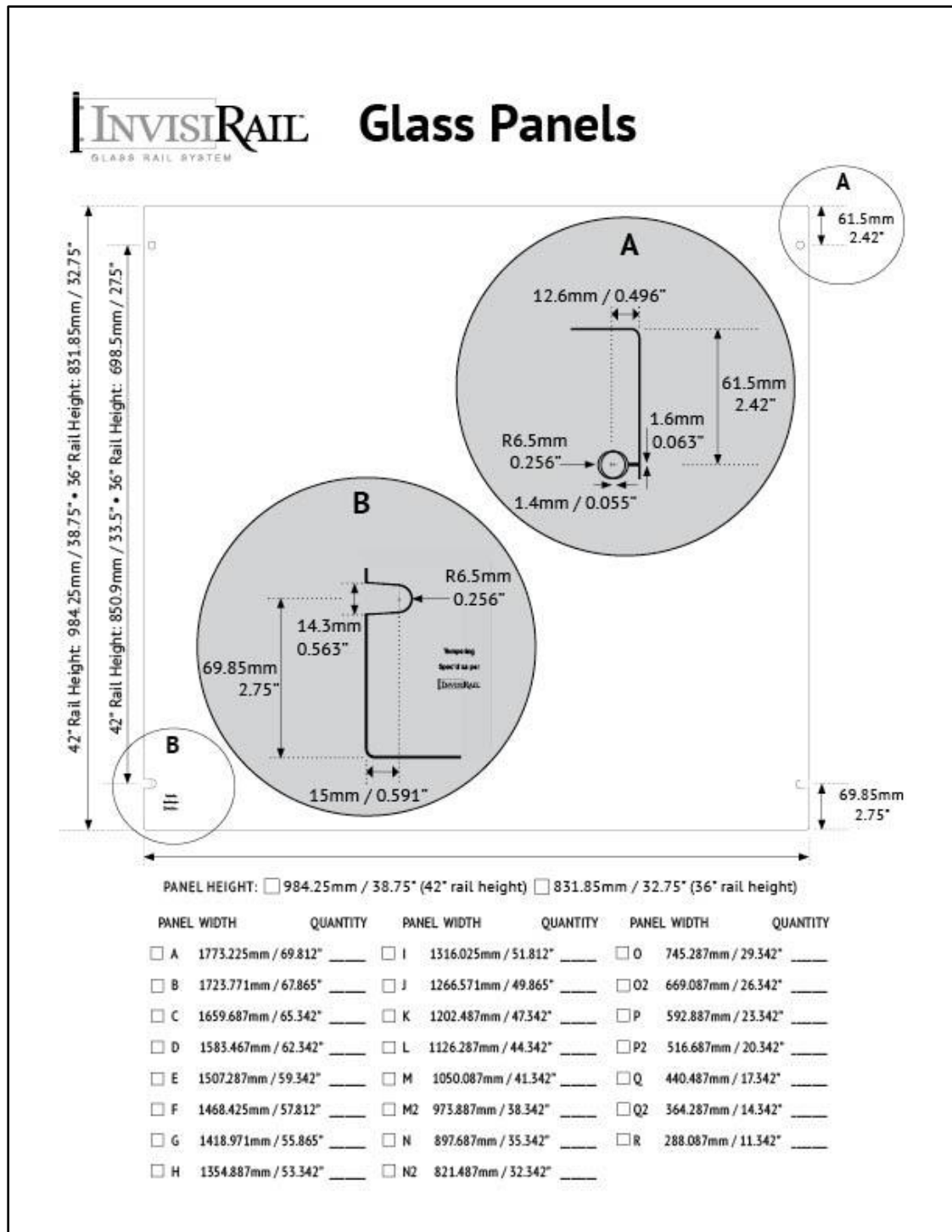
SS Clamp Notch 10 mm



TEST REPORT FOR LIV BUILDING PRODUCTS

Report No.: 103542752TOR-002A

Date: 08/29/18





Total Quality. Assured.

6225 Kenway Dr.
Mississauga, ON, L5T 2L3

Telephone: 905-678-7820
Facsimile: 905-678-7131
www.intertek.com/building

TEST REPORT FOR LIV BUILDING PRODUCTS

Report No.: 103542752TOR-002A

Date: 08/29/18

SECTION 10

REVISION LOG

REVISION #	DATE	PAGES	REVISION
0	08/29/18	22	Original Report Issue