QAI LABORATORIES
CERTIFICATION TESTING INSPECTION

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CLIENT: **Excell Railing Systems Ltd.**
Attn: Blair Holliday
#306 12886 Anvil Way
Surrey, BC V3W 8E7

Evaluation No: T1024-1	Date: August 19, 2015

Product ID: The following products for evaluation are identified as: Excell Railing Systems Ltd. 1.72" deck mounted picket railing system.

For a more detailed description please see page 2.

AUTHORIZATION: Authorized by Mr. Blair Holliday, dated July 8, 2015

EVALUATION REQUESTED: Engineering services/evaluation of Excell Railing Systems Ltd. 1.72" deck mounted picket railing system to performance properties from the following Criteria:

- 2010 Canadian National Building Code (NBC) – section 4.1.5.14 & section 9.8.8.2 - Loads on Guards
- 2012 British Columbia Building Code (BCBC) – section 4.1.5.14 & section 9.8.8.2 -Loads on Guards
- 2012 Ontario Building Code (OBC) – section 4.1.5.14 & section 9.8.8.2 -Loads on Guards

RESULTS: Based on the evaluation of supporting evidence contained in this evaluation, it is the professional opinion of QAI Laboratories that the Excell Railing Systems Ltd. - 1.72" deck mounted picket railing system with a maximum span of 5 foot 3 inches (1600 mm) meets the requirements of 2010 Canadian National Building Code (NBC) – section 4.1.5.14 & section 9.8.8.2 "Loads on Guards", 2012 British Columbia Building Code (BCBC) – section 4.1.5.14 & section 9.8.8.2 "Loads on Guards" and 2012 Ontario Building Code (OBC) – section 4.1.5.14 & section 9.8.8.2 -Loads on Guards.

Signed for and on behalf of
QAI Laboratories Inc.

Jay Klassen
Special Projects Manager

Signed for and on behalf of
QAI Laboratories Inc.

LICENSED PROFESSIONAL ENGINEER
D. H. WREN
Aug 25, 2015
PROVINCE OF ONTARIO

David Wren
Division Manager

EVALUATION PURPOSE:

QAI Laboratories Ltd. (QAI) was retained by Excell Railing Systems Ltd. to conduct an Engineering Evaluation on the 1.72" deck mounted picket railing system. The purpose of this evaluation is to evaluate the Excell Railing Systems Ltd. 1.72" deck mounted picket railing system for a 2010 Canadian National Building Code (NBC) – section 4.1.5.14 & section 9.8.8.2 - Loads on Guards, 2012 British Columbia Building Code (BCBC) – section 4.1.5.14 & section 9.8.8.2 -Loads on Guards and 2012 Ontario Building Code (OBC) – section 4.1.5.14 & section 9.8.8.2 -Loads on Guards

PRODUCT DESCRIPTION:

Samples were assembled by the client with the following components:

Post: 6061-T6 Aluminum Extrusion - 1.72 in x 1.72 (44 mm x 44 mm)

Base: 4 in x 4 in x 3/8 in (100 mm x 100 mm x 9.5 mm) flat plate with 4 mounting holes

Railing System Height: 42 in (1067 mm) or less overall height (above the deck)

Top Rails: 6063-T5 Aluminum Extrusion Rail

Picket Insert: 6063-T5 Aluminum Extrusion 5/8 in x 5/8 in (16 mm x 16 mm) spaced 4-1/2 in (114 mm) o.c.

Connections: See Intertek Report in Appendix A

Note: *Base to sub-structure fastener evaluation is beyond the scope of this report. Four 3/8 inch Grade 5 bolts were used to attach the surface mount posts.*

REFERENCED STANDARDS AND REPORTS:

- 2010 Canadian National Building Code (NBC) – section 4.1.5.14 & section 9.8.8.2 - Loads on Guards
- 2012 British Columbia Building Code (BCBC) – section 4.1.5.14 & section 9.8.8.2 -Loads on Guards
- 2012 Ontario Building Code (OBC) – section 4.1.5.14 & section 9.8.8.2 -Loads on Guards
- Intertek test report # 3174887COQ-002B (Dated April 6, 2009)
- Intertek test report # 3174887COQ-002C(Dated April 6, 2009)

CODE REQUIREMENTS:

In each of the 2010 Canadian National Building Code (NBC) – section 4.1.5.14 & section 9.8.8.2 "Loads on Guards", 2012 British Columbia Building Code (BCBC) – section 4.1.5.14 & section 9.8.8.2 "Loads on Guards" and 2012 Ontario Building Code (OBC) – section 4.1.5.14 & section 9.8.8.2 -Loads on Guards the following loads must be resisted by a railing system.

1. The minimum specified horizontal load applied inward or outward at the minimum required height of every required guard shall be:

   c) 0.75 kN/m or a concentrated load of 1.0 kN applied at any point, whichever governs for locations other than those described in Clauses (a) and (b).

2. Individual elements within the guard, including solid panels and picket, shall be designed for a load of 0.5 kN applied over an area of 100 mm x 100 mm located at any point in the elements so as to produce the most critical effect.

3. The loads required in Sentence (2) need not be considered to act simultaneously with the loads provided for in Sentences (1) and (4).

4. The Minimum specified load applied vertically at the top of every required guard shall be 1.5 kN/m and need not be considered to act simultaneously with the horizontal load provided for in sentence (1).

Note: Clauses (a) and (b) described in 1(c) refer to means of egress and equipment access walkways. This system is not intended for areas of means of egress and for equipment access walkways.

A Live Load safety factor of 1.5, as per section 4 of the code, must be applied to each load. Also a material resistance factor must be applied along with the live load safety factor, in accordance with the NBC 2010 – Section 4.3.5., which states that structural members made with aluminum shall conform to CAN/CSA-S157/S157.1, "Strength Design in Aluminum/Commentary on CSA S157-05, Strength Design in Aluminum." This standard specifies an aluminum performance factor of 0.9 to be factored in to the loads, when the mode of failure for the railing is ductile failure and a performance factor of 0.75 to be factored in to the loads, when the mode of failure for the railing is brittle. CSA S157-05 also states that "If four or less items are tested, the characteristic resistance shall be the lesser of the mean of the ultimate test loads multiplied by 0.9; and the lowest ultimate test load achieved."

ENGINEERING EVALUATION:

This evaluation of the Excell Railing Systems Ltd. 1.72" deck mounted picket railing system is based on the Intertek test report # 3174887COQ-002B (Dated April 6, 2009), Intertek test report # 3174887COQ-002C (Dated April 6, 2009) and newel post performance testing performed at QAI Laboratories Coquitlam Lab.

The factored loads required in the NBC, BCBC and OBC are as follows:

- Individual elements within the guard $= \frac{P \times SF}{PR \times CR} = \frac{112.4\ lbs\ (0.5\ kN) \times 1.5}{0.9 \times 0.9} = 208\ lbs\ (0.87\ kN)$
- Uniform Horizontal Load $= \frac{P \times SF}{PF \times CR} = \frac{51.4\ lbs/ft\ (0.75\ kN/m) \times 1.5}{0.75 \times 0.9} = 114.3\ lbs/ft$
- Concentrated horizontal load $= \frac{P \times SF}{PF \times CR} = \frac{224.8 \times 1.5}{0.75 \times 0.9} = 500\ lbs$
- Uniform vertical load $= \frac{P \times SF}{PF \times CR} = \frac{102.8\ lbs/ft\ (1.5\ kN/m) \times 1.5}{0.9 \times 0.9} = 190\ lbs/ft$

SF = *Live Load Safety Factor = 1.5*
PF = *Aluminum Performance Factor (Ductile = 0.75; Brittle = 0.9)*
CR = *Characteristic Resistance Factor = 0.9*

The failure mode for the horizontal load test (concentrated and uniform) is brittle; due to the welds and fasteners failing suddenly at the base to post connection. The failure for the in-fill test and uniform vertical load is ductile; due to the fact that is a bending failure of the picket and top rail.

The Excell Railing Systems Ltd. 1.72" deck mounted picket railing system was tested for both the ICC-ES AC 273 and NBC, BCBC & OBC Loads on Guards requirements. The worst case load applied to the Excell picket rail system was 169 lbs (0.75 kN) over a 4" x 4" (100 mm x 100 mm) area for the in-fill test, 77 lbs/ft (1.125 kN/m) for the uniform horizontal load, 500 lbs (2.22 kN) for the concentrated horizontal loads and 154 lbs/ft (2.25 kN/m) for the uniform vertical load.

In-Fill Test:

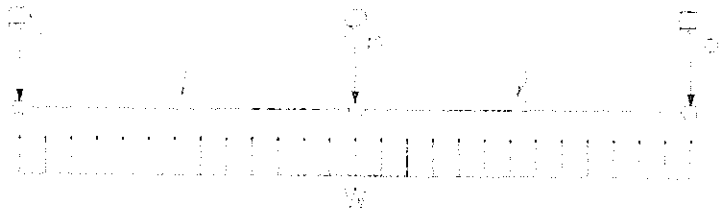
Testing the in-fill using the NBC Part 4 – 4" x 4" (100 mm x 100 mm) loading plate only applies the load on one picket. Pickets are ductile and under load bow excessively prior to failure. There is a 39 lbs (208 lbs vs 169 lbs) difference on the picket in-fill requirements versus what was tested. Based on the testing of similar picket systems, without failure, the previous testing of the Excell Picket Railing System is acceptable to meet the load resistance requirements of the NBC.

Uniform Horizontal Test:

Intertek applied a 77 lbs/ft uniform load (third point loading) to the 6 foot span 2 post railing system. The main failure point of the uniform horizontal load test is the post to plate connection. Intertek only tested a 2 post system. As shown in Figure 1, R_o is half the load applied to the middle posts, R_m, in a multi-post system. Therefore, we test the posts individually until failure to determine the ultimate failure load of the post. If the post has an average ultimate strength greater than R_m, then the railing system would achieve the load resistance required for a multi-post railing system.

On August 17th we tested 3 deck mounted posts; they had ultimate loads of 545 lbs, 681 lbs and 578 lbs; with an average ultimate load of 601 lbs.

Figure 1: Multi-post railing system – Free Body Diagram



Multi-post railing:

The resistance of the post must be greater than the maximum reaction force applied to full railing system at the post base based on code required loading mentioned above.

$R_{total} = w * 2 * l * SF$

$R_m = w * l * SF$

$R_o = w * l * SF / 2$

R_{total} = Reaction force of the railing system
R_m = Maximum reaction force on an intermediate post

Middle post reaction force of the 6 foot span picket railing assembly:

R_m = 114.3 lbs/ft x 6 ft = 686 lbs

Mean Ultimate Load of the post = 601 lbs

Due to the fact that the characteristic resistance of the post is less the factored load resistance requirement, the span will need to be reduced to show compliance.

Therefore, $l = \frac{P_{post}}{w*SF} = \frac{601\ lbs}{114.3\ lbs/ft} = 5'3"\ span\ (maximum)$

Concentrated Horizontal Test:

Intertek tested the 6 ft picket railing system with a 500 lbs (2.22 kN) concentrated load at the top rail adjacent to the post and at the center of the span on the top rail for the ICC-ES AC273 testing. This load is equivalent to the factored NBC loading requirement.

Uniform Vertical Test:

Intertek tested the 6 ft picket railing system with a 154 lbs/ft (2.25 kN/m) uniform load (third point loading). Due to the lower distributed load than the factored NBC requirements, the span will need to be reduced.

The Bending Moment of the tested railing assembly is as follows:

$$M_{tested} = \frac{w * l^2}{8} = \frac{154\frac{lbs}{ft} * 6\ ft^2}{8} = 693\ ft - lbs$$

Reduction in span due to lower than required uniform load:

$$M_{tested} = \frac{w * l^2}{8} \therefore l = \sqrt{\frac{M_{tested} * 8}{w}} = \sqrt{\frac{693\ ft - lbs * 8}{190\frac{lbs}{ft}}} = 5'5"$$

Based on the evaluations for each of the load resistance requirements in the NBC, the maximum span that can be used in the Excell Railing Systems Ltd. is 5 foot 3 inches. The limiting factor for span is the horizontal load resistance of the posts.

CONCLUSIONS:

Based on the evaluation of supporting evidence contained in this evaluation, it is the professional opinion of QAI Laboratories that the Excell Railing Systems Ltd. - 1.72" deck mounted picket railing system with a maximum span of 5 foot 3 inches (1600 mm) meets the requirements of 2010 Canadian National Building Code (NBC) – section 4.1.5.14 & section 9.8.8.2 "Loads on Guards", 2012 British Columbia Building Code (BCBC) – section 4.1.5.14 & section 9.8.8.2 "Loads on Guards" and 2012 Ontario Building Code (OBC) – section 4.1.5.14 & section 9.8.8.2 -Loads on Guards.

The report relates only to the items specified. Test results in this report may not be reproducible in the field.

TEST REPORT

REPORT NUMBER: 3174887COQ-002B
ORIGINAL ISSUE DATE: April 6, 2009

EVALUATION CENTER

INTERTEK TESTING SERVICES NA LTD.
1500 BRIGANTINE DRIVE
COQUITLAM, BC V3K 7C1

RENDERED TO

EXCELL RAILING SYSTEMS LTD.
#306 – 12886 ANVIL WAY
SURREY, BC V3W 8E7

PRODUCT EVALUATED: Excell Picket and Glass Railing Systems
EVALUATION PROPERTY: Load Requirements

Report of Excell Picket and Glass Railing Systems for compliance with the applicable requirements of the following criteria: 2006 International Building Code, Section 1607.7.1

1 Table of Contents

2 Introduction

Intertek Testing Services NA Ltd. (Intertek) has conducted a test program for Excell Railing Systems Ltd. on two face mounted aluminum railing systems. The evaluation was carried out to determine whether the railing systems would meet the loads specified in the 2006 International Building Code (IBC), Section 1607.7. The evaluation was conducted in the month of March 2009.

3 Test Samples

3.1. SAMPLE SELECTION

The client submitted one (1) aluminum face mounted picket railing sample and one (1) aluminum face mounted glass in-fill railing sample to the Evaluation Center on March 16, 2009. Samples were not independently selected for testing and cannot be used for Intertek Certification.

3.2. SAMPLE AND ASSEMBLY DESCRIPTION

The samples were identified as the following:

- 6 ft. Excell Welded Picket Railing System, which consists of the following:

Post:	1.72 in. x 1.72 in. 6061-T6 extruded aluminum post
Base Plate:	2 in. x 2 in. x 5 in. x 1/4 in. 6061-T6 fascia mounted angle bars (2) each with 2 mounting holes
Top Rails:	42 in. high, 6063-T5 aluminum rail (1-piece round profile)
Picket Insert:	5/8 in. x 5/8 in. 6063-T5 aluminum spaced 4-1/2 in. o/c
Connections:	Connection details are provided in Appendix B.

- 5 ft. Excell Glass In-fill Railing System, which consists of the following:

Post:	1.72 in. x 1.72 in. 6061-T6 extruded aluminum post
Base Plate:	2 in. x 2 in. x 5 in. x 1/4 in. 6061-T6 fascia mounted angle bars (2) each with 2 mounting holes
Top Rails:	42 in. high, 6063-T5 aluminum rail (1-piece round profile)
Panel Insert:	6 mm, tempered glass panel measuring 54 in. wide x 38 in. high
Connections:	Connection details are provided in Appendix C.

Note: Post to sub-structure fastener evaluation is beyond the scope of this report. Four 3/8 inch Grade 5 bolts were used to install deck mount posts.

4 Testing and Evaluation Methods

Each test specimen was loaded at a rate to achieve the specified loads between 10 seconds and 5 minutes. The specified test loads were held for one minute before the load was released. As per Section 1607.7.1 of the 2006 IBC, the following tests were conducted:

4.1. GENERAL (Clause 1607.7.1)

One complete railing system, consisting of two posts, was tested at maximum spacing and in the worst-case scenario.

4.2. IN-FILL LOAD TEST (Clause 1607.7.1.2)

A load consisting of 125 lbf was applied over 1 sq. ft. (0.0929 m^2) normal to the in-fill in a worst-case scenario for the picket railing system. A load consisting of 200 lbf was applied over 1 sq. ft. (0.0929 m^2) normal to the in-fill in a worst-case scenario for the glass railing system. As per Section 2407.1.1 of the 2006 IBC, a safety factor of 4 was used for glass panel.

4.3. UNIFORM LOAD TEST (Clause 1607.7.1)

A load consisting of 125 lbf/ft was applied across the top rail of each system in a 45° vectored direction.

4.4. CONCENTRATED LOAD TEST (Clause 1607.7.1.1)

The top rail of the guardrail system was subjected to two separate tests where a concentrated load of 500 lbf was applied at the following locations:

- Horizontally at the centre of the guardrail.
- Horizontally at the top rail adjacent to the rail to post connection to verify the connection capacity.

5 Testing and Evaluation Results

5.1. RESULTS AND OBSERVATIONS

The product test results are shown in Table 1 below and a copy of the test data sheets are located in Appendix A.

Table 1. Test Results

System Description	System Height (inches)	Maximum Post to Post Center Spacing (inches)	Test	Compliance
6 ft. Excell Welded Picket Railing System	42	72	In-fill load	Complied
			Uniform Load	Complied
			Mid-span Concentrated Load	Complied
			Adjacent to Post Concentrated Load	Complied
5 ft. Excell Glass In-fill Railing System	42	60	In-fill load	Complied
			Uniform Load	Complied
			Mid-span Concentrated Load	Complied
			Adjacent to Post Concentrated Load	Complied

6 Conclusion

The Excell Welded Picket and Glass In-fill Railing Systems identified in this test report have complied with the loads specified in the 2006 International Building Code, Section 1607.7.1 as presented in Section 5 of this test report.

INTERTEK TESTING SERVICES NA LTD.

Tested by: _____
Riccardo DeSantis
Project Coordinator / Test Technician, Construction Products

Reported by: _____
Chris Chang, EIT
Project Leader / Test Engineer, Construction Products

Reviewed by: _____
Heiko Neugebauer, AScT
Manager, Fenestration / Construction Products Group

APPENDIX A: Test Data (2 pages)

Intertek

Test:	2006 IBC			Project:	3174887
Date:	16-Mar-09			Eng/Tech:	Riccardo DeSantis
Client:	Excell Railing Systems Ltd.				
Product:	6 ft. Excell Welded Picket - Face Mounted				
Post Spacing:	6	ft	1.83	m	
Effective Length:	6	ft	1.83	m	
Height of Guard:	42	in	1067	mm	
Opening in Guard:	3.875	in	98	mm	
Method:	2006 International Building Code Section 1607.7.1 Handrails and Guards				
	2006 International Building Code Section 1714.3.1 Handrails and Guards				
Safety Factor:	2.5				
Equipment:	Revere 3000 lbf load cell (Intertek ID# D2741, cal due October 2009)				

Test	Design Load (Inward/ Outward) (lbf)	Factored Load (lbf)	Calculated Moment (lbf-ft)	Equivalent Quarter-Point Load (lbf)	Required Proof Load (lbf)	Pass/Fail
In-fill Load Test	50	125	-	-	125	Pass
Uniform Load Test (per ft) 45 deg	50	125	563	375	750	Pass
Midspan Concentrated Load	200	500	-	-	500	Pass
Top of Post Concentrated Load	200	500	-	-	500	Pass

Test	Design Load (Inward/ Outward) (kN)	Factored Load (kN)	Calculated Moment (kNm)	Equivalent Quarter-Point Load (kN)	Required Proof Load (kN)	Pass/Fail
In-fill Load Test	0.22	0.56	-	-	0.56	Pass
Uniform Load Test (per m)	0.73	1.82	0.76	1.67	3.34	Pass
Midspan Concentrated Load	0.89	2.22	-	-	2.22	Pass
Top of Post Concentrated Load	0.89	2.22	-	-	2.22	Pass

Intertek

Test:	2006 IBC			Project:	3174887
Date:	16-Mar-09			Eng/Tech:	Riccardo DeSantis
Client:	Excell Railing Systems Ltd.				
Product:	5 ft. Excell Glass In-fill - Face Mounted				
Post Spacing:	5	ft	1.52	m	
Effective Length:	5	ft	1.52	m	
Height of Guard:	42	in	1067	mm	
Opening in Guard:	3.875	in	98	mm	
Method:	2006 International Building Code Section 1607.7.1 Handrails and Guards				
	2006 International Building Code Section 1714.3.1 Handrails and Guards				
Safety Factor:	2.5				
	4.0	Glass Safety Factor (as per Section 2407.1.1)*			
Equipment:	Revere 3000 lbf load cell (Intertek ID# D2741, cal due October 2009)				

Test	Design Load (Inward/ Outward) (lbf)	Factored Load (lbf)	Calculated Moment (lbf-ft)	Equivalent Quarter-Point Load (lbf)	Required Proof Load (lbf)	Pass/Fail
In-fill Load Test	50	200 *	-	-	200 *	Pass
Uniform Load Test (per ft) 45 deg	50	125	391	313	625	Pass
Midspan Concentrated Load	200	500	-	-	500	Pass
Top of Post Concentrated Load	200	500	-	-	500	Pass

Test	Design Load (Inward/ Outward) (kN)	Factored Load (kN)	Calculated Moment (kNm)	Equivalent Quarter-Point Load (kN)	Required Proof Load (kN)	Pass/Fail
In-fill Load Test	0.22	0.89*	-	-	0.89*	Pass
Uniform Load Test (per m)	0.73	1.82	0.53	1.39	2.78	Pass
Midspan Concentrated Load	0.89	2.22	-	-	2.22	Pass
Top of Post Concentrated Load	0.89	2.22	-	-	2.22	Pass

APPENDIX B: Excell Welded Picket Drawings (7 pages)

EXCELL WELDED PICKET SYSTEM WITH 1.72" FASCIA POSTS

POST MOUNT PLATE FASTENED TO 1.72" FASCIA POST WITH 2x #10x1 1/2" PH SS SCREWS AND TO TOP RAIL WITH 2x #10x1 1/2" PH SS SCREWS

Intertek Testing Services ETL SEMKO

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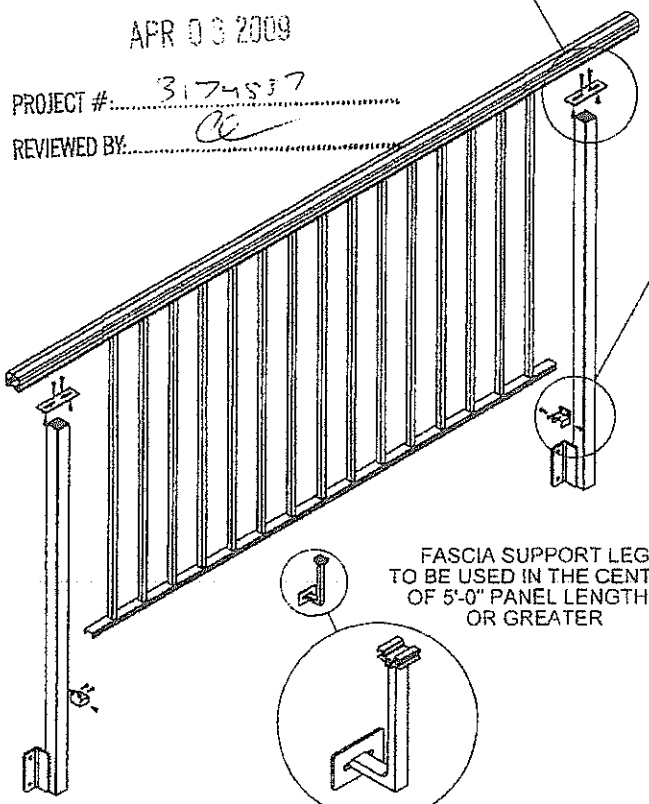
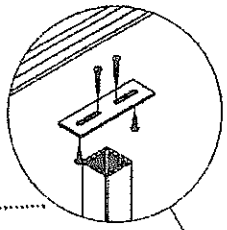
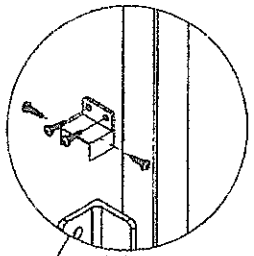
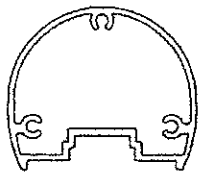


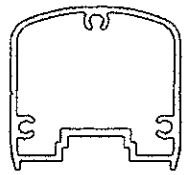




BOTTOM MOUNT FASTENED TO 1.72" FASCIA POST WITH 2x #10x3/4" TEK SCREWS AND BOTTOM RAIL WITH 2x #10x3/4" TEK SCREWS

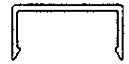


EXCELL ROUND WELDED PICKET TOP RAIL



EXCELL SQUARE WELDED PICKET TOP RAIL

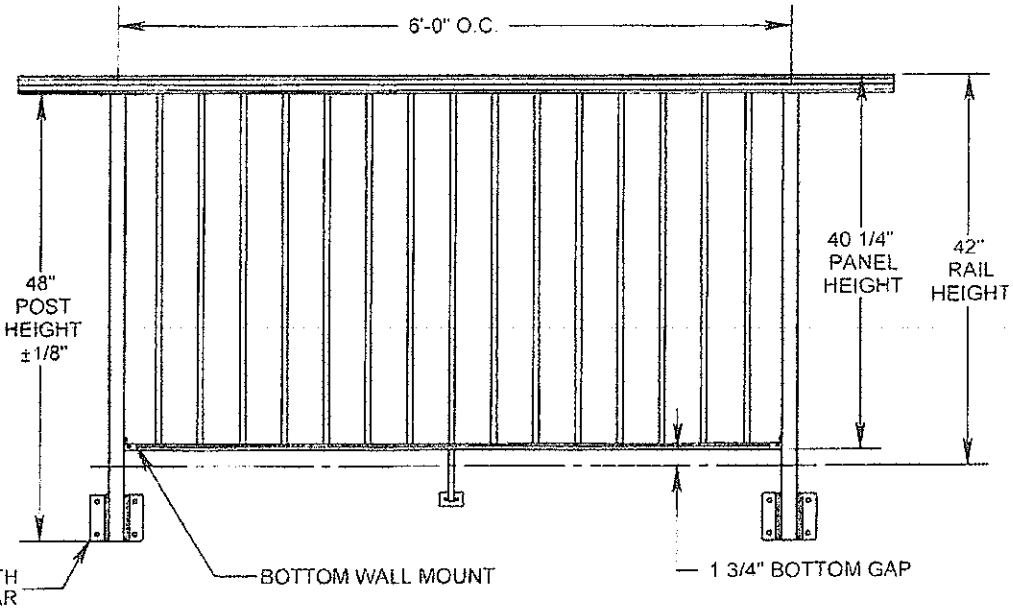
5/8" SQUARE PICKET



WELDED PICKET BOTTOM RAIL

FASCIA SUPPORT LEG TO BE USED IN THE CENTER OF 5'-0" PANEL LENGTHS OR GREATER

PLEASE SEE DRAWING 08-ERS-FPD1 FOR POST ASSEMBLY DETAILS



EXCELL RAILING SYSTEMS LTD.

MANUFACTURER OF EXCELL & DURARAIL PRODUCT LINES

durarail

ALL DIMENSIONS ARE SUBJECT TO SITE MEASUREMENTS AND ARE TO BE CONFIRMED BEFORE FABRICATION OF PRODUCT

Authorization Signature	Date of Authorization

Excell Railing Systems Ltd.
#306 - 12886 Anvil Way
Surrey, BC Canada V3W 8E7
Phone: 604-501-0151 Fax: 604-501-0155
Toll Free: 1-866-999-7245
www.excellrailing.com

Durarail Kansas City Warehouse
1722 Iron Street
North Kansas City, MO 64116
Toll Free: 1-800-338-3568
Fax: 1-816-421-2924
www.durarail.com

Drawing Name	09-ERSL-EWP1FASENG1				
Customer	Excell Railing Systems Ltd.				
Project Name	Excell WP Style 1 with 1.72 Fascia Posts (Engineer Report)				
Drawn By	Csaba Bezzegh			Date Created	March 31, 2009
Revision No.		Scale	NTS	Last Update	

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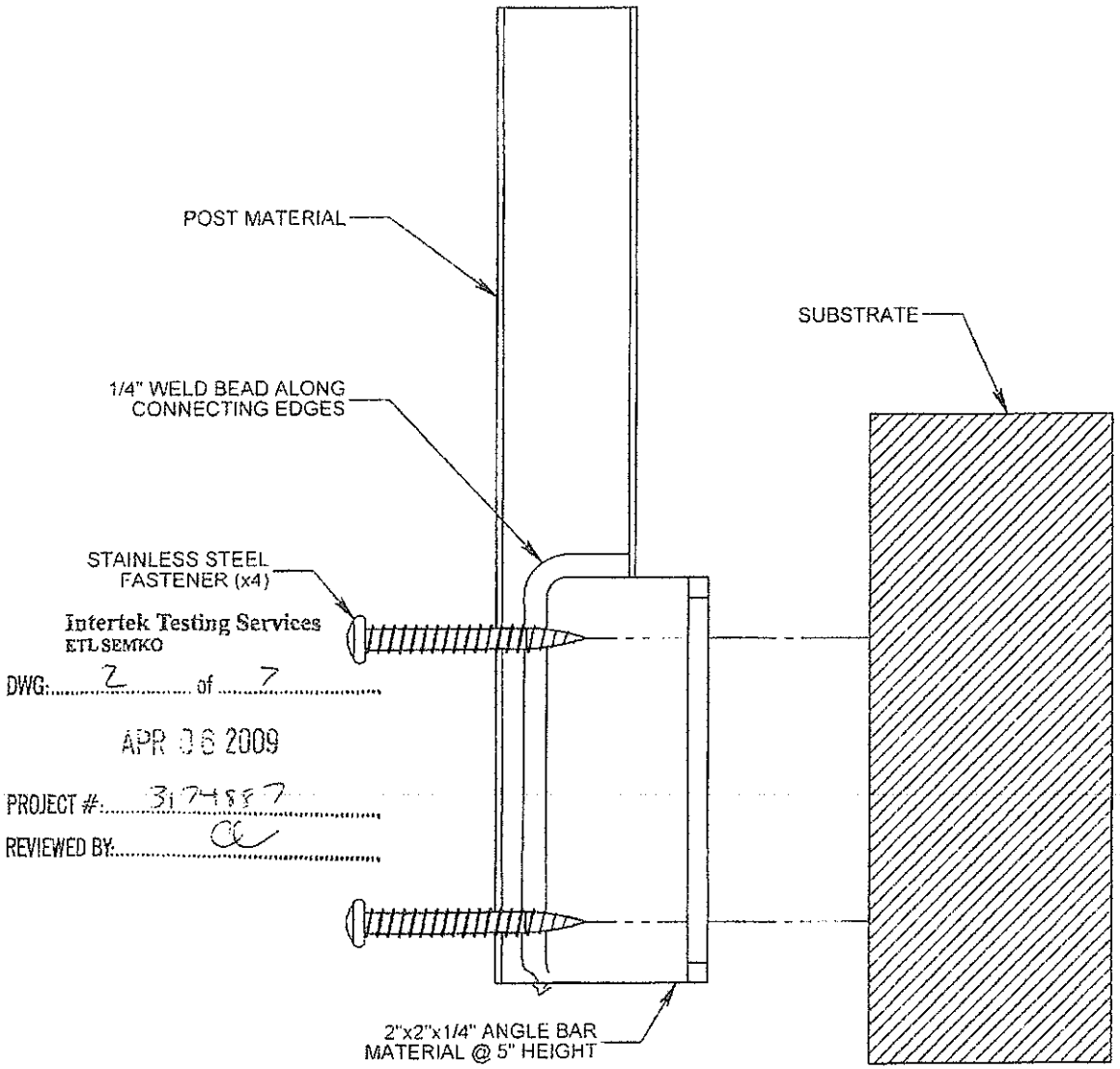

Intertek Testing Services
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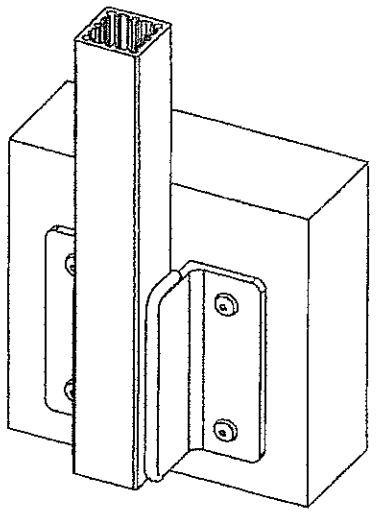
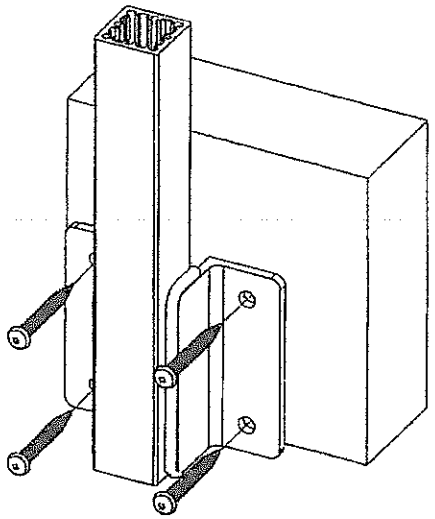




ALL DIMENSIONS ARE SUBJECT TO SITE MEASUREMENTS AND ARE TO BE CONFIRMED BEFORE FABRICATION OF PRODUCT

Authorization Signature	Date of Authorization

Drawing Name	08-ERS-FPD1
Customer	Durarail / Excell Railing Systems
Project Name	Fascia Post Design
Drawn By	Csaba Bezzegh
Date Created	December 10, 2008
Revision No.	2
Scale	NTS
Last Update	April 6, 2009

\\Ubsrv\sales\Drawing Library\Engineering\Railing Assemblies\Posts and Base Plates\1.72 Inch Post\Fascia Installation\

EXCELL RAILING SYSTEMS LTD.
MANUFACTURER OF EXCELL & DURARAIL PRODUCT LINES
durarail

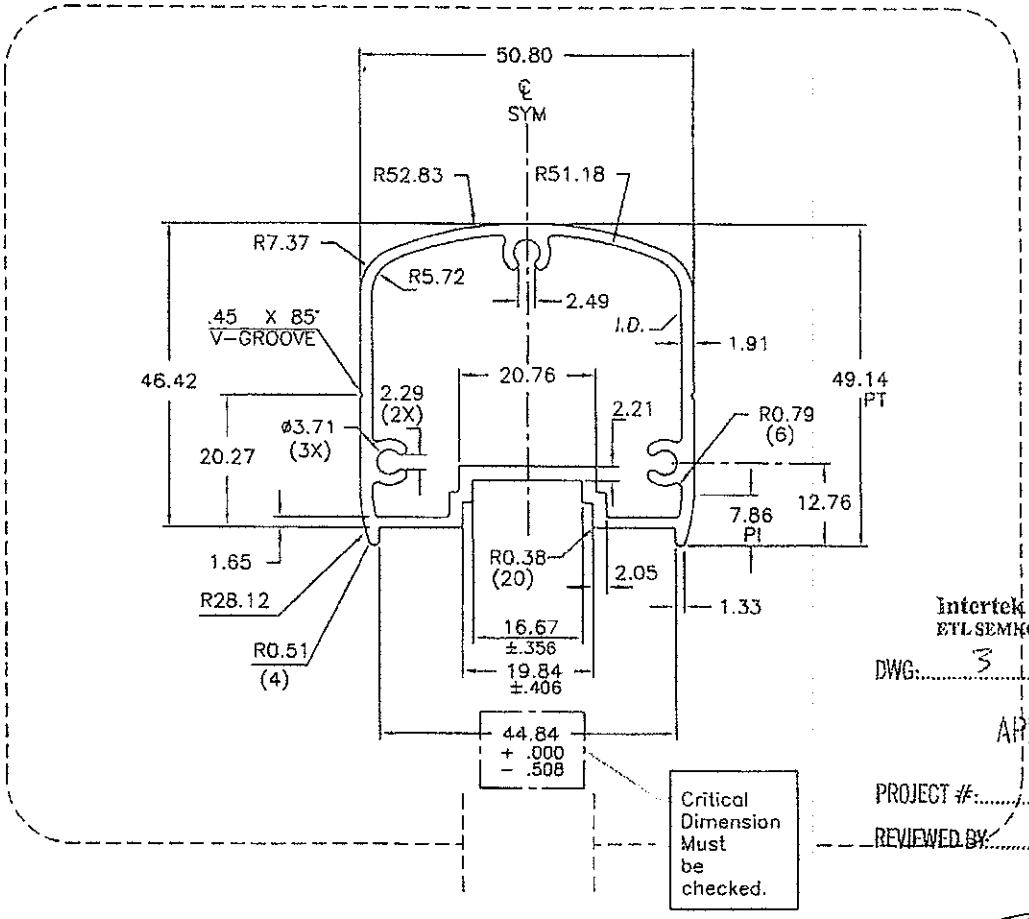
Excell Railing Systems Ltd.
#306 - 12886 Anvil Way
Surrey, BC Canada V3W 8E7
Phone: 604-501-0151 Fax: 604-501-0155
Toll Free:1-866-999-7245
www.excellrailing.com

Durarail Kansas City Warehouse
1722 Iron Street
North Kansas City, MO 64116
Toll Free: 1-800-338-3568
Fax: 1-816-421-2924
www.durarail.com

CUSTOMER	CUSTOMER PART NO.	DIE NO.
EXCELL RAILING SYSTEMS		VH-38399

DESCRIPTION	ALLOY& TEMPER	DIE LOC.	DASH NO.
WELDED SQUARE TOP RAIL	6063 T5		
STANDARD TOLERANCES TO APPLY UNLESS OTHERWISE SPECIFIED		BACKER LOC.	PROPOSAL NO. 10024-2

EXPOSED SURFACE



Intertek Testing Services
ETL SEMKO

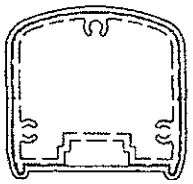
DWG: 3 of 7

APR 08 2009

PROJECT #: 3174807

REVIEWED BY:

ACTUAL SIZE



Moment of inertia: X: 114279mm4
Y: 146002mm4

Radii of gyration: X: 16.48mm
Y: 18.62mm

SLIDE FIT WITH VH-39357
HALF-SIZE

INDALEX
TORONTO – MONTREAL – CALGARY – VANCOUVER

PLUG RATIO: 1
LN2: YES

EST. AREA	EST. WT.	EST. PER	DWN BY	CAVITIES	SCALE	DATE
0.652 IN² 420.90 MM²	0.770 LBS/FT 1.146 KG/M	17.260 IN. 438.41 MM	BW	1	1:1	00/09/7

OUT PER.	WALLS	C.C.D.
8.011 IN 203.48 MM	2.16 ±18 EXCEPT AS SHOWN	2.539 IN 64.48 MM

DIE SIZE	PKT.	LIP	BACKER SIZE	BACKER NO.	BOLSTER
9 x 5.5"			P.H.		C20(A3)

DATE	SYM	REVISION	BY
x	(X)	x	BD
x	(X)	x	BD
x	(X)	x	BD
x	(X)	x	BD

DIE NO. VH-38399

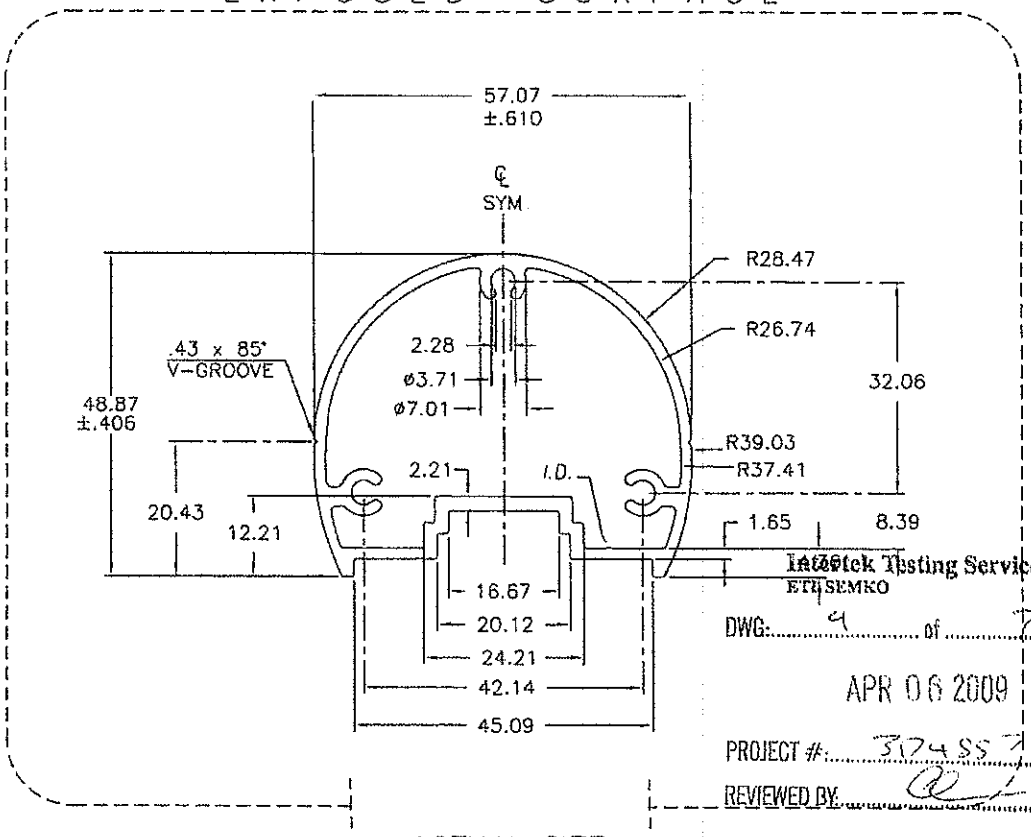
FORM NO. ACAD2.DWT REV.#-2 99/01/05 CHANGED & APPROVED BY – BD

NOTE: BREAK ALL CORNERS WITH .010" (.254MM) RADIUS UNLESS OTHERWISE NOTED.

CUSTOMER	CUSTOMER PART NO.	DIE NO.
EXCELL RAILINGS		VH-40827

DESCRIPTION	ALLOY& TEMPER	DIE LOC.	DASH NO.
ROUND TOP WELDED PICKET	6063 T5		
STANDARD TOLERANCES TO APPLY UNLESS OTHERWISE SPECIFIED		BACKER LOC.	PROPOSAL NO. 10621-1

EXPOSED SURFACE



Intertek Testing Services
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DWG: 9 of 7

APR 06 2009

PROJECT #: 317455

REVIEWED BY:

ACTUAL SIZE

Area:		420.0151
Perimeter:		449.7696
Bounding box:	X:	−28.5367 -- 28.5292
	Y:	−21.0632 -- 27.8026
Centroid:	X:	0.0000
	Y:	0.0000
Moments of inertia:	X:	105469.4897
	Y:	155821.3978
Product of inertia:	XY:	5.0159
Radii of gyration:	X:	15.8464
	Y:	19.2611

Principal moments and X-Y directions about centroid:
I: 105469.4892 along [1.0000 0.0001]
J: 155821.3983 along [−0.0001 1.0000]

UNMARKED RADII TO BE 0.80 RAD. BREAK ALL SHARP CORNERS WITH 0.38 RAD.

INDALEX
ALUMINUM SOLUTIONS
TORONTO - MONTREAL - CALGARY - VANCOUVER

PLUG RATIO: 3

LN2: YES

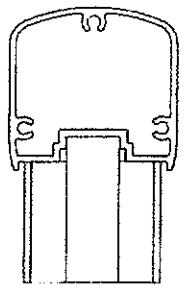
EST. AREA	0.651 IN²	420.02 MM²	OUT PER.	7.831 IN	198.90 MM
EST. WT.	0.768 LBS/FT	1.143 KG/M	WALLS	SHOWN ±18 EXCEPT AS SHOWN	
EST. PER	17.707 IN.	449.77 MM	C.C.D.	2.400 IN	60.96 MM
DWN BY	BW	CAVITIES - 1	SCALE	1:1	DATE 01/05/31

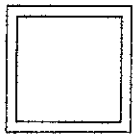
DIE SIZE	PKT.	LIP	BACKER SIZE	BACKER NO.	BOLSTER
9 x 5.5"			P.H.		C20(A2)

DATE	SYM	REVISION	BY
x	(X)	X	BD
x	(X)	X	BD
x	(X)	X	BD
x	(X)	X	BD

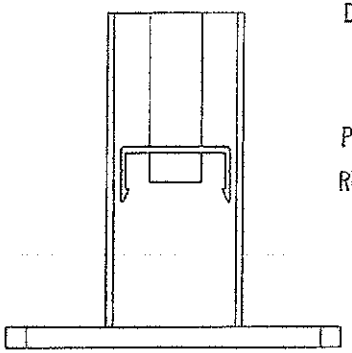
DIE NO. VH-40827

WELDED PICKET - PICKET SIZES





3/4" SQUARE PICKET
WALL THICKNESS: 0.062 IN 1.57 mm
ALLOY: 6063-T5 ALUMINUM



Intertek Testing Services
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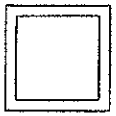
DWG: 5 of 7

APR 03 2008

PROJECT #: 3174587

REVIEWED BY: CC



5/8" SQUARE PICKET
WALL THICKNESS: 0.05 IN 1.27 mm
ALLOY: 6063-T5 ALUMINUM

5/8" x 1 1/2" PICKET
WALL THICKNESS: 0.079 IN 2.01 mm
ALLOY: 6063-T5 ALUMINUM

EXCELL RAILING SYSTEMS LTD

MANUFACTURER OF EXCELL & DURARAIL PRODUCT LINES

durarail

ALL DIMENSIONS ARE SUBJECT TO SITE MEASUREMENTS AND ARE TO BE CONFIRMED BEFORE FABRICATION OF PRODUCT

Authorization Signature	Date of Authorization

Excell Railing Systems Ltd.
#306 - 12886 Anvil Way
Surrey, BC Canada V3W 8E7
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Toll Free:1-866-999-7245
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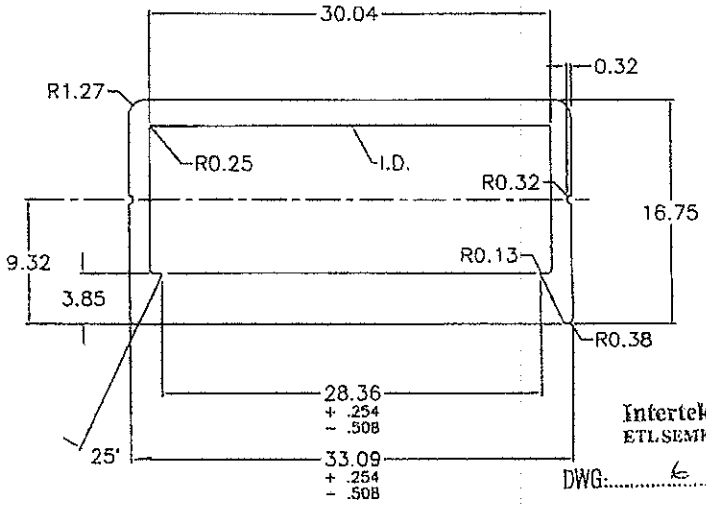
Durarail Kansas City Warehouse
1722 Iron Street
North Kansas City, MO 64116
Toll Free: 1-800-338-3568
Fax: 1-816-421-2924
www.durarail.com

Drawing Name	Welded Picket - Picket Sizes				
Customer	Excell / Durarail Railing Systems				
Project Name	Internal Design Engineering				
Drawn By	Csaba Bezzegh			Date Created	May 30, 2006
Revision No.		Scale	NTS	Last Update	July 18, 2008

\\Erssrv\sales\Drawing Library\Engineering\Railing Assemblies\WP\1.72 Posts\WP Style 1\Picket Inserts\

CUSTOMER		CUSTOMER NO.	PROPOSAL# 9331-1	DASH	DIE NO.
	EXCELL RAILINGS	402383	CLASSIFICATION#		VS-35866
DESCRIPTION: Welded Bottom Rail		DATE / SYM	REVISION		



Intertek Testing Services
ETL SEMKO

DWG: 6 of 7

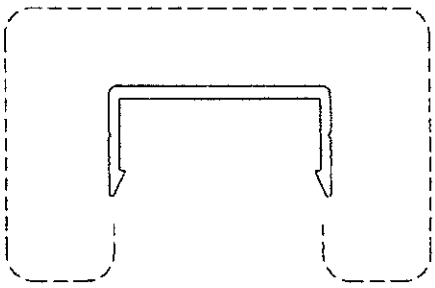
APR 06 2009

PROJECT #: 3174857

REVIEWED BY: CE

Area: 107.2564
Perimeter: 128.8164
Bounding box: X: -16.5430 -- 16.5431
Y: -12.3249 -- 4.4198
Centroid: X: 0.0000
Y: 0.0000
Moments of inertia: X: 2578.8965
Y: 16716.5424
Product of inertia: XY: 0.0000
Radii of gyration: X: 4.9035
Y: 12.4842
Principal moments and X-Y directions about centroid:
I: 2578.8965 along [1.0000 0.0000]
J: 16716.5424 along [0.0000 1.0000]

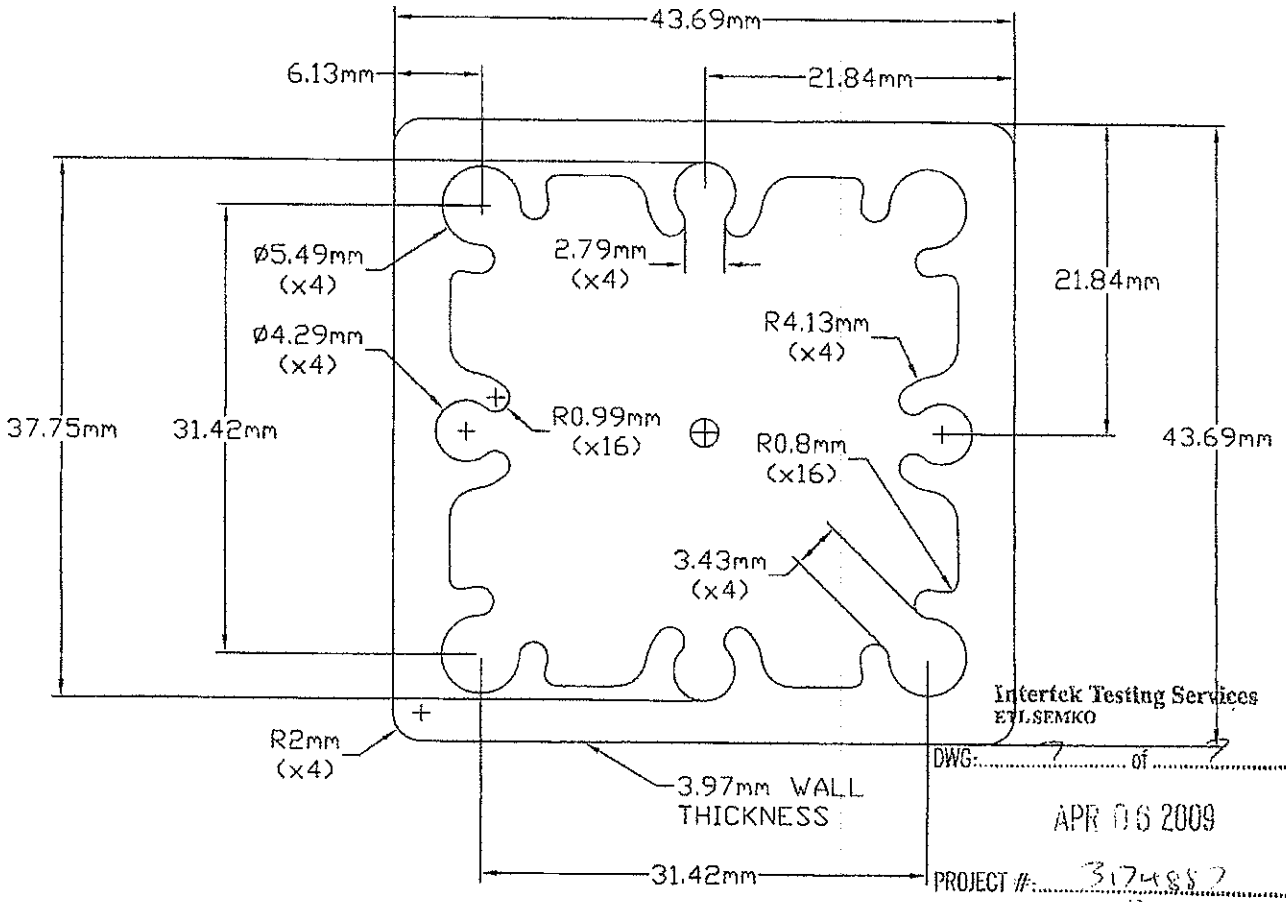
EXPOSED SURFACE



ACTUAL SIZE

Caradon Indalex

PRICING: ☐ WT. ☐ PC.	PLUGGING RATIO: ☒ 1 ☐ 2 ☐ 3			LIQ. NITROGEN ☐ YES. ☐ NO.	
DIE SIZE. 9 x 1.5"	PKT. 1/2"	DIE LOC.			
WALL THICKNESS 0.060 IN 1.52 MM	EXCEPT AS SHOWN	BACKER SIZE. 9 x 3.5"		FEEDER SIZE.	
EST. AREA 0.166 IN^2 107.26 MM^2	OUT PER. 0.000 IN 0.00 MM	BACKER NO. 40256		FEEDER NO.	
EST. WT. 0.196 $LBS/_{FT.}$ 0.196 $KG/_M$	FACTOR 26 / 441	BACKER LOC.		FEEDER LOC.	
EST. PER. 5.072 IN 128.82 MM	C.C.D. 1.427 IN 36.24 MM	BOLSTER NO. C406(A12)	SHIM SIZE.		CAV. 4
DWN BY WL	ALLOY 6063-T5	SCALE 2:1	DATE 99/07/20	PRESS NO. 2	CONT'R 188	EXT. RATIO 64
BREAK ALL CORNERS .010"R (0.25R) UNLESS OTHERWISE NOTED.				STANDARD TOLERANCES TO APPLY UNLESS OTHERWISE SPECIFIED	



Intertek Testing Services
ETLSEMKO

DWG: 7 of 7

APR 06 2009

PROJECT #: 3174887

REVIEWED BY: CR

---------- REGIONS ----------

Area: 730.4024
Perimeter: 407.2132
Bounding box: X: -21.8440 -- 21.8440
Y: -21.8440 -- 21.8440
Centroid: X: 0.0000
Y: 0.0000
Moments of inertia: X: 181675.8852
Y: 181675.8852
Product of inertia: XY: 0.0000
Radii of gyration: X: 15.7713
Y: 15.7713
Principal moments and X-Y directions about centroid:
I: 181675.8852 along [1.0000 -0.0004]
J: 181675.8852 along [0.0004 1.0000]

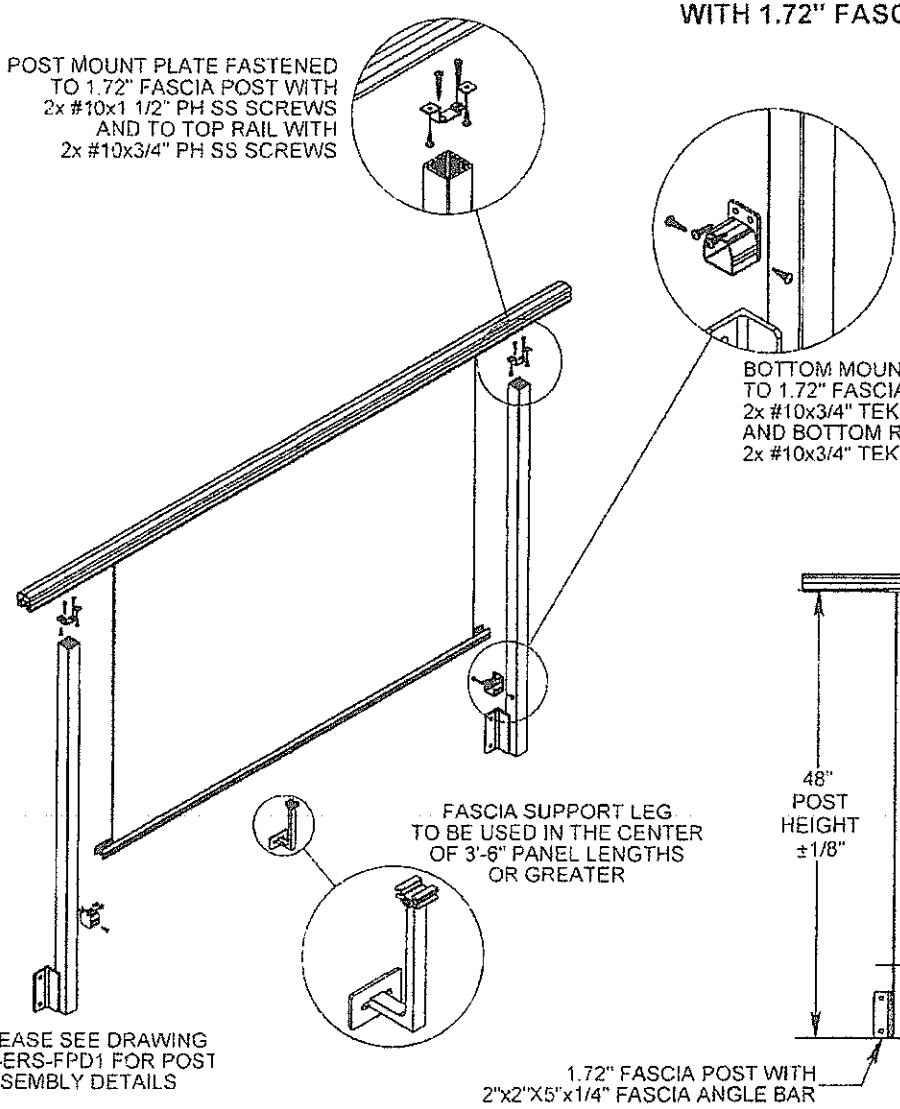
---------- REGIONS ----------

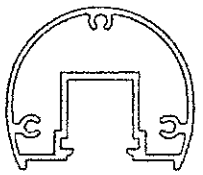
Area: 1.1321 sq in
Perimeter: 16.0320 in
Bounding box: X: -0.8600 -- 0.8600 in
Y: -0.8600 -- 0.8600 in
Centroid: X: 0.0000 in
Y: 0.0000 in
Moments of inertia: X: 0.4365 sq in sq in
Y: 0.4365 sq in sq in
Product of inertia: XY: 0.0000 sq in sq in
Radii of gyration: X: 0.6209 in
Y: 0.6209 in
Principal moments (sq in sq in) and X-Y directions about centroid:
I: 0.4365 along [0.9891 0.1475]
J: 0.4365 along [-0.1475 0.9891]

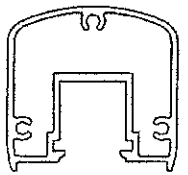
PROVIDENCE ENGINEERING CORP.
117 South West End Avenue · Lancaster · PA 17603
Phone: 717-509-7000 · Fax: 717-509-5110

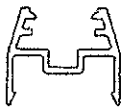
APPENDIX C: Excell Glass Drawings (6 pages)

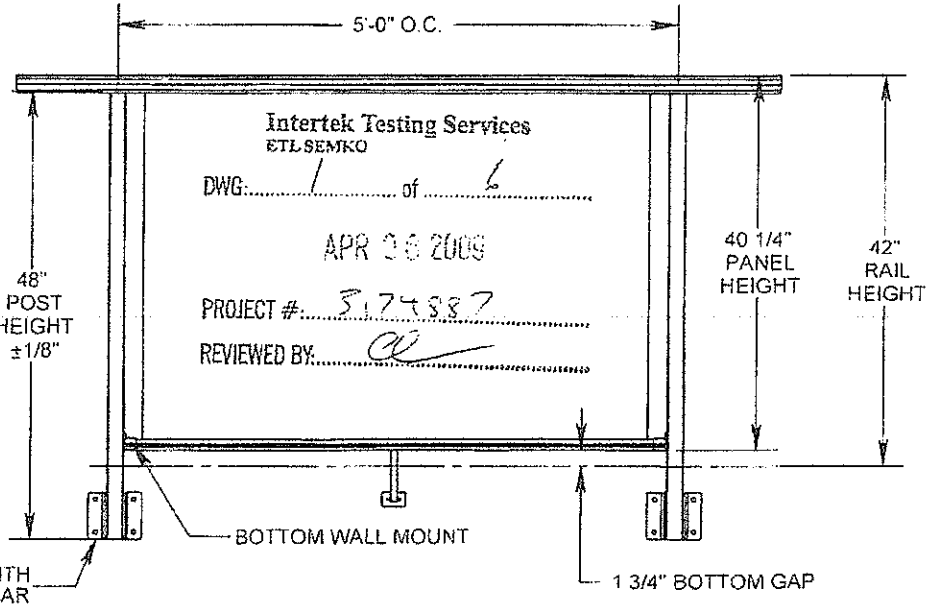
EXCELL GLASS SYSTEM WITH 1.72" FASCIA POSTS




EXCELL ROUND COMPONENT GLASS TOP RAIL


EXCELL SQUARE COMPONENT GLASS TOP RAIL


COMPONENT GLASS BOTTOM RAIL



Intertek Testing Services
ETL SEMKO
DWG: 1 of 6
APR 08 2009
PROJECT #: 3176387
REVIEWED BY:

ALL DIMENSIONS ARE SUBJECT TO SITE MEASUREMENTS AND ARE TO BE CONFIRMED BEFORE FABRICATION OF PRODUCT

MANUFACTURER OF EXCELL & DURARAIL PRODUCT LINES

Authorization Signature	Date of Authorization

Excell Railing Systems Ltd.
#306 - 12886 Anvil Way
Surrey, BC Canada V3W 8E7
Phone: 604-501-0151 Fax: 604-501-0155
Toll Free:1-866-999-7245
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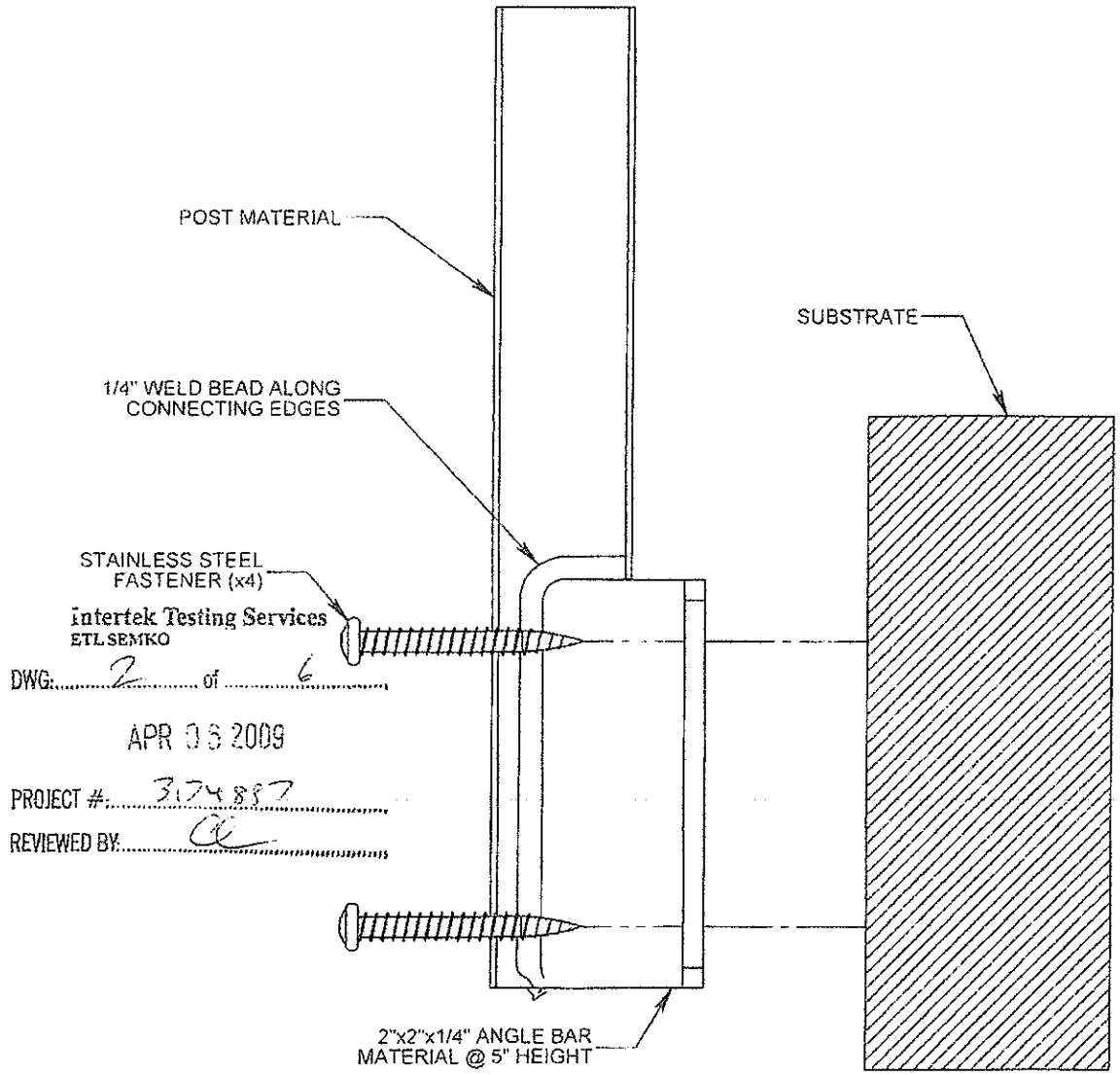
Durarail Kansas City Warehouse
1722 Iron Street
North Kansas City, MO 64116
Toll Free: 1-800-338-3568
Fax: 1-816-421-2924
www.durarail.com

Drawing Name	09-ERSL-EGL1FASENG1				
Customer	Excell Railing Systems Ltd.				
Project Name	Excell Glass Style 1 with 1.72 Fascia Posts (Engineer Report)				
Drawn By	Csaba Bezzegh			Date Created	April 2, 2009
Revision No.		Scale	NTS	Last Update	

\\Jbsrv\sales\Drawing Library\Engineering\Railing Assemblies\Glass\1.72 Posts\Glass Style 1\Excell (Fascia)\



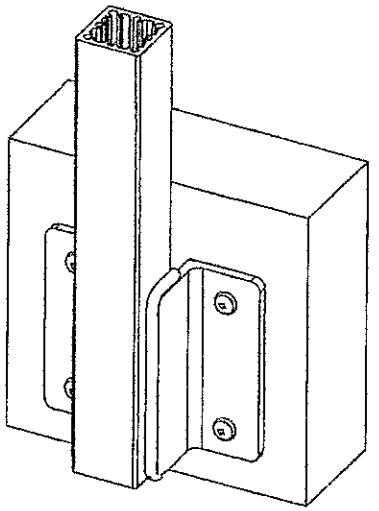
Intertek Testing Services
ETL SEMKO

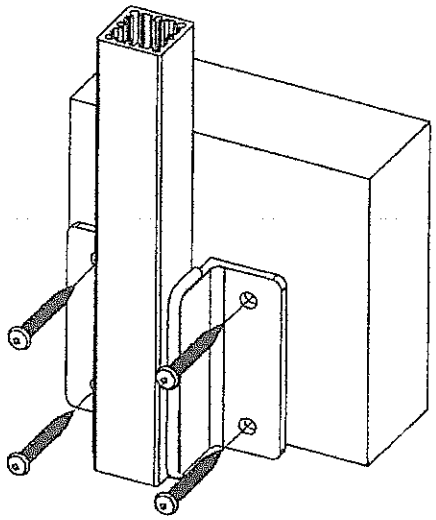
DWG: 2 of 6

APR 06 2009

PROJECT #: 374857

REVIEWED BY: CE





ALL DIMENSIONS ARE SUBJECT TO SITE MEASUREMENTS AND ARE TO BE CONFIRMED BEFORE FABRICATION OF PRODUCT

MANUFACTURER OF EXCELL & DURARAIL PRODUCT LINES

Authorization Signature | Date of Authorization

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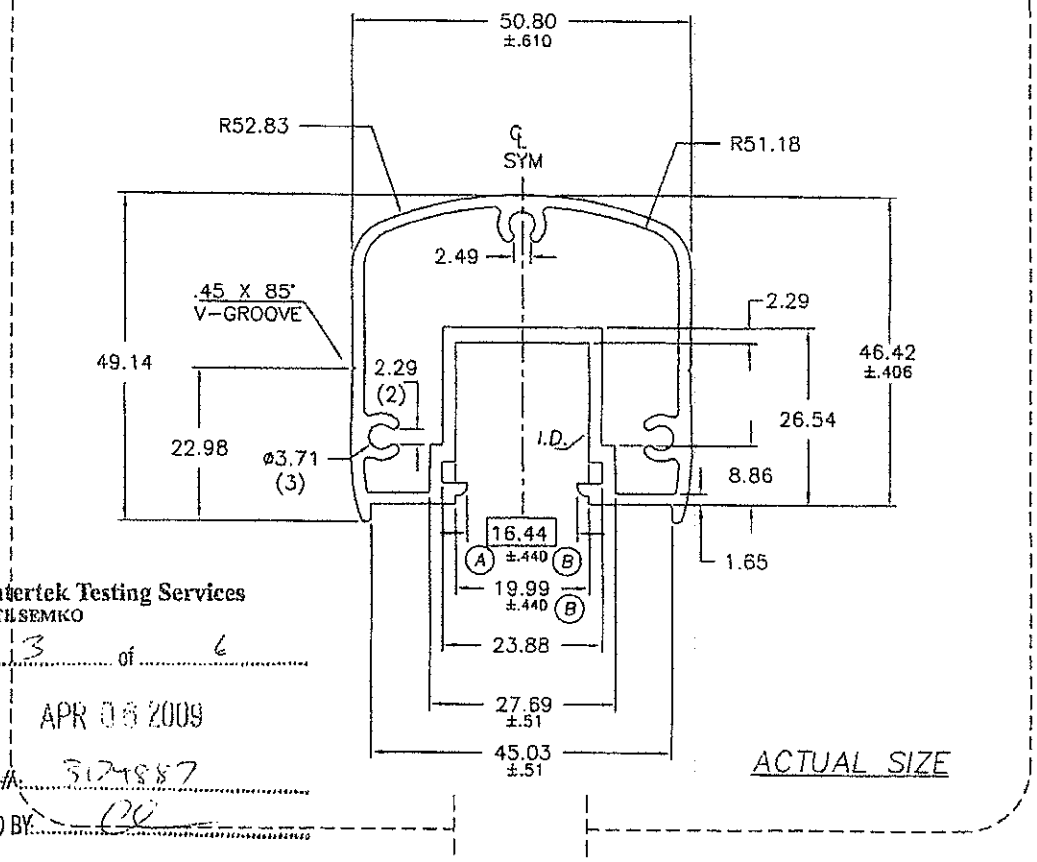
Durarail Kansas City Warehouse
1722 Iron Street
North Kansas City, MO 64116
Toll Free: 1-800-338-3568
Fax: 1-816-421-2924
www.durarail.com

Drawing Name	08-ERS-FPD1				
Customer	Durarail / Excell Railing Systems				
Project Name	Fascia Post Design				
Drawn By	Csaba Bezzegh			Date Created	December 10, 2008
Revision No.	2	Scale	NTS	Last Update	April 6, 2009

\\Jbsrv\sales\Drawing Library\Engineering\Railing Assemblies\Posts and Base Plates\1.72 Inch Post\Fascia Installation\

CUSTOMER		CUSTOMER PART NO.	DIE NO.
EXCELL RAILINGS			VH-39217B
DESCRIPTION: TOP RAIL	ALLOY & TEMPER: 6063 T5	DIE LOC.	DASH NO.
STANDARD TOLERANCES TO APPLY UNLESS OTHERWISE SPECIFIED		BACKER LOC.	PROPOSAL NO. 10243-1

EXPOSED SURFACE



ACTUAL SIZE

Intertek Testing Services
ETILSEMKO

DWG: 3 of 6

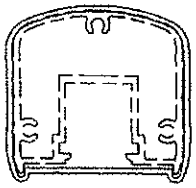
APR 03 2009

PROJECT #: 327887

REVIEWED BY: CO

UNMARKED RADII TO BE 0.80 RAD. BREAK ALL SHARP CORNERS WITH 0.25 RAD.

Area: 508.43 mm2
Moments of inertia: X: 115626 mm4
Y: 157913 mm4
Radii of gyration: X: 1508 mm
Y: 17.62 mm



SLIDE FIT WITH VH-39357
HALF-SIZE

INDALEX
TORONTO – MONTREAL – CALGARY – VANCOUVER

PLUG RATIO: 3
LN2: YES

EST. AREA	0.788 IN²	508.43 MM²	OUT PER.	9.894 IN	251.32 MM
EST. WT.	0.930 LBS/FT	1.384 KG/M	WALLS –	1.90	±.18 EXCEPT AS SHOWN
EST. PER	20.492 IN.	520.49 MM	C.C.D.	2.515 IN	63.87 MM
DWN BY	BW	CAVITIES – 1	SCALE	1:1	DATE 00/12/19

DIE SIZE	PKT.	LIP	BACKER SIZE	BACKER NO.	BOLSTER
9 x 5.5"			P.H.		1024(k12)

DATE	SYM	REVISION	BY
01/09/11	A	Rev. tolerance /add mating shp	BW
01/09/27	B	Revise tolerance	BW
X	X	X	BD
X	X	X	BD

DIE NO. VH-39217B

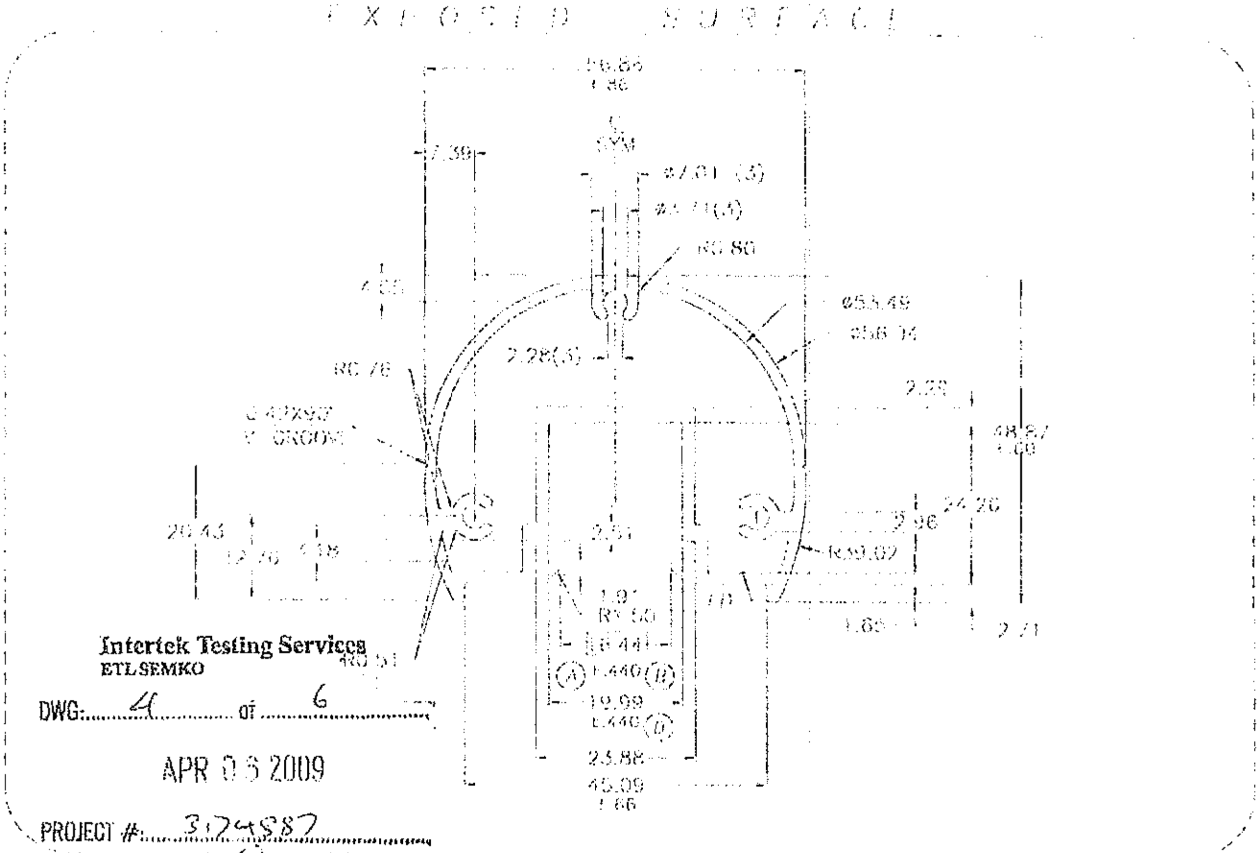
CUSTOMER: EXCEL RAILING

CUSTOMER PART NO. | DIE NO. VI 40396B

DESCRIPTION: FULL ROUND TOP RAIL — ALLOY & TEMPER 6063 T5

STANDARD TOLERANCES TO APPLY UNLESS OTHERWISE SPECIFIED

EXPOSED SURFACE



Intertek Testing Services
ETL SEMKO

DWG: 4 of 6

APR 0 3 2009

PROJECT #: 3174587

REVIEWED BY: [illegible]

MATES WITH VI 40395

Area: 508.55 mm2
Moments of inertia: X: 103584.30 mm4
Y: 161703.94 mm4
Radii of gyration: X: 14.27 mm
Y: 17.83 mm

UNMARKED RADII TO BE 0.50 MAX. BREAK ALL SHARP CORNERS WITH 0.25 RAD.

1/2 ACTUAL SIZE

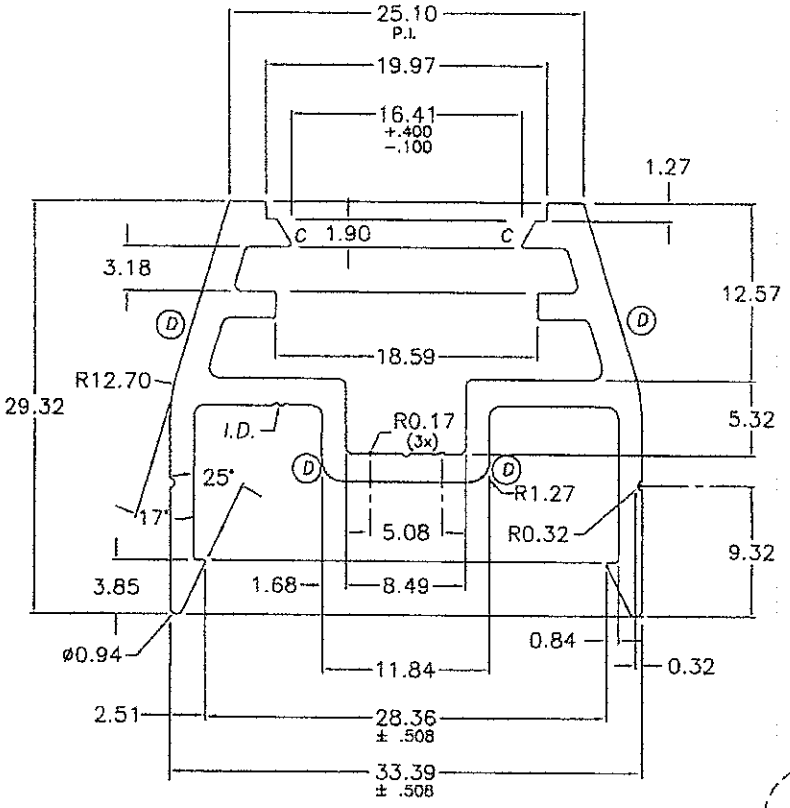
INDALEX
ALUMINUM SOLUTIONS

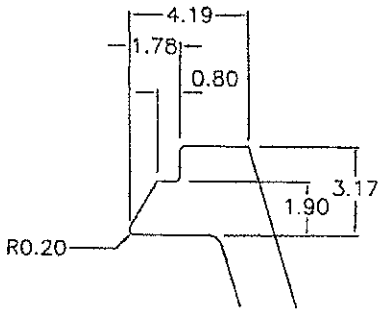
EST. AREA 0.788 IN² 508.55 MM² — 9.703 IN 246.50 MM

EST. WT. 0.910 #/FT — 20.833 IN — 60.88 MM

DATE	REV	REVISION	BY
01/09/09	A	Revise tolerances	
01/09/09	B	Revise tolerances	

CUSTOMER	CUSTOMER PART NO.	DIE NO.
EXCELL RAILINGS		VS-36305D
DESCRIPTION: BOTTOM CHANNEL	DIE LOC.	DASH NO.
STANDARD TOLERANCES TO APPLY UNLESS OTHERWISE SPECIFIED	BACKER LOC.	PROPOSAL NO. 9414-1





Intertek Testing Services
ETLSEMKO Scale 4:1

DWG: 5 of 6

APR 03 2009

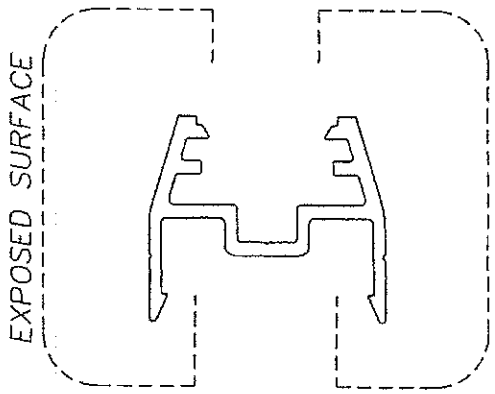
PROJECT #: 3127587

REVIEWED BY:

Area: 207.72 mm2

Moments of inertia: X: 1323248.9159 mm4
Y: 4870836.4622 mm4

Radii of gyration: X: 79.8145 mm
Y: 153.1308 mm



ACTUAL SIZE

INDALEX
TORONTO – MONTREAL – CALGARY – VANCOUVER

PLUG RATIO: 2
LN2: YES

EST. AREA	0.322 IN²	207.72 MM²	OUT PER.	N/A IN	N/A MM
EST. WT.	0.380 LBS/FT	0.565 KG/M	WALLS– SHOWN ±.18 EXCEPT AS SHOWN		
EST. PER	8.645 IN.	219.59 MM	C.C.D.	1.670 IN	42.43 MM
DWN BY	WL	CAVITIES – 2	SCALE	2:1	DATE 00/06/23

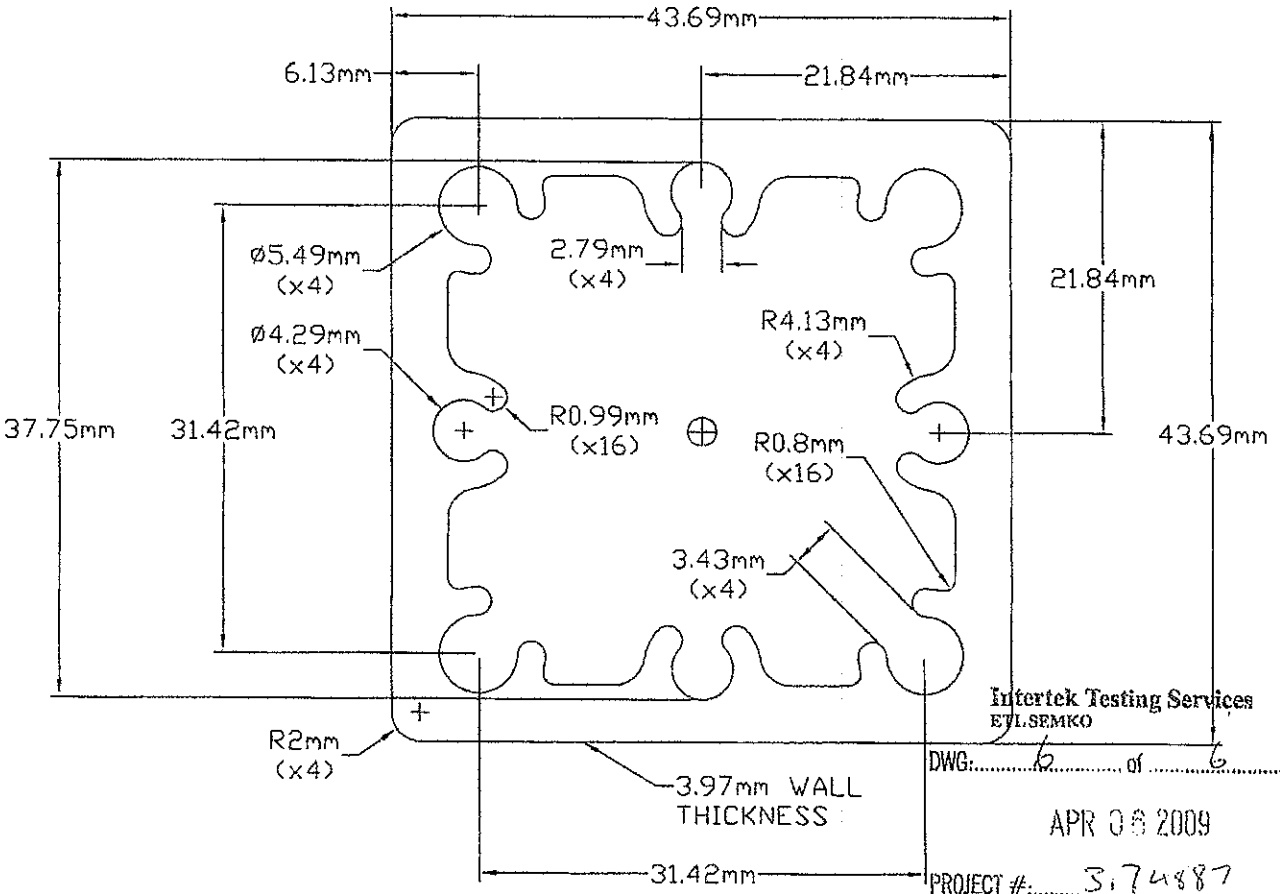
DIE SIZE	PKT.	LIP	BACKER SIZE	BACKER NO.	BOLSTER
9 x 2"	1/2"		9 x 3.5"	21521	227(A8

DATE	SYM	REVISION	BY
12/10/99	A	Rounded edge of nibs	BW
01/03/00	B	Corrected gap dimension	BW
01/21/00	C	Revised snap (see detail view).	WL
6/23/00	D	Increased wall thickness	BW

DIE NO. VS-36305D

FORM NO. ACAD2.DWT REV.#-2 99/01/05 CHANGED & APPROVED BY – BD

NOTE: BREAK ALL CORNERS WITH .010" (.254MM) RADIUS UNLESS OTHERWISE NOTED.



Intertek Testing Services
ETL SEMKO

DWG: 6 of 6

APR 08 2009

PROJECT #: 3.74887

REVIEWED BY:

---------- REGIONS ----------

Area: 730.4024
Perimeter: 407.2132
Bounding box: X: -21.8440 -- 21.8440
Y: -21.8440 -- 21.8440
Centroid: X: 0.0000
Y: 0.0000
Moments of inertia: X: 181675.8852
Y: 181675.8852
Product of inertia: XY: 0.0000
Radii of gyration: X: 15.7713
Y: 15.7713
Principal moments and X-Y directions about centroid:
I: 181675.8852 along [1.0000 -0.0004]
J: 181675.8852 along [0.0004 1.0000]

---------- REGIONS ----------

Area: 1.1321 sq in
Perimeter: 16.0320 in
Bounding box: X: -0.8600 -- 0.8600 in
Y: -0.8600 -- 0.8600 in
Centroid: X: 0.0000 in
Y: 0.0000 in
Moments of inertia: X: 0.4365 sq in sq in
Y: 0.4365 sq in sq in
Product of inertia: XY: 0.0000 sq in sq in
Radii of gyration: X: 0.6209 in
Y: 0.6209 in
Principal moments (sq in sq in) and X-Y directions about centroid:
I: 0.4365 along [0.9891 0.1475]
J: 0.4365 along [-0.1475 0.9891]

PROVIDENCE ENGINEERING CORP.
117 South West End Avenue · Lancaster · PA 17603
Phone: 717-509-7000 · Fax: 717-509-7810

TEST REPORT

REPORT NUMBER: 3174887COQ-002C
ORIGINAL ISSUE DATE: April 6, 2009

EVALUATION CENTER

INTERTEK TESTING SERVICES NA LTD.
1500 BRIGANTINE DRIVE
COQUITLAM, BC V3K 7C1

RENDERED TO

EXCELL RAILING SYSTEMS LTD.
#306 – 12886 ANVIL WAY
SURREY, BC V3W 8E7

PRODUCT EVALUATED: Excell Picket and Glass Railing Systems
EVALUATION PROPERTY: Load Requirements

Report of Excell Picket and Glass Railing Systems for compliance with the applicable requirements of the following criteria: *2005 National Building Code of Canada, Section 4.1.5.15 Loads on Guards*

1 Table of Contents

2 Introduction

Intertek Testing Services NA Ltd. (Intertek) has conducted a test program for Excell Railing Systems Ltd. on two face mounted aluminum railing systems. The evaluation was carried out to determine whether the railing systems would meet the loads specified in the 2005 National Building Code of Canada, Section 4.1.5.15 *Loads on Guards*. This evaluation was conducted in the month of March 2009.

3 Test Samples

3.1. SAMPLE SELECTION

The client submitted one (1) aluminum face mounted picket railing sample and one (1) face mounted aluminum glass in-fill railing sample to the Evaluation Center on March 16, 2009. Samples were not independently selected for testing and cannot be used for Intertek Certification.

3.2. SAMPLE AND ASSEMBLY DESCRIPTION

The samples were identified as the following:

- 6 ft. Excell Welded Picket Railing System, which consists of the following:

Post:	1.72 in. x 1.72 in. 6061-T6 extruded aluminum post
Base Plate:	2 in. x 2 in. x 5 in. x 1/4 in. 6061-T6 fascia mounted angle bars (2) each with 2 mounting holes
Top Rails:	42 in. high, 6063-T5 aluminum rail (1-piece round profile)
Picket Insert:	5/8 in. x 5/8 in. 6063-T5 aluminum spaced 4-1/2 in. o/c
Connections:	Connection details are provided in Appendix B.

- 5 ft. Excell Glass In-fill Railing System, which consists of the following:

Post:	1.72 in. x 1.72 in. 6061-T6 extruded aluminum post
Base Plate:	2 in. x 2 in. x 5 in. x 1/4 in. 6061-T6 fascia mounted angle bars (2) each with 2 mounting holes
Top Rails:	42 in. high, 6063-T5 aluminum rail (1-piece round profile)
Panel Insert:	6 mm, tempered glass panel measuring 54 in. wide x 38 in. high
Connections:	Connection details are provided in Appendix C.

Note: Post to sub-structure fastener evaluation is beyond the scope of this report. Four 3/8 inch Grade 5 bolts were used to install deck mount posts.

4 Testing and Evaluation Methods

The test specimen was loaded at a rate to achieve the specified loads between 10 seconds and 5 minutes. The specified test loads were held for one minute before the load was released. As per Section 4.1.5.15 of the 2005 National Building Code, the following tests were conducted:

4.1. 2005 NBC: SECTION 4.1.5.15 LOADS ON GUARDS REQUIREMENTS

1) The minimum specified horizontal load applied inward or outward at the top of every required *guard* shall be:

   (c) 0.75 kN/m or a concentrated load of 1.0 kN applied at any point, whichever governs, for locations other than described in Clauses (a) and (b) [refer to Notes below].

2) Individual elements within the *guard*, including solid panels and pickets, shall be designed for a concentrated load of 0.5 kN applied over an area of 100 mm x 100 mm located at any point in the element or elements so as to produce the most critical effect.

3) The loads required in Sentence (2) need not be considered to act simultaneously with the loads provided for in Sentences (1) and (4).

4) The minimum specified load applied vertically at the top of every required *guard* shall be 1.5 kN/m and need not be considered to act simultaneously with the horizontal load provided for in Sentence (1).

Notes:

1. Clauses (a) and (b) refer to means of egress and equipment access walkways and therefore are not applicable.

2. A live load factor of 1.5 is applicable to the above loads.

4.2. IN-FILL LOAD TEST

A load of 0.75 kN (169 lbf) was applied using a 100 mm x 100 mm square block normal to the in-fill so as to produce the most critical effect. After release of the load, the system was evaluated for failure, any evidence of disengagements of any component and/or visible cracking from any component.

4.3. UNIFORM LOAD TEST

The top rail of the guardrail system was subjected to two separate tests where a maximum equivalent uniform load of 1.125 kN/m (77 plf) was applied horizontally and 2.25 kN/m (154 plf) was applied vertically. The horizontal and vertical loads were applied using third point loading. The third point loads applied were calculated to impose an equivalent moment to the uniform loads specified. After release of the load, the system was evaluated for failure, any evidence of disengagements and/or visible cracking from any component.

4.4. CONCENTRATED LOAD TEST

The top rail of the guardrail system was subjected to three separate tests where a concentrated load of 1.5 kN (337 lbs) was applied:

- Horizontally at the centre of the guardrail.
- Horizontally at the top rail adjacent to the rail post connection to verify the connection capacity

5 Testing and Evaluation Results

5.1. RESULTS AND OBSERVATIONS

The product test results are shown in Table 1 below (a complete set of test data is provided in Appendix A).

Table 1. Test Results

System Description	System Height (inches)	Maximum Post to Post Center Spacing (inches)	Test	Compliance
6 ft. Excell Welded Picket Railing System	42	72	In-fill load	Complied
			Uniform Load	Complied
			Mid-span Concentrated Load	Complied
			Adjacent to Post Concentrated Load	Complied
5 ft. Excell Glass In-fill Railing System	42	60	In-fill load	Complied
			Uniform Load	Complied
			Mid-span Concentrated Load	Complied
			Adjacent to Post Concentrated Load	Complied

6 Conclusion

The Excell Welded Picket and Glass In-fill Railing Systems identified in this test report have complied with the loads specified in Section 4.1.5.15 *Loads on Guards* of the 2005 National Building Code of Canada.

INTERTEK TESTING SERVICES NA LTD.

Tested by: _____
Riccardo DeSantis
Project Coordinator / Test Technician, Construction Products

Reported by: _____
Chris Chang, EIT
Project Leader / Test Engineer, Construction Products

Reviewed by: _____
Heiko Neugebauer, AScT
Manager, Fenestration / Construction Products Group

APPENDIX A: Test Data (2 pages)

Intertek

Test:	2005 NBC	Project	3174887
Date:	16-Mar-09	Eng/Tech:	Riccardo DeSantis
Client:	Excell Railing Products Ltd.		
Product:	6 ft. Excell Welded Picket - Face Mounted		
Post Spacing:	6 ft	1.83 m	
Height of Guard:	42 in	1067 mm	
Opening in Guard:	3.875 in	98 mm	
Method:	2005 National Building Code of Canada 4.1.5.15. Loads on Guards		
Safety Factor:	1.5		
Equipment:	Revere 3000 lbf load cell (Intertek ID# D2741, cal due October 2009)		

Test	Design Load (Inward/ Outward) (lbf)	Factored Load	Calculated Moment (lbf-ft)	Equivalent Quarter-Point Load (lbf)	Required Proof Load (lbf)	Pass/Fail
In-fill Load Test (100 mm x 100 mm)	112	169	-	-	169	Pass
Vertical Uniform Load (per ft)	103	154	694	462	925	Pass
Midspan Concentrated Load	225	337	-	-	337	Pass
Top of Post Concentrated Load	225	337	-	-	337	Pass

Test	Design Load (Inward/ Outward) (kN)	Factored Load	Calculated Moment (kNm)	Equivalent Quarter-Point Load (kN)	Required Proof Load (kN)	Pass/Fail
In-fill Load Test (100 mm x 100 mm)	0.5	0.75	-	-	0.75	Pass
Vertical Uniform Load (per m)	1.5	2.25	0.94	2.06	4.11	Pass
Midspan Concentrated Load	1	1.5	-	-	1.5	Pass
Top of Post Concentrated Load	1	1.5	-	-	1.5	Pass

Intertek

Test:	2005 NBC	Project:	3174887
Date:	16-Mar-09	Eng/Tech:	Riccardo DeSantis
Client:	Excell Railing Products Ltd.		
Product:	5 ft. Excell Glass In-fill - Face Mounted		
Post Spacing:	5 ft	1.52 m	
Height of Guard:	42 in	1067 mm	
Opening in Guard:	3.875 in	98 mm	
Method:	2005 National Building Code of Canada 4.1.5.15. Loads on Guards		
Safety Factor:	1.5		
Equipment:	Revere 3000 lbf load cell (Intertek ID# D2741, cal due October 2009)		

Test	Design Load (Inward/ Outward) (lbf)	Factored Load	Calculated Moment (lbf-ft)	Equivalent Quarter-Point Load (lbf)	Required Proof Load (lbf)	Pass/Fail
In-fill Load Test (100 mm x 100 mm)	112	169	-	-	169	Pass
Vertical Uniform Load (per ft)	103	154	482	385	771	Pass
Midspan Concentrated Load	225	337	-	-	337	Pass
Top of Post Concentrated Load	225	337	-	-	337	Pass

Test	Design Load (Inward/ Outward) (kN)	Factored Load	Calculated Moment (kNm)	Equivalent Quarter-Point Load (kN)	Required Proof Load (kN)	Pass/Fail
In-fill Load Test (100 mm x 100 mm)	0.5	0.75	-	-	0.75	Pass
Vertical Uniform Load (per m)	1.5	2.25	0.65	1.71	3.43	Pass
Midspan Concentrated Load	1	1.5	-	-	1.5	Pass
Top of Post Concentrated Load	1	1.5	-	-	1.5	Pass

APPENDIX B: Excell Welded Picket Drawings (7 pages)

EXCELL WELDED PICKET SYSTEM WITH 1.72" FASCIA POSTS

POST MOUNT PLATE FASTENED TO 1.72" FASCIA POST WITH 2x #10x1 1/2" PH SS SCREWS AND TO TOP RAIL WITH 2x #10x1 1/2" PH SS SCREWS

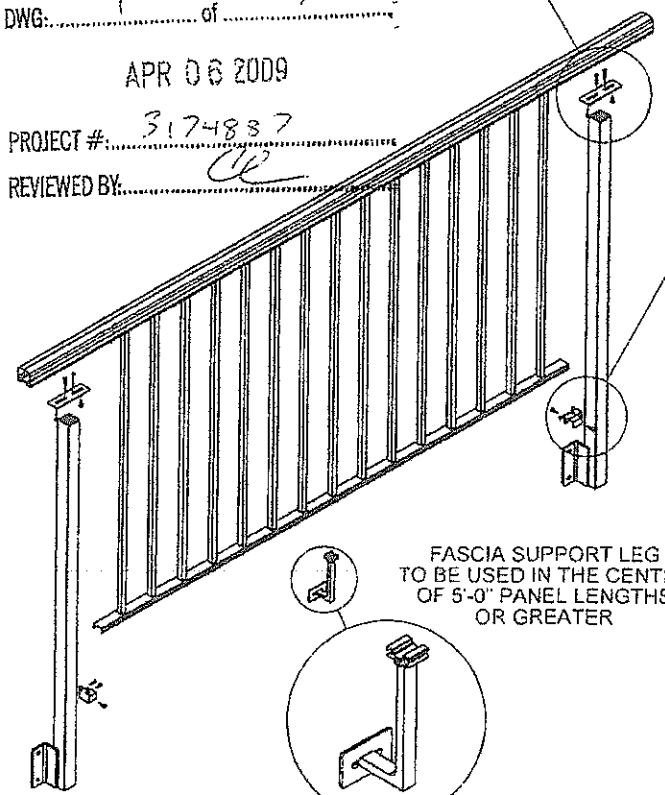
Intertek Testing Services
ETL SEMKO

DWG: 1 of 7

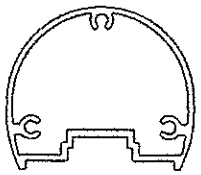
APR 06 2009

PROJECT #: 3174837

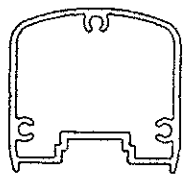
REVIEWED BY:



BOTTOM MOUNT FASTENED TO 1.72" FASCIA POST WITH 2x #10x3/4" TEK SCREWS AND BOTTOM RAIL WITH 2x #10x3/4" TEK SCREWS

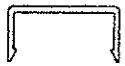


EXCELL ROUND WELDED PICKET TOP RAIL

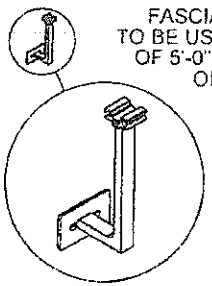


EXCELL SQUARE WELDED PICKET TOP RAIL

5/8" SQUARE PICKET

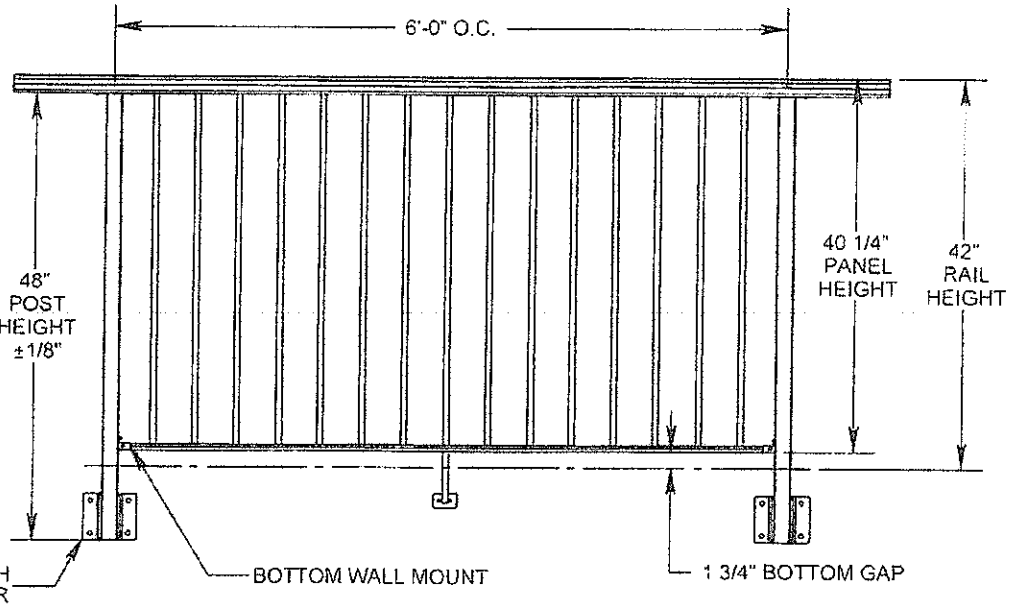


WELDED PICKET BOTTOM RAIL



FASCIA SUPPORT LEG TO BE USED IN THE CENTER OF 5'-0" PANEL LENGTHS OR GREATER

PLEASE SEE DRAWING 08-ERS-FPD1 FOR POST ASSEMBLY DETAILS



EXCELL RAILING SYSTEMS LTD.

MANUFACTURER OF EXCELL & DURARAIL PRODUCT LINES

durarail

ALL DIMENSIONS ARE SUBJECT TO SITE MEASUREMENTS AND ARE TO BE CONFIRMED BEFORE FABRICATION OF PRODUCT

Authorization Signature	Date of Authorization

Excell Railing Systems Ltd.
#306 - 12886 Anvil Way
Surrey, BC Canada V3W 8E7
Phone: 604-501-0151 Fax: 604-501-0155
Toll Free:1-866-999-7245
www.excellrailing.com

Durarail Kansas City Warehouse
1722 Iron Street
North Kansas City, MO 64116
Toll Free: 1-800-338-3568
Fax: 1-816-421-2924
www.durarail.com

Drawing Name	09-ERSL-EWP1FASENG1				
Customer	Excell Railing Systems Ltd.				
Project Name	Excell WP Style 1 with 1.72 Fascia Posts (Engineer Report)				
Drawn By	Csaba Bezzegh			Date Created	March 31. 2009
Revision No.		Scale	NTS	Last Update	

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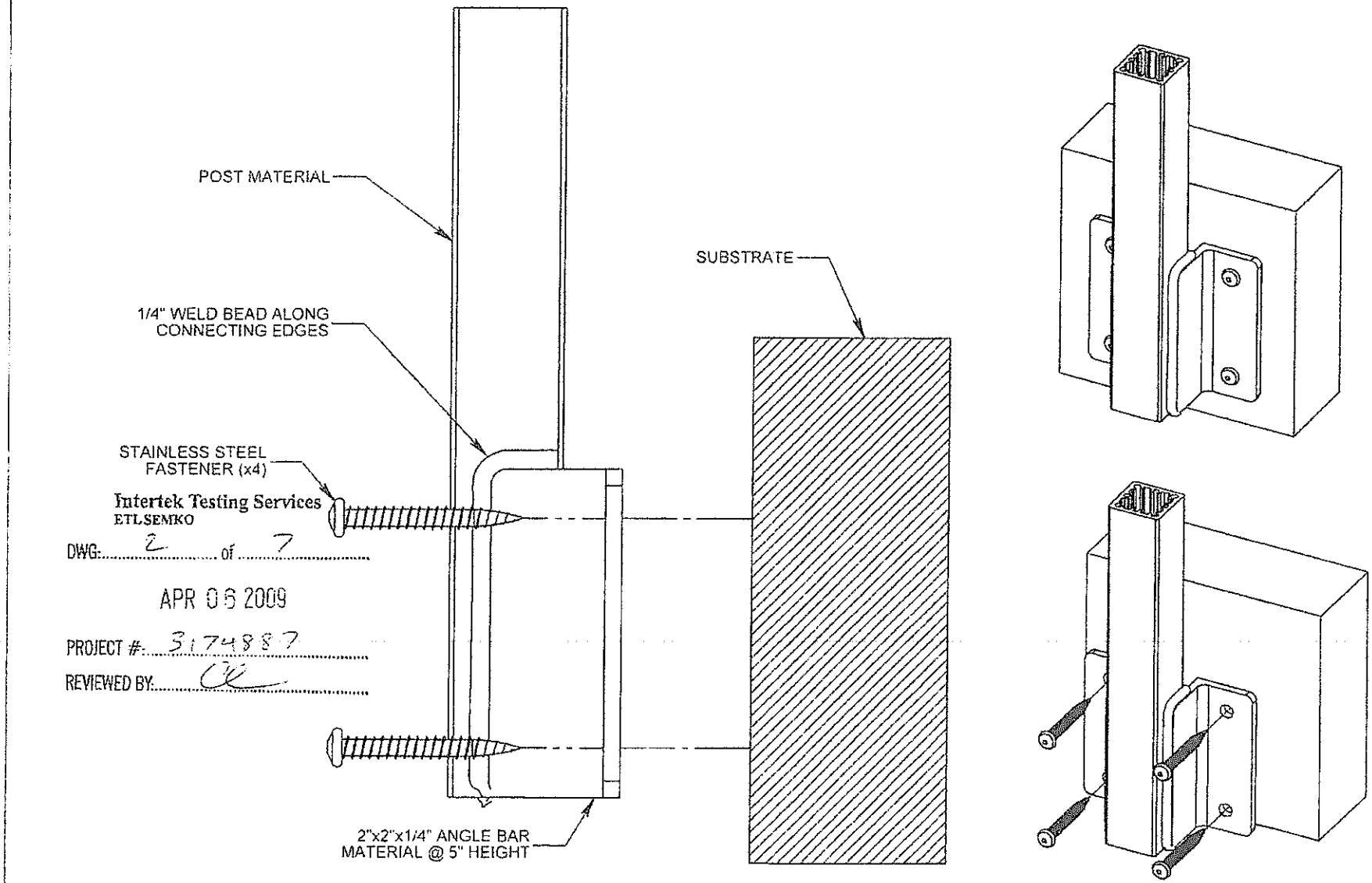


Intertek Testing Services
ETLSEMKO

DWG: 2 of 7

APR 06 2009

PROJECT #: 3174887

REVIEWED BY: CK

ALL DIMENSIONS ARE SUBJECT TO SITE MEASUREMENTS AND ARE TO BE CONFIRMED BEFORE FABRICATION OF PRODUCT

Authorization Signature	Date of Authorization

Drawing Name	08-ERS-FPD1
Customer	Durarail / Excell Railing Systems
Project Name	Fascia Post Design
Drawn By	Csaba Bezzegh
Date Created	December 10, 2008
Revision No.	2
Scale	NTS
Last Update	April 6, 2009

\\Ubsrv\sales\Drawing Library\Engineering\Railing Assemblies\Posts and Base Plates\1.72 Inch Post\Fascia Installation\

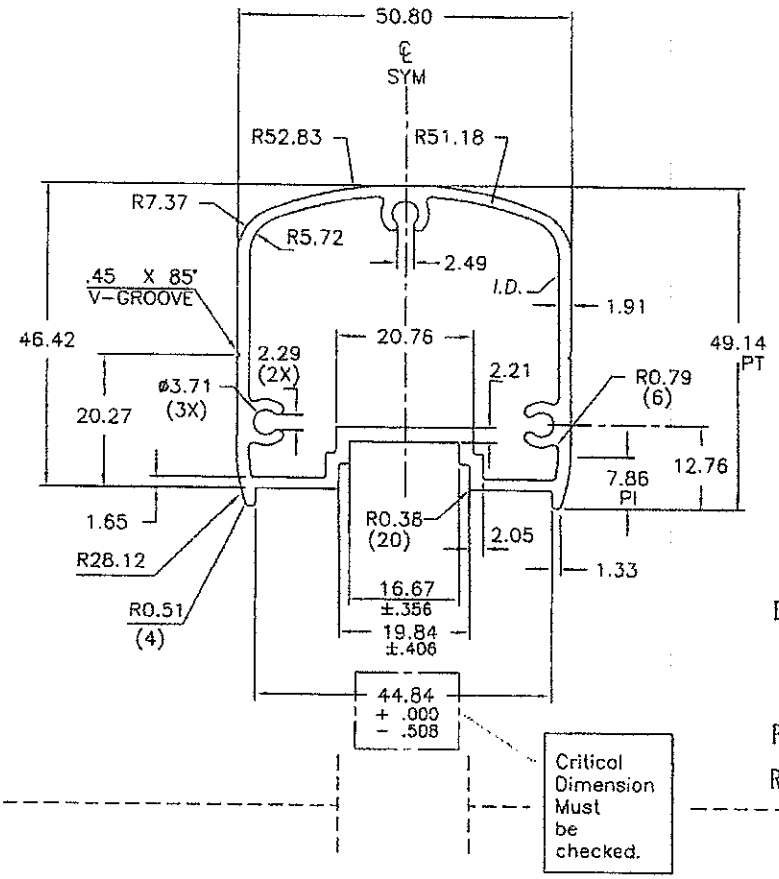
MANUFACTURER OF EXCELL & DURARAIL PRODUCT LINES

Excell Railing Systems Ltd.
#306 - 12886 Anvil Way
Surrey, BC Canada V3W 8E7
Phone: 604-501-0151 Fax: 604-501-0155
Toll Free:1-866-999-7245
www.excellrailing.com

Durarail Kansas City Warehouse
1722 Iron Street
North Kansas City, MO 64116
Toll Free: 1-800-338-3568
Fax: 1-816-421-2924
www.durarail.com

CUSTOMER	CUSTOMER PART NO.	DIE NO.
EXCELL RAILING SYSTEMS		VH-38399
DESCRIPTION WELDED SQUARE TOP RAIL / ALLOY& TEMPER 6063 T5	DIE LOC.	DASH NO.
STANDARD TOLERANCES TO APPLY UNLESS OTHERWISE SPECIFIED	BACKER LOC.	PROPOSAL NO. 10024-2

EXPOSED SURFACE



Intertek Testing Services
ETL SEMKO

DWG: 3 of 7

APR 06 2009

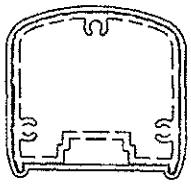
PROJECT #: 3174587

REVIEWED BY: CR

ACTUAL SIZE

Moment of inertia: X: 114279mm4
Y: 146002mm4

Radii of gyration: X: 16.48mm
Y: 18.62mm



SLIDE FIT WITH VH-39357
HALF-SIZE

INDALEX
TORONTO - MONTREAL - CALGARY - VANCOUVER

PLUG RATIO: 1
LN2: YES

EST. AREA 0.652 IN² 420.90 MM²	OUT PER. 8.011 IN 203.48 MM				
EST. WT. 0.770 LBS/FT 1.146 KG/M	WALLS-2.16 #18 EXCEPT AS SHOWN				
EST. PER 17.260 IN. 438.41 MM	C.C.D. 2.539 IN 64.48 MM				
DWN BY BW	CAVITIES - 1	SCALE 1:1	DATE 00/09/7		
DIE SIZE	PKT.	LIP	BACKER SIZE	BACKER NO.	BOLSTER
9 x 5.5"			P.H.		C20(A3)

DATE	SYM	REVISION	BY
X	X	X	BD
X	X	X	BD
X	X	X	BD
X	X	X	BD

DIE NO. VH-38399

FORM NO. ACAD2.DWT REV.#-2 98/01/05 CHANGED & APPROVED BY - BD

NOTE: BREAK ALL CORNERS WITH .010" (.254MM) RADIUS UNLESS OTHERWISE NOTED.