Intertek ETL SEMKO

Report of Excell Railing Systems Ltd. 60 in. Picket Guardrail System, Guard Rail Testing to the 2003 International Residential Code

Final Report No.: 3090870-004
Original Issue Date: June 28, 2006

Applicant:
Excell Railing Systems Ltd.
#306 – 12866 Anvil Way
Surrey, British Columbia V3W 8E7

Intertek Testing Services NA Ltd.
1500 Brigantine Drive, Coquitlam, BC V3K 7C1
Telephone: 604-520-3321 Fax: 604-524-9186 Web: www.intertek-etlsemko.com

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2 Preface

All services undertaken are subject to the following general policy:

1) This report is for the exclusive use of Intertek Testing Services NA Ltd.'s (Intertek's) client and is provided pursuant to the agreement between Intertek and its client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this report.

2) Only the client is authorized to copy or distribute this report and then only in its entirety. Intertek must first approve any use of the Intertek's name or one of its marks for the sale or advertisement of the tested material, product or service in writing.

3) The observations and test results in this report are relevant only to the sample tested. This report by itself does not imply that the material, product or service is or has ever been under an Intertek certification program.

3 Introduction

Intertek Testing Services NA Ltd. (Intertek) personnel have conducted structural performance tests for Excell Railing Systems Ltd on their 60 in. Picket Guardrail System. The railing system was evaluated for the ability to resist the loads specified in the 2003 International Residential Code (IRC). Evaluation of the post base connection to the structure was not within the scope of this program. This evaluation was completed in the month of May 2006.

4 Materials and Methods

4.1. Sample Selection

The sample was submitted by the client and was identified as the 60 in. Picket Guardrail System.

4.2. Sample Description

The 60 in. picket guardrail system is 42 in. high with two 1 5/8 posts spaced at 5 ft. apart on center. The panel is fitted with a 1 piece top rail which is welded/attached to the two balusters. There are two stitch welds on the inboard side of the posts and one continuous weld on the outside/underside of the top rail where it meets the post. The posts are inset 3/8 of 1 in. from the end of the top rail. The balusters are made of 1-5/8 in. extruded aluminum square profiles which have 6 screw ports. Each baluster is fitted with a 4 x 4 x ¼ base plate which is screwed and back welded to the bottom of the support. The screws are 2 in. long x #12 coarse thread rust protected screws. The bottom rail is an extruded U channel that has been punched at four 15/16 centers with 21/32 holes to accept 5/8 pickets. The U channel is inverted and welded between the two balusters. The pickets are welded to the underside of the U channel with one stitch weld each. Pickets are also welded to the underside of the top rail with one stitch weld each. Drawings of the system as well as the individual components are included in Appendix B.

Note: Post to sub-structure fastener evaluation is beyond the scope of this report. Four 3/8 in. Grade 5 bolts on each post were used to install the specimen for testing.

4.3. Test Program

Excell Railing Systems Ltd submitted a guardrail system test specimen. The Picket Guardrail System consisted of two posts at 60 in. centre spacing, top and bottom rail with the pickets, secured to the steel plate of our test apparatus. All tests were conducted in accordance with the 2003 edition of the IRC. The test specimens were loaded at a rate to achieve the specified loads between 1 to 5 minutes. The specified proof loads were held for one minute before the load was released.

4.3.1. Concentrated Load Test

As per the 2003 edition of the IRC, the top rail of the guardrail system was subjected to a Concentrated Load Test where design loads of 200 lbs (890 N) and factored loads of 500 lbs (2220N) were applied horizontally at the centre of the guardrail and over top of the post.

4.3.2. Element Load Test (Infill Load Test)

As per the 2003 edition of the IRC, a design load of 50 lbs (222 N) and a factored load of 125 lbs (556 N) were applied using a 12 in. square block on the pickets. The system was evaluated for any evidence of component disengagement or visible cracking.

5 Test Results

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

Table 1 – Excell Railing Systems Ltd. IRC-2003 Test Results

Structural Test	Design Requirement (lbf)	Factored Requirement (lbf)	Pass / Fail
Concentrated Load at top rail • Load applied at mid-span • Load applied at post	200	500	Pass
Element Load Test (In-fill)	50	125	Pass

6 Conclusion

The 60 in. Picket Guardrail System submitted by Excell Railing Systems Ltd., identified in this report has complied with the load requirements specified in Section R301.5 of the 2003 International Residential Code. It should be noted that evaluation of the post base connection to the structure was not within the scope of this program.

INTERTEK TESTING SERVICES NA LTD.

Reported by: _____
Ivo Tanner
Technician, Construction Products

Reviewed by: _____
Craig Lawson, NZCE (Mech)
Manager, Construction Products

Reviewed by: _____
Chris Bowness, P. Eng.
Manager, Engineering Services

6/28/06

it/ahvs

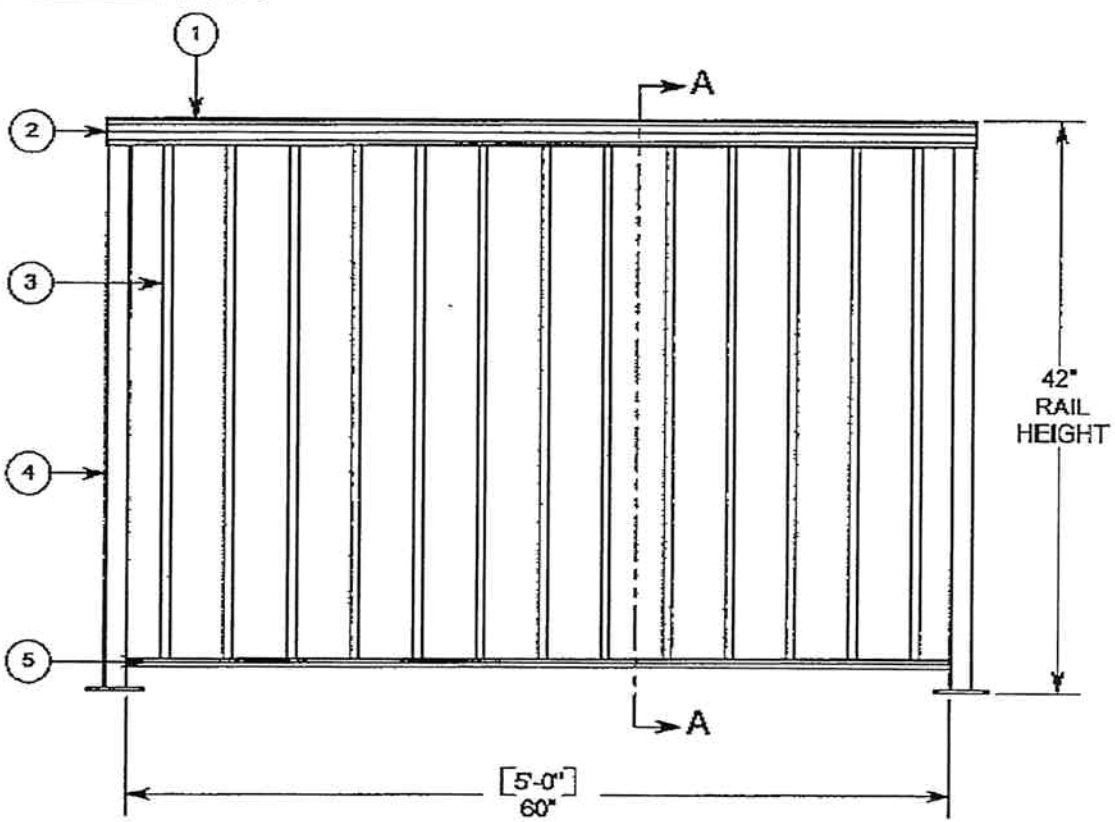
Appendix A: Test Data (1 page)

Intertek ETL SEMKO

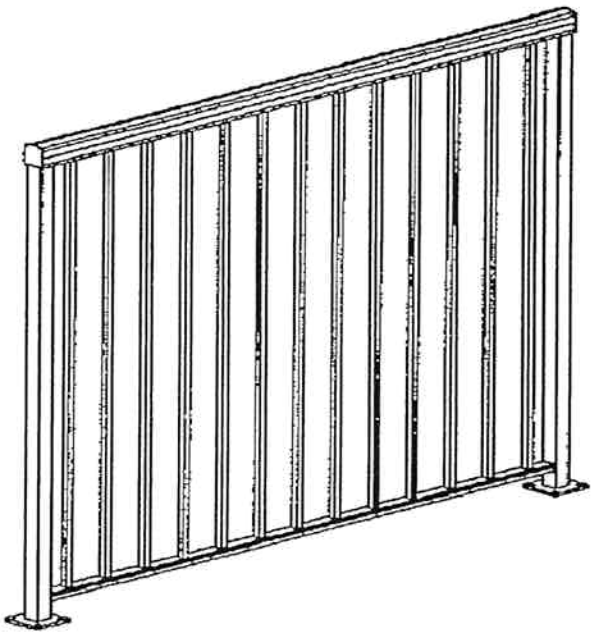
Test:	**2003 IRC Loads on Guards**				
Date:	17-May-06	Project:	3090870	Eng/Tech:	Ivo Tanner
Client:	Excell Railing				
Product:	5 Foot Straight Picket Rail System (tested with Excell Square Top Rail)				
Number of Posts:	2				
Post Spacing (ft):	5				
System Length (ft):	5				
Height (in.):	42.0				
Standard:	2003 International Residential Code R301.5				
Safety Factor:	2.5				
Equipment:	Artech 2500 lbs Load cell ID # 2723 due April 2007				

Test	Design Load - Inward / Outward (lbf)	Design Load × Safety Factor (lbf)	Calculated Moment (kNm)	Equivalent 3-Point Load (kN)	Total 3-Point Load (kN)	Required Load (lbf)	Pass/Fail
Horrizontal Concentrated Load - Midspan (kN)	200	500	-	-	-	500	**Pass**
Horrizontal Concentrated Load - Post (kN)	200	500	-	-	-	500	**Pass**
In-fill applied over a 12 in. square area (kN)	50	125	-	-	-	125	**Pass**

Appendix B: Drawings (8 pages)

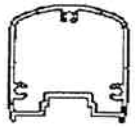


SECTION A-A
SCALE 1 : 10



ITEM NO.	DESCRIPTION	ALLOY
1	TOP RAIL	6063-T5
2	CAP FOR TOP RAIL	6063-T5
3	5/8" SQUARE PICKET	6063-T5
4	POST	6005A-T61 & 6061-T6
5	WELDED PICKET BOTTOM RAIL	6063-T5

WELDED
PICKET
BOTTOM RAIL



EXCELL
SQUARE
TOP RAIL

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DWG: 1 of 8

JUN 2 6 2006

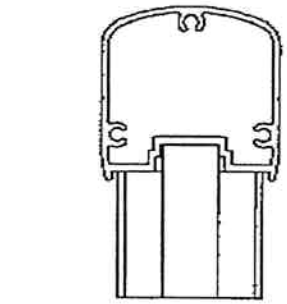
PROJECT #: 3090570

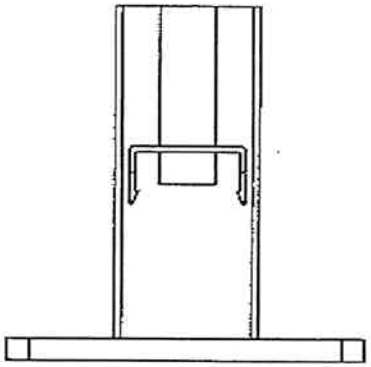
REVIEWED BY: Leo Lavoie MLL

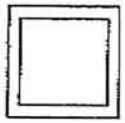
ALL DIMENSIONS ARE SUBJECT TO SITE MEASUREMENTS AND ARE TO BE CONFIRMED BEFORE FABRICATION OF PRODUCT

Authorization Signature	Date of Authorization	Drawing Name	Welded Picket Panel Style 1 Template
		Customer	Excell / Durarail Railing Systems
Excell Railing Systems Ltd		Project Name	Internal Design Engineering

WELDED PICKET - PICKET SIZES







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

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DWG: 2 of 8

JUN 2 6 2006

PROJECT #: 3090870

REVIEWED BY: [signature]

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.
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

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	

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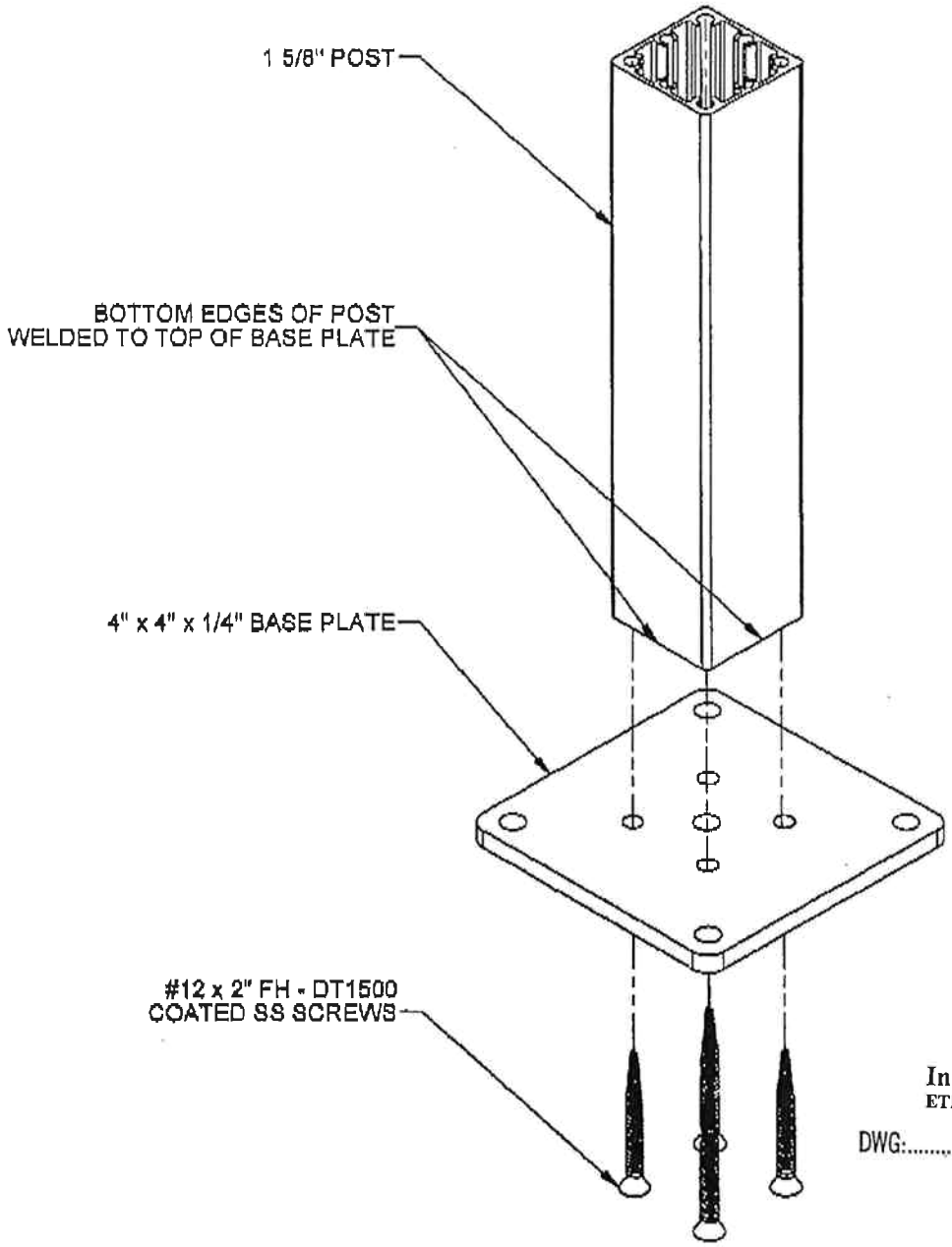

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DWG: 3 of 8

JUN 2 6 2006

PROJECT #: 3090570

REVIEWED BY: Ido Tamara PMP

Excell Railing Systems Ltd.
#306 - 12686 Anvil Way, Surrey, BC Canada V3W 8E7
Phone: 604-501-0151 Fax: 604-501-0155 Toll Free:1-866-899-7245
www.excellrailing.com

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

Drawing Name	Base Plate to Post Attachment				Authorization Signature
Customer	Excell / Durarail Railing Systems				
Project Name	Internal Design Engineering				
Drawn By	Csaba Bazzegh		Date Created	June 19, 2006	Date of Authorization
Revision No.		Scale NTS	Last Update		

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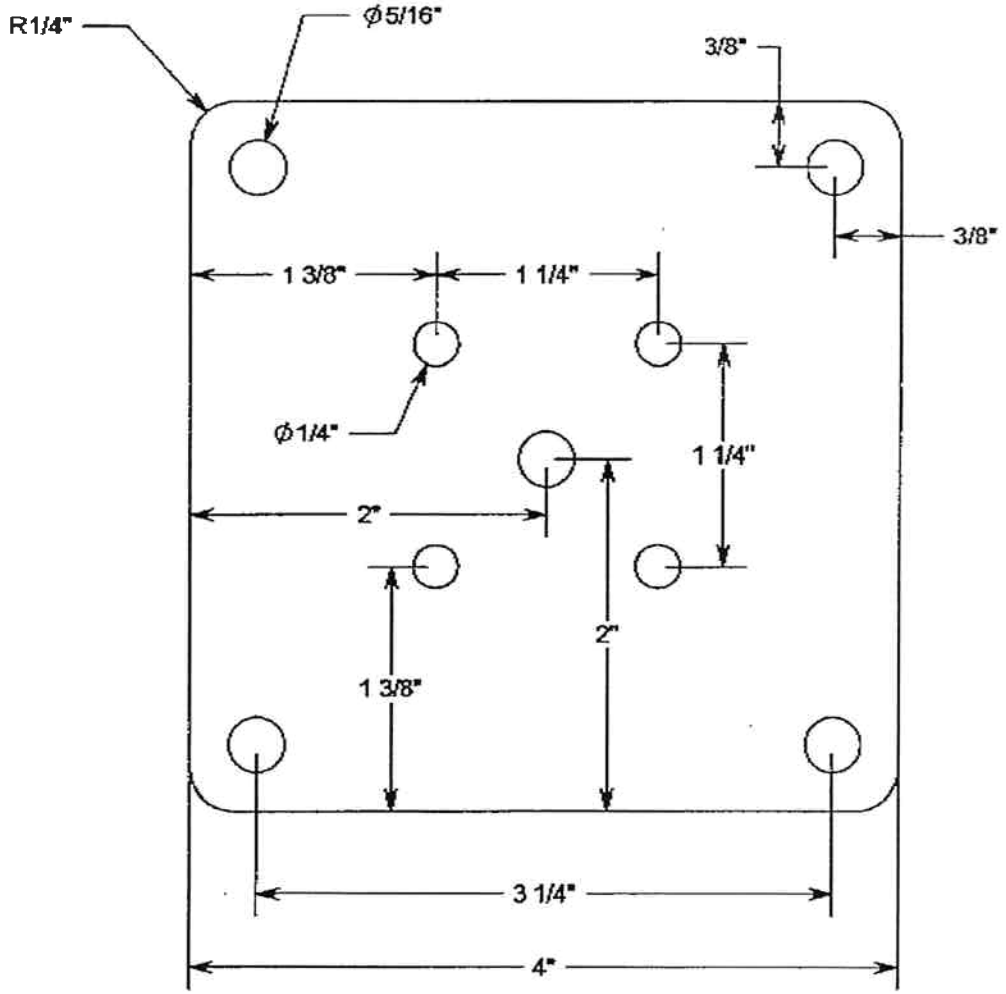

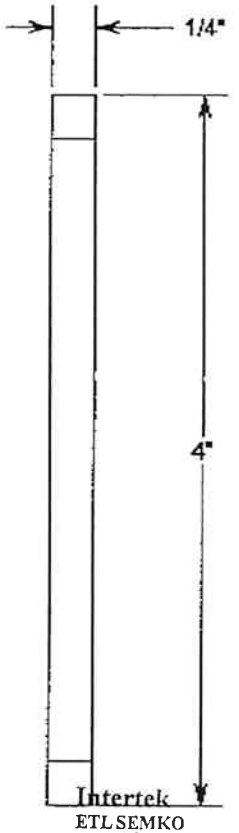

DWG: 4 of 8

ALLOY: 6061-T6

JUN 2 6 2006

PROJECT #: 3090870

REVIEWED BY: KO

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

Authorization Signature	Date of Authorization

Drawing Name	4 Inch x 4 Inch Base Plate				
Customer	Excell / Durarail Railing Systems				
Project Name	Internal Design Engineering				
Drawn By	Csaba Bezzegh			Date Created	June 19,2006
Revision No.		Scale	NTS	Last Update	
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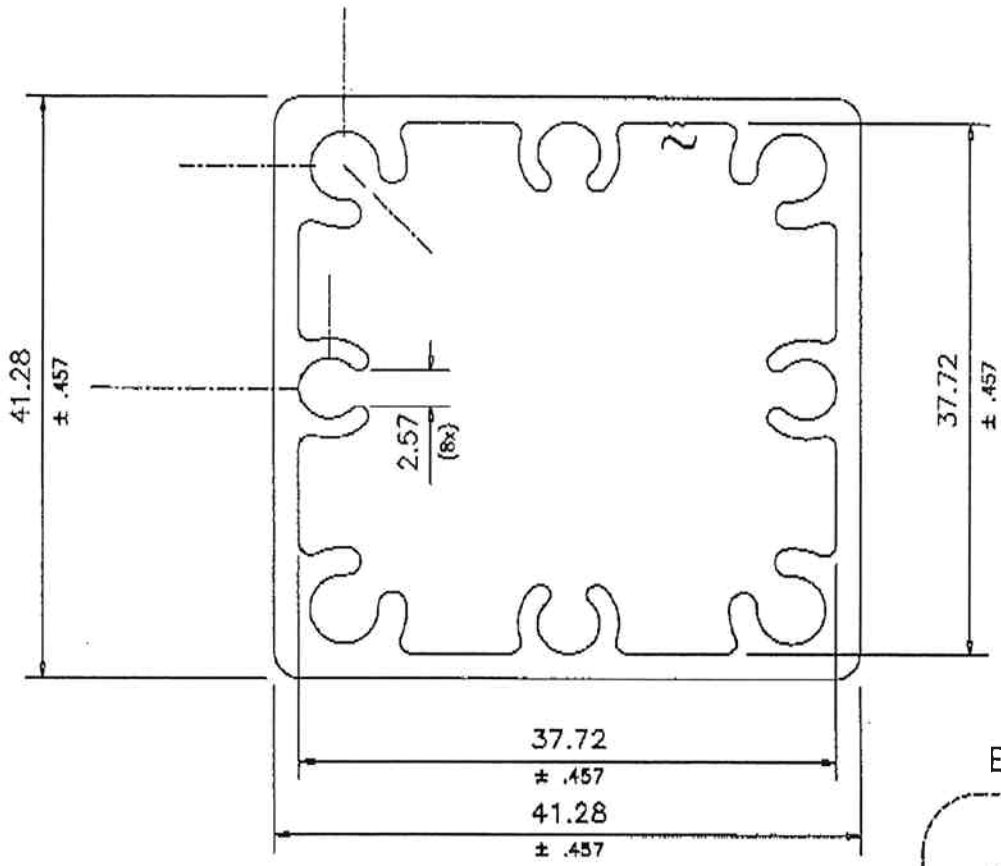
EXCELL RAILING SYSTEMS LTD.
Excell Railing Systems Ltd.
#306 - 12886 Annil Way Surrey, BC Canada V3W 8E7
Phone: 604-501-0151 Fax: 604-501-0155 Toll Free:1-866-999-7245
www.excellrailing.com

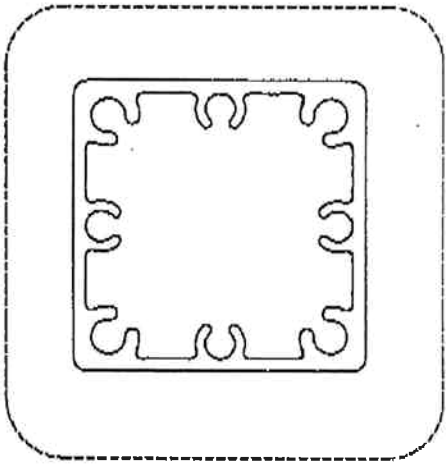
CUSTOMER		CUSTOMER NO.	PROPOSAL#	DASH	DIE NO.
DMJ Holdings		2401	9209A-1		VH-11722A
DESCRIPTION: 1 5/8" Post		DATE / SYM	REVISION		
			CLASSIFICATION#		

PRODUCTION COPY ONLY

~ INDALEX I.D. R0.203 x 0.203 High (2x)



Exposed All Around



Actual Size

Intertek
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DWG: 5 of 8

JUN 2 6 2006

PROJECT #: 3090870

REVIEWED BY: (MLT)

Caradon Indalex

WALL THICKNESS 0.070 IN 1.79 MM	EXCEPT AS SHOWN		
EST. AREA 0.689 IN^2 444.52 MM^2	OUT PER. 6.365 IN 161.67MM		
EST. WT. 0.827 LBS/FT. 1.206 KG/M	FACTOR 20 / 350		
EST. PER. 16.610 IN 421.90 MM	C.C.D. 2.265 IN 57.54 MM		
DWN BY W.Lam	ALLOY 6005A-T61	SCALE 2:1	DATE 99/06/23

BREAK ALL CORNERS .010"R (0.25R) UNLESS OTHERWISE NOTED.

NOTE

CHECK OR INDICATE EXPOSED SURFACES, CIRCLE CRITICAL DIMENSIONS
INDICATE LOCATION FOR CARDON INDALEX IDENTIFICATION MARK

SHAPE DRAWING APPROVAL

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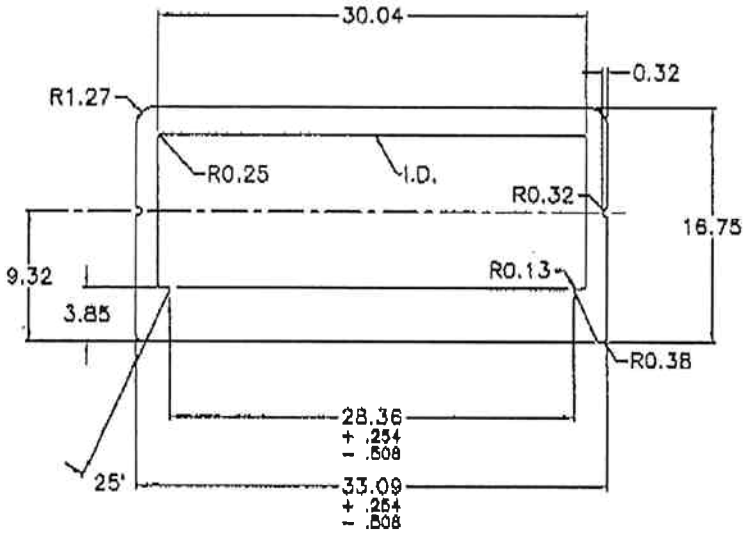
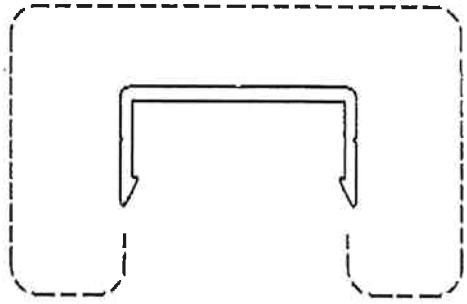
SIGNED BY: DATE:

STANDARD TOLERANCES TO APPLY UNLESS OTHERWISE SPECIFIED

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



EXPOSED SURFACE



ACTUAL SIZE

Intertek
ETLSEMKO

DWG: 6 of 8

JUN 2 6 2006

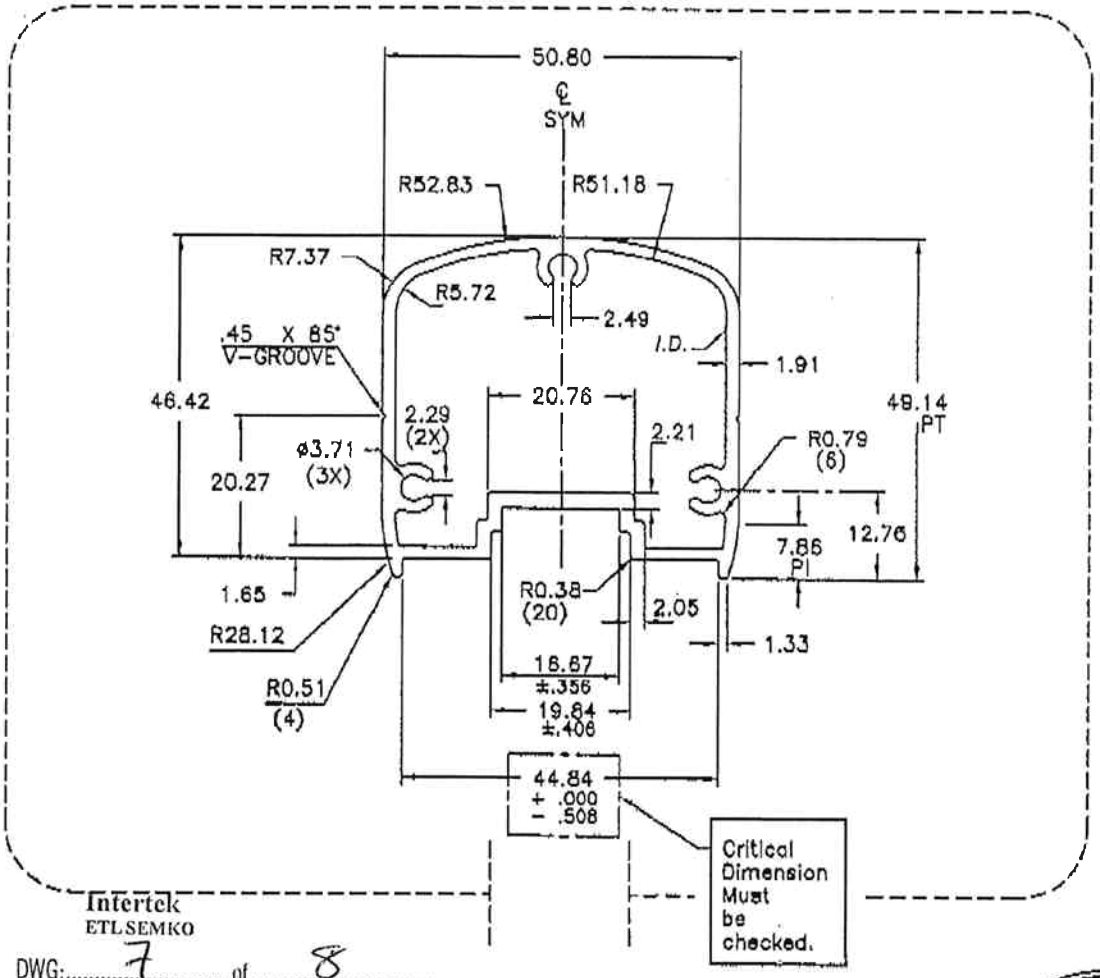
PROJECT #: 391870

REVIEWED BY:

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		

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



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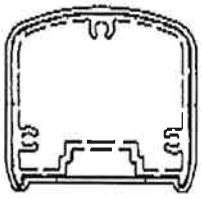
DWG: 7 of 8

JUN 2 6 2006

ACTUAL SIZE



SLIDE FIT WITH VH-39357
HALF-SIZE

PROJECT #: 3090870

REVIEWED BY: [signature]

INDALEX
ALUMINUM SOLUTIONS
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 99/01/05 CHANGED & APPROVED BY - BD

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

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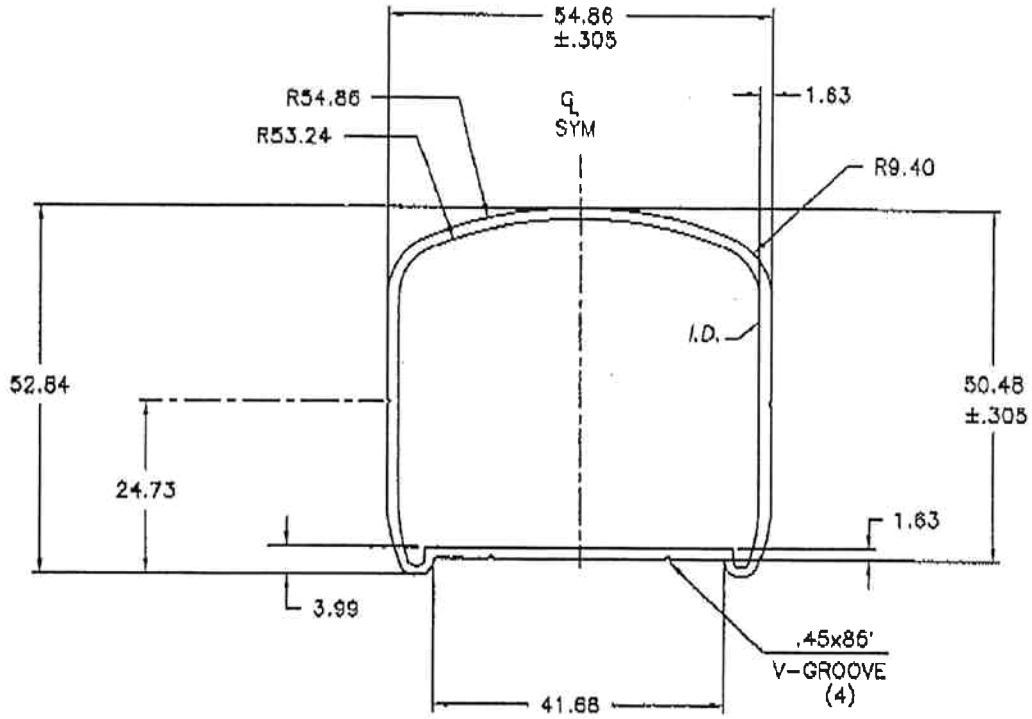
CUSTOMER		CUSTOMER PART NO.	DIE NO.
EXCELL RAILINGS			VH-39357
DESCRIPTION 10243-2	ALLOY & TEMPER 6063 T5	DIE LOC.	DASH NO.
STANDARD TOLERANCES TO APPLY UNLESS OTHERWISE SPECIFIED		BACKER LOC.	PROPOSAL NO. 10243B-2

EXPOSED SURFACE ALL AROUND



ACTUAL SIZE

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DWG: 8 of 8

JUN 2 6 2006

PROJECT #: 3090870

REVIEWED BY: [signature]

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

INDALEX
ALUMINUM EXTRUSIONS
TORONTO – MONTREAL – CALGARY – VANCOUVER

PLUG RATIO: 2
LN2: YES

EST. AREA 0.481 IN² 310.46 MM²	OUT PER. 7.898 IN 200.61 MM		
EST. WT. 0.568 LBS/FT 0.845 KG/M	WALLS– 1.63 ±.18 EXCEPT AS SHOWN		
EST. PER 15.451 IN. 392.46 MM	C.C.D. 2.678 IN 68.03 MM		
DWN BY BW	CAVITIES – 1	SCALE 1:1	DATE 01/01/11

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

DATE	SYM	REVISION	BY

DIE NO. VH-39357

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

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