



Railtech Railing System, Inc.

Model Designation: Exterior Glass Railing System

Client Package

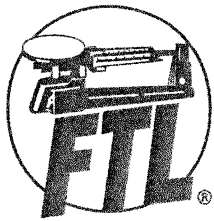
**Fenestration Testing Laboratory
8148 N.W. 74th Avenue
Medley, Florida 33166
Phone: (305) 885-3328
Fax: (305) 885-3329
Toll: (888) 819-7877**

**Remote Offices:
Tampa, FL (813) 200-5886**

**Schaumburg, Illinois (312) 253-7203
Pensacola, FL (850) 454-1734**

**Las Vegas, NV (702) 922-7142
Houston, TX (281) 763-0401**

Test Report and Drawings



Quality Accuracy Assurance

Fenestration Testing Laboratory, Inc.

8148 N.W. 74th Avenue Medley, FL 33166 Phone: (305) 885-3328 Fax: (305) 885-3329 (888) 819-7877

e-mail: clientservices@ftl-inc.com www.ftl-inc.com

Report Date: 10/3/2016
 Completion Date: 8/12/2016
 Expiration Date: 8/12/2020
 Page No. 1 of 7
 Lab. Number: 8988
 Project Number: 16-6477

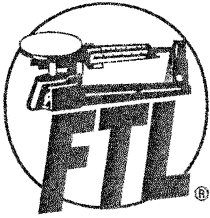
OFFICIAL TEST REPORT

MANUFACTURER: Railtech Railing System, Inc. **SPECIFICATIONS:** Florida Building Code
 Concentrated Load Test, TAS 202 (loads
 and ANSI Z97.1

ADDRESS: 4342 NW 120th Avenue **PROJECT:** Railtech Railing System, Inc.
 Coral Springs, Florida 33076

Table of Contents

Sample A-1		Page	Rev
Revision Table		2	
Notes Table		2	
Remarks Table		2	
Description of Test Sample		2	
Material Characteristics		3	
Railing Corners Construction		3	
Glazing		3	
Reinforcement		3	
Additional Information		3	
Test Sample Installation		4	
Results Sample A-1			
Concentrated Load Test	1607.8.1/1607.8.1.1	4	
Concentrated Load Test	1607.8.1/1607.8.1.1	4	
1/2 Structural Load Test Positive	TAS 202	4	
Design Load Test Positive	TAS 202	5	
1/2 Structural Load Test Negative	TAS 202	5	
Design Load Test Negative	TAS 202	5	
Uniform Structural Load Test Positive	TAS 202	6	
Uniform Structural Load Test Negative	TAS 202	6	
Drop Test		7	



Quality Accuracy Assurance

Fenestration Testing Laboratory, Inc.

8148 N.W. 74th Avenue Medley, FL 33166 Phone: (305) 885-3328 Fax: (305) 885-3329 (888) 819-7877
 e-mail: clientservices@ftl-inc.com www.ftl-inc.com

Report Date: 10/3/2016
 Completion Date: 8/12/2016
 Expiration Date: 8/12/2020
 Page No. 2 of 7
 Lab. Number: 8988
 Project Number: 16-6477

OFFICIAL TEST REPORT

Revision	Description	Author	Effective Date
0	Initial Release	Ms. Lusinda Delgado	10/3/2016

Notes

* designates measurements by laboratory
 ** as per manufacturer

Drawings referenced in this document are an integral part of this report, therefore, are required when distributing this test report. Test results obtained represent the actual value of the tested specimens and do not constitute opinion, endorsement or certification by this laboratory.

This test report is considered the exclusive property of the client named herein and is applicable to the sample tested. This report may not be reproduced without the approval of Fenestration Testing Laboratory, Inc.

At conclusion of above tests, there was no apparent damage to the concrete slab or fasteners and after the impact the glass did break, but remained in place and there wasn't any apparent tear in the inter layer film. Test specimens were covered with 1.5 mil plastic sheeting to seal from air leakage when load test were performed, however this had no effect on above results.

Remarks

Detailed drawings will be retained by Fenestration Testing Laboratory for a period of one year from the original test date, and test report for a period of four years. Due to the code cycle change it is recommended that this report be evaluated during the lifespan of this document.

This product was tested in accordance with the Florida Building Code (2014) TAS 202 (loads), with the deviation that only one sample was tested.

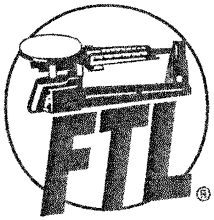
This product was tested in accordance with ANSI Z-97.1-09 (FBC section 1618.4.6.3) with no deviations.

This product was tested in accordance with the Florida Building Code section 1607.8.1/1607.8.1.1 with no deviations.

Testing was conducted as per instructions received from the manufacturer's company representative.

DESCRIPTION OF SAMPLE

Model Designation:	Exterior Glass Railing System
Overall Size:	15'-5 1/2" (185") by 3'-8" (44") high
Size and Location of Post:	41 5/8" high vertical post located one at each end and 61 1/4" and 121 1/4" from left
Sample A-1	



Quality Accuracy Assurance

Fenestration Testing Laboratory, Inc.

8148 N.W. 74th Avenue Medley, FL 33166 Phone: (305) 885-3328 Fax: (305) 885-3329 (888) 819-7877

e-mail: clientservices@ftl-inc.com www.ftl-inc.com

Report Date: 10/3/2016
 Completion Date: 8/12/2016
 Expiration Date: 8/12/2020
 Page No. 3 of 7
 Lab. Number: 8988
 Project Number: 16-6477

OFFICIAL TEST REPORT

MATERIAL CHARACTERISTICS

Members	Material**	Part Number**	Joint Type
Top Rail	6063-T6	056171	N/A
Bottom Rail	6063-T6	056169	N/A
Hand Rail	6063-T6	056170	N/A
Female Vertical Post	6063-T6	056168	N/A
Male Vertical Post	6063-T6	056167	N/A
Railing Construction	Number of Fasteners	Size of Fasteners	
Top rail fastened with	Four	12 by 1" PH SMS	
Bottom rail fastened with	Four	12 by 1" PH SMS	

Glazing

Glazing Location	Glazing Material	Glazing Compound	Compound Color
All three lites of glass	*9/16" overall nominal laminated glass composed of (2) 1/4" **tempered glass	**Dow Corning 995	Black
Interlaying Film: *0.060" **Kuraray SentryGlas°		Laminator: **Oldcastle	
Glazing Method: Exterior glazed with a *0.638" glazing penetration using silicone and glazing tape and using a vinyl wedge on the interior. The sample was tested using one 4" by 1/2" by 1/2" setting block at the bottom rail located 6" from each end of each glass.			
Daylight Opening:	57 1/2" by 36 3/4" high		

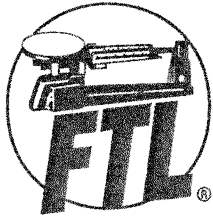
Reinforcement

Quantity and Type	Location	Method of Attachment
One 3.326" by 3/8" by 41 5/16" long aluminum flat bar (item No. 11)	Inside the male vertical post at each end	One No. 14 by 1 1/2" PH SMS into the top and bottom rail and one No. 14 by 2 1/2" FH SMS located 1/2" from bottom and 1 7/8" from top
One 3.326" by 3/8" by 41 5/16" long aluminum flat bar (item No. 11)	Inside the male and females vertical post located 61 1/4" and 121 1/4" from left	One No. 14 by 1 1/2" PH SMS into the top and bottom rail

Additional Information

There was a 3/4" gap between the top of the concrete slab and the bottom of the bottom rail.

The hand rail was fastened to the top rail using a single row of No. 8 by 5/8" truss head SDS located 5 5/8", 18 1/8", 31 3/8", 44 1/4", 57 1/8", 65 1/4", 78 3/8", 91 1/2", 104 3/8", 117", 125 1/4", 138 3/8", 151 5/8", 164 1/2" and 177 1/8" from left.



Quality Accuracy Assurance

Fenestration Testing Laboratory, Inc.

8148 N.W. 74th Avenue Medley, FL 33166 Phone: (305) 885-3328 Fax: (305) 885-3329 (888) 819-7877

e-mail: clientservices@ftl-inc.com www.ftl-inc.com

Report Date: 10/3/2016
 Completion Date: 8/12/2016
 Expiration Date: 8/12/2020
 Page No. 4 of 7
 Lab. Number: 8988
 Project Number: 16-6477

OFFICIAL TEST REPORT

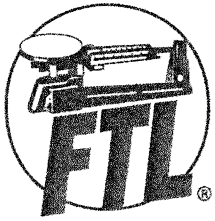
Sample Installation

The vertical post were set into a 6" diameter hole using **Sakrete Non-Shrink Construction Grout (minimum 8,000 psi after 28 days of cure) with a 5 3/8" embedment into a 3,000 psi concrete slab. The hollow part of the vertical post embedment was also filled with grout.

Sample: A-1		Temperature: 90.0°F		Barometric Reading: 30.4 inches Hg	
Title of Test			Load		Notes
Concentrated Load Test			400.0 lbf		As per FBC section 1618.4.6.1. The load was applied at the corner of the hand rail
Reading#	Deflection	Permanent Set	Results	Add. Info	
1	0.500"	0.062"	Passed		

Sample: A-1		Temperature: 90.0°F		Barometric Reading: 30.4 inches Hg	
Title of Test			Load		Notes
Concentrated Load Test			750.0 lbf		As per FBC section 1618.4.6.1. The load was applied at the center of the hand rail
Reading#	Deflection	Permanent Set	Results	Add. Info	
1	1.090"	0.090"	Passed		

Sample: A-1		Temperature: 90.0°F		Barometric Reading: 30.4 inches Hg	
Title of Test			Pressure		Notes
1/2 Structural Load Test Positive Load			100.0 psf		
			Results		Passed



Quality Accuracy Assurance

Fenestration Testing Laboratory, Inc.

8148 N.W. 74th Avenue Medley, FL 33166 Phone: (305) 885-3328 Fax: (305) 885-3329 (888) 819-7877

e-mail: clientservices@ftl-inc.com www.ftl-inc.com

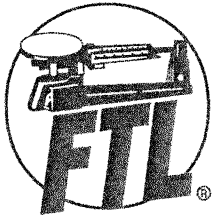
Report Date: 10/3/2016
 Completion Date: 8/12/2016
 Expiration Date: 8/12/2020
 Page No. 5 of 7
 Lab. Number: 8988
 Project Number: 16-6477

OFFICIAL TEST REPORT

Sample: A-1		Temperature: 90.0°F		Barometric Reading: 30.4 inches Hg	
Title of Test			Pressure		Notes
Design Load Test Positive Load			100.0 psf		
Reading#	Deflection	Permanent Set	Results	Add. Info	
1	0.859"	0.020"	Passed		
2	0.681"	0.018"	Passed		
3	0.350"	0.012"	Passed		
4	0.052"	0.001"			
Actual Movement		Actual Set		Recovery	Additional Info.
1.) 0.859"		0.020"		98%	

Sample: A-1		Temperature: 90.0°F		Barometric Reading: 30.4 inches Hg	
Title of Test			Pressure		Notes
1/2 Structural Load Test Negative Load			100.0 psf		
			Results		Passed

Sample: A-1		Temperature: 92.9°F		Barometric Reading: 30.0 inches Hg	
Title of Test			Pressure		Notes
Design Load Test Negative Load			100.0 psf		
Reading#	Deflection	Permanent Set	Results	Add. Info	
1	0.926"	0.017"	Passed		
2	0.879"	0.014"	Passed		
3	0.403"	0.007"	Passed		
4	0.029"	0.002"	Passed		
Actual Movement		Actual Set		Recovery	Additional Info.
1.) 0.926"		0.017"		98.2%	



Quality Accuracy Assurance

Fenestration Testing Laboratory, Inc.

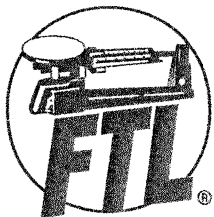
8148 N.W. 74th Avenue Medley, FL 33166 Phone: (305) 885-3328 Fax: (305) 885-3329 (888) 819-7877
 e-mail: clientservices@ftl-inc.com www.ftl-inc.com

Report Date: 10/3/2016
 Completion Date: 8/12/2016
 Expiration Date: 8/12/2020
 Page No. 6 of 7
 Lab. Number: 8988
 Project Number: 16-6477

OFFICIAL TEST REPORT

Sample: A-1		Temperature: 92.9°F		Barometric Reading: 30.0 inches Hg	
Title of Test		Pressure		Notes	
Uniform Structural Test Positive Load		200.0 psf			
Reading#	Deflection	Permanent Set	Results	Add. Info	
1	1.970"	0.243"	Passed		
2	1.593"	0.211"	Passed		
3	0.861"	0.142"	Passed		
3	0.153"	0.036"	Passed		
Actual Movement		Actual Set		Recovery	
1.) 1.970"		0.243"		87.7%	
Additional Info.					

Sample: A-1		Temperature: 92.9°F		Barometric Reading: 30.0 inches Hg	
Title of Test		Pressure		Notes	
Uniform Structural Test Negative Load		200.0 psf			
Reading#	Deflection	Permanent Set	Results	Add. Info	
1	1.458"	0.151"	Passed		
2	1.364"	0.142"	Passed		
3	0.652"	0.080"	Passed		
3	0.056"	0.010"	Passed		
Actual Movement		Actual Set		Recovery	
1.) 1.458"		0.151"		89.6%	
Additional Info.					



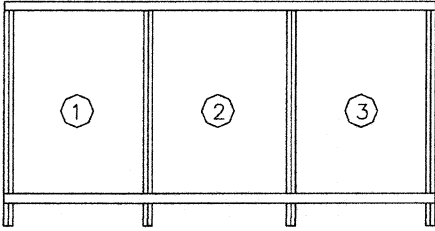
Quality Accuracy Assurance

Fenestration Testing Laboratory, Inc.

8148 N.W. 74th Avenue Medley, FL 33166 Phone: (305) 885-3328 Fax: (305) 885-3329 (888) 819-7877
e-mail: clientservices@ftl-inc.com www.ftl-inc.com

Report Date: 10/3/2016
Completion Date: 8/12/2016
Expiration Date: 8/12/2020
Page No. 7 of 7
Lab. Number: 8988
Project Number: 16-6477

OFFICIAL TEST REPORT

Sample: A-1	Temperature: 89.3°F	Barometric Reading: 30.11 inches Hg
Title of Test		Notes
Drop Test		As per FBC section 1618.4.6.3
		
Drop #	Results	Add. Info
1	Passed	Impacted center of lite. After impact the glass did not break.
2	Passed	Impacted center of lite. After impact the glass did not break.
3	Passed	Impacted center of lite. After impact the glass did break but remained in the place and there wasn't any apparent tear in the inter layer film.

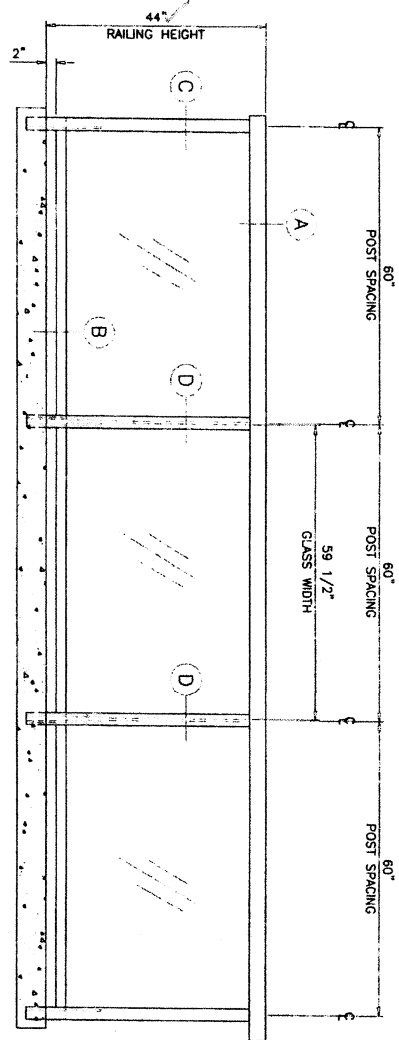
Witnessed by:

Ms. Idalmis Ortega, FTL P.E.
Mr. Tom Ellis, Railtech Railing System, Inc.
Mr. Philip Ellis, Railtech Tailing System, Inc.

FENESTRATION TESTING LABORATORY, INC.

Technicians:
Mr. Michael Chala
Mr. Luis Gonzalez

Mr. Manny Sanchez
Chief Executive Officer



TEST MOCKUP

TESTS: (TAS 301)
 IMPACT (297.1) WITH LOAD OF 400 Ft.-Lb
 STATIC WIND LOAD
 $P_d = +1000$
 -1000 PSF

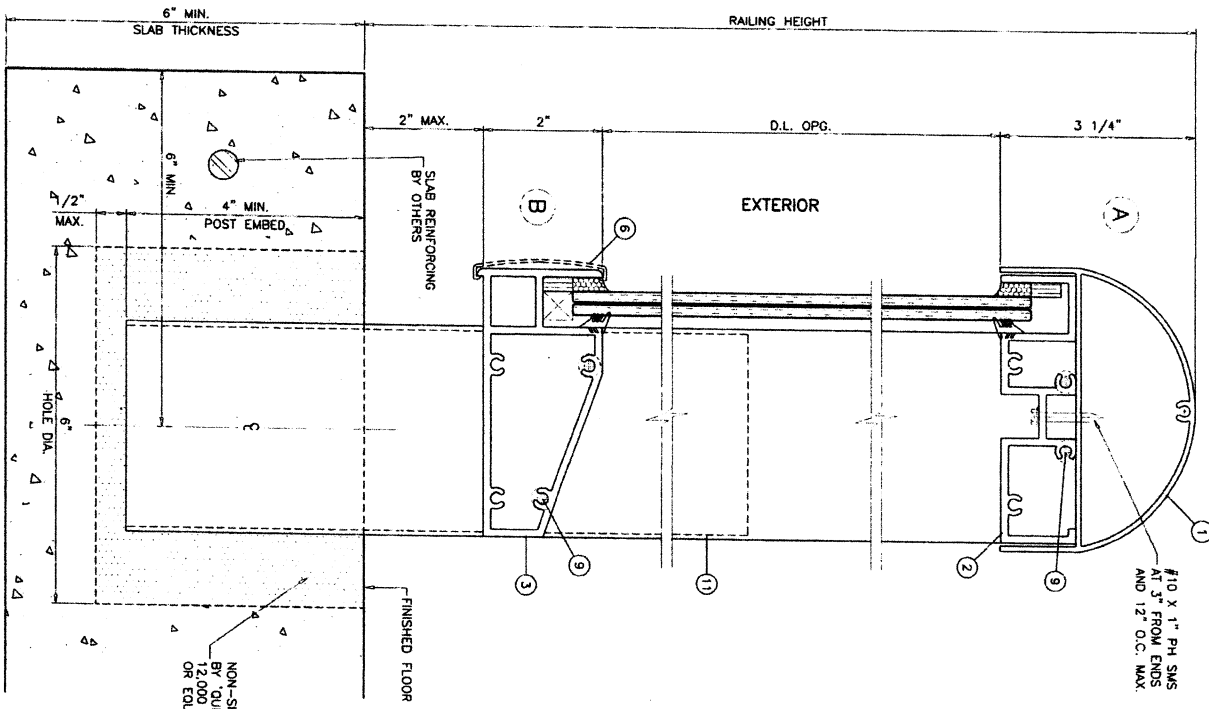
PENETRATION TESTING LAB, INC.

LAB# 8988

DATE 7/2/16

DRAWING VERIFIED BY: [Signature]

drawing no. 16-04	date: 04-19-16	revisions:		ALUMINUM AND GLASS RAILING SYSTEM RAILTECH RAILING SYSTEMS, INC. 4342 NW 120th Avenue Coral Springs, FL 33065 TEL. (954) 340-4064 FAX (954) 340-5223	AL-FAROOQ CORPORATION ENGINEERS & PRODUCT DEVELOPMENT 9360 SUNSET DRIVE, SUITE 220 MIAMI, FLORIDA 33173 (C.A.N. 3538) TEL. (305) 264-8100 FAX. (305) 262-6978	
	scale: 1/2"=1'-0"	no.	date			
	dr. by: TARIQ					
	chk. by:					



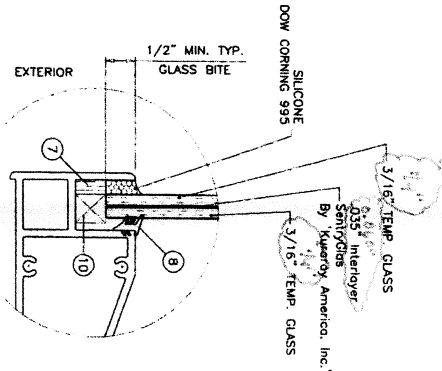
#10 X 1" PH SMS
AT 3" FROM ENDS
AND 12" O.C. MAX.

NON-SHRINK PRECISION GROUT
BY "QUIKRETE"
12,000 PSI
OR EQUAL

ONLY ITEMS CHECKED IN RED HAVE
BEEN VERIFIED BY LABORATORY

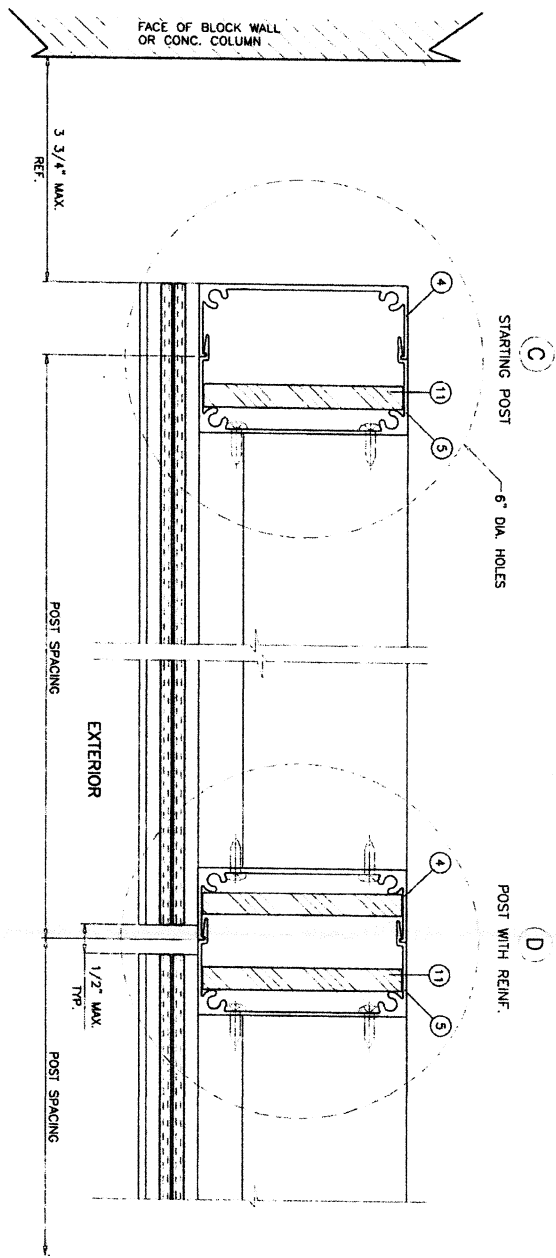
FINESTRATION TESTING LAB, INC.

LAB# 8988



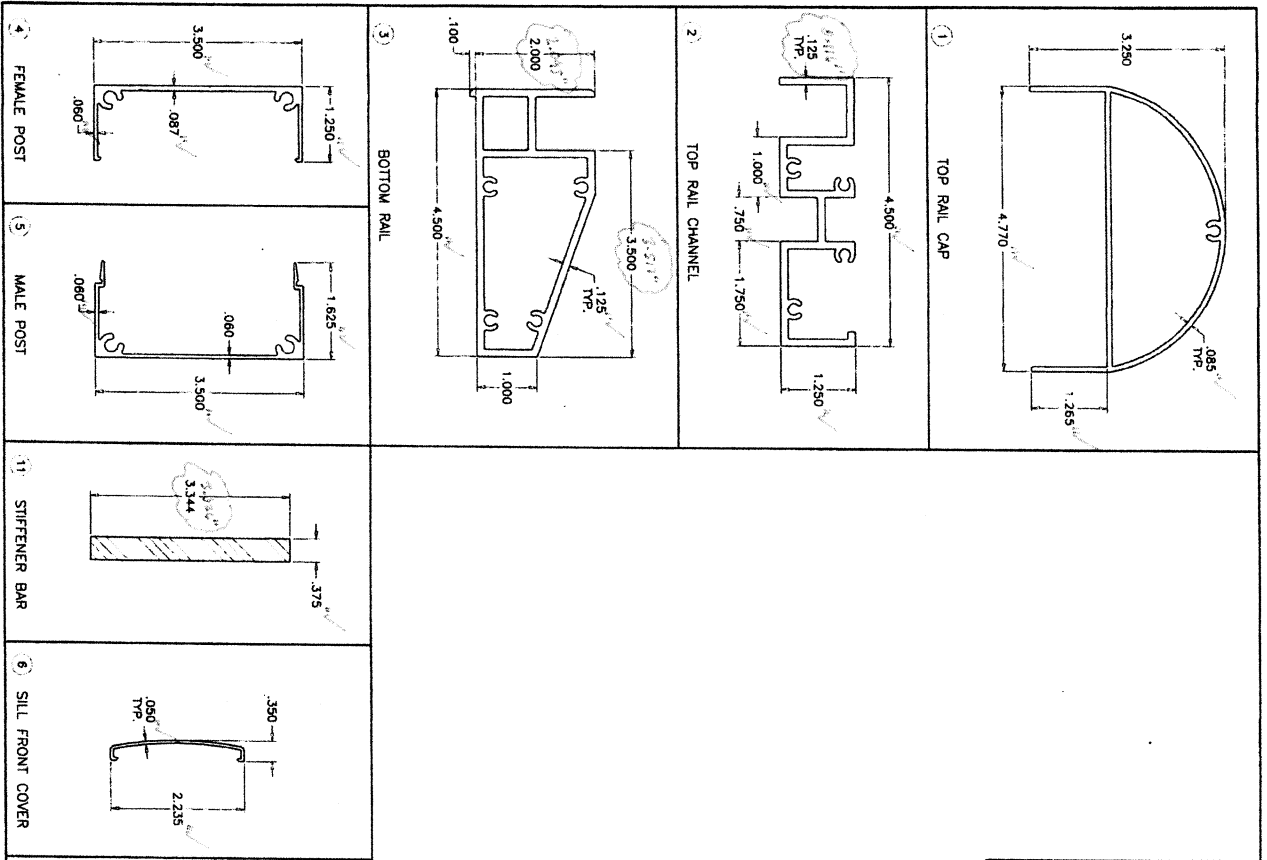
GLASS DETAIL
7/16" OVERALL U.M. GLASS

drawing no. 16-04 sheet 2 of 4	date: 04-19-16 scale: 1/2" = 1" dr. by: TARIQ chk. by:	revisions: <table border="1"> <thead> <tr> <th>no.</th> <th>date</th> <th>by</th> <th>description</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	no.	date	by	description					ALUMINUM AND GLASS RAILING SYSTEM RAILTECH RAILING SYSTEMS, INC. 4342 NW 120th Avenue Coral Springs, FL 33065 TEL. (954) 340-4064 FAX (954) 340-5223	AL-FAROOQ CORPORATION ENGINEERS & PRODUCT DEVELOPMENT 9360 SUNSET DRIVE, SUITE 220 MIAMI, FLORIDA 33173 (C.A.N. 3538) TEL. (305) 264-8100 FAX. (305) 262-6978	a f c
	no.	date	by	description									
RAILING\16-04AP													



KINESTRAILION TESTING LAB, INC.
 DATE: 11/11/04
11/11/04
 DRAWING VERIFIED BY: TAR

sheet 3 of 4 drawing no. 16-04	date: 04-19-16 scale: 1/2" = 1" dr. by: TARIQ chk. by:	revisions: <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 5%;">no</th> <th style="width: 10%;">date</th> <th style="width: 85%;">by description</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </tbody> </table>	no	date	by description										ALUMINUM AND GLASS RAILING SYSTEM RAILTECH RAILING SYSTEMS, INC. 4342 NW 120th Avenue Coral Springs, FL. 33065 TEL. (954) 340-4064 FAX (954) 340-5223	AL-FAROOQ CORPORATION ENGINEERS & PRODUCT DEVELOPMENT 9360 SUNSET DRIVE, SUITE 220 MIAMI, FLORIDA 33173 (C.A.N. 3538) TEL. (305) 264-8100 FAX. (305) 262-6978	
no	date	by description															



ITEM	PART #	DESCRIPTION	MATERIAL	MANF./SUPPLIER/REMARKS
1	056170	TOP RAIL CAP	6063-T6	
2	056171	TOP RAIL CHANNEL	6063-T6	
3	056189	BOTTOM RAIL	6063-T6	
4	056188	FEMALE POST	6063-T6	
5	056187	MALE POST	6063-T6	
6	056172	SILL FRONT COVER	6063-T6	
7	V2100	1/4" x 1/2" EXTERIOR SPACER TAPE	POLYURETHANE	OPTIONAL
8	SPV335C	INTERIOR GLAZING CASKET	VINYL	SAINT-GOBAIN
9	#12 X 1 1/2"	SETTING BLOCK (1/2" x 1/2" x 4" LONG) 2 PER LITE	ST. STEEL	DURQUETER 7045 SHORE A
10		STIFFENER BAR, 15" LONG	EPDM	HH SELF DRILLING SCREWS
11			6063-T6	DURQUETER 8045 SHORE A

ONLY ITEMS CHECKED IN RED HAVE
BEEN VERIFIED BY LABORATORY

EXHIBIT/STRAINING TESTING LAB, INC.

11/18/89

DATE:

DRAWING VERIFIED BY:

date: 04-19-16 scale: 1/2" = 1" dr. by: TARIO chk. by:	revisions: no. date by description	ALUMINUM AND GLASS RAILING SYSTEM RAILTECH RAILING SYSTEMS, INC. 4342 NW 120th Avenue Coral Springs, FL 33065 TEL. (954) 340-4064 FAX (954) 340-5223	AL-FAROQ CORPORATION ENGINEERS & PRODUCT DEVELOPMENT 9360 SUNSET DRIVE, SUITE 220 MIAMI, FLORIDA 33173 (C.A.N. 3538) TEL. (305) 264-8100 FAX. (305) 262-8978	a f c RAILING 16-04AP
---	---------------------------------------	--	---	--------------------------

sheet 4 of 4
drawing no. 16-04

The Pro's Choice Since 1926

SAKRETE

Non-Shrink Construction Grout

Sakrete® Non-Shrink Construction Grout is a non-shrink, non-metallic, structural hydraulic cement for high-strength grouting.

FEATURES AND BENEFITS:

- Meets ASTM C 1107 (Plastic and Flowable) Packaged Dry, Hydraulic Cement Grout (Non-shrink)
- Non-corrosive, Will Not Attack Reinforcement
- Non-shrink, Per ASTM C 1107
- Non-metallic, Non-Staining, Gray Color
- Meets Corps of Engineers Specification CRD-C 621
- Plastic and Flowable Consistency
- Pumpable for Easy Placement
- Super Plasticized for Improved Strength

USES: Grouting of

- Concrete - poured in place, precast, tilt-up and prestressed
- Heavy Machinery
 - Dowel Rods
 - Reinforcing Steel in Block Ceils
 - Concrete Columns
- Sole Plates
- Anchor Bolts
- Steel Bearing Plates

SAFETY:

READ and UNDERSTAND the Material Safety Data Sheet (MSDS) before using this product. **WARNING:** Wear protective clothing and equipment. See HMIS block. For emergency information, call CHEMTREC at 800-424-9300 or 703-527-3887 (outside USA). **KEEP OUT OF REACH OF CHILDREN.**

PREPARATION:

Remove all unsound concrete, grease, oil, paint, and any other foreign material that will inhibit performance. Prior to grout placement, all surfaces must be clean and saturated with water for 24 hours. Remove excess water before placing the grout. Provide air relief holes where necessary if grouting is beneath large plates.

Suggestions in Form Work: Wood form work or other absorbent forms should be coated with a form release oil to prevent grout adherence and water absorption. Design form work to facilitate rapid, continuous and complete filling of the space to be grouted. Use methods that will enable the grout to flow by gravity between the surfaces and keep the grout in full contact with these surfaces until it has hardened.

Refer to: ACI 351.R-99 Report on Grouting between Foundations and Bases for Support Equipment and Machinery for important information and recommendations.

TECHNICAL DATA:

<u>Consistency of Flow</u> ASTM C 942	<u>Plastic</u> 115%	<u>Flowable</u> 140%
24 hours	3,000 psi (21 MPa)	2,000 psi (14 MPa)
7 days	6,500 psi (45 MPa)	6,000 psi (43 MPa)
28 days	9,000 psi (62 MPa)	8,000 psi (55 MPa)

MIXING:

Add only clean water. The water quantities shown are approximate and may vary slightly with type of equipment and application conditions. Water demand and mix temperature must be determined using standard test methods for consistency and temperature measurement at the time of application.

Desired Grout Consistency:

Flowable (Pumping Consistency), 50 lbs. (22.7kg) Grout, approximately 1.1 Gallons Water (4.2 L)

Plastic (Trowel Consistency), 50 lbs. (22.7 kg) Grout, approximately 1.0 Gallon Water (3.8 L)

PLACEMENT:

Use a mixer large enough to permit continuous placement before any part of the grout has set. Place the grout quickly. Rodding the grout tightly will help move material. Avoid vibration which can cause bleeding and segregation. Shut down nearby machines.

The air, mix & substrate temperatures should all be between 40°F (4.4°C) and 90°F (32.2°C).

CURING:

SAKRETE Construction Grout can be exposed under normal weathering conditions. Forms may be removed as soon as the grout reaches its final set. Protect from freezing for a minimum of 48 hours after placement. ACI 308-Standard Practice for Curing Concrete.

STORAGE:

Store in a tightly closed container off the floor in a dry place.

COVERAGE:

50 lbs. covers 0.45 cu. ft. (12.7 L)

PACKAGING:

50 lb. bag (22.7 kg) UPC: 7-64661-16350-3

REV 8/14