



Intertek Testing Services
ETL SEMKO

REPORT OF

PRODUCT EVALUATION

CONDUCTED ON A

"COMPONENT GLASS"
ALUMINUM GUARDRAIL ASSEMBLY

TO THE

BOCA NATIONAL BUILDING CODE, 1999

FOR

ENSURCO DURADEK LTD.
8288 – 129th AVENUE
SURREY, BC
V3W 0A6

REPORT PREPARED BY:

INTERTEK TESTING SERVICES NA LTD.
WARNOCK HERSEY
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V3K 4X9

REPORT NUMBER: 481-1457 – 4c

DATE: MARCH 6, 2000



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INTRODUCTION

Intertek Testing Services NA Ltd./Warnock Hersey has conducted Uniform and Concentrated load tests on an aluminum guardrail assembly manufactured at Ensuro Duradek Ltd. manufacturing plant in Surrey, BC. The rail assembly was identified as the "Component Glass System (42" Height)" and was tested on January 19, 2000.

The testing was conducted in accordance with the BOCA National Building Code /1999, sections 1615.8.2 "Guard Design and Construction" and 1615.8.2.1 "In-fill Areas".

DESCRIPTION

The guardrail is (120") wide measured from corner post to corner post (which includes an intermediate post at mid-span) and is (42") high measured from deck level to the top of the guardrail.

The top rail is constructed in two pieces consisting of a sub-rail and a snap-on Square Top Rail cap. The sub-rail is fastened to the top of each corner post using two #12 x 1-1/2" panhead screws. The corner sleeve portion of the top cap is mitre cut and welded and extends approximately 4" to either side. Each top cap runs continuously from one 90° corner segment to the other. Where the top and bottom rails attach to the building wall structure a wall attachment plate is provided.

A 2-1/2" wide x 3" high x 1/8" aluminum plate assembly (complete with 1-1/2" long welded sleeve) is fastened to the end of the top rail using two #12 x 1-1/2" panhead screws and three #14 x 2" panhead screws (complete with Mungo brand, model MN8x40 sleeve anchors) which secure the wall attachment plate to the concrete wall structure. A 1-1/2" wide x 2-7/8" high x 1/8" thick aluminum plate assembly is fastened to the end of the bottom rail using a single #8 x 3/4" self tapping panhead screw and two #14 x 2" panhead screws (complete with Mungo brand, model MN8x40 sleeve anchors) which secure the wall attachment plate to the concrete wall structure. The bottom rails are fastened to a 1" long extruded aluminum rail clip using a single #8 x 3/4" self tapping panhead screw. Each of the rail clips, located on either side of each post, are fastened to the post using two #12 x 1-1/2" panhead screws.

A tempered glass panel 0.222" (5.65mm) thick is supported between the top sub-rail and the tapered channel shaped bottom rail. A co-extruded vinyl sleeve is provided within both the top sub-rail channel and the bottom rail channel. The vinyl sleeve in the top channel is approximately 1" deep. The vinyl sleeve in the bottom channel is approximately 1/2" deep. Three pairs of extruded aluminum angles, each being 1-1/2" x 3/4" x 1/8" x 1-3/4" long, were fastened at mid span and at quarter points to each post leg using two #12 x 1-1/2" stainless steel panhead screws. Butyl glazing tape was used between the aluminum angles and the glass to avoid direct metal to glass contact.

The corner posts are 1-5/8" square complete with a screw chase at each inside corner and mid-section with a wall thickness of 0.068" thick. An aluminum baseplate measuring 3-1/2" x 3-1/2" x 1/4" thick was fastened to the base of each post using four #12 x 2" hardened steel flathead tapping screws (Robertson Whitehouse Type "A"). Four #14 x 2" panhead screws (complete with Mungo brand, model MN8x40 sleeve anchors) secure each post to the concrete floor. Supporting the bottom rail midway between the posts are 1/2" square (0.060" wall thickness) aluminum picket support leg which is snapped into the underside of the bottom rail and secured using a single #8 x 1/2" self tapping screw. Each leg is fastened to the concrete floor using a #12 x 2" panhead screw (complete with a Mungo brand, model MN8x40 sleeve anchor). See attached drawings in the Appendix for details and a general layout.

TEST RESULTS

BOCA National Building Code: Sections 1615.8.2 and 1615.8.2.

1615.8.2

Guards shall be designed and constructed for a concentrated load of 200 pounds (91 kg) applied at any point and in any direction along the top railing member. Guards located in other than dwelling units in occupancies in Use Groups R-2 and R-3 shall also be designed and constructed for a uniform load of 50 pounds per foot (74 kg/m) applied horizontally at the required guard height and a simultaneous uniform load of 100 pounds per foot (149 kg/m) applied vertically downward at the top of the guard. The concentrated and uniform loading conditions shall not be applied simultaneously.

2. 1615.8.2.

The in-fill area of a guard shall be designed and constructed for a horizontal concentrated load of 200 pounds (91 kg) applied on a 1 square foot (0.093 m²) area at any point in the system, including intermediate rails or other elements serving this purpose. This loading condition shall not be applied simultaneously with the loading conditions in Section 1615.8.2.

The guardrail assembly withstood the loading conditions as described above which included a 2.0 safety factor. The glass in-fill panel loading included a 4.0 safety factor or 800 lbs over the 1 square foot area.

3. 2406.1.1

The panels and their support system shall be designed to withstand the loads specified in section 1615.8. A safety factor of 4 shall be used.

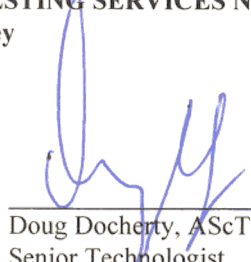
The guardrail assembly withstood the loading conditions as described above which included a 2.0 safety factor. The glass in-fill panel loading included a 4.0 safety factor or 800 lbs over the 1 square foot area.

CONCLUSION

The guardrail system and installation as described in this report (and attached drawings) meets the loading requirements of the BOCA National Building Code 1999 Edition, Sections 1615.8.2, 1615.8.2.1 and 2406.1.1.


INTERTEK TESTING SERVICES NA LTD.
Warnock Hersey

Tested by:



Doug Docherty, AScT
Senior Technologist
Building Products

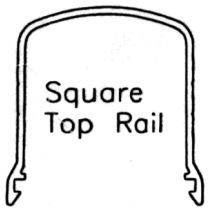
Reviewed by:



Sheldon Warman, P.Eng.
Manager
Physical Testing and Certification

DD/vjk

COMPONENTS



Square Top Rail



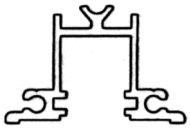
Square Top Sleeve



Round Top Rail



Round Top Sleeve



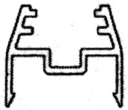
Top Rail Receiver



Top Rail Glass Insert



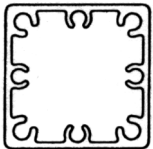
Bottom Rail Glass Insert



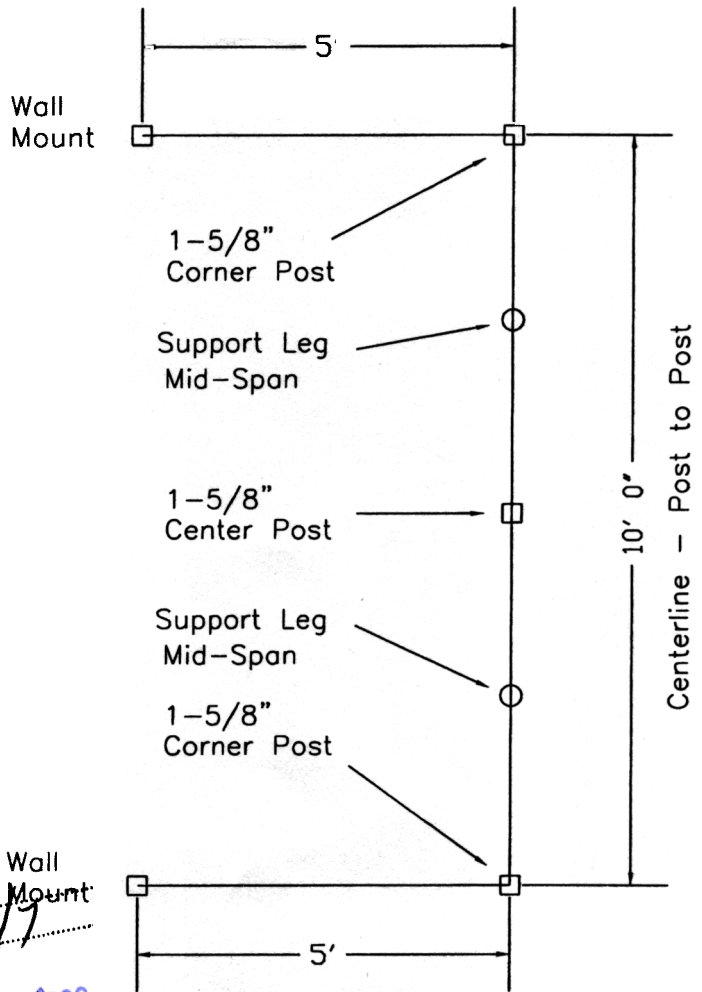
Bottom Rail



Rail Clip



1-5/8" Square Post

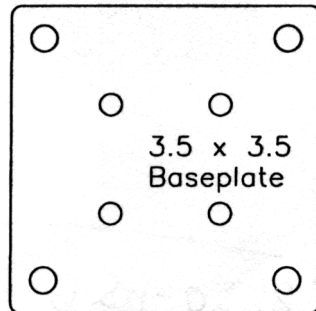


Wall Mount
DWG No. 1119

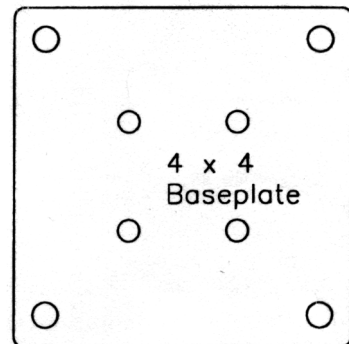


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APP BY



3.5 x 3.5 Baseplate



4 x 4 Baseplate

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TLE Component Glass System @ 42" Height

| | | |
|-----------------|----------------|------------------------|
| SCALE 3/8" = 1' | DATE Jan. 2000 | N.B.C. 120" Centerline |
| DRAFT P. Bacon | CHK'D | U.B.C. 120" Centerline |
| ENG. | CHK'D | BOCA 120" Centerline |

durarail™

DRAWING No.

