

# CONSTRUCTION RESEARCH LABORATORY, INC.

7600 N.W. 79<sup>TH</sup> AVENUE MIAMI, FLORIDA 33166 Phone : 305-592-9222 FAX : 305-594-9148 crlmiami@bellsouth.net

Report 7444-13B -ICC

15 July 2013

Tested: 9 July 2013

## TESTING OF SAFTY RAILING

**Client:**

# SÄFTRON

SÄFTRON Manufacturing, LLC

6012 33rd St E

Bradenton, FL 34203- USA

Phone: (305) 233-5511, Fax: (941) 751-2802

**General:** Load tests on Steel/ PCV Plastic Safety Railings to show conformance to requirements for the International Code Council, ICC ES AC 174.

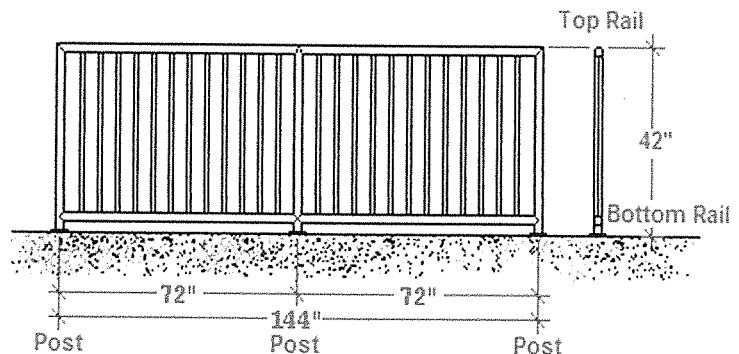
**Witness to Testing:**

Robert Weise, SÄFTRON Manufacturing, LLC  
George Dotzler, CRL Director of Operations

Yamil G. Kuri, P.E., Official Witness  
Michael Lamborghini, CRL Test Engineer

**Description of Specimen:** The test specimen consisted of a composite structure of PVC pipe and aluminum pipe as shown in the below referenced drawings. The test specimen was also of the nominal dimensions as shown at right (as viewed from interior side, all diagrams are similar).

**Statement of Conformance:** The specimen is in conformance with drawings provided by the manufacturer. These drawings have been marked to indicate the portions descriptive of these tests.



**Labeled:**

**2200 SERIES, 6' STEEL TEST RAIL, PLATE MOUNT**

Date: 5/22/2013 Sheet 1 Of 1

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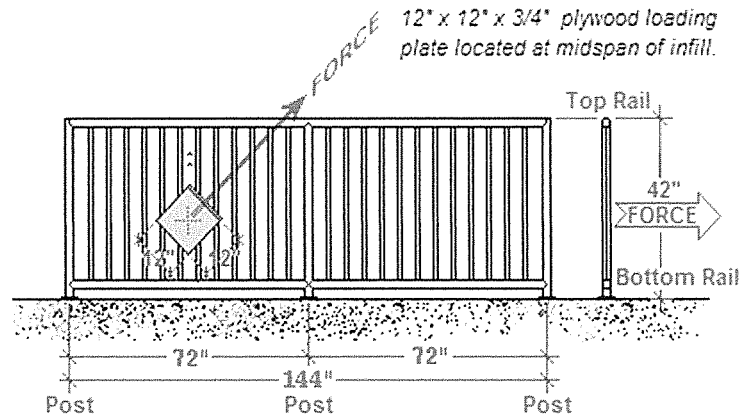
JUL 23 2013

### Tests upon Components

#### Test I – Load on Baluster:

A horizontal load was applied, for sixty seconds, to a 12" x 12" piece of 3/4" plywood positioned at the mid-height of the baluster (as shown in the diagram at right). Results as follows:

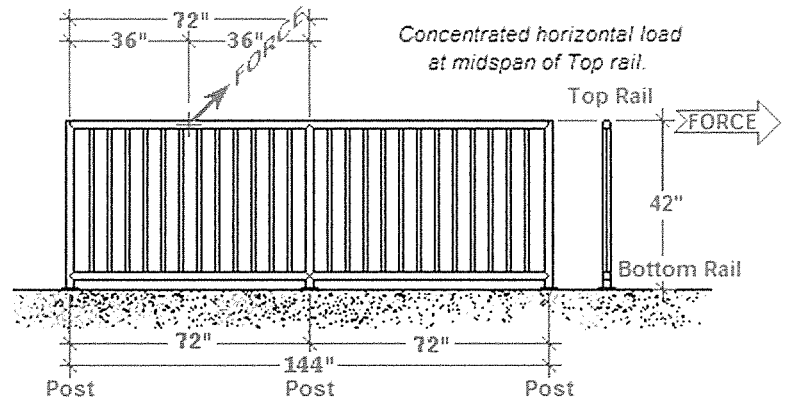
Code	Load (Lbs.)	Results
ICC ES AC 174	125.0	No Failure / Pass



#### Test II – Horizontal Point Load on Top Rail:

A single load was applied, for sixty seconds, to the mid-span of the top rail of the specimen (as shown in the diagram at right). Deflection Gauges were placed at the top of each post adjacent to the load and at the center of the Top Rail between the load points to record deflections. Gauges were zeroed before each subsequent load. Results as follows:

### Tests upon Handrails and Guards

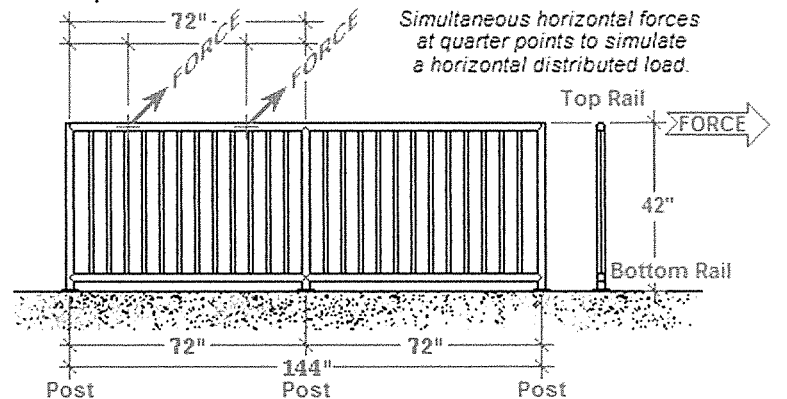


Code	Load (Pounds)	Defl'n / Set (In.) Top of post Lt.	Defl'n / Set (In.) Top Rail Center	Defl'n / Set (In.) Top of post Rt.
ICC ES AC 174	200.0	0.4375 / 0.0	1.750 / 0.1875	0.500 / 0.0

#### Test III – Distributed Horizontal Load : Top Rail:

Two equivalent and simultaneous loads were applied, for sixty seconds, to the top rail of the specimen (as shown in the diagram at right) at quarter points to simulate statically the equivalent conditions as a distributed load. Deflection Gauges were placed at the top of each post adjacent to the load and at the center of the Top Rail between the load points to record deflections. Gauges were zeroed before each subsequent load. Results as follows:

### Tests upon Handrails and Guards



Code	Dist. load (PLF)	Load (Lbs.)	Total Load (Lbs.)	Defl'n / Set (In.) Top of post Lt.	Defl'n / Set (In.) Top Rail Center	Defl'n / Set (In.) Top of post Rt.
ICC ES AC 174	50.0	150.0	300.0	0.750 / 0.0	2.0 / 0.125	0.875 / 0.0

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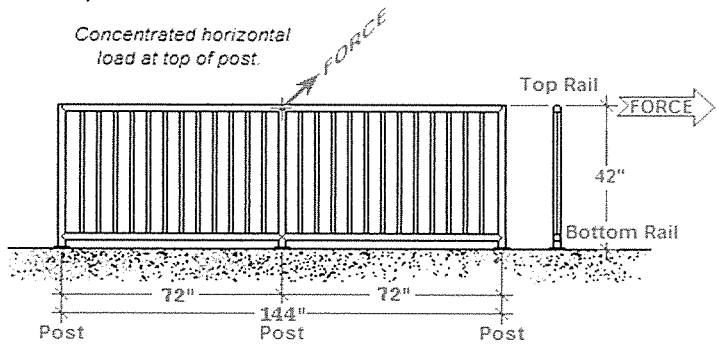
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## Test IV – Horizontal Point Load on Post:

A single load was applied, for sixty seconds, to the top of the central post of the specimen (as shown in the diagram at right). Deflection Gauges were placed at the top of this post to record deflections. Gauges were zeroed before each subsequent load. Results as follows:

Tests upon Posts



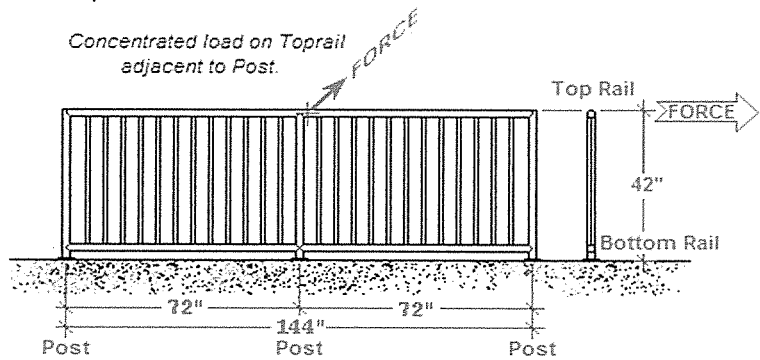
top  
the  
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were

Code		Load (Lbs.)	Defl'n / Set (In.) Top of post.
ICC ES AC 174	Top Rail on Post	200.0	1.000 / 0.063
ICC ES AC 174	Rail req. 6 Ft x 50 PLF	300.0	1.625 / 0.1875

## Test V – Horizontal Point Load on Top Rail:

A single load was applied, for sixty seconds, to the top rail of the specimen immediately adjacent to the central post (as shown in the diagram at right). Deflection Gauges were placed at the top of this post to record deflections. Gauges were zeroed before each subsequent load. Results as follows:

Tests upon Handrails and Guards



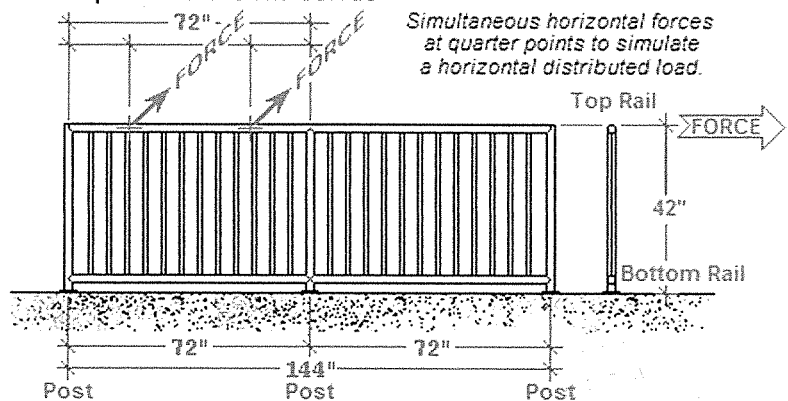
Code		Load (Pounds)	Defl'n / Set (Inches) Top of post.
ICC ES AC 174	Top Rail near Post	200.0	1.063 / 0.000
ICC ES AC 174	Top Rail near Post	300.0	1.625 / 0.063

## Test VI – Distributed Horizontal Load : Top Rail:

Two equivalent and simultaneous loads were applied, for sixty seconds, to the top rail of the specimen (as shown in the diagram at right) at quarter points to simulate statically the equivalent conditions as a distributed load.

Results as follows:

Tests upon Handrails and Guards



Simultaneous horizontal forces at quarter points to simulate a horizontal distributed load.

Code	Distributed load (Lbs.)	Eq. Load (Lbs.)	Total Load (Lbs.)	Defl'n / Set (In.) Top of post Lt.	Defl'n / Set (In.) Top Rail Center	Defl'n / Set (In.) Top of post Rt.
ICC ES AC 174	125.0	375.0	750.0	4.0 / 1.875	6.875 / 1.6875	3.125 / 0.875

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**Summary:** Tests were conducted in accordance with the requirements of the International Code Council, ICC ES AC 174 with recovery after deflections of greater than or equal to 80% in all cases.

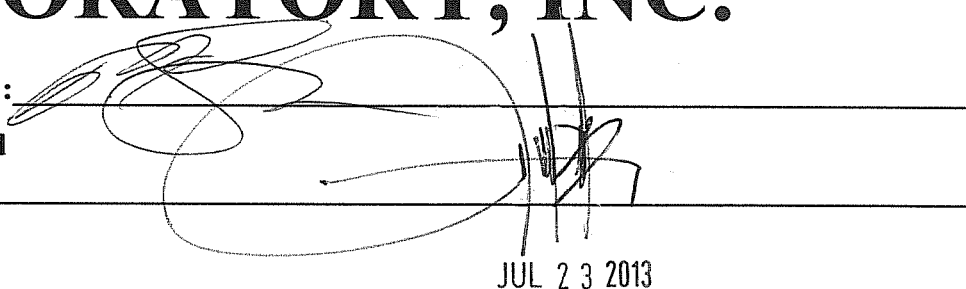
Respectfully submitted,

## **CONSTRUCTION RESEARCH LABORATORY, INC.**

Report by Michael Lamborghini :

Test witnessed & report reviewed

by Yamil G. Kuri, P.E.:



JUL 23 2013