
ARSEE ENGINEERS, INC.
CLIENT ORIENTED — BY DESIGN

Frederick A. Herget, PE
Kenneth L. Pensinger, PE
Allen R. Pulley
John A. Seest, PE
Scott A. Jones, PE

Victoria A. Emery, PE
Albert C. Kovacs, PE
Laura E. Metzger, PE
Matthew D. Kilgour, PE
Daniel M. Calabrese, PE

March 11, 2014

Mr. Greg Garvey
Tuttle Railing Systems
120 Shadwolawn Drive
Fishers, IN 46038

Re: Load Testing of T-1000 Aluminum Handrail System

Dear Mr. Garvey,

At your request, ARSEE Engineers tested the T-1000 series handrail system manufactured by Tuttle Railing Systems. This test assembly was comprised of three posts, a top rail, an intermediate mid-height rail and mounting bases as shown on the attached drawing provided by Tuttle Railing Systems. Handrail anchoring components were installed within a fully cured concrete floor system in accordance with your Manufacturer's Installation Instructions. Testing was performed on March 6, 2014 within your manufacturing facility.

Testing loads were applied at the top of the center post and at the mid-point of the top rail. Lateral (horizontal) loads were introduced at both locations and a gravity (vertical) load was also introduced at the mid-point of the top rail. Each load was applied independently using a hydraulic cylinder and cable linkage system monitored by an in-line 500 pound capacity load cell and digital readout. Post and rail deflections were tracked and recorded using a digital measuring caliper. The maximum load applied to the T-1000 series components was 300 pounds per your request.

Loads were applied gradually and uniformly and deflections were recorded at intervals corresponding to 200 and 300 pounds of force. Data collected during these tests are given in the attached Table A.

ARSEE Engineers has enjoyed the opportunity to be of service to you on this project. Please advise if you have any questions or need additional information.

Yours truly,

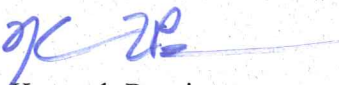

Kenneth Pensinger
Professional Engineer

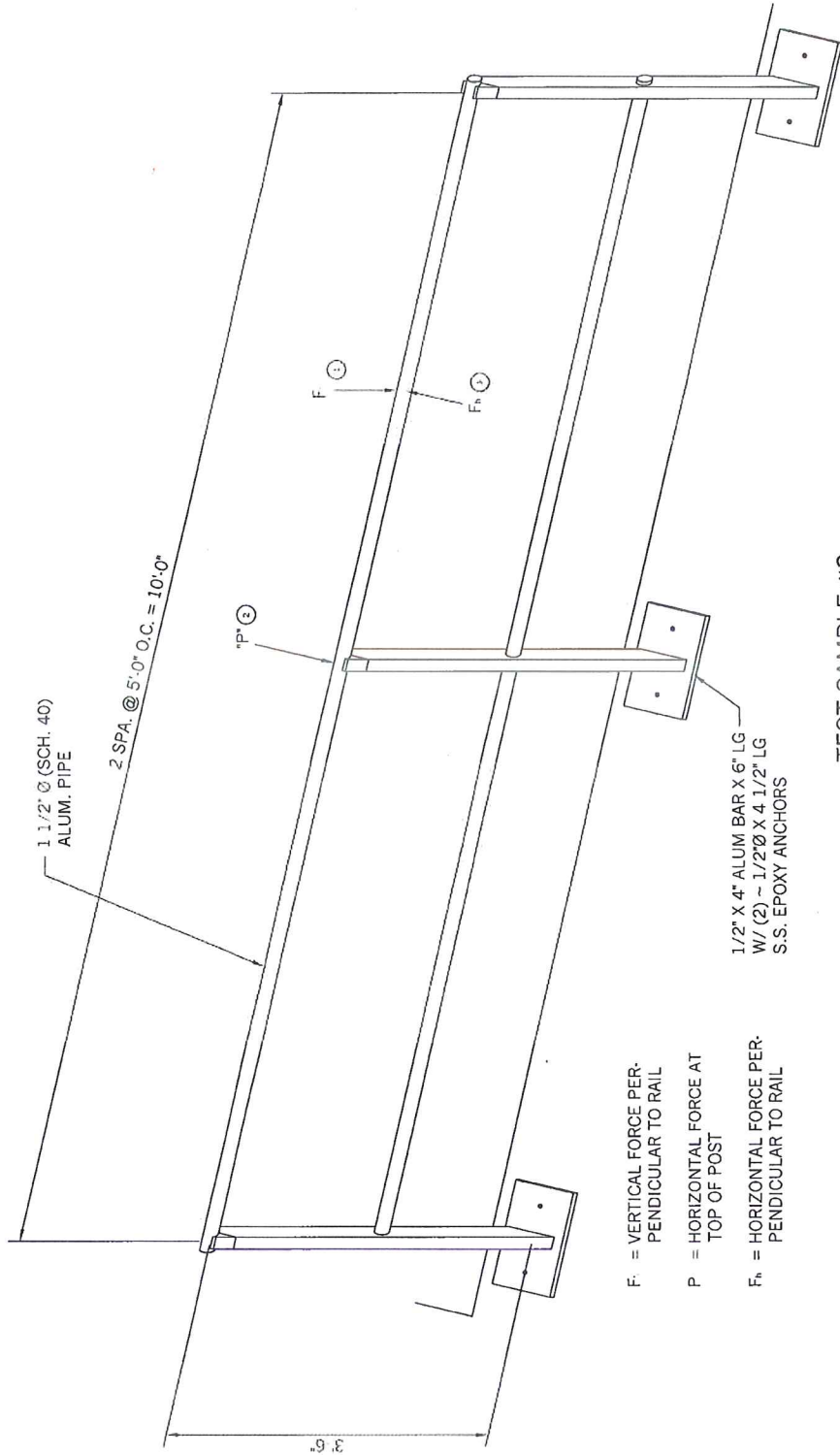
Table A

Tuttle Railing Systems - Fishers, IN

T-1000 Handrail Testing Data

March 6, 2014

Railing Model	Center Post (lateral)		Top Rail (lateral)		Top Rail (vertical)		
	Load	Defl	Load	Defl	Load	Defl	Set
T-1000 Series	200 lbs.	0.890"	200 lbs.	0.993"	200 lbs.	0.232"	
	300 lbs.	1.555"	300 lbs.	1.697"	300 lbs.	0.347"	
		0.226"		0.274"			0.017"



- F: = VERTICAL FORCE PER-
PENDICULAR TO RAIL
- P = HORIZONTAL FORCE AT
TOP OF POST
- F_h = HORIZONTAL FORCE PER-
PENDICULAR TO RAIL

TEST SAMPLE #3
TABCO 1000