Farabaugh Engineering and Testing LLC.

Project No. T320-25
Report Date: November 18, 2025
No. Pages: 16 (inclusive)

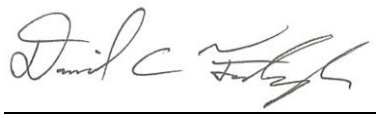
PERFORMANCE TEST REPORT

ALUMINUM HANDRAIL SYSTEM

FOR

SHAPES UNLIMITED, INC.
590 E. WESTERN RESERVE RD.
YOUNGSTOWN, OH 44514

Report Prepared By:



Daniel C. Farabaugh

Reviewed and Approved By:

Daniel G. Farabaugh

Purpose

This testing was performed to evaluate the referenced test specimens under various load conditions as provided herein.

Test Specimen

Manufacturer: Shapes Unlimited, Inc.
590 E. Western Reserve Rd.
Youngstown, OH 44514

Specimen: - Standard Residential and Commercial Hand Rail Panel
- Nominal 8’ long x 42-1/4" High
- Continuous Rail with Rail Bracket (attached to aluminum post 3”x 3” x 48”)
- 1” X 1” aluminum balusters (pickets) at 5” oc

Testing Apparatus

The test apparatus consisted of a panel mock-up assembly (3 aluminum posts and 2 handrail panels) and load applicator. The mock-up assembly was as shown on the attached detail drawings. The loads were measured with a calibrated load cell. The loads were applied to specific components as shown on the attached drawing. The base of each aluminum post was secured so that the connection between the post base flange and the test fixture was excluded from the scope of this test.

Test Procedure

The specimen was loaded at a rate to achieve the specified loads between 10 seconds and 5 minutes. The specified test loads were held for one minute before the load was released.

In-fill Load Test

- A 50 lb load was applied at the mid-span center of the panel balusters over a 1 ft² area, perpendicular to the in-fill.

Uniform Load Tests

- A 50 lb/ft uniform load (using the ¼-point load method) was applied across the top rail, first in a vertical downward direction and then separately in a horizontal direction. The loads were applied simultaneously across both panels.

Concentrated Load Tests

- At the mid-span of the top rail, loads were applied in both vertical downward and horizontal directions, with the loads applied simultaneously across both panels.
- Additionally, a concentrated load was applied at the top of both the end post and the interior post separately.

TEST DATA

Testing Date: 10-22-25

In-fill Load Test

MEMBER	LOCATION	TEST LOAD	LOAD DIRECTION
Balusters	Center Midspan (1 SF Area)	50 lb	Horizontal

Results:
As a result of the above loading, there were no noticeable failures of the specimen.

Uniform Load Test (using ¼ point loading method)

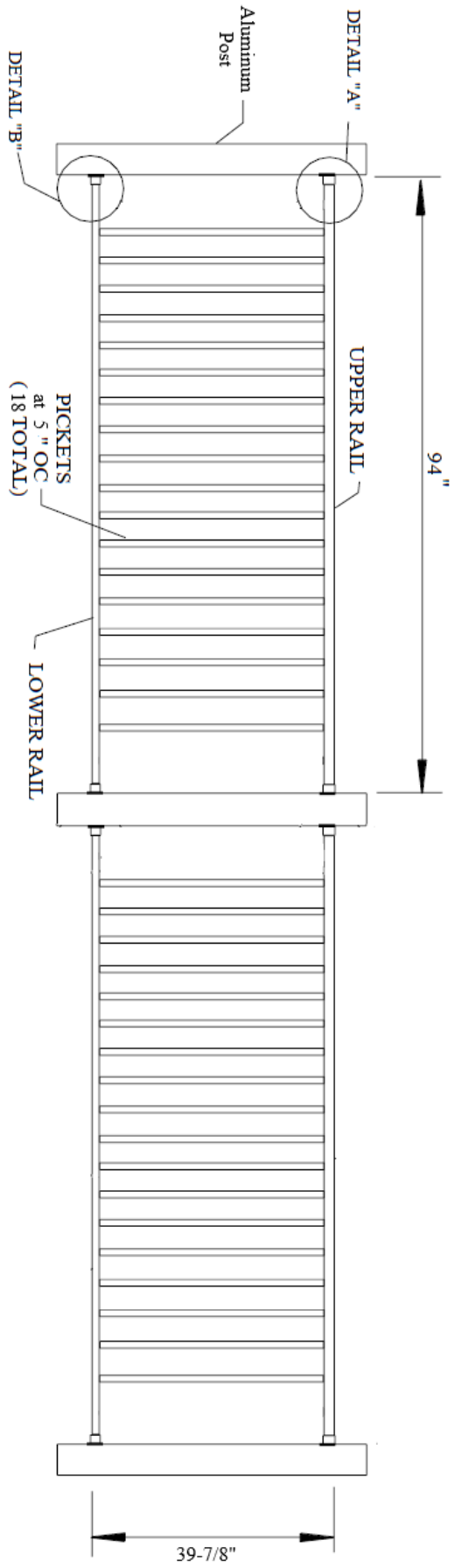
MEMBER	LOCATION	TEST LOAD	LOAD DIRECTION
Top Rail	Across Top Rail	50 lb/ft	Vertically Downward
Top Rail	Across Top Rail	50 lb/ft	Horizontal

Results:
As a result of the above loading, there were no noticeable failures of the specimen.

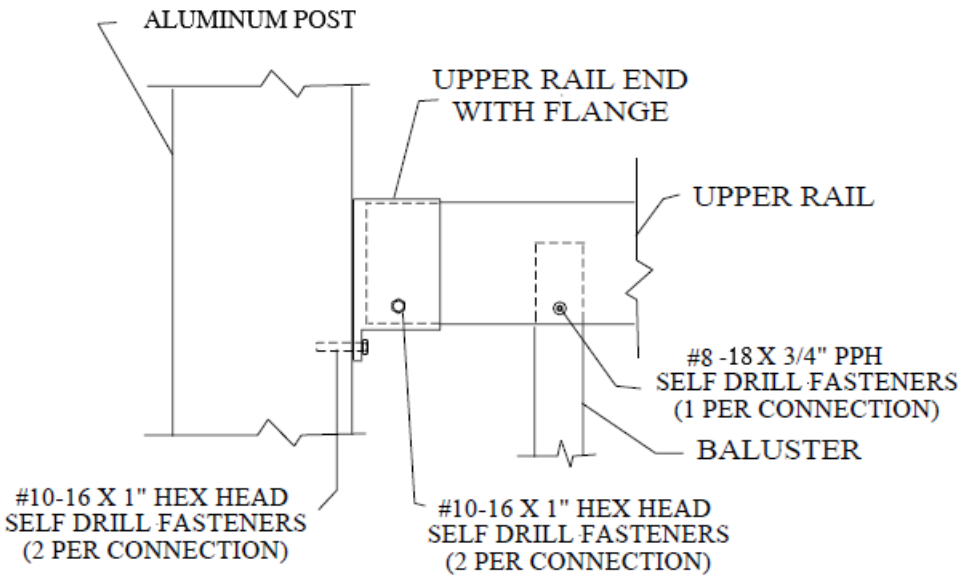
Concentrated Load Test

MEMBER	LOCATION	TEST LOAD	LOAD DIRECTION
Top Rail	Mid-span Between Posts	200 lb	Vertically Downward
Top Rail	Mid-span Between Posts	200 lb	Horizontal
Interior Post	Top of Post	200 lb	Horizontal
End Post	Top of Post	200 lb	Horizontal

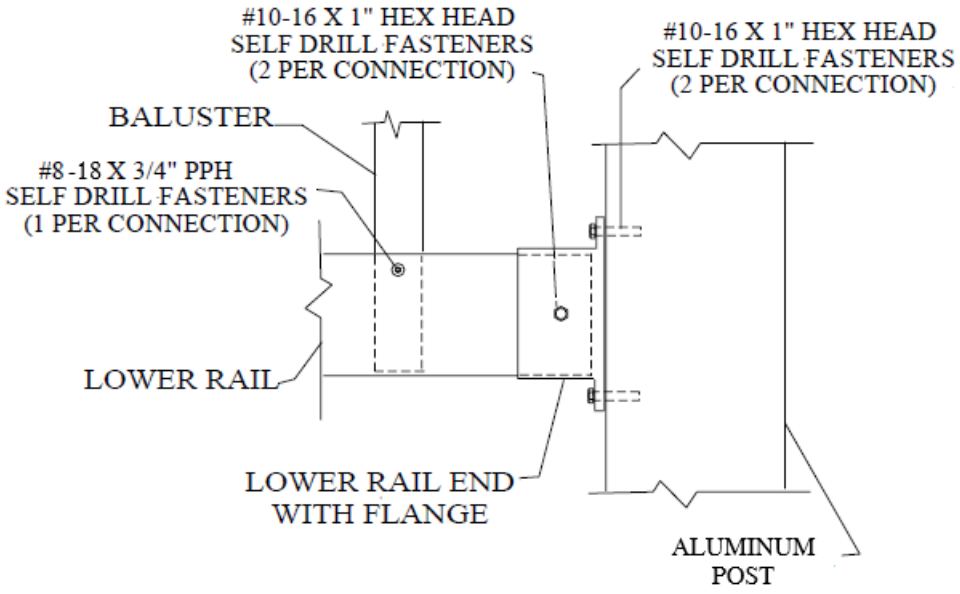
Results:
As a result of the above loading, there were no noticeable failures of the specimen.



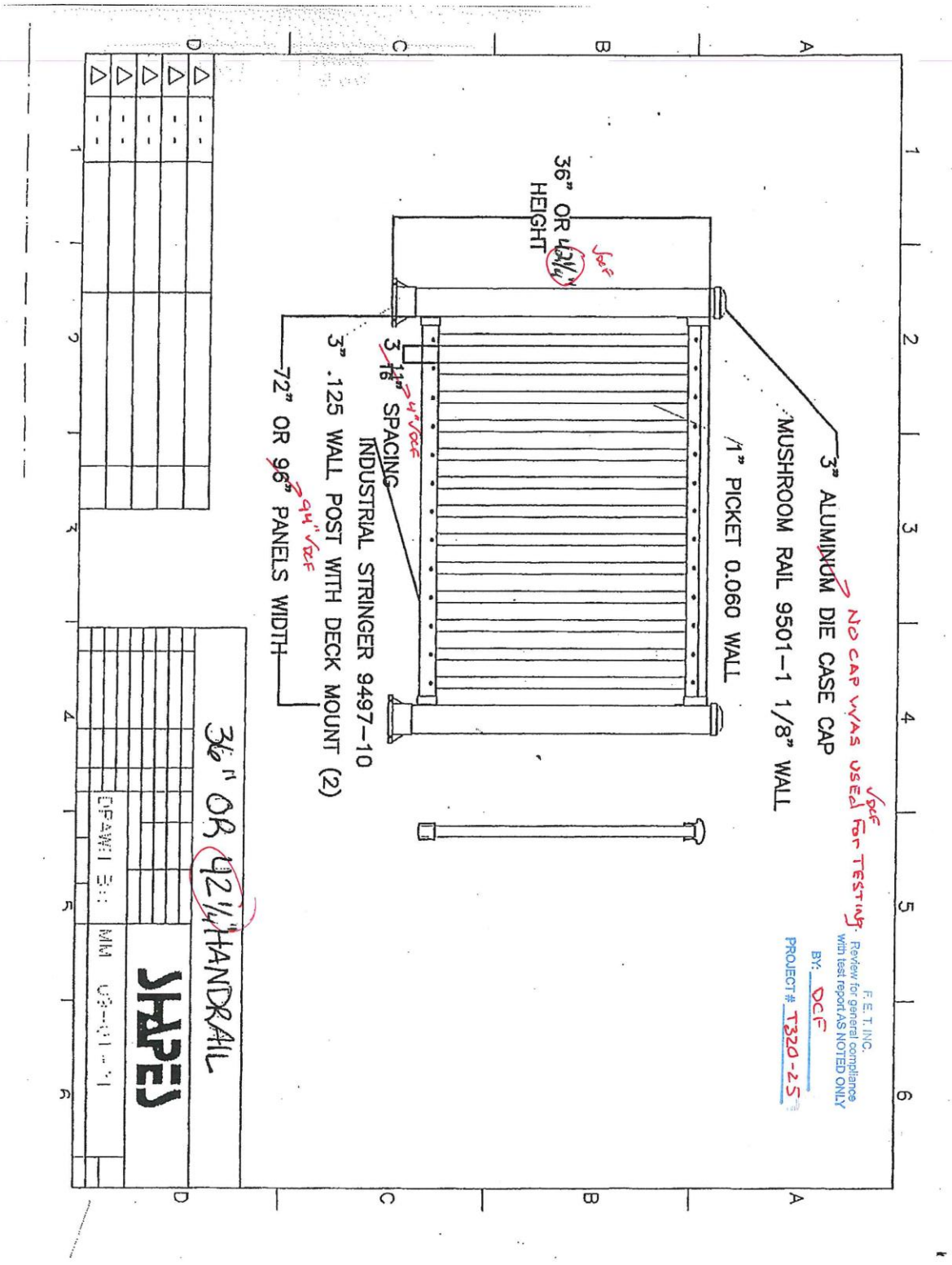
ELEVATION VIEW



DETAIL "A"



DETAIL "B"


3" ALUMINUM DIE CASE CAP
MUSHROOM RAIL 9501-1 1/8" WALL
1" PICKET 0.060 WALL
36" OR 42¼" HEIGHT
3 11/16" SPACING
INDUSTRIAL STRINGER 9497-10
3" .125 WALL POST WITH DECK MOUNT (2)
72" OR 96" PANELS WIDTH
NO CAP WAS USED FOR TESTING
F. E. T. INC.
Review for general compliance with test report AS NOTED ONLY
BY: DCF
PROJECT # T320-25
36" OR 42¼" HANDRAIL
SHAPES

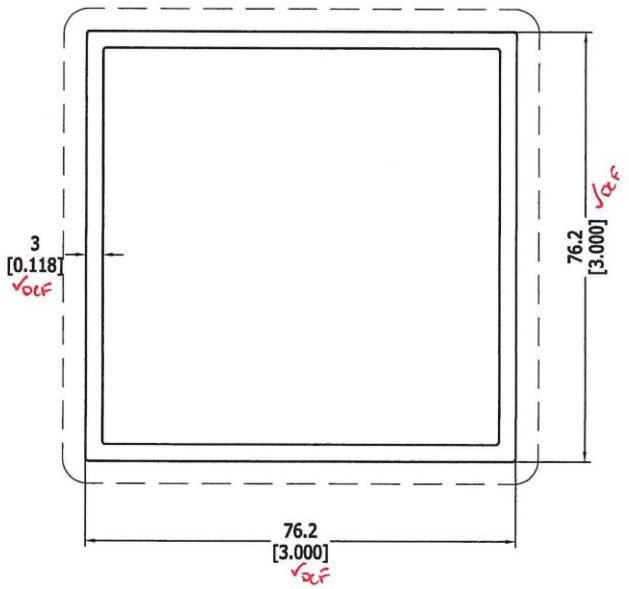
PT. SIDO AGUNG ALUMI
design@sidoagungalumi.com

SECTION No. GCA-0086
00367
MATTING WITH SECTION

SHA

F. E. T. INC.
Review for general compliance
with test report AS NOTED ONLY
BY: DcF
PROJECT # T320-25

V.S



UNSPEC. DIMENSION ACCORDING TO THIS TOLERANCES	
<1	±0.10
<1-2	±0.12
<2-3	±0.14
<3-4	±0.16
<4-6	±0.18
<6-12	±0.20
<12-19	±0.23
<19-25	±0.25
<25-38	±0.30
<38-50	±0.36
<50-100	±0.61
<100-150	±0.86
<150-200	±1.12
<200-250	±1.38

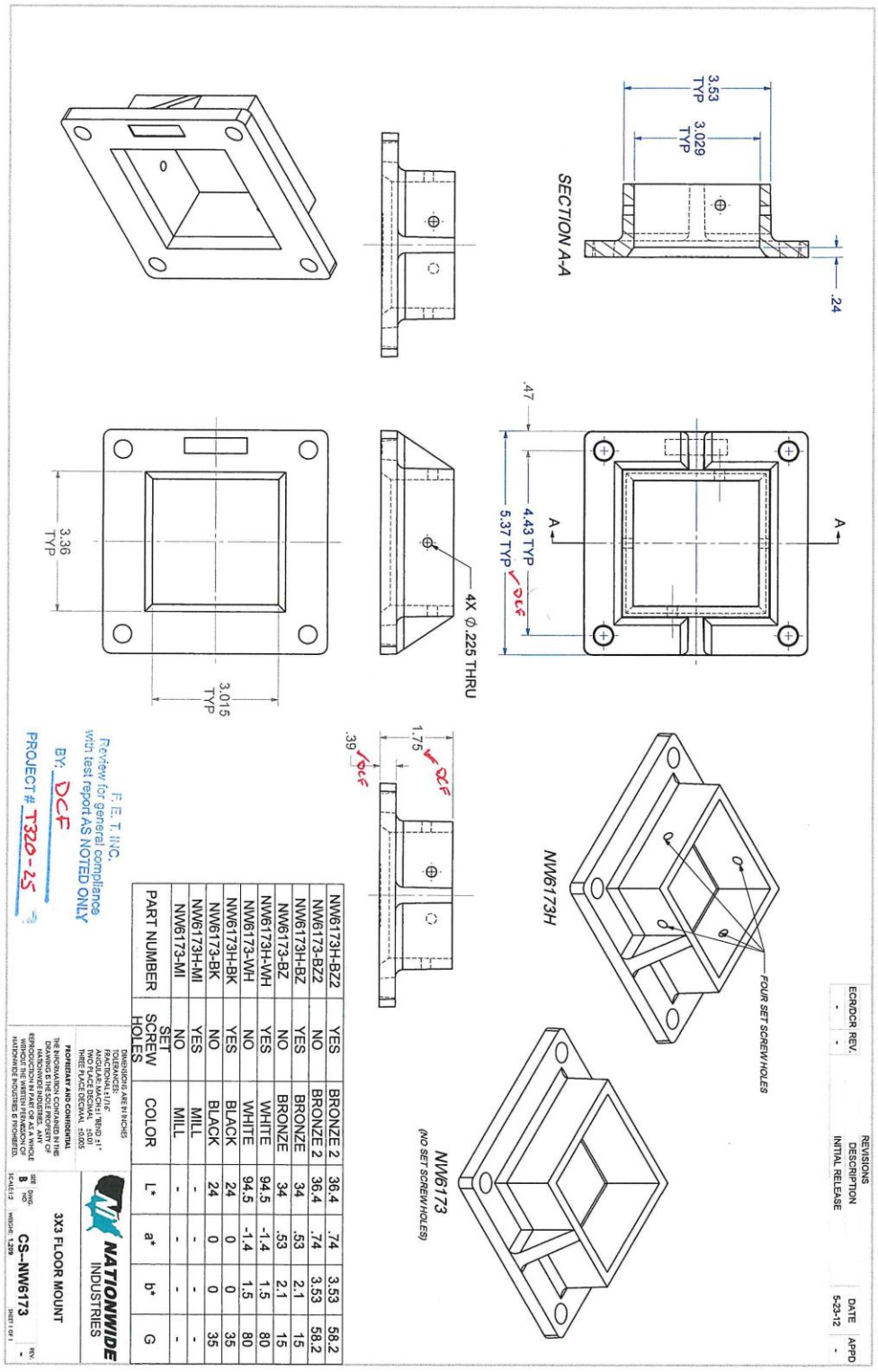
NOTE:
— — EXPOSED
REMOVE SHARP CORNERS WITH 0.41mm RADIUS

C.C.D	Ø 107.42
CEXPOSED SURFACE	P/C

ALUMINUM ASSOCIATION STANDARD EXTRUSION TOLLERANCES WILL APPLY UNLESS OTHERWISE NOTED ON PRINT

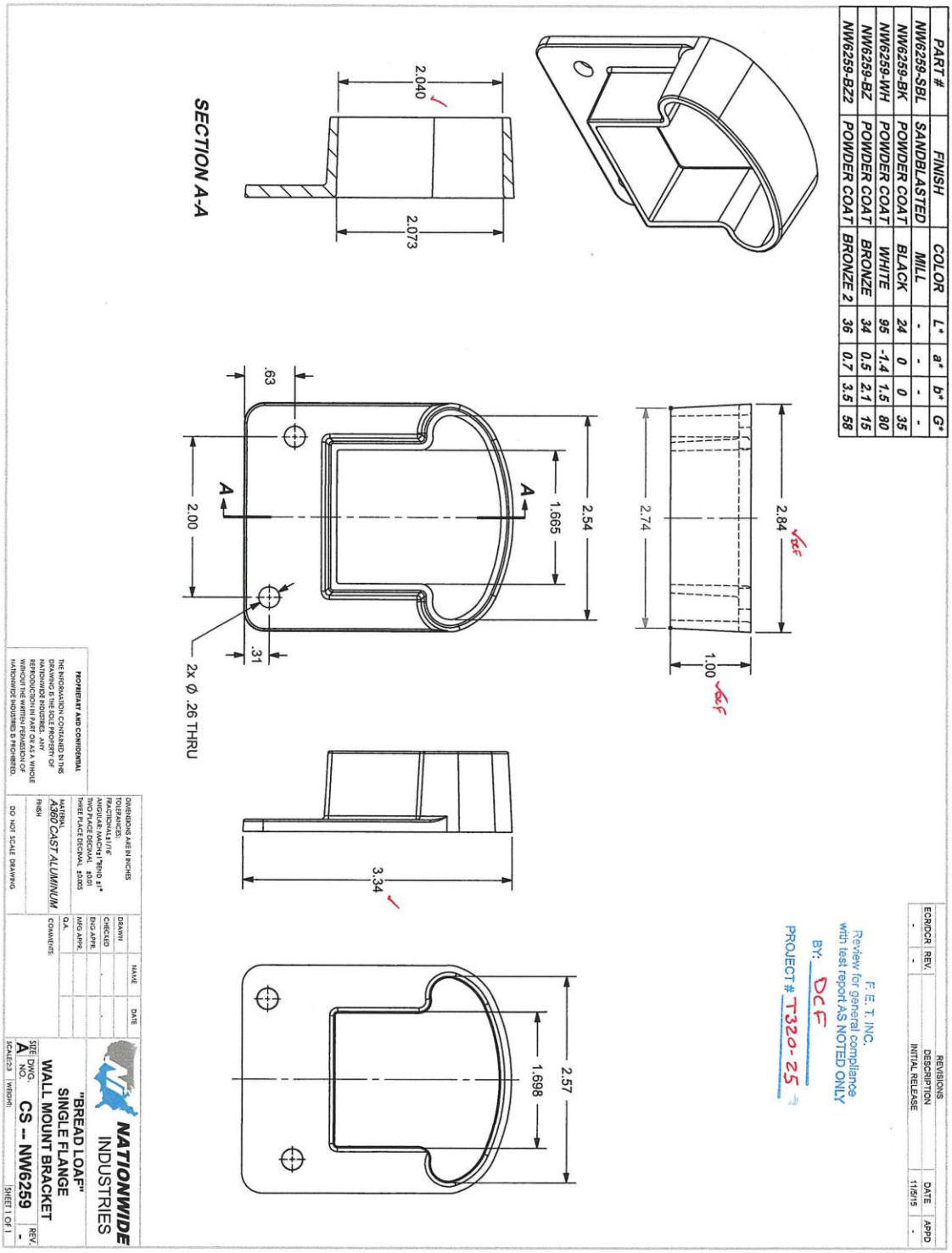
No. REF.	01-M1-170221	DIMENSI	76.20 X 76.20			00367
DATE	FEBRUARY 17th,2021					
SCALE	1 : 1	THICKNESS	3.00 [0.118"]			
DRAWN	YB 17_02_2021	TOLERANCE	± 0.18mm [0.007"]			
CHECKED	17_02_2021	ALLOY & TEMPER	6063-T6			APPLICATION
EST. AREA	878.4 mm²	EXTRUDE RATIO	-	CCD	-	SQUARE HOLLOW
EST. WEIGHT	1.611 WT/FT	BILLET	7"	CAVITY	-	PRODUCT CLASSIFICATIONS
EST. PERIMETER	304.096 mm	MACHINE MODEL	700 T ☐	1000 T ☐	1800 T ☑	SOLID ☐ SEMIHOLLOW ☐ HOLLOW ☑ SPECIAL ☐
P.C. PERIMETER	- mm					

Aluminum Post

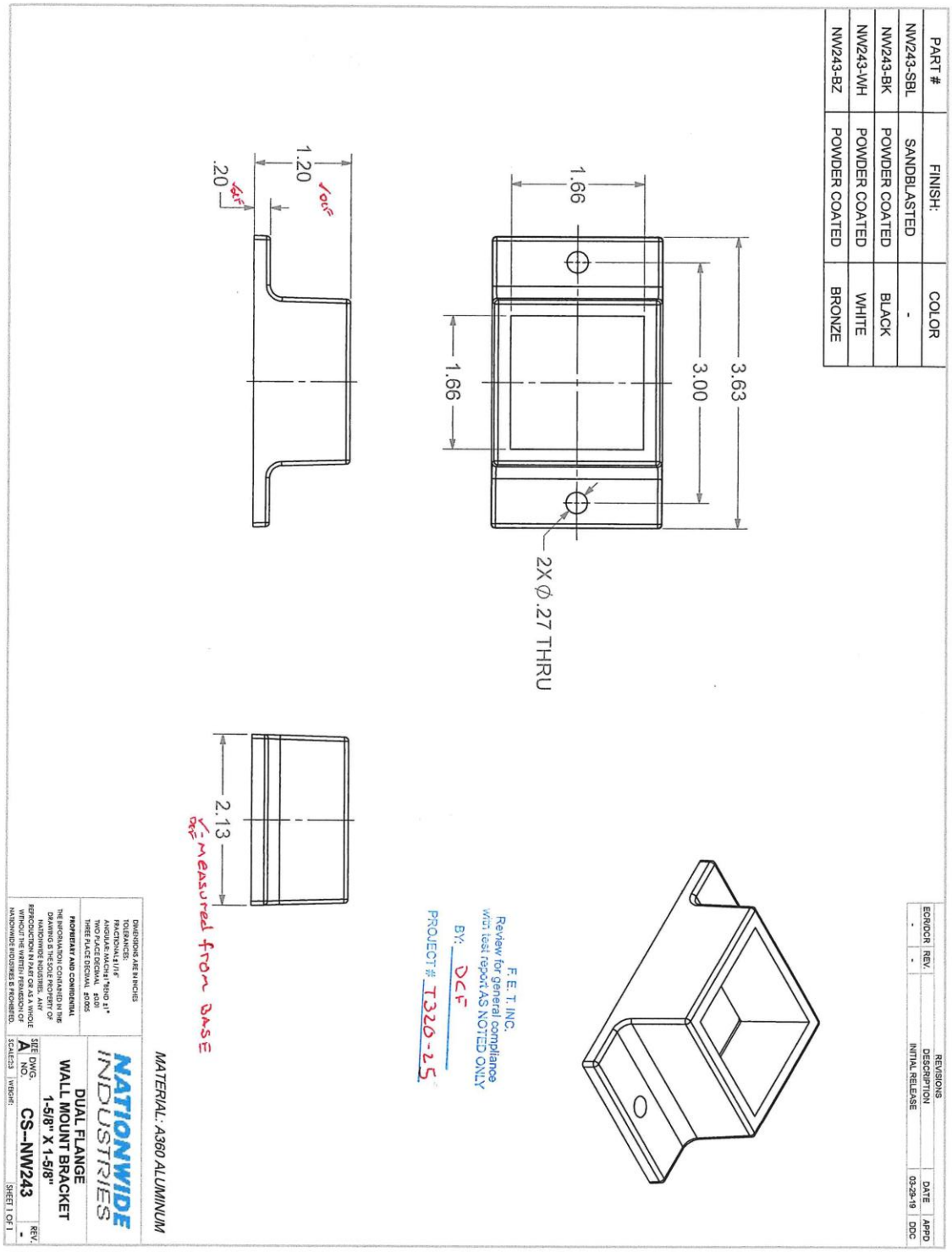


PART NUMBER	SCREW HOLES	COLOR	L*	a*	b*	G
NW6173H-BZ2	YES	BRONZE 2	36.4	.74	3.53	58.2
NW6173-BZ2	NO	BRONZE 2	36.4	.74	3.53	58.2
NW6173H-BZ	YES	BRONZE	34	.53	2.1	15
NW6173-BZ	NO	BRONZE	34	.53	2.1	15
NW6173H-WH	YES	WHITE	94.5	-1.4	1.5	80
NW6173-WH	NO	WHITE	94.5	-1.4	1.5	80
NW6173H-BK	YES	BLACK	24	0	0	35
NW6173-BK	NO	BLACK	24	0	0	35
NW6173H-MI	YES	MILL	-	-	-	-
NW6173-MI	NO	MILL	-	-	-	-

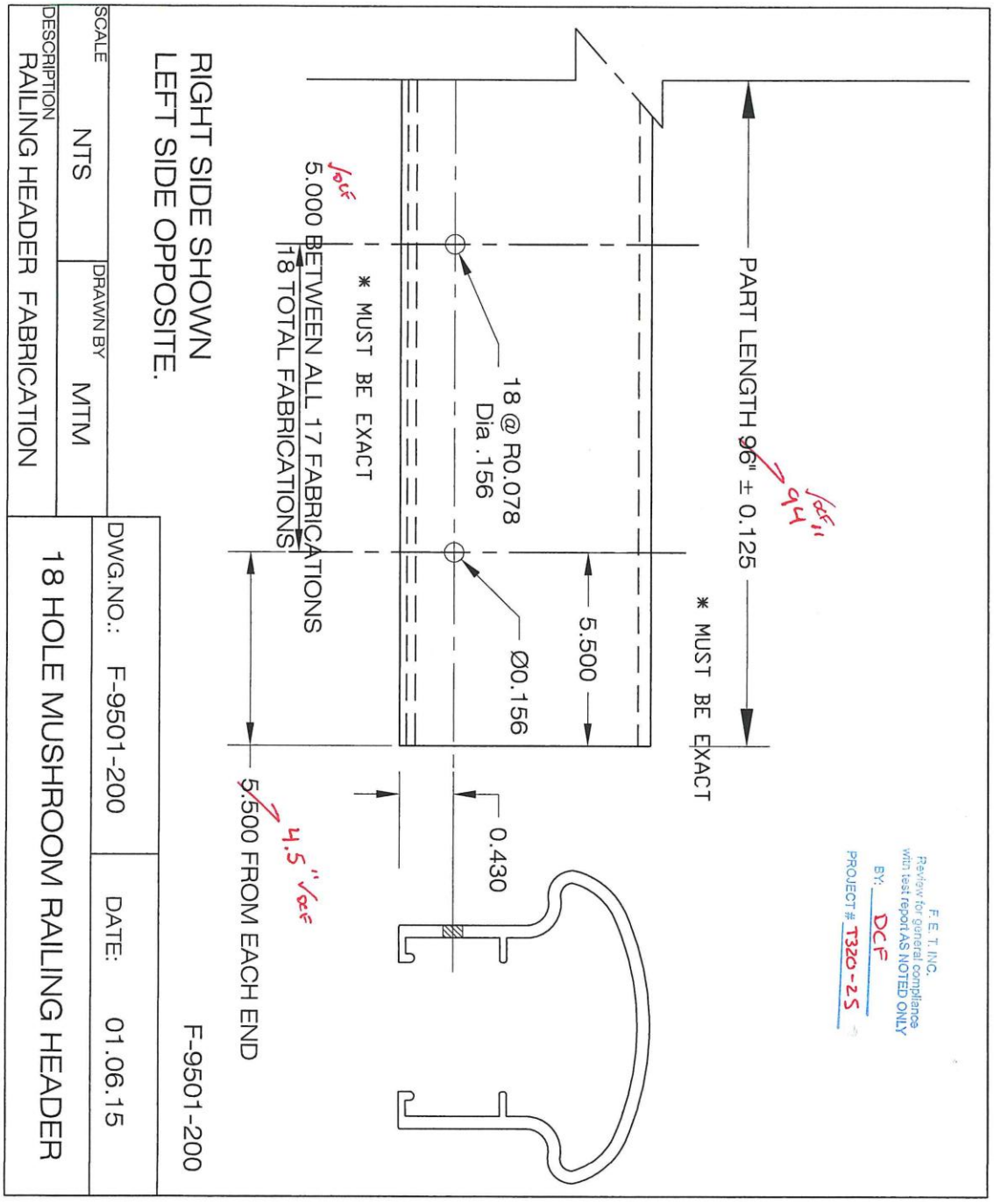
Post Base Flange



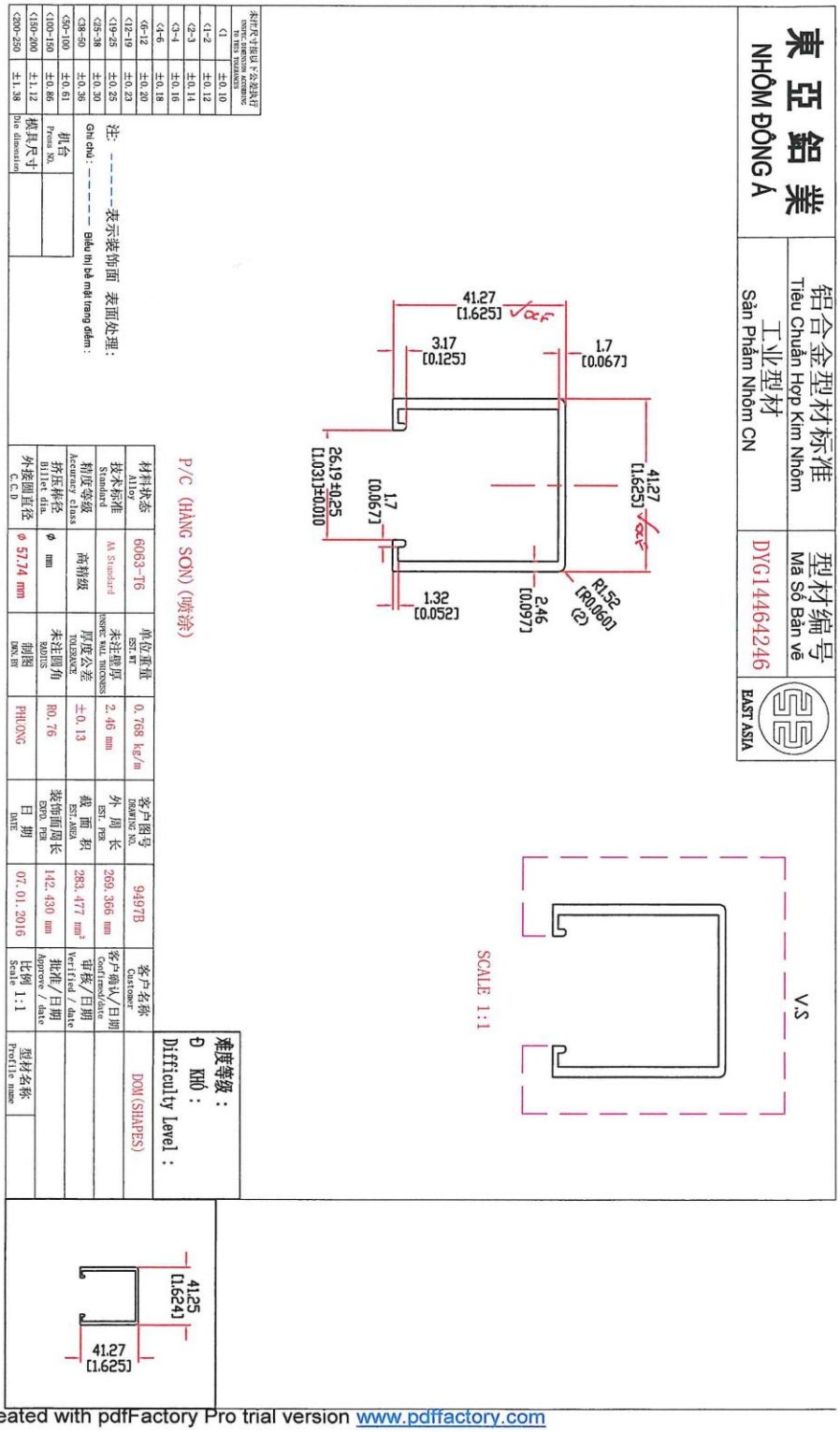
Top Rail Mounting Bracket



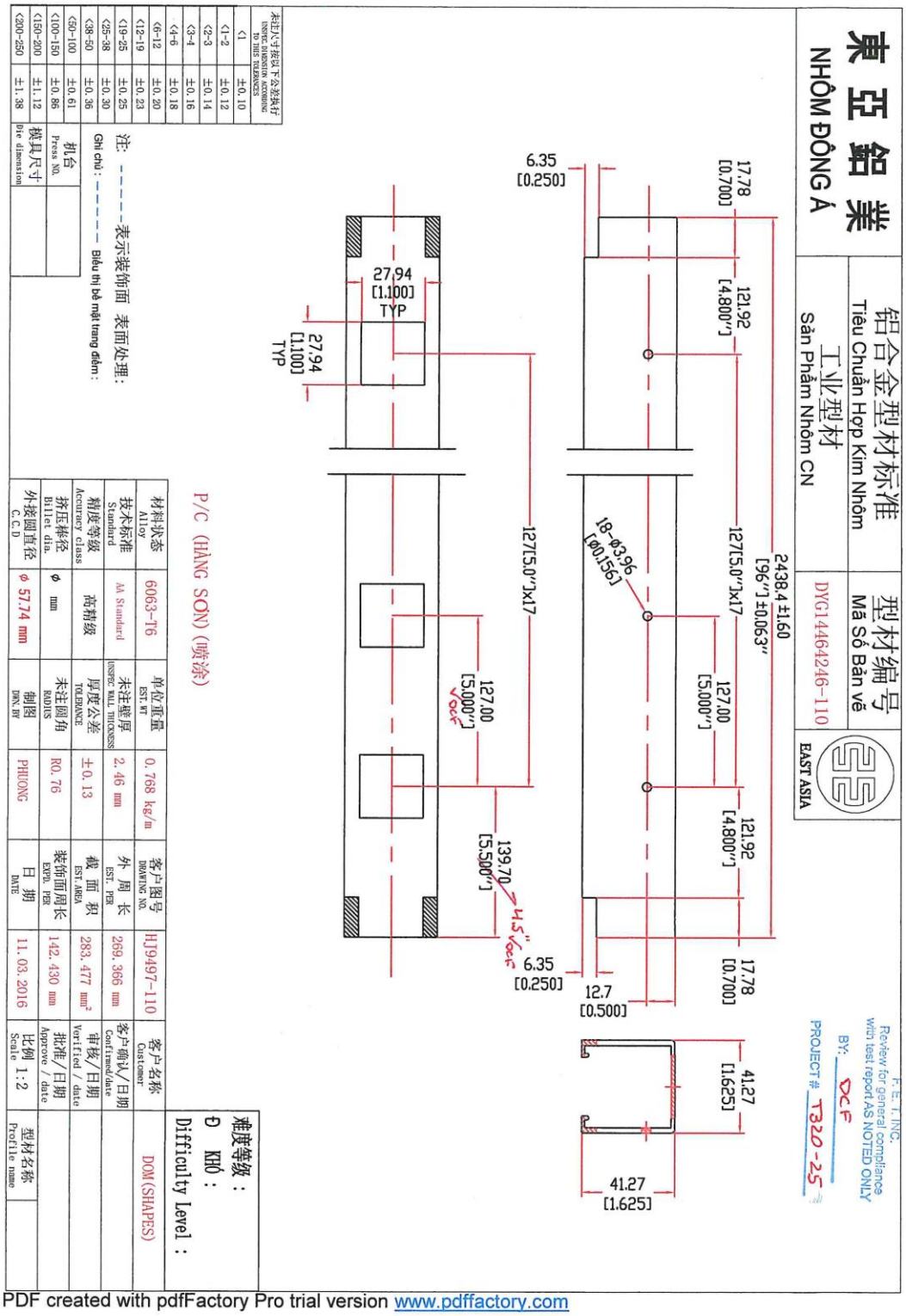
Bottom Rail Mounting Bracket


PART LENGTH 96" ± 0.125
94"
* MUST BE EXACT
18 @ R0.078
Dia .156
Ø0.156
5.500
0.430
* MUST BE EXACT
5.000 BETWEEN ALL 17 FABRICATIONS
18 TOTAL FABRICATIONS
4.5" REF
5.500 FROM EACH END
F-9501-200
RIGHT SIDE SHOWN
LEFT SIDE OPPOSITE.
SCALE NTS
DRAWN BY MTM
DESCRIPTION RAILING HEADER FABRICATION
DWG.NO.: F-9501-200
DATE: 01.06.15
18 HOLE MUSHROOM RAILING HEADER
F. E. T. INC.
Review for general compliance with test report AS NOTED ONLY
BY: DCF
PROJECT # T320-25

Top Rail



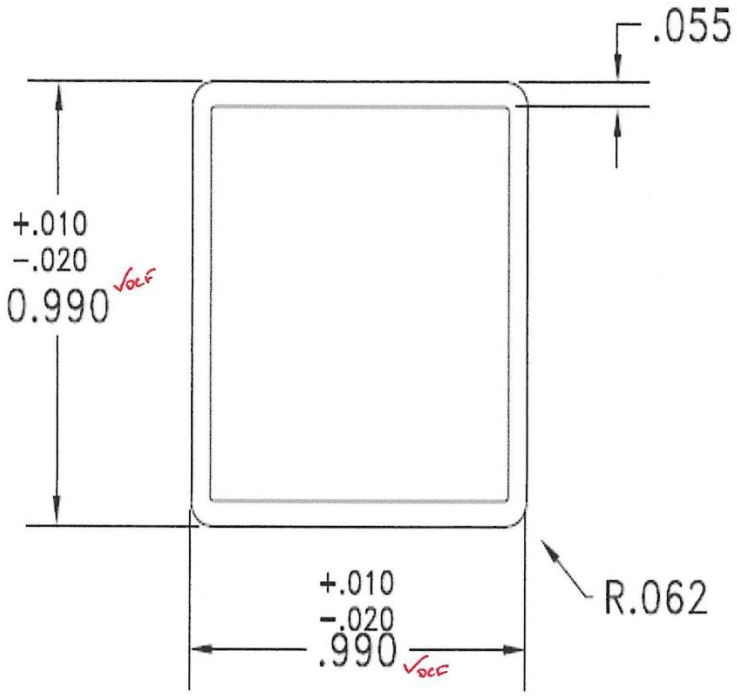
Bottom Rail



Bottom Rail

SHAPES UNLIMITED
ALUMINUM BUILDING PRODUCTS

373



F. E. T. INC.
Review for general compliance
with test report AS NOTED ONLY
BY: DCF
PROJECT # T320-25

590 E. Western Reserve Rd. Bldg. #4C, Youngstown, Ohio 44514 | (330) 726-0844 | www.shapesunlimitedinc.com

Baluster (Picket)

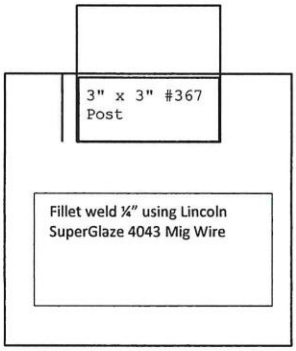
SHAPES UNLIMITED
ALUMINUM BUILDING PRODUCTS

3" x 3" #367 Aluminum Post with Welded Floor Mount

Configuration: SHAPES 3x3 #367 Post welded to NW6173 Floor Mount Base

F. E. T. INC.
Review for general compliance with test report AS NOTED ONLY
BY: DCF
PROJECT # T320-25

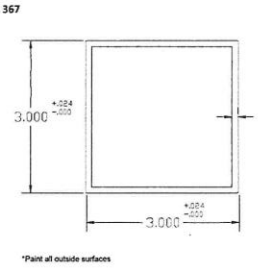
Post Dimensions: 3.000" x 3.000" (0.125" wall thickness)
Flange Dimensions: 5.37" x 5.37" base, 1.75" height, Ø0.225" holes (4x)
Insert depth: 3.029" typ. Total assembly height: 4.78" typ.
Material: Post - 6063-T5 Aluminum | Flange - Cast Aluminum (A356-T6 or eq.)
Finish: Powder Coat (Black, White, Bronze, or Mill



Base Plate 5.37" x 5.37"

NOTES:

1. Weld continuously along full perimeter of post-to-base connection.
2. Fillet Weld ¼" using Lincoln SuperGlaze 4043 Mig Wire
3. Remove weld spatter and sharp edges prior to coating.
4. Anchor assembly designed by others.
5. Assembly intended for surface-mount applications.
6. Dimensional tolerances ±0.03" unless otherwise noted.



| REV: A | DATE: NOV 2025 |

Post/ Base Flange Connection

Revision Log

Rev. #	Date	Page(s)	Revision (s)
0	November 18, 2025	16	Original Report Issue