

MILLENNIUM FORMS, LLC TEST REPORT

SCOPE OF WORK

ANSI/FM 4473 IMPACT RESISTANCE TESTING OF 304 STAINLESS STEEL FLAT, WALL TILES

REPORT NUMBER

L5745.01-109-44

TEST DATE(S)

11/24/20

ISSUE DATE

01/14/21

RECORD RETENTION END DATE

11/24/24

PAGES

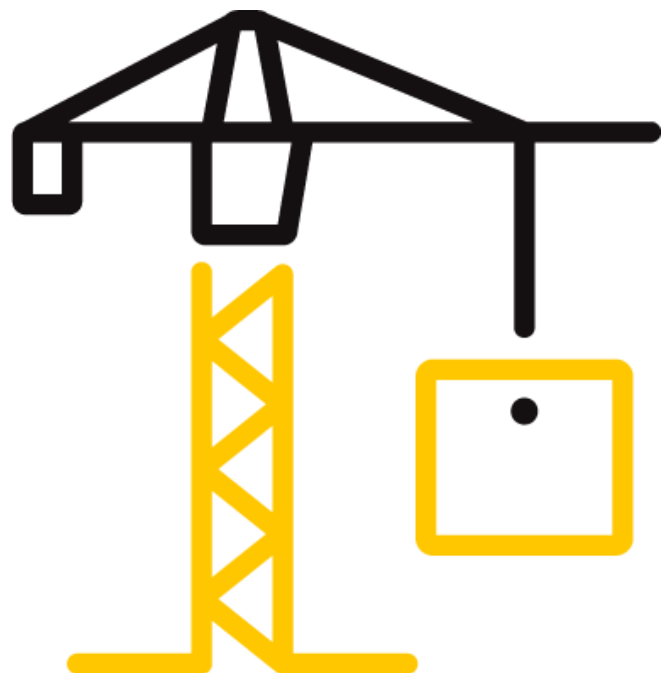
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DOCUMENT CONTROL NUMBER

ATI 00371 (08/24/17)

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TEST REPORT FOR MILLENNIUM FORMS, LLC

Report No.: L5745.01-109-44

Date: 01/14/21

REPORT ISSUED TO

MILLENNIUM FORMS, LLC

550 East Centralia Street
Elkhorn, Wisconsin 53121

SECTION 1

SCOPE

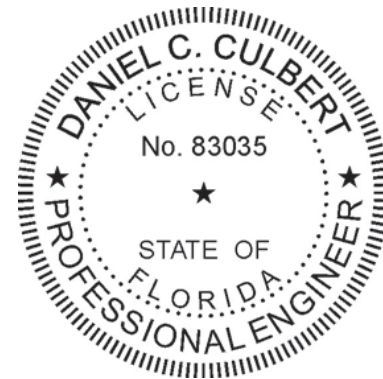
Intertek Building & Construction (B&C) was contracted by Millennium Forms, LLC to perform impact resistance testing in accordance with ANSI/FM 4473 on their 304 Stainless Steel Flat, wall tiles. Results obtained are tested values and were secured by using the designated test method(s). Testing was conducted at Intertek B&C test facility in York, Pennsylvania.

This report does not constitute certification of this product nor an opinion or endorsement by this laboratory.


SECTION 2


SUMMARY OF TEST RESULTS

Product Classification Achieved: Class 4



For INTERTEK B&C:

COMPLETED BY:	Robert J. Beatty
TITLE:	Technician – Product Testing
SIGNATURE:	 <small>Digitally Signed by: Robert Beatty</small>
DATE:	01/14/21

REVIEWED BY:	Daniel C. Culbert, P.E.
TITLE:	Senior Project Engineer
SIGNATURE:	 <small>Digitally Signed by: Daniel C. Culbert</small>
DATE:	01/14/21

RJB:nls

2021.01.14 13:13:05 -05'00'

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SECTION 3

TEST METHOD(S)

The specimen was evaluated in accordance with the following:

ANSI/FM 4473 (2011), *Specification Test Standard for Impact Resistance Testing of Rigid Roofing Materials by Impacting with Freezer Ice Balls*. American National Standard, FM Approvals (January 2011)

SECTION 4

MATERIAL SOURCE/INSTALLATION

Test specimen was provided by the client. Representative samples of the test specimen(s) will be retained by Intertek B&C for a minimum of four years from the test completion date.

Installation of the tested product was performed by Intertek B&C personnel.

SECTION 5

EQUIPMENT

Cannon: Constructed from steel piping utilizing compressed air to propel the missile

Missile: 2.0 in (50.8 mm) diameter ice balls

Cannon Identification Number: A1207

Timing Device: Electronic Beam Type

Weather Station: 63316

Tape Measure Verification: 63788

SECTION 6

LIST OF OFFICIAL OBSERVERS

NAME	COMPANY
John A. Shanabrook	Intertek B&C
Timothy J. McGill	Intertek B&C
Daniel C. Culbert, P.E.	Intertek B&C
Robert J. Beatty	Intertek B&C

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SECTION 7

TEST SPECIMEN DESCRIPTION

Product Type: Wall Tiles

Series/Model: 304 Stainless Steel Flat

Color: Metallic

Finish: Flat

Overall Assembly Size: 36 in (914 mm) width by 36 in (914 mm) length

Nominal Thickness: 0.020 in (0.5 mm)

Tile Description:

Individual Tile Weight: 0.832 lb (377 g)

Individual Tile Size: 14-3/4 in (375) width by 9-3/4 in (248 mm) length

Exposed Tile Size: 14-1/2 in (368 mm) width by 8-1/2 in (216 mm) length

Number of Tiles: 12

Deck Construction:

The wood test deck was 3' wide by 3' high and constructed with 2x4 Southern-Yellow Pine construction lumber at the perimeter with one stud located at midspan. The test deck was covered with 15/32" thick plywood decking secured to the test deck with #8 x 1-5/8" screws located 2" from each end and on 6" centers.

Tile Construction:

The tiles were constructed from formed stainless steel. A male interlock was utilized on the bottom and right side of the tile and a female interlock on the top and left side of the tile. The tiles were secured with #10 x 1" pan head screws located 3/4" from the ends at the top of each tile.

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SECTION 8

TEST RESULTS

ANSI/FM 4473, Ice Ball Impact Resistance

Sample Conditioning Temperature: 64°F (18°C) for at least 4 hours

Sample Conditioning Relative Humidity: 23% for at least 4 hours

Ice Ball Conditioning Temperature: -7°F (-22°C) for at least 48 hours

Muzzle Distance from Test Specimen: 36 in (914 mm)

The ambient temperature during testing was 64°F (18°C). The results are tabulated as follows.

Test Unit #1

IMPACT	MISSILE VELOCITY fps (m/s)	ORIENTATION	WEIGHT lbs (g)	DIAMETER in. (mm)	ENERGY ft-lb (j)	IMPACT AREA	OBSERVATIONS	RESULTS
1-1	110.0 (33.5)	15° of vertical	0.139 (63)	50.8 (2.0)	26.12 (35.4)	Center of tile	Dented tile, no visible cracking or breakage	Pass
1-2	107.9 (32.9)	15° of vertical	0.139 (63)	50.8 (2.0)	25.13 (34.1)	Center of tile	Dented tile, no visible cracking or breakage	Pass
2-1	109.9 (33.5)	15° of vertical	0.139 (63)	50.8 (2.0)	26.07 (35.3)	Right interlock at the center of the panel	Dented tile, no visible cracking or breakage	Pass
2-2	110.0 (33.5)	15° of vertical	0.139 (63)	50.8 (2.0)	26.12 (35.4)	Right interlock at the center of the panel	Dented tile, no visible cracking or breakage	Pass
3-1	110.0 (33.5)	15° of vertical	0.139 (63)	50.8 (2.0)	26.12 (35.4)	Bottom left corner	Dented tile, no visible cracking or breakage	Pass

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IMPACT	MISSILE VELOCITY fps (m/s)	ORIENTATION	WEIGHT lbs (g)	DIAMETER In. (mm)	ENERGY ft-lb (j)	IMPACT AREA	OBSERVATIONS	RESULTS
3-2	108.9 (33.2)	15° of vertical	0.139 (63)	50.8 (2.0)	25.60 (34.7)	Bottom left corner	Dented tile, no visible cracking or breakage	Pass

Note: See Intertek B&C Sketch No. 1 for Impact Locations

SECTION 9

CONCLUSION

The sample tested met the performance requirements set forth in the referenced test procedures for a Class 4.

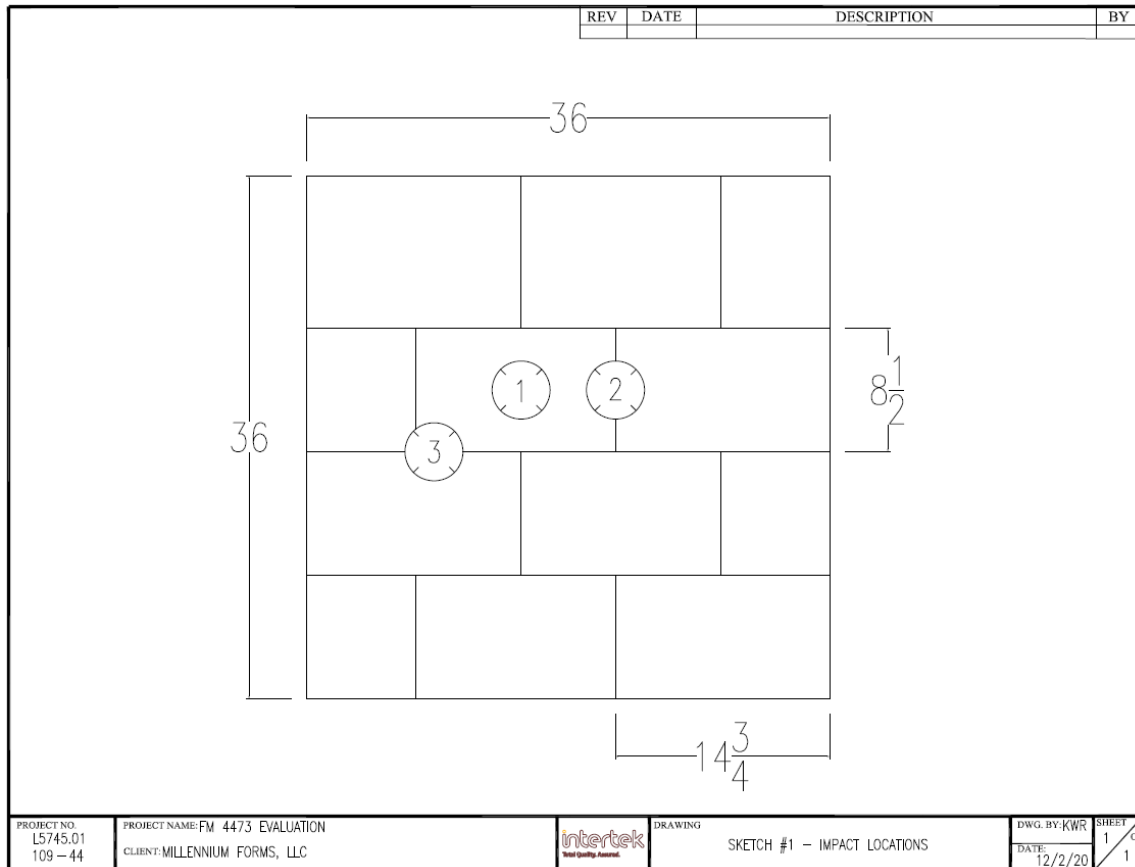
TEST REPORT FOR MILLENNIUM FORMS, LLC

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SECTION 10

SKETCH(ES)



Sketch No. 1
Impact Locations



Total Quality. Assured.

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SECTION 11

BILL OF MATERIALS

130 Derry Court
York, Pennsylvania 17406

Telephone: 717-764-7700
Facsimile: 717-764-4129
www.intertek.com/building

550 E Centralia St
Elkhorn, WI 53121
p: 262.723.7778
f: 262.922.4275
www.millenniumforms.com



MILLENNIUM
F O R M S

Estimate #	# of Pallets
Intertek	

Bill To
Intertek Tim McGill 130 Derry Court York, PA 17406-8405

Ship To
Intertek Vicki McElwain 130 Derry Court York, PA 17406-8405

Customer PO No.	Ship Date	Ship Via	FOB	Project Name
241310R0/24...	11/13/2020			Intertek Tile testing 2020
Item	Description	Ordered	U/M	Shipped
SS Tiles	304 SS, Mill finish, Flat tiles, 26ga, 480 tiles/8boxes	8		
SS Tiles	304 SS, Bright finish, Cupped tiles, 26ga, 480 tiles/8boxes	8		
SS Flashing	FLASHING - 304 Stainless steel, mill finish, 24ga, False Starters/Starter strips	6		
SS Flashing	FLASHING -304 Stainless steel, mill finish, 24ga, J-channels from the scrap pile	24		
Other Tiles	1 roll of Grace of Ice/Water shield barrier WI State/County Sales Tax at 5.5%	1		

If error is found in shipment please notify us within 48 hours.

Shipper/Packager: _____ Driver Signature: _____
Date Packaged: _____ Date Picked Up: _____

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SECTION 12

PHOTOGRAPH



Photo No. 1
304 Stainless Steel Flat, Wall Tiles



Total Quality. Assured.

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York, Pennsylvania 17406

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TEST REPORT FOR MILLENNIUM FORMS, LLC

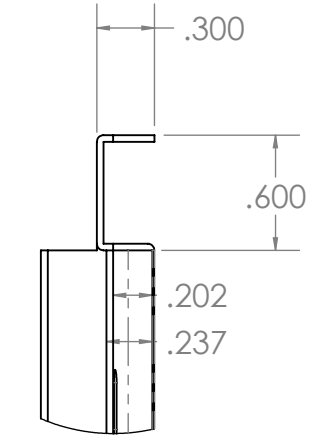
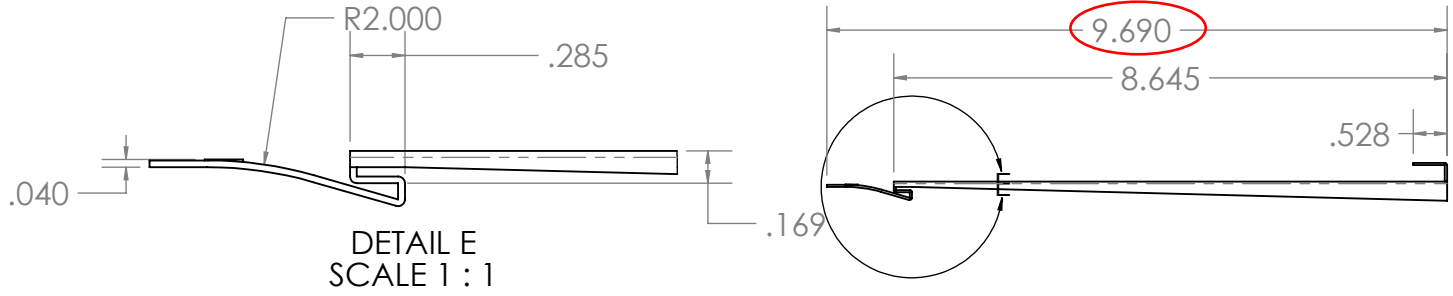
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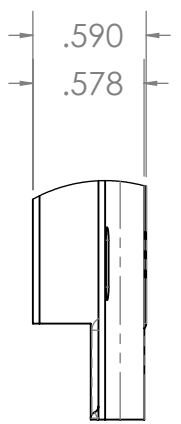
SECTION 13

DRAWINGS

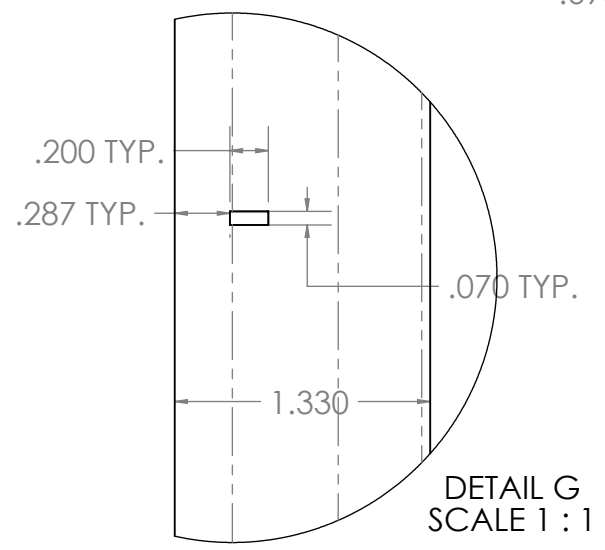
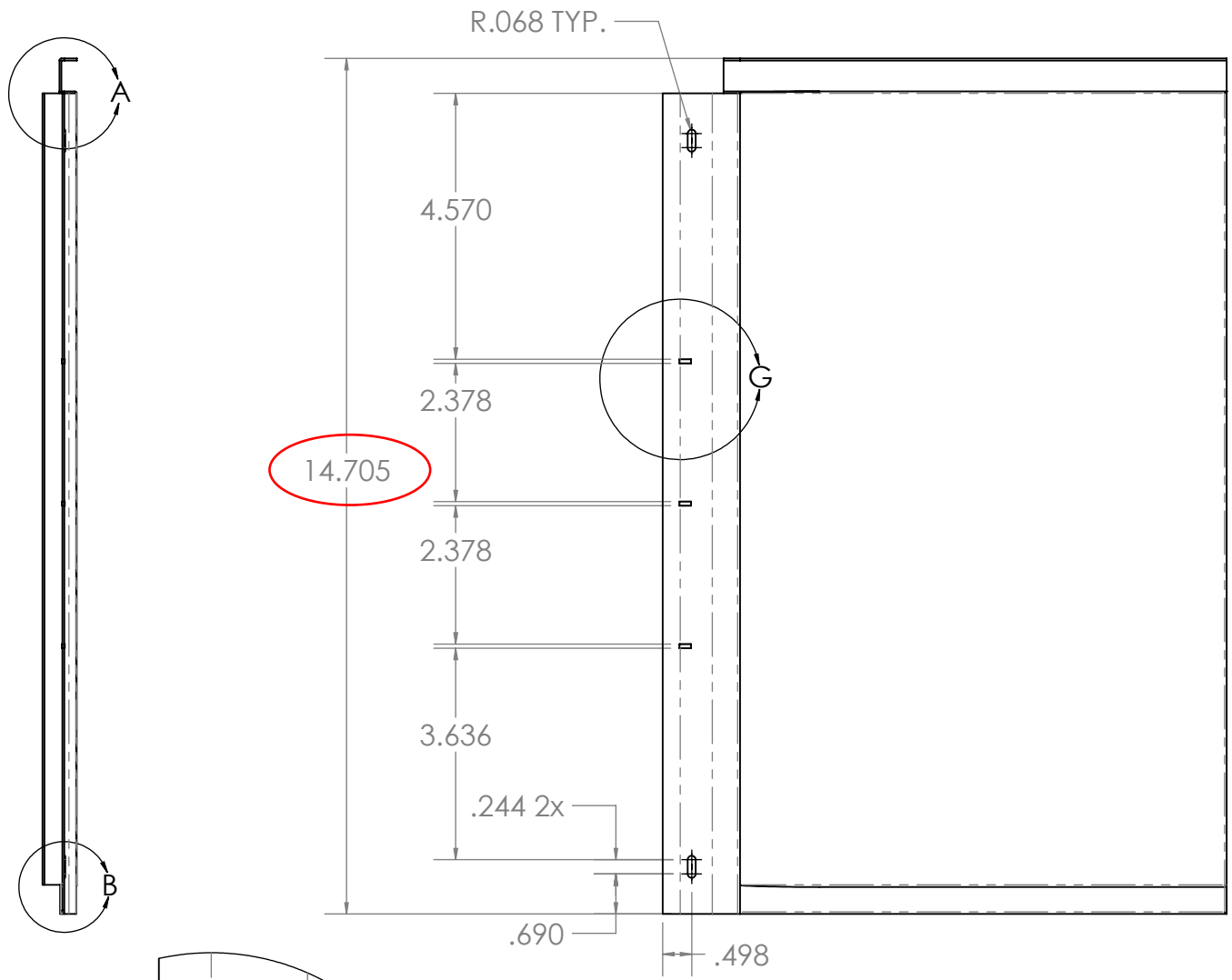
The test specimen drawings have been reviewed by Intertek B&C and are representative of the test specimen(s) reported herein. Test specimen construction was verified by Intertek B&C per the drawings included in this report. Any deviations are documented herein or on the drawings.



DETAIL A
SCALE 1 : 1



DETAIL B
SCALE 1 : 1



DETAIL G
SCALE 1 : 1



Report #:

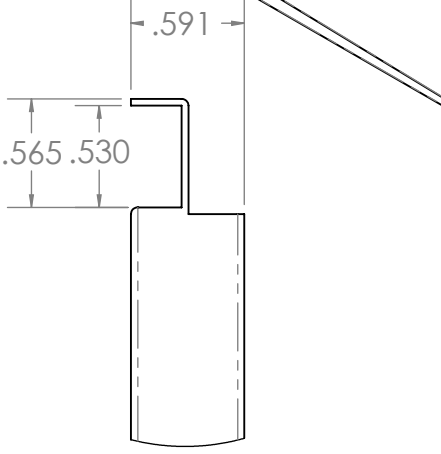
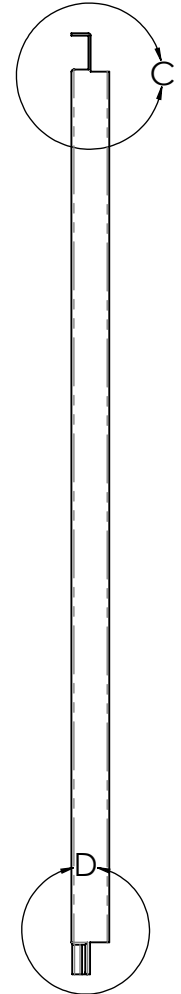
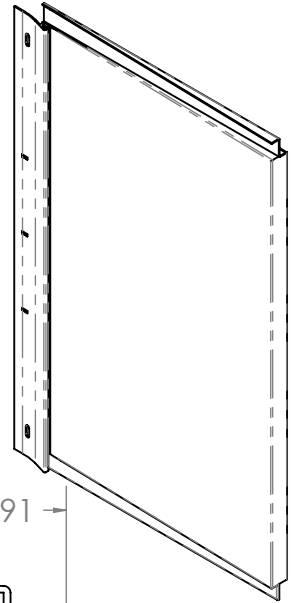
L5745

Date:

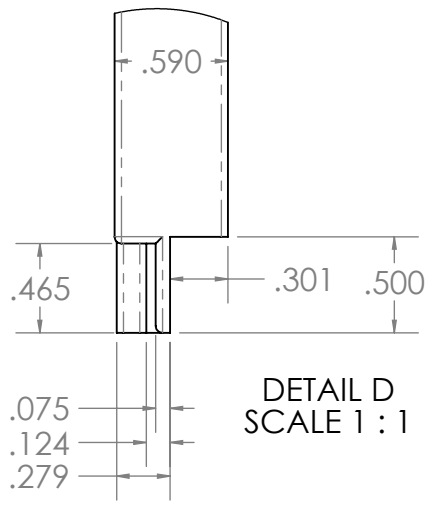
12/02/20

Verified by:






DETAIL C
SCALE 1 : 1



DETAIL D
SCALE 1 : 1

				UNLESS OTHERWISE SPECIFIED:		NAME	DATE	 <div>D&H INDUSTRIES INC. 510 S. WORTHINGTON ST. OCONOMOWOC, WI 53066 262-569-1960</div>	
				TOLERANCES:	DRAWN	A. Niebler	6/26/19		
				.X = ±.030	CHECKED				
				.XX = ±.010	ENG APPR.				
				.XXX = ±.005	MFG APPR.				
				Angles= ± 1°	Q.A.			DESCRIPTION:	
				MATERIAL:	COMMENTS:			Flat Tile	
								DWG. NO.	
				FINISH:					
REV	DATE	BY	DESCRIPTION	NOT TO SCALE				SHEET SIZE: B	



Total Quality. Assured.

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York, Pennsylvania 17406

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SECTION 14

REVISION LOG

REVISION #	DATE	PAGES	REVISION
0	01/14/21	N/A	Original Report Issue