QAI LABORATORIES
CERTIFICATION TESTING INSPECTION

3980 North Fraser Way
Burnaby, BC V5J 5K5
(604) 527-8378 ph. | (604) 527-8368 fx.
www.qai.org

CLIENT: **WILLIAMS BROTHERS CORPORATION OF AMERICA**
1330 Progress Dr.
Front Royal, VA
USA 22630

Engineering Evaluation Report No: BUR0542-ENG1	**Issue Date: March 6, 2025**

PRODUCT ID: Williams Brother's 36 in. x 36 in. (914 mm x 914 mm) FRC 800 insulated steel ceiling access door. Detailed descriptions and drawings of this product can be found in Section 2.0 and the Appendix of this report.

AUTHORIZATION: QAI Proposal 25RT01281 dated January 28, 2025, signed by Williams Brothers Corporation of America personnel Angie Williams, Vice President on February 6, 2025.

EVALUATION REQUESTED: Engineering Services / Engineering Evaluation of Williams Brothers's FRC 800 ceiling access door as described in this report to performance properties from the following criteria:

- ASTM E119-24, *Standard Test Methods for Fire Tests of Building Construction and Materials (ASTM E119).*
- CAN/ULC S101-14, *Standard Methods of Fire Endurance Tests of Building Construction and Materials (ULC S101).*

CONCLUSIONS: Based on the rationale presented in this report, it is the professional opinion of QAI Laboratories, Ltd. that Williams Brother's 36 in. x 36 in. (914 mm x 914 mm) FRC 800 insulated ceiling access door when installed a wood frame and gypsum floor/ceiling assembly as outlined in section 2.0 of this report, would achieve a 1-hour fire resistance rating accordance with ASTM E119-24 and CAN/ULC S101-14.

Prepared By:

Connor Rasilainen, EIT
Project Specialist

Signed for and on behalf of
QAI Laboratories Ltd.

Scott Leduc
Supervisor – Fire Laboratory

1.0 EVALUATION PURPOSE:

At the request of Williams Brothers Corporation of America, (Williams Brothers) QAI Laboratories, Ltd. (QAI) has conducted an evaluation of Williams Brothers's 36 in. x 36 in. (914 mm x 914 mm) FRC 800 insulated steel ceiling access door installed in wood frame and gypsum, floor/ceiling assemblies for fire-resistance ratings in accordance with ASTM E119-24 (ASTM E119) and CAN/ULC S101-14 (CAN/ULC S101).

This evaluation was conducted to determine if the Williams Brothers product listed above when installed in accordance with Section 2.0 of this report would achieve a 1-hour fire resistance rating for a floor/ceiling assembly when evaluated to the full requirements of ASTM E119 / CAN/ULC S101.

Testing conducted by QAI to the ASTM E119 / CAN/ULC S101 methods outlined in test report BUR0331-FT-2 dated January 31, 2025, performed on a Williams Brother's FRC 800 ceiling access door in a wood frame and gypsum floor/ceiling assembly constructed as outlined in Section 2.0 of this report, will serve as a basis for this evaluation.

2.0 PRODUCT DESCRIPTION:

Testing of the FRC 800 product installed in an assembly described below was done by QAI for Williams Brothers in accordance with ASTM E119 and CAN/ULC S101 on January 17, 2025. The tested assembly achieved a 1-hour fire resistance rating with deviations from the standard methods listed below.

Table 1 – Test Assembly Description

COMPONENT	DESCRIPTION	
Door and Frame Assemblies	Model:	FRC 800
	Description:	36 in. x 36 in. (914 mm x 914 mm) mineral wool insulated steel door and frame.
	Insulation:	Mineral wool: 2 in. (51 mm) thick ProRox SL 960 mineral wool with a specified nominal density of 8.0 lbs/ft3 (128 kg/m^3).
	Door:	18-gauge powder coated cold rolled steel housing and 20-gauge powder coated cold rolled lid. The door was 2 in. (51 mm) thick.
	Frame:	16-gauge powder coated cold rolled steel frame. 1.0 in. (25 mm) flange and 2.625 in. (67 mm) depth.
	Hardware:	Two latches spaced 18 in. (457 mm) which were 0.98 in. (25 mm) wide with a 0.5 in. (12.7 mm) throw. Model number 1193-04.
	Install:	The inside edge of the framing around the opening was fully covered with 5/8 in. (16 mm) Type X gypsum board. The frame was screwed into the wood stud framing of the wall through mounting holes using #10 x 2 in. (51 mm) wood screws.
Floor / Ceiling Construction	Type:	Wood joist, Type X gypsum and plywood.
	Framing:	Nominal 2 in. x 8 in. Spruce-Pine-Fir (SPF) dimensional wood joists.
	Ceiling:	Two layers of 1/2 in. (12.5 mm) Type X gypsum board.
	Sub-Floor:	One layer of 3/4 in. (20 mm) plywood.
	Opening:	One layer of 5/8 in. (16 mm) Type X gypsum board around the perimeter of the opening.

Refer to the Appendix for product details and drawings.

Deviation from the Test Standards:

This assembly was tested under a positive pressure condition as required by NFPA 288.

The test was performed on a smaller size than ASTM E119 and CAN/ULC S101 requires but was tested on the largest available test specimen size.

Fewer thermocouples were used than required by the test standard due to the smaller sample size. Additional thermocouples were placed inside the cavity and on the supporting studs for comparative purposes.

3.0 REFERENCED STANDARDS AND REPORTS:

- ASTM E119-24, *Standard Test Methods for Fire Tests of Building Construction and Materials (ASTM E119).*
- CAN/ULC S101-14, *Standard Methods of Fire Endurance Tests of Building Construction and Materials (ULC S101).*
- QAI Test Report BUR0331-FT-2 dated January 31, 2025,

4.0 ENGINEERING EVALUATION:

QAI Test Report BUR0331-FT-2 conduced to ASTM E119 and CAN/ULC S101 (with deviations from these standards listed above) on a wood frame and gypsum floor/ceiling assembly with Williams Brothers's 36 in. x 36 in. (914 mm x 914 mm) FRC 800 ceiling access door was reviewed and these results were evaluated to determine if the achieved fire-resistance rating for this assembly was applicable to the full requirements of ASTM E119 and CAN/ULC S101 for a full scale floor/ceiling assembly.

The testing conducted by QAI was done using a mid-scale size furnace on an assembly that was smaller than the requirements prescribed in ASTM E119 and CAN/ULC S101. This report is evaluating the impact of the presence of the FRC 800 ceiling access door on the assembly to determine if these results would continue to apply to the full-scale assembly size prescribed in ASTM E119 and CAN/ULC S101.

The table below shows the maximum temperature rise after 60 minutes of fire exposure measured by thermocouples placed on the unexposed side the assembly at the location of the FRC 800 ceiling access door.

Table 2 – Maximum Unexposed Temperature Rise

PROPERTY	INITIAL TEMP	MAXIMUM TEMP	TEMP RISE	TEMP RISE LIMIT
Average Temperature	64.9°F (18.3°C)	301.8°F (150.0°C)	236.9°F (131.7°C)	250°F (140°C)
Single Point Temperature	64.9°F (18.3°C)	313.5°F (156.4°C)	248.6°F (138.1°C)	325°F (181°C)

The maximum average temperature limit of 250°F (140°C) above the initial, and the single point maximum temperature limit of 325°F (181°C) above initial were not reached for the 60-minute duration of the fire endurance test. The mid-scale testing conducted by QAI follows the same time/temperature curve as would be applied during the full-scale testing, and although the full scale assembly may experience higher temperature rise during the test, it is QAI's opinion that the margin between the unexposed temperature and the temperature limit is significant enough that the full scale assembly would be expected to maintain temperature rise values below the limits specified above.

Additionally, during testing thermocouples were placed on joist locations adjacent to the FRC 800 ceiling access door and additional thermocouples were placed on joists in locations where the stud cavity did not contain a door. The maximum final temperatures after 60 minutes of fire exposure are shown in the table below.

Table 3 – Maximum Joist Temperatures

MEASUREMENT TYPE	MAXIMUM TEMPERATURE
Joist Temperature (at FRC800 Location)	253°F (123 °C)
Joist Temperature (at Gypsum Board Location)	600°F (316 °C)

After 60 minutes of fire exposure, the FRC 800 ceiling access door resulted in significantly lower joist temperatures compared to the joists in the cavity that did not contain a door as described in Table 1. As a result, the FRC 800 is expected to offer equivalent or superior protection, with regards to temperature rise under fire exposure, to the structural members when compared to those cavities that did not contain a door as described in this report. These results show that the FRC 800 ceiling access door would not compromise the structural integrity and fire resistance capability of the assembly under fire exposure in comparison to the areas protected by gypsum board and would be expected to meet the full-scale requirements of ASTM E119 & CAN/ULC S101 for this assembly.

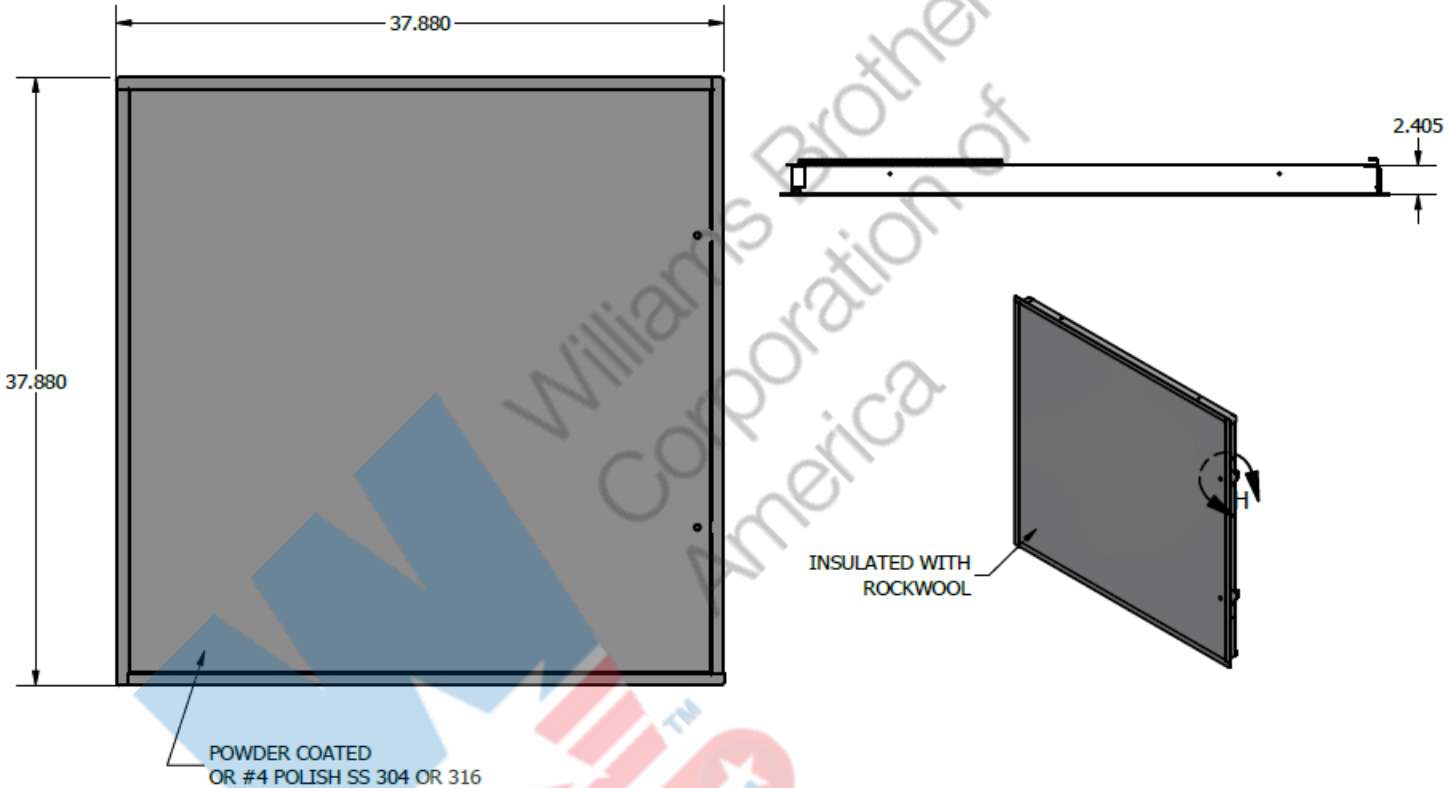
It should also be noted that the presence of the FRC 800 insulated steel access hatch did not result in flaming or through penetrations observed for the 60-minute duration of the fire endurance test.

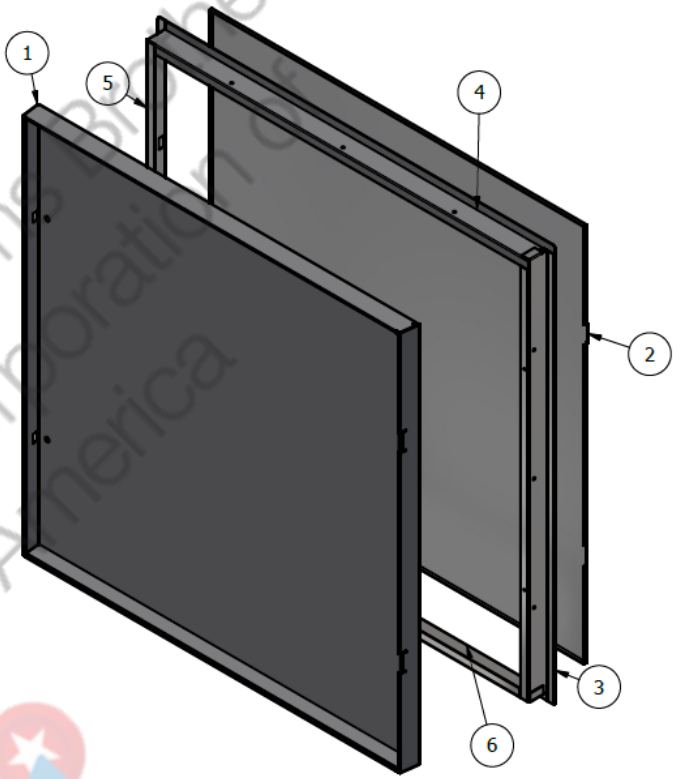
5.0 CONCLUSION:

It is the professional opinion of QAI Laboratories, Ltd. that based on the rationale presented in this report, that Williams Brother's 36 in. x 36 in. (914 mm x 914 mm) FRC 800 insulated steel ceiling access door when installed in wood frame and gypsum floor/ceiling assembly as outlined in section 2.0 of this report, would achieve a 1-hour fire resistance rating in accordance with the performance requirements of ASTM E119-24 and CAN/ULC S101-14 when installed as described in this report.

APPENDIX

PAGE	DESCRIPTION
7-16	FRC 800 Product Drawings





PARTS LIST			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	FR800-48X48-01	DOOR HOUSING
2	1	FRC800-24X24-02	DOOR LID
3	1	FRC800-24X24-03	RETURN FRAME RIGHT
4	1	FRC800-24X24-04	RETURN FRAME BOTTOM
5	1	FRC800-24X24-05	RETURN FRAME LEFT
6	1	FRC800-24X24-06	RETURN FRAME TOP
7	0	FRC800-24X24-07	HINGE ROD

TOLERANCES EXCEPT WHERE OTHERWISE STATED
.XX = ±0.01
.XXX = ±.005
ANGLES ± 0.5°

THIRD ANGLE PROJECTION

AG LASER TECHNOLOGY, LLC

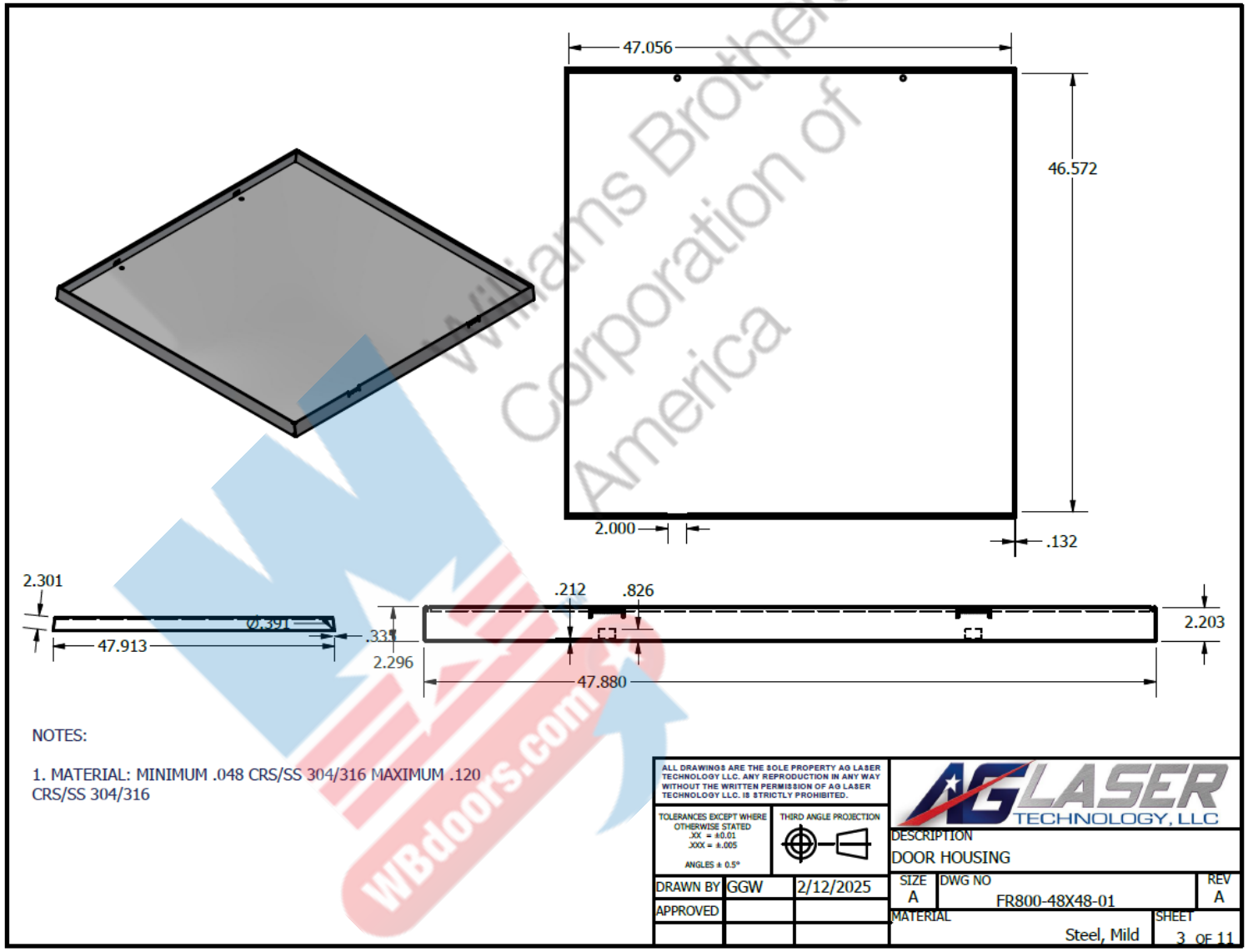
DESCRIPTION: FR800-48X48

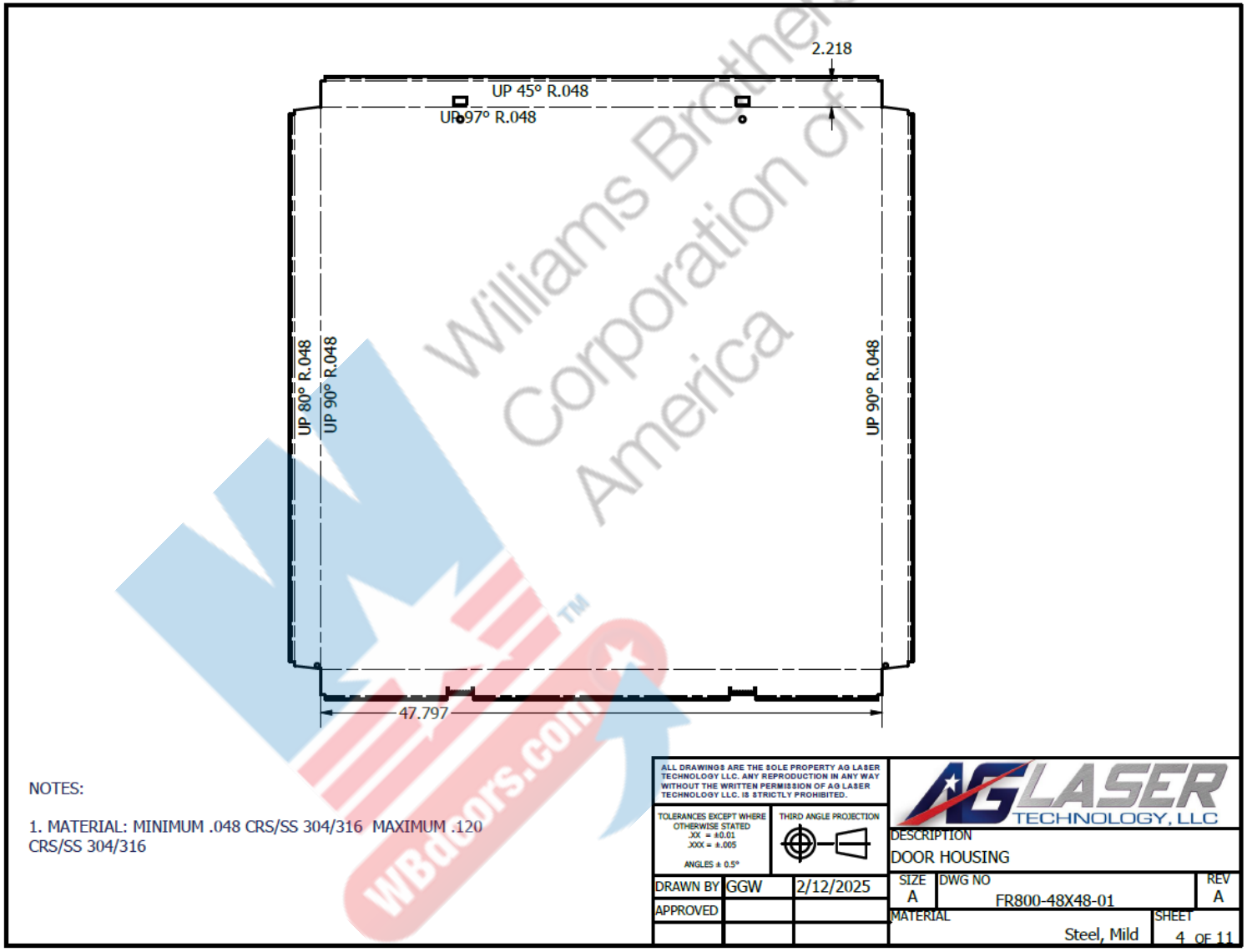
DRAWN BY	GGW	11/1/2023	
APPROVED			

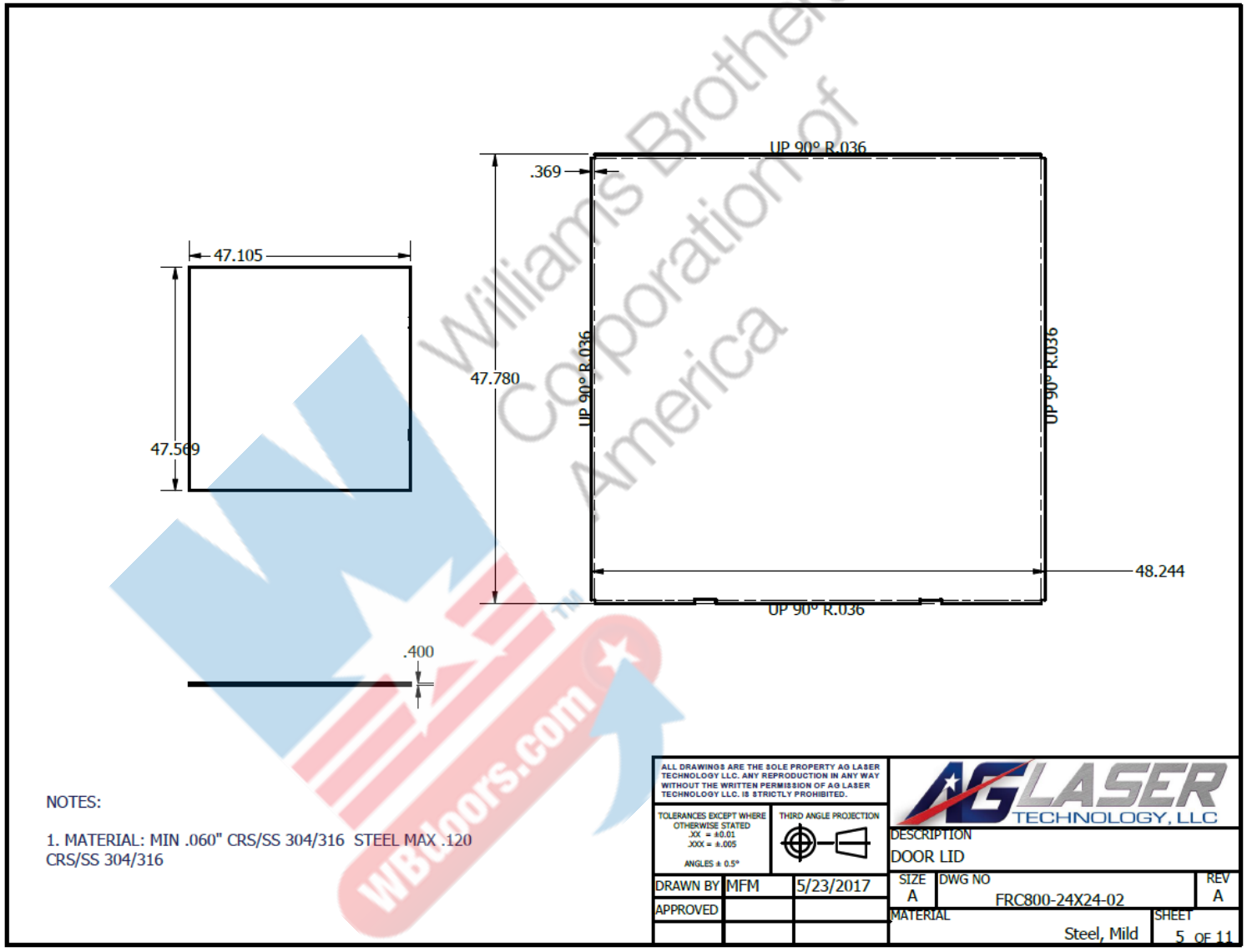
SIZE: A | DWG NO: FRC800-24X24 | REV:

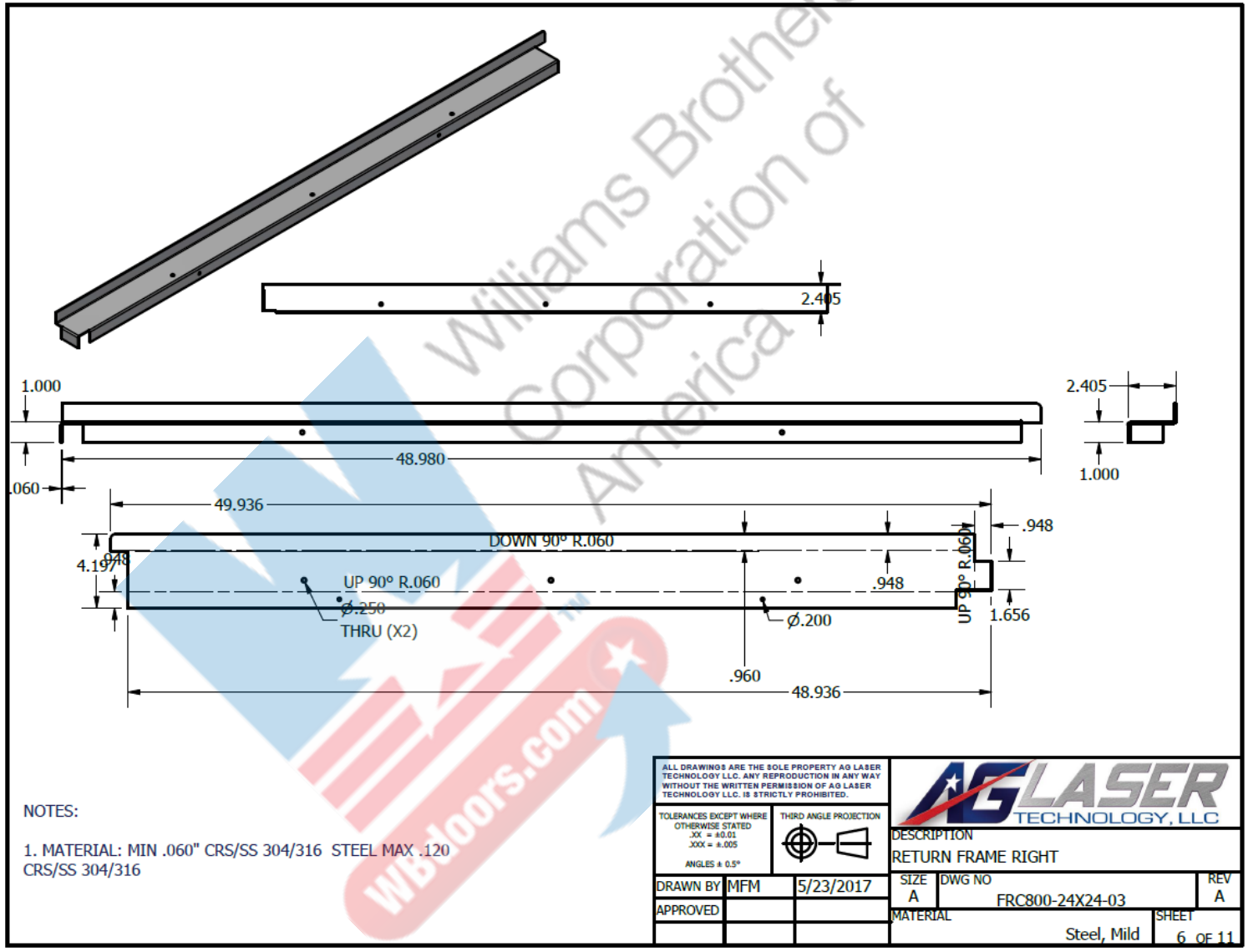
MATERIAL:

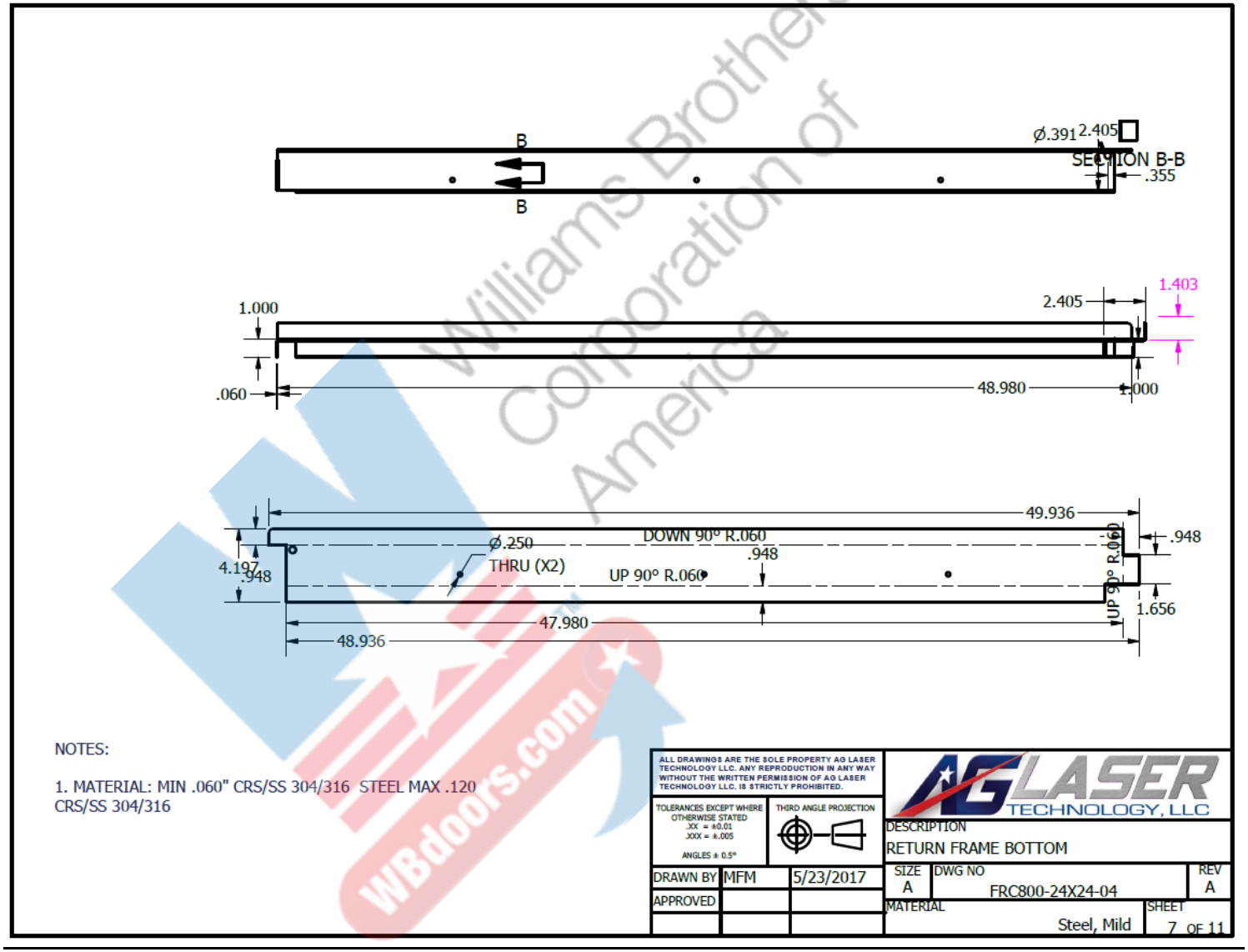
SHEET: 2 OF 11

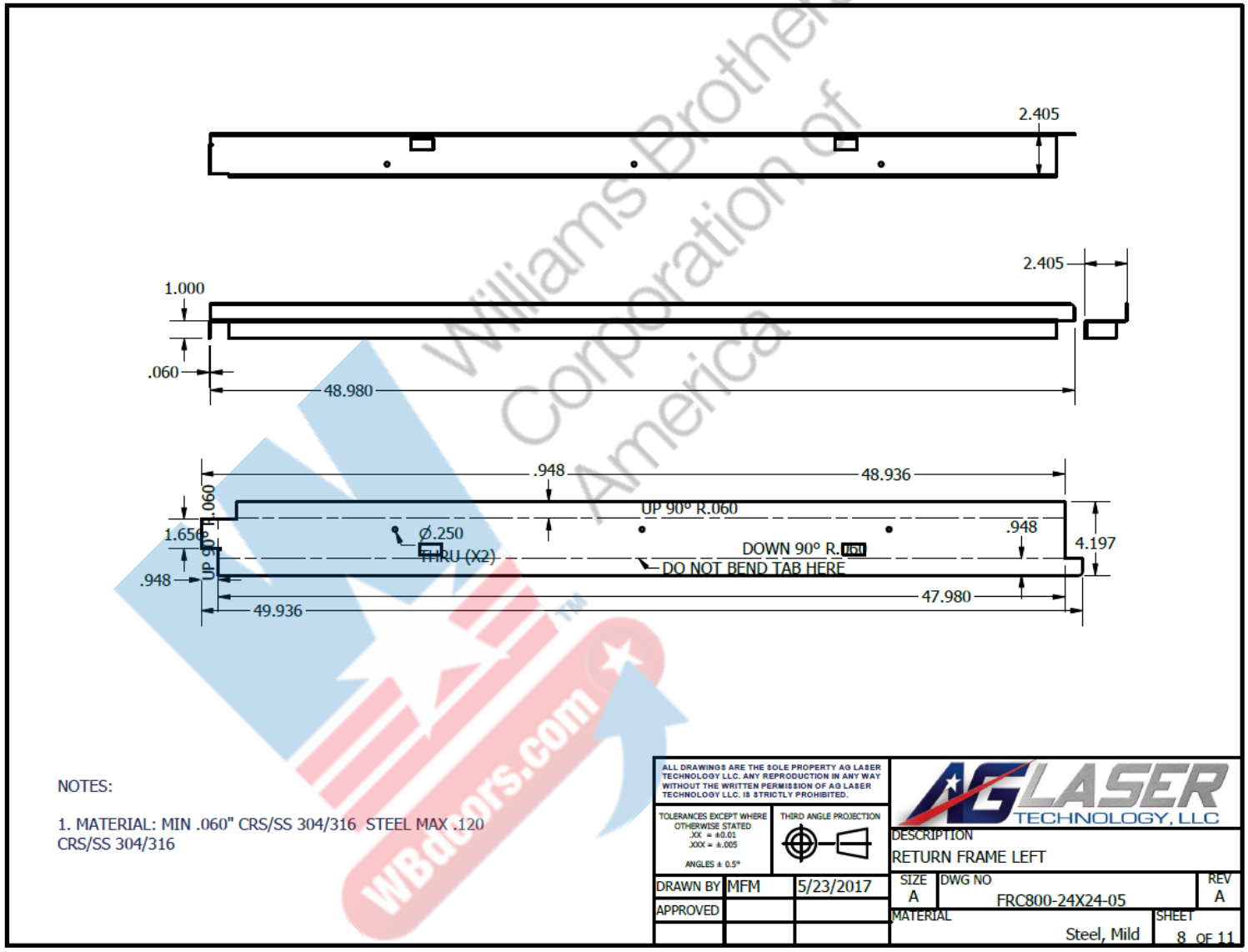


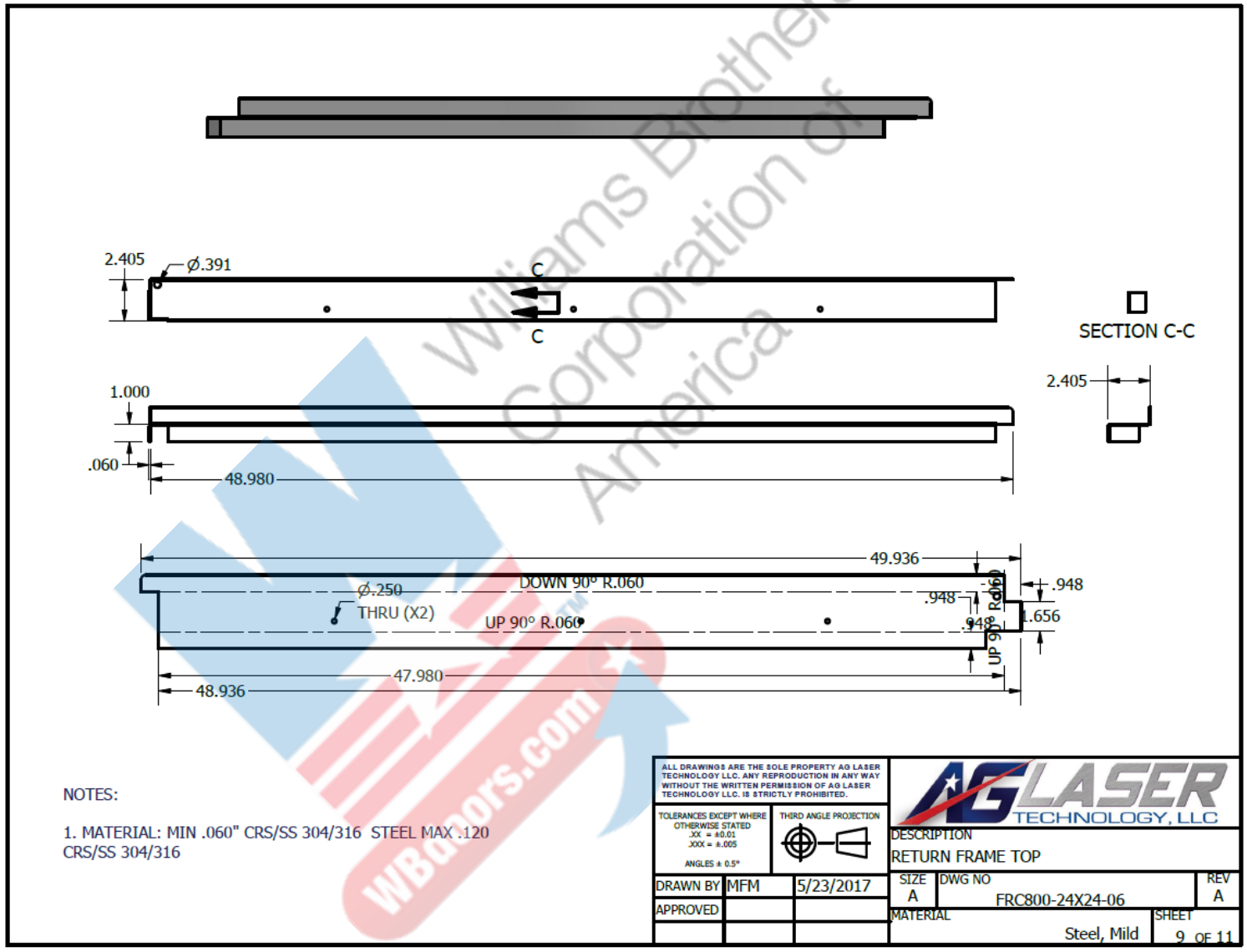


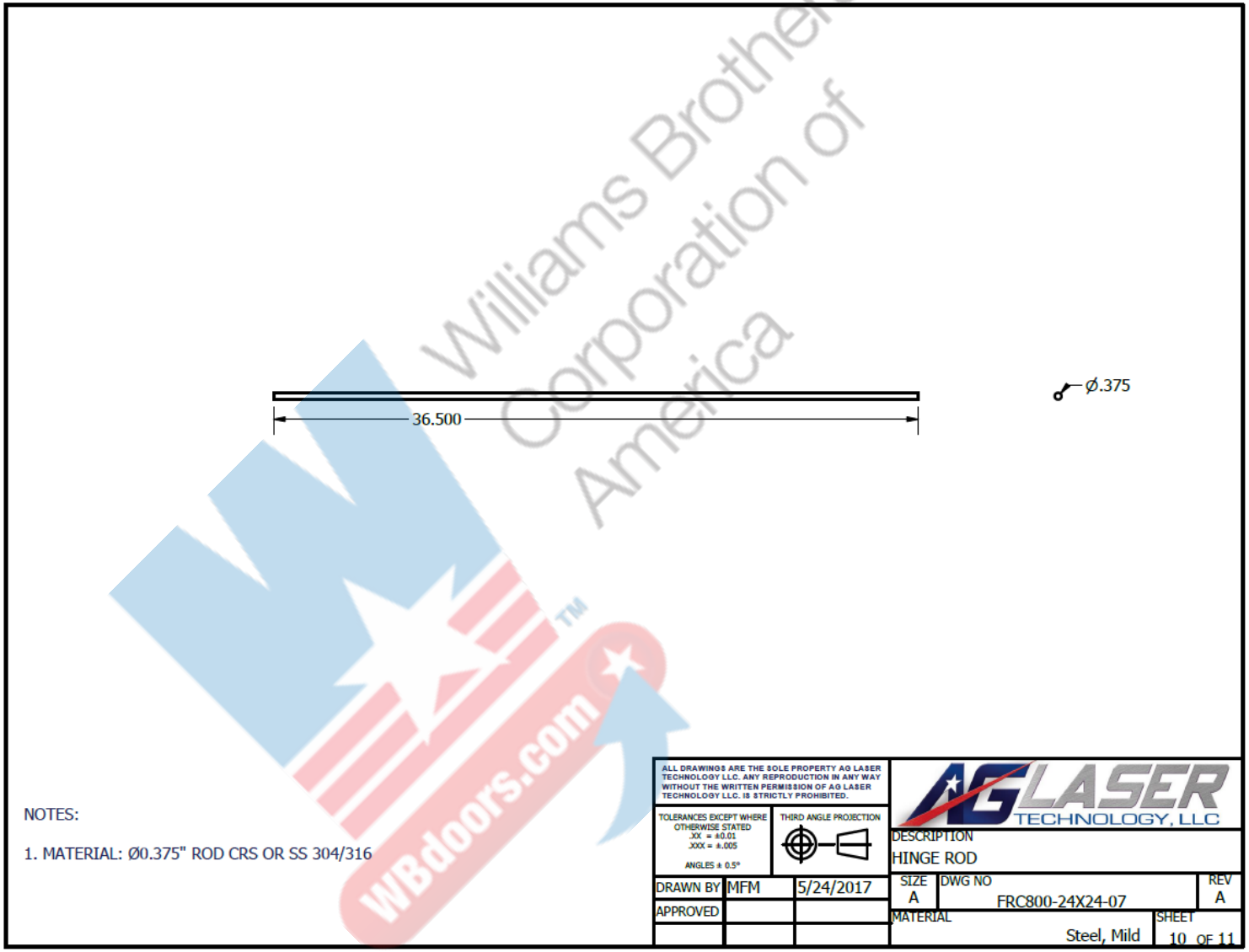












DATE	REVISION	CHANGE DESCRIPTION	INITIALS
March 6, 2025	-	Original Report	CR

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