

Ballistic Testing Services

Report Number: BTR-12-06-2019-Sample 4A

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Name: Midwest Glass Fabricators  
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Report Date: December 6, 2019  
 Contact: Paul Mouton  
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**Ballistic Results**

**Project Summary**  
 Type of Products to be tested: **Bullet Resistant Glazings**  
 Test Specimen Sample size(s): **12 x 12 inch**  
 Number of test specimens: **23 Samples**  
 Weight of all samples: **321.7 lbs**  
 Are Materials a Health Hazard: **No**  
 Need the Tests performed by: **within 7 to 10 days**  
 Need products shipped back: **No**  
 Purchase Order Number: **Not Applicable**

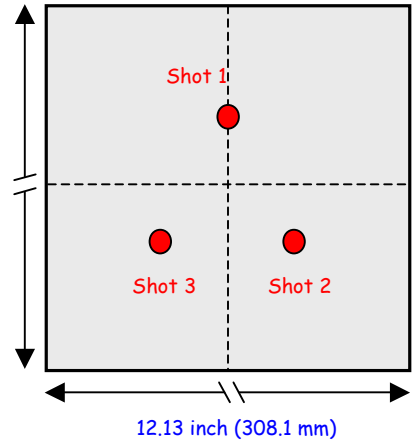
**International Ballistic Standards / Specifications Testing**  
 ASTM     Canadian     FRA     NIJ     CFR Pass All  
 Australian     EN1063     Germ DIN     State Dept     CFR SYA  
 British     EN1522/23     MIL-SAMIT     UL 752     Other  
 Test Standard: **Underwriters Laboratory UL752 (Ambient Temp. Only)**  
 Particular Test: **UL Level 1 Part 1 (9 mm Parabellum FMJ)**  
 Velocity Range: **1,175 to 1,293 ft/s**  
 Shots: **3 shots**  
 Shot Pattern: **4.0 ± 0.5 inch triangle**

**Test Results**

Test Sample: **Sample 4A**  
 Part Number / D.O.M.: **MWGF-UL1-ENBR2 / November 25, 2019**    12.13 inch (308.1 mm)  
 Reference ID: **CFR UL Level 1 and EN BR2**  
 Description: **Security Glazing**  
 Sample Size: **12.13 x 12.13 inch (308.1 x 308.1 mm)**  
 Thickness: **0.546 inch (13.87 mm)**  
 Weight: **5.78 lbs (2.62 kg)**  
 Weapon Type: **9 mm Parabellum**  
 Cartridge / Projectile Type: **9 mm Parabellum FMJ**  
 Projectile Weight: **124 grains**  
 Target Distance: **15 feet**  
 Number of Shots: **3 shots**  
 Shot Sequence:

	Shot 1	Shot 2	Shot 3
Impact Velocity (ft/sec) *:	1,188	1,178	1,182
Impact Energy (ft-lbs):	389	382	385
Impact Momentum (lb-sec.):	0.65	0.65	0.65
Impact Angle (degrees):	0°	0°	0°
Sample Penetration:	NP	NP	NP
Witness Plate Penetration:	NP	NP	NP
Impact Spacing (inches) **:	3.60	4.40	4.00

Impact Spacing / Pattern: **4.00 inch (average)**  
 Witness plate material: **0.125 in. thick corrugated cardboard**  
 Spall catch box: **Not required**  
 Witness / Box Distance: **18.0 inches**  
 Spall Occurrence: **No spall occurred**  
 Test Temperature: **70 ° F**  
 Test Date: **December 06, 2019**  
 Pass / Fail Results: **Passed the Test**  
 Comments: **CFR Reference for UL Level 1 and EN1063 BR2 (9 mm)**



NP = No Penetration  
 PP = Partial Penetration  
 CP = Complete Penetration  
 N/A = Not Applicable

**Footnotes**

\* Velocity measurements were taken at a distance of 6 feet from muzzle.  
 \*\* Impact Spacing is the distance between shots (shot 1= 3 to 1, shot 2 = 1 to 2, shot 3 = 2 to 3)

**Test and Report Engineers**

Tested and Reported by: **Sam Raheb**

Signature: *Sam Raheb*

Date: **December 6, 2019**

Name: **Midwest Glass Fabricators**

Report Date: **December 6, 2019**

**Ballistic Test Results and Photographs**

**Ballistic Test Results:**

Test Sample 4A passed the Underwriters Laboratory UL752 UL Level 1 Part 1 (9 mm Parabellum FMJ) Ballistic test. There was no complete penetration of the test sample from any of the 9 mm Parabellum FMJ caliber projectiles. Sample 4A was also used for the 2 shot UL752 Part 2 test because sample 3 failed due to a brittle polycarbonate rear face ply. Refer to Sample 4B report for the UL752 Part 2 test.

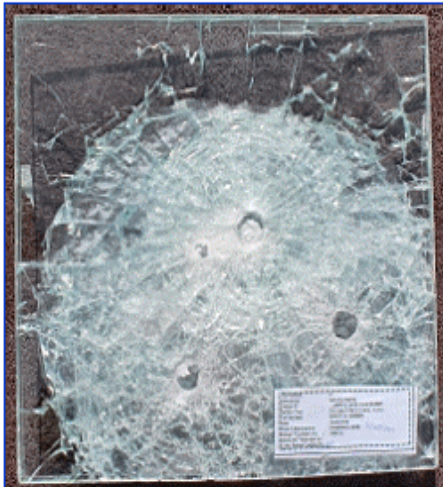
**Witness Plate and Spall Effects:**

No spall occurred or damage to the 0.125 in. thick corrugated cardboard witness plate was observed.

**Photographs**

The following photographs show the post-test sample. Additional larger sized photographs are included with this report.

**Sample 4A: MWGF-UL1-ENBR2 - D.O.M. November 25, 2019 - CFR UL Level 1 and EN BR2 - UL Level 1 Part 1 - 12.13 x 12.13 x 0.546 in.**



Sample 4A Post Test Impact Side



Sample 4A Post Test Rear Side

**Test and Report Engineers**

Tested and Reported by: **Sam Raheb**

Signature: *Sam Raheb*

Date: **December 6, 2019**