

October 10, 2024

Riot Glass
17941 Brookshire Lane
Huntington Beach, CA 93647
ATTN: Brad Campbell

Dear Mr. Campbell:

In accordance with your instructions, Oregon Ballistic Laboratories conducted Ballistic and Impact testing on three samples.

The samples were tested in accordance with ASTM F3561-22 in an indoor range with the muzzle of the test barrel mounted 20 feet from the target and positioned to produce 0-degree obliquity impacts. A doppler radar system was placed such that projectile velocity was measured 10 feet from the target. Penetrations were determined by examination of the sample. The sample was then tested for forced-entry. Forced-entry failures were determined by the use of a 6-in diameter sphere passing through the sample. Results for all testing performed for this purpose are summarized in the following table.

Model: Gen II AP2-SF-STD-AP250								
Test Sample			Ballistic Threat				Results	
OBL No.:	Sample No.:	Dimensions (in.)	Projectile	Shots	Velocity (fps)		Penetrations	Resistance Level
					Min.	Max.		
38125	4-1	40x40	M193	10	3342	3395	10	6
38126	4-2	40x40	M193	10	3344	3394	10	5
38127	4-3	40x40	M193	10	3333	3391	10	4

*Data shown in the table represents fair impacts only.


The Model Achieved a Level 4 Forced-entry Resistance Rating

This report pertains only to the samples tested and may not be modified or edited in any way. This report may not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any federal government agency. Samples will be maintained at Oregon Ballistic Laboratories for 30 days and discarded unless other instructions are received. If you have any further questions or concerns, don't hesitate to contact us.

Reviewed by,

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Contributors to measurement of uncertainty:
Velocity- tape measure used for screen spacing, Measurement of uncertainty of frequency counters.

BALLISTIC RESISTANCE TEST - V₀

Customer: Riot Glass
OBL ID#: 38125
Date Rcv'd: 10/7/2024
Test Date: 10/8/2024
Purchase Order:

TEST SAMPLE

Sample No.: 4-1
Model No.: Gen II AP2-SF-STD-AP250
Lot No.: N/A
Plies: N/A
Description: Gen II AP2-SF-STD-AP250 - Frames And Infills

Size (in.): 40 x 40
Weight (lb.): N/A
Thickness: N/A
Avg. Thk. (in):

RANGE SET-UP

Range to Target: 20 ft.
Screen Dist. Vel. 1 (ft.): 5
Screen Dist. Vel. 2 (ft.): 4
Screen 4 to target (ft): N/A
Primary Vel. Location: 8.25 ft. from target
Striking Velocity: No
Target to Witness: N/A
Witness Panel: N/A
Backing Material: N/A
Obliquity: 0 Degrees
Barrel: 5.56mm NATO/1:7/30"

Range #: 4
Temperature: 64.2 °F
Bar. Pressure: 29.77 in. Hg
Rel. Humidity: 53.0 %
Sample Temp. Amb. °F
Recorder: Jerhemi Stone
Gunner: Chris Moe

CLAY CALIBRATION NOT REQUIRED

Pre Test:
Clay Drops (mm):
Drop Avg (mm):
Clay Temp °F:
Clay Box #:
Post Test:
Clay Drops (mm):
Drop Avg (mm):
Clay Temp °F:

AMMUNITION

Projectile: 5.56mm M193 Ball

Powder: IMR 4227

STANDARDS / PROCEDURES

ASTM F3561-22

Required Velocity: 3370 fps ± 33 fps

SHOT NO.	PROJECTILE WT. (gr.)	POWDER WT. (gr.)	TIME 1 μ s (10 ⁻⁶)	TIME 2 μ s (10 ⁻⁶)	VELOCITY 1 ft/s	VELOCITY 2 ft/s	AVERAGE VELOCITY	PENET. P/C	OBLIQUITY	CALIPER BFD	NOTES
1	55.3	21.1	1474	1179	3392	3393	3393	C	0°		
2	54.7	21.1	1475	1180	3390	3390	3390	C	0°		
3	55.5	21.1	1475	1180	3390	3390	3390	C	0°		
4	55.1	21.1	1485	1188	3367	3367	3367	C	0°		
5	55.5	21.1	1480	1184	3378	3378	3378	C	0°		
6	55.0	21.1	1478	1182	3383	3384	3384	C	0°		
7	55.2	21.1	1484	1187	3369	3370	3370	C	0°		
8	55.3	21.1	1496	1197	3342	3342	3342	C	0°		
9	55.0	21.1	1473	1178	3394	3396	3395	C	0°		
10	55.0	21.1	1474	1180	3392	3390	3391	C	0°		

REMARKS:

P=Partial Penetration
C=Complete Penetration
UH=Unfair Hit
Projectile Yaw Check: <5° for all velocity shots

TEST RESULTS:

Test sample satisfied the requirements given.

FOOTNOTES:

Impact Number	Resistance Level	Pass / Fail	Description of Occurrence
1	1	PASS	No visible damage.
2	1	PASS	Small blemish visible on glass.
3	2	PASS	Small crack formed.
4	2	PASS	No Change.
5	3	PASS	No Change.
6	3	PASS	No Change.
7	4	PASS	No Change.
8	4	PASS	No Change.
9	5	PASS	No Change.
10	5	PASS	No Change.
11	6	PASS	No Change.
12	6	PASS	No Change.
13	7	PASS	No Change.
14	7	FAIL	Glass cracked out the back of the sample. Able to fit 6in diameter fail shape through.

BALLISTIC RESISTANCE TEST - V₀

Customer: Riot Glass
OBL ID#: 38126
Date Rcv'd: 10/7/2024
Test Date: 10/8/2024
Purchase Order:

TEST SAMPLE

Sample No.: 4-2
Model No.: Gen II AP2-SF-STD-AP250
Lot No.: N/A
Plies: N/A
Description: Gen II AP2-SF-STD-AP250 - Frames And Infills

Size (in.): 40 x 40
Weight (lb.): N/A
Thickness: N/A
Avg. Thk. (in):

RANGE SET-UP

Range to Target: 20 ft.
Screen Dist. Vel. 1 (ft.): 5
Screen Dist. Vel. 2 (ft.): 4
Screen 4 to target (ft): N/A
Primary Vel. Location: 8.25 ft. from target
Striking Velocity: No
Target to Witness: N/A
Witness Panel: N/A
Backing Material: N/A
Obliquity: 0 Degrees
Barrel: 5.56mm NATO/1:7/30"

Range #: 4
Temperature: 67.1 °F
Bar. Pressure: 29.83 in. Hg
Rel. Humidity: 63.0 %
Sample Temp. Amb. °F
Recorder: Jerhemi Stone
Gunner: Chris Moe

CLAY CALIBRATION NOT REQUIRED

Pre Test:
Clay Drops (mm):
Drop Avg (mm):
Clay Temp °F:
Clay Box #:
Post Test:
Clay Drops (mm):
Drop Avg (mm):
Clay Temp °F:

AMMUNITION

Projectile: 5.56mm M193 Ball

Powder: IMR 4227

STANDARDS / PROCEDURES

ASTM F3561-22

Required Velocity: 3370 fps ± 33 fps

SHOT NO.	PROJECTILE WT. (gr.)	POWDER WT. (gr.)	TIME 1 μ s (10 ⁻⁶)	TIME 2 μ s (10 ⁻⁶)	VELOCITY 1 ft/s	VELOCITY 2 ft/s	AVERAGE VELOCITY	PENET. P/C	OBLIQUITY	CALIPER BFD	NOTES
1	55.3	21.1	1483	1186	3372	3373	3373	C	0°		
2	55.2	21.1	1479	1183	3381	3381	3381	C	0°		
3	55.4	21.1	1482	1186	3374	3373	3374	C	0°		
4	55.2	21.1	1484	1187	3369	3370	3370	C	0°		
5	55.3	21.1	1495	1196	3344	3344	3344	C	0°		
6	55.5	21.1	1489	1192	3358	3356	3357	C	0°		
7	55.4	21.1	1479	1183	3381	3381	3381	C	0°		
8	55.3	21.1	1493	1194	3349	3350	3350	C	0°		
9	55.1	21.1	1485	1188	3367	3367	3367	C	0°		
10	55.1	21.1	1473	1179	3394	3393	3394	C	0°		

REMARKS:

P=Partial Penetration
C=Complete Penetration
UH=Unfair Hit
Projectile Yaw Check: <5° for all velocity shots

TEST RESULTS:

Test sample satisfied the requirements given.

FOOTNOTES:

Impact Number	Resistance Level	Pass / Fail	Description of Occurrence
1	1	PASS	Crack / Blemish forming in the middle of the sample.
2	1	PASS	No change.
3	2	PASS	No change.
4	2	PASS	No change.
5	3	PASS	No change.
6	3	PASS	No change.
7	4	PASS	Crack extended slightly.
8	4	PASS	No change.
9	5	PASS	No change.
10	5	PASS	Crack extended slightly.
11	6	PASS	Sample pushed out of frame but not enough to get the fail shape through.
12	6	FAIL	Sample was pushed even further out of the frame leaving enough room to get the fail shape through.

BALLISTIC RESISTANCE TEST - V₀

Customer: Riot Glass
OBL ID#: 38127
Date Rcv'd: 10/7/2024
Test Date: 10/8/2024
Purchase Order:

TEST SAMPLE

Sample No.: 4-3
Model No.: Gen II AP2-SF-STD-AP250
Lot No.: N/A
Plies: N/A
Description: Gen II AP2-SF-STD-AP250 - Frames And Infills

Size (in.): 40 x 40
Weight (lb.): N/A
Thickness: N/A
Avg. Thk. (in):

RANGE SET-UP

Range to Target: 20 ft.
Screen Dist. Vel. 1 (ft.): 5
Screen Dist. Vel. 2 (ft.): 4
Screen 4 to target (ft): N/A
Primary Vel. Location: 8.25 ft. from target
Striking Velocity: No
Target to Witness: N/A
Witness Panel: N/A
Backing Material: N/A
Obliquity: 0 Degrees
Barrel: 5.56mm NATO/1:7/30"

Range #: 4
Temperature: 67.1 °F
Bar. Pressure: 29.83 in. Hg
Rel. Humidity: 63.0 %
Sample Temp. Amb. °F
Recorder: Jerhemi Stone
Gunner: Chris Moe

CLAY CALIBRATION NOT REQUIRED

Pre Test:
Clay Drops (mm):
Drop Avg (mm):
Clay Temp °F:
Clay Box #:
Post Test:
Clay Drops (mm):
Drop Avg (mm):
Clay Temp °F:

AMMUNITION

Projectile: 5.56mm M193 Ball

Powder: IMR 4227

STANDARDS / PROCEDURES

ASTM F3561-22

Required Velocity: 3370 fps ± 33 fps

SHOT NO.	PROJECTILE WT. (gr.)	POWDER WT. (gr.)	TIME 1 μ s (10 ⁻⁶)	TIME 2 μ s (10 ⁻⁶)	VELOCITY 1 ft/s	VELOCITY 2 ft/s	AVERAGE VELOCITY	PENET. P/C	OBLIQUITY	CALIPER BFD	NOTES
1	54.9	21.1	1492	1193	3351	3353	3352	C	0°		
2	55.1	21.1	1493	1194	3349	3350	3350	C	0°		
3	55.0	21.1	1476	1181	3388	3387	3388	C	0°		
4	55.2	21.1	1478	1182	3383	3384	3384	C	0°		
5	55.6	21.1	1499	1199	3336	3336	3336	C	0°		
6	55.1	21.1	1478	1183	3383	3381	3382	C	0°		
7	55.2	21.1	1500	1200	3333	3333	3333	C	0°		
8	55.5	21.1	1480	1184	3378	3378	3378	C	0°		
9	55.1	21.1	1489	1192	3358	3356	3357	C	0°		
10	55.4	21.1	1474	1180	3392	3390	3391	C	0°		

REMARKS:

P=Partial Penetration
C=Complete Penetration
UH=Unfair Hit
Projectile Yaw Check: <5° for all velocity shots

TEST RESULTS:

Test sample satisfied the requirements given.

FOOTNOTES:

Impact Number	Resistance Level	Pass / Fail	Description of Occurance
1	1	PASS	No visible damage.
2	1	PASS	Crack / Blemish forming in the middle of the sample.
3	2	PASS	Crack extended.
4	2	PASS	No change.
5	3	PASS	No change.
6	3	PASS	No change.
7	4	PASS	No change.
8	4	PASS	No change.
9	5	PASS	Sample pushed out of frame but cant fit fail shape through.
10	5	FAIL	Glass shattered leaving an openig big enough for our fail shape.



OREGON BALLISTIC LABORATORIES



ASTM F3561 Impactor



OBL #38125 – Pre Test



OBL #38125 – Post Test



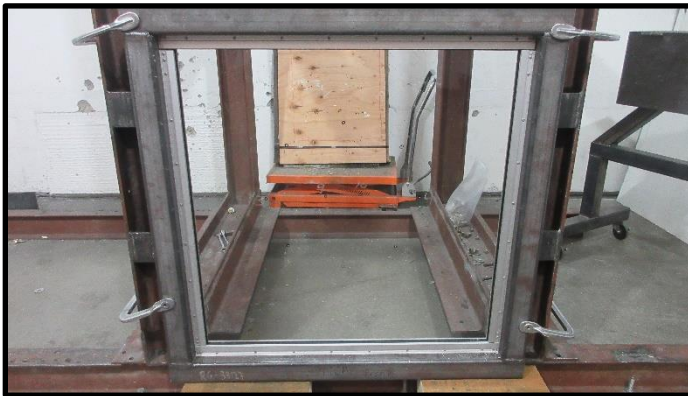
OBL #38126 – Pre Test



OREGON BALLISTIC LABORATORIES



OBL #38126 – Post Test



OBL #38127 – Pre Test



OBL #38127 – Post Test