

# Product Guide

## Saf-Glas / EnergyGlass Natural and Man-Made Disaster Resistant Glass

### ENERGYGLASS ELECTRICAL GENERATING BULLET RESISTANT GLASS “PASS ALL”

Code	Threat	Velocity Range (ft/sec)	Spacing shots (in.)	Shot Pattern	Standard	Thickness
<b>SAF-GLAS / ENERGYGLASS British Ballistic Standards</b>						
BS-SAF H1	9 mm Parabellum 115 gr FMJ	1,280 to 1,378	3	3.93	3.93 in. triangle in a 7.87 in. square	BSI GO 5/8"
BS-SAF H3	.357 Magnum 158 gr JSP	1,427 to 1,526	3	3.93	3.93 in. triangle in a 7.87 in. square	BSI G1 3/4"
BS-SAF H4	.44 Magnum 240 gr JSP	1,496 to 1,594	3	3.93	3.93 in. triangle in a 7.87 in. square	BSI G2 1"
BS-SAF R1	.223 cal. 5.56 NATO 63 gr M855 / SS109	3,015 to 3,114	3	3.93	3.93 in. triangle in a 7.87 in. square	BSI R1 1-1/2"
BS-SAF R2	.30 cal. 7.62 NATO 147 gr M80	2,674 to 2,772	3	3.93	3.93 in. triangle in a 7.87 in. square	BSI R2 1-3/4"

<b>SAF-GLAS / ENERGYGLASS Australian Ballistic Standards</b>						
AS-SAF H1	9 mm Parabellum 115 gr FMJ	1,294 to 1,362	3	3.93	3.93 in. triangle in a 7.87 in. square	AS GO 5/8"
AS-SAF H3	.357 Magnum 158 gr SWC	1,467 to 1,532	3	3.93	3.93 in. triangle in a 7.87 in. square	AS G1 3/4"
AS-SAF H4	.44 Magnum 240 gr SWC	1,568 to 1,634	3	3.93	3.93 in. triangle in a 7.87 in. square	AS G2 1"
AS-SAF R1	.223 cal. 5.56 NATO 55 gr M193	3,182 to 3,248	3	3.93	3.93 in. triangle in a 7.87 in. square	AS R1 1-1/2"
AS-SAF R2	.30 cal. 7.62 NATO 147 gr M80	2,766 to 2,831	3	3.93	3.93 in. triangle in a 7.87 in. square	AS R2 1-3/4"

**SAF-GLAS / ENERGYGLASS ASTM Ballistic Standards**

ASTM-SAF H2	.38 Super 130 gr FMJ	1,230 to 1,330	3	6.93	8 in. Ø circle 120 ° apart	ASTM .38 Super	5/8"
ASTM-SAF H4	.44 Magnum 240 gr JSP	1,400 to 1,500	3	6.93	8 in. Ø circle 120 ° apart	ASTM .44 Magnum	1"
ASTM-SAF R2	.30 cal. 7.62 NATO 147 gr M80	2,750 to 2,850	3	6.93	8 in. Ø circle 120 ° apart	ASTM Rifle	1-3/4"
ASTM-SAF S1	12 Gauge 3.0 inch Mag. 808 gr # 00 Buck	1,265 to 1,365	3	6.93	8 in. Ø circle 120 ° apart	ASTM Shotgun	1-5/8"
ASTM-SAF S2	9 mm Parabellum 124 gr FMJ	1,350 to 1,450	3	6.93	8 in. Ø circle 120 ° apart	ASTM Sub M.G.	3/4"

**SAF-GLAS / ENERGYGLASS Brunswick Ballistic Standards**

BW-SAF R3	.30 7.62 NATO 147 gr M59	V50	-	-	-	Brunswick	1-3/4"
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**SAF-GLAS / ENERGYGLASS Canadian Ballistic Standards**

CA-SAF R1	.223 cal. 5.56 NATO 55 gr M193	3,200 to 3,300	3	6.93	8 in. Ø circle 120 ° apart	Canadian Vehicle	1-1/2"
CA-SAF R4	.30 cal. 7.62 NATO 147 gr C21	2,800 to 2,900	3	6.93	8 in. Ø circle 120 ° apart	Canadian Vehicle	1-3/4"

**SAF-GLAS / ENERGYGLASS European Standard EN 1063**

EN-SAF BR1	.22 LR 40 grain Lead Round	1,048 to 1,214	3	4.7	4.3 to 5.1 in. triangle	EN BR1	5/8"
EN-SAF BR2	9 mm Parabellum 124 gr FSJ RNSC	1,280 to 1,345	3	4.7	4.3 to 5.1 in. triangle	EN BR2	3/4"
EN-SAF BR3	.357 Magnum 158 gr FSJ Coned Soft Core	1,378 to 1,444	3	4.7	4.3 to 5.1 in. triangle	EN BR3	3/4"
EN-SAF BR4	.44 Magnum 240 gr FCJ Flat Nose Soft Core	1,411 to 1,476	3	4.7	4.3 to 5.1 in. triangle	EN BR4	1"
EN-SAF BR5	5.56 x 45 NATO 62 gr SS109 (M855)	3,084 to 3,150	3	4.7	4.3 to 5.1 in. triangle	EN BR5	1-1/2"
EN-SAF BR6	7.62 x 51 NATO 147 gr FSJ (M80)	2,690 to 2,756	3	4.7	4.3 to 5.1 in. triangle	EN BR6	2"
EN-SAF BR7	7.62 x 51 NATO 150 gr FCJ steel hard core	2,657 to 2,723	3	4.7	4.3 to 5.1 in. triangle	EN BR7	2"

**SAF-GLAS / ENERGYGLASS Federal Railroad Administration FRA Ballistic Standards**

FRA-SAF BR1a	.22 LR 40 gr Lead	min. of 960	1	-	Center shot	FRA I Part 1	5/8"
FRA-SAF BR1b	.22 LR 40 gr Lead	min. of 960	1	-	Center shot	FRA II Part 1	5/8"

**SAF-GLAS / ENERGYGLASS German DIN Ballistic Standards**

DIN-SAF H1f	9 mm Parabellum 124 gr FMJ	1,165 to 1,198	3	5.1	4.9 to 5.3 in. triangle	DIN C1-SF	5/8"
DIN-SAF H3f	.357 Magnum 158 gr FMJ	1,362 to 1,394	3	5.1	4.9 to 5.3 in. triangle	DIN C2-SF	3/4"
DIN-SAF H4f	.44 Magnum 240 gr FMJ	1,427 to 1,460	3	5.1	4.9 to 5.3 in. triangle	DIN C3-SF	1"
DIN-SAF R2f	.30 cal. 7.62 NATO 147 gr M80	2,575 to 2,608	3	5.1	4.9 to 5.3 in. triangle	DIN C4-SF	2"
DIN-SAF H1a	9 mm Parabellum 124 gr FMJ	1,165 to 1,198	3	5.1	4.9 to 5.3 in. triangle	DIN C1-SA	5/8"
DIN-SAF H3a	.357 Magnum 158 gr FMJ	1,362 to 1,394	3	5.1	4.9 to 5.3 in. triangle	DIN C2-SA	3/4"
DIN-SAF H4a	.44 Magnum 240 gr FMJ	1,427 to 1,460	3	5.1	4.9 to 5.3 in. triangle	DIN C3-SA	1"
DIN-SAF R2a	.30 cal. 7.62 NATO 147 gr M80	2,575 to 2,608	3	5.1	4.9 to 5.3 in. triangle	DIN C4-SA	2"

**SAF-GLAS / ENERGYGLASS MIL-SAMIT Ballistic Standards**

MIL-SAF R2	.30 cal. 7.62 NATO 147 gr M80	2,750 to 2,850	25	6.93	8 in. $\emptyset$ circle 120 ° apart		2"
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**SAF-GLAS / ENERGYGLASS National Institute of Justice (NIJ) Ballistic Standards**

NIJ-SAF BR2-I1	.22 LR HV 40 gr Lead	1,010 to 1,090	5	4.24	>2 in. (4.24 in. on 12x12 in. sample)	NIJ I Part 1	5/8"
NIJ-SAF H5-I2	.38 Special 158 gr RNL	800 to 900	5	4.24	>2 in. (4.24 in. on 12x12 in. sample)	NIJ I Part 2	5/8"
NIJ-SAF H1-IIA1	9 mm Parabellum 124 gr FMJ	1,050 to 1,130	5	4.24	>2 in. (4.24 in. on 12x12 in. sample)	NIJ II-A Part 1	5/8"
NIJ-SAF H3-IIA2	.357 Magnum 158 gr JSP	1,200 to 1,300	5	4.24	>2 in. (4.24 in. on 12x12 in. sample)	NIJ II-A Part 2	3/4"
NIJ-SAF H1-II1	9 mm Parabellum 124 gr FMJ	1,135 to 1,215	5	4.24	>2 in. (4.24 in. on 12x12 in. sample)	NIJ II Part 1	5/8"
NIJ-SAF H3-II2	.357 Magnum 158 gr JSP	1,345 to 1,445	5	4.24	>2 in. (4.24 in. on 12x12 in. sample)	NIJ II Part 2	3/4"
NIJ-SAF H4-IIIA1	.44 Magnum 240 gr SWC	1,350 to 1,450	5	4.24	>2 in. (4.24 in. on 12x12 in. sample)	NIJ III-A Part 1	1"



NIJ-SAF H1-III A2	9 mm Parabellum 124 gr FMJ	1,350 to 1,450	5	4.24	>2 in. (4.24 in. on 12x12 in. sample)	NIJ III-A Part 2	3/4"
NIJ-SAF R2-III	.30 cal. 7.62 NATO 147 gr M80	2,700 to 2,800	5	4.24	>2 in. (4.24 in. on 12x12 in. sample)	NIJ III	2"

### SAF-GLAS / ENERGYGLASS State Department (SD) Ballistic Standards

SD-SAF H1	9 mm Parabellum 115 gr SFMJ	1,350 to 1,450	3	6.93	8 in. Ø circle 120 ° apart	SD Minimum Part 1	5/8"
SD-SAF H1b	12 Gauge 2 3/4 inch 556 gr # 4 Buck	1,275 to 1,375	1	-	Center shot	SD Minimum Part 2	1-5/8"
SD-SAF R2	.30 cal. 7.62 NATO 147 gr M80	2,700 to 2,800	1	-	Center shot	SD Rifle Part 1	2"
SD-SAF R1	.223 cal. 5.56 NATO 55 gr M193	3,135 to 3,235	1	-	Center shot	SD Rifle Part 2	1-1/2"
SD-SAF R1b	.223 cal. 5.56 NATO 63 gr M855	min. of 2,950	1	-	Center shot	SD Rifle Part 3	1-5/8"
SD-SAF R5	12 Gauge 2 3/4 inch 556 gr # 4 Buck	1,275 to 1,375	1	-	Center shot	SD Rifle Part 4	1-5/8"

### SAF-GLAS / ENERGYGLASS Underwriters Laboratory UL 752 Ballistic Standards

UL-SAF H-L1P1	9 mm Parabellum 124 gr FMJ	1,175 to 1,293	3	4	4.0 inch triangle	UL Level 1 Part 1	5/8"
UL-SAF H-L1P2	9 mm Parabellum 124 gr FMJ	1,175 to 1,293	2	1.5	1.25 to 1.75 in.	UL Level 1 Part 2	5/8"
UL-SAF H-L1P3	9 mm Parabellum 124 gr FMJ	1,175 to 1,293	1	-	Unsupported edge shot	UL Level 1 Part 3	5/8"
UL-SAF H-L2P1	.357 Magnum 158 gr JSP	1,250 to 1,375	3	4	4.0 inch triangle	UL Level 2 Part 1	3/4"
UL-SAF H-L2P3	.357 Magnum 158 gr JSP	1,250 to 1,375	2	1.5	1.25 to 1.75 in.	UL Level 2 Part 2	3/4"
UL-SAF H-L2P3	.357 Magnum 158 gr JSP	1,250 to 1,375	1	-	Unsupported edge shot	UL Level 2 Part 3	3/4"
UL-SAF H-L3P1	.44 Magnum 240 gr SWC	1,350 to 1,485	3	4	4.0 inch triangle	UL Level 3 Part 1	1"
UL-SAF H-L3P2	.44 Magnum 240 gr SWC	1,350 to 1,485	2	1.5	1.25 to 1.75 in.	UL Level 3 Part 2	1"
UL-SAF H-L3P3	.44 Magnum 240 gr SWC	1,350 to 1,485	1	-	Unsupported edge shot	UL Level 3 Part 3	1"
UL-SAF R-L4P1	.30 cal. 30-06 180 gr JSP	2,540 to 2,794	1	-	Center shot	UL Level 4 Part 1	1-5/8"
UL-SAF R-L4P2	.30 cal. 30-06 180 gr JSP	2,540 to 2,794	1	-	Unsupported edge shot	UL Level 4 Part 2	1-5/8"
UL-SAF R-L5P1	.30 cal. 7.62 NATO 150 gr FMJ	2,750 to 3,025	1	-	Center shot	UL Level 5 Part 1	1-5/8"
UL-SAF R-L5P2	.30 cal. 7.62 NATO 150 gr FMJ	2,750 to 3,025	1	-	Unsupported edge shot	UL Level 5 Part 2	1-5/8"
UL-SAF R-L6	9 mm Parabellum 124 gr FMJ	1,400 to 1,540	5	3.18	4.5 inch square	UL Level 6	3/4"

UL-SAF R-L7	.223 cal. 5.56 NATO 55 gr FMJ	3,080 to 3,388	5	3.18	4.5 inch square	UL Level 7	1-3/4"
UL-SAF R-L8	.30 cal. 7.62 NATO 150 gr FMJ	2,750 to 3,025	5	3.18	4.5 inch square	UL Level 8	2"

**SAF-GLAS ENERGYGLASS QUANTICO DEPARTMENT OF THE ARMY (FPED) Joint Chiefs**

Q-SAF-66	9mm Parabellum 124 gr FMJ	1,175 to 1,293	3	1.5	1.25	PAS Range	5/8"
S-SAF-617	.44 Magnum 158 gr FMJ	1,350 to 1,485	3	1.5	1.25 in.	PAS Range	1"
S-SAF-743	.30 cal 7.62 NATO 150 gr FMJ	3,080 to 3,388	3	4	Triangle	PAS Range	1-5/8"
R-SAF-188	.223 cal 5.56 NATO 63 gr M855	3100	1		Center shot	PAS Range	1-5/8"
R-SAF-189	.223 cal 5.56 NATO 62 gr AP	2900	1		Center shot	PAS Range	2"
R-SAF-1194	.30 cal 7.62 NATO 150 gr FMJ	3,080 to 3,388	3	4	Triangle	PAS Range	2"

**ENERGYGLASS ELECTRICAL GENERATING BOMB BLAST GLASS "PASS ALL"**

CODE	THREAT	LOAD	DURATION	RESULT	GRADE	THICKNESS
<b>SAF-GLAS / ENERGYGLASS BOMB BLAST RESISTANT GLASS</b>						
B-BLA-77	4psi	Air cannon	4	No thru opening	1	9/16"
B-BLA -78	4 psi	Air cannon	31	No thru opening	1	9/16"
B-BLA -79	4 psi	Air cannon	60	No thru opening	2	9/16"
B-BLA-88	10 psi	Air cannon	22	No thru opening	3a	9/16"
B-BLA-90	10 psi	Air cannon	31	No thru opening	3a	9/16"
B-BLA-92	10 psi	Air cannon	60	No thru opening	3b	9/16"

**SAF-GLAS / ENERGYGLASS BOMB BLAST RESISTANT GLASS ARENA**

A-BOM-88	Claymore mine 35'	.30 cal ball		Hi veloc	No thru opening	Pass	9/16"
A-BOM-90	Claymore mine 30'	.30 cal ball		Hi veloc	No thru opening	Pass	9/16"
A-BOM-92	Claymore mine 25'	.30 cal ball		Hi veloc	No thru opening	Pass	5/8"

A-BOM-96	Handgrenade 10'	1/8" ball bearings		Hi veloc	No thru opening	Pass	9/16"
A-BOM-98	Handgrenade 5'	1/8" ball bearings		Hi veloc	No thru opening	Pass	9/16"
A-BOM-101	50 lb 30'	TNT		Hi veloc	No thru opening	Pass	9/16"
A-BOM-104	50 lb 15'	TNT		Hi veloc	No thru opening	Pass	3/4"
A-BOM-106	50 lb 6'	TNT		Hi veloc	No thru opening	Pass	1-3/4"
A-BOM-108	50 lb ground zero	TNT		Hi veloc	No thru opening	Pass	2-1/2"
SO-TES-9	M2 flamethrower 20'	Gas		Med	No thru opening	Pass	1-1/2"
SO-TES-10	M2 flamethrower 15'	Gas		Med	No thru opening	Pass	1-1/2"

**ENERGYGLASS ELECTRICAL GENERATING PHYSICAL ATTACK GLASS “PASS ALL”**

SAF-GLAS/ ENERGYGLASS PHYSICAL ATTACK RESISTANT GLASS							
CODE	THREAT	CATEGORY		RESULT		GRADE	THICKNESS
SAF-02	Human impact	protect			No thru opening	Pass	7/16"
SAF-04	Blunt impacting 5 min	I			No thru opening	Pass	9/16"
SAF-06	Blunt impacting 15 min	DOS			No thru opening	Pass	1-5/8"
SAF-08	Blunt impacting 30 min	HP			No thru opening	Pass	1-1/4"
SAF-10	Blunt impacting Seq I	ASTM			No thru opening	Pass	5/8"
SAF-12	WMFL III	WMFL			No thru opening	Pass	3/4"
SAF-14	WMFLII	WMFL			No thru opening	Pass	5/8"
SAF-16	Level I	HP White			No thru opening	Pass	1/2"
SAF-18	Level II	HP White			No thru opening	Pass	5/8"
SAF-20	Level III	HP White			No thru opening	Pass	3/4"
SAF-test	80 min	Pas Range			No thru opening	Pass	1"
SR-5096	60 min	EN			No thru opening	Pass	9/16"
SAF-GLAS-1	10 min	Commercial			No thru opening	Pass	5/8"

SAF-08	15 min	FRA			No thru opening	Pass	5/8"
Acryl-01	30 min	HP White			No thru opening	Pass	3/4"
Acryl-02	60 min	HP White			No thru opening	Pass	7/8"
PC-08	30 min	HP White			No thru opening	Pass	5/8"
PC-10	60 min	HP White			No thru opening	Pass	3/4"
PC-.5	10 min	UL 972			No thru opening	Pass	9/16"
SAF-66	Architectural impact	IBC			No thru opening	Pass	7/16"
SAF-86	Architectural impact	IBC			No thru opening	Pass	5/8"
SAF-96	Architectural impact	IBC			No thru opening	Pass	3/4"

**ENERGYGLASS ELECTRICAL GENERATING FIRE RESISTANT GLASS “PASS ALL”**

**SAF-GLAS / ENERGYGLASS FIRE RESISTANT GLASS**

CODE	THREAT	CATEGORY			RESULT	GRADE	THICKNESS
F-12	20 min	Fire no HS			No thru opening	Pass	1/4"
F-14	30 min	Fire no HS			No thru opening	Pass	3/16"
F-16	45 min	Fire and HS			No thru opening	Pass	3/16"
F-18	60 min	Fire and HS			No thru opening	Pass	3/16"
F-20	90 min	Fire and HS			No thru opening	Pass	3/16"
F-24	120 min	Fire and HS			No thru opening	Pass	3/16"
F-28	180 min	Fire and HS			No thru opening	Pass	3/16"
SFBH-1	20 min impact	Fire no HS			No thru opening	Pass	1/2"
SFBH-2	45 min impact	Fire and HS			No thru opening	Pass	9/16"
SFBH-3	60 min impact	Fire and HS			No thru opening	Pass	9/16"
SPFBH-01	20 min non impact	Fire no HS			No thru opening	Pass	1/4"
SPFBH-02	45 min non impact	Fire and HS			No thru opening	Pass	1/2"
SPFBH-03	60 min non impact	Fire and HS			No thru opening	Pass	9/16"

**ENERGYGLASS ELECTRICAL GENERATING WEATHER: HURRICANE / TORNADO / EARTHQUAKE / TYPHOON RESISTANT GLASS “PASS ALL”**

**SAF-GLAS / ENERGYGLASS WEATHER: HURRICANE / TORNADO / EARTHQUAKE / TYPHOON**

CODE	THREAT	CATEGORY	RESULT	GRADE	THICKNESS
HW-26	Hurricane cat I	Impact / cycle	No thru opening	Pass	5/16"
HW-28	Hurricane cat II	Impact / cycle	No thru opening	Pass	5/16"
HW -30	Hurricane cat III	Impact / cycle	No thru opening	Pass	7/16"
HW-38	Hurricane cat IV	Impact / cycle	No thru opening	Pass	7/16"
HW-42	Hurricane cat V	Impact / cycle	No thru opening	Pass	9/16"
HW-44	Hurricane cat VI	Impact / cycle	No thru opening	Pass	5/8"
HW-48	Hurricane level E	Impact / cycle	No thru opening	Pass	3/4"
TW-04	Tornado level V	Impact / cycle	No thru opening	Pass	3/4 "
EAW-08	Earthquake Level 6	Siesmic active	Stayed in place	Pass	9/16"