

# SCHOTT Glass laminates – Protection against consecutive multiple attacks

The world's first special glass products that successfully withstand consecutive fire and ballistic attacks

SCHOTT's new safety laminates now offer the possibility to reliably protect buildings against multiple and combined attacks. Such situations may occur, for example, when glass panes are first exposed to fire from a Molotov cocktail and then fired upon.

Other safety glasses available on the market to date, have offered protection against various types of attacks, but always

against only one form of attack in the event of an emergency. The unique thing about the new PYRANOVA® secure and NOVOLAY® secure laminates is that they successfully withstand successive and simultaneous attacks: A glass laminate damaged by gunshot will still provide reliable protection against fire. In the same manner, the laminated panel will still stand up to gunshot after being exposed to fire.

## Standard products | Consecutive multiple attacks: Fire protection<sup>1</sup> after bullet resistance<sup>2</sup>

Ballistic class <sup>2</sup>	Fire resistance class <sup>1</sup>	Product name	Type number	Fire resistance class <sup>1</sup> after ballistic attack <sup>2</sup>	Thickness in mm	Weight in kg/m <sup>2</sup>	Last layer (safe side)
BR2NS	EI 30	PYRANOVA® secure MC BR2NS	14.0.1	EI 30 after BR2NS	34	79	Glass
BR4NS	EI 30	PYRANOVA® secure MC BR4NS	14.0.2	EI 30 after BR4NS	52	114	Glass
BR6NS	EI 30	PYRANOVA® secure MC BR6NS	14.0.3	EI 30 after BR6NS	76	168	Glass
BR2NS	EI 30	PYRANOVA® secure 30 BR2NS	14.0.4	EI 30 after BR2NS	52	114	Glass
BR2NS	EI 30	PYRANOVA® secure 30 BR2NS	14.0.5	EI 30 after BR2NS	36	80	PC
BR4NS	EI 30	PYRANOVA® secure 30 BR4NS	14.0.6	EI 30 after BR4NS	68	149	Glass
BR6NS	EI 30	PYRANOVA® secure 30 BR6NS	14.0.7	EI 30 after BR6NS	75	170	Glass

<sup>1</sup> based on EN 13501-2

<sup>2</sup> based on EN 1063

PC = last layer polycarbonate

## Standard products | Consecutive multiple attacks: Bullet resistance<sup>2</sup> after fire protection<sup>1,3</sup>

Ballistic class <sup>2</sup>	Fire resistance class	Product name	Type number	Ballistic attack <sup>2</sup> after fire (Classification according to 1063)	Thickness in mm	Weight in kg/m <sup>2</sup>	Last layer (safe side)
BR2NS	MC <sup>3</sup>	PYRANOVA® secure MC BR2NS	14.0.1	BR2NS after MC <sup>3</sup>	34	79	Glass
BR4NS	MC <sup>3</sup>	PYRANOVA® secure MC BR4NS	14.0.2	BR4NS after MC <sup>3</sup>	52	114	Glass
BR6NS	MC <sup>3</sup>	PYRANOVA® secure MC BR6NS	14.0.3	BR6NS after MC <sup>3</sup>	76	168	Glass
BR2NS	EI 30 <sup>1</sup>	PYRANOVA® secure 30 BR2NS	14.0.4	BR2NS after EI 30 <sup>1</sup>	52	114	Glass
BR2NS	EI 30 <sup>1</sup>	PYRANOVA® secure 30 BR2NS	14.0.5	BR2NS after EI 30 <sup>1</sup>	36	80	PC
BR4NS	EI 30 <sup>1</sup>	PYRANOVA® secure 30 BR4NS	14.0.6	BR4NS after EI 30 <sup>1</sup>	68	149	Glass
BR6NS	EI 30 <sup>1</sup>	PYRANOVA® secure 30 BR6NS	14.0.7	BR4NS after EI 30 <sup>1</sup>	75	170	Glass

<sup>1</sup> based on EN 13501-2

<sup>2</sup> based on EN 1063 (Unlike standard test, samples are fired upon immediately after fire test while still hot.)

<sup>3</sup> Fire exposure based on Molotov cocktail (high temperature, short exposure)

PC = last layer polycarbonate



**Standard products | Consecutive multiple attacks: Explosion resistance<sup>4</sup> after ballistic attack<sup>2</sup>**

Ballistic class <sup>2</sup>	Physical attack class	Product name	Type number	Blast/ Shock tube general	Shock tube <sup>4</sup> after ballistic attack <sup>2</sup>	Thickness in mm	Weight in kg/m <sup>2</sup>	Last layer (safe side)
BR2NS	P6B	NOVOLAY® secure BR2NS	1.4.5	ER4NS	ER4NS after BR2NS	24	52	Glass
BR4NS	P8B	NOVOLAY® secure BR4NS	1.5.4	ER4NS	ER4NS after BR4NS	44	94	Glass
BR6NS	P8B	NOVOLAY® secure BR6NS	1.5.7	ER4NS	ER4NS after BR6NS	63	137	Glass
BR7NS	P8B	NOVOLAY® secure BR7NS	1.1.2	ER4NS	ER4NS after BR7NS	74	162	Glass

<sup>2</sup> based on EN 1063

<sup>4</sup> based on EN 13541

**Standard products | Consecutive multiple attacks: Fire protection<sup>1</sup> after ballistic attack<sup>2</sup> and explosion resistance<sup>4</sup>**

Ballistic class <sup>2</sup>	Fire resistance class	Product name	Type number	Blast/ Shock tube general	Shock tube after ballistic attack	Thickness in mm	Weight in kg/m <sup>2</sup>	Last layer (safe side)
BR2NS	EW 30 / EW 60	NOVOLAY® secure BR2NS	1.4.5	ER4NS	E 60 after BR2NS und ER4NS	24	52	Glass
BR4NS	EI 20 / EW 30 / E 60	NOVOLAY® secure BR4NS	1.5.4	ER4NS	E 60 after BR4NS und ER4NS	44	94	Glass
BR6NS	EI 30 / EW 30 / E 60	NOVOLAY® secure BR6NS	1.5.7	ER4NS	EI 30 / E 60 after BR6NS und ER4NS	63	137	Glass
BR7NS	EI 45 / EW 60 / E 60	NOVOLAY® secure BR7NS	1.1.2	ER4NS	EI 30 / E 60 after BR7NS und ER4NS	74	162	Glass

<sup>1</sup> based on EN 1363

<sup>2</sup> based on EN 1063

<sup>4</sup> based on EN 13541



Test: Large fire test after gun shots



Test: Gun shots after small fire test

**Fire resistance test methods:**

Two different types of test methods are used to rate the fire resistance times of safety glass. In the uniform-temperature-time-curve test, the glass reaches a temperature of over 500°C after only 5 minutes in a large furnace. In the second test using a Molotov cocktail, the glass panes are exposed to temperatures exceeding 700 °C after only 5 minutes.