

www.press-glas.com



Largest Polish producer

Press-Glas firm was founded in 1991 and constantly strengthens its leading position on the glass market by continual perfection of the system of production management and customer service as well as systematic modernisation of technological equipment and increasing the quality of products. All investments are undertaken to offer a better product range intended to satisfy consumer needs. Their visible satisfaction regarding the partnership with Press-Glas company justifies the decisions taken. At present, customers of Press-Glas are served by three factories located in Poland: Nowa Wieś (near Częstochowa), Tychy, Tczew (near Gdańsk).

State-of-the art technology

Press-Glas realizes its investment plans with singlemindedness, which expands the level of the technology used. Press-Glas has the following up-to-date facilities at its disposal for glass treatment:

- automatic lines for glazing with maximum panel dimensions 2700 x 5000 mm,
- tables for cutting and shaping glass of the float type, coated glass and laminated glass,
- furnaces for hardening (tempering) of glass,
- abrasive lines for blunting, grinding, polishing and chamfering edges of glass,
- stationary drills,
- lines for cutting fire-resistant glass,

- facilities for glazing glass with silk-screen printing, as well as a ceramic or silicon coating, which allows for the production of non-transparent glass (the so-called spandrel),
- automatic benders for forming and defficant insertion spacerbars.

All the afore-mentioned equipment is manned by a highly qualified staff, which allows for the highest level of quality production.

Best quality

The main aim of Press-Glas is to strengthen its leading position in the market of double-glazing glass and the continual expansion of the highly-processed, special glass on offer. The constant strive for the highest quality of products and customer services bore fruit in 1999, when the firm was awarded the ISO Standard 9002 and in 2002, when the firm achieved the ISO Standard 9001:2000. According to the norms

> of ISO, it is in recognition of high quality and reliability of the products and the high level of services provided.



Our assets

The strong attributes of the firm which single it out among other producers of glazed units, are as follows:

high quality products confirmed by ISO 9001:2000 certification,

- short delivery time,
- European range of activity,
- state-of-the-art technology and development of production base,
- professional technical expertise,
- integrated, computer operated production and delivery management;
- control of orders with the use of the Internet,
- transport by self-unloading trucks at client's request,
- expansion of client base with the help of seminars

and presentations.

Awards

Bizzbesu

Gazela Biznesu 2004

Press-Glas received the Kryształowe Skrzydła (Crystal Wing Prize) awarded by the editor of the periodical świat Szkła (The World of Glass) to an outstanding window glass manufacturer. The company has also been twice nominated for the promotion logo "Teraz Polska" and is regularly classified among the best firms in Poland in ranking systems that are published by renowned economic journals and magazines.

The Top-Glas low emission double-glazed unit was awarded a gold medal at the international building fair BUDMA in Poznań, Poland.

It has also received the statue known as "Gazela Biznesu" (The Gazelle of Business) in one of the most prestigious economic ranking systems, which was announced by the editor's office of the magazine entitled "Puls Biznesu".

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Energy saving and solar control

Low emission glass



Function

One of the main tasks of the modern glass production industry is the limitation of heat emission. In recent years there has been a huge improvement in this limitation by glass structures. Low emission glass helps to economise on heating expenses.

Structure

A low emission double-glazed unit consists of two panes of glass, of which one (Thermofloat type) contains an invisible composition of metals (the so-called low emission coating). A thin, invisible coating lets the light and solar energy inside while preventing the heat from going out. The space between the two panes of glazing is filled with noble gas to further reduce the heat transfer coefficient Ug.

Advantages

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- helps to economise on heating expenses,
- guarantees optimum room temperature,
- ensures high light transmission,
- limits the condensation phenomenon,
- reduces ultraviolet transmission (UV),
- helps protect the environment by reduced emission of carbon dioxide into the atmosphere.

76

85

Heat transfer coef-

ficient

0,6

0,9

1,0

1,1

2,9

5,8

Ug [W/m²K]

Type of glass	Structure [mm]	Light transmission	Light reflection	Total energy transmission (solar factor)
	T - Thermofloat	L _T [%]	L _R [%]	g [%]
Top-Glas Plus Ug=0,6	4T/10/4/10/4T with krypton	65	17	42
Top-Glas K Ug=0,9	4T/16/4T with krypton	72	12	45
Top-Glas Ultra Ug=1,0	4/16/4T with argon	80	12	63
Top-Glas Ug=1,1	4/16/4T	76	13	56

83

90

Light transmission

The offer of double glazed low-emission glass

with argon

4/16/4

with air

4

Standard

Single glass

Ug=2,9



Warm edge

Objectives

Offer

Up to recent times, tests by producers aimed at improving the thermal qualities of the glass units has been limited to the perfection of the basic component, which is the glass itself, or filling the space between the panes with gas of defined qualities in order to achieve the best coefficient value (Ug). However, there is also the influence of the linear heat conductivity on the edges of the glass pane which must be taken into account in the case of insulating glass units. Up to now, the aluminium spacerbar has been widely in use, which is an essential element of glass units, while in the case of higher heat conduction coefficient values, warm window frames and glazings turned out to be poor elements in making double glazing glass. Aluminium is a much better carrier of heat than the remaining parts of the window construction, so an aluminium spacerbar is the final exit point for heat to move from the interior to the external area. A solution to this problem could be to apply a spacerbar, which is made from highly insulating material known as "warm edge". The application of a warm spacerbar improves thermal insulation along the edges, which in turn increases the temperature in this area and reduces the risk of temporary water vapour condensation. In effect, the permissible air humidity which in given conditions creates steam on the surface of the glass pane can be controlled due to the application of a warm spacerbar, as the temperature is 10-15% higher and so there is less danger of condensation.

- bent spacerbar with thin walls of stainless steel,

- bent spacerbar TERMO in chosen palette of colours.

Corners

One of the most essential criteria which is taken into account when assessing insulating glass units is the imperviousness, both in cases of humidity getting into the interior of the pane and losses of gas which is used inside panes to improve the thermal or soundproof parameters. In order to assure the highest level of parameters, the warm spacerbar applied in double glazing glass should not be cut or connected at corners by plastic connectors. Such a method of forming a spacerbar has the effect of reducing the imperviousness of the glass units, which can cause faster losses of noble gas in the spacing between the two panes, which in turn causes a worsening of heat insulation and destroys the benefits of using warm spacerbars. The weak points of corners in double glazing glass made from cut frames are eliminated by the use of bent spacerbars in corners, which is one of the fundamental solutions in the direction of creating products of the highest quality parameters.

Advantages

In offering our clients warm spacerbars, Press-Glas has the following benefits in mind:

- energy saving, due to the reduction of the linear heat leakage bridge,
- elimination of the risk of condensation on the edges of the panes,
- wide range of possibilities with regard to their use,
- ease of assembling internal divider bars,
- mechanical properties are analogical to that of aluminium spacerbars.

Conditions of research	Construction of glass unit	Type of profile regarding window frames	Type of spacerbar	Temperature on the edges of the inner pane	Δt on the edge and centre of the inner pane	Condensation point on the edge of the inner pane		
				[°C]	[°K]	[%]		
External tem-	Top-Glas Ug=1,1	Wood	Plastic	13,3	4,5	64,1		
perature 0°C	4/16/41 with Argon		Stainless steel	12,4	5,2	62,8		
Internal tem-					Aluminium	10,8	6,8	55,7
+ 20°C		PCV	Plastic	13,2	4,7	64,3		
			Stainless steel	12,5	5,3	62,3		
			Aluminium	11,1	6,7	56,2		

Temperatures on the edges of the inner pane in double glazing glass which is assembled in windows.

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BANK ŚLĄSKI - HEADQUARTERS, KATOWICE - ARCH. M. KUBACZKA; COOL LITE SKN 165

Ress-Glas

RAIFFEISEN BUSINESS CENTER, WARSZAWA ARCH. A. WYSZYŃSKI, W. HERMANOWICZ, P. MAJEWSKI LUXGUARD NEUTRAL 52

Solar control glass

Applications

For many years architects and designers have been looking for new construction materials that would open up the commercial and residential buildings to the exterior world. They have been fascinated with the properties of glass which proved to be the perfect construction material for the modern era. It offers quality and beauty, helps save energy, and allows for easy assembly. Among its various qualities, there is one which is especially useful for offices and public facilities, namely solar protection. Solar control glass adds character to a building and reduces undesirable heating of the elevation regarding a type of coating.

range of solar control glass products by the most renowned international manufacturers, providing the biggest choice of tint to match a facade.

Types of glass

Solar control glass can be divided into absorptive and reflective glass, based on their visual characteristics and the ability to reduce solar radiation. Press-Glas offers three types of solar control glass:

- THE ABSORPTIVE float glass, flat and transparent, with blue, brown, grey or green tint. It may be used in single glazing or double glazing. This is applied to reduce the transmittance of solar energy.

- THE REFLEXIVE float glass - flat and transparent, neutral or dyed to blue, brown, grey or green in the glass structure, while also coated with metal oxides for proper reflective effect. This is applied to control light, and reduce solar energy transmittance. It may be used in single glazing or double glazing - regarding a type of coating.

- THE SELECTIVE float glass - flat and transparent, neutral or dyed to blue, brown, grey or green in the glass structure, and coated with a metal oxide multilayer, with the aim of achieving the appropriate effect of reflection, control of isolation of rooms, as well as limiting the penetration of solar energy plus a high level of thermal protection. It may be used only in double glazing.



Type of glass with Thermofloat			Light char [%	acteristics 61		Energy cha [%		Heat transfer coefficient Ug [W/m ² K]		
	Structure [mm]	Position of coating*	Ч	LR	ET	EA	ER	g	air	argon
Antisol brown	6/16/6	3	43	7	33	57	10	42	1,4	1,1
Stopsol Classic brown	6/16/6	2 + 3	18	12	17	68	15	25	1,4	1,1
Stopsol Classic brown	6/16/6	1 + 3	18	34	17	51	32	23	1,4	1,1
Antisol blue	6/16/6	3	48	8	28	63	9	37	1,4	1,1
Stopsol Supersilver Dark Blue	6/16/6	2 + 3	35	16	23	64	13	31	1,4	1,1
Stopsol Supersilver Dark Blue	6/16/6	1 + 3	35	31	23	51	26	30	1,4	1,1
Antelio clear	6/16/6	2 + 3	41	27	29	42	29	39	1,4	1,1
Antelio clear	6/16/6	1 + 3	41	33	29	36	35	38	1,4	1,1
Stopsol Classic clear	6/16/6	2 + 3	33	28	28	42	30	37	1,4	1,1
Stopsol Classic clear	6/16/6	1 + 3	33	35	28	35	37	36	1,4	1,1
Antelio silver	6/16/6	2 + 3	59	33	39	27	34	49	1,4	1,1
Antelio silver	6/16/6	1 + 3	59	33	39	25	36	48	1,4	1,1
Antisol grey	6/16/6	3	37	6	30	60	9	39	1,4	1,1
Stopsol Classic grey	6/16/6	2 + 3	16	10	16	71	13	23	1,4	1,1
Stopsol Classic grey	6/16/6	1 + 3	16	34	16	53	31	22	1,4	1,1
Antelio green	6/16/6	2 + 3	48	23	24	62	14	31	1,4	1,1
Antelio green	6/16/6	1 + 3	48	31	23	52	25	30	1,4	1,1
Antisol green	6/16/6	3	63	10	29	62	9	38	1,4	1,1
Stopsol Classic green	6/16/6	2 + 3	27	20	15	73	12	22	1,4	1,1
Stopsol Classic green	6/16/6	1 + 3	27	35	15	56	29	20	1,4	1,1

Primary market offer

This data is based on EN 410, EN 673 requirements

* It is recommended to assemble solar control glass with a layer of metal oxides toward the inside of a glass unit (position #2), otherwise (position #1) it can cause degradation of the layer under weather conditions and air pollution.

Type of glass with Thermofloat			Light chara [%	acteristics 61		Energy cha [%		Heat transfer coefficient Ug [W/m²K]		
	Structure [mm]	Position of coating	Ч	۲ _R	ET	EA	ER	g	air	argon
Sun-Guard Solar Neutral 67	6/16/4	2 + 3	59	19	21	39	40	48	1,4	1,1
Sun-Guard Solar Ligh Blue 52	6/16/4	2 + 3	45	14	15	55	30	36	1,4	1,1
Sun-Guard Solar Silver Grey 32	6/16/4	2 + 3	28	22	19	61	20	24	1,4	1,1
Sun-Guard Solar Silver 20	6/16/4	2 + 3	19	34	13	54	33	17	1,4	1,1
Sun-Guard Solar Silver 10	6/16/4	2 + 3	9	44	6	53	41	10	1,4	1,1
Sun-Guard HP Light Blue 63	6/16/4	2 + 3	59	14	40	41	19	47	1,4	1,1
Sun-Guard HP Neutral 50	6/16/4	2 + 3	49	17	32	46	22	38	1,4	1,1
Sun-Guard HP Neutral 40	6/16/4	2 + 3	39	21	25	50	25	31	1,4	1,1
Sunergy clear	6/16/6	2 + 3	59	11	38	47	15	46	1,4	1,1
Sun-Guard Solar Green 67	6/16/4	2 + 3	47	17	24	64	12	30	1,4	1,1
Sun-Guard Solar Green 52	6/16/4	2 + 3	36	11	18	74	8	23	1,4	1,1
Sun-Guard Solar Green 32	6/16/4	2 + 3	23	16	11	79	10	16	1,4	1,1
Sun-Guard Solar Green 20	6/16/4	2 + 3	16	24	8	78	14	13	1,4	1,1
Sun-Guard Solar Green 10	6/16/4	2 + 3	7	32	4	79	17	8	1,4	1,1
Sun-Guard HP Green 63	6/16/4	2 + 3	48	11	24	68	8	30	1,4	1,1
Sun-Guard HP Green 50	6/16/4	2 + 3	40	12	19	72	9	25	1,4	1,1
Sun-Guard HP Green 40	6/16/4	2 + 3	32	15	15	75	10	21	1,4	1,1
Sunergy green	6/16/6	2 + 3	48	9	24	69	7	31	1,4	1,1
Sunergy Azur blue	6/16/6	2 + 3	48	9	26	66	8	33	1,4	1,1

Special market offer

This data is based on EN 410, EN 673, ISO 10292 requirements



Special market offer

Type of glass with floa		Light characteristics [%]				Energy cha	Heat transfer coefficient			
	Structure [mm]	Position of coating	Ч	LR	ET	EA	ER	g	U	y tw/m-ki
		couting							air	argon
Stopray Carat 52/26 neutral-blu	e 6/16/6	2	52	14	*23	*47	*30	*26	1,4	1,1
Silverstar Combi Neutral 50/2	5 6/16/4	2	50	12	24	51	25	27	1,4	1,1
Stopray Safir 61/32 neutral-blu	e 6/16/6	2	61	15	*29	*37	*34	*32	1,4	1,1
Silverstar Combi Neutral 61/3	2 6/16/4	2	61	13	31	41	28	34	1,4	1,1
Stopray Elite 67/37 neutral-gree	n 6/16/6	2	67	14	*34	*33	*33	*37	1,4	1,1
Silverstar (Select) Combi Neutral 70/4	0 6/16/6	2	70	12	38	34	28	42	1,4	1,1
Stopray Neutral 50/4	0 6/16/6	2	50	13	*34	*46	*20	*40	1,5	1,2
Silverstar Combi Neutral 50/3	7 6/16/6	2	50	18	33	45	22	39	1,6	1,3
Stopray Cristal 61/40 neutr	al 6/16/6	2	61	18	*36	*35	*29	*40	1,4	1,1
Silverstar Combi Neutral 62/4	5 6/16/6	2	62	19	41	33	26	47	1,5	1,2
Sun-Guard HP Neutral 61 cle	ar 6/16/4	2	61	23	39	30	31	42	1,5	1,2
Stopray Silver 43/2	5 6/16/6	2	43	47	*22	*28	*50	*25	1,4	1,1
Silverstar Combi Neutral Silver 43/2	7 6/16/6	2	43	45	24	30	46	28	1,4	1,1
Sun-Guard HP Silver 4	3 6/16/4	2	42	31	29	35	36	31	1,5	1,2

This data is based on EN 410, EN 673, *ISO 9050 requirements

It is strongly recomended to temper all types of glass with an energy absorption $({\rm E}_{\rm A})$ factor of over 50%.

The offer for other types of glass requires consultation with representatives of Press-Glas.

- $\textbf{L}_{\!\!T}$ Light transmission
- L_R Light reflection
- $\mathbf{E_{T}}$ Direct energy transmission.
- $\mathbf{E_R}$ Energy reflection
- $\textbf{E}_{\ensuremath{\boldsymbol{\mathsf{A}}}}$ Energy absorption
- g Total energy transmission



MARKING OF COATINGS USED IN DOUBLE GLAZED GLASS UNITS





Safety and security

Classification of safety and protective glass: Safety glass:

 laminated glass-high strength plastic foil (PVB) makes the splinters of glass remain hanging on the foil when the glass breaks;

tempered glass – after breakage, the glass disintegrates into small cube-like particles, thus reducing the risk of injury.
wire mesh reinforced glass – the wire mesh protects the glass from falling apart after breakage;

Security glass: - laminated glass.

Bullet-proof glass: - multi-layer laminated glass.

Objectives

Safety glass should be used in cases where there is a risk of glass breakage and danger to people who are within the range of glass particles (hospitals, schools, creches, shop windows). Glass panes with increased resistance to burglary are used in cases where we want to protect a given building, while also preserving the aesthetics of the elevation or partition walls (by eliminating window bars, shutters, roller blinds). The task of bullet-proof glass is to protect against gunshots. The application of bullet-proof glass panes depends on the degree of risk, the function of the protected property, the distance from where people are located from the zone of direct risk.

		Re	Group					
Categories	Categories Type of factor Number of resistance of physical blows			Way of influence				
of resistance			Factor	Drop height [m]				
P1A P2A	Steel ball	3 3	Free fall of the ball onto	1,5 3	Safety glass			
P3A P4A P5A	of 4,11 kg mass	3 3 9	the surface of glass fixed into a frame	6 9 9	Security glass			
P6B P7B P8B	Testing axe of 2 kg mass	30-50 51-70 over 70	Cutting out a hole (energy of a singl	with a testing axe le blow 300-350J)	Anti-burglary glass			

Classification and requirements for safety and security glass



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Examples of application of safety and security glass

	Place of application	Categories of resistance	Notes
1	flats, schools, offices, manufacturing facilities: - inside doors, - windows on the ground floor, - windows on the upper floors.	P1A	Protects against injury at breakage, making it less possible to break the glass when slamming a door or window.
2	kiosks, detached houses, ground floor windows in blocks of flats, hotel and office windows, retail outlets of minor protective value, gymnasiums and sports centres.	P2A	Protects against injury, may constitute a temporal protection against a break-in attempt.
3	hotel and office entry areas, store fronts, retail out- lets of major protective value, villas, chemist shops.	P3A, P4A	Serves as an impendiment to a break-in; can repla- ce a protective grid of 150 mm mesh made of steel wire of 10 mm diameter.
4	museums, antique shops, art galleries, bank operating areas, shops of major protective value, luxury villas.	P5A, P6B	Serves as an impediment to a break-in; can replace protective steel grid made of 12 mm rods.
5	jewellery shops, banks, special purpose buildings, shop windows of major protective value.	P7B, P8B	Glass which is highly resistant to break-ins; can replace protective steel grid made of 16 mm rods.

Classification and requirements for bullet-proof glass

Categories of resistance	Type and caliber of arms used	Bullet mass [g]	Bullet speed [m/s]	Shooting distance [m]	Application
BR1	rifle 0,22 LR	2,6	360	10	public administration buildings, mansions
BR2	gun 9 mm Luger	8	400	5	
BR3	gun 0,357 Magnum	10,2	430	5	telecommunication and computer operators
BR4	gun 0,44 Magnum	15,6	440	5	
BR5	rifle 5,56	4	950	10	buildings open to high risk of terrorist attacks or rob- bery, cashiers' compartments
BR6	rifle 7,62	9,5	830	10	military facilities, penitentiaries
BR7	rifle 7,62	9,8	820	10	military facilities and other high risk facilities

PRODUCT CATALOGUE



PROTECTION AGAINST NOISE

Characteristics

Protection against noise is one of the most important issues in our lives. The condition of assuring appropriate comfort and sometimes living in a given place is the assurance of a low level of noise. The feeling of noise in a room involves the following principle: if the level of noise in a room reduces to 10 decibels with relation to that outside, we get the impression that it is reduced by half. Protection against noise must be applied everywhere, where noise can not be liquidated completely. In such cases we come face to face with acoustic double glazed units. Acoustic double glazed units are constructed based on the asymmetry of the assembled panes of glass, flexible bonding of the panes, and the use of attenuation gases in the space between the panes. Acoustic double glazed units can achieve the acoustic insulation factor $R_W = 30 - 53 \text{ dB}$, depending on the type of unit. Before choosing a suitable unit, the source of noise should always be specified and other influential factors should be identified. Therefore, in all cases customers should contact us during an early planning stage, so that all specific requirements for the glass can be taken into consideration by our well qualified staff. When defining the source of noise we use the so-called acoustic insulation coefficient R_W and corrective coefficients C and Ctr. R_W states the number of decibels suppressed by the glass and does not describe the frequency band but gives an average suppression value within the 100 and 3150 Hz band. Press-Glas possesses certification for sound absorbing glass with an acoustic insulation factor ranging between 34 dB and 51 dB.



Standard acoustic insulation coefficients on the basis of PN-EN 12354-3:2002

This chart presents standard values of the weighted acoustid insulation coefficient R_w, as wel as the coefficient R for different frequencies of sounds tested for the essential structures of double glazed glass units presented ir glass trade magazines and technical publications

- R_W weighted acoustic insulation coefficient
 C_{tr} - corrective coefficient for sound sources containing a large number
 - of low frequencies, for example urban road traffic
- c orrective coefficient for sound sources containing few low frequencies for example high speed road traffic, high speed rail traffic, children playing

acoustic fficients he basis	Structure [mm]	Αсοι	istic in averag	sulatio ge freq	it at	Acou tion and coe	stic in coeffic l adapt efficie	sula- cient tive nts		
-5.2002				R [([dB]				
		125	250	500	1k	2k	4k	R _W	Ctr	С
s standard			Sin	gle gla	zing					
d acoustic	3	14	19	25	29	33	25	28	-4	-1
R _w , as well	4	17	20	26	32	33	26	29	-3	-2
different	5	19	22	29	33	29	31	30	-2	-1
tested for	6	18	23	30	35	27	32	31	-3	-2
of double	8	20	24	29	34	29	37	32	-3	-2
esented in	10	23	26	32	31	32	39	33	-3	-2
nd techni-	12	27	29	31	32	38	47	34	-2	0
DIICATIONS.			Laminated glass							
	6,4 (VSG 33.1)	20	23	29	34	32	38	32	-3	-1
	8,8 (VSG 44.2)	20	25	32	35	34	42	33	-3	-1
or	9,5 (VSG 44.4)	24	26	33	33	35	44	34	-3	-1
g			Doi	uble gla	azina					
	4/(6-16)/4	21	17	25	35	37	31	29	-4	-1
example	6/(6-16)/4	21	20	26	38	37	39	32	-4	-2
	6/(6-16)/6	20	18	28	38	3/	38	31	-1	_1
or sound	8/(6-16)/6	20	21	33	40	36	18	35	-6	-2
	10/(6 16)/4	20	21	20	40 Z7	12	40	ZE	5	2
nple	10/(0-10)/4	24	21	52	57	42	45	55	-5	-2
	10/(6-16)/6	24	24	32	37	37	44	35	-3	-1
	6,4 (VSG 33.1)/(6-16)/6	20	19	30	39	37	46	33	-5	-2
	6,4 (VSG 33.1)/(6-16)/10	24	25	33	39	40	49	37	-5	-1

Structure and coefficients of acoustic double glazed units produced by Press-Glas and confirmed by certification

Structure [mm]		Acoustic insulation coefficient R _W [dB]	Acoustic insulation coefficient at average frequencies [Hz] R [dB]						Heat transfer coefficient Ug [W/m²K]		
			125	250	500	1k	2k	4k	with Thermofloat glass		
T - Thermofloat											
6/16/4T	Argon	34	26	24	31	45	39	44	1,1		
8/12/4T	SF ₆ +Argon	36	24	27	32	38	40	39	1,9		
8/16/4T	Argon	36	26	24	34	43	44	46	1,1		
8/15/4T	SF ₆ +Argon	37	25	28	33	41	40	40	1,9		
8.8 (VSG 44.2)/12/6T	SF ₆ +Argon	38	27	32	44	35	38	43	1,9		
8.4 (VSG 44.1)/16/6T	Argon	38	26	28	38	45	38	51	1,1		
8.8 (VSG 44.2)/16/6T	Argon	39	27	29	39	46	40	52	1,1		
8.8 (VSG 44.2)/15/6T	SF ₆	40	25	32	43	44	37	48	1,9		
9.5 (VSG 44.4)/16/6T	Argon	40	27	32	39	45	41	54	1,1		
8.8 (VSG 44.2) Akustic/16/6T	Argon	42	26	30	40	50	47	54	1,1		
9.5T (VSG 44.4T)/14/6/14/4T	Argon/Air	43	22	30	42	50	40	51	0,7		
8.8 (VSG 44.2) Akustic/20/6T	Argon	44	25	37	48	52	49	52	1,1		
12.8 (VSG 66.2) Akustic/20/8.8T (VSG 44.2T) Akustic	Argon	51	30	41	48	56	55	62	1,1		

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PROTECTION AGAINST FIRE

Tasks

The continuing tendency to use glass in internal and external applications ensures the pleasant appearance of buildings and removes the barrier between the building and the outside world. However, the glazed separators must in many cases meet the fire-fighting regulations relating to flame-retardation and the safe evacuation of the building users. Those requirements are very often met through the use of fire-resistant glass. Press-Glas offers PYROBELITE & PYROBEL fire-resistant glass manufactured by the Belgian firm Glaverbel. It is multi-layered glass, where the sheets of float glass are connected by means of intermediate layers made of gel, which expands under high temperature. During a fire, when the temperature rises to 120°C, the gel layers expand forming a hard, non-transparent layer, which temporarily prevents fire propagation.

Trade name	Application	Туре	Thickness ***[mm]	Maximal dimension *[mm]	Minimal dimension **[mm]	Weight [kg/m²]	R _w [dB]	L, [%]	U [W/m²K]
PYROBELite 7	Internal	E 30	7	1200 x 2000	200 x 400	17	35	88	5.7
PYROBELite 7+3	external	E 30	12	1200 x 2000	200 x 400	28	36	86	5.3
PYROBEL 8	Internal	EI 15/E30	8	1200 x 2000	200 x 400	20	36	87	5.5
PYROBEL 16	Internal	EI 30/E 45	16	1400 x 2700	300 x 400	40	39	84	5.2
PYROBEL 16+3	external	EI 30/E 45	20	1400 x 2700	300 x 400	48	40	83	5.0
PYROBEL EI 45/16	Internal	EI 45/E 60	16	1200 x 2300	200 x 400	37	41	84	5.2
PYROBEL EI 45/16+3	external	EI 45/E 60	20	1200 x 2300	200 x 400	45	40	83	5.0
PYROBEL 25	Internal	EI 60	25	1400 x 2700	200 x 400	60	42	82	5.0
PYROBEL 25+3	external	EI 60	29	1400 x 2700	200 x 400	68	43	81	4.9
PYROBEL 35	Internal	EI 90	37	1200 x 2300	200 x 400	77	43	81	4.9
PYROBEL 35+3	external	EI 90	41	1200 x 2300	200 x 400	85	44	80	4.7
PYROBEL 52	Internal	EI 120	52	1100 x 2100	200 x 400	120	46	69	4.8
PYROBEL 52+3	external	EI 120	56	1100 x 2100	200 x 400	128	47	68	4.6

*Maximum dimensions are presented on the basis of test results for complete wall systems. The maximum dimensions can be different for particular wall systems. Maximum dimensions for each system are presented in technical approvals.

**Relates to double-glazed glass sheets

*** Thickness tolerance [mm] +/- 3 mm

Classification

Our products meet two basic criteria specified in building standards:

- fire-proof (class E),

creating a barrier preventing the propagation of fire, smoke and gases to neighbouring areas, which are not on fire – the PYROBELITE - type glass;

- fire-insulation (class El),

creating a barrier preventing the propagation of fire, smoke and gases to neighbouring areas, which are not on fire, preventing the propagation of high temperatures, which ensures safe evacuation of people – PYROBEL - type glass.

The average temperature on the surface unaffected by flames ought not to rise by more than 140 °C above the ambient temperature. To be precise, the temperature ought not to exceed 180 °C. In order to specify the time in which the glass meets the above requirements under the influence of fire, the glass classification symbol is supplemented with a numerical value indicating the time (in minutes), in which the fire-resistant glass meets the fireproof and the fire-insulation requirements.

The PYROBELITE and PYROBEL glass types have been tested in many countries against the local standards in force. Both glass types were also subjected to fire tests in Instytut Techniki Budowlanej (the Building Research Institute) in Warsaw, as a result of which they have received a number of Polish technical approvals. However, it must be remembered that in accordance with the generally applicable regulations, certifications are not issued solely for fire-resistant glass. The certifications relate to complex glass systems and not to their particular elements. The investor can not therefore demand a supplier to submit a document classifying a glass pane with respect to its fire-resistant properties. In order to obtain the certification, one must apply to the manufacturer or the supplier of system solutions.

On account of the fact that fire-resistant glass may be built in internally or externally as monolithic or double-glazed glass, the Glaverbel and Press-Glas offer includes glass types, which are quite different with respect to their construction. On account of the fact that the gel binding of the glass is characterised by high sensitivity to UV radiation, the fire-resistant glass used externally must be secured by means of the PVB foil on the side of the glass most exposed to UV radiation. It is assumed that in the case of the transparent external glass not having a safety layer in the form of the PVB foil, the fireresistant glass for internal applications may be fitted within a minimum of 3.5 metres from that external glass.

Advantages

- high level of light transmittance,
- full transparency,
- may be used as single or double-glazed glass,
- suitable for internal and external applications with an additional UV filter,
- as glass for external use which is classified as safe glass that meets the requirements of the BS 6206 and EN 12600 standards,
- anti-burglary system,
- highly soundproof,
- has received a number of technical approvals.

Application

PYROBELITE and PYROBEL may be used where required by building regulations and where natural lighting and transparency are the key factors. The following places are suitable for application:

- hospitals and laboratories,
- schools and offices,
- hotels and restaurants,
- theatres and museums,
- shopping centres and underground stations,
- banks, etc.

Offer

Since we can combine the PYROBELITE and PYROBEL glass with laminated, coloured, reflexive and low-emission glass, we offer a wide range of glass panes combined with fire-resistant glass. This type of glass may perform different functions, such as: protection against burglary and noise, thermal and light insulation. As we have possibilities to process the fire-resistant glass, all our fire-resistant products are available with very short lead times.

It must be remembered that the process of transforming fire-resistant glass into double-glazed units may not be commissioned to random manufacturers. That process requires specific manufacturing discipline due to the necessity of protecting the glass edges from coming into contact with the gel bonding of the panes by means of special aluminium foil. Direct contact with aggressive substances in the air or in water may lead to the fire-resistant glass layers losing their fire-resistant properties.

Similarly, special precautions must be applied during the fitting of double-glazed sheets in window frames in order to prevent the breaking of the protective layer securing the edges. The destruction of the protective layer may lead to the glass losing its properties and result in quicker flame propagation, as well as the inability to evacuate people from the building. In the event of the time spell between the glass manufacture and fitting in the window frame being very long, the inside surface of the fire-resistant glass must be protected from the UV radiation, as it is not protected by means of the PVB foil.

Before orders are processed, clients ought to be notified of the general criteria defined by glass manufacturers, which must be followed during its application. The company which processes the glass sheets into double-glazed units is not responsible for the loss of the fire-resistant properties as a result of inappropriate fitting.





Hardened glass ESG

The nature of glass is fragile. Thanks to the hardening process, changes of inner stresses are made in its structure, which results in the increasing of its bending capacity. Hardened glass means safety. When it breaks, the pane is shattered into tiny pieces with blunt edges. This feature causes hardened glass to be used in particularly sensitive places, with a high risk of being broken or exposed to high insolation - which means a big increase of inner thermal tensions.

Advantages

- bending strength is five times higher in comparison with nonhardened glass,
- resistance to thermal shock and heating caused by solar radiation,
- decreased risk of injury when the pane is broken.

Directional hardening

An inseparable component of the hardening process is the so-called glass waviness. Press-Glas informs all customers that this effect can occur, in order to be fair in service. The waviness effect is of particular importance if glass panes are assembled in building facades, especially with big glazed surfaces. It is visualised by a distortion of the view reflected in the facade. To decrease the distortion effect of a reflected picture, it is suggested that directional hardening is made. It means that e.g. in the case of hardening along the height, waviness will occur perpendicularly to this dimension.

Semi-hardened TVG glass

Semi-hardened TVG glass differs from the ESG hardened glass by the kind of breaking netting, which occurs during glass panel damage. Due to its breaking characteristic, the panel assembled in the frame stays there after the damage, which protects against injury. Thanks to this feature, TVG is starting to become interesting as an alternative for hardened ESG. However, TVG glass is not counted among the types of safety glass.

Market offer

Hardened window panes:

- in the shape of single formats or double and triple glazing,
- with holes and cuttings,
 - with chamfered, ground or polished edges;
 - in triangular, rectangular and polygonal shapes, arcs and
 - circles;
 - covered with silicon coatings and enamelled,
 - silk screen printed.

Depending on the customer's request, before starting the tempering process, the glass must undergo the machining process i.e. cutting, drilling, grinding or grinding and polishing together. Safety glass which is tempered, undergoes checking according to the Polish standard PN-EN 12150- 1 and the technical criteria of KT ISiC 027/S/2003.

Machining of edges

There is the possibility that small micro-breaks on the edges of cut formats may occur during the cutting process. Thanks to the process of grinding edges, the risk of breaking as a result of increased inner tensions is lower under insolation (thermal stresses) or under the influence of mechanical forces (forced compressions, physical blows and others). Due to this feature, this extra processing of edges is commonly used for hardened glass.

Grinding of edges is also done in order to increase the safety of using the glass, e.g. in walls and 'frameless doors', where the danger of injury exists.

To practice proper aesthetics, there is the extra possibility of polishing the edges after grinding. The use of glass as table tops, in furniture or glass shelvings, and in decorations of interiors, requires high aesthetics of finishing.

Advantages

Glass with ground edges:

- risk of self-breaking, resulting from micro-breaks occurring during the cutting process is lowered,
- no risk of hurting anybody who comes into contact with the glass edge,
- high aesthetics of finishing.

Chamfering edges

To achieve specific aesthetics of processing with regard to edges, chamfering is added. It makes the product more attractive, which is of particular importance if the glass is used as a component of interior architecture. Wide chamfers made on the edges of the glass pane lead to the dispersion of passing light and produce coloured spectra on these surfaces.

Market offer

Window panes with ground edges:

- triangular, rectangular and polygonal shapes with straight edges,
- in the shape of single formats or double and triple glazing,
 as tempered glass.
- covered with silicon coatings and enamelled,
- silk screen printed.
- sinc serveri princed.

Applications

The characteristics of tempered and machined glass allow for a wide application in different industries. Building structures:

- sulfulling structures.
- glazing the facades of buildings in columnar-transom systems,
 glazing the facades of buildings in structural systems,
- glazing in point fastening systems,
- glazing of skylights,



EMBASSY OF JAPAN, WARSAW; ARCH. K. INGARDEN & J. EWY; ANTISOL GREEN, FLOAT

- glazing the partition walls,
- filling of railings and balconies,
- frameless glass door systems,
- glass stairs.

Fittings and decorations of interior:

- table tops,
- components of furniture,
- glass shelvings,
- shower cabins.

Household appliances:

- components of refrigerators and freezers,
- components of cookers and cooking ovens.



Glass with holes and cuttings

Holes are required in numerous fastening systems. This solution makes the construction of building elements possible, in which the glass forms flat surfaces, which are not disturbed by construction elements. Making holes and cuttings also gives the possibility of a wider use in interiors as decorations and components of household appliances. It increases the possibility of creating new solutions of constructions and interior creation by architects.

Advantages

- the possibility of making smooth surfaces with regard to glass facades and partition walls,
- the possibility of constructing "frameless door" systems,
- easy mechanical fastening,
- the possibility of using glass in every place where holes are necessary; e.g. in household appliances.

Market offer

Panes with holes and cuttings:

- in the shape of single formats or double and triple glazing (panes are assembled after fastening the fixing rotools in the holes),
- as hardened glass,
- with chamfered edges, ground or polished edges,
- in triangular, rectangular and polygonal shapes, arcs and circles;
- covered with silicon coatings and enamelled,
- silk screen printed.



Standard palette of patterns

Standard palette of colours:

White similar to RAL 9010 lub 9016
Imitation of etching lack of an equivalent to RAL
Light yellow
Yellow lemon
Rusty red similar to RAL 3009
Green similar to RAL 6024
Turquoise similar to RAL 5021
Blue similar to RAL 5005
Black similar to RAL 9004 or 9005
Siena similar to RAL 1011
Grey similar to RAL 7031
Light grey similar to RAL 7038
Brown similar to RAL 8004
Chocolate brown similar to RAL 8017
for details visit our website www.press-glas.com

In the case of interest regarding a wider palette of colours please contact the representatives of Press-Glas. *Float glass possesses a light green colour, which can have an effect on the silk-screen.

Decorative glass with silk-screen printing

In modern architecture, glass is increasingly used as a decorative material. This is possible due to the fact that additional elements can be attached to it. There is no end to the possibilities of patterns and colours with regard to silk-screen printing, which enables a perfect application to the expectations of clients. The realization of an individual pattern, both in the form of pictures and graphics, allows the creation of an unrepeatable composition. Glass which undergoes silk-screen printing can fulfil not only the function of decoration, but that of practical use also. Partially transparent glass panes used as filling, allow the control of light between the spaces, which eliminates the need for further exposure to light. These panes also assure the feeling of privacy. Thermally-hardened ceramic paints are used for the production of glass with silk-screen printing. Their unquestioned advantage is durability and neutrality as regards its effects on the natural environment. Advantages

- avantages
- it is a perfect decorative material,
- due to the process of tempering, in which it goes through drying and partial melting of paints, it takes on all the properties of tempered glass:
- it has greater resistance to bending in comparison to ordinary glass,
- resistant to thermal shock,
- reduces the risk of injury in the case of the pane breaking,
- allows for the selection of light inflow through the glass surface,
- reduces the effect of dazzling by direct rays of light,
- the layers of silk-screen are characterized by a high level of durability,
- it is classified as safety glass.

Maximum panel dimensions [mm] 1500 x 3000 Maximum panel width [mm]

Maximum panel dimensions [mm] 2000 x 3000

1600

Minimum panel dimensions [mm]

100 x 250

Silicon spandrels

Glass Thickness [mm]

5 – 19



Application

The connection of the decorative function and practicality as well as the possibility of assembling in a multi-functional structure lead to the unlimited use of glass which undergoes silk-screen printing.

Building constructions:

- glass facades of buildings and skylights,
- fillings of railings and balconies,
- framed or frameless glass internal walls and doors systems,
- glass stairs.

Equipment and interior design:

- table tops,
- components of furniture,
- glass shelvings,
- shower cabins,
- other decorative elements.

Household appliances:

- components of refrigerators and freezers,
- elements of cookers and cooking ovens.

Market offer

Press-Glas Company produces glass with silk-screen printing according to the standard palette of colours and patterns. When making an order, one should give the pattern number of silk-screen as well as the colour from the standard palette. Realization of individual orders requires consultation and the establishment of conditions with a representative of Press-Glas. With regard to the fact that drying and hardening of the silk screen on the glass surface take place during tempering, the glass must be machined beforehand e.g. cutting, drilling of holes, grinding and polishing. Glass panes which undergo silkscreen printing are:

- cut in format size or double and triple glazing,
- with drilled holes and cuttings,
- with edges that have been bevelled, grinded or polished;
- with right-angled shapes, multi-angled shapes, arch-shapes.

Spandrels

Spandrels with ceramic coating

In order to achieve a totally non-transparent glass pane, the spandrels are covered with ceramic paint, as is the decorative glass by the silk screen. Spandrels with the ceramic paint coating have the same features and application as decorative glass with silk screen and are available in the same palette of standard colours as well as the same dimensions.

Spandrels with silicon coating

The second widely used method of producing spandrels is covering the glass surface with a layer of silicon paint. After covering it with silicon paint, it becomes hardened by lamps. The glass must be machined and tempered before covering it with silicon paint. Spandrels with a silicon coating are commonly used in areas of non-transparent facades of buildings. Realization of orders requires consultation with representatives of Press-Glas and the individual choice of colour coating from the RAL palette.

Hardening process	Glass thickness ESG, TVG [mm]	Minimum panel dimensions [mm]		Maximum panel dimensions [mm]
	3,8 – 4,7 ESG, TVG			2440 x 3000
	4,7 – 19 ESG 4,7 - 10 TVG	100 x 250		2440 x 5100
	Machining type	Minimum pane dimensions [mm] concerns glass less than 20 mm thick	Maximum panel dimensions	Glass thickness [mm]
Crinding and polishing of edges Processing glass of polygonal shapes with straight edges	Trapezium cut, polishing, edges chamfering - angle 0÷60°	80 x 150	2700 x 5000	3 - 35
	Machining type	Minimum panel dimensions [mm]	Maximum panel dimensions [mm]	Glass thickness [mm]
All shapes cuttings	Milling	250 x 400	2700 x 5000	3 - 19
	Machining type	Drilling range (diameter) D [mm]		Glass thickness [mm]
Drilling holes	Drilling, Milling	3 – 200		3 - 50

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Facade glazing

With almost unlimited design versatility, structural glazing has redefined modern architecture. The dream of architects and facade designers of creating a visual impression of a monolithic glass structure has finally come true, thanks to the use of either structural glazing or bolt fixing.

Structural glazing

By the term " structural glazing" we mean the technology of attaching a glass structure to the building structure, where structural glazing silicon sealant serves as the binding agent.

Basic types

Depending on the construction methods applied, there are four kinds of structural glazing:

- two-sided systems using a two-sided structural glazing technique, either the vertical or horizontal joints are adhered to the supporting structure;
- four-sided systems when using a four-sided system, no mechanical retention is used for the facade panels;
- bonded fixing systems in this system the bolts are fixed directly on to the glass via a circular structural silicon seal which acts as a fixing point;
- fin glazing systems the fin glazing technique employs glass panes which run from the frame of the building, perpendicular to the facade, which is then bonded to the fins using specific structural silicon sealants.

Structural glazing can be supported, and then the dead weight of the panel is transferred by a suitable mechanical support; and is not supported, when the dead weight of the panel is transferred solely by an adhesive.

Requirements

Sealants used in structural glazing have to meet the most stringent requirements for strength and durability. They have to be resistant to ultraviolet radiation and changing weather conditions. Final sealing of the assembled units is made with silicon sealants of similar characteristics to the structural sealants.

Since large glass surfaces may cause problems of over-heating in summer and considerable heat losses in winter, designing glass facades is a task which requires expertise from architects and designers and experience on the part of the technical staff. Therefore, we must warn customers against commissioning haphazard people for mounting and fixing, as the results of this action become evident after a few years and the investor covers the costs.

Press-Glas is an acknowledged contractor for fixing structural glazing with Dow Corning sealants.

Bolt fixing

Bolt fixing is a system for securing glazing to a load-bearing structure by means of steel bolts going through the glass and mounted in specially designed holes.

Bolt fixing allows designers to create perfectly smooth and transparent glass surfaces making up facades which are virtually invisible barriers between the interior and the exterior space of a building. It imposes no limitations as regards the height of the building and gives the architects almost unlimited design versatility thanks to the direct fixing of glass panes to a load-bearing structure. As with the structural glazing, bolt fixing can be used with a variety of glass types e.g. clear, low-emission, solar control - absorptive and reflective, as well as with a combination of glass types. Whatever glass type is used, however, it has to undergo heat treatment for greater resistance to thermal stresses.





Decorative and light transmission

The increased use of glass as a modern decorative material leads to the necessity of satisfying the specific requirements which designers and architects place before it. Thus, ornamental glass should let the light come inside a room enhancing the warmth and depth of its features while at the same time preserving its privacy. The ornamental glass offered by Press-Glas boasts the highest quality and a unique style to match. By changing the structure of glass we can change the degree of its transparency.





Window dividers

Quadra Brąz range of widths: 8 mm Srebrny range of widths:

Biały 9010 range of widths: 8, 18, 26, 45 mm

8 mm

Złoty range of widths: 8, 18, 26 mm

Douglasie w. Biały 9010 / Douglasie w. range of widths: 18, 26 mm



Złoty dąb Biały 9010 / Złoty dąb range of widths: 18, 26 mm



Dab bagienny Biały 9010 / Dąb bagienny range of widths: 18, 26 mm

> Orzech Biały 9010 / Orzech range of widths: 18, 26 mm

Mahoń Biały 9010 / Mahoń range of widths: 18, 26 mm

Braz 8014 Biały 9010 / Braz 8014 range of widths: 18, 26 mm

Brąz 8017 Biały 9010 / Brąz 8017 range of widths: 18, 26 mm

C. brąz 8022 Biały 9010 / C. brąz 8022 range of widths: 18, 26 mm

Brunatno – Czerwony 8012 range of widths: 18, 26 mm

IT SHOULD BE REMEMBERED, THAT ORNAMENTAL GLASS AND WINDOW DIVIDERS ARE TO BE ORDERED BASED ON SAMPLES NOT CATALOGUE DESCRIPTIONS

Aesthetic and functional values

Modern technology and traditional looks

Press-Glass offers a whole range of dividers which can be an interesting architectural device for both tradition lovers and enthusiasts of modern design. Windows with dividers get that great new appeal. Available in a wide variety of colours [RAL] including two-coloured sets, dividers can be installed with different types of glass, each time on the client's individual request. Moreover, they can be bent into curves or circles, and fixed at different angles.









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