Flat safety glasses

By safety glass it is referred to glass structures protecting people and property from an outside party and/or reducing persons' risk of injury in case of accidents. Safety glass is normal annealed glass manufactured either by laminating, tempering or by combining these methods.

Safety glasses are used among other things in locations where usual glass does not provide the required protection against vandalism, breaking in, a person's risk of falling etc. outside threat. Tambest Glass Solution's safety glasses are always manufactured of materials of highest quality. We use only established suppliers' tested products.

LAMINATED SAFETY GLASSES

Tambest Glass Solution's flat laminated glass is manufactured on the ProL lamination line. Several automatic functions of the lamination line, such as the automatic measurement of glass thickness and the glass centring function, ensure the first class quality of the product.

TAMBEST GLASS SOLUTIONS FOIL CODE	COLOUR SHADE	LIGHT TRANSMIS. VALUE	COLOUR MODEL
STL-88 Clear	clear	88%	
SentryGlass	clear	88%	
Sound Control	clear	88%	
STL-87 Clear	clear	87%	
STL-80 Soft White	light opal	80%	
STL-65 Opal	opal	65%	
STL-73 Green	green	73%	
STL-72 Green	green	72%	
STL-56 Green	green	56%	
STL-50 Green	green	50%	
STL-71 Blue	blue	71%	
STL-70 Blue	blue	70%	
STL-53 Blue	blue	53%	
STL-49 Blue	blue	49%	
STL-42 Grey	grey	42%	
STL-41 Grey	grey	41%	
STL-27 Grey	grey	27%	
STL-20 Grey	grey	20%	
STL-55 Light Brown	light brown	55%	
STL-28 Middle Brown	middle brown	28%	
STL-09 Dark Brown	dark brown	9%	
STL-08 Dark Brown	dark brown	8%	

* All the above PVB laminating foils are available from our warehouse. In addition to those, we supply for projects all the foils manufactured by Solutia, Trosifol and DuPond foil factories.

* The Tambest Glass Solutions foil code will have to be mentioned in the order

The maximum size of the glasses to be laminated on the line is 2600 x 4800 mm, nevertheless, the special arrangements allows us to manufacture laminated glasses up to the size 6000 x 3210 mm, when necessary.

COLOURED GLASSES

When a particular colour shade is being looked for, it is possible to use coloured foils, glasses or combinations of them. The colour models for lamination foils have been described in the table on left hand side. Thanks to our wide range of coloured foils and glasses, however, we are able to offer a considerably wider range of different colour shades. The colour shades differing from those included in the table are built using different combinations, case by case.

BURGLAR-PROOF GLASSES

Burglar-proof glass is used, as its name suggests, to prevent breaking in through the glass. The burglar-proof glasses manufactured by Tambest Glass Solution meet the requirements set by the Federation of Finnish Insurance Companies for burglar-proof glasses, and they have been tested in accordance with the standard 356.

SFN-EN 356	LOCATION OF USE	GLASS THICKNESS (mm)	GLASS WEIGHT (kg)/M2
P6B	dwellings, stores	15	33
P7B	banks, museums	20	44
P8B	jewellers'	25	55

SOUND INSULATING GLASSES

Sound insulation is achieved by using laminated glasses of various thicknesses and foils of various thicknesses and types. The sound insulation (Rw) is expressed by means of a decibel value (dB). Tambest Glass Solution uses the so called Sound Control film in their sound insulation glasses. The table below clarifies the sound insulation of SC foil in relation with a standard foil with regard to most commonly used structures.

Sound insulation figure (standard foil vs. Sound Control foil)				
GLASSES (mm)	STANDARD FOIL (mm)	Rw (dB)	SOUND CONTROL FOIL (mm)	Rw (dB)
4+4	0,76	34	0,76	37
5+5	0,76	35	0,76	38
6+6	0,76	37	0,76	39
8+8	0,76	38	0,76	41
10+10	0,76	39	0,76	42
12+12	0,76	40	0,76	43

SENTRYGLASS

SentryGlass laminating foil is approx. 100 times more rigid and approximately five times more durable than usual laminating foil. Thanks to these characteristics, it is possible to achieve an extremely durable and simultaneously light structure.

TEMPERED SAFETY GLASS

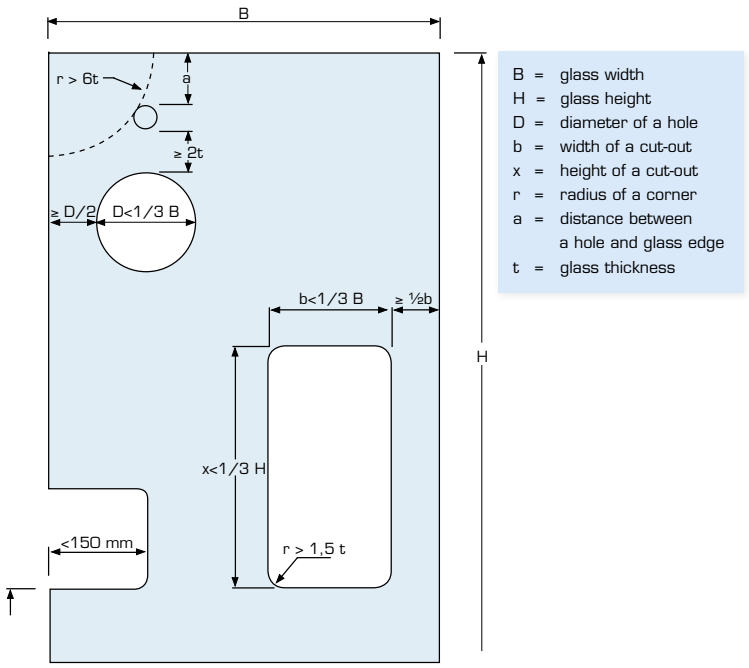
Almost all the glass types can be tempered. In the tempering process used by Tambest Glass Solution, the glass is heated in two phases by partly convection air, which means that the optical characteristics of the glass remain excellent also in case of coated glasses. HTF PRO-E-CC tempering oven is being used for the tempering machine applied to flat glasses, where the maximum glass size is 2440 x 4500 mm. Thanks to the advanced pre-heating oven of the machine, the optical characteristics of glass remain almost unaltered - also in case of big glass sizes. The importance of optical constancy is emphasized first of all in large reflecting glass surfaces.

More detailed information about the maximum sizes of tempered glass by glass thickness and about standards regarding tempered glass can be found on the tables from the right hand side.

INSTRUCTIONS FOR MACHINING AND RECOMMENDED DIMENSIONING

Tempered glass is recommended to be used in locations that require the glass to be machined, e.g. for hinges, handles etc. The machining and grinding procedures to be applied to the glass must be done prior to the tempering process. The dimensions and positioning of the machining measures depend on the glass thickness used. Instructions for machining tempered glass and recommended dimensioning has been presented in the figures below and specified in the instructions placed below the figures.

Instructions for machining and recommended dimensioning are only indicative. We recommend their more detailed specification with the sales department, prior to placing a final order.



B = glass width
H = glass height
D = diameter of a hole
b = width of a cut-out
x = height of a cut-out
r = radius of a corner
a = distance between a hole and glass edge
t = glass thickness

DIAMETERS AND PLACES OF HOLES

A hole to be drilled into the glass must have the minimum diameter of 5 - 6 mm, and in case of glasses thicker than that the same as the glass thickness 't'. The diameter cannot be greater than one third of the narrowest part of a glass plate.

GLASS THICKNESS t (mm)	a	D min	D max
3 - 6	≥ 1,5t	≥ 5 mm	≤ H/3
8 - 9	≥ 2t	≥ t	≤ H/3

Around holes, there must be a glass base of at least one half of the hole diameter (a ≥ D/2), and the distance from the glass angle must be at least 6t.

Rounding
The corners of holes must be rounded, Rmin = 1.5t.

LAMINATED TEMPERED SAFETY GLASS

Tambest Glass Solution's modern production lines for tempered and laminated safety glass as well as the versatile range of glasses and foils support the manufacturing of laminated tempered safety glass. The maximum size of laminated tempered glass is 2440 x 4500 mm.

MANUFACTURING TOLERANCES, BIGGEST MANUFACTURED SIZES AND STANDARDS

The measurement tolerances of glasses manufactured by Tambest Glass Solution conform to the EN standards. We are also able to manufacture our products by tolerances more accurate than those EN standards, that are to be defined case by case.

MANUFACTURING TOLERANCES

NOMINAL DIMENSION (mm)	MANUFACTURING TOLERANCES		
	NOMINAL THICKNESS ≤ 8mm	NOMINAL THICKNESS OF EVERY GLASS < 10 mm	NOMINAL THICKNESS OF AT LEAST ONE GLASS ≥ 10 mm
< 1100	± 2	+ 2,5	+ 3,5
		- 2	- 2,5
< 1500	+ 3	+ 3,5	+ 4,5
	- 2	- 2	- 3
< 2000	+ 3	+ 3,5	+ 5
	- 2	- 2	- 3,5
< 2500	+ 4,5	+ 5	+ 6
	- 2,5	- 3	- 4
≥ 2500	+ 5	+ 5,5	+ 6,5
	- 3	- 3,5	- 4,5

BIGGEST MANUFACTURED SIZES

THICKNESS	SIZE
TEMPERED GLASS	
4 mm	2450 x 4500 mm
5 ja 6 mm	2450 x 4500 mm
8, 10 ja 12 mm	2450 x 4500 mm
15 mm	weight approx. 300 kg
LAMINATED GLASS	
all thicknesses	6000 x 3210 mm

SAFETY GLASS STANDARDS

PRODUCT	STANDARD
Tempered glass	SFS-EN 12150-1
Laminated glass	SFN-EN ISO 12543
Safety glass	SFN-EN 12600
Burglarproof glass	SFN-EN 356