ALLPLASTICS

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PERSPEX™ 2012

Perspex Data Sheet

For glazing

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APPENDIX 1- PORPERTIES

Table 1 Compares the typical physical and mechanical properties of cast and extruded sheet.

PERSPEX™ acrylic sheet

Properties Method	**TEST**	**Units**	**Pespex CS Cast Sheet**	**Perspex XT Extruded Sheet**
Ten Sile Strength	ISO 527 (1)	MPa	75	70
Elongation at Break	ISO 527 (1)	%	4	4
Flexural Strength	ISO 178 (2)	MPa	116	107
Flexural Modulus	ISO 178 (2)	MPa	3210	3030
Charpy Impact Strength	ISO 179 (3)	kJ.m ^{2}	12	10
Vicat Softening Point	ISO 306 Method A	°C	>110	>105
Rockwell Hardness	ISO 2039-2	M Scale	102	101
Light Transmission	ASTM D1003	% (4)	>92	>92
Refractive Index	ISO 489/A	-	1.49	1.49
Water Absorption	ISO 62	%	0.2	0.2
Relative Density	ISO 1883	-	1.19	1.19

NB: (1) 5 mm/ m in, (2) 2 mm / min, (3) un-notched, (4) in 3 mm

Table 2 Fire test performance of PERSPEX™ to the more important international fire tests.

Country	**Product Type**	**Test**	**Result/ Class**
France	Cast Extruded	NFP 92-307 NFP 92-307	M4 M4
Germany	Cast Extruded	DIN 4102 DIN 4102	B2 B2
Holland	Cast Extruded	NEN 6005 NEN 6005	Class 3 surface spread of flame Class 4 contribution to flashover
United Kingdom	Cast Cast Extruded	BS 476:Pt 7 BS 476:Pt 7 BS 476: Pt 7	Class 4 under 3mm Class 3 for 3 mm and above Class 4 all thicknesses
United States	Cast Extruded	UL 94 UL 94	HB HB

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PERSPEX™ cast acrylic sheet burns at rate similar to hard woods but with low smoke evolution. Encapsulation the edges of all PERSPEX™ sheets into metal glazing profiles greatly reduces the ease of ignition.

Table 3 The Sound Reduction Index of PERSPEX™ in decibels (db)

Glazing Option	**Sound Reduction Index (db)**
1 x 3 mm PERSPEX	26
1 x 6 mm PERSPEX	32
1 x 8 mm PERSPEX	34
1 x 12 mm PERSPEX	35

To maximize the efficiency of double glazing it is important to minimize sound leakage within the glazing profile.

Table 4 The heat transfer coefficient (U value) of PERSPEX™ and glass windows measured in W/m² °C

Glazing Option	**Air Gap Between Panels**	**Heat Loss (U Value)**	
		Glass	Perspex
3mm single pane	-	5.6	5.2
5 mm	-	5.5	4.9
3 mm	3 mm	4	3.6
3 mm	12 mm	3.1	2.9
3 mm	20 mm	2.9	2.7

Table 5 The thermal conductivity coefficient (K value) of PERSPEX™ and glass

Units	**Glass**	**Perspex**
W m/M².°C	1.15	0.189

Table 6 The minimum cold-bend radii for PERSPEX™ barrel vaults in temperate climates

Sheet Thickness (mm)	3	4	5	6
Cast PERSPEX	600	800	1000	1200
Extruded PERSPEX	900	1200	1500	1800

The above figures were originally derived from stress/ strain studies. From experience gained over 20 years it is known that if the minimum cold-bend radius is reduced further there is a greater risk of sheet crazing in service.

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Table 7 The recommended thickness of cast and extruded PERSPEX™ for barrel vaults where the barrel height is ½ span dimension

Barrel Span (mm)	Sheet width	
	1000 mm	**2000 mm**
800	3 mm	4 mm
1100	4 mm	5 mm
1400	5 mm	5 mm
1700	6 mm	6 mm
2000	6 mm	8 mm

Table 8 The recommended thickness of cast and extruded PERSPEX™ for barrel vaults where the barrel height is ¼ span dimension

Barrel Span (mm)	Sheet width	
	1000 mm	**2000 mm**
800	4 mm	5 mm
1100	4 mm	5 mm
1400	5 mm	6 mm
1700	6 mm	8 mm
2000	6 mm	8 mm

Table 9 The recommended thickness of cast and extruded PERSPEX™ for barrel vaults where the barrel height is 1/8 span dimension

Barrel Span (mm)	Sheet width	
	1000 mm	**2000 mm**
800	4 mm	6 mm
1100	5 mm	6 mm
1400	6 mm	8 mm
1700	6 mm	8 mm
2000	8 mm	10 mm

NB **1.** All the above calculations have been based on an assumed wind load of 100 N/m².
2. When using impact modified grades the above thicknesses should be increased to the next size.

Table 10 The recommended thickness of cast and extruded PERSPEX™ for flat roofs

Roof Span (mm)	Glazing Profiles spacing (mm)		
	800	**1000**	**1200**
800	5 mm	6 mm	6 mm
1400	6 mm	8 mm	8 mm
2000	6 mm	8 mm	10 mm

The values for **Table 10** assume a snow load of 750N/m².

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Recommended thickness of PERSPEX™ for windows

The required thickness is dictated by two considerations. The first is the desired impact strength and the second is the wind loading which an external window must sustain. In most countries statutory requirements or codes of practice exist which specify wind loads for building structures and these must be followed. For example, in the United Kingdom, BS CP3 Chapter V Part 2 is the Code of Practice to be followed when designing windows or glazed structures.

Figures 3 and 4 give the recommended thicknesses of PERSPEX™ for various wind loads when designing for square windows, with all edges fully supported

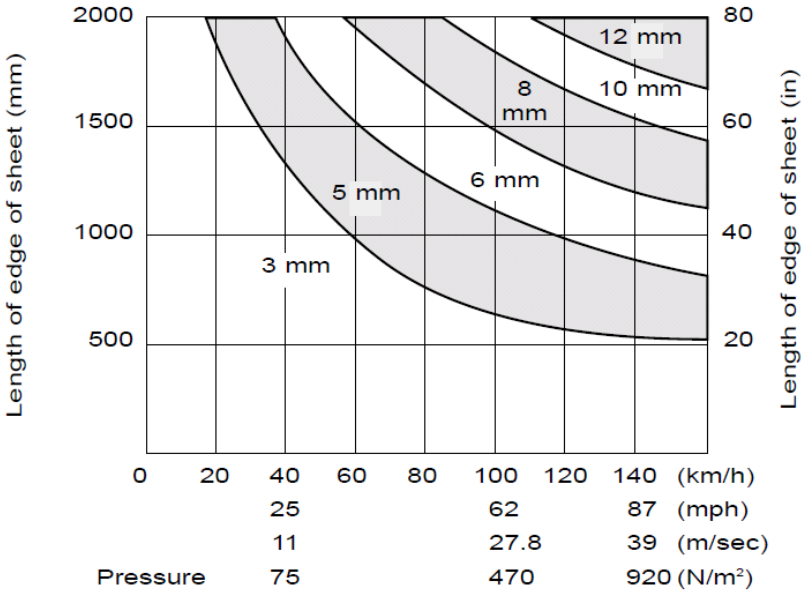
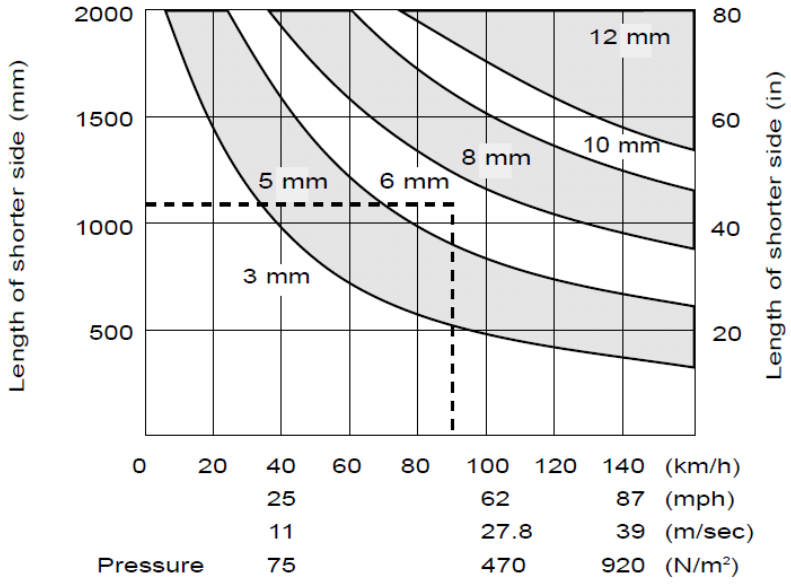


Figure 4 The recommended thicknesses of PERSPEX™ for various wind loads when designing for rectangular windows, with all edges fully supported.



NB: The figures for sheet thickness apply to areas bounded by the curves

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Example of the use of Figure 4
To determine the thickness of PERSPEX™ that must be used for a window 1100 x 1520 mm with a wind load of 90km/h (380 N/m²), determine the point of intersection between wind load line and **shorter** panel size (see the dotted line). The recommended thickness is 6 mm.

NB: At the recommended thickness, the sheet can deflect under full wind load and it is therefore important to use the appropriate depth of rebate, as recommended in **Table 12**, to ensure the sheet remains firmly fixed in the frame.

Appendix Ш- Installation
Mounting Details
The preferred method of mounting PERSPEX™ glazing is between metal frames. Aluminum profiles or glazing bars are generally acceptable and these can be obtained from your local PERSPEX™ distributor, who will be able to give full advice on products available and the manufacturers recommended fixing methods.

As a general rule, PERSPEX™ should be fixed in the frames with rubber profile sections as is the normal glazing practice. If preferred, flexible mastics may be used and *polysulphide* sealants have been found to be suitable for this purpose. Silicone sealants can be used but, as stated earlier, it is very important to use rubber profiles or sealants which are known to be compatible with acrylic sheet.

In the event of any doubt the manufacturer's advice should be sought first. When installing glazing in any frame system, two critical observations need to be taken into account:

- Thermal expansion clearance
- Rebate Depth

Thermal expansion clearance
PERSPEX™ has a high thermal expansion coefficient compared to traditional glazing materials and allowance within the frames must be made in both directions for thermal expansion and contraction. Failure to observe this rule can lead to stresses in the sheet which can cause distortions in the panel and crazing at the edges of the sheet in time.

An allowance of 5 mm per meter run length should be allowed **in both dimensions** during installation. This figure has been found from long experience to be sufficient for all locations and climates.

Rebate depth
It follows from the above that the rebate depth must be sufficient to allow for the expansion clearance **and also the thermal contraction** that can take place in winter. Rebate depth must also be sufficient to prevent the sheet from being deflected out of the frame in gale force winds.

Figure 3 shows a typical profile assembly and **Table 12** the recommended rebate depth for various panel sizes, based on installation at 20 °C.

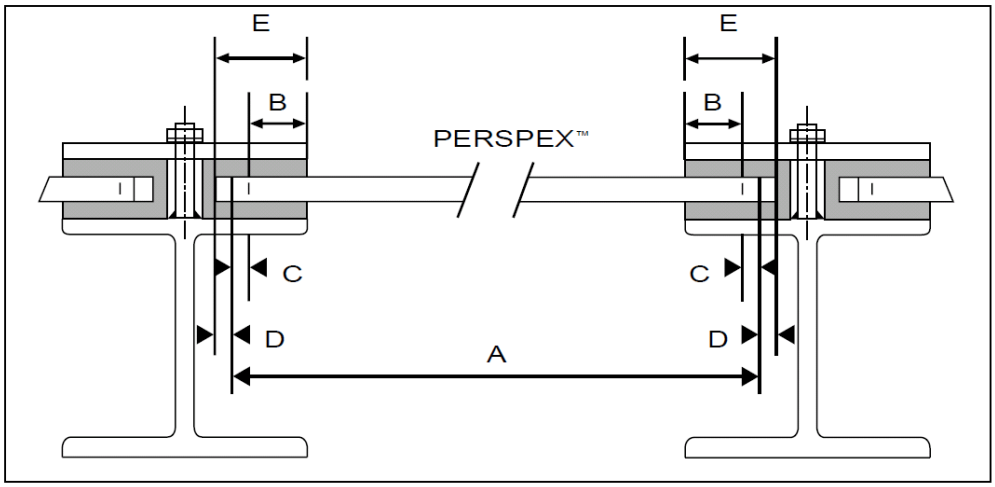

Figure 3 Mounting details for PERSPEX™ glazing

Table 12 The recommended rebate depth for glazed PERSPEX™ panels in frames

Nominal Panel Size A	Minimum Rebate Depth B	Contraction Allowance C	Expansion Allowance D	Total Rebate E
1000 mm	30 mm	5 mm	5 mm	40 mm
2000 mm	35 mm	10 mm	10 mm	55 mm
3000 mm	40 mm	15 mm	15 mm	70 mm

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