3. Applications

- Building and construction
  - Roofing
  - Cladding
  - Skylights
  - Domes
  - Sheds
  - Vaults
  - Suspended ceilings
  - Glasshouses
  - Partitions
  - Industrial roofs
  - Sunrooms
  - Swimming pools
  - Conservatory roofing
  - Shopping centre roofing
  - Railway/metro stations
  - Football stadiums
  - Greenhouses
  - Farm buildings
- Packaging
  - Boxes
  - Pallet shields
  - Protective covers for fragile items
- Advertising
  - Illuminated signs
  - Advertising panels
- Lighting
  - Lamp optics
  - Neon signs

4. Standard dimensions and tolerances

		SPC 4	SPC 6	SPC 8	SPC 10	SPC 16	SPC 20	SPC 25	SPC 25	SPC 32
Design of the flutes									 Diamond	 Diamond
Thickness	mm	4	6	8	10	16	20	25	25	32
	tolerance	+/- 0,5								
Weight	g/m²	800/ 900	1300	1500	1700	2700	3200	3400	3300	3700
	tolerance	+/- 30	+/- 30	+/- 50	+/- 50	+/- 50	+/- 50	+/-50	+/-50	+/-50
Standard tolerance	width (mm)	+/- 5								
	tolerance									
	length (mm)	-0/+8								
	tolerance									

5. Technical information

5.1. Technical data sheet

GENERAL			
Property	**Method**	**Units**	**QUINN SPC**
Density	ISO 1183	g/cm³	1,2
Rockwell Hardness	D-785	M scale	-
OPTICAL			
Property	**Method**	**Units**	**QUINN SPC**
Light Transmission	DIN 5036 T3	%	86
Refractive Index	ISO 489	n^{D}_{20}	1.585
MECHANICAL			
Property	**Method**	**Units**	**QUINN SPC**
Flexural Modulus	ISO 489	MPa	-
Strength	ISO 178	MPa	>95
Tensile Modulus	ISO 527	MPa	2200
Tensile Strength	ISO 527	MPa	60
Elongation	ISO 527	%	80
THERMAL			
Property	**Method**	**Units**	**QUINN SPC**
Vicat Temp. (VST/B 50)	ISO 306	°C	145
Heat Deflection Temp. (A)	ISO R 75	°C	135
Specific Heat Capacity	-	J/gK	1.17
Coefficient of linear thermal expansion	DIN 53328	$K^{-1}x10^{-5}$	6.5
Thermal conductivity	DIN 52612	W/mK	0.2
Degradation temperature		°C	>280
Max. service temperature continuous use		°C	115
Max service temperature short term use		°C	130
Sheet forming temp. range		°C	180-210
IMPACT STRENGTHS			
Property	**Method**	**Units**	**QUINN SPC**
Izod (notched)	ISO 180	kJ/m²	-
Charpy(notched)	ISO 179	kJ/m²	>10
Charpy (unnotched)	ISO 179	kJ/m²	NB
ELECTRICAL			
Property	**Method**	**Units**	**QUINN SPC**
Dielectric constant 50 HZ	DIN 53483		3.0
Volume Resistivity	DIN 53482	Ω.cm	10^{15}
Surface Resistivity	DIN 53482	Ω	10^{15}
Dielectric strength	DIN 53481	kV/mm	>30
Dissipation Factor (50 HZ)	DIN 53483		$8x10^{-4}$

5.2. Light transmission

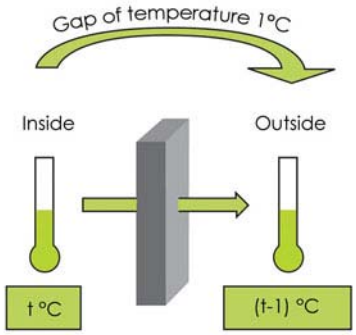
	Clear	Opal 3B	Opal 6B	Bronze
SPC 4	86%	56%	18%	
SPC 6	86%	67%	10%	60%
SPC 8	81%			65%
SPC 10	84%	66%	6%	44%
SPC 16	73%	45%		25%
SPC 20	73%			34%
SPC 25*	64%	41%		27%

5.3. Thermal insulation

U-value (K-value): glazing surface wall transmission coefficient

U or K value is the coefficient which determines heat loss in the glazing walls of a building.

Definition: Heat will flow through a wall of 1 square meter at a temperature difference of one degree Celsius between the two environments.



Unit: W/m².°C
U = 1/R
R = Thermal resistance

U- value for QUINN SPC

SPC 4	SPC 6	SPC 8	SPC 10	SPC 16	SPC 20	SPC 25
3,9	3,6	3,2	2,8	2,3	2	1,6

5.4. Resistance to chemicals

QUINN SPC sheets perform very well upon exposure to most chemicals.

They are not attacked by many inorganic and organic acids, oxidizing and reducing salts, by acid and basic salines, fats, detergents, aliphatic hydrocarbons, alcohols and lubricating oils.

They can be decomposed by certain solvents, by aqueous and alcoholic alkaline solutions, by gaseous ammonia and amines and after prolonged exposure to water at temperatures of over +60°C.

The chemical stability of polycarbonate depends above all on the concentration of the chemical agents and on exposed temperature.

The tests have been carried out by manufacturers of granulated polycarbonate raw materials.

Chemical resistance

Acetic acid, 10%	+	Heptane	+
Acetone	-	Hexane	+
Alkaline Solutions	-	Hydrochloric Acid, concentrated	-
Ammonia	-	Hydrochloric Acid, 20%	+
Ammonium Sulphate, saturated aqueous solution	+	Hydrofluoric Acid, concentrated	-
Benzene	-	Hydrogen Peroxide, 30%	+
Benzoic acid	-	Methane	+
Boric Acid	+	Methyl Alcohol	-
Butyl Acetate	-	Methyl Ethyl Ketone	-
Butyl Alcohol	+	Methylene Chloride	-
Chlorine Gas, humid	-	Nitric Acid, 10%	+
Chromic Acid, 20%	+	Ozone	+
Citric acid, 10%	+	Perchloric Acid, 10%	+
Cresol	-	Perchloro Ethylene	-
Cyclohexanone	-	Phosphoric Acid, concentrated	+
Dibutyl Phtalate	-	Potassium Permanganate, 10% in water	+
Diethyl Ether	-	Propane	+
Diethylene Glycol	+	Propionic Acid, concentrated	-
Dimethyl Formamide	-	Sodium Carbonate, saturated aqueous solution	+
Dioctyl Phtalate	-	Tetrachloro Ethane	-
Ethyl Alcohol	+	Tetraline	-
Ethylene Glycol	+	Xylol	-
Gasoline (aromatic free)	+		

\+ resistant
\- does not resist

5.5. Fire performance

QUINN SPC sheet has good fire performance characteristics and receives high ratings in several major European institutes. QUINN SPC is a thermoplastic which melts under intense heat but does not contribute to the growth of fire by spreading the flames.

FIRE PERFORMANCE QUINN SPC

Product	Thickness	Result	Standard	Test institute
QUINN SPC	4 mm	M 1	French standard	Prefecture de Police
QUINN SPC	6 mm	M 2	French standard	Prefecture de Police
QUINN SPC	8 - 10 mm	M 2	French standard	Prefecture de Police
QUINN SPC	16 mm	M 2	French standard	Prefecture de Police
QUINN SPC	20 mm	M 2	French standard	Prefecture de Police
QUINN SPC	25-32 mm	M 4	French standard	Prefecture de Police
QUINN SPC **Opal 3B**	6, 10 mm	M 1	French standard	Prefecture de Police
QUINN SPC **Opal 3B**	16, 20mm	M 2	French standard	Prefecture de Police
QUINN SPC	4 -10 mm	B 1	DIN 4102-01 MPA NRW	
QUINN SPC	16 mm	B 1	DIN 4102-01 MPA NRW	
QUINN SPC	20 mm	B 1	DIN 4102-01 MPA NRW	
QUINN SPC	25 - 32 mm	B 1	DIN 4102-01 MPA NRW	
QUINN SPC	4 - 32 mm	Class 1	NEN 6065 (fire propagation)	TNO 2001-CVB-R04035 (The Netherlands)
QUINN SPC	4 – 25 mm	$<10m^{-1}$	NEN 6066 (smoke production)	TNO 2001-CVB-R04035 (The Netherlands)

TECHNICAL APPROVALS	COUNTRY
Avis Technique	France
Aprobata Techniczna	Poland
Allgemeine bauaufsichtliche Zulassung 4-10 mm	Germany

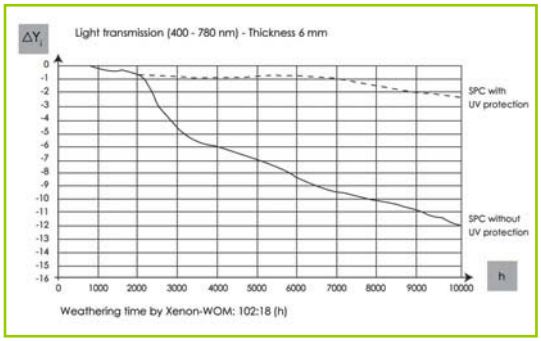
5.6. UV protection

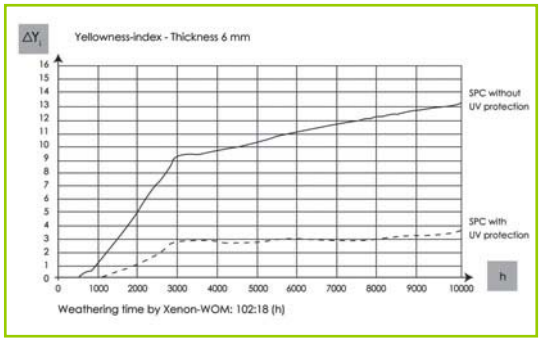
Solar radiation has a harmful component by UV rays which initiate degradation of many polymeric materials including polycarbonate. This depends on geographic locations, seasons, etc.

QUINN SPC sheets are protected against UV-rays by a protection layer on the side exposed to solar radiation. The co-extruded polycarbonate layer enriched with additives allows protection against harmful UV-rays.

Quinn Plastics warrants against weathering for 10 years, covering discolouration, loss of light transmission and loss of strength. However proper installation and good maintenance ensure an even longer period for product life.

Changes in the Yellowness-index and Light Transmission under artificial weathering (Xenon-lamp).





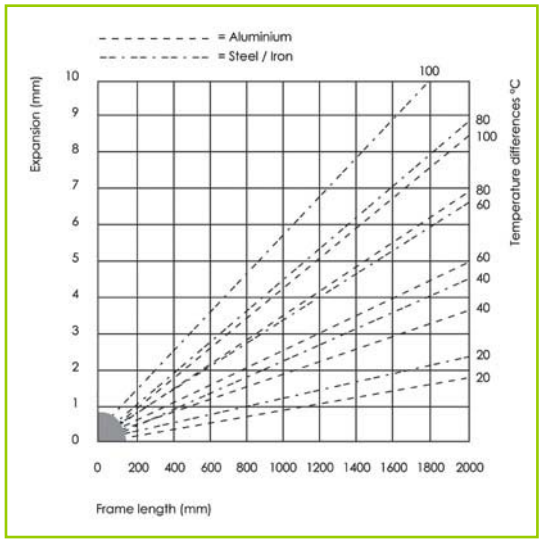
The UV-protected side of the sheet is shown by the printed film QUINN SPC.

In case the protective film is removed before installation it is still possible to identify the UV-protected side:

- Side marking: In order to ensure the full traceability of our production and the follow-up of quality issues, sheets are ink-printed every meter. This marking is shown on the UV-protected side.
- Visual control: On clear sheets the edge of the upper skin has a bluish tint. On coloured sheets, the partition lines are more visible on the UV protected side.

5.7. Thermal properties

Linear expansion differences of steel/iron and aluminium: with respect to SPC sheets on heating is 0.065 mm/m.°C.
Using QUINN SPC sheets with other materials, these different expansions on heating are to be taken into consideration.



Example:
A transparent pane made from QUINN SPC sheets is to be put into an aluminium frame. The dimensions are 1200 x 1800 mm. The temperature range is -20°C to +80°C (a difference of 100°C). If the installation of the pane takes place at +20°C, we must in this case allow for a temperature difference of +60°C (+20°C to +80°C). For the frame length of 1200 mm we have, according to the chart, for aluminium an expansion of 3 mm, and for the frame length of 1800 mm, 4.5 mm to be provided for the expansion of the QUINN SPC sheet. For the temperature difference of 40°C (+20°C to -20°C) there is a shrinkage of 2 mm to be taken into account for the frame length of 1800 mm, over the whole frame. (The given values are minimums and should not be less than specified).

5.8. Acoustical properties

QUINN SPC sheets offer sound insulating properties due to material stiffness, light weight and low visible density. According to DIN S2210-7S, the maximum sound transmission of QUINN SPC is:

Sound insulation values for QUINN SPC

From SPC 4 to SPC 8	18 dB
From SPC 10 to SPC 16	20 dB
From SPC 20 to SPC 32	22 dB

5.9. Impact strength

QUINN SPC sheet has outstanding impact performance over a wide temperature range, of -40°C to +120°C and also after prolonged outdoor weathering exposure.

IMPACT TEST
According to Norm SIA V280 (1996) test n° 9

Description
Shoot PA-balls at different areas of the cooled sheet.
Measure the different speeds till a break appears on the sheet.

Data
Diameter of the Polyamide 66 -balls: 40 mm
Average weight of the balls: 38,5 g
Samples size: 800 mm x 1000 mm
Before the shooting starts the sheet is covered with ice-chips for 3 minutes.

Results

QUINN SPC 10

Speed m/s	Appearance	Depression: Ø mm	Depth mm	Result
15	No change			Dense
20	Little depression			Dense
30	Contained deformation	19	2,8	Dense
50	Contained deformation	22	5,7	Dense
70	Contained deformation	32	8,9	Dense
90	Break on the top layer			Leak

QUINN SPC 16

Speed m/s	Appearance	Depression: Ø mm	Depth mm	Result
15	No change			Dense
20	Little depression			Dense
30	Contained deformation	25	0,9	Dense
50	Contained deformation	33	5,8	Dense
70	Contained deformation	35	8,4	Dense
90	Contained deformation	45	12	Dense
116	Break on the top layer			Leak

QUINN SPC 25

Speed m/s	Appearance	Depression: Ø mm	Depth mm	Result
15	No change			Dense
20	Little depression			Dense
30	Contained deformation	31	1,1	Dense
50	Contained deformation	43	6,3	Dense
70	Contained deformation	64	9	Dense
90	Contained deformation	66	15	Dense
110	Contained deformation	70	21	Dense
125	Break on the top layer			Leak

6. Loading characteristics

In order to determinate the required dimensions for plates made from QUINN SPC sheets fixed on all sides, the following factors are to be taken into consideration:

6.1. Coefficient of thermal expansion

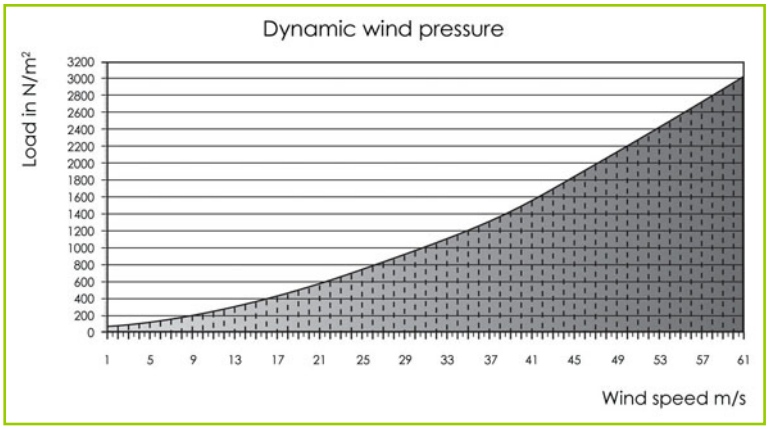
65 x 10^{-6} K^{-1} corresponding to 0.065 mm per m length and 1°C change of temperature inside width of the frame.
The frames can be made of plastic, wood or metal. It is recommended to equip the frame rebate with a relatively dense material. For a defined edge length of the sheet, the frame must accommodate the following amounts.

Edge length	Addition by:
500 mm	3 mm
1000 mm	5 mm
1500 mm	7 mm
2000 mm	10 mm
3000 mm	15 mm

Depth of rebate: The rebate should be approx. 25 mm deep.

6.2. Wind loading

A permissible deflection of the sheet of 50 mm per edge length is acceptable.



6.3. Snow loading

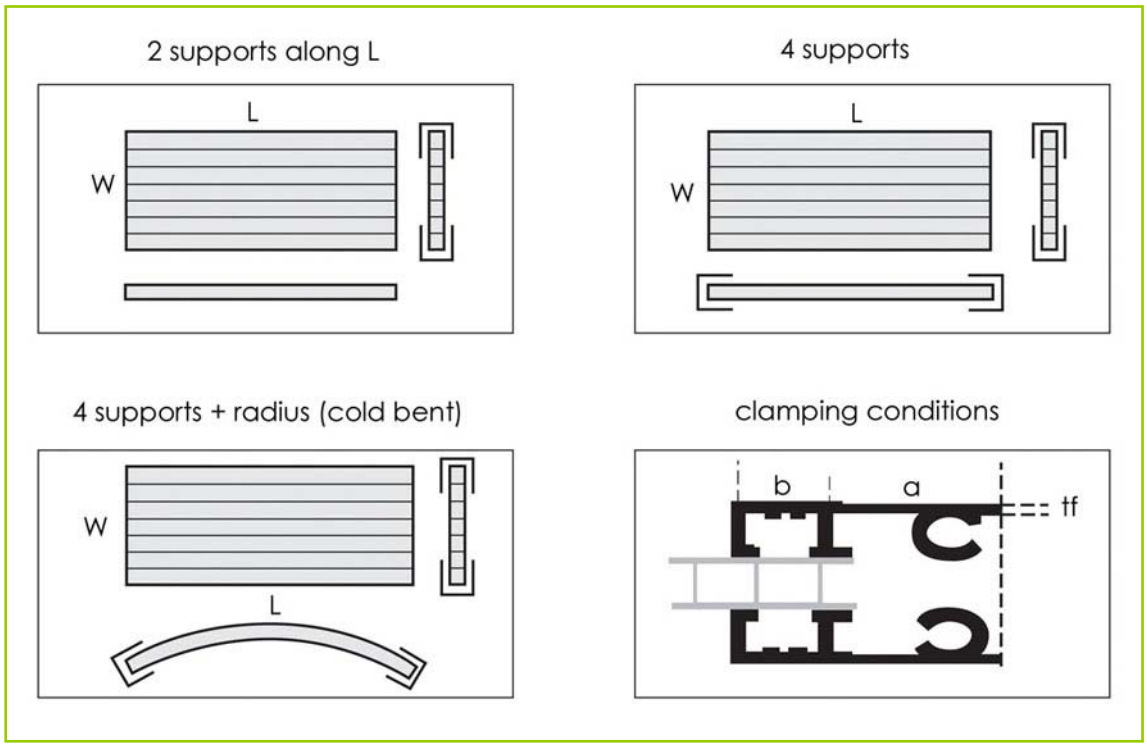
Snow loading on roof or sidewall glazing shall be equivalent to a uniform load, the vertical load per square meter of the horizontal projection of the pane.

The load of snow on a horizontal or weakly tilted cover must be considered as an uniformly distributed load, perpendicular to the cover. Norms of constructions define the tolerable snow load by the construction. The density of snow can vary 0,07 to 0,3. In certain climatic conditions snow can be charged with water. It is therefore preferable to evacuate a volume of fresh snow in order to avoid all overcharge.

Example

	Load N/m²	
Thickness	**Fresh snow**	**Wet snow**
20 cm	140	600
50 cm	350	1500
100 cm	700	3000

6.4. Conditions of supports



6.5. Loading capacity (Figures per thickness available in appendix)

SUPPORTS	Cond.		SPC 4	SPC 6	SPC 10	SPC 16	SPC 20	SPC 25
2 supports along L			Fig. 1	Fig. 10	Fig. 19	Fig. 28	Fig. 37	Fig. 46
		L in meter						
4 supports	Length	L=1	Fig. 2	Fig. 11	Fig. 20	Fig. 29	Fig. 38	Fig. 47
		L=1,5	Fig. 3	Fig. 12	Fig. 21	Fig. 30	Fig. 39	Fig. 48
		L=2	Fig. 4	Fig. 13	Fig. 22	Fig. 31	Fig. 40	Fig. 49
		L=3 and +	Fig. 5	Fig. 14	Fig. 23	Fig. 32	Fig. 41	Fig. 50
		R in mm						
Cold bent	Bending Radius	667	Fig. 6					
		1000	Fig. 7	Fig. 15				
		1500	Fig. 8	Fig. 16				
		1667			Fig. 24			
		2000	Fig. 9	Fig. 17	Fig. 25			
		2500		Fig. 18				
		2667			Fig. 26	Fig. 33		
		3000						
		3300					Fig. 42	
		3500			Fig. 27	Fig. 34		
		4000					Fig. 43	
		4200						Fig. 51
		4500				Fig. 35	Fig. 44	
		5000						Fig. 52
		5300						
		5500				Fig. 36	Fig. 45	Fig. 53
		6000						Fig. 54
		7000						

Minimum bending radius
Equivalent to "4 supports plane

Other conditions of supports, contact us:

- 2 supports parallel to W
- multi-supports parallel to W