TECHNICAL INFORMATION

QUINN SPC
ENGLISH

Contents

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ENGLISH

1. Product identification

QUINN SPC is the brand name for extruded multiwall polycarbonate sheets from Quinn Plastics.
The QUINN SPC programme offers solutions to both indoor and outdoor applications.

QUINN SPC is a lightweight sheet, quite easy to transport, handle and install.
QUINN SPC is virtually unbreakable and can resist hailstorms and have outstanding impact performance over a wide temperature range and prolonged outdoor exposure.
The flute structure provides the sheet with an air-insulating gap which is an important regulatory requirement in many countries for thermal insulation.
The span capabilities are excellent and vary with the thickness of the sheet being used.
QUINN SPC sheets offer excellent aesthetic and optical properties with a range of clear and translucent colours.
The fire performance of QUINN SPC is outstanding as polycarbonate make almost no contribution to the growth of a fire by spreading the flames.
QUINN SPC sheets are UV-protected by co-extrusion, giving excellent durability to outdoor weathering.
Quinn Plastics offer a 10 year warranty for light transmission and against discolouration.

QUINN SPC's specific properties make this product an ideal fit for building, construction, packaging, advertising and lighting applications.

2. Characteristics

- Lightness
- Thermal insulation
- High solidity
- High resistance to shocks
- Extensive span capabilities
- Good chemical resistance
- Transparent
- Resistance to UV-rays
- Fire resistance, conforming to European standards
- Resistance to extreme temperature variations (-40°C up to +120°C)
- Aesthetic quality
- 10 year warranty for optical and mechanical properties, and for resistance to hail on materials 10 mm and above

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

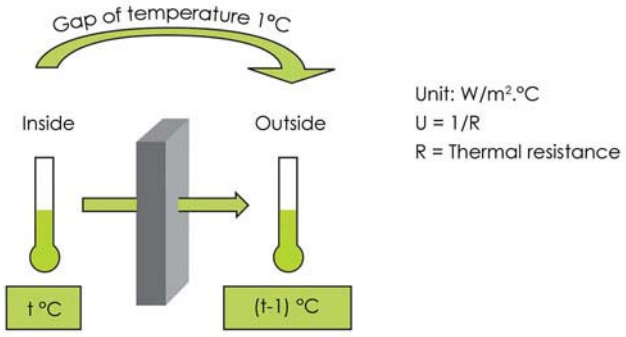
	Clear	Opal 3B	Opal 6B	Bronze
SPC 4	86%	56%	18%	
SPC 6	86%	67%	10%	60%
SPC 8	81%			65%
SPC 10	84%	66%	6%	44%
SPC 16	73%	45%		25%
SPC 20	73%			34%
SPC 25*	64%	41%		27%

5.3.1 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.



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

5.3.2.□□

G-value (shading coefficient): The Shading coefficient characterizes the solar energy transmittance through transparent materials. G-values range from 0 to 1, a lower value representing less solar gain.

G-value for QUINN SPC

SPC 25mm □□ clear	SPC 25mm silver-opal
□0.61	□0.34

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	$<10 m^{-1}$	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

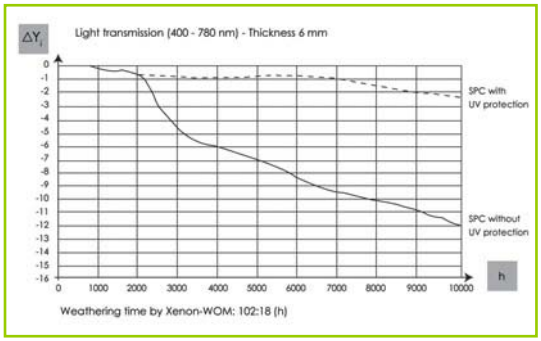
5.6. UV protection

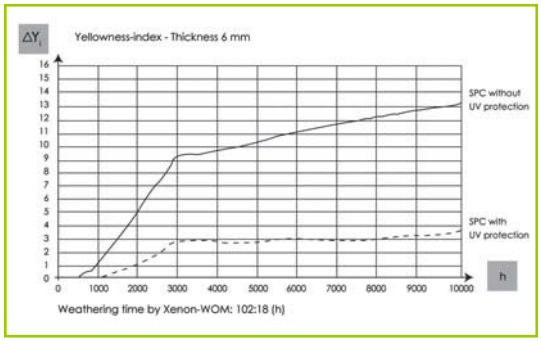
Solar radiation has a harmful component by UV rays which initiate degradation of many polymeric materials including polycarbonate. This depends on geographic locations, seasons, etc.

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).





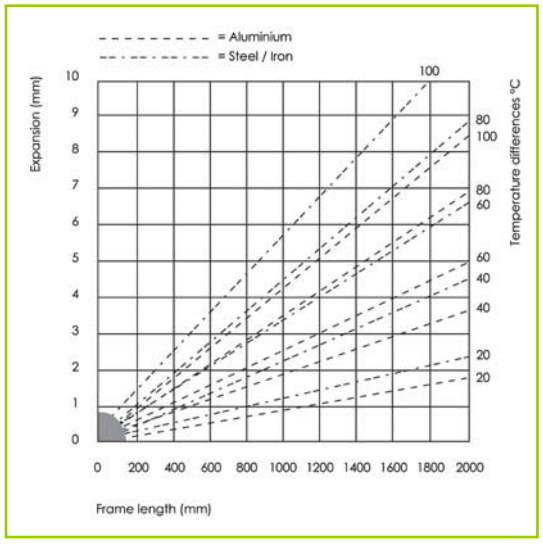
The UV-protected side of the sheet is shown by the printed film QUINN SPC.

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

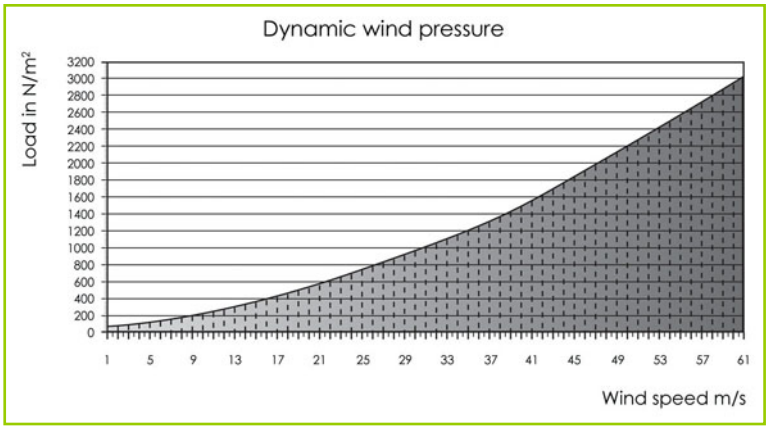
65 x 10^{-6} K^{-1} corresponding to 0.065 mm per m length and 1°C change of temperature inside width of the frame.
The frames can be made of plastic, wood or metal. It is recommended to equip the frame rebate with a relatively dense material. For a defined edge length of the sheet, the frame must accommodate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

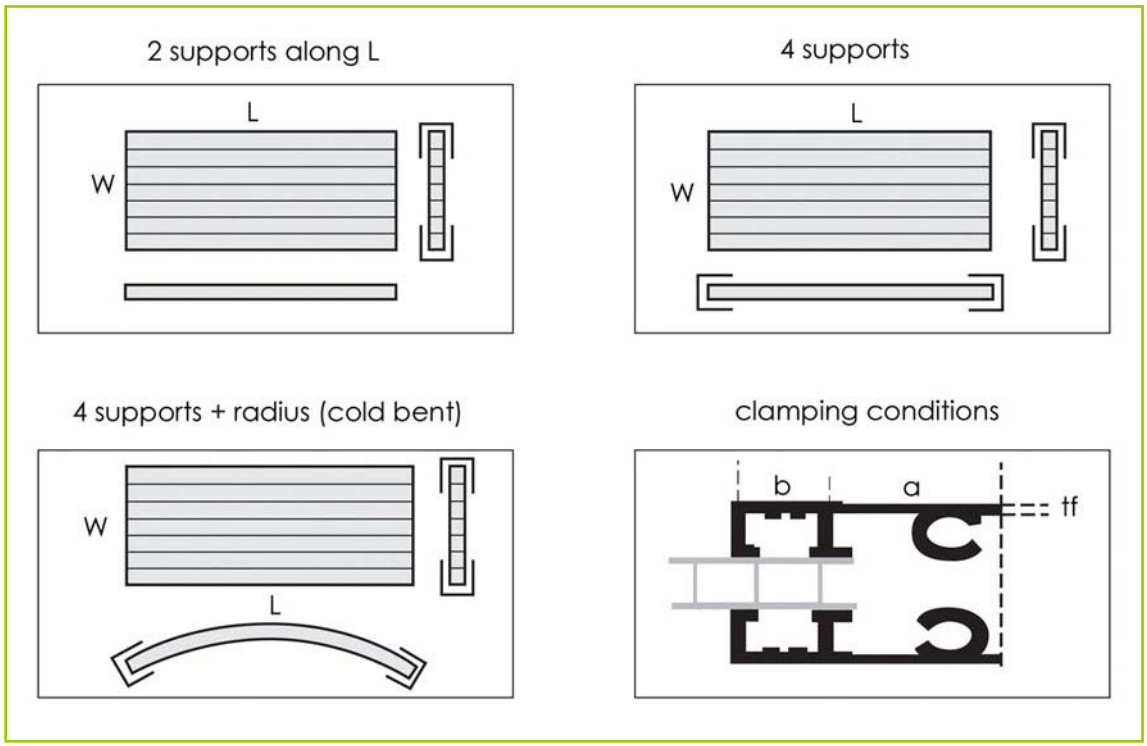
Snow loading on roof or sidewall glazing shall be equivalent to a uniform load, the vertical load per square meter of the horizontal projection of the pane.

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

7. User guide information

7.1. Installation

When QUINN SPC has just been installed, the printed polyethylene film on the UV-protected side as well as the plain polyethylene film on the inner side will be removed.

In order to prevent condensation developing inside the flutes, we recommend QUINN SPC sheets be sealed with plain aluminium tape for the upper sealing and with micro-perforated aluminium tape for the bottom sealing. In the latter one we also recommend to use profiles which allow good ventilation and drainage.

The use of silicone putties should be avoided, as most of them are not compatible with polycarbonate, increasing the risk of chemically damaging the sheets. We also strongly advise against the use of PVC gaskets. Most of them will cause damage to the sheets because of plasticizer migrations. The use of EPDM gaskets is recommended.

When installing QUINN SPC sheets, do not walk on the sheet.
Install QUINN SPC sheets with the flutes towards the watershed direction.

Take account for rebate fittings of the coefficient of thermal expansion, which is equal to $6.7x10^{-5}$ mm °C. The total play corresponds to 3 mm/m.
The sheet holding should not be less than 18 mm.
The rebate depth takes account of the sheet holding, the usual play for thermal expansion and the fitting tolerances. It corresponds to the following values:

Distances between rabbets	Minimum rebate depth
0 to 1,000 mm	20 mm
1,000 to 2,500 mm	25 mm
More than 2,500 mm	30 mm

7.2. Cutting

The following precautions are needed when cutting QUINN SPC sheets:
Make sure the sheets are in a perfectly flat position and use sharp cutting tools. The following table shows the kinds of tools to be used for sheets up to 20 mm thickness.

Tool	Slot pitch (mm)	Speed (revs. per minute)
Light metal-cutting high speed band saw	2	1,200
Light metal-cutting high speed circular saw	2-3	3,000
Fire-toothed circular saw	10	4,000-5,000
Diamond circular saw	10	3,000

For hand cutting (especially for 4 and 6 mm thicknesses) use Stanley-type blades.
To get rid of any shaving left in the flutes after cutting, use an appropriate air compressed vacuum cleaner. While cutting QUINN SPC sheets, make sure no overheating develops. This would possibly deform the sheets. If necessary cool the tools during the cutting process accordingly, and prevent moisture development.

7.3. Storage

For outdoor storage, pallets of QUINN SPC sheets should be stored on a flat and dry ground with adequate ventilation, protected from direct sunlight and rain (condensation risk).
For indoor storage without pallets, sheets should not be horizontally piled up for more than 2 meters. Vertical storage is possible only if the shelves are perfectly straight. If not permanent deformation will develop.
Before moving any pallet make sure that the lifting ropes are well but not too tightly attached to the sheets. If not this may damage the top sheets of the pallet.
For all 2,100 mm wide QUINN sheets and lengths of more than 7,000 mm, do not use short forklift trucks. The risk is high to bend the pallet when it is moved and results in the pallet nails protruding due to distortion and entering the bottom sheets on the pallet.

7.4. Drilling

For drilling action use conically headed high-speed metal drills (1,000 to 1,500 revs. per minute).
Holes should be drilled at a distance of at least 10 mm from the sheet edges. Make sure that the diameters of the holes are larger than those of the screws (i.e. 10-12 mm for 6 mm screws). This will allow thermal expansion without any risk.

7.5. Cleaning

Never use watery solutions that may contain abrasives or aggressive solvents.
Use regularly non-alkaline liquid soaps, warm but not hot water and soft sponges only.
If necessary repeat the operation several times.
Rinse with warm water and dry with soft fabrics with the same care.
Small scratches and superficial marks of abrasion can be eliminated with polish-type paste, dabbed on the sheets to then be removed with warm water or light detergents.
Greasy taints as well as fresh painting marks can also be eliminated by quickly dabbing alcohol, petrol or very light solvents on the sheets. A generous rinse with warm detergent water is then immediately required.

8. Warranty

1. Quinn Plastics warrants – for a period of 10 years from the date of sales by Quinn Plastics – that QUINN SPC is protected on one side from the adverse effects of UV-radiation and that it will not show any significant change in its yellowness index and mechanical properties when being exposed to moderate European climate.

2. This warranty exclusively applies to standard QUINN SPC-Sheets (from 6 mm upwards) having been installed, handled and maintained according to Quinn Plastics recommendations and instructions. The buyer is presumed to be informed of those recommendations and instructions. If this is not the case, he can obtain the relevant documents from his Quinn Plastics sales contacts or from the authorized distributor.

3. No warranty will be granted for scratched, cracked or broken sheets or for sheets having been exposed to corrosive materials or environmental influences which might affect them, nor for sheets whose protective layer has been damaged in any way whatever.

4. In case of warranty claims due to quality impairment, these particular sheets and the appropriate delivery note must be returned to Quinn Plastics or to the original distributor.

5. The yellowing degree is determined by measurements according to the ASTM-testing method D1925 (1977) which means, that several samples are taken from the sheet and cut into sizes meeting the requirements of the relevant test method. Prior to testing, the samples will be cleaned. QUINN SPC sheets presenting a changed yellowness rate of less than 6 Delta units - compared to the original value having been specified by Quinn Plastics on the date of manufacturing - are not subject to any complaint.

6. Any change in light transmission is determined by means of the testing method according to DIN 5036 which means, that several samples are taken from the sheet and cut into sizes meeting the requirements of the relevant testing method. Prior to testing, the samples will be cleaned. QUINN SPC sheets presenting a change in light transmission of less than 4% - compared to the original value having been specified by Quinn Plastics on the date of manufacturing - are not subject to any complaint.

7. The term "Unbreakability" in the sense of this warranty means, that after 10 years' time the modulus of elasticity is of > 2100 MPa. Testing of the mechanical properties is performed with plain, unscratched samples with reference to ISO 527 standards.

8. In case of justified complaints as part of this warranty, Quinn Plastics will replace that particular material without any other liability.
   Up to 5 years' time from the purchase date, Quinn Plastics will replace the material at 100%
   Between 5 - 7 years' time from the purchase date, Quinn Plastics will replace the material at 60%
   Between 7 - 10 years' time, Quinn Plastics will replace the material at 30%
   If the replacement material cannot be provided within a reasonable period of time, Quinn Plastics may decide to repay the original material costs without any other liability. This warranty, for instance, doesn't cover any (re)installation expense or other incidental costs which may derive from that complaint.

9. There are no express or implicit, written or oral warranties or statements made by Quinn Plastics including any warranties or statements on the marketability or of some determined product utility, except as set forth herein.

NOTE: The particulars given in this document are based on our actual knowledge and experience. They do not release the user from the obligation of carrying out his own tests and trials, due to the abundant factors which may affect processing and application of our products. It is the consignee's responsibility to ensure, that any protective rights and existing laws and regulations are observed.

Appendix: Loading capacities

Loading characteristics - QUINN SPC 4

Snow and wind (kN/m²)

Product name: **QUINN SPC 4**
weight: 900 g/m²

Conditions maximum displacement (d) 50 mm
maximum pop out (p) 15 mm

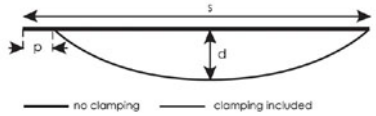


Fig. 1: SPC 4 • 2 supports//L

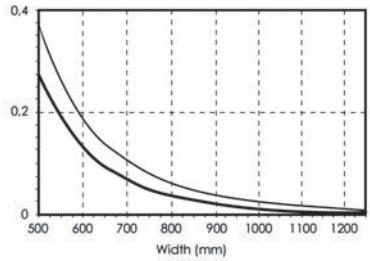


Fig. 2: SPC 4 • 4 supports • L=1

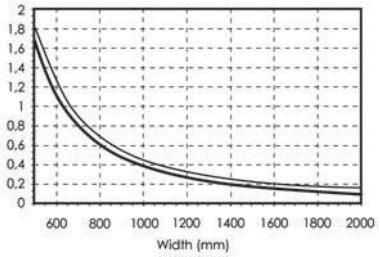


Fig. 3: SPC 4 • 4 supports • L=1,5

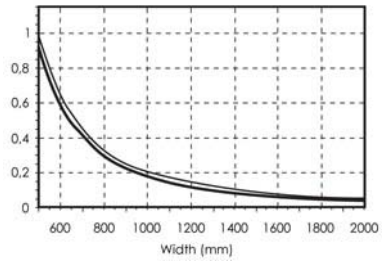


Fig. 4: SPC 4 • 4 supports • L=2

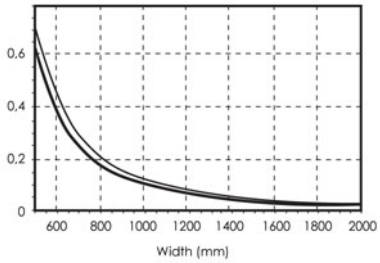


Fig. 5: SPC 4 • 4 supports • L=3 and +

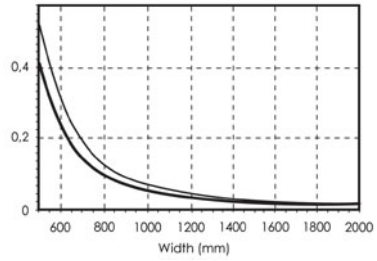


Fig. 6: SPC 4 • cold bent • R=667mm

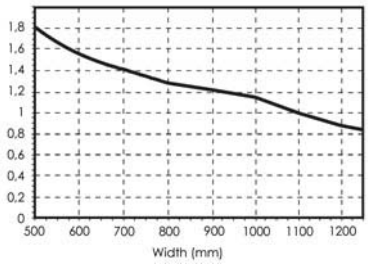


Fig. 7: SPC 4 • cold bent • R=1000mm

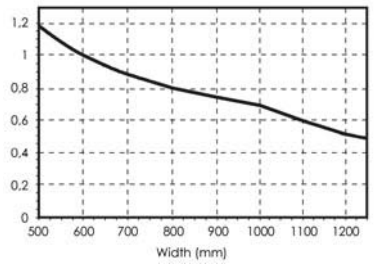


Fig. 8: SPC 4 • cold bent • R=1500mm

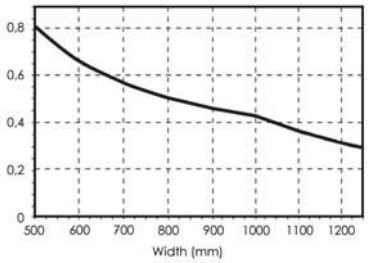
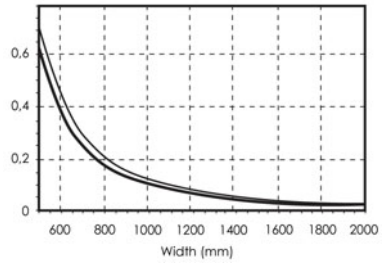


Fig. 9: spc 4 • cold bent • R=2000mm



Loading characteristics - QUINN SPC 6

Snow and wind (kN/m²)

Product name: **QUINN SPC 6**
weight: 1300 g/m²

Conditions maximum displacement (d) 50 mm
maximum pop out (p) 15 mm

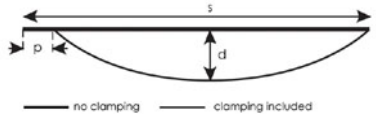


Fig. 10: SPC 6 • 2 supports//L

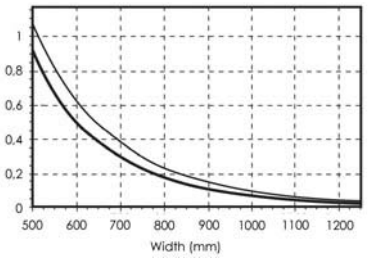


Fig. 11: SPC 6 • 4 supports • L=1

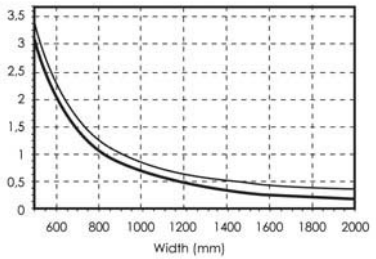


Fig. 12: SPC 6 • 4 supports • L=1,5

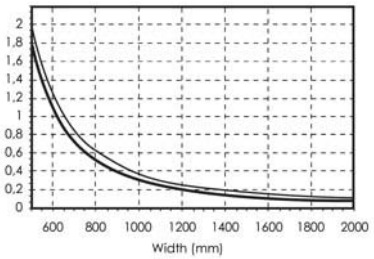


Fig. 13: SPC 6 • 4 supports • L=2

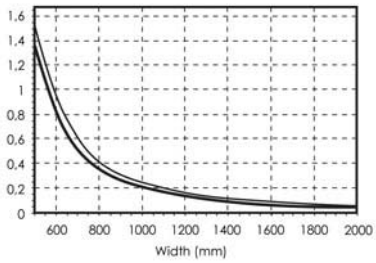


Fig. 14: SPC 6 • 4 supports • L=3 and +

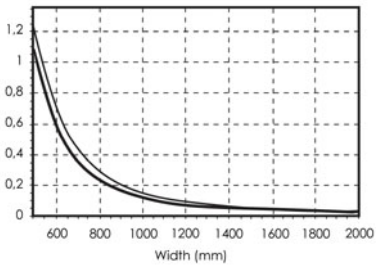


Fig. 15: SPC 6 • cold bent • R=1000mm

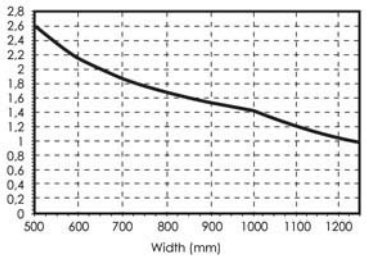


Fig. 16: SPC 6 • cold bent • R=1500mm

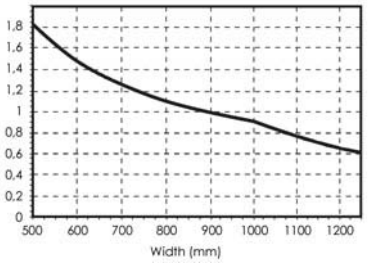


Fig. 17: SPC 6 • cold bent • R=2000mm

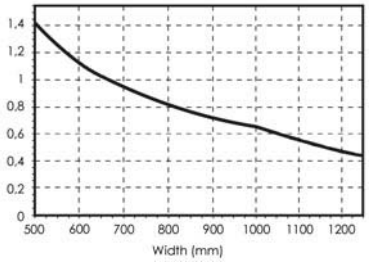
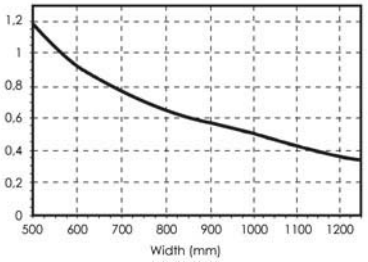


Fig. 18: SPC 6 • cold bent • R=2500mm



Loading characteristics - QUINN SPC 10

Snow and wind (kN/m²)

Product name: **QUINN SPC 10**
weight: 1700 g/m²

Conditions maximum displacement (d) 50 mm
maximum pop out (p) 15 mm

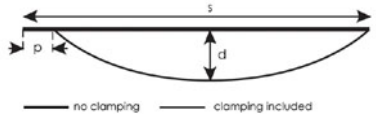


Fig. 19: SPC 10 • 2 supports//L

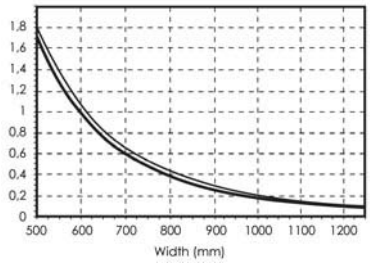


Fig. 20: SPC 10 • 4 supports • L=1

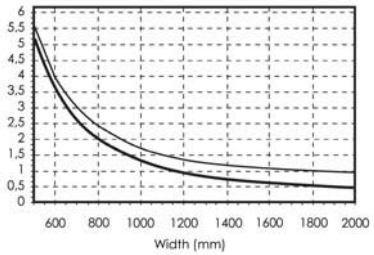


Fig. 21: SPC 10 • 4 supports • L=1,5

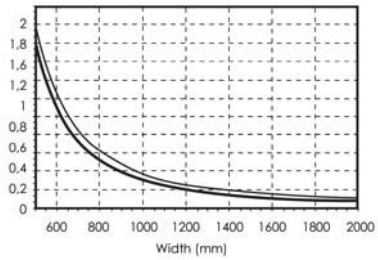


Fig. 22: SPC 10 • 4 supports • L=2

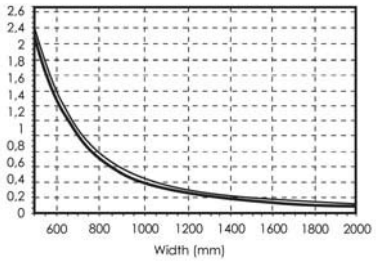


Fig. 23: SPC 10 • 4 supports • L=3 and +

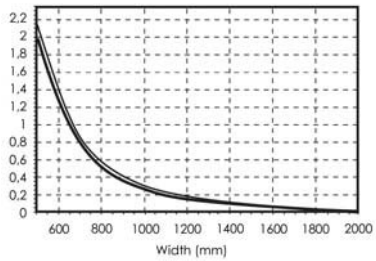


Fig. 24: SPC 10 • cold bent • R=1667mm

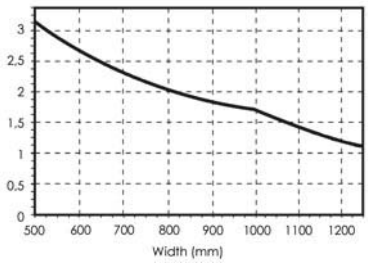


Fig. 25: SPC 10 • cold bent • R=2000mm

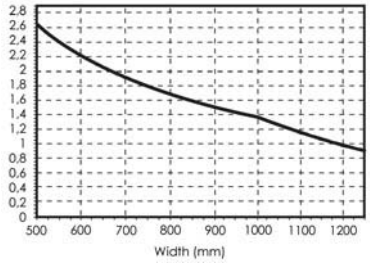


Fig. 26: SPC 10 • cold bent • R=3000mm

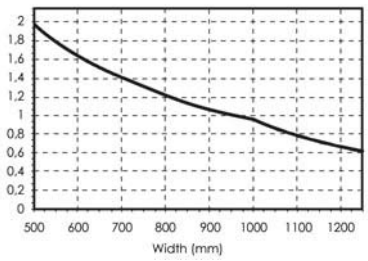
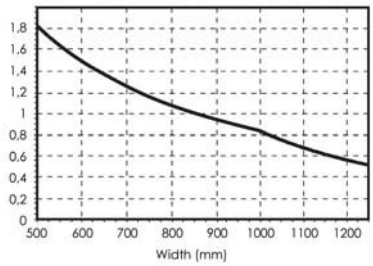


Fig. 27: SPC 10 • cold bent • R=3500mm



Loading characteristics - QUINN SPC 16

Snow and wind (kN/m²)

Product name: **QUINN SPC 16**
weight: 2700 g/m²

Conditions maximum displacement (d) 50 mm
maximum pop out (p) 15 mm

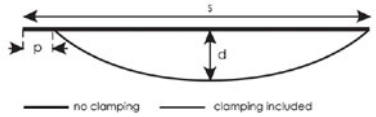


Fig. 28: SPC 16 • 2 supports//L

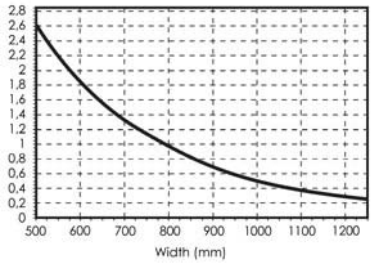


Fig. 29: SPC 16 • 4 supports • L=1

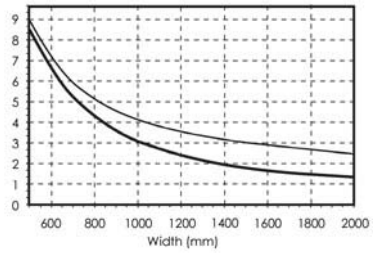


Fig. 30: SPC 16 • 4 supports • L=1,5

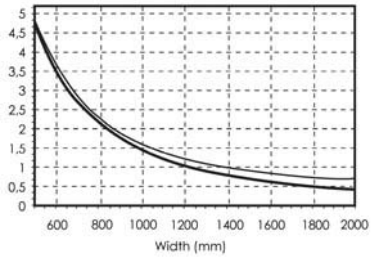


Fig. 31: SPC 16 • 4 supports • L=2

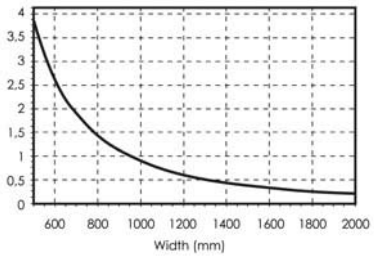


Fig. 32: SPC 16 • 4 supports • L=3 and +

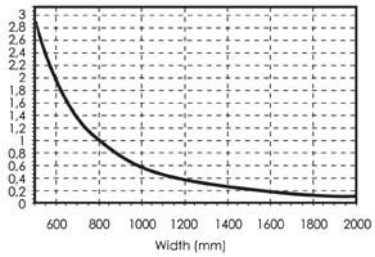


Fig. 33: SPC 16 • cold bent • R=2667mm

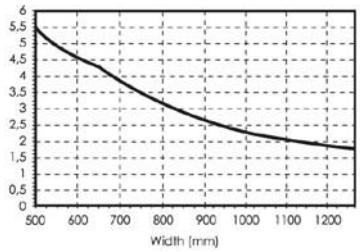


Fig. 34: SPC 16 • cold bent • R=3500m

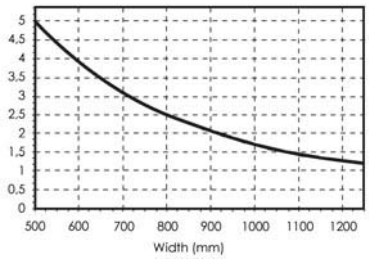


Fig. 35: SPC 16 • cold bent • R=4500mm

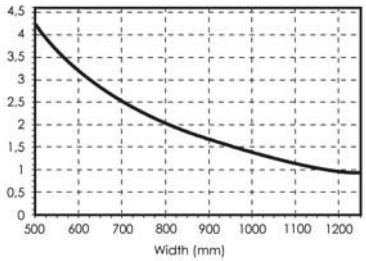
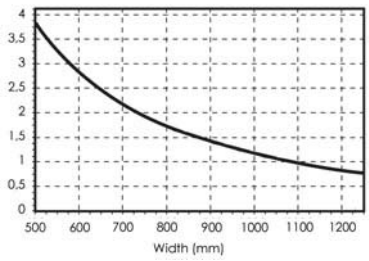


Fig. 36: SPC 16 • cold bent • R=5500mm



Loading characteristics - QUINN SPC 20

Snow and wind (kN/m²)

Product name: **QUINN SPC 20**
weight: 3200 g/m²

Conditions maximum displacement (d) 50 mm
maximum pop out (p) 15 mm

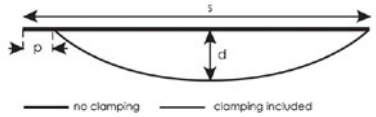


Fig. 37: SPC 20 • 2 supports//L

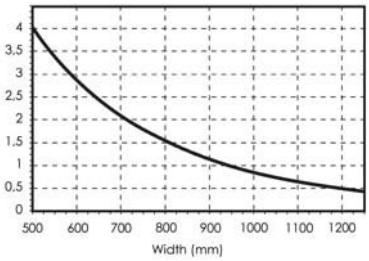


Fig. 38: SPC 20 • 4 supports • L=1

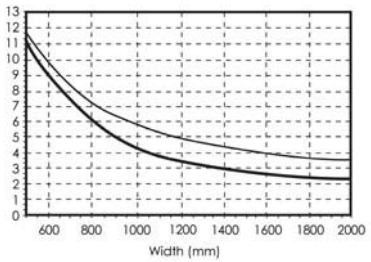


Fig. 39: SPC 20 • 4 supports • L=1,5

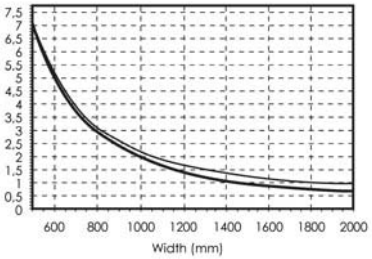


Fig. 40: SPC 20 • 4 supports • L=2

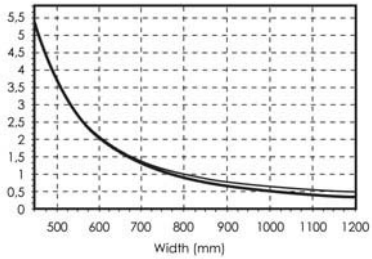


Fig. 41: SPC 21 • 4 supports • L=3 and +

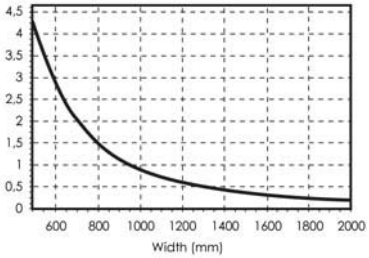


Fig. 42: SPC 20 • cold bent • R=3300mm

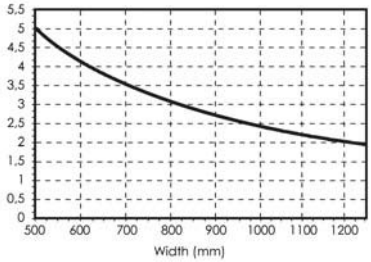


Fig. 43: SPC 20 • cold bent • R=4000mm

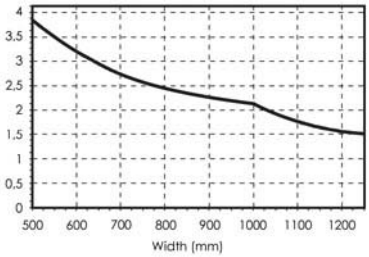


Fig. 44: SPC 20 • cold bent • R=4500mm

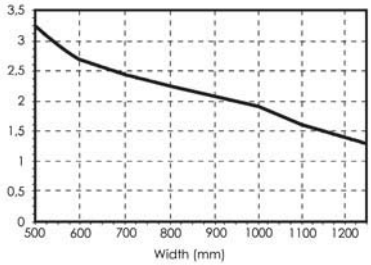
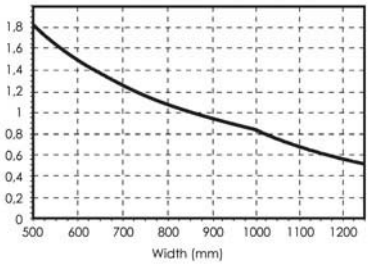


Fig. 45: SPC 20 • cold bent • R=5500mm



Loading characteristics - QUINN SPC 25

Snow and wind (kN/m²)

Product name: **QUINN SPC 25**
weight: 3400 g/m²

Conditions maximum displacement (d) 50 mm
maximum pop out (p) 15 mm

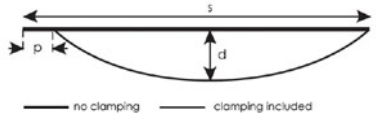


Fig. 46: SPC 25 • 2 supports//L

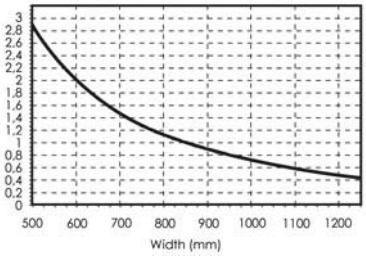


Fig. 47: SPC 25 • 4 supports • L=1

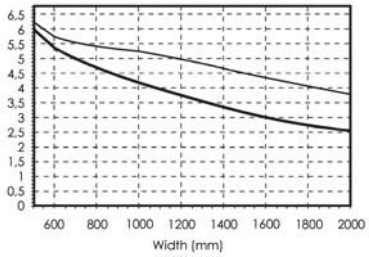


Fig. 48: SPC 25 • 4 supports • L=1,5

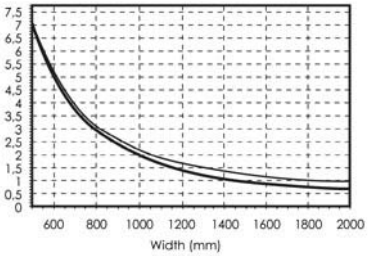


Fig. 49: SPC 25 • 4 supports • L=2

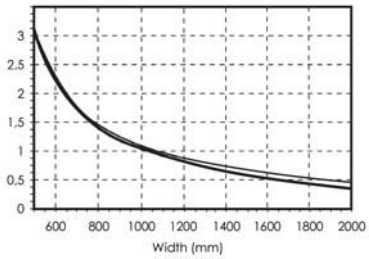


Fig. 50: SPC 25 • 4 supports • L=3 and +

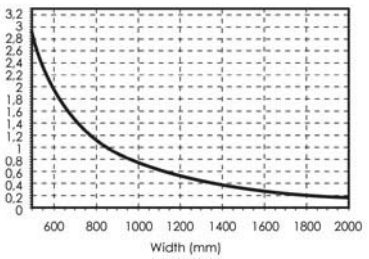


Fig. 51: SPC 25 • cold bent • R=4200mm

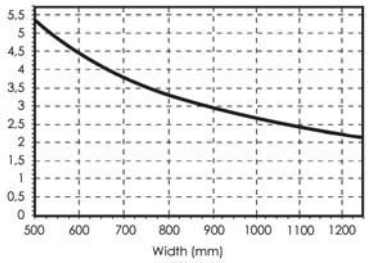


Fig. 52: SPC 25 • cold bent • R=5000mm

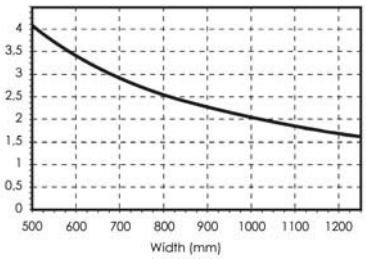


Fig. 53: SPC 25 • cold bent • R=5500mm

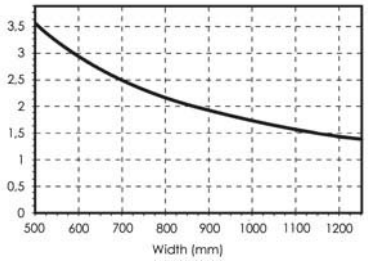
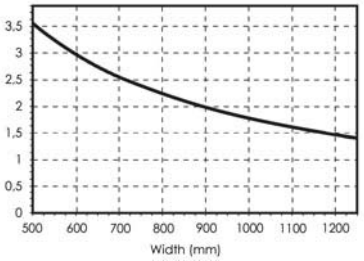


Fig. 54: SPC 25 • cold bent • R=6000mm



9. QUINN SPC diamond datasheet

9.1. Product identification

QUINN SPC is the brand name for extruded structured polycarbonate sheets made by Quinn Plastics. The QUINN SPC programme offers solutions for both indoor and outdoor applications.

QUINN SPC can offer clear, bronze and the standard opal white versions, as well as a variety of colours, which are subject to minimum quantities and price surcharges.

QUINN SPC diamond is a new range of structured sheets, specially designed to offer cost saving and improved mechanical properties.

QUINN SPC diamond has a lower weight. However this is a stiffer product due to the design of its structure, which allows better span capabilities. Diamond is cost saving because fewer glazing bars will be used. The sheet is designed to look similar to a rectangular box structure when installed and this also improves the light transmission compared to other rigid sheets available on the market.

QUINN SPC diamond Solar Control range has been developed to reduce the heat build up (IR transmission), combined with improved light transmission. QUINN SPC diamond is available in Cool White (opal sheet with white layer) and Super Cool White (clear sheet with white layer).

9.2. Characteristics

- 10 year warranty for optical and mechanical properties
- Lower weight
- Thermal insulation as good as 1.4
- Higher stiffness
- Higher impact resistance
- Extensive span capabilities
- Resistant to chemical agents (except solvents)
- Transparency improved due to the design
- Resistance to weathering i.e. UV-rays with co-extrusion capability
- Resistance to heat build up i.e. IR-rays (Solar control range)
- Fire performance, conforming to European standards
- Resistance to extreme temperature variations (-40° C up to +120° C)
- Aesthetic quality
- 10 year warranty for optical, mechanical properties and for resistance to hail on thickness 10 mm and above

9.3. Applications

- Conservatories
- Skylights
- Sheds
- Vaults
- Ceilings
- Pergolas
- Rooflights
- Atriums
- Cladding
- Winter gardens
- Stadium roofing
- Greenhouses

9.4. Fabrication and finishing techniques

QUINN SPC diamond sheets are easy to handle due to their stiffness and lower weights.

All QUINN SPC diamond sheets are UV-protected on one side. The printed masking film shows the side for external exposure to the sun and ageing UV-rays.
We recommend removing the masking only after the installation to prevent sheet damaging.

QUINN SPC diamond sheets should be taped with solid aluminium and/or micro-perforated aluminium tapes to prevent moisture, insects and dust developing inside the flutes.

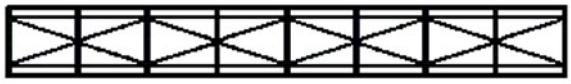
QUINN SPC diamond sheets must be treated differently compared to glass, as they cannot be rigidly clamped. The clamping must enable the expansion and contraction of the sheets (see below). During the installation avoid any horizontal positioning of the sheets and foresee a slope and an angle along the lengths of the sheets.

QUINN SPC diamond sheets can be cut with standard electric saw tools. Air pressure cleaners can get rid of the sawdust. Nowadays knife blades give clean products, as there is no dust generated inside the flutes of the sheets.

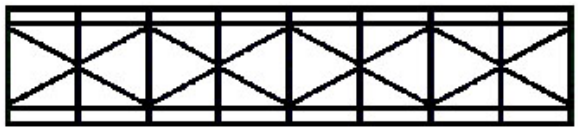
More detailed information on QUINN SPC diamond sheets can be found in our technical product information brochure, available on request.

9.5. Sheet design

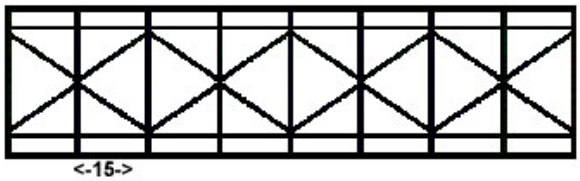
QUINN SPC diamond 16



QUINN SPC diamond 25

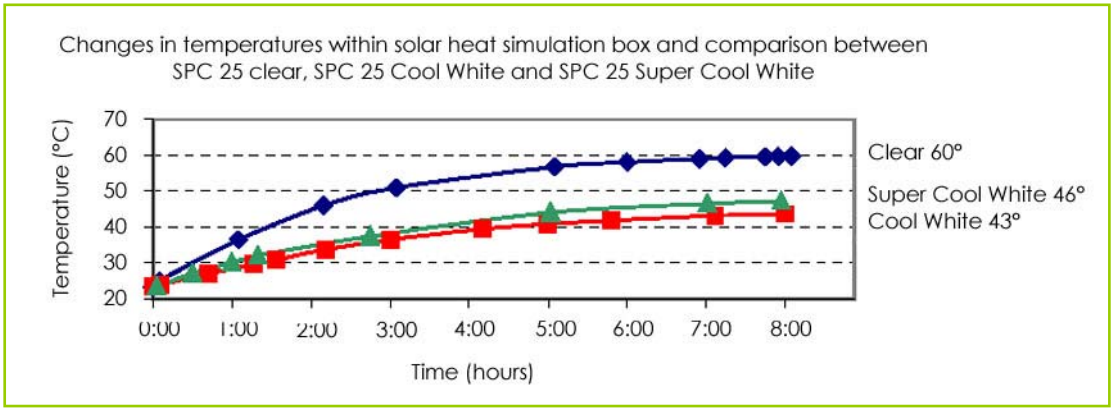


QUINN SPC diamond 35



9.6. Solar control

Quinn Plastics has developed a range of solar control (SC) sheets, specially designed for closed conservatories. In the summertime temperature inside conservatories can sometimes reach more than 60°C. Infrared radiance is the cause of the temperature increase. QUINN SPC diamond SC multiwall polycarbonate sheets are made to reduce the heat radiance. QUINN SPC diamond SC sheets are also long-life UV-protected products. Cool white and super cool white versions are available up to 1230 mm only.



The three sheets have been exposed to IR radiation in a black box, separated in two parts by the sheet, with in the upper side an IR lamp and in the lower side a thermometer.

9.7. QUINN SPC diamond characteristics

QUINN SPC diamond	16 mm	25 mm	32 mm	35 mm
Weight in kg/m²	2.5 kg/m²	3.3 kg/m²	3.7 kg/m²	4.0 kg/m²
Number of walls	6	6	6	6
U- value	1.8 W/m².°C	1.5 W/m².°C	1.4 W/m².°C	1.4 W/m².°C
Min. bending radius	3500 mm*	5300 mm*	7300 mm*	8400 mm*

	Light transmission according to Norm NF-38511					Solar transmission		Solar ratio (LT/ST)	
	Clear	Opal 3B	Bronze	Cool White	Super Cool White	Cool White	Super Cool White	Cool White	Super Cool White
16 mm	60%	40%	25%	37%	45%	34%	40%	1.09	1.12
25 mm	57%	41%	15%	36%	44%	30%	36%	1.20	1.22
32 mm	57%	44%	16%	34%	42%	29%	35%	1.17	1.20
35 mm	56%	44%	16%	34%	41%	29%	35%	1.17	1.17

* Due to deformation of oblique walls, some visual defects can appear especially on clear sheet. To avoid this defect, you must consider the following data:

QUINN SPC diamond	16 mm	25 mm	32 mm	35 mm
Min. bending radius	7500 mm	9000 mm	11000 mm	11000 mm

9.8. Technical information

GENERAL			
Property	**Method**	**Units**	**QUINN SPC diamond**
Density	ISO 1183	g/cm³	1,2
Rockwell Hardness	D-785	M-schaal	-
OPTICAL			
Property	**Method**	**Units**	**QUINN SPC diamond**
Light Transmission	DIN 5036	%	86
Refractive Index	T3	n^{D}_{20}	1.585
MECHANICAL			
Property	**Method**	**Units**	**QUINN SPC diamond**
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 diamond**
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 diamond**
Izod (notched)	ISO 180	kJ/m²	-
Charpy(notched)	ISO 179	kJ/m²	> 40
Charpy (unnotched)	ISO 179	kJ/m²	NB
ELECTRICAL			
Property	**Method**	**Units**	**QUINN SPC diamond**
Dielectric constant 50 HZ	DIN 53483		3.0
Volume Resistivity	DIN 53482	Ω.cm	10^{15}
Surface Resistivity	DIN 53482		10^{15}
Dielectric strength	DIN 53481	Ω	>30
Dissipation Factor (50 HZ)	DIN 53483	kV/mm	$8x10^{-4}$

9.9. Loading characteristics

In order to determine the required dimensions for QUINN SPC diamond sheets fixed on all sides, the following factors have to be taken into account:

Coefficient of thermal expansion
The figure of 65 x 10^{-6} K^{-1} corresponds to 0.065 mm per m length and 1°C change in temperature on the inside width of the frame.

The frames can be made of plastic, wood or metal. It is recommended to allow the frame to have rebates for relatively dense materials. For a defined edge length of the sheet, the frame must allow the following rebates:

Edge length	Addition in mm
500 mm	+ 3 mm
1000 mm	+ 5 mm
1500 mm	+ 7 mm
2000 mm	+ 10 mm
3000 mm	+15 mm

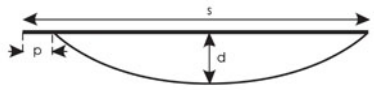
Loading capacity (Dan/m²)

QUINN SPC diamond 16 mm		Lengths in mm					
		1000	2000	3000	4000	5000	6000
Widths in mm	500	200	175	150	125	110	100
	700	160	135	110	90	75	65
	900	135	110	90	75	65	60
	1000	125	100	75	65	60	55
	1200	100	75	65	60	55	50

QUINN SPC diamond 25 mm		Lengths in mm					
		1000	2000	3000	4000	5000	6000
Widths in mm	500	240	215	190	63.75	150	130
	700	220	190	63.75	150	130	120
	900	190	63.75	150	130	120	105
	1000	0	150	130	120	105	95
	1200	150	130	120	105	95	90

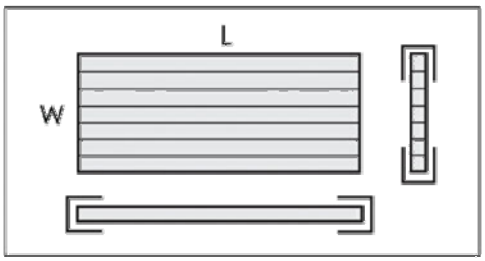
QUINN SPC diamond 32 - 35 mm		Lengths in mm					
		1000	2000	3000	4000	5000	6000
Widths in mm	500	285	250	225	200	175	150
	700	250	225	200	175	150	140
	900	225	200	175	150	140	125
	1000	200	175	150	140	125	110
	1200	175	150	140	125	110	105

Conditions



Deflection d:	50 mm
Pop-out p:	15 mm
Ratio d/s:	0.05

Support on 4 sides



Minimum clamping required: 20 mm
For QUINN SPC 25, 32 and 35 diamond, we recommend clamping to be equal to the thickness of the sheet.
(i.e. 25 mm for SPC 25-mm)