



All under  
one roof



Facade systems

## Facade systems with nanogel<sup>®</sup>

High Performance Daylight solutions for a sustainable design.

Nanogel in polycarbonate sheets offer excellent features:

- Unsurpassed thermal insulation
- Improved acoustic insulation
- Excellent lightdiffusion
- Very low weight

**Thermal insulation:** in polycarbonate sheets offer outstanding U-values:

Thickness	U-Value
16 mm PC	1.4 W/m <sup>2</sup> .K
20 mm PC	1.2 W/m <sup>2</sup> .K
25 mm PC	0.9 W/m <sup>2</sup> .K
40 mm PC	0.54 W/m <sup>2</sup> .K
50 mm PC	0.48 W/m <sup>2</sup> .K

**Light:** Nanogel offers translucency and even distribution of light inside the building, offering a reduction or elimination of glare and improved comfort. Solar blinds systems may not be necessary at the outside or inside of the building.

**Weight:** The very low weight of Nanogel offers an exceptional architectural design freedom. Nanogel in 16 mm sheet weighs only 3.6kg/m<sup>2</sup> in comparison to insulated glass ( 6/16/6) weighs 30.kg/m<sup>2</sup>.

**Benefits** of Nanogel systems:

- Lower investments in airconditioning- or heating units
- Reduced energy consumption
- No further requirements for solar blinds either inside or outside
- Complete and proven facade systems warrant an excellent cost/benefit performance



Sports hall Carquefou, France



Condor – Royal Marine Training Centre, Scotland

## Content:

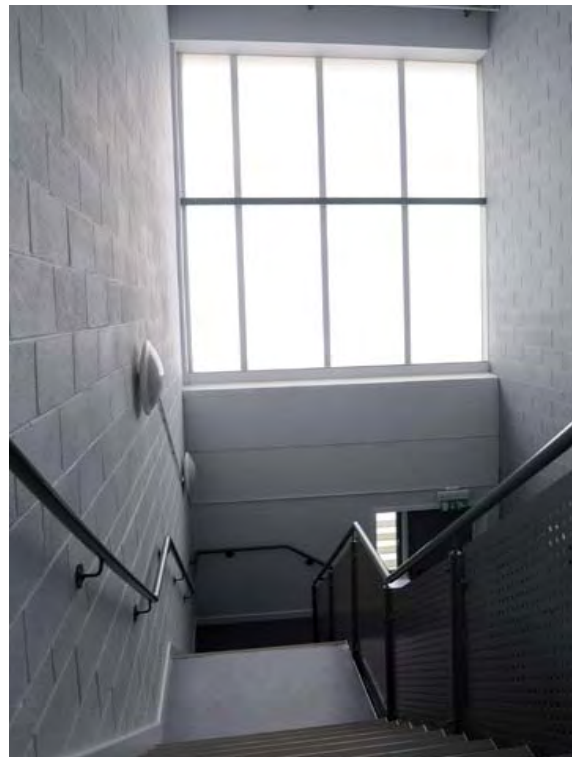
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### Introduction:

In close cooperation with dott.gallina s.r.l., Italy, EMB Products AG, Germany, has developed an array of innovative facadesystems with Nanogel technology. There are a number of combinations available for use in facades, in clicksystems, separation walls and curtain-walls.

### Potential applications for new design and renovation:

- Schools, museums und hotels
- Sport- and leisure centres, swimming pools
- Offices and shopping malls
- Industrial buildings
- Private buildings



Interior view of the Condor Royal Marine Trainingcentre, Scotland. 25 mm polycarbonate sheets with Nanogel have been used.



**Product description Nanogel:**

Nanogel is the tradename of the Cabot Corporation for its family of silica aerogels.

Nanogel Aerogel used in fenestration products is an amorphous form of synthetic silica structured by nano – sized pores. Nano stands for very small pores and structures with a diameter of around 20 nanometer. About 95 percent of its volume is occupied by air, making aerogel the world’s lightest solid material. The low solids content and extremely small pore size make it very effective against conduction and convection of heat. The amorphous silica particles are inherently safe under most construction materials measurements. Additionally, aerogel is chemically and ultraviolet (UV)-stable, nontoxic, noncombustible, and generates no smoke. It is also permanently hydrophobic so it repels water, resists vapor migration, and does not support growth of mould or mildew spores. Aerogel is also permanently non-yellowing, with a luminous white appearance. Since silica is inert, aerogel can last the life of a structure and be recycled when the building is decommissioned.

Some products may perform similarly in one area, but Nanogel excels in all of the following:

- **Unsurpassed thermal insulation:** 0.018 W/m.K. This allows more natural daylight through a roof and/or a facade while minimizing heat loss.
- **Good light transmission:** up to 80% per cm. Natural daylight creates a more efficient and beneficial interior environment, with positive psychological and physiological effects.
- **Excellent light diffusion:** translucency and even distribution of light inside the building. This allows a reduction or elimination of glare and improved comfort. Solar blind systems may not be necessary, meaning a reduced initial investment, no need for maintenance, and no modification of architectural design.
- **Reduction of solar transmission.** Depending on the type of sheet used reduction total solar transmission level of 30 % or more can be achieved.
- **Improved acoustic insulation:** 100 m/sec vs. 340 m/sec in air. 50% reduction at 100Hz.
- **UV resistance and hydrophobicity:** no growth of fungus nor mildew, performance will not deteriorate over time.
- **Considered as a non-combustible** (ASTM D1929) and **non-smoking material** (ASTM E662).
- **Low weight:** 70-100 kg/m<sup>3</sup>. Due to low weight of Nanogel the same static calculations

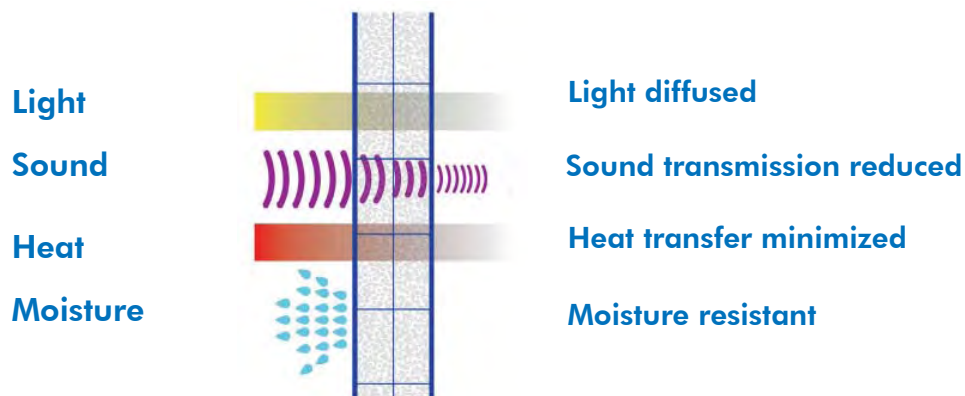
## Facade systems

of windloads can be used.

- **Architectural freedom:** translucent glazing with Nanogel aerogel balances daylighting with thermal performance. Architects can now meet or exceed the most stringent building codes (UK: Part L; France: RT2005; Spain: CTE etc.) in terms of thermal and acoustical insulation and light transmission.
- **Environmentally friendly:** financial and energy savings less heating and/or air-conditioning, reduced artificial lighting, reduction of CO<sub>2</sub> emission and energy bills.

Glazing systems incorporating Nanogel aerogel insulation can offer architects and building owners affordable and practical options in a variety of fenestration systems, satisfying both the relevant building codes and bringing diffuse light indoors.

Further information about Nanogel can be obtained from the productdatasheet Nanogel which is available for downloading from our website [www.roda.de](http://www.roda.de).



### Overview product data facade systems

#### Multitwall sheets 16 mm + 25 mm:

Thickness	Colour	Without Nanogel				With Nanogel			
		U-Value W/m <sup>2</sup> K	Lighttrans- mission %	TST %	Sound- insulation db	U-Value W/m <sup>2</sup> K	Lighttrans- mission %	TST %	Sound- insulation db
16mm/ 2wall	Clear	2,5	74	86	19	1,4	64	60	21
16mm/ 2wall	Infrared	2,5	55	35	19	1,4	45*	28*	21
16mm/ 3wall	Clear	2,4	74	82	19	1,3	64	59	21
16mm/ 3wall	Infrared	2,4	55	35	19	1,3	45	35*	21
25 mm/ 3wall	Clear	1,5	71	66	21	0,9	55	59	24
25 mm/ 3wall	Infrared	1,5	38	29	21	0,9	34	35*	24

#### Modular system 623, 20 mm:

Thickness	Colour	Without Nanogel				With Nanogel			
		U-Value W/m <sup>2</sup> K	Lighttrans- mission %	TST %	Sound- insulation db	U-Value W/m <sup>2</sup> K	Lighttrans- mission %	TST %	Sound- insulation db
623/ 3wall	Clear	2,1	78	83	19	1,2	47	55*	21
623/ 3wall	Infrared	2,1				1,2	40	25*	21

#### Click system 40 mm:

Thickness	Colour	Without Nanogel				With Nanogel			
		U-Value W/m <sup>2</sup> K	Lighttrans- mission %	TST %	Sound- insulation db	U-Value W/m <sup>2</sup> K	Lighttrans- mission %	TST %	Sound- insulation db
40 mm/ 7wall	Clear	1,1	55	61	22*	0,54	20	25*	26*

#### Multitwall sheets 50 mm:

Thickness	Colour	Without Nanogel				With Nanogel			
		U-Value W/m <sup>2</sup> K	Lighttrans- mission %	TST %	Sound- insulation db	U-Value W/m <sup>2</sup> K	Lighttrans- mission %	TST %	Sound- insulation db
50 mm/ 9wall	Clear	0,98	50	52	26	0,48	24	32	30
50 mm/ 9wall	Infrared	0,98	31	18	26	0,48	*	*	30

\*still in test

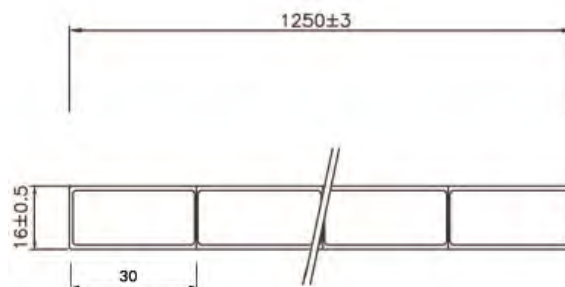
### A. Multiwall sheets 16 + 25 mm

#### Description:

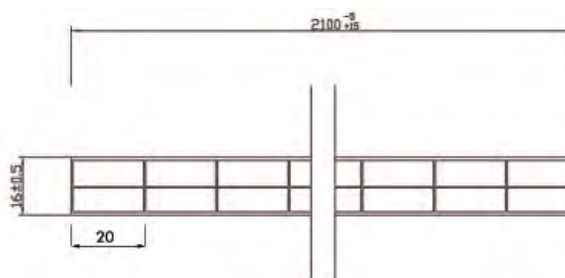
The characteristic structure of the multiwall sheets with air space guarantees excellent thermal insulation and excellent resistance to impact strength. The external side of the multiwall sheet is coated with U.V. protection (on request both sides) warranting resistance to aging due to atmospheric agents and U.V. rays. Multiwall sheets are used for roofing, windows, skylights, greenhouses, porches, gazebos and ceilings.

The standard polycarbonate width of this group is 2100 mm ( or max 1250 mm for 16 mm WIDE) and maximum length is 7000 mm.

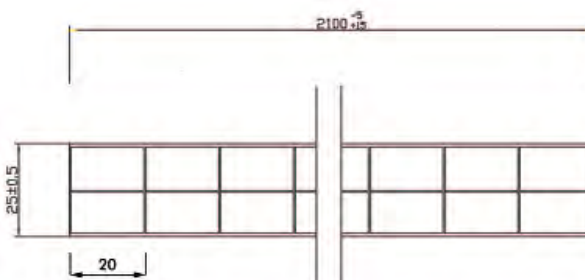
16 mm 2wall WIDE



16 mm 3wall



25 mm 3wall



### Data **without** using Nanogel:

	Weight kg/m <sup>2</sup>	U-Value W/m <sup>2</sup> K	Width mm	Length mm
16 mm WIDE 2wall	3.9	2.5	980 - 1200 - 1250 - 2100	7000
16 mm 3wall	2.7	2.3	980 - 1200 - 1250 - 2100	7000
25 mm 3wall	3.3	1.50	980 - 1.200	7000

### Data **with** using Nanogel:

	Weight kg/m <sup>2</sup>	U-Value W/m <sup>2</sup> K	Width mm	Length mm
16 mm WIDE 2wall	4.9	1.4	980 - 1200 - 1250 - 2100	7000
16 mm 3wall	3.6	1.3	980 - 1200 - 1250 - 2100	7000
25 mm 3wall	5.1	0.9	980 - 1200	7000

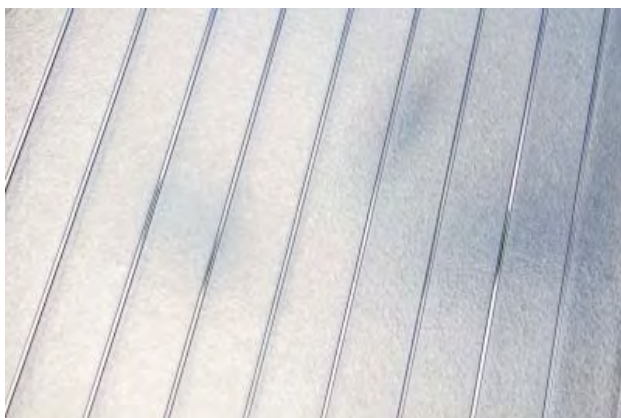
### Properties:

In case of fire self-extinguishing.

Polycarbonate sheets have Class I type approval and meet the EuroClass B S1 d0 fire rating, also when filled with Nanogel.

### Light transmission:

The use of Nanogel eliminates glare by direct sunlight and creates pleasant lightdiffusion of museum quality. To demonstrate of these properties pictures have been taken of 16 mm and 50 mm polycarbonate samples filled with Nanogel and a treeleave underneath. The samples were backlit.



16 mm PC-sheet with Nanogel

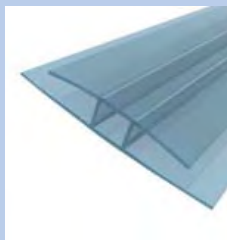


50 mm PC-sheet with Nanogel

### Applications:

- Vertical walls

### Accessories



H-profile, U.V. protected  
16 mm



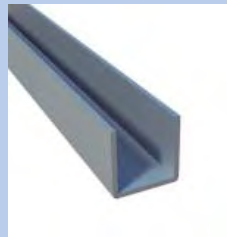
U-profile, U.V. protected  
16 mm



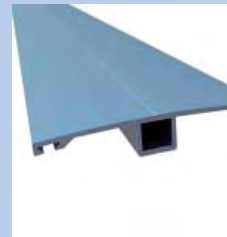
R-profile, U.V. protected  
16 mm



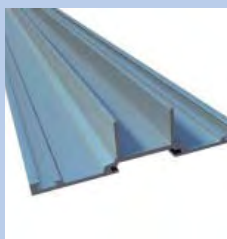
F-profile, U.V. protected  
16 mm



U-profile in anodized  
aluminium, 16 mm



Upper profile in anodized  
aluminium, 16 - 20 mm



Side profile in anodized  
aluminium, 16 - 20 mm



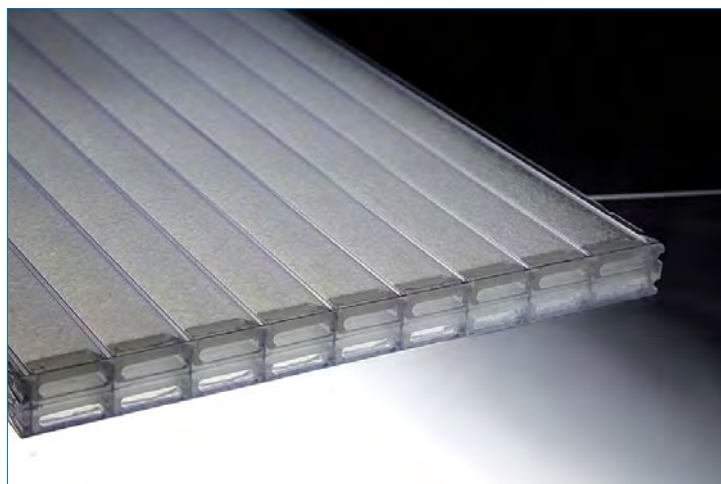
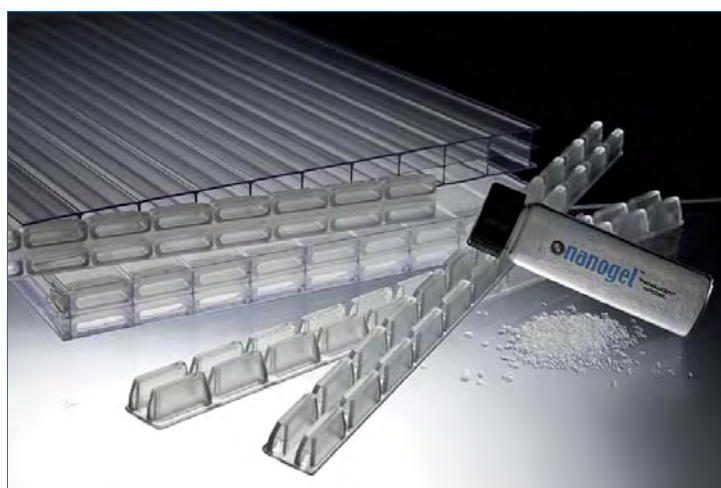
Washer with  
gasket

### TIP-TOP-System for 16 mm sheets:

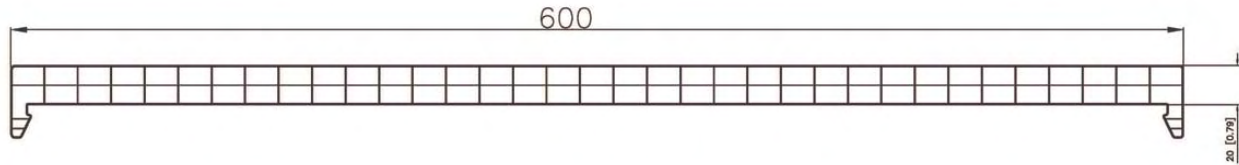
The E.M.B. Products AG introduces a novelty which puts all present potential problems of endcap sealing away, the TIP-TOP system for 16 mm to start with. This novelty consist of a polycarbonate sealing device which is driven into the sheet at both ends end sealed to create a robust permanent sealing of the endcaps. As of now all the 16 mm sheets will be provided with this system. In due course E.M.B. Products AG will provide this into 25 mm and the 623 product.

### Advantages of the TIP-TOP-System:

- Avoidance of transportation damages and installation damages at sheet ends
- Prolonging the lifespan of the PC sheets
- Protection against humidity penetration



### B. Modular System 623



#### Description:

The Modular System 623 is a system of coextruded 3 walls polycarbonate panel with a thickness of 20 mm, and 600 mm module, assembled using a snap-on system of plasticised steel or aluminium profiles. The product has a 1 mm thick outerlayer and a thicker U.V. coating to enable a better impact resistance and U.V. protection. Used for vertical glazing, flat roofing (min. slope 5 %) and curved roofing (minimum radius 4 m).

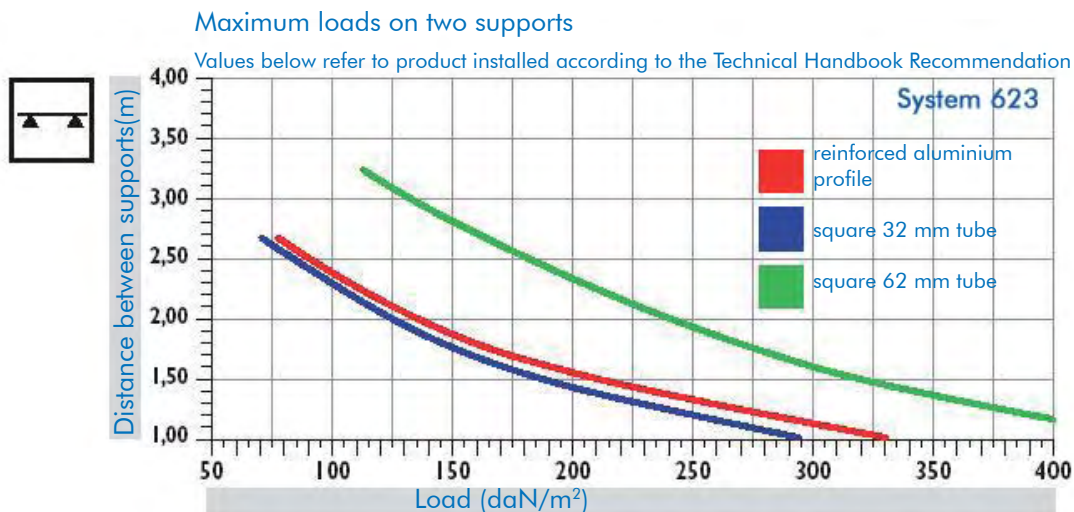
#### Data with Nanogel:

U-Value W/m <sup>2</sup> K	Acoustic insulation	Lightrans- mission %	TST %	U.V. rays protection	Fire classification
1,2 W/m <sup>2</sup> K	21 db	47	55	Coextrusion	EuroClass B S1 d0

#### Applications:

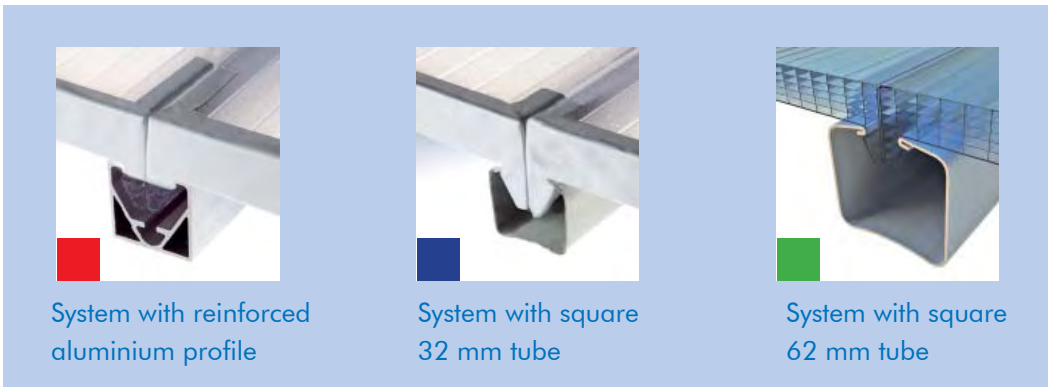
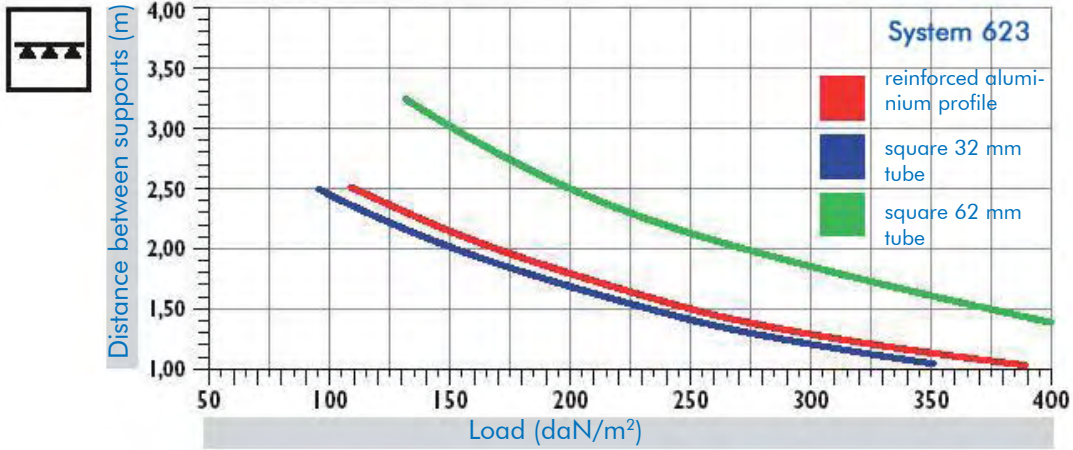
- Facades
- Curtainwalls
- Vertical windows
- Roofing
- Curved roofing

#### Flat system load resistance:



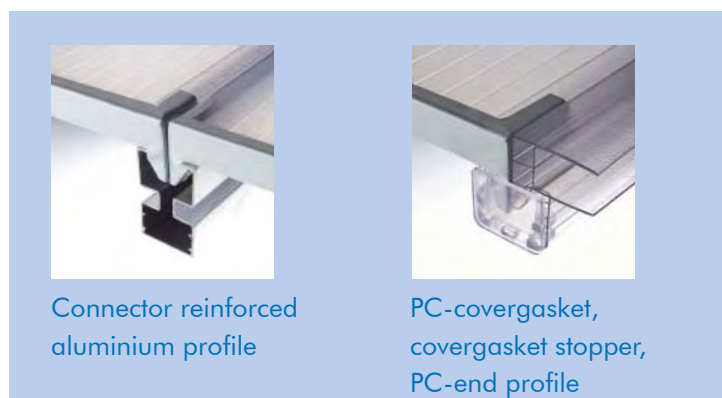
Maximum loads on more supports

Values below refer to product installed according to the Technical Handbook Recommendation.



**Easy and low-cost installation:**

The 3 walls design with snap-on connection to open joint tubes gives the panel remarkable flexural strength. It is suitable for vertical curtain walls and large areas of self-supporting roofing without the use of section-breaker profiles. The snap-on connection and complete range of accessories and aluminium perimeter profiles combine to guarantee a perfectly watertight seal and considerable wind load resistance.

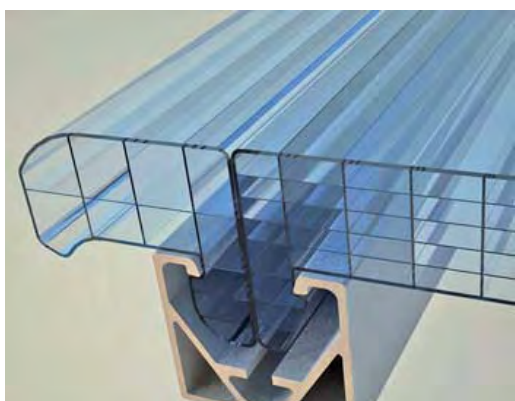


### Accessories:

The system includes a complete range of accessories to facilitate installation.

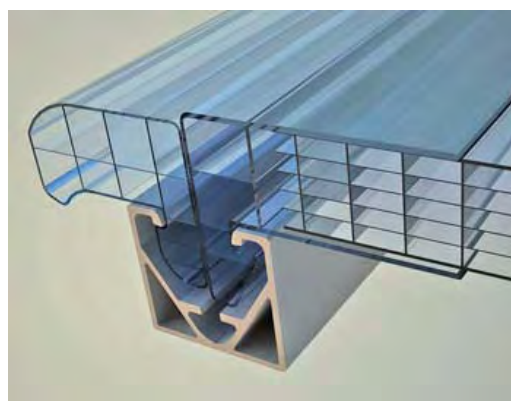
#### Start profile

Detail of insertion of start profile on roof.



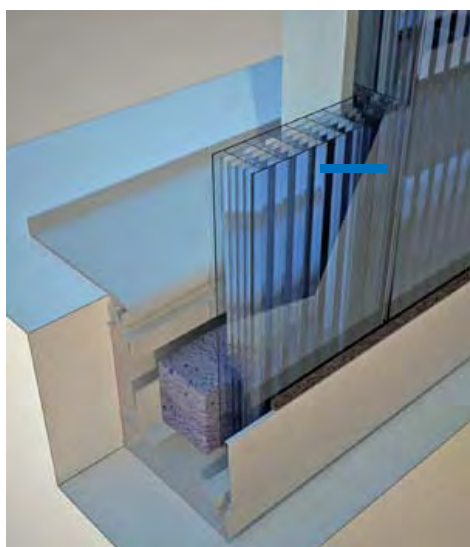
#### End profile

Detail of insertion of section-breaker profile to complete roofing.



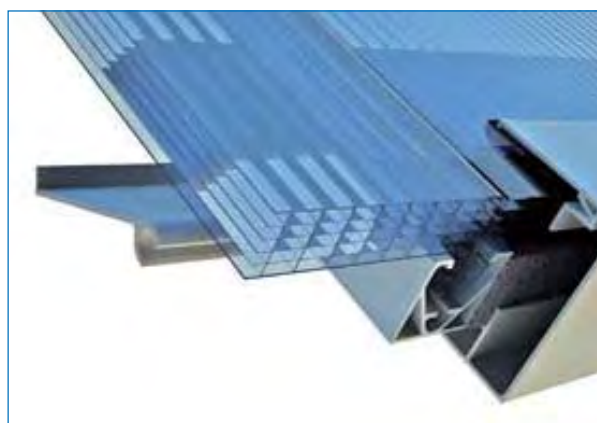
#### Wall system

Construction of continuous transparent walls, with insertion of aluminium profile using a snap-on system.



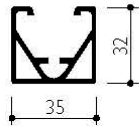
#### Detail of support

Insertion of panels by pressing on to supporting profiles and special side supports.

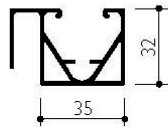


## Metal profiles

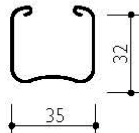
Reinforced aluminium profile  
(straight + curved)



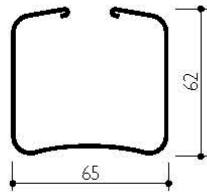
Gabled aluminium profile  
(straight + curved)



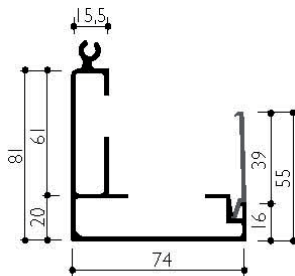
Square 32 mm tube  
(straight + curved)



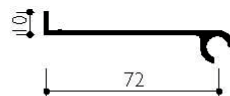
Square 62 mm tube  
(straight + curved)



Base-side aluminium profile with frontal opening



Closing aluminium support



## Accessories



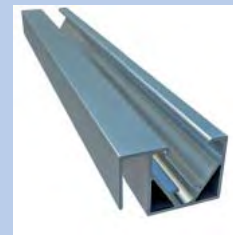
Square 32 mm tube  
(straight + curved)



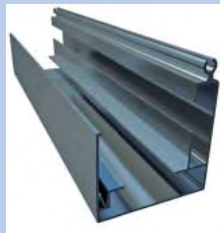
Square 62 mm tube  
(straight + curved)



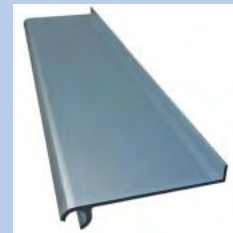
Reinforced alu profile  
(straight + curved)



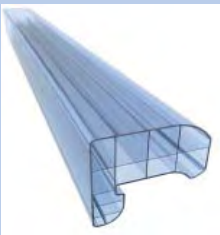
Gabled alu profile  
(straight + curved)



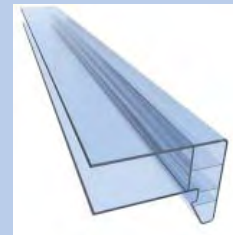
Base-side alu profile  
with frontal opening



Closing aluminium  
support



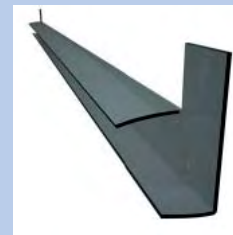
Start profile in  
polycarbonate



End profile in  
polycarbonate



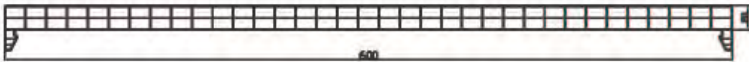
Pad PE-LD



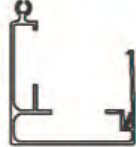






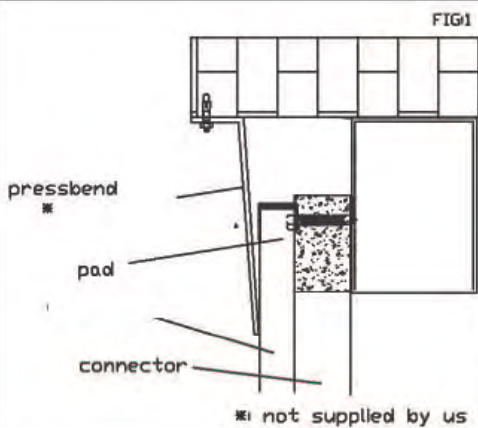
Block cover

## Installation instruction:

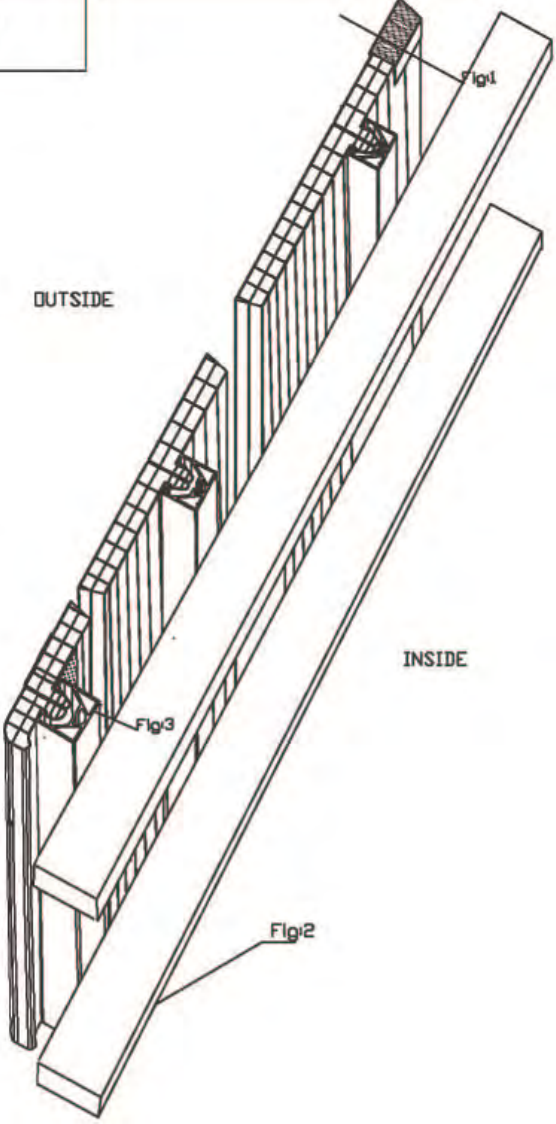
### Modular system 623

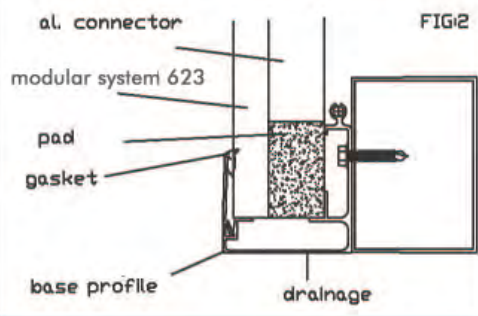


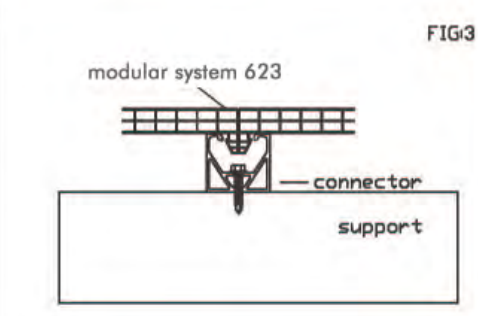
	Reinforced aluminium profile (connector)		Anti-dust tape		Base-side aluminium profile with frontal opening (base profile)
	Start profile in polycarbonate		Pad PE-LD		
	End profile in polycarbonate		Gasket		



\* not supplied by us

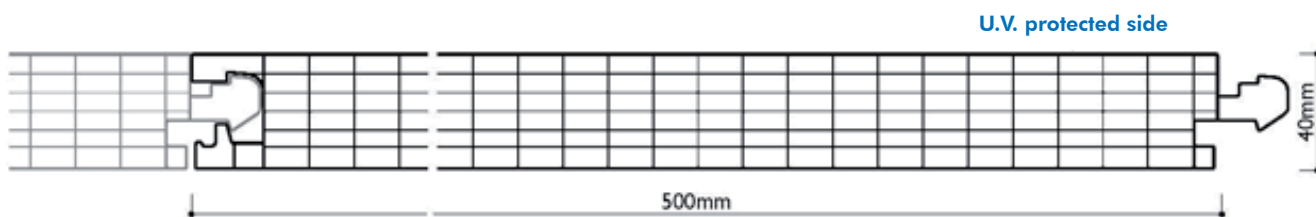






	Modular system 623 with reinforced aluminium profile (see accessories at page 14).
Board No. 1	E.M.B. Products AG Rudolf-Diesel-Str. 6 D-46446 Emmerich Phone.: +49 2822 69710 Fax: +49 2822 69715

### C. Click system 547, 40 mm



#### Description:

The Click system 547 is a modular system of coextruded 7 walls polycarbonate panels with a thickness of 40 mm, aluminium profiles, accessories and opening windows, designed for simple and versatile use. It can be used for facades curtain walls and also for roofing applications with a minimum slope of 7 %.

As part of a process to obtain the German general construction permit (allgemeine bauaufsichtliche Zulassung) an agreement for the assessment of loading and the use of the sheet is available ( Nr 93/07 G).

Data with Nanogel:

U-Value W/m <sup>2</sup> K	Acoustic insulation	Light- transmission	TST %	U.V.- protection	Fire classification
0,54	26	20	25	Coextrusion	EuroClass B S1 d0

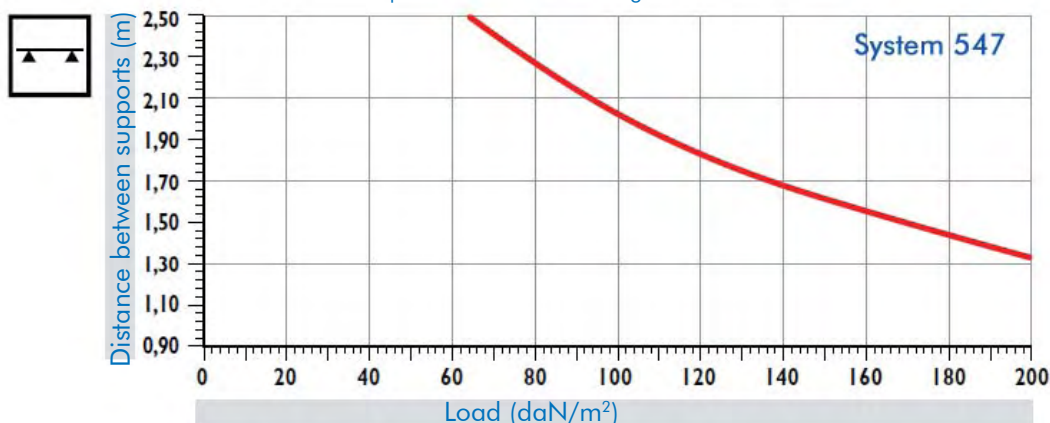
#### Applications:

- Facades
- Curainwalls
- Vertical windows
- Roofing

#### Load resistance:

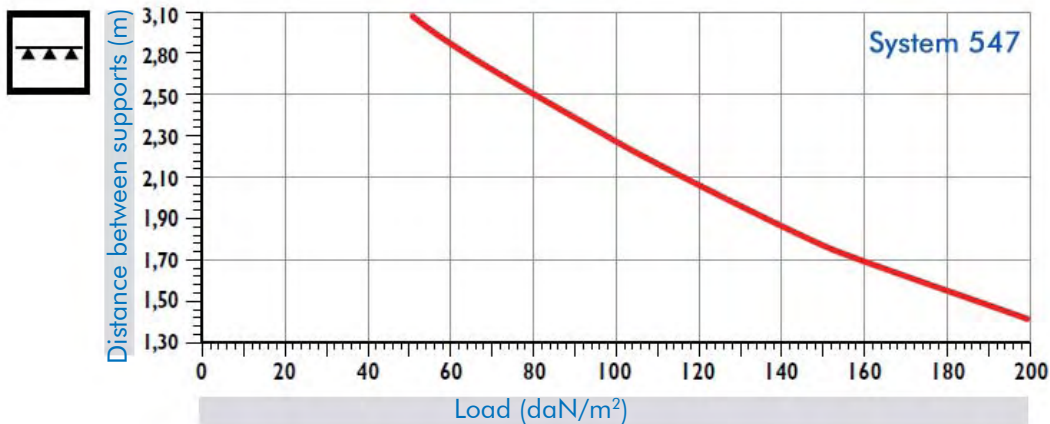
Maximum loads on two supports

Values below refer to product installed according to the Technical Handbook Recommendation



## Maximum loads on more supports

Values below refer to product installed according to The Technical Handbook Recommendation

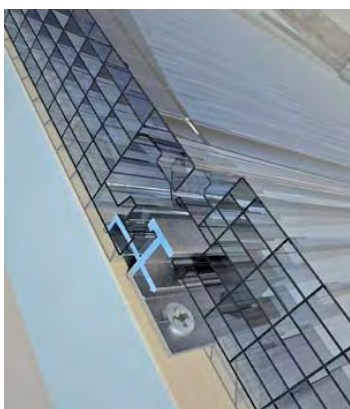


### Easy and low-cost installation:

The 40 mm-thick, 7 walls design with tongue and groove connection gives the panels remarkable flexural strength. It also allows the panels to be installed without the use of metal reinforcement frames (continuous glazing), thus eliminating heat loss due to the thermal bridges caused by these structures (discontinuous glazing). For installations exceeding 2,2 m, a suitable section-breaker profile must be installed to which the panels can then be fixed. This is done using the specific brackets to give the system the necessary resistance to negative wind load and permit sliding due to thermal expansion (see load resistance graph).

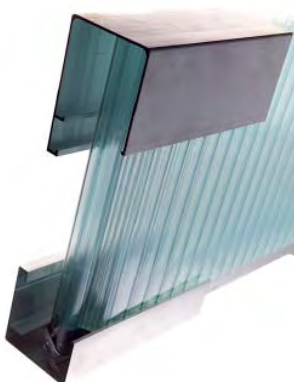
#### Insertion of plate

Insertion of aluminium plates for anchorage to existing structures.



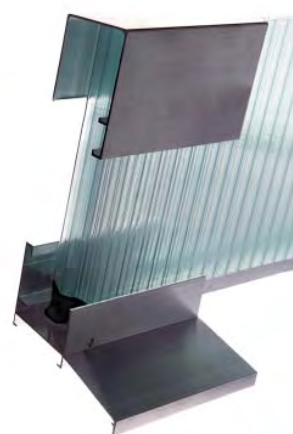
#### Example:

Base aluminium profile, upper and side aluminium profile.

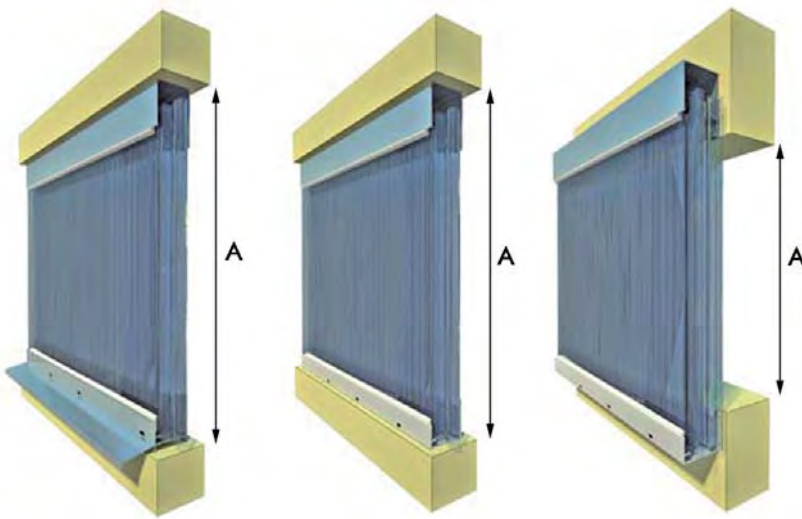


#### Example:

Base aluminium profile with eave, upper and side aluminium profile.



### Calculation and installation examples of panel length (PL)



**With eave**

$PL = A - 50 \text{ mm}$   
 $A = \text{opening mea-}$   
 $\text{sure}$

**Without eave**

$PL = A - 45 \text{ mm}$   
 $A = \text{opening mea-}$   
 $\text{sure}$

**Outside of the building**

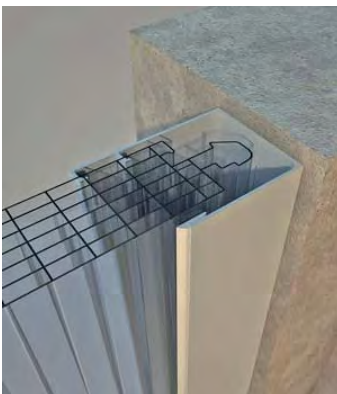
$PL = A + 95 \text{ mm}$   
 $A = \text{opening mea-}$   
 $\text{sure}$

### Accessories:

In addition to a complete range of aluminium profiles for installing the panels, the system also includes opening windows (manually operated or motorised) to ventilate the building. The air cells of the polycarbonate panels without Nanogel must be sealed using vented aluminium breather tape. This allows correct ventilation and prevents soiling on the side. When filled with Nanogel normal aluminium or reinforced polyester tape can be used.

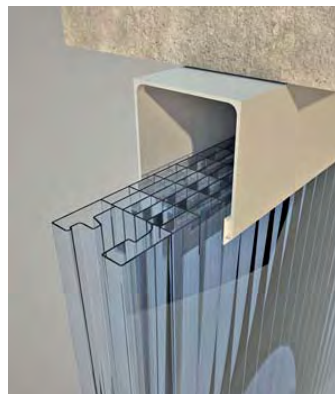
**Side profile**

Detail of vertical curtain wall.



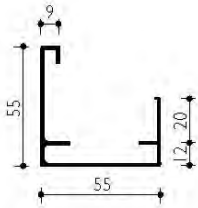
**Upper profile**

Detail of vertical curtain wall and space at the top allow for expansion.

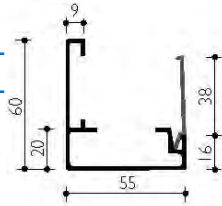


**Metal profiles**

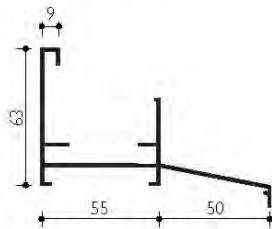
Base aluminium profile



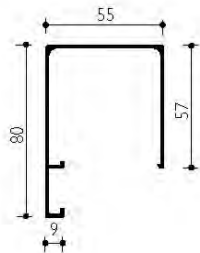
Base aluminium profile with frontal opening



Base aluminium profile with eave



Upper and side aluminium profile



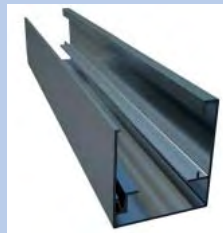
**Accessories**



Base aluminium profile



Base aluminium profile with eave



Base aluminium profile with frontal opening



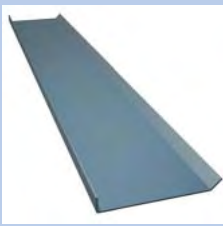
Upper and side aluminium profile



Aluminium bracket



Inox bracket

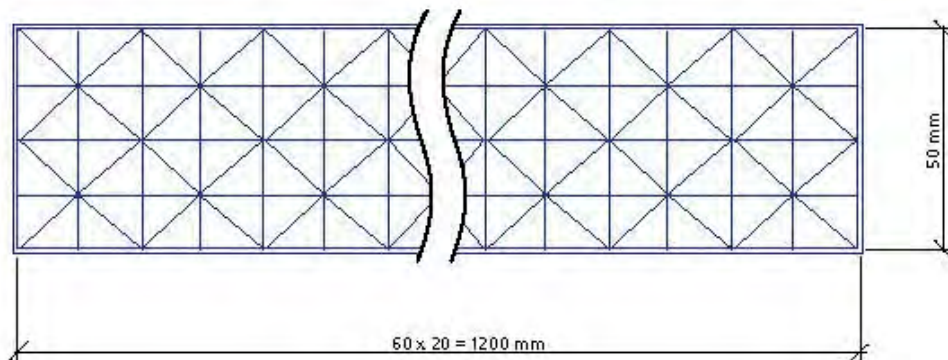


Connection element base profile adapter



Gasket

### C. Multiwall sheet 50 mm



#### Description:

The special structure of the 50 mm 9 wall sheet in combination with the properties of the polycarbonate and Nanogel offer an excellent thermal insulation, impact resistance and stiffness. The sheet features a 2 side proprietary surface treatment designed to protect the sheet against the degrading effects of ultra-violet radiation in natural light.

#### Data without Nanogel:

U-Value W/m <sup>2</sup> K	Weight kg/m <sup>2</sup>	Soundinsu- lation db	Lightrans- mission %	TST %	Width mm	Length mm
0.98	4.8	26	50	52	1200	7000

#### Data with Nanogel:

U-Value W/m <sup>2</sup> K	Weight kg/m <sup>2</sup>	Soundinsu- lation db	Lightrans- mission %	TST %	Width mm	Length mm
0.48	8.3	30	24	32	1200	7000

#### Application profiles:

- Facades
- Side walls
- Separation walls



50 mm pc-sheet filled with Nanogel backlit.

### Colour Design

#### Description:

All polycarbonate sheets from this facade program are also available in all RAL colours to create more individual design possibilities. Also bi-colours per sheet ( one colour on one side, another color on the other side) are available. The light transmission and –diffusion will differ per color and intensity. The Colour Design makes it possible to create your own personal accents. Please check the possibilities and the minimum quantities.

#### Colour examples:



### Warranty

We offer a ten Year Limited Warranty against yellowing, light transmission and thermal properties for the 16 mm and 25 mm products. We can extend the warranty from ten to fifteen years for the product 623 and 547.



Sportshall Carquefou, France  
Architect Murail, Nantes  
650 Lux right in the centre of the sportshall

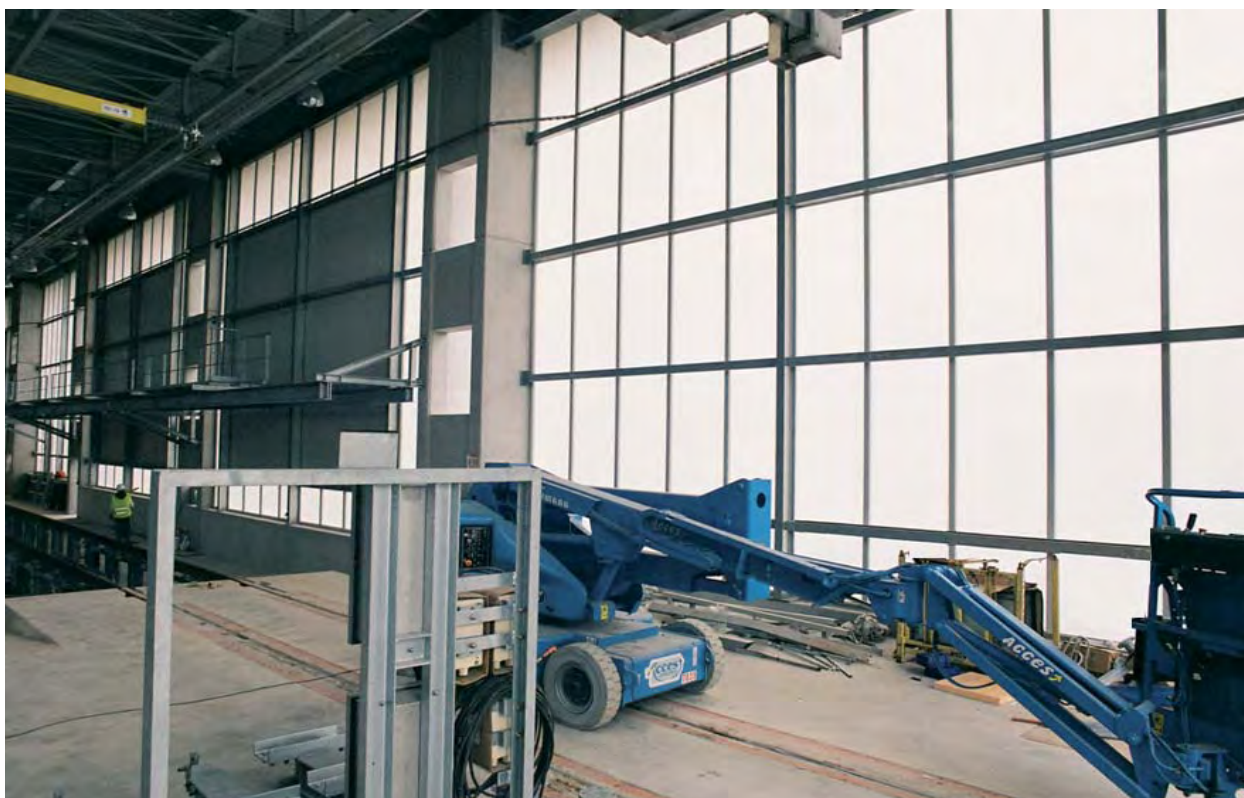
Sports complex of Carquefou, France



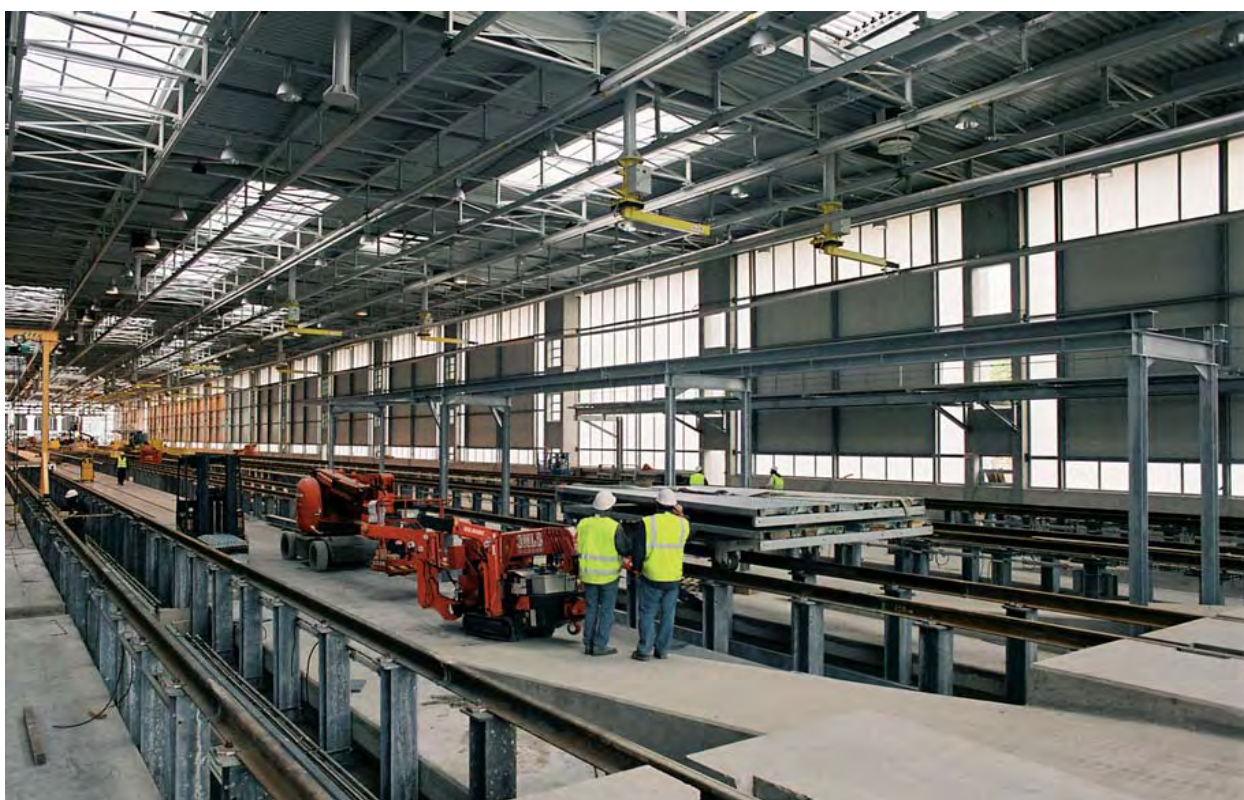
SNCF Lyon TGV maintenance hall (25 mm polycarbonate with Nanogel)



SNCF Lyon TGV maintenance hall (25 mm polycarbonate with Nanogel)



SNCF Lyon TGV maintenance hall (25 mm polycarbonate with Nanogel)



Condor – Royal Marine Training Centre, Scotland



Condor – Royal Marine Training Centre, Scotland



In case you need more information about these applications or products used, please let us know and we will be delighted to be of service to you.



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