



Voltarlux ASI-Glass Elements

Modular Sizes



- Solar electricity
- Light management
- Comfort
- Effective shading
- Glare protection
- Thermal management
- Innovative architecture
- Cost savings by combining and integrating several functions

The frameless glass laminates and double glazed elements are designed to be compatible with most conventional glazing systems for facades and skylights.

ASI Glass elements are designed on the basis of SCHOTT Solar's ASI thin-film technology as silicon tandem cells on glass superstrate. ASI Glass elements demonstrably produce maximum energy yields.

Whether a façade or a roof, today's building envelope has to fulfil multiple purposes. Alongside its conventional roles of providing privacy and protection from rain and noise, additional factors are becoming increasingly important, such as thermal insulation and shading. All of these tasks have to be performed by the shell of a building. Today, building integrated photovoltaic systems are able to provide all of these functions **plus** solar electricity.









Laminates





Voltarlux ASI Glass Laminates

Applications with semitransparent laminates



For carports or train stations, glazed roofs without a thermal insulation function are typical applications for semi-transparent laminates. It is

Application with non-transparent (opaque) laminates



The non-transparent (ASIOPAK) laminates can be used for rainscreen cladding as well as for façades using transom and mullion systems.

Module design

All laminates come with two cable outlets on the rear face. The distance of the cable outlet to the laminate edge is defined by the active area of the module. The drawing at the right hand side shows the actual dimensions for the laminates shown within this data sheet.

Please note, the framing system needs to allow a sufficient distance between the cable outlet housing and the actual framework. Any mechanical load on the cable outlet housings must be avoided.

All modules are delivered with Multi-Contact connectors. Please note the geometry of the connectors when planning the cable guidance within your framework.



Multi-Contact Connectors



Cable outlet of a Voltarlux laminate a = ca. 25mm b = ca. 25mm





Voltarlux ASI Glass – Double glazing

Double glazed units based on the ASITHRU technology are always used when a thermal insulation, shading and of course electricity generation is required. The construction of the double glazed units offer the same thermal insulation compared with conventional double glazed units. As standard, the elements are offered with a U-Value of 1.1 W/m²K. For even higher requirements, please contact your local sales representative.



Voltarlux double glazing

Applications with double glazing



Module design

All Voltarlux double glazing units are built with cable outlets exiting from the edge. These are designed to fit into the majority of transom and mullion systems available. The details are shown in the drawing on the right hand side. Please note, the cable outlets must not be used as setting blocks when installing the elements.

All modules are delivered with Multi-Contact connectors. Please note the geometry of the connectors when planning the cable guidance within your framework.



Multi-Contact Connectors



Cable outlet of a Voltarlux double glazing unit





Voltarlux ASI-Glass Elements with 1 Sub-Module

Version:	Lam	inate	Double Glazing	
	UE 926 926 976 mm 1028 m	n	976 mm 1020 mm	
Туре:	ASIOPAK-1-L	ASITHRU-1-L	ASITHRU-1-IO	
Mechanical Construction:	0	0	0 m m 1/00	
Front Glass (low iron)	6mm HSG	6mm HSG	6mm HSG	
ASI-GIASS (1X)	ASI OPAK	ASI THRU	ASITHRU	
Interlayer	1.1mm PVB	1.1mm PVB		
Cavity	/	/	16 mm	
Back Glass	6mm HSG	6mm HSG	8mm LSG	
	rear side	rear side	lateral	
Cable Type / Diameter (+ and -)	Double isolated, black / 2.5mm ²			
Outer Diameter / Cable Length		5.2m	m / 1m	
Connector (Male / Female)		Multi-Contact F	PV-KBT3 / PV-KST3	
Dimension, Weight*:				
Glass Size	1028mm x 629mm		1020mm x 626mm	

Glass Size	1028mm x 629mm		1020mm x 626mm
Active Area	976mm x 576mm		976mm x 576mm
Total Glass Thickness	17mm	17mm	34mm
Total Weight	28kg 28kg		30kg

Physical Data***:

Ug- Value (DIN EN 673)	~5W/m²K	~5W/m²K	1.1W/m²K
g-Value	23%	27%	10%
Light Transmission	1%	10%	10%

Initial Nominal Power P _{mpp}	35W _p	31Wp	31W _p
Nominal Power P _{mpp} **	29W _p	25W _p	25W _p
Current at Nominal Power Impp **	0.43A	0.37A	0.37A
Short Circuit Voltage Isc **	0.55A	0.49A	0.49A
Voltage at Nominal Power U _{mpp} **	68V	68V	68V
Open Circuit Voltage U _{oc} **	93V	93V	93V
Maximum System Voltage	600V	600V	600V





Voltarlux ASI-Glass Elements with 2 Sub-Modules



Glass Size	1028mm x 1205mm		1020mm x 1203mm
Active Area	976mm x 1153mm		976mm x 1153mm
Total Glass Thickness	17mm 17mm		34mm
Total Weight	53ka 53ka		57kg

Physical Data***:

U _g - Value (DIN EN 673)	~5W/m²K	~5W/m²K	1,1W/m²K
g-Value	23%	27%	10%
Light Transmission	1%	10%	10%

Initial Nominal Power P _{mpp}	71W _p	61Wp	61W _p
Nominal Power P _{mpp} **	58W _p	50W _p	50W p
Current at Nominal Power Impp **	0.85A	0.74A	0.74A
Short Circuit Voltage Isc **	1.10A	0.98A	0.98A
Voltage at Nominal Power U _{mpp} **	68V	68V	68V
Open Circuit Voltage U _{oc} **	93V	93V	93V
Maximum System Voltage	600V	600V	600V





Voltarlux ASI-Glass Elements with 3 Sub-Modules



Mechanical Construction:

Front Glass (low iron)	6mm HSG	6mm HSG	6mm HSG
Interlayer	1.1mm PVB	1.1mm PVB	0.8mm PVB
ASI-Glass (3x)	ASI OPAK	ASI THRU	ASI THRU
Interlayer	1.1mm PVB	1.1mm PVB	/
Cavity	/	/	16 mm
Back Glass	6mm HSG	6mm HSG	8mm LSG
Cable Outlet	rear side	rear side	lateral
Cable Type / Diameter (+ and -)	Double isolated, black / 2.5mm ²		
Outer Diameter / Cable Length	5.2mm / 1m		
Connector (Male / Female)	Multi-Contact PV-KBT3 / PV-KST3		

Dimension, Weight*:

Glass Size	1028mm x 1782mm		1020mm x 1780mm
Active Area	976mm x 1730mm		976mm x 1730mm
Total Glass Thickness	17mm 17mm		34mm
Total Weight	79kg	79ka	83kg

Physical Data***:

Ug- Value (DIN EN 673)	~5W/m²K	~5W/m²K	1.1W/m²
g-Value	23%	27%	10%
Light Transmission	1%	10%	10%

Initial Nominal Power P _{mpp}	106W _p	92W _p	92W _p
Nominal Power P _{mpp} **	87W _p	75W _p	75W _p
Current at Nominal Power Impp **	1.28A	1.11A	1.11A
Short Circuit Voltage Isc **	1.65A	1.48A	1.48A
Voltage at Nominal Power U _{mpp} **	68V	68V	68V
Open Circuit Voltage U _{oc} **	93V	93V	93V
Maximum System Voltage	600V	600V	600V





Voltarlux ASI-Glass Elements with 4 Sub-Modules



Mechanical Construction:

Front Glass (low iron)	6mm HSG	6mm HSG	6mm HSG
Interlayer	1.1mm PVB	1.1mm PVB	0.8mm PVB
ASI-Glass (4x)	ASI OPAK	ASI THRU	ASI THRU
Interlayer	1.1mm PVB	1.1mm PVB	1
Cavity	/	/	16 mm
Back Glass	6mm HSG	6mm HSG	8mm LSG
Cable Outlet	rear side	rear side	lateral
Cable Type / Diameter (+ and -)	Double isolated, black / 2.5mm ²		
Outer Diameter / Cable Length	5.2mm / 1m		
Connector (Male / Female)	Multi-Contact PV-KBT3 / PV-KST3		

Dimension, Weight*:

Glass Size	1028mm x 2358mm		1020mm x 2356mm
Active Area	976mm x 2307mm		976mm x 2307mm
Total Glass Thickness	17mm	17mm	34mm
Total Weight	105kg	105kg	110kg

Physical Data***:

Ug- Value (DIN EN 673)	~5W/m²K	~5W/m²K	1.1W/m²K
g-Value	23%	27%	10%
Light Transmission	1%	10%	10%

Initial Nominal Power P _{mpp}	141Wp	122Wp	122W _P
Nominal Power P _{mpp} **	116W _p	100W _p	100Wp
Current at Nominal Power Impp **	1.71A	1.48A	1.48A
Short Circuit Voltage Isc **	2.20A	1.97A	1.97A
Voltage at Nominal Power U _{mpp} **	68V	68V	68V
Open Circuit Voltage U _{oc} **	93V	93V	93V
Maximum System Voltage	600V	600V	600V





Voltarlux ASI-Glass Elements with 4 Sub-Modules



Mechanical Construction:

Front Glass (low iron)	6mm HSG	6mm HSG	6mm HSG
Interlayer	1.1mm PVB	1.1mm PVB	0.8mm PVB
ASI-Glass (4x)	ASI OPAK	ASI THRU	ASI THRU
Interlayer	1.1mm PVB	1.1mm PVB	1
Cavity	/	/	16 mm
Back Glass	6mm HSG	6mm HSG	8mm LSG
Cable Outlet	rear side	rear side	lateral
Cable Type / Diameter (+ and -)	Double isolated, black / 2.5mm ²		
Outer Diameter / Cable Length	5.2mm / 1m		
Connector (Male / Female)	Multi-Contact PV-KBT3 / PV-KST3		

Dimension, Weight*:

Glass Size	1205mm x 2005mm		1197mm x 2003mm
Active Area	1153mm x 1953mm		1153mm x 1953mm
Total Glass Thickness	17mm	17mm	34mm
Total Weight	104kg	104kg	110kg

Physical Data***:

U _g - Value (DIN EN 673)	~5W/m²K	~5W/m²K	1.1W/m²K
g-Value	23%	27%	10%
Light Transmission	1%	10%	10%

Initial Nominal Power P _{mpp}	140W _p	117W _p	117W _p
Nominal Power P _{mpp} **	114W _p	96W _p	96W _p
Current at Nominal Power Impp **	1.59A	1.33A	1.33A
Short Circuit Voltage Isc **	2.09A	1.80A	1.80A
Voltage at Nominal Power U _{mpp} **	72V	72V	72V
Open Circuit Voltage U _{oc} **	98V	98V	98V
Maximum System Voltage	600V	600V	600V





Notes on given technical data:

* The tolerances of the outer glass dimensions are ±3mm.

** These data represent stabilised electrical module performance at standard test conditions (STC -1000W/m²; AM 1.5; 25°C cell temperature). The nominal power may be initially approx. 18% higher than the quoted stabilised power data. This power bonus has to be considered when designing the system. All given electrical data are subject to a production tolerance of ± 10%.

***The given g-Values and U-values are approximate data.

Cell temperature coefficients

Referred to nominal power	T _k (P _n)	- 0.2 % / K
Referred to open circuit voltage	T _k (U _{oc})	- 0.31 % / K
Referred to short-circuit current	T _k (I _{sc})	+ 0.08% / K

System Design

- When designing a system, fuses for each string (serial interconnection of single PV-elements) are recommended. The maximum fuse rating for string fuses is two times the short-circuit current (2 x I_{sc}).
- Never exceed the given maximum system voltage. Under normal conditions, a photovoltaic module may experience conditions that produce more current and/or voltage than reported at Standard Test Conditions.
- For Voltarlux modules based on the ASI technology, any negative potential within the string has to be avoided.

Product nomenclature



Appearance of the semiconductor

Thin-film silicon modules may exhibit slight variations in colour, both across any given module and from module to module. These non-uniformities are caused by optical interference effects within the semiconductor layers, and are thus inherent to the manufacturing process. Most importantly, however, the perceived colour differences have no influence whatsoever on the electrical performance of the modules and their service life, and, therefore, present no reason for rejection.





Quality of glass and lamination

Glass:

- HSG: <u>Heat Strengthened Glass</u> (semi toughened glass) according to DIN EN 1863-1
- LSG: Laminated Safety Glass (float glass / PVB foil /float glass) according to DIN EN 12543-1

Lamination foil:

For all given laminates and double glazing elements only PVB (Polyvinylbutyral) interlayer will be used with the following mechanical parameters:

- Tensile Strength > 20 N/mm²
- Breaking Elongation > 250 %

The glass edges are not polished. Due to the production process, isolated and sporadic small bubbles in the Laminate in the rim area and main areas of the glass panes may appear and are not considered to be defects.

The choice of glass thickness and quality, such as float glass, heat strengthened glass or fully hardened glass is not the responsibility of Glaswerke Arnold. All glazing has to be built according to relevant building codes, national standards and best practice for glazed structures. The actual specifications for glass configuration has to be determined by the architect or buyer based upon local building codes. On request the inner glass of all double glazing units can be offered as safety glass laminate based on heat strengthened glass.

Qualification

The modules are built according to safety class II (see given maximum system voltage)

Specifications are subject to change without notice.

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