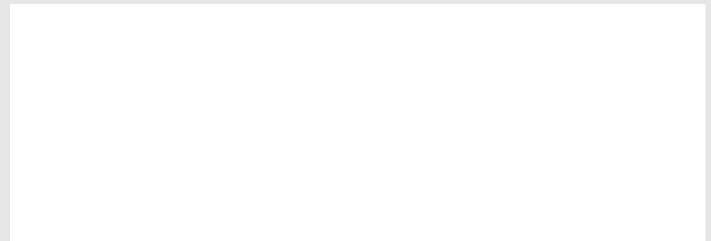
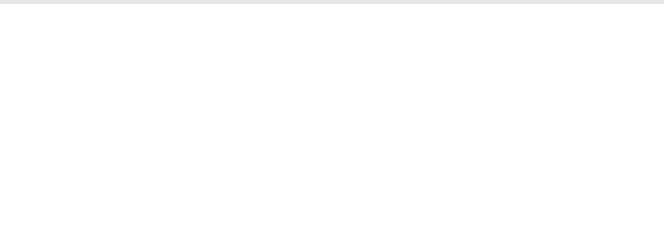


Pane 1	PLANICLEAR (4 mm)
Cavity 1	ARGON (90%) / AIR (10%) / 10 mm
Pane 2	PLANITHERM ONE T FG PLANICLEAR (4 mm)
Cavity 2	ARGON (90%) / AIR (10%) / 10 mm
Pane 3	PLANITHERM ONE T FG PLANICLEAR (4 mm)



	LUMINOUS FACTORS	CIE015:2018
	Light transmission (TL %)	51.4 %
	Outdoor reflection (RLe %)	34.5 %
	Indoor (RLi %)	34.5 %
	SOLAR FACTORS	EN410:2011
	Solar factor (g)	0.3705
	Shading Coefficient (SC)	0.4258
	COLOR RENDERING	CIE015:2018
	Transmission (Ra)	94.8
	Reflection (Ra)	95.6
	BURGLAR RESIST	EN356:1999
	Result :	NPD
	CARBON FOOTPRINT	EN15804:2012+A2:2019
	Global warming potential 'GWP' 50 Kg(CO2)/m ² (A1-A3)	

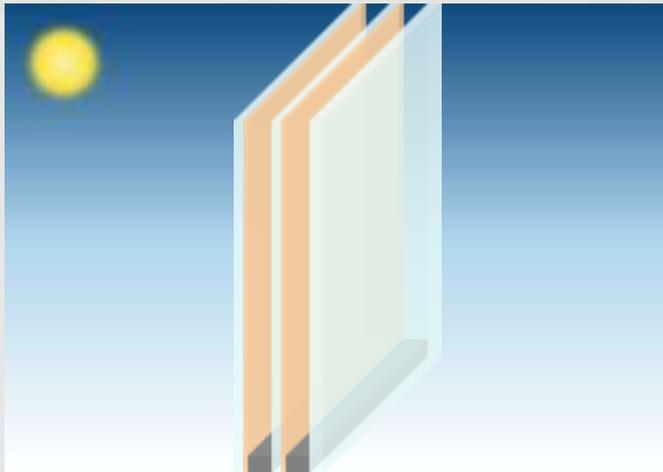
	ENERGY FACTORS	EN410:2011
	Transmission (Te)	28.3 %
	Reflection (Ree)	49.4 %
	Indoor (Rei)	47.2 %
	Absorption (AE1)	7.9%
	Absorption (AE2)	10.1 %
	Absorption (AE3)	4.2%

	THERMAL TRANSMISSION	EN673:2011
	Ug	0.783 W/m ² .K
	0° related to vertical position	

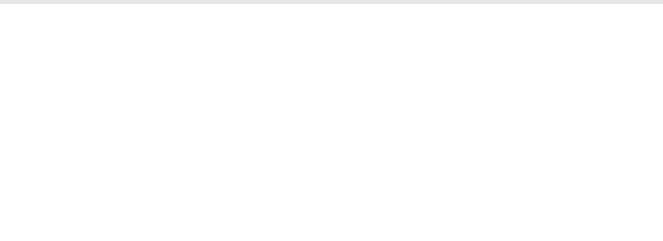
	MANUFACTURING SIZES	
	Nominal thickness	32.0 mm
	Weight	30.0 kg/m ²

	PENDULUM RESISTANCE	EN12600:2002
	Result :	NPD

	ACOUSTICS	EN12758:2019
	Acoustic simulated values - v2.0	Rw(C;Ctr) = 31(-1;-4) dB
	OITC (ASTM E1332)	25
	STC (ASTM E413)	31



Pane 1	PLANICLEAR (4 mm) COOL-LITE SKN 176 II
Cavity 1	ARGON (90%) / AIR (10%) / 10 mm
Pane 2	PLANICLEAR (4 mm) PLANITHERM ONE T FG
Cavity 2	ARGON (90%) / AIR (10%) / 10 mm
Pane 3	PLANICLEAR (6 mm)



	LUMINOUS FACTORS	CIE015:2018
	Light transmission (TL %)	52.5 %
	Outdoor reflection (RLe %)	23.4 %
	Indoor (RLi %)	28.5 %
	SOLAR FACTORS	EN410:2011
	Solar factor (g)	0.2810
	Shading Coefficient (SC)	0.3230
	COLOR RENDERING	CIE015:2018
	Transmission (Ra)	92.0
	Reflection (Ra)	84.7
	BURGLAR RESIST	EN356:1999
	Result :	NPD
	CARBON FOOTPRINT	EN15804:2012+A2:2019
	Global warming potential 'GWP' 56 Kg(CO2)/m ² (A1-A3)	

	ENERGY FACTORS	EN410:2011
	Transmission (Te)	24.3 %
	Reflection (Ree)	39.4 %
	Indoor (Rei)	44.8 %
	Absorption (AE1)	31%
	Absorption (AE2)	4.4%
	Absorption (AE3)	0.8%

	THERMAL TRANSMISSION	EN673:2011
	Ug	0.782 W/m ² .K
	0° related to vertical position	

	MANUFACTURING SIZES	
	Nominal thickness	34.0 mm
	Weight	35.0 kg/m ²

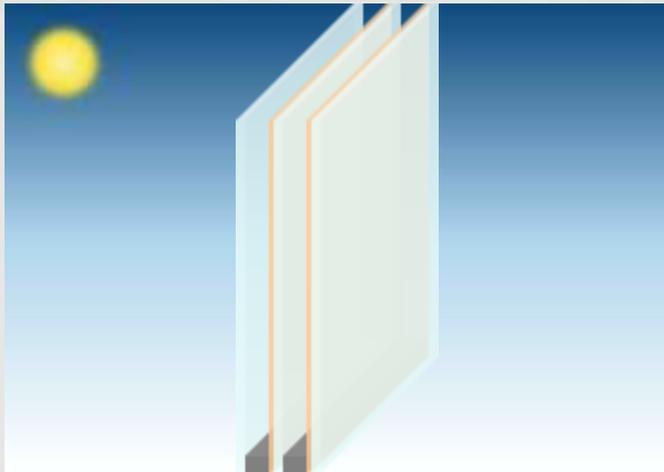
	PENDULUM RESISTANCE	EN12600:2002
	Result :	NPD

	ACOUSTICS	EN12758:2019
	Acoustic simulated values - v2.0	Rw(C;Ctr) = 34(-1;-4) dB
	OITC (ASTM E1332)	28
	STC (ASTM E413)	34

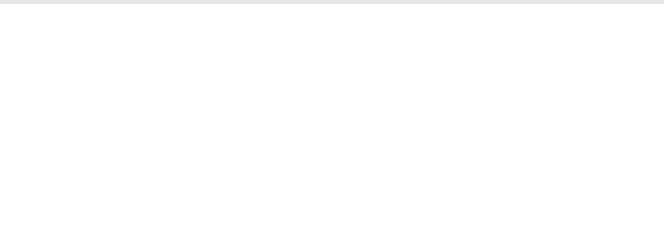


Calumen III calculates the photometric characteristics and thermal transmission of glass using calculation algorithms which comply with the following standards: the European standards EN 410 and EN 673, the international standard ISO9050, the Japanese standard JIS R 3106/3107 and the Korean standard KS L 2514/2525. The functional output and calculation rules of Calumen for standards EN 410 and EN 673 have been validated by TÜV Rheinland (report 89212153-01). The technical performances obtained according to these standards are provided for information only and are subject to amendment. Only the values entered in the performance declaration available on the CE marking site of Saint-Gobain Glass are official.

The sound attenuation indices are measured under laboratory conditions according to the standards EN ISO 10140 and EN 12758. The calculated indices are provided for information only. The accuracy for Rw index lies within a range of +/-2dB. The glass thickness calculations comply with the 2012 version of the DTU39-P4 description. The USER is responsible for ensuring that the correct calculation hypotheses are entered and the DTU39 is applied appropriately for the project concerned.



Pane 1	PLANICLEAR (4 mm)
Cavity 1	ARGON (90%) / AIR (10%) / 10 mm
Pane 2	PLANITHERM TOTAL+ FG PLANICLEAR (4 mm)
Cavity 2	ARGON (90%) / AIR (10%) / 10 mm
Pane 3	PLANITHERM TOTAL+ FG PLANICLEAR (4 mm)



	LUMINOUS FACTORS	CIE015:2018
	Light transmission (TL %)	69.1 %
	Outdoor reflection (RLe %)	16.6 %
	Indoor (RLi %)	16.7 %
	SOLAR FACTORS	EN410:2011
	Solar factor (g)	0.6064
	Shading Coefficient (SC)	0.6971
	COLOR RENDERING	CIE015:2018
	Transmission (Ra)	98.2
	Reflection (Ra)	89.9
	BURGLAR RESIST	EN356:1999
	Result :	NPD
	CARBON FOOTPRINT	EN15804:2012+A2:2019
	Global warming potential 'GWP' 50 Kg(CO2)/m ² (A1-A3)	

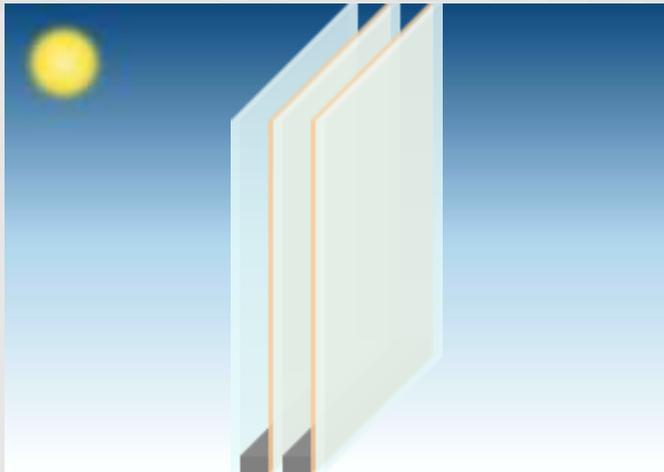
	ENERGY FACTORS	EN410:2011
	Transmission (Te)	48.9 %
	Reflection (Ree)	26%
	Indoor (Rei)	25.5 %
	Absorption (AE1)	6.5%
	Absorption (AE2)	11.7 %
	Absorption (AE3)	6.9%

	THERMAL TRANSMISSION	EN673:2011
	Ug	0.868 W/m ² .K
	0° related to vertical position	

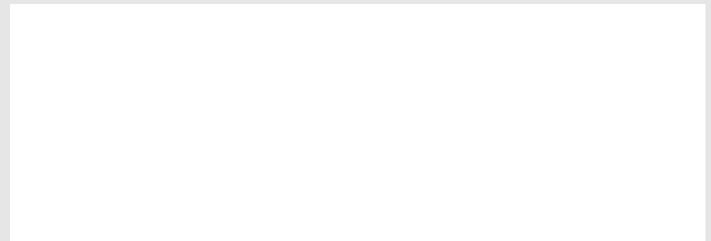
	MANUFACTURING SIZES	
	Nominal thickness	32.0 mm
	Weight	30.0 kg/m ²

	PENDULUM RESISTANCE	EN12600:2002
	Result :	NPD

	ACOUSTICS	EN12758:2019
	Acoustic simulated values - v2.0	Rw(C;Ctr) = 31(-1;-4) dB
	OITC (ASTM E1332)	25
	STC (ASTM E413)	31



Pane 1	PLANICLEAR (4 mm)
Cavity 1	ARGON (90%) / AIR (10%) / 12 mm
Pane 2	PLANITHERM ONE T FG PLANICLEAR (4 mm)
Cavity 2	ARGON (90%) / AIR (10%) / 12 mm
Pane 3	PLANITHERM ONE T FG PLANICLEAR (4 mm)



	LUMINOUS FACTORS	CIE (15-2004)
	Light transmission (TL %)	51.4 %
	Outdoor reflection (RLe %)	34.5 %
	Indoor (RLi %)	34.5 %
	SOLAR FACTORS	EN410 (2011-04)
	Solar factor (g)	0.3712
	Shading Coefficient (SC)	0.4267
	COLOR RENDERING	CIE (15-2004)
	Transmission (Ra)	94.8
	Reflection (Ra)	95.6
	BURGLAR RESIST	EN356
	Result :	NPD
	CARBON FOOTPRINT	EN15804 [A2]
	Global warming potential 'GWP' 51 Kg(CO2)/m ² (A1-A3)	

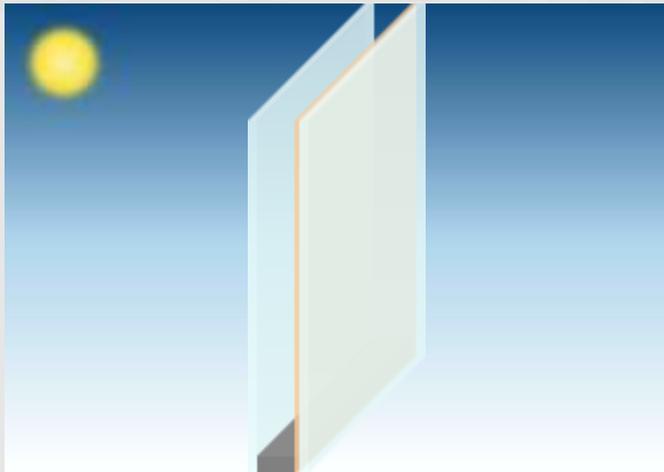
	ENERGY FACTORS	EN410 (2011-04)
	Transmission (Te)	28.3 %
	Reflection (Ree)	49.4 %
	Indoor (Rei)	47.2 %
	Absorption (AE1)	7.9%
	Absorption (AE2)	10.1 %
	Absorption (AE3)	4.2%

	THERMAL TRANSMISSION	EN673 (2011-04)
	Ug	0.672 W/m ² .K
	0° related to vertical position	

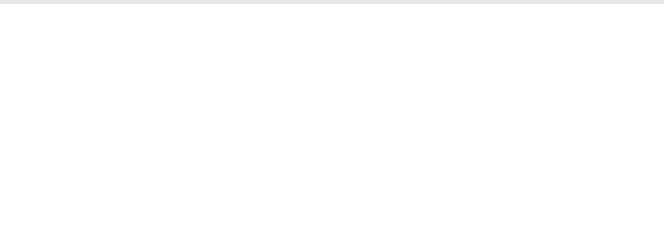
	MANUFACTURING SIZES	
	Nominal thickness	36.0 mm
	Weight	30.0 kg/m ²

	PENDULUM RESISTANCE	EN12600
	Result :	NPD





Pane 1	PLANICLEAR (4 mm)
Cavity 1	ARGON (90%) / AIR (10%) / 16 mm
Pane 2	PLANITHERM ONE T FG PLANICLEAR (4 mm)



LUMINOUS FACTORS

CIE015:2018

Light transmission (TL %)	67.0 %
Outdoor reflection (RLe %)	25.0 %
Indoor (RLi %)	25.0 %



SOLAR FACTORS

EN410:2011

Solar factor (g)	0.4941
Shading Coefficient (SC)	0.5679



COLOR RENDERING

CIE015:2018

Transmission (Ra)	97.1
Reflection (Ra)	96.0



BURGLAR RESIST

EN356:1999

Result :	NPD
----------	-----



CARBON FOOTPRINT

EN15804:2012+A2:2019

Global warming potential 'GWP' 33 Kg(CO2)/m² (A1-A3)



ENERGY FACTORS

EN410:2011

Transmission (Te)	42.7 %
Reflection (Ree)	42.3 %
Indoor (Rei)	40.3 %
Absorption (AE1)	7.6%
Absorption (AE2)	7.4%



THERMAL TRANSMISSION

EN673:2011

Ug	1.042 W/m ² .K
0° related to vertical position	



MANUFACTURING SIZES

Nominal thickness	24.0 mm
Weight	20.0 kg/m ²



PENDULUM RESISTANCE

EN12600:2002

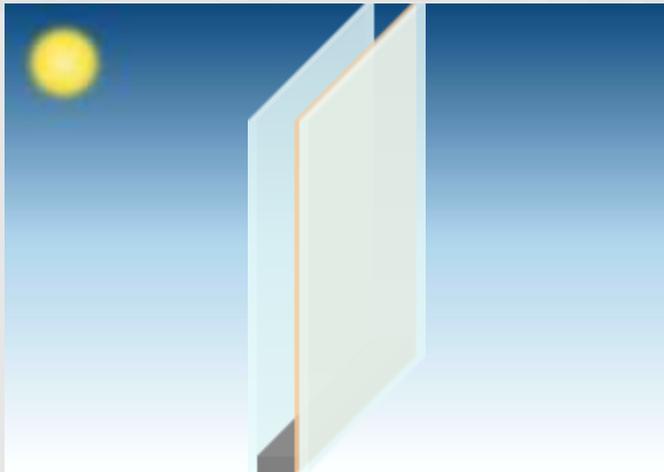
Result :	NPD
----------	-----



ACOUSTICS

EN12758:2019

Acoustic values according to EN 12758 and from notified body -	Rw(C;Ctr) = 31(-1;-4) dB
OITC (ASTM E1332)	N/A
STC (ASTM E413)	N/A



Pane 1	PLANICLEAR (4 mm)
Cavity 1	ARGON (90%) / AIR (10%) / 16 mm
Pane 2	PLANITHERM TOTAL+ FG PLANICLEAR (4 mm)



LUMINOUS FACTORS

CIE (15-2004)

Light transmission (TL %)	79.2 %
Outdoor reflection (RLe %)	13.0 %
Indoor (RLi %)	12.2 %



SOLAR FACTORS

EN410 (2011-04)

Solar factor (g)	0.7254
Shading Coefficient (SC)	0.8338



COLOR RENDERING

CIE (15-2004)

Transmission (Ra)	99.1
Reflection (Ra)	90.2



ENERGY FACTORS

EN410 (2011-04)

Transmission (Te)	64.3 %
Reflection (Ree)	20.2 %
Indoor (Rei)	20.5 %
Absorption (AE1)	6.1 %
Absorption (AE2)	9.4 %



THERMAL TRANSMISSION

EN673 (2011-04)

Ug	1.193 W/m ² .K
0° related to vertical position	



MANUFACTURING SIZES

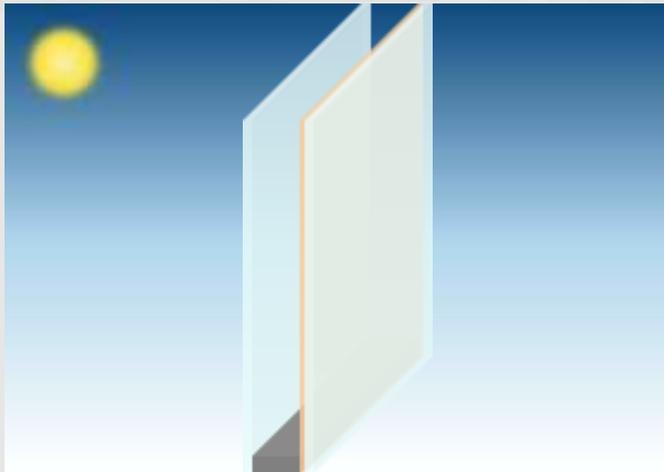
Nominal thickness	24.0 mm
Weight	20.0 kg/m ²



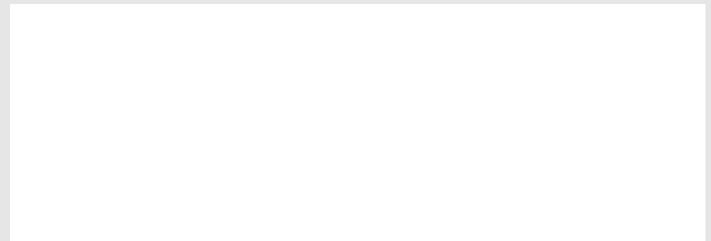
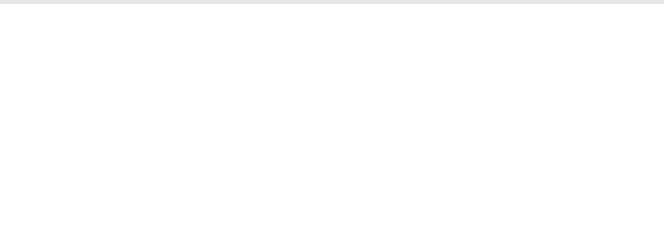
ACOUSTICS

EN12758

Acoustic values according to EN 12758 and from notified body	Rw(C;Ctr) = 31(-1;-4) dB
--	--------------------------



Pane 1	PLANICLEAR (4 mm)
Cavity 1	ARGON (90%) / AIR (10%) / 20 mm
Pane 2	PLANITHERM ONE T FG PLANICLEAR (4 mm)



	LUMINOUS FACTORS	CIE (15-2004)
	Light transmission (TL %)	67.0 %
	Outdoor reflection (RLe %)	25.0 %
	Indoor (RLi %)	25.0 %

	SOLAR FACTORS	EN410 (2011-04)
	Solar factor (g)	0.4939
	Shading Coefficient (SC)	0.5677

	COLOR RENDERING	CIE (15-2004)
	Transmission (Ra)	97.1
	Reflection (Ra)	96.0

	BURGLAR RESIST	EN356
	Result :	NPD

	CARBON FOOTPRINT	EN15804 [A2]
	Global warming potential 'GWP' 34 Kg(CO2)/m ² (A1-A3)	

	ENERGY FACTORS	EN410 (2011-04)
	Transmission (Te)	42.7 %
	Reflection (Ree)	42.3 %
	Indoor (Rei)	40.3 %
	Absorption (AE1)	7.6%
	Absorption (AE2)	7.4%

	THERMAL TRANSMISSION	EN673 (2011-04)
	Ug	1.068 W/m ² .K
	0° related to vertical position	

	MANUFACTURING SIZES	
	Nominal thickness	28.0 mm
	Weight	20.0 kg/m ²

	PENDULUM RESISTANCE	EN12600
	Result :	NPD



Pane 1 PLANICLEAR (4 mm)
PLANITHERM ONE T FG

Cavity 1 ARGON (90%) / AIR (10%) / 20 mm

Pane 2 PLANICLEAR (4 mm)



LUMINOUS FACTORS

CIE (15-2004)

Light transmission (TL %) 67.0 %
Outdoor reflection (RLe %) 25.0 %
Indoor (RLi %) 25.0 %



SOLAR FACTORS

EN410 (2011-04)

Solar factor (g) 0.4472
Shading Coefficient (SC) 0.5140



COLOR RENDERING

CIE (15-2004)

Transmission (Ra) 97.1
Reflection (Ra) 97.2



BURGLAR RESIST

EN356

Result : NPD



ENERGY FACTORS

EN410 (2011-04)

Transmission (Te) 42.7 %
Reflection (Ree) 40.3 %
Indoor (Rei) 42.3 %
Absorption (AE1) 15.4 %
Absorption (AE2) 1.6%



THERMAL TRANSMISSION

EN673 (2011-04)

Ug 1.068 W/m².K
0° related to vertical position



MANUFACTURING SIZES

Nominal thickness 28.0 mm
Weight 20.0 kg/m²



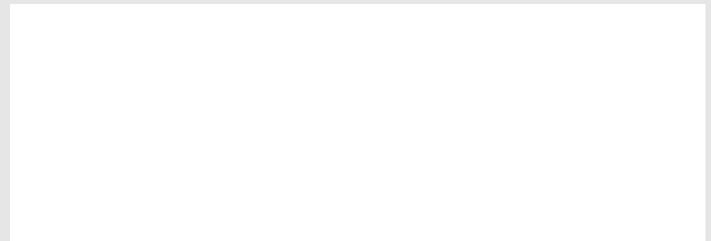
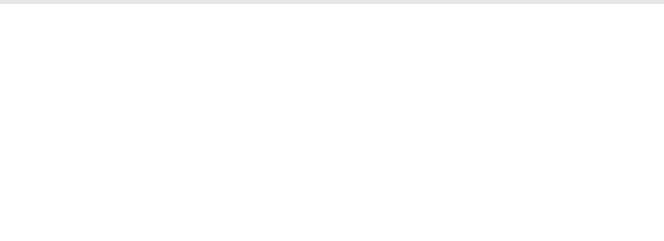
PENDULUM RESISTANCE

EN12600

Result : NPD



Pane 1	PLANICLEAR (4 mm) COOL-LITE SKN 176 II
Cavity 1	ARGON (90%) / AIR (10%) / 20 mm
Pane 2	PLANICLEAR (3 mm) PVB standard (2 x 0.38 mm) PLANICLEAR (3 mm)



LUMINOUS FACTORS

CIE (15-2004)

Light transmission (TL %)	69.9 %
Outdoor reflection (RLe %)	13.0 %
Indoor (RLi %)	14.9 %



SOLAR FACTORS

EN410 (2011-04)

Solar factor (g)	0.3712
Shading Coefficient (SC)	0.4266



COLOR RENDERING

CIE (15-2004)

Transmission (Ra)	93.9
Reflection (Ra)	81.8



BURGLAR RESIST

EN356

Result :	NPD/P1A
----------	---------



CARBON FOOTPRINT

EN15804 [A2]

Global warming potential 'GWP' 48 Kg(CO2)/m² (A1-A3)



ENERGY FACTORS

EN410 (2011-04)

Transmission (Te)	33.1 %
Reflection (Ree)	35.2 %
Indoor (Rei)	33.4 %
Absorption (AE1)	28.4 %
Absorption (AE2)	3.3%



THERMAL TRANSMISSION

EN673 (2011-04)

Ug	1.061 W/m ² .K
0° related to vertical position	



MANUFACTURING SIZES

Nominal thickness	30.8 mm
Weight	25.8 kg/m ²



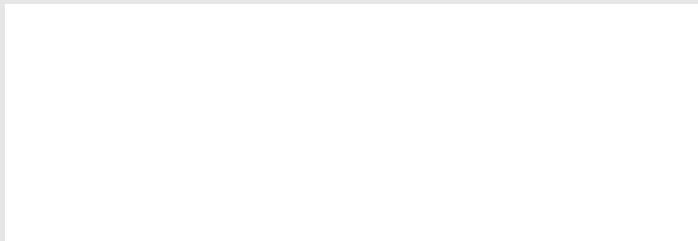
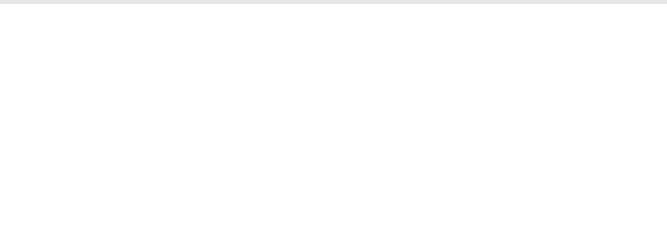
PENDULUM RESISTANCE

EN12600

Result :	NPD/1B1
----------	---------



Pane 1	PLANICLEAR (4 mm) COOL-LITE SKN 176 II
Cavity 1	ARGON (90%) / AIR (10%) / 20 mm
Pane 2	PLANICLEAR (4 mm)



LUMINOUS FACTORS

CIE015:2018

Light transmission (TL %)	70.4 %
Outdoor reflection (RLe %)	13.1 %
Indoor (RLi %)	15.0 %



SOLAR FACTORS

EN410:2011

Solar factor (g)	0.3739
Shading Coefficient (SC)	0.4298



COLOR RENDERING

CIE015:2018

Transmission (Ra)	94.3
Reflection (Ra)	81.9



BURGLAR RESIST

EN356:1999

Result :	NPD
----------	-----



CARBON FOOTPRINT

EN15804:2012+A2:2019

Global warming potential 'GWP' 34 Kg(CO2)/m² (A1-A3)



ENERGY FACTORS

EN410:2011

Transmission (Te)	35.3 %
Reflection (Ree)	34.4 %
Indoor (Rei)	40.2 %
Absorption (AE1)	29.3 %
Absorption (AE2)	0.9 %



THERMAL TRANSMISSION

EN673:2011

Ug	1.068 W/m ² .K
0° related to vertical position	



MANUFACTURING SIZES

Nominal thickness	28.0 mm
Weight	20.0 kg/m ²



PENDULUM RESISTANCE

EN12600:2002

Result :	NPD
----------	-----

Product code

69 / 35 / 1.1



total thickness = 36 mm

Glazing from external to internal:

<p>6 mm Pane 1 Float Glass ExtraClear SunGuard SN 70/35 HT</p>	<p>Spacer 1 - 24 mm</p> <p>10 Air % Argon 90 %</p>	<p>6 mm Pane 2 Float Glass ExtraClear</p>
---	--	--

Results

Visible light (EN 410 - 2011)

transmittance [%]	$\tau_v = 69.$
reflectance external [%]	$\rho_v = 0$
reflectance internal [%]	$\rho_{iv} = 14.$
general colour rendering index [%]	$R_a = 6$
	15.
	8
<u>Thermal properties (EN 673 - 2011)</u>	
U-value [W/(m ² K)]	$U_g = 1.1$
slope $\alpha = 90^\circ$	4

Solar energy (EN 410 - 2011)

solar factor [%]	$g = 35.0$
shading coefficient [g/0.87]	$sc = 0.40$
direct transmittance [%]	$\tau_e = 32.9$
direct reflectance external [%]	$\rho_e = 41.0$
direct reflectance internal [%]	$\rho_{ie} = 41.0$
direct absorption [%]	$a = 26.1$
UV transmittance [%]	$\tau_{uv} = 9.0$
secondary internal heat transfer factor [%]	$q_i = 2.1$

Other data

estimated sound reduction index [dB]	$R_w = \text{NPD}$
(EN 717-1)	$C = \text{NPD}$
	$C_{tr} = \text{NPD}$

The calculated values are for orientation only and do not offer any guarantee regarding the fabrication of the un-intended end-product. Glass configurations do not amount to a guarantee of product availability.



Acoustic Calculation

Glass Configuration

9/27/2018

6mm Float Glass

24mm Cavity

6mm Float Glass

Glass Weight: 30.0kg/m²

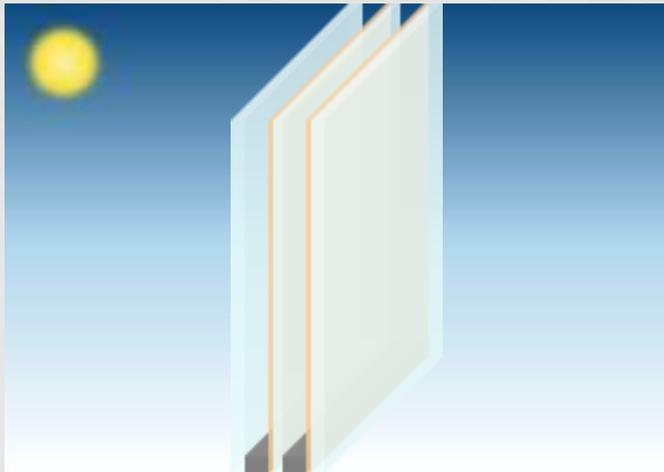
Unit Thickness: 36mm

The acoustic performance data within this document is determined by calculation, based on factors derived from certified data. Due to inherent variations in acoustic performance when testing in accordance with EN ISO 140-3 and/or ASTM E90, some variation in the calculated performance can also be expected. As such, the weighted performance, R_w , and adaptation terms, C and C_{tr} , should typically be considered to be accurate within ± 2 dB. However, wider deviations can occur.

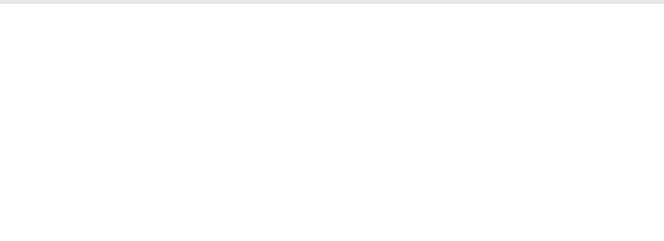
Sound Reduction Indices - dB

Frequency - Hertz					R_w	C	C_{tr}	OITC	STC
125	250	500	1000	2000	35	-2	-5	28	33
24	24	31	44	37					

Disclaimer: The information contained in this publication is a general description of the products and Guardian hereby disclaims all liability arising from any inaccuracy in or omissions from this publication and all the consequences of relying on it. It is the responsibility of the users of this information to ensure that the intended application of the Guardian products is appropriate and complies with all relevant laws, regulations, standards, codes of practices and other requirements.



Pane 1	PLANICLEAR (6 mm)
Cavity 1	ARGON (90%) / AIR (10%) / 10 mm
Pane 2	PLANITHERM TOTAL+ FG PLANICLEAR (4 mm)
Cavity 2	ARGON (90%) / AIR (10%) / 10 mm
Pane 3	PLANITHERM TOTAL+ FG PLANICLEAR (6 mm)



LUMINOUS FACTORS

CIE (15-2004)

Light transmission (TL %)	68.6 %
Outdoor reflection (RLe %)	16.8 %
Indoor (RLi %)	16.9 %



SOLAR FACTORS

EN410 (2011-04)

Solar factor (g)	0.5914
Shading Coefficient (SC)	0.6797



COLOR RENDERING

CIE (15-2004)

Transmission (Ra)	98.0
Reflection (Ra)	86.6



BURGLAR RESIST

EN356

Result :	NPD
----------	-----



CARBON FOOTPRINT

EN15804 [A2]

Global warming potential 'GWP' 63 Kg(CO2)/m² (A1-A3)



ENERGY FACTORS

EN410 (2011-04)

Transmission (Te)	46.9 %
Reflection (Ree)	25%
Indoor (Rei)	24.4 %
Absorption (AE1)	9.3%
Absorption (AE2)	11.1 %
Absorption (AE3)	7.6%



THERMAL TRANSMISSION

EN673 (2011-04)

Ug	0.865 W/m ² .K
0° related to vertical position	



MANUFACTURING SIZES

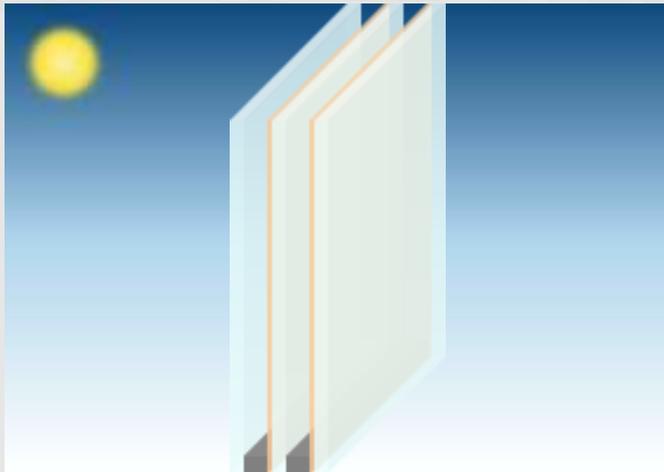
Nominal thickness	36.0 mm
Weight	40.0 kg/m ²



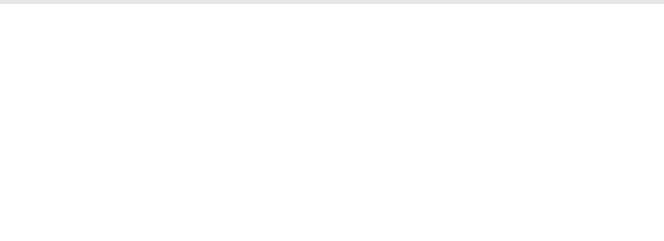
PENDULUM RESISTANCE

EN12600

Result :	NPD
----------	-----



Pane 1	PLANICLEAR (6 mm)
Cavity 1	ARGON (90%) / AIR (10%) / 10 mm
Pane 2	PLANITHERM ONE T FG PLANICLEAR (6 mm)
Cavity 2	ARGON (90%) / AIR (10%) / 10 mm
Pane 3	PLANITHERM ONE T FG PLANICLEAR (6 mm)



	LUMINOUS FACTORS	CIE015:2018
	Light transmission (TL %)	50.4 %
	Outdoor reflection (RLe %)	34.0 %
	Indoor (RLi %)	34.0 %
	SOLAR FACTORS	EN410:2011
	Solar factor (g)	0.3632
	Shading Coefficient (SC)	0.4174
	COLOR RENDERING	CIE015:2018
	Transmission (Ra)	93.9
	Reflection (Ra)	95.1
	BURGLAR RESIST	EN356:1999
	Result :	NPD
	CARBON FOOTPRINT	EN15804:2012+A2:2019
	Global warming potential 'GWP' 69 Kg(CO2)/m ² (A1-A3)	

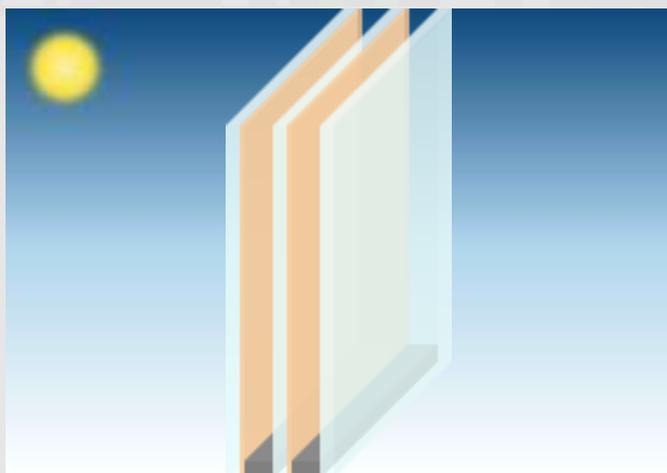
	ENERGY FACTORS	EN410:2011
	Transmission (Te)	26.9 %
	Reflection (Ree)	46.5 %
	Indoor (Rei)	44.5 %
	Absorption (AE1)	11.3 %
	Absorption (AE2)	10.8 %
	Absorption (AE3)	4.4%

	THERMAL TRANSMISSION	EN673:2011
	Ug	0.779 W/m ² .K
	0° related to vertical position	

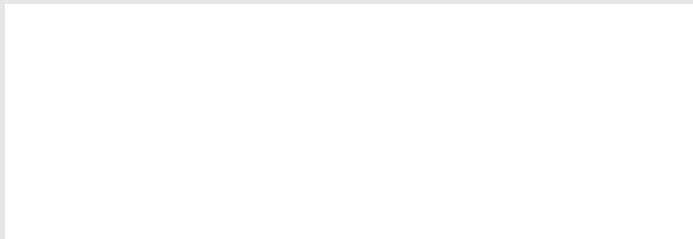
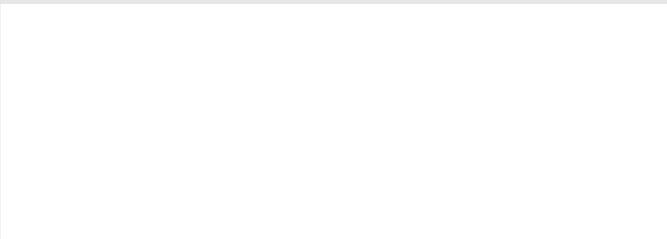
	MANUFACTURING SIZES	
	Nominal thickness	38.0 mm
	Weight	45.0 kg/m ²

	PENDULUM RESISTANCE	EN12600:2002
	Result :	NPD

	ACOUSTICS	EN12758:2019
	Acoustic simulated values - v1.0	Rw(C;Ctr) = 31(-1;-4) dB
	OITC (ASTM E1332)	24
	STC (ASTM E413)	31



Pane 1	PLANICLEAR (6 mm) COOL-LITE SKN 176 II
Cavity 1	ARGON (90%) / AIR (10%) / 12 mm
Pane 2	PLANICLEAR (6 mm) PLANITHERM ONE T FG
Cavity 2	ARGON (90%) / AIR (10%) / 12 mm
Pane 3	PLANICLEAR (6 mm)



LUMINOUS FACTORS

CIE015:2018

Light transmission (TL %)	51.9 %
Outdoor reflection (RLe %)	23.0 %
Indoor (RLi %)	28.4 %



SOLAR FACTORS

EN410:2011

Solar factor (g)	0.2768
Shading Coefficient (SC)	0.3182



COLOR RENDERING

CIE015:2018

Transmission (Ra)	91.4
Reflection (Ra)	83.9



BURGLAR RESIST

EN356:1999

Result :	NPD
----------	-----



CARBON FOOTPRINT

EN15804:2012+A2:2019

Global warming potential 'GWP' 70 Kg(CO2)/m² (A1-A3)



ENERGY FACTORS

EN410:2011

Transmission (Te)	23.8 %
Reflection (Ree)	37.2 %
Indoor (Rei)	44.4 %
Absorption (AE1)	33.4 %
Absorption (AE2)	4.8 %
Absorption (AE3)	0.8 %



THERMAL TRANSMISSION

EN673:2011

Ug	0.670 W/m ² .K
0° related to vertical position	



MANUFACTURING SIZES

Nominal thickness	42.0 mm
Weight	45.0 kg/m ²



PENDULUM RESISTANCE

EN12600:2002

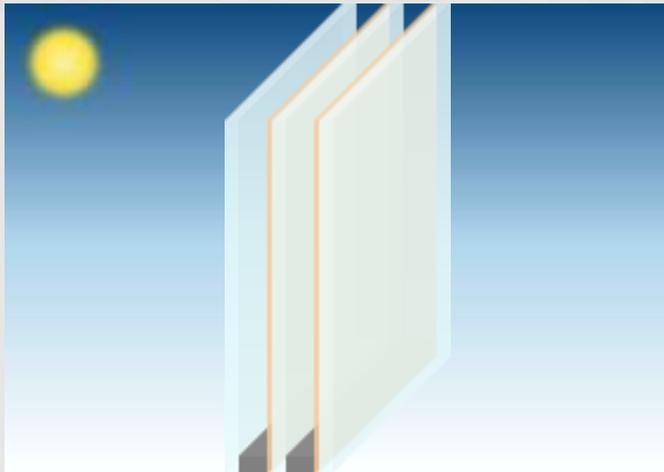
Result :	NPD
----------	-----



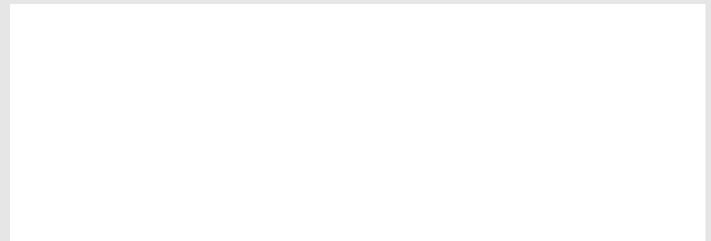
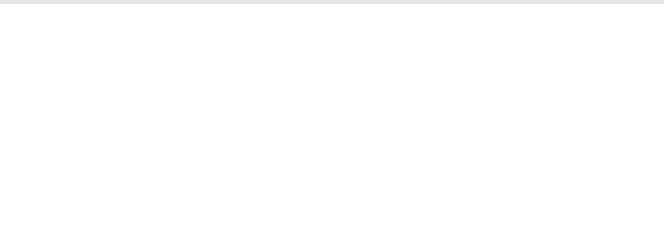
ACOUSTICS

EN12758:2019

Acoustic simulated values - v2.0	Rw(C;Ctr) = 34(-2;-6) dB
OITC (ASTM E1332)	25
STC (ASTM E413)	34



Pane 1	PLANICLEAR (6 mm)
Cavity 1	ARGON (90%) / AIR (10%) / 12 mm
Pane 2	PLANITHERM ONE T FG PLANICLEAR (6 mm)
Cavity 2	ARGON (90%) / AIR (10%) / 12 mm
Pane 3	PLANITHERM ONE T FG PLANICLEAR (6 mm)



	LUMINOUS FACTORS	CIE015:2018
	Light transmission (TL %)	50.4 %
	Outdoor reflection (RLe %)	34.0 %
	Indoor (RLi %)	34.0 %
	SOLAR FACTORS	EN410:2011
	Solar factor (g)	0.3638
	Shading Coefficient (SC)	0.4182
	COLOR RENDERING	CIE015:2018
	Transmission (Ra)	93.9
	Reflection (Ra)	95.1
	BURGLAR RESIST	EN356:1999
	Result :	NPD
	CARBON FOOTPRINT	EN15804:2012+A2:2019
	Global warming potential 'GWP' 70 Kg(CO2)/m ² (A1-A3)	

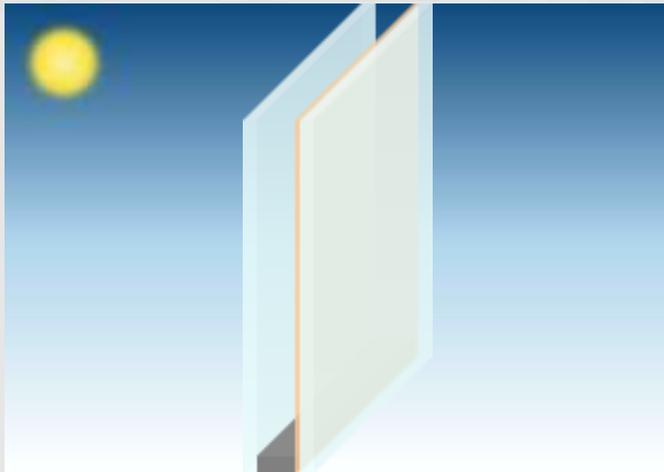
	ENERGY FACTORS	EN410:2011
	Transmission (Te)	26.9 %
	Reflection (Ree)	46.5 %
	Indoor (Rei)	44.5 %
	Absorption (AE1)	11.3 %
	Absorption (AE2)	10.8 %
	Absorption (AE3)	4.4%

	THERMAL TRANSMISSION	EN673:2011
	Ug	0.670 W/m ² .K
	0° related to vertical position	

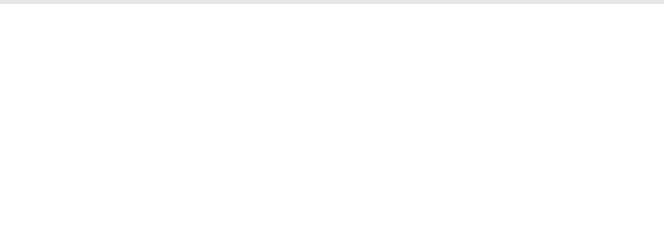
	MANUFACTURING SIZES	
	Nominal thickness	42.0 mm
	Weight	45.0 kg/m ²

	PENDULUM RESISTANCE	EN12600:2002
	Result :	NPD

	ACOUSTICS	EN12758:2019
	Acoustic simulated values - v2.0	Rw(C;Ctr) = 34(-2;-6) dB
	OITC (ASTM E1332)	25
	STC (ASTM E413)	34



Pane 1	PLANICLEAR (6 mm)
Cavity 1	ARGON (90%) / AIR (10%) / 16 mm
Pane 2	PLANITHERM ONE T FG PLANICLEAR (6 mm)



LUMINOUS FACTORS

CIE (15-2004)

Light transmission (TL %)	66.1 %
Outdoor reflection (RLe %)	24.7 %
Indoor (RLi %)	24.7 %



SOLAR FACTORS

EN410 (2011-04)

Solar factor (g)	0.4852
Shading Coefficient (SC)	0.5577



COLOR RENDERING

CIE (15-2004)

Transmission (Ra)	96.5
Reflection (Ra)	95.7



BURGLAR RESIST

EN356

Result :	NPD
----------	-----



CARBON FOOTPRINT

EN15804 [A2]

Global warming potential 'GWP' 45 Kg(CO2)/m² (A1-A3)



ENERGY FACTORS

EN410 (2011-04)

Transmission (Te)	41.2 %
Reflection (Ree)	40%
Indoor (Rei)	38.2 %
Absorption (AE1)	10.9 %
Absorption (AE2)	7.9%



THERMAL TRANSMISSION

EN673 (2011-04)

Ug	1.038 W/m ² .K
0° related to vertical position	



MANUFACTURING SIZES

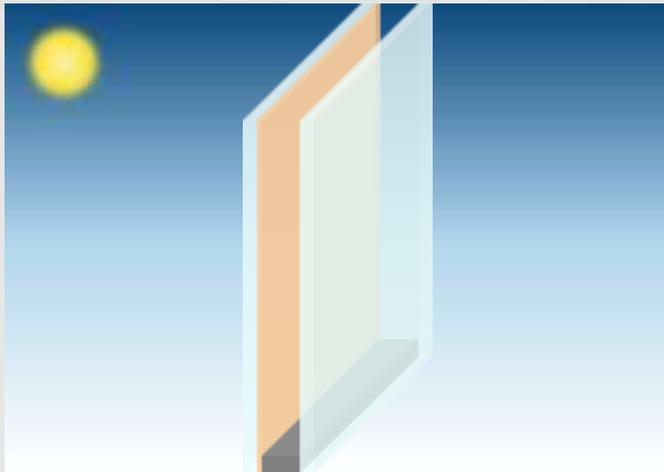
Nominal thickness	28.0 mm
Weight	30.0 kg/m ²



PENDULUM RESISTANCE

EN12600

Result :	NPD
----------	-----



Pane 1 PLANICLEAR (6 mm)
COOL-LITE SKN 175 II

Cavity 1 ARGON (90%) / AIR (10%) / 16 mm

Pane 2 PLANICLEAR (6 mm)

	LUMINOUS FACTORS	CIE (15-2004)
	Light transmission (TL %)	69.6 %
	Outdoor reflection (RLe %)	14.4 %
	Indoor (RLi %)	15.2 %

	SOLAR FACTORS	EN410 (2011-04)
	Solar factor (g)	0.3499
	Shading Coefficient (SC)	0.4022

	COLOR RENDERING	CIE (15-2004)
	Transmission (Ra)	94.8
	Reflection (Ra)	81.6

	BURGLAR RESIST	EN356
	Result :	NPD

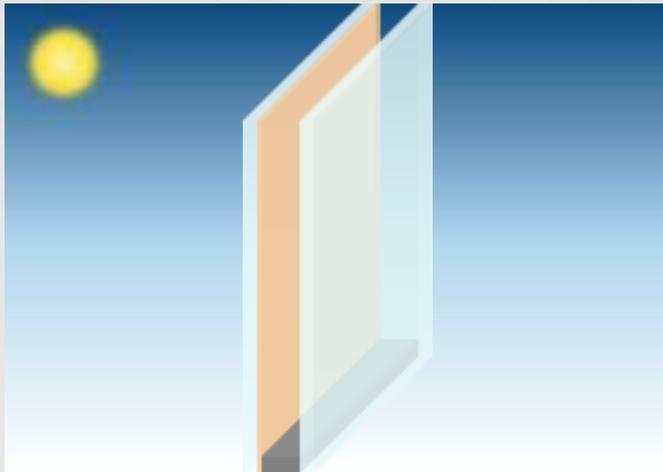
	CARBON FOOTPRINT	EN15804 [A2]
	Global warming potential 'GWP' 45 Kg(CO2)/m ² (A1-A3)	

	ENERGY FACTORS	EN410 (2011-04)
	Transmission (Te)	32.8 %
	Reflection (Ree)	37.1 %
	Indoor (Rei)	40.7 %
	Absorption (AE1)	28.9 %
	Absorption (AE2)	1.2 %

	THERMAL TRANSMISSION	EN673 (2011-04)
	Ug	1.038 W/m ² .K
	0° related to vertical position	

	MANUFACTURING SIZES	
	Nominal thickness	28.0 mm
	Weight	30.0 kg/m ²

	PENDULUM RESISTANCE	EN12600
	Result :	NPD



Pane 1	PLANICLEAR (6 mm) COOL-LITE SKN 176 II
--------	---

Cavity 1	ARGON (90%) / AIR (10%) / 16 mm
----------	---------------------------------

Pane 2	PLANICLEAR (6 mm)
--------	-------------------



LUMINOUS FACTORS

CIE (15-2004)

Light transmission (TL %)	69.6 %
Outdoor reflection (RLe %)	13.0 %
Indoor (RLi %)	14.9 %



SOLAR FACTORS

EN410 (2011-04)

Solar factor (g)	0.3696
Shading Coefficient (SC)	0.4249



COLOR RENDERING

CIE (15-2004)

Transmission (Ra)	93.6
Reflection (Ra)	82.9



BURGLAR RESIST

EN356

Result :	NPD
----------	-----



ENERGY FACTORS

EN410 (2011-04)

Transmission (Te)	34.6 %
Reflection (Ree)	34.1 %
Indoor (Rei)	39.2 %
Absorption (AE1)	30.0 %
Absorption (AE2)	1.3%



THERMAL TRANSMISSION

EN673 (2011-04)

Ug	1.038 W/m ² .K
0° related to vertical position	



MANUFACTURING SIZES

Nominal thickness	28.0 mm
Weight	30.0 kg/m ²



PENDULUM RESISTANCE

EN12600

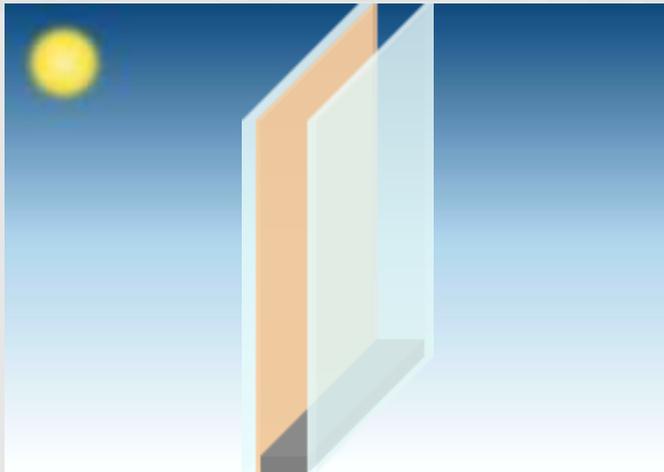
Result :	NPD
----------	-----



ACOUSTICS

EN12758

Acoustic values according to EN 12758 and from notified body	Rw(C;Ctr) = 33(-1;-5) dB
--	--------------------------



Pane 1	PLANICLEAR (6 mm) COOL-LITE SKN 176 II
--------	---

Cavity 1	ARGON (90%) / AIR (10%) / 20 mm
----------	---------------------------------

Pane 2	PLANICLEAR (4 mm)
--------	-------------------



LUMINOUS FACTORS

CIE (15-2004)

Light transmission (TL %)	70.0 %
Outdoor reflection (RLe %)	13.0 %
Indoor (RLi %)	15.0 %



SOLAR FACTORS

EN410 (2011-04)

Solar factor (g)	0.3703
Shading Coefficient (SC)	0.4256



COLOR RENDERING

CIE (15-2004)

Transmission (Ra)	93.9
Reflection (Ra)	81.7



BURGLAR RESIST

EN356

Result :	NPD
----------	-----



CARBON FOOTPRINT

EN15804 [A2]

Global warming potential 'GWP' 40 Kg(CO2)/m² (A1-A3)



ENERGY FACTORS

EN410 (2011-04)

Transmission (Te)	34.9 %
Reflection (Ree)	33.1 %
Indoor (Rei)	40.2 %
Absorption (AE1)	31%
Absorption (AE2)	0.9%



THERMAL TRANSMISSION

EN673 (2011-04)

Ug	1.065 W/m ² .K
0° related to vertical position	



MANUFACTURING SIZES

Nominal thickness	30.0 mm
Weight	25.0 kg/m ²



PENDULUM RESISTANCE

EN12600

Result :	NPD
----------	-----



Pane 1	PLANICLEAR (6 mm) COOL-LITE SKN 176 II
--------	---

Cavity 1	ARGON (90%) / AIR (10%) / 24 mm
----------	---------------------------------

Pane 2	PLANICLEAR (6 mm)
--------	-------------------

 **LUMINOUS FACTORS** CIE015:2018

Light transmission (TL %)	69.5 %
Outdoor reflection (RLe %)	12.9 %
Indoor (RLi %)	14.9 %

 **SOLAR FACTORS** EN410:2011

Solar factor (g)	0.3705
Shading Coefficient (SC)	0.4258

 **COLOR RENDERING** CIE015:2018

Transmission (Ra)	93.6
Reflection (Ra)	81.5

 **BURGLAR RESIST** EN356:1999

Result :	NPD
----------	-----

 **CARBON FOOTPRINT** EN15804:2012+A2:2019

Global warming potential 'GWP' 47 Kg(CO2)/m² (A1-A3)

 **ENERGY FACTORS** EN410:2011

Transmission (Te)	34.5 %
Reflection (Ree)	32.3 %
Indoor (Rei)	37.7 %
Absorption (AE1)	31.8 %
Absorption (AE2)	1.3 %

 **THERMAL TRANSMISSION** EN673:2011

Ug	1.084 W/m ² .K
----	---------------------------

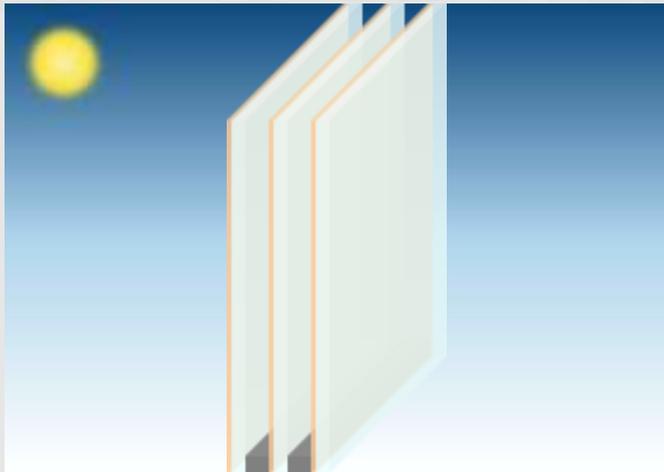
0° related to vertical position

 **MANUFACTURING SIZES**

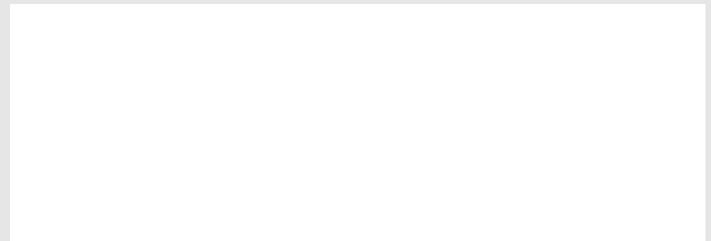
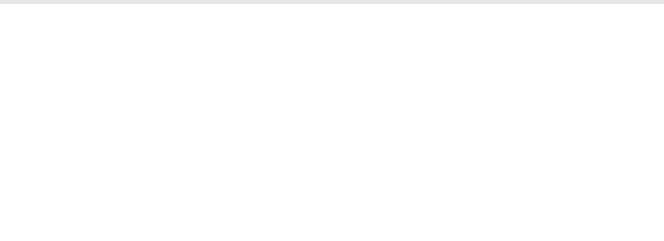
Nominal thickness	36.0 mm
Weight	30.0 kg/m ²

 **PENDULUM RESISTANCE** EN12600:2002

Result :	NPD
----------	-----



Pane 1	VISION-LITE II PLANICLEAR (6 mm)
Cavity 1	ARGON (90%) / AIR (10%) / 10 mm
Pane 2	PLANITHERM TOTAL+ FG PLANICLEAR (6 mm)
Cavity 2	ARGON (90%) / AIR (10%) / 10 mm
Pane 3	PLANITHERM TOTAL+ FG PLANICLEAR (6 mm)



LUMINOUS FACTORS

CIE015:2018

Light transmission (TL %)	70.1 %
Outdoor reflection (RLe %)	13.6 %
Indoor (RLi %)	14.6 %



SOLAR FACTORS

EN410:2011

Solar factor (g)	0.5904
Shading Coefficient (SC)	0.6786



COLOR RENDERING

CIE015:2018

Transmission (Ra)	97.5
Reflection (Ra)	84.7



BURGLAR RESIST

EN356:1999

Result :	NPD
----------	-----



CARBON FOOTPRINT

EN15804:2012+A2:2019

Global warming potential 'GWP' 70 Kg(CO2)/m² (A1-A3)



ENERGY FACTORS

EN410:2011

Transmission (Te)	46.6 %
Reflection (Ree)	23.4 %
Indoor (Rei)	23.3 %
Absorption (AE1)	10.6 %
Absorption (AE2)	12.2 %
Absorption (AE3)	7.3 %



THERMAL TRANSMISSION

EN673:2011

Ug	0.863 W/m ² .K
0° related to vertical position	



MANUFACTURING SIZES

Nominal thickness	38.0 mm
Weight	45.0 kg/m ²



PENDULUM RESISTANCE

EN12600:2002

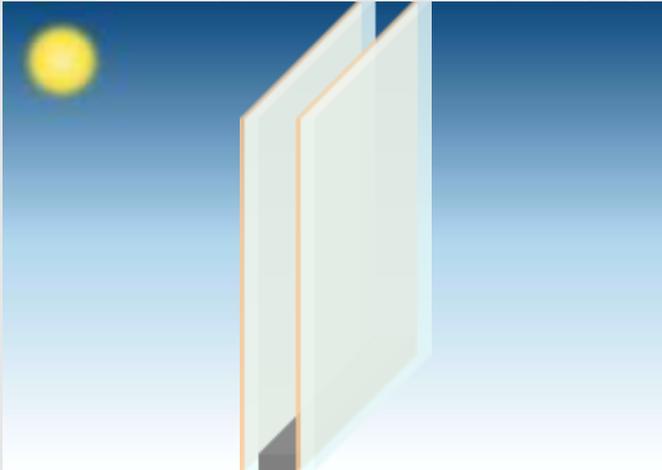
Result :	NPD
----------	-----



ACOUSTICS

EN12758:2019

Acoustic simulated values - v1.0	Rw(C;Ctr) = 31(-1;-4) dB
OITC (ASTM E1332)	24
STC (ASTM E413)	31



Pane 1	VISION-LITE II PLANICLEAR (6 mm)
Cavity 1	ARGON (90%) / AIR (10%) / 16 mm
Pane 2	PLANITHERM TOTAL+ FG PLANICLEAR (6 mm)

 **LUMINOUS FACTORS** CIE015:2018

Light transmission (TL %)	80.7 %
Outdoor reflection (RLe %)	9.8 %
Indoor (RLi %)	10.5 %

 **SOLAR FACTORS** EN410:2011

Solar factor (g)	0.6880
Shading Coefficient (SC)	0.7908

 **COLOR RENDERING** CIE015:2018

Transmission (Ra)	98.4
Reflection (Ra)	86.5

 **BURGLAR RESIST** EN356:1999

Result :	NPD
----------	-----

 **CARBON FOOTPRINT** EN15804:2012+A2:2019

Global warming potential 'GWP' 46 Kg(CO2)/m² (A1-A3)

 **ENERGY FACTORS** EN410:2011

Transmission (Te)	59.3 %
Reflection (Ree)	19.8 %
Indoor (Rei)	19.4 %
Absorption (AE1)	10.2 %
Absorption (AE2)	10.7 %

 **THERMAL TRANSMISSION** EN673:2011

Ug	1.187 W/m ² .K
0° related to vertical position	

 **MANUFACTURING SIZES**

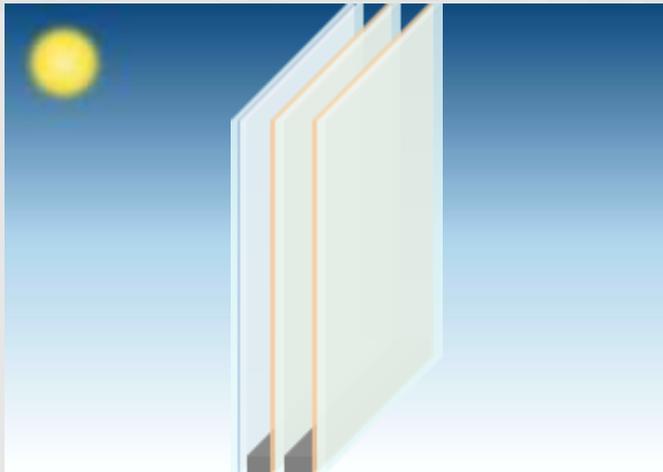
Nominal thickness	28.0 mm
Weight	30.0 kg/m ²

 **PENDULUM RESISTANCE** EN12600:2002

Result :	NPD
----------	-----

 **ACOUSTICS** EN12758:2019

Acoustic values according to EN 12758 and from notified body -	Rw(C;Ctr) = 33(-1;-5) dB
OITC (ASTM E1332)	N/A
STC (ASTM E413)	N/A



Pane 1	PLANICLEAR (3 mm) PVB standard (2 x 0.38 mm) PLANICLEAR (3 mm)
Cavity 1	ARGON (90%) / AIR (10%) / 10 mm
Pane 2	PLANITHERM ONE T FG PLANICLEAR (4 mm)
Cavity 2	ARGON (90%) / AIR (10%) / 12 mm
Pane 3	PLANITHERM ONE T FG PLANICLEAR (4 mm)



LUMINOUS FACTORS

CIE (15-2004)

Light transmission (TL %)	51.0 %
Outdoor reflection (RLe %)	34.1 %
Indoor (RLi %)	34.5 %



SOLAR FACTORS

EN410 (2011-04)

Solar factor (g)	0.3430
Shading Coefficient (SC)	0.3942



COLOR RENDERING

CIE (15-2004)

Transmission (Ra)	94.5
Reflection (Ra)	95.3



BURGLAR RESIST

EN356

Result :	P1A/NPD/NPD
----------	-------------



CARBON FOOTPRINT

EN15804 [A2]

Global warming potential 'GWP' 63 Kg(CO2)/m² (A1-A3)



ENERGY FACTORS

EN410 (2011-04)

Transmission (Te)	26.9 %
Reflection (Ree)	42.1 %
Indoor (Rei)	47.2 %
Absorption (AE1)	19.2 %
Absorption (AE2)	8.1 %
Absorption (AE3)	3.6 %



THERMAL TRANSMISSION

EN673 (2011-04)

Ug	0.720 W/m ² .K
0° related to vertical position	



MANUFACTURING SIZES

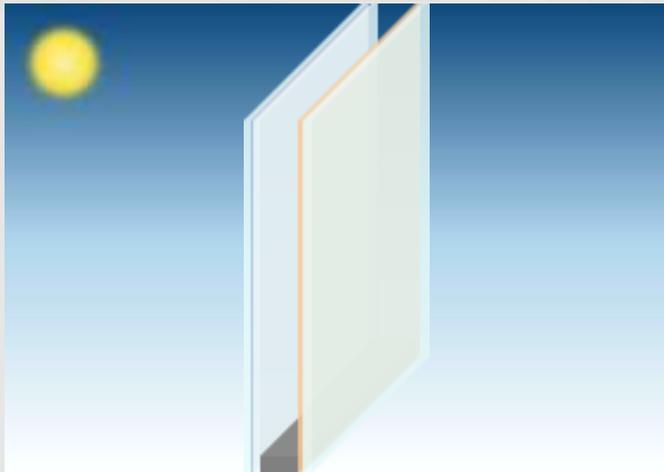
Nominal thickness	36.8 mm
Weight	35.8 kg/m ²



PENDULUM RESISTANCE

EN12600

Result :	1B1/NPD/NPD
----------	-------------



Pane 1	PLANICLEAR (3 mm) PVB standard (2 x 0.38 mm) PLANICLEAR (3 mm)
--------	--

Cavity 1	ARGON (90%) / AIR (10%) / 16 mm
----------	---------------------------------

Pane 2	PLANITHERM ONE T FG PLANICLEAR (4 mm)
--------	--



LUMINOUS FACTORS

CIE (15-2004)

Light transmission (TL %)	66.5 %
Outdoor reflection (RLe %)	24.7 %
Indoor (RLi %)	25.0 %



SOLAR FACTORS

EN410 (2011-04)

Solar factor (g)	0.4573
Shading Coefficient (SC)	0.5257



COLOR RENDERING

CIE (15-2004)

Transmission (Ra)	96.8
Reflection (Ra)	95.8



BURGLAR RESIST

EN356

Result :	P1A/NPD
----------	---------



CARBON FOOTPRINT

EN15804 [A2]

Global warming potential 'GWP' 47 Kg(CO2)/m² (A1-A3)



ENERGY FACTORS

EN410 (2011-04)

Transmission (Te)	40%
Reflection (Ree)	35.6 %
Indoor (Rei)	40.3 %
Absorption (AE1)	18.7 %
Absorption (AE2)	5.7%



THERMAL TRANSMISSION

EN673 (2011-04)

Ug	1.036 W/m ² .K
0° related to vertical position	



MANUFACTURING SIZES

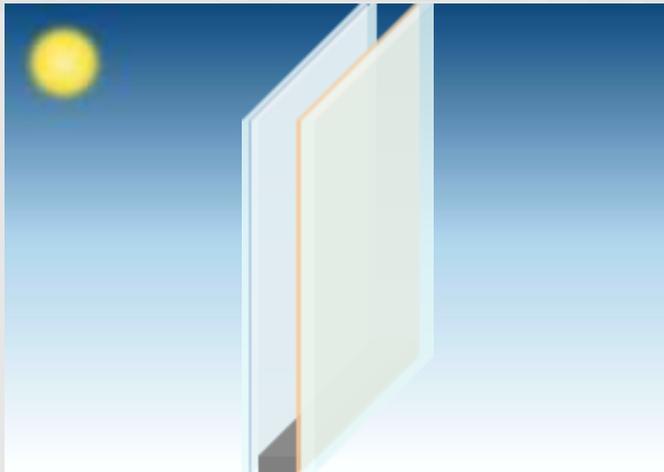
Nominal thickness	26.8 mm
Weight	25.8 kg/m ²



PENDULUM RESISTANCE

EN12600

Result :	1B1/NPD
----------	---------



Pane 1	PLANICLEAR (3 mm) PVB standard (2 x 0.38 mm) PLANICLEAR (3 mm)
--------	--

Cavity 1	ARGON (90%) / AIR (10%) / 16 mm
----------	---------------------------------

Pane 2	PLANITHERM TOTAL+ FG PLANICLEAR (6 mm)
--------	---



LUMINOUS FACTORS

CIE (15-2004)

Light transmission (TL %)	77.7 %
Outdoor reflection (RLe %)	12.8 %
Indoor (RLi %)	12.0 %



SOLAR FACTORS

EN410 (2011-04)

Solar factor (g)	0.6649
Shading Coefficient (SC)	0.7643



COLOR RENDERING

CIE (15-2004)

Transmission (Ra)	98.7
Reflection (Ra)	89.9



BURGLAR RESIST

EN356

Result :	P1A/NPD
----------	---------



ENERGY FACTORS

EN410 (2011-04)

Transmission (Te)	57.8 %
Reflection (Ree)	15.8 %
Indoor (Rei)	19.3 %
Absorption (AE1)	17.1 %
Absorption (AE2)	9.4%



THERMAL TRANSMISSION

EN673 (2011-04)

Ug	1.182 W/m ² .K
0° related to vertical position	



MANUFACTURING SIZES

Nominal thickness	28.8 mm
Weight	30.8 kg/m ²



PENDULUM RESISTANCE

EN12600

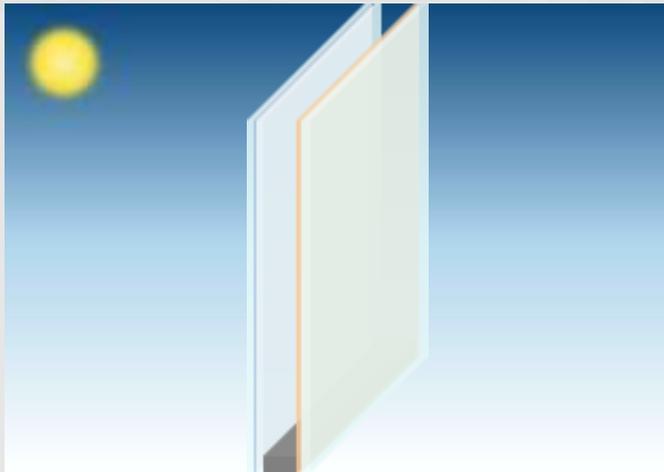
Result :	1B1/NPD
----------	---------



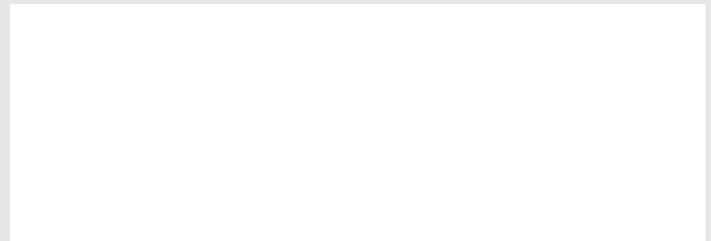
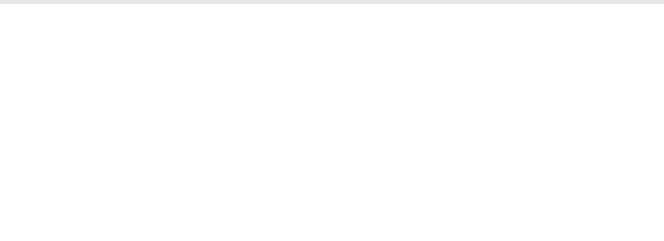
ACOUSTICS

EN12758

Acoustic simulated values	Rw(C;Ctr) = 34(-2;-5) dB
---------------------------	--------------------------



Pane 1	PLANICLEAR (3 mm) PVB silence (2 x 0.38 mm) PLANICLEAR (3 mm)
Cavity 1	ARGON (90%) / AIR (10%) / 14 mm
Pane 2	PLANITHERM ONE T FG PLANICLEAR (4 mm)



	LUMINOUS FACTORS	CIE (15-2004)
	Light transmission (TL %)	66.5 %
	Outdoor reflection (RLe %)	24.7 %
	Indoor (RLi %)	25.0 %

	SOLAR FACTORS	EN410 (2011-04)
	Solar factor (g)	0.4573
	Shading Coefficient (SC)	0.5257

	COLOR RENDERING	CIE (15-2004)
	Transmission (Ra)	96.8
	Reflection (Ra)	95.8

	BURGLAR RESIST	EN356
	Result :	P1A/NPD

	CARBON FOOTPRINT	EN15804 [A2]
	Global warming potential 'GWP' 46 Kg(CO2)/m ² (A1-A3)	

	ENERGY FACTORS	EN410 (2011-04)
	Transmission (Te)	40%
	Reflection (Ree)	35.6 %
	Indoor (Rei)	40.3 %
	Absorption (AE1)	18.7 %
	Absorption (AE2)	5.7%

	THERMAL TRANSMISSION	EN673 (2011-04)
	Ug	1.063 W/m ² .K
	0° related to vertical position	

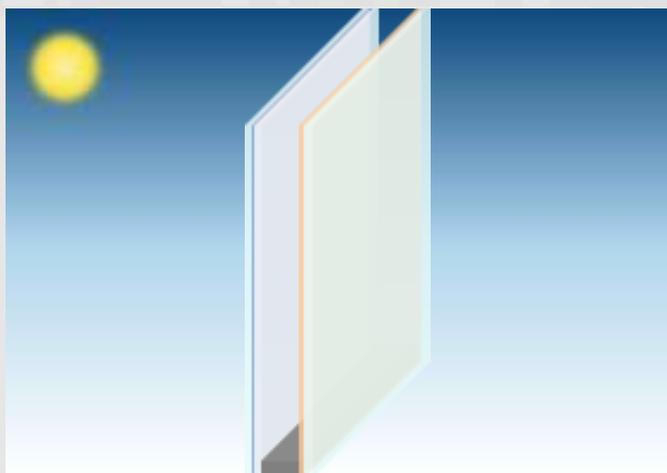
	MANUFACTURING SIZES	
	Nominal thickness	24.8 mm
	Weight	25.8 kg/m ²

	PENDULUM RESISTANCE	EN12600
	Result :	1B1/NPD



Calumen III calculates the photometric characteristics and thermal transmission of glass using calculation algorithms which comply with the following standards: the European standards EN 410 and EN 673, the international standard ISO9050, the Japanese standard JIS R 3106/3107 and the Korean standard KS L 2514/2525. The functional output and calculation rules of Calumen for standards EN 410 and EN 673 have been validated by TÜV Rheinland (report 89212153-01). The technical performances obtained according to these standards are provided for information only and are subject to amendment. Only the values entered in the performance declaration available on the CE marking site of Saint-Gobain Glass are official.

The sound attenuation indices are measured under laboratory conditions according to the standards EN ISO 10140 and EN 12758. The calculated indices are provided for information only. The accuracy for Rw index lies within a range of +/-2dB. The glass thickness calculations comply with the 2012 version of the DTU39-P4 description. The USER is responsible for ensuring that the correct calculation hypotheses are entered and the DTU39 is applied appropriately for the project concerned.



Pane 1	PLANICLEAR (3 mm) PVB silence (2 x 0.38 mm) PLANICLEAR (3 mm)
Cavity 1	ARGON (90%) / AIR (10%) / 16 mm
Pane 2	PLANITHERM TOTAL+ FG PLANICLEAR (4 mm)

	LUMINOUS FACTORS	CIE (15-2004)
	Light transmission (TL %)	78.2 %
	Outdoor reflection (RLe %)	12.8 %
	Indoor (RLi %)	12.1 %

	SOLAR FACTORS	EN410 (2011-04)
	Solar factor (g)	0.6661
	Shading Coefficient (SC)	0.7657

	COLOR RENDERING	CIE (15-2004)
	Transmission (Ra)	98.9
	Reflection (Ra)	90.0

	BURGLAR RESIST	EN356
	Result :	P1A/NPD

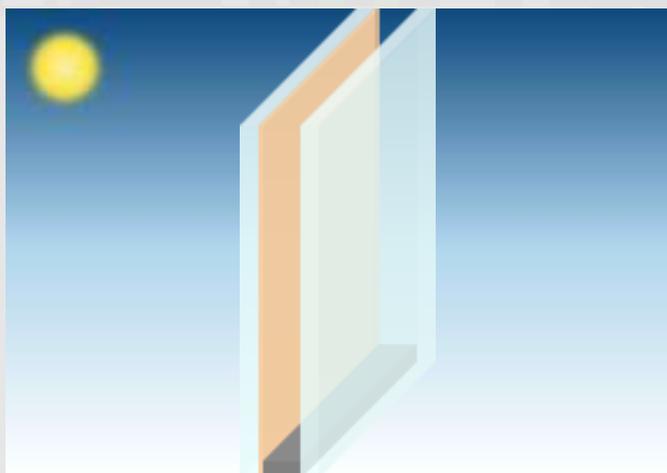
	ENERGY FACTORS	EN410 (2011-04)
	Transmission (Te)	58.9 %
	Reflection (Ree)	15.9 %
	Indoor (Rei)	20.3 %
	Absorption (AE1)	17.1 %
	Absorption (AE2)	8.1 %

	THERMAL TRANSMISSION	EN673 (2011-04)
	Ug	1.185 W/m ² .K
	0° related to vertical position	

	MANUFACTURING SIZES	
	Nominal thickness	26.8 mm
	Weight	25.8 kg/m ²

	PENDULUM RESISTANCE	EN12600
	Result :	1B1/NPD

	ACOUSTICS	EN12758
	Acoustic simulated values	Rw(C;Ctr) = 36(-1;-6) dB



Pane 1	PLANICLEAR (8 mm) COOL-LITE SKN 176 II
--------	---

Cavity 1	ARGON (90%) / AIR (10%) / 16 mm
----------	---------------------------------

Pane 2	PLANICLEAR (8 mm)
--------	-------------------



LUMINOUS FACTORS

CIE (15-2004)

Light transmission (TL %)	68.7 %
Outdoor reflection (RLe %)	12.8 %
Indoor (RLi %)	14.7 %



SOLAR FACTORS

EN410 (2011-04)

Solar factor (g)	0.3661
Shading Coefficient (SC)	0.4208



COLOR RENDERING

CIE (15-2004)

Transmission (Ra)	92.9
Reflection (Ra)	82.5



BURGLAR RESIST

EN356

Result :	NPD
----------	-----



ENERGY FACTORS

EN410 (2011-04)

Transmission (Te)	33.8 %
Reflection (Ree)	32.1 %
Indoor (Rei)	36.9 %
Absorption (AE1)	32.4 %
Absorption (AE2)	1.7%



THERMAL TRANSMISSION

EN673 (2011-04)

Ug	1.033 W/m ² .K
0° related to vertical position	



MANUFACTURING SIZES

Nominal thickness	32.0 mm
Weight	40.0 kg/m ²



PENDULUM RESISTANCE

EN12600

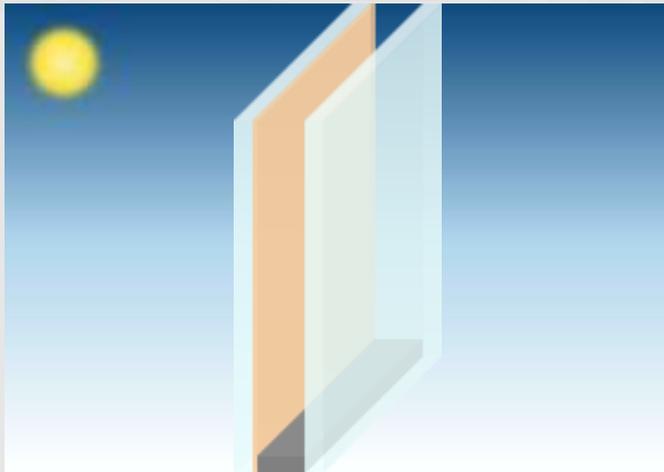
Result :	NPD
----------	-----



ACOUSTICS

EN12758

Acoustic simulated values	Rw(C;Ctr) = 33(-2;-6) dB
---------------------------	--------------------------



Pane 1	PLANICLEAR (8 mm) COOL-LITE SKN 176 II
--------	---

Cavity 1	ARGON (90%) / AIR (10%) / 20 mm
----------	---------------------------------

Pane 2	PLANICLEAR (8 mm)
--------	-------------------

 **LUMINOUS FACTORS** CIE (15-2004)

Light transmission (TL %)	68.7 %
Outdoor reflection (RLe %)	12.8 %
Indoor (RLi %)	14.7 %

 **SOLAR FACTORS** EN410 (2011-04)

Solar factor (g)	0.3664
Shading Coefficient (SC)	0.4212

 **COLOR RENDERING** CIE (15-2004)

Transmission (Ra)	93.0
Reflection (Ra)	81.2

 **BURGLAR RESIST** EN356

Result :	NPD
----------	-----

 **CARBON FOOTPRINT** EN15804 [A2]

Global warming potential	59.065 Kg(CO2)/m ²
--------------------------	-------------------------------

 **ENERGY FACTORS** EN410 (2011-04)

Transmission (Te)	33.8 %
Reflection (Ree)	31.1 %
Indoor (Rei)	35.5 %
Absorption (AE1)	33.4 %
Absorption (AE2)	1.7 %

 **THERMAL TRANSMISSION** EN673 (2011-04)

Ug	1.059 W/m ² .K
0° related to vertical position	

 **MANUFACTURING SIZES**

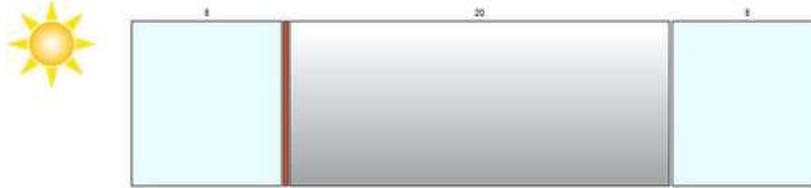
Nominal thickness	36.0 mm
Weight	40.0 kg/m ²

 **PENDULUM RESISTANCE** EN12600

Result :	NPD
----------	-----

Product code

68 / 35 / 1.1



total thickness = 36 mm

Glazing from external to internal:

	Pane 1		Pane 2
8 mm	Float Glass ExtraClear SunGuard SN 70/35 HT		8 mm Float Glass ExtraClear
	Spacer 1 - 20 mm		
10 %	Air		
90 %	Argon		

Results

Visible light (EN 410 - 2011)

transmittance [%]	$\tau_v = 68.$
reflectance external [%]	$\rho_v = 2$
reflectance internal [%]	$\rho_{iv} = 14.$
general colour rendering index [%]	$R_a = 6$
	15.
	9
<u>Thermal properties (EN 673 - 2011)</u>	
U-value [W/(m ² K)]	$U_g = 1.1$
slope $\alpha = 90^\circ$	0

Solar energy (EN 410 - 2011)

solar factor [%]	$g = 34.6$
shading coefficient [g/0.87]	$sc = 0.40$
direct transmittance [%]	$\tau_e = 32.2$
direct reflectance external [%]	$\rho_{e,d} = 39.0$
direct reflectance internal [%]	$\rho_{i,d} = 39.3$
direct absorption [%]	$a = 28.8$
UV transmittance [%]	$\tau_{uv} = 8.4$
secondary internal heat transfer factor [%]	$q_i = 2.4$

Other data

estimated sound reduction index [dB]	$R_w = \text{NPD}$
(EN 717-1)	$C = \text{NPD}$
	$C_{tr} = \text{NPD}$

The calculated values are for orientation only and do not offer any guarantee regarding the fabrication of the un-intended end-product. Glass configurations do not amount to a guarantee of product availability.



Acoustic Calculation

Glass Configuration

9/27/2018

8mm Float Glass

20mm Cavity

8mm Float Glass

Glass Weight: 40.0kg/m²

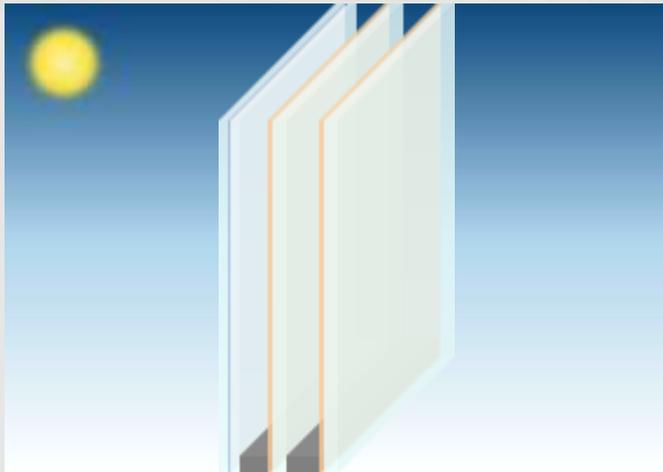
Unit Thickness: 36mm

The acoustic performance data within this document is determined by calculation, based on factors derived from certified data. Due to inherent variations in acoustic performance when testing in accordance with EN ISO 140-3 and/or ASTM E90, some variation in the calculated performance can also be expected. As such, the weighted performance, R_w , and adaptation terms, C and C_{tr} , should typically be considered to be accurate within ± 2 dB. However, wider deviations can occur.

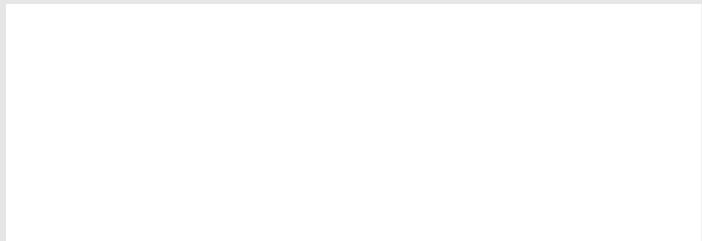
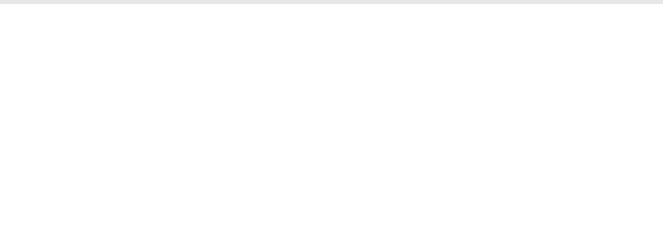
Sound Reduction Indices - dB

Frequency - Hertz					R_w	C	C_{tr}	OITC	STC
125	250	500	1000	2000	36	-1	-4	30	36
27	24	31	42	42					

Disclaimer: The information contained in this publication is a general description of the products and Guardian hereby disclaims all liability arising from any inaccuracy in or omissions from this publication and all the consequences of relying on it. It is the responsibility of the users of this information to ensure that the intended application of the Guardian products is appropriate and complies with all relevant laws, regulations, standards, codes of practices and other requirements.

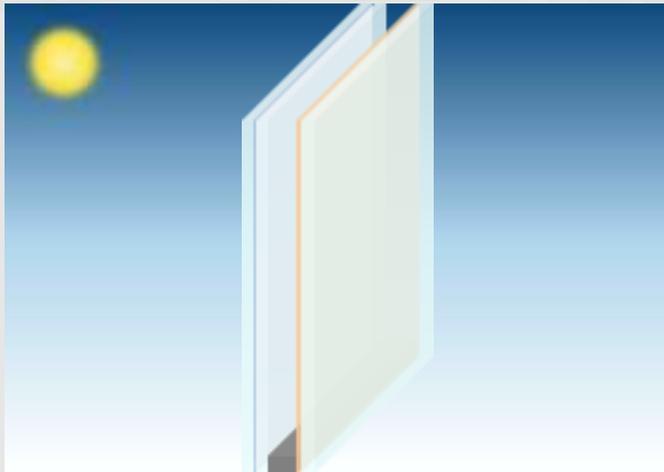


Pane 1	PLANICLEAR (4 mm) PVB standard (4 x 0.38 mm) PLANICLEAR (4 mm)
Cavity 1	ARGON (90%) / AIR (10%) / 12 mm
Pane 2	PLANITHERM ONE T FG PLANICLEAR (6 mm)
Cavity 2	ARGON (90%) / AIR (10%) / 14 mm
Pane 3	PLANITHERM ONE T FG PLANICLEAR (6 mm)

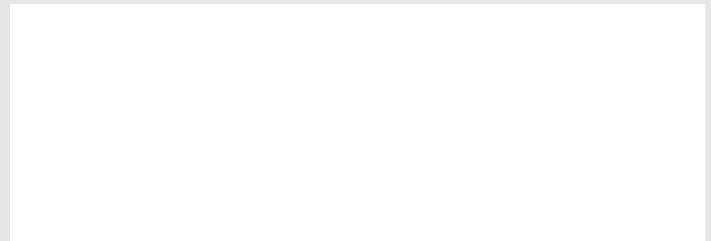
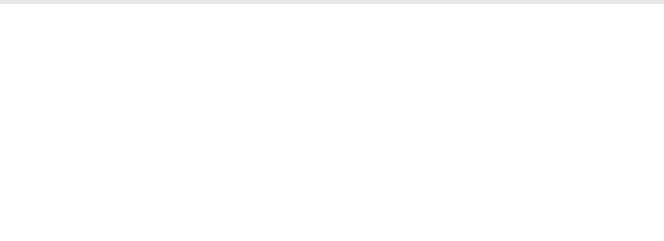


	LUMINOUS FACTORS	CIE015:2018
	Light transmission (TL %)	49.9 %
	Outdoor reflection (RLe %)	33.5 %
	Indoor (RLi %)	34.0 %
	SOLAR FACTORS	EN410:2011
	Solar factor (g)	0.3341
	Shading Coefficient (SC)	0.3840
	COLOR RENDERING	CIE015:2018
	Transmission (Ra)	93.6
	Reflection (Ra)	94.8
	BURGLAR RESIST	EN356:1999
	Result :	P4A/NPD/NPD
	CARBON FOOTPRINT	EN15804:2012+A2:2019
	Global warming potential 'GWP' 89 Kg(CO2)/m ² (A1-A3)	

	ENERGY FACTORS	EN410:2011
	Transmission (Te)	25.5 %
	Reflection (Ree)	38.3 %
	Indoor (Rei)	44.4 %
	Absorption (AE1)	23.8 %
	Absorption (AE2)	8.7 %
	Absorption (AE3)	3.8 %
	THERMAL TRANSMISSION	EN673:2011
	Ug	0.622 W/m ² .K
	0° related to vertical position	
	MANUFACTURING SIZES	
	Nominal thickness	47.5 mm
	Weight	51.6 kg/m ²
	PENDULUM RESISTANCE	EN12600:2002
	Result :	1B1/NPD/NPD



Pane 1	PLANICLEAR (5 mm) PVB standard (2 x 0.38 mm) PLANICLEAR (5 mm)
Cavity 1	ARGON (90%) / AIR (10%) / 12 mm
Pane 2	PLANITHERM TOTAL+ FG PLANICLEAR (6 mm)



	LUMINOUS FACTORS	CIE (15-2004)
	Light transmission (TL %)	77.1 %
	Outdoor reflection (RLe %)	12.8 %
	Indoor (RLi %)	13.0 %

	SOLAR FACTORS	EN410 (2011-04)
	Solar factor (g)	0.6289
	Shading Coefficient (SC)	0.7229

	COLOR RENDERING	CIE (15-2004)
	Transmission (Ra)	98.0
	Reflection (Ra)	89.0

	BURGLAR RESIST	EN356
	Result :	P2A/NPD

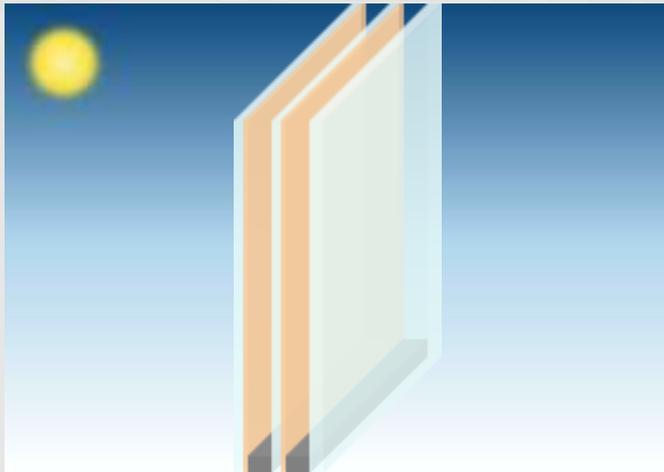
	CARBON FOOTPRINT	EN15804 [A2]
	Global warming potential 'GWP' 65 Kg(CO2)/m ² (A1-A3)	

	ENERGY FACTORS	EN410 (2011-04)
	Transmission (Te)	54.3 %
	Reflection (Ree)	16%
	Indoor (Rei)	20%
	Absorption (AE1)	20.6 %
	Absorption (AE2)	9.1%

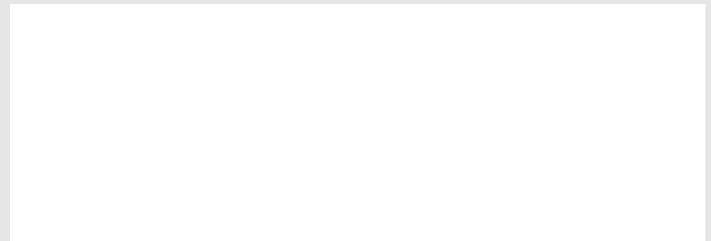
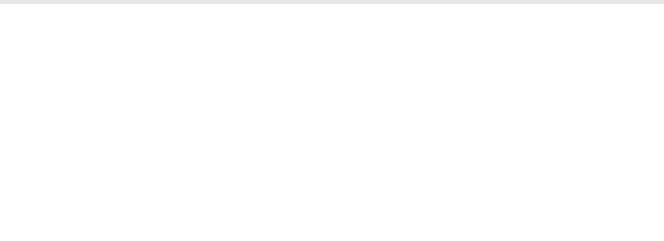
	THERMAL TRANSMISSION	EN673 (2011-04)
	Ug	1.323 W/m ² .K
	0° related to vertical position	

	MANUFACTURING SIZES	
	Nominal thickness	28.8 mm
	Weight	40.8 kg/m ²

	PENDULUM RESISTANCE	EN12600
	Result :	1B1/NPD



Pane 1	PLANICLEAR (4 mm) COOL-LITE SKN 176 II
Cavity 1	ARGON (90%) / AIR (10%) / 10 mm
Pane 2	PLANICLEAR (4 mm) PLANITHERM ONE T FG
Cavity 2	ARGON (90%) / AIR (10%) / 10 mm
Pane 3	PLANICLEAR (6 mm)



	LUMINOUS FACTORS	CIE015:2018
	Light transmission (TL %)	52.5 %
	Outdoor reflection (RLe %)	23.4 %
	Indoor (RLi %)	28.5 %
	SOLAR FACTORS	EN410:2011
	Solar factor (g)	0.2810
	Shading Coefficient (SC)	0.3230
	COLOR RENDERING	CIE015:2018
	Transmission (Ra)	92.0
	Reflection (Ra)	84.7
	BURGLAR RESIST	EN356:1999
	Result :	NPD
	CARBON FOOTPRINT	EN15804:2012+A2:2019
	Global warming potential 'GWP' 56 Kg(CO2)/m ² (A1-A3)	

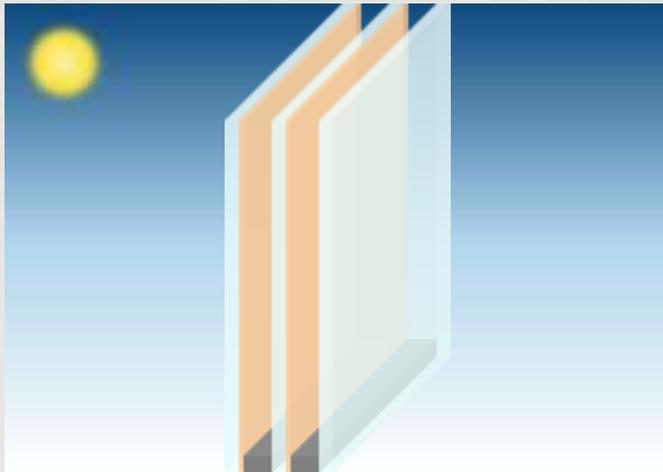
	ENERGY FACTORS	EN410:2011
	Transmission (Te)	24.3 %
	Reflection (Ree)	39.4 %
	Indoor (Rei)	44.8 %
	Absorption (AE1)	31%
	Absorption (AE2)	4.4%
	Absorption (AE3)	0.8%

	THERMAL TRANSMISSION	EN673:2011
	Ug	0.782 W/m ² .K
	0° related to vertical position	

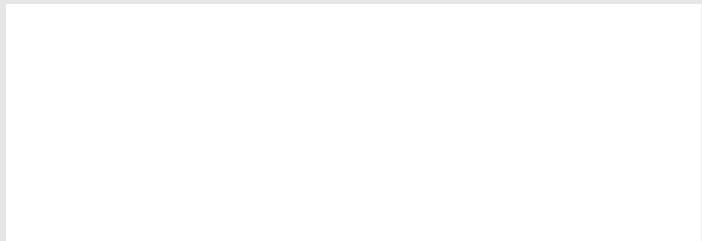
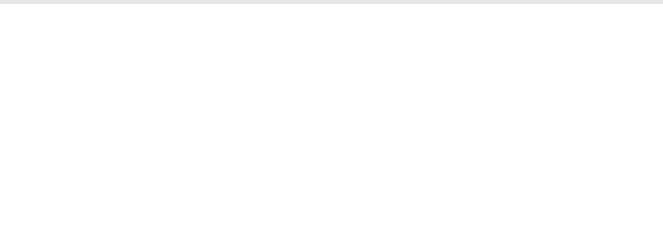
	MANUFACTURING SIZES	
	Nominal thickness	34.0 mm
	Weight	35.0 kg/m ²

	PENDULUM RESISTANCE	EN12600:2002
	Result :	NPD

	ACOUSTICS	EN12758:2019
	Acoustic simulated values - v2.0	Rw(C;Ctr) = 34(-1;-4) dB
	OITC (ASTM E1332)	28
	STC (ASTM E413)	34



Pane 1	PLANICLEAR (6 mm) COOL-LITE SKN 176 II
Cavity 1	ARGON (90%) / AIR (10%) / 12 mm
Pane 2	PLANICLEAR (6 mm) PLANITHERM ONE T FG
Cavity 2	ARGON (90%) / AIR (10%) / 12 mm
Pane 3	PLANICLEAR (6 mm)



LUMINOUS FACTORS

CIE015:2018

Light transmission (TL %)	51.9 %
Outdoor reflection (RLe %)	23.0 %
Indoor (RLi %)	28.4 %



SOLAR FACTORS

EN410:2011

Solar factor (g)	0.2768
Shading Coefficient (SC)	0.3182



COLOR RENDERING

CIE015:2018

Transmission (Ra)	91.4
Reflection (Ra)	83.9



BURGLAR RESIST

EN356:1999

Result :	NPD
----------	-----



CARBON FOOTPRINT

EN15804:2012+A2:2019

Global warming potential 'GWP' 70 Kg(CO2)/m² (A1-A3)



ENERGY FACTORS

EN410:2011

Transmission (Te)	23.8 %
Reflection (Ree)	37.2 %
Indoor (Rei)	44.4 %
Absorption (AE1)	33.4 %
Absorption (AE2)	4.8 %
Absorption (AE3)	0.8 %



THERMAL TRANSMISSION

EN673:2011

Ug	0.670 W/m ² .K
0° related to vertical position	



MANUFACTURING SIZES

Nominal thickness	42.0 mm
Weight	45.0 kg/m ²



PENDULUM RESISTANCE

EN12600:2002

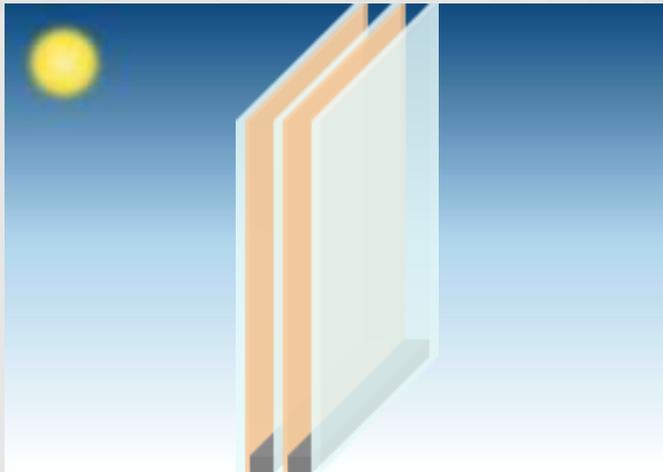
Result :	NPD
----------	-----



ACOUSTICS

EN12758:2019

Acoustic simulated values - v2.0	Rw(C;Ctr) = 34(-2;-6) dB
OITC (ASTM E1332)	25
STC (ASTM E413)	34



Pane 1	PLANICLEAR (4 mm) COOL-LITE SKN 176 II
Cavity 1	ARGON (90%) / AIR (10%) / 10 mm
Pane 2	PLANICLEAR (4 mm) PLANITHERM ONE T FG
Cavity 2	ARGON (90%) / AIR (10%) / 10 mm
Pane 3	PLANICLEAR (4 mm)



LUMINOUS FACTORS

CIE015:2018

Light transmission (TL %)	52.9 %
Outdoor reflection (RLe %)	23.4 %
Indoor (RLi %)	28.8 %



SOLAR FACTORS

EN410:2011

Solar factor (g)	0.2812
Shading Coefficient (SC)	0.3232



COLOR RENDERING

CIE015:2018

Transmission (Ra)	92.4
Reflection (Ra)	84.7



BURGLAR RESIST

EN356:1999

Result :	NPD
----------	-----



CARBON FOOTPRINT

EN15804:2012+A2:2019

Global warming potential 'GWP' 50 Kg(CO₂)/m² (A1-A3)



ENERGY FACTORS

EN410:2011

Transmission (Te)	24.6 %
Reflection (Ree)	39.4 %
Indoor (Rei)	47.4 %
Absorption (AE1)	31%
Absorption (AE2)	4.4%
Absorption (AE3)	0.6%



THERMAL TRANSMISSION

EN673:2011

U _g	0.783 W/m ² .K
0° related to vertical position	



MANUFACTURING SIZES

Nominal thickness	32.0 mm
Weight	30.0 kg/m ²



PENDULUM RESISTANCE

EN12600:2002

Result :	NPD
----------	-----



ACOUSTICS

EN12758:2019

Acoustic simulated values - v2.0	Rw(C;Ctr) = 31(-1;-4) dB
OITC (ASTM E1332)	25
STC (ASTM E413)	31

6 FT (12 Argon 90) 6 FT (12 Argon 90) 6 FT [Swisspacer Ultimate]

Coating: PLANITHERM ONE T FG #3 / PLANITHERM ONE T FG #5

Computed by:

Computed on: 15/10/2025

Product catalog: United Kingdom

Norms: EN410:2011

Glazing type



Glazing 1

- PLANICLEAR (6mm) - Tempered



Cavity 1

- Argon 90% 12 mm
- Swisspacer Ultimate



Glazing 2

- PLANITHERM ONE T FG
- PLANICLEAR (6mm) - Tempered



Cavity 2

- Argon 90% 12 mm
- Swisspacer Ultimate



Glazing 3

- PLANITHERM ONE T FG
- PLANICLEAR (6mm) - Tempered



Swispacer Ultimate

Psi-values (Ψ_g) for triple glazing 4-12-4-12-4 ($U_g = 0.7$ W/m².K)

For windows

Metal with thermal break	0.031 W/(m.K)
PVC	0.030 W/(m.K)
Wood	0.029 W/(m.K)
Wood / Metal	0.030 W/(m.K)

For facade profiles

Wood / Metal	0.050 W/(m.K)
Metal with thermal break (di = 100mm)	0.062 W/(m.K)
Metal with thermal break (di = 200mm)	0.064 W/(m.K)

Source: ift Rosenheim directive WA-08/3 and WA-22/2 ("Warm edge" working group) / Bundesverband Flachglas (German Flat Glass Association) window data sheets

Simulated performance datas

Luminous Factors	CIE015:2018
Light Transmittance (TL)	50%
Outdoor Reflectance (RLe)	34%
Indoor Reflectance (RLi)	34%

Energy Factors	EN410:2011
Transmittance (TE)	27%
UV (Tuv)	N/A
Outdoor Reflectance (Ree)	47%
Indoor Reflectance (Rei)	44%
Absorptance A1 (AE1)	11%
Absorptance A2 (AE2)	11%
Absorptance A3 (AE3)	4%

Solar Factors	EN410:2011
Solar Factor (g)	0.36
Shading Coefficient (SC)	0.42

Thermal Transmission	EN673:2011
Angle relative to the vertical	0°
Ug	0.7 W/(m ² .K)

Acoustics	EN 12758
<i>Acoustic simulated values</i>	
Rw (C;Ctr)	34 (-2; -6) dB
Ra	32 dB
Ra,tr	28 dB
STC (ASTM E413)	34
OITC (ASTM E1332)	25

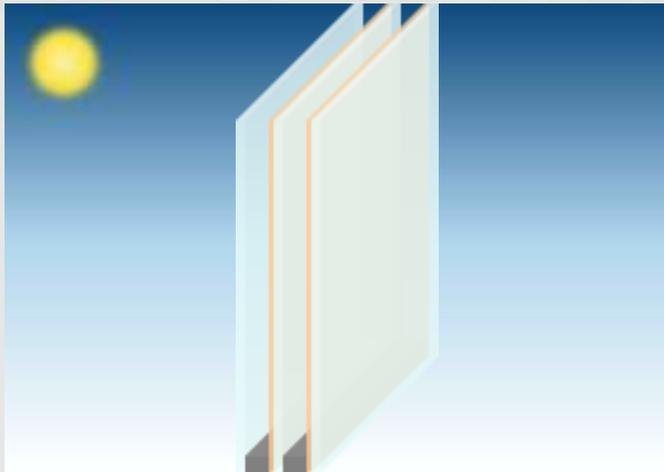
Color Rendering	CIE015:2018
Transmission (Ra)	93.9
Reflection (Ra)	95.1

Safety Class	EN12600
Pendulum Body Resistance	1C2/1C2/1C2

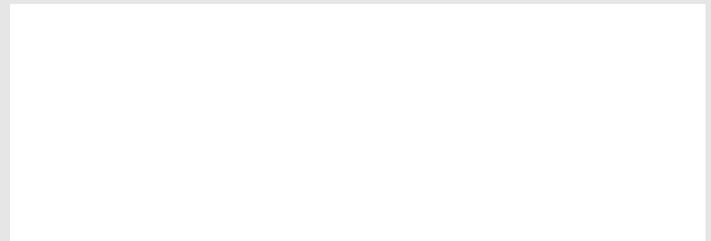
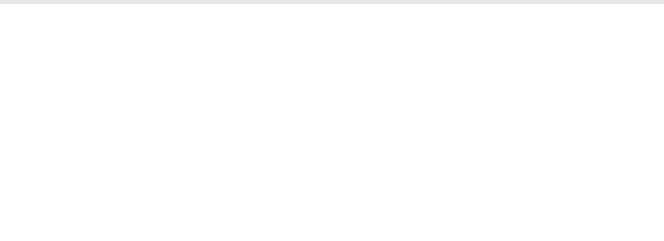
Anti-Burglary	EN356
Burglar Resistance	NPD

Manufacturing Sizes	
Nominal Thickness	42.0 mm
Weight	45 kg/m ²

Sustainability	
Carbon footprint	
<i>The value is calculated regarding the composition computed based on the standard EN 15804+A2 (2019)</i>	
Global Warming Potential (GWP) - A1-A3	EN 15804+A2 (2019)
(kg, CO ₂ eq./m ²) European average	81



Pane 1	PLANICLEAR (4 mm)
Cavity 1	ARGON (90%) / AIR (10%) / 10 mm
Pane 2	PLANITHERM ONE T FG PLANICLEAR (4 mm)
Cavity 2	ARGON (90%) / AIR (10%) / 10 mm
Pane 3	PLANITHERM ONE T FG PLANICLEAR (4 mm)



	LUMINOUS FACTORS	CIE015:2018
	Light transmission (TL %)	51.4 %
	Outdoor reflection (RLe %)	34.5 %
	Indoor (RLi %)	34.5 %
	SOLAR FACTORS	EN410:2011
	Solar factor (g)	0.3705
	Shading Coefficient (SC)	0.4258
	COLOR RENDERING	CIE015:2018
	Transmission (Ra)	94.8
	Reflection (Ra)	95.6
	BURGLAR RESIST	EN356:1999
	Result :	NPD
	CARBON FOOTPRINT	EN15804:2012+A2:2019
	Global warming potential 'GWP' 50 Kg(CO2)/m ² (A1-A3)	

	ENERGY FACTORS	EN410:2011
	Transmission (Te)	28.3 %
	Reflection (Ree)	49.4 %
	Indoor (Rei)	47.2 %
	Absorption (AE1)	7.9%
	Absorption (AE2)	10.1 %
	Absorption (AE3)	4.2%

	THERMAL TRANSMISSION	EN673:2011
	Ug	0.783 W/m ² .K
	0° related to vertical position	

	MANUFACTURING SIZES	
	Nominal thickness	32.0 mm
	Weight	30.0 kg/m ²

	PENDULUM RESISTANCE	EN12600:2002
	Result :	NPD

	ACOUSTICS	EN12758:2019
	Acoustic simulated values - v2.0	Rw(C;Ctr) = 31(-1;-4) dB
	OITC (ASTM E1332)	25
	STC (ASTM E413)	31

4 FT SATINOVO MATE (10 Argon 90) 4 FT (10 Argon 90) 4 FT [Swisspacer Ultimate]

Coating: PLANITHERM ONETFG#3/PLANITHERM ONE TFG#5

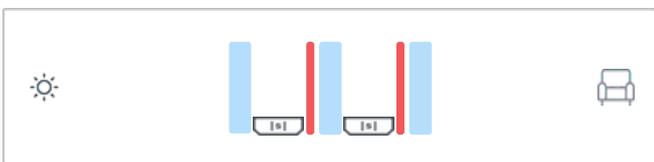
Computed by:

Computed on: 08/12/2025

Productcatalog: UnitedKingdom

Norms: EN410:2011

Glazing type



	Glazing 1 <ul style="list-style-type: none"> SATINOVO MATE (4mm) - Tempered
	Cavity 1 <ul style="list-style-type: none"> Argon 90% 10 mm Swisspacer Ultimate
	Glazing 2 <ul style="list-style-type: none"> PLANITHERM ONE T FG PLANICLEAR (4mm) - Tempered
	Cavity 2 <ul style="list-style-type: none"> Argon 90% 10 mm Swisspacer Ultimate
	Glazing 3 <ul style="list-style-type: none"> PLANITHERM ONE T FG PLANICLEAR (4mm) - Tempered

Swisspacer Ultimate
Psi-values (Ψ_g) for triple glazing 4-12-4-12-4 ($U_g = 0.7$ W/m².K)

For windows

Metal with thermal break	0.031 W/(m.K)
PVC	0.030 W/(m.K)
Wood	0.029 W/(m.K)
Wood / Metal	0.030 W/(m.K)

For facade profiles

Wood / Metal	0.050 W/(m.K)
Metal with thermal break (di = 100mm)	0.062 W/(m.K)
Metal with thermal break (di = 200mm)	0.064 W/(m.K)

Source: ift Rosenheim directive WA-08/3 and WA-22/2 ("Warm edge" working group) / Bundesverband Flachglas (German Flat Glass Association) window data sheets

Simulated performance datas

- Indicative values only, due to the light diffusion characteristics of this glazing.
- The orientation of the pattern or surface treatment must be considered when using textured, printed, or etched glass.

	Luminous Factors Light Transmittance (TL) Outdoor Reflectance (RLe) Indoor Reflectance (RLi)	CIE015:2018 50.2% 33.2% 34.5%
	Energy Factors Transmittance (TE) UV (Tuv) Outdoor Reflectance (Ree) Indoor Reflectance (Rei) Absorptance A1 (AE1) Absorptance A2 (AE2) Absorptance A3 (AE3)	EN410:2011 27.3% N/A 43.1% 47.1% 16.2% 9.3% 4.0%
	Solar Factors Solar Factor (g) Shading Coefficient (SC)	EN410:2011 0.358 0.411
	Thermal Transmission Angle relative to the vertical Ug	EN673:2011 0° 0.783 W/(m2.K)
	Acoustics Acoustic simulated values Rw (C;Ctr) Ra Ra,tr	EN 12758 31 (-1; -4) dB 30 dB 27 dB 31 25
	Color Rendering Transmission (Ra) Reflection (Ra)	CIE015:2018 94.8 96.5
	Safety Class Pendulum Body Resistance	EN12600 1C3/1C3/1C3 EN356 NPD
	Anti-Burglary Burglar Resistance	
	Manufacturing Sizes Nominal Thickness Weight	32.0 mm 30.0 kg/m ²
	Sustainability Carbon footprint	

The value is calculated regarding the composition computed based on the standard EN 15804+A2 (2019)
 Global Warming Potential (GWP) - **EN 15804+A2 (2019)**
 A1-A3
 (kg, CO₂ eq./m²) European average N/A



Calumen® calculates the photometric characteristics and thermal transmission of glass using calculation algorithms which comply with the following standards: the European standards EN 410 and EN 673, the international standard ISO9050, the Japanese standard JIS R 3106/3107 and the Korean standard KS L 2514/2525. The functional output and calculation rules of Calumen® for standards EN 410 and EN 673 have been validated by TÜV Rheinland (report 89212153- 01). The technical performances obtained according to these standards are provided for information only and are subject to amendment. Only the values entered in the performance declaration available on the CE marking site of Saint-Gobain Glass are official. The sound attenuation indices are measured under laboratory conditions according to the standards EN ISO 10140 and EN 12758. The calculated indices are provided for information only. The accuracy for Rw index lies within a range of +/-2dB. The glass thickness calculations comply with the 2012 version of the DTU39-P4 description. The USER is responsible for ensuring that the correct calculation hypotheses are entered and the DTU39 is applied appropriately for the project concerned.