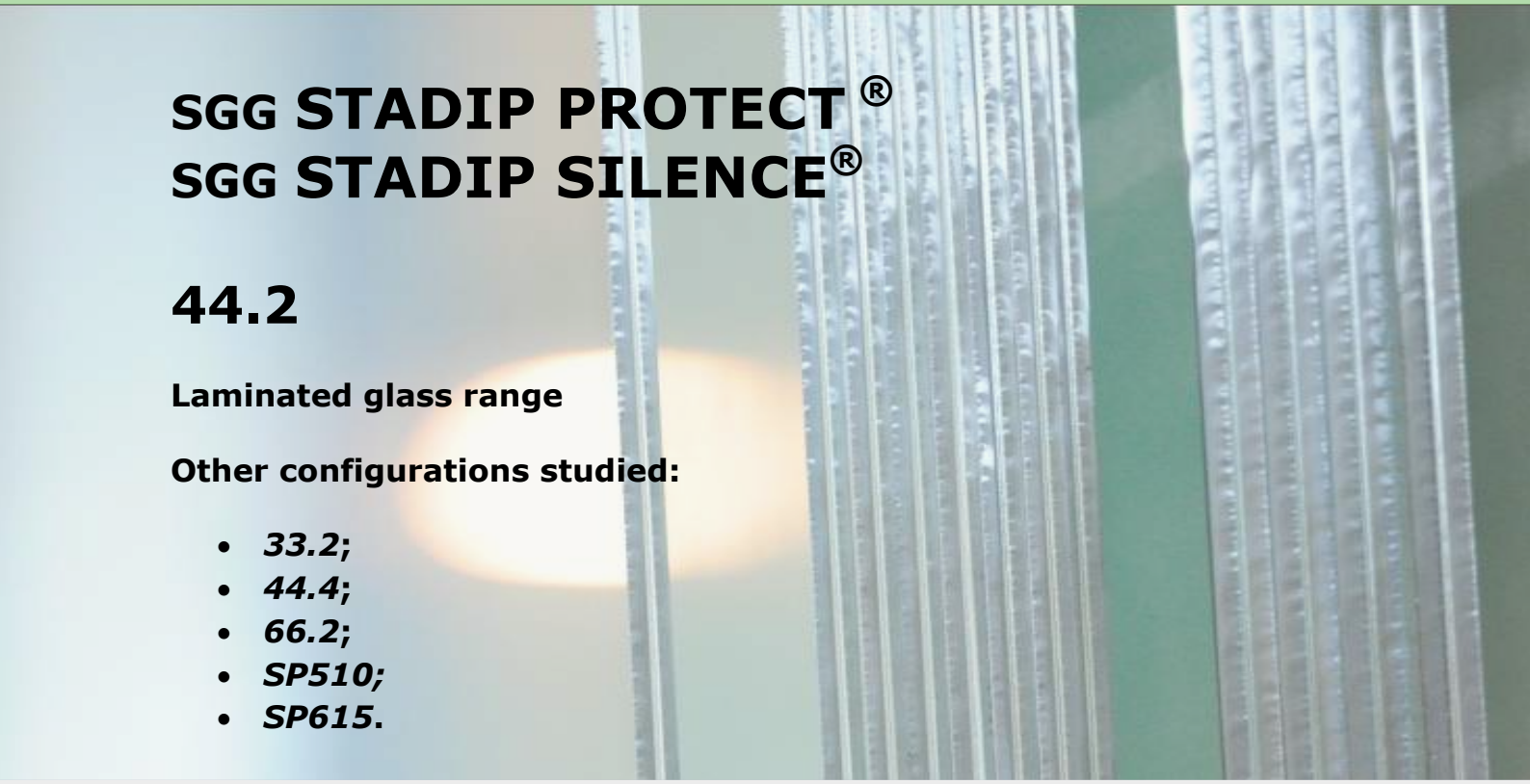
SAINT-GOBAIN GLASS

Novembre 2012

Extract from the Environmental Product Declaration

In conformity with International Standards ISO 14025, ISO 14040 & ISO 14044

AFNOR Registration Number N° 08-260 : 2011



SGG STADIP PROTECT®
SGG STADIP SILENCE®

44.2

Laminated glass range

Other configurations studied:

- ***33.2*;**
- ***44.4*;**
- ***66.2*;**
- ***SP510;***
- ***SP615*.**

The environmental impacts of this product have been assessed over its whole life cycle.

Its Environmental Product Declaration has been verified by an independent third party.

EXTRACT FROM THE

ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH ISO 14025 and ISO 14040

SGG STADIP PROTECT®

SGG STADIP SILENCE®

(Laminated glass range)

44.2

Additional configurations: 33.2, 44.4, 66.2, SP510 and SP615.

Version 2.2 November 2012
Verified under AFNOR programme
AFNOR Registration number N° 08-260: 2011

1. Data Sources

SAINT-GOBAIN GLASS is responsible for disclosing any information contained in this declaration in accordance with *NF P 01-010 § 4.6.*

Contact : sustainable.glass@saint-gobain.com

2. Product characterisation in accordance with NF P 01-010 § 4.3

2.1 Definition of the functional unit (FU)

1 m^2 laminated glass incorporated into a building for one year. The Reference Service Life (RSL) considered is 30 years. The impacts of the installation accessories are not taken into account.

2.2 Product mass and basic data required to calculate the functional unit (FU)

Quantities of product, distribution packaging and additional products contained in the FU on the basis of a Reference Service Life (RSL) of 30 years for the configuration of reference 44.2.

Product unit (nature and quantity)

The glass considered is representative of the products making up the SGG STADIP PROTECT®/STADIP SILENCE® range; it consists of two panes, SGG PLANILUX® laminated with a PVB (Polyvinyl butyral) film. The nominal thickness of the glass panes is 4 mm and the actual thickness is 3.85 mm in accordance with the EN 572-2 standard. The thickness of the PVB film is 0.76 mm.

The mass of the full glass for each year is 0.667 kg (20.01 kg over the whole RSL). This mass includes the two glass panes and the PVB film.

The reference flow of the product Life Cycle Assessment (LCA) is 1m^2 of product over a period of 30 years.

The reference flow of the FU is then 0.667 kg per year and 20.01 kg over the RSL of 30 years.

Distribution packaging (nature and quantity): a 1 m^2 double glazed unit needs the following packaging:

- Metal: 6.33 E-5 kg (0.0019 kg over the whole RSL).
- Board: 3.9 E-04 kg (0.0117 kg over the whole RSL).
- Spacer powder: 1.67 E-5 kg (0.0005 kg over the whole RSL).
- Plastic materials (polyethylene, polystyrene, polypropylene): 7.67E-4 kg (0.023 kg over the whole RSL).
- Wood (kg): 1.17 E-3 kg (0.035 kg over the whole RSL).

Installation accessories: Not taken into account because there are several methods of installation. This in accordance with the standard NF P 01-010 § 4.3c.

Material losses: There are no material losses in the installation or on the building because there is no cutting to be done on the job-site, the products being delivered with the final dimensions.

Use: Cleaning is taken into account: 0.2 l of cleaning solution per m^2 of double glazing and per year.

Substantiation of information disclosed: the information collected comes from 10 European sites producing SGG PLANILUX®, 6 European sites producing SGG STADIP® (SAINT-GOBAIN GLASS).

2.3 Useful technical characteristics not contained in the definition of the functional unit

The laminated glass SGG STADIP PROTECT® has an $R_{a;tr}$. index of 31 dB and SGG STADIP SILENCE® an $R_{a;tr}$ index of 34 dB measured in a laboratory in accordance with the standard EN ISO 140-3.

The impact resistance classification in accordance to EN 12600 is 1B1, and the resistance to manual burglary attempts classification in accordance to EN 356 is P2A.

The product complies with the EN 14449 standard.

3. Environmental impacts representative of construction products in accordance with NF P 01-010 6

N°	Environmental impact	Indicator value for the Functional Unit				
	Configuration	**44.2**	**33.2**	**44.4**	**66.2**	**Units**
1	Consumption of energy resources					
	Total primary energy	16.0	13.2	20.1	21.4	MJ/FU
	Renewable energy	0.479	0.422	0.583	0.592	MJ/FU
	Non-renewable energy	15.5	12.9	19.6	20.9	MJ/FU
	Fuel energy	15.0	12.2	18.3	20.2	MJ/FU
2	Depletion of natural resources	0.00652	0.00542	0.00831	0.00872	kg eq Sb/FU
3	Total water consumption	8.13	6.37	8.99	11.6	l/FU
4	Solid waste:					
	Recovered waste (total)	0.0424	0.0333	0.0438	0.0607	kg/FU
	Waste disposed of:					
	Hazardous waste	0.00338	0.00276	0.00378	0.00464	kg/FU
	Non-hazardous waste	0.640	0.482	0.665	0.957	kg/FU
	Inert waste	0.0334	0.0263	0.0334	0.0475	kg/FU
	Radioactive waste	0.000191	0.000182	0.000335	0.000211	kg/FU
5	Climatic change	1.06	0.866	1.28	1.46	kg eq CO_2/FU
6	Atmospheric acidification	0.00605	0.00469	0.00640	0.00877	kg eq SO_2/FU
7	Air pollution	96.4	74.9	101	139	m^3/FU
8	Water pollution	0.481	0.371	0.518	0.702	m^3/FU
9	Stratospheric ozone layer depletion	8.23 E-12	6.08 E-12	8.23 E-12	1.25 E-11	kg CFC eq R11/ FU
10	Formation of photochemical oxidants	0.000284	0.000233	0.000309	0.000387	kg eq ethylene /FU
Other indicator (not included in the NF P 01-010)						
11	Eutrophication	0.463	0.345	0.469	0.700	g eq PO_4^{3-}/FU

N°	Environmental impact	Indicator value for the Reference Service Life				
	Configuration	**44.2**	**33.2**	**44.4**	**66.2**	**Units**
1	Consumption of energy resources					
	Total primary energy	479	397	602	643	MJ
	Renewable energy	14.4	12.7	17.5	17.8	MJ
	Non-renewable energy	466	386	587	627	MJ
	Fuel energy	448	368	552	607	MJ
2	Depletion of natural resources	0.196	0.163	0.249	0.262	kg eq Sb
3	Total water consumption	244	191	270	349	l
4	Solid waste:					
	Recovered waste (total)	1.27	0.998	1.31	1.82	kg
	Waste disposed of:					
	Hazardous waste	0.101	0.0827	0.113	0.139	kg
	Non-hazardous waste	19.2	14.5	19.9	28.7	kg
	Inert waste	1.00	0.790	1.00	1.43	kg
	Radioactive waste	0.00574	0.00545	0.0100	0.00634	kg
5	Climatic change	31.9	26.0	38.5	43.9	kg eq CO_2
6	Atmospheric acidification	0.182	0.141	0.192	0.263	kg eq SO_2
7	Air pollution	2 89	2 248	3 015	4 179	m^3
8	Water pollution	14.4	11.1	15.5	21.1	m^3
9	Stratospheric ozone layer depletion	2.47 E-10	1.83 E-10	2.47 E-10	3.75 E-10	kg CFC eq R11
10	Formation of photochemical oxidants	0.00852	0.00698	0.00926	0.0116	kg eq ethylene
Other indicator (not included in the NF P 01-010)						
11	Eutrophication	13.9	10.3	14.1	21.0	g eq PO_4^{3-}

N°	Environmental impact	Indicator value for the Functional Unit		
	Configuration	**SP510**	**SP615**	**Units**
1	Consumption of energy resources			
	Total primary energy	24.1	32.9	MJ/FU
	Renewable energy	0.687	0.888	MJ/FU
	Non-renewable energy	23.6	32.2	MJ/FU
	Fuel energy	21.7	29.9	MJ/FU
2	Depletion of natural resources	0.0101	0.0137	kg eq Sb/FU
3	Total water consumption	9.84	13.7	l/FU
4	Solid waste:			
	Recovered waste (total)	0.0452	0.0640	kg/FU
	Waste disposed of:			
	Hazardous waste	0.00418	0.00565	kg/FU
	Non-hazardous waste	0.689	1.02	kg/FU
	Inert waste	0.0334	0.0454	kg/FU
	Radioactive waste	0.000478	0.000638	kg/FU
5	Climatic change	1.51	2.06	kg eq CO_2/FU
6	Atmospheric acidification	0.00676	0.00942	kg eq SO_2/FU
7	Air pollution	105	145	m^3/FU
8	Water pollution	0.555	0.782	m^3/FU
9	Stratospheric ozone layer depletion	8.23 E-12	1.19 E-11	kg CFC eq R11/ FU
10	Formation of photochemical oxidants	0.000333	0.000446	kg eq ethylene /FU
Other indicator (not included in the NF P 01-010)				
11	Eutrophication	0.474	0.683	g eq PO_4^{3-}/FU $^-$

N°	Environmental impact	Indicator value for the Reference Service Life		
	Configuration	**SP510**	**SP615**	**Units**
1	Consumption of energy resources			
	Total primary energy	724	986	MJ
	Renewable energy	20.6	26.6	MJ
	Non-renewable energy	708	965	MJ
	Fuel energy	656	892	MJ
2	Depletion of natural resources	0.303	0.412	kg eq Sb
3	Total water consumption	295	411	l
4	Solid waste:			
	Recovered waste (total)	1.36	1.92	kg
	Waste disposed of:			
	Hazardous waste	0.125	0.169	kg
	Non-hazardous waste	20.7	30.6	kg
	Inert waste	1.00	1.36	kg
	Radioactive waste	0.0143	0.0192	kg
5	Climatic change	45.2	61.9	kg eq CO_2
6	Atmospheric acidification	0.203	0.283	kg eq SO_2
7	Air pollution	3 139	4 357	m^3
8	Water pollution	16.6	23.5	m^3
9	Stratospheric ozone layer depletion	2.47 E-10	3.56 E-10	kg CFC eq R11
10	Formation of photochemical oxidants	0.0100	0.0134	kg eq ethylene
Other indicator (not included in the NF P 01-010)				
11	Eutrophication	14.2	20.5	g eq PO_4^{3-}

4. Product contribution to assessing health risks and quality of life inside buildings in accordance with NF P 01-010 § 7

Product contribution		Related paragraph	Expression (Measurement values, calculations…)
To assess health risks	Indoor air quality	§ 4.1.1	VOC emissions during use after 28 days: PVB = 160 µg/m^3 (Eurofins G10504). Radioactive emissions: no natural radioactivity measured. Fibres and particulates emissions: not relevant for glass. Micro-organisms and mould: some moulds can grow on the glass surface, but they do not produce any degradation. These moulds can be removed easily (report CONIDIA DEV 0111-006).
	Water quality	§ 4.1.2	There is no impact. No migration of glass elements occurs when in contact with water (REACH Dossier CPIV).
To the quality of life	Hygrothermal comfort	§ 4.2.1	Not relevant.
	Acoustic comfort	§ 4.2.2	Contribution to acoustic comfort EN ISO 140-1, 140-3 and EN ISO 717: SGG STADIP PROTECT®: $R_{a;tr}$ index = 31 dB. SGG STADIP SILENCE® $R_{A;tr}$ index = 34 dB
	Visual comfort	§ 4.2.3	Contribution to visual comfort (encourages natural light, according to surface glazed, orientation of the façades…):
	Olfactive comfort	§ 4.2.4	No odour emission test has been conducted.

5. Additional information

NF P 01-010 is the Product Category Rule for this EPD.

On average, 30% of the weight of a glass pane produced by SAINT-GOBAIN GLASS comes from internally recycled cullet (compared to 20% 10 years ago).

Cullet from DGUs can be recycled in a glass furnace after treatment to separate the glass from PVB film. Nowadays however, nearly 95% of glass at the end of life goes to landfill due to a lack of dismantling, sorting and collecting networks. The collect rate of glass at the end of life is thus only 5%.

Abbreviations used

RSL: Reference Service Life.

FU: Functional Unit.

VOC: Volatile Organic Compounds.