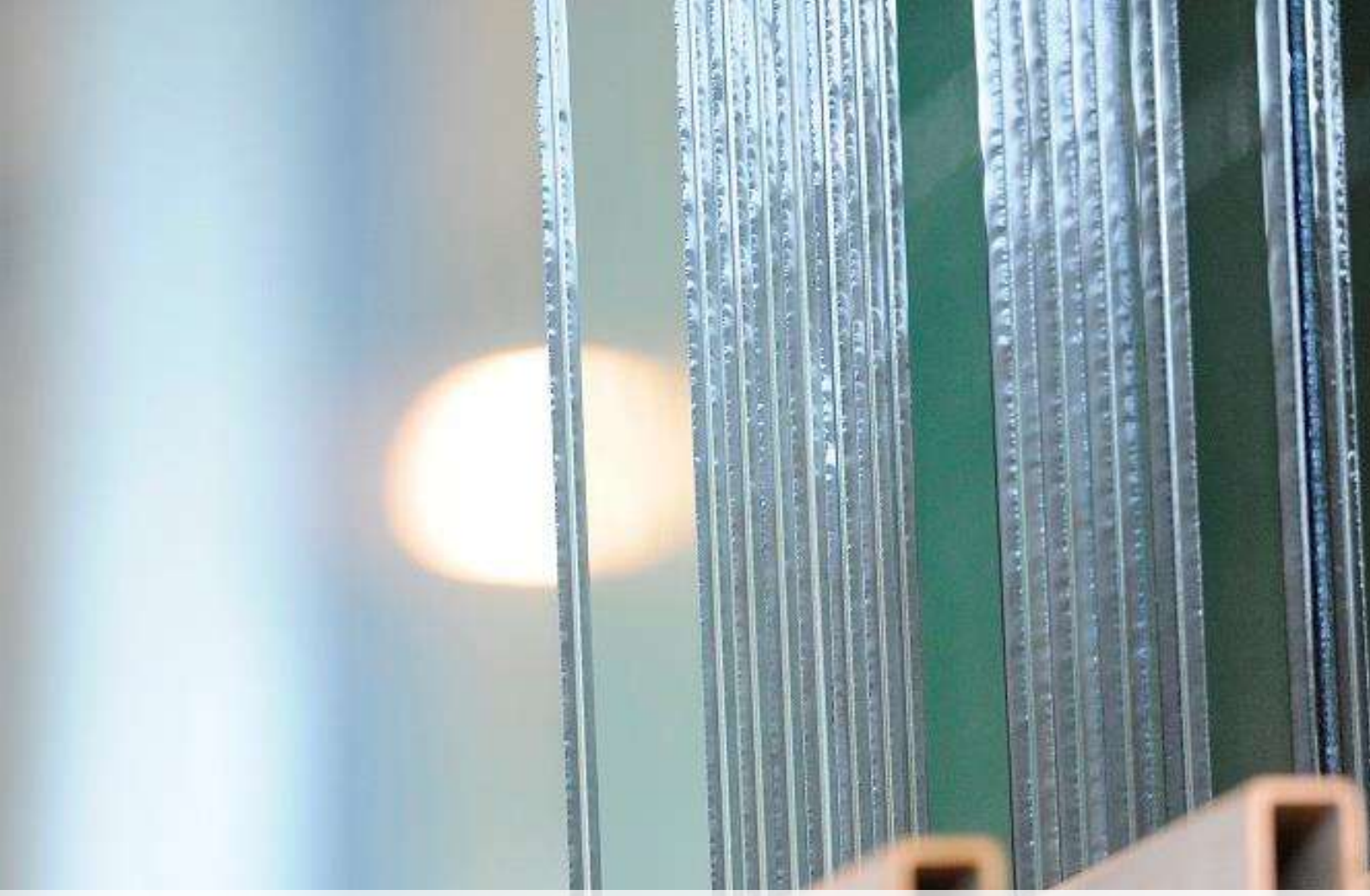

# ENVIRONMENTAL PRODUCT DECLARATION

*In accordance with EN 15804 and ISO 14025*

## SGG PARSOL®

**From 3 mm to 12 mm**

**Body-tinted glass**

**Production zone: India**
**Date of issue : 27/10/2017**
**Version : V2**

EPD VERIFIED

EPD®

**VERIFICATION**

**S-P-00979**

SAINT-GOBAIN

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# General information

**Manufacturer:**

SAINT-GOBAIN INDIA PRIVATE LIMITED. GLASS BUSINESS
Sigapi Aachi Building, Floor No. 7, 18/3, Rukmini Lakshmipathy Road,
600008 Chennai
India

| European standard EN 15804 served as core EPD | |
|---|---|
| **Product / product family name and manufacturer represented** | SGG PARSOL® produced by SAINT-GOBAIN India Private Limited– Glass Business |
| **Declaration issued:** | 27/10/2017 |
| **valid until:** | 27/10/2022 |
| **Program used** | INTERNATIONAL EPD SYSTEM www.environdec.com |
| **EPD registration number/declaration number:** | S-P-00979 |
| **PCR identification** | EN 15804 as the core PCR and PCR for construction products and construction services issue by the International EPD System (PCR 2012:01 Construction products and construction services, version 2.2 / 2017-05-30)<br>GPI 2.5 |
| **PCR review was conducted by** | The technical committee of the international EPD system Chair: Massimo Marino<br><br>Contact via info@environdec.com |
| **CPC Classification:** | 37113 “Float glass and surface ground or polished glass, in sheets.” |
| **Independent verification of the declaration and data, according to ISO 14025** | An independent verification of the declaration and data was made, according to ISO 14025:2010. This verification was based on the PCR mentioned above. |
| **Third party verifier** | Matthias Schulz |
| **Accredited or approved by** | INTERNATIONAL EPD SYSTEM |

# Product description

## Product description and description of use

SGG PARSOL is a body-tinted soda-lime silicate glass, produced using the float procedure. It is meant to be used in building & industrial applications. SGG PARSOL has a colored appearance, as well as basic solar control properties.

There are 5 colors in the SGG PARSOL range: green, bronze, dark grey, dark blue, blue. SGG PARSOL products are available in a range of thicknesses, from 3 mm to 12 mm, depending on the color.

SGG PARSOL is in conformity with the European Standard EN 572-2.

Performance data

All the performance data are given according to the EN 410-2011 standard.

### SGG PARSOL Green

| Thickness (mm) | 3 | 3.5 | 4 | 5 | 6 | 8 |
|---|---|---|---|---|---|---|
| Visible parameters | | | | | | |
| Light transmittance (LT) % | 82.3 | 80.8 | 79.4 | 76.6 | 73.9 | 68.8 |
| External light reflection (RLE) (%) | 7.5 | 7.4 | 7.3 | 7.1 | 6.9 | 6.6 |
| Energetic parameters | | | | | | |
| Energy transmittance (ET) % | 65.3 | 62.1 | 59.2 | 54.0 | 49.4 | 42.0 |
| Energy absorbance (EA) % | 28.3 | 31.7 | 34.7 | 40.2 | 44.9 | 52.6 |
| Solar factor g | 0.72 | 0.7 | 0.67 | 0.63 | 0.60 | 0.54 |

### SGG PARSOL Bronze

| Thickness (mm) | 3 | 3.5 | 4 | 5 | 6 | 8 | 10 | 12 |
|---|---|---|---|---|---|---|---|---|
| Visible parameters | | | | | | | | |
| Light transmittance (LT) % | 67.1 | 63.7 | 60.4 | 54.5 | 49.1 | 40.0 | 32.6 | 26.6 |
| External light reflection (RLE) (%) | 6.4 | 6.2 | 6.0 | 5.7 | 5.5 | 5.1 | 4.8 | 4.7 |
| Energetic parameters | | | | | | | | |
| Energy transmittance (ET) % | 66.7 | 63.3 | 60.1 | 54.5 | 49.1 | 40.2 | 33 | 27.2 |
| Energy absorbance (EA) % | 27.0 | 30.5 | 33.9 | 40.0 | 45.5 | 54.7 | 62.2 | 68.2 |
| Solar factor g | 0.73 | 0.7 | 0.68 | 0.64 | 0.60 | 0.53 | 0.48 | 0.43 |

### SGG PARSOL Blue

| Thickness (mm) | 3 | 3.5 | 4 | 5 | 6 | 8 |
|---|---|---|---|---|---|---|
| Visible parameters | | | | | | |
| Light transmittance (LT) % | 72.4 | 69.6 | 66.9 | 61.9 | 57.3 | 49.2 |
| External light reflection (RLE) (%) | 6.8 | 6.6 | 6.5 | 6.2 | 5.9 | 5.5 |
| Energetic parameters | | | | | | |
| Energy transmittance (ET) % | 62.0 | 58.4 | 57.1 | 49.2 | 44.0 | 35.7 |
| Energy absorbance (EA) % | 31.8 | 35.6 | 39.1 | 45.3 | 50.7 | 59.3 |
| Solar factor g | 0.70 | 0.67 | 0.64 | 0.60 | 0.56 | 0.50 |

### SGG PARSOL Dark Grey

| Thickness (mm) | 3 | 3.5 | 4 | 5 | 6 | 8 | 10 | 12 |
|---|---|---|---|---|---|---|---|---|
| Visible parameters | | | | | | | | |
| Light transmittance (LT) % | 35.6 | 30.4 | 26 | 19 | 13.9 | 7.5 | 4 | 2.2 |
| External light reflection (RLE) (%) | 4.9 | 4.8 | 4.6 | 4.5 | 4.4 | 4.3 | 4,3 | 4.3 |
| Energetic parameters | | | | | | | | |
| Energy transmittance (ET) % | 47.5 | 42.8 | 38.7 | 31.9 | 26.4 | 18.4 | 13.1 | 9.5 |
| Energy absorbance (EA) % | 47.2 | 52 | 56.2 | 63.3 | 69.0 | 77.2 | 82.5 | 86.2 |
| Solar factor g | 0.59 | 0.55 | 0.52 | 0.47 | 0.43 | 0.37 | 0.32 | 0.3 |

### SGG PARSOL Dark Blue

| Thickness (mm) | 3 | 3.5 | 4 | 5 | 6 | 8 |
|---|---|---|---|---|---|---|
| Visible parameters | | | | | | |
| Light transmittance (LT) % | 50.1 | 45.5 | 41.3 | 34.1 | 28.3 | 19.7 |
| External light reflection (RLE) (%) | 5.5 | 5.3 | 5.2 | 4.9 | 4.7 | 4.5 |
| Energetic parameters | | | | | | |
| Energy transmittance (ET) % | 53.4 | 49.2 | 45.3 | 38.7 | 33.2 | 24.8 |
| Energy absorbance (EA) % | 40.9 | 45.3 | 49.4 | 56.3 | 61.9 | 70.5 |
| Solar factor g | 0.63 | 0.6 | 0.57 | 0.52 | 0.48 | 0.41 |

## Declaration of the main product components and/or materials

The product is 100% glass CAS number 65997-17-3, EINECS number 266-046-0.

At the date of issue of this declaration, there is no “Substance of Very High Concern” (SVHC) in concentration above 0.1% by weight, and neither do their packaging, following the European REACH regulation (Registration, Evaluation, Authorization and Restriction of Chemicals).

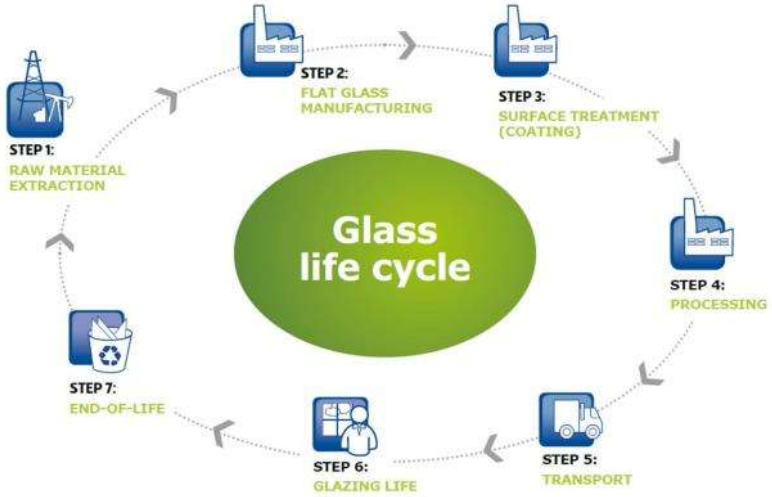
# LCA calculation information

| | |
|---|---|
| **FUNCTIONAL UNIT / DECLARED UNIT** | 1m$^2$ of SGG PARSOL to be incorporated into a building, furniture or industrial application. The impacts of installation are not taken into account. |
| **SYSTEM BOUNDARIES** | Cradle to gate:<br>Mandatory Stages = A1-A3 |
| **REFERENCE SERVICE LIFE (RSL)** | n/a. Boundaries are cradle to gate |
| **CUT-OFF RULES** | All significant parameters are included.<br>According to EN 15804, mass flows under 1% of the total mass input; and/or energy flows representing less than 1% of the total primary energy usage of the associated unit process may be omitted. However, the total amount of energy and mass omitted must not exceed 5% per module.<br><br>Substances of Very High Concern (SVHC), as defined in the REACH Regulation (article 57), in a concentration above 0.1% by weight, in glass final products, shall be included in the Life Cycle Inventory and the cut-off rules shall not apply. |
| **ALLOCATIONS** | Allocations are done on mass basis (kg) |
| **GEOGRAPHICAL COVERAGE AND TIME PERIOD** | The informations were established over the year 2016.<br>The information collected comes from the Indian sites producing SGG PARSOL® (SAINT-GOBAIN India Private Limited– Glass Business) |
| **BACKGROUND DATA SOURCE** | GaBi data were used to evaluate the environmental impacts. |
| **SOFTWARE** | GaBi 8 - GaBi envision<br>IN_SGG EPD Tool Building glass 1m2 for India_2017-10-23.gbmx |

According to EN 15804, EPD of construction products may not be comparable if they do not comply with this standard. According to ISO 21930, EPD might not be comparable if they are from different programmes.

# Life cycle stages

*Diagram of the Life Cycle*



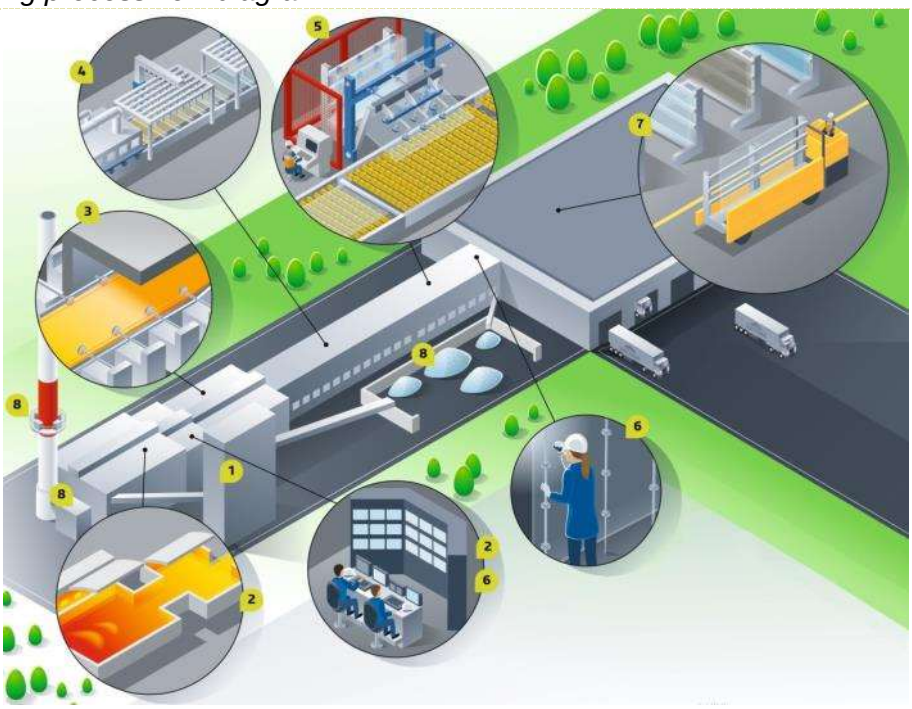

Not relevant stages**: as this is a cradle to gate with options declaration stages A4 to D are not** relevant.

## Product stage, A1-A3

**Description of the stage:** For flat glass A1 to A3 represents the production of glass in the float from cradle to gate.

The product stage includes the extraction and processing of raw materials and energies, transport to the manufacturer, manufacturing and processing of flat glass.

*Manufacturing process flow diagram*



©Saint-Gobain/Julien Kern pour SPECIFIQUE

1. BATCH MIXER: Mix of raw materials (silica, soda ash, lime, feldspar and dolomite) to which is added recycled glass (cullet) and other compounds depending on the desired color and properties.
2. FUSION FURNACE: Raw materials are melted at 1,550°C in a furnace.
3. FLOAT: The molten glass is fed into a bath of molten tin. The glass floats on this flat surface and is drawn off in a ribbon. Serrated wheels, or top rolls, pull and push the glass sideways depending on the desired thickness (from 2 to 19 millimeters).
4. ANNEALING LEHR: The glass is lifted onto conveyor rollers and passes through a controlled cooling tunnel measuring more than 100 meters in length. Approximately 600°C at the start of this step, the glass exits the lehr at room temperature.
5. CUTTING AND STACKING: The glass is automatically cut lengthwise and crosswise. The sheets of glass are raised by vacuum frames that then place them on glass stillages.
6. QUALITY: Automatic inspections and regular samples are taken to check the quality of the glass at each step in the glassmaking process.
7. STORAGE AND TRANSPORTATION: The stillages are placed on storage racks in the warehouse.
8. ENVIRONMENT: Use of recycled cullet, installation of pollution abatement systems and closed circuit management of water: every measure is taken to limit the consumption of energy, extraction of natural resources, production of waste and emissions into the atmosphere.

# LCA results

The table below present the environmental impacts associated with the production of 1 square meter of SGG PARSOL, as a mix of every colors. This is a Cradle-to-Gate EPD. The environmental impacts of all the other stages in the life cycle of SGG PARSOL are not declared (MND).

## ENVIRONMENTAL IMPACTS SGG PARSOL 3mm

| Parameters | Product stage | Construction process stage | | Use stage | | | | | | | End-of-life stage | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A1 / A2 / A3 | A4 Transport | A5 Installation | B1 Use | B2 Maintenance | B3 Repair | B4 Replacement | B5 Refurbishment | B6 Operational energy use | B7 Operational water use | C1 Deconstruction / demolition | C2 Transport | C3 Waste processing | C4 Disposal | D Reuse. recovery. recycling |
| Global Warming Potential (GWP) - *kg $CO_2$ equiv/FU* | 11.7 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| | The global warming potential of a gas refers to the total contribution to global warming resulting from the emission of one unit of that gas relative to one unit of the reference gas. carbon dioxide. which is assigned a value of 1. | | | | | | | | | | | | | | |
| Ozone Depletion (ODP) *kg CFC 11 equiv/FU* | 6.94E-11 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| | Destruction of the stratospheric ozone layer which shields the earth from ultraviolet radiation harmful to life. This destruction of ozone is caused by the breakdown of certain chlorine and/or bromine containing compounds (chlorofluorocarbonsor halons). Which break down when they reach the stratosphere and then catalytically destroy ozone molecules. | | | | | | | | | | | | | | |
| Acidification potential (AP) *kg $SO_2$ equiv/FU* | 0.0711 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| | Acid depositions have negative impacts on natural ecosystems and the man-made environment incl. buildings. The main sources for emissions of acidifying substances are agriculture and fossil fuel combustion used for electricity production. heating and transport. | | | | | | | | | | | | | | |
| Eutrophication potential (EP) *kg $(PO_4)^{3-}$ equiv/FU* | 0.00386 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| | Excessive enrichment of waters and continental surfaces with nutrients. and the associated adverse biological effects. | | | | | | | | | | | | | | |
| Photochemical ozone creation (POPC) *kg Ethene equiv/FU* | 0.0037 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| | Chemical reactions brought about by the light energy of the sun. The reaction of nitrogen oxides with hydrocarbons in the presence of sunlight to form ozone is an example of a photochemical reaction. | | | | | | | | | | | | | | |
| Abiotic depletion potential for non-fossil ressources (ADP-elements) - *kg Sb equiv/FU* | 4.56E-5 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Abiotic depletion potential for fossil ressources (ADP-fossil fuels) - *MJ/FU* | 130 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| | Consumption of non-renewable resources. thereby lowering their availability for future generations. | | | | | | | | | | | | | | |

## RESOURCE USE SGG PARSOL 3mm

| Parameters | Product stage | Construction process stage | | Use stage | | | | | | | End-of-life stage | | | | D Reuse. recovery. recycling |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A1 / A2 / A3 | A4 Transport | A5 Installation | B1 Use | B2 Maintenance | B3 Repair | B4 Replacement | B5 Refurbishment | B6 Operational energy use | B7 Operational water use | C1 Deconstruction / demolition | C2 Transport | C3 Waste processing | C4 Disposal | |
| Use of renewable primary energy excluding renewable primary energy resources used as raw materials - *MJ/FU* | 6.06 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Use of renewable primary energy used as raw materials *MJ/FU* | 0 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) *MJ/FU* | 6.06 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials - *MJ/FU* | 133 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Use of non-renewable primary energy used as raw materials *MJ/FU* | 0 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) - *MJ/FU* | 133 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Use of secondary material *kg/FU* | 1.79 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Use of renewable secondary fuels- *MJ/FU* | 0 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Use of non-renewable secondary fuels - *MJ/FU* | 0 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Use of net fresh water - *$m^3$/FU* | 0.0349 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |

## WASTE CATEGORIES SGG PARSOL 3mm

| Parameters | Product stage | Construction process stage | | Use stage | | | | | | | End-of-life stage | | | | D Reuse. recovery. recycling |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A1 / A2 / A3 | A4 Transport | A5 Installation | B1 Use | B2 Maintenance | B3 Repair | B4 Replacement | B5 Refurbishment | B6 Operational energy use | B7 Operational water use | C1 Deconstruction / demolition | C2 Transport | C3 Waste processing | C4 Disposal | |
| Hazardous waste disposed *kg/FU* | 1.91E-7 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Non-hazardous(excluding inert) waste disposed *kg/FU* | 0.165 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Radioactive waste disposed *kg/FU* | 0.00102 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |

## OUTPUT FLOWS SGG PARSOL 3mm

| Parameters | Product stage | Construction process stage | | Use stage | | | | | | | End-of-life stage | | | | D Reuse. recovery. recycling |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A1 / A2 / A3 | A4 Transport | A5 Installation | B1 Use | B2 Maintenance | B3 Repair | B4 Replacement | B5 Refurbishment | B6 Operational energy use | B7 Operational water use | C1 Deconstruction / demolition | C2 Transport | C3 Waste processing | C4 Disposal | |
| Components for re-use *kg/FU* | 0 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Materials for recycling *kg/FU* | 0 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Materials for energy recovery *kg/FU* | 0 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Exported energy. detailed by energy carrier *MJ/FU* | 0 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |

## ENVIRONMENTAL IMPACTS SGG PARSOL 3.5mm

| Parameters | Product stage | Construction process stage | | Use stage | | | | | | | End-of-life stage | | | | D Reuse. recovery. recycling |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A1 / A2 / A3 | A4 Transport | A5 Installation | B1 Use | B2 Maintenance | B3 Repair | B4 Replacement | B5 Refurbishment | B6 Operational energy use | B7 Operational water use | C1 Deconstruction / demolition | C2 Transport | C3 Waste processing | C4 Disposal | |
| Global Warming Potential (GWP) - *kg $CO_2$ equiv/FU* | 13.6 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| | The global warming potential of a gas refers to the total contribution to global warming resulting from the emission of one unit of that gas relative to one unit of the reference gas. carbon dioxide. which is assigned a value of 1. | | | | | | | | | | | | | | |
| Ozone Depletion (ODP) *kg CFC 11 equiv/FU* | 8.1E-11 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| | Destruction of the stratospheric ozone layer which shields the earth from ultraviolet radiation harmful to life. This destruction of ozone is caused by the breakdown of certain chlorine and/or bromine containing compounds (chlorofluorocarbonsor halons). Which break down when they reach the stratosphere and then catalytically destroy ozone molecules. | | | | | | | | | | | | | | |
| Acidification potential (AP) *kg $SO_2$ equiv/FU* | 0.0829 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| | Acid depositions have negative impacts on natural ecosystems and the man-made environment incl. buildings. The main sources for emissions of acidifying substances are agriculture and fossil fuel combustion used for electricity production. heating and transport. | | | | | | | | | | | | | | |
| Eutrophication potential (EP) *kg $(PO_4)^{3-}$ equiv/FU* | 0.0045 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| | Excessive enrichment of waters and continental surfaces with nutrients. and the associated adverse biological effects. | | | | | | | | | | | | | | |
| Photochemical ozone creation (POPC) *kg Ethene equiv/FU* | 0.00431 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| | Chemical reactions brought about by the light energy of the sun. The reaction of nitrogen oxides with hydrocarbons in the presence of sunlight to form ozone is an example of a photochemical reaction. | | | | | | | | | | | | | | |
| Abiotic depletion potential for non-fossil ressources (ADP-elements) - *kg Sb equiv/FU* | 5.31E-5 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Abiotic depletion potential for fossil ressources (ADP-fossil fuels) - *MJ/FU* | 152 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| | Consumption of non-renewable resources. thereby lowering their availability for future generations. | | | | | | | | | | | | | | |

## RESOURCE USE SGG PARSOL 3.5mm

| Parameters | Product stage | Construction process stage | | Use stage | | | | | | | End-of-life stage | | | | D Reuse. recovery. recycling |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A1 / A2 / A3 | A4 Transport | A5 Installation | B1 Use | B2 Maintenance | B3 Repair | B4 Replacement | B5 Refurbishment | B6 Operational energy use | B7 Operational water use | C1 Deconstruction / demolition | C2 Transport | C3 Waste processing | C4 Disposal | |
| Use of renewable primary energy excluding renewable primary energy resources used as raw materials - *MJ/FU* | 7.07 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Use of renewable primary energy used as raw materials *MJ/FU* | 0 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) *MJ/FU* | 7.07 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials - *MJ/FU* | 155 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Use of non-renewable primary energy used as raw materials *MJ/FU* | 0 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) - *MJ/FU* | 155 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Use of secondary material *kg/FU* | 2.08 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Use of renewable secondary fuels- *MJ/FU* | 0 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Use of non-renewable secondary fuels - *MJ/FU* | 0 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Use of net fresh water - *$m^3$/FU* | 0.0407 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |

## WASTE CATEGORIES SGG PARSOL 3.5mm

| Parameters | Product stage | Construction process stage | | Use stage | | | | | | | End-of-life stage | | | | D Reuse. recovery. recycling |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A1 / A2 / A3 | A4 Transport | A5 Installation | B1 Use | B2 Maintenance | B3 Repair | B4 Replacement | B5 Refurbishment | B6 Operational energy use | B7 Operational water use | C1 Deconstruction / demolition | C2 Transport | C3 Waste processing | C4 Disposal | |
| Hazardous waste disposed *kg/FU* | 2.22E-7 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Non-hazardous(excluding inert) waste disposed *kg/FU* | 0.193 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Radioactive waste disposed *kg/FU* | 0.00119 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |

## OUTPUT FLOWS SGG PARSOL 3.5mm

| Parameters | Product stage | Construction process stage | | Use stage | | | | | | | End-of-life stage | | | | D Reuse. recovery. recycling |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A1 / A2 / A3 | A4 Transport | A5 Installation | B1 Use | B2 Maintenance | B3 Repair | B4 Replacement | B5 Refurbishment | B6 Operational energy use | B7 Operational water use | C1 Deconstruction / demolition | C2 Transport | C3 Waste processing | C4 Disposal | |
| Components for re-use *kg/FU* | 0 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Materials for recycling *kg/FU* | 0 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Materials for energy recovery *kg/FU* | 0 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Exported energy. detailed by energy carrier *MJ/FU* | 0 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |

## ENVIRONMENTAL IMPACTS SGG PARSOL 4mm

| Parameters | Product stage | Construction process stage | | Use stage | | | | | | | End-of-life stage | | | | D Reuse. recovery. recycling |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A1 / A2 / A3 | A4 Transport | A5 Installation | B1 Use | B2 Maintenance | B3 Repair | B4 Replacement | B5 Refurbishment | B6 Operational energy use | B7 Operational water use | C1 Deconstruction / demolition | C2 Transport | C3 Waste processing | C4 Disposal | |
| Global Warming Potential (GWP) - *kg $CO_2$ equiv/FU* | 15.5 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| | The global warming potential of a gas refers to the total contribution to global warming resulting from the emission of one unit of that gas relative to one unit of the reference gas. carbon dioxide. which is assigned a value of 1. | | | | | | | | | | | | | | |
| Ozone Depletion (ODP) *kg CFC 11 equiv/FU* | 9.25E-11 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| | Destruction of the stratospheric ozone layer which shields the earth from ultraviolet radiation harmful to life. This destruction of ozone is caused by the breakdown of certain chlorine and/or bromine containing compounds (chlorofluorocarbonsor halons). Which break down when they reach the stratosphere and then catalytically destroy ozone molecules. | | | | | | | | | | | | | | |
| Acidification potential (AP) *kg $SO_2$ equiv/FU* | 0.0948 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| | Acid depositions have negative impacts on natural ecosystems and the man-made environment incl. buildings. The main sources for emissions of acidifying substances are agriculture and fossil fuel combustion used for electricity production. heating and transport. | | | | | | | | | | | | | | |
| Eutrophication potential (EP) *kg $(PO_4)^{3-}$ equiv/FU* | 0.00514 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| | Excessive enrichment of waters and continental surfaces with nutrients. and the associated adverse biological effects. | | | | | | | | | | | | | | |
| Photochemical ozone creation (POPC) *kg Ethene equiv/FU* | 0.00493 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| | Chemical reactions brought about by the light energy of the sun. The reaction of nitrogen oxides with hydrocarbons in the presence of sunlight to form ozone is an example of a photochemical reaction. | | | | | | | | | | | | | | |
| Abiotic depletion potential for non-fossil ressources (ADP-elements) - *kg Sb equiv/FU* | 6.07E-5 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Abiotic depletion potential for fossil ressources (ADP-fossil fuels) - *MJ/FU* | 173 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| | Consumption of non-renewable resources. thereby lowering their availability for future generations. | | | | | | | | | | | | | | |

## RESOURCE USE SGG PARSOL 4mm

| Parameters | Product stage | Construction process stage | | Use stage | | | | | | | End-of-life stage | | | | D Reuse. recovery. recycling |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A1 / A2 / A3 | A4 Transport | A5 Installation | B1 Use | B2 Maintenance | B3 Repair | B4 Replacement | B5 Refurbishment | B6 Operational energy use | B7 Operational water use | C1 Deconstruction / demolition | C2 Transport | C3 Waste processing | C4 Disposal | |
| Use of renewable primary energy excluding renewable primary energy resources used as raw materials - *MJ/FU* | 8.08 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Use of renewable primary energy used as raw materials *MJ/FU* | 0 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) *MJ/FU* | 8.08 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials - *MJ/FU* | 177 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Use of non-renewable primary energy used as raw materials *MJ/FU* | 0 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) - *MJ/FU* | 177 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Use of secondary material *kg/FU* | 2.38 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Use of renewable secondary fuels- *MJ/FU* | 0 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Use of non-renewable secondary fuels - *MJ/FU* | 0 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Use of net fresh water - *$m^3$/FU* | 0.0465 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |

## WASTE CATEGORIES SGG PARSOL 4mm

| Parameters | Product stage | Construction process stage | | Use stage | | | | | | | End-of-life stage | | | | D Reuse. recovery. recycling |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A1 / A2 / A3 | A4 Transport | A5 Installation | B1 Use | B2 Maintenance | B3 Repair | B4 Replacement | B5 Refurbishment | B6 Operational energy use | B7 Operational water use | C1 Deconstruction / demolition | C2 Transport | C3 Waste processing | C4 Disposal | |
| Hazardous waste disposed *kg/FU* | 2.54E-7 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Non-hazardous(excluding inert) waste disposed *kg/FU* | 0.221 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Radioactive waste disposed *kg/FU* | 0.00136 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |

## OUTPUT FLOWS SGG PARSOL 4mm

| Parameters | Product stage | Construction process stage | | Use stage | | | | | | | End-of-life stage | | | | D Reuse. recovery. recycling |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A1 / A2 / A3 | A4 Transport | A5 Installation | B1 Use | B2 Maintenance | B3 Repair | B4 Replacement | B5 Refurbishment | B6 Operational energy use | B7 Operational water use | C1 Deconstruction / demolition | C2 Transport | C3 Waste processing | C4 Disposal | |
| Components for re-use *kg/FU* | 0 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Materials for recycling *kg/FU* | 0 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Materials for energy recovery *kg/FU* | 0 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Exported energy. detailed by energy carrier *MJ/FU* | 0 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |

## ENVIRONMENTAL IMPACTS SGG PARSOL 5mm

| Parameters | Product stage | Construction process stage | | Use stage | | | | | | | End-of-life stage | | | | D Reuse. recovery. recycling |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A1 / A2 / A3 | A4 Transport | A5 Installation | B1 Use | B2 Maintenance | B3 Repair | B4 Replacement | B5 Refurbishment | B6 Operational energy use | B7 Operational water use | C1 Deconstruction / demolition | C2 Transport | C3 Waste processing | C4 Disposal | |
| Global Warming Potential (GWP) - *kg $CO_2$ equiv/FU* | 19.4 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| | The global warming potential of a gas refers to the total contribution to global warming resulting from the emission of one unit of that gas relative to one unit of the reference gas. carbon dioxide. which is assigned a value of 1. | | | | | | | | | | | | | | |
| Ozone Depletion (ODP) *kg CFC 11 equiv/FU* | 1.16E-10 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| | Destruction of the stratospheric ozone layer which shields the earth from ultraviolet radiation harmful to life. This destruction of ozone is caused by the breakdown of certain chlorine and/or bromine containing compounds (chlorofluorocarbonsor halons). Which break down when they reach the stratosphere and then catalytically destroy ozone molecules. | | | | | | | | | | | | | | |
| Acidification potential (AP) *kg $SO_2$ equiv/FU* | 0.118 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| | Acid depositions have negative impacts on natural ecosystems and the man-made environment incl. buildings. The main sources for emissions of acidifying substances are agriculture and fossil fuel combustion used for electricity production. heating and transport. | | | | | | | | | | | | | | |
| Eutrophication potential (EP) *kg $(PO_4)^{3-}$ equiv/FU* | 0.00643 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| | Excessive enrichment of waters and continental surfaces with nutrients. and the associated adverse biological effects. | | | | | | | | | | | | | | |
| Photochemical ozone creation (POPC) *kg Ethene equiv/FU* | 0.00616 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| | Chemical reactions brought about by the light energy of the sun. The reaction of nitrogen oxides with hydrocarbons in the presence of sunlight to form ozone is an example of a photochemical reaction. | | | | | | | | | | | | | | |
| Abiotic depletion potential for non-fossil ressources (ADP-elements) - *kg Sb equiv/FU* | 7.59E-5 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Abiotic depletion potential for fossil ressources (ADP-fossil fuels) - *MJ/FU* | 217 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| | Consumption of non-renewable resources. thereby lowering their availability for future generations. | | | | | | | | | | | | | | |

## RESOURCE USE SGG PARSOL 5mm

| Parameters | Product stage | Construction process stage | | Use stage | | | | | | | End-of-life stage | | | | D Reuse. recovery. recycling |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A1 / A2 / A3 | A4 Transport | A5 Installation | B1 Use | B2 Maintenance | B3 Repair | B4 Replacement | B5 Refurbishment | B6 Operational energy use | B7 Operational water use | C1 Deconstruction / demolition | C2 Transport | C3 Waste processing | C4 Disposal | |
| Use of renewable primary energy excluding renewable primary energy resources used as raw materials - *MJ/FU* | 10.1 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Use of renewable primary energy used as raw materials *MJ/FU* | 0 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) *MJ/FU* | 10.1 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials - *MJ/FU* | 221 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Use of non-renewable primary energy used as raw materials *MJ/FU* | 0 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) - *MJ/FU* | 221 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Use of secondary material *kg/FU* | 2.97 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Use of renewable secondary fuels- *MJ/FU* | 0 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Use of non-renewable secondary fuels - *MJ/FU* | 0 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Use of net fresh water - *$m^3$/FU* | 0.0582 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |

## WASTE CATEGORIES SGG PARSOL 5mm

| Parameters | Product stage | Construction process stage | | Use stage | | | | | | | End-of-life stage | | | | D Reuse. recovery. recycling |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A1 / A2 / A3 | A4 Transport | A5 Installation | B1 Use | B2 Maintenance | B3 Repair | B4 Replacement | B5 Refurbishment | B6 Operational energy use | B7 Operational water use | C1 Deconstruction / demolition | C2 Transport | C3 Waste processing | C4 Disposal | |
| Hazardous waste disposed *kg/FU* | 3.18E-7 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Non-hazardous(excluding inert) waste disposed *kg/FU* | 0.276 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Radioactive waste disposed *kg/FU* | 0.0017 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |

## OUTPUT FLOWS SGG PARSOL 5mm

| Parameters | Product stage | Construction process stage | | Use stage | | | | | | | End-of-life stage | | | | D Reuse. recovery. recycling |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A1 / A2 / A3 | A4 Transport | A5 Installation | B1 Use | B2 Maintenance | B3 Repair | B4 Replacement | B5 Refurbishment | B6 Operational energy use | B7 Operational water use | C1 Deconstruction / demolition | C2 Transport | C3 Waste processing | C4 Disposal | |
| Components for re-use *kg/FU* | 0 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Materials for recycling *kg/FU* | 0 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Materials for energy recovery *kg/FU* | 0 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Exported energy. detailed by energy carrier *MJ/FU* | 0 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |

## ENVIRONMENTAL IMPACTS SGG PARSOL 6mm

| Parameters | Product stage | Construction process stage | | Use stage | | | | | | | End-of-life stage | | | | D Reuse. recovery. recycling |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A1 / A2 / A3 | A4 Transport | A5 Installation | B1 Use | B2 Maintenance | B3 Repair | B4 Replacement | B5 Refurbishment | B6 Operational energy use | B7 Operational water use | C1 Deconstruction / demolition | C2 Transport | C3 Waste processing | C4 Disposal | |
| Global Warming Potential (GWP) - *kg $CO_2$ equiv/FU* | 23.3 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| | The global warming potential of a gas refers to the total contribution to global warming resulting from the emission of one unit of that gas relative to one unit of the reference gas. carbon dioxide. which is assigned a value of 1. | | | | | | | | | | | | | | |
| Ozone Depletion (ODP) *kg CFC 11 equiv/FU* | 1.39E-10 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| | Destruction of the stratospheric ozone layer which shields the earth from ultraviolet radiation harmful to life. This destruction of ozone is caused by the breakdown of certain chlorine and/or bromine containing compounds (chlorofluorocarbonsor halons). Which break down when they reach the stratosphere and then catalytically destroy ozone molecules. | | | | | | | | | | | | | | |
| Acidification potential (AP) *kg $SO_2$ equiv/FU* | 0.142 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| | Acid depositions have negative impacts on natural ecosystems and the man-made environment incl. buildings. The main sources for emissions of acidifying substances are agriculture and fossil fuel combustion used for electricity production. heating and transport. | | | | | | | | | | | | | | |
| Eutrophication potential (EP) *kg $(PO_4)^{3-}$ equiv/FU* | 0.00772 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| | Excessive enrichment of waters and continental surfaces with nutrients. and the associated adverse biological effects. | | | | | | | | | | | | | | |
| Photochemical ozone creation (POPC) *kg Ethene equiv/FU* | 0.00739 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| | Chemical reactions brought about by the light energy of the sun. The reaction of nitrogen oxides with hydrocarbons in the presence of sunlight to form ozone is an example of a photochemical reaction. | | | | | | | | | | | | | | |
| Abiotic depletion potential for non-fossil ressources (ADP-elements) - *kg Sb equiv/FU* | 9.11E-5 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Abiotic depletion potential for fossil ressources (ADP-fossil fuels) - *MJ/FU* | 260 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| | Consumption of non-renewable resources. thereby lowering their availability for future generations. | | | | | | | | | | | | | | |

## RESOURCE USE SGG PARSOL 6mm

| Parameters | Product stage | Construction process stage | | Use stage | | | | | | | End-of-life stage | | | | D Reuse. recovery. recycling |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A1 / A2 / A3 | A4 Transport | A5 Installation | B1 Use | B2 Maintenance | B3 Repair | B4 Replacement | B5 Refurbishment | B6 Operational energy use | B7 Operational water use | C1 Deconstruction / demolition | C2 Transport | C3 Waste processing | C4 Disposal | |
| Use of renewable primary energy excluding renewable primary energy resources used as raw materials - *MJ/FU* | 12.1 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Use of renewable primary energy used as raw materials *MJ/FU* | 0 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) *MJ/FU* | 12.1 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials - *MJ/FU* | 265 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Use of non-renewable primary energy used as raw materials *MJ/FU* | 0 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) - *MJ/FU* | 265 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Use of secondary material *kg/FU* | 3.57 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Use of renewable secondary fuels- *MJ/FU* | 0 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Use of non-renewable secondary fuels - *MJ/FU* | 0 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Use of net fresh water - *$m^3$/FU* | 0.0698 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |

## WASTE CATEGORIES SGG PARSOL 6mm

| Parameters | Product stage | Construction process stage | | Use stage | | | | | | | End-of-life stage | | | | D Reuse. recovery. recycling |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A1 / A2 / A3 | A4 Transport | A5 Installation | B1 Use | B2 Maintenance | B3 Repair | B4 Replacement | B5 Refurbishment | B6 Operational energy use | B7 Operational water use | C1 Deconstruction / demolition | C2 Transport | C3 Waste processing | C4 Disposal | |
| Hazardous waste disposed *kg/FU* | 3.81E-7 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Non-hazardous(excluding inert) waste disposed *kg/FU* | 0.331 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Radioactive waste disposed *kg/FU* | 0.00204 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |

## OUTPUT FLOWS SGG PARSOL 6mm

| Parameters | Product stage | Construction process stage | | Use stage | | | | | | | End-of-life stage | | | | D Reuse. recovery. recycling |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A1 / A2 / A3 | A4 Transport | A5 Installation | B1 Use | B2 Maintenance | B3 Repair | B4 Replacement | B5 Refurbishment | B6 Operational energy use | B7 Operational water use | C1 Deconstruction / demolition | C2 Transport | C3 Waste processing | C4 Disposal | |
| Components for re-use *kg/FU* | 0 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Materials for recycling *kg/FU* | 0 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Materials for energy recovery *kg/FU* | 0 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Exported energy. detailed by energy carrier *MJ/FU* | 0 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |

## ENVIRONMENTAL IMPACTS SGG PARSOL 8mm

| Parameters | Product stage | Construction process stage | | Use stage | | | | | | | End-of-life stage | | | | D Reuse. recovery. recycling |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A1 / A2 / A3 | A4 Transport | A5 Installation | B1 Use | B2 Maintenance | B3 Repair | B4 Replacement | B5 Refurbishment | B6 Operational energy use | B7 Operational water use | C1 Deconstruction / demolition | C2 Transport | C3 Waste processing | C4 Disposal | |
| Global Warming Potential (GWP) - *kg $CO_2$ equiv/FU* | 31.1 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| | The global warming potential of a gas refers to the total contribution to global warming resulting from the emission of one unit of that gas relative to one unit of the reference gas. carbon dioxide. which is assigned a value of 1. | | | | | | | | | | | | | | |
| Ozone Depletion (ODP) *kg CFC 11 equiv/FU* | 1.85E-10 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| | Destruction of the stratospheric ozone layer which shields the earth from ultraviolet radiation harmful to life. This destruction of ozone is caused by the breakdown of certain chlorine and/or bromine containing compounds (chlorofluorocarbonsor halons). Which break down when they reach the stratosphere and then catalytically destroy ozone molecules. | | | | | | | | | | | | | | |
| Acidification potential (AP) *kg $SO_2$ equiv/FU* | 0.19 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| | Acid depositions have negative impacts on natural ecosystems and the man-made environment incl. buildings. The main sources for emissions of acidifying substances are agriculture and fossil fuel combustion used for electricity production. heating and transport. | | | | | | | | | | | | | | |
| Eutrophication potential (EP) *kg $(PO_4)^{3-}$ equiv/FU* | 0.0103 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| | Excessive enrichment of waters and continental surfaces with nutrients. and the associated adverse biological effects. | | | | | | | | | | | | | | |
| Photochemical ozone creation (POPC) *kg Ethene equiv/FU* | 0.00986 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| | Chemical reactions brought about by the light energy of the sun. The reaction of nitrogen oxides with hydrocarbons in the presence of sunlight to form ozone is an example of a photochemical reaction. | | | | | | | | | | | | | | |
| Abiotic depletion potential for non-fossil ressources (ADP-elements) - *kg Sb equiv/FU* | 0.000121 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Abiotic depletion potential for fossil ressources (ADP-fossil fuels) - *MJ/FU* | 347 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| | Consumption of non-renewable resources. thereby lowering their availability for future generations. | | | | | | | | | | | | | | |

## RESOURCE USE SGG PARSOL 8mm

| Parameters | Product stage | Construction process stage | | Use stage | | | | | | | End-of-life stage | | | | D Reuse. recovery. recycling |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A1 / A2 / A3 | A4 Transport | A5 Installation | B1 Use | B2 Maintenance | B3 Repair | B4 Replacement | B5 Refurbishment | B6 Operational energy use | B7 Operational water use | C1 Deconstruction / demolition | C2 Transport | C3 Waste processing | C4 Disposal | |
| Use of renewable primary energy excluding renewable primary energy resources used as raw materials - *MJ/FU* | 16.2 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Use of renewable primary energy used as raw materials *MJ/FU* | 0 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) *MJ/FU* | 16.1 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials - *MJ/FU* | 354 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Use of non-renewable primary energy used as raw materials *MJ/FU* | 0 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) - *MJ/FU* | 354 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Use of secondary material *kg/FU* | 4.76 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Use of renewable secondary fuels- *MJ/FU* | 0 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Use of non-renewable secondary fuels - *MJ/FU* | 0 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Use of net fresh water - *$m^3$/FU* | 0.0931 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |

## WASTE CATEGORIES SGG PARSOL 8mm

| Parameters | Product stage | Construction process stage | | Use stage | | | | | | | End-of-life stage | | | | D Reuse. recovery. recycling |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A1 / A2 / A3 | A4 Transport | A5 Installation | B1 Use | B2 Maintenance | B3 Repair | B4 Replacement | B5 Refurbishment | B6 Operational energy use | B7 Operational water use | C1 Deconstruction / demolition | C2 Transport | C3 Waste processing | C4 Disposal | |
| Hazardous waste disposed *kg/FU* | 5.08E-7 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Non-hazardous(excluding inert) waste disposed *kg/FU* | 0.441 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Radioactive waste disposed *kg/FU* | 0.00272 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |

## OUTPUT FLOWS SGG PARSOL 8mm

| Parameters | Product stage | Construction process stage | | Use stage | | | | | | | End-of-life stage | | | | D Reuse. recovery. recycling |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A1 / A2 / A3 | A4 Transport | A5 Installation | B1 Use | B2 Maintenance | B3 Repair | B4 Replacement | B5 Refurbishment | B6 Operational energy use | B7 Operational water use | C1 Deconstruction / demolition | C2 Transport | C3 Waste processing | C4 Disposal | |
| Components for re-use *kg/FU* | 0 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Materials for recycling *kg/FU* | 0 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Materials for energy recovery *kg/FU* | 0 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Exported energy. detailed by energy carrier *MJ/FU* | 0 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |

## ENVIRONMENTAL IMPACTS 10mm

| Parameters | Product stage | Construction process stage | | Use stage | | | | | | | End-of-life stage | | | | D Reuse. recovery. recycling |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A1 / A2 / A3 | A4 Transport | A5 Installation | B1 Use | B2 Maintenance | B3 Repair | B4 Replacement | B5 Refurbishment | B6 Operational energy use | B7 Operational water use | C1 Deconstruction / demolition | C2 Transport | C3 Waste processing | C4 Disposal | |
| Global Warming Potential (GWP) - *kg $CO_2$ equiv/FU* | 38.9 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| | The global warming potential of a gas refers to the total contribution to global warming resulting from the emission of one unit of that gas relative to one unit of the reference gas. carbon dioxide. which is assigned a value of 1. | | | | | | | | | | | | | | |
| Ozone Depletion (ODP) *kg CFC 11 equiv/FU* | 2.31E-10 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| | Destruction of the stratospheric ozone layer which shields the earth from ultraviolet radiation harmful to life. This destruction of ozone is caused by the breakdown of certain chlorine and/or bromine containing compounds (chlorofluorocarbonsor halons). Which break down when they reach the stratosphere and then catalytically destroy ozone molecules. | | | | | | | | | | | | | | |
| Acidification potential (AP) *kg $SO_2$ equiv/FU* | 0.237 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| | Acid depositions have negative impacts on natural ecosystems and the man-made environment incl. buildings. The main sources for emissions of acidifying substances are agriculture and fossil fuel combustion used for electricity production. heating and transport. | | | | | | | | | | | | | | |
| Eutrophication potential (EP) *kg $(PO_4)^{3-}$ equiv/FU* | 0.0129 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| | Excessive enrichment of waters and continental surfaces with nutrients. and the associated adverse biological effects. | | | | | | | | | | | | | | |
| Photochemical ozone creation (POPC) *kg Ethene equiv/FU* | 0.0123 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| | Chemical reactions brought about by the light energy of the sun. The reaction of nitrogen oxides with hydrocarbons in the presence of sunlight to form ozone is an example of a photochemical reaction. | | | | | | | | | | | | | | |
| Abiotic depletion potential for non-fossil ressources (ADP-elements) - *kg Sb equiv/FU* | 0.000152 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Abiotic depletion potential for fossil ressources (ADP-fossil fuels) - *MJ/FU* | 433 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| | Consumption of non-renewable resources. thereby lowering their availability for future generations. | | | | | | | | | | | | | | |

## RESOURCE USE 10mm

| Parameters | Product stage | Construction process stage | | Use stage | | | | | | | End-of-life stage | | | | D Reuse. recovery. recycling |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A1 / A2 / A3 | A4 Transport | A5 Installation | B1 Use | B2 Maintenance | B3 Repair | B4 Replacement | B5 Refurbishment | B6 Operational energy use | B7 Operational water use | C1 Deconstruction / demolition | C2 Transport | C3 Waste processing | C4 Disposal | |
| Use of renewable primary energy excluding renewable primary energy resources used as raw materials - *MJ/FU* | 20.2 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Use of renewable primary energy used as raw materials *MJ/FU* | 0 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) *MJ/FU* | 20.2 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials - *MJ/FU* | 442 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Use of non-renewable primary energy used as raw materials *MJ/FU* | 0 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) - *MJ/FU* | 442 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Use of secondary material *kg/FU* | 5.95 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Use of renewable secondary fuels- *MJ/FU* | 0 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Use of non-renewable secondary fuels - *MJ/FU* | 0 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Use of net fresh water - *$m^3$/FU* | 0.116 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |

## WASTE CATEGORIES 10mm

| Parameters | Product stage | Construction process stage | | Use stage | | | | | | | End-of-life stage | | | | D Reuse. recovery. recycling |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A1 / A2 / A3 | A4 Transport | A5 Installation | B1 Use | B2 Maintenance | B3 Repair | B4 Replacement | B5 Refurbishment | B6 Operational energy use | B7 Operational water use | C1 Deconstruction / demolition | C2 Transport | C3 Waste processing | C4 Disposal | |
| Hazardous waste disposed *kg/FU* | 6.35E-7 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Non-hazardous(excluding inert) waste disposed *kg/FU* | 0.552 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Radioactive waste disposed *kg/FU* | 0.00341 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |

## OUTPUT FLOWS 10mm

| Parameters | Product stage | Construction process stage | | Use stage | | | | | | | End-of-life stage | | | | D Reuse. recovery. recycling |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A1 / A2 / A3 | A4 Transport | A5 Installation | B1 Use | B2 Maintenance | B3 Repair | B4 Replacement | B5 Refurbishment | B6 Operational energy use | B7 Operational water use | C1 Deconstruction / demolition | C2 Transport | C3 Waste processing | C4 Disposal | |
| Components for re-use *kg/FU* | 0 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Materials for recycling *kg/FU* | 0 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Materials for energy recovery *kg/FU* | 0 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Exported energy. detailed by energy carrier *MJ/FU* | 0 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |

## ENVIRONMENTAL IMPACTS 12mm

| Parameters | Product stage | Construction process stage | | Use stage | | | | | | | End-of-life stage | | | | D Reuse. recovery. recycling |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A1 / A2 / A3 | A4 Transport | A5 Installation | B1 Use | B2 Maintenance | B3 Repair | B4 Replacement | B5 Refurbishment | B6 Operational energy use | B7 Operational water use | C1 Deconstruction / demolition | C2 Transport | C3 Waste processing | C4 Disposal | |
| Global Warming Potential (GWP) - *kg $CO_2$ equiv/FU* | 46.6 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| | The global warming potential of a gas refers to the total contribution to global warming resulting from the emission of one unit of that gas relative to one unit of the reference gas. carbon dioxide. which is assigned a value of 1. | | | | | | | | | | | | | | |
| Ozone Depletion (ODP) *kg CFC 11 equiv/FU* | 2.78E-10 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| | Destruction of the stratospheric ozone layer which shields the earth from ultraviolet radiation harmful to life. This destruction of ozone is caused by the breakdown of certain chlorine and/or bromine containing compounds (chlorofluorocarbonsor halons). Which break down when they reach the stratosphere and then catalytically destroy ozone molecules. | | | | | | | | | | | | | | |
| Acidification potential (AP) *kg $SO_2$ equiv/FU* | 0.284 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| | Acid depositions have negative impacts on natural ecosystems and the man-made environment incl. buildings. The main sources for emissions of acidifying substances are agriculture and fossil fuel combustion used for electricity production. heating and transport. | | | | | | | | | | | | | | |
| Eutrophication potential (EP) *kg $(PO_4)^{3-}$ equiv/FU* | 0.0154 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| | Excessive enrichment of waters and continental surfaces with nutrients. and the associated adverse biological effects. | | | | | | | | | | | | | | |
| Photochemical ozone creation (POPC) *kg Ethene equiv/FU* | 0.0148 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| | Chemical reactions brought about by the light energy of the sun. The reaction of nitrogen oxides with hydrocarbons in the presence of sunlight to form ozone is an example of a photochemical reaction. | | | | | | | | | | | | | | |
| Abiotic depletion potential for non-fossil ressources (ADP-elements) - *kg Sb equiv/FU* | 0.000182 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Abiotic depletion potential for fossil ressources (ADP-fossil fuels) - *MJ/FU* | 520 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| | Consumption of non-renewable resources. thereby lowering their availability for future generations. | | | | | | | | | | | | | | |

## RESOURCE USE 12mm

| Parameters | Product stage | Construction process stage | | Use stage | | | | | | | End-of-life stage | | | | D Reuse. recovery. recycling |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A1 / A2 / A3 | A4 Transport | A5 Installation | B1 Use | B2 Maintenance | B3 Repair | B4 Replacement | B5 Refurbishment | B6 Operational energy use | B7 Operational water use | C1 Deconstruction / demolition | C2 Transport | C3 Waste processing | C4 Disposal | |
| Use of renewable primary energy excluding renewable primary energy resources used as raw materials - *MJ/FU* | 24.2 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Use of renewable primary energy used as raw materials *MJ/FU* | 0 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) *MJ/FU* | 24.2 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials - *MJ/FU* | 530 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Use of non-renewable primary energy used as raw materials *MJ/FU* | 0 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) - *MJ/FU* | 530 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Use of secondary material *kg/FU* | 7.14 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Use of renewable secondary fuels- *MJ/FU* | 0 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Use of non-renewable secondary fuels - *MJ/FU* | 0 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Use of net fresh water - *$m^3$/FU* | 0.14 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |

## WASTE CATEGORIES 12mm

| Parameters | Product stage | Construction process stage | | Use stage | | | | | | | End-of-life stage | | | | D Reuse. recovery. recycling |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A1 / A2 / A3 | A4 Transport | A5 Installation | B1 Use | B2 Maintenance | B3 Repair | B4 Replacement | B5 Refurbishment | B6 Operational energy use | B7 Operational water use | C1 Deconstruction / demolition | C2 Transport | C3 Waste processing | C4 Disposal | |
| Hazardous waste disposed *kg/FU* | 7.62E-7 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Non-hazardous(excluding inert) waste disposed *kg/FU* | 0.662 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Radioactive waste disposed *kg/FU* | 0.00409 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |

## OUTPUT FLOWS 12mm

| Parameters | Product stage | Construction process stage | | Use stage | | | | | | | End-of-life stage | | | | D Reuse. recovery. recycling |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A1 / A2 / A3 | A4 Transport | A5 Installation | B1 Use | B2 Maintenance | B3 Repair | B4 Replacement | B5 Refurbishment | B6 Operational energy use | B7 Operational water use | C1 Deconstruction / demolition | C2 Transport | C3 Waste processing | C4 Disposal | |
| Components for re-use *kg/FU* | 0 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Materials for recycling *kg/FU* | 0 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Materials for energy recovery *kg/FU* | 0 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |
| Exported energy. detailed by energy carrier *MJ/FU* | 0 | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND |

# LCA results interpretation

In the production of SGG PARSOL, two main sources of impacts were found.

One is the energy consumed in the furnace and the other one is the impacts generated in the production of one of the main raw materials, the soda ash.

Soda ash is in the origin of more than 25% of the GWP, more than 60% of the abiotic depletion for non fossil fuels (ADP elements) and more than 20% of the energy consumption.

| | | **Environmental impacts (A1-A3) SGG PARSOL 6mm** | **Unit** |
|---|---|---|---|
|  | Global warming | **23.3** | Kg $CO_2$ equiv/FU |
|  | Non-Renewable resources consumption[1] | **260** | MJ/FU |
|  | Energy consumption[2] | **277.1** | MJ/FU |
|  | Water consumption[3] | **0.0698** | $M^3$/FU |
|  | Waste production[4] | **0.333** | Kg/FU |

[1]: This indicator corresponds to the abiotic depletion potential of fossil resources.
[2]: This indicator corresponds to the total use of primary energy.
[3]: This indicator corresponds to the use of fresh net water.
[4]: This indicator corresponds to the sum of hazardous, non-hazardous and radioactive waste disposed.

# Health characteristics

Concerning the Indoor air quality, flat glass is an inert material that doesn't release any inorganic & organic compounds, in particular no VOC (volatile organic compounds).

# Additional Environmental Information

## Saint-Gobain's environmental policy

Saint-Gobain's environmental vision is to ensure the sustainable development of its Activities, while preserving the environment from the impacts of its processes and services throughout their life cycle. The Group thus seeks to ensure the preservation of resources, meet the expectations of its relevant stakeholders, and offer its customers the highest added value with the lowest environmental impact.

The Group has set two long-term objectives: zero environmental accidents and a minimum impact of its activities on the environment. Short and medium-term goals are set to address these two ambitions. They concern five environmental areas identified by the Group: raw materials and waste; energy, atmospheric emissions and climate; water; biodiversity; and environmental accidents and nuisance.

**Saint-Gobain's long term objectives:**

| | |
|---|---|
|  | Non recovered waste (2010-2025) : -50%<br>Long-term: zero non-recovered waste |
|  | Energy consumption: -15% (2010-2025)<br>$CO_2$ emissions: -20% (2010-2025)<br>Emissions of NOx, $SO_2$ and dust: -20% for each emissions category (2010-2025) |
|  | Water discharge: -80% (2010-2025)<br>Long-term: zero industrial water discharge in liquid form |
|  | 2025: promote the preservation of natural areas at Company sites as much as possible |
|  | 2025: all environmental events are recorded, registered and investigated |

More information on our website: www.saint-gobain.com and our Registration Document.

## Our products' contribution to Sustainable Buildings

Saint-Gobain encourages sustainable construction and develops innovative solutions for new and renovated buildings that are energy efficient, comfortable, healthy and esthetically superior, while at the same time protecting natural resources.

The following information might be of help for green building certification programs:

**RECYCLED CONTENT**

*(Required for LEED v4 Building product disclosure and optimization - sourcing of raw materials)*

Recycled content: proportion, by mass, of recycled material in a product or packaging. Only pre-consumer and post-consumer materials shall be considered as recycled content.

- Post-consumer material: material generated by households or commercial, industrial and institutional facilities in their role as end-users of the product which can no longer be used for its intended purpose.

  In practice, in the case of flat glass, all material coming from glass recycling collection schemes falls under this category, i.e. glass waste from end-of-life vehicles, construction and demolition waste, etc.

- Pre-consumer material: material diverted from the waste stream during a manufacturing process. Excluded is reutilization of materials such as rework, regrind, or scrap generated in a process and capable of being reclaimed within the same process that generated it.

  In the case of flat glass, this waste originates from the processing or re-processing of glass that takes place before the final product reaches the consumer market. Pre-consumer waste flat glass is made of cut-offs, losses during laminating, bending and other processing, including the manufacture of insulating glass units or automotive windscreens.

Cullet generated in the furnace plant and which is reintroduced into the furnace cannot be considered as pre-consumer recycled content, since there was never an intent to discard it and therefore it would never have entered the solid waste stream.

| | |
|---|---|
| **Pre-consumer cullet** | ~7% |
| **Post-consumer cullet** | < 1% |

In the future, Saint-Gobain Glass intends to continue the increase of recycled material in its products, especially when recycling building post-consumer cullet glass dismantling and recycling networks will be available in every country.

**For any other question / document / certification, please contact our local sales teams.**