# Statement of Verification

BREG EN EPD No.: 000268 Issue 04

This is to verify that the

**Environmental Product Declaration**

provided by:

Pyroguard

BRE Global Verified EPD

is in accordance with the requirements of:

EN 15804:2012+A1:2013

and

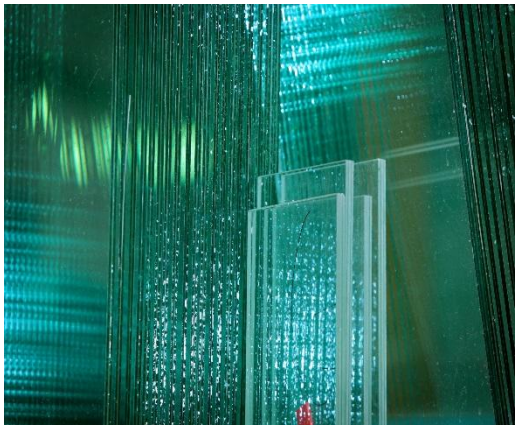
BRE Global Scheme Document SD207

This declaration is for:

Pyroguard T-Range Safety Glass

## Company Address

Millfield Lane
Haydock
Merseyside
WA11 9GA



Pyroguard

| | | |
|---|---|---|
| Signed for BRE Global Ltd | Hayley Thomson<br>Operator | 22 December 2025<br>Date of this Issue |
| 03 October 2019<br>Date of First Issue | | 31 December 2026<br>Expiry Date |

BRE Global Verified EPD

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BRE Global Ltd., Garston, Watford WD25 9XX.
T: +44 (0)333 321 8811 F: +44 (0)1923 664603 E: Enquiries@breglobal.com

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# Environmental Product Declaration

## EPD Number: 000268

## General Information

| EPD Programme Operator | Applicable Product Category Rules |
|---|---|
| BRE Global<br>Watford, Herts<br>WD25 9XX<br>United Kingdom | BRE Environmental Profiles 2013 Product Category Rules for Type III environmental product declaration of construction products to EN 15804:2012+A1:2013 |
| **Commissioner of LCA study** | **LCA consultant/Tool** |
| Pyroguard UK Ltd<br>Millfield Lane<br>Haydock<br>Merseyside<br>WA11 9GA<br>United Kingdom | BRE LINA v2.0 |
| **Declared/Functional Unit** | **Applicability/Coverage** |
| 1m$^2$ of Pyroguard T-range safety glass | Manufacturer specific product range |
| **EPD Type** | **Background database** |
| Cradle to Gate | ecoinvent v3.2 |

| Demonstration of Verification |
|---|
| CEN standard EN 15804 serves as the core PCR [a] |
| Independent verification of the declaration and data according to EN ISO 14025:2010<br>☐Internal ☒ External |
| (Where appropriate [b]) Third party verifier:<br>Jane Anderson |
| a: Product category rules<br>b: Optional for business-to-business communication; mandatory for business-to-consumer communication (see EN ISO 14025:2010, 9.4) |

| Comparability |
|---|
| Environmental product declarations from different programmes may not be comparable if not compliant with EN 15804:2012+A1:2013. Comparability is further dependent on the specific product category rules, system boundaries and allocations, and background data sources. See Clause 5.3 of EN 15804:2012+A1:2013 for further guidance |


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## Information modules covered

| Product | | | Construction | | Use stage | | | | | | | End-of-life | | | | | Benefits and loads beyond the system boundary |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Related to the building fabric | | | | | Related to the building | | | | | | | |
| A1 | A2 | A3 | A4 | A5 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3 | C4 | | D |
| Raw materials supply | Transport | Manufacturing | Transport to site | Construction – Installation | Use | Maintenance | Repair | Replacement | Refurbishment | Operational energy use | Operational water use | Deconstruction demolition | Transport | Waste processing | Disposal | | Reuse, Recovery and/or Recycling potential |
| ☑ | ☑ | ☑ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | | ☐ |

Note: Ticks indicate the Information Modules declared.

## Manufacturing sites

| | |
|---|---|
| Pyroguard France SARL<br>Parc d'activities communautaire no.1<br>145 rue des Roseaux<br>57455 Seingbouse<br>France | Pyroguard UK Ltd<br>Unit H1<br>Haydock Cross Industrial Estate<br>Kilbuck Lane<br>Haydock<br>WA11 9UX<br>United Kingdom |

# Construction Product:

## Product Description

Pyroguard makes fire resistant glasses providing various levels of fire protection in a range of dimensions. The Pyroguard T product range (data for which is modeled in this project) consists of modified toughened monolithic glasses and modified toughened laminated glasses containing patented nano composite gel interlayers.

Pyroguard T glass is suitable for use in ambitious architectural projects as it is available in large sizes to fit glass walls or ceilings. It enables the transmission of natural light, provides acoustic control and thermal and solar performance when incorporated into IGU's, losing no aesthetic benefits while maintaining the highest standards of safety. Pyroguard T is commonly specified for applications such as fully glazed, fire resistant atriums and façades, which can include fire-rated glazed spandrel panels.

## Technical Information

The table below covers the basic technical properties of all of the Pyroguard T-range products.

| Property | Value, Unit | Value, Unit | Value, Unit | Value, Unit | Value, Unit |
|---|---|---|---|---|---|
| | Pyroguard T EI 47-3 | Pyroguard T EW 13-1 | Pyroguard T EI 18-2 | Pyroguard T EI 25-3 | Pyroguard T EI 32-2 |
| Mass per area | 96 kg/m$^2$ | 30 kg/m$^2$ | 39 kg/m$^2$ | 54 kg/m$^2$ | 66 kg/m$^2$ |
| Thickness | 47 mm | 13 mm | 18 mm | 25 mm | 32 mm |
| Minimum size | 300 x 400 mm | 300 x 400 mm | 300 x 400 mm | 300 x 400 mm | 300 x 400 mm |


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| Property | Value, Unit | Value, Unit | Value, Unit | Value, Unit | Value, Unit |
|---|---|---|---|---|---|
| Maximum size | 2040 x 3600 mm | Dependent on application | Dependent on application | Dependent on application | Dependent on application |
| Burglar resistance (EN 356) | P1A | n/a | n/a | P1A | P1A |
| Resistance to fire (EN 13501-2) | EI 47-3 | EW13-1 | EI 18-2 | EI 25-3 | EI 32-2 |
| Pendulum body impact resistance (EN 12600) | 1B1 | 1B1 | 1B1 | 1B1 | 1B1 |
| Direct air borne sound reduction (EN 12758): Rw (C;Ctr) | 46 dB | 37 dB | Not measured | 42 dB | 43 dB |
| Solar transmittance, g-value (EN 410) | 0.56 | 0.75 | 0.69 | 0.62 | 0.63 |
| U value (EN 673) | 4.6 W/m$^2$K | 5.5 W/m$^2$K | 5.6 W/m$^2$K | 5.4 W/m$^2$K | 5.2 W/m$^2$K |
| Temperature range | -10 to +45 °C | -10 to +45 °C | -10 to +45 °C | -10 to +45 °C | -10 to +45 °C |

## Main Product Contents

The table below shows the average raw material input breakdown of the Pyroguard T-range products, as modelled:

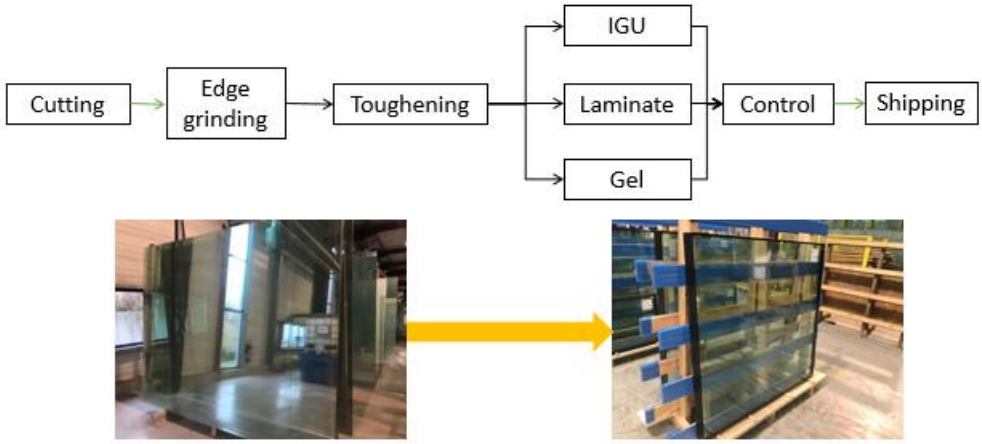
| Material/Chemical Input | Mass (%) |
|---|---|
| Flat Glass | 77 |
| Silicate | 12 |
| Fire resistant gel | 9 |
| Spacer | 1 |
| Sealant | 1 |

## Manufacturing Process

The raw material uncoated plate glasses are toughened by heating and rapidly cooling within a toughening oven. A fire-resistant nano composite gel interlayer is sandwiched between the glasses which contain a spacer system to allow for the designated thickness of gel to be achieved. Multiple layers of nano composite gel interlayer and glass are combined depending on the fire resistance required. The glasses are then cured in an oven and cooled on a racking system before packaging and dispatch.


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## Process flow diagram




Those are the 6 major steps of the production process

# Life Cycle Assessment Calculation Rules

## Declared / Functional unit description

1m$^2$ of Pyroguard T-range product of a weight of up to 96 kg/m$^2$. The declared unit represents the average composition of all the products in the Pyroguard T-range as made during the stated production period, modelled at the weight of the heaviest product in the range; the Pyroguard T EI 47-3 product.

## System boundary

This is a cradle-to-gate EPD, reporting all production life cycle stages (modules A1 to A3) in accordance with EN 15804:2012+A1:2013.

## Data sources, quality and allocation

This is a cradle-to-gate LCA follows the modular design defined in EN 15804:2012+A1:2013. The LCA models and reports the production stage modules, A1 to A3. No inputs or outputs have been excluded and all raw materials, packaging and transport, energy, water use and wastes, are included, except for direct emissions to air, water and soil, which are not measured.

The silicate quantities provided are solid content (the solids content of the silicate dispersion is 47.3%) and it is the dry content that has been provided and modelled. In the absence of a background dataset in ecoinvent 3.2 for the Gevarsil 2270-Silicate (Potassium silicate dispersion), the Sodium Silicate dataset (Sodium silicate, without water, in 48% solution state {RER}| sodium silicate production, hydrothermal liquor, product in 48% solution state | Alloc Def, U) used as proxy as it is similar in chemical properties.

In the absence of a background dataset in ecoinvent 3.2 for the TPS Spacer – polyisobutylene, the Butene dataset (Butene, mixed {RER}| production | Alloc Def, U) was used as a proxy as it is the monomer of polyisobutylene.
For the French site, 12 months of manufacturing data, from 1st April 2018 to 1st April 2019 were available, whilst for the UK site, which is new, manufacturing data from 1st January 2019 to 1st April 2019 were available.

At both the French and UK manufacturing sites, only products in the Pyroguard T range are made. Therefore, total site figures for raw materials, packaging, energy, water, wastewater and solid wastes were used, and no allocation was required.


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Within the Pyroguard T range, specific products can vary based the thickness and number of layers of glass and intumescent, meaning that the total mass per $m^2$ varies across the range. The mass per $m^2$ of the heaviest product, the Pyroguard T 47-3 product, at 96 kg/$m^2$, was used to represent the weight of the range, and will provide results covering the worst case scenario in terms of total product mass.

The mass balance for the French site was found to be low on inputs because wastage of glass and polysulphide sealant was not covered by the inputs. These quantities were therefore added to the respective inputs. The mass balance for the UK site was found to be acceptable.

Secondary data has been drawn from the BRE LINA database v2.0.53 and the background LCI datasets are based on ecoinvent v3.2 (2015).

## Cut-off criteria

No inputs or outputs have been excluded and raw material or energy flows omitted. All raw materials and packaging inputs, plus their transport, process and general energy and water use, production and non-production waste, have been included, except for direct emissions to air, water and soil, which are not measured.


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## LCA Results

The results per declared unit (1m$^2$) based on total site data and the weight per m$^2$ of the heaviest product, the Pyroguard T EI 47-3 product, can be found in the following tables:

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

**Parameters describing environmental impacts**

| | | | GWP | ODP | AP | EP | POCP | ADPE | ADPF |
|---|---|---|---|---|---|---|---|---|---|
| | | | kg $CO_2$ equiv. | kg CFC 11 equiv. | kg $SO_2$ equiv. | kg $(PO_4)^{3-}$ equiv. | kg $C_2H_4$ equiv. | kg Sb equiv. | MJ, net calorific value. |
| Product stage | Raw material supply | A1 | AGG | AGG | AGG | AGG | AGG | AGG | AGG |
| | Transport | A2 | AGG | AGG | AGG | AGG | AGG | AGG | AGG |
| | Manufacturing | A3 | AGG | AGG | AGG | AGG | AGG | AGG | AGG |
| | Total (of product stage) | A1-3 | 112 | 2.31E-05 | 0.858 | 0.166 | 0.0575 | 8.07E-04 | 1530 |

GWP = Global Warming Potential;
ODP = Ozone Depletion Potential;
AP = Acidification Potential for Soil and Water;
EP = Eutrophication Potential;
POCP = Formation potential of tropospheric Ozone;
ADPE = Abiotic Depletion Potential – Elements;
ADPF = Abiotic Depletion Potential – Fossil Fuels.

**Parameters describing resource use, primary energy**

| | | | PERE | PERM | PERT | PENRE | PENRM | PENRT |
|---|---|---|---|---|---|---|---|---|
| | | | MJ | MJ | MJ | MJ | MJ | MJ |
| Product stage | Raw material supply | A1 | AGG | AGG | AGG | AGG | AGG | AGG |
| | Transport | A2 | AGG | AGG | AGG | AGG | AGG | AGG |
| | Manufacturing | A3 | AGG | AGG | AGG | AGG | AGG | AGG |
| | Total (of product stage) | A1-3 | 154 | 2.36E-03 | 154 | 2200 | 0 | 2200 |

PERE = Use of renewable primary energy excluding renewable primary energy used as raw materials;
PERM = Use of renewable primary energy resources used as raw materials;
PERT = Total use of renewable primary energy resources;
PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials;
PENRM = Use of non-renewable primary energy resources used as raw materials;
PENRT = Total use of non-renewable primary energy resource.


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## LCA Results (continued)

| Parameters describing resource use, secondary materials and fuels, use of water | | | | | | |
|---|---|---|---|---|---|---|
| | | | SM | RSF | NRSF | FW |
| | | | kg | MJ net calorific value | MJ net calorific value | $m^3$ |
| Product stage | Raw material supply | A1 | AGG | AGG | AGG | AGG |
| | Transport | A2 | AGG | AGG | AGG | AGG |
| | Manufacturing | A3 | AGG | AGG | AGG | AGG |
| | Total (of product stage) | A1-3 | 0 | 0 | 0 | 1.66 |

SM = Use of secondary material;
RSF = Use of renewable secondary fuels;
NRSF = Use of non-renewable secondary fuels;
FW = Net use of fresh water.

| Other environmental information describing waste categories | | | | | |
|---|---|---|---|---|---|
| | | | HWD | NHWD | RWD |
| | | | kg | kg | kg |
| Product stage | Raw material supply | A1 | AGG | AGG | AGG |
| | Transport | A2 | AGG | AGG | AGG |
| | Manufacturing | A3 | AGG | AGG | AGG |
| | Total (of product stage) | A1-3 | 18.10 | 9.53 | 1.47E-02 |

HWD = Hazardous waste disposed;
NHWD = Non-hazardous waste disposed;
RWD = Radioactive waste disposed.

| Other environmental information describing output flows – at end of life | | | | | | |
|---|---|---|---|---|---|---|
| | | | CRU | MFR | MER | EE |
| | | | kg | kg | kg | MJ per energy carrier |
| Product stage | Raw material supply | A1 | AGG | AGG | AGG | AGG |
| | Transport | A2 | AGG | AGG | AGG | AGG |
| | Manufacturing | A3 | AGG | AGG | AGG | AGG |
| | Total (of product stage) | A1-3 | 0 | 5.65 | 0.0265 | 0 |

CRU = Components for reuse;
MFR = Materials for recycling;
MER = Materials for energy recovery;
EE = Exported energy.


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