Statement of Verification

BREG EN EPD No.: 000268 Issue 03

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

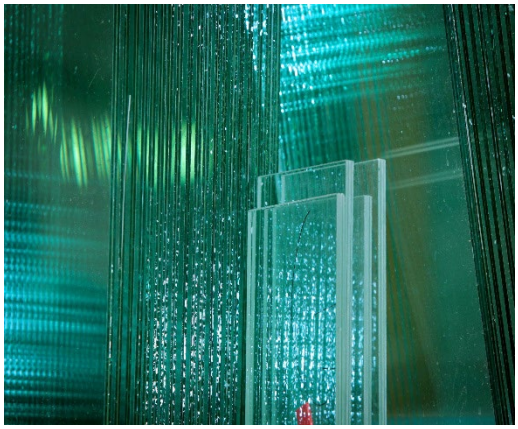
BRE Global Scheme Document SD207

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 Operator	22 April 2025 Date of this Issue
03 October 2019 Date of First Issue		31 December 2025 Expiry Date

BRE Global Verified EPD

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ECO PLATFORM EPD VERIFIED

Environmental Product Declaration

EPD Number: 000268

General Information

EPD Programme Operator	Applicable Product Category Rules
BRE Global Watford, Herts WD25 9XX 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 Millfield Lane Haydock Merseyside WA11 9GA 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 ☐Internal ☒ External
(Where appropriate [b]) Third party verifier: Jane Anderson
a: Product category rules 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

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 Parc d'activities communautaire no.1 145 rue des Roseaux 57455 Seingbouse France	Pyroguard UK Ltd Unit H1 Haydock Cross Industrial Estate Kilbuck Lane Haydock WA11 9UX 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

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^2K	5.5 W/m^2K	5.6 W/m^2K	5.4 W/m^2K	5.2 W/m^2K
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

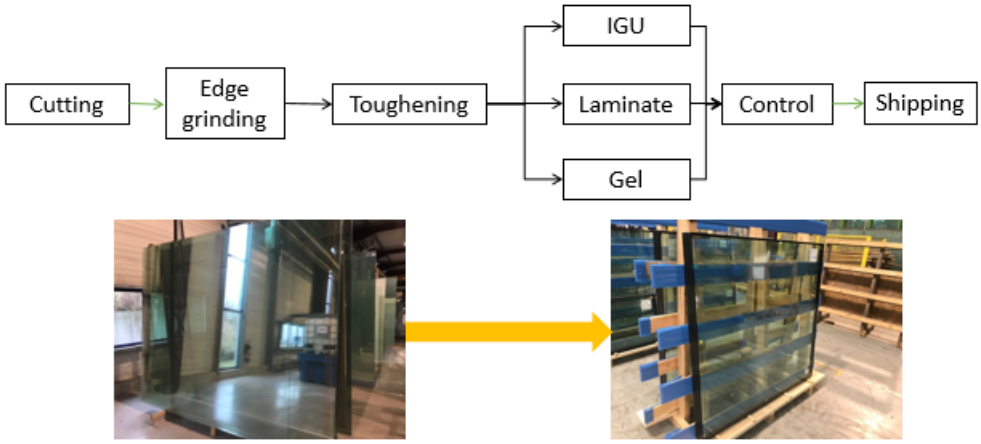
The table below shows the average raw material input breakdown of the Pyroguard T-range products, as modelled:

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.

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.

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.

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.

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.

References

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