Statement of Verification

BREG EN EPD No: 000765 Issue: 02

This is to verify that the Environmental Product Declaration provided by:

SFS Group Schweiz AG

are in accordance with the requirements of:

EN 15804:2012+A2:2019

and

BRE Global Scheme Document SD207

This declaration is for:
1 kg of average rainscreen fasteners, including associated accessories such as sleeves, washers, caps and gaskets. The declared unit also includes primary packaging.

Company Address

SFS Group Schweiz AG
Segment Fastening Systems
Rainscreen
Rosenbergsaustrasse 10
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Signed for BRE Global Limited	Hayley Thomson Operator	09 November 2026
09 November 2026 Date of this Issue	23 February 2026 Date of First Issue	22 February 2031 Expiry Date

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Environmental Product Declaration

EPD Number: 000765

General Information

EPD Programme Operator	Applicable Product Category Rules
BRE Global Watford, Herts WD25 9XX United Kingdom	BRE Environmental Profiles 2025 Product Category Rules for Type III environmental product declaration of construction products to EN 15804+A2 PN 514 Rev 3.2
Commissioner of LCA study	**LCA consultant/Tool**
SFS Group Schweiz AG Segment Fastening Systems Rainscreen Rosenbergsaustrasse 10 CH-9435 Heerbrugg	BRE LINA A2 Karim Merkli - SFS Group Schweiz AG
Declared/Functional Unit	**Applicability/Coverage**
1 kg of average rainscreen fasteners, including associated accessories such as sleeves, washers, caps and gaskets. The declared unit also includes primary packaging.	Product Average.
EPD Type	**Background database**
Cradle to Gate with Module C and D	Ecoinvent3.8

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: Kim Allbury

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+A2:2019. 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+A2:2019 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 site(s)

Manufacturing in France and Republic of China

Construction Product:

Product Description

SFS rainscreen fasteners are designed to provide secure attachment of rainscreen cladding systems. Manufactured from materials such as stainless steel, these fasteners offer corrosion resistance, making them ideal for use in diverse environmental conditions. With features like self-drilling tips, centring systems and precise threading. They are compatible with a wide range of cladding materials and they accommodate thermal expansion, backed by wind load testing & quality control.

In this EPD, the average results for rainscreen fasteners, including associated accessories such as sleeves, washers, caps, and gaskets, have been included. The LCA analysis has been conducted using averaged fastener manufacturing data, based on mass allocation from production at two sites.

The rainscreen fasteners are divided into three levels:



First level fixing
Subframe to substrate
Insulation to substrate



Second level fixing
Rails to brackets or wood



Third level fixing
Cladding panel to subframe

The fasteners come in various sizes and find applications in different scenarios, such as fixing subframe to steel stud in the first level fixing, Rails to bracket in the second level fixing and the cladding panel to subframe in the third level fixing.

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Depending on the specific usage, the length, diameter, and the requirement for washers and EPDM may vary. In this EPD, the total production quantity (including carbon steel, stainless steel, PMMA and EPDM) of fasteners has been taken to conduct an LCA analysis and the declared unit is 1 kg of rainscreen fasteners.

The following fasteners are in the scope of this EPD:

Level	Application	Fastener code
First level fixing	Subframe to steel stud	SX5
Second level fixing	Rails to brackets or wood	SDA5, SW3, SDA2
Third level fixing	Cladding panel to subframe (Visible fasteners)	TDA-S, SX4, SDA4, SX3, TW-S, TW-A4, SCFW-S, SLA3, SLA5
	Cladding panel to subframe (Concealed fasteners)	TUF-S, TU-S, TUC-S, TD-A4
	Balcony fixing solution	BF-NUT, BFS-SLEEVE

The following product is shown as a reference (e.g., SX4) that the fasteners are completed with a centring system.



Technical Information

Standards	Value, Unit
ETAs represent evidence of the technical suitability of a construction product in line with the EU member states' Construction Products Regulation (CPR). An ETA is issued for a construction product which is not covered by a harmonised EU standard for the application concerned. The issue of such an approval allows the product manufacturer to use the CE mark on construction products and free access to all contracting states within the European marketplace.	
Service life	25 years

All the technical product details for each mechanical fastener can also be found on the local websites.

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Main Product Contents

Material/Chemical Input	%
Stainless Steel / Carbon steel	97-99%
EPDM/PMMA	0-3%

Note: Product contents of all the fasteners which are listed in scope is assessed within this average EPD.

Manufacturing Process

Journey of SFS Fastener Manufacturing from raw materials to secure connections

Fastener manufacturing is a multi-step industrial process. The fasteners are manufactured from a combination of stainless steel and carbon steel. Production includes material selection, forming and finishing operations such as cold forming, pointing and thread rolling.

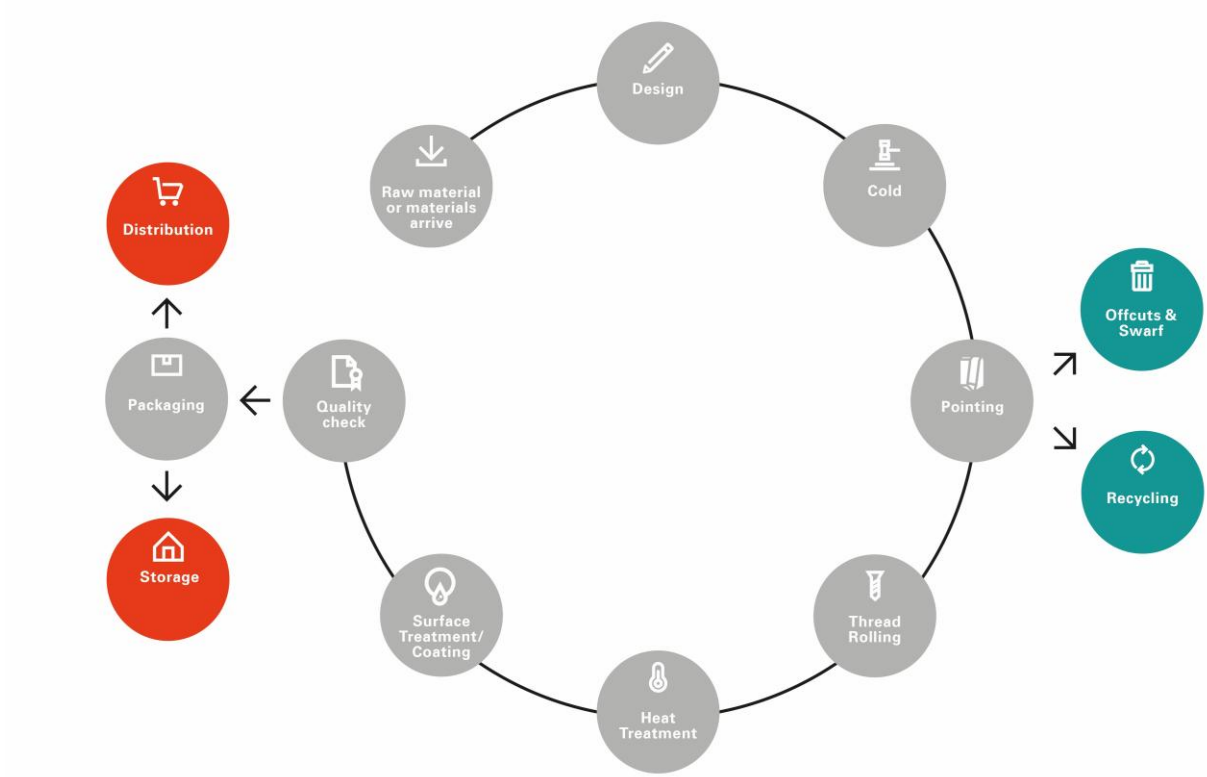
During the forming and machining processes, offcuts (excess material trimmed during shaping) and swarf (metal particles or chips generated during machining) are produced. These material fractions are collected and segregated by material type and sent for recycling.

Following forming, the fasteners may undergo heat treatment to achieve the required mechanical properties. Quality control measures, including dimensional inspections and functional testing, are applied throughout the production process to ensure conformity with product specifications.

After final inspection, the finished fasteners are packaged and prepared for distribution

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Process flow diagram



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End of Life

Deconstruction / Dismantling Scenario:
Dismantling mechanical fasteners from rainscreen facades is a precise process and essential for renovations, repair, or deconstruction. This systematic approach uses specific tools to remove fasteners without compromising structural integrity. Firstly, priorities safety by equipping workers with appropriate personal protective equipment. Ensure the work area is secure and communicate ongoing dismantling activities.

Assess and plan the removal process and be mindful of their placement and the impact on the building structure.

The use of specialized tools like power drills or fastener extractors to ensure careful extraction and avoid structural damage. Apply controlled force to avoid damaging the surrounding materials or the building structure. After the fasteners are removed, the material disassembly starts, such as cladding panels, rails or brackets. Finally, the underlying structure must be inspected and repaired for safety reasons. The energy used to dismantle the fasteners is not included in this analysis because energy consumption for the overall demolition significantly outweighs the negligible energy consumption associated with fastener removal. Initiating the removal process by systematically unscrewing and extracting fasteners using the selected tools. The Power drill is the only tool used to dismantle the fasteners. Scenario about the dismantling process that on the jobsite 10 power drills are used to dismantle 1kg fasteners. 10Ah avg. (power drill) x 10 power drill x 8 hours. After dismantling, 100% of the fastener are recovered, that is 1kg of fasteners go into further processing.

End-of Life scenario:
Fastener Recycling and End-of-Life Management:
At the end of a building's life cycle, fasteners recovered during demolition enter the pre-processing stage of end-of-life management. This process involves sorting and recycling, where steel components are melted down and reformed into new stainless-steel products. This sustainable practice significantly contributes to resource conservation and reduces the demand for raw materials.
Fasteners are available in different sizes, and the composition of stainless steel, carbon steel, and EPDM/PMMA varies depending on the fastener type and size. For this analysis, the worst-case composition has been used: fasteners are assumed to be 97% steel and 0.3% EPDM/PMMA.
For a typical 1kg of rainscreen fasteners:

- Composition: 95-97% steel, 0-3% EPDM and PMMA
- Recovery rate: 100% from deconstruction
- Recycling efficiency: 95% of steel is recycled
- Material loss: 5% during processing (sent to landfill)

Due to the high recyclability of steel, most of the fastener material can be reclaimed. However, separating EPDM and PMMA components can be challenging in some scenarios. As a result, 3% of EPDM/PMMA/Biodegradable may not be recoverable and will be sent to landfills
By implementing these recycling practices, we at SFS Group are committed to minimizing waste and maximizing resource efficiency in the construction industry.

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Life Cycle Assessment Calculation Rules

Declared / Functional unit description

1 kg of average rainscreen fasteners, including associated accessories such as sleeves, washers, caps and gaskets. The declared unit also includes primary packaging.

System boundary

This is a cradle-to-gate with modules C and D LCA, reporting all production life cycle stages of modules A1 to A3 and end of life stages C1-C4, and D in accordance with EN 15804:2012+A2:2019 and BRE 2025 Product Category Rules (PN 514 Rev 3.2).

Data sources, quality and allocation

The datasets are derived from Ecoinvent v3.8, and the LCA tool used was BRE LINA A2. In this EPD, the mechanical fastener has been calculated per 1kg, allowing the end-user to assess the impacts of the fasteners they use. Typically, these fasteners are produced in two different factories: one located in the Republic of China (ROC) and the other in France. Because the geographical contexts of the two facilities differ, production information from each site has been considered separately for this LCA analysis. Since the end user has no option to select impacts from individual sites, weighted average results have been used.

Different product variants belonging to the same product family are produced at both manufacturing facilities; however, the composition of the variants and the manufacturing processes are the same at both sites. The quality of data from vendor orders is considered accurate, and allocations are based on annual averages covering the period from 01/01/2023 to 31/12/2023.

The products manufactured in the ROC are semi-finished goods that are transported to the French facility for completion. Therefore, the LCA analysis has been conducted separately for the LCA analysis for 1 kg of Fasteners, by including the energy, water, waste, and non-production waste associated with completing the semi-finished goods at the French facility have been included and fed the results in the back end of LINA as a separate dataset to add the additional quantity. the semi-finished good and added the additional amount of energy. These impacts have been allocated based on the proportion of the product completed at the French facility, i.e., by mass.

The original data collection form has been used while doing an LCA analysis, there was no uplift in the given data. In both the manufacturing sites, other products are manufactured in addition to the mechanical industrial fastener, therefore allocation of fuel consumption, water consumption & discharge, and waste emissions was required, and this has been done according to the provisions of the BRE PCR PN514 3.2 and EN 15804 i.e., by using the mass allocation.

In addition, no proxy dataset used for the LCA modelling, secondary data has been obtained for all other upstream and downstream processes that are beyond the control of the manufacturer (i.e. raw material production) from the ecoinvent 3.8 database. All ecoinvent datasets are complete within the context used and conform to the system boundary and the criteria for the exclusion of inputs and outputs, according to the requirements specified in EN 15804:2012+A2:2019.

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ISO14044 guidance. Quality Level	Geographical representativeness	Technical representativeness	Time representativeness
Very Good	Data from area under study.	Data from processes and products under study. Same state of technology applied as defined in goal and scope (i.e., identical technology).	There is approximately 1-2 years between the Ecoinvent LCI reference year, and the time period for which the LCA was undertaken.

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Specific European datasets have been selected from the ecoinvent LCI for this LCA. Manufacturer uses the France and China national grid electricity and EU natural gas for production, so therefore the national grid electricity dataset has been used for the LCA modelling (Ecoinvent 3.8). The GWP carbon footprint for using 1 kWh of France electricity is 0.082 kgCO2e/kWh and for using 1 kWh of China national grid electricity is 1.054 kgCO2e/kWh. In addition, for using the 1 MJ of Natural gas EU is 0.071 kgCO2e/MJ. The quality level of time representativeness is also Very Good as the background LCI datasets are based on ecoinvent v3.8 which was compiled in 2021. Therefore, there is less than 5 years between the ecoinvent LCI reference year and the time period for which the LCA was undertaken

Cut-off criteria

At the ROC and France manufacturing facility, All inputs and outputs have been included, covering all raw materials, packaging, transport, energy, water use, and wastes, except for direct emissions to air, water, and soil, which are not measured at either site.
Upstream extraction and/or processing of inputs are accounted for through the use of background datasets within LINA.

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LCA Results

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

Parameters describing environmental impacts									
			GWP-total	GWP-fossil	GWP-biogenic	GWP-luluc	ODP	AP	EP-freshwater
			kg CO_2 eq	kg CO_2 eq	kg CO_2 eq	kg CO_2 eq	kg CFC11 eq	mol H^+ eq	kg $(PO_4)^{3-}$ eq
Product stage	Raw material supply	A1	5.44E+00	5.41E+00	2.06E-02	5.11E-03	2.93E-07	3.20E-02	1.85E-03
	Transport	A2	3.49E-01	3.49E-01	2.44E-04	1.56E-04	7.89E-08	2.99E-03	2.07E-05
	Manufacturing	A3	5.46E-01	5.83E-01	-3.80E-02	5.27E-04	7.16E-08	1.70E-03	1.52E-04
	Total (Consumption grid)	A1-3	6.33E+00	6.34E+00	-1.72E-02	5.79E-03	4.44E-07	3.67E-02	2.02E-03
95% recycling scenario for stainless steel and carbon steel and 5% material is left to landfill									
End of life	Deconstruction, demolition	C1	9.11E-01	8.80E-01	2.90E-02	2.09E-03	4.39E-08	4.72E-03	8.82E-04
	Transport	C2	1.66E-02	1.66E-02	1.42E-05	6.53E-06	3.85E-09	6.75E-05	1.07E-06
	Waste processing	C3	5.30E-02	5.30E-02	1.87E-05	5.28E-06	1.13E-08	5.50E-04	1.64E-06
	Disposal	C4	4.06E-03	4.05E-03	3.44E-06	5.72E-07	1.99E-10	5.11E-06	7.00E-08
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-7.08E-01	-7.10E-01	2.22E-03	-2.01E-04	-2.83E-08	-2.57E-03	-2.80E-04

GWP-total = Global warming potential, total;
GWP-fossil = Global warming potential, fossil;
GWP-biogenic = Global warming potential, biogenic;
GWP-luluc = Global warming potential, land use and land use change;

ODP = Depletion potential of the stratospheric ozone layer;
AP = Acidification potential, accumulated exceedance; and
EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment

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LCA Results (continued)

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

Parameters describing environmental impacts									
			EP-marine	EP-terrestrial	POCP	ADP-mineral &metal	ADP-fossil	WDP	PM
			kg N eq	mol N eq	kg NMVOC eq	kg Sb eq	MJ, net calorific value	m^3 world eq deprived	disease incidence
Product stage	Raw material supply	A1	5.74E-03	6.07E-02	1.94E-02	1.33E-04	6.79E+01	1.93E+00	4.12E-07
	Transport	A2	8.02E-04	8.85E-03	2.48E-03	1.10E-06	5.15E+00	2.16E-02	2.71E-08
	Manufacturing	A3	5.81E-04	4.00E-03	1.13E-03	2.61E-06	2.78E+01	4.34E-01	2.04E-08
	Total (Consumption grid)	A1-3	7.13E-03	7.36E-02	2.30E-02	1.37E-04	1.01E+02	2.38E+00	4.59E-07
95% recycling scenario for stainless steel and carbon steel and 5% material is left to landfill									
End of life	Deconstruction, demolition	C1	8.24E-04	7.16E-03	1.95E-03	8.82E-07	1.90E+01	6.33E-01	1.40E-08
	Transport	C2	2.03E-05	2.22E-04	6.80E-05	5.78E-08	2.51E-01	1.13E-03	1.43E-09
	Waste processing	C3	2.44E-04	2.67E-03	7.34E-04	2.72E-08	7.26E-01	1.68E-03	1.47E-08
	Disposal	C4	1.31E-05	1.92E-05	6.36E-06	1.63E-09	1.46E-02	6.59E-04	1.02E-10
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-6.11E-04	-6.48E-03	-3.56E-03	-5.35E-07	-7.18E+00	-5.09E-02	-4.75E-08

EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment;
EP-terrestrial = Eutrophication potential, accumulated exceedance;
POCP = Formation potential of tropospheric ozone;
ADP-mineral&metals = Abiotic depletion potential for non-fossil resources;
ADP-fossil = Depletion potential of the stratospheric ozone layer;
WDP = Water (user) deprivation potential, deprivation-weighted water consumption; and
PM = Particulate matter.

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LCA Results (continued)

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

Parameters describing environmental impacts							
			IRP	ETP-fw	HTP-c	HTP-nc	SQP
			kBq U^{235} eq	CTUe	CTUh	CTUh	dimensionless
Product stage	Raw material supply	A1	7.04E-01	1.63E+02	1.07E-07	1.27E-07	2.93E+01
	Transport	A2	2.60E-02	3.90E+00	1.46E-10	3.91E-09	3.14E+00
	Manufacturing	A3	1.12E+00	1.34E+01	3.64E-10	5.32E-09	5.54E+00
	Total (Consumption grid)	A1-3	1.85E+00	1.81E+02	1.07E-07	1.37E-07	3.80E+01
95% recycling scenario for stainless steel and carbon steel and 5% material is left to landfill							
End of life	Deconstruction, demolition	C1	5.21E-01	9.36E+00	2.25E-10	7.55E-09	2.73E+00
	Transport	C2	1.29E-03	1.96E-01	6.35E-12	2.06E-10	1.73E-01
	Waste processing	C3	3.27E-03	4.25E-01	1.64E-11	3.08E-10	9.25E-02
	Disposal	C4	6.69E-05	1.19E-02	3.54E-13	7.45E-12	3.26E-02
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-1.27E-02	-2.12E+01	-3.79E-09	-1.46E-08	-1.40E+00

IRP = Potential human exposure efficiency relative to U235;
ETP-fw = Potential comparative toxic unit for ecosystems;
HTP-c = Potential comparative toxic unit for humans;
HTP-nc = Potential comparative toxic unit for humans; and
SQP = Potential soil quality index.

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LCA Results (continued)

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

Parameters describing resource use, primary energy

			PERE	PERM	PERT	PENRE	PENRM	PENRT
			MJ	MJ	MJ	MJ	MJ	MJ
Product stage	Raw material supply	A1	1.29E+01	2.14E-01	1.67E+01	6.55E+01	1.04E+00	8.86E+01
	Transport	A2	6.73E-02	0.00E+00	6.73E-02	5.05E+00	0.00E+00	5.05E+00
	Manufacturing	A3	1.68E+00	9.52E-01	2.63E+00	2.57E+01	2.06E+00	2.77E+01
	Total (Consumption grid)	A1-3	1.46E+01	1.17E+00	1.94E+01	9.62E+01	3.10E+00	1.21E+02
95% recycling scenario for stainless steel and carbon steel and 5% material is left to landfill								
End of life	Deconstruction, demolition	C1	3.37E+00	0.00E+00	3.37E+00	1.92E+01	0.00E+00	1.92E+01
	Transport	C2	3.54E-03	0.00E+00	3.54E-03	2.47E-01	0.00E+00	2.47E-01
	Waste processing	C3	4.07E-03	0.00E+00	4.07E-03	7.12E-01	0.00E+00	7.12E-01
	Disposal	C4	1.96E-04	0.00E+00	1.96E-04	-9.69E-01	9.83E-01	1.43E-02
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-1.48E-01	0.00E+00	-1.48E-01	-7.11E+00	0.00E+00	-7.11E+00

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)

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

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	4.20E-01	0.00E+00	0.00E+00	5.60E-02
	Transport	A2	0.00E+00	0.00E+00	0.00E+00	5.36E-04
	Manufacturing	A3	5.69E-02	0.00E+00	0.00E+00	1.14E-02
	Total (Consumption grid)	A1-3	4.77E-01	0.00E+00	0.00E+00	6.80E-02
95% recycling scenario for stainless steel and carbon steel and 5% material is left to landfill						
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	1.61E-02
	Transport	C2	0.00E+00	0.00E+00	0.00E+00	2.80E-05
	Waste processing	C3	0.00E+00	0.00E+00	0.00E+00	4.14E-05
	Disposal	C4	0.00E+00	0.00E+00	0.00E+00	1.55E-05
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	0.00E+00	0.00E+00	0.00E+00	-1.24E-03

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

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LCA Results (continued)

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

Other environmental information describing waste categories					
			HWD	NHWD	RWD
			kg	kg	kg
Product stage	Raw material supply	A1	4.62E+00	8.94E+00	2.46E-04
	Transport	A2	5.84E-03	9.46E-02	3.49E-05
	Manufacturing	A3	1.76E-01	3.63E-01	3.33E-04
	Total (Consumption grid)	A1-3	4.80E+00	9.40E+00	6.14E-04
95% recycling scenario for stainless steel and carbon steel and 5% material is left to landfill					
End of life	Deconstruction, demolition	C1	6.68E-02	4.31E+00	1.40E-04
	Transport	C2	2.77E-04	4.92E-03	1.70E-06
	Waste processing	C3	9.57E-04	6.70E-03	5.01E-06
	Disposal	C4	2.23E-05	3.04E-02	9.07E-08
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-6.55E-02	-1.35E+00	-7.60E-06

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

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LCA Results (continued)

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

Other environmental information describing output flows – at end of life								
			CRU	MFR	MER	EE	Biogenic carbon (product)	Biogenic carbon (packaging)
			kg	kg	kg	MJ per energy carrier	kg C	kg C
Product stage	Raw material supply	A1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	A2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Manufacturing	A3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Total (Consumption grid)	A1-3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
95% recycling scenario for stainless steel and carbon steel and 5% material is left to landfill								
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Waste processing	C3	0.00E+00	9.20E-01	0.00E+00	0.00E+00	0.00E+00	9.20E-01
	Disposal	C4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

CRU = Components for reuse;
MFR = Materials for recycling

MER = Materials for energy recovery;
EE = Exported Energy

Information on biogenic carbon content

Results per functional unit		
BIOGENIC CARBON CONTENT	Unit	Quantity
Biogenic carbon (product)	kg C	0.00E+00
Biogenic carbon (packaging)	kg C	3.27E-2

Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO_2.

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Scenarios and additional technical information

Scenarios and additional technical information			
Scenario	Parameter	Units	Results
C1 – Deconstruction	In this scenario, the deconstruction and dismantling process refers to the removal of the rainscreen fasteners from the building structure at the end of their service life. This process typically forms part of a wider deconstruction or demolition activity, during which the façade or cladding system is removed or replaced. The fasteners are unscrewed from the substructure using standard construction tools, such as electric screwdrivers. Given the accessibility of the fasteners, this is considered a straightforward process. It is assumed that the removal of the fasteners is carried out by skilled workers in accordance with standard demolition practices. The associated energy consumption is minimal and has been included in the analysis. The recovered fasteners can either be recycled as metal waste or disposed of in accordance with local waste management regulations. All assumptions made for this scenario are consistent with standard construction and demolition practices, and the values provided relate to the declared unit defined at the outset of this project. The scenario assumes that 100% of the fasteners are removed; however, the actual recovery rate may vary depending on the specific circumstances of the deconstruction project.		
	Electricity used to dismantle the Fasteners - “Electricity average Europe”	MJ	8.28
C2 – Transportation	On average, a 100 km distance was considered, as the dismantling companies would be hired in the area 100 km from the site.		
C2 – Transportation	Transportation to Pre-processing sector	km	100
C2 – Transportation	Transportation	Road transport	Lorry, 16-32 ton
C3 – Preprocessing	Once the fasteners are recovered from demolition at their end of life, they enter the preprocessing stage, i.e., the end-of-life management process. This process involves sorting and recycling, including melting down the steel and reforming it into new steel products. This sustainable practice contributes to resource conservation and reduces the demand for new raw materials. Fasteners are available in different sizes, and the composition of stainless steel, carbon steel, and EPDM/PMMA varies depending on the fastener type and size. For this analysis, the worst-case composition has been used: fasteners are assumed to be 97% steel and 0.3% EPDM/PMMA. Therefore, in 1 kg of rainscreen fasteners, which comprise 95–97% steel and 0–3% EPDM/PMMA, 100% of the fasteners are assumed to be recovered from the deconstruction sector. Given the high recyclability of steel, 95% of the steel is recycled, while the remaining 5% is considered natural loss during processing and ends up in landfill. In some scenarios, separating EPDM can be challenging, so 3% of EPDM cannot be recovered and will also end up in landfill (C4). The above end of life scenario has been taken from BRE PCR EN15804+A2		
95% recycling scenario for stainless steel and carbon steel and 5% material is left to landfill	Out of the 97% of steel consumption, 95% will be recycled	kg	0.92
C4 – Disposal	95% recycling scenario for stainless steel and carbon steel and 5% material is left to landfill. In some scenarios, separating the EPDM used for washer is challenging, so 3% of EPDM can’t be recovered and will end up in landfills		
	Washer waste to landfill	Kg	0.03

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Scenarios and additional technical information			
Scenario	Parameter	Units	Results
	Steel waste to landfill	Kg	0.048
Module D	Benefits and loads beyond the system boundary" (module D) accounts for the environmental benefits and loads resulting from waste steel which is collected for recycling at end of life. These benefits and loads are calculated by excluding the pre-existing recycled steel that is used in the primary process. Rainscreen fasteners are composed of 97% steel. For the LCA modelling, the Ecoinvent 3.8 steel dataset was selected, which reflects a weighted average of 54% pre-existing recycled content in stainless and carbon steel. The percentage of secondary material was calculated based on data from Ecoinvent 3.8. Therefore, the benefits of recycling steel should be calculated by avoiding the pre-existing recycled content. Therefore, in the 97% of steel, 0.92 kg of steel recovered from C3, the pre-existing content of 0.50 kg scrap steel should be avoided. The benefits have been calculated for virgin steel i.e., 0.42 kg. In line with this, 0.42 kg of steel recovered from the demolition sites can be used to offset the impacts of 0.42 kg of virgin steel material. It is assumed that there is a 100% recycling yield from the recycling process.		
Module D	Description of scenario		
	Products Recycled Content (post consumer)	Kg	
	Recovered for recycling	Kg	
	Recovered for re-use	Kg	
	Recovered for energy	Kg	

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End – user calculation:

The LCA results listed in the tables above is to the processing of 1 kg of rainscreen fasteners. Consequently, the end-user of this EPD can calculate the impact of each fastener used in the building sector by applying the average weight of the fasteners. In the table below, the fasteners which have been used in the different application has been provided with the average weight in kg's and the impacts has been calculated by multiplying with the average weight in kilograms.

For example, the GWP impact of **1 kilogram** of rainscreen fasteners is **6.33E+00**, so multiplying with SX5's avg. weight of one piece in kg i.e., **0.012x6.33E+00 = 0.076 kgCO_2eq**.

Note: The quantities of washers, gaskets and sleeves may vary depending on the specific application of the fastener. Therefore, the calculated environmental impacts (including GWP) represent approximate values, as they are based on an average rainscreen fastener and not on a product configuration specifically modelled for each individual use case.

First level fixing

Subframe to steel stud	Avg. Weight in gram	Avg. Weight in kg	GWP total of one piece in kg (A1-A3)
SX5	11.550	0.01155	0.0731

Second level fixing

Rails to brackets or wood	Avg. Weight in gram	Avg. Weight in kg	GWP total of one piece in kg (A1-A3)
SDA5	5.276	0.005276	0.0334
SW3	4.932	0.004932	0.0312
SDA2	4.750	0.004750	0.0301

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Third level fixing

Cladding panel to subframe (Visible fasteners)	Avg. Weight in gram	Avg. Weight in kg	GWP total of one piece in kg (A1-A3)
TDA-S	6.800	0.0068	0.0430
SDA4	7.124	0.0071	0.0449
SLA3	3.565	0.0036	0.0228
SLA5	3.459	0.0035	0.0222
SCFW-S	4.6	0.0046	0.0291
TW-S	5.887	0.0059	0.0373
SX3	5.34	0.0053	0.0335
SX4	7.419	0.0074	0.0468

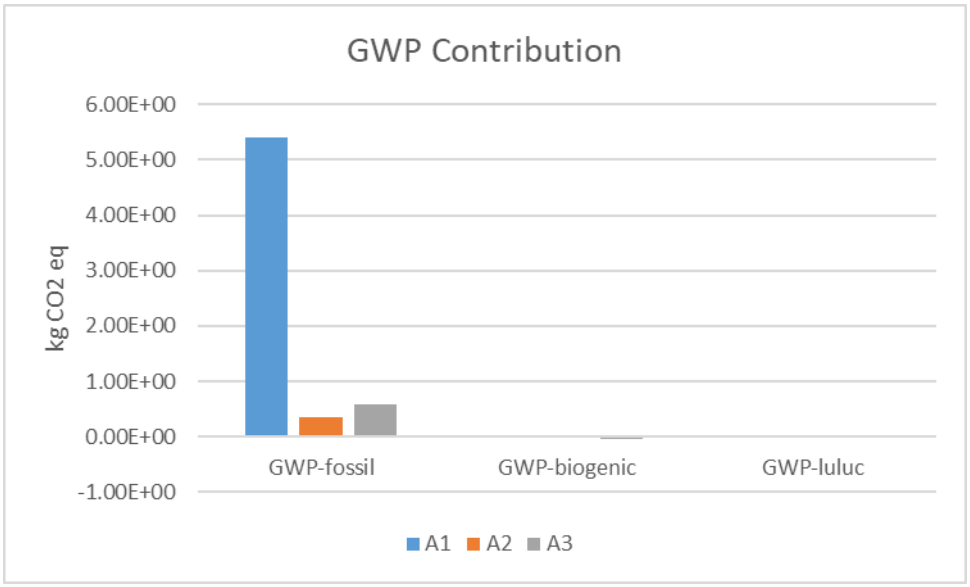
Cladding panel to subframe (Concealed fasteners)	Avg. Weight in gram	Avg. Weight in kg	GWP total of one piece in kg (A1-A3)
TUF-S	5.841	0.0058	0.0367
TU-S	6.020	0.0060	0.0380
TUC-S	6.261	0.0063	0.0399
TD-A4	3.44	0.0034	0.0215

Balcony fixing solution	Avg. Weight in gram	Avg. Weight in kg	GWP total of one piece in kg (A1-A3)
BF-NUT	13.882	0.0139	0.0880
BFS-SLEEVE	6.054	0.0061	0.0386

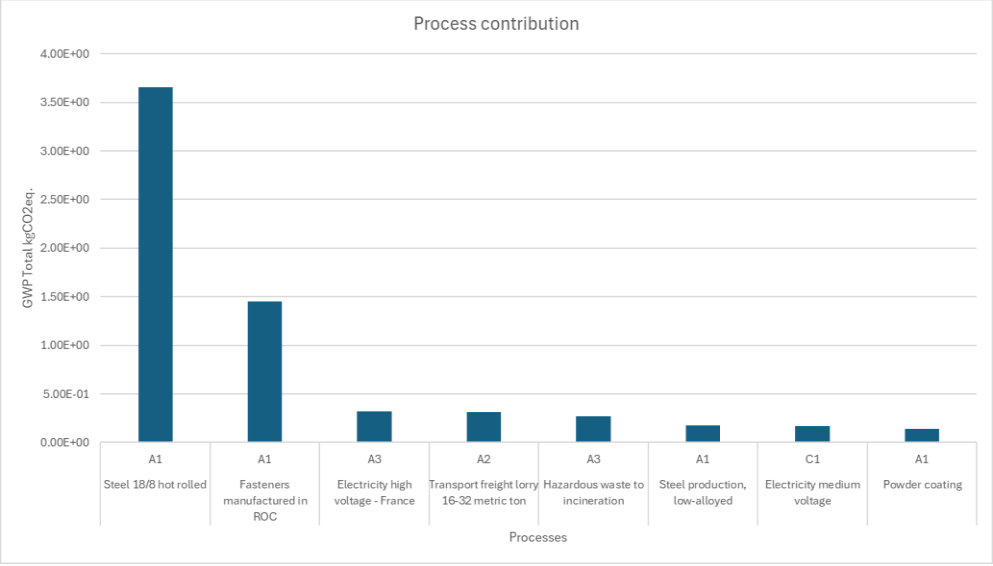
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Interpretation of results

The bulk of the environmental impacts and primary energy demand are attributed to the upstream manufacturing process of the Fasteners, covered by information modules A1-A3 of EN15804:2012+A2:2019. The chart illustrates the Global Warming Potential (GWP) contributions of different stages (A1, A2, A3) across three categories: fossil, biogenic, and land use and land-use change (LULUC). The GWP-fossil category shows a dominant contribution from stage A1, with much smaller contributions from A2 and A3. In the GWP-biogenic and GWP-luluc categories, all stages show minimal or negligible impact. This indicates that fossil emissions, particularly from stage A1, are the primary driver of GWP in this assessment.



The chart illustrates the contribution of various processes to the overall environmental impact in terms of greenhouse gas emissions. It is clear that steel production using a converter for low-alloyed steel dominates the emissions profile, significantly outweighing all other processes. In contrast, other contributors such as transport, waste treatment, electricity supply, and coating have relatively minor impacts. This suggests that efforts to reduce emissions should primarily focus on optimizing or substituting the steel production process, as it is the most carbon-intensive stage in the lifecycle being assessed.



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ETA-24/0682 - Fastening kit for facade panels (Center Point System)

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