Statement of Verification

BREG EN EPD No.: 000635 Issue 01

This is to verify that the

Environmental Product Declaration

provided by:

SAS International

BRE Global Verified EPD

is in accordance with the requirements of:

EN 15804:2012+A2:2019

and

BRE Global Scheme Document SD207

This declaration is for:

1kg of SAS Horizon Aluminium with a Polyester powder coated (PPC) finish ceiling product/system

Company Address

SAS International
EMAC House,
Unit 28, Sutton Park Ave,
Reading
RG6 1AZ
United Kingdom

SAS International

Signed for BRE Global Ltd	Emma Baker Operator	19 September 2024 Date of this Issue
19 September 2024 Date of First Issue		18 September 2029 Expiry Date

BRE Global Verified EPD

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

ECO PLATFORM EPD VERIFIED

Environmental Product Declaration

EPD Number: 000635

General Information

EPD Programme Operator	Applicable Product Category Rules
BRE Global Watford, Herts WD25 9XX United Kingdom	BRE 2023 Product Category Rules (PN 514 Rev 3.1) for Type III environmental product declaration of construction products to EN 15804:2012+A2:2019.
Commissioner of LCA study	**LCA consultant/Tool**
SAS International EMAC House, Unit 28, Sutton Park Ave, Reading RG6 1AZ United Kingdom	LCA Consultant: SAS International Tool: BRE LINA Version A2
Declared/Functional Unit	**Applicability/Coverage**
1kg of SAS Horizon Aluminium with a Polyester powder coated (PPC) finish ceiling product/system	Product Average.
EPD Type	**Background database**
Cradle to Gate with Module C and D	Ecoinvent 3.8

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: Roger Connick
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

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)

SAS International
Parc Crescent
Waterton Industrial Estate
Mid Glamorgan
CF31 3XU

Construction Product:

Product Description

SAS International offers a wide range of metal ceiling types, including metal linear ceilings, suspended ceilings, metal ceiling baffles, and more. We also provide a fully bespoke service to create custom metal ceilings tailored to specific project requirements. Our ceiling products are designed to meet a broad spectrum of customer needs. For further information, please visit: https://sasintgroup.com/

Metal ceiling solutions are commonly incorporated into:

- Office spaces
- Meeting spaces
- Co-working spaces
- Educational institutions
- Public buildings
- Retail premises
- Airports
- Restaurants
- Leisure centres
- Exhibition spaces

This EPD represents 1 kg of SAS Horizon Aluminium with Polyester powder coated finish, a ceiling product/system intended for use in ceiling applications and the results are included in this EPD. The manufacturing process for all Horizon aluminium products within the group is the same, with similar compositions.

The below product/system covered in the EPD:

Property	Dimensions Length x Width x Thickness (mm)	Aluminium - Scaling Factor Table			
		Plain*	D1522*	D3939*	D8063*
SAS120	600x600x30	2.7	2.2	1.9	1.4
SAS130	600x600x30	2.4	1.9	1.6	1.1
SAS140	2000x400x38	2.7	2.2	1.9	1.4
SAS170	1200x600x36.5	3.6	3.0	2.6	2.0
SAS175	1200x600x30	3.6	3.0	2.6	2.0
SAS175 - Triangular	1200x30mm SIDE	2.8	2.4	2.0	1.5
SAS200	1200x300x70	3.7	3.1	2.7	2.1
SAS205	1200x300x30	3.5	3.0	2.6	2.0
SAS310	1200x300x30	3.4	2.8	2.4	1.8
SAS330	1200x300x30	3.7	3.1	2.7	2.1
SAS330 C-Profile	100x30mm Profile	3.7	N/A	N/A	N/A
SAS330A	1200x300x30	3.7	3.1	2.7	2.1
SAS380 Data Centre Tile	1149x549x48	2.9	N/A	N/A	N/A
SAS380 Data Centre Profile	45mm To suit tile module	6.0	N/A	N/A	N/A
SAS385 Heavy-Duty Data Centre Tile	1149x549x16	2.4	N/A	N/A	N/A
SAS385 Heavy-Duty Data Centre Profile	70mm To suit tile module	11.0	N/A	N/A	N/A
SAS500 - standalone	1500x300x50	4.0	3.7	3.4	3.1
SAS500 - continuous	1500x300x50	4.0	3.7	3.4	3.1
SAS500 - open grid	1500x300x50	4.0	3.6	3.4	3.0
SAS510 - continuous	1500x300x50	4.0	3.7	3.4	3.1
SAS600 (Skye)	1500x600x45	3.5	2.9	2.5	1.8
SAS720	100x30 wide 200 ctrs	3.7	N/A	N/A	N/A
SAS730 (Profile)	H-line 50 CTRS 3m 29.4x36	6.6	N/A	N/A	N/A
SAS740 (Profile)	200 CTRS TCA0887 100x40	6.4	N/A	N/A	N/A
SAS750 (Profile)	50 DIA 100 CTRS	6.2	N/A	N/A	N/A
SAS Pin Wall	1800x600x60	3.3	2.7	N/A	N/A
SASWP10	1800x600x37	3.2	2.6	N/A	N/A
SASWP20	1800x600x42	3.2	2.6	N/A	N/A
SASWP120	3x3 arrangement using 600x600x30 tiles	2.7	2.2	N/A	N/A
SAS900	980x30mm	2.7	2.2	1.9	1.4

Note:

*Plain – Plain tile without any Perforation

*D1522 – Diagonal pitch to edge of tile, Ø1.5 mm perforation, 22% open area

*D3939 – Diagonal pitch to edge of tile, Ø3.9 mm perforation, 39% open area

*D8063 – Diagonal pitch to edge of tile, Ø8.0 mm perforation, 63% open area

Note: The table with the individual product/system dimension has been given so that the end user of this EPD can use these results to calculate the impact profiles of each SAS ceiling system with different dimensions by using the Scaling Factor Table provided. Please contact the SAS technical team for more information on the weight per m^2 calculation.

Technical Information

Property	Value, Unit
Systems are manufactured and tested in accordance with BS EN 13964:2014 including essential characteristics performance:	
Reaction to Fire:	(up to) A1 European Reaction to Fire Classification fire system (Euro classes)
Release of Formaldehyde:	CLASS E1
Release of Asbestos	NO CONTENT
Durability:	CLASS B
Note: Technical properties of all products assessed within this average EPD	
For information, please contact SAS international technical team or visit https://sasintgroup.com/metal-ceilings/	

Main Product Contents

The raw material quantities have been taken for all variations of the system and modelled as a single dataset. The main product contents listed below represent the average values derived from this dataset, with a weight of 1 kg

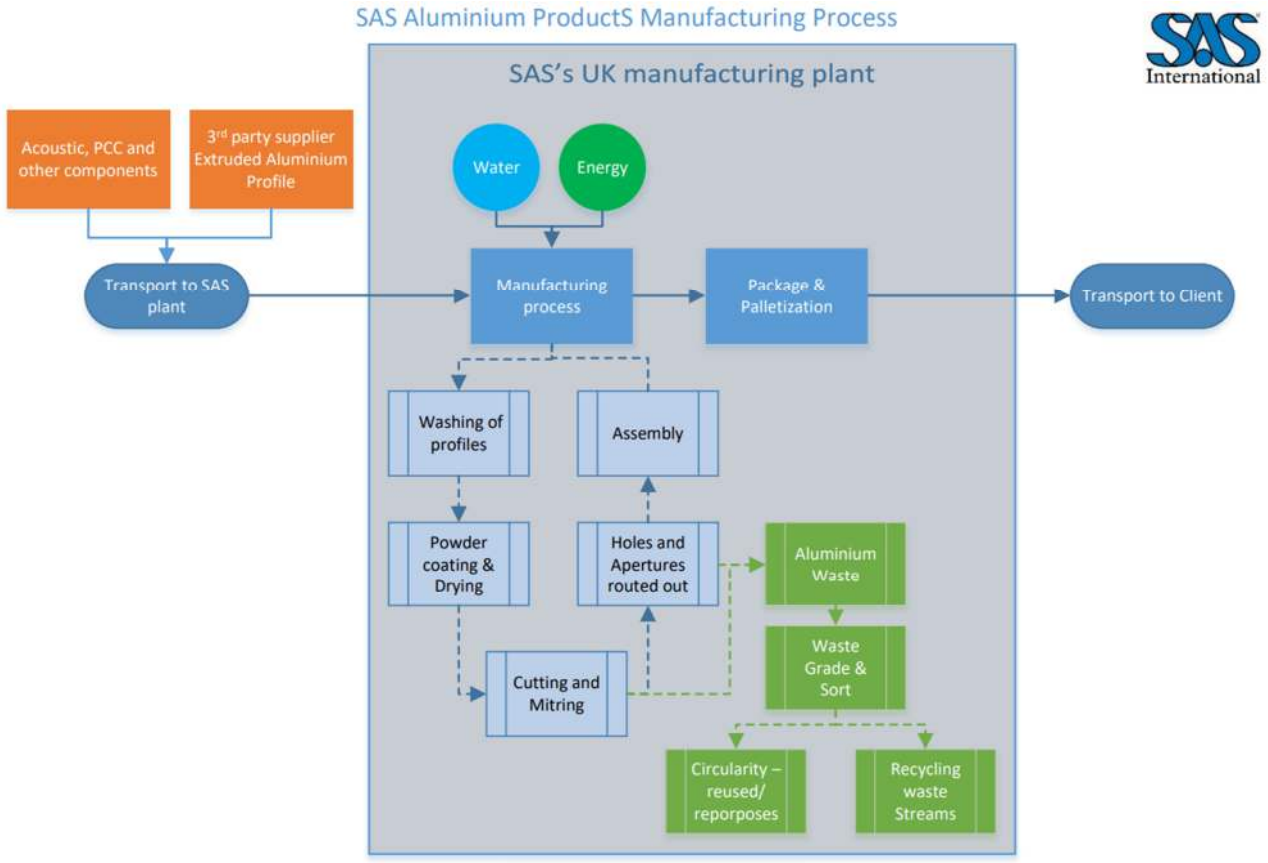
Material/Chemical Input	%
Aluminium	>99
PPC	<1

Note: Main product content of all products assessed within this average EPD

Manufacturing Process

The Bridgend factory is split into two separate units; Unit 1 is where the tile systems are formed, including the addition of the various types of acoustic padding. Key Unit 1 processes include: slitting of the Aluminium sheets, perforating, washing, spray coating and drying. These processes account for the most energy intensive stages of the products life cycle. Unit 2 is where the grid systems are rolled and formed; it houses less energy-intensive processes than Unit 1.

Process flow diagram



Construction Installation

Each SAS system is developed as a finished product, ready for installation without further preparation or finishes.

Use Information

- Office spaces
- Meeting spaces
- Co-working spaces
- Educational institutions
- Public buildings
- Retail premises
- Airports
- Restaurants
- Leisure centres
- Exhibition spaces

End of Life

At the end of its service life, SAS international ceiling product will be removed manually from the building without the use of power tools. As the product is made up of Aluminium which has a valuable recycling or repurposing percentage, it will therefore be either recovered by SAS or sent to processing unit for recycling.

According to BRE PCR EN15804 A2, the end-of-life scenario for the aluminium products is 95% to recycling and 5% is considered as a natural loss during the recycling process. In addition, the powder coated material which weights <0.1% of the overall composition which can't be recycled at end of life, and it will be landfilled.

Benefits and loads beyond the system boundary (module D) accounts for the environmental benefits and loads resulting from Aluminium which is used as raw material that is collected for recycling at end of life. These benefits and loads are calculated by excluding the pre-existing recycled aluminium content that is used in the primary process

Life Cycle Assessment Calculation Rules

Declared / Functional unit description

1kg of SAS Horizon Aluminium with a Polyester powder coated (PPC) finish ceiling product/system

System boundary

This is a cradle-to-gate with modules C & 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 2023 Product Category Rules (PN 514 Rev 3.1).

Data sources, quality and allocation

SAS International Aluminium ceiling systems are available in various systems, sizes and perforated and manufactured with the same basic method with only the geometry of each system that varies between systems and nothing more specifically in the composition and it follows the same manufacturing process. Therefore, in this LCA\EPD modelling, the quantity used in the data collection for this EPD is the total quantity of SAS Horizon Aluminium Product group manufactured during the data collection period (29/01/2023 - 29/12/2023) have been used.

Allocation by mass has been used to calculate the amount of input energy flow - natural gas, water, and waste flows per selected products according to the provisions of the BRE PCR PN514 and EN 15804. Raw material quantities have been uplifted 1% proportionally to account for production wastes. All production waste is taken

by a third-party supplier, and since the economic value of the waste sold is less than 1% of SAS's total revenue, the waste has been allocated by mass.

SAS International generally receives aluminium profiles from a third-party supplier, and the manufacturer has an EPD for the aluminium profiles where the environmental impacts are calculated for 1 kg of aluminium. Using the manufacturers EPD, the Ecoinvent dataset was adjusted to match the supplier specs for recycled content (post-consumer) and fed into the LINA tool as a raw material. Additional processing impacts from the SAS manufacturing unit have been calculated, and the results are enclosed in this EPD.

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 EN15804 A2

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).	n/a
Very Good	n/a	n/a	There is approximately 1-2 years between the Ecoinvent LCI reference year, and the time period for which the LCA was undertaken.

Specific UK and European have been selected from the ecoinvent LCI for this LCA. Manufacturer uses the on-site solar PV system and national grid electricity 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 electricity, GB kWh is 0.239 kgCO2e/kWh and for the 1 kWh of solar PV, GB kWh is 0.077 is kgCO2e/kWh. Further, the manufacturer uses Natural gas for office heating, so therefore Natural gas, at industrial furnace (kWh) has been used and the GWP carbon footprint for using 1kWh of the UK natural gas is 0.232 kg CO2eq.

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

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

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	3.65E+00	3.62E+00	1.05E-02	1.47E-02	1.99E-07	2.66E-02	4.45E-04
	Transport	A2	2.73E-02	2.73E-02	2.33E-05	1.07E-05	6.32E-09	1.11E-04	1.76E-06
	Manufacturing	A3	1.10E-01	1.16E-01	-6.68E-03	1.49E-04	1.04E-08	2.73E-04	2.50E-05
	Total (Consumption grid)	A1-3	3.78E+00	3.77E+00	3.89E-03	1.49E-02	2.16E-07	2.70E-02	4.72E-04
Construction process stage	Transport	A4	MND	MND	MND	MND	MND	MND	MND
	Construction	A5	MND	MND	MND	MND	MND	MND	MND
Use stage	Use	B1	MND	MND	MND	MND	MND	MND	MND
	Maintenance	B2	MND	MND	MND	MND	MND	MND	MND
	Repair	B3	MND	MND	MND	MND	MND	MND	MND
	Replacement	B4	MND	MND	MND	MND	MND	MND	MND
	Refurbishment	B5	MND	MND	MND	MND	MND	MND	MND
	Operational energy use	B6	MND	MND	MND	MND	MND	MND	MND
	Operational water use	B7	MND	MND	MND	MND	MND	MND	MND
95% Recycling and 5% 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	0.00E+00
	Transport	C2	4.54E-03	4.54E-03	4.41E-06	1.63E-06	1.08E-09	1.89E-05	2.83E-07
	Waste processing	C3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Disposal	C4	1.97E-03	1.95E-03	1.76E-05	2.18E-06	2.13E-10	1.30E-05	5.75E-07
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-3.82E+00	-3.83E+00	1.12E-02	-5.10E-03	-1.13E-07	-2.45E-02	-1.14E-03

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

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 &metals	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	3.05E-03	1.18E-03	1.00E-02	3.17E-06	4.05E+01	1.01E+01	8.13E-09
	Transport	A2	3.34E-05	3.65E-04	1.12E-04	9.49E-08	4.13E-01	1.86E-03	2.36E-09
	Manufacturing	A3	1.38E-04	8.18E-04	3.24E-04	1.05E-06	2.40E+00	3.45E-02	2.69E-09
	Total (Consumption grid)	A1-3	3.22E-03	2.36E-03	1.05E-02	4.31E-06	4.33E+01	1.01E+01	1.32E-08
Construction process stage	Transport	A4	MND	MND	MND	MND	MND	MND	MND
	Construction	A5	MND	MND	MND	MND	MND	MND	MND
Use stage	Use	B1	MND	MND	MND	MND	MND	MND	MND
	Maintenance	B2	MND	MND	MND	MND	MND	MND	MND
	Repair	B3	MND	MND	MND	MND	MND	MND	MND
	Replacement	B4	MND	MND	MND	MND	MND	MND	MND
	Refurbishment	B5	MND	MND	MND	MND	MND	MND	MND
	Operational energy use	B6	MND	MND	MND	MND	MND	MND	MND
	Operational water use	B7	MND	MND	MND	MND	MND	MND	MND
95% Recycling and 5% 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	0.00E+00
	Transport	C2	5.78E-06	6.32E-05	2.03E-05	1.04E-08	7.07E-02	3.42E-04	5.34E-10
	Waste processing	C3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Disposal	C4	3.21E-06	3.45E-05	1.02E-05	4.32E-09	2.78E-02	8.79E-04	1.94E-10
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-4.10E-03	-4.28E-02	-1.23E-02	-3.30E-06	-3.44E+01	-4.55E-01	-3.16E-07

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.

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	8.51E-03	4.14E+00	1.75E-10	3.95E-09	7.34E-01
	Transport	A2	2.12E-03	3.22E-01	1.04E-11	3.38E-10	2.83E-01
	Manufacturing	A3	4.55E-02	2.17E+00	5.05E-11	1.28E-09	1.92E+00
	Total (Consumption grid)	A1-3	5.62E-02	6.64E+00	2.35E-10	5.57E-09	2.93E+00
Construction process stage	Transport	A4	MND	MND	MND	MND	MND
	Construction	A5	MND	MND	MND	MND	MND
Use stage	Use	B1	MND	MND	MND	MND	MND
	Maintenance	B2	MND	MND	MND	MND	MND
	Repair	B3	MND	MND	MND	MND	MND
	Replacement	B4	MND	MND	MND	MND	MND
	Refurbishment	B5	MND	MND	MND	MND	MND
	Operational energy use	B6	MND	MND	MND	MND	MND
	Operational water use	B7	MND	MND	MND	MND	MND
95% Recycling and 5% Landfill							
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	3.58E-04	5.52E-02	1.53E-12	6.05E-11	8.09E-02
	Waste processing	C3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Disposal	C4	1.62E-04	3.10E+01	1.81E-12	4.78E-11	3.55E-02
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-4.52E-02	-9.84E+01	-3.95E-09	-8.42E-08	-7.14E+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.

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	-1.51E+01	4.93E-03	-3.02E+01	4.11E+01	4.97E-01	8.10E+01
	Transport	A2	5.81E-03	0.00E+00	5.81E-03	4.05E-01	0.00E+00	4.05E-01
	Manufacturing	A3	6.67E-01	2.32E-01	9.00E-01	2.82E+00	3.05E-02	2.85E+00
	Total (Consumption grid)	A1-3	-1.44E+01	2.37E-01	-2.93E+01	4.43E+01	5.27E-01	8.42E+01
Construction process stage	Transport	A4	MND	MND	MND	MND	MND	MND
	Construction	A5	MND	MND	MND	MND	MND	MND
Use stage	Use	B1	MND	MND	MND	MND	MND	MND
	Maintenance	B2	MND	MND	MND	MND	MND	MND
	Repair	B3	MND	MND	MND	MND	MND	MND
	Replacement	B4	MND	MND	MND	MND	MND	MND
	Refurbishment	B5	MND	MND	MND	MND	MND	MND
	Operational energy use	B6	MND	MND	MND	MND	MND	MND
	Operational water use	B7	MND	MND	MND	MND	MND	MND
95% Recycling and 5% 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	8.99E-04	0.00E+00	8.99E-04	6.94E-02	0.00E+00	6.94E-02
	Waste processing	C3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Disposal	C4	1.79E-03	0.00E+00	1.79E-03	2.75E-02	0.00E+00	2.75E-02
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-2.10E+00	0.00E+00	-2.10E+00	-3.42E+01	0.00E+00	-3.42E+01

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)

(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	8.14E-01	0.00E+00	0.00E+00	2.00E-01
	Transport	A2	0.00E+00	0.00E+00	0.00E+00	4.60E-05
	Manufacturing	A3	1.18E-02	1.11E-06	0.00E+00	1.03E-03
	Total (Consumption grid)	A1-3	8.26E-01	1.11E-06	0.00E+00	2.01E-01
Construction process stage	Transport	A4	MND	MND	MND	MND
	Construction	A5	MND	MND	MND	MND
Use stage	Use	B1	MND	MND	MND	MND
	Maintenance	B2	MND	MND	MND	MND
	Repair	B3	MND	MND	MND	MND
	Replacement	B4	MND	MND	MND	MND
	Refurbishment	B5	MND	MND	MND	MND
	Operational energy use	B6	MND	MND	MND	MND
	Operational water use	B7	MND	MND	MND	MND
95% Recycling and 5% Landfill						
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	0.00E+00	0.00E+00	0.00E+00	8.41E-06
	Waste processing	C3	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Disposal	C4	0.00E+00	0.00E+00	0.00E+00	2.13E-05
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	0.00E+00	0.00E+00	0.00E+00	-1.22E-02

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

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	1.77E-02	8.90E-01	8.73E-04
	Transport	A2	4.55E-04	8.08E-03	2.79E-06
	Manufacturing	A3	3.68E-03	7.53E-02	1.42E-05
	Total (Consumption grid)	A1-3	2.18E-02	9.73E-01	8.90E-04
Construction process stage	Transport	A4	MND	MND	MND
	Construction	A5	MND	MND	MND
Use stage	Use	B1	MND	MND	MND
	Maintenance	B2	MND	MND	MND
	Repair	B3	MND	MND	MND
	Replacement	B4	MND	MND	MND
	Refurbishment	B5	MND	MND	MND
	Operational energy use	B6	MND	MND	MND
	Operational water use	B7	MND	MND	MND
95% Recycling and 5% Landfill					
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	7.45E-05	1.30E-03	4.74E-01
	Waste processing	C3	0.00E+00	0.00E+00	0.00E+00
	Disposal	C4	7.60E-04	5.45E-02	1.10E-07
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-7.57E-01	-4.74E+00	-3.93E-05

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

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	2.45E-04
	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	6.70E-04	1.02E-08	9.32E-04	-2.40E-03	-5.20E-03
	Total (Consumption grid)	A1-3	0.00E+00	6.70E-04	1.02E-08	9.32E-04	-2.40E-03	-4.96E-03
Construction process stage	Transport	A4	MND	MND	MND	MND	MND	MND
	Construction	A5	MND	MND	MND	MND	MND	MND
Use stage	Use	B1	MND	MND	MND	MND	MND	MND
	Maintenance	B2	MND	MND	MND	MND	MND	MND
	Repair	B3	MND	MND	MND	MND	MND	MND
	Replacement	B4	MND	MND	MND	MND	MND	MND
	Refurbishment	B5	MND	MND	MND	MND	MND	MND
	Operational energy use	B6	MND	MND	MND	MND	MND	MND
	Operational water use	B7	MND	MND	MND	MND	MND	MND
95% Recycling and 5% 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	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	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

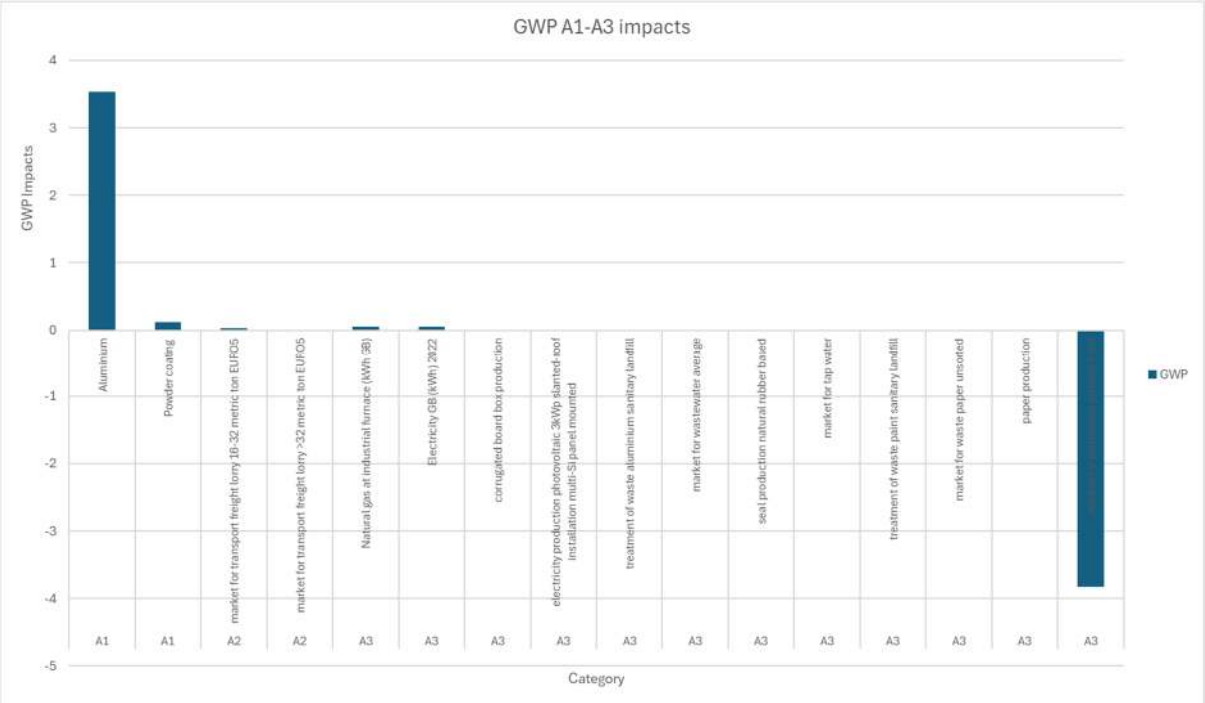
Scenarios and additional technical information

Scenarios and additional technical information			
Scenario	Parameter	Units	Results
C1 – Deconstruction	At the end of its service life, SAS international ceiling product will be removed manually from the building without the use of power tools. As the product is made up of Aluminium which has a valuable recycling or repurposing percentage, it will therefore be either recovered via SAS or sent to a processing unit for recycling. It is assumed as 100% recovery rate from the deconstruction unit		
C2 – Transportation	50km by road has been modelled for module C2 as a typical distance from the demolition site to the pre-processing unit. However, end-users of the EPD can use this information to calculate the impacts of a bespoke transport distance for module C2 if required	Liters per km	0.267
	Type of transport – Road transport	Lorry	16-32 tonne
	Deconstruction site to waste processing unit	km	50
C3 – Waste processing	1kg is of Aluminium composition, and it is assumed that at "End of Life" the product and its associated metal components can be dismantled and sorted into the various waste/ recycling routes. As part of dismantling the system and sorting process, powder coated finished materials do not need to be removed from components and will be managed via existing industry recycling routes/ methods. This sustainable practice contributes to resource conservation and reduces the demand for new raw materials. SAS Ceiling tiles, which are primarily composed of aluminium with a small amount of powder coating paint, follow a waste processing procedure where 95% of the aluminium is recycled, and the remaining 5% is considered natural loss during processing (BRE PCR 3.1). The energy and materials used for sorting processes have not been included in Module C3 because they are assumed to be very small and effectively negligible.		
	Aluminium – 95% recycling	kg	0.95
C4 – Disposal	The 5% aluminium waste, along with some of the powder-coated paint associated with the aluminium, cannot be recovered due to the small amount and inability to separate it from the aluminium waste. Therefore, it ends up in landfills.		
	Unrecovered Aluminium waste with the small amount of powder coated waste	kg	0.05

Scenarios and additional technical information			
Scenario	Parameter	Units	Results
Module D	"Benefits and loads beyond the system boundary" (module D) accounts for the environmental benefits and loads resulting from waste Aluminium which is collected for recycling at end of life. These benefits and loads are calculated by excluding the pre-existing recycled aluminium that is used in the primary process. At the end of its working life, 1kg of the product becomes 0.95 kg of scrap aluminium, as a small percentage will have been lost due to wear; this 95% of the product will be recycled. In order to calculate the benefits of the product at Module D, the pre-existing recycled content will be excluded. In the 1 kg of Aluminium, the given SAS Aluminium supplier has 81% of the post-consumer waste dataset. Therefore, the benefits of recycling aluminium should be calculated by avoiding the pre-existing recycled content. In the 95% of the recycling content, the scrap aluminium content is 0.78 kg and virgin aluminium content of 0.17kg. Therefore, the pre-existing scrap content should be avoided, and benefits has been calculated only for the virgin aluminium i.e., 0.17kg. In line with this, 0.17 kg of aluminium recovered from the demolition sites can be used to offset the impacts of 0.17 kg of virgin aluminium material in A1. It is assumed that there is a 100% recycling yield from the recycling process. Recycling percentage 95%, scrap aluminium content = 0.81 = 95%*0.81 = 0.78 kg Primary aluminium content = 0.18 kg = 0.18*95% = 0.17 kg		

Interpretation of results:

The bulk of the environmental impacts are attributed to the manufacturing of Aluminium covered by information modules A1-A3 of EN15804:2012+A2:2019.



Individual product calculation:

The LCA analysis is conducted for 1kg of SAS Horizon Aluminium with a Polyester powder coated (PPC) finish ceiling product/system with the weight of 1 kg for use in ceiling applications. The table with the individual product/system weight is given so that the end user of this EPD can use these results to calculate the impact profiles of each SAS ceiling system with different dimensions by using the Scaling Factor Table provided.

The below product/system covered in the EPD:

Property	Dimensions Length x Width x Thickness (mm)	Aluminium - Scaling Factor Table			
		Plain*	D1522*	D3939*	D8063*
SAS120	600x600x30	2.7	2.2	1.9	1.4
SAS130	600x600x30	2.4	1.9	1.6	1.1
SAS140	2000x400x38	2.7	2.2	1.9	1.4
SAS170	1200x600x36.5	3.6	3.0	2.6	2.0
SAS175	1200x600x30	3.6	3.0	2.6	2.0
SAS175 - Triangular	1200x30mm SIDE	2.8	2.4	2.0	1.5
SAS200	1200x300x70	3.7	3.1	2.7	2.1
SAS205	1200x300x30	3.5	3.0	2.6	2.0
SAS310	1200x300x30	3.4	2.8	2.4	1.8
SAS330	1200x300x30	3.7	3.1	2.7	2.1
SAS330 C-Profile	100x30mm Profile	3.7	N/A	N/A	N/A
SAS330A	1200x300x30	3.7	3.1	2.7	2.1
SAS380 Data Centre Tile	1149x549x48	2.9	N/A	N/A	N/A
SAS380 Data Centre Profile	45mm To suit tile module	6.0	N/A	N/A	N/A
SAS385 Heavy-Duty Data Centre Tile	1149x549x16	2.4	N/A	N/A	N/A
SAS385 Heavy-Duty Data Centre Profile	70mm To suit tile module	11.0	N/A	N/A	N/A
SAS500 - standalone	1500x300x50	4.0	3.7	3.4	3.1
SAS500 - continuous	1500x300x50	4.0	3.7	3.4	3.1
SAS500 - open grid	1500x300x50	4.0	3.6	3.4	3.0
SAS510 - continuous	1500x300x50	4.0	3.7	3.4	3.1
SAS600 (Skye)	1500x600x45	3.5	2.9	2.5	1.8
SAS720	100x30 wide 200 ctrs	3.7	N/A	N/A	N/A
SAS730 (Profile)	H-line 50 CTRS 3m 29.4x36	6.6	N/A	N/A	N/A
SAS740 (Profile)	200 CTRS TCA0887 100x40	6.4	N/A	N/A	N/A
SAS750 (Profile)	50 DIA 100 CTRS	6.2	N/A	N/A	N/A
SAS Pin Wall	1800x600x60	3.3	2.7	N/A	N/A
SASWP10	1800x600x37	3.2	2.6	N/A	N/A

Property	Dimensions Length x Width x Thickness (mm)	Aluminium - Scaling Factor Table			
		Plain*	D1522*	D3939*	D8063*
SASWP20	1800x600x42	3.2	2.6	N/A	N/A
SASWP120	3x3 arrangement using 600x600x30 tiles	2.7	2.2	N/A	N/A
SAS900	980x30mm	2.7	2.2	1.9	1.4

Note:

*Plain – Plain tile without any Perforation

*D1522 – Diagonal pitch to edge of tile, Ø1.5 mm perforation, 22% open area

*D3939 – Diagonal pitch to edge of tile, Ø3.9 mm perforation, 39% open area

*D8063 – Diagonal pitch to edge of tile, Ø8.0 mm perforation, 63% open area

Product Specific Scaling Formula: Environmental Impact/GWP per m² product/system X scaling factor

For example, Calculating the environmental impact of SAS310 with 1522 Perf in Aluminum:

SAS310 with 1522 Perf 2.8 (Scaling Factor) x 3.78 (GWP Total) = 10.58Kg/CO2/m2

	Module	1 kg of aluminium	SAS 310 perf
Raw Material	A1	3.65E+00	6.57E+00
Transport	A2	2.73E-02	4.91E-02
Manufacturing	A3	1.10E-01	1.98E-01
total	A1-A3	3.78E+00	6.80E+00
For more information on the individual product weight per m2, please contact SAS international technical team			

Explanation of non-entries:

No emissions to air, water and soil have been included in A3 as are not required to be measured on site by local/ national enforcement agencies as any emissions are below reportable levels. SAS carries out annual inspection and testing of curing ovens and effluent wastewater as part of internal environmental management system and ISO 14001 record management process. Emissions from fuels used are included within the relevant datasets. No ancillary materials are required in association with the production of the system and therefore not included within the LCA.

References

BSI. Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products. BS EN 15804:2012+A2:2019. London, BSI, 2019.

BSI. Environmental labels and declarations – Type III Environmental declarations – Principles and procedures. BS EN ISO 14025:2010 (exactly identical to ISO 14025:2006). London, BSI, 2010.

BSI. Environmental management – Life cycle assessment – Principles and framework. BS EN ISO 14040:2006. London, BSI, 2006.

BSI. Environmental management – Life cycle assessment – requirements and guidelines. BS EN ISO 14044:2006. London, BSI, 2006.

BS EN 13964.2014 London BSI 2014 - BSI Suspended Ceilings Requirements and Test Methods