Statement of Verification

BREG EN EPD No.: 000698 Issue 01

This is to verify that the

Environmental Product Declaration

provided by:

MW Insulation Ltd

BRE Global Verified EPD

is in accordance with the requirements of:

EN 15804:2012+A2:2019

and

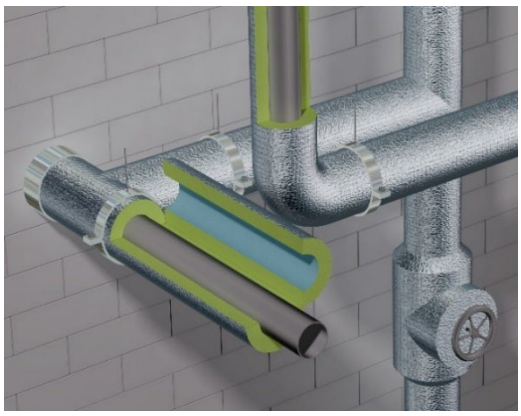
BRE Global Scheme Document SD207

This declaration is for:

1 linear metre of Supaphen phenolic pipe insulation of specified pipe diameter and insulation thickness with the weight of 1kg/m

Company Address

MW Insulation Ltd
Unit 2
Guinness Road Trading Estate
Trafford Park
Manchester
M17 1SB



MW insulation

UK Manufacturers of Thermal Insulation Products
www.mwinsulation.co.uk

Signed for BRE Global Ltd	Hayley Thomson Operator	22 April 2025 Date of this Issue
22 April 2025 Date of First Issue		21 April 2030 Expiry Date

BRE Global Verified EPD

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ECO PLATFORM EPD VERIFIED

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Environmental Product Declaration

EPD Number: 000698

General Information

EPD Programme Operator	Applicable Product Category Rules
BRE Global Watford, Herts WD25 9XX United Kingdom	BRE Environmental Profiles 2023 Product Category Rules for Type III environmental product declaration of construction products to EN 15804+A2 PN 514 Rev 3.1
Commissioner of LCA study	**LCA consultant/Tool**
MW Insulation Ltd Unit 2 Guinness Road Trading Estate Trafford Park Manchester M17 1SB	Bala Subramanian/ BRE LINA A2
Declared/Functional Unit	**Applicability/Coverage**
1 linear metre of Supaphen phenolic pipe insulation of specified pipe diameter and insulation thickness with the weight of 1kg/m.	Other (please specify). Product specific
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

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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)

MW Insulation Ltd
Unit 2
Guinness Road Trading Estate
Trafford Park
Manchester
M17 1SB

Construction Product:

Product Description

Supaphen is a high performance phenolic thermal pipe insulation which meets the requirements of European standard EN14314 and is used primarily for the lagging of chilled, cold, hot and heating pipe work. Supaphen is highly thermally efficient with an independently tested K value (thermal conductivity) of 0.025 W/m. K at 10ºC mean temperature. Supaphen is manufactured as a rigid block at a standard density of 40kg/m^3. MW Insulation cuts pipe sections from these blocks to very close tolerances ensuring a close fit to the pipe. The pipe insulation is fabricated into a range of diameters/thicknesses for use as insulation in the building services and process pipe work.

In this EPD, the LCA results of 1 linear meter of Supaphen phenolic pipe insulation with the weight of 1kg/m and per m^2 of Supaphen aluminium facer with the weight of 0.0596 kg/m^2 has been included. The results per linear metre can be obtained by multiplying the specified weight of the foam in the pipe insulation and area of the facer, by the relevant pipe insulation and facer results, respectively, in the LCA results tables. The dimensions (outer pipe diameter and insulation thickness), of 25 of the most commonly sold Supaphen phenolic pipe insulation products have been given alongside the corresponding foam weight and facer area, to facilitate this calculation

Technical Information

Property	Value, Unit
Density of Supaphen foam for products covered	40 kg/m^3
Foam colour	Green
Thermal conductivity of foam (EN12667), at 10°C	0.025 W/m. K max
Supaphen is closed cell, resisting moisture ingress. Supaphen is fire and smoke safe and has been independently tested at Exova Warrington Fire in the UK as a pipe section to the required standard EN13501-1 achieving a rating of BL s1 d0.	

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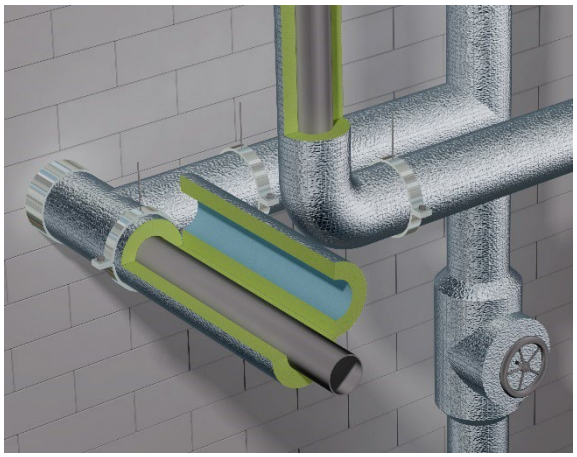
For more information, please contact MW insulation technical team or visit
https://www.mwinsulation.co.uk/products/supaphen/



Main Product Contents

Clearly, the proportion of raw material input per linear metre of pipe insulation varies depending on the dimensions of the pipe. However, the average raw material inputs by percentage solid content for the faced Supaphen phenolic pipe insulation, based raw material usage as provided by MW Insulation, can be found in the table below:

Material/Chemical Input	%
Phenolic foam	80-85
Adhesive	1-10
Bore coating	5-10
Aluminium Factor	1-10

Manufacturing Process

Raw phenolic foam blocks received from upstream manufacturers are fabricated into pipe section using CNC cutting machines. The sections are stripped from cut blocks and the carcass of block is compacted and put in skip in bags as waste. The cut sections are dedusted and bore coated. Adhesive and aluminium foil is applied to the bore coated section and the finished faced product placed in cardboard carton for dispatch.

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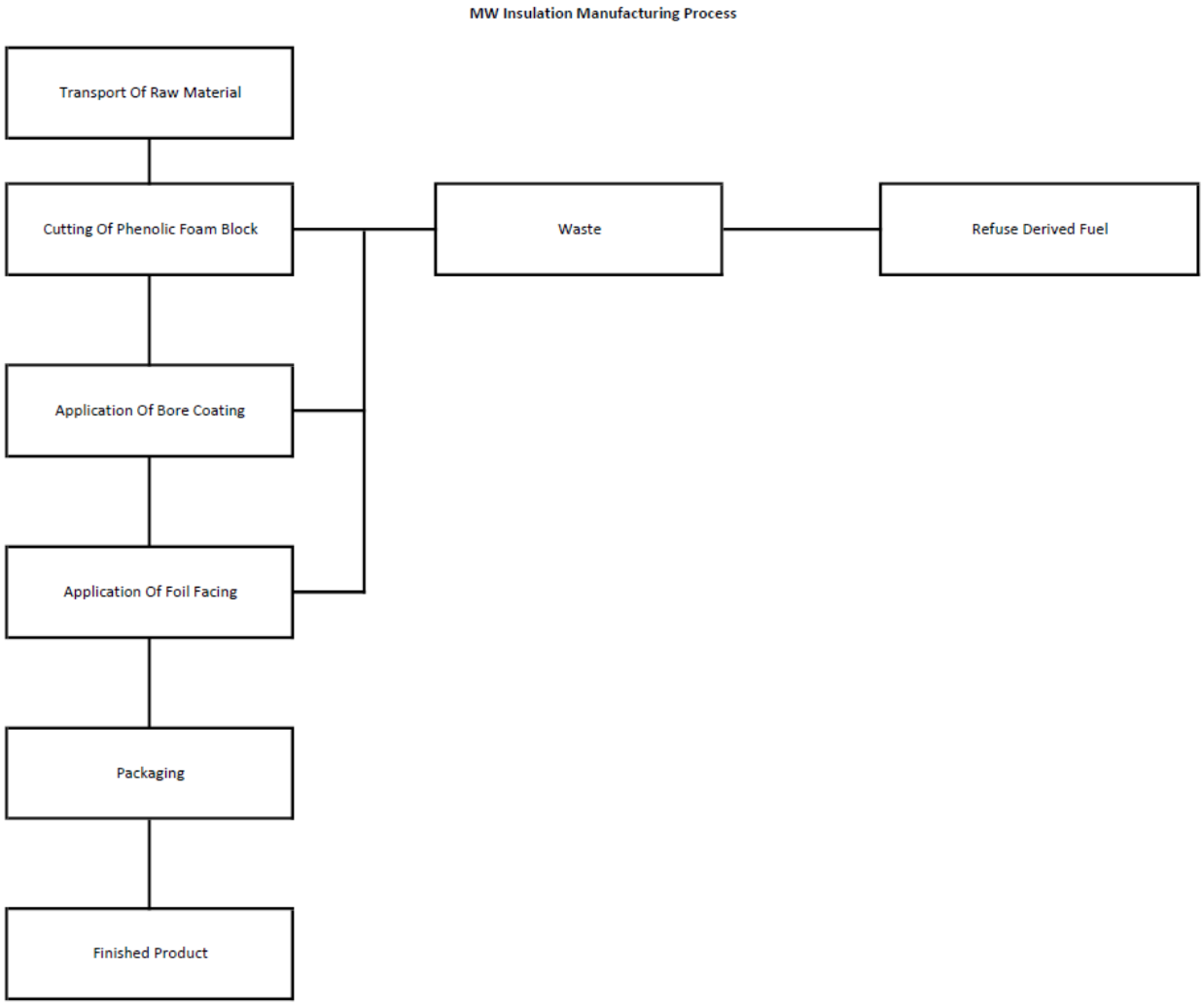
Process flow diagram



End of Life

Supaphen Rigid Phenolic Foam Pipe Insulation is composed of phenolic foam and aluminium foil. During the manufacturing process, the Aluminium foil is adhered to the foam using adhesives, making it inseparable from the final product. Therefore, it is assumed that the entire pipe will be treated as foam waste at the waste processing unit. There are currently no methods for recycling insulation foams; once the foam has been broken up, it cannot be reprocessed because the foam structure is compromised, leaving landfill and combustion the only viable forms of disposal. In this LCA analysis, the industrial average waste scenario has been applied to the phenolic foam pipe. According to the BRE PCR 3.1, 100% of the foam product will be incinerated for energy recovery. Phenolic structure is similar to polyurethane therefore the polyurethane end of life dataset has been selected as a proxy for the LCA analysis.

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Life Cycle Assessment Calculation Rules

Declared unit description.

1 linear metre of Supaphen phenolic pipe insulation of specified pipe diameter and insulation thickness with the weight of 1kg/m.

System boundary

This is a cradle to gate with module C and D LCA of EPS manufactured by MW Insulation Ltd manufactured in the United Kingdom, reporting all production life cycle stages of modules A1 to A3 and end-of-life stages C1-C4, and D. It follows the modular design defined in EN15804:2012+A2:2019 and BRE 2023 Product Category Rules (PN 514 Rev 3.1).

Data sources, quality and allocation

The datasets are derived from Ecoinvent v3.8, and the LCA tool used was BRE LINA A2 using manufacturer specific data provided by MW Insulation for their production site in the UK, covering a 12-month data period from 1st July 2022 to 30th June 2023. In this EPD, two LCA results have been included: one for 1 linear meter of unfaced Supaphen phenolic pipe insulation with the weight of 1 kg/m and another one for 1 m² of Supaphen aluminium facer with the weight of 0.0596 kg/m^2. The Supaphen phenolic pipe insulation is sold to third-party suppliers on a linear meter basis, with varying lengths. Typically, the phenolic pipe consists of foam and an aluminium facer. The phenolic foam is cut into blocks, and adhesives and aluminium foil are applied over the foam blocks to create the final insulation pipe. The aluminium foil is measured in square meters (m²), while the foam blocks are measured in linear meter (m). To ensure accurate impact calculations, the LCA analysis was conducted separately for 1 linear meter of foam with the weight of 1 kg/m and 1 m² of aluminium facer with the weight of 0.0596 kg/m^2. Therefore, the end user of this EPD can therefore enable the bespoke impacts for the faced Supaphen pipe section used on the construction site. The guidance has been provided in the LCA results section.

In addition, MW insulation receives the phenolic foam from their supplier, and they are based in Netherlands. The manufacturer has provided the production data of phenolic foam and by using the manufacturer's data the LCA analysis is conducted for 1 kg/m^3 of Phenolic foam and fed into the LINA background and used for the MW insulation analysis. The LCA analysis has been conducted by following the EN 15804 data quality assessment. All the transportation and packaging has been included in the analysis. The electricity, waste, and water usage has been allocated based on the m3 basis as their production line is metered on a m^3 basis. Therefore, the allocation is by m3. The manufacturer has used the national grid electricity and Natural gas for processing the phenolic foam, therefore the appropriate ecoinvent 3.8 dataset has been selected for the modelling. The GWP carbon footprint for using "1 kWh of Netherland electricity, consumption mix" is 0.6 kgCO2e/kWh and for using 1MJ of Natural has, at industrial furnace is 0.071 kgCO2e/MJ.

At the MW Insulation manufacturing site, other insulation is manufactured in addition to the Supaphen phenolic insulation, so allocation, was applied to total site processes (packaging, electricity and gas, water, waste, wastewater), with the Supaphen phenolic insulation under study, representing approximately 98% of total site manufacture on a linear metre basis. 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.

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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.

Specific UK and European have been selected from the Ecoinvent LCI for this LCA. Manufacturer uses the national grid electricity and natural gas for production, so therefore the most recent consumption mix has been used for the LCA modelling (Ecoinvent 3.8). The GWP carbon footprint for using 1 kWh of UK electricity, consumption mix is 0.239 kgCO2e/kWh and for using 1 kWh of UK Natural gas, industrial furnace is 0.232 kgCO2eq/kWh. 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

All raw materials and energy input to the manufacturing process have been included, except for direct emissions to air, water, and soil, which are not measured. The inventory process in this LCA includes all data related to raw material, packaging material and consumable items. Process energy, water use, and discharge are included and the production waste from the processing is also included in the analysis.

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LCA Results

The LCA results (see following pages) are provided in two tables; one for 1 kg/m of unfaced Supaphen phenolic pipe insulation and one for 1 m^2 of Supaphen aluminium facer with the weight of 0.0596 kg/m^2. Note that (MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated).

In order to obtain results for a linear metre of faced Supaphen phenolic insulation, first select the relevant specification of pipe from the 25 listed in the table immediately below:

Dimensions of faced Supaphen pipe section (outside diameter of pipe to be insulated in mm x insulation thickness in mm)	Foam weight (kg per linear metre)	Facer area (m^2 per linear metre)
15 x 15	0.06	0.141
21 x 15	0.07	0.160
21 x 20	0.10	0.192
27 x 20	0.12	0.211
15 x 20	0.09	0.173
34 x 20	0.14	0.233
27 x 15	0.08	0.179
42 x 20	0.16	0.258
22 x 15	0.07	0.163
27 x 25	0.16	0.242
42 x 25	0.21	0.289
22 x 20	0.11	0.195
34 x 25	0.19	0.264
21 x 25	0.14	0.223
54 x 20	0.19	0.295
34 x 15	0.09	0.201
54 x 25	0.25	0.327
28 x 20	0.12	0.214
28 x 25	0.17	0.245
15 x 25	0.13	0.204
76 x 25	0.32	0.396
60 x 25	0.27	0.346
48 x 20	0.17	0.276
48 x 25	0.23	0.308
28 x 15	0.08	0.182

Then for that specific pipe dimension, multiply the results of 1kg/m of unfaced Supaphen phenolic insulation for the foam weight in the table, and the results of 1m^2 of Supaphen aluminium facer, by the facer area in the same row. The sum of these two values for each individual results indicator, represents the results of one linear metre of that particular dimension of faced Supaphen phenolic pipe insulation.

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LCA Results – 1 kg per linear metre of Supaphen phenolic pipe

(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	7.91E+00	7.87E+00	3.16E-02	3.94E-03	3.86E-07	2.84E-02	2.04E-03
	Transport	A2	1.97E-01	1.96E-01	1.95E-04	8.16E-05	4.50E-08	8.13E-04	1.39E-05
	Manufacturing	A3	3.62E+00	3.49E+00	1.22E-01	1.99E-03	7.69E-08	6.57E-03	1.10E-03
	Total	A1-3	1.17E+01	1.16E+01	1.54E-01	6.01E-03	5.08E-07	3.58E-02	3.15E-03
100% Incineration with energy recovery									
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	8.32E-03	8.31E-03	7.08E-06	3.26E-06	1.92E-09	3.37E-05	5.35E-07
	Waste processing	C3	2.73E+00	2.73E+00	3.16E-04	3.13E-05	1.27E-08	2.35E-03	1.36E-05
	Disposal	C4	0.00E+00	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	-1.08E+00	-1.07E+00	-1.78E-03	-1.47E-03	-7.27E-08	-3.36E-03	-1.71E-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 &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	4.94E-03	5.11E-02	2.85E-02	7.24E-05	1.73E+02	4.22E+00	2.60E-07
	Transport	A2	2.47E-04	2.69E-03	8.21E-04	6.88E-07	2.97E+00	1.42E-02	1.69E-08
	Manufacturing	A3	1.87E-02	2.00E-02	3.42E-03	7.77E-06	1.39E+01	-3.34E+01	9.84E-08
	Total	A1-3	2.39E-02	7.38E-02	3.27E-02	8.09E-05	1.90E+02	-2.91E+01	3.75E-07
100% Incineration with energy recovery									
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	1.02E-05	1.11E-04	3.40E-05	2.89E-08	1.26E-01	5.65E-04	7.17E-10
	Waste processing	C3	1.81E-03	1.25E-02	2.97E-03	3.60E-07	1.50E+00	2.20E-01	7.70E-09
	Disposal	C4	0.00E+00	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	-7.92E-04	-8.77E-03	-2.15E-03	-3.03E-06	-2.86E+01	-2.04E-01	-1.64E-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	6.16E-01	1.59E+02	2.78E-08	7.37E-08	1.43E+01
	Transport	A2	1.57E-02	2.33E+00	7.77E-11	2.43E-09	2.04E+00
	Manufacturing	A3	2.52E-01	3.58E+02	3.65E-09	9.62E-08	1.68E+01
	Total (Consumption grid)	A1-3	8.84E-01	5.19E+02	3.15E-08	1.72E-07	3.32E+01
100% Incineration with energy recovery							
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	6.46E-04	9.81E-02	3.18E-12	1.03E-10	8.63E-02
	Waste processing	C3	2.16E-03	7.29E+00	2.63E-10	9.43E-09	2.60E-01
	Disposal	C4	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	-1.01E+00	-1.33E+01	-2.70E-10	-7.68E-09	-1.07E+01

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	5.25E+00	7.84E-02	1.04E+01	9.00E+01	8.04E+01	3.34E+02
	Transport	A2	4.10E-02	0.00E+00	4.10E-02	2.86E+00	0.00E+00	2.86E+00
	Manufacturing	A3	3.56E+00	2.80E+00	6.36E+00	-2.12E+01	3.28E+01	1.15E+01
	Total	A1-3	8.84E+00	2.88E+00	1.67E+01	7.17E+01	1.13E+02	3.48E+02
100% Incineration with energy recovery								
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	1.77E-03	0.00E+00	1.77E-03	1.23E-01	0.00E+00	1.23E-01
	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	-5.19E+00	0.00E+00	-5.19E+00	-2.85E+01	0.00E+00	-2.85E+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

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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	2.92E-05	0.00E+00	0.00E+00	8.28E-03
	Transport	A2	0.00E+00	0.00E+00	0.00E+00	3.53E-04
	Manufacturing	A3	2.04E-01	4.54E-06	0.00E+00	-7.76E-01
	Total	A1-3	2.04E-01	4.54E-06	0.00E+00	-7.67E-01
100% Incineration with energy recovery						
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	1.40E-05
	Waste processing	C3	0.00E+00	0.00E+00	0.00E+00	5.14E-03
	Disposal	C4	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	-5.20E-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	3.51E-01	9.51E+00	1.95E-04
	Transport	A2	3.21E-03	5.70E-02	1.97E-05
	Manufacturing	A3	9.31E-02	2.01E+00	7.60E-05
	Total	A1-3	4.48E-01	1.16E+01	2.91E-04
100% Incineration with energy recovery					
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	1.39E-04	2.46E-03	8.50E-07
	Waste processing	C3	0.00E+00	0.00E+00	0.00E+00
	Disposal	C4	0.00E+00	0.00E+00	0.00E+00
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-5.92E-02	-8.19E-01	-2.52E-04

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	2.31E-02	3.65E-08	3.68E-03	5.29E-03	-9.29E-02
	Total	A1-3	0.00E+00	2.31E-02	3.65E-08	3.68E-03	5.29E-03	-9.29E-02
100% Incineration with energy recovery								
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

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LCA Results – 1 m^2 of Supaphen aluminium facer with the weight of 0.0596 kg/m^2

(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	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 (Consumption grid)	A1-3	1.08E+00	1.08E+00	-1.64E-03	2.31E-04	3.75E-08	1.02E-02	6.06E-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

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	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 (Consumption grid)	A1-3	1.36E-03	1.39E-02	4.00E-03	1.27E-06	1.09E+01	8.56E-02	6.15E-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	AGG	AGG	AGG	AGG	AGG
	Transport	A2	AGG	AGG	AGG	AGG	AGG
	Manufacturing	A3	AGG	AGG	AGG	AGG	AGG
	Total (Consumption grid)	A1-3	6.65E-02	1.91E+01	1.15E-09	2.18E-08	2.24E+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.

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 (Consumption grid)	A1-3	2.19E-01	0.00E+00	0.00E+00	1.09E+01	0.00E+00	0.00E+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	AGG	AGG	AGG	AGG
	Transport	A2	AGG	AGG	AGG	AGG
	Manufacturing	A3	AGG	AGG	AGG	AGG
	Total (Consumption grid)	A1-3	1.35E-03	3.83E-05	0.00E+00	2.69E-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

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 (Consumption grid)	A1-3	1.73E-01	2.86E+00	2.63E-05

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	Biogenic carbon (product)	Biogenic carbon (packaging)
			kg	kg	kg	MJ per energy carrier	kg C	kg C
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 (Consumption grid)	A1-3	0.00E+00	9.35E-05	3.36E-07	3.97E-03	0.00E+00	8.70E-05

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

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Scenarios and additional technical information

Scenarios and additional technical information			
Scenario	Parameter	Units	Results
C1 - Deconstruction	Supaphen Rigid Phenolic Foam Pipe Insulation is used in various industrial and commercial applications due to its excellent thermal properties, fire resistance, and moisture resistance. Once it reaches the end of its life, the product will be removed from the building either manually or using cutting machines. The deconstruction scenario is not included in the analysis. It is assumed that 100% of the waste materials will be recovered from the construction site and sent to a waste processing site for processing.		
C2 – Transportation	50km by road has been modelled for module C2 as a typical distance from the demolition site to the waste processing site. However, end-users of the EPD can use this information to calculate the impacts of a bespoke transport distance for module C2 if required.	km	50
	Transport type: Lorry 10-32 metric ton	Fuel per km	0.267
C3 – Waste processing	Supaphen Rigid Phenolic Foam Pipe Insulation is composed of phenolic foam and aluminium foil. During the manufacturing process, the Aluminium foil is adhered to the foam using adhesives, making it inseparable from the final product. Therefore, it is assumed that the entire pipe will be treated as foam waste at the waste processing unit. There are currently no methods for recycling insulation foams; once the foam has been broken up, it cannot be reprocessed because the foam structure is compromised, leaving landfill and combustion the only viable forms of disposal. In this LCA analysis, the industrial average waste scenario has been applied to the phenolic foam pipe. According to the BRE PCR 3.1, 100% of the foam product will be incinerated for energy recovery. Phenolic structure is similar to polyurethane therefore the polyurethane end of life dataset has been selected as a proxy for the LCA analysis		
	Supaphen Rigid Phenolic Foam Pipe Insulation to incineration	100% incineration	39.9 kg
C4- Disposal	No waste to Landfill as 100% of the product will be incinerated at the Waste processing unit		
Module D	“Benefits and loads beyond the system boundary" (module D) accounts for the environmental benefits and loads resulting from the incineration of Phenolic Foam Pipe insulation. According to BRE PCR 3.1, 100% of the pipes will be incinerated for energy recovery. This process is energy efficient, with 37.4% of the combustion heat recovered after incineration (Environmental agency, 2013) (DEFRA, 2013). The dataset used to calculate the avoided impacts of electricity consumption in a future system was "Electricity, medium voltage {GB}| market for electricity, medium voltage | EN15804, S". Calorific value of Polyurethane – 33.18 MJ/kg (Hasanzadeh et al., 2024)		

Interpretation of results

The bulk of the environmental impacts are attributed to the manufacturing of phenolic pipe insulation, as covered by information modules A1-A3 of EN 15804:2012+A2:2019. Phenolic foam accounts for the highest environmental impact in A1 (raw material stage), contributing approximately 58.74% of the total impact. This indicates that the phenolic foam used for insulation is the most critical factor affecting overall environmental performance. The manufacturing stage (A3) has the second highest impact within the product stage, while Module C3 (waste processing of pipe insulation at the end-of-life stage) contributes the most to CO_2 emissions.

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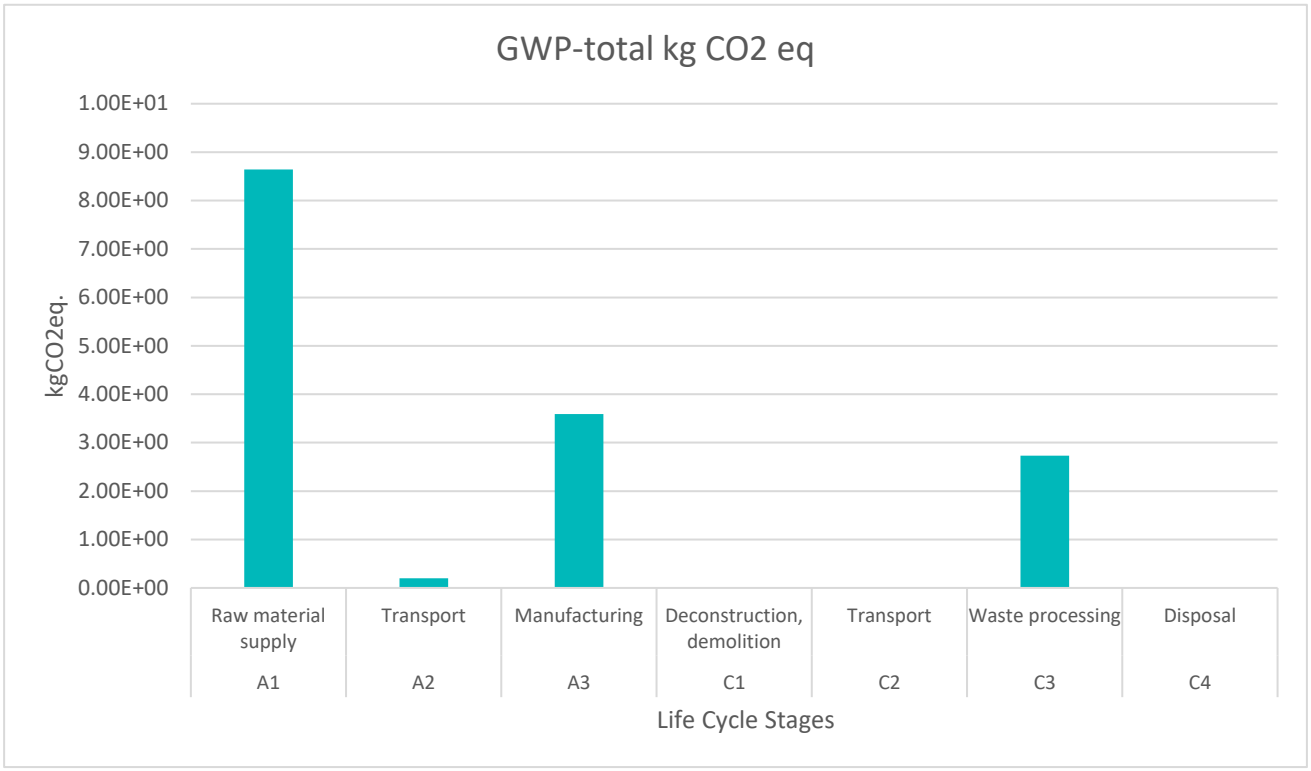

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