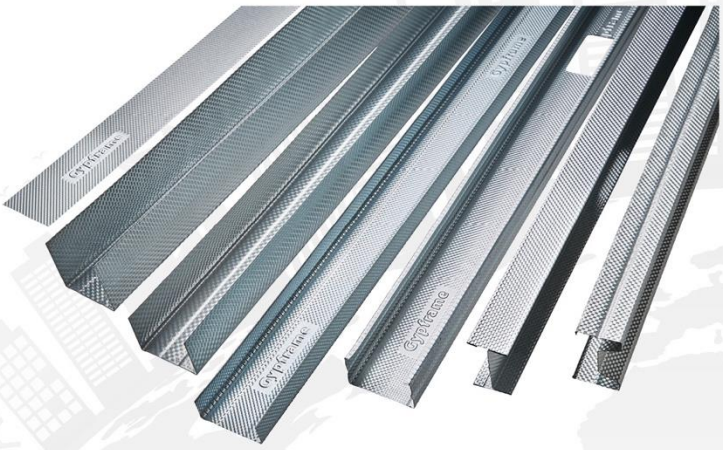
British Gypsum
SAINT-GOBAIN

EPD®
THE INTERNATIONAL EPD® SYSTEM

Environmental Product Declaration

In accordance with EN 15804 and ISO 14025



Gypframe® metal framing components for gypsum plasterboard

Publication Date:	18.01.2016
Validity:	5 years
Revision Date:	15.10.2021
Valid Until:	20.02.2026
Version:	2
Geographical Scope:	United Kingdom

The environmental impacts of this product have been assessed over its whole life cycle. Its Environmental Product Declaration has been verified by an independent third party.

The International EPD® System Registration Number: S-P-00808

ECO PLATFORM EPD EN 15804 VERIFIED

EPD VERIFIED

General information

Manufacturer: Saint-Gobain House, East Leake, Loughborough, Leicestershire. LE12 6JU

Programme used: International EPD System **http://www.environdec.com/**

EPD registration number/declaration number: S-P-00808

PCR identification: The International EPD® System PCR 2012:01 version 2.33 for Construction Products. EN 15804 Sustainability of construction works. And with reference to Institut Bauen und Umwelt e.V. PCR Guidance-Texts for Building-Related Products and Services, Part B: Requirements on the EPD for Structural steels.

Site of manufacture: The production site is Smethwick, West Midlands**.**
Owner of the declaration: Registered Office Saint-Gobain House, East Leake, Loughborough, Leicestershire. LE12 6JU

Product / product family name and manufacturer represented:

Declaration issued:18.01.2016 **Revision date:**15.10.2021 **Valid until:**20.02.2026

Demonstration of verification: An independent verification of the declaration was made, according to ISO 14025:2010. This verification was external and conducted by the following third party: Andrew Norton, Renuables, based on the PCR mentioned above.

EPD Prepared by: Yves Coquelet (Saint-Gobain LCA analyst) and Tom Wire (Systems Project Coordinator).
Contact: bgtechnicalenquiries@bpb.com

Scope: The LCA is based on 2019 production data for one site in the United Kingdom.
This EPD covers information modules A1 to C4 + module D (cradle to grave) as defined in EN 15804:2012

The declared unit is 1 kg of Gypframe metal framing components for gypsum plasterboard.

Declaration of Hazardous substances (Candidate list of Substances of Very High Concern): none

Geographical scope of the EPD®: United Kingdom

EPDs of construction products may not be comparable if they do not comply with EN 15804.

CEN standard EN 15804 serves as the core PCR[a]	
PCR:	EN 15804 Sustainability of construction works – Environmental product declaration - core rules for the product category of construction product.
Independent verification of the declaration, according to EN ISO 14025:2010 **Internal ☐ External ☒**	
Third party verifier:	Andrew Norton
Accredited or approved by	The National programme of environmental labelling, CENIA, the Czech Environmental Information Agency

Product description

Product description and use:
This Environmental Product Declaration (EPD®) describes the environmental impacts of 1 kg of Gypframe metal framing components for gypsum plasterboard.

Gypframe profiles are light gauge profile made of hot-dip galvanized sheet steel, which makes them excellent in strength, durability and longevity. Among the profiles you will find both steel thin-walled galvanized profiles for creating a load-bearing grate of plasterboard partitions, as well as profiles for the construction of ceilings, adjustment brackets, couplings, etc.

Technical data/physical characteristics:

Reaction to fire	A1
Density	7750 kg/m³
Tensile Strength	270-500 N/mm²
Grade of material according to the delivery standard	DX51X + Z140 NAC non-fluting and free delivery standards from coil break

Description of the main components and/or materials for 1 kg of product for the calculation of the EPD®:

Parameter	Value (expressed per functional unit)
Quantity of metal profile	1 kg
Packaging for the transportation and distribution	Plastic straps: 0,54 g/kg Wooden pallet : 3.8 g/kg
Installation	No material included

During the life cycle of the product no hazardous substance listed in the “Candidate List of Substances of Very High Concern (SVHC) for authorization” has been used in a percentage higher than 0,1% of the weight of the product.

The verifier and the program operator do not make any claim nor have any responsibility of the legality of the product.

LCA calculation information

EPD Type Functional	Cradle to Gate with options
Functional Unit	1 kg of Gypframe metal framing components for gypsum plasterboard. The gauge of the profiles varies between 0.4 – 1 mm. The density of Gypframe profiles is 7750 kg/m³. The dimensional specifications datasheet can be referenced to calculate the weight of a linear meter of each type of profile. This can then be applied to calculate assumed environmental impacts for that profile from the LCA results
System Boundaries	Cradle to Gate with options: Mandatory stages = A1-3; Optional stages = A4-5, B1-7, C1-4, D.
Reference Service Life (RSL)	50 years By default, it corresponds to Standards building design life and value is included in Appendix III of Saint-Gobain Environmental Product Declaration Methodological Guide for Construction Products.
Cut-Off Rules	Life Cycle Inventory data for a minimum of 99% of total inflows to the upstream and core module shall be included Flows related to human activities such as employee transport are excluded. The construction of plants, production of machines and transportation systems are excluded since the related flows are supposed to be negligible compared to the production of the building product when compared at these systems lifetime level.
Allocations	Production data, recycling, energy and waste data have been calculated on a mass basis.
Geographical Coverage And Time Period	Scope includes: United Kingdom Data included is collected from one production site Smethwick, West Midlands. Data collected for the year 2019 Background data: Ecoinvent (from 2015 to 2016) and GaBi (from 2013 to 2016)
Product CPC Code	42190 - Other structures (except prefabricated buildings) and parts of structures, of iron, steel or aluminium; plates, rods, angles, shapes, sections, profiles, tubes and the like, prepared for use in structures, of iron, steel or aluminium; props and similar equipment for scaffolding, shuttering or pitpropping

According to EN 15804, EPDs of construction products may not be comparable if they do not comply with this standard.
According to ISO 21930, EPDs might not be comparable if they are from different programmes.

Life cycle stages

Flow diagram of the Life Cycle

Product stage, A1-A3

Description of the stage: the product stage of plaster products is subdivided into 3 modules A1, A2 and A3 respectively “Raw material supply”, “transport to manufacturer” and “manufacturing”.

A1, raw material supply.
This includes the extraction and processing of all raw materials and energy which occur upstream from the manufacturing process.

A2, transport to the manufacturer.
The raw materials are transported to the manufacturing site. The modelling includes road, boat and/or train transportations of each raw material.

A3, manufacturing.
This module includes the manufacture of products and the manufacture of packaging. The production of packaging material is taken into account at this stage. The processing of any waste arising from this stage is also included.

Manufacturing process flow diagram

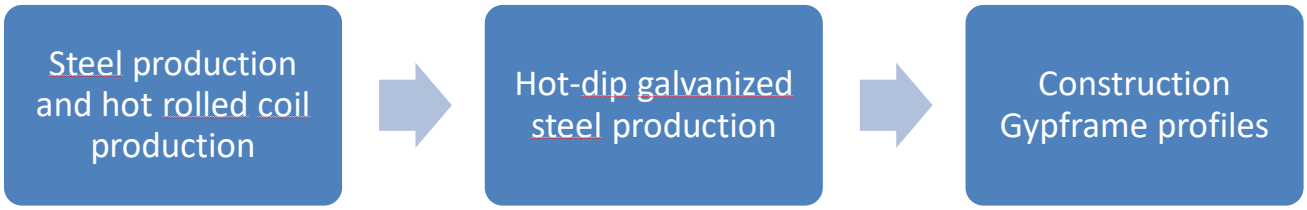


Figure 1: Manufacturing process flow diagram

Manufacturing in detail:

Gypframe steel profiles are manufactured using hot-dip galvanized steel coil produced around the world. In Europe, hot-dip galvanized steel coils are generally manufactured via the blast furnace/basic oxygen furnace (BF/BOF) route. The blast furnace route produces pig iron from various forms of iron ore such as sinter, pellets and lump ore with coke as a reducing agent. The pig iron is transferred to the basic oxygen furnace vessel, where it is converted to steel by reducing the carbon content. The BOF vessel is also used to regulate other chemical properties of the steel such as the alloy content. Steel scrap is used in the BOF vessel, primarily for temperature control.
Liquid steel from the BOF vessel is cast into slabs and rolled to produce hot rolled coil. To produce hot-dip galvanized steel, the hot rolled coil is cold rolled, annealed, pickled and coated in zinc. Hot-dip galvanized steel coil are forming and cutting into the specific profiles required for the building application. The products are packaged in plastic straps and loaded onto wooden bearer prior to distribution.

Construction process stage, A4-A5

Description of the stage: the construction process is divided into 2 modules: A4, transport to the building site and A5, installation in the building

A4, transport to the building site.
This module includes transport from the production gate to the building site. Transport is calculated on the basis of a scenario with the parameters described in the following table.

Parameter	Value (expressed per functional unit)
Fuel type and consumption of vehicle or vehicle type used for transport e.g. long distance truck, boat, etc.	Long distance truck, maximum load weight of 27 tonnes and consumption of 0.38 liters per km
Distance	198 km
Capacity utilisation (including empty returns)	85% (30% empty returns)
Bulk density of transported products	7750 kg/m³
Volume capacity utilisation factor	1

A5, installation into the building.
The accompanying table quantifies the parameters for installing the product at the building site. All installation materials and their waste processing are included.

Parameter	Value (expressed per functional unit)
Ancillary materials for installation (specified by materials)	Screws: 2 units
Water use	None
Other resource use	None
Quantitative description of energy type (regional mix) and consumption during the installation process	Electricity: 0,2 kWh
Wastage of materials on the building site before waste processing, generated by the product's installation (specified by type)	Gypframe profile: 0,05 kg (5%) plastic straps: 0,54 g Wooden bearer: 3,8 g Screw: 0 kg
Output materials (specified by type) as results of waste processing at the building site e.g. of collection for recycling, for energy recovering, disposal (specified by route)	Metal scraps are considered 85% valorized and 15% landfilled Plastic straps are landfilled. Wooden bearers are considered 90% reuse and 10% landfilled
Direct emissions to ambient air, soil and water	None

Use stage (excluding potential savings), B1-B7

Description of the stage:
The use stage, related to the building fabric includes:

B1, use or application of the installed product;
B2, maintenance;
B3, repair;
B4, replacement;
B5, refurbishment;
B6, operational energy use
B7, operational water use

Description of scenarios and additional technical information:
The product has a reference service life of 50 years. This assumes that the product will last in situ with no requirements for maintenance, repair, replacement or refurbishment throughout this period. Therefore, it has no impact at this stage.

End-of-life stage C1-C4

Description of the stage: This stage includes the next modules:

C1, de-construction, demolition;
C2, transport to waste processing;
C3, waste processing for reuse, recovery and/or recycling;
C4, disposal, including provision and all transport, provision of all materials, products and related energy and water use.

Description of the scenarios and additional technical information for the end-of-life:

Parameter	Value (expressed per functional unit)
Collection process specified by type	85% collected separately for recycling and 15% collected with mixed deconstruction and demolition waste to landfill
Recovery system specified by type	0,85 kg recycled
Disposal specified by type	0.15 kg disposed in landfill
Assumptions for scenario development (e.g. transportation)	Steel profile waste is transported 50 km by truck from deconstruction/demolition sites to treatment plant.

Reuse/recovery/recycling potential, D

Description of the stage: module D has been taken into account.

LCA result

Description of the system boundary (X = Included in LCA, MNA = Module Not Assessed)

CML 2001 has been used as the impact model. Specific data has been supplied by the plant, and generic data come from GABI and Ecoinvent databases.
All emissions to air, water, and soil, and all materials and energy used have been included.

All figures refer to a functional unit of 1 kg Gypframe hot-dip galvanized steel profiles for building application.

Product Stage			Construction Stage		Use Stage							End Of Life Stage				Benefits And Loads Beyond The System Boundary
Raw material supply	Transport	Manufacturing	Transport	Construction-Installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-recovery
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	MNA

Environmental Impacts

Parameters	Product stage	Construction process stage		Use stage							End-of-life stage				
	A1 / A2 / A3	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 Deconstruction / demolition	C2 Transport	C3 Waste processing	C4 Disposal	D Reuse, recovery, recycling
Global Warming Potential (GWP 100) - *kg CO_2 equiv/FU*	2,09E+00	3,56E-04	1,15E-01	0	0	0	0	0	0	0	4,40E-03	2,29E-03	2,15E-03	2,23E-03	-1,23E+00
The global warming potential of a gas refers to the total contribution to global warming resulting from the emission of one unit of that gas relative to one unit of the reference gas, carbon dioxide, which is assigned a value of 1.															
Ozone Depletion (ODP) *kg CFC 11 equiv/FU*	4,03E-05	7,92E-19	2,02E-06	0	0	0	0	0	0	0	6,37E-19	3,75E-19	7,14E-18	1,14E-17	-4,24E-05
Destruction of the stratospheric ozone layer which shields the earth from ultraviolet radiation harmful to life, This destruction of ozone is caused by the breakdown of certain chlorine and/or bromine containing compounds (chlorofluorocarbons or halons), which break down when they reach the stratosphere and then catalytically destroy ozone molecules,															
Acidification potential (AP) *kg SO_2 equiv/FU*	4,96E-03	2,63E-06	2,70E-04	0	0	0	0	0	0	0	5,53E-06	9,16E-06	1,51E-05	1,31E-05	-2,38E-03
Acid depositions have negative impacts on natural ecosystems and the man-made environment incl, buildings, The main sources for emissions of acidifying substances are agriculture and fossil fuel combustion used for electricity production, heating and transport,															
Eutrophication potential (EP) *kg $(PO_4)^{3-}$ equiv/FU*	5,13E-04	4,40E-07	2,72E-05	0	0	0	0	0	0	0	8,50E-07	2,30E-06	3,62E-06	1,48E-06	-1,66E-04
Excessive enrichment of waters and continental surfaces with nutrients, and the associated adverse biological effects,															
Photochemical ozone creation (POPC) *kg Ethylene equiv/FU*	2,26E-06	1,41E-07	4,31E-05	0	0	0	0	0	0	0	6,36E-07	3,64E-07	1,67E-06	1,07E-06	-5,75E-04
Chemical reactions brought about by the light energy of the sun, The reaction of nitrogen oxides with hydrocarbons in the presence of sunlight to form ozone is an example of a photochemical reaction.															
Abiotic depletion potential for non-fossil ressources (ADP-elements) - *kg Sb equiv/FU*	4,65E-07	3,55E-11	2,07E-07	0	0	0	0	0	0	0	1,29E-10	1,89E-10	2,44E-09	7,81E-10	-2,10E-05
Abiotic depletion potential for fossil ressources (ADP-fossil fuels) - *MJ/FU*	2,05E+01	4,68E-03	1,13E+00	0	0	0	0	0	0	0	5,87E-02	3,11E-02	4,17E-02	2,90E-02	-1,16E+01
Consumption of non-renewable resources, thereby lowering their availability for future generations.															

Resource Use

Parameters	Product stage	Construction process stage		Use stage							End-of-life stage				D Reuse, recovery, recycling
	A1 / A2 / A3	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 Deconstruction / demolition	C2 Transport	C3 Waste processing	C4 Disposal	
Use of renewable primary energy excluding renewable primary energy resources used as raw materials *MJ/FU*	4,53E-01	8,58E-04	1,58E-02	0	0	0	0	0	0	0	1,95E-04	1,75E-03	3,11E-03	3,92E-03	8,62E-01
Use of renewable primary energy used as raw materials *MJ/FU*	3,84E-03	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) - *MJ/FU*	4,57E-01	8,58E-04	1,58E-02	0	0	0	0	0	0	0	1,95E-04	1,75E-03	3,11E-03	3,92E-03	8,62E-01
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials - *MJ/FU*	2,06E+01	4,72E-03	1,13E+00	0	0	0	0	0	0	0	5,89E-02	3,12E-02	4,32E-02	2,99E-02	-1,11E+01
Use of non-renewable primary energy used as raw materials - *MJ/FU*	1,68E-02	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) - *MJ/FU*	2,06E+01	4,72E-03	1,13E+00	0	0	0	0	0	0	0	5,89E-02	3,12E-02	4,32E-02	2,99E-02	-1,11E+01
Use of secondary material *kg/FU*	1,30E-01	0	6,51E-03	0	0	0	0	0	0	0	0	0	0	0	0
Use of renewable secondary fuels- *MJ/FU*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Use of non-renewable secondary fuels - *MJ/FU*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Use of net fresh water - m^3/*FU*	2,36E-02	1,60E-06	1,20E-03	0	0	0	0	0	0	0	4,34E-07	2,03E-06	1,22E-05	7,51E-06	-2,28E-03

Waste Categories

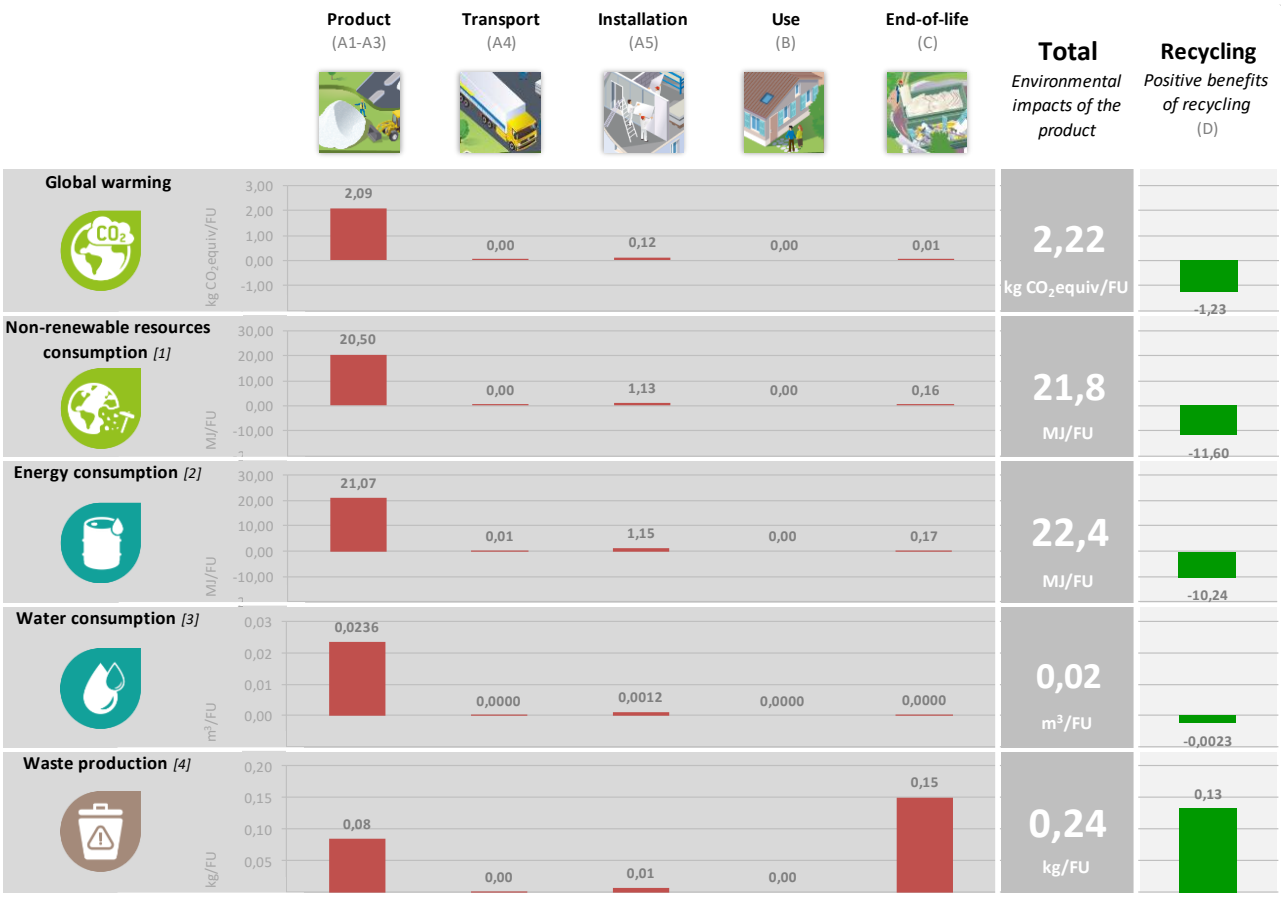
Parameters	Product stage	Construction process stage		Use stage							End-of-life stage				D Reuse, recovery, recycling
	A1 / A2 / A3	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 Deconstruction / demolition	C2 Transport	C3 Waste processing	C4 Disposal	
Hazardous waste disposed *kg/FU*	1,73E-06	1,62E-10	9,90E-08	0	0	0	0	0	0	0	5,81E-12	1,45E-09	1,13E-09	4,55E-10	-1,42E-06
Non-hazardous (excluding inert) waste disposed *kg/FU*	8,41E-02	1,22E-06	6,86E-03	0	0	0	0	0	0	0	1,29E-05	4,78E-06	1,17E-05	1,50E-01	1,32E-01
Radioactive waste disposed *kg/FU*	1,81E-05	1,57E-08	9,18E-07	0	0	0	0	0	0	0	6,46E-08	3,87E-08	5,70E-07	3,35E-07	3,95E-07

Output Flows

Parameters	Product stage	Construction process stage		Use stage							End-of-life stage				D Reuse, recovery, recycling
	A1 / A2 / A3	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 Deconstruction / demolition	C2 Transport	C3 Waste processing	C4 Disposal	
Components for re-use *kg/FU*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Materials for recycling *kg/FU*	2,65E-02	0	4,88E-02	0	0	0	0	0	0	0	0	0	8,50E-01	0	8,24E-01
Materials for energy recovery *kg/FU*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exported energy, detailed by energy carrier *MJ/FU*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

LCA results interpretation

The following figure refers to a functional unit of 1 kg Gypframe hot-dip galvanized steel profiles for building application



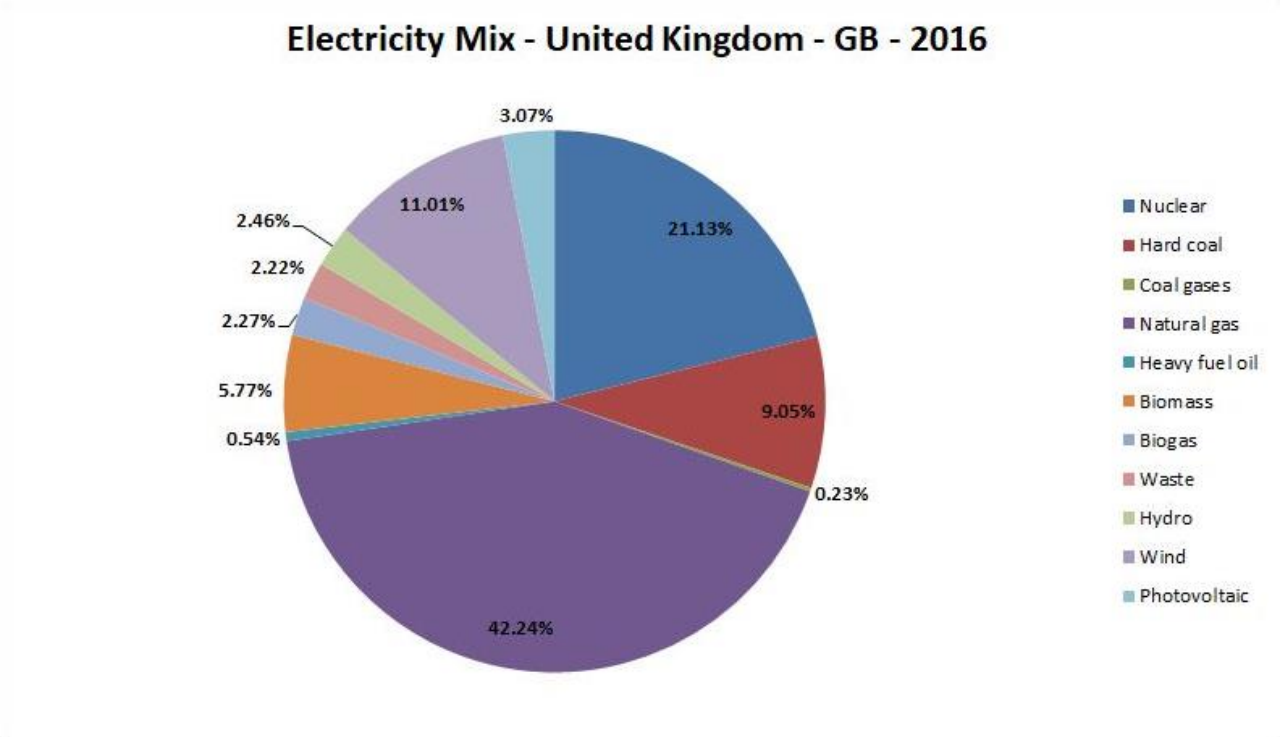
[1] This indicator corresponds to the abiotic depletion potential of fossil resources.
[2] This indicator corresponds to the total use of primary energy.
[3] This indicator corresponds to the use of net fresh water.
[4] This indicator corresponds to the sum of hazardous, non-hazardous and radioactive waste disposed.

The product stage (A1-A3) is responsible for over 85% of Gypframe metal profiles in its lifetime for the following impacts: Global warming, Non-renewable resources consumption, Energy consumption and Water consumption.
The main source of impact occurs in A1 (production of raw material) due to steel production is an intensive process requiring a lot of energy and raw materials, however increasing high levels of recycled content helps to lower it.
Some impact can be seen in stage A5, installation, as a small amount of product is lost when products are cut to size at the construction site.

Additional information

Electricity description

TYPE OF INFORMATION	DESCRIPTION
Location	Representative of average production in United Kingdom
Geographical representativeness description	Split of energy sources in United Kingdom: - Nuclear: 21.13% - Hard coal: 9.05% - Coal gases: 0.23% - Natural gas: 42.24% - Heavy fuel oil: 0.54% - Biomass:5.77% - Biogas: 2.27% - Waste: 2.22% - Hydro: 2.46% - Wind: 11.01% - Photovoltaic: 3.07%
Reference year	2016
Type of data set	Cradle to gate
Source	GaBi database from 2020 version
GWP (kg CO2 eq./kWh)	0,682



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