EPD®

THE INTERNATIONAL EPD® SYSTEM

ENVIRONMENTAL PRODUCT DECLARATION

In accordance with ISO 14025 EN and 15804+A2:2019 for

GYPROC AQUA OPTIMA

Date of issue: 2022-04-01
Validity: 5 years
Valid until: 2027-03-31
Version 1
Scope of the EPD®: Russia

Gyproc
SAINT-GOBAIN

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General information

Manufacturer: Saint-Gobain Construction Products Russia, 140301 Russian Federation, Moscow Region, Yegorievsk, Smychka Street 60.

PCR identification: The International EPD® System PCR 2012:01 version 2.33 for Construction Products. EN 15804 Sustainability of construction works.

Site of manufacture: The production site is RF, Nizhny Novgorod region, Pavlovsky district, v. Gomzovo
Owner of the declaration: Saint-Gobain Construction Products Russia, 140301 Russian Federation, Moscow Region, Yegorievsk, Smychka Street 60.
Product / product family name and manufacturer represented: Gyproc AQUA OPTIMA

Declaration issued:2022-04-01, **valid until:**202-03-31

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: Saint-Gobain Construction Products Rus, Patricia Jimenez Diaz (Saint-Gobain LCA central TEAM, Patricia.JimenezDiaz@saint-gobain.com) & Elena Pankova (Saint-Gobain Construction Products Rus) Elena.Pankova@Saint-Gobain.com

Scope: The LCA is based on 2019 production data for one site in Russia.
This EPD covers information modules A1 to C4 + module D (cradle to grave) as defined in EN 15804+A2:2019

The declared unit is 1 m² gypsum plasterboard.

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

CEN standard EN 15804 serves as the core PCR	
PCR:	PCR 2012:01 Construction products and Construction services, Version 2.33
Independent verification of the declaration, according to EN ISO 14025:2010 Internal ☒ External ☐	
www.saint-gobain.ru	

The EPD owner has the sole ownership, liability, and responsibility for the EPD.
EPDs within the same product category but from different programs may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804. For further information about comparability, see EN 15804 and ISO 14025.

Product description

Product description and use:

This Environmental Product Declaration (EPD®) describes the environmental impacts of 1 m² of gypsum plasterboard.

Gyproc AQUA OPTIMA consists of an aerated gypsum core encased in, and firmly bonded to, strong paper liners. The gypsum core contains various additives. Gyproc AQUA OPTIMA is a standard board product and comes with the option of either tapered edge or square edge on the long edges and has short edges sawn straight. Gyproc AQUA OPTIMA is a plasterboard that is suitable for dry lining internal surfaces..

Gyproc plasterboards are the ultimate lining solution for today's buildings, providing fire, sound, thermal, moisture and impact resistance to create modern internal environments that offer comfort and safety for occupants. They offer high quality, high performance linings for walls and ceilings, lift shafts and stairwells, corridors and auditoria, in buildings as diverse as houses, schools, hospitals and cinemas.

The high performance linings for walls and ceilings, partitions deliver comfort and safety for all occupants. Excellent durability of plasterboard construction elements makes them last for the building's lifetime, which is assumed to be 50 years (Saint-Gobain Methodological Guide).

Technical data/physical characteristics:

REACTION TO FIRE	A2
DENSITY	684 kg/m3
WATER VAPOUR RESISTANCE	0,075 mg/(m*h*Pa)
THERMAL CONDUCTIVITY	0,25 W/mK

Description of the main components and/or materials for 1 m² of product for the calculation of the EPD®:

PARAMETER	VALUE (expressed per declared unit)
Quantity for 1 m² of product	8.55 kg
Thickness	12.5 mm
Surfacing	Paper: 0.043 kg
Packaging for the transportation and distribution	PET strip: 0.0002 kg PE sheet: 0,001, kg Paper label: 0.000003 kg Gypsum culls: 0.039 kg
Product used for the Installation	Jointing compound: 0.33 kg/ m² Jointing tape: 0.004 kg/m² Screws: 0.01 kg/ m²

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	Cradle to grave and module D
DECLARED UNIT	The declared unit is 1 m² of installed board
SYSTEM BOUNDARIES	Mandatory Stages = A1-A3 ; B1-B7 ; C1-C4 and 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: Russia Data included is collected from one production site at the Gomzovo plant Data collected for the year 2019 Background data: Ecoinvent 3.6 and GaBi ts 9.2
PRODUCT CPC CODE	37530 Articles of plaster or of composition based on plaster

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 programs.

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.

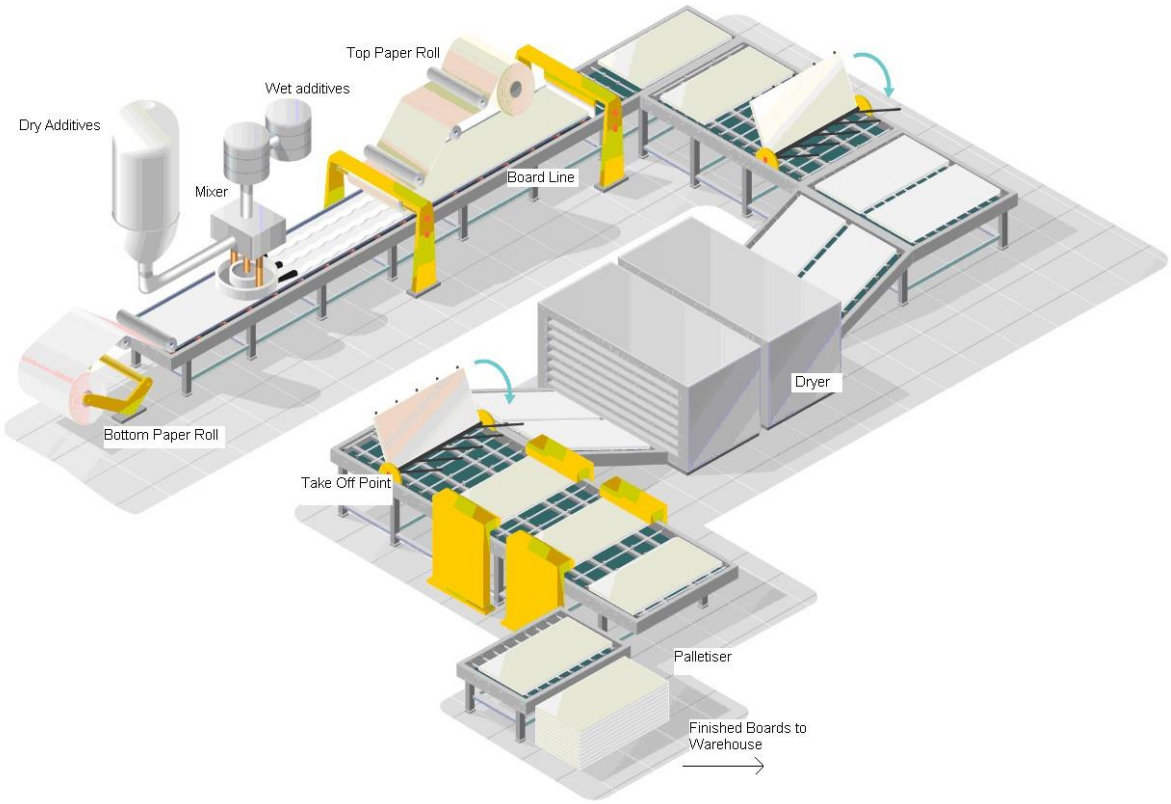


Figure 1: Manufacturing process flow diagram

Manufacturing in detail:.

Gyproc gypsum plasterboards are manufactured in a highly automated continuous process. Natural and recycled gypsum waste are milled and calcined in a hammer mill in order to produce plaster powder. Plaster powder (stucco), solid & liquid additives and pre-generated foam are mixed in a high-speed mixer to form homogeneous slurry. The slurry is then spread via multiple hose outlets onto a paper liner on a moving conveyor belt. A second paper liner is fed onto the production line from above to form the plasterboard. This passes through the extruder to be compressed to the specific thickness. At the end of forming belt, the board has a sufficient strength and is cut into panels of specific length. These boards are turned over, fed through a long multi-level dryer to evaporate excess water and increase strength. The dried plasterboard is trimmed and bundled for shipment.
In striving to maintain high standards in its manufacturing systems Saint-Gobain Gyproc Russia applies principles of World Class Manufacturing (WCM), which aims to reduce the impact on resources (natural gypsum, water use, energy consumption, waste generation and polluting emissions).

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 t and consumption of 0.38 liters per km Train (electricity and diesel average), 726t payload capacity
Distance	565 km by truck, 2202 km by rail
Capacity utilisation (including empty returns)	97,5 % (100% empty returns)
Bulk density of transported products	684 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)	Jointing compound 0.33 kg/m2 board, tape 1.23 m /m2 board, screws 8 /m2 board
Water use	0.165 litres/m2 board
Other resource use	None
Quantitative description of energy type (regional mix) and consumption during the installation process	None
Wastage of materials on the building site before waste processing, generated by the product's installation (specified by type)	Plasterboard: 5% Screws: 0.0104 kg Jointing Compound: 0.33 kg Jointing Tape: 0.0002 kg PET strip: 0.0002 kg PE sheet: 0,001, kg Paper label: 0.000003 kg Gypsum culls: 0.039 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)	Plasterboard: 5% to landfill Screws: 0.0104 kg to landfill Jointing Compound: 0.33 kg to landfill Jointing Tape: 0.0002 kg to landfill PET strip: 0.0002 kg to landfill PE sheet: 0,001, kg to landfill Paper label: 0.000003 kg to landfill Gypsum culls: 0.039 kg to landfill
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	100% of waste is collected by truck to be landfilled
Recovery system specified by type	No waste is recycled
Disposal specified by type	100% landfilled
Assumptions for scenario development (e.g. transportation)	On average, Gypsum board waste is transported 50 km by truck from deconstruction/demolition sites to landfill sites.

Reuse/recovery/recycling potential, D

An end of life recycling 0% (100% of wastes are landfilled) has been assumed using local demolition waste data and adjusted considering the recyclability of the product.

LCA results

As specified in EN 15804:2012+A2:2019 and also the Product-Category Rules, the environmental impacts are declared and reported using the baseline characterization factors are from the ILCD. 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.

LCA data results are detailed on the following tables and they refer to a functional unit of is 1 m² of Gyproc AQUA OPTIMA.

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

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	X

Environmental Impacts

		Product stage	Construction stage		Use stage							End of life stage				Reuse, Recovery Recycling
	Environmental indicators	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
	Climate Change [kg CO2 eq.]	8.51E+00	4.12E-02	7.58E-01	0	0	0	0	0	0	0	4.05E-02	2.20E-02	0	3.42E+00	0
	Climate Change (fossil) [kg CO2 eq.]	1.46E+01	4.09E-02	7.83E-01	0	0	0	0	0	0	0	4.05E-02	2.18E-02	0	1.37E-01	0
	Climate Change (biogenic) [kg CO2 eq.]	-6.11E+00	-7.03E-05	-2.73E-02	0	0	0	0	0	0	0	5.34E-05	-3.68E-05	0	3.28E+00	0
	Climate Change (land use change) [kg CO2 eq.]	4.20E-02	3.33E-04	2.20E-03	0	0	0	0	0	0	0	8.89E-07	1.77E-04	0	3.96E-04	0
	Ozone depletion [kg CFC-11 eq.]	2.51E-05	4.95E-18	1.26E-06	0	0	0	0	0	0	0	4.30E-18	4.02E-18	0	5.10E-16	0
	Acidification terrestrial and freshwater [Mole of H+ eq.]	8.54E-02	2.35E-04	4.48E-03	0	0	0	0	0	0	0	1.19E-04	1.27E-04	0	9.86E-04	0
	Eutrophication freshwater [kg P eq.]	4.97E-03	1.25E-07	2.49E-04	0	0	0	0	0	0	0	8.94E-09	6.67E-08	0	2.36E-07	0
	Eutrophication marine [kg N eq.]	2.11E-02	1.14E-04	1.12E-03	0	0	0	0	0	0	0	2.22E-05	6.12E-05	0	2.54E-04	0
	Eutrophication terrestrial [Mole of N eq.]	2.11E-01	1.26E-03	1.12E-02	0	0	0	0	0	0	0	2.43E-04	6.77E-04	0	2.79E-03	0
	Photochemical ozone formation - human health [kg NMVOC eq.]	3.69E-02	2.14E-04	2.01E-03	0	0	0	0	0	0	0	6.96E-05	1.16E-04	0	7.68E-04	0
	Resource use, mineral and metals [kg Sb eq.]	2.08E-04	2.95E-09	1.23E-05	0	0	0	0	0	0	0	1.06E-09	1.77E-09	0	1.23E-08	0
	Resource use, energy carriers [MJ]	2.35E+02	5.48E-01	1.24E+01	0	0	0	0	0	0	0	4.94E-01	2.92E-01	0	1.80E+00	0
	Water scarcity [m³ world equiv.]z	1.58E+01	3.68E-04	7.99E-01	0	0	0	0	0	0	0	8.39E-05	2.14E-04	0	1.44E-02	0

Ressources Use

	Ressources Use indicators	Product stage	Construction 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	D Reuse, recovery, recycling
	Use of renewable primary energy (PERE) [MJ]	9.02E+01	3.08E-02	4.73E+00	0	0	0	0	0	0	0	1.73E-03	1.69E-02	0	2.36E-01	0
	Primary energy resources used as raw materials (PERM) [MJ]	15.1	0	0.753	0	0	0	0	0	0	0	0	0	0	0	0
	Total use of renewable primary energy resources (PERT) [MJ]	1.06E+02	3.08E-02	5.48E+00	0	0	0	0	0	0	0	1.73E-03	1.69E-02	0	2.36E-01	0
	Use of non-renewable primary energy (PENRE) [MJ]	2.35E+02	5.49E-01	1.24E+01	0	0	0	0	0	0	0	4.95E-01	2.93E-01	0	1.80E+00	0
	Non-renewable primary energy resources used as raw materials (PENRM) [MJ]	0.176	0	0.0088	0	0	0	0	0	0	0	0	0	0	0	0
	Total use of non-renewable primary energy resources (PENRT) [MJ]	2.35E+02	5.49E-01	1.24E+01	0	0	0	0	0	0	0	4.95E-01	2.93E-01	0	1.80E+00	0
	Input of secondary material (SM) [kg]	8.10E-01	0	0.0421	0	0	0	0	0	0	0	0	0	0	0	0
	Use of renewable secondary fuels (RSF) [MJ]	0.00E+00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Use of non renewable secondary fuels (NRSF) [MJ]	0.00E+00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Use of net fresh water (FW) [m3]	3.71E-01	3.57E-05	1.89E-02	0	0	0	0	0	0	0	3.07E-06	1.97E-05	0	4.55E-04	0

Waste Category & Output flows

Waste Category & Output Flows	Product stage	Construction 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	B7 Operational	C1 Deconstruction / demolition	C2 Transport	C3 Waste processing	C4 Disposal	D Reuse, recovery, recycling
Hazardous waste disposed (HWD) [kg]	3.11E-07	2.55E-08	2.25E-08	0	0	0	0	0	0	0	5.02E-11	1.36E-08	0	2.75E-08	0
Non-hazardous waste disposed (NHWD) [kg]	4.18E-02	8.40E-05	7.97E-01	0	0	0	0	0	0	0	1.22E-04	4.65E-05	0	9.07	0
Radioactive waste disposed (RWD) [kg]	1.97E-04	6.79E-07	2.16E-05	0	0	0	0	0	0	0	5.68E-07	5.41E-07	0	0.0000205	0
Components for re-use (CRU) [kg]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Materials for Recycling (MFR) [kg]	8.73E+00	0	0.436	0	0	0	0	0	0	0	0	0	0	0	0
Material for Energy Recovery (MER) [kg]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exported electrical energy (EEE) [MJ]	0.00E+00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exported thermal energy (EET) [MJ]	0.00E+00	0	0	0	0	0	0	0	0	0	0	0	0	0	0

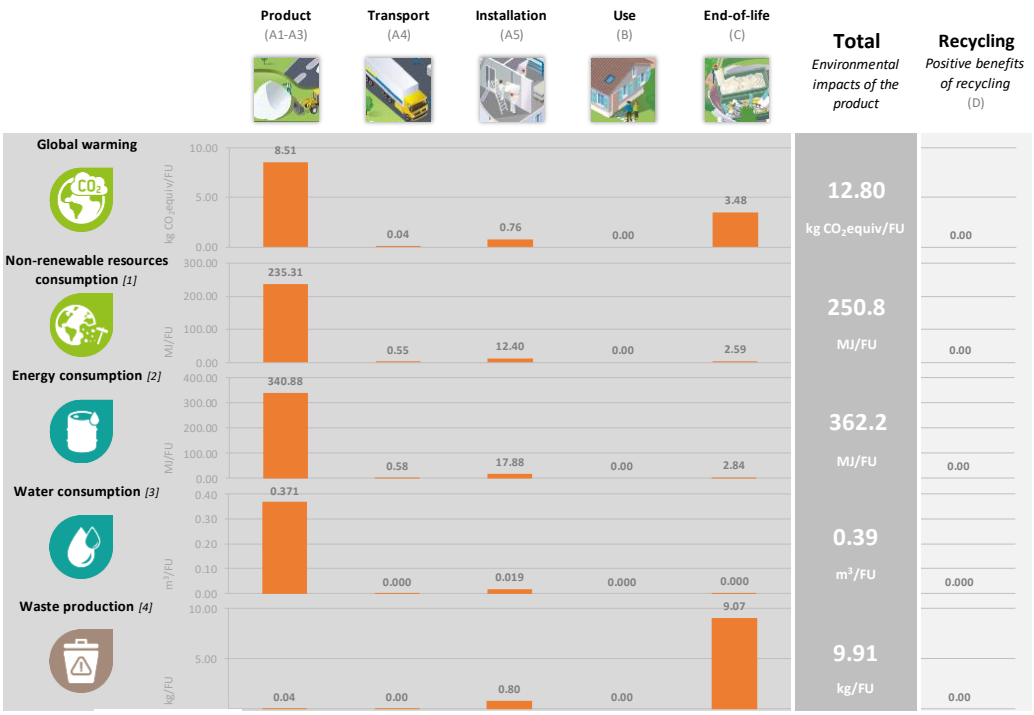
Information on biogenic carbon content

		Product stage
	Biogenic Carbon Content	A1 / A2 / A3
	Biogenic carbon content in product [kg]	1.72E+00
	Biogenic carbon content in packaging [kg]	1.14E-05

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

LCA results interpretation

The following figure refers to a functional unit of 1 m² Gyproc AQUA OPTIMA



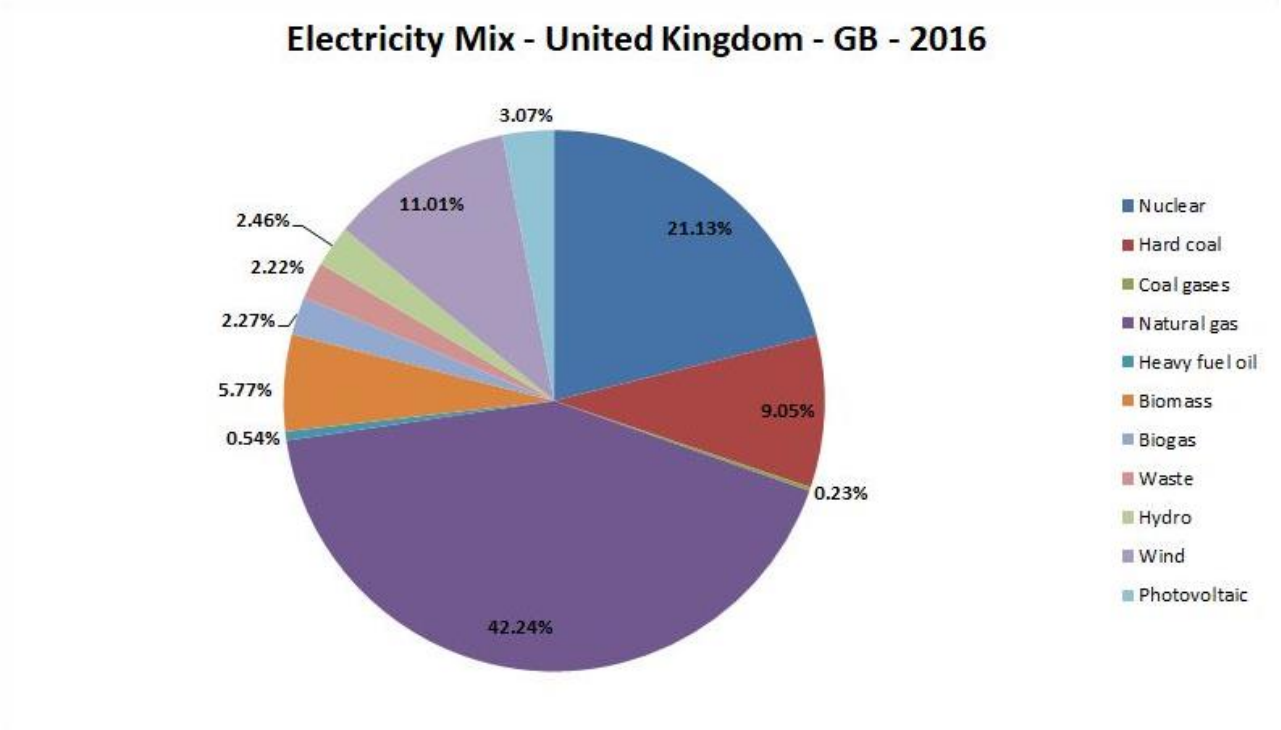
[1] This indicator corresponds to the abiotic depletion potential of fossil resources.
[2] This indicator corresponds to the total use of primary energy.
[3] This indicator corresponds to the use of net fresh water.
[4] This indicator corresponds to the sum of hazardous, non-hazardous and radioactive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

The product stage (A1-A3) is responsible for over 85% of Gyproc AQUA OPTIM 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.

Appendix:

Electricity description

TYPE OF INFORMATION	DESCRIPTION
Location	Representative of average production in Russia
Geographical representativeness description	Split of energy sources in Russia: - 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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