ENVIRONMENTAL PRODUCT DECLARATION

In accordance with EN 15804 and ISO 14025

Cement based Standard tile adhesives

Date of issue: 2019-12-17
Validity: 5 years
Valid until: 2024-12-16
Scope of the EPD: Turkey

EPD VERIFIED

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.

weber SAINT-GOBAIN

EPD®
THE INTERNATIONAL EPD® SYSTEM

Registration number
The International EPD® System:

S-P-01313

ECO PLATFORM
EPD
EN 15804 VERIFIED

ECO EPD Ref. No 00001088

We care about people and their environment

At Weber, we believe that what matters most in the construction industry is to care about people and their environment. Weber develops, produces and sells solutions based an industrial mortars and constructions chemicals for building construction and renovation. Weber is made up of 10,000 people in 64 countries supported by almost 200 production units. Weber's services and solutions aim to help customers save time, feel confident and comfortable, be successful in their work and grow their business.

Our brand promises:

- **Well-being:** We care for the safety and benefit of all. Making lives easier, more convenient and more comfortable.
- **Empathy:** We care about people. Listening to what matters to people and taking into account theirs needs. Helping everyone to grow. Responding to the multiplicity of challenges in today's world, and adapting to the diversity of the lives that populate it.
- **Long-lasting:** We care about today. But also for the future. Taking responsibility to lead the change and build a tomorrow that is in harmony with its environment.

Weber, a Saint-Gobain brand:

Saint-Gobain designs, manufactures and distributes materials and solutions which are key ingredients in the wellbeing of each of us and the future of all. They can be found everywhere in our living places and our daily life: in buildings, transportation, infrastructure and in many industrial applications. They provide comfort, performance and safety while addressing the challenges of sustainable construction, resource efficiency and climate change.

Site-related information: İzmir Plant, Gebze Plant, Polatlı Plant, Antalya Plant, Adana Plant, Samsun Plant

- Quality management system: ISO 9001:2015
- Environment management system: ISO 14001:2015
- Health and Safety management system: OHSAS 18001:2007

General information

Manufacturer: Saint-Gobain WEBER (Turkey)

PLANT	ADRESS
Izmir Plant	**Kemalpaşa OSB Mah. Kuyucak Yolu Sokak No: 284 35730 Kemalpaşa, İzmir, TÜRKİYE**
Gebze Plant	**GOSB Tembelova Kısmı Gençlik Caddesi No: 3006 41480 Gebze, Kocaeli, TÜRKİYE**
Ankara Plant	Ankara Eskişehir E90 Devlet Karayolu 67.Km **Kargalı Köyü Mevkii, Polatlı, Ankara, TÜRKİYE**
Antalya Plant	Organize Sanayi Bölgesi 2. Kısım 25. Cadde **No:8, Antalya, TÜRKİYE**
Adana Plant	Hacı Sabancı Organize Sanayi Bölgesi Atatürk **Bulvarı No:53 Sarıçam Adana, TÜRKİYE**
Samsun Plant	**Kavak OSB 4.Cadde No:1 Kavak, Samsun, TÜRKİYE**

Programme used: The International EPD® System. More information at www.environdec.com

PCR identification: The International EPD® System PCR 2012:01 Construction products and construction services version 2.3.

UN CPC Code: 37510 Non-refractory mortars and concretes

Owner of the declaration: SG WEBER YAPI - Kemalpasa OSB Mah. Kuyucak Yolu Sok. No:284 ve 289 - **Izmir - Turkey**

Product / product family name and manufacturer represented:

This EPD describes the environmental impacts of 1kg of Cement based standard tile adhesives – manufactured in Turkey.

As their environmental impact differs less than 10%, this EPD covers the following products:

weber.kol Rapid
weber.kol seraçim max
weber.kol serakol
weber.kol fermafix
weber.kol standart

Differences versus previous versions of the EPD : This is the first version of the EPD.

EPD® prepared by: Bircan Uysal (Saint-Gobain Weber Turkey)
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Declaration issued: 2019-12-17, **valid until:** 2024-12-16

Demonstration of verification: an independent verification of the declaration was made, according to ISO 14025:2010. This verification was external and conducted by a third party, based on the PCR mentioned above (see information below).

CEN standard EN 15804 served as the core PCR	
EPD Program operator	International EPD System. Operated by EPD® International AB http://www.environdec.com/
PCR review conducted by	The Technical Committee of the International EPD® System. Chair: Massimo Marino. Contact via info@environdec.com
Independent verification of the declaration and data, according to ISO 14025	Internal ☐ External ☒
Third party verifier	Marcel Gomez Marcel Gómez Consultoria Ambiental (www.marcelgomez.com) Tlf 0034 630 64 35 93 Email: info@marcelgomez.com
Accredited or approved by	The International EPD System

Product description

Product description and description of use:

The product family observed within the scope of this study is cement-based tile adhesives. Cement based tile adhesives comprise of binder agents, polymer binders, aggregates, fillers and various additives in order to provide solid fixing and manufactured according to EN 12004 standard. Cement based tile adhesive include various types of tile adhesives ranging from tile adhesives to improved tile adhesives in order to be able to answer different application requirements. Selection of products for application requires consideration of factors such as type and size of the coating, type of application surface, application place and preferences of applicators.

Cement based tile adhesives are used for interior and exterior applications for covering surfaces with tiles, marbles, natural stones, granite, ceramics, porcelain ceramics and similar coating materials. Products are mixed with water before application. The amount of water required for mixing is indicated on the back side of craft bags, technical data sheets of products and “Weber Solution Guide” (product guide). According to the preference of applicator, mixing should be realized either with the help of low-speed electrical mixer or manually with trowel. Prepared mortar should be applied on the substrate and its thickness should be adjusted with steel notched trowel. Tooth size of trowel should be adjusted according to dimensions of tile and smoothness of application surface.
Cement based tile adhesives can be used for tiling in bathrooms, regular rooms, kitchens and stairs.

All technical characteristic and properties for any product could be find on Weber website:

https://www.tr.weber/search-content/content_type/product/activities/seramik-uygulamalari-8

During the life cycle of the product any 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

Technical data/physical characteristics		
Initial tensile adhesion strength at the 28th day	≥ 0.5 Mpa	TS EN 12004-1:2017-04
Tensile adhesion strength after water immersion at the 28th day		
Tensile adhesion strength after heat ageing at the 28th day		
Tensile adhesion strength after freeze-thaw cycles at the 28th day		
Open time: tensile adhesion strength (after not less than 20 min) at the 28th day		
Resistance to fire	Class A1	TS EN 13501-1 + A1:2013-04

Description of the main product components and/or materials:

All raw materials contributing more than 5% to any environmental impact are listed in the following table.

PARAMETER	VALUE (expressed per declared unit)
Quantity of mortar	Standard products: 1 kg Binders: 20 % - 35 % Fillers: 65 – 80 % Additives : 0,3% - 1,5 %
Packaging for the transportation and distribution	Polyethylene: 0.325 g/kg Paper bag: 8 g/kg Pallet: 10 g/kg
Product used for the installation	Energy: 0.158 MJ/kg Water: 0.2 l/kg

DECLARED UNIT	1 kg of cement based standard tile adhesive
SYSTEM BOUNDARIES	Cradle to gate with options
REFERENCE SERVICE LIFE (RSL)	50 years
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
ALLOCATIONS	Based on mass repartition. The polluter pays and modularity principles have been followed
GEOGRAPHICAL COVERAGE AND TIME PERIOD	Data included is collected from 6 production sites in TURKEY Production year from 2018 Background data: Ecoinvent (from 2015 to 2018) and GaBi (from 2013 to 2018)

EPD of construction products may not be comparable if they do not comply with EN 15804. Environmental product declarations within the same product category from different programs may not be comparable.

Life cycle stages

Flow diagram of the Life Cycle

Figure 1: Life Cycle illustration of a product for construction

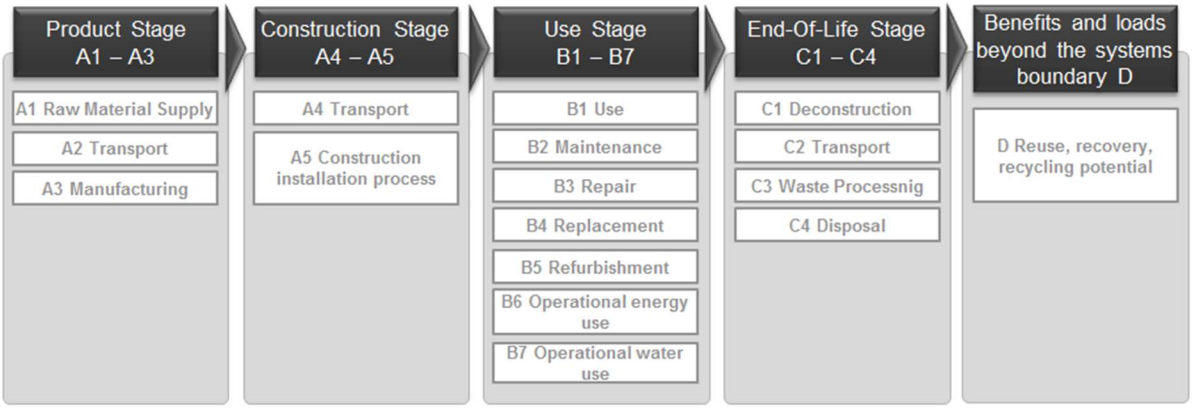


Figure 2: Cradle to gate with option analysis taking into account all stages of the Life Cycle product

Product stage, A1 - A3

Description of the stage:

The product stage of the Weber products is subdivided into 3 modules A1, A2 and A3 respectively “Raw material supply”, “transport” and “manufacturing”.

The aggregation of the modules A1, A2 and A3 is a possibility considered by the EN 15 804 standard. This rule is applied in this EPD.

Raw material and energy supply – A1

This part takes into account the extraction and processing of all raw materials and energy which occurs upstream to the studied manufacturing process.

Specifically, the raw material supply covers sourcing (quarry) and production of all binder components and additives (e.g. sand, cement, rheology agent and others).

Use of electricity, fuels and auxiliary materials in the production is taken into account too. The environmental profile of these energy carriers is modeled for local conditions.

Transport to manufacturer – A2

The raw materials are transported to the manufacturing site. In this case, the modelling includes road and boat transportations (average values) of each raw material.

Manufacture – A3

This module includes manufacturing of products but also besides on-site activities such as grinding, drying, storing, mixing, packing and internal transportation.

The manufacturing process also collect data on the combustion of refinery products, such as diesel and gasoline, related to the production process.

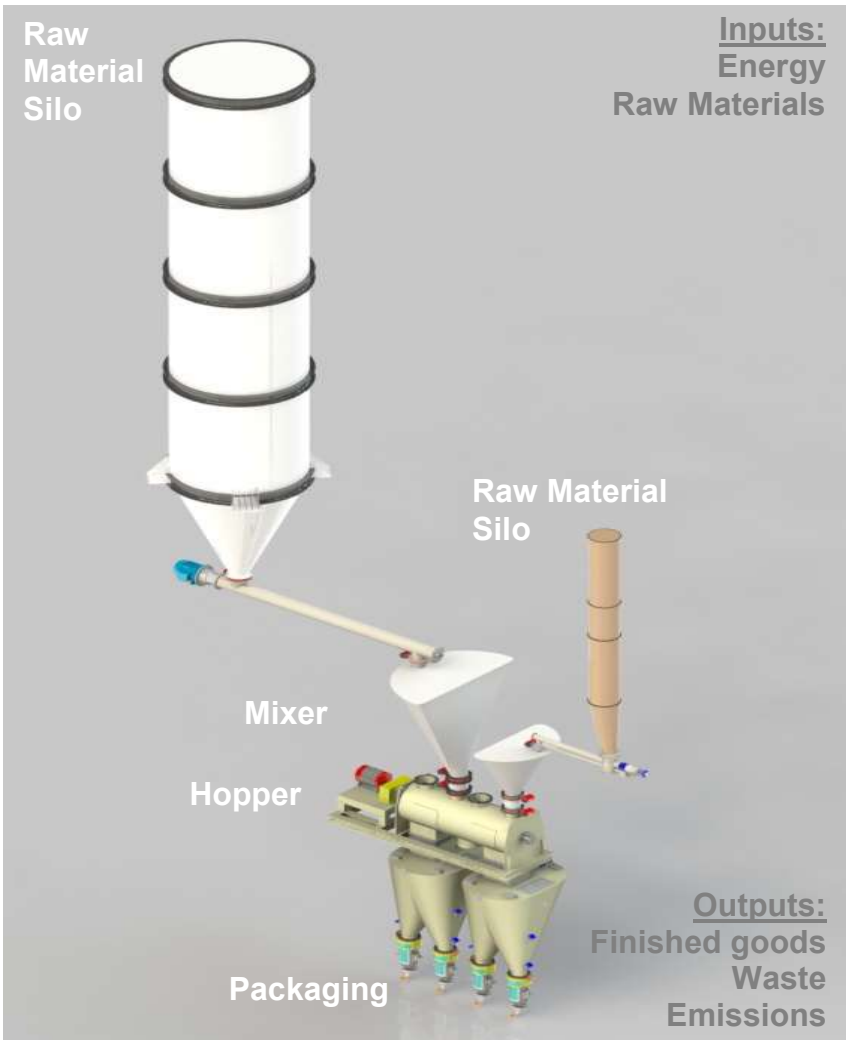
Packaging-related flows in the production process and all up-stream packaging are included in the manufacturing module, i.e. wooden pallets, paper sack and LDPE film.

Apart from production of packaging material, the supply and transport of packaging material are also considered in the LCA model. They are reported and allocated to the module where the packaging is applied. Data on packaging waste created during this step are then generated.

It is assumed that packaging waste generated in the course of production and up-stream processes is 100% collected and either recycled or incinerated with energy recovery.

[1] **Included Transport**

Manufacturing process flow diagram: Basic scheme of a Mortar Production line



Construction process stage, A4 - A5

Description of the stage:

Transport – A4

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.

Transport to the building site:

PARAMETER	VALUE (expressed per declared unit)
Fuel type and consumption of vehicle or vehicle type used for transport e.g. long distance truck, boat, etc.	38 l / 100km for 26t load
Distance	360 km
Capacity utilisation (including empty returns)	83 % for lorries 30% of empty returns
Bulk density of transported products	1.55 kg/lit ± 0.05
Volume capacity utilisation factor	1 (by default)

Construction installation process – A5

For the implementation of the product, mixer pump equipment is generally used for high volume purposes. Smaller volumes are mixed and applied according to local circumstances. A pump is generally used. The energy to run different equipment has been accounted for in relation to the product type and different uses.

During installation and construction, 5 % of the material amount is estimated to be wasted through excess preparation and cleaning processes. The losses are considered as landfilled. Within module A5, site-related packaging waste processing is included in the LCA.

End-of-life of packaging materials is reported and allocated to the module where it arises.

Packaging materials and leftovers are considered 100 % collected and recycled.

Installation in the building:

PARAMETER	VALUE (expressed per declared unit)
secondary materials for installation (specified by materials)	none
Water use	0,28 liters / kg
Other resource use	None
Quantitative description of energy type (regional mix) and consumption during the installation process	0.0106 MJ/kg
Wastage of materials on the building site before waste processing, generated by the product's installation (specified by type)	0.05 kg (5%)
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)	Polyethylene film: 0.81 g/kg Paper bag: 3,4 g/kg Pallet: 18,7 g/kg Packaging and pallets are sent to recycling
Direct emissions to ambient air, soil and water	none

Use stage (excluding potential savings), B1 - B7

Description of the stage:

The use stage is divided into the following modules:

Use – B1

Maintenance – B2

Repair – B3

Replacement – B4

Refurbishment – B5

Operational energy and water use – B6 and B7

Once installation is complete, no actions or technical operations are required during the use stages until the end of life stage. The product does not require any energy, water or material input to keep it in working order. Furthermore, it is not exposed to the indoor atmosphere of the building, nor is it in contact with the circulating water or the ground.

The product covered by this EPD does not require any maintenance as it is aimed for cement based tile adhesive. In addition, due to the product durability; maintenance, repair, replacement or restoration are irrelevant in the specified applications. Declared product performances therefore assume a working life that equals the building's lifetime. For this reason, no environmental loads are attributed to any of the modules between B1 and B5.

End-of-life stage C1 - C4

Description of the stage:

Landfill is considered to be the worst scenario.

The end-of-life stage is divided into the following modules:

Deconstruction – C1

The de-construction and/or dismantling of the product take part of the demolition of the entire building. In our case, the environmental impact is assumed to be very small and can be neglected.

Transport to waste processing – C2

The model use for the transportation is applied (cf. table below).

Waste processing – C3

The product is considered to be landfilled without reuse, recovery or recycling. It is classified as 'non-hazardous waste' in the European list of waste products.

Disposal –C4

The impact of landfill is taken into account according to available data.

Additional technical information of End-of-life:

PARAMETER	VALUE (expressed per declared unit) / DESCRIPTION
Collection process specified by type	1 kg collected with mixed construction waste.
Recovery system specified by type	0% of waste
Disposal specified by type	100 % (1 kg) product to municipal landfill
Assumptions for scenario development (e.g. transportation)	Average truck trailer with 27t payload, diesel consumption 38L/100km ; 50km distance to landfill

Reuse/recovery/recycling potential, D

Post-consumer recycling scenarios are not considered within this EPD.

LCA results

Description of the system boundary, X = Included in LCA, MND = Module Not Declared

CML 2001- April 2013 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.

Resume of the LCA data results are detailed on the following tables and they refer to a declared unit of 1kg of Cement based standard tile adhesives.

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	MND

ENVIRONMENTAL IMPACTS

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	
Global Warming Potential (GWP) - *kg CO2equiv/FU*	2,53E-01	5,84E-03	8,97E-03	0	0	0	0	0	0	0	4,70E-03	2,56E-03	0	1,67E-02	MND
	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*	1,29E-08	8,88E-19	2,85E-10	0	0	0	0	0	0	0	6,40E-19	6,35E-19	0	9,35E-17	MND
	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 SO2equiv/FU*	7,12E-04	7,83E-06	3,31E-05	0	0	0	0	0	0	0	1,65E-05	1,04E-05	0	9,55E-05	MND
	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 (PO4)3-equiv/FU*	3,23E-04	1,66E-06	1,01E-05	0	0	0	0	0	0	0	9,60E-07	2,63E-06	0	1,08E-05	MND
	Excessive enrichment of waters and continental surfaces with nutrients, and the associated adverse biological effects.														
Photochemical ozone creation (POPC) *Etheneequiv/FU*	1,13E-06	6,08E-07	2,10E-06	0	0	0	0	0	0	0	1,11E-06	4,24E-07	0	7,86E-06	MND
	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 Sbequiv/FU*	1,07E-07	7,72E-11	3,08E-09	0	0	0	0	0	0	0	1,17E-10	2,22E-10	0	5,69E-09	MND
Abiotic depletion potential for fossil ressources (ADP-fossil fuels) - *MJ/FU*	1,60E+00	8,08E-02	8,83E-02	0	0	0	0	0	0	0	5,85E-02	3,46E-02	0	2,23E-01	MND
	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*	4,94E-01	1,86E-03	2,72E-02	0	0	0	0	0	0	0	1,90E-04	2,06E-03	0	2,93E-02	MND
Use of renewable primary energy used as raw materials *MJ/FU*	1,12E-01	0	2,20E-03	0	0	0	0	0	0	0	0	0	0	0	MND
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) *MJ/FU*	7,18E-01	1,86E-03	2,94E-02	0	0	0	0	0	0	0	1,90E-04	2,06E-03	0	2,93E-02	MND
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw	1,66E+00	8,11E-02	9,59E-02	0	0	0	0	0	0	0	5,87E-02	3,47E-02	0	2,31E-01	MND
Use of non-renewable primary energy used as raw materials *MJ/FU*	8,50E-02	0	1,67E-03	0	0	0	0	0	0	0	0	0	0	0	MND
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) - *MJ/FU*	1,75E+00	8,11E-02	9,75E-02	0	0	0	0	0	0	0	5,87E-02	3,47E-02	0	2,31E-01	MND
Use of secondary material *kg/FU*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	MND
Use of renewable secondary fuels- *MJ/FU*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	MND
Use of non-renewable secondary fuels - *MJ/FU*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	MND
Use of net fresh water - *m3/FU*	5,41E-04	6,19E-07	3,09E-04	0	0	0	0	0	0	0	3,50E-07	3,48E-06	0	5,80E-05	MND

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*	2,71E-09	2,91E-10	2,25E-10	0	0	0	0	0	0	0	7,23E-12	1,93E-09	0	3,93E-09	MND
Non-hazardous (excluding inert) waste disposed *kg/FU*	1,92E-04	9,83E-07	2,57E-02	0	0	0	0	0	0	0	8,64E-06	2,93E-06	0	1,07E+00	MND
Radioactive waste disposed *kg/FU*	3,74E-05	9,45E-08	2,50E-06	0	0	0	0	0	0	0	7,24E-08	7,11E-08	0	3,06E-06	MND

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	MND
Materials for recycling *kg/FU*	9,86E-04	0	1,67E-02	0	0	0	0	0	0	0	0	0	0	0	MND
Materials for energy recovery *kg/FU*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	MND
Exported energy, detailed by energy carrier *MJ/FU*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	MND

Environmental parameters description

Environmental impacts

Global warming potential

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 CO_2, which is assigned a value of 1.

For example, if CH_4 (methane) has a global warming potential of 25, it means that 1kg of methane has the same impact on climate change as 25kg of CO_2 and thus 1kg of CH_4 would count as 25kg of CO_2 equivalent.

Ozone Depletion

Ozone depletion is the destruction of the stratospheric ozone layer which shields the earth from UV radiation harmful to life.

Acidification potential

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

It corresponds to an excessive enrichment of waters and continental surfaces with nutrients, and the associated adverse biological effects.

Photochemical ozone creation

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. It corresponds to the pollution of the air at ground level.

Abiotic depletion potential for fossil and non-fossil resources

The abiotic depletion potential is the consumption of non-renewable resources, thereby lowering their availability for future generations.

Resource Use

Use of primary energy resources

Renewable energy is energy from non-fossil sources (wind, solar, geothermal, etc.
Renewable resource is a resource that is grown, naturally replenished or naturally cleansed, on a human time scale.

Non-Renewable energy is energy from sources which are not defined as renewable energy sources.
Non-renewable resource is resource that exists in a finite amount that cannot be replenished on a human scale.

Use of secondary material

Secondary material is material recovered from previous use or from waste which substitutes primary materials. Materials recovered from previous use of from waste from one product system and used as an input in another product system are secondary materials (recycled scrap metal, recycled plastic, recycled wood chips, etc.)

Use of secondary fuels

Secondary fuel is fuel recovered from previous use or from waste which substitutes primary fuels. Any combustible material recovered from previous use or from waste from the previous product system and used as a fuel in a following system is a secondary fuel (e.g. solvents, used tyres, used oil, etc.)

Use of net fresh water

Fresh water is naturally occurring water on the Earth's surface (ice, lakes, rivers, groundwater, etc.) It is generally characterized by having low concentrations of dissolved salts; the term specifically excludes seawater and brackish water.

Waste categories

Hazardous waste disposed

This kind of waste poses substantial or potential threats to public health or the environment

Non-hazardous waste disposed

This kind of waste is a waste that can burn, produce chemical, physical or biological reaction but without being hazardous or toxic for human health (e.g. PE, PVC, PS, metals, non-treated wood, construction waste mixed with non-mineral waste without any hazardous substance inside, etc.).

Radioactive waste disposed

These kinds of wastes contain radioactive material. Radioactive wastes are usually by-products or nuclear power generation and other applications of nuclear fission or nuclear technology, such research and medicine. Radioactive waste is hazardous to most forms of life and the environment, and is regulated by government in order to protect human health and the environment.

Output flows

Components for re-use

To re-use is to use again after it has been used: this includes conventional reuse where the item is used again for the same function and new-life reuse where it is used for a different function.

Material for recycling

In contrast with re-use, recycling is the breaking down of the used item into raw materials which are used to make new items.

Materials for energy recovery

It includes any technique or method of minimizing the input of energy to an overall system by the exchange of energy from one sub-system to another.

Exported energy

It relates to energy exported from waste incineration and landfill

LCA results interpretation

The following figure refers to a declared unit of 1kg Standard products of Cement based standard tile adhesives.

[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.

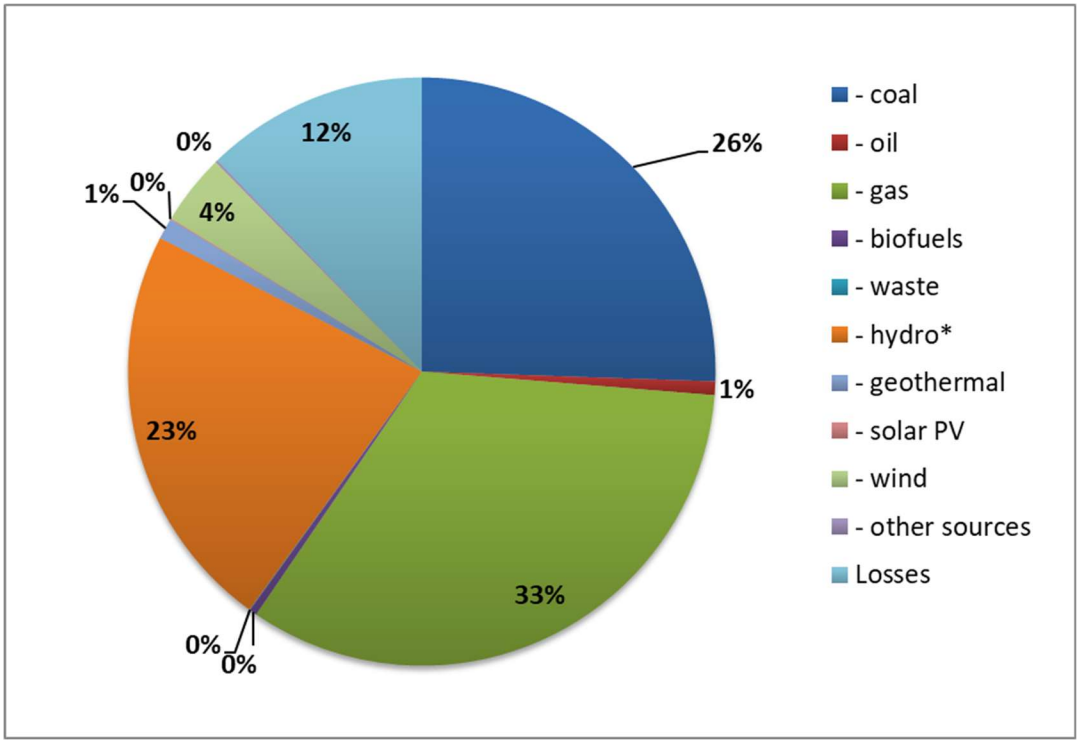
Comments:

With the graphic views above, it is possible to assess which steps of the LCA are the most impacting for the chosen indicators

- The main environmental impacts of the product life cycle come from extraction and processing of raw materials (A1-A3). The Product stage is responsible for over 75% of the impact for following indicators: Global Warming, Non-renewable resources consumption, Energy consumption and Water consumption.
- As expected, waste production is mainly generated (over 95 %) during the end-of-life stage with building demolition.
- Water is added at installation.
    - The formula mix and distribution pattern have identifiable impacts on the total.

Electricity description

TYPE OF INFORMATION	DESCRIPTION
Location	Representative of average production in Turkey 2015
Geographical representativeness description	Split of energy sources in Turkey - coal 26% - oil 1% - gas 33% - biofuels 0% - waste 0% - hydro* 23% - geothermal 1% - solar PV 0% - wind 4% - other sources 0% Losses 12%
Reference year	2017
Type of data set	Cradle to gate from Ecoinvent
Source	International Energy Agency -2015
Global warming potential (excluding biogenic Carbon)	0,587 kg of CO2 eq /kWh



Data Quality

Scope: Turkey

Period: 2018

Background information is taken from the GaBi or Ecoinvent database, trade association or suppliers data.

Raw Materials	Generic database, trade association and supplier data
Production	Own specific data
Transport	Generic and specific data
Application	Generic and specific data
Life in Use	Generic data
End of Life	Generic data
Energy	Generic average country

References

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3. Sub-PCR 2012:01-SUB-PCR-A Mortar applied to a surface (construction product) version 2.3
4. EN 15804:2012 + A1:2013 Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products
5. ISO 14 025: environmental labels and declarations – type III Environmental Declarations Principles and procedure (2009)
6. ISO 14 040: Environmental management – Life Cycle Assessment – Principles and framework (2006)
7. ISO 14 044: Environmental management – Life Cycle Assessment – Requirements and guidelines (2006)
8. Saint-Gobain Environmental Product Declaration Methodological Guide for Construction Products, Version 3.0.1 (2013)
9. ISO 14020:2000 Environmental labels and Declarations - General principles
10. EN 15978 Sustainability of construction works - Assessment of environmental performance of buildings - Calculation method