ENVIRONMENTAL PRODUCT DECLARATION

as per /ISO 14025/ and /EN 15804/

Owner of the Declaration	**Türk Ytong Sanayi A.Ş.**
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-TYS-20180104-CAD1-EN
Issue date	09.03.2020
Valid to	08.03.2025

Multipor Thermal Insulation Board

Türk Ytong Sanayi A.Ş.

www.ibu-epd.com / https://epd-online.com

General Information

Türk Ytong Sanayi A.Ş.

Programme holder
IBU - Institut Bauen und Umwelt e.V.
Panoramastr. 1
10178 Berlin
Germany

Declaration number
EPD-TYS-20180104-CAD1-EN

This Declaration is based on the Product Category Rules:
Aerated concrete, 07.2014
(PCR tested and approved by the SVR)

Issue date
09.03.2020

Valid to
08.03.2025

Dipl. Ing. Hans Peters
(President of Institut Bauen und Umwelt e.V.)

Dr. Alexander Röder
(Managing Director IBU)

Multipor Thermal Insulation Board

Owner of the Declaration
Türk Ytong Sanayi A.Ş.

Headquarters
Aydınevler Mahallesi, İnönü Caddesi, Gökçe Sokak
34854 No:3 Maltepe İstanbul, Turkey

Declared product / Declared unit
1 m³ of Multipor thermal insulation board with a bulk density of 102 kg/m³

Scope:
This EPD is prepared as an average EPD for Multipor Thermal Insulation Boards product group manufactured in the plant of Türk Ytong located in Çatalca/Istanbul, Turkey. The data used in this study is collected as an annual representative value for the period 01/09/2016-31/08/2017.

The owner of the declaration shall be liable for the underlying information and evidence; the IBU shall not be liable with respect to manufacturer information, life cycle assessment data and evidences.

Verification

The CEN Norm /EN 15804/ serves as the core PCR
Independent verification of the declaration according to /ISO 14025/
☐ internally ☒ externally

Prof. Dr. Birgit Grahl
(Independent verifier appointed by SVR)

Product

Product description / Product definition
The products mentioned are Multipor thermal insulation boards in various formats.
Multipor boards are thermal insulation materials made of calcium silicate hydrates with a very high proportion of air pores.

For the use and application of the product the respective national provisions at the place of use apply, in Turkey the National Technical Approval of ITB: /UTO 2016/075: Rev.01/.

Application
It can be used for renovation and new buildings:

- Internal and external insulation of exterior walls
- Insulation of underground garage, basement, passageway ceilings
- Rooftop insulation of inclined and flat roofs, and parking floors
- In External Thermal Insulation Composite System (ETICS) as a system component
- Double walls
- Insulation of cavity in the walls
- Ventilated facades
- Insulation under screed

Technical Data
Multipor thermal insulation boards demonstrate the following constructional performance:

Constructional data

Name	Value	Unit
Compressive strength acc. to /TS EN826/	0.35	N/mm²
Tensile strength acc.to /TS EN 1607/	0.08	N/mm²
Thermal conductivity acc.to /TS EN 12667/	0.044	W/(mK)
Gross dry density acc. to /TS EN1602/	100 - 115	kg/m³

100-115kg/m³ is the range of densities that may occur. The mass weighted average is 102 kg/m³ and LCA data calculated for that value.

Base materials / Ancillary materials
Thermal insulation boards are made from Portland

cement, quicklime, calcite, quartzite/sand, gypsum, Al paste, hydrophobic agents and primer chemical.

- Portland cement 25-50%
- Quicklime 5-25%
- Mineral aggregate 10-20%
- Quartzite 25-40%
- Gypsum 3-7%
- Aluminium 0.7-0.8%

In addition, 75-140% water is used (based on the solid materials).

Sand: The sand used is a natural resource, in addition to the main mineral quartz (SiO_2) contains minor and trace minerals. It is an essential raw material for the hydrothermal reaction during steam curing.
Cement: Cement acts as a binder and is predominantly made from limestone marl or a mixture of limestone and clay. The natural raw materials are burned and then ground.
Quicklime: Quicklime serves as a binder and is made by burning natural limestone.
Gypsum: the sulphate carrier used influences the setting time of the raw block and originates from natural sources.
Mineral aggregate: Ground limestone as an additional mineral component.
Aluminum: Aluminum paste serves as a porosity agent. The metallic aluminum reacts in the alkaline environment with release of hydrogen gas, which forms the pores and escapes after completion of the blowing process.
Water: The presence of water is the basis for the hydraulic reaction of the binders. Water is also needed to make a homogeneous suspension.
Mould oil: Mould oil is used as a release agent between mould and raw block. Mineral oils are used, free of polycyclic aromatic hydrocarbons, with the addition of long-chain additives to increase the viscosity. This prevents run-off in the mould and enables economical use.
Hydrophobing agent: The hydrophobing agent reduces the water absorption of the material. Liquid silicones are used.

Reference service life
The reference service life cannot be required for this EPD covering only Modules A1 to A3 (cradle-to-gate).

Further Information
For further information, please contact Türk Ytong A.S. through its website at www.ytong.com.tr

LCA: Calculation rules

Declared Unit
The declared unit for this product category is defined as 1m³ of Multipor thermal insulation boards product group. This declaration is classified as an average product as calculated from one plant of one manufacturer according to section 1c in PCR Part A: Calculation Rules for the Life Cycle Assessment and Requirements on the Project Report.

Declared unit

Name	Value	Unit
Declared unit	1	m³
Conversion factor to 1 kg	0.0098	-
Gross dry density	102	kg/m³

System boundary
Type of the EPD: cradle-to-gate

The system boundaries of this life cycle assessment study are considered as cradle-to-gate, since all the modules except A1-A3 product stage are not declared within the scope of this study. This means the system boundary covers Ytong Multipor boards from extraction of raw material to the production of finished packed product at the factory gate.

The product stage contains A1 (extraction, processing, production of raw materials), A2 (Transport to the manufacturer and internal transport) and A3 (Manufacturing operations) modules. These are declared as summed.

Background data
All relevant background datasets were taken from the /Ecoinvent/ database within /SimaPro/ software.

Comparability
Basically, a comparison or an evaluation of EPD data is only possible if all the data sets to be compared were created according to /EN 15804/ and the building context, respectively the product-specific characteristics of performance, are taken into account.
.

LCA: Scenarios and additional technical information

A1, A2 and A3 modules are declared within the scope of this study. Hence, there are no scenarios provided below regarding the other modules A4, A5, B1-B7, C1-C4 and D.

Type and amount of packaging materials:
For packaging of 1m³ Multipor board, PE Strech film (transparent and yellow, 1.247kg), wooden pallet (0.579 piece), carton seperator (0.521kg) and opaque PE etiquette (0.579 piece) were used by the plant.

LCA: Results

The following table shows the impact estimate results which are relative expressions and do not predict impacts on category endpoints or the transgression of thresholds, safety margins or risks.

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE NOT DECLARED)

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
X	X	X	MND	MND	MND	MND	MNR	MNR	MNR	MND	MND	MND	MND	MND	MND	MND

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT: 1 m3 Multipor Thermal Insulation Board

Parameter	Unit	A1-A3
Global warming potential	[kg CO_2-Eq.]	2.27E+2
Depletion potential of the stratospheric ozone layer	[kg CFC11-Eq.]	1.40E-5
Acidification potential of land and water	[kg SO_2-Eq.]	8.65E-1
Eutrophication potential	[kg $(PO_4)^{3-}$-Eq.]	1.07E-1
Formation potential of tropospheric ozone photochemical oxidants	[kg ethene-Eq.]	4.08E-2
Abiotic depletion potential for non-fossil resources	[kg Sb-Eq.]	2.02E-3
Abiotic depletion potential for fossil resources	[MJ]	2.32E+3

RESULTS OF THE LCA - RESOURCE USE: 1 m3 Multipor Thermal Insulation Board

Parameter	Unit	A1-A3
Renewable primary energy as energy carrier	[MJ]	3.88E+2
Renewable primary energy resources as material utilization	[MJ]	1.09E+2
Total use of renewable primary energy resources	[MJ]	4.97E+2
Non-renewable primary energy as energy carrier	[MJ]	2.32E+3
Non-renewable primary energy as material utilization	[MJ]	5.42E+1
Total use of non-renewable primary energy resources	[MJ]	2.37E+3
Use of secondary material	[kg]	IND
Use of renewable secondary fuels	[MJ]	IND
Use of non-renewable secondary fuels	[MJ]	IND
Use of net fresh water	[m^3]	3.39E-1

RESULTS OF THE LCA – OUTPUT FLOWS AND WASTE CATEGORIES: 1 m3 Multipor Thermal Insulation Board

Parameter	Unit	A1-A3
Hazardous waste disposed	[kg]	3.05E-3
Non-hazardous waste disposed	[kg]	1.25E+1
Radioactive waste disposed	[kg]	5.99E-3
Components for re-use	[kg]	IND
Materials for recycling	[kg]	IND
Materials for energy recovery	[kg]	IND
Exported electrical energy	[MJ]	IND
Exported thermal energy	[MJ]	IND

Note: There are no direct radioactive wastes during the manufacturing processes of boards. Within the manufacturing stage (A3) (see above table), the value acquired for radioactive waste generation mainly is in relation with the background processes of electricity.

References

Institut Bauen und Umwelt
Institut Bauen und Umwelt e.V., Berlin (pub.): Generation of Environmental Product Declarations (EPDs);
General Principles
for the EPD range of Institut Bauen und Umwelt e.V. (IBU), 2015/10
www.ibu-epd.de

/ISO 14025/
DIN EN /ISO 14025:2011-10/, Environmental labels and declarations — Type III environmental declarations — Principles and procedures

/EN 15804/
/EN 15804:2012-04+A1 2013/, Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction products

/PCR Part A/
Product Category Rules for Building Related Products and Services , Institute Construction and Environment e.V. (IBU) Part A: Calculation Rules for the Life Cycle Assessment and Requirements on the Project Report (version 1.6),11.04.2017; www.bau-umwelt.de

/PCR Part B/
Product Category Rules (PCR), Guidance-Texts for Building-Related Products and Services, from the range of Environmental Product Declarations of Institute Construction and Environment e.V. (IBU), Part B: Requirements on the EPD for Aerated concrete, version 1.3, 04.07.2014
www.bau-umwelt.de

/ISO 14040-44/
DIN EN ISO 14040:2006: Environmental management - Life cycle assessment - Principles and framework (ISO 14040:2006) and Requirements and guidelines (ISO 14044:2006)

/Ecoinvent/
Ecoinvent Centre, www.ecoinvent.com (v3.3)

/SimaPro/
SimaPro LCA Package, Pré Consultants, the Netherlands, www.pre-sustainability.com (v8.3.0.0)

/TS EN 197-1/
Cement - Part 1: Composition, specifications and conformity criteria for common cements

/TS EN 459-1/
Building lime - Part 1: Definitions, specifications and conformity criteria

/TS EN 13501-1 + A1/
Fire classification of construction products and building elements - Part 1: Classification using data from reaction to fire tests

/UTO 2016/075: Rev. 01/
Türk Ytong Sanayi A.Ş. – Multipor Thermal Insulation Board, 31.03.2017

/TS EN 826/
Determination of compression behaviour

/TS EN 1602/
Determination of the apparent density

/TS EN 1607/
Determination of tensile strength perpendicular to faces

/TS EN 12667/
Determination of thermal resistance by means of guarded hot plate and heat flow meter methods - Products of high and medium thermal resistance

Publisher
Institut Bauen und Umwelt e.V.
Panoramastr. 1
10178 Berlin
Germany

Tel +49 (0)30 3087748- 0
Fax +49 (0)30 3087748- 29
Mail info@ibu-epd.com
Web **www.ibu-epd.com**

Programme holder
Institut Bauen und Umwelt e.V.
Panoramastr 1
10178 Berlin
Germany

Tel +49 (0)30 - 3087748- 0
Fax +49 (0)30 – 3087748 - 29
Mail info@ibu-epd.com
Web **www.ibu-epd.com**

Author of the Life Cycle Assessment
Altensis Ins. Enerji San. Ve Tic. Ltd. Sti.
Kayisdagi Caddesi Baris Sok. Meriç Plaza 2
34750 Istanbul
Turkey

Tel +90 216 410 61 35
Fax +90 216 410 61 53
Mail info@altensis.com
Web **www.altensis.com**

Owner of the Declaration
Türk Ytong A.S.
Aydinevler Mahallesi, Inönü Caddesi,
Gökçe Sokak Maltepe No:3
34854 Istanbul
Turkey

Tel + 90 216 396 66 00
Fax + 90 216 396 19 61
Mail ytong@ytong.com.tr
Web **www.ytong.com.tr**