TRB INTERNATIONAL

CERTIFICATE

ALAZ AHŞAP TEKNOLOJİLERİ SAN. VE TİC. LTD. ŞTİ.

EMEK MAH.NATO YOLU CAD.NO:319/1 SANCAKTEPE İSTANBUL

ISO 9001:2015

PRODUCTION AND APPLICATION OF DECORATION AND FACADE PRODUCTS FROM WOOD FOR INDOOR AND OUTDOOR PLACES

This certificate is valid for 3 years on condition that surveillance audits are carried out before the period of each year in accordance with the accreditation rules. With this certificate, the holder of the certificate has been audited on the address mentioned above by TRB Certification Body in accordance with the condition and requirements of the license contract and it has been registered that the company satisfies the conditions of the standard. This certificate is valid as long as the certificate holder follows TRB certification rules and the certificate is seen as valid on www.trb.com.de web site certificate inquiry section.

Certification	: DE-QC-1280
Date of Issue	: 20.12.2019
Expiry Date	: 19.12.2021
Certification	: 3 Years (2. Year)
Printing Number	: 01

General Manager

MEMBER OF MULTILATERAL RECOGNITION ARRANGEMENT IAF

DAkkS Deutsche Akkreditierungsstelle D-ZM-19486-01-00

Pfannestiel 17, D-88677 Markdorf-Deutschland
Telefon: 0049-7544-7440623 Fax: 0049-7544-7440629 web: www.trb.com.de E-mail: info@trb.com.de

TRB INTERNATIONAL

CERTIFICATE

ALAZ AHŞAP TEKNOLOJİLERİ SAN. VE TİC. LTD. ŞTİ.

EMEK MAH.NATO YOLU CAD.NO:319/1 SANCAKTEPE İSTANBUL

ISO 10002:2018

PRODUCTION AND APPLICATION OF DECORATION AND FACADE PRODUCTS FROM WOOD FOR INDOOR AND OUTDOOR PLACES

This certificate is valid for 3 years on condition that surveillance audits are carried out before the period of each year in accordance with the accreditation rules. With this certificate, the holder of the certificate has been audited on the address mentioned above by TRB Certification Body in accordance with the condition and requirements of the license contract and it has been registered that the company satisfies the conditions of the standard. This certificate is valid as long as the certificate holder follows TRB certification rules and the certificate is seen as valid on www.trb.com.de web site certificate inquiry section.

Certification	: DE-CS-1280
Date of Issue	: 20.12.2019
Expiry Date	: 19.12.2021
Certification	: 3 Years (2. Year)
Printing Number	: 01

General Manager

Pfannestiel 17, D-88677 Markdorf-Deutschland
Telefon: 0049-7544-7440623 Fax: 0049-7544-7440629 web: www.trb.com.de E-mail: info@trb.com.de

TRB INTERNATIONAL

CERTIFICATE

ALAZ AHŞAP TEKNOLOJİLERİ SAN. VE TİC. LTD. ŞTİ.

EMEK MAH.NATO YOLU CAD.NO:319/1 SANCAKTEPE İSTANBUL

ISO 14001:2015

PRODUCTION AND APPLICATION OF DECORATION AND FACADE PRODUCTS FROM WOOD FOR INDOOR AND OUTDOOR PLACES

This certificate is valid for 3 years on condition that surveillance audits are carried out before the period of each year in accordance with the accreditation rules. With this certificate, the holder of the certificate has been audited on the address mentioned above by TRB Certification Body in accordance with the condition and requirements of the license contract and it has been registered that the company satisfies the conditions of the standard. This certificate is valid as long as the certificate holder follows TRB certification rules and the certificate is seen as valid on www.trb.com.de web site certificate inquiry section.

Certification	: DE-EC-1280
Date of Issue	: 20.12.2019
Expiry Date	: 19.12.2021
Certification	: 3 Years (2. Year)
Printing Number	: 01

General Manager

MEMBER OF MULTILATERAL RECOGNITION ARRANGEMENT IAF

DAkkS Deutsche Akkreditierungsstelle D-ZM-19486-01-00

Pfannestiel 17, D-88677 Markdorf-Deutschland
Telefon: 0049-7544-7440623 Fax: 0049-7544-7440629 web: www.trb.com.de E-mail: info@trb.com.de

TRB INTERNATIONAL

CERTIFICATE

ALAZ AHŞAP TEKNOLOJİLERİ SAN. VE TİC. LTD. ŞTİ.

EMEK MAH.NATO YOLU CAD.NO:319/1 SANCAKTEPE İSTANBUL

ISO 45001:2018

PRODUCTION AND APPLICATION OF DECORATION AND FACADE PRODUCTS FROM WOOD FOR INDOOR AND OUTDOOR PLACES

This certificate is valid for 3 years on condition that surveillance audits are carried out before the period of each year in accordance with the accreditation rules. With this certificate, the holder of the certificate has been audited on the address mentioned above by TRB Certification Body in accordance with the condition and requirements of the license contract and it has been registered that the company satisfies the conditions of the standard. This certificate is valid as long as the certificate holder follows TRB certification rules and the certificate is seen as valid on www.trb.com.de web site certificate inquiry section.

Certification	: DE-SC-1280
Date of Issue	: 20.12.2019
Expiry Date	: 19.12.2021
Certification	: 3 Years (2. Year)
Printing Number	: 01

TRB

General Manager

Pfannestiel 17, D-88677 Markdorf-Deutschland
Telefon: 0049-7544-7440623 Fax: 0049-7544-7440629 web: www.trb.com.de E-mail: info@trb.com.de

CERTIFICATION

Certificate

EC UYGUNLUK BEYANI
EC CERTIFICATE OF CONFORMITY

KURULUŞ / COMPANY

ALAZ AHŞAP TEKNOLOJİLERİ SAN.VE TİC.LTD.ŞTİ.

ADRES / ADRESS

EMEK MAH.NATO YOLU CAD.NO:319/1 SANCAKTEPE/İSTANBUL/TURKEY

That the following described product in our delivered version complies with appropriate basic safety and health requirements based on 2001/95/EC on its design and type, as brought into circulation by us. In Case of alteration of the product, not agreed upon by us, this declaration will lose its validity. /

Aşağıda adı, tipi/modeli verilen ürünü **2001/95/EC** yönetmeliğine uygun olarak ve ilgili diğer mevzuatların gereklerini karşılayacak şekilde ürettiğimizi ve üreteceğimizi beyan ederiz. İlgili tüm doküman ve kayıtlar tarafımızdan muhafaza edilmektedir.

PRODUCT DESCRIPTION/ ÜRÜN TANIMI	:	NATURAL WOODEN VENEERED ALUMINUM AND GRP MATERIALS
PRODUCT COMMERCIAL BRAND / MARKA	:	TECHNOWOOD
APPLICABLE EC DIRECTIVES / UYGULANAN YÖNETMELİKLER	:	2001/95/EC
APPLICABLE HARMONISED STANDARDS UYGULANAN STANDARTLAR	:	TS EN 14354,TSE-RD 017-REV.01.TSE, TSE-RD 026-REV.01.TSE,TSE-RD 032
PRODUCT TYPE / ÜRÜN TİPLERİ	:	CLASS 1

CERTIFICATE NUMBER : 22032019CE0078
CERTIFICATE ISSUE DATE : 09.06.2020
CERTIFICATE VALIDITY DATE : 08.06.2021

KURULUŞ YETKİLİ KAŞE İMZA

Bu sertifika, Asist certification'ın belgelendirme şartlarına uyulması ve her yıl yapılacak gözetim denetimlerinin başarılı bir şekilde tamamlanması durumunda, ilk yayın tarihinden itibaren 3 yıl geçerlidir. Bu sertifikanın mülkiyeti ASİST Sertifikasyon Ltd.Şti'ye aittir. İstenildiğinde iadesi zorunludur. Sertifikanın geçerlilik durumu www.asistekalite.net adresinden kontrol edilebilir. Asist Sertifikasyon Ltd.Şti. İncilipınar Mh. İncilipınar İş Merkezi Kat:3 No:302 Şehitkamil/GAZİANTEP • www.asistekalite.net / info@asistekalite.net

CERTIFICATE OF REGISTRATION

This is to certify that

ALAZ AHŞAP TEKNOLOJİLERİ SAN.VE TİC.LTD.ŞTİ.

Emek Mah.
Natoyolu Cad.
No:319/1
Sancaktepe - Istanbul

has been audited and found to meet the requirements of standard(s) **FSC-STD-40-004 (Version 3.0) EN and FSC-STD-50-001 (Version 2.0) EN** for **FSC® Chain of Custody Certification**

Scope of certification

PRODUCTION AND SALE OF WOOD VENEER COATING WITH ALL ALUMINIUM PRODUCTS AND ALL GRP (GLASS REINFORCED POLYESTERS) PRODUCTS

Products:
W5.3 Beams, W11.1 Doors and door frames, W11.2 Windows and Frames,
W11.3 Stairs, W11.4 Dividers, W11.6 Gates and garage doors,
W11.7 Wall cladding, W11.11 Window blinds, shutters etc,
W11.12 Houses and building elements, W12.13 Shelves,
W13.1 Garden furniture, W13.3 Shelters and parasols,
W13.4 Fences, fence stakes, pales, W13.5 Decking and garden sleepers,
W13.7 Other outdoor furniture gardening products,
W11.14 Trusses and roofs

Certificate number: TT-COC-005224

Issue number: 2020-01

Certificate start date: 11 March 2020

Certificate expiry date: 10 March 2025

Date of initial certification: 7 January 2015

Karen Prendergast
Divisional Director - Certification
BM TRADA

Issuing Office: Warringtonfire Testing and Certification Limited t/a bmtrada Chiltern House, Stocking Lane, High Wycombe, Buckinghamshire, HP14 4ND, UK
Registered Office: 10 Lower Grosvenor Place, London, United Kingdom, SW1W 0EN Reg.No. 11371436

Environmental Product Declaration

TECHNOWOOD ALUMINUM PROFILES/SIDINGS

technowood
DESIGN ARCHITECTURE SYSTEMS

Technowood has developed the lamination of Natural Wood veneer with materials that are durable to outdoor conditions, preventing therefore the unpredictable bending and the possible deformations caused by bending of wood with ageing due to time and environmental factors. The product is developed under an environmentalist ideology, reducing the consumption of solid wood 98% and increasing usage life by more than 5 times. The 3 main materials used are: Aluminum Profiles and Plates, Aluminum composite plates and GRP profiles and plates.

Technowood's range of products can be used in various areas of construction providing high performance solutions in interior and exterior spaces allowing designers to achieve unique projects.

In particular, it provides high performance solutions in many various areas like pergolas, façades, benches, flowerpots and as well as city furniture.

Technowood is a product which is composed with aluminum products covered by timber. By so we are introducing a new state of wood which is long lasting, requires less maintenance and doesn't crack or twist. We define Technowood as technological wood.

UL CERTIFIED
ENVIRONMENTAL PRODUCT DECLARATION
UL.COM/EPD

ENVIRONMENTAL PRODUCT DECLARATION

TECHNOWOOD
ALUMINUM PROFILES/SIDINGS

According to ISO 14025, ISO 21930:2017 & EN 15804

1. General Information

This declaration is an environmental product declaration (EPD) in accordance with ISO 14025. EPDs rely on Life Cycle Assessment (LCA) to provide information on a number of environmental impacts of products over their life cycle. Exclusions: EPDs do not indicate that any environmental or social performancebenchmarks are met, and there may be impacts that they do not encompass. LCAs do not typically address the site-specific environmental impacts of raw material extraction, nor are they meant to assess human health toxicity. EPDs can complement but cannot replace tools and certifications that are designed to address these impacts and/or set performance thresholds – e.g. Type 1 certifications, health assessments and declarations, environmental impact assessments, etc. Accuracy of Results: EPDs regularly rely on estimations of impacts, and the level of accuracy in estimation of effect differs for any particular product line and reported impact. Comparability: EPDs are not comparative assertions and are either not comparable or have limited comparability when they cover different life cycle stages, are based on different product category rules or are missing relevant environmental impacts. EPDs from different programs may not be comparable.

PROGRAM OPERATOR	UL Environment
DECLARATION HOLDER	Alaz Ahsap Teknolojileri-Technwood Design Architecture Systems
DECLARATION NUMBER	4787986654.101.1
DECLARED PRODUCT	Aluminum Profiles/Siding
REFERENCE PCR	UL Part B Insulated Metal Panels, Metal Compostie Panels and Metal Cladding: Roof and Wall Panels, 2nd Edition, October 23, 2018
DATE OF ISSUE	July 1, 2019
PERIOD OF VALIDITY	5 Years
CONTENTS OF THE DECLARATION	Product definition and information about building physics Information about basic material and the material's origin Description of the product's manufacture Indication of product processing Information about the in-use conditions Life cycle assessment results Testing results and verifications

The PCR review was conducted by:	PCR Peer Review Commitee Thomas Gloria, PhD (Chair) epd@ulenvironment.com
This declaration was independently verified in accordance with ISO 14025 by Underwriters Laboratories ☐ INTERNAL ☒ EXTERNAL	Grant R. Martin Grant R. Martin, UL Environment
This life cycle assessment was independently verified in accordance with ISO 14044 and the reference PCR by:	Thomas P. Gloria Thomas P. Gloria, Industrial Ecology Consultants

This EPD conforms with ISO 21930:2017 and EN 15804

2. EPD Content

2.1. Product Description

Technowood represents a product range, emerged by coating the materials resistant to especially the compelling external spatial conditions with real wood. Technowood Aluminum profile and siding are produced from aluminum, natural wood veneer, adhesive and polish. Two different options consist of as aluminum tube profiles and sidings.

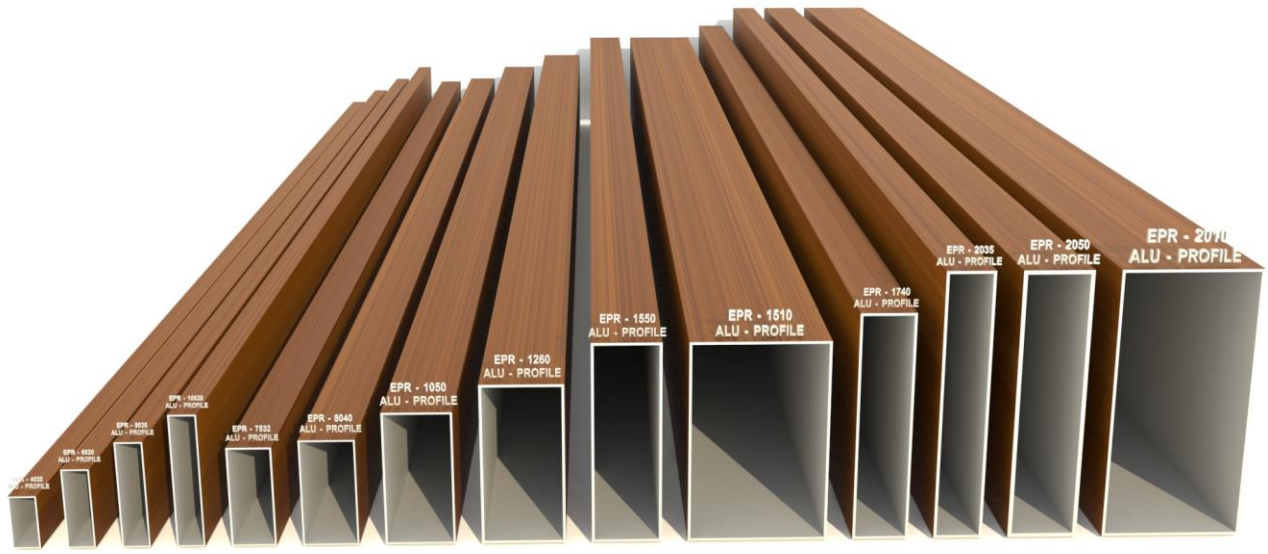


Figure 1. Technowood profiles covered with timber

2.2. Application Area

Technowood aluminum profile and siding products can be used in all places that wood products can be used, in interior and exterior spaces as well as façade systems. It provides high performance solutions in many various areas like pergolas, camellia systems, benches, flowerpots and as well as city furniture. The declared unit is 100 m2 Aluminum Panel which is the surface area but application of the product is either as profiles or sidings.

2.3. Manufacturing Location

This Environmental Product Declaration (EPD) represents the production of Aluminum profiles/siding manufactured in Sancaktepe/Istanbul /Turkey.

2.4. Technical Information and Product Standards

Technical information and product standards are given in the tables below:

Technical Product Information		
Name	Average Value	Unit
Length	19,685	ft
Width	0,6561	ft
Thickness	0,071	in
Density	168,48	lb/ft3
Tensile strength	45000	lbf/in2 (PSI)
Modulus of Elasticity	10000	lbf/in2 (PSI)
R value of typical materials where continuous	0,61	ft2·°F·hr/BTU

Table 1. Technical information and product standard of Aluminum Panel.

2.5. Material Composition Stage

Main materials and ancillary materials are shown in the tables below.

Materials	Material Type	Weight (kg)	
Aluminium	Main material	710	86,62%
Wood	Main material	20	2,44%
Lacquer	Ancillary material	50	6,10%
Adhesive	Ancillary material	39,65	4,84%

Table 2. Main and ancillary for 100 m2 of Aluminum Panel.

There are no products that can be included in ‘’Candidate List of Substances of Very High Concern for Authorization’’ and raw materials used are not part of the /EU REACH/ regulation.

2.6. Manufacturing Stage

Manufacturing flow chart is given in the figure below:

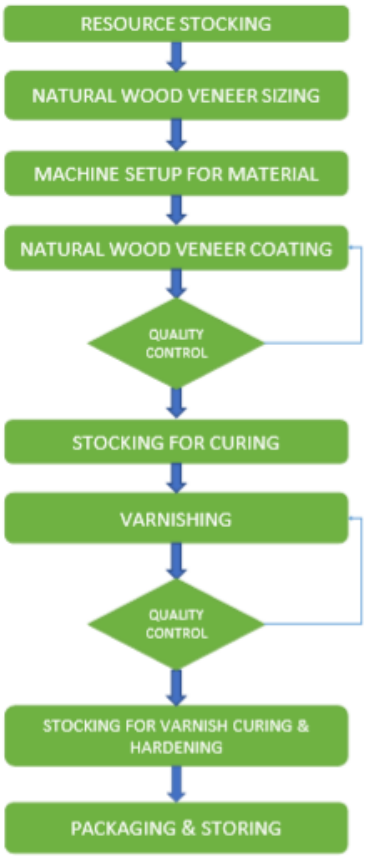


Figure 2. Manufacturing flow chart

2.7. Product Average

This EPD covers aluminum profiles and sidings and the declared unit has been determined according to the surface area. Aluminum Profiles and sidings have been studied together because profiles and sidings are made of the same components also as mass but different shapes. So, the average product has been determined 100-meter squares aluminum panel for profiles and siding products. Delivery Status
The metal ceiling systems, ceiling kits and components are produced in individual sizes and can be supplied with or without substructures. Packaging is usually on pallets and in cardboard. Area weight (kg/m²) depends on the specific product. A conversion table is helpful for converting the declared unit (kg/m²) and can be supplied upon request.

3. LCA: Calculation Rules

The LCA study and analysis were conducted according to the *"Product Category Rule Guidance for Building Related Products and Services, 'Part B: Insulated Metal Panels, Metal Composite Panels, and Metal Cladding: Roof and Wall Panels'* in accordance with ISO 14025, ISO 14040 and ISO 14044.

3.1. Declared Unit or Functional Unit

The declared unit is 100 m2 Aluminum Panel.

Name	Value	Unit
Declared/Functional Unit	100	Square meters
Mass	5,83	Kg/m2
Conversion factor to 100m2	17,15	-

Table 3. Declared unit information.

3.2. Declaration of Methodological Framework

All inputs and outputs to unit processes for which data available are included in the calculation. Data gaps are filled by conservative assumptions with average or generic data, as described above.

There is no neglected unit process more than 1% of total mass and energy flows. The total neglected input and output flows are also not exceeded 5% of energy usage or mass as indicated in the PCR.

This LCA study includes the provision of all materials, transportation, energy and emission flows of product. The life cycle analysis is covered from cradle to gate, including all industrial processes from raw material acquisition and pre-processing and production.

The production of capital goods used paint on packaging cardboards, infrastructure, carrying of product to the storage are in manufacturing site, production of manufacturing equipment and personnel-related activities are not included in this LCA study as indicated in the PCR.

3.3. Allocation

- ✓ **Multi-input allocation:** No multi-input allocation occurs in the product system.
- ✓ **Closed-loop allocation:** No closed-loop input allocation occurs in the product system.
- ✓ **Open-loop allocation:** No recycled content is used in the product. Only environmental impacts from the point of recovery and forward are considered. Product, packaging and ancillary materials used during installation is modeled as being disposed in a landfill, incinerated or recycled.

3.4. Background Data

The LCA model of Technowood Aluminum were created using GaBi DB Version 6.115 software system for life cycle engineering by ERKE Sustainable Building Design and Consultancy Ltd.

For conservative assumptions in combination with plausibility considerations an expert judgment can be used to demonstrate compliance in practice. In this assessment, all modelling calculations are based on the amounts declared by manufacturer.

The primary data collection was accomplished in the form of spreadsheet and questionnaires and supplemented by conversations with manufacturer. All relevant background data necessary for the materials used in the model are included in the GaBi database. The data provided by company and calculations made by LCA practitioner can be found in Life Cycle Inventory section. Once the data had been collected, it was imported into GaBi where the modelling was carried out.
081000560056

3.5. Data Quality and Data Sources

For consistency and completeness of data, GaBi 6 Software-System and Databases for Life Cycle Engineering DB Version 6.115 is used. It provides the life cycle inventory database in all branches to assess the potential environmental burdens of a product from cradle to grave. All input and output flows, type of materials used, energy consumption, transportation and wastes were primary data taken from manufacturer. The manufacturer issues a declaration for the compatibility of their data with reality.

All primary required data for LCA Analysis were in the time period between 08.2017 and 07.2018 for 12 consecutive months. Datasets used in GaBi for calculation are attempted to select within the last 10 years.

The specific data quality coverages are also;

- Geographical coverage: the study applies to the actual manufacturing situation in Turkey. The product distribution processes are the only processes that do not take place in Turkey.
- Time period covered: goal of the study is to determine the actual environmental loads for 12 consecutive months, so data for the time period between 08.2017 and 07.2018 is used.

- Technology coverage: the objective of the study is to use data that apply to average technology which represents actual situation. Data available for those processes in GaBi are expected to show limited variability globally.

The different data sources for different stages are summarized in the table below. The data quality has been assessed based on Table 8.2 of WRI Product Standard. The declaration of raw material inputs and outputs were collected on site by weighting each type of materials, therefore "Very Good" was assigned for raw material stage. Manufacturer has reasonable data for the stage of manufacturing and transportation, data quality of this stage has been determined as "Good".

DATA QUALITY ASSESSMENT	
Life Cycle Assessment Stages	**Data Quality**
Raw Material	Very Good
Manufacturing Stage	Good
Transportation	Good

Table 4. Data Quality Assessment.

3.6. System Boundaries

This is a cradle-to-gate Life Cycle Analysis study. The product stage includes A1, A2 and A3 modules which have the stages production of raw material extraction and processing (A1), transport of the raw materials (A2), and transport the packaging materials to the manufacturer (A2) and manufacturing of the product (A3) and waste materials (A3). Delivery of main materials, ancillary materials and packaging materials, emissions to air, water and soil during manufacturing were included to the study.

Construction of capital equipment, maintenance and operation of support equipment, human labor and employee commute, overhead of manufacturing facilities and internal transportation were excluded. Infrastructure flows are also excluded.

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	Deconstruction & 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	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

Table 5. Description of the System Boundary (X: Included in LCA; MND: Not included)

3.7. Results of the assessment

For the results of life cycle assessment according to relevant PCR, the following life cycle stages and information modules are considered;

- ✓ **Raw material:** This stage covers the extraction of the main materials and ancillary materials.
- ✓ **Transportation:** This stage covers the delivery of the main materials, ancillary materials and packaging materials.
- ✓ **Manufacturing:** This stage includes the production processes of final product in the factory as gate to gate processes. Energy and water consumption and waste generation are accounted in this stage.

4. LCA: Results

The Life Cycle Inventory Assessment results are documented below for the system boundary stages; A1 through A3 Product Stage as defined above under System Boundary section in this report. Results are based on characterization factors from the US EPA Tool for the Reduction and Assessment of Chemical and Other Environmental Impacts that called TRACI 2.1 Impact Categories. Due to the relative approach of this LCA study, the results include only amount of life cycle impact category parameters based on declared unit. The declared unit is 100 m2 aluminum panel. LCIA results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins or risks. The analysis were conducted according to the *"Product Category Rule Guidance for Building Related Products and Services, alongside of 'Part B: Insulated Metal Panels, Metal Composite Panels, and Metal Cladding: Roof and Wall Panels'* in accordance with ISO 14025, ISO 14040 and ISO 14044.

North America (Part A, Section 4.7, Table 7, TRACI Indicators)	A1	A2	A3
TRACI 2.1, Global Warming Air, excl. biogenic carbon [kg CO2-Equiv.]	6,40E+03	1,61E+01	8,41E+01
TRACI 2.1, Ozone Depletion Air [kg CFC 11-Equiv.]	2,06E-06	1,22E-10	2,14E-08
TRACI 2.1, Acidification [kg SO2-Equiv.]	2,94E+01	9,83E-02	9,93E-01
TRACI 2.1, Eutrophication [kg N-Equiv.]	8,19E-01	8,23E-03	1,50E-02
TRACI 2.1, Smog Air [kg O3-Equiv.]	3,16E+02	2,13E+00	6,00E+00
TRACI 2.1, Resources, Fossil fuels [MJ surplus energy]	7,37E+03	3,13E+01	4,23E+00

Table 6. Life Cycle Stage Impacts for North America for 100m2 Aluminum Panel

EU (Part A, Section 4.8, Table 8, CML Indicators)	A1	A2	A3
CML2001 - Apr. 2015, Global Warming Potential (GWP 100 years), excl biogenic carbon [kg CO2-Equiv.]	6,40E+03	1,61E+01	8,41E+01
CML2001 - Apr. 2015, Ozone Layer Depletion Potential (ODP, steady state) [kg R11-Equiv.]	1,94E-06	1,15E-10	2,01E-08
CML2001 - Apr. 2015, Acidification Potential (AP) [kg SO2-Equiv.]	3,07E+01	7,38E-02	1,10E+00
CML2001 - Apr. 2015, Eutrophication Potential (EP) [kg Phosphate-Equiv.]	1,81E+00	1,82E-02	3,52E-02
CML2001 - Apr. 2015, Photochem. Ozone Creation Potential (POCP) [kg Ethene-Equiv.]	3,05E+00	-2,59E-02	7,69E-02
CML2001 - Apr. 2015, Abiotic Depletion (ADP elements) [kg Sb-Equiv.]	3,19E-03	1,96E-06	2,51E-06
CML2001 - Apr. 2015, Abiotic Depletion (ADP fossil) [MJ]	7,02E+04	2,19E+02	5,36E+01

Table 7. Life Cycle Stage Impacts for EU for 100m2 Aluminum Panel

		(A1)	(A2)	(A3)
RPRE: Renewable primary energy used as energy carrier (fuel)	[MJ]	3,47E+04	1,26E+01	2,13E+02
RPRM: Renewable primary re- sources with energy content used as material	[MJ]	0,00E+00	0,00E+00	0,00E+00
NRPRE: Non-renewable primary resources used as an energy carrier (fuel)	[MJ]	8,38E+04	2,20E+02	7,00E+01
NRPRM: Non-renewable primary resources with energy content used as material	[MJ]	0,00E+00	0,00E+00	0,00E+00
Secondary material	[kg]	0,00E+00	0,00E+00	0,00E+00
RSF: Renewable secondary fuels	[MJ]	0,00E+00	0,00E+00	0,00E+00
NRSF: Non-renewable secondary fuels	[MJ]	0,00E+00	0,00E+00	0,00E+00
RE: Recovered energy	[MJ]	0,00E+00	0,00E+00	0,00E+00
FW: Use of net fresh water re-sources	[m3]	8,41E+04	1,26E+00	3,28E+02

Table 8. Other Environmental Parameters

Life Cycle Inventory Results: Output Flows and Waste Categories		A1	A2	A3
HWD	[kg]	6,71E-02	1,65E-05	1,55E-03
NHWD	[kg]	7,95E+03	1,19E+00	2,65E+01
HLRW	[kg]	8,86E-03	6,89E-07	8,02E-06
ILLRW	[kg]	1,43E-01	1,31E-05	1,64E-04
CRU	[kg]	0,00E+00	0,00E+00	0,00E+00
MR	[kg]	0,00E+00	0,00E+00	0,00E+00
MER	[kg]	0,00E+00	0,00E+00	0,00E+00
EE	[MJ]	0,00E+00	0,00E+00	0,00E+00

Table 9. Output Flows and Waste Categories for 100m2 Aluminum Panel

5. LCA: Interpretation

The greatest contributor to the environmental indicators to produce metal panel is the raw material preparation (A1 module) process.

The greatest contributors to the environmental impacts to produce for Aluminum Panel are the “Raw Materials”. Aluminum is the primary contributor (99,5%) in raw materials. “Manufacturing Stage” and “Transportation “does not have so much environmental impacts compared to raw materials. LCA study also revealed that manufacturing process has a relatively lower environmental impacts profile as compared to the raw material process.

The transportation of raw material contributed the least to all environmental impact categories. The A2 (transportation) module is responsible for less than 1% of the related environmental impact categories.

Aluminum which is playing the biggest role as raw material by its weight ratio is locally supplied within short distances. Sending the generated aluminum scrap for recycling has played an important role on offsetting the environmental impacts.

6. Additional Environmental Information

6.1. Environment and Health during manufacturing

Manufacturing conditions do not demand any health and safety measures except for those designated by the authorities for special working areas, e.g. protective clothes, ear plugs, protective masks, helmets, safety shoes, dust protection masks.

The threshold limit values are not exceeded at any point of the production process. Waste emissions generated during production are cleaned in accordance with statutory requirements. Emissions are below those outlined in the /Technical Guidelines governing Air. Water/Ground/: No contamination of water or soil occurs.

All the values established inside and outside the production facilities are below the applicable requirements governing noise protection in Turkey. Noise-intensive plant components such as perforation lines are isolated accordingly by structural measures. /EN ISO 14001/ system and environment protection documents can be supplied upon request.

6.2. Extraordinary Effects

Fire: EN 13501-1:2007 Technowood profiles/sidings provide A2 fire reaction class at standard production. Other testing methods are as follow; ASTM E 84 Standard Test Method for Surface Burning Characteristics of Building Materials, UL 723 Testing, EN 13823, ISO EN 1716:2010.

Water: There are no known effects on the environment in the event of unforeseen ingress by water.

Mechanical Destruction: In the case of mechanical destruction, all the substances remain bound. It can be assumed that in the case of adhesive, arise in such small volumes that no negative effects are incurred by the environment.

6.3. Product Standards

The product complies with the national standards and regulations as follows TS/EN ISO 9001:2015, TS/EN ISO 14001:2015, OHSAS 18001: 2007, ISO 10002: 2004 and CE Declaration of Conformity.

7. References

Product Category Rule Guidance for Building Related Products and Services. UL Product Category Rules for Part B: Insulated Metal Panels, Metal Composite Panels, and Metal Cladding: Roof and Wall Panels, Standard 10010-5, Edition 2.

UL Environment Part A: Life Cycle Assessment Calculation Rules and Report Requirements, Standard 10010, Version 3.2.

EN ISO 14025:2011-10: Environmental labels and declarations: Type 3 Environmental Declarations Principles and Procedures.

EN 15804:2012-04+A1 2013 Sustainability of construction works: Environmental Product Declarations. Core Rules for the Product Category of Construction Products.

EN ISO 9001:2015 Quality Management System Requirements.

ISO 14001:2004 Environmental Management System Requirements Standard.

ISO 14040 INTERNATIONAL STANDARD ORGANIZATION. ISO 14040:2006-10, Environmental Management– Life Cycle Assessment– PRINCIPLES AND FRAMEWORK (ISO 14040:2006).

ISO14044 INTERNATIONAL STANDARD ORGANIZATION. “ISO 14044:200610, Environmental Management– Life Cycle Assessment– REQUIREMENTS AND GUIDELINES (ISO 14044:2006).

EU REACH OHSAS 18001:2007 Occupational Health and Safety Management Systems Standard.
GaBi DB Version 6.115. Software and database for life cycle engineering. LBP, University of Stuttgart and PE INTERNATIONAL AG, Leinfelden-Echterdingen, Germany.

CML 2001. Impact assessment developed by the Institute of Environmental Sciences, Leiden University, The Netherlands, and is published in a handbook with several different authors

ISO 21930:2017- Sustainability in building construction -- Environmental declaration of building products

Tool for Reduction and Assessment of Chemicals and Other Environmental Impacts (TRACI)

Author of the Life Cycle Assessment
ERKE Sustainable Building Design LLC
Kisikli Mah. Hanimseti Sk. No:5 34692
Uskudar/Istanbul TURKEY
Tel: +90 216 369 73 93
Fax: +90 216 369 73 96
Mail: info@erketasarim.com
Web: http://www.erketasarim.com

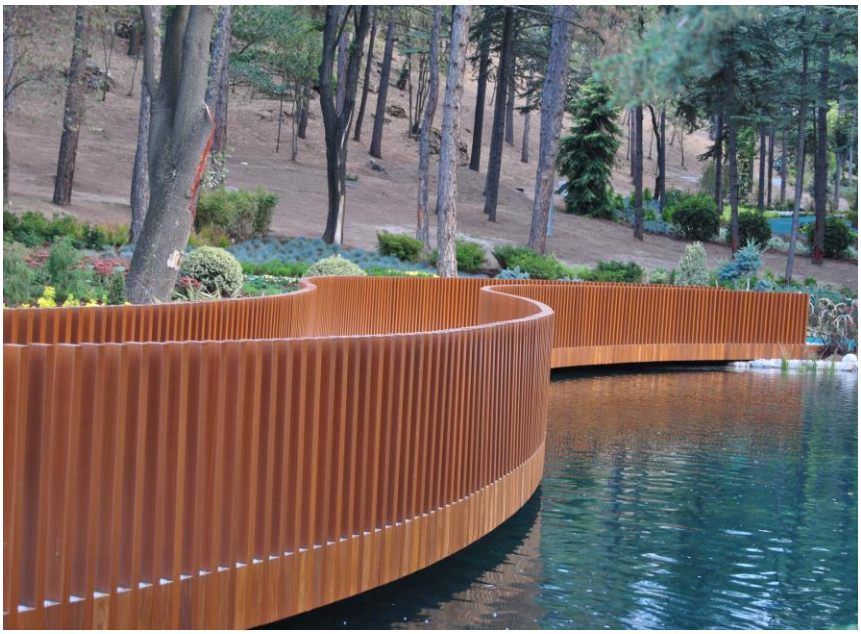
Owner of the Declaration
ALAZ AHSAP TEKNOLOJILERI
Emek Mah. Nato Yolu cd. 319/1
Sancaktepe / Istanbul / TURKEY
Tel : +90 216 471 81 19
Mail: info@alaz.com.tr
Web: www.technowood.com.tr

Publisher
UL Environment LCC
2211 Newmarket Parkway Suite 106
Marietta, GA 30067 USA
Tel: +1 888 486 4733
Web: http://www.environment@ul.com

Environmental Product Declaration

TECHNOWOOD

GRP PROFILES AND PANELS



technowood
DESIGN ARCHITECTURE SYSTEMS

Technowood has developed the lamination of Natural Wood veneer with materials that are durable to outdoor conditions, preventing therefore the unpredictable bending and the possible deformations caused by bending of wood with ageing due to time and environmental factors. The product is developed under an environmentalist ideology, reducing the consumption of solid wood 98% and increasing usage life by more than 5 times. The 3 main materials used are: Aluminum Profiles and Plates, Aluminum composite plates and GRP profiles and plates.
Technowood's range of products can be used in various areas of construction providing high performance solutions in interior and exterior spaces allowing designers to achieve unique projects. In particular, it provides high performance solutions in many various areas like pergolas, façades, benches, flowerpots and as well as city furniture.

Technowood is a product which is composed with GRP aluminum products covered by timber. By so we are introducing a new state of wood which is long lasting, requires less maintenance and doesn't crack or twist. We define Technowood as technological wood.

UL
CERTIFIED
ENVIRONMENTAL PRODUCT DECLARATION
UL.COM/EPD

ENVIRONMENTAL PRODUCT DECLARATION

TECHNOWOOD
GRP PROFILES/PANELS

According to ISO 14025 and ISO 21930:2007

1. General Information

This declaration is an environmental product declaration (EPD) in accordance with ISO 14025. EPDs rely on Life Cycle Assessment (LCA) to provide information on a number of environmental impacts of products over their life cycle. Exclusions: EPDs do not indicate that any environmental or social performance benchmarks are met, and there may be impacts that they do not encompass. LCAs do not typically address the site-specific environmental impacts of raw material extraction, nor are they meant to assess human health toxicity. EPDs can complement but cannot replace tools and certifications that are designed to address these impacts and/or set performance thresholds – e.g. Type 1 certifications, health assessments and declarations, environmental impact assessments, etc. Accuracy of Results: EPDs regularly rely on estimations of impacts, and the level of accuracy in estimation of effect differs for any particular product line and reported impact. Comparability: EPDs are not comparative assertions and are either not comparable or have limited comparability when they cover different life cycle stages, are based on different product category rules or are missing relevant environmental impacts. EPDs from different programs may not be comparable.

PROGRAM OPERATOR	UL Environment
DECLARATION HOLDER	Alaz Ahsap Teknolojileri-Technwood Design Architecture Systems
DECLARATION NUMBER	4787986654.103.1
DECLARED PRODUCT	GRP Profiles/Panels
REFERENCE PCR	UL Cladding System Products v.1 June 18, 2015
DATE OF ISSUE	June 18, 2019
PERIOD OF VALIDITY	5 Years
CONTENTS OF THE DECLARATION	Product definition and information about building physics Information about basic material and the material's origin Description of the product's manufacture Indication of product processing Information about the in-use conditions Life cycle assessment results Testing results and verifications

The PCR review was conducted by:	PCR Peer Review Commitee Thomas Gloria, PhD (Chair) epd@ulenvironment.com
This declaration was independently verified in accordance with ISO 14025 by Underwriters Laboratories ☐ INTERNAL ☒ EXTERNAL	Grant R. Martin Grant R. Martin, UL Environment
This life cycle assessment was independently verified in accordance with ISO 14044 and the reference PCR by:	Thomas P. Gloria, Industrial Ecology Consultants

This EPD conforms with ISO 21930:2017 and EN 15804

2. EPD Content

2.1. Product Description

Technowood GRP Profiles and Panels are produced GRP with natural wood veneer, adhesive and polish. Glass-reinforced plastic is a polymer made of plastic strengthened by fibres made of glass which makes it light weight, water resistant and corrosion resistant. Standard profiles are produced with natural wood coating. Optionally, they can be produced in self-white color. The panels are vertically sealed, and they can be curved. They can be easily cut with diamond-tipped aluminum saw.

Figure 1. GRP covered with timber

2.2.2 Application Area

Technowood GRP Profiles and Panels can be used for wall cladding to separate a building from the natural environment and provide an outer building skin or layer. It provides fire resistance, control of weather elements to safely direct water and wind, and control run-off and infiltration of other foreign objects into the building structure. It also provides a durable, aesthetically pleasing building appearance.

2.3. Manufacturing Location

This Environmental Product Declaration (EPD) represents the production of GRP profile/panel manufactured in Sancaktepe/Istanbul /Turkey.

2.4. Technical Information and Product Standards

Technical information of Technowood GRP Panel is given in the tables below:

Technical Product Information		
Name	Value	Unit
Length	19,685	ft
Width	0,5249	ft
Thickness	0,1574	in
Density	112	lb/ft3

Table 1. Technical details of GRP Panel

2.5. Material Composition Stage

Main materials and ancillary materials for 100 sq.ft GRP Panel is shown in the table below.

MATERIALS	MATERIAL TYPE	WEIGHT (kg)	
GRP	Main material	84,8	89,27%
Wood	Main material	1,86	1,96%
Lacquer	Ancillary material	4,65	4,89%
Adhesive	Ancillary material	3,68	3,88%

Table 2. Main and ancillary for 100 sq.ft of GRP Panel.

2.6. Manufacturing stage

The system components for GRP panel and profiles are manufactured in a continuous manufacturing process. The GRP sheet comes ready to cut to size. Natural wood veneer coating then be applied using a heating process All production steps are carried out in accordance with the requirements and test guidelines outlined in /EN 13964/.

Manufacturing flow chart is given in the figure below:

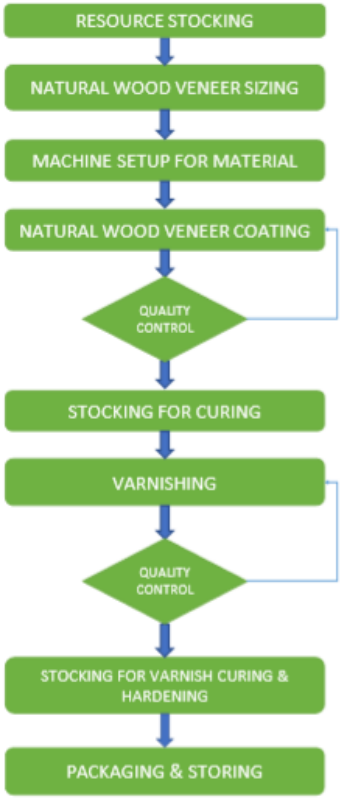


Figure 2. Manufacturing flow chart

2.7. Product Average

This EPD covers GRP profiles and panels and the declared unit has been determined according to the surface area. The products has been studied together because profiles and panels are made of the same components also as mass but different shapes. So, the average product has been determined 100-square feet GRP panel for profiles and panel products.

2.8. Delivery Status

The system is produced in individual sizes and can be supplied with or without substructures. Packaging is usually on pallets and in cardboard. Area weight (kg/m²) depends on the specific product. A conversion table is helpful for converting the declared unit (kg/sf) and can be supplied upon request.

3. LCA: Calculation Rules

The LCA study and analysis were conducted according to the "Product Category Rule Guidance for Building Related Products and Services, UL Product Category Rule (PCR) for Preparing an Environmental Product Declaration (EPD) for Product Group, Cladding System Products, Version June 18, 2015.

3.1. Declared Unit

The declared unit is a 100 sq.ft of GRP Panel.

Name	Value	Unit
Declared/Functional Unit	100	Square feet
Mass	10,63	Kg/sf
Conversion factor to 100m2	9,40	-

Table 3. Declared unit information.

3.2. Cut-off Criteria

All inputs and outputs to unit processes for which data available are included in the calculation. Data gaps are filled by conservative assumptions with average or generic data, as described above.

There is no neglected unit process more than 1% of total mass and energy flows. The total neglected input and output flows are also not exceeded 5% of energy usage or mass as indicated in the PCR.

This LCA study includes the provision of all materials, transportation, energy and emission flows of product. The life cycle analysis is covered from cradle to gate, including all industrial processes from raw material acquisition and pre-processing and production. The production of capital goods, used paint on packaging cardboards, infrastructure, carrying of product to the storage are in manufacturing site, production of manufacturing equipment and personnel-related activities are not included in this LCA study as indicated in the PCR. All hazardous and toxic releases (emissions to air, water and/or land) are monitored and reported in accordance with Turkish Republic Regulation on Control of Hazardous Wastes.

3.3. Allocation

- ✓ **Multi-input allocation:** No multi-input allocation occurs in the product system.
- ✓ **Closed-loop allocation:** No closed-loop input allocation occurs in the product system.
- ✓ **Open-loop allocation:** No recycled content is used in the product. Only environmental impacts from the point of recovery and forward are considered. Product, packaging and ancillary materials used during installation is modeled as being disposed in a landfill, incinerated or recycled.

3.4. Background Data

The LCA model of Technowood GRP Panel were created using GaBi DB Version 6.115 software system for life cycle engineering by ERKE Sustainable Building Design and Consultancy Ltd.

For conservative assumptions in combination with plausibility considerations an expert judgment can be used to demonstrate compliance in practice. In this assessment, all modelling calculations are based on the amounts declared by manufacturer.

The primary data collection was accomplished in the form of spreadsheet and questionnaires and supplemented by conversations with manufacturer. All relevant background data necessary for the materials used in the model are included in the GaBi database.

The data provided by company and calculations made by LCA practitioner can be found in Life Cycle Inventory section. Once the data had been collected, it was imported into GaBi where the modelling was carried out.

3.5. Data Quality and Data Sources

For consistency and completeness of data, GaBi 6 Software-System and Databases for Life Cycle Engineering DB Version 6.115 is used. It provides the life cycle inventory database in all branches to assess the potential environmental burdens of a product from cradle to grave. All input and output flows, type of materials used, energy consumption, transportation and wastes were primary data taken from manufacturer. The manufacturer issues a declaration for the compatibility of their data with reality.

All primary required data for LCA Analysis were in the time period between 08.2017 and 07.2018 for 12 consecutive months. Datasets used in GaBi for calculation are attempted to select within the last 10 years.

The specific data quality coverages are also;

- Geographical coverage: the study applies to the actual manufacturing situation in Turkey. The product distribution processes are the only processes that do not take place in Turkey.
- Time period covered: goal of the study is to determine the actual environmental loads for 12 consecutive months, so data for the time period between 08.2017 and 07.2018 is used.
- Technology coverage: the objective of the study is to use data that apply to average technology which represents actual situation. Data available for those processes in GaBi are expected to show limited variability globally.

The different data sources for different stages are summarized in the table below. The data quality has been assessed based on Table 8.2 of WRI Product Standard. The declaration of raw material inputs and outputs were collected on site by weighting each type of materials, therefore "Very Good" was assigned for raw material stage. Manufacturer has reasonable data for the stage of manufacturing and transportation, data quality of this stage has been determined as "Good".

3.6. System Boundaries

This is a cradle-to-gate Life Cycle Analysis study. The product stage includes A1, A2 and A3 modules which have the stages production of raw material extraction and processing (A1), transport of the raw materials (A2), and transport the packaging materials to the manufacturer (A2) and manufacturing of the product (A3) and waste materials (A3). Delivery of main materials, ancillary materials and packaging materials, emissions to air, water and soil during manufacturing were included to the study.

Construction of capital equipment, maintenance and operation of support equipment, human labor and employee commute, overhead of manufacturing facilities and internal transportation were excluded. Infrastructure flows are also excluded.

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	Deconstruction & 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	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

Table 4. Description of the System Boundary (X: Included in LCA; MND: Not included)

3.7. System Boundaries

Technowood GRP Panel LCA study is conducted in accordance with all methodological considerations, such as performance, system boundaries, data quality, allocation procedures, and decision rules to evaluate inputs and outputs.

All estimations and assumptions regarding the cut off criteria and the allocation are declared in those parts. There are no other additional estimations and/or assumptions in the scope of this study.

3.8. Results of the assessment

For the results of life cycle assessment according to relevant PCR, the following life cycle stages and information modules are considered;

- ✓ **Raw material:** This stage covers the extraction of the main materials and ancillary materials.
- ✓ **Transportation:** This stage covers the delivery of the main materials, ancillary materials and packaging materials.
- ✓ **Manufacturing:** This stage includes the production processes of final product in the factory as gate to gate processes. Energy and water consumption and waste generation are accounted in this stage.

4. LCA: Results

The Life Cycle Inventory Assessment results documented below are covered all product stages from cradle to gate. Results are based on TRACI factors. The LCIA results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins or risks. Results are shown for 100 sq.ft. GRP Panel. The greatest contributors to the environmental impacts to produce GRP Panel are the "Raw Materials". While "Manufacturing Stage" and "Transportation "does not have so much environmental impacts. The environmental impact results given below in the charts demonstrate that the considerable inputs has been used.

100 sq.ft GRP Panel, Life Cycle Stage Impacts (TRACI)					
Part B.1 Impact Assessment Methodology: TRACI 2.1 Modules included in LCA: (to be reported below) UNITs					
Impact Categories		Units	Life Cycle Stages		
			Raw Materials	Transportation	Manufacturing
GWP	Global warming potential	kg CO2 Eq.	133	2,17	12,7
ODP	Depletion potential of the stratospheric ozone layer	kg CFC 11 Eq.	3,44E-009	1,67E-011	4,72E-012
AP	Acidification potential	kg SO2 Eq.	0,313	0,00693	0,142
EP	Eutrophication potential	kg N Eq.	0,0229	0,000709	0,00224
POCP	Photochemical ozone creation potential	kg O3 Eq.	4,98	0,14	0,898

ADPF (optional)	Abiotic depletion potential for fossil resources	MJ surplus energy	364	4,27	12,7

Table 5. Life Cycle Stage Impacts

5. LCA: Interpretation

Results are shown for 100 sq.ft GRP Panel. The greatest contributors to the environmental impacts to produce GRP Panel is the "Raw Materials". While "Manufacturing Stage" and "Transportation "does not have so much environmental impacts. The environmental impact results given below in the charts demonstrate that the considerable inputs have been used.

6. Additional Environmental Information

6.1. Environment and Health during manufacturing

Manufacturing conditions do not demand any health and safety measures except for those designated by the authorities for special working areas, e.g. protective clothes, ear plugs, protective masks, helmets, safety shoes, dust protection masks.

The threshold limit values are not exceeded at any point of the production process. Waste emissions generated during production are cleaned in accordance with statutory requirements. Emissions are below those outlined in the /Technical Guidelines governing Air. Water/Ground/: No contamination of water or soil occurs.

All the values established inside and outside the production facilities are below the applicable requirements governing noise protection in Turkey. Noise-intensive plant components such as perforation lines are isolated accordingly by structural measures. /EN ISO 14001/ system and environment protection documents can be supplied upon request.

6.2. Extraordinary Effects

Fire: EN 13501-1:2007 Technowood GRP profiles an d panels provide A2 fire reaction class at standard production. Other testing methods are as follow; ASTM E 84 Standard Test Method for Surface Burning Characteristics of Building Materials, UL 723 Testing, EN 13823, ISO EN 1716:2010.

Water: There are no known effects on the environment in the event of unforeseen ingress by water.

Mechanical Destruction: In the case of mechanical destruction, all the substances remain bound. It can be assumed that in the case of adhesive, arise in such small volumes that no negative effects are incurred by the environment.

6.3. Product Standards

The product complies with the national standards and regulations as follows TS/EN ISO 9001:2015, TS/EN ISO 14001:2015, OHSAS 18001: 2007, ISO 10002: 2004 and CE Declaration of Conformity.

References

Product Category Rule Guidance for Building Related Products and Services. UL Environment Part A: Life Cycle Assessment Calculation Rules and Report Requirements, Standard 10010, Version 3.2 September 2018

UL Product Category Rule (PCR) for Preparing an Environmental Product Declaration (EPD) for Product Group, Cladding System Products, Version June 18, 2015.

EN ISO 14025:2011-10: Environmental labels and declarations: Type 3 Environmental Declarations Principles and Procedures.

EN 15804:2012-04+A1 2013 Sustainability of construction works: Environmental Product Declarations. Core Rules for the Product Category of Construction Products.

EN ISO 9001:2015 Quality Management System Requirements.
ISO 14001:2004 Environmental Management System Requirements Standard.

ISO 14025: 2006 Environmental labels and declarations -- Type III environmental declarations -- Principles and procedures.

ISO 14044:2006 Environmental Management-Life Cycle Assessment- Requirements and Guidelines.
OHSAS 18001:2007 Occupational Health and Safety Management Systems Standard.

GaBi DB Version 6.115. Software and database for life cycle engineering. LBP, University of Stuttgart and PE INTERNATIONAL AG, Leinfelden-Echterdingen, Germany.

Tool for Reduction and Assessment of Chemicals and Other Environmental Impacts (TRACI)

ISO 21930:2007- Sustainability in building construction -- Environmental declaration of building products

Author of the Life Cycle Assessment
ERKE Sustainable Building Design LLC
Kisikli Mah. Hanimseti Sk. No:5 34692
Uskudar/Istanbul TURKEY
Tel: +90 216 369 73 93
Fax: +90 216 369 73 96
Mail: info@erketasarim.com
Web: http://www.erketasarim.com

Owner of the Declaration
ALAZ AHSAP TEKNOLOJILERI
Emek Mah. Nato Yolu cd. 319/1
Sancaktepe / Istanbul / TURKEY
Tel : +90 216 471 81 19
Mail: info@alaz.com.tr
Web: www.technowood.com.tr

Publisher
UL Environment LCC
2211 Newmarket Pakway Suite 106
Marietta, GA 30067 USA
Tel: +1 888 486 4733
Web: http://www.environment@ul.com