Environmental Product Declaration

In accordance with ISO14025 and EN15804+A2:2019/AC:2021 for

EPDM Membrane

Manufactured by Techno Rubber Company Limited

Programme: The International EPD® System, www.environdec.com
Programme Operator: EPD International AB
Local Operator: EPD MENA
S-P Code: S-P-12591
Date of Publication: 2024-02-13
Date of Validity: 2029-02-12

An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www environdec.com.

EPD® THE INTERNATIONAL EPD® SYSTEM

MENA EPD THE INTERNATIONAL EPD SYSTEM

ECO PLATFORM EPD VERIFIED

PROGRAMME INFORMATION

The International EPD® System: EPD International AB Box 210 60 SE-100 31 Stockholm, Sweden, info@environdec.com

ISO standard ISO 21930 and CEN standard EN 15804 serves as the core Product Category Rules (PCR) Product Category Rules (PCR): 2019:14 Version 1.3.2, Construction Products and, EN 15804:2012 + A2:2019/AC:2021 Sustainability of Construction Works.

PCR review was conducted by: The Technical Committee of the International EPD® System. Review chair: Claudia A. Peña, University of Concepción, Chile. The review panel may be contacted via the Secretariat www.environdec.com/contact.

Independent third-party verification of the declaration and data, according to ISO 14025:2006, via:
EPD verification by individual verifier
Third party verifier: Prof. Vladimir Kočí
Approved by: The International EPD® System
Procedure for follow-up of data during EPD validity involves third party verifier:

Yes [x] No

Life Cycle Assessment (LCA)

LCA accountability: Metsims Sustainability Consulting

The EPD owner has the sole ownership, liability, and responsibility for the EPD. EPDs within the same product category but registered in different EPD programmes may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison.

ABOUT TECHNO RUBBER COMPANY

TECHNORUBBER commenced commercial production of EPDM Water Proofing System, Extruded Rubber Profiles, Molded Rubber Products, and other technical rubber items at its plant at Second Industrial City, Dammam, Saudi Arabia from 2004 onwards. TECHNORUBBER is now a leading manufacturer and supplier of hi-quality and hi-tech rubber products, both molded, calendared and extruded, from various types of natural and synthetic rubber, as per customer needs. We meet the various needs of critical and important industries like Construction Engineering, Electrical, Automobiles, Chemicals, OEM, etc .

Our plants have been equipped with latest state-of-the-art machinery from the best manufacturers all around the globe. Procurement of the machines and know-how of making the whole venture to current state was accomplished through a comprehensive research and contacts with the masters in the field.

TECHNORUBBER, from the start of its operations, pursue a Quality Management System complying with the requirements set forth by the International Standard ISO 9001:2015 and CE Marking is certified by Bureau Veritas and European Commission Authority. We have a quality conscious workforce and documented QA/QC operations at each relevant stage of manufacture to ensure consistent quality products. The reward for our commitment to quality materialized in the form of approval from esteemed organizations like M/s SAUDI ARAMCO, M/s AL Khafji Joint Operations, M/s SAUDI ELECTRICITY COMPANY, ROYAL AIRFORCE OF SAUDI ARABIA, MINISTRY OF WATER, SAUDI ARABIA, M/s MARAFIQ, SAUDI ARABIA etc.

ABOUT THE PRODUCT

With more than 12 years in EPDM roofing, Techno Rubber Company Limited has a proven track record of manufacturing products with superior durability, flexibility and UV resistance. Techno Rubber's synthetic rubber compound is the foundation for Techno Rubber EPDM Roofing Membrane. Techno Rubber EPDM Roofing Membrane, the Industry's premium-grade EPDM roofing membrane.

From office buildings and distribution warehouses to hospitals and schools, Techno Rubber EPDM Roofing system delivers outstanding, long-lasting performance in all climates worldwide.

TR-EPDM Membrane is a cured synthetic rubber sheet with base polymer Ethylene Propylene Diene Monomer (EPDM) compounded with other specialty additives. The compounded stock is calendared to sheet form and vulcanized.

The exceptional characteristics of resistance to ozone and temperature shocks, ease of application and maintenance etc. made it the best waterproofing Membrane available to cope with the performance demands of the scorching desert climate of the Arabian Gulf.

TechnoRubber EPDM membranes are manufactured as per ASTM D-4637 specification for EPDM single ply roofing membrane.

EPDM NON-REONFORCED - available in width up to 12,2 mtr and thickness 1 mm to 2,30 mm, this membrane is designed for low slope applications and offers increased fire resistance.
EPDM REINFORCED - fro roofs with frequent service demands, TechnoRubber EPDM membrane is available in widths of up to 3,05 mtr and thickness of up to 2,30 mm. This membrane is reinforced to combat roof tears and punctures and provides superior resistance to wind forces.

The product UN CPC code is 54530 according to Central Product Classification (CPC) Version 2.1.

SYSTEM BOUNDARIES & DESCRIPTION

A1 – RAW MATERIAL SUPPLY

This stage includes raw material/s extraction and pre-treatments before its use in manufacturing. The production of the energy necessary for the manufacturing of raw material process is taken into account.

A2 - TRANSPORT

Transport information of the raw materials is provided by the manufacturer. The distances and routes are calculated accordingly. The raw materials are locally supplied transported via trucks and the waste is sourced within the production province.

Transport Mode	Type
Road	**Vehicle:** Lorry **Size Class:** >32 metric ton **Emission Standard:** EURO5 **Fuel Type:** Diesel
Sea	**Vehicle:** Container Ship **DWT** *(Load Capacity)***:** 43000 tonnes **Fuel Type:** Heavy Fuel Oil

A3 - MANUFACTURING

The manufacturing stage encompasses all the emissions that are risen during the assembly of each product. During the manufacturing stage diesel is consumed as well as the electricity from the Saudi Arabia Grid.

Electricity Mix	Emission Factor
KSA Grid Mix, Medium Voltage	1,06 kg $CO_{2eq.}$/ kWh

A4 - TRANSPORT

Transport of final product to customers are considered and the routes and distances are calculated accordingly. Transport routes were provided by the manufacturer for 2022.

Transport Mode	Type
Road	**Vehicle:** Lorry **Size Class:** >32 metric ton **Emission Standard:** EURO5 **Fuel Type:** Diesel
Sea	**Vehicle:** Container Ship **DWT** *(Load Capacity)***:** 43000 tonnes **Fuel Type:** Heavy Fuel Oil

A5 – INSTALLATION

EPDM Membranes are installed without any additional equipment or energy required. The installation process was modeled following common practice in which non-reinforced EPDM is fully adhered using appropriate adhesives

B – USE

There are no additional material or energy used during the use phase of EPDM Membrane.

C1 - DECONSTRUCTION / DEMOLITION

EPDM Membrane that has completed their service life are dismantled without any additional equipment or energy required.

C2 - WASTE TRANSPORT

This step includes the transport to the recycling plant after they reach their end-of-life. The average distance was assumed 500 km by truck from demolition site to the closest recycling area.

Parameter	Value
Vehicle Type	**Vehicle:** Lorry **Size Class:** 16-32 metric ton **Emission Standard:** EURO5 **Fuel Type:** Diesel
Distance	500 km (assumption)

C3 - WASTE PROCESSING

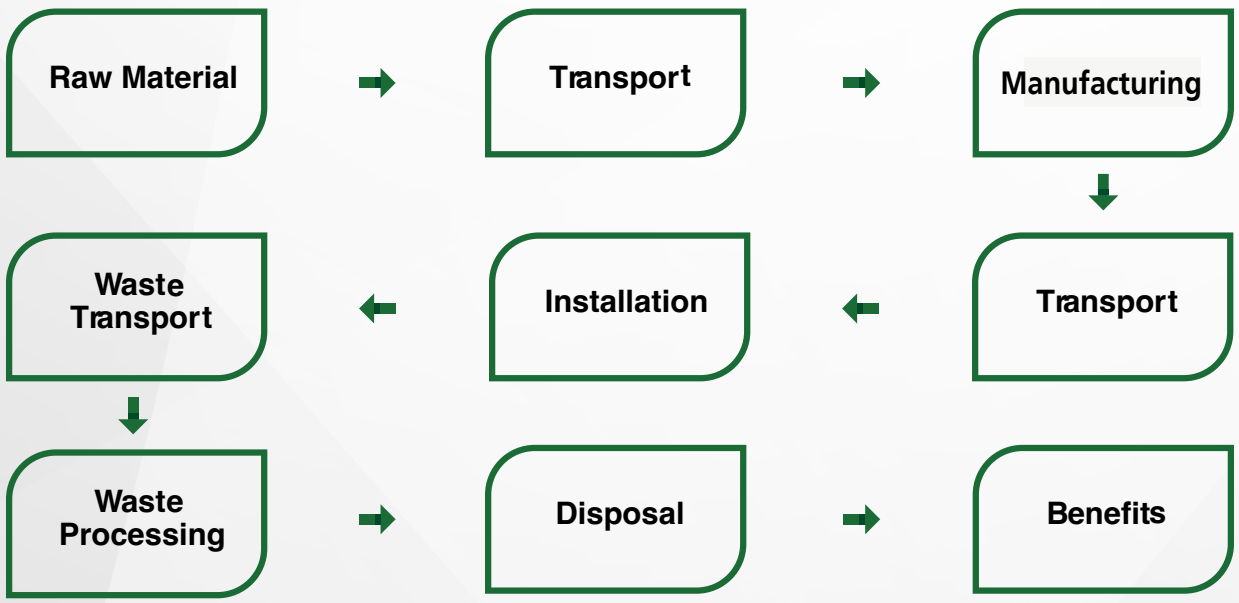
EPDM Membranes that dismantled, does not require any waste processing before its landfilled.

C4 – DISPOSAL

The waste disposal phase accounts for the emissions that are resulting due to disposal of the waste. The EPDM Membrane at the end of its life will be subject to geographical sector practices. It is assumed that 100% of the EPDM Membranes are landfilled at the end-of-life stage.

D - BENEFITS

This module assesses the advantages and environmental impacts associated with the recovery, reusing, or recycling processes of waste generated by the product at the end of its life cycle. These processes could potentially contribute to the life cycle of a new product. It's important to note that when calculating the benefits of recycling these materials, only the post-consumer composition of the materials has been considered, and not the composition of the materials after they've been recycled.



LCA INFORMATION

Functional Unit/ Declared Unit: The declared unit are thousand 1 m^2 of TR-EPDM Membrane with a thickness of 1 mm with the reference service life of 35 years.

To convert the declared unit to a comparable mass of product (kg), the thickness and density of the specific product is considered. The declared unit has a weight of 1,32 kg.

Reference Service Life: 35 years for the LCA study

Time Representativeness: 2022

Database(s) and LCA Software: Ecoinvent 3.9.1 and SimaPro 9.5

System Boundaries: Cradle to grave with options, (A1-A5 + C + D)

	Product Stage			Construction Process Stage		Use Stage							End of Life Stage				Re-source recovery stage
	Raw Material Supply	Transport	Manufacturing	Transport	Construction Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational Energy Use	Operational Water Use	Deconstruction / Demo-lition	Transport	Waste Processing	Disposal	Reuse-Recovery-Recy-cling-potential
Module	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Modules Declared	X	X	X	X	X	-	-	-	-	-	-	-	X	X	X	X	X
Geogra-phy	SA	SA	SA	GLO	GLO	-	-	-	-	-	-	-	GLO	GLO	GLO	GLO	GLO
Specific Data Used	>90%					-	-	-	-	-	-	-	-	-	-	-	-
Variation - Products	<10%					-	-	-	-	-	-	-	-	-	-	-	-

The inventory for the LCA study is based on the 2022 production figures.

Product Variation

The environmental performance of EPDM Membranes exhibits variability based on the manufactured thickness. Refer to the table below for conversion factors corresponding to different thicknesses. To obtain results for 1 m^2 functional units, simply multiply the environmental indicators by the thickness-specific product conversion factors provided.

Thickness, mm	Product weight, kg/m^2	Conversion Factor
1,1	1,45	1,10
1,5	1,95	1,48
2,3	2,95	2,24

ALLOCATIONS

Water consumption, energy consumption and raw material transportation were weighted according to 2022 production figures. In addition, hazardous and non-hazardous waste amounts were also allocated from the 2022 total waste generation. There is no co-product allocation.

CUT-OFF CRITERIA

1% cut-off is applied. Data for elementary flows to and from the product system contributing to a minimum of 99% of the declared environmental impacts have been included.

REACH REGULATION

No substances included in the Candidate List of Substances of Very High Concern for authorization under the REACH regulations are present in this product either above the threshold for registration with the European Chemicals Agency or above 0,1% (wt/wt).

LCA MODELLING, CALCULATION AND DATA QUALITY

The results of the LCA with the indicators as per EPD requirement are given in the LCA result tables. EN15804 method is followed. All energy calculations were obtained using Cumulative Energy Demand, Low Heating Values (LHV) methodology, while freshwater use is calculated within selected inventory flows in SimaPro according to the PCR. Corresponding regional energy datasets were used for all energy related activities. Data quality assessment scheme is given in the table below.

LCA Stages	Data Type
Raw Material Supply	Generic database, plant specific data
Raw Material Transport	Generic database, plant specific data
Manufacturing	Generic database, plant specific data
Product Transport	Generic database, generic data
Installation	-
Deconstruction	-
Waste Transport	Generic database, scenario, and generic data
Waste Processing	-
Disposal	Generic database, scenario, and generic data
Benefits and Loads	Generic database, scenario, and generic data

CONTENT DECLARATIONS

PRODUCT COMPOSITION

Product composition of the EPDM Membrane is shown in the table below.

Product components	Weight Percentage, %	Post-consumer recycled material, weight-%	Biogenic material, weight-% and kg C/kg
Clay	20-40	0%	0%
Rubber	20-40	0%	0%
Carbon Black	10-20	0%	0%
Paraffinic Oil	10-20	0%	0%
Activator	1-3	0%	0%
Curative	<1%	0%	0%
Sum	100%	0%	0%

PACKAGING

The EPDM Membrane is packaged using packing cover and papercore.

Packaging materials	Weight, kg	Weight-% (versus the product)	Weight biogenic carbon, kg C/kg
Corrugated Board	0.019	1-3%	0.035
PE Film	0.001	<1%	0
Sum	0.023	2-5%	0.035

LCA RESULTS

Core environmental impact indicators	Unit (EN)	Total A1-A3	A4	A5	C1	C2	C3	C4	D
Global warming potential - fossil fuels (GWP-fossil)	kg CO2 eq.	2,99	0,202	0	0	0,063	0	0,072	0
Global warming potential - biogenic (GWP-biogenic)	kg CO2 eq.	-0,027	-2,67E-05	0	0	2,41E-05	0	0,311	0
Global warming potential - land use and land use change (GWP-luluc)	kg CO2 eq.	0,002	1,49E-04	0	0	3,26E-05	0	2,88E-05	0
Global warming potential - total (GWP-total)	kg CO2 eq.	2,96	0,202	0	0	0,064	0	1,06	0
Depletion potential of the stratospheric ozone layer (ODP)	kg CFC-11 eq.	7,95E-08	3,10E-09	0	0	1,08E-09	0	4,68E-10	0
Acidification potential, accumulated exceedance (AP)	mol H+ eq.	0,017	0,005	0	0	1,74E-04	0	2,26E-04	0
Eutrophication potential - freshwater (EP-freshwater)	kg P eq.	4,02E-04	8,01E-06	0	0	5,33E-06	0	2,10E-05	0
Eutrophication potential - marine (EP-marine)	kg N eq.	0,004	0,001	0	0	4,58E-05	0	0,002	0
Eutrophication potential - terrestrial (EP-terrestrial)	mol N eq.	0,043	0,015	0	0	4,74E-04	0	0,001	0
Photochemical ozone creation potential (POCP)	kg NMVOC eq.	0,019	0,004	0	0	2,51E-04	0	4,87E-04	0
Abiotic depletion potential - non-fossil resources (ADPE)	kg Sb eq.	1,86E-05	2,42E-07	0	0	1,78E-07	0	8,26E-08	0
Abiotic depletion potential - fossil resources (ADPF)	MJ, net calorific value	75,0	2,54	0	0	0,959	0	0,452	0
Water (user) deprivation potential (WDP)	m3 world eq. deprived	0,875	0,007	0	0	0,005	0	0,016	0
Additional mandatory environmental impact indicators									
Global warming potential (GWP-GHG)	kg CO2 eq.	3,00	0,202	0	0	0,064	0	0,826	0
Additional voluntary environmental impact indicators									
Particulate matter emissions (PM)	Disease incidence	3,02E-07	7,69E-09	0	0	6,27E-09	0	2,95E-09	0
Ionizing radiation, human health (IRP)	kBq U235 eq.	0,089	0,001	0	0	0,001	0	0,002	0
Eco-toxicity - freshwater (ETP-fw)	CTUe	32,1	1,27	0	0	0,509	0	3,37	0
Human toxicity, cancer effect (HTP-c)	CTUh	1,07E-09	8,74E-11	0	0	2,82E-11	0	4,23E-11	0
Human toxicity, non-cancer effects (HTP-nc)	CTUh	2,19E-08	9,02E-10	0	0	6,95E-10	0	1,93E-09	0

Indicators describing resource use									
Use of renewable primary energy as energy carrier (PERE)	MJ, net calorific value	1,81	0,020	0	0	0,012	0	0,021	0
Use of renewable primary energy resources used as raw materials (PERM)	MJ, net calorific value	0	0	0	0	0	0	0	0
Total use of renewable primary energy (PERT)	MJ, net calorific value	1,81	0,020	0	0	0,012	0	0,021	0
Use of non renewable primary energy as energy carrier (PENRE)	MJ, net calorific value	75,0	2,54	0	0	0,959	0	0,452	0
Use of non renewable primary energy resources used as raw materials (PENRM)	MJ, net calorific value	0	0	0	0	0	0	0	0
Core environmental impact indicators	**Unit (EN)**	**Total A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
Total use of non renewable primary energy resource (PENRT)	MJ, net calorific value	75,0	2,54	0	0	0,959	0	0,452	0
Use of secondary material (SM)	kg	0	0	0	0	0	0	0	0
Use of renewable secondary fuels (RSF)	MJ, net calorific value	0	0	0	0	0	0	0	0
Use of non-renewable secondary fuels (NRSF)	MJ, net calorific value	0	0	0	0	0	0	0	0
Net use of fresh water (FW)	m3	0,017	2,69E-04	0	0	1,96E-04	0	4,09E-04	0
Environmental information describing waste categories									
Hazardous waste disposed (HWD)	kg	0	0	0	0	0	0	0	0
Non-harzardous waste disposed (NHWD)	kg	0.079	0	0.023	0	0	0	1,00E03	0
Radioactive waste disposed (RWD)	kg	0	0	0	0	0	0	0	0
Environmental information describing output flows									
Components for re-use (CRU)	kg	0	0	0	0	0	0	0	0
Materials for recycling (MFR)	kg	0	0	0	0	0	0	0	0
Materials for energy recovery (MER)	kg	0	0	0	0	0	0	0	0
Exported electrical energy (EEE)	MJ, net calorific value	0	0	0	0	0	0	0	0
Exported thermal energy (EET)	MJ, net calorific value	0	0	0	0	0	0	0	0

REFERENCES

GPI/ General Programme Instructions of the International EPD® System. Version 4.0. EN ISO 9001/ Quality Management Systems - Requirements EN ISO 14001/ Environmental Management Systems - Requirements

EN ISO 50001 / Energy Management Systems - Requirements ISO 14020:2000/ Environmental Labels and Declarations — General principles

EN 15804:2012+A2:2019/AC:2021 Sustainability of construction works - Environmental Product Declarations — Core rules for the product category of construction products

ISO 14020:2000/ Environmental Labels and Declarations — General principles

ISO 14025 / DIN EN ISO 14025:2009-11: Environmental labels and declarations - Type III environmental declarations — Principles and procedures

ISO 14040/44/ DIN EN ISO 14040:2006-10, Environmental management - Life cycle assessment - Principles and framework (ISO14040:2006) and Requirements and guidelines (ISO 14044:2006) PCR 2019:14 Construction products (EN 15804:A2) (1.3.2) prepared by IVL Swedish Environmental Research Institute, EPD International Secretariat, date 2023-12-08.

PCR for Construction Products and Construction Services/ Prepared by IVL Swedish Environmental Research Institute, Swedish Environmental Protection Agency, SP Trä, Swedish Wood Preservation Institute, Swedisol, SCDA, Svenskt Limträ AB, SSAB, The International EPD System, 2019:14 Version 1.3.2 DATE 2024-12-20

The International EPD® System/ The International EPD® System is a programme for type III environmental declarations, maintaining a system to verify and register EPD®s as well as keeping a library of EPD®s and PCRs in accordance with ISO 14025. **www.environdec.com**

Ecoinvent / Ecoinvent Centre, **www.ecoinvent.org**

SimaPro / SimaPro LCA Software, Pré Consultants, the Netherlands, **www.pre-sustainability.com**

Metsims / **www.metsims.com**

CONTACT INFORMATION

Programme		**The International EPD® System** **www.environdec.com**
Programme operator	EPD® THE INTERNATIONAL EPD® SYSTEM	EPD International AB Box 210 60 SE-100 31 Stockholm, Sweden www.environdec.com info@environdec.com
Local Operator	MENA EPD THE INTERNATIONAL EPD SYSTEM	EPD MENA
Owner of the declaration	TRC	Techno Rubber Company Limited 23(Cross 90), Second industrial City Dammam, Saudi Arabia www.technorubber.com.sa info@technorubber.com.sa
LCA practitioner and EPD design	metsims Sustainability Consulting	4 Clear Water Place Oxford OX2 7NL, UK 0 800 722 0185 www.metsims.com info@metims.com
	enviroLINK	No. 06, NSL Building, Bur Dubai, Dubai, UAE www.envirolink.me contact@envirolink.me
LCA Verifier **Prof. Vladimir Kočí**	LCA Studio	Šárecká 5,16000 Prague 6 - Czech Republic www.lca.cz

TRC