

# Environmental Product Declaration

Voltite Waterproofing Membranes  
in accordance with EN 15804  
and and ISO 14025

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SHIELD THE FIELD  
WITH VOLTITE

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# Company Profile

## CHALLENGE

As Geomas Geocomposite, we serve the environmental lining projects and as well as construction fields with our innovatively developed waterproofing products. High production capacity of our fully automated facility and Turkey's strategic location are important factors in our ability to serve as the best available option to our clients in fast and cost efficient manner.

As a subsidiary of the leading group, IZOMAS GROUP in Turkey, Geomas also improves its research and development operations on geosynthetic product range by vigorous commitment to quality.

## SOLUTION COMMITTED TO QUALITY

All the steps of production from raw material supply to packaging is monitored according to the intensive GEOMAS Manufacturing Quality Control Plan integrated with the ISO 9001 management system. Voltite and the raw materials are subjected to compliance tests in order to ensure the consistent properties throughout the latest ASTM and EN ISO Standards,

Besides well qualified Geomas Laboratory, some vital performance values of the product such as permeability and shear strength are also tested independently by GAI-LAP accredited laboratories in specific frequencies.

## REGIONAL POWER FROM EUROPE TO FAR EAST

The first and only waterproofing brand to participate Tübitak Support Program, Geomas exports to 50 countries on 5 continents ranging from Tanzania to Australia; Canada to Dubai

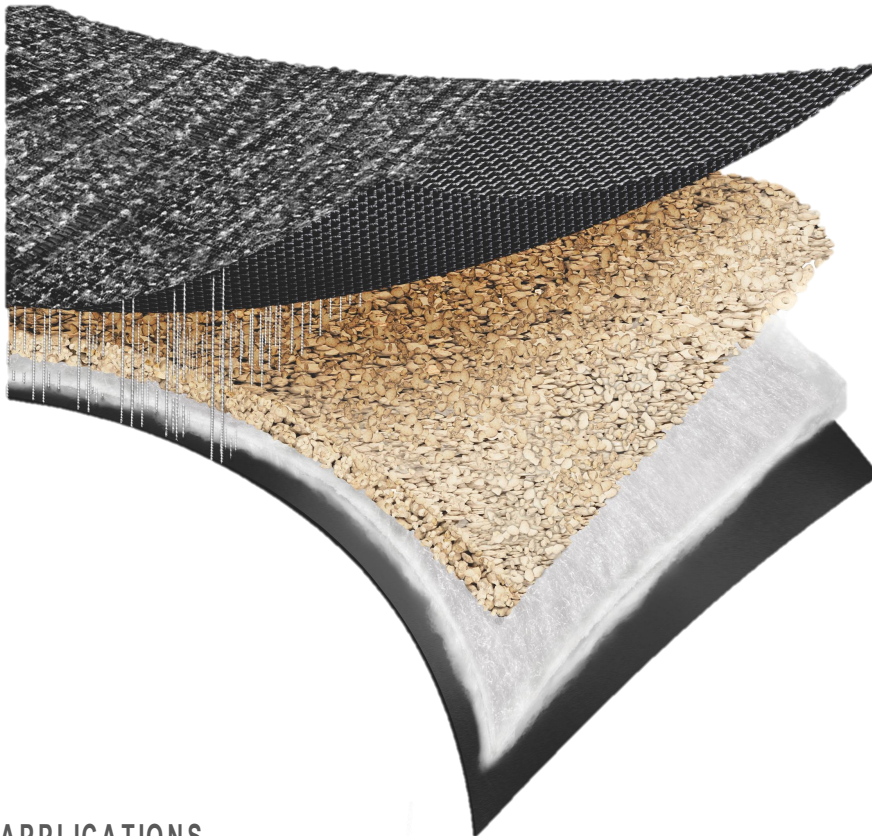




## VOLTITE

“Voltite” is a factory prehydrated bentonite membrane specially formulated for use in diversified waterproofing applications. It is mainly composed of polymer enhanced sodium bentonite granules encapsulated between high strength woven and non-woven geotextiles.

The sealing technology of Voltite effectively combines the unique swelling performance of sodium bentonite granules with two high strength geotextiles. Once Voltite is hydrated, it forms an impermeable barrier against liquids, water vapor and gases.



## APPLICATIONS

Voltite® geosynthetic clay liners (GCL's) are very effective sealing liners for both below grade waterproofing of civil structures and wide variety of environmental projects from landfills to mining areas, lagoons to canals.

## COMPONENTS

COMPONENTS	AMOUNT, %
Polypropylene Geotextile	6,1 %
Sodium bentonite	93 %
Other (additive packaging)	0,9 %

The formulation contains no hazardous substances and no substances of very high concern (SVHC) on the REACH Candidate List/ published by the European Chemicals Agency in a concentration more than 0,1% (by unit weight).

# Product Specifications



# Production Process

## UPSTREAM

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### **A1: RAW MATERIAL SUPPLY**

In this declaration, for Voltite geosynthetic clay liner products production starts with raw materials, mainly locally sourced but some transported from abroad. European countries are the only source for imported goods. Raw material supply has the biggest effect on global warming potential due to polypropylene usage. Environmental impacts during the production of all raw materials are reflected in this declaration.

### **A2: TRANSPORT**

Transport is relevant for delivery of raw materials to the plant and internal transport within the manufacturing plant for each product group. Both local and imported raw materials are carried by trucks.

## CORE PROCESSES

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### **A3: MANUFACTURING**

Production stages start with feeding of raw materials by the help of conveyor belts and rollers and continues with the needle-punching process storing at accumulator, rolling and finished with the packaging process. Consumed electricity is taken into account as industrial voltage level during the modeling the manufacturing stage of the product.

## DOWNSTREAM PROCESSES

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### **C4: TRANSPORT FROM DOOR TO THE SITE**

Relying on geographical and time constraints, both land transport through trucks and sea freight through containers are chosen to carry over the goods from manufacturing plant to client's address. Most of the case, transport is done direct to the construction site.

### **C4: DISPOSAL**

For any type of bentonite waterproofing membrane products, relevant disposal scenarios are modeled by taking into consideration the fate of the construction and packaging wastes in Turkey. All construction products disposed into a C&D landfill, which is modeled as such in this declaration. Packaging waste is assumed to end up at packaging recycling streams due to the relevant national law in Turkey in 2014, which requires manufacturers to have certain percentage of their packaging waste to be recovered (C4).

## FUNCTIONAL UNIT

This declaration evaluates the environmental impacts of 1 m<sup>2</sup> of Geomas Voltite bentonite waterproofing membrane.

## SYSTEM BOUNDARIES

The system boundary covers A1-A3 product stages referred as ‘Raw Material Supply’, ‘Transport’ and ‘Manufacturing’ and C4 as the disposal.

## CUT OFF RULES

1% cut-off rule is applied to raw materials less than 1% in the composition but making sure their total is below this threshold.

## DATA QUALITY & BACKGROUND

Raw materials, electricity, water use and waste data were collected from annual production data of Geomas. Ecoinvent database were used as generic background data source. The results of the LCA with the indicators as per are given in the following tables for product manufacture (A1, A2, A3) and disposal.(C4) All energy calculations were obtained using Cumulative Energy Demand methodology, while environmental impacts are calculated with the CML-IA baseline V4.2 within SimaPro.

PRODUCT STAGE		CONSTRUCTION PROCESS	USE STAGE	END OF LIFE STAGE	BENEFIT & LOAD
Upstream	Core				
A1	Raw Materials Supply				
A2	Transport				
A3	Manufacturing				
A4	Transport from the gate to the site				
A5	Assembly				
B1	Use				
B2	Maintenance				
B3	Repair				
B4	Replacement				
B5	Refurbishment				
B6	Operational energy use				
B7	Operational water use				
C1	De-construction				
C2	Transport				
C3	Waste processing				
C4	Disposal				
D	Reuse-Recycling-Recovery				
X		MND			
X		MND			
X		MND			
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# LCA Calculation Rules



# LCA Results

## ENVIRONMENTAL IMPACTS

During the modeling, all values are taken into account for 1 m<sup>2</sup> of BentoShield bentonite waterproofing membrane.

ENVIRONMENTAL IMPACT PERFORMANCE FOR 1 SQM OF VOLTITE			
Parameter	Unit	A1-A3	A4
GWP	[MJ eq.]	5.10E-01	0,000034
ODP	[kg CFC11 eq.]	8.30E-07	1.30E-11
POCP	[kg ethene eq.]	9.17E-04	5.40E-08
AP	[kg SO <sub>2</sub> eq.]	8.50E-04	1.70E-07
EP	[kg PO <sub>4</sub> <sup>3-</sup> eq.]	4.50E-03	1.08E-05
ADPE	[kg Sb eq.]	3.10E-06	3.30E-11
ADPF	[MJ eq.]	1.20E-01	9.28E-04
Legend	Potential, EP: Eutrophication Potential, POCP: Formation potential of tropospheric ozone photochemical oxidants ADPE: Abiotic depletion potential for non-fossil resources, ADPF: Abiotic depletion potential for fossil resources		

RESOURCE USE FOR 1 SQM OF VOLTITE			
Parameter	Unit	A1-A3	A4
PERE	[MJ]	6.20E-00	3.50E-05
PERM	[MJ]	-	
PERT	[MJ]	6.20E-00	3.50E-05
PENRE	[MJ]	6.45E-01	1.25E-03
PENRM	[MJ]	0	
PENRT	[MJ]	6.45E-00	1.25E-03
SM	[kg]		
RSF	[MJ]		
NRSF	[MJ]		
FW	[m <sup>3</sup> ]	9.00E-03	1.24E-06
Legend	PERE: Use of renewable primary energy excluding resources used as raw materials, PERM: Use of renewable primary energy resources used as raw materials, PERT: Total use of renewable primary energy resources PENRE: Use of non-renewable primary energy excluding resources used as raw materials, PENRM: Use of non-renewable primary energy resources used as raw materials, PENRT: Total use of non-renewable primary energy resources, SM: Use of secondary material, RSF: Use of renewable secondary fuels, NRSF: Use of non-renewable secondary fuels, FW: Use of net fresh water		

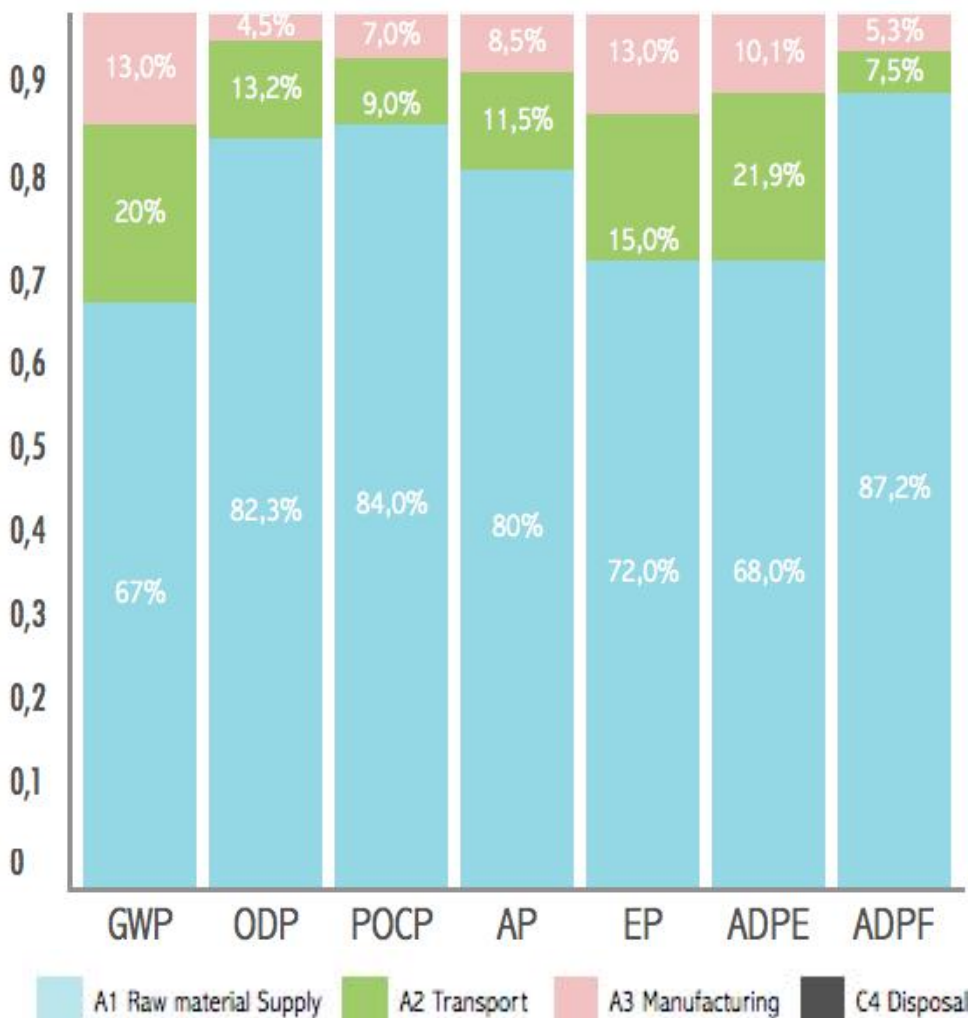
## OUTPUT FLOWS AND WASTE CATEGORIES FOR 1 SQM OF VOLTITE

Parameter	Unit	A1-A3	A4
HWD	[kg]	6.53E-05	0
NHWD	[kg]	0	3,77E+0
RWD	[kg]	0	
CRU	[kg]	0	0
MFR	[kg]	6.30E-02	6.70E-02
MER	[kg]	0	0
EE [Typ]	[MJ]	0	0

**Legend**  
HWD: Hazardous waste disposed, NHWD: Non-hazardous waste disposed, RWD: Radioactive waste disposed, CRU: Components for re-use, MFR: Materials for recycling, MER: Materials for energy recovery, EE: Exported Energy

## ENVIRONMENTAL INTERPRETATION

Among all impact categories raw material supply (A1) represents the life cycle stage with the biggest impact. The GWP of raw material supply is 67%, while transport has about 20% of the total carbon emissions followed by manufacturing with 13%. The end of life of Voltite waterproofing membranes manufactured by GEOMAS has no effect on GWP.



# LCA Results



# References

## **EN 15804/ EN 15804:2012+A1:2013**

Sustainability of construction works - Environmental Product Declarations  
Core rules for the product category of construction products

## **ISO 14025/ DIN EN ISO 14025:2009-11**

Environmental labels and declarations - Type III environmental declarations —  
Principles and procedures

## **ISO 14020/**

Environmental labels and declarations - General principles

## **EN 13967**

Flexible sheets for waterproofing

## **Ecoinvent**

Ecoinvent Centre,  
[www.Eco-invent.org](http://www.Eco-invent.org)

## **SimaPro**

SimaPro LCA Package, Pré Consultants, the Netherlands,  
[www.pre-sustainability.com](http://www.pre-sustainability.com)

## **REACH**

Registration , Evaluation , Authorisation and Restriction of CHemicals  
<http://www.reach-info.de>

## **ISO 9001**

DIN EN ISO 9001:2008: Quality management systems - Requirements (ISO  
9001:2008); Trilingual version EN ISO 9001:2008