

# GEOMEMBRANES · CONSTRUCTION FOILS · FOILS FOR HORNCULTURE · AGRICULTURAL FOILS

**CONSTRUCTION FOILS** 



We are the company that continues the activity of well known and respected **OBR Joint Stock Company** which, thanks to over **50 years** of experience in the market has gained the status of one of the largest producer of polyethylene foils in **Poland** and one of the **largest in Europe**.

We conduct the production, sales and promotion of modern, environment friendly polyethylene foils for various industrial branches. We are continuing the tradition of manufacturing and delivering products of the **highest quality**. Our target is to develop on the Polish and European market, nevertheless we concentrate on maintaining our customer service and clients satisfaction at the highest level.

We also pay attention to the standards of production processes together with accurate quality control, what makes geomembranes and foils produced by **Warter Polymers** becoming more and more popular and recognized.

2



## Geomembrane GEOCHRON HDPE

Geosynthetic polymer barrier – geomembrane known by the trade name GEOCHRON HDPE, is an insulating material with a very wide range of applications in road construction, railway and in municipal investments such as landfill sealings. Permanently installed in the ground, GEOCHRON HDPE geomembranes meet various functions arising from design assumptions, such as improving physico-mechanical sub construction performance, strengthening the stability of slopes, changing the values and directions of groundwater filtration, form a permanent water resistance and gas-tight aperture in the ground.

The advantages of GEOCHRON HDPE geomembrane quickly proved to be in environmental conditions and thanks to high mechanical strength, lack of microbiological degradation, water resistance, ease of installation, resistance to aging and many other features have become almost indispensable in geotechnical projects.

Many years of experience in manufacturing and selling geomembranes HDPE in conjunction with the launch of a new production line for geomembrane HDPE with its production based on proved, high-quality materials make our products meet the high demands of users. By increasing the production capacity and obtaining even higher quality for smooth and textured geomembranes, our products are able to meet the needs of even the most demanding customers.

GEOCHRON HDPE geomembranes are of 5-5.3 m width and of 0.75, 1.0, 1.2, 1.5, 2.0, 2.5, 3.0 mm thickness for smooth and of 1.0, 1.5, 2.0, 2.5 mm thickness for textured geomembranes. The choice of foil thickness for the application of sealing an object depends on its function.

**GEOCHRON HDPE geomembrane** meets all of the requirements of the harmonized standards: PN-EN 13491, PN-EN 13492, PN-EN 13493, PN-EN 13361, PN-EN 13362, PN-EN 15382 and most of the requirements of **GRI GM 13** towards polymeric geosynthetic barriers determined by the Geosynthetics Institute of Texas Research International Company (USA).

#### Waste seals Hydraulic structure seals

Municipal and industrial landfills are investments which constitute a potential threat to the environment. The risks arise from the possibility of contamination of air, soil and ground and surface water.

The construction of a modern landfill, taking into account the maximum extent of protecting the environment, is a very difficult, responsible and demanding task that involves the best technology, engineering solutions and ideas. Proper sealing, and thereby protecting against the infiltration of leachate, is just as much of a key element of the construction of a new landfill, the expansion of next quarters, as during rehabilitation or even closure. That is why most designers, investors and constructors decide to use **GEOCHRON HDPE** geomembrane for this purpose.

#### The advantages of GEOCHRON over other insulating materials involve:

- Physical properties and strength;
- Chemical resistance;
- Microbiological resistance;
- Aging resistance;
- Greater guarantee of join tightness;
- Break elongation 800% causes the insulating shutter to fulfill it's task even during large building settlement.

#### The application of GEOCHRON foil as a barrier for preventing or restricting the flow of liquids:

- Sealing and reclamation of municipal waste landfills;
- Sealing within liquid fuel storage and distribution facilities;
- Municipal sewage treatment plants sealing (domestic and industrial wastewater) and slurry tanks;
- Construction of tunnels and underground structures;
- Construction of reservoirs and dams;
- Construction of channels.

geomembranes HDPE have been used for road construction in Western Europe for many years. Their use for this type of application was preceded by many years of observation and research of the material.

In order to protect the environment, in this case especially the groundwater, appropriate sealing of the substrate is necessary.

A particular threat to the purity of groundwater are leaking toxic fluids flowing from the road surface, dust produced during grinding tires, brakes and pavement and salt used for melting snow and ice. Contaminated water is acquired by groundwater basins or roadside ditches and thereby is creating a significant risk of groundwater contamination and the softening of grounds susceptible to moisture excess. To protect the environment, it is necessary to apply radical technical solutions: sealing through the use of impermeable materials, construction of efficient drainage and purification systems – sealed with the GEOCHRON HDPE geomembranes road ditches and evaporation reservoirs.

GEOCHRON HDPE geomembrane is used in communication engineering for:

- Forming insulating layers preventing from contaminated road runoffs;
- Strengthening the foundations of highways, airports, parking lots;
- Sealing of retention and evaporation reservoirs;
- Sealing of evaporation and drainage reservoirs;
- Sealing of road ditches;

#### GEOMEMBRANES



- Insulation of water resistant building elements in contact with the ground, i.e.: retaining walls, bridge abutments, overpasses and communication tunnels, while strengthening high and steep earthen walls to prevent them from descenting, etc.;
- Sealing and protecting embankments.

#### Laying and connecting

• Geomembrane shoud be laid on properly prepared substrate of smooth and uniformly densified surface cleaned of stones and other sharp elements which could cause damage to the material.

#### Conditions during the laying of geomembrane:

- Air temperature it is recommended to perform the sealings at air temperature between +5°C and +40°C. Higher or lower temperatures have an adverse effect on transport, storage, handling, laying and connecting of particular geomembrane stripes.
- Wind strong wind has an adverse effect on laying of particular geomembrane stripes, aligning tabs while performing the welds and on the cleanliness of the surface.
- Rain dampness of the contact surfaces which are being connected during precipitation has a significant influence on the reduction of the quality of performed welds.

While performing the welds connecting particular geomembrane stripes it is recommended to use methods that ensure high quality of performed works. Surfaces of connected stripes should be free of contamination, dust, moisture and other foreign substances. They should also be aligned over the entire length of combined stripes with a welding hem appropriate for particular technology.



Textured geomembrane GEOCHRON HDPE has smooth stripes on both edges which enable welding and tightness testing

Methods recommended for connecting GEOCHRON geomembrane:

- Welding
- Soldering

The soldering method is permitted only in places difficult to reach in which no other method can be applied as well as during the performance of all types of material repairs. For this purpose we recommend a HDPE wire 4mm in diameter. The most common and recommended method of connecting is welding, implemented as a one weld version or two welds separated by a test channel version. The application of carefully selected and tested best quality raw materials in manufacturing GEOCHRON HDPE geomembrane ensures effective welding of the material. Whereas implementation of rigorous product testing procedures at every stage of its production in our own specialized laboratory provides the highest level of geomembranes!

Welding with one weld



Welding with two welds



- In every case the sealing barrier should be loaded with ground so it is not lifted by the working form underneath pressure of water or gas. The geomembrane should not be built-in directly under the surface of a roadside or an escarpment. The geomembrane should be stored and transported exclusively in pre-packaged rolls laid horizontally on an aligned surface. No loads should be laid on the rolls. The package of the rolls should not be removed until the building-in.
- During the loading, unloading and storage the rolls should be protected from mechanical or chemical damage and from the influence of high temperatures.
- The barrier should be laid so that it is aligned, without damage and foldings and so that it adheres well to the substrate. In case of application of geomembrane to perform objects located on territories of water protection and to perform tight water or effluent reservoirs, it is recommended to avoid welding connections. Tightness of such connections should be carefully checked after the completion of works. Connections of geomembrane should fulfill the requirements of PN-B-10290:1997 Standard.
- If the polymer barrier is being laid on a gravelly or stony ground or if it is being overwhelmed by such ground it should be protected by a special layer.
- To avoid barrier stripes movement e.g. by the wind, they should be temporarily loaded. The barrier is exposed to damage during building-in. Therefore, its condition should be checked in every case before covering with protective or other layers.

# **Geomembrane GEOCHRON HDPE smooth**

				lormative par		erties		
	Properties	Testing method	Geochron	Geochron	Geochron	Geochron	Geochron	Geochron
	Water permeability		0,75G	1,00 G	1,20 G	1,50 G	2,00 G	2,50 G
	[m <sup>3</sup> x m <sup>-2</sup> x d <sup>-1</sup> ]	PN-EN 14150				3 -2 1-12		
2.	Gas permeability	ASTM D 1434 (Procedure V)		/		m³ x m⁻² x d⁻¹] 10l x m⁻² x d⁻¹]		
	Tensile strength [N/mm²] along and across	PN-EN ISO 527-1 PN-EN ISO 527-3			30	(-4)		
	Static puncture resistance (CBR), [kN]	PN-EN ISO 12236	1,8 (-0,20)	3,0 (-0,40)	3,3 (-0,40)	4,3 (-0,60)	5,5 (-0,60)	6,5 (-0,65)
5.	Durability and resistance for - oxidation - weathering conditions resistance - environmental stress crack resistance	PN-EN 14575 PN-EN 12224 ASTM D 5397 (app.)			Fulfills the r	equirements		
3.	Hazardous substances	-			NI	PD	/	
				Information part				
	Properties	Testing method	Geochron 0,75G	Geochron 1,00 G	Prop Geochron 1,20 G	erties Geochron 1,50 G	Geochron 2,00 G	Geochron 2,50 G
	Thickness [mm]	PN-EN 1849-2	0,75 ±10%	1,00 ±10%	1,20 ±10%	1,50 ±10%	2,00 ±10%	2,50 ±10%
	Mass per unit area (average) [g/m <sup>2</sup> ]	PN-EN 1849-2	705 ±10%	940 ±10%	1128 ±10%	1410 ±10%	1880 ±10%	2350 ±10%
3.	Width, [m]	PN-EN 1848-2			1	5 (± 0,2)		
	Tear resistance [kN/m] along and across	PN-ISO 34-1	100 (-10%)	130 (-10%)	130 (-10%)	130 (-10%)	130 (-10%)	130 (-10%)
5.	Reaction to fire	PN-EN ISO 11925-2		, ,	Cla	ss E	, ,	
	Environmental Declaration Type II	PN-EN ISO 14021:2016-06			HRON geomembra ranulates) and doe			
_	Resistance to roots	prCEN/TS 14416				ISS		
+	Stress at yield [MPa] Elongation at break [%]	PN-EN ISO 527-1				6		
9.	along and across	PN-EN ISO 527-3			≥ 8	300		
0.	Tensile strength [kN/m] min.	PN-EN ISO 10319	7	1	5	23	3	80
1.	Resistance to impact [mm] min.	DIN 16726, PN-EN 12691 met. A	-	50	00	800	1200	1600
2.	Dynamic perforation test (cone drop test), hole diameter	PN-EN ISO 13433			≤	19		
	Resistance to static load [kg]	PN-EN 12730 met. B	-		≤2	20		
	Dimensional stability (1h, 100°C), [%]	PN-EN 1107-2			≤(	),5		
5.	Resistance to leaching: met. A (leaching by hot water), met. B (leaching by aqueous alkaline liquids), met. C (leaching by oragnic alcohols)	PN-EN 14415						
6.	Resistance to chemicals for landfill applications: met. A (hydrolysis under acid conditions), met. B (hydrolysis under basic conditions), met. C (solvation and swelling), met. D (synthetic leachate)	PN-EN 14414			Fulfills the r	equirements		
	Microbiological resistance	PN-EN 12225						
	Cold folding resistance (-40°C)	PN-EN 495-5						
	Loss of tensile strength after 30 freeze-thaw cycles, [%]	GOST R 55032			≤`	10		
				irements of GRI (				
	Thickness [mm] Lowest individual of 10 values	ASTM D 5199	0,75 (-10%)	1,0 (-10%)	1,2 (-10%)	1,5 (-10%)	2,0 (-10%)	2,5 (-10%)
1.	Density [g/cm³]	ASTM D 1505			≥0,	940		
2.	Yield strength [kN/m] min.		11	15	19	22	29	37
3.	Break strength [kN/m] min.	ASTM D 6693	20	27	35	40	53	67
_	Yield elongation [%] min.	Typ IV			1	2		
	Break elongation [%] min.				70	00		
6.	Multi-Axial [%]	ASTM D 5617			-		23	-
	Tear resistance [N] min.	ASTM D 1004	93	125	150	187	249	311
	Puncture resistance [N] min.	ASTM D 4833	240	320	380	480	640	800
	Environmental stress crack resistance, min.	ASTM D 5397 (app.)			50	00		
	Carbon Black Content [%]	ASTM D 1603				-3,0		
~	Carbon Black Dispersion Oxidative Induction Time	ASTM D 5596 ASTM D 3895			Categori ≥1	es 1 or 2 00		
	(OIT), [min] min. UV resistance <sup>(1)</sup> HPOIT- %	ASTM D 5885				1%		
	retained after 1600 hrs					x 10 <sup>-₄</sup>		
3. M	Coefficient of Linear	ASTM D 696						
33. 34.	Coefficient of Linear Thermal Expansion, [1/K] Low temperature brittleness	ASTM D 696				ISS		

			Normative		lue	
	Properties	Testing method	Geochron 1000 T	Geochron 1500 T	Geochron 2000 T	Geochron 2500 T
1.	Water permeability [m <sup>3</sup> x m <sup>-2</sup> x d <sup>-1</sup> ]	PN-EN 14150		≤1	0-6	
2.	Gas permeability	ASTM D 1434 (Procedure V)		≤ 2,6 x 10 <sup>-3</sup> [i ≤ 1,5 x 10 <sup>-1</sup> [n		
3.	Tensile strength [N/mm <sup>2</sup> ] along and across	PN-EN ISO 527-1 PN-EN ISO 527-3		23	(-4)	
4.	Static puncture resistance (CBR), [kN]	PN-EN ISO 12236	2,0 (-0,3)	3,0 (-0,4)	5,0 (-0,6)	5,6 (-0,7)
5.	Durability and resistance for - oxidation - weathering conditions resistance - environmental stress crack resistance	PN-EN 14575 PN-EN 12224 PN-EN 14576/ ASTM D 5397 (app.)		Fulfills the re	equirements	
3. -	Hazardous substances	-		NF	P	
D	ated: 13.04.2022 Version: VII		Information	part		
				Val	lue	
	Properties	Testing method	Geochron 1000 T	Geochron 1500 T	Geochron 2000 T	Geochron 2500 T
1.	Mass per unit area (average) [ [g/m²]	PN-EN 1849-2	940 (±10%)	1410 (±10%)	1880 (±10%)	2350 (±10%)
2.	Width, [m]	PN-EN 1848-2		5,0 - 5,5	· · · /	
3.	Tear resistance [kN/m] along and across	PN-ISO 34-1	130 (-10%)	130 (-10%)	130 (-10%)	130 (-10%)
4.	Reaction to fire	PN-EN ISO 11925-2	. ,	Clas	ss E	. ,
5.	Environmental Declaration Type II	PN-EN ISO 14021:2016-06		EOCHRON geomembra no regranulates) and doe		
3.	Elongation at break [%] along and across	PN-EN ISO 527-1 PN-EN ISO 527-3		≥ 6	•	-
7.	Dimensional stability (1h, 100°C), [%]	PN-EN 1107-2		≤ (	),5	
	Resistance to leaching: met. A (leaching by hot water),					
8.	met. B (leaching by aqueous alkaline liquids), met. C (leaching by oragnic alcohols)	PN-EN 14415				
-	alkaline liquids), met. C (leaching by oragnic	PN-EN 14415 PN-EN 14414		Fulfills the re	equirements	
9.	alkaline liquids), met. C (leaching by oragnic alcohols) Resistance to chemicals for landfill applications: met. A (hydrolysis under acid conditions), met. B (hydrolysis under basic conditions), met. C (solvation and swelling), met. D (synthetic leachate)			Fulfills the re	equirements	
9.	alkaline liquids), met. C (leaching by oragnic alcohols) Resistance to chemicals for landfill applications: met. A (hydrolysis under acid conditions), met. B (hydrolysis under basic conditions), met. C (solvation and swelling), met. D (synthetic leachate)	PN-EN 14414		Fulfills the re		
9.	alkaline liquids), met. C (leaching by oragnic alcohols) Resistance to chemicals for landfill applications: met. A (hydrolysis under acid conditions), met. B (hydrolysis under basic conditions), met. C (solvation and swelling), met. D (synthetic leachate) Microbiological resistance Loss of tensile strength after 30 freeze-thaw cycles, [%]	PN-EN 14414 PN-EN 12225	Requirements of	≤ GRI GM 13	10	
ə. 0. 1.	alkaline liquids), met. C (leaching by oragnic alcohols) Resistance to chemicals for landfill applications: met. A (hydrolysis under acid conditions), met. B (hydrolysis under basic conditions), met. C (solvation and swelling), met. D (synthetic leachate) Microbiological resistance Loss of tensile strength after	PN-EN 14414 PN-EN 12225	Requirements of 1,0 (-10%)	<		2,5 (-10%)
9. 0. 1. 2.	alkaline liquids), met. C (leaching by oragnic alcohols) Resistance to chemicals for landfill applications: met. A (hydrolysis under acid conditions), met. B (hydrolysis under basic conditions), met. C (solvation and swelling), met. D (synthetic leachate) Microbiological resistance Loss of tensile strength after 30 freeze-thaw cycles, [%] Thickness [mm] Lowest individual of 10 values Density [g/cm³]	PN-EN 14414 PN-EN 12225 GOST R 55032	1,0	≤ GRI GM 13 1,5	10 2,0 (-10%)	
9. 0. 1. 3.	alkaline liquids), met. C (leaching by oragnic alcohols) Resistance to chemicals for landfill applications: met. A (hydrolysis under acid conditions), met. B (hydrolysis under basic conditions), met. C (solvation and swelling), met. C (solvation and swelling), met. D (synthetic leachate) Microbiological resistance Loss of tensile strength after 30 freeze-thaw cycles, [%] Thickness [mm] Lowest individual of 10 values Density [g/cm³] Yield strength	PN-EN 14414 PN-EN 12225 GOST R 55032 ASTM D 5199	1,0	≤ <sup>-</sup> GRI GM 13 1,5 (-10%)	10 2,0 (-10%)	
э. 0. 1. 3. 4.	alkaline liquids), met. C (leaching by oragnic alcohols) Resistance to chemicals for landfill applications: met. A (hydrolysis under acid conditions), met. B (hydrolysis under basic conditions), met. C (solvation and swelling), met. D (synthetic leachate) Microbiological resistance Loss of tensile strength after 30 freeze-thaw cycles, [%] Thickness [mm] Lowest individual of 10 values Density [g/cm³] Yield strength [kN/m] min.	PN-EN 14414 PN-EN 12225 GOST R 55032 ASTM D 5199 ASTM D 1505	1,0 (-10%)	≤ GRI GM 13 1,5 (-10%) ≥0,	2,0 (-10%) 940	(-10%)
9. 0. 1. 3. 4. 5.	alkaline liquids), met. C (leaching by oragnic alcohols) Resistance to chemicals for landfill applications: met. A (hydrolysis under acid conditions), met. B (hydrolysis under basic conditions), met. C (solvation and swelling), met. D (synthetic leachate) Microbiological resistance Loss of tensile strength after 30 freeze-thaw cycles, [%] Thickness [mm] Lowest individual of 10 values Density [g/cm³] Yield strength [kN/m] min.	PN-EN 14414 PN-EN 12225 GOST R 55032 ASTM D 5199	1,0 (-10%) 15	≤ GRI GM 13 1,5 (-10%) ≥0, 22	10 2,0 (-10%) 940 29 21	(-10%)
9. 0. 1. 3. 4. 5.	alkaline liquids), met. C (leaching by oragnic alcohols) Resistance to chemicals for landfill applications: met. A (hydrolysis under acid conditions), met. B (hydrolysis under basic conditions), met. C (solvation and swelling), met. C (solvation and swelling), met	PN-EN 14414 PN-EN 12225 GOST R 55032 ASTM D 5199 ASTM D 1505	1,0 (-10%) 15	≤ <sup>-</sup> GRI GM 13 1,5 (-10%) ≥0,- 22 16	10 2,0 (-10%) 940 29 21 2	(-10%)
9. 0. 1. 2. 3. 4. 5. 5. 6.	alkaline liquids), met. C (leaching by oragnic alcohols) Resistance to chemicals for landfill applications: met. A (hydrolysis under acid conditions), met. B (hydrolysis under basic conditions), met. C (solvation and swelling), met. C (solvation ad swelling), met. C (solvation	PN-EN 14414 PN-EN 12225 GOST R 55032 ASTM D 5199 ASTM D 1505	1,0 (-10%) 15	≤ GRI GM 13 1,5 (-10%) ≥0, <sup>2</sup> 22 16 1	10 2,0 (-10%) 940 29 21 2	(-10%)
9. 10. 11. 13. 14. 15. 16. 17. 18.	alkaline liquids), met. C (leaching by oragnic alcohols) Resistance to chemicals for landfill applications: met. A (hydrolysis under acid conditions), met. B (hydrolysis under basic conditions), met. D (synthetic leachate) Microbiological resistance Loss of tensile strength after 30 freeze-thaw cycles, [%] Thickness [mm] Lowest individual of 10 values Density [g/cm³] Yield strength [kN/m] min. Break strength [kN/m] min. Yield elongation [%] min. Tear resistance	PN-EN 14414 PN-EN 12225 GOST R 55032 ASTM D 5199 ASTM D 1505 ASTM D 6693 Typ IV	1,0 (-10%) 15 10	≤ <sup>-</sup> GRI GM 13 1,5 (-10%) ≥0, <sup>-</sup> 22 16 1 1 1	10 2,0 (-10%) 940 29 21 2 20	(-10%) 37 26
<ol> <li>9.</li> <li>0.</li> <li>1.</li> <li>2.</li> <li>3.</li> <li>4.</li> <li>5.</li> <li>6.</li> <li>7.</li> <li>8.</li> <li>9.</li> </ol>	alkaline liquids), met. C (leaching by oragnic alcohols) Resistance to chemicals for landfill applications: met. A (hydrolysis under acid conditions), met. B (hydrolysis under basic conditions), met. D (synthetic leachate) Microbiological resistance Loss of tensile strength after 30 freeze-thaw cycles, [%] Thickness [mm] Lowest individual of 10 values Density [g/cm³] Yield strength [kN/m] min. Break strength [kN/m] min. Yield elongation [%] min. Break elongation [%] min.	PN-EN 14414 PN-EN 12225 GOST R 55032 ASTM D 5199 ASTM D 1505 ASTM D 6693 Typ IV	1,0 (-10%) 15 10 125	≤ ° GRI GM 13 1,5 (-10%) ≥0, 22 16 1 10 10 187	10 2,0 (-10%) 940 29 21 2 20 249 534	(-10%) 37 26 311
<ol> <li>9.</li> <li>0.</li> <li>1.</li> <li>2.</li> <li>3.</li> <li>4.</li> <li>5.</li> <li>6.</li> <li>7.</li> <li>8.</li> <li>9.</li> <li>9.</li> <li>20.</li> <li>21.</li> </ol>	alkaline liquids), met. C (leaching by oragnic alcohols) Resistance to chemicals for landfill applications: met. A (hydrolysis under acid conditions), met. B (hydrolysis under basic conditions), met. C (solvation and swelling), met. D (synthetic leachate) Microbiological resistance Loss of tensile strength after 30 freeze-thaw cycles, [%] Thickness [mm] Lowest individual of 10 values Density [g/cm³] Yield strength [kh/m] min. Break strength [kN/m] min. Yield elongation [%] min. Break elongation [%] min. Puncture resistance [N] min. Environmental stress crack resistance, min. Carbon Black Content [%]	PN-EN 14414 PN-EN 12225 GOST R 55032 ASTM D 5199 ASTM D 1505 ASTM D 6693 Typ IV ASTM D 1004 ASTM D 1004 ASTM D 1004 ASTM D 5397 (app.) ASTM D 1603	1,0 (-10%) 15 10 125	≤ <sup>-</sup> GRI GM 13 1,5 (-10%) ≥0,- 22 16 1 10 187 400 50 2,0-	10 2,0 (-10%) 940 29 21 2 20 249 534 20 3,0	(-10%) 37 26 311
9. 10. 11. 12. 13. 14. 15. 16. 17. 17. 18. 8. 19. 20. 21. 22.	alkaline liquids), met. C (leaching by oragnic alcohols) Resistance to chemicals for landfill applications: met. A (hydrolysis under acid conditions), met. B (hydrolysis under basic conditions), met. C (solvation and swelling), met. D (synthetic leachate) Microbiological resistance Loss of tensile strength after 30 freeze-thaw cycles, [%] Thickness [mm] Lowest individual of 10 values Density [g/cm³] Yield strength [kN/m] min. Break strength [kN/m] min. Yield elongation [%] min. Break elongation [%] min. Tear resistance [N] min. Puncture resistance [N] min. Environmental stress crack resistance, min. Carbon Black Content [%] Carbon Black Dispersion	PN-EN 14414 PN-EN 12225 GOST R 55032 ASTM D 5199 ASTM D 1505 ASTM D 6693 Typ IV ASTM D 1004 ASTM D 1004 ASTM D 4833 ASTM D 5397 (app.)	1,0 (-10%) 15 10 125	≤ ° GRI GM 13 1,5 (-10%) ≥0, 22 16 1 10 187 400 50	10 2,0 (-10%) 940 29 21 2 20 249 534 00 	(-10%) 37 26 311
<ol> <li>9.</li> <li>10.</li> <li>11.</li> <li>12.</li> <li>13.</li> <li>14.</li> <li>15.</li> <li>16.</li> <li>17.</li> <li>18.</li> <li>19.</li> <li>20.</li> <li>21.</li> </ol>	alkaline liquids), met. C (leaching by oragnic alcohols) Resistance to chemicals for landfill applications: met. A (hydrolysis under acid conditions), met. B (hydrolysis under basic conditions), met. D (synthetic leachate) Microbiological resistance Loss of tensile strength after 30 freeze-thaw cycles, [%] Thickness [mm] Lowest individual of 10 values Density [g/cm³] Yield strength [kN/m] min. Break strength [kN/m] min. Yield elongation [%] min. Break elongation [%] min. Tear resistance [N] min. Environmental stress crack resistance, min. Carbon Black Content [%] Carbon Black Dispersion Oxidative Induction Time (OIT), [min] min.	PN-EN 14414         PN-EN 12225         GOST R 55032         GOST R 55032         ASTM D 5199         ASTM D 1505         ASTM D 6693         Typ IV         ASTM D 1004         ASTM D 5397         (app.)         ASTM D 1603         ASTM D 5596	1,0 (-10%) 15 10 125	≤ GRI GM 13 1,5 (-10%) ≥0, 22 16 1 10 187 400 50 2,0- Categori	10 2,0 (-10%) 940 29 21 2 20 249 534 20 3,0 es 1 or 2 00	(-10%) 37 26 311
9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23.	alkaline liquids), met. C (leaching by oragnic alcohols) Resistance to chemicals for landfill applications: met. A (hydrolysis under acid conditions), met. B (hydrolysis under basic conditions), met. C (solvation and swelling), met. D (synthetic leachate) Microbiological resistance Loss of tensile strength after 30 freeze-thaw cycles, [%] Hickness [mm] Lowest individual of 10 values Density [g/cm³] Yield strength [kN/m] min. Break strength [kN/m] min. Yield elongation [%] min. Break elongation [%] min. Tear resistance [N] min. Puncture resistance [N] min. Environmental stress crack resistance, min. Carbon Black Content [%] Carbon Black Dispersion	PN-EN 14414         PN-EN 12225         GOST R 55032         GOST R 55032         ASTM D 5199         ASTM D 1505         ASTM D 6693         Typ IV         ASTM D 1004         ASTM D 4833         ASTM D 5397         (app.)         ASTM D 1603         ASTM D 3895	1,0 (-10%) 15 10 125	≤ GRI GM 13 1,5 (-10%) ≥0,- 22 16 1 10 187 400 50 2,0- Categori ≥1	10 2,0 (-10%) 940 29 21 2 20 249 534 20 3,0 es 1 or 2 00 %	(-10%) 37 26 311

(1) The condition of the test should be 20 hr. UV cycle at 75°C followed by 4 hr. condensation at 60°C

7

#### **Geosynthetic Polymeric Barrier**

# Geomembrane LLDPE smooth

#### Intended uses :

- Fluid barrier in the construction of tunnels and underground structures.
- Fluid and/or gas barrier in the construction of liquid waste disposal sites, transfer stations or secondary containment.
- Fluid and/or gas barrier in the construction of solid waste storage and disposal sites.
- Fluid barrier in the construction of reservoirs and dams.
- Fluid barrier in the construction of canals.
- Fluid barrier in transportation infrastructure

#### Recommended especially in case of applications where increased flexibility is needed e.g.:

- Slopes with difficult access,
- Artificial reservoirs and channels,
- For reclamation of municipal waste landfills,
- Embankments.

Geomembrane LLDPE smooth

#### The Geomembrane characterizes with:

- Excellent flexibility and ease of laying,
- High static puncture resistance,
- High stress corrosion cracking resistance,
- The product does not contain neither fillers nor plasticizers which can migrate during the use (in contrast to PCV geomembranes),
- Smooth stripes make the welding of geomembrane easier and faster,
- It comes in the form of a smooth or one or both side textured sheet,
- It is neutral to the water environment it does not contain hazardous substances.

		Norma	ative part					
		Testing	Value					
	Properties	method	Geomembrane LLDPE 0,75 G	Geomembrane LLDPE 1,00 G	Geomembrane LLDPE 1,50 G	Geomembrane LLDPE 2,00 G		
1.	Water permeability [m <sup>3</sup> x m <sup>-2</sup> x d <sup>-1</sup> ]	PN-EN 14150	≤ 7,60*10 <sup>-6</sup>					
2.	Gas permeability	ASTM D 1434 (Procedure V)		≤ 1,27*10 <sup>-3</sup> n ≤ 5,67*10 <sup>-2</sup> n	n <sup>3</sup> x m <sup>-2</sup> x d <sup>-1</sup> nol x m <sup>-2</sup> x d <sup>-1</sup>			
3.	Tensile strength [N/mm <sup>2</sup> ] along and across	PN-EN ISO 527-1 PN-EN ISO 527-3	28(-4)					
4.	Static puncture resistance (CBR) [kN]	PN-EN ISO 12236	1,8 (-0,18)	5,0 (-0,50)				
	Durability and resistance for - oxidation	PN-EN 14575 PN-EN 12224	Cover in one year					
5.	<ul> <li>weathering conditions resistance</li> <li>environmental stress crack resistance</li> </ul>	PN-EN 14576/ ASTM D 5397 (app.)	Fulfills the requirements					
6.	Hazardous substances	-		Ν	PD			

		Infor	mation part					
				Va	lue			
	Properties	Testing method	Geomembrane LLDPE 0,75 G	Geomembrane LLDPE 1,00 G	Geomembrane LLDPE 1,50 G	Geomembrane LLDPE 2,00 G		
1.	Width [m]	PN-EN 1848-2		5 (± 0,2)				
2.	Thickness, [mm]	PN-EN 1849-2	0,75 ±10%	1,00 ±10%	1,50 ±10%	2,00 ±10%		
3.	Tear resistance [kN/m] along and across	PN-ISO 34-1	107 (-10%)	107 (-10%)	107 (-10%)	107 (-10%)		
4.	Stress at yield [MPa]	PN-EN ISO 527-1 PN-EN ISO 527-3		1	2	<u>.</u>		
5.	Elongation at break [%] along and across	PN-EN ISO 527-1 PN-EN ISO 527-3	≥ 800					
6.	Resistance to folding at low temperature -35°C	PN-EN 495-5	- lack of scratches, no cracks					
		Requireme	ents of GRI GM 17					
7.	Thickness [mm] Lowest individual of 10 values	ASTM D 5199	0,75 -10%	1,00 -10%	1,50 -10%	2,00 -10%		
8.	Density [g/cm³]	ASTM D 1505		≤0,	939			
9.	Break strength [kN/m] min.	ASTM D 6693	20	27	40	53		
10.	Break elongation [%] min.	Typ IV		80	00			
11.	Tear resistance [N] min.	ASTM D 1004	70	100	150	200		
12.	Puncture resistance [N] min.	ASTM D 4833	190	250	370	500		
13.	Carbon Black Content [%]	ASTM D 1603		2.0	-3.0			
14.	Carbon Black Dispersion	ASTM D 5596		Categor	ries 1 - 2			
15.	Oxidative Induction Time (OIT), [min] min.	ASTM D 3895	≥100					

The results of the same characteristics determined by different standards may effect in different values.

These differences result from other conditions of the test.

#### GEOMEMBRANES

Geomembrane LLDPE textured

	Normative part										
	<b>.</b>			Value							
	Properties	Testing method	Geomembrane LLDPE 1000T	Geomembrane LLDPE 1500T	Geomembrane LLDPE 2000T						
1.	Water permeability [m <sup>3</sup> x m <sup>-2</sup> x d <sup>-1</sup> ]	PN-EN 14150		≤ 7,60*10 <sup>-6</sup>							
2.	Gas permeability	ASTM D 1434 (Procedure V)		$\leq 1,27*10^{-3} \text{ m}^3 \text{ x m}^{-2} \text{ x d}^{-1}$ $\leq 5,67*10^{-2} \text{ mol x m}^{-2} \text{ x d}^{-1}$							
3.	Tensile strength [N/mm <sup>2</sup> ] along and across	PN-EN ISO 527-1 PN-EN ISO 527-3	22(-4)								
4.	Static puncture resistance (CBR), [kN]	PN-EN ISO 12236	2,0 (-0,20)	3,2 (-0,32)	5,0 (-0,50)						
	Durability and resistance for - oxidation	PN-EN 14575 PN-EN 12224		Cover in one year							
5.	<ul> <li>weathering conditions resistance</li> <li>environmental stress crack resistance</li> </ul>	PN-EN 14576/ ASTM D 5397 (app.)	Fulfills the requirements								
6.	Hazardous substances	-		NPD							

#### Information part Value Properties Testing method Geomembrane LLDPE 1000T Geomembrane LLDPE 1500T Geomembrane LLDPE 2000T Width, [m] PN-FN 1848-2 5,0-5,5 (±0,2) 1. Mass per unit area, [g/m<sup>2</sup>] PN-EN 1849-2 935 ±10% 1403 ±10% 1870 ±10% 2. Tear resistance, [kN/m] 107 107 107 3. PN-ISO 34-1 along and across (-10%) (-10%) (-10%) PN-EN ISO 527-1 4 Stress at yield, [MPa] 12 **PN-EN ISO 527-3** Elongation at break, [%] PN-EN ISO 527-1 ≥ 600 5. along and across **PN-EN ISO 527-3** Requirements of GRI GM 17 Thickness, [mm] 1,00 1,50 2,00 ASTM D 5199 6. Lowest individual of 10 values (-10%) (-10%) (-10%)7. Density, [g/cm<sup>3</sup>] ASTM D 1505 ≤0,939 Break strength, [kN/m] min. ASTM D 6693 11 21 16 8. Break elongation, [%] min. Typ IV 250 9. 100 200 10. Tear resistance, [N] min. ASTM D 1004 150 11. Puncture resistance, [N] min. ASTM D 4833 200 300 400 12. Carbon Black Content, [%] ASTM D 1603 2.0-3.0 Carbon Black Dispersion ASTM D 5596 Categories 1 - 2 13. 14. Oxidative Induction Time (OIT), [min] min. ASTM D 3895 ≥100

The results of the same characteristics determined by different standards may effect in different values. These differences result from other conditions of the test.

#### **REACH INFORMATION**

This product is an article as defined in article 3 of regulation (EC) No 1907/2006 (REACH). It contains no substances which are intended to be released from the article under normal or reasonably foreseeable conditions of use. A safety data sheet following article 31 of the same regulation is not needed to bring the product to the market, to transport or to use it. In accordance with our knowledge and assurance of our suppliers, polymers and all additives used for production of article do not contain substances (SVHC) from the candidate list and comply with Annex XVII REACH.

### Accessories

#### Tight system solutions in Water Engineering

#### HDPE wire for soldering

HDPE wire for folding is designed for performing extrusion welds in difficult to reach places and for all kinds of repairs of GEOCHRON HDPE Geomembrane. It is performed of the same kind of raw material as GEOCHRON HDPE Geomembrane which gives a guarantee of compatibility.

#### GeoLath

The HDPE GeoLath for concrete has perpendicular protruding profiles which perform a homogeneous element after the bonding of concrete.

#### Performing of the sealing:

During the performing of concrete elements which are connected with the GEOCHRON HDPE Geomembrane it is recommended to install HDPE GeoLathes. It is recommended to perform this stage at the moment of timbering of the concrete element. HDPE GeoLathes should be installed in an appropriate place according to the project. As a result of the concreting process the profile is being permanently connected with the concrete element of the construction. Afterwards the prepared profile should be folded with earlier prepared sheets of HDPE Geochron Geomembrane. The place of connection should be sealed with an extrusion weld. The adjacent sheets of GEOCHRON HDPE geomembrane and the connection places of the geomembrane and the GeoLathes should be connected by qualified specialists using special equipment.





#### GEOMEMBRANES



# CONSTRUCTION FOIL IZOVIL (from LDPE)

IZOVIL is a product for damp proofing intended for applications on or under floors or ground slabs in order to protect from water not under hydrostatic pressure passing from the ground into the internal environment. It may also be applied in walls.

#### **Rules of assembly**

The installation involves laying stripes of IZOVIL with an overlap of min. 10 cm. The ground, which the foil is installed on, should be even, without sharp, protruding elements and impurities ex. small stones, which may cause film perforation or tear. The above insulation should be applied in accordance with applicable law regulations from the field of building construction including current standards and technical documentation.

#### **Declared performance:**

		Harmo	onized technica	specific	ation								
			PN-EN 13967	:2012									
	Us	e						Туре о	f plasti	C			
	Damp proofing in	buildings– type A							PE				
									lue				
	Properties	Testing method	Unit	1ZOVIL 0,15/ ±30%	IZOVIL 0,20/ ±30%	1ZOVIL 0,30/ ±30%	1ZOVIL 0,40/ ±30%	1ZOVIL 0,50/ ±30%	0,60/	IZOVIL 0,70/ ±30%	IZOVIL 0,80/ ±30%	120VIL 1,00/ ±30%	120VIL 1,50/ ±30%
			Normative	oart									
1.	Reaction to fire	PN EN ISO 11925-2	-					Cla	ss F				
2.	Watertightness (2kPa)	PN-EN 1928 met. A	-					Pa	ass				
3.	Resistance to tearing	PN-EN 12310-1	Ν	≥15	≥20	≥35	≥45	≥60	≥70	≥85	≥90	≥90	≥120
4.	Joint strength	PN-EN 12317-2	N/50mm					N	PD				
5.	Resistance to impact	PN-EN 12691 met. B	mm					N	PD				
6.	Tensile strength	PN-EN 12311-2	N/50mm	≥22	≥30	≥45	≥60	≥75	≥80	≥95	≥100	≥100	≥125
7.	Elongation at break	FIN-LIN 12311-2	%					≥1	.00				
8.	Resistance to static loading	PN-EN 12730 met. B	kg					Ν	PD				
9.	Watertightness after artificial ageing (70°C/12 weeks) (2kPa) Watertightness after exposure	PN-EN 1296 PN-EN 1931	-					Pa	iss				
	Watertightness after exposure to chemicals (2kPa)	PN-EN 1847	-										
10.	Dangerous substances	-	-					N	PD				
			Information	<u> </u>									
11.	Thickness	PN EN 1849-2	mm				0,40 (±30%)			0,70 (±30%)			
12.	Mass per unit area	TH EN 1045 2	mm	97 (±10%)	129 (±10%)	193 (±10%)	258 (±10%)	322 (±10%)	386 (±10%)	451 (±10%)	515 (±10%)	644 (±10%)	966 (±10%)
	Se Wound length		m				(20-10	0) ± 5%					(20-50) ±5%
13.	Wound length	PN-EN 1848-2	m	(5-12	) ± 5%		± 5%	(5-6) ± 5%		. ,	± 5%		(5-6(7)) ± 5%
	a Rectilinearity		-		Deviat	ion fror		nearity the pro		re than ngth	65mm f	or 10m	
14.	Visible defects	PN-EN 1850-2	-				Lack of	visible	defects	5			
15.	Watertightness after exposure to chemicals (60kPa) ( 95 petrol, kerosene, motor oil, gear oil)	PN-EN 1928 PN-EN 1847	-			-				Ра	SS		
16.	Compatibility with bitumen (70°C, 28 days) watertight after exposure (60kPa, 24h)	EN 1548 PN-EN 1928	-	Pass									
17.	Density	EN ISO 1183	g/cm³					≥0,	920				
18.	Resistance to roots	prCEN/TS 14416	-			-				P	ass		

#### Storage and transport

Rolls of the product should be stored in original wrappings in roofed spaces or in natural conditions with protection against direct influence of UV rays or precipitation. Transport with covered means of transport, protecting against mechanical damages and movement during transportation, in accordance with applicable law regulations.



#### CONSTRUCTION FOILS IZOVIL MAX HDPE/ GEOPLAN M HDPE

Product for damp proofing of buildings and water insulation of underground parts – TYPE T Sheet used in wall construction or on or under floors or ground slabs to prevent liquid water not under hydrostatic pressure and under hydrostatic pressure passing from the ground into the internal environment or from one section of the structure to another.

#### General characteristics and level or class of declared performances:

			Harm	onized technical	specific	ation								
				PN-EN 13967:	2012									
		Us	e		Type of palstic									
	Damp proofing in buil	dings ar	nd basement tanking – 1	ГҮР Т					HC	PE				
	Properties		Testing method	Unit						lue				
	rioperties				0,30	0,50	0,60	0,70	0,75	0,80	1,00	1,20	1,50	2,00
	1			Normative pa	rt									
1.	Reaction to fire		PN EN ISO 11925-2	-			Class F					Class E		
2.	Watertightness (60kPa)	PN-EN 1928 met. A	-						iss					
3.	Resistance to tearing	PN-EN 12310-1	N	≥250	≥300	≥300	≥500	≥500	≥500	≥500	≥500	≥500	≥500	
		TD			≥250	≥350	≥350	≥600	≥600	≥600	≥600	≥600	≥600	≥600
4.	Tensile strength	MD		N/50mm	≥300	≥400	≥450	≥560	≥600	≥600	≥800	≥950	≥1200	≥1600
		TD	PN-EN 12311-2		≥300	≥400	≥450	≥560	≥600	≥600	≥800	≥950	≥1200	≥1600
5.	Elongation at break	MD TD		%	≥300									
6.	Watertightness after artii ageing (70°C/12 weeks) (60kPa) Watertightness after expo	ficial	PN-EN 1296 PN-EN 1931	-					Pa	155				
	Watertightness after expected to chemicals (60kPa)	osure	PN-EN 1847	-										
7.	Dangerous substances		-	-					N	PD				
				Information	•									
8.	Thickness		PN EN 1849-2	mm	0,30 (±15%)	0,50 (±15%)	0,60 (±15%)	0,70 (±15%)	0,75 (±15%)	0,80 (±15%)	1,00 (±15%)	1,20 (±15%)	1,50 (±15%)	2,00 (±15%)
9.	ធ្វី Wound length	m	(25-200) ± 0,5%											
	Wound length Width		PN-EN 1848-2	m	(5–5,5) ± 5%									
10.	Visible defects		PN-EN 1850-2	-				Lac	k of visi	ble defe	ects			

#### VAPOUR INSULATING FILM DIFOL

DIFOL is flexible sheet of plastic whose function is to control the movement of water and/or water vapour trough a wall, floor or roof.

#### General characteristics and level or class of declared performances:

		Harm	onized technical	specification				
			EN 13984:20	13				
		Use				Type of plastic	:	
	Vapour cont	rol layer – TYPE A				LDPE		
	Properties	Testing method	Unit			Value		
	Properties	lesting method	Unit	DIFOL 0,15	DIFOL 0,20	DIFOL 0,30	DIFOL 0,40	DIFOL 0,50
			lormative part					
1.	Watertightness (2kPa)	PN-EN 1928 met. A	-			Pass		
2.	Resistance to impact	PN-EN 12691 met. B	mm			NPD		
3.	Water vapour resistance after artificial ageing (70°C/12 weeks)	PN-EN 1296 PN-EN 1931	-			Pass		
	ි Chemical resistance	PN-EN 1847	-					
4.	Resistance to tearing	PN-EN 12310-1	N	≥ 20	≥ 30	≥ 40	≥ 50	≥ 55
5.	Joint strength	PN-EN 12317-2	N/50mm			NPD		
6.	Water vapour resistance	PN-EN 1931	(m²*s*Pa)/kg	2	2,3*10 <sup>11</sup> ± 60%		4,0*10 <sup>1</sup>	1 ± 60%
7.	Tensile strength	PN-EN 12311-2	N/50mm	≥ 20	≥ 22	≥ 30	≥ 40	≥ 45
8.	Reaction to fire	PN EN ISO 11925-2	-			Class F		
9.	Dangerous substances	-	-			NPD		
		lr Ir	nformation part			1		1
10.	Thickness	PN EN 1849-2	mm	0,15 (± 30%)	0,20 (± 30%)	0,30 (± 30%)	0,40 (± 30%)	0,50 (± 30%)
11.	Mass per unit area	FIN LIN 1045-2	g/m2	97 (± 10%)	129 (± 10%)	193 (± 10%)	258 (± 10%)	322 (± 10%)
	얻 Wound length		m			(20–100) ± 2%		
12	.og Width	DNI EN 1040 2	m	(2-12)	) ± 5%	(4-12)	) ± 5%	(5–6) ±5%
12.	Wound length Width Rectilinearity	PN-EN 1848-2	-	Deviation from rectilinearity no more than 75mm for 10m of the product length				
13.	Visible defects	PN-EN 1850-2	-			k of visible defe	0	



# CONSTRUCTION FOIL

IZO-V foil is flexible sheet of plastic whose functions are:

- Control the movement of water and/or water vapour through a wall, floor or roof
- Prevent water rising up a wall form the ground, water moving from one part a wall to another and to deflect water from an inner wall of a cavity construction to the exterior of the building
- Protect the inside of the building from water moving down from above in mansory chimneys and parapet walls

#### General characteristics and level or class of declared performances:

			Harm	onized technical	specification					
			EN 1	3984:2013, EN 1	4909:2012					
		U	se			Type o	f plastic			
		•	l layer – TYPE A ourse – TYPE A			LD	PE			
		Properties	Testing method	Unit	Value					
		Properties	lesting method	Unit	IZO-V 0,20	IZO-V 0,30	IZO-V 0,40	IZO-V 0,50		
				Normative p	art					
1.	Wate	rtightness (2kPa)	PN-EN 1928 met. A	-			ass			
2.		tance to impact	PN-EN 12691 met. B	mm		N	PD			
	aft	ater vapour resistance er artificial ageing 9°C/12 weeks) emical resistance atertightness after	PN-EN 1296 PN-EN 1931	-						
2	ig Ch	emical resistance	PN-EN 1847	-	_	D				
3.	art	atertightness after ificial ageing )°C/12 weeks) (2kPa)	PN-EN 1296 PN-EN 1928	-		Pa	155			
	Alk	ali resistance	PN-EN 1847, PN-EN 1928	-						
4.	Resist	tance to tearing	PN-EN 12310-1	Ν	≥ 25	≥ 35	≥ 45	≥ 50		
5.	Joint	strength	PN-EN 12317-2	N/50mm		N	PD			
6.	Resist	tance to low temperature	PN-EN 495-5	-		N	PD			
7.	Wate	r vapour resistance	PN-EN 1931	(m²*s*Pa)/kg	2,3*10 <sup>1</sup>	<sup>1</sup> ± 60%	4,0*101	' ± 60%		
8.	Tensil	le strength	PN-EN 12311-2	N/50mm	≥ 20	≥ 25	≥ 35	≥ 40		
9.	React	ion to fire	PN EN ISO 11925-2	-		Cla	ss F			
10.	Dang	erous substances	-	-		N	PD			
				Information p	part					
11.	Thick	ness	PN EN 1849-2	mm	0,20 (± 40%)	0,30 (± 40%)	0,40 (± 40%)	0,50 (± 40%)		
12.	Mass	per unit area	FIN EIN 1649-2	g/m2	110 (± 10%)	166 (± 10%)	221 (± 10%)	276 (± 10%)		
	si M	Vound length		m		(20–10	0) ± 2%			
13.	V Dimensions	Vidth	PN-EN 1848-2	m		(2-12) ± 5%		(4-12) ± 5%		
	n E	ectilinearity		-	Deviation from rec	tilinearity no more th	an 60mm for 10m of	the product length		
14.	Visible	e defects	PN-EN 1850-2	-		Lack of visi	ble defects			

# CONSTRUCTION FOIL

#### THE ADVANTAGES OF IZO-FUNDAMENT:

High resistance to:

- moisture thanks to the foil the construction is perfectly protected against ground moisture
- · decomposition process foil is permanently resistant to decay
- influence of increased temperature
- alkaline environments high chemical resistance

#### General characteristics and level or class of declared performances:

		Harmo	nized technical s	pecification							
			EN 14909:20	12							
		Use		Type of	plastic						
	Damp poof o	course – TYPE A		LDPE							
	Duranting	Testing method	Unit	Val	ue						
	Properties	lesting method	Unit	IZO-FUNDAMENT 300	IZO-FUNDAMENT 1000						
	Normative part										
1.	Watertightness (2kPa)	PN-EN 1928 met. A	-	Pass							
2.	Resistance to impact	PN-EN 12691 met. B	mm	NPD							
3.	Low temperature resistance	PN-EN 495-5	-	NPD							
4.	Watertightness after artificial ageing (70°C/12 weeks) (2kPa)	PN-EN 1296 PN-EN 1928	-	Pa	55						
	Alkali resistance	PN-EN 1847, PN-EN 1928	-								
5.	Reaction to fire	PN EN ISO 11925-2	-	Clas	s F						
6.	Dangerous substances	-	-	NPD							
			Information p	art							
7.	Mass per unit area	PN EN 1849-2	g/m²	300 (± 30%)	1000 (± 30%)						



# CONSTRUCTION FOIL

IZO-FOL foil is flexible sheet of plastic whose functions are:

- Control the movement of water and/or water vapour through a wall, floor or roof
- Prevent water rising up a wall form the ground, water moving from one part a wall to another and to deflect water from an inner wall of a cavity construction to the exterior of the building
- Protect the inside of the building from water moving down from above in mansory chimneys and parapet walls

#### General characteristics and level or class of declared performances:

		Harm	onized technical	specification					
		EN 1	L3984:2013, EN 3	14909:2012					
	U	se			Туре о	f plastic			
	•	l layer – TYPE A ourse – TYPE A			LC	PE			
	Ducucation	Testing method	Unit	Value					
	Properties	lesting method	Unit	IZO-FOL 0,20	IZO-FOL 0,30	IZO-FOL 0,40	IZO-FOL 0,50		
			Normative p	part					
1.	Watertightness (2kPa)	PN-EN 1928 met. A	-			ass			
2.	Resistance to impact	PN-EN 12691 met. B	mm		N	PD			
	Water vapour resistance after artificial ageing ⇒ (70°C/12 weeks)	PN-EN 1296 PN-EN 1931	-						
3.	Chemical resistance	PN-EN 1847	-	-	D				
3.	A (70°C/12 weeks) (70°C/12 weeks) Chemical resistance Watertightness after artificial ageing (70°C/12 weeks) (2kPa)	PN-EN 1296 PN-EN 1928	-	Pass					
	Alkali resistance	PN-EN 1847, PN-EN 1928	-						
4.	Resistance to tearing	PN-EN 12310-1	Ν	≥ 20	≥ 30	≥ 40	≥ 45		
5.	Joint strength	PN-EN 12317-2	N/50mm		N	PD			
6.	Resistance to low temperature	PN-EN 495-5	-		N	PD			
7.	Water vapour resistance	PN-EN 1931	(m2*s*Pa)/kg	2*10 <sup>11</sup> ±	60%	3,5*10 <sup>1</sup>	<sup>1</sup> ± 60%		
8.	Tensile strength	PN-EN 12311-2	N/50mm	≥ 20	≥ 22	≥ 30	≥ 35		
9.	Reaction to fire	PN EN ISO 11925-2	-		Cla	ss F			
10.	Dangerous substances	-	-		N	PD			
			Information	part					
11.	Thickness	PN EN 1849-2	mm	0,20 (± 50%)	0,30 (± 50%)	0,40 (± 50%)	0,50 (± 50%)		
12.	Mass per unit area	PIN EIN 1849-2	g/m²	92 (± 10%)	138 (± 10%)	184 (± 10%)	230 (± 10%)		
	ଞ୍ଚ Wound length		m		•	0) ± 2%			
13.	Wound length Width Rectilinearity	PN-EN 1848-2	m		(2-12) ± 5% *		(4-12) ± 5% *		
	Rectilinearity		-	Deviation from rect	ilinearity no more th	an 75mm for 10m c	of the product length		
14.	Visible defects	PN-EN 1850-2	-		Lack of vis	ble defects			

#### **REACH INFORMATION**

This product is an article as defined in article 3 of regulation (EC) No 1907/2006 (REACH). It contains no substances which are intended to be released from the article under normal or reasonably foreseeable conditions of use. A safety data sheet following article 31 of the same regulation is not needed to bring the product to the market, to transport or to use it. In accordance with our knowledge and assurance of our suppliers, polymers and all additives used for production of article do not contain substances (SVHC) from the candidate list and comply with Annex XVII REACH.

This document was published for the information purposes. Information provided here is based on our knowledge and experience. It isn't a guarantee of properties of a product, quality specification and can't be used as the basis for the claim. The guaranteed values of the corresponding technical parameters will be approved with each client. The product should be transported, stored and used according to existing regulating and Health and Safety Protocols.





# FOILS FOR HORTICULTURE

#### The highest quality garden foils

Multi-seasonal agricultural foils are used to cover the construction of tunnels widely used for covering crops in agriculture, horticulture and forestry. The use of agricultural foils accelerates the growth of plants and the increase in crop yields, while protecting against harmful UV radiation and other weather conditions.

Foil structure in conjunction with the appropriate choice of raw materials, stabilizers and decades of experience in the production of agricultural foils make our foils products which meet the highest requirements of users.

Prope	erties	Value								
Width*			6, 8	3, 12 m ± 0	,3m					
Wound length*	Wound length*			33mb ± 0,5mb						
Colour				4 seasonal	5 seasonal	6 seasonal				
Colour		blue	yellow	green	red	violet				

\*or other according to the agreement with the customer



#### FOILS FOR HORTICULTURE

# Polyethylene POOLFILM

One or two colors (blue-green) polyethylene pool covers allows the application of seals in small bodies of water (swimming pools, garden ponds, pools, ponds, etc.)

The foil is strong and resistant to penetration by roots from aquatic plants and mechanical damage. Flexibility, durability, ease of stacking and hermeticity-these advantages are emphasized by clients who chose our product.

Property	Value
Width*	6, 8m ± 0,3m
Wound length*	25, 33mb ± 0,5mb
Colour*	Black, blue and blue and green

\*or other according to the agreement with the customer

During the installation of the foil, it is important to remember to properly prepare the bottom of the tank - its surface should be even and smooth, without sharp stones, glass, etc. The foil is installed by spreading the foil over the prepared tank and then lowering it and laying it loosely starting from the deepest point of the excavation up to the edges of the tank.

Available film colours: black, blue, blue-green or other on request.

Standard foil size: 6m x 25m

#### FOILS FOR HORTICULTURE





WARTER Polymers

# SILAGE FOIL

Silage film is intended for ensiling green plants by covering formed prisms of properly shredded maize, grasses, beet leaves intended for silage for animal feed. The film is also used to cover silos and mounds of plant roots and tubers.

Silage films produced by our company are well-known to Polish silage growers and have for years enjoyed an excellent reputation due to their very high mechanical resistance, lack of aging effect of the film under the effect of solar radiation, excellent hermeticity and resistance to silage acids.

Thanks to special properties, the film restricts the access of air and light during the forage ensiling process and provides the right temperature needed for the ensiling process to take place successfully. Properly covering the heap also reduces the risk of contamination during adverse weather conditions, while maintaining the high nutritional value of the silage.

SILAGE FOIL black or black and white ensures the proper temperature for the ensiling process. Covering with the foil limits the access of water and air, as well as the escape of carbon dioxide acting as a silage preservative. Thanks to the use of black and white foil, the efficiency of ensiling is improved. The white layer reflects sunlight and prevents from reducing the nutritional value during the ensiling process, what takes place while using black foil. The task of the black layer is to maintain proper temperature inside the pile.

Application of the silage foils -covering of formed piles of properly crushed corn, grass, beet leaves for silage for animal feed.

The basic purpose of application of foils is limiting the access of air and light to ensure a proper ensiling process and to prevent the produced silage from dirt and the influence of atmospheric factors.

Property	Value
Width*	6; 8; 10; 12 m ± 0,3 m
Roll lenght [m]	0,75; 1,0; 1,25; 1,5 m
Wound length*	25; 33mb ± 0,5 mb
Colour	Black or black and white

\*or other according to the agreement with the customer



#### AGRICULTURAL FOILS



#### WARTER POLYMERS Sp. z o.o.

Koralowa 60 02-967 Warsaw, Poland www.warterpolymers.pl

#### **Production plant:**

Zglenickiego 5, 09-411 Płock Mob. +48 501 552 252 biuro@warterpolymers.pl

Edition 2022