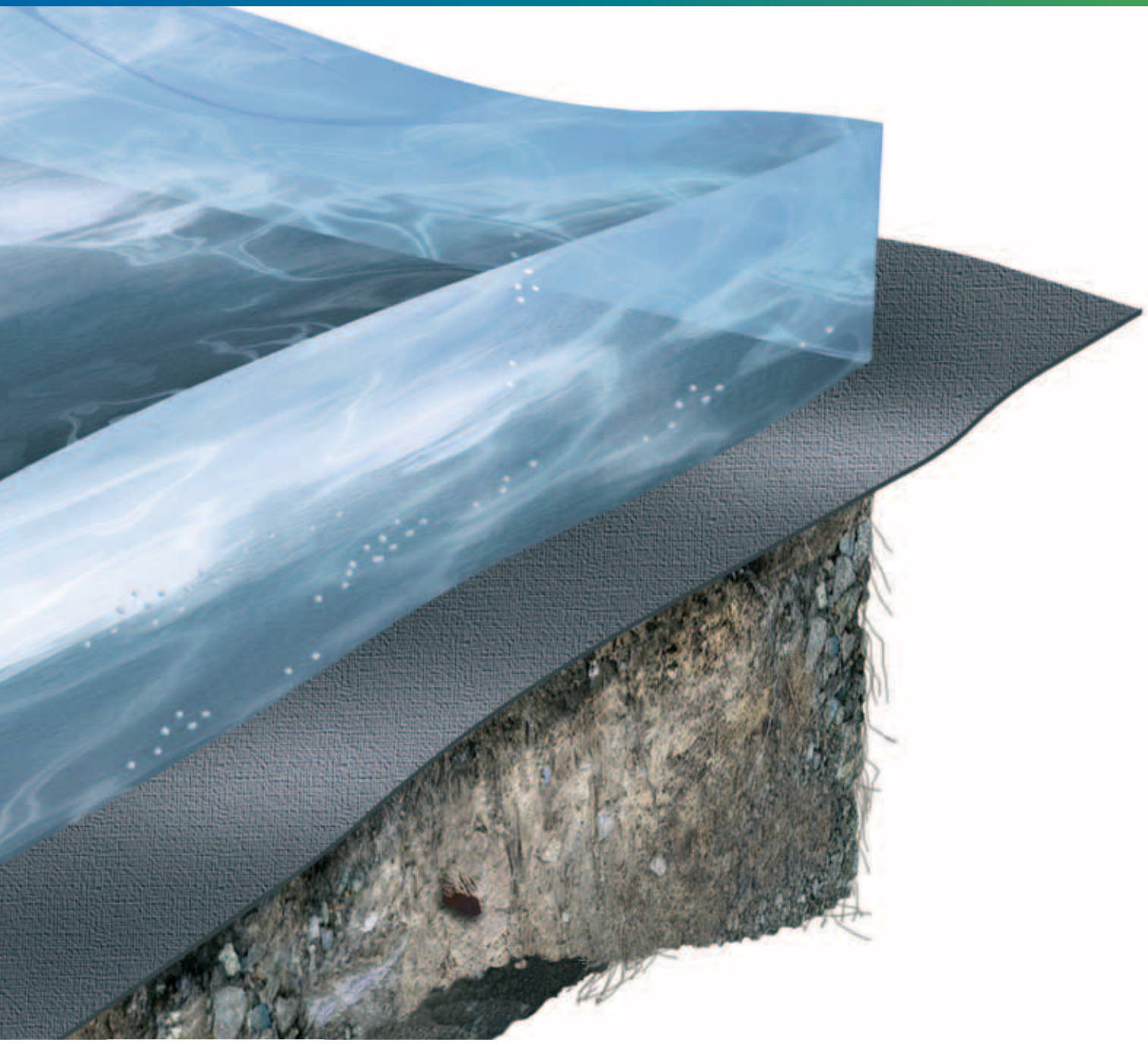
SealEco

Elastoseal EPDM Geomembrane System

Water containment in gardening, landscaping, aquatic ecosystems, industry, agriculture, civil engineering and infrastructure



ElastoSeal

Elastoseal EPDM Geomembranes - proven watertight performance

EPDM rubber membranes stay watertight for decades, in any water containment application. EPDM rubber is not affected by the environment and does not release any chemicals that can affect fauna, flora or ecological system.

Elastoseal EPDM Geomembranes do not affect and are not affected by the environment, and are therefore the ultimate barrier in all types of water and liquid containment.

The membrane is prefabricated to panels of any size and shape, from the small garden ponds to large water landscapes, irrigation reservoirs, landfill ponds- and cappings and industrial waste containments.

Elastoseal EPDM can be installed exposed to weather and atmosphere, or covered by soil or water. Strength, elasticity and service life remains untouched by mechanical stress, settlements temperatures, chemical and biological influence.

3500 m² Ornamental pond in Karaj, Iran.

Concern for the environment

EPDM membranes have no negative influence on nature. Fishes, aquatic or biological life in and around ponds and reservoirs are not harmed. The membrane is chemically stable and does not contain any additives or plasticizers that will be emitted or released during the service life, or when discarded or recycled.

EPDM liners reclaimed from old installations can be burned for energy production, placed on landfills or recycled for use in new EPDM products.

500 m² Fish farming tanks, Iceland.

50000 m² Industrial waste deposit, Swedish Steel AB, Oxelösund , Sweden.

80000 m² Waste water reservoir, Comurhex, Norbonne, France.

2500 m² Ornamental pond, Stockholm, Sweden.

55000 m² Irrigation reservoir, Villena Alicante, Spain

The EPDM polymer
- a superior material for water containment liners

EPDM is a superior material for geomembranes, as it is unaffacted by water, earth chemicals and microorganisms. The flexible rubber will accommodate earth movements and settlements and is resistant to root penetration and rodents. As far back as the late 60´s the first liner installations with SealEco liners were made. Many are still in service.

Elastoseal EPDM Geomembrane is a vulcanised rubber sheet that belongs to the product group polyolefines. Strength and elasticity are not affected by high or low temperatures and physical properties are practically unchanged over decades of service, without becoming brittle, cracking or shrinking.

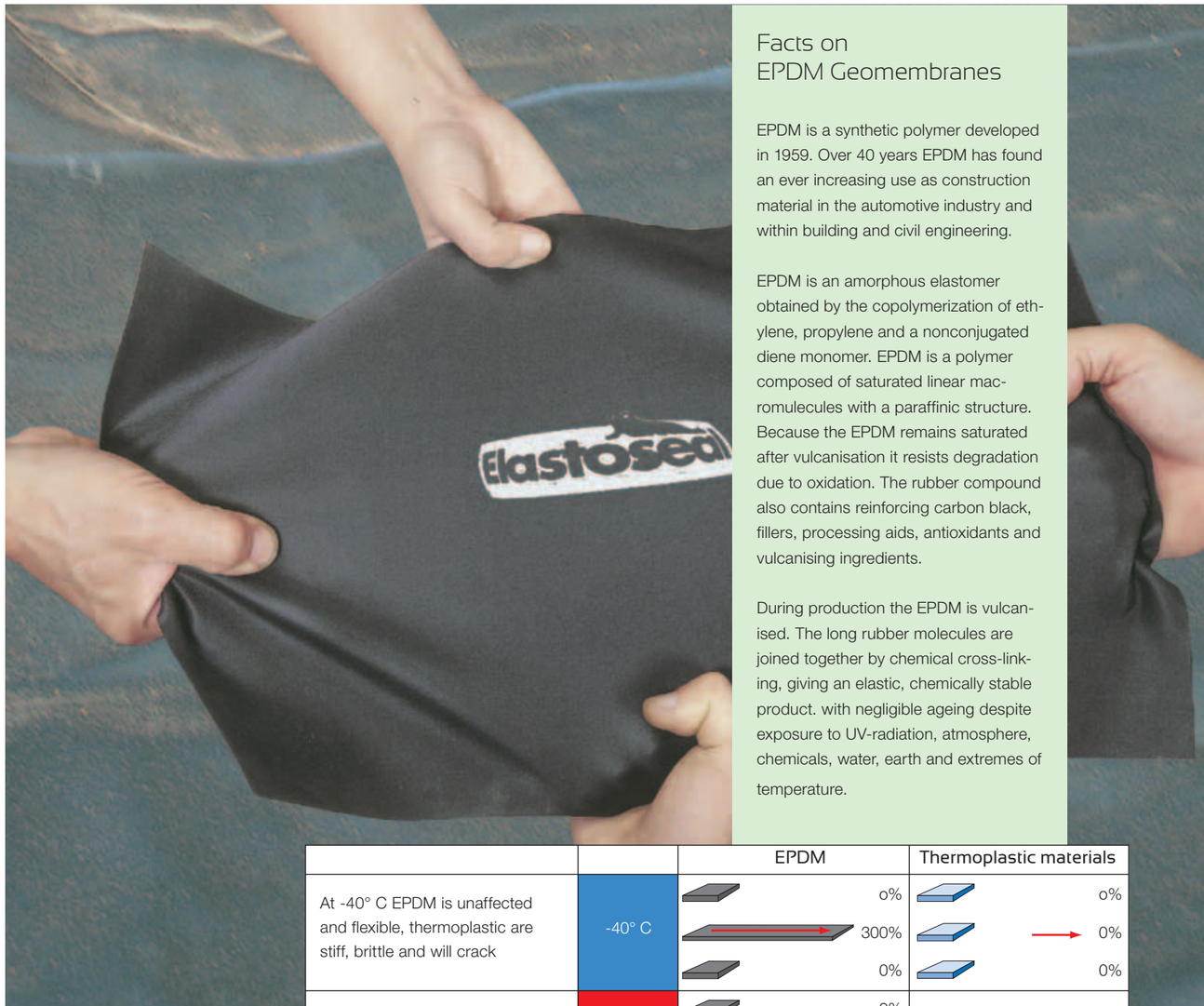
Viscoelastic properties

Rubber membranes have no yield point under elongation whereas thermoplastic materials become thinner, and will break at a low tensile force. Rubber membranes elongate to a maximum 300 % and can be strained in all directions at the same time (multiaxial response). Rubber membranes are not subject to “stress cracking”, whereas semi crystalline materials will break even at low stress, at points where the surface is scratched, contains defects or exhibit other weaknesses. Stress cracking occurs at elongations of 20 - 30 % of the yield point of thermoplastic materials (i.e. at 2 - 4 % elongation.) The risk of stress cracking on thermoplastic, semi crystalline materials will increase upon installation and service at low temperatures. A rubber membrane has viscoelastic properties, which means that the product can withstand an almost unlimited loading. At low loads the elastic properties are dominating and at high loads the viscose properties dominate. The material can be deformed to extreme limits and still return to its original size and shape. The opposite is true for the semi crystalline thermoplastic materials, where a concentration of load results in a permanent deformation or thickness reduction.

Characteristics of Elastoseal EPDM Geomembrane

- Elasticity and strength – irrespective of temperature the membrane will perform well under maximum working load.
- Multidirectional Strain – superior to earth settlements and movements.
- Puncture resistance with full flexibility up to maximum tensile strain.
- Lay flat characteristics – adheres to and provides close contact to any substrate.
- Unaffected by low temperatures and fully thermally seamable even in freezing conditions.
- Optimal surface friction characteristics – soft textured rubber surface provides high interface friction.
- Excellent UV and ozone resistance – superior service life also in exposed installations.
- High resistance to chemicals – the membrane provides chemical resistance required in waste water ponds.
- Large panels prefabricated to specified sizes according to site drawings. The result is reduced field seaming and short installation times.
- The Thermobond seaming technique with hot wedge allows for maximum installation control and quality.
- The Thermobond seaming with dual hot wedge allows for conventional air channel QC testing on site.
- Can be easily adhered to substrates of concrete, wood or metal and can be anchored with conventional methods.
- Protrusions and pipes are easily attached with prefabricated boots and hot air seaming.
- Damage is easily repaired, even after long service life and exposed installations.
- Rubber membranes have been used for over 50 years in lining applications and have the longest history of all geomembranes.
- SealEco has over 30 years of experience with rubber membranes in geotechnical applications.

EPDM Membranes can be strained in all directions at the same time, and up to 300 % elongation.



Facts on EPDM Geomembranes

EPDM is a synthetic polymer developed in 1959. Over 40 years EPDM has found an ever increasing use as construction material in the automotive industry and within building and civil engineering.

EPDM is an amorphous elastomer obtained by the copolymerization of ethylene, propylene and a nonconjugated diene monomer. EPDM is a polymer composed of saturated linear macromulecules with a paraffinic structure. Because the EPDM remains saturated after vulcanisation it resists degradation due to oxidation. The rubber compound also contains reinforcing carbon black, fillers, processing aids, antioxidants and vulcanising ingredients.

During production the EPDM is vulcanised. The long rubber molecules are joined together by chemical cross-linking, giving an elastic, chemically stable product. with negligible ageing despite exposure to UV-radiation, atmosphere, chemicals, water, earth and extremes of temperature.

		EPDM	Thermoplastic materials
At -40° C EPDM is unaffected and flexible, thermoplastic are stiff, brittle and will crack	-40° C	0% 300% 0%	0% 0% 0%
At +150° C EPDM is unaffected thermoplastics become liquids	+150° C	0% 300% 0%	
After decades of flexing, EPDM is unaffected. Themoplastics become thin and elongated, and eventually will crack	Elongations due to settlements and movements	0% 300% 0%	0% 40% 40%

Thermobond seaming technique - the obvious choice

The Thermobond seaming technique provides a fast, easy method for producing quality thermally welded seams. All site seaming is performed with a thermal hot wedge. Details like pipe connections, penetrations,
overflows and flashings are seamed with a hot air gun. The combination of an elastic, vulcanised rubber membrane, prefabricated boots, engineered details and reliable, uncomplicated thermal welding in all types of weather provides a maximum of security and a homogenous, elastic waterproofing membrane.

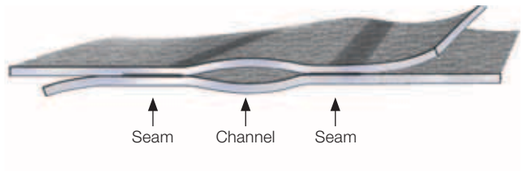
During production, a thin layer of a thermoplastic rubber (TPE) is laminated to one side of the membrane resulting in a vulcanised EPDM membrane which can be heat seamed. This technique offers the best of both worlds: the advantage of elastomers and the advantage of thermoplastics. The combination of Elastoseal EPDM and Thermobond seaming provides the superior service life and performance of EPDM and the thermal seaming performance of thermoplastic membranes.

Seams with air pressure test channels are produced with dual hot wedges. The dual wedge provides easy air pressure testing of seams both immediately after installation and after many years of service.

Prefabricated pipe boots, flashings and details are seamed with hot air guns. Quality control testing is provided by means of high pressure air lance testing.

The engineered system panels made to size

The Elastoseal Geomembranes are prefabricated, using thermal welding to form large, homogenous panels. The size of each panel is often 500 – 1500 sqm:s. The topography of the site, conditions and equipment will dictate the size and weight of each panel. Size and shape of each panel is individual, depending on shape, depth and size of the pond or water containment.



Engineered technical solutions can be prefabricated in advance in the fabrication plant, providing ready-made sections, pipe boots and special attachments.

SealEco Geomembrane QAS - a waterproof quality assurance system

The Elastoseal EPDM Geomembrane is a completely engineered system, where product, seaming, details, installation technique and site quality assurance guarantees a maximum of safety and performance. The traceability from production to fabrication and finally to installation is always guaranteed.

Organisation on the work site

Installers are always certified by SealEco. In every installation crew a quality manager is authorized.

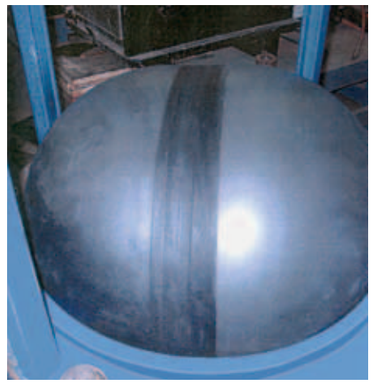
Supply logistics

Deliveries to the site are controlled for quality by ensuring packing, transport, storing of material on site and control of received goods is fully documented.

Control of earth works

Before the start of a lining installation the earth work and surface quality as well as compaction is approved by the installer.

The SealEco QAS, fully applied, gives a complete documentation and quality control over geomembrane production and installation.



Testing of multi axial strain according to ASTM D5617, on Elastoseal membrane and Thermobond seam.

The installers quality control records

Include drawings, marking of all panels, documentation of testing and final report to ensure that all materials can be traced back to manufacture.

Trial seam QC testing

The installer controls seam quality prior to each period or shift.

Destructive QC testing

Seam samples are taken each 150-300 m on all field seams. Seam strength is recorded.

Non destructive QC seam testing

Each dual wedge welded seam is tested with air pressure. All details are tested with air lance.

Repairs and patching

All repairs are fully documented and QC tested.

Cover materials placement

After completion of the lining installation the placement of cover soils and other geosynthetics is closely monitored to prevent damage to the membrane.

Installation
- of the Elastoseal EPDM Geomembrane

Prefabricated panels are unrolled, unfolded, positioned and seamed with automatic hot wedge welding machines, producing double tracks for air testing. The seaming speed is approx. 2-3 m/min. With 1000 sqm panels a three man crew will install 2-3 panels per day including positioning and quality testing.

Factory made pipe boots and flashing details with Thermobond hot air seaming technique is available in all sizes.

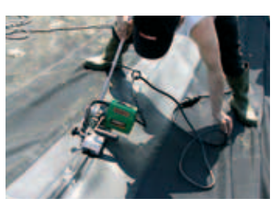
Installation steps

1. Excavation work. Slopes should be restricted to max. 45º. Stones, roots and debris are removed, and the surface should be compacted, and smooth. The bottom surface shall have a positive slope to provide gas/water drainage.

2. A geotextile (500 - 800 g/sqm) or a layer of sand, (3-5 cm), is applied.

3. The EPDM panel, sized according to site drawing, is supplied as a roll on a pallet. Each panel is marked with panel number, position and unfolding directions.

4. The panels are rolled out, unfolded and positioned. At sizes over 600 sqm:s a winch or fork lift is recommended. Normal panel size is 1000 sqm but sizes up to 3000 sqm:s have been used.

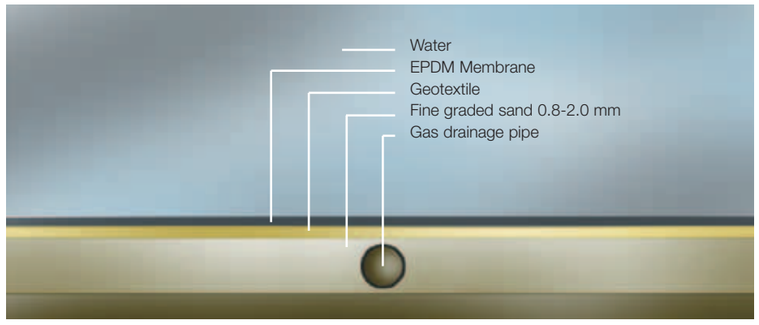


5. The panels are seamed with a dual hot wedge producing a seam with an air channel.

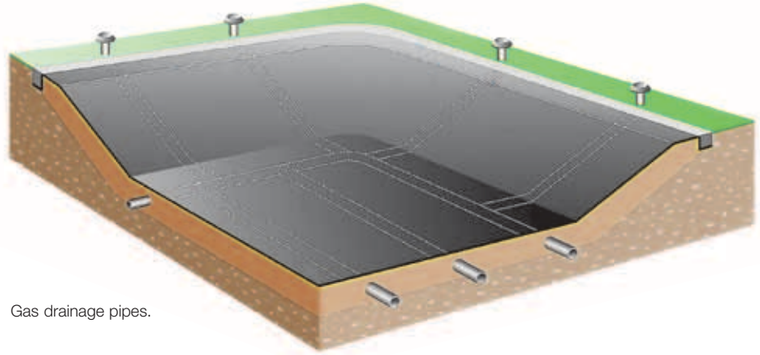
6. Each seam is tested with air pressure. Results are documented according to SealEco QAS.

7. The EPDM panels are placed in anchor trenches and backfilled as panel placement proceeds. Then the final beach design is constructed.

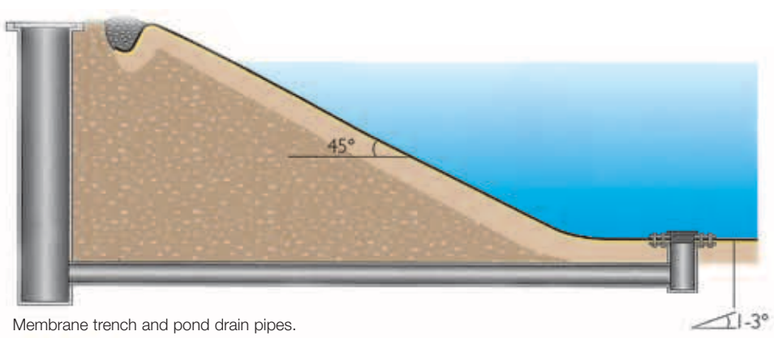
Comparison



Reservoir construction.



Gas drainage pipes.



Membrane trench and pond drain pipes.

Compared to traditional thermoplastic membranes the Elastoseal EPDM Geomembrane offers a trouble free, secure installation process.

• The seam quality and speed is independent of membrane thickness. Unlike thermoplastic materials which require surface melt, Elastoseal is heated to effect a bond. With large variations in thermoplastic membrane thickness, the required energy, and the correct speed of the hot wedge, can vary substantially from sheet to sheet when seaming thermoplastics.

• Elastoseal EPDM can be installed and seamed independent of season, with no effect on quality or workmanship. Fully seamable down to - 15º C.

• Elastoseal EPDM has low thermal expansion/contraction characteristics and is a flexible product that conforms to the substrate. Folds or wrinkles in the seaming area due to temperature variations are not a problem when seaming.

• Elastoseal EPDM has a textile surface finish offering high interface friction characteristics. Earth material will stay in place on slopes up to 24-27 degrees.

• Before ballasting a geomembrane, high winds often are a major problem causing uplift and damage. Unlike lighter thermoplastic membranes, Elastoseal EPDM lays flat and adheres to the soil surface preventing uplift.

• Penetrations and attachments to pipes are no problem with the Thermobond seaming technique and hot air guns. Pipe boots and collars can be made on site or factory produced in any size.

Applications
- of Elastoseal EPDM geomembranes

Landscaping and leisure
Parks and gardens
Golf courses
Zoological park
Cemetery ponds
Wetlands
Sports arenas
Lagoons for artificial snow

Agriculture
Irrigation reservoirs
Irrigation water tanks
Manure ponds
Fish farming
Anaerobic Digestion
Ensilage covers
Irrigation water canals
Floating covers

Environment
Ground water protection
Biological water purification
Hazardous waste containment
Spill and secondary containment
Landfills
Radon- and lead protection
Green gardens on terraces, decks

Infrastructure
Highway turnoff ponds
Ditch linings
Dams and embankments
Water conveyance
Hydroelectric dams
De-icing areas at air fields
Solar energy tanks

Industry
Portable water tanks
Process water tanks
Storage of sludge, ash, waste
Storage of polluted water
Fire fighting ponds
Floating covers
Cooling water ponds
Mining waste lagoons
Secondary protection
liners

Membrane Specification
- and physical properties

Property	Standard	Unit	Typical value	Specification
Thickness		mm		0,8; 1,0; 1,2
Density	ASTM D792	g/ml		1,15-1,20
Tensile Strength	ASTM D882/ISO 37	Mpa	8,2	7,0
Elongation at break	ASTM D882/ISO 37	%	450	300
Multiaxial stress	ASTM D5617	kPa	1650	1600
Multiaxial strain	ASTM D5617	%	150	130
CBR Puncture resistance	EN ISO 12236	N	850	
CBR Puncture strain	EN ISO 12236	%	250	
Tear resistance	ASTM D1004	N	45	40
Tear resistance	ISO 34	N	50	50
Properties after aging	121 C, 168 hrs			
Tensile strength	ISO 188/ISO 37	Mpa		Min 5,0
Elongation at break	ISO 188/ISO 37	%		Min 250
Water absorption	ASTM D471	%	0,1	Max 1,0
Cold Bend	ASTM D3786/ISO 812	C°		Min 63
Dimensional stability	ASTM D1204	%	0,5	Max 1,0
Hydrostatic Burst	ASTM D751, proc. A	kPa	500	480
Hydrostatic Puncture Resist.	ASTM D5514, proc. B			
25 mm sharp rocks		kPa	620	600
Critical Cone Height	ASTM D5514, proc. A	mm	90	
Interface direct shear	ASTM D5321			
Sand		Degr.	23	
Lean clay		Degr.	14	
Geotextile		Degr.	23	
Glacial Till		Degr.	26	

Specification values are for membrane thickness 1,20 mm

Property	Standard	Unit	Typical value
Thermobond seam properties			
Multiaxial stress	ASTM D5617	kPa	2100
Multiaxial strain	ASTM D5617	%	100
Shear strength	ASTM D6392	kN/m	7,2
Peel strength	ASTM D6392	kN/m	3,0

Specification values are for membrane thickness 1,20 mm

Chemical resistance
(1=Resistance, 2=Moderately resistant, 3=Not resistant)

Petrol, hydrocarbons	3	Amines	1
Mineral oils	3	Esters	1
Chlorine	3	Ketones	1
Ethers	2	Organic acids	1
Phenols	2	Soil chemicals	1
Inorganic salts	1	Landfill seepage	1
Animals oils	1		
Bases	1		
Organic salts	1		
Vegetable oils	1		
Diluted inorganic acids	1		
Alcohols	1		
Aldehydes	1		

CE marked according to: EN 13361 Geosynthetic Barriers CE-07, 0402- CPD-470302

Examples
- of installations with SealEco geomembranes


2001 Alsterbro Water Purification Plant, Alsterbro, Sweden 1.700 m²
Reed beds.


2001 AvestaPolarit, Avesta, Sweden 7.100 m²
Liner in industrial landfill for hydroxide sludge.


2002 Crematorium, Uccle, Belgium 1.000 m²
Ornamental lake.


2004 Kungsholmen, Stockholm, Sweden 1.000 m²
Ornamental lake.


2004 Renders, Malle, Belgium 6.000 m²
Biogas tanks and manure pit liner.


2004 Djupdalen Landfill, Karlstad, Sweden 4.800 m²
Areation pond for leachate water.


2004 Orlen Co, Plock, Poland 7.000 m²
Fire fighting pond at petro-chemicals storage area.


2005 Outo Kumpu AB, Avesta, Sweden 8.500 m²
Industrial slurry pond.


2005 Denys-Persyn Aquafin, Harelbeke, Belgium 2.500 m²
Water purification pond.


2006-2007 Swedish Steel AB, Oxelösund, Sweden 8.000+42.000 m²
Industrial waste deposit.


2006-2007 The Kolubara River Displacement, Lazarevac, Serbia 98.000 m²
Dislocation of a river at an open pit coal mine.


2007 Långbro, Stockholm, Sweden 2.500 m²
Renovation of 100 year old ornamental pond.


2007 de Groothe, Zwevezele, Belgium 1.300 m²
Areation and promotion pond at truck dealer.


2007 Trotting Raceway, Vaggeryd, Sweden 4.000 m²
Decorative pond at horse trotting raceway.

Our operations are conducted according to ISO 9001 and ISO 14000. Products and systems are tested according to applicable standards, supervised by independent laboratories, authorities and certified to local building codes in all the markets where we are active.

The Watertight Difference

Unique rubber membranes

Rubber is elastic, not plastic. Vulcanisation creates a stable cross-linked polymer structure with unsurpassed dimensional stability, elasticity and long term durability. Our systems involve patented, very competitive elastomeric materials and splicing techniques.

Fully engineered systems

30 years of close co-operation with architects, construction engineers and roofing contractors have resulted in complete and reliable solutions comprising rubber membranes, installation methods and compatible accessories; all backed by efficient technical service.

Focus on the environment

Environmental protection and care comes naturally to a supplier of products that contribute to the conservation of water, as well as the protection of goods and property from water leakage and moisture. Our rubber membranes are chemically stable and contain no problematic additives such as plasticisers, heat- or UV-stabilisers. They do not release any substances that cause allergies or hazards to the environment. Recycling options are available for membranes reclaimed from old installations.

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