

WELCOME

BENFELT BENTONITE LINERS



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WE THINK IN SYSTEMS



GEOFELT is the **comprehensive supplier**
in the geosynthetics market. This is our **strength**.

We use it quickly with flexibility and **technical competence**.



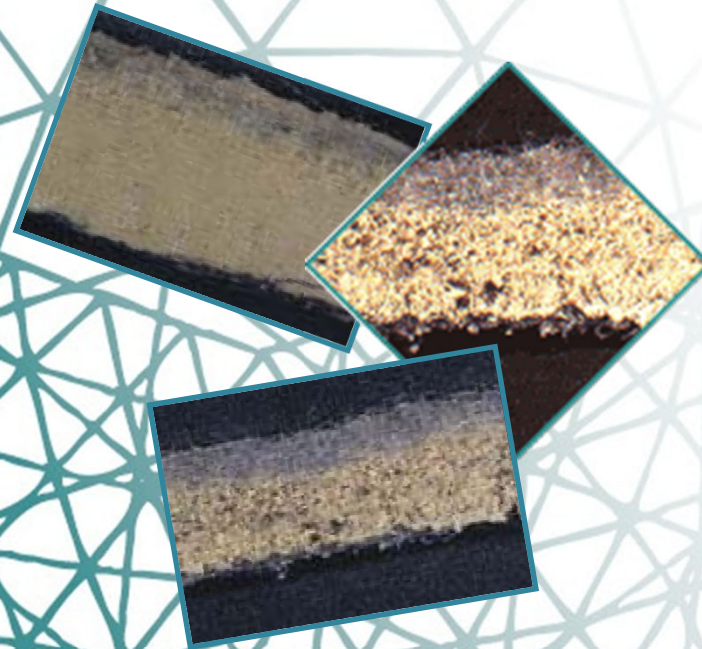
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BENFELT BENTONITE LINERS



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REQUIREMENTS OF BENFELT BENTONITE LINERS



low permeability against
water and gas

resistance against
oxidation of synthetic
components

behaviour after:
wet/dry-cycles
freeze/thaw-cycles
cation-exchange



long-term shear creep
behaviour

behaviour against plant
roots



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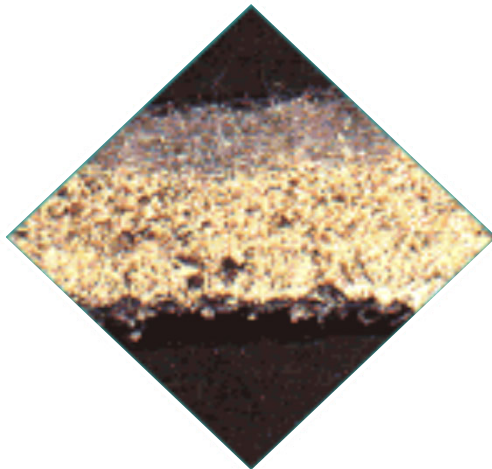


High technology for natural lining systems

BENFELT bentonite liners contain a high quality **bentonite clay** characterized by high swelling capacity and extremely low permeability. The bentonite clay in the liner absorbs water from the surrounding soil and hydrates.

Free swelling of the bentonite, however, is confined by the structure of the bentonite liner as well as the confining pressure generated by the cover material that is to be placed on top of the liner.

The result is an **extremely tight liner** of comparably low thickness, which seals the structure securely.



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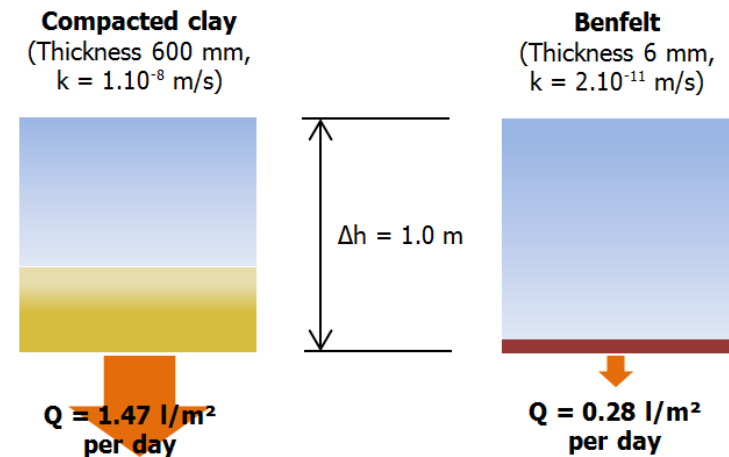
BENFELT BENTONITE LINERS



BENFELT bentonite liners are primarily used as a substitute for conventional compacted clay liners providing superior technical properties, and significant advantages in cost, ease of installation and performance.

BENFELT bentonite liners are:

- **environmentally friendly**
- **easy to install**
- **consistent quality**
- **defined and uniform hydraulic properties**



BENFELT BENTONITE LINERS



BENFELT - a composite made of two or more layers of geotextiles and bentonite, a clay mineral with excellent swelling characteristics. This combination of fibers and a naturally clay mineral gives the ultimate sealing layer with high long term shear strength. BENFELT is an effective barrier against liquids, vapour and gases.

BENFELT®



BENFELT CS®



BENFELT C®



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BENFELT BENTONITE LINERS



Applications

BENFELT can be used to seal all types of constructions, such as:

- base and surface seals of waste disposals (landfill caps)
- roads leading through protected areas
- canals and storage reservoirs
- tunnel and building sites, dams, canals and water sources
- filtering and storage reservoirs
- tank storage sites
- biotopes
- run-off basins
- composting plants
- and many more.



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BENFELT BENTONITE LINERS STANDARD

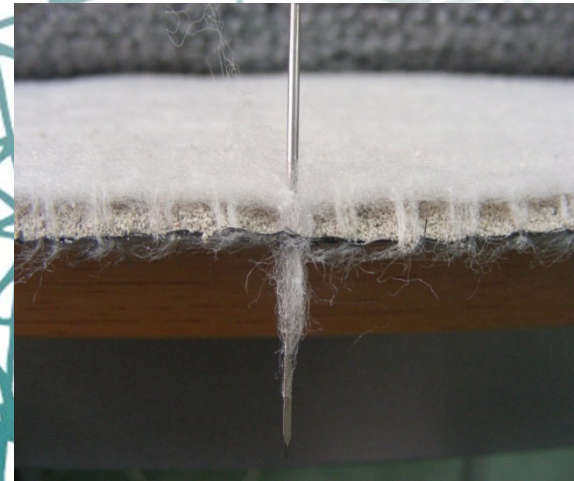


BENFELT 3, 3.5, 4, 4.5, 5

Geosynthetic clay liner based on bentonite placed between two layers of geotextiles.

Bentonite absorbs water and swells, its expansion is impeded by layer pressure.

That forms a highly light layer which provides sealing to construction.



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BENFELT BENTONITE LINERS STANDARD

BENFELT 3, 3.5, 4, 4.5, 5

ADVANTAGES OF BENFELT:

- **Small mass** minimizes cost of transport and is harmless for the environment
- **Quick and easy installation** does not require highly qualified personnel, expensive welding or use of heavy sealing equipment
- **High sealing performance** with predefined permeability
- **Self-restoring capability** in case of small perforations, due to swelling properties
- **Width up to 5,10 m** reduces loss on connections
- **Verified quality** enhances constructions safety



GBL Geofelt Bentonite Liners		
BENFELT 5		
Mechanically bonded composite, consisting of pulverized or granulated bentonite, embedded and fixed between two layers of geotextile.		
Mass per unit area (average)		
Carrier Layer	PP Woven	100 g/m ²
Inlay	Na-Bentonite	5.000 g/m ²
Cover Layer	PP Nonwoven	200 g/m ²
Total Product Weight	ASTM D 5993	5.300 g/m ² (+/- 10 %)
Bentonite Properties		
Montmorillonite Content	CLR 33	≥ 75 %
Swelling Capacity	ASTM D 5890	> 24 ml/2g
Moisture Content	DIN 18121-1 / 18121-2	max 12 %
Physical Properties of the Composite		
Thickness	EN ISO 9863-1 / 9863-2	7,4 mm
Index Flux	ASTM D 5887	≤ 3,0 × 10 ⁻⁹ m ³ /m ² /s (6,0 × 10 ⁻⁹ m ³ /m ² /s)
Permeability	ASTM D 5887	≤ 1,8 × 10 ⁻¹¹ m/s (3,6 × 10 ⁻¹¹ m/s)
Tensile Strength MD	EN ISO 10319	10,4 kN/m (- 10 %)
Tensile Strength CD	EN ISO 10319	8,5 kN/m (- 10 %)
CBR Puncture Strength	EN ISO 12236	1,6 kN (- 10 %)
Peel Strength	ASTM D 6496	60 N/10 cm (-10 %)
Durability:		
-cover in installation day		
-durability 25 years at natural base and pH between 4 and 9 and temperature < 25°C.		
Standard Roll Dimensions		
Length/Width		40 x 5,1 m
<div> <div> CE <small>1023 - CPO - 0366 F</small> </div> </div> <div> GEOFELT GmbH Rainerstrasse 14 T: +43 (732) 60 98 60 F: +43 (732) 60 98 60-8 A-4020 Linz/Austria www.geofelt.com </div>		



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BENFELT BENTONITE LINERS

BENFELT C



BENFELT C

Fully needle-punched composite, consisting of pulverized or granulated bentonite, embedded and fixed between two layers of geotextile for **application between concrete wall and charge**, which guarantees impenetrability of bentonite mats.

The mat absorbs water from surrounding soil, but its expansion is impeded by layer pressure. In consequence this leads to the formation of a highly tight layer that **provides sealing to construction elements**.

BENFELT C is delivered to the building site at different dimensions.

Widths from 1,25 m to 5,10 m
and roll lengths from 5,10 m to 40 m.



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BENFELT BENTONITE LINERS

BENFELT CS



BENFELT CS

Is an isolation, waterproofing system which consists of two complementary components:

- Geosynthetic barriers: PE, PP, PVC permanently protects against penetrating water and toxic substances
- Geosynthetic clay liner: water causes the bentonite to hydrate and thus renders the GCL impermeable, based on:
 - Nonwoven as cover layer
 - Bentonite
 - Woven as carrier + reinforcement layer



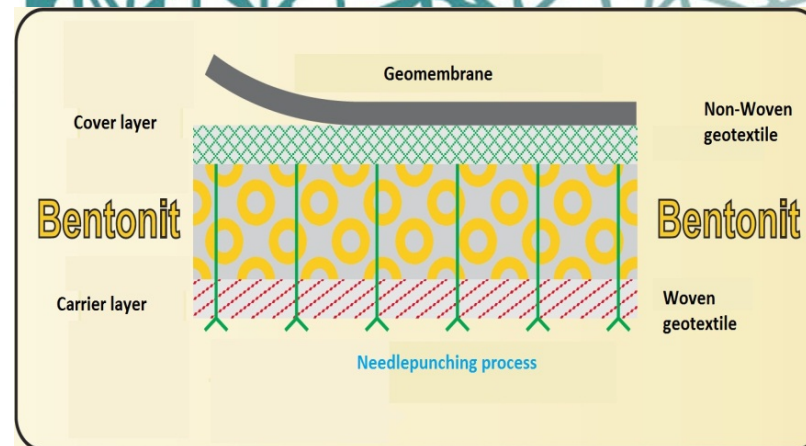
BENFELT BENTONITE LINERS

BENFELT CS



BENFELT CS product is made through the process of:

- Needling process – a woven material is caught by special needle, hooked through bentonite and nonwoven layer, which gives very tight product.
- Gluing process – is based on connection of the needled bentonite mat with geosynthetic barrier



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BENFELT BENTONITE LINERS

BENFELT CS



BENFELT CS – has additional ADVANTAGES:

- Upgraded mechanical parameters
- Extremely tough
- Double lining system
- Self healing properties
- Puncture resistance
- Environment safety
- Verified and proven quality



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BENFELT CS - ACCESSORIES



BENFELT STRIP – bentonite sealing strip

Used for the sealing of dilatation joints in the building engineering and water structures. Has the power to expand at contact with water and to increase its volume up to 200 % what creates safe protection against water action even from the point of view of pressure.

BENFELT PASTE MQ 100 Master – bentonite paste

Bonding and sealing product manufactured on the base of bentonite. Eliminates unevenness of the bed, ensures perfect contact with the concrete surface and the sealing strip. The outstanding feature is a high elastic adhesive power and ability to expand at contact with water up to 90 % of its volume.

BENFELT PASTE MQA 150 – bentonite paste

A one-part permanently plastic sealing with high elastic adhesive power to numerous materials, such as plastics, wood, metal, rubber, building materials, etc.



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BENFELT BENTONITE LINERS CERTIFICATES



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REFERENCES



Tirana East Gate Shopping Mall/ Albania

BENFELT Bentonite Liner

Application: Building Construction



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REFERENCES

Reservoir TGV Avignon/France

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Application: Reservoirs & Canals



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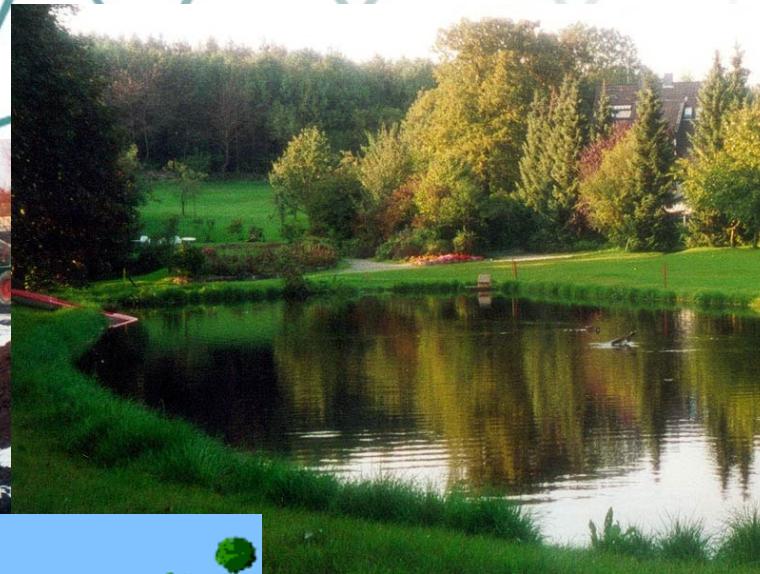
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REFERENCES

Golfpond GC Juliana/Germany

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Application: Pond Construction



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REFERENCES

L235 Pinkafelder Landesstraße/ Austria
"Sixtina Well" to the Seeraubach
Ground Water Protection

BENFELT CS Bentonite Liner

Application: Canal Construction



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REFERENCES

Reservoir Nördlingen/Germany

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Application: Reservoir Construction



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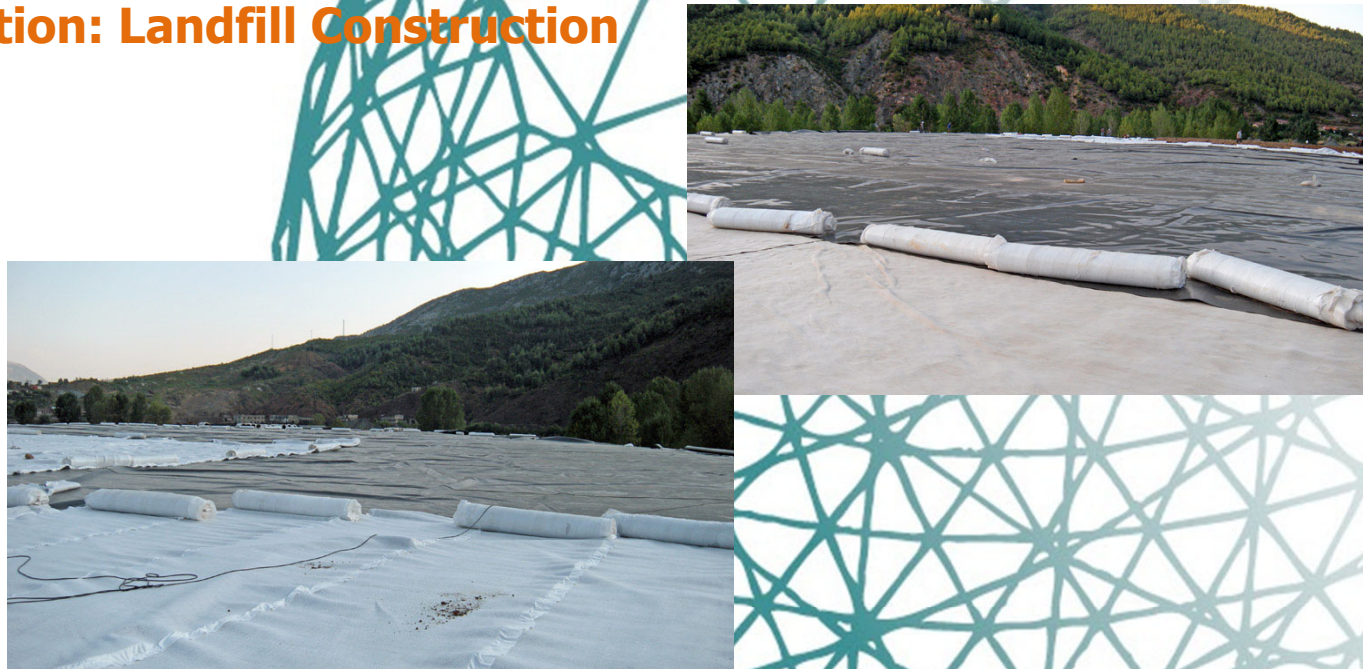
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REFERENCES

Landfill Copper Mine Rubik / Albania

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Application: Landfill Construction



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Landfill Crkviste, Pakrac/Croatia

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REFERENCES



Ash Landfill Tuhkamäki – Naantali/Finland

BENFELT Bentonite Liner

Application: Landfill Construction



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geofelt geosynthetics

invisible -
but everywhere



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GEO-LOGICAL**



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