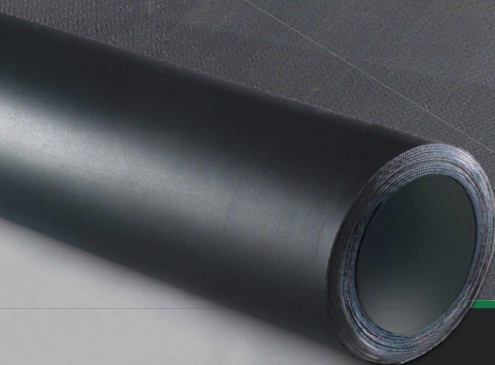



# LINING SYSTEMS

GEOMEMBRANES  
MADE FROM  
PE, FPP UND TPO





# Lining Systems

## Competence in Plastics

AGRU Kunststofftechnik GmbH is a high-performance Austrian company, operating in more than 80 countries. AGRU proves its competence and innovation in development, production and distribution of high-quality thermoplastic products. The core business is the production of a first-class range of pipes, concrete protection sheets, semi-finished products and liners.

The product group Lining Systems offers a wide range of geomembranes made of PE, FPP and TPO. These products have proven themselves in numerous applications and are used for hydraulic and landfill engineering, groundwater protection and in tunnel construction.

## Quality

The most modern machinery and well-trained staff ensure the production of highest grade products.

A high quality is ensured by the quality management system based on ISO 9001. On this basis the product requirements are defined according to national and international regulations. The compliance with these requirements is permanently checked by means of a production control. The quality management is additionally supported by a high-quality awareness of each employee.

Regular external audits by accredited and qualified testing institutes, which are performed in regular intervals, confirm the compliance with these requirements. The high quality level is also documented by many approvals for geomembranes. The described quality measures ensure our customers, that AGRU's geomembranes meet the high requirements for various applications.





## Producing

AGRU is manufacturing geomembranes for over 30 years with flat die and downstream calendering according to the highest quality standards. In addition to the established HDPE liner, AGRU is producing a variety of liners for different applications made of other polyolefins.

The modern machinery of AGRU allows the production of coextruded liners (multi-layer), handling of reinforcement layers and bonding of geotextiles to the liner. Geomembranes are offered up to a width of 7 m with a thickness from 0.5 mm up to 4.0 mm.

- **HDPE** High Density Polyethylene
- **LLDPE** Linear Low Density Polyethylene
- **VLDPE** Very Low Density Polyethylene
- **FPP** Flexible Polypropylene (PPflex)

## Structured Liners

As well as producing liners with a smooth surface, AGRU also manufactures structured liner surfaces. The texture is embossed during the manufacturing process and the spikes are an integral part of the geomembrane. In addition to MST/MSB liners, which have proven their reliability for many years, we also offer special structures such as spikes and drainage studs.

The AGRU HighGrip liner is the newest development in the field of structured geomembranes. The position of the spikes was relocated and optimized and a totally new form was developed. The new HighGrip structure leads to a uniform, consistent surface with high friction values with many typical interface materials such as geocomposites, geotextiles, GCL's and soils. This was tested and verified in several surveys. Due to the new structure, the practicable slope angles are higher and the storage capacity of landfills and artificial ponds can be increased accordingly.

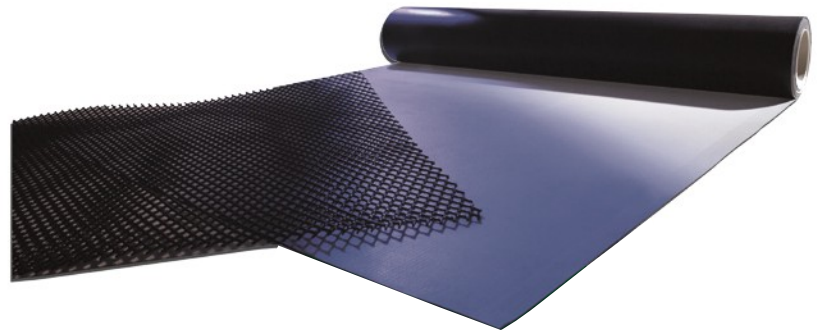




Canal lining



Fire water pond



## Hydraulic Engineering

By producing high-quality liners, pipes and pipe components, AGRU makes its contribution to secure the availability of clean water and green power supply:

- Lining of channels for power plants
- Lining of water storage ponds for hydropower stations
- Lining of artificial ponds, for collecting rain water as well as potable water
- Lining of artificial water reservoirs for snow production
- Artificial ponds for landscaping



Potable water reservoir close to Perviccia

Over the years AGRU PE liners have proven their ability to work as an excellent sealing material, especially in tough environments as for example the use in water reservoirs for artificial snow production.

The aim of every winter tourism manager is a winter season, which is as long as possible. This requires the production of artificial snow. AGRU liners and piping systems are therefore most important for the modern winter sports industry, especially for the storage and the transport of the needed water.

The supply of potable water in sufficient quality is one of the challenges of the 21<sup>st</sup> century. Due to the construction of large scale water ponds, water can be stored in the winter season to eliminate or at least to mitigate the results of floods. In dry periods the stored water can be used for the supply of potable water as well as for agricultural applications.

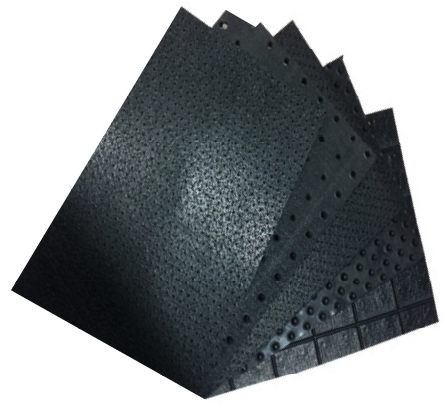




Sealing of landfill base

## Landfill Construction

AGRU HDPE liners are used for the base sealing and the capping of landfill sites. Substances endangering a body of water are encapsulated and the flow of leachate is prevented. Due to the capping, the infiltration of clean rain water is avoided.



## Advantages of AGRU HDPE liners

- Excellent chemical resistance
- High resistance to stress cracking
- High shear values, because of the structured surface
- Complete quality monitoring



Realization of steep slopes





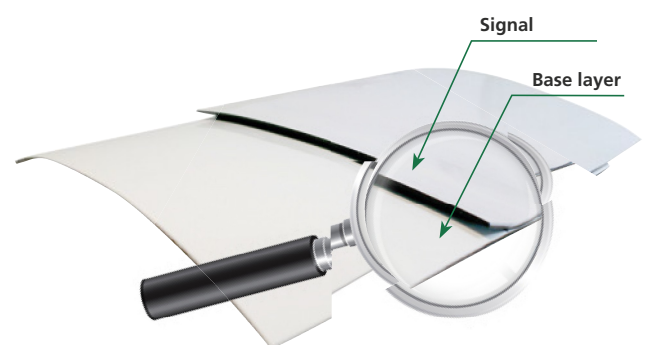


## Tunneling

Due to the high flexibility of the AGRU VLDPE tunnel liner guarantees a perfect adjustment to the tunnel structure, an easy installation and leak tight joints can be ensured. The material has an excellent resistance to aggressive soil and mountain water.

## Benefits of AGRU tunnel liners

- Complacence with ZTV-ING, RIL 853, ÖBV and SIA 272 regulation
- Signal layer as indicator for mechanical defects
- Thickness of the signal layer is a quality criteria, if requested AGRU tunnel liners fulfill  $\leq 0.2$  mm
- Base layer made of black VLDPE fulfills the mechanical and physical requirements



## Easy-Fix-System

The modern production machinery of AGRU allows to bond a geotextile on the back of the VLDPE tunnel liner.

- Width up to 4 m possible
- Installation with automated scaffolding
- No thermal stress to the VLDPE tunnel liner during the installation

## Installation procedures

- Velcro disc / profile
- Hot-Air-mounting system
- Hot-Melt-adhesive system



## Drainage Pipes

Drainage pipes are used for collecting and discharge of ground and surface water in tunnel, landfill and road construction. As a result, drainage systems contribute significantly to the quality and long-term protection of constructions. Additionally they increase the general reliability and safety. Drainage pipes have to be designed with adequate load bearing strength and according to local conditions. Neglecting a high quality and durable drainage system means compromising the complete construction.

In addition to the production of geomembranes the company AGRU is one of the leading manufacturers of piping systems and sheets for the most demanding applications. For drainage pipes AGRU recommends to use a fully welded system (heated tool butt welding or electro fusion welding) and solid wall PE- and PP pipes.



## Advantages

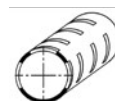
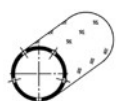
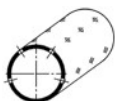
- Break-proof pipes thanks to a high toughness and flexibility
- Excellent ring stiffness for maximum dynamic and static loads
- High resistance against lechate and soils
- Optimum flow rate due to smooth inner surface

## Supply range

AGRU offers a full product range for drainage pipes made of high quality PE 100 (polyethylene) and PP (polypropylene) materials. Solid wall pipes, adjusted to the required load bearing capacity are offered:

- Perforated or slotted pipes possible
- Dimension 63 mm up to 400 mm
- Fully or partly (2/3 perforated) perforated pipes available
- Bright coextruded inner layer possible (inspection friendly)

### SUPPLY RANGE



#### Drainage pipes

2/3 perforated

extruded + drilled

#### Drainage pipes

fully perforated

extruded + drilled

#### Drainage pipes

2/3 slotted

extruded + slotted

#### Drainage pipes

fully slotted

extruded + slotted

## Accessories

Besides the drainage pipes AGRU also offers a full range of pipes and fittings. Additionally AGRU can also provide the required welding equipment:

- Extensive fitting programm
- Electrofusion fittings
- Welding Machines and Accessories



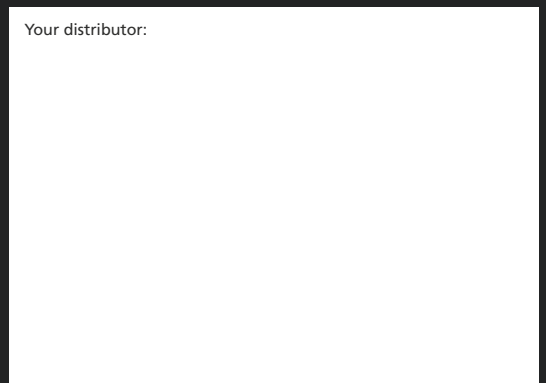
High-quality drainage pipes from AGRU, plus matching fittings and electro fusion fittings, can ensure a permanently effective drainage system. The reliable collection and drainage of lechate and groundwater ensures the highest level of security and long-term stability of infrastructures.





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Your distributor:



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