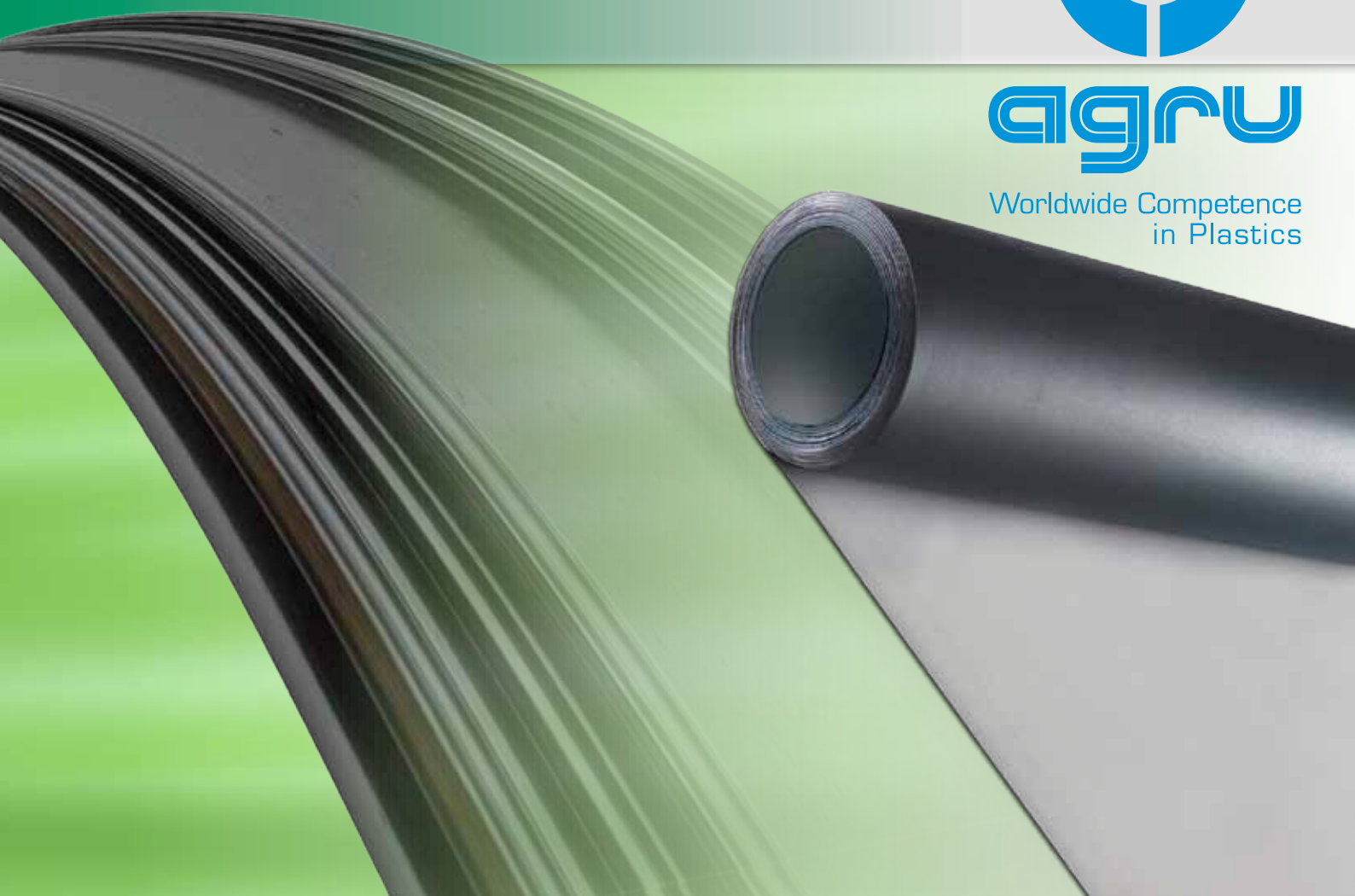


LINING SYSTEMS



agru

Worldwide Competence
in Plastics





Worldwide 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 special 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 to our customers, that AGRU's geomembranes meet the high requirements for various applications.

Business Unit Lining ...

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... we are looking forward to your call!

GUIDANCE AND PRODUCT RANGE

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

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

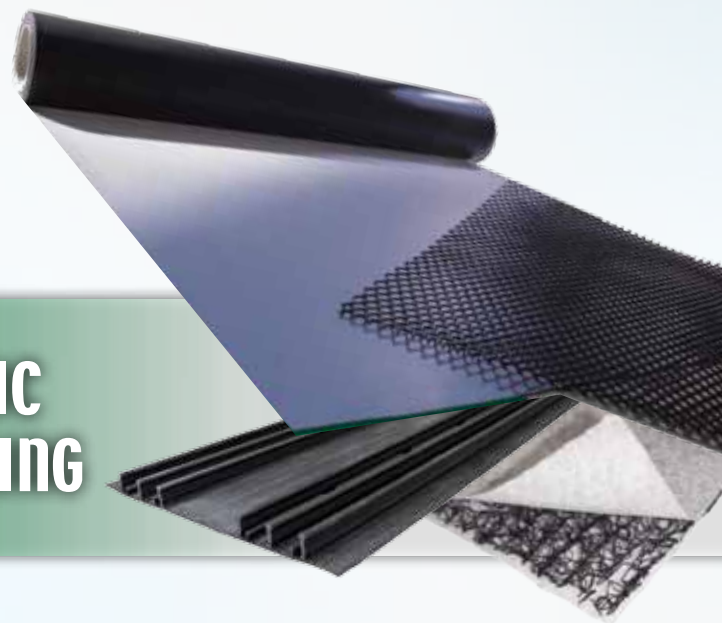
The modern production machinery of AGRU allows the production of coextruded liners (multi layer), handling of reinforcement layers and bonding of geotextiles to the liner. Geomembranes are offered up to a width of 7 m and a thickness of up to 5 mm.





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

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



HYDRAULIC ENGINEERING



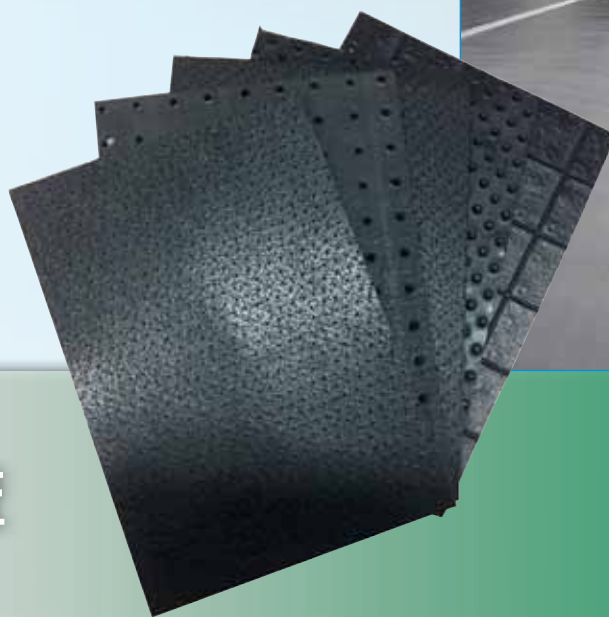
Over the years AGRU PE liners have proven their ability to work as an excellent sealing material, especially in tough environments as for example the use at water reservoirs for artificial snow production.

The aim of every winter tourism manager is a winter season, which is as long as possible. 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 provision of potable water in a sufficient dimension is one of the challenges of the 21st Century. Due to the construction of large scale water storage 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.

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.

AGRU uses a flat die calendering process to produce smooth and structured liner. We search for the most efficient way to solve critical problems and stability issues with the wide product range of structured liners.



LANDFILL SITE

Certifications:

- ÖNORM (Austria)
- BAM (Germany)
- DIBt (Germany)
- ASQUAL (France)
- KIWA (The Netherlands)
- GOST (Russia)

Advantages of AGRU HDPE liners:

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

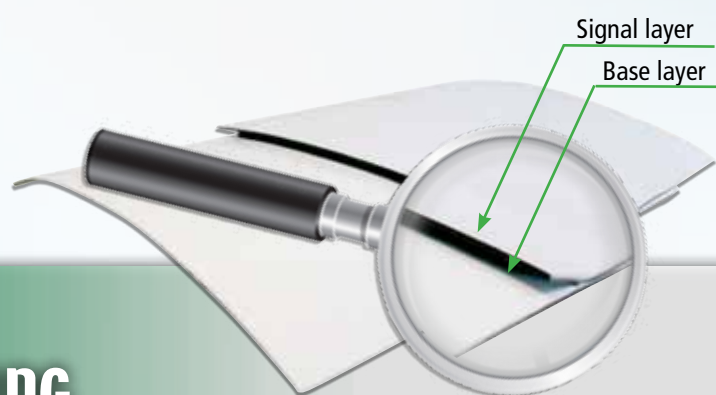




Due to the high level of flexibility the AGRU VLDPE tunnel liner guarantees a perfect adjustment to the tunnel structure, an easy installation and leak tight joints. The material has an excellent resistance to aggressive soil and mountain water.

Benefits of AGRU tunnel liners:

- According ZTV-ING, RIL 853, ÖVB, ...
- Signal layer as indicator for mechanical defects
- Thickness of the signal layer is a quality criteria, if requested AGRU tunnel liner fulfill ≤ 0.2 mm
- Base layer made of black VLDPE fulfill the mechanical and thermal requirements



TUNNELING



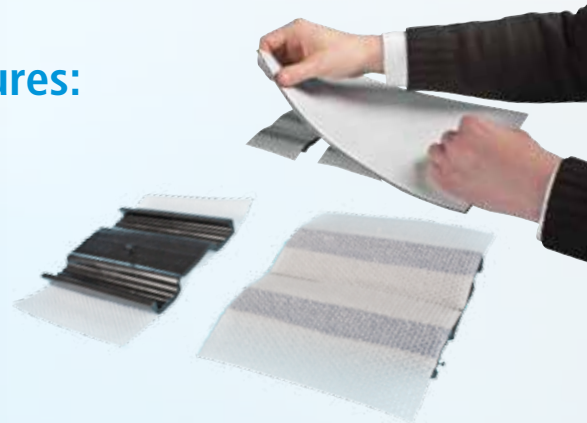
Easy- Fix- System:

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

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

Installation procedures:

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



There are different drainage systems (undrained, partially drained, or fully drained) that are used in landfill sites or tunnels. The design has to be adjusted to the local and structural conditions.

The choice of the right material is essential, because of the settlements, heat generation or aggressive media. Therefore we recommend the use of welded PE or PP drainage pipe systems (butt welding or usage of e-cupplers).

The abdication of a permanent operational drainage system in mountains and landfills is equivalent with the endangering of the overall system.

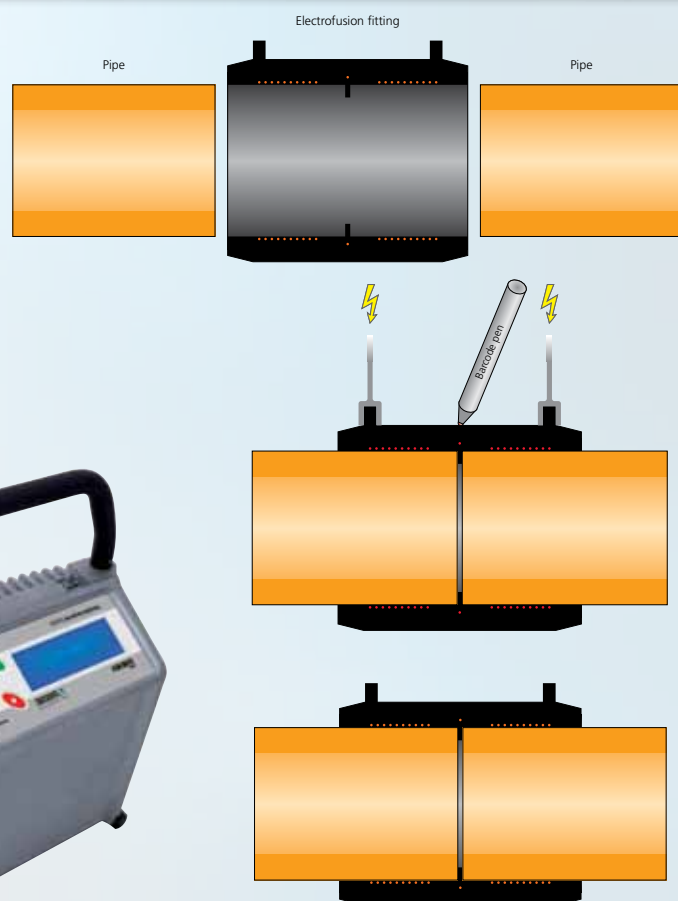


DRAINAGE PIPES

Accessories

In addition to pipes and fittings AGRU also supplies matching tools for an optimal installation.

- Welding machines
- Re-rounding tools
- Scrapping devices
- Pipe clamps



High Temperature Resistant Liner

AGRU for many years has supplied PE pipes for hot water applications. With this vast knowledge and experience AGRU developed the first high temperature resistant (HTR) PE geomembrane in the market-place. It looks, feels and welds like every other HD-PE geomembrane. Additionally HTR geomembranes deliver real benefits, including:

- Temperature resistance up to 100 °C
- Long lasting performance and durability
- Excellent long-term strength and creep resistance



○ LINING SYSTEMS

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Illustrations are generic and for reference only.

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