

Concrete Protective Liners

THE LATEST INNOVATION IN
AGRU'S CPL PRODUCT LINE





The Plastics Experts.

AGRU offers high quality concrete protective liners (CPL) that offer protection against aggressive and abrasive media as well as groundwater intrusion. AGRU CPL products are part of the AGRUSAFE system and offer unique benefits including high-quality manufacturing with top-grade polymers, fully integrated studs for unparalleled safe mechanical anchoring, and industry-leading backpressure and pullout resistance.

The AGRU success story has been unfolding for seven decades. Founded in 1948 by Alois Gruber, who set the company on the course for plastic manufacturing, AGRU has become one of the world's most important single-source suppliers for piping systems, semi-finished products, concrete protective liners, and lining systems made from engineered plastics. We use only top-grade thermoplastic polymers as our raw materials. When it comes to application-technical consulting, we are your best partner in the field.



Quality

The AGRU quality assurance system is compliant with multiple international standards and AGRU's procedures help ensure that products meet or exceed these international standards, on an ongoing basis. The start-to-finish attention to quality ensures that the products meet and beat the strictest technical specifications, providing safe operation within industrial, water, and wastewater infrastructures.

AGRU Concrete Protective Liners

Reinforced concrete is the most common and versatile construction material of the 20th and 21st centuries. But as robust as reinforced concrete may seem, water, gases, and chemicals often find a way to corrode and infiltrate the concrete, thus compromising the stability and integrity of structures. AGRU's concrete protective liner (CPL) products are specially designed and produced with chemically resistant thermoplastics to prevent concrete corrosion and water intrusion; and therefore, significantly extend the life of structures. CPL products include AGRU's traditional Sure-Grip® CPL as well as the newly innovated AGRU-Ultra Grip® CPL. Each product offers a unique set of benefits making them well-suited for specific applications.

Reliable Waterproofing

Manufactured using low-permeability thermoplastics like high-density polyethylene.

- High-quality manufacturing processes at AGRU ensure optimal liner integrity for extended service lifetimes.
- Extremely low-permeable raw materials used in AGRU CPL minimize leaks and protect the underlying concrete from water exposure.
- AGRU CPL products are known for their durability and reduced risk of cracking from accidental impacts or environmental related stresses.

Effective Protection Against Concrete Corrosion

Firmly sealed surfaces keep reinforced concrete in like-new conditions for years.

- Liner sections are joined by welding, which provides permanent and reliable joints
- Welding technologies supported include butt welding, extrusion welding, hot wedge welding, and hot gas welding
- An optional signal layer can be added for improved damage and/or wear detection.

Innovative Anchoring System

AGRU CPL features unique V-shaped embedment anchors which are integrally formed onto the liner during the extrusion process to provide secure mechanical anchoring of the concrete protective liner to the concrete.

- Liner includes unique anchor design and placement for optimum anchoring into concrete surfaces
- A variety of anchor designs are available to meet specific project requirements
- The Ultra Grip line offers enhancements to the anchor design for superior backpressure resistance.

Solutions for Every Requirement

Available in a wide range of materials including PP, PE, PE-el, PVDF, and ECTFE. AGRU CPL products are suitable across a wide temperature and chemical range.

- Suitable for both cast-in-situ application and precast concrete products
- Available in a wide variety of thicknesses, dimensions, and colors to meet practically every project's specific needs
- Effective in both renovated and new structures.

Unsurpassed Cost Efficiency

Easy installation and outstanding product quality leads to time and cost savings

- Innovative profiles speed installation time and improve installation quality
- Available in wide liner formats to minimize seaming requirements
- Once lined with an AGRU CPL product, concrete surfaces become essentially maintenance-free with a significantly increased life expectancy.

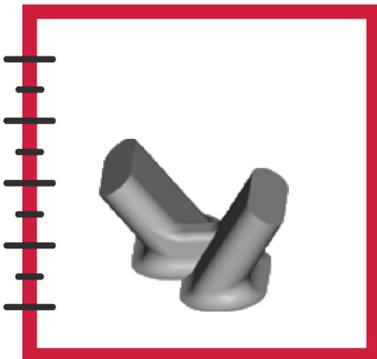


Sure-Grip

Sure Grip® - The Industry Standard

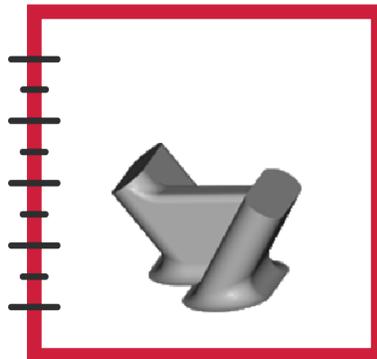
AGRU CPL has been headlined by Sure-Grip for over 30 years. In that time, Sure-Grip has been installed in thousands of projects worldwide as a long-term alternative to spray-applied concrete protection products. In addition to Sure-Grip's standard 13 mm anchor height, it is also available in Type 571. Sure-Grip Type 571 boasts a 19 mm anchor height, which often offers an advantage for rehabilitation projects when grout flow or additional structural support/reinforcement is needed. During the past several years, AGRU has innovated on Sure-Grip's design to create Ultra Grip.

AGRU Sure-Grip®
Type 560



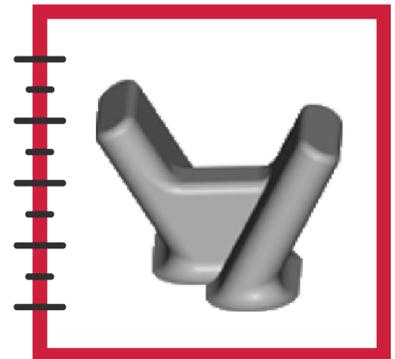
Anchor height 13 mm

AGRU-ULTRA GRIP®



Anchor height 13 mm

AGRU Sure-Grip®
Type 571

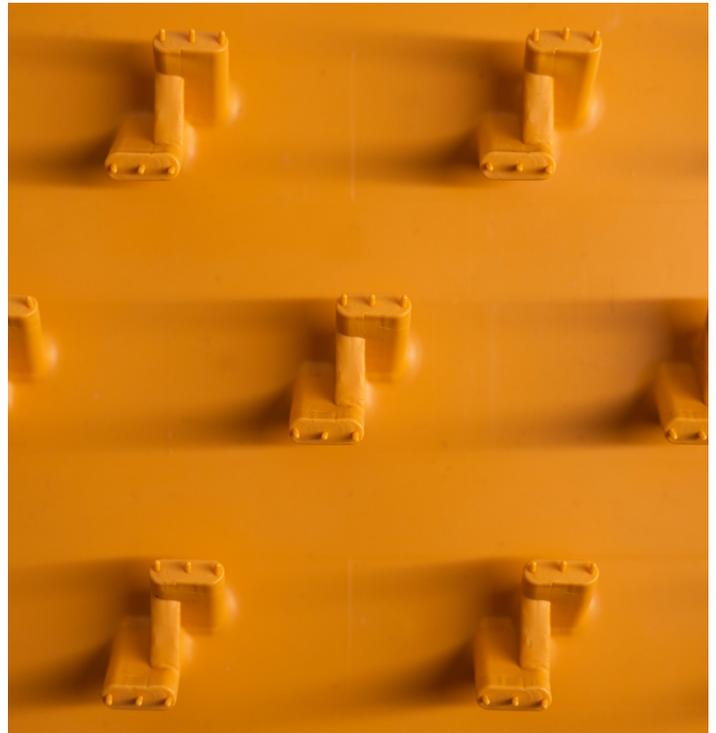


Anchor height 19 mm

Ultra Grip®

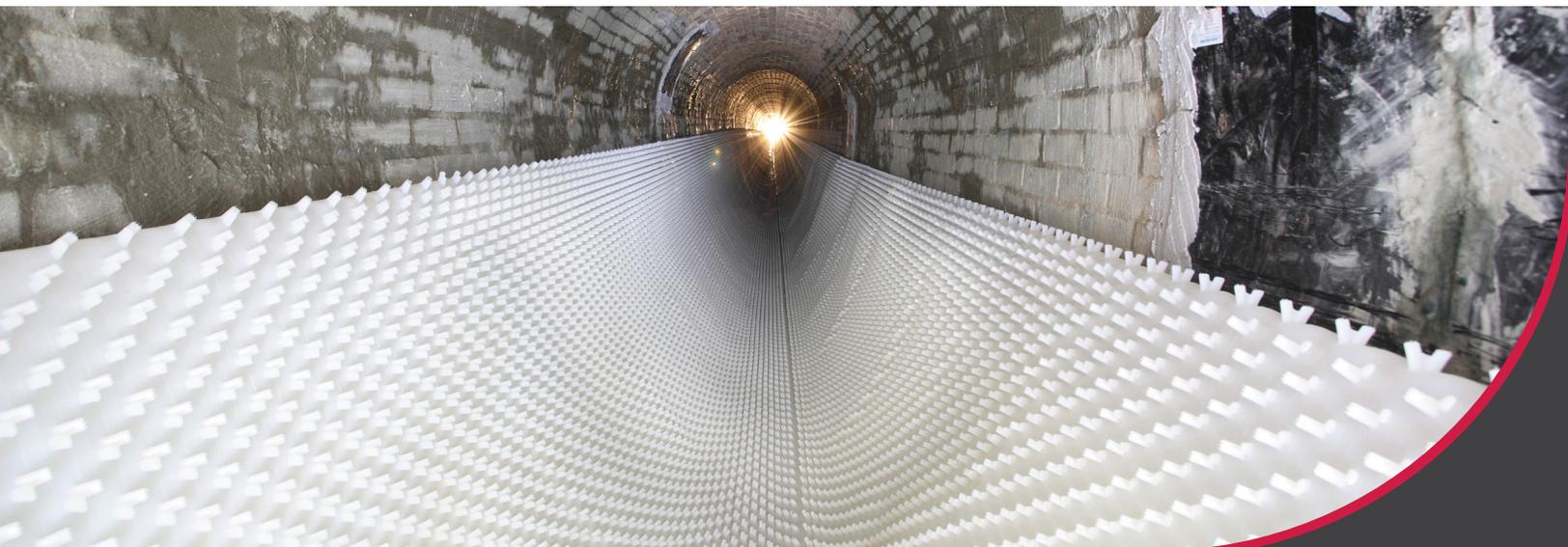
Decades of experience creating and delivering Sure-Grip led to the development of Ultra Grip. The innovative new product features a revolutionary redesign of the 13 mm Sure-Grip anchor to provide unparalleled backpressure resistance. Ultra Grip's high backpressure resistance stems from its significant pull out resistance, which reaches up to 820 kN/m² with PE 80 at 20°C. Ultra Grip can now be manufacturing using HDPE, HDPE-el, or PP, depending on project requirements.

Ultra Grip's distinctive design utilizes a V-shape anchor to offer superior attachment properties and backpressure/pullout resistance in concrete structures. The product is especially useful for structures installed in significant groundwater depths, resisting sustained long-term backpressures of up to 1.75 bar (at 20°C or 68°F) in long-term testing and applications. Another area where Ultra Grip shines is in larger installations, as the product is available in rolls and sheets of up to 10' (3.05 m) in width and up to 5 mm (200 mils) in thickness. These sizing options can help save up to 60% of installation time due to the reduced welding requirements. Ultra Grip also offers unparalleled corrosion resistance when compared with alternative products, which typically must be reapplied due to cracking or delamination.



Ultra Grip Summary

- Sheets with a thickness of 4 mm (PE 80 at 20°C) and above are rated to last in excess of 50 years under a pressure of 1.75 bar (25.38 psi)
- Features an anchor height of 13 mm, and 420 anchors per square meter
- Ultra Grip features an innovative redesign of Sure Grip's V-shape anchor system for superior backpressure resistance
- Recommended for installations of structures in areas with high groundwater where significant backpressures will be encountered
- Well-suited for large-scale construction projects with available widths of up to 10'.





CPL Product Customizations

Signal Layer adds a light-colored layer that offers visual detection of damages, improving the quality control process.

Fabric-Backed concrete protective liners offer a suitable option for dual-laminate applications and areas of transition to dissimilar materials.

AGRU's Self Cleaning System provides a unique and innovative pipe lining invert, which greatly reduces sediment deposits in piping systems that are designed with flat grades or predominantly low-flow situations.

AGRU's Step Security System affords an anti-skid surface that can be used for traction and safety in lined floors.

Customized Productions are available for projects that meet a minimum order quantity. Product customizations may include color(s), widths, lengths, and more.

Applications

AGRU CPL can be configured to meet a wide variety of project requirements.

Lining of Precast Concrete Structures

AGRU's concrete protective liners offer many benefits for the lining of precast concrete structures, including prefabricated concrete elements, concrete pipes and manholes, wet wells and pumping stations, tank constructions, and oil/ water separators.



Lining of Cast in Situ Structures

AGRU's concrete protective liners are easily fabricated to the shape of the required construction thanks to efficient and secure mounting to existing formworks by means of end profiles and tear off profiles. After the concrete sets, the concrete protective liner system is extrusion welded to provide a leak-proof solution.

This installation method enables the installation of both the concrete protective liner and the formwork at the same time. In situ structures include underground construction; foundations and bridges; areas where chemical media are used, transported, or stored; and any type of concrete sump or basin.



Structure Relining/Rehabilitation

AGRU's concrete protective liners can be used to reline and rehabilitate many existing concrete structures. This is accomplished through the use of a formwork system and the introduction of grout or concrete into the interstitial space. The concrete protective liners can be prefabricated and preassembled in sections to significantly speed up the on-site installation efforts, reducing production downtime and project costs.



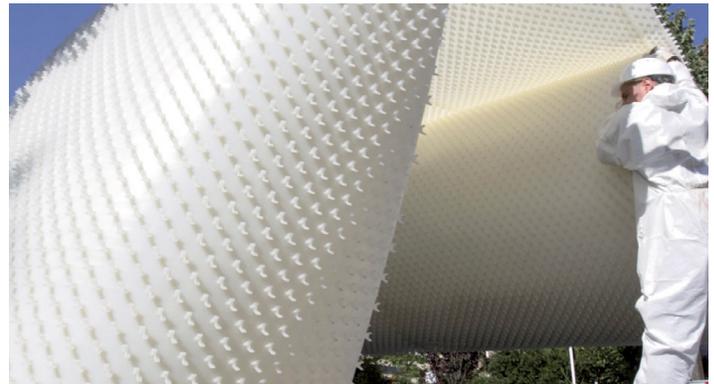
Trenchless Relining of Underground Pipes

AGRU offers system solutions for trenchless relining which enable the rehabilitation of various cross sections and dimensions, independent of the degree of corrosion. Applications include both segmental and hose relining.



Reducing Inflow and Infiltration into Sewer Systems

Groundwater backpressure presents a significant concern for wastewater professionals due to its contribution to inflow and infiltration (I & I) into sewer systems. Allowing groundwater or other fluids to enter a wastewater treatment system is an unnecessary and costly expense. Therefore, wastewater professionals are compelled to design systems that eliminate or greatly reduce I & I and limit the amount of liquids being treated to only the actual wastewater generated by system ratepayers. Ultra Grip's tensile strength and high elongation allow it to bridge cracks in concrete structures and prevent groundwater from entering the wastewater system.

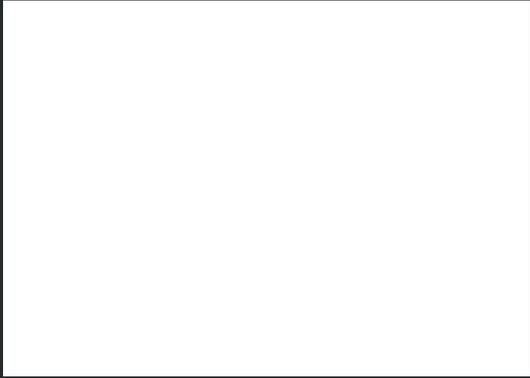




CPL Installation in a
Double Shell Tunnel Lining



DTSS Phase I, Singapore;
AGRU HDPE blue CPL



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Illustrations are generic and for reference only.

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Revision Date: July 23, 2019 3:47 PM

