

Monoform PLUS™

ULTIMATE MANHOLE
REHABILITATION SOLUTION





Before

After

The Plastics Experts.

Wastewater piping systems continue to be one of the most essential components in modern infrastructure. Our understanding of corrosion and flow capacity as well as infiltration and exfiltration has enabled the creation of innovative solutions. To help municipal and industrial customers create more effective and longer lasting wastewater collection systems, AGRU has leaned on its experience as the Plastics Experts to develop concrete protective lining solutions using a variety of materials that include HDPE, PP, PVDF, and ECTFE. These materials can handle a variety of waste streams ranging from standard municipal wastewater to complex and aggressive industrial waste streams.

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. AGRU uses only the finest grade thermoplastic polymers as raw materials. When it comes to application-technical consulting, AGRU is 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 even in challenging conditions.

Collaboration

AGRU occasionally collaborates with third-party fabricators and distributors to create unique solutions. HK Solutions Group, which includes Turner Lining Company, is a custom fabricator and distributor that supplies fabricated products for precast pipe, wet wells, manholes, structures, and cast-in-place construction. Incorporating their experience of working with AGRU products for more than 26 years, HK Solutions have developed Monoform PLUS™, the ultimate manhole and wet well rehabilitation solution that combines HK Solution's Monoform technology with AGRU-ULTRA GRIP®.



Monoform PLUS™ Overview

Monoform, by HK Solutions, is a trenchless structural manhole and wet well rehabilitation solution that is designed for failing brick, block, and concrete manholes. Monoform supports the creation of a one-piece monolithic structural concrete liner thanks to fully configurable custom ABS plastic forms. Monoform PLUS™ expands on the Monoform technology by integrating AGRU's HDPE Ultra Grip into the concrete for protection system against corrosion, infiltration, and exfiltration.

Ultra Grip also features long-term sustained backpressure resistance of up to 1.75 bar (at 20°C or 68°F), which sets it apart from competing products. If a corrosion protection system cannot sustain the required backpressure long-term then its failure is imminent. Finally, Ultra Grip's high tensile strength and elongation allow it to stretch and bridge cracks should concrete structures develop breakage, preventing groundwater from entering the system.

Lean on Expertise

- Monoform PLUS™ is the result of decades of experience
- Flexible, solution-oriented service and technical support
- State-of-the-art production machines and processes
- Custom fabrication for project-specific solutions.

Minimize Disruptions

- Monoform PLUS™ is a trenchless technology with minimal traffic disruption
- Quick installation with 4 to 6 structures completed per week, with each structure only taking two days to complete
- No external bypassing required; flows are managed by an internal bypass system
- Eliminates compaction issues that can occur with replacements.

Efficient Solutions

- Economical and cost-effective when compared with the cost of a manhole replacement or repair with current practices.
- Prevent damage typical of microbial induced corrosion and reduce cost of maintenance
- Once completed, Monoform PLUS™ is the only manhole rehabilitation system that eliminates infiltration, exfiltration, and corrosion
- Once installed, the new manhole or wet well has a minimum design life of 50 years.

Quality Control

- Ultra Grip is made from 100% virgin resin
- Ultra Grip can handle high amounts of sustained high backpressure
- All field welding for Monoform PLUS™ is performed by AGRU-trained welders.
- All raw materials are tested internally upon arrival at AGRU's state-of-the art laboratory prior to manufacturing
- All finished materials go through a quality control process and are certified to meet published performance specifications.



Ultimate Manhole Rehabilitation in Eight Steps with Monoform PLUS™

Monoform PLUS™ is a comprehensive manhole rehabilitation solution that offers streamlined installation with minimal impact on local traffic. The Monoform technology comprises a concrete forming system installed within existing manhole structures. Inner forms wrapped with AGRU Ultra Grip pair with the existing structure, which serves as the outer form. Concrete is then poured between the two forms to create a new structure. The concrete cures around the UltraGrip anchors, making the liner mechanically bonded permanently into the structural frame.

The system is not a surface coating. Once complete, the Monoform PLUS™ system is structurally sound and meets the Cooper E-80 locomotive load testing criteria, meaning the systems is compatible for railway use and can support a fully loaded locomotive.

1

Use measurements from the manhole to fabricate HDPE Ultra Grip into the appropriate shape and dimensions.



2

Field fabricate the remaining HDPE Ultra Grip segments.



3

Assemble the Monoform concrete forming system inside the existing manhole structure.



4

Attach all HDPE Ultra Grip liner segments onto the Monoform concrete forming system.





This solution offers equal performance and design life compared with a typical replacement job, but comes with numerous benefits including minimal traffic disruption, cost-effectiveness, faster installation, no required external bypass pumps, and no compaction issues. Most manholes can be completely rehabilitated in 2 days without being taken out of service.

Additionally, Monoform PLUS™ can be used with the added benefit of integrating custom-fabricated HDPE Ultra Grip concrete protective liner during the rehabilitation process. Ultra Grip provides protection against infiltration, exfiltration, and concrete corrosion. Ultra Grip is maintenance free and expected to last the life of the structure under normal operating conditions.

5

Pour high-strength ready-mix concrete to produce a permanent monolithic concrete liner within the existing structure.

6

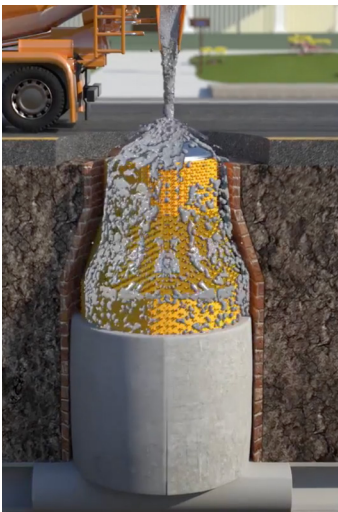
Field weld all interior HDPE Ultra Grip liner seams using AGRU-trained welders.

7

Install new casting and cover.

8

Restore the pavement.





Subject to errors of typesetting, misprints and modifications.
Illustrations are generic and for reference only.

AGRU America
500 Garrison Road
Georgetown, SC 29440
USA

T. +1 800 373 2478
F. +1 843 546 0516
info@agruamerica.com
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