



## PRODUCT DATA SHEET

### HammerHead® Lateral CIPP Solutions

## HammerHead Lateral CIPP Solutions

HammerHead Lateral CIPP Solutions are cured-in-place pipe linings used to rehabilitate lateral sewers and other non-pressure 2 to 12-inch diameter pipelines without excavation. Rehabilitation with HammerHead CIPP provides a structural repair to deteriorated or damaged pipelines while eliminating infiltration and protecting against future corrosion along the rehabilitated pipe in a less disruptive manner than conventional dig and replace. Installation is performed by inverting a resin-impregnated tube into an existing pipeline and expanding it against the interior of the existing pipe during cure, as described in ASTM F1216. This results in a finished CIPP that is smooth, tight-fitting, and continuous over its installed length.

### Applications for Use

HammerHead Lateral CIPP Solutions are certified by NSF International, IAPMO and ICC-ES for compliance with NSF Standard 14, ASTM F1216, the International Plumbing Code, and the Uniform Plumbing Code to provide a leak-tight, structural repair to existing pipelines, including storm and sanitary sewers, drain, waste, vents, and other piping systems. HammerHead CIPP systems are resistant to municipal sewage flows and may be used to rehabilitate existing piping with straight alignment, bends, offset joints, and size or material transitions. HammerHead® Trenchless provides detailed guidelines and instructions for use and makes training available in support of quality management.



DWV SEWER I.P. Code U.P. Code



International Plumbing Code



Uniform Plumbing Code

### Technical Data

HammerHead Lateral CIPP Solutions are an engineered composite consisting of a specialized textile tube and formulated thermosetting resin. HammerHead's resin systems are VOC-free and may be cured under ambient thermal conditions, by hot water circulation or by photo-initiation with a specific spectrum of LED blue light. The resin system and curing method are selected based on installation conditions and the desired working and cure times. The CIPP is designed to withstand all external loads including hydrostatic, soil, and live loads in accordance with ASTM F1216, Appendix X1. Corrosion and heat resistance properties of the installed CIPP are optimal for municipal sewer and commercial drain, waste, and vent application environments.

### Structural Properties

HammerHead Lateral CIPP Solutions provide a structural repair with a leak-tight, frictional fit throughout the length of the rehabilitated pipe and can accommodate circular or non-circular cross sections and a wide range of common pipe materials such as, but not limited to, concrete, vitrified clay, PVC, asbestos cement, cast iron and ductile iron. Structural stability of the CIPP is achieved through compression during cure as the CIPP is expanded tightly against the walls of the existing pipe. At the same time, resin migrates into pipe joints, irregularities, and defects anchoring the CIPP in-place. The structural properties in the following table are met or exceeded when HammerHead installation guidelines are followed.

| Property          | Test Method | ASTM F1216 (minimum) |
|-------------------|-------------|----------------------|
| Flexural Modulus  | ASTM D790   | 250,000 psi          |
| Flexural Strength | ASTM D790   | 4,500 psi            |



# PRODUCT DATA SHEET

## HammerHead® Lateral CIPP Solutions

### HammerHead Ambient and Heat Cured Epoxy Resin Systems

HammerHead heat and ambient cured CIPP resin systems are two-part, 100% solids, styrene-free epoxies offering superior mechanical properties, chemical resistance, and adhesion to pipe materials, even under humid and wet conditions typical for buried pipelines. The heat cured HH Resin Base epoxy systems require the application of circulated hot water to achieve a fast and full cure. The HH Ambient epoxy system cures under typical ambient conditions in sewer pipelines without the application of heat. While the Ambient system takes longer to cure than heat cured resin, it offers an economical approach without compromising the performance of the finished CIPP.

As a component of HammerHead CIPP systems, these resins are specifically formulated with excellent wet-out capability, low-odor, and no styrene or other VOC emissions for pipeline rehabilitation.

| Epoxy Resin System Properties |               |              |                |              |                  |                     |
|-------------------------------|---------------|--------------|----------------|--------------|------------------|---------------------|
| Material Data                 | HH Resin Base | HH Winter 30 | HH Standard 60 | HH Summer 90 | HH Ambient Resin | HH Ambient Hardener |
| Mix ratio, by weight          | 4             | 1            | 1              | 1            | 2.33             | 1                   |
| Mix ratio, by volume          | 3.3           | 1            | 1              | 1            | 2                | 1                   |
| Color                         | Yellow        | Blue         | Blue           | Blue         | Blue             | Yellow              |

| Epoxy Resin System Working and Cure Times |              |                        |                   |                   |
|---|--------------|------------------------|-------------------|-------------------|
| Time, minutes                             | Working Time | Cure Time <sup>2</sup> |                   |                   |
| HH Resin Base/Winter 30                   | 15           | 70 @ 158°F (70°C)      | 40 @ 176°F (80°C) | 30 @ 194°F (90°C) |
| HH Resin Base/ Standard 60                | 35           | 130 @ 158°F (70°C)     | 60 @ 176°F (80°C) | 40 @ 194°F (90°C) |
| HH Resin Base/ Summer 90                  | 55           | 140 @ 158°F (70°C)     | 90 @ 176°F (80°C) | 60 @ 194°F (90°C) |
| HH Ambient Resin/Hardener                 | 25           | 240 @ 55°F (10°C)      | 120 @ 77°F (25°C) |                   |

**Ambient temperature:** Temperature of the work area where the resin system is mixed, the tube is wetted, and the liner is loaded into the inversion drum.

**IMPORTANT:** Working and cure times are affected by ambient temperature and that of materials. Warmer temperatures reduce working and cure time while colder temperatures increase working and cure time. Resin, tube, and the inversion drum should be conditioned to 72-75°F (22-24°C) prior to use for optimum control during installation.

<sup>1</sup>**Working time:** Time from the start of mixing resin to the completion of inversion of the liner into the existing pipe.

<sup>2</sup>**Cure time:** Time from the start of the curing process to the time of substantial completion of cure required for return to service. Listed cure times are based on temperature of the air or hot water circulated within the lined pipe.

### HammerHead Bluelight Resin System

Bluelight LED resin system is a single component, styrene-free vinyl ester resin. It is cured in the blue light wave range of approximately 450 nm by patented LED light sources at a rate of up to five times faster than traditional curing methods, such as hot water, steam, or ambient air. This resin offers superior mechanical properties chemical resistance, and adhesion under conditions typical for buried pipelines.

As a component of the Bluelight LED CIPP system, this resin is specifically formulated with excellent wet-out capability, low-odor, and no styrene or other VOC emissions for quick and easy pipeline rehabilitation. The resin is a single component system which has a shelf life of one year when appropriately stored. Shelf life of wet out tube with Bluelight resin is dependent upon the tube type and storage conditions and may be as long as ninety days. Refer to Shelf Life and Storage section below.



# PRODUCT DATA SHEET

## HammerHead® Lateral CIPP Solutions

### HammerHead Tube

HammerHead offers several options for tube that are selected based upon existing pipeline configuration, cure method, and conditions affecting installation such as pipe configuration, fittings, or diameter transitions.

| Tube  | Tube Material      | Tube Coating | Technical Characteristics   | Bends |     | Cure Method              |
|---|--------------------|--------------|---|-------|-----|--------------------------|
|   |                    |              |   | 45°   | 90° |                          |
| HELIAM™ Scrim                                 | PES Felt w/scrim   | PVC          | Tube with continuous filament scrim to assure accurate inversion length.  | X     |     | Heat<br>Light<br>Ambient |
| HELIAM™ Transitional Scrim                    | PES Felt w/scrim   | PVC          | Tube with continuous filament scrim to assure accurate inversion length for installations with size transition.   | X     |     | Heat<br>Light<br>Ambient |
| HELIAM™ Scrim 5-3/4" Undersized for Clay/Cast | PES Felt w/scrim   | PVC          | Tube with continuous filament scrim to assure accurate inversion length sized specifically for undersized 6" clay and cast-iron pipe.                           | X     |     | Heat<br>Light<br>Ambient |
| HH LED  | PES Felt           | PU           | LED light cure tube for straight shot applications and minimal bends.   | X     |     | Light                    |
| HH FLEX LED                                   | PES Felt           | PU           | LED light cure tube for straight shot applications, bends, and size transitions. High flexibility with minimal wrinkling. Also compatible with Heat cure resin. | X     | X   | Heat<br>Light            |
| HH Scrim                                      | PES Felt w/scrim   | PU           | Tube with continuous filament scrim to assure accurate inversion length.  | X     |     | Heat<br>Ambient          |
| HH Transitional Scrim                         | PES Felt w/scrim   | PU           | Tube with continuous filament scrim to assure accurate inversion length for installations with size transition.   | X     |     | Heat<br>Ambient          |
| HH Flex                                       | PES Felt           | PU           | Tube for installations with minimal bends or size transition.   | X     |     | Heat<br>Ambient          |
| HH Super Flex                                 | PES Felt           | PU           | Tube for installations with multiple bends.   | X     | X   | Heat<br>Ambient          |
| HH Wovo/Brawoliner                            | Seamless Woven PES | PU           | Woven, seamless tube for installations with bends. High flexibility with minimal wrinkling.   | X     | X   | Heat<br>Ambient          |
| HH Wovo/Brawoliner 3D                         | Seamless Woven PES | PU           | Woven, seamless tube for installations with multiple bends and size transition.   | X     | X   | Heat<br>Ambient          |

PES: Polyester, PVC: Polyvinyl Chloride, PU: Polyurethane

| Tube                       | Available Diameter (in.) x Nominal Thickness (mm) |     |  |     |       |     |     |     |     |
|----------------------------|---|-----|--|-----|-------|-----|-----|-----|-----|
|                            | 2   | 3   | 4  | 5   | 5-3/4 | 6   | 8   | 10  | 12  |
| HELIAM™ Scrim              |   | 3.0 | 3.0  | 3.0 | 3.0   | 3.0 |     |     |     |
| HELIAM™ Transitional Scrim |   |     | 4 to 6 transitions x 3.0                   |     |       |     |     |     |     |
| HH LED                     |   |     |  |     |       | 4.5 | 4.5 | 4.5 |     |
| HH Flex LED                | 2.5   | 3.0 | 4.0  |     |       | 4.0 |     |     |     |
| HH Scrim                   |   | 3.0 |  | 3.0 |       |     | 3.0 | 4.5 | 4.5 |
| HH Transitional Scrim      |   |     | 4 to 6 transitions x 3.0                   |     |       |     |     |     |     |
| HH Flex                    |   |     | 4.5  | 4.5 |       | 4.5 | 4.5 |     |     |
| HH Super Flex              | 2.0   | 2.0 | 4.5  | 4.5 |       | 4.5 | 4.5 |     |     |
| HH Wovo/Brawoliner         | 3.0   | 4.0 | 4.0  | 4.0 |       | 4.0 | 4.0 |     |     |
| HH Wovo/Brawoliner 3D      |   |     | 3 to 4 • 4 to 6 • 6 to 9 transitions x 4.5 |     |       |     |     |     |     |



# PRODUCT DATA SHEET

## HammerHead® Lateral CIPP Solutions

### HammerHead Calibration Tube

HammerHead calibration tube is used to expand and hold the resin-impregnated tube (liner) tightly against the existing pipe wall during cure.

| Tube Property  | Light Duty                        | Heavy Duty                        |
|--|-----------------------------------|-----------------------------------|
| Pipe Diameter, in.   | 2 to 3                            | 4 to 12                           |
| Tube Material/Coating  | Polyester fabric/PVC              | Polyester fabric/PVC              |
| Seam Construction  | HF Welded Overlap                 | Stitched and taped                |
| Cure Method  | Ambient or Hot Water up to 122° F | Ambient or Hot Water up to 176° F |
| Installation Pressure<br><i>Additional pressure may be required to invert around bends</i> | 5 to 7 psi                        | 7 to 10 psi                       |

### Shelf Life and Storage

**Resin System Components:** One (1) year when stored in original sealed packaging at 65-80°F (18-27°C) and less than 65% relative humidity.

**Tube/Calibration Tube:** One (1) year when stored protected from light at 40-80°F (5-27°C) and less than 65% relative humidity.

**Bluelight Resin Impregnated LED Tube:** Thirty (30) days when stored in original packaging at 40-70°F (5-21°C).

**Bluelight Resin Impregnated HELIAM Tube:** Ninety (90) days when stored in original packaging at 40-70°F (5-21°C).

### Safety

Refer to the Safety Data Sheets for these products for safety and health information prior to use. Follow all notices on the Safety Data Sheets (SDS). If you do not understand or cannot adhere to the guidelines and procedures for handling and use of these products in strict accordance with the SDS, do not use these products. Contact HammerHead® at 800-331-6653 for a copy of the SDS.

The information contained herein is offered without charge for use by technically qualified personnel at their discretion and risk. All statements, technical information and recommendations contained herein are based on tests and data which we believe to be reliable, but the accuracy or completeness thereof is not guaranteed, and no warranty of any kind is made with respect thereto. Always read, understand, and comply with hazard warnings described in the products' Safety Data Sheet(s) before use.