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# TECHNICAL DATA SHEET

## POLYWATER® FST™ MINI FOAM SEALANT

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## DESCRIPTION

FST™ closed-cell sealant provides superior pressure-blocking in the toughest environments. It stops water, methane, and other gases to protect electrical systems. FST Sealant is durable and easy to install.

FST expands and hardens to a semi-permanent, but removable, seal. The foam wets and adheres to metals, plastics, and concrete. It conforms around complex cable fill configurations to keep out moisture, gases, dust, insects, and rodents. FST is a proven solution used to protect switchgear, panels, riser poles, combiner boxes, and meters.

## HYDROSTATIC (PRESSURE) TESTING

FST Sealant is an excellent water block. To test water blocking performance, it is installed into a conduit according to standard procedures, forming a 2-inch plug. Water is added to the system and then pressurized to create a “water head”. Seal passes if there is no leakage observed.

| CONDUIT | TEST CONDITION | RESULT |
|---|---|---|
| 1” PVC | 30 psi (2.0 bar), 24 hours | |
| 2” PVC | 3 cables,<br>*bent* 45° two directions,<br>then *pulled* 15 lbs<br>(6.8 Kg) axial force<br>30 psi (2.0 bar), 24 hours | Pass |
| 2” PVC | 12 polyethylene wires,<br>30 psi (2.0 bar),<br>24 hours | Pass |
| 2” Steel | 30 psi (2.0 bar), 24 hours | Pass |
| 2” Steel | 8 THHN wires,<br>30 psi (2.0 bar), 24 hours | Pass |
| 2” Fiberglass | 30 psi (2.0 bar), 24 hours | Pass |


*Convenient FST package creates a reliable seal.*

## PRODUCT FEATURES

- Reliable—Holds 22 feet (6.7 m) water head pressure continuous; 65-foot (20 m) surges
- Versatile—Seals multiple conduits with different sizes and cable fill configurations
- Compatible—Use with a wide range of cable and conduit materials
- Reenterable—Cured foam is semi-permanent and can be removed

## STANDARDS

- Complies with 2011 NEC Articles 225.27, 230.8, 300.5(G) and 300.7(A) on Raceway Seals
- Minimizes gas and vapor passage for boundary seals described in NEC Article 501.15(B)(2) for Class 1, Div 2
- Complies with TIA-758-B Standard 5.1.1.2.8, 5.4.2.3 and 7.4.2.8.1

## APPROVALS

UL Recognized
*Passes UL94*
*Class HBF fire retardant rating*

## COMPONENT PHYSICAL PROPERTIES

FST Sealant is a two-part, urethane foam. The liquid Part A and B are formulated to be mixed at a 1/1 ratio using the two-part side by side cartridge and mixing nozzle, provided.

| PROPERTY | PART A | PART B |
|---|---|---|
| Color | Amber | Clear |
| Form, Viscosity | Liquid, 250 cps | Liquid, 650 cps |
| VOC | 0 g/L | 0 g/L |
| Specific Gravity | 1.2 | 1.1 |

## CURED RESIN PROPERTIES

FST Sealant cures to solid, closed-cell foam.

| PROPERTY | RESULT |
|---|---|
| Appearance | Light yellow color with small, even cells |
| Closed Cell Percent | 98% |
| Density | 6 lbs/ft$^3$ (0.1 g/cm$^3$) |
| Moisture Absorption (ASTM D2842) | <4% |
| Compressive Strength (ASTM D1621) | 145 psi (1.00 N/mm$^2$) |
| Tensile Strength (ASTM D1623) | 120 psi (0.83 N/mm$^2$) |
| Seal Strength – Water | 65 ft (20 m) intermittent<br>22 ft (6.7 m) continuous |
| Seal Strength – Air | >5 psi (>0.3 bar) |

## SEAL STRENGTH, AIR AND GAS

FST Sealant seals out manhole gases. Seal strength was tested by installing FST per standard directions. Conduit was then pressurized with both air and helium. Helium represents methane as it is less than half the molecular size.

| CONDITION | RESULT |
|---|---|
| Air, 20 psi (1.4 bar), 168 hrs | Pass (Holds Seal) |
| Helium, 5 psi (0.3 bar), 72 hrs | Pass (Holds Seal) |

## CABLE COMPATIBILITY

FST Sealant is compatible with common cable jacket materials. The cured foam is an inert solid that does not affect cable components. It does not change physical or electrical property of cable, based on tensile elongation and volume resistivity testing.

| SEMI-CONDUCTING MATERIAL | VOLUME RESISTIVITY (42 DAY EXPOSURE) |
|---|---|
| TR-XLPE | Pass (Shows stability) |
| EPR | Pass (Shows stability) |

| CABLE JACKET | TENSILE | ELONGATION |
|---|---|---|
| PVC | >99% control | >93% control |
| XLPE | >96% control | >91% control |

*Testing based on IEEE 1210. Full report available upon request.*

## ENVIRONMENTAL RESISTANCE

FST Sealant withstands the rigors of the conduit exposure environment.

**In Service Temperature Use Range**
-20°F to 200°F (-30°C to 95°C) Continuous
-40°F to 250°F (-40°C to 120°C) Peak

FST Sealant does not lose function in direct sunlight. Reacted foam that is exposed to UV will yellow. This discoloration does not affect performance. The foam seal retains its hardness and continues to act as a duct block.

The foam sealant can be protected with a weather-proofing paint. Both urethane and epoxy-based products have been tested with good results and excellent adhesion to the foam.

## CHEMICAL RESISTANCE

FST Sealant is chemically resistant to gasoline, oils, dilute acids and bases, and most unsaturated hydrocarbons.

Cured FST was soaked in chemical for 45 days following ASTM C267. Weight change is noted.

| CHEMICAL EXPOSURE | Δ% WEIGHT | RESULT |
|---|---|---|
| Sodium Hydroxide (1N) | 0.80 | Resistant |
| Hydrochloric Acid (1N) | 1.88 | Resistant |
| Sulfuric Acid (1N) | 1.00 | Resistant |
| Hydrogen Peroxide (30%) | 1.57 | Resistant |
| Dielectric Oil | 0.48 | Resistant |
| Mineral Oil | 0.35 | Resistant |
| Gasoline | 0.18 | Resistant |

## APPLICATION

**Field-Ready Kit**
The FST Sealant kit includes all materials required to install a finished duct block.

**Seal Length (Depth)**
It is most important to make a seal of adequate length by using and properly spacing the damming strips. A 2-inch (50-mm) plug will meet performance guidelines.

**Application Temperature**
Working temperature for Polywater FST Sealant is 40°F to 95°F (4°C to 35°C).

**Water in Duct**
FST Sealant will cure and seal duct with small amounts of water present. The water should not be flowing and should be relatively clean. FST foam will incorporate water into its cure. However, excessive water will weaken the seal.

For full installation information, please see FST MINI use instructions.

## CURE RATE

The FST Sealant can be used in temperatures down to 40°F (4°C). At low temperatures, the reaction is slower, but the sealant will completely foam and cure with time. At cold temperatures, the sealant components become more viscous and flow through the mixing nozzle at a slower rate. Cure times are as follows:

| REACTION TIME | 40°F (4°C) | 70°F (21°C) |
|---|---|---|
| Foaming expansion complete | 8-9 minutes | 4-5 minutes |
| Hard, non-sticky skin formation | 15-18 minutes | 7-9 minutes |

To decrease cure time in cold temperatures, warm FST Sealant cartridges prior to use.

## CLEAN-UP

Any unreacted material may be cleaned from surfaces with a solvent wipe such as Polywater's Type HP™ Cleaner/Degreaser. The part A amber resin will react with water if surfaces are washed with a soap and water solution. Once reacted, the foam has strong adhesion, and may be scraped or cut from surface.

## REENTERABLITY AND REMOVAL

FST Sealant can be mechanically removed with some effort. Use a long screwdriver to puncture holes throughout the seal. With a hammer, punch the screwdriver through the foam, twist it to enlarge the cavity, and pull out. Once the foam is weakened, it can be chipped away, and the cable should break free.

## TROUBLE-SHOOTING

Once a skin has formed, the foam may be visually inspected to determine whether the seal has completely filled the void. After the sealant has cured, the positioning rod or a screwdriver can be used to check for voids in the finished seal.

## STORAGE AND HANDLING

Keep containers cool, dry and away from sunlight. Leave cartridges in the protective foil pouch until ready to use/reuse.

Product shelf life is 15 months. Cartridge can be used for one month after the product is opened.

## SAFETY

FST Sealant is a two-part urethane foam containing reactive chemicals. Polyurethanes are common in the construction industry and have been used for many years. Some individuals may become sensitized to components in the unreacted resin. Precautions must be observed during use and handling of these materials.

The use of FST in the prepackaged cartridge controls and reduces exposure. A monitoring study using OSHA Sampling Method 47 MOD shows that exposure is well under limits set by this agency. Full paper can be found on our website: *Urethane MDI Monitoring White Paper*.

Once reacted, the foam is solid, closed-cell polyurethane. The finished product is non-toxic. See SDS for more information.

**Combustion of Cured Foam**
Irritating and toxic smoke and vapors may form during combustion of cured FST Foam Sealant. If burning the sealant material cannot be avoided, provide appropriate ventilation/respiratory protection against decomposition products during flame cutting operations.

## MODEL SPECIFICATION

*The statement below may be inserted into a customer specification to help maintain engineering standards and ensure work integrity.*

Duct sealant shall be Polywater FST Foam Sealant. Duct sealant shall be a 2-part, 98% closed-cell urethane foam that reacts to set in 5-10 minutes at 70°F (21°C). It shall be reusable and capable of sealing up to 12-inch (30-cm) conduits with multiple cable configurations. Duct sealant shall be reenterable. It shall be capable of withstanding temperatures from -20°F to 200°F (-30°C to 95°C); and be chemically resistant to gasoline, oils, dilute acids and bases. Duct sealant shall not affect the physical or electrical properties of wire and cable.

Duct sealant shall have good adhesion to duct and cable jacket surfaces with good structural strength. It shall have 145-lb compressive strength (ASTM D1621). Duct sealant shall be capable of holding 22 ft (6.7 m) water head pressure continuous or 65 ft (20 m) water head pressure short-term. It shall block up to 5 psi (0.3 bar) gas or vapor continuous. It shall meet NEC codes for raceway seals and meet UL 94 fire rating HBF to be UL recognized.

## ORDER INFORMATION

| CAT # | PACKAGE DESCRIPTION |
|---|---|
| FST-MINI-1 | 1 – 50 ml FST Cartridge<br>2 – Mixing Nozzles (cat# MXR-20T-10)<br>6 – Foam Discs<br>2 – Pairs of Gloves<br>1 – Instruction Sheet |
| FST-MINI-B6 | 6 – FST-MINI-1 |
| TOOL-50-11 | 1 – Dispensing Tool for FST MINI |
| MXR-20T-10 | 10-Pack of Mixing Nozzles for FST MINI |

## CONTACT US

**+1-651-430-2270 Main | Europe, Middle East, North Africa +31 10 233 0578 | email: support@polywater.com**



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