TECHNICAL DATA SHEET

POLYWATER® FST™ FOAM SEALANT

polywater.com

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 3-inch (75 mm) 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
2”/50mm PVC	30 psi (2.0 bar), 7 days 70 feet (21.3 m) water head	Pass
2”/50mm Fiberglass	30 psi (2.0 bar), 7 days 70 feet (21.3 m) water head	Pass
2”/50mm HDPE	30 psi (2.0 bar), 7 days 70 feet (21.3 m) water head	Pass
4”/100mm Steel	30 psi (2.0 bar), 24 hours 70 feet (21.3 m) water head	Pass
4”/100mm HDPE	30 psi (2.0 bar), 24 hours 70 feet (21.3 m) water head	Pass
6”/150mm PVC	25 psi (1.7 bar), 24 hours 58 feet (17.7 m) water head	Pass
8”/200mm PVC	15 psi (1.0 bar), 24 hours 34 feet (10.5 m) water head	Pass

Full Report with Additional Configurations is Available Upon Demand. LRQA Test Certification available.

Meets IP 66 Ingress Protection (IEC Method 60529). Report available upon request.



Convenient FST package creates a reliable seal.

PRODUCT FEATURES

- Reliable—Holds 22 feet (6.7 m) water head pressure continuous; 90-foot (27 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

Creates a watertight gastight seal.

Complies with NEC and CEC National Electric Code Articles for Raceway Seals

Complies with NESC National Electric Safety Code for Exterior Penetrations

Complies with DIN Standards for Conduit Sealing

Complies with ITU and TIA Standards for Sealing Communication Ducts

APPROVALS

UL Classified *File R39313*
Caulking and Sealant Surface Burning Characteristics Applied to Inorganic Reinforced Cement Board + Flame Spread 30 + Smoke Spread 160

NSF Certified
Nonfood Compounds S2

COMPONENT PHYSICAL PROPERTIES

FST Sealant is a two-part, urethane foam. The liquid Parts A and B are formulated to be mixed at a 1/1 ratio using the two-part coaxial caulking tube 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%
R-Value (ASTM C518)	3.51°F·ft^2·h/BTU per 1 inch 0.62°C·m^2·K/W per 25 mm
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	90 ft (27 m) intermittent 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 air.

CONDITION	RESULT
Air, 20 psi (1.4 bar), 168 hrs	Pass (Holds Seal)

CABLE REMOVAL TESTING

FST acts as a theft deterrent by sealing cables into conduit.

CABLE TYPE	AVERAGE PULL OUT TENSION
2 AWG THHN	171 lb$_f$ (77.6 Kg$_f$)
4/0 XHHW	320 lb$_f$ (145 Kg$_f$)

A standard application of FST is used to seal 3 cables into conduit. Force to pull out each cable is measured.

FST seals in the cables inside duct, making removal by hand very difficult.

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 materials.

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.

FIRE PROPERTIES

Meets UL 94 HBF fire rating criteria. Self-extinguishes when exposed to a flame for 1 minute.

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 work well.

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 3-inch (75-mm) plug will meet performance guidelines.

Application Temperature
Working temperature for Polywater FST Sealant is 35°F to 95°F (2°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 use instructions.

RODENT DETERRENT

FST contains rodent deterrent. A rodent test was conducted using a 5/8-inch (16 mm) barrier of the FST foam. FST prevented the entry of rodents for 24 hours. Details available upon request.

CURE RATE

The FST Sealant can be used in temperatures down to 35°F (2°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	35°F (2°C)	70°F (21°C)
Foaming expansion complete	10-12 minutes	4-5 minutes
Hard, non-sticky skin formation	20-22 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 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 (1.00 N/mm^2) compressive strength (ASTM D1621). Duct sealant shall be capable of holding 22 ft (6.7 m) water head pressure continuous or 90 ft (27 m) water head pressure short-term. It shall block up to 5 psi (0.3 bar) gas or vapor continuous. It shall meet UL 94 with a fire rating of HBF. It shall meet NEC codes for raceway seals and be classified to UL 723 for smoke and fire performance.

ORDER INFORMATION

CAT #	PACKAGE DESCRIPTION
FST-250KIT1	1 - FST Foam Sealant two-part caulking tube 3 - mixing nozzles 4 - 24-inch foam damming strips 1 - 12-inch abrasive strip 1 - pair disposable gloves 1 - positioning rod for foam dam 1 - pre-treating wipe 1 - resealing cap 1 - instruction sheet TOOL-250 NOT INCLUDED
FST-250KIT	Same as FST-250KIT1 in a case of 6
FST-250	1 - FST Foam Sealant two-part caulking tube 1 - mixing nozzle 1 - resealing cap
TOOL-250	1 - high-ratio dispensing tool
MXR-41T-10	10-pack mixing nozzles for FST-250
FST-DAM	1 – 24-inch foam damming strip

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IMPORTANT NOTICE: The statements here are made in good faith based on tests and observations we believe to be reliable. However, the completeness and accuracy of the information is not guaranteed. Before using, the end- user should conduct whatever evaluations are necessary to determine that the product is suitable for the intended use.

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