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TECHNICAL DATA SHEET

POLYWATER® FTTx SPRAY LUBRICANT

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DESCRIPTION

Polywater® FTTx Lubricant is a high-performance, liquid cable-pulling lubricant designed specifically for communication cable installations. Polywater FTTx is highly concentrated and works with only a thin coating. It can be sprayed or wiped for easy application or poured into innerduct for long pulls. It has excellent cling and wetting, evenly coating the entire cable jacket surface. Polywater FTTx works even after it has dried. The residue is a thin, slippery film that retains lubricity for months after use.

Polywater FTTx is recommended for quick and easy lubrication with no mess. The lubricant is suitable for all types of communication cable installations.

FRICTION TESTING

Friction is determined using a standard Telcordia test procedure.[1] The duct is wrapped 420° around a three-foot diameter (0.9 m) cylinder. In this test, a variable incoming weight is attached to the cable as it is pulled at a set rate of 65 ft/min (19.8 m/min). A load cell takes pulling tension data that is used to determine a "dynamic" friction coefficient.

FRICTION COEFFICIENT MDPE-JACKETED CABLE ON HDPE INNERDUCT		
BACK TENSION	**WIPE APPLICATION**	**SPRAY APLICATION**
8 lbf	.09	.09
25 lbf	.08	.07

Polywater FTTx does not increase the coefficient of friction of prelubricated duct.

[1] Telcordia Standard GR-356-CORE, Section 4.2.5, Generic Requirements for Optical Cable Innerduct, Associated Conduit, and Accessories (Issue 2, June 2009).

Meets MS-5/20xx Model Specification for HDPE Solid Wall Conduit for Power and Communications Applications.

Polywater FTTx can be sprayed into small conduits

PRODUCT FEATURES

- **Superior Performance:** Reduces friction with ultra-thin coating levels.
- **Zero Mess:** Dries quickly, without mess.
- **Low-Friction Residue:** Compatible with prelubricated ducts. Continues to lubricate dry.
- **Spray or Wipe Application:** Efficient and easy to use.
- **Effective on High-Performance Data Cables:** Minimal effect on cable signal attenuation.
- **Compatible with Cable Jackets:** Suitable for a variety of cable jacket types.

END USE

- Fiber optic drops (FTTx)
- High performance data cable
- Textile innerduct
- Long fiber pulls
- Long copper pulls

CABLE COMPATIBILITY

Polyethylene Stress Cracking:
Polywater FTTx does not cause environmental stress cracking of polyethylene jackets commonly found on communications cables. Untreated polyethylene (Union Carbide DYNK) and MDPE jacket material were both tested according to ASTM standard method.[1] After 168 hours exposure, none of the test specimens showed failures.

Polycarbonate Stress Cracking:
Polywater FTTx will not stress-crack polycarbonate. Polycarbonate bars are bent to a defined strain and exposed to lubricant as described in the Telcordia standard,[2] Section 8.2, Stress Cracking of Polycarbonate. After 48 hours, none of the test specimens showed signs of crazing or cracking.

Corrosion of Copper and Steel:
Polywater FTTx will not corrode copper after 24-hour exposure as described in the Telcordia standard,[2] Section 8.3, Copper Mirror Test.

[1] ASTM Test Method D1693, Environmental Stress-Cracking of Ethylene Plastics.

[2] Telcordia Standard TR-NWT-002811, Generic Requirements for Cable Placing Lubricants.

DIRECTIONS FOR USE

Polywater FTTx Lubricant can be sprayed or wiped directly onto the cable as it enters the conduit. It may also be poured directly into the duct.

For normal cable pulls, prelube the conduit by spraying 5–10 squirts of pulling lubricant into the conduit before pulling. Saturate a wipe by spraying with lubricant and lightly wipe lubricant on jacket to fully coat the cable as it enters the conduit.

For lowest coefficient of friction, completely prelubricate the conduit. Squirt or pour appropriate amount of lubricant into the conduit and pull through a sponge or lubricant spreader to coat the interior of the entire length. Wipe lubricant on cables as they enter the conduit as described above.

High-efficiency spray pulling lubricants are effective with very thin coats in the range of 1–5 mg/cm^2 of jacket surface. See product usage section for lubricant quantity formulas.

PHYSICAL PROPERTIES

PROPERTY	RESULT
Appearance	Slightly thickened, white liquid
Percent non-volatile solids	3%
VOC content	0 gms/liter
Viscosity	250–1250 cps @10rpm
pH	6.5–8.0

PERFORMANCE PROPERTIES

Wetting—Continuous Coat:
Wetting is a measure of the lubricant's ability to coat the jacket as a thin film for continued lubricity on longer pulls.

Polywater FTTx Lubricant will wet out evenly on all surfaces. It will not bead up or rub off the cable jacket. Lubricant will completely coat a 1-inch diameter PVC-jacketed cable dipped 6 inches into the lubricant, then withdrawn within 10 seconds. The lubricant coating shall cover 100% of the cable jacket without dripping off or pulling away from the edges as it is held horizontally for 1 minute (at 70°F).

Combustibility:
Lubricant has no flash point and dried residue is nonflammable.

Sprayability:
Low viscosity lubricant allows product to flow through spray head. Lubricant will not clog valves or atomizers.

USE AND STORAGE CONDITIONS

Temperature Use Range:
20°F to 140°F (-5°C to 60°C).

Temperature Stability:
Polywater FTTx is freeze/thaw stable.

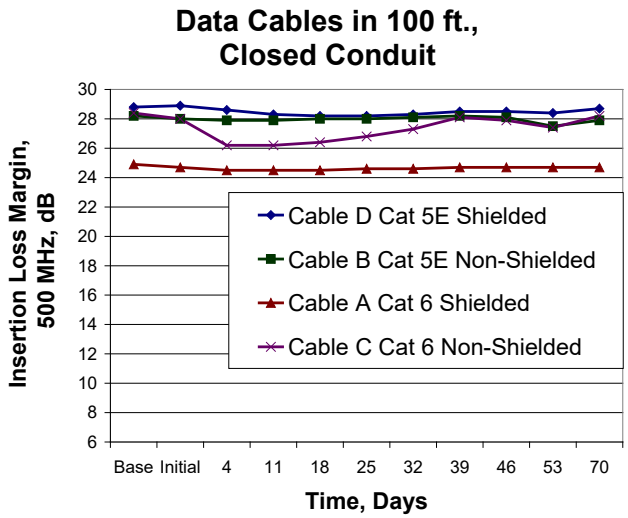
Clean-up:
Polywater FTTx is nonstaining. Complete clean-up is possible with water.

Storage and Shelf Life:
Store Polywater FTTx in a tightly sealed container away from direct sunlight. Lubricant shelf life is 24 months.

APPLICATION PROPERTIES

Polywater FTTx is innovative and easy to use in multiple types of cable installations. It is a very thin liquid that can be sprayed or wiped directly onto the cable jacket. Polywater FTTx can be used to facilitate cable pushing for shorter installations. It can be poured or sprayed into conduit for longer, outside plant installations.

High-Performance Data Cables:
Polywater FTTx is recommended for high-performance data cables. It has a minimal effect on the data-carrying capacity of high-speed, Cat. 5E, 6, and 6A copper cable. As a "thin-film" lubricant, FTTx has a limited effect on cable signal attenuation.



Polywater FTTx shows dramatic friction reduction in data cable installations. Data cable was pulled through EMT conduit with two 90° bends and a back tension of 14 lbs.

COEFFICIENT OF FRICTION DATA CABLE IN EMT CONDUIT	
Unlubricated	.33
Polywater FTTx	.10

Polywater FTTx reduced friction by 70%.

For more information and full test results, please see *TIA Paper TR42.7, PN SP-3-0177, "The Effect of Lubricants on High Frequency Data Cables."*

The lubricant may be sprayed on a towel, or an FTTx-D20 wipe can be used to efficiently apply the lubricant to the cable jacket. The presaturated wipe lays down a thin, even coat of lubricant. The towel material is specifically formulated to release lubricant without mess.

Textile Innerduct:
Proven to reduce friction on these specialty fabrics, Polywater FTTx is perfect for use with textile innerducts. Polywater FTTx is directly applied to cable, dramatically lowering friction.

Friction is determined using a modification of Telcordia test procedure.[1] In this test, a fabric inner duct is placed inside a continuous HDPE conduit. The MDPE-jacketed cable is lubricated with Polywater FTTx and pulled through a fabric cell.

COEFFICIENT OF FRICTION IN MAXCELL™ FABRIC INNERDUCT	
Back Tension	Polywater FTTx Wipe
25 lb_f	.08

[1] Telcordia Standard GR-356-CORE, Section 4.2.5, Generic Requirements for Optical Cable Innerduct, Associated Conduit, and Accessories.

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Polywater FTTx does not leak or squeeze into neighboring cells, causing them to seal shut. Use of a "thin-film" lubricant such as FTTx is ideal for this end use.

Prelubricated Duct:
Polywater FTTx is compatible with prelubricated duct.

Traditional Outside Plant Cable Installation:
Polywater FTTx is effective at lower quantity than traditional cable lubricants. It can be pumped, poured, or sprayed into the innerduct.

Quantity Formula for Fiber Cable Installation

Q = K x L x D

Where: Q = Quantity of lubricant gallons (liters)
L = Length of conduit in feet (meters)
D = Cable diameter in inches (mm)
K = .0003 (.0002 if metric)

Appropriate quantity for use on any given pull can vary from this recommendation by 50%, depending on complexity. Adjust the volume of pulling lubricant based on cable stiffness, conduit type and condition, conduit fill, and pulling environment.

MODEL SPECIFICATION

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

The cable pulling lubricant shall be Polywater FTTx. Lubricant has a low viscosity that may be sprayed without clogging valves or applicators. It shall coat and cling to the cable. It shall be nonstaining. Lubricant shall produce a low coefficient of friction on communication cable jacket materials and shall lubricate at low-coating thickness. Lubricant shall continue to reduce friction after it has dried. It shall conform to the physical and performance requirements of Telcordia Standard, GR-356-CORE, Generic Requirements for Optical Cable Innerduct, Associated Conduit, and Accessories. It shall have a limited effect on data cable signal attenuation. It shall not contain solvents and shall not have a flash point.

No substitutions are permitted without certification from an officer of the manufacturer that the substitute product meets all the requirements of this specification.

ORDER INFORMATION

CAT #	PACKAGE DESCRIPTION
FTTx-D20	20-ct wipe canister 12/case
FTTx-35LR	1-qt. spray bottle (.95 liter) 12/case
FTTx-128	1-gal. jug (3.7 liter) 4/case
FTTx-640	5-gal. pail (18.9 liter)

CONTACT US

+1-651-430-2270 Main | +31 10 233 0578 Europe & Africa | +971 4 5521709 APAC & GCC | email: support@polywater.com

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