Polywater® FTTx Communications Lubricant

American Polywater® Corporation

TECHNICAL SPECIFICATION

Description:

Polywater® FTTx Lubricant is a high-performance, liquid cable pulling lubricant designed specifically for communication cable installations. Lubricant 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. Lubricant FTTx works even after it has dried. The residue is a thin, slippery film that retains lubricity for months after use.

Polywater® FTTx Lubricant 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 cylinder. A variable incoming weight is attached to the cable as it is pulled at a set rate of 65 feet per minute. A load cell takes pulling tension data, which is used to determine a "dynamic" friction coefficient.

Coefficient of Friction for MDPE-Jacketed Cable on HDPE Continuous Innerduct

Back Tension	Wipe Application	Spray Application
8 lb_f	.09	.09
25 lb_f	.08	.07

[1] Telcordia Standard TR-NWT-002811, Section 4.1.3 and 4.1.4; Generic Requirements for Cable Placing Lubricants.

Product Benefits:

- Easy spray or wipe application
- Lubricates with a thin film
- Excellent friction reduction
- Performs after drying
- Compatible with cable jackets
- Clean and non-staining

End Use:

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

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 Lubricant will completely coat a one-inch diameter PVC-jacketed cable dipped six inches into the lubricant; then withdrawn within 10 seconds.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 one minute (at 70°F).

Combustibility:
Lubricant has no flash point and dried residue is non-flammable.

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

Physical Properties:

Property	Result
Appearance:	Slightly thickened, white liquid
Percent Non-Volatile Solids:	3%
VOC Content:	0 gms/liter
Viscosity:	250–750 cps @10rpm
pH:	6.5–8.0

Application Properties:

Temperature Use Range:
20°F to 120°F (-5°C to 50°C).

Temperature Stability:
No phase-out after five freeze/thaw cycles or 5-day exposure at 120°F (50°C). *Will not phase out or separate during the shelf life of lubricant.*

Clean-Up:
Non-staining. Complete clean-up with water.

Storage and Shelf Life:
Store tightly sealed, away from direct sunlight. Lubricant shelf life is one year past the date of manufacture.

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 Telcodia 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 duct.

For normal cable pulls, prelube the conduit by spraying five to ten 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 in above.

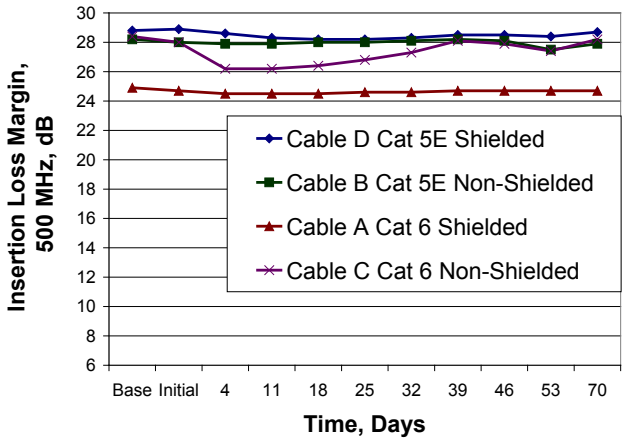
High-efficiency spray pulling lubricants are effective with very thin coats in the range of 1 to 5 mg/cm^2 of jacket surface. See product usage section for lubricant quantity formulas.

Product Usage and Application Systems:

Polywater® FTTx Lubricant is innovative. It is intended for flexibility and ease in use. 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.

Data Cables in 100 ft., Closed Conduit



Polywater® FTTx shows dramatic friction reduction in data cable installations. Data cable 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 reduces 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."*

FTTx may be sprayed on a towel or a pre-saturated FTTx-D20 wipe can be used to efficiently apply the lubricant to the cable jacket. These pre-saturated wipes apply a thin, even coat of lubricant on cables. The towel material is specifically formulated to release lubricant without mess.

Wipe Application

Quantity Formula for High Performance Data Cables

Q = 4 X n X D

Where:
Q = Quantity lubricant, fluid ounces per 100 ft
n = Number of cables in conduit
D = Average cable diameter in inches

Approximate quantity will vary by complexity of pull and field conditions.

Cable Pushing and Fiber Drops:
Polywater® FTTx Lubricant eases short installations of fiber where the fiber is pushed up to 300 feet. It effectively lowers friction so that the cable can be pushed farther distances, eliminating the need to blow or rod in pulling tapes.

The FTTx-35LR comes with an easy application trigger sprayer. The trigger head is industrial quality, high volume. Use this package to apply FTTx Lubricant directly to the cable or to inject into conduit.

Spraying Action

Note: A high-volume trigger sprayer injects one fluid ounce per 20 sprays.

Product Usage and Application Systems:

Textile Innerduct:
Proven to reduce friction on these specialty fabrics, Polywater® FTTx Lubricant is perfect for use with textile innerducts. 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 innerduct is placed in 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 TR-NWT-002811, Section 4.1.3 and 4.1.4; Generic Requirements for Cable Placing Lubricants.

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Polywater® FTTx doesn't 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 Lubricant is compatible with prelubricated duct.

Traditional Outside Plant Cable Installation:
For traditional cable installations, Polywater® FTTx Lubricant 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 = .00038 (.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 specific job specification to help maintain engineering standards and ensure project integrity.

The cable pulling lubricant shall be Polywater® Lubricant 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 non-staining. 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, TR-NWT-002811, Generic Requirements for Cable Placing Lubricants. 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 of the requirements of this specification.

Order Information:

Cat #	Package Description
FTTx-D20	20-ct wipe canister 12/case
FTTx-35LR	1-quart spray bottle (0.95 Liter 12/case
FTTx-128	1-gallon pail (3.78 Liter) 4/case
FTTx-640	5-gallon pail (18.9 Liter)

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