Polywater® F Communications Lubricant

American Polywater® Corporation

TECHNICAL SPECIFICATION

Description:

Polywater® F Lubricant is a high performance, pourable liquid, cable pulling lubricant recommended for pulling underground fiber optic cable. Polywater® F is also suitable for pulling coaxial and copper-pair cable.

Polywater® F wets and clings to cable jacket and evenly coats the jacket surface. It continues to lubricate by leaving a lubricating film after its water base has evaporated. Polywater® F is compatible with a broad range of cable jackets, including polyethylene types.

Polywater® F is a thick liquid, and is applied by pouring or pumping the lubricant into the duct system. F is a popular lubricant and used in the pulling over 50,000 miles (80,000 km) of fiber optic cable into duct.

Friction Testing:

Friction is measured using a standard Telcordia test procedure[1]. HDPE duct is wrapped 420° around a three-foot-diameter (0.91 m) cylinder. A weight is attached to the back of the test cable (variable back tension). Pulling force is measured as the cable is pulled at 65 ft/min (19.8 m/min) through the wrapped duct. A friction coefficient is calculated from the pulling force/back tension ratio. Results below are typical values.

Coefficient of Friction for Communication Cable into HDPE Smoothwall Innerduct

Back Tension	Cable Jacket		
	MDPE	HDPE	PVDF
8 lb_f	.10	.12	.10
14 lb_f	.10	.12	.09
25 lb_f	.10	.11	.09

Polywater® F Lubricant shows good friction reduction for these common cable jackets at both high and low bend shear.

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

Product Benefits:

- Field proven performance
- Easy to pour into innerducts and feeder tubes
- Approved and recommended by many cable manufacturers
- Superior friction reduction
- Carries with cable for long distance - wets and clings to cable.
- Compatible with cable jackets
- Clean and non-staining

End Use:

Use for all types of cable installations, including:

- Outside plant cable pulls
- Underground cable installation
- Lightweight cable, long-haul installation

Performance Properties

For fiber pulling, special pulling lubricants are required for the long lengths and significant duration of the pulls. Lightweight fiber cable can rub on both the top and bottom of the duct, so the lubricant must completely coat the cable jacket and stay evenly coated. The lubricant must remain slippery over time, and not dry to a hard or sticky residue.

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

Polywater® F Lubricant will wet and coat evenly on jacket surfaces. A half-inch (13 mm) diameter PE-jacketed cable shall be dipped six inches (152 mm) into Polywater® F Lubricant for 10 seconds and then removed. The lubricant coating shall cover 100% of the cable jacket without dripping off, beading up, or pulling away from the edges as the cable is held horizontally for one minute at 70° F (21° C).

Stringy Rheology:
"String" character is a measure of the lubricant's pituity and its ability to adhere, follow and stay with cable over long distances.

A ¼-inch (6 mm) fiber cable (MDPE jacket) dipped two inches (50 mm) into Polywater® F Lubricant and then pulled out at a 40 inches/minute rate (100 cm/min) will produce a non-supported, lubricant string length greater than 8 inches (20 cm) .

Pourability:
Pourability is a measure of the lubricant's ease of pouring.

Five gallons (18.9 l) of Polywater® F Lubricant will empty from a Reike® spouted 5-gallon pail in less than 90 seconds (no air relief) and in less than 60 seconds with air relief.

Combustibility:
Polywater® F Lubricant has no flash point and its dried residue is not flammable.

Physical Properties:

Property	Result
Appearance:	Orange-colored, stringy liquid
Percent Non-Volatile Solids:	< 5 %
VOC Content:	60 gms/liter 260 gms/liter (wintergrade)
Viscosity:	1,000 – 3,000 cps @10rpm
pH:	8.0 – 9.5

Application Properties:

Temperature Use Range:
Polywater® F:
20° F to 140° F (-5° C to 60° C).
Polywater® WF (wintergrade version):
-20°F to 140°F (-30° C to 60° C).

Temperature Stability:
Polywater® F will not show more than a 20% change in Brookfield viscosity from 40° F to 100° F (5° C to 40° C). Polywater® F will not phase-out after five freeze/thaw cycles or 5-day exposure at 120° F (50° C). Polywater® F will not phase out or separate over the shelf life of the lubricant.

Clean-Up:
Polywater® F is non-staining. Complete clean-up is possible with water.

Storage and Shelf Life:
Store Polywater® F in a tightly sealed container away from direct sunlight. Lubricant shelf life is one year.

Cable Compatibility:

Polyethylene Stress Cracking:
Polywater® F does not cause stress cracking of polyethylene jackets commonly used on communications cables.

Cable jacket polyethylene blends were tested according to ASTM ESCR standard method.[1]

DFDA 0588 Low density polyethylene
DFDA 6049 Linear low density polyethylene
DHDA 6497 Medium density polyethylene
DGDJ 3479 High density polyethylene
MDPE Stripped Cable Jacket

After 500 hours immersion in Polywater® F none of the specimens showed failures.

Polycarbonate Stress Cracking:
Polywater® F does not stress crack polycarbonate. Polycarbonate bars were bent to a defined stress and exposed to Polywater® F lubricant as described in the Telcordia standard[2], Section 8.2, Stress Cracking of Polycarbonate". After 48 hours, none of the test specimens showed crazing or cracking.

[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® F can be poured or pumped directly into the conduit before and during the pull. Coat the entire cable as it enters the conduit.

Polywater® F can be pumped with the Polywater® LP-D5 specialty lubricant pump. Pumping allows hands-free transfer and consistent application of lubricant.

Clean up by wiping off any excess lubricant with a rag.

Recommended Lubricant Quantity

Q = k X L X D

Where:

Q = quantity in gallons (liters)
L = length of conduit run in feet (meters)
D = ID of the conduit in inches (mm)
k = 0.0015 (0.0008 if metric units)

The quantity that is appropriate for any given pull can vary from this recommendation by 50%, depending on the complexity of the pull. Consider the following factors:

Cable weight and stiffness
(Increase quantity for stiff, heavy cable)

Conduit condition
(Increase quantity for old, dirty or rough conduits)

Conduit fill
(Increase quantity for high percent conduit fill)

Number of bends
(Increase quantity for pulls with several bends)

Pulling environment
(Increase quantity for high temperatures)

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 F. The lubricant shall contain no waxes, greases, silicones, or waxes.

The lubricant shall be a pourable liquid with good wetting (coating) properties. It shall have a friction coefficient less than 0.15 using MDPE-jacketed cable and HDPE innerduct.

The lubricant shall conform to the physical and performance requirements of Telcordia Standard, TR-NWT-002811, "Generic Requirements for Cable Placing Lubricants". It shall not stress crack polyethylene when tested by ASTM 1693. .

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
	Regular
F-35	1-quart squeeze bottle (0.95 liter)
F-128	1-gallon jug (3.78 liter)
F-320	2 ½- gallon jug (9.5 liter)
F-640	5-gallon pail (18.9 liter)
	Wintergrade
WF-35	1-quart squeeze bottle (0.95 liter)
WF-128	1-gallon jug (3.78 liter)
WF-320	2 ½- gallon jug (9.5 liter)
WF-640	5-gallon pail (18.9 liter)

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