TECHNICAL DATA SHEET

POLYWATER® + SILICONE™ NN LUBRICANT

polywater.com

DESCRIPTION

Polywater® + Silicone™ NN Lubricant provides superior tension reduction and is suitable for all types of cable pulling. It is used for long pulls of heavy cable. In this type of pulling, the superior tension reduction and continued lubrication while pulling through water are well documented.

Polywater NN comes as a pourable, gel lubricant. While it can be applied by hand, it is best to pour or pump the lubricant into the duct system.

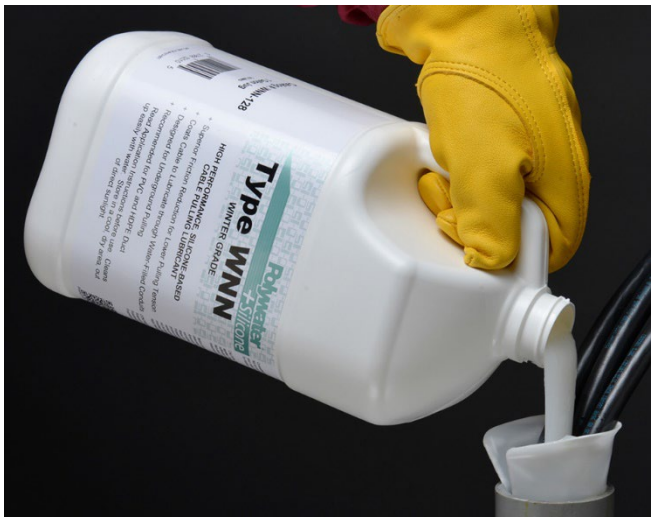
Polywater NN is suitable for use with factory lubricated duct. It continues to lubricate under high sidewall pressure forces in conduit bends. Polywater NN is slow drying. The residue is a thin, slippery film that retains its slip for months after use.

FRICTION TESTING

Lubricity: Polywater NN Lubricant shows superior friction reduction on a variety of jacket types. Typical friction coefficients at 200 lbs/ft (2.91 kN/m) normal pressure are shown. Test results are based on the method described in the white paper, "Coefficient of Friction Measurement on Polywater's Friction Table, 2019". Values are averages based on cable jacket and conduit materials from multiple manufacturers.

CABLE JACKET	CONDUIT TYPE			
	HDPE	PVC	STEEL	FRP
LLDPE	.05	.11	.13	.14
PVC	.08	.09	.13	.14
CPE	.08	.10	.20	.16
XLPE	.07	.08	.13	.07
PP	.07	.05	.17	.10

Coefficient of friction data on additional or specific cable jackets or conduits can be obtained from American Polywater Corporation.



Polywater + Silicone Lubricant is easy to pump or pour into conduit.

PRODUCT FEATURES

- **Heavy Pulls:** Preferred lubricant for underground transmission cable installations.
- **Water Resistant:** Does not wash off. Reduces tension even when pulling through water.
- **Very Low Friction:** Consistently low friction and tension when pulling through HDPE and PVC pipe.
- **Specification Grade:** Meets high performance requirements for installation of heavy transmission cable and for pulling cable through wet environments.
- **Nonfreezing Formula:** Polywater WNN can be used for cold weather (subfreezing) pulling. All lubricants are freeze/thaw stable.

CABLE COMPATIBILITY

Tensile and Elongation:
LLDPE, HDPE, PP, XLPE, CPE, and PVC cable jacket materials aged in Polywater NN per IEEE Standard 1210[1] meet the tensile and elongation retention requirements of that standard.

Polyethylene Stress Cracking:
Polywater NN shows no stress cracking on LLDPE, MDPE, or HDPE cable jacket when tested per IEEE Standard 1210.[1]

Volume Resistivity:
There are no significant changes in the conductive properties of XLPE and EPR semi-conducting compounds when volume resistivity is tested according to IEEE Standard 1210.[1]

Cable Approvals:
Polywater NN is approved and used by many cable manufacturers. Contact American Polywater for further information.

Field Data:
Polywater NN has been specified and used on many long, heavy cable installations. Side-by-side comparison pull tension data is available. Contact American Polywater for details.

[1]IEEE Std 1210-2004, IEEE Standard Tests for Determining Compatibility of Cable-Pulling Lubricants with Wire and Cable.

PHYSICAL PROPERTIES

PROPERTY	RESULT
Appearance	Cream-colored, pourable gel
Wax and grease content	None
Non-volatile solids (%)	3.5
VOC content	10 gm/L 200 gm/L (Winter Grade)
Viscosity	13,000-20,000 cps @10rpm
pH	7.5-9.0

PERFORMANCE PROPERTIES

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

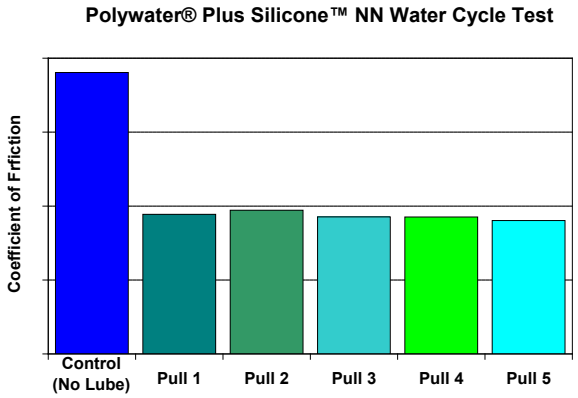
Polywater NN will wet out evenly on cable jacket surfaces. It will not bead up or rub off the jacket sample. A 1-inch (25 mm) diameter XLPE cable dipped 6 inches (152 mm) into the Polywater NN, then withdrawn and held vertically, will retain at least 15 grams of Polywater NN for one minute at 70°F (21°C).

Friction Reduction through Water:
Friction Reduction through Water is a measure of a lubricant's function through water.

Polywater NN will not show a significant increase in friction coefficient when tested with five water change cycles as described below.

A cable coated with Polywater NN was pulled through a water-filled HDPE duct wrapped 420° around a 3-foot diameter cylinder.[2] For this test, 25 lbs. of back tension was used. Measured tension was used to calculate friction coefficient as described in the Telcordia test procedure.[2] After each pull (cycle), the conduit was rinsed, cleaned, and fresh tap water was added. The same cable was pulled again, and tension measured. The cable was not relubricated between cycles.

DIRECTIONS FOR USE



Actual data from the test (above) shows no change in friction coefficient through five water change cycles.

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

APPLICATION PROPERTIES

Application Systems:
Polywater NN has a thin gel consistency and can be poured directly into the conduit. Polywater NN can be pumped into the conduit or onto the cable using the Polywater LP-D5 specialty lubricant pump. Use of a pump allows hands-free transfer and consistent application of lubricant. This low-shear pump will not change the gel character of Polywater NN. The LP-D5 pump supports lubricant application rates of 1-2 gallons (4-8 liters) per minute.

Pull-Planner™ Tension Calculation Software is available from Polywater. Pulling tension estimations can ensure the use of appropriate pulling equipment and that the cable is installed within safe limits.

A Winter Grade version (WNN) *is also available for use during installation work below freezing.*

Temperature Use Range:
Polywater NN:
20°F to 120°F (-5°C to 50°C).
Polywater WNN (Winter Grade version):
-20°F to 120°F (-30°C to 50°C)

Temperature Stability:
Polywater NN and WNN will not phase out after five freeze/thaw cycles or 5-day exposure at 120°F (50°C).

Clean-up:
Polywater NN and WNN are nonstaining. Complete clean-up is possible with water.

Storage and Shelf Life:
Store Polywater NN (WNN) in a tightly sealed container away from direct sunlight. Lubricant shelf life is 18 months.

DIRECTIONS FOR USE

Lubricants NN and WNN can be poured or pumped directly onto the cable as it enters the conduit.

To prelubricate for long or difficult pulls, pour Polywater NN (WNN) into the conduit before the pull begins and spread with a mandrel or a swab on the winch line during the pull. For long horizontal pulls, place as much as two-thirds of the recommended quantity of lubricant into the conduit for prelubrication.

Directly lubricate the cable jacket as it enters the conduit for the entire length of the pull.

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

Recommended Lubricant Quantity:

$$Q = K \times L \times D$$

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 jacket hardness
(Increase quantity for stiff, heavy cable)

Conduit type and conditions
(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 customer specification to help maintain engineering standards and ensure work integrity.

The cable pulling lubricant shall be Polywater® + Silicone™ NN Lubricant. The cable pulling lubricant shall provide a low coefficient of friction on a wide variety of cable jacket materials. The lubricant shall leave a low solids residue of less than 4.0%.

The lubricant shall be compatible with the cable jacket material. Cable jacket compatibility shall be tested by the IEEE 1210, Standard Tests for Determining Compatibility of Cable-Pulling Lubricants with Wire and Cable. The lubricant shall not stress crack polyethylene per ASTM Standard 1693. There shall be no significant changes in the conductive properties of XLPE and EPR semi-conducting compounds when the lubricant's effect on volume resistivity is tested according to IEEE Standard 1210.

The lubricant shall not show a significant increase in friction coefficient over five water change cycles when tested through a water-filled duct via Telcordia test standard GR-356-CORE, Section 4.2.5. The cable shall not be relubricated during the test.

ORDER INFORMATION

CAT #	PACKAGE DESCRIPTION
NN-128	1-gallon jug (3.78 liter) 4/case
NN-320	2½-gallon jug (9.6 liter) 2/case
NN-640	5-gallon pail (18.9 liter)
	Winter Grade
WNN-128	1-gallon jug (3.78 liter) 4/case
WNN-640	5-gallon pail (18.9 liter)

CONTACT US

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