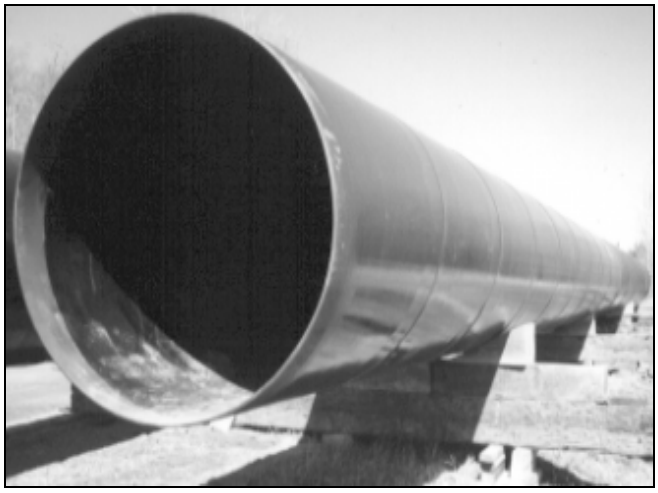
PRODUCT COMPARISON REPORT
97.02.15

100% Solids Rigid Polyurethane Coatings vs. Tape Wrap Coatings



100% Solids Rigid Polyurethane Coating

Tape Wrap Coating

- ***HANDLING DAMAGE***
- ***ADHESION***
- ***AGING***
- ***CATHODIC SHIELDING***
- ***SOIL STRESS***

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100% solids rigid polyurethane coatings outperform tape wrap systems to provide greater longevity due to better resistance to damage and corrosion. The higher performing polyurethane coatings exhibit superior impact resistance, greater tensile adhesion to the metal substrate, better weathering resistance, and higher abrasion resistance than tape wrap systems.

Resistance to Handling Damage

Tape wrap coatings are often damaged during shipping, handling, storage, and installation. Poor impact resistance and inadequate adhesion to the substrate allow for easy damage to the tape wrap corrosion protection system. In fact, the heavier the pipe, the more likely that coating damage will occur.

100% solids rigid polyurethane coatings provide a corrosion protection system that will resist shipping and handling damage so that the protective coating system is able to offer a superior in-service corrosion protection system.

Tape coatings are often damaged during shipping, storage, handling, and installation thereby requiring frequent and difficult repairs.

Adhesion

One of the main requirements of a coating system is to adhere well to the pipe surface. Tape wrap coating systems have very poor adhesion to the substrate. Poor adhesion results in easy disbondment of the tape from the pipe surface and the creation of corrosion cells and areas of cathodic shielding.

100% solids rigid polyurethane coatings have adhesion values of over 2000 psi to metallic substrates with superior cathodic disbondment results.

Cathodic Shielding

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The disbonding of tape wrap systems from the steel surface can result in the creation of a corrosion cell underneath the coating from anaerobic bacteria, even if the pipeline is cathodically protected. If potentials are increased in an attempt to correct the problem, further disbondment can result from the formation of hydrogen gas bubbles under the tape. 100% solids rigid polyurethane coatings have superior adhesion to the substrate. Very low cathodic disbondment values around damaged areas resist the advance of the corrosion, especially when used with a cathodic protection system.

Soil Stress

Tape coating systems are vulnerable to damage by soil stress in soils that are heavy or of a clay consistency. Tapes disbond from the substrate in cases of shear stress or simply unravel as the pipe or soil moves.

100% solids rigid polyurethane coatings are impact and abrasion resistant products that adhere to the surface with values of over 2,000 psi. Historically, rigid polyurethane coating systems have been used for directional drilling and rock shield applications due to their superior shear stress and abrasion resistance.

Aging

Plasticizers can contribute up to 50% of the weight of a tape wrap system. These plasticizers leach from the tape over time due to sunlight exposure, microbiological attack, or immersion in water.

The loss of plasticizers cause the tape wrap coatings to become brittle, crack, and eventually fall apart. This leads to an increase in cathodic protection demands and can create corrosion cells under the tape coating.

100% solids rigid polyurethane coating systems are UV and bacteria resistant, while also being impermeable to water during immersion service.

Summary

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Tape coat systems are subject to frequent damage, poor adhesion to the substrate, cathodic shielding, and poor aging.

100% solids rigid polyurethane coatings have superior impact resistance, high tensile adhesion values, resistance to cathodic disbondment, and long service life.

References:

1) Benedict, R., “Evaluation of Tape Coats for Large Diameter Water Transmission Lines”, CORROSION 94, no. 563 (Houston, TX: NACE International, 1994).

2) Jack, T.; Wilmott, M.; Sutherby, R.; Worthingham, R., “External Corrosion of Line Pipe - A Summary of Research Activities”, (Materials Performance, Houston, March 1996), pp.18-24.

3) Jack, R.; Van Boven, G; Wilmott, M.; Worthingham, R., “Evaluation of Coating Performance After Exposure to Biologically Active Soils”, CORROSION 95, no. 353 (Houston, TX: NACE International, 1995).

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