Application Profile

Scotchkote™ Liquid Coatings For Girthwelds (Field Joints)

Introduction

The coating of girthwelds is a critical factor for the final integrity of the complete anti-corrosion system utilized on line pipes. The coated girthweld area is often viewed as the weakest link in pipeline corrosion mitigation.

The goal is to provide a field-applied coating system with equal durability, design life and functionality as the parent mill-applied line-pipe coating system. 3M™ Scotchkote™ 323 100% solids liquid coating system is both practical and cost effective. It is fully compatible with the parent mill-applied coating, providing total integration at the mill-applied overlap interface.

The product is available in both a 100% Solids Epoxy version – 3M™ Scotchkote™ 323 Epoxy Coating – and in a 100% Solids Urethane version – 3M™ Scotchkote™ 352 Urethane Coating. The Scotchkote 352 liquid coating (refer to the specific data sheet for the product being used and suitability of coatings) adheres to the polyolefin and provides improved compatibility with 3-layer epoxy polyolefin (3LPE/PP) mill-applied coatings.

Application Description

3M™ Scotchkote™ Liquid Coatings may be applied by plural component spray equipment or simply by lint-free rollers or brush. Coating performance is dependent upon the cleanliness and preparation of the substrate receiving the coating. The surface must be clean, dry, free of loose rust, scale, paint, and all oils and grease, etc. Metal should be blast cleaned in accordance with NACE No. 2/SSPC-SP10/ISO 8501:1, Grade 2 1/2 to a near-white finish using a suitable abrasive media.

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Product Description

Scotchkote™ liquid coatings are designed to overlap onto the main pipeline coating that is feathered at least 2" from the bare metal at the girthweld. Scotchkote liquid coatings may be applied at a wide range of substrate temperature at a minimum of 3°C (37.4°F) above the dew point, to a recommended minimum film thickness of 25 mils (635 microns).

Figure 2. Process schematic for field application.

<table>
<thead>
<tr>
<th>Temperature</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>5°C (41°F)</td>
<td>7 hrs</td>
</tr>
<tr>
<td>24°C (75°F)</td>
<td>1 hr 45 mins</td>
</tr>
<tr>
<td>50°C (122°F)</td>
<td>25 minutes</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Temperature</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>-5°C (23°F)</td>
<td>48 hrs</td>
</tr>
<tr>
<td>10°C (50°F)</td>
<td>4 hrs</td>
</tr>
<tr>
<td>35°C (95°F)</td>
<td>1 hr</td>
</tr>
<tr>
<td>65°C (149°F)</td>
<td>10 minutes</td>
</tr>
<tr>
<td>100°C (212°F)</td>
<td>5 minutes</td>
</tr>
</tbody>
</table>

Figure 3. Cure time vs. substrate temperature.

Product Description

Both Scotchkote 323 liquid coating and Scotchkote 352 liquid coating are two-part systems designed to protect steel pipe and other metal surfaces from the effects of corrosion, without contributing to shielding issues with CP (cathodic protection) systems. The coating materials are 100% solids and do not require thinning with solvents. Scotchkote 323 has a mix ratio of 2 parts A to 1 part B by volume, while Scotchkote 352 has a mix ratio of 3 parts A to 1 part B. The coating material is supplied in various pack sizes: Scotchkote 323 comes in 50 mil, 400 mil, quarts, gallon and 5 gallon pails (the 55 gallon drum is made to order), Scotchkote 352 comes in 1.3 liter kits, 5 gallon pails and 55 gallon drums. Pot life and gel time varies depending on temperature.

Approximate backfill time for Scotchkote liquid coating 323
- @ 24°C / 75°F: Approximately 2 hrs 39 mins
- @ 50°C / 122°F: Approximately 39 mins

Approximate backfill time for Scotchkote liquid coating 352
- @ 24°C / 75°F: Approximately 3 hrs
- @ 40°C / 104°F: Approximately 20 mins
Product Benefits / Advantages

There are a number of advantages to be attained from using Scotchkote liquid coatings on girthwelds:

- **Conformity** – Scotchkote liquid coatings form a physical bond with the substrate and the main-line coating, even on irregular shapes, while tapes and shrink sleeves are basically wrapped around pipe.

- **Safety** – Scotchkote liquid coatings may be applied at a wide range of temperatures without having to use heat. Shrink sleeves require an open flame torch. There are many issues encountered when an open flame for heating has to be used in a process area, and the Safety Officer has to give out “Hot Work” permits.

- **Productivity** – Full cure is achieved in a relatively short time.

- **100% Solids** – Low VOC, environmentally friendly.

- **High Build** – 1000 micron film achievable in a single coat.

- **Fewer Installation Steps** - Scotchkote liquid coatings are user-friendly and have fewer application steps in girthweld coating when compared to shrink sleeves.

- **Faster Installation** – Pipes can be buried in 35 minutes.

- **Versatile** – Application by roller, brush or spray.

- **Functionality** – Performance matches mill-applied coatings with outstanding cathodic disbondment operating temperatures of up to 95°C (203°F) for 323 coating and 60°C (140°F) for 352 coating.

- **Compatibility** – Scotchkote liquid coatings are compatible with all epoxy based coatings. In 3LPE/PP systems, 352 coating offers intimate bonding to the polyolefin coating. Scotchkote coatings have excellent resistance to hydrocarbons, chemicals and varying soil conditions.

- **Durability** – Scotchkote liquid coatings provide a long term coating solution.

Competition

Two competitive girthweld corrosion mitigation systems are: cold applied tapes, and; heat shrink sleeves. These systems are relatively low cost, but offer limited corrosion protection to pipeline systems. Properly applied shrink sleeves are not low cost.

There are also a number of liquid-coating systems from competitors, such as Denso, Specialty Polymer Coatings (SPC), Ameron, Enviroline and Carboline.

Approach to Market

3M™ Scotchkote™ Liquid Coatings are designed for use on any cathodically protected buried pipeline. The coatings are also commonly used as standalone systems on pipelines or as a repair coating for pipe rehabilitation. Target markets for Scotchkote liquid coatings include refineries, gas and chemical plants, manufacturing plants, water and power utilities and offshore platforms. In North America emphasis has been on pipeline rehabilitation and the water market.

Application Method

Scotchkote liquid coatings are available in two grades, brush grade and spray grade.

The brush grade is applied using a lint free ¼” nap paint roller. A good quality (bristles do not come off easily) paint brush is also acceptable.

The spray grade is applied using plural component spray equipment. This type of equipment is available from suppliers like Graco (www.graco.com).

**Note:** 323 coating is designed for use below grade for corrosion and potable water. 352 coating may be used in UV applications.
Key Objections and How to Overcome

Contractors prefer to use shrink sleeves because of less QC, less equipment, faster process, etc. Try to work with pipeline project engineers and end-user-to convince them to use the best coating to protect their project from corrosion. Type of equipment is available from suppliers like Graco (www.graco.com).

Key Learning Points

1. Comfort level – engineering consultants and applicators generally stick to traditional systems.
2. Success comes from relationships in this industry. Establish cooperation between consultants, site contractors, pipe-owner, material supplier and inspectors. Work with the contractor to gain support.
3. Local sales representative must have both product and technical knowledge.
4. Must have local inventory.
5. Get on the specification to authorize the use of Scotchkote coatings.
6. Faster curing coatings are desirable.
7. Training demos are very important.
8. 352 coating (for use with 3-layer epoxy polyolefin (3LPE/PP)) must be applied by experienced companies like Pipeline Induction Heat, Ltd. (PIH).

Please refer to the appropriate data and instructions for the 323 coating and 352 coating products.