

# POLYKEN®



## Polyken 942/955 Tape Coating System For Buried Pipelines

*Berry Plastics warrants that the product conforms to its chemical and physical description and is appropriate for the use stated on the technical data sheet when used in compliance with Berry Plastics written instructions. Since many installation factors are beyond the control of Berry Plastics, the user shall determine the suitability of the products for the intended use and assume all risks and liabilities in connection herewith. Berry Plastics liability is stated in the standard terms and conditions of sale. Berry Plastics makes no other warranty either expressed or implied. All information contained in this technical data sheet is to be used as a guide and is subject to change without notice. This technical data sheet supersedes all previous data sheets on this product.*



**CORROSION PROTECTION GROUP**

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## **SCOPE**

### **1.0 Field Joint Application Guideline 1027 primer + 942-EN (2 layers) + 955-EN (2 layers) EN12068; DIN 30672 Class C50**

- 1.1 General
- 1.2 Material Storage
- 1.3 Field Joint Preparation
- 1.4 Primer Application
- 1.5 Joint Coating Application
- 1.6 Joint Coating System Repair
- 1.7 Lowering in and Backfill

### **2.0 Field Adhesion Test Method**

### **3.0 Holiday Test Method**

## **1.0 FIELD JOINT APPLICATION GUIDELINE**

### **1.1 GENERAL**

- 1.1.1 This specification will cover the proper application and installation of the Polyken® (Berry Plastics CPG) joint wrap coating system for the exterior protection of welded field joints.
- 1.1.2 The joint coating system shall be applied in accordance with Berry Plastics CPG specifications and the end-user specifications. The joint coating system shall be installed in accordance with size specifications per Berry Plastics CPG recommendations.
- 1.1.3 The pipeline contractor responsible for the application of the joint coating system shall furnish all equipment and properly trained and supervised labor and service required for the specified application of the joint coating system. All equipment and tools required for the application of the joint coating system shall be subject to the approval of the End-user Company. The pipeline contractor shall follow the Berry Plastics CPG application specifications and work in harmony with representatives of Berry Plastics CPG and the end-user to alleviate any difficulties during the application and installation.
- 1.1.4 The contractor shall be responsible for verifying the integrity of the coated field joint. Damaged coating shall be repaired at the contractor's expense. The pipeline contractor shall supply all repair material.
- 1.1.5 At the option of the end-user company or the pipeline construction contractor, Berry Plastics CPG will supply a service person to assist or instruct the contractor and/or the end-user coating inspector with the proper application of the joint coating system.
- 1.1.6 The Berry Plastics CPG (Polyken®) service person shall have the authority, through the end-user representative, to suspend the application of the joint coating system until such time that the application satisfies Berry Plastics CPG (Polyken®) application and quality control standards for the joint coating system.
- 1.1.7 Inspection of coated weld joints shall be performed by coating inspectors qualified either by experience or certified training. The joint coating system shall be applied by properly trained personnel in the application of the joint coating system and meet the approval of Berry Plastics CPG (Polyken®).
- 1.1.8 High-tack adhesive joint wrap tapes are supplied with a coated release liner on the adhesive. This interliner is required to prevent the highly aggressive adhesive from prematurely bonding to the tape backing.

### **1.2 MATERIAL STORAGE**

- 1.2.1 All coating material shall be stored, handled, and transported in such a manner as to prevent damage to individual carton containers. Cartons, tape rolls, or individual repair rolls removed from the storage pallets shall not be dropped, rolled, or thrown in any manner as to damage the coating material. Cartons or tape rolls shall not be handled with hooks, ropes, cables, or any other mechanical devices as to damage the coating materials.
- 1.2.2 Factory rolls and/or cartons shall be stacked on end at all times and no higher than 72 inches (182.88 cm).
- 1.2.3 The coating material shall be stored and/or transported in a dry, ventilated location. Storage temperature shall be a minimum of 60°F / 15.5° C and not exceed 150°F / 65.5° C.
- 1.2.4 Individual cartons or rolls of coating material shall not contact bare ground or bare warehouse floor. Tools or equipment shall not be stacked on top of the rolls.

- 1.2.5 Joint coating materials that have been damaged or show signs of deterioration shall be inspected by representatives of Berry Plastics CPG and at the discretion of the end-user, be rejected.
- 1.2.6 Primer shall be stored in accordance with regulations that govern hazardous material storage. Primer inventory shall rotate on a first in - first out basis. Primer containers shall be marked with receiving date.
- 1.2.7 Joint-coating system waste material, primer containers, stub rolls, empty cartons, release liners, separator papers, and related waste materials SHALL NOT be discarded along the pipeline right-of-way or in the pipeline ditch.
- 1.2.8 Roll separator paper or plastic bag, as supplied by Berry Plastics CPG, shall always be used with the joint wrap tape coatings. The separator paper prohibits adhesive edge bleed of the tape rolls from sticking to unintended surfaces.

### **1.3 FIELD JOINT PREPARATION**

- 1.3.1 The field joint pipe surface shall be free of mud, oil, grease, or any other foreign material that will prevent the joint coating system from bonding to the steel pipe surface. Visible oil and grease shall be removed with suitable solvent. The steel surface shall be dry prior to the application of the joint wrap tapes. KEROSENE shall NOT be used for cleaning the pipe joints.
- 1.3.2 All bare pipe surfaces shall be either power wire brush or abrasive cleaned. The power wire brush cleaned surface shall be cleaned to a Swedish Standards Association (SSA), ISO-8501-ST 2 ½ or ST 3 or Steel Structure Painting Council (SSPC) SSPC-SP3-82 surface finish. The abrasive cleaned surface shall be a minimum commercial blast surface finish as specified in Swedish Standards Association (SSA), ISO 8501-SA 2.5 or Steel Structure Painting Council (SSPC) SSPC-SP6-82 surface finish. All burrs and weld slag shall be removed from the pipe surface.
- 1.3.3 The pipe surface shall be dry and free of any dust particulate prior to the application of the joint coating system. There shall be no flash rust on the pipe surface prior to the application of the coating system.
- 1.3.4 Mill applied primary coating system should be beveled at the cutback area with a power wire brush. Abraded coating shall be removed from the cut back area.
- 1.3.5 The pipe joint surface shall not be covered with dew, frost, or rain moisture prior to the application of the joint coating system. If required by the end-user, prior to the application of the tape coating system, the pipe steel shall be heated to 120°F / 48.8°C, to remove any moisture trapped within the steel surface.

### **1.4 PRIMER APPLICATION**

- 1.4.1 The Berry Plastics CPG (Polyken®) joint coating system 942/955 EN shall ALWAYS be applied with the proper Berry Plastics CPG (Polyken®) primer # 1027. Other primers are available for use. Contact Berry Plastics CPG Representative for more information.
- 1.4.2 Primer is applied to the pipe steel surface with a brush or paint roller to a wet thickness of no less than 2 mils (50 microns) and no greater than 4 mils (100 microns). The primer shall be thoroughly mixed prior to application on pipe. Primer container shall remain covered when not in use. Primer coverage should be between approximately 200 and 400 square feet per gallon. Metric 18.5 to 37 square meters per gallon (1 gallon = 3.785 liters = 9.8 m<sup>2</sup> per liter).
- 1.4.3 The primer shall cover the entire exposed steel surface including the raised circumferential weld bead and overlap onto the mill applied primary coating system by a minimum of 4 inches (10.16 cm).
- 1.4.4 The primer shall be dry to "tacky to touch" prior to the application of the joint wraps.

- 1.4.5 The primer shall not be diluted. Primer cans shall remain covered when not in use to avoid solvent evaporation and contamination.
- 1.4.6 If required by the end-user, prior to the application of the joint coating system, the raised girth weld shall be coated with the Polyken® #931 mastic filler. A filler strip, 4 inches (10.16 cm) wide shall be centered, smoothed, and coat the entire surface of the raised girth weld.

## **1.5 JOINT COATING APPLICATION**

- 1.5.1 The cold applied joint wrap tape coating systems shall be applied under hand tension or using a hand-wrapping machine capable of maintaining even, constant tension across the width of the tape.
- 1.5.2 The joint wrap tape coating system 942 EN shall be applied to the primed field joint in either spiral or cigarette configuration, as determined by the end-user specifications. The wrapping process shall start at a minimum of 4 inches (10.16 cm) beyond the cutback edge of the plant applied coating and start on the downside of the pipe. The release liner of 942 tape should be removed just prior to the application of the tape to the primed pipe surface. This will prevent contamination of the high tack adhesive.
- 1.5.3 The joint coating system 942 EN shall be applied under taught hand or machine tension that will result in a smooth, wrinkle free coating. Sufficient tension shall be applied to cause a 1 - 2% neckdown width. The minimum spiral overlap width shall be 50%. Particular attention should be afforded while coating over the girth weld area, to prevent wrinkles in the coating.
- 1.5.4 The mechanical protection layer 955-EN shall be applied on top of the 942 EN under taught hand or machine tension that will result in a smooth, wrinkle free coating. Sufficient tension shall be applied to cause a 1 - 2% neckdown width. The minimum spiral overlap width shall be 50%. When ditch conditions dictate or when required by end-user specifications, additional layers of the joint coating system can be used. The end of the spiral wrap shall be cut on the downside at the 3 or 9 o'clock position on the pipe.
- 1.5.5 The taping materials shall be stored in a facility in accordance with section 2.0 at a minimum ambient temperature of 70°F / 21°C and not to exceed 100°F / 37°C. The rolls shall be removed and transported from the storage facility on a daily consumption basis and conveyed to the right-of-way (ROW) in a heated and covered box, vehicle, or sled. The heated box, vehicle, or sled shall be maintained at a minimum of 70°F / 21°C and not to exceed 100°F / 37° C to insure proper roll body temperature prior to application. The joint coating system shall be stored in the heated vehicle or sled a minimum of 12 hours prior to application and shall be removed directly from the heated vehicle or sled immediately prior to application. The joint coating system SHALL NOT be applied if the coating roll body temperature is below 60°F/ 15.5° C.

## **1.6 JOINT COATING SYSTEM REPAIR**

- 1.6.1 The coated field joint shall be electrically inspected for holidays according to National Association of Corrosion Engineers (NACE) Standard RP-02-74, (Square root of the coating thickness X 1250 volts +/- 20 %). The travel rate of the holiday detector shall not exceed one (1) foot / 30.48 cm per second, nor shall an activated holiday detector remain stationary over the coated field joint.
- 1.6.2 Coated field joints that are damaged prior to lowering in and backfilling shall be repaired with coatings approved by the end-user.
- 1.6.3 The damage area shall be cleaned and the abraded portions trimmed level. The repair coating shall be applied in accordance with the coating manufacturer specifications or recommendations.

## **1.7 LOWERING IN AND BACKFILL**

- 1.7.1 Backfill material shall contain NO large or sharp stones that could damage the joint wrap coating system during backfilling.
- 1.7.2 Perforated rockshield shall be used on backfill operations requiring the utilization of supplemental rockshield protection.

## **2.0 FIELD ADHESION TEST METHOD**

The method for conducting pipe coating adhesion testing in a coating plant or on the right of way is described below. The tests should be performed min 120 hrs after coating (in accordance with EN10329) between 21° and 24°C to achieve proper values without slip stick or other strange values.

- 1) Cut with a sharp knife a 2 cm wide strip of coating approximately 30 cm long through the coating. Make certain that the coating is cut through to the underlying pipe surface. Remove the outer wraps. Use only the inner wrap for the test. Mark the length at 1 cm for the length of the cut.
- 2) Peel back a 5 to 10 cm tab and double over adhesive to adhesive.
- 3) Attach modified vice-grip pliers to the doubled over coating tab.
- 4) Attach a peel-force measuring device to the vice-grip pliers.
- 5) Grip the handle of the measuring device and pull the coating off at a 90° angle. Pull the coating at a constant steady rate of 10 mm / min of peeled coating.
- 6) Record the average peel force. En 12068 class C requires an adhesion value of minimum 10 N / cm.
- 7) Record the separation mode exhibited during the peel test as described below:
  - a) Primer separation is when primer is removed along with the coating and the pipe surface is clean metal.
  - b) Adhesive separation is when the adhesive fails to adhere to the primed pipe surface. The pipe surface is left with primer only.
  - c) Cohesive separation is when the adhesive separates leaving some adhesive on the pipe surface and the remainder on the backing. This is the value we want to see.
  - d) Delamination is when the backing separates from the adhesive. The entire adhesive mass remains on the pipe surface.

## **3.0 HOLIDAY TEST METHOD**

In order to clarify what voltages are to be used for our various coating thicknesses, we have included hereunder a calculation sheet with the recommended jeeping voltage and the tolerable range of voltages per the NACE standard RP-02-74. The mil thicknesses for many combinations of Polyken coating thicknesses are used in the calculation. We have also provided the formula for determining the voltage in the event that a specific calculation is not included on the sheet.

Note that there are three figures given; an exact figure per the formula, and + or – 20% of that figure

representing the NACE acceptable voltage range. These figures can be rounded off to the nearest 100 volts when specifying voltage requirements to customers.

Please find hereunder a copy of the general NACE standard RP-02-74 for high voltage electrical inspection of Pipeline Coatings prior to installation describing the test procedure.

**Voltage Calculations per NACE Specification RP-02-74**

**Formula – Square root (coating thickness) x 1250 ± 20%**

	<b>Mil Thickness</b>	<b>Actual Value</b>	<b>Acceptable Voltage Range</b>
1.	$\sqrt{15 \text{ mil} \times 1250} =$	4840 + 20% = 4840 – 20% =	5800 3900
2.	$\sqrt{20 \text{ mil} \times 1250} =$	5590 + 20% = 5590 – 20% =	6700 4500
3.	$\sqrt{25 \text{ mil} \times 1250} =$	6250 + 20% = 6250 – 20% =	7500 5000
4.	$\sqrt{40 \text{ mil} \times 1250} =$	7906 + 20% = 7906 – 20% =	9500 6300
5.	$\sqrt{45 \text{ mil} \times 1250} =$	8385 + 20% = 8385 – 20% =	10,100 6,700
6.	$\sqrt{50 \text{ mil} \times 1250} =$	8839 + 20% = 8839 – 20% =	10,600 7,200
7.	$\sqrt{65 \text{ mil} \times 1250} =$	10,078 + 20% = 10,078 – 20% =	12,100 8,100
8.	$\sqrt{70 \text{ mil} \times 1250} =$	10,458 + 20% = 10,458 – 20% =	12,550 8,400
9.	$\sqrt{75 \text{ mil} \times 1250} =$	10,825 + 20% = 10,825 – 20% =	13,000 8,700
10.	$\sqrt{80 \text{ mil} \times 1250} =$	11,180 + 20% = 11,180 – 20% =	13,400 8,900
11.	$\sqrt{100 \text{ mil} \times 1250} =$	12,500 + 20% = 12,500 – 20% =	15,000 10,000