POLYKEN®

Polyken 1600HT

Cold Applied, High Temperature Coating System
Reconditioning/Rehabilitation Application Specifications

Headquarters
Franklin, MA, USA
Tel: +1 508 918 1714
US Toll Free: +1 800 248 0149
Fax: +1 508 918 1910
CPG@berryplastics.com

Houston, TX, USA
Tel: +1 713 676 0085
US Toll Free: +1 888 676 7202
Fax:+1 713 676 0086
CPGH@berryplastics.com

Tijuana, Mexico
Tel USA +1 858 633 9797
Fax US: +1 858 633 9740
Tel Mexico: +52 664 647 4397
Fax Mexico: +52 664 607 9105
CPGTJ@berryplastics.com

Westerlo, Belgium
Tel. +32 14 722500
Fax +32 14 722570
CPGE@berryplastics.com

Baroda, India
Tel: +91 2667 264721
Fax: +91 2667 264724
CPGIN@berryplastics.com

HIGH TEMPERATURE COATING SYSTEM
RECONDITIONING/REHABILITATION APPLICATION SPECIFICATION

SCOPE

1.0 General

2.0 Material Storage

3.0 Project Site Conditions

4.0 Pipe Surface Preparation

5.0 Liquid Adhesive Application

6.0 Coating Application

7.0 Coating Inspection and Repair

8.0 Backfill

9.0 Material Safety

Appendix I. Application Tension

Materials Discussed in This Application Guideline

- Polyken 1619 Liquid Adhesive
- 931 and 939 Mastic Filler
- Polyken 1600HT Coating Material

HIGH TEMPERATURE COATING SYSTEM
RECONDITIONING/REHABILITATION APPLICATION SPECIFICATION

1.0 ***GENERAL***

1.1 This specification will cover the proper application and installation of the Polyken high temperature coating system in the field on operating pipelines.

1.2 The coating system shall be applied in accordance with Polyken specifications and the end-user specifications and shall be installed in accordance with size specifications per Polyken recommendations.

1.3 The pipeline contractor or end-user responsible for the application of the coating system shall furnish all equipment and properly trained and supervised labor and service required for the specified application of the high temperature coating system. All equipment and tools required for the application of the coating system shall be subject to the approval of the end-user company. The pipeline contractor shall follow the Polyken application specifications and work in harmony with Polyken and the end-user to alleviate any difficulties during the application and installation of the coated pipe.

1.4 The contractor shall be responsible for verifying the integrity of the coating system. Damaged coating shall be repaired at the contractor's expense.

1.5 At the option of the end-user company or the pipeline contractor, Polyken will supply a service representative to assist or instruct the contractor and or the end-user coating inspector with the proper application of the coating system. The application of the coating system must meet with the approval of Polyken.

1.6 The Polyken service representative shall have the authority, through the end-user representative, to suspend the application of the coating system until such time that the application meets the Polyken application specification.

1.7 Coating inspectors qualified either by experience or certified training should perform inspection of the coated pipe. Properly trained personnel in the application of the coating system shall apply the coating system.

1.8 The coating system consists of Polyken 1619 liquid adhesive and Polyken 1600HT. The patch and repair system also consists of Polyken 1619 primer liquid adhesive and Polyken 1600HT hand applied coating. Additionally for irregular shaped objects and void filling, the Polyken 931 or 939 high temperature mastic filler is recommended. This high temperature mastic filler is applied onto the primed pipe surface prior to over-wrapping with the high temperature coating system.

1.9 The Polyken 1600HT is supplied with a coated release liner on the adhesive. This inter-liner will prevent the highly aggressive adhesive from prematurely bonding to the backing.

2.0 ***MATERIAL STORAGE***

2.1 All coating material shall be stored, handled, and transported in such a manner as to prevent damage to individual carton containers. Cartons, 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 rolls shall not be handled with hooks, ropes, cables, or any other mechanical devices as to damage the coating materials.

2.2 Factory rolls and/or cartons shall be stacked on end at all times and no higher than 72 inches

(183 cm).

2.3 The high temperature coating material shall be stored and/or transported in a dry ventilated location.

2.4 Individual cartons or rolls shall not contact bare ground or bare warehouse floor. Tools or equipment shall not be stacked on top of the tape rolls.

2.5 Coating materials that have been damaged or show signs of deterioration shall be inspected and at the discretion of the end-user and Polyken shall be rejected.

2.6 Polyken liquid adhesive shall be stored in accordance with regulations that govern hazardous material storage. Polyken liquid adhesive inventory shall rotate on a first in - first out basis. Polyken coating waste material, liquid adhesive 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.

2.7 Roll separator paper, as supplied by Polyken, should always be used with the Polyken coating system. The separator paper is placed between the stacked rolls and prohibits edge bleed of the adhesive from sticking to unintended surfaces.

3.0 PROJECT SITE CONDITIONS

Project site conditions should be routinely monitored. Project site temperature issues should be used to determine the optimum roll-body application temperature for the coating system. Polyken recommends that the minimum roll body temperature of the Polyken 1600HT be approximately 70º F (21º C) during application. Particular site conditions may require that the coating application temperature be higher than the minimum requirement of approximately 70º F (21º C). Please refer to data below for guidance of when higher than minimum roll body temperature of approximately 70º F (21º C) would be required. Polyken 933 and/or 934 can be suitably applied at a minimum roll body temperature of 40º F (4.5º C).

3.1 <u>Cold conditions/Cold pipe</u>

- Ambient temperature: below 40º F (4.5º C)
- Pipeline temperature: below 40º F (4.5º C)

Polyken 1600HT roll body temperature should be 70ºF to 90ºF (21º C to 32.2º C). When conditions as noted above are in the 28ºF (-2.2ºC) and below range, it is recommended that the Polyken 1600HT be applied at approximately a 90ºF (32.2ºC) roll body temperature. The system should be applied in a prompt manner to ensure that the heated roll body temperature does not decrease by more than 20ºF by roll end.

3.2 <u>Cold Conditions/ Warm pipe**:**</u>

- Ambient temperature: below 40º F (4.5º C)
- Pipeline temperature: 70ºF to150ºF (21ºC to 65.5ºC)

Polyken 1600HT roll body temperature should approximate that of the pipeline temperature but with a roll body maximum of 120ºF (49ºC). A decrease in roll body temperature during application process should not be more than 20ºF.

3.3 Warm Conditions / Warm pipe:

- Ambient temperature: above 40ºF to 100ºF (4º C to 38º C)
- Pipeline temperature: Identical to ambient

Polyken 1600HT roll body temperature should be minimum of 70ºF (21ºC). Application should be prompt enough so that roll body temperature would not decrease by more than -20ºF. If decrease in roll body temperature is expected to be more than 20ºF by roll end then initial roll body temperature should be slightly higher than minimum 70ºF (21ºC).

3.4 Warm Temperature Conditions:

- Ambient temperature: above 40ºF to 100ºF (4.5º C - 38º C)
- Pipeline temperature: 90ºF to 150ºF (32.2º C to / 65.5º C)

Polyken 1600HT roll body temperature should approximate that of the pipeline temperature but with a roll body maximum of 120ºF (49ºC). Decrease in roll body temperature during application process should not be more than 20ºF. If drop in roll body temperature is expected to be more than 20ºF by roll end then initial roll body temperature should be increased accordingly, but never above 120ºF (49ºC).

4.0 *PIPE SURFACE PREPARATION*

4.1 The pipe surface shall be free of mud, oil, grease, or any other foreign material that will prevent the 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 coating. KEROSENE shall NOT be used for cleaning the pipe surface. Toluene or Heptane Solvent is recommended.

4.2 All bare pipe surfaces shall be abrasive blast cleaned to a Swedish Standards Association (SSA), ISO 8501-SA2/2.5, NACE TM-01-70 #3 or Steel Structure Painting Council (SSPC) SSPC-SP6 commercial blast surface finish. All burrs and weld slag shall be removed from the pipe surface.

4.3 The pipe surface shall be dry and free of any dust particulates prior to the application of the coating system. There shall be no flash rust on the pipe surface prior to the application of the high temperature coating system. This may require additional brush blasting to remove the surface flash rust.

5.0 *LIQUID ADHESIVE APPLICATION*

5.1 The Polyken high temperature coating system SHALL ALWAYS be applied with the required Polyken 1619 liquid adhesive.

5.2 The liquid adhesive is applied to the pipe steel surface with a brush or paint roller to a wet thickness of no less than 2 mil (51 microns) and no greater than 3 mils (76 microns). The liquid adhesive shall not be diluted. Liquid adhesive containers shall remain covered when not in use to avoid solvent evaporation or contamination.

5.3 The liquid adhesive shall cover the entire exposed steel surface. The primed pipe surface shall be free from air borne contamination and completely dry prior to the application of the Polyken 1600HT.

5.4 The liquid adhesive shall not be used as a temporary storage coating. Primed pipe must be immediately coated with the high temperature tape system

6.0 *COATING APPLICATION*

6.1 The Polyken 1600HT coating shall be applied to the pipe in a spiral configuration. Two layers of the high temperature coating system shall be applied in two separate wraps or a single wrap at a 50% overlap or half lap configuration.

6.2 The Polyken 1600HT shall be applied under tension using a powered, wrapping machine capable of maintaining even and constant tension across the coating film width. The wrapping machine shall be equipped with a constant tension braking system and a release liner take-up spool. The release liner should be removed just prior to the application of the coating to the primed surface. This will prevent contamination of the high tack adhesive. The wrapping machine must be equipped with a preceding arm configuration such that the wrapster wheels are on top of the applied coating and not the primed pipe surface. The wrapping machine wheels shall be configured as to not damage or cause wrinkles in the Polyken 1600HT.

6.3 The Polyken 1600HT shall be applied under machine tension that will result in a smooth, wrinkle free coating. Sufficient tension shall be applied resulting in a minimum neck down of 1% and a maximum neck down of 2% of the unstressed coating film width. Particular attention should be afforded while coating over the weld areas, to prevent wrinkles in the coating. The first 1/3 turn around the pipe circumference shall be hand taut. The initial edge of the coating wrap should be held in place until the adhesive layer bonds to the primed pipe surface and will not shear from the pipe surface as machine tension is applied.

6.4 A minimum of two layers of Polyken 1600HT shall be applied to the pipe. If additional protection is required by the end-user, more layers of the Polyken 1600HT can be applied. The additional layers of coating shall be applied in accordance with Section 3.0. The overlaps of the additional layers shall not coincide with each other.

6.5 The end of the coating wrap shall be cut on the downside at the 3 or 9 o'clock position on the pipe. The Polyken 1600HT coating material shall be used as an over-wrap to hold the wrapped coating in place. The Polyken 1600HT coating material shall be circumferentially wrapped around the final edge of the coating and overlapped onto itself by a minimum of 4 inches (100mm). The final wrap of the Polyken 1600HT coating material shall be cut on the downside of the pipe at the 3 or 9 o'clock position.

7.0 *COATING REPAIR*

7.1 The coated pipe shall be electrically inspected for holidays according to National Association of Corrosion Engineers (NACE) Standard RP-02-74. The travel rate of the holiday detector shall not exceed one (1) foot (30.5 CM) per second, nor shall an activated holiday detector remain stationary over the coated pipe surface.

7.2 Sections of coated pipe that are damaged prior to lowering in and backfilling shall be repaired with the Polyken 1600HT high temperature coating system.

7.3 The damage area shall be power wire brush cleaned and the abraded portions of the Polyken 1600HT coating to be trimmed level. The exposed steel pipe shall be primed with Polyken 1619 liquid adhesive. The liquid adhesive shall be applied with brush or roller to a wet film

thickness of 2 - 3 mils (51 to 76 microns).

7.4 The Polyken 1600HT is hand applied over the damage area circumferentially around the pipe. The liquid adhesive shall be dry prior to the Polyken 1600HT. The Polyken 1600HT shall cover the damaged area by a minimum of 4 inch (100 mm) width and shall overlap onto itself by a minimum of 2 inches (50 mm). The overlap shall be located on the downside of the pipe at the 3 or 9 o'clock positions.

8.0 *BACKFILL*

8.1 Backfill material shall contain NO large or sharp stones that could damage the coating system during backfilling.

8.2 Backfilling shall be performed utilizing mechanical drive auger backfilling equipment, inspected and approved by the end-user company. Backfilling shall be performed in such a manner as to prevent damage to the coated pipe.

8.3 The Polyken recommended alternate backfilling methods are front-end dozer with a grading plow or a front-end loader with a side bucket. Prior to backfilling with these alternate methods, the backfill material shall be visually inspected and removed of foreign material such as boulder size stones, wooden skids, tree stumps, and any other foreign material that will damage the coated pipe. The backfill material shall be dropped from the edge of the ditch perpendicular onto the coated pipe and in a manner to prevent damage to the coating.

9.0 *MATERIAL SAFETY*

9.1 All Berry Plastics-CPG Product Material Safety Data Sheets, (MSDS), and precautionary Labels shall be read and understood by all user personnel before using the products.

APPENDIX I.
LINE TRAVEL COATING SYSTEM
RECOMMENDED APPLICATION TENSION

*Neck down tape width (inch)

Original Roll body width	4”	6”	9”	12”
1% neck down tension	3 31/32”	5 15/16”	8 29/32”	11 7/8”
2% neck down tension	3 15/16”	5 7/8”	8 13/16”	11 ¾”

*Neck down tape width (cm)

Original Roll body width	10.16 cm	15.25 cm	22.9cm	30.48 cm
1% neck down tension	10.05 cm	15.09 cm	22.67 cm	30.18 cm
2% neck down tension	9.95 cm	14.94 cm	22.44 cm	29.87 cm