Protective & Marine Coatings

PIPECLAD® 2000
FUSION-BONDED EPOXY

pipeclad®

Revised: December 7, 2021

PRODUCT INFORMATION

PRODUCT DESCRIPTION

PIPECLAD 2000 thermosetting epoxy coating system is engineered to be applied to pipelines. Pipeclad 2000 can be used in single layer applications, as a primer layer for dual layer FBE, as a primer layer for 3 layer PE/PP applications, and as a girth weld coating.

PRODUCT CHARACTERISTICS

Color: Green

Thermal Properties (CSA Z245.20 Section 12.7): Tg_1 54°C-68°C (129°F-154°F)
Tg_2 102°C-114°C (215°F-237°F)

Moisture Content (CSA Z245.20 Section 12.4): 0.6% maximum

Particle Size (CSA Z245.20 Section 12.5): Larger than 250 microns (10 mils) <0.2%
Larger than 150 microns (6 mils) <3.0%

Density (CSA Z245.20 Section 12.6): 1.38-1.48 g/ml

Recommended Coating Thickness:

	Dry microns (mils) - Minimum	Dry microns (mils) - Maximum
FBE systems:	**300** (12)	**400** (16)
Primer in 3-layer PE or PP systems:	**150** (6)	**300** (12)
Girth Weld:	**450** (18)	**1500** (60)

Other thicknesses may be used depending on application conditions and requirements. Contact your Sherwin-Williams representative for assistance.

Gel Times and Cure Times (see graphs on second page):

	Gel Time @ 204°C/400°F
Fast gel:	8.5 seconds ± 20%
Slow gel:	18.4 seconds ± 20%
Long gel:	30 seconds ± 20%
Extra long gel:	50 seconds ± 20%
	Cure Time @ 232°C/450°F
Fast gel:	45 seconds
Slow gel:	90 seconds
Long gel:	110 seconds
Extra long gel:	3.5 minutes

Shelf Life:	12 months if stored below 27°C (80°F)
Specific Gravity:	1.38-1.48
Theoretical Coverage:	0.700 m^2/kg per mm (135 ft^2/lb per mil)
Operating Temperature Range:	-73°C (-100°F) to 110°C (230°F)
Quench Time:	Depends on pipe wall thickness, line speed and temperature.

PERFORMANCE CHARACTERISTICS

Test Name	Test Method		Results
Adhesion (Lap Shear)	ASTM D1002		7,414 psi (51,178kPa)
Cathodic Disbondment	CSA Z245.20 Section 12.8	24 hours, -3.5V, 65°C	2.1 mm avg.
		48 hours, -1.5V, 65°C	2.5 mm avg.
		28 days, -1.5V, 20°C	3.1 mm avg.
		28 days, -1.5V, 65°C	3.9 mm avg.
Cathodic Disbondment (Strained Coating)	CSA Z245.20 Section 12.13, 28 days, -1.5V, 20°C		No cracking
Chemical Resistance Test	90 days @ 23°C: No blistering, loss of adhesion, cracks, delaminating or bleaching: slight softening		
Dielectric Strength	ASTM D149, Breakdown Voltage		>1000V/mil
Elongation	ASTM D2370, Tensile Test		8.6% at break
Flexibility	CSA Z245.20 Section 12.11, fixed mandrel bend, -30°C		>3° per pipe diameter length
Flexibility	09-SAMSS-089, fixed mandrel bend, 0°C		4° per pipe diameter as a single layer with DFT 575-750 microns (23-30 mils)
	09-SAMSS-089, fixed mandrel bend, 25°C		5.5° per pipe diameter as a single layer with DFT 575-750 microns (23-30 mils)
Hot Water Resistance	CSA Z245.20 Section 12.14	24 hours, 75°C	1 Rating
		28 days, 75°C	1 Rating
Impact Resistance	CSA Z245.20 Section 12.12, 16 mm ball, 2.3J, -30°C		No holidays
Penetration	ASTM G17, 23°C		<3%
Porosity	CSA Z245.20 Section 12.10	Cross Section	1 Rating
		Interface	1 Rating
Salt Spray	ASTM B117, 4,000 hours		No rust, no blisters, <2mm creep
Volume Resistivity	ASTM D257		2.92×10^{15} Ohm*cm
		Through film, 500 V	>1.2×10^{15} Ohm*cm
Yield Strength	ASTM D2370, Tensile Test		570 kg/m^2 (8000 psi)

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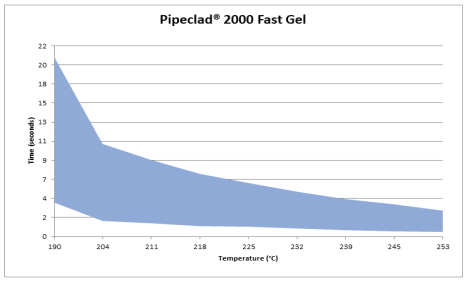
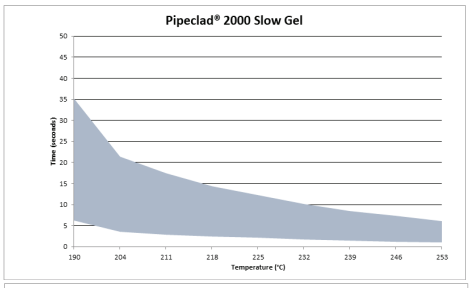
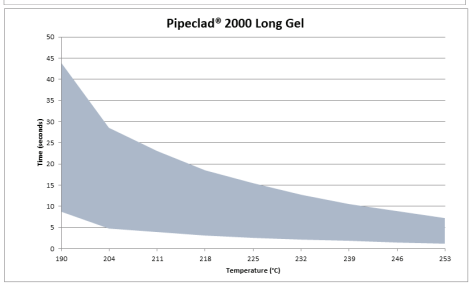
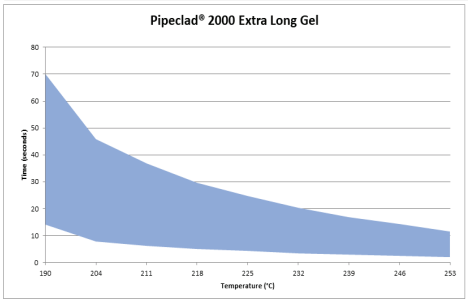
INTERCOAT TIME TO ADHESIVE APPLICATION**



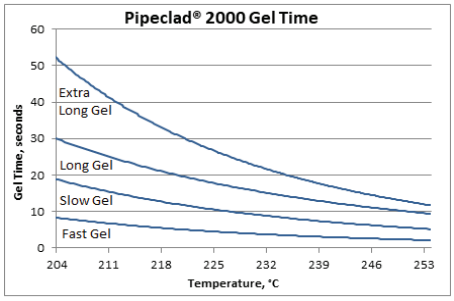




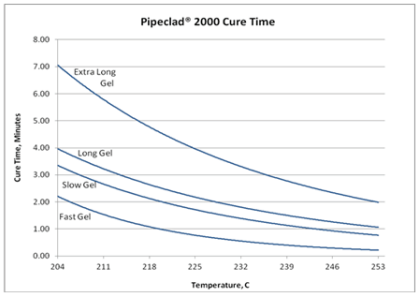


**Intercoat times may vary depending on individual line conditions. Establish optimum intercoat conditions for your line by testing.

COMBINED GEL TIME GRAPH



COMBINED CURE TIME GRAPH



ADDITIONAL INFORMATION

APPLICATION:
Factors such as plant capability, specifications, and pipe construction or characteristics can affect application conditions. Generally recommended application temperature range for FBE systems is 232-253ºC (450-488ºF)*. Generally recommended application temperature range for 3 layer PE/PP systems is 205-240ºC (400-464ºF)*. Allow to cure by residual heat before quench.

*Curing conditions outside of these ranges is possible; please contact your Sherwin-Williams representative for assistance.

SURFACE PREPARATION:
Remove all surface contamination before abrasive blasting. Blast clean using steel grit to SSPC SP-10-near-white metal with a minimum surface profile of 2 mils (50 microns).

STORAGE AND HANDLING:
Store below 27ºC (80ºF). Protect from temperatures above 33ºC (91ºF). If stored below the application room temperature, allow to warm to room temperature before opening. Refer to the safety data sheet for more information.

COATING REPAIR AND GIRTH WELD:
Damage less than 0.023 m^2 (36 in^2) - Repair using the Pipeclad 5000 patching system following the instructions on the data sheet. Pipeclad Patch Stick may be used if allowed by the pipe coating applicator and pipe owner. For Girth weld applications, Pipeclad 2000 or Pipeclad 5000 should be used. Other girth weld and repair options are possible with written consent of Sherwin-Williams.

DISCLAIMER

The information and recommendations set forth in this Product Data Sheet are based upon tests conducted by or on behalf of The Sherwin-Williams Company. Such information and recommendations set forth herein are subject to change and pertain to the product offered at the time of publication. Consult your Sherwin-Williams representative to obtain the most recent Product Data Information and Application Bulletin.

SAFETY PRECAUTIONS

Refer to the SDS sheet before use.

Published technical data and instructions are subject to change without notice. Contact your Sherwin-Williams representative for additional technical data and instructions.

WARRANTY

The Sherwin-Williams Company warrants our products to be free of manufacturing defects in accord with applicable Sherwin-Williams quality control procedures. Liability for products proven defective, if any, is limited to replacement of the defective product or the refund of the purchase price paid for the defective product as determined by Sherwin-Williams. NO OTHER WARRANTY OR GUARANTEE OF ANY KIND IS MADE BY SHERWIN-WILLIAMS, EXPRESSED OR IMPLIED, STATUTORY, BY OPERATION OF LAW OR OTHERWISE, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.