



Highland International, Inc.

Engineered Paint Systems

Chem-Temp 47 Series Hybrid Epoxy Novolac Primer/DTM

Chem-Temp 47 Series is a high-build 2-K hybrid epoxy novolac specifically formulated to provide exceptional chemical protection and temperature protection up to 450°F. Chem-Temp 47 is surface tolerant and may be applied over marginally prepared surfaces (tightly bonded rust and previously painted surfaces) up to 16 mils DFT. It may be used as a primer or a DTM (Direct to Metal) under insulation coating. With proper reducer selection, Chem-Temp may be modified to be applied directly to hot surfaces up to 400°F.

Vehicle Type:	Hybrid Epoxy Novolac	
Pigmentation:	Lead Free	
Reducer:	Not Normally Required	
Reducer for Hot Application:	Highland #101A Reducer	
Mix Ratio:	4:1 w/47-AHF-100	
Pot Life:	3 Hours @ 77°F (Decreases at higher temperatures)	
Volume Solids:	70%	
Theoretical Coverage:	1120 ft ² /gal. @ 1mil DFT	
VOC:	<300 g/L	
Flash Point:	16°F (Lowest Flashing Component)	
Recommended DFT:		
Primer:	4-16 mils DFT	
DTM:	4-14 mils DFT	
Dry-time:	Normal	Hot Application
Recoat:	3-36 Hours	30 Seconds
Topcoat:	4-36 Hours	30 Seconds
To Handle:	6 Hours	N/A
Put in Service (Heat)	3 hours after final coat	
Cure Time:	5-7 Days @ 77°F	
Shelf Life:	1 Year from DOM	
Finish:	Semi-gloss	
Color:	Yellow, Red	

Typical Systems

Direct to Metal

47 Series (10-16) mils DFT @ 5-8 mils DFT/coat

Primer (250°F - 450 °F)

47 Series (4-8 mils DFT)

Topcoat (250°F - 450 °F)

815 Series (2-3 mils DFT)

Primer

47 Series (4-8 mils)

Topcoat

68 Series Dry-Fall Urethane

Surface Preparation

1) Surface preparation should be in accordance with SSPC-SP6 Commercial Blast Cleaning. When abrasive blast cleaning is not an option, SSPC-SP3 Power Tool or SSPC-SP2 Hand Tool Cleaning are acceptable and provide good results. SSPC-SP12 Water-jetting is also acceptable.

2) All surfaces to be painted should be clean, dry and free of all foreign contaminants.

Mixing and Application Requirements

- 1) Mix 1 Part "A" Activator with 4 parts "B" Base by volume.
- 2) Mixed material is ready for use after a 30 minute induction period.
- 3) Apply 4-8 mils DFT per coat in 1-2 coats to achieve TDFT
- 4) Apply at a rate of 70-280 square feet per gallon to obtain the recommended dry film thickness when used as a primer.
- 5) Apply at a rate of 70-112 square feet per gallon to obtain the recommended dry film thickness when used as a DTM.
- 6) Allow one week before being put into service for immersion.
- 7) The second coat/topcoat must be applied within 36 hours @ 77°F or the surface will need to be scuffed.

Special Notes for Hot Surface Application

Chem-Temp 47 -HF Hot Application formula may be applied directly to hot surfaces not exceeding 400°F.

- 1) Mix 1 Part "A" Activator with 4 Parts "B" Base (4 to 1 by volume).
- 2) Mixed material is ready for reduction after a 30 minute induction period.
- 3) Reduce 20% with Highland #101 Hot Application Reducer. To achieve the recommended film thickness, apply in multiple subsequent coats not exceeding 2 mils DFT per coat.

Method of Application

Conventional Gun:

DeVilbiss MBC-510
Fluid Tip: E
Air Cap: 704
Atomizing Pressure: 70 psi
Pot Pressure: 15-20 psi
Hose: ½ inch ID

Airless Gun:

Graco 205-591
Pump: 30:1/45:1/60:1, Gas Pump Acceptable
Tip Range: 3.013 – 4.017
Pump Pressure: 1800 psi minimum
Hose: 3/8 inch ID

Brush or Roller: Natural or synthetic bristle
Clean Up: Clean all equipment with MEK

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Advantages of 47 Series Chem-Temp

- Next generation polymer technology specifically engineered for heat stability and chemical resistance
- Dry heat stability up to 450°F, immersion up to 300°F
- Superior resistance to a wide variety of chemicals and solvents
- Superior abrasion resistance
- Superior adhesion even over marginally prepared surfaces
- Excellent corrosion resistance
- Ease of application
- Specially engineered inert filler package provides superior barrier properties
- Superior substrate wetting provides excellent adhesion and corrosion protection
- Ultra-high crosslink density provides a tough durable film with long lasting protection

Performance Data

Adhesion (ASTM D 4541) – Commercial Blast	> 1800 psi
Abrasion Resistance (ASTM D 4060) 1000 cycles	Excellent
Humidity Resistance (ASTM 4585)	Excellent
Salt Spray Resistance (ASTM B 117) > 5000 hours	Excellent
Chemical Resistance (ASTM D 1308)	Excellent
Pencil Hardness (ASTM D 3363)	6H
Elongation (ASTM D 522)	8%

Independent Test Data - Autoclave

RAE Engineering and Inspection Ltd. May 2011

NACE TM0185 – Evaluation of Internal Plastic Coatings for Corrosion Control of Tubular Goods by Autoclave Testing.

Adhesion

Method: ASTM D4541
System: Two coats 47 Series @ 8 mils DFT per coat applied to: 1) SSPC-SP6 Commercial Blast prepared steel, 2) no surface preparation
Result: 1) No less than 1400 psi with SPPC-SP6 Commercial Blast, 2) No less than 1000 psi with no surface preparation.

Chemical Immersion

Method: Continuous Immersion at 93°C (200°F)
System: Two coats 47 Series @ 8 mils DFT per coat applied To SSPC-SP5 White Metal Blast prepared steel. Cured 14 days at 21°C (70°F).
Result: No cracking, lifting, or delamination after 60 days of continuous exposure.
Reagents: 10% methanol, 50% methanol, 10% sulfuric acid, 25% sulfuric acid, 10% sodium hydroxide, 50% Sodium hydroxide.

Heat Resistance

Method: Continuous heat exposure at 232°C (450°F)
System: Two coats 47 Series @ 8 mils DFT per coat applied To: 1) SSPC-SP56 Commercial Blast prepared steel, 2) No surface preparation, 3) No surface preparation with tight rust. Cured 14 days at 21°C (70°F).
Result: No cracking, lifting, or delamination of the film after 3000 hours of continuous exposure.

Acid Condensation Bath

Method: Coated panels exposed to a condensation bath with 50% sulfuric acid and water. The test duration was 1000 hours total at 177°C (350°F) and the panels were scribed with an “X” to evaluate corrosion. The acid bath was performed in an enclosed apparatus that retained the sulfuric acid condensation, and the panels were suspended in the headspace.
System: Single coat as well as two coats 47 Series @ 8 mils DFT per coat applied to SSPC-SP6 Commercial Blast prepared steel. Cured 24 hours at 21°C (70°F).
Result: No rust creepage, softening, cracking or Delamination of the film after 1000 hours of continuous exposure.

Sulfuric Acid Spot Testing

Method: Continuous heat at 177°C (350°F) for 1500 hours. After 1500 hours, spot testing was performed with 98% sulfuric acid for 72 hours.
System: Two coats 47 Series @ 8 mils DFT per coat applied to SSPC-SP6 Commercial Blast prepared steel. Cured 24 hours at 21°C (70°F).
Result: No softening or cracking of the film (some Discoloration was observed).

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Safety Precautions

- 1) Use normal precautions such as gloves, facemasks and barrier creams.
- 2) Adequate ventilation must be maintained. In confined areas, workmen must wear constant flow airline respirators.
- 3) If product comes into contact with skin, wash thoroughly with lukewarm water or diluted Boric Acid, and obtain immediate medical attention.
- 4) This product contains **FLAMMABLE** materials. Keep away from sparks and open flames. Observe **NO SMOKING** regulations.
- 5) All electrical equipment and installations should conform to NEC regulations. In areas where explosion hazards exist, workmen should be required to use non-ferrous tools, and to wear conductive, non sparking shoes.
- 6) Observe low flash regulations.
- 7) Refer to Material Safety Data Sheet (MSDS) for complete safety instructions.

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