

> BR[®] 127 CORROSION INHIBITING PRIMER

TECHNICAL DATA SHEET



DESCRIPTION

BR[®] 127 corrosion inhibiting primer is a modified epoxy primer. It is the industry standard for high-performance corrosion inhibiting primers and has been used in virtually every commercial aircraft built since its introduction.

BR 127 primer can be used with essentially all 250°F (121°C) film adhesives and has been designed to provide optimal structural performance at temperatures ranging from -67°F to 300°F (-55°C to 149°C).

BR 127 primer is formulated to provide maximum environmental resistance and durability within the bond line, as well as prevent corrosive undercutting. It can also be used effectively as a protective coating outside bonded areas.

BR 127 corrosion inhibiting primer can be cured prior to bonding. Recommended cure cycles range from 4 hours at 180°F (82°C) to 30 minutes at 250°F (121°C).

Articles primed with BR 127 primer and then cured have an indefinite shelf life. Primed details should be wrapped in Kraft paper (as protection from dust and dirt) and stored prior to adhesive bonding.

Maintaining controlled conditions of 85°F (29°C) maximum temperature and 65% maximum humidity is recommended for extended storage life.

Cure cycles for adhesive films primed with BR 127 primer may vary from 200°F to 350°F (93°C to 177°C) with minimum pressures to assure proper mating of bonded details.

FEATURES & BENEFITS

- Industry-wide standard for corrosion resistant primers
- Prevents hydrolysis of oxide layers
- Structural performance from -67°F to 300°F (-55°C to 149°C)
- Compatible with a wide variety of adhesive systems
- Improves hydrolytic stability at the adhesive-to-metal interface
- Protects prepared surfaces from further oxidation

> BR[®] 127 CORROSION INHIBITING PRIMER

TECHNICAL DATA SHEET

CHARACTERISTICS

Table 1 | Product Description

Color	Yellow
Solids	10% ± 1% sprayable
Density	7.3 lb/gal (875 g/liter)
Volatile organic content	6.6 lb/gal (792 g/liter)
Out-gassing properties¹	0.48% TML, 0.03% CVCM
Shop life at 75°F (24°C)	10 days
Shop life at 90°F (32°C)	5 days
Shelf life at recommended storage	12 months
Recommended storage	Store at or below 0°F (-18°C)

¹ NASA reference publication 1124, GSC 10164-reference number)

Complimentary Products

The following products are recommended for use with BR 127 corrosion inhibiting primer:

- FM[®] 73 film adhesive
- FM[®] 87 film adhesive
- FM[®] 94 film adhesive
- BR[®] 95 past adhesive
- FM[®] 123-2 film adhesive
- FM[®] 123-5 film adhesive
- FM[®] 300 film adhesive
- FM[®] 300-1 film adhesive
- FM[®] 300-2 film adhesive

> BR[®] 127 CORROSION INHIBITING PRIMER

TECHNICAL DATA SHEET

PROPERTIES

Table 2 | Physical Properties of Structural Adhesives Cured with BR 127

Property	Condition	FM 73 adhesive ¹	FM 87-1 K adhesive ²
Tensile shear, psi (MPa) (Federal standard MMM-A-132A)	-67°F (-55°C)	6650 (45.9)	5500 (38.0)
	75°F (24°C)	6500 (44.9)	6700 (46.2)
	180°F (82°C)	4340 (29.9)	4120 (28.4)
	250°F (120°C)	1040 (7.2)	3250 (22.4)
Wide area lap shear, psi (MPa) (Federal standard MMM-A-132A)	-67°F (-55°C)	5460 (37.6)	5490 (37.9)
	75°F (24°C)	5100 (35.2)	5200 (35.9)
	180°F (82°C)	4080 (28.2)	4200 (29.0)
	250°F (120°C)	1410 (9.7)	2710 (18.7)
Metal-to-metal climbing drum peel, in-lb/in (Nm/m) (ASTM-D-1781-76)	-67°F (-55°C)	73 (325)	63 (280)
	75°F (24°C)	95 (423)	73 (325)
	180°F (82°C)	130 (578)	75 (334)
	250°F (120°C)	68 (302)	57 (254)
Floating roller peel, in-lb/in (kN/m) (ASTM-D-3167-76)	-67°F (-55°C)	66 (11.6)	60 (10.5)
	75°F (24°C)	65 (11.4)	70 (12.3)
	180°F (82°C)	96 (16.8)	66 (11.6)
	250°F (120°C)	55 (9.6)	55 (9.6)
Honeycomb sandwich peel, in-lb/3in (Nm/m) (MIL-A-25463B)	-67°F (-55°C)	53 (78.6)	53 (78.6)
	75°F (24°C)	95 (140.9)	63 (93.4)
	180°F (82°C)	41 (60.8)	59 (87.5)
	250°F (120°C)	5 (7.4)	50 (74.1)
Flat-wise tensile, psi (MPa) (MIL-A-25463B)	-67°F (-55°C)	1680 (11.6)	1360 (9.3)
	75°F (24°C)	1300 (9.0)	1050 (7.2)
	180°F (82°C)	660 (4.6)	640 (4.4)
	250°F (120°C)	72 (0.5)	380 (2.6)

¹ Test Condition: 0.06 psf (300 gsm); Cure Temperature: 1 hour at 250°F (120°C); Service Temperature: 180°F (82°C)

² Test Condition: 0.06 psf (300 gsm); Cure Temperature: 1 hour at 250°F (120°C); Service Temperature: 250°F (120°C)

> BR[®] 127 CORROSION INHIBITING PRIMER

TECHNICAL DATA SHEET

Table 3 | Physical Properties of Structural Adhesives Cured with BR 127 Continued

Property	Condition	FM 123-2 adhesive ¹	FM 300 adhesive ²	FM 300-2K adhesive ³
Tensile shear, psi (MPa) (Federal standard MMM-A-132A)	-67°F (-55°C)	5790 (39.9)	5460 (37.7)	4580 (31.6)
	75°F (24°C)	5580 (38.5)	5850 (40.4)	5900 (40.7)
	180°F (82°C)	3350 (23.1)	5180 (35.7)	5300 (36.6)
	250°F (120°C)	1490 (10.3)	4200 (19.0)	3730 (25.7)
	300°F (149°C)	NA ⁴	3160 (21.8)	2300 (15.9)
Wide area lap shear, psi (MPa) (Federal standard MMM-A-132A)	-67°F (-55°C)	4900 (33.8)	4510 (37.6)	–
	75°F (24°C)	4240 (29.2)	4700 (35.2)	–
	180°F (82°C)	2980 (20.5)	3980 (28.2)	–
	250°F (120°C)	1250 (8.6)	–	–
	300°F (149°C)	NA ⁴	2550 (17.6)	–
Metal-to-metal climbing drum peel, in-lb/in (Nm/m) (ASTM-D-1781-76)	-67°F (-55°C)	56 (249)	14 (62)	18 (80)
	75°F (24°C)	65 (289)	37 (165)	35 (156)
	180°F (82°C)	60 (267)	44 (196)	40 (178)
	250°F (120°C)	–	45 (200)	38 (169)
	300°F (149°C)	NA ⁴	30 (133)	40 (178)
Floating roller peel, in-lb/in (kN/m) (ASTM-D-3167-76)	-67°F (-55°C)	52 (9.1)	26 (4.6)	18 (3.2)
	75°F (24°C)	60 (10.5)	28 (4.9)	36 (6.3)
	180°F (82°C)	69 (10.5)	30 (5.3)	40 (7.0)
	250°F (120°C)	–	32 (5.6)	42 (7.4)
	300°F (149°C)	NA ⁴	25 (4.4)	42 (7.4)
Honeycomb sandwich peel, in-lb/3in (Nm/m) (MIL-A-25463B)	-67°F (-55°C)	59 (87.5)	39 (57.8)	34 (50.4)
	75°F (24°C)	55 (81.5)	37 (54.9)	45 (66.7)
	180°F (82°C)	33 (48.9)	42 (62.8)	48 (71.2)
	250°F (120°C)	–	38 (56.3)	44 (65.2)
	300°F (149°C)	NA ⁴	23 (34.1)	33 (48.9)
Flat-wise tensile, psi (MPa) (MIL-A-25463B)	-67°F (-55°C)	1270 (8.7)	1080 (7.4)	1080 (7.4)
	75°F (24°C)	840 (5.8)	1030 (7.1)	1120 (7.7)
	180°F (82°C)	420 (2.9)	870 (6.0)	960 (6.6)
	250°F (120°C)	–	660 (4.6)	690 (4.7)
	300°F (149°C)	NA ⁴	470 (3.2)	330 (2.2)

¹ Test Condition: 0.06 psf (300 gsm); Cure Temperature: 1 hour at 250°F (120°C); Service Temperature: 180°F (82°C)

² Test Condition: 0.08 psf (400 gsm); Cure Temperature: 1 hour at 350°F (177°C); Service Temperature: 300°F (150°C)

³ Test Condition: 0.08 psf (400 gsm); Cure Temperature: 1.5 hour at 250°F (120°C); Service Temperature: 300°F (150°C)

⁴ Not Applicable: For additional information refer to the individual adhesive product literature

> BR[®] 127 CORROSION INHIBITING PRIMER

TECHNICAL DATA SHEET

Table 4 | Effect of Salt Spray on Strength Retention

(2024-T3 alclad aluminum lap shear coupons primed with BR 127 and bonded with a 250°F (121°C) cure elastomer modified epoxy adhesive)

Exposure Time	Lap Shear Strength, psi (MPa)
Initial	5680 (39.2)
After 30 days	5890 (40.6)
After 90 days	4970 (34.3)
After 180 days	4480 (30.9)

APPLICATION NOTES

Preparation of Aluminum

A clean, dry, grease-free aluminum surface is required for optimum performance of the BR 127 primer. Aluminum surfaces should be cleaned by either an FPL etch process or phosphoric acid anodizing process. BR127 primer bonds well to surfaces prepared by either surface treatment.

The procedure for cleaning aluminium surfaces by FPL etch is described in the following steps. For information on phosphoric acid anodizing refer to Boeing patent 4,085,012 issued April 18, 1978.

FPL Etch Procedure

The FPL etch process involves immersion of the aluminum surface in a sodium dichromate/sulfuric acid solution. Instructions for preparing this solution follow.

NOTE: Chromic acid is highly corrosive. All contact with skin and tissues must be prevented. Wear impervious apron, boots and gloves as well as splash-proof goggles and a face shield when preparing and/or using chromic acid solutions. If air-borne concentrations of chromic acid exceed the 8 hour total weight average (TWA) permissible exposure limit (PEL) established by OSHA, respirators approved by NIOSH must be worn.

NOTE: Chromic acid solutions should be prepared and handled only in fume hoods or other adequately ventilated areas, even when the TWA is not exceeded. Traces of chromyl chloride may occur in the vapors above heated chromic acid solutions prepared from chlorinated water.

Preparation of the Sodium Dichromate/Sulfuric Acid Solution

Prepare the sodium dichromate/sulfuric acid solution according to the following steps. This solution will dissolve 1.5 grams of 2024 clad aluminium per liter.

1. Dissolve 34 grams of sodium dichromate (FED-O-S-595A) in 700 ml of deionized water
2. Add 304 grams of sulphuric acid (FED-O-A-115, Class A, Grade 2)
3. Mix well adding additional deionized water to make one liter of solution.

FPL Etch Cleaning Method

Once the sodium dichromate/sulfuric acid solution is prepared, the aluminium surface should be cleaned according to the following steps.

1. Vapor degrease, alkaline clean, and rinse the aluminium surface checking for water break
2. Immerse the aluminium in the sodium dichromate/sulfuric acid solution at 155°F ± 5°F (68°C ± 3°C) for the length of time listed in Table 5.

> BR[®] 127 CORROSION INHIBITING PRIMER

TECHNICAL DATA SHEET

Table 5 | Etch Time for Clad and Bare Aluminum

Type of Aluminum	Etch Time
Clad	10 minutes
Bare	5 minutes

3. Spray rinse the aluminum with deionized water at or below 75°F (24°C)
4. Immerse the aluminum in cold water
5. Repeat the spray rinse with deionized water
6. Check for water break
7. Dry in at a maximum temperature of 150°F (65°C) in an oven with mechanical exhaust ventilation

Primer Application

1. Allow the BR 127 primer to warm to room temperature prior to opening the container
2. Thoroughly mix the BR 127 prior to application and continue to agitate it during application
3. Spray or brush coat to a dry primer thickness of 0.0001 inch (0.0025 mm) nominal with a 0.0003 inch (0.0075 mm) maximum thickness.
For protective coating applications, increase primer thickness to 0.0004 up to 0.0010 inch (0.0100 to 0.0250 mm).
4. Air dry for 30 minutes minimum prior to oven cure
5. Oven cure for 30 minutes at 250°F ± 10°F (120°C ±6 °C)

NOTE: Primed assemblies which have been cured and wrapped with a protective covering such as Kraft paper may be stored at 75°F (24°C) for six months or longer without fear of degradation of the final bond.

Bonding Procedure

1. Before bonding assemble all detail parts and film adhesive.
2. Cut patterns of the film adhesive as required before removal of protective covering
3. Apply the film adhesive smoothly to the parts.
For additional tack, warm to approximately 110°F (43°C) with a heat gun or tack table.
4. After assembly of the details, apply pressure and cure using the standard cure cycle recommended for the adhesive product.

> BR[®] 127 CORROSION INHIBITING PRIMER

TECHNICAL DATA SHEET

PRODUCT HANDLING AND SAFETY

Cytec Engineered Materials recommends wearing clean, impervious gloves when working with epoxy resin systems to reduce skin contact and to avoid contamination of the product.

Materials Safety Data Sheets (MSDS) and product labels are available upon request and can be obtained from any Cytec Engineered Materials Office.

DISPOSAL OF SCRAP MATERIAL

Disposal of scrap material should be in accordance with local, state, and federal regulations.

CONTACT INFORMATION

GLOBAL HEADQUARTERS

Tempe, Arizona
tel 480.730.2000
fax 480.730.2088

NORTH AMERICA

Olean, New York
tel 716.372.9650
fax 716.372.1594

Springfield, Massachusetts
tel 1.800.253.4078
fax 716.372.1594

Havre de Grace, Maryland
tel 410.939.1910
fax 410.939.8100

Winona, Minnesota
tel 507.454.3611
fax 507.452.8195

Anaheim, California
tel 714.630.9400
fax 714.666.4345

Orange, California
tel 714.639.2050
fax 714.532.4096

Greenville, Texas
tel 903.457.8500
fax 903.457.8598

Cytec Carbon Fibers LLC
Piedmont, South Carolina
tel 864.277.5720
fax 864.299.9373

D Aircraft Products, Inc.
Anaheim, California
tel 714.632.8444
fax 714.632.7164

EUROPE AND ASIA

Wrexham, United Kingdom
tel +44.1978.665200
fax +44.1978.665222

Östringen, Germany
tel +49.7253.934111
fax +49.7253.934102

Shanghai, China
tel +86.21.5746.8018
fax +86.21.5746.8038

DISCLAIMER: The data and information provided in this document have been obtained from carefully controlled samples and are considered to be representative of the product described. Cytec Engineered Materials (CEM) does not express or imply any guarantee or warranty of any kind including, but not limited to, the accuracy, the completeness or the relevance of the data and information set out herein. Because the properties of this product can be significantly affected by the fabrication and testing techniques employed, and since CEM does not control the conditions under which its products are tested and used, CEM cannot guarantee that the properties provided will be obtained with other processes and equipment. No guarantee or warranty is provided that the product is adapted for a specific use or purpose and CEM declines any liability with respect to the use made by any third party of the data and information contained herein. CEM has the right to change any data or information when deemed appropriate.

All trademarks are the property of their respective owners.