

BR® 179

BR® 179 corrosion inhibiting primer is a non-chromate, one-part, modified epoxy bonding primer. This primer is designed to meet stringent requirements of adhesive bonding primers on various metallic substrates and is compatible with PAA, PSA, PSA/TSA, and Sol-Gel surface treatments.

BR® 179 can be used with essentially all 250°F (121°C) epoxy-based 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® 179 has favorable durability and corrosion resistance within the bond line and can effectively be used as a protective coating outside bonded areas. BR® 179 also provides outstanding performance for most 350°F (177°C) curing structural adhesive systems.

BR® 179 has wide application and processing latitude, simple processing with HVLP or standard atomizing spray equipment and is insensitive to spray booth conditions – temperatures from 65°F to 95°F (18°C to 35°C) and relative humidity from 30% to 70%.

Features and Benefits

- Non-chromated; Excellent film formation before curing
- Protects prepared surfaces from further oxidation
- Prevents hydrolysis of oxide layers
- Service temperature from -70°F to 350°F (-57°C to 177°C)
- Long storage life; 12 months at 0°F (-18°C), 9 months at 40°F (4.4°C)
- Long Shop life; 180 days at 75°F (24°C), 90 days at 90°F (32°C)
- Excellent corrosion resistance; Scribe corrosion comparable to chromated primers and exceeds ASTM B117 specification
- Short drying time, easy to determine when flash-off is complete
- Compatible with a wide variety of 250°F to 350°F (121°C to 177°C) curing adhesives
- Excellent performance at 0.10 to 0.35 mils (0.003 to 0.009 mm) primer thickness

CHARACTERISTICS

Table 1 | Physical Properties

Property	Value	Test Method
Density	7.0 lb/gal (0.84 g/cc)	ASTM D 792
Volatile Organic Content (VOC)	6.6 lb/gal (0.79 g/cc)	ASTM D 3530
Inhibitor	Non-chromate corrosion inhibitor	
Shelf life	12 months from date of shipment at or below 0°F (-18°C) 9 months from date of shipment at 40°F (4.4°C)	
Shop life	180 days at 75°F (24°C) 90 days at 90°F (32°C)	



Table 2 | Product Availability

Property	Description
Solids	10% ± 1%
Color	Orange
Size	0.25 gallon (0.95 L) 1.00 gallon (3.79 L) 5.00 gallon (18.9 L)

PROPERTIES

Table 3 | BR® 179 Primer Properties

Property	Description
Salt Spray Resistance	A properly cured coating of BR® 179 will pass a 40 day, 5% salt spray exposure test per ASTM B117
MEK Resistance	Cured BR® 179 will withstand 20+ wipes with a shop towel saturated with Methyl Ethyl Ketone (MEK)
Humidity Resistance	Cured BR® 179 shows no blistering and loss of adhesion (tape adhesion test) after 840 hours of humidity exposure [120°F (49°C) and 100% RH]

Table 4 | Mechanical Properties of BR® 179 with FM® 73M, 250°F (121°C) Cure Adhesive

Property	Test Condition	Value	Test Method
Floating Roller Peel, lbf/in (kN/m)	-67°F (-55°C)	63 (11.0)	ASTM D 3167
	75°F (24°C)	80 (14.0)	
	176°F (80°C)	59 (10.3)	
	194°F (90°C)	50 (8.8)	
Wide Area Lap Shear, psi (MPa)	-67°F (-55°C)	5261 (36.3)	ASTM D 3165
	75°F (24°C)	4771 (32.9)	
	176°F (80°C)	3805 (26.2)	
	194°F (90°C)	3444 (23.7)	
Single Lap Shear, psi (MPa)	-67°F (-55°C)	6585 (45.4)	ASTM D 1002
	75°F (24°C)	6241 (43.0)	
	176°F (80°C)	4307 (29.7)	
	194°F (90°C)	3651 (25.2)	
Climbing Drum Peel, lbf/in (kN/m)	-67°F (-55°C)	75 (13.1)	ASTM D 1781
	75°F (24°C)	111 (19.4)	
	176°F (80°C)	128 (22.4)	
	194°F (90°C)	105 (18.4)	

Substrate: 2024-T3 Aluminum, Bare Surface

Treatment: FPL + PAA

Adhesive Film: FM® 73M, 0.06 psf (290 gsm)

Cure Cycle: 60 minutes at 250°F (121°C) under 40 psi (0.28 MPa) pressure Primer

Thickness: 0.20 mils (0.005 mm)

Table 5 | Mechanical Properties of BR® 179 with FM® 94M, 250°F (121°C) Cure Adhesive


Property	Test Condition	FM® 94M Adhesive		Test Method
		0.03 psf (145 gsm)	0.06 psf (290 gsm)	
Floating Roller Peel, lbf/in (kN/m)	-67°F (-55°C)	51 (8.9)	47 (8.2)	ASTM D 3167
	75°F (24°C)	52 (9.1)	61 (10.7)	
	176°F (80°C)	52 (9.1)	68 (11.9)	
	194°F (90°C)	50 (8.8)	68 (11.9)	
	250°F (121°C)	52 (9.1)	67 (11.7)	
Single Lap Shear, psi (MPa)	-67°F (-55°C)	5398 (37.2)	5807 (40.0)	ASTM D 1002
	75°F (24°C)	5228 (36.0)	5801 (40.0)	
	176°F (80°C)	4288 (29.6)	4938 (34.0)	
	194°F (90°C)	4028 (27.8)	4602 (31.7)	
	250°F (121°C)	2393 (16.5)	2564 (17.7)	

Substrate: 2024-T3 Aluminum, Bare Surface

Treatment: FPL + PAA

Adhesive Films: FM® 94M, 0.03 psf (145 gsm) and FM® 94M, 0.06 psf (290 gsm) Cure

Cycle: 60 minutes at 250°F (121°C) under 40 psi (0.28 MPa) pressure Primer

Thickness: 0.20 mils (0.005 mm)

Table 6 | Mechanical Properties of BR® 179 with FM® 300K, 350°F (177°C) Cure Adhesive

Property	Test Condition	Value	Test Method
Single Lap Shear, psi (MPa)	75°F (24°C)	6037 (41.6)	ASTM D 1002
	176°F (80°C)	5273 (36.4)	
	250°F (121°C)	4461 (30.8)	
Floating Roller Peel, lbf/in (kN/m)	-67°F (-55°C)	24 (4.2)	ASTM D 3167
	75°F (24°C)	41 (7.2)	

Substrate: 2024-T3 Aluminum, Bare Surface

Treatment: FPL + PAA

Adhesive Film: FM® 300K, 0.05 psf (244 gsm)

Cure Cycle: 75 minutes at 350°F (149°C) under 40 psi (0.28 MPa) pressure Primer

Thickness: 0.20 mils (0.005 mm)



Figure 1 | Scribe Corrosion Test: 2000 Hours Exposure to Salt Spray per ASTM B 117 and ASTM D 1654 on 2024-T3 Aluminum Bare, 0.2 mil (5 µm) primer thickness



PROCESSING

Primer Storage

BR® 179 may be stored at 0°F (-18°C) for 12 months, 40°F (4.4°C) for up to 6 months and at 75°F (24°C) for 60 days. These storage conditions may likely be extended upon more collected data on shelf life and out time.

Mixing

Warm the container to room temperature before opening. Thoroughly mix BR® 179 upon opening and agitate during application.

NOTE: During transportation and storage conditions, the primer has a very thin layer of settling powdery solids at the bottom of the can. It will take more mechanical force to disperse the solids from the bottom if the settling is loosely packed. To increase mixing efficiency, we recommend warming the container to room temperature and using a shaker or can roller or a mechanical propeller blade to disperse the settling solids and maintain agitation during spraying application.

Surface Preparation

A clean, dry, grease free surface is required for bonding. BR® 179 is used with all standard cleaning techniques involving solvent degreasing, alkaline cleaning, surface abrading, chemical deoxidizing, and/or anodizing. General guidance can be found in ASTM D 2651.

Best results for aluminum are obtained by a four step procedure of solvent degreasing, alkaline cleaning, chemical deoxidizing (etching), and phosphoric acid anodizing or phosphoric / sulfuric acid anodizing.

Equipment

BR® 179 may be sprayed using a variety of equipment including hand-held, automated, conventional air-atomizing, HVLP, or electrostatic spray equipment. Parts may be racked for spray and cured in any position convenient for the process.

Primer Thickness

A primer thickness of 0.0002 to 0.0003 inches (0.005 to 0.008 mm) is recommended for optimum mechanical properties and corrosion resistance [full range: 0.0001 to 0.00035 inches (0.003 to 0.009 mm)]. The primer should be applied using typically two to four thin box coats (4 to 8 cross coats) to obtain the final film thickness at around 0.0002 inches (0.005 mm).

Additional coats of primer may be sprayed and cured onto previously cured areas without loss of properties.

Spraying

For uniform coating, apply one thin coat of primer to cover the entire part and use spray air to assist drying if needed (primed part color will change to lighter yellow when dry). Then spray additional box coats on top to achieve the desired primer thickness. Allow 10 to 30 seconds of drying or spray air to accelerate drying between each box coat. Note: In between each box coat, agitate the primer can for 15-20 seconds to ensure homogeneous mixing for following box coat.

Spray Gun Cleaning

Before spraying, the spray gun must be cleaned and rinsed with MEK or acetone and sprayed for 15 seconds with MEK or acetone prior to loading the gun with BR® 179 primer. Clean the gun immediately after use by rinsing and spraying with MEK or acetone.



Dry Time

A drying time of 15 to 30 minutes at 75°F (24°C) and less than 55% relative humidity is recommended.

Primer Cure Cycle

Dry primer coatings should be cured at 250°F ± 10°F (121°C ± 5.5°C) for 60 minutes to obtain a surface which is scratch and MEK wipe resistant. Assemblies primed with BR® 179 and then cured can be stored for six months or longer without degradation of the final bond strength. Assemblies that have been primed and cured should be protected from dust and oil by wrapping in protective sheeting such as Kraft paper. Stored assemblies should be wiped with a suitable solvent prior to bonding.

Bonding Cycles

BR® 179 may be used with most epoxy-based adhesives that cure between 250°F and 350°F (121°C and 177°C).

SPRAY GUN SETTINGS

Table 7 | Settings for two types of Spray Guns

	Devilbiss Model GTI-620S (HVLP)	Binks Model 95
Fan Adjustment	1 counter-clockwise turn	1 counter-clockwise turn
Fluid Control (needle adjustment screw)	1.5 counter-clockwise turns	2.5 counter-clockwise turns
Needle Size	0.079"	0.079"
Air Cap Model	2000	66SD
Atomization Pressure	30 psi (0.21 MPa)	30 psi (0.21 MPa)
Spraying Distance (nozzle to panel)	10 in (25.4 cm)	7 in - 10 in
Room Temperature	70°F - 90°F (21°C - 32°C)	70°F - 90°F (21°C - 32°C)
Humidity	< 65%	< 65%
Air Supply Pressure	40 psi (0.28 MPa)	40 psi (0.28 MPa)

HEALTH & SAFETY

Please refer to the product SDS for safe handling, personal protective equipment recommendations and disposal considerations.

