

## BR® 252

BR® 252 corrosion inhibiting primer is a non-chromated, modified epoxy primer. It is designed to meet stringent requirements of adhesive bonding primers on various metallic substrates.

BR® 252 exceeds all state and federal Volatile Organic Content (VOC) emission regulations [(OSHA and REACH: VOC ≤ 2.09 lb/gal (250 g/L)] for structural adhesive bonding primers and offers mechanical properties and corrosion resistance equal to that of solvent-based primer systems.

BR® 252 shows excellent sprayability, film formation and scratch resistance before and after curing. In addition, BR® 252 provides outstanding performance with most 250°F – 350°F (121°C – 177°C) curing adhesive systems.

Primed and cured details should be wrapped in Kraft paper (as protection from dust and dirt) and stored prior to adhesive bonding. Maintaining controlled conditions of 90°F (32°C) maximum temperature and 70% maximum humidity is recommended for extended storage life.

BR® 252 offers wide application/processing latitude, simple processing with High Volume, Low Pressure (HVLP) or standard air atomizing spray equipment and is insensitive to spray booth conditions. It can be sprayed at temperatures from 65°F – 90°F (18°C – 32°C) and relative humidity from 30% – 70%.

Typical applications for BR® 252 include bonding primer for aluminum components where corrosion protection is critical, utility as corrosion inhibiting paint primer for aluminum substrates, and effective adhesion promoter for other metals (stainless steel, titanium, and nickel).

### Features and Benefits

- All raw materials are REACH compliant
- Water-based, very low VOC [(approximately 0.10 lb/gal (12 g/L)]
- Non-chromated corrosion inhibitor package
- Shows excellent film formation and scratch resistance before curing
- Scribe corrosion meets ASTM B 117
- Short drying time, easy to determine when flash-off is complete
- Drips and runs less likely to occur; clean up requires water only
- Can be applied by spraying or hand brush
- Compatible with a wide variety of 250°F – 350°F (121°C – 177°C) curing adhesives
- Mechanical properties comparable to solvent-based primer systems
- Service temperature range from -70°F – 350°F (-57°C – 177°C)
- Methyl ethyl ketone (MEK) wipe resistant after 60 minute cure at 250°F (121°C)
- Long storage life, 12 months at 40°F (4°C)
- Long shop life, 2 months at 75°F (24°C)
- Compatible with most amine-cured epoxy adhesive systems



## CHARACTERISTICS

**Table 1 | Physical Properties (Liquid Primer)**

Shipping/Transport Temperature	15 days maximum at 35°F to 90°F (1.7°C to 32°C) DO NOT FREEZE
Shelf Life	12 months at or below 35°F to 55°F (1.7°C to 13°C) from date of shipment DO NOT FREEZE
Shop Life	60 days at 75°F (24°C) 30 days maximum at 56°F to 90°F (13°C to 32°C)
Density	8.60 lb/gal (1030 g/L)
Inhibitor	Non-chromate corrosion inhibitor

**Table 2 | Product Availability**

Solids ASTM D 2369	18%
Color	Blue
Size	1.00 gal (3.79 L)

## PROPERTIES

**Table 3 | Primer Properties (Properties of Cured Coating)**

Property		
Pencil Hardness ASTM D 3363	9H+ after a standard 60 minute 250°F (121°C) cure cycle. 9H+ hardness rating is maintained after 7 day exposure to 75°F (24°C) deionized water, Skydrol® D4, MIL-H-5606 fluid, MIL-L-7808 jet engine oil, Jet Fuel A and Methyl Ethyl Ketone (MEK).	
MEK Resistance ASTM D 5402	A properly cured coating of BR® 252 will withstand 20+ wipes with a shop towel saturated with MEK.	
Salt Spray Resistance ASTM B 117/ ASTM D 1654	A properly cured coating of BR® 252 will pass 40 day, 5% salt spray exposure test per ASTM B117.	
Tape Adhesion Test ASTM D 3359	Humidity Resistance	A properly cured coating of BR® 252 will have no blistering or loss of adhesion after 35 day humidity exposure at 120°F (49°C) and 100% relative humidity.
	Heat Resistance	A properly cured coating of BR® 252 will show no loss of adhesion after 70 hours of exposure at 350°F (177°C).
	Fluid Exposure	A properly cured coating of BR® 252 will show no loss of adhesion after 7 day exposure to deionized water, Skydrol® D4, MIL-H-5606 fluid, jet engine oil, Jet Fuel A and Methyl Ethyl Ketone (MEK).



**Table 4 | Mechanical Properties of FM® 94 0.060 psf (293 gsm) Adhesives with BR® 252**

Property	Test Temperature	FM 94M <sup>1</sup>	FM 94K <sup>1</sup>	Substrate
Lap Shear ASTM D 1002	<b>°F (°C)</b>	<b>psi(MPa)</b>		0.063 in (1.60 mm) 2024-T3 Aluminum <sup>2</sup> clad
	75 (24)	5810 (40.1)	5490 (37.9)	
	180 (82)	4450 (30.7)	4120 (28.4)	
Floating Roller Peel ASTM D 3167	<b>°F (°C)</b>	<b>lb/in (kN/m)</b>		0.032 in (0.81 mm); 0.063 in (1.60 mm) 2024-T3 Aluminum <sup>2</sup> clad
	75 (24)	65 (11.4)	65 (11.4)	
	180 (82)	63 (11.0)	62 (10.9)	
Lap Shear ASTM D 1002	<b>°F (°C)</b>	<b>psi(MPa)</b>		0.063 in (1.60 mm) 2024-T3 Aluminum <sup>3</sup> clad
	75 (24)	5710 (39.4)	5240 (36.1)	
	180 (82)	4470 (30.8)	4020 (27.7)	
Floating Roller Peel ASTM D 3167	<b>°F (°C)</b>	<b>lb/in (kN/m)</b>		0.032 in (0.81mm); 0.063 in (1.60 mm) 2024-T3 Aluminum <sup>3</sup> clad
	75 (24)	60 (10.5)	65 (11.4)	
	180 (82)	62 (10.9)	63 (11.0)	

<sup>1</sup> Test Condition: 0.060 psf (293 gsm); Cure Temperature: 90 minutes at 250°F (121°C), 40 psi (0.28 MPa)

<sup>2</sup> Surface Preparation: FPL Etch and PAA

<sup>3</sup> Surface Preparation: FPL Etch and PSA

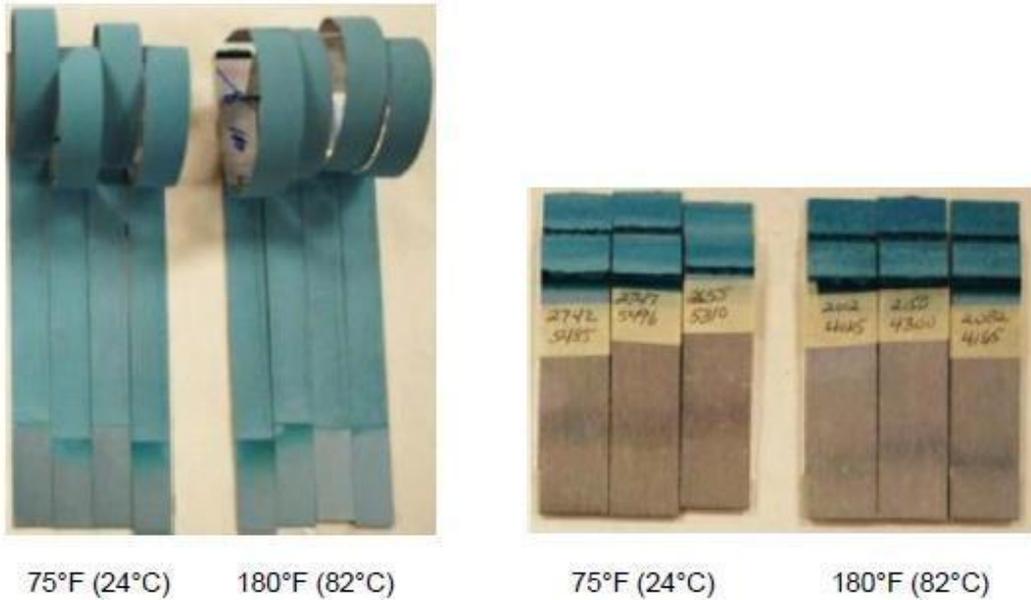
**Table 5 | Out Time Mechanical Properties of FM® 94 K .060 psf (293 gsm) with BR® 252: 60 days at 86°F (29°C)**

Property	Test Temperature	FM 94K <sup>1</sup>	Substrate
Lap Shear ASTM D 1002	<b>°F (°C)</b>	<b>psi(MPa)</b>	0.063 in (1.60 mm) 2024-T3 Aluminum <sup>2</sup> clad
	75 (24)	5180 (35.7)	
	180 (82)	3560 (24.5)	
Floating Roller Peel ASTM D 3167	<b>°F (°C)</b>	<b>lb/in (kN/m)</b>	0.032 in (0.81 mm); 0.063 in (1.60 mm) 2024-T3 Aluminum <sup>2</sup> clad
	75 (24)	61 (10.7)	
	180 (82)	55 (9.6)	

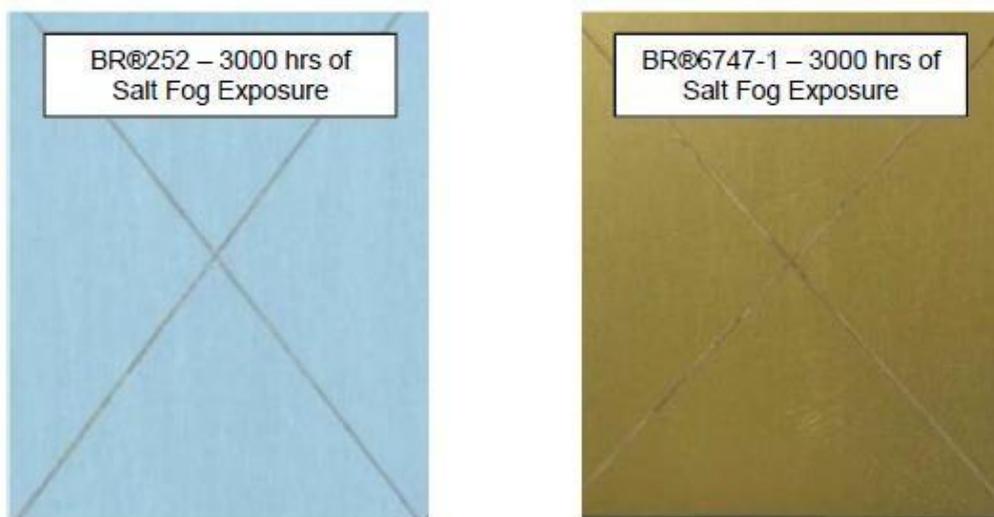
<sup>1</sup> Test Condition: 0.060 psf (293 gsm); Cure Temperature: 90 minutes at 250°F (121°C), 40 psi (0.28 MPa)

<sup>2</sup> Surface Preparation: FPL Etch and PAA





**Figure 1 | Test Samples for Floating Roller Peel (Left) and Lap Shear (Right) on 2024-T3 Aluminum, Clad, FPL Etch & PAA with FM® 94 K 0.060 psf (293 gsm)**



**Figure 2 | Scribe Corrosion Comparison between BR® 252 and BR® 6747-1 on 2024-T3 Aluminum, Clad**

## PROCESSING

### Primer Storage

BR® 252 may be stored at a temperature of 40°F (4°C) for up to 12 months and at 75°F (24°C) for up to 60 days. Specific care should be taken to prevent BR® 252 from freezing or from being exposed to temperatures below 32°F (0°C) and above 90°F (32°C).



### Mixing

It is not necessary to warm the container to room temperature before opening. Thoroughly mix BR® 252 upon opening and agitate during application. NOTE: During transportation and storage conditions the primer may form a layer of soft settling solids at the bottom of the can. It will take more mechanical force to disperse the solids from the bottom if the settling is densely packed. To increase mixing efficiency, we recommend using mixing beads to aid agitation or using a mechanical propeller blade to disperse the settling solids before putting into a shaker or roller machine.

### Surface Preparation

A clean, dry, grease-free surface is required for bonding. BR® 252 is used with standard cleaning techniques involving a four step procedure of solvent degreasing, alkaline cleaning, chemical deoxidizing (etching) and phosphoric acid anodizing\*. General guidance for etching and phosphoric acid anodizing can be found in ASTM D 2651 and ASTM D 3933, respectively. Best results for aluminum feature priming after appropriate surface preparation.

\*Boeing patent 4,085,012 April 1978. Phosphoric acid anodizing is now being used by a large number of aircraft manufacturers due to the improved surface bond durability it provides.

### Equipment

BR® 252 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. Refer to Tables 6 and 7 for specific equipment set-up recommendations.

### Primer Thickness

Spray or brush a dry primer thickness of 0.0001 in to 0.0003 in (0.0025 mm to 0.0076 mm) for optimum mechanical properties. Spray technique consists of applying smooth and even coats. The primer should be applied using two to three thin box coats (4 - 6 cross coats) to obtain the final film thickness. 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 allow it to dry completely (primed portion color will change to lighter blue when dry). Then spray additional box coats on top to achieve the desired primer thickness. Allow 30 to 60 seconds drying between each box coat.

### Spray Gun Cleaning

If using a gun in which a solvent-based material has been used, the spray gun must be rinsed and sprayed for at least 1 minute with deionized water prior to loading the gun with BR® 252 primer. Clean the gun immediately after use by rinsing and spraying with deionized water.

### Dry Time

15 to 60 minutes (typically 30 minutes) at 75°F (24°C) and less than 55% relative humidity is recommended.

### Primer Cure Cycle

Dry primer coatings are recommended to be cured at 250°F ± 10°F (121°C ± 6°C) for 60 minutes to obtain a surface which is scratch and MEK wipe resistant. Assemblies primed with BR® 252 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® 252 may be used with most epoxy based thermoset adhesives that cure between 250°F and 350°F (121°C and 177°C). Primed details may be exposed to up to three 60 minute 250°F (121°C) cure cycles with no significant loss of primer properties.



## Spray Gun Settings

**Table 6 | Settings for Accuspray Spray Gun (HVLP) Series 10**

Fan Adjustment	1 counter-clockwise turn
Fluid Control (needle adjustment screw)	2 counter-clockwise turns
Needle Size	0.036 in (0.091 cm)
Air Cap Model	#11
Cup Pressure	4 psi (0.02 MPa)
Atomization Pressure	6 psi (0.04 MPa)
Spraying Distance (nozzle to panel)	14 in – 16 in (36 cm – 41 cm)
Room Temperature	70°F – 90°F (21°C – 32°C)
Humidity	< 65%
Air Supply Pressure	Minimum 80 psi (0.55 MPa)

**Table 7 | Settings for Devilbiss Spray Gun (HVLP) Model JGHV-531**

Fan Adjustment	1 counter-clockwise turn
Fluid Control (needle adjustment screw)	1/2 – 3/4 counter-clockwise turns
Needle Size	0.034 in (0.086 cm)
Air Cap Model	46 MP
Cup Pressure	4 psi (0.02 MPa)
Atomization Pressure	38 psi (0.26 MPa)
Spraying Distance (nozzle to panel)	14 in – 16 in (36 cm – 41 cm)
Room Temperature	70°F – 90°F (21°C – 32°C)
Humidity	< 65%
Air Supply Pressure	Minimum 80 psi (0.55 MPa)

## HEALTH & SAFETY

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

