TECHNICAL DATASHEET

BR® 6747-1 Water-based Adhesive Bonding Primer System

Description:

BR® 6747-1 corrosion inhibiting primer is a one part, chromate based, modified epoxy primer which contains **no volatile organic components (V.O.C.).**

BR® 6747-1 is 100% water-based and does not rely on exempt solvents to achieve its zero V.O.C. level rating. BR® 6747-1 exceeds all state and federal V.O.C. emission regulations for structural adhesive bonding primers and offers mechanical properties and corrosion resistance equal to that of solvent-based primer systems. BR® 6747-1 also provides outstanding performance with most 250°F (120°C) and 350°F (177°C) curing adhesive systems.

Wide application/processing latitude, simple processing with H.V.L.P or standard air atomizing spray equipment; and insensitive to spray booth conditions – temperatures from 65°F (18°C) to 95°F (35°C) and R.H. from 30% to 70%.

For applications which do not allow the use of chromate corrosion inhibitors, please see the Cytec Technical Bulletin for BR® 6747-1 non-chromate-based corrosion-inhibiting adhesive bonding primer.

For more information contact:
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Features and benefits:

- **No volatile organic components- 100% water-based, zero V.O.C.**
- **Short drying time, and easy to determine when flash-off is complete**
- **Drips and runs are less likely to occur; clean up requires only water**
- **Rated at 600 hours of continuous operation, so spray gun clogging & tank scaling are not an issue**
- **Excellent corrosion resistance**
- **Mechanical properties equal to solvent-based primer systems, with primer thickness from 0.00015 to 0.0004 inches**
- **Can be cured from 250°F (120°C) to 350°F (177°C) and is compatible with a wide variety of 250°F (120°C) and 350°F (177°C) curing adhesives**
- **Service temperature from -70°F (-57°C) to 350°F (177°C)**
- **Protects prepared surface from further oxidation; prevents hydrolysis of oxide layers**
- **M.E.K. wipe resistant after 60 minute cure at 250°F(120°C)**
- **Long storage life, 12 months at 40°F to 55°F**

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Physical properties (liquid primer)

Shelf life	Twelve months from date of shipment at recommended storage condition (40°F – 55°F). **DO NOT FREEZE** 6 months at 56°F - 75°F
Shop life	30 days at 76°F - 90°F
Solids	20% or 30% available
Color	Yellow
Density	8.78 lbs./gal.; 20% solid. 9.10 lbs./gal.; 30% solid.
Inhibitor	15% chromate (based on resin solids)
Recommended products	FM®73, MB® 1146, FM® 377, FM® 350

Primer properties (properties of the cured coating)

Pencil hardness	8H+ after a standard 60 minute 250°F (120°C) cure cycle. 8H+ hardness rating is maintained after 7 day exposure to 75°F (25°C) deionized water, Skydrol D4, MIL-H-5606 fluid, MIL-L-7808 jet engine oil, Jet Fuel A and Methyl Ethyl Ketone (MEK).
M.E.K. resistance	A properly cured coating of BR® 6747-1 will withstand 20+ wipes with a shop towel saturated with Methyl Ethyl Ketone.
Salt spray resistance	A properly cured coating of BR® 6747-1 will pass 40 day, 5% salt spray exposure test per ASTM B117.
Filiform corrosion	A properly cured coating of BR® 6747-1 which has been top coated with Polyurethane Enamel, scribed to expose bare aluminum, and then exposed to 12 normal Hydrochloric Acid vapor for one hour will have no blistering of the top coat after 30 day exposure to 95°F (35°C) and 85% R.H..

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Mechanical properties with FM® 73 adhesive

250°F cure adhesive data

Test Type	Test temp °F (°C)	BR® 6747-1 primer
Lap shear, psi (Mpa)	-67 (-55) 75 (24) 180 (82) 225 (107)	7000 (48.3) 6500 (44.8) 4500 (31.0) 4500 (31.0)
Floating roller peel, pli (KN/M)	-67 (-55) 75 (24) 225 (107)	62 (10.9) 82 (14.4) 56 (9.8)
Metal:	2024-T3 bare aluminum. Surface treatment: FPL+PAA	
Adhesive:	FM® 73 0.060 lbs./ft.^{2} (293 gsm) adhesive cured 60 min. at 250°F (120°C) under 40 psi (275 KPa).	

Mechanical properties with Metlbond® 73 adhesive

250°F cure adhesive data

Test type	Test temp °F (°C)	BR® 6747-1 primer
Lap shear, psi (Mpa)	-67 (-55) 75 (24) 250 (121)	6500 (44.8) 6000 (41.4) 3600 (24.8)
Floating roller peel, pli(KN/M)	-67 (-55) 75 (24) 225 (107)	35 (6.1) 60 (10.5) 50 (8.8)
Metal:	2024-T3 bare aluminum. Surface treatment: FPL+PAA	
Adhesive:	Metlbond® 1146M 0.060 lbs./ft.^{2} (293gsm) adhesive cured 60 min. at 250ºF (120°C) under 40 psi (275 KPa)	

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Mechanical properties with Metlbond® 1113 adhesive

250°F cure adhesive data

Test type	Test temp °F (°C)	BR® 6747-1 primer
Lap shear, psi (Mpa)	-67 (-55) 75 (24) 180 (82)	7300 (50.3) 6800 (46.9) 3800 (26.2)
Floating roller peel, pli(KN/M)	-67 (-55) 75 (24)	55 (9.6) 82 (14.4)
Metal-to-metal climbing Drum peel, pli (NM/M)	75 (24)	70 (311)
Metal:	2024-T3 bare aluminum. Surface treatment: FPL+PAA	
Adhesive:	Metlbond® 1113 0.060 lbs./ft.^{2} (293gsm) adhesive cured 60 min. at 250°F (120°C) under 40 psi (275 KPa).	

Mechanical properties with FM® 123-2 adhesive

250°F cure adhesive data

Test type	Test temp °F (°C)	BR® 6747-1 primer
Lap shear, psi (Mpa)	-67 (-55) 75 (24) 180 (82)	4600 (31.7) 5100 (35.2) 3400 (23.5)
Floating roller peel, pli (KN/M)	-67 (-55) 75 (24)	40 (7.8) 57 (10.0)
Metal-to-metal climbing Drum peel, pli (NM/M)	75 (24)	62 (276)
Metal:	2024-T3 bare aluminum. Surface treatment: FPL+PAA	
Adhesive:	FM® 123-2 0.060 lbs./ft.^{2} (293gsm) adhesive cured 60 min. at 250°F (120°C) under 40 psi (275 KPa).	

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Mechanical properties with FM® 87-1K adhesive

250°F cure adhesive data

Test type	Test temp °F (°C)	BR® 6747-1 primer
Lap shear, psi (Mpa)	-67 (-55) 75 (24) 250 (121)	5600 (38.6) 6600 (45.5) 3400 (23.5)
Floating roller peel, pli(KN/M)	-67 (-55) 75 (24)	42 (7.4) 66 (11.6)
Metal-to-metal climbing Drum peel, pli(NM/M)	75 (24)	88 (391)
Metal:	2024-T3 bare aluminum. Surface treatment: FPL+PAA	
Adhesive:	FM® 87-1K 0.060 lbs./ft.^{2} (293gsm) adhesive cured 60 min. at 250°F (120°C) under 40 psi (275 KPa).	

Mechanical properties with FM® 300-2M adhesive

250°F cure adhesive data

Test type	Test temp °F (°C)	BR® 6747-1 primer
Lap shear, psi (Mpa)	-67 (-55) 75 (24) 300 (149)	4300 (29.7) 5000 (39.5) 1800 (12.4)
Floating roller peel, pli(KN/M)	75 (24)	32 (5.6)
Metal-to-metal climbing Drum peel, pli (NM/M)	75 (24)	30 (133)
Metal:	2024-T3 bare aluminum. Surface treatment: FPL+PAA	
Adhesive:	FM® 300-2M 0.085 lbs./ft.^{2} (415gsm) adhesive cured 60 min. at 250°F (120°C) under 40 psi (275 KPa).	

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Mechanical properties with Metlbond® 1146 adhesive

350°F cure adhesive data

Test type	Test temp °F (°C)	BR® 6747-1 primer
Lap shear, psi (Mpa)	-67 (-55) 75 (24) 250 (121)	6200 (42.8) 6000 (41.4) 3500 (24.1)
Floating roller peel, pli (KN/M)	-67 (-55) 75 (24) 250 (121)	35 (6.1) 75 (13.1) 60 (10.5)
Metal:	2024-T3 bare aluminum. Surface treatment: FPL + PAA	
Adhesive:	Metlbond® 1146M 0.060 lbs./ft ^{2} (293 gsm) adhesive cured 90 min. at 350°F (177°C) under 40 psi (275 KPa)	

Mechanical properties with Metlbond® 1515-3M adhesive

350°F cure adhesive data

Test type	Test temp °F (°C)	BR® 6747-1 primer
Lap shear, psi (Mpa)	-67(-55) 75 (25) 350 (175)	4600 (31.7) 4600 (31.7) 1700 (11.7)
Floating roller peel, pli (KN/M)	-67 (-55) 75 (25)	14 (2.5) 24 (4.2)
Metal-to-metal Climbing Drum peel, pli (NM/M)	75 (25)	21 (93)
Metal:	2024-T3 bare aluminum. Surface treatment: FPL + PAA	

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Mechanical properties with FM® 300 adhesive

350°F cure adhesive data

Test type	Test Temp °F (°C)	BR® 6747-1 Primer
Lap shear, psi(MPa)	-67 (-55) 75 (25) 350 (177)	4600 (31.7) 4600 (31.7) 1700 (11.7)
Floating roller peel, pli (KM/M)	67 (-55) 75 (25)	14 (2.5) 24 (4.2)
Metal-to-metal climbing drum peel, pli (NM/M)	75 (25)	21 (93)
Metal:	2024-T3 bare aluminum. Surface treatment: FPL + PAA	
Adhesive:	FM® 300. 0.050 lbs./ft. ^{2} (244 gsm) adhesive cured 90 min. at 350°F (177°C) under 40 psi (275 KPa)	

Mechanical properties with FM® 350 adhesive

350°F cure adhesive data

Test type	Test temp °F (°C)	BR® 6747-1 primer
Lap shear, psi (Mpa)	75 (25) 350 (177)	4580 (31.5) 3330 (23.0)
Metal-to-metal climbing Drum peel, pli (NM/M)	75 (25)	10 (44)
Metal:	2024-T3 bare aluminum. Surface treatment: FPL + PAA	
Adhesive:	FM® 350 0.075 lbs./ft. 2 (366 gsm) adhesive cured 90 min. at 350°F (177°C) under 40 psi (275 KPa).	

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Mechanical properties with FM® 377S adhesive

350°F cure adhesive data

Test type	Test temp °F (°C)	BR® 6747-1 primer
Lap shear, psi (Mpa)	75 (25) 250 (120) 350 (177)	4160 (28.7) 3450 (23.80) 2150 (14.8)
Metal-to-metal Climbing Drum peel, pli (NM/M)	75 (25)	32 (142)
Metal:	2024-T3 bare aluminum. Surface treatment: FPL + PAA	
Adhesive:	FM® 377S 0.080 lbs./ft ^{2} (390 gsm) adhesive cured 90 min. at 350°F (177°C) under 40 psi (275 KPa)	

Mechanical properties with FM® 400 adhesive

350°F cure adhesive data

Test type	Test temp °F (°C)	BR® 6747-1 primer
Lap shear, psi (MPa)	-67 (-55) 75 (25) 350 (177) 365 (185) 420 (216)	4100 (28.2) 4900 (33.7) 2100 (14.4) 2000 (13.7) 1800 (12.4)
Metal:	2024-T3 bare aluminum. Surface treatment: FPL + PAA	
Adhesive:	FM® 400 0.080 lbs./ft^2 (390 gsm) adhesive cured 90 min. at 350°F (177°C) under 40 PSI (275 KPa)	

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Processing and application

Primer storage

BR® 6747-1 may be stored at temperatures from 40°F (4.5°C) to 55°F (12.8°C) for up to 12 months, from 56°F (13°C) to 75°F (24°C) for up to 6 months, and from 76°F (24.°C) to 90°F (32°C) for up to 30 days. Specific care should be taken to prevent BR® 6747-1 from freezing or from being exposed to temperatures below 32°F (0°C) or above 90°F (32°C).

Mixing

It is not necessary to warm the container to room temperature before opening. Thoroughly mix BR® 6747-1 before opening and agitate during application.

Surface preparation

A clean, dry, grease-free surface is required for bonding. BR® 6747-1 is used with all standard cleaning techniques involving: solvent degreasing, alkaline cleaning, surface abrading, chemical deoxidizing, alodining, 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*. It is now being used by a large number of aircraft manufacturers due to the improved surface bond durability it provides.

*Boeing patent 4,085,012. April 1978.

Equipment

BR® 6747-1 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. See the following page for specific equipment set-up recommendations.

Primer thickness

A primer thickness of 0.0002 to 0.0003 inch is recommended for optimum mechanical properties and corrosion resistance (full range: 0.00015 – 0.0004 inch). The primer should be applied using two thin box coats (4 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.

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Processing and application, con't.

Spraying

For uniform coating, apply one thin coat of primer to cover the entire part and allow the first layer to dry completely (primed part color will change to lighter yellow when dry). Then spray an additional box coat 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 D.I. water prior to loading the gun with BR® 6747-1 primer.

- Clean up gun immediately after use by rinsing and spraying with D.I. water.

Dry time

15 to 60 minutes at 75°F (25°C) and less than 55% R.H. is recommended.

Primer cure cycle

Dry primer coatings should be cured at 250°F (120°C) ± 10°F (-12°C) for 60 minutes to obtain a surface which is scratch- and MEK- wipe resistant. Assemblies primed with BR® 6747-1 and then cured can be stored for six months and longer without degradation of final bond strength. Assemblies that have been primed and cured should be protected from dust and oil by wrapping in a protective sheeting such as craft paper. Stored assemblies should be wiped with a suitable solvent prior to bonding.

Bonding cycles

BR® 6747-1 may be used with most epoxy based thermoset adhesives that cure between 250°F (120°C) and 350°F (177°C). Primed details may be exposed up to three 60 minute 250°F (120°C) cure cycles with no significant loss of primer properties.

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Product features

Setting for Accuspray spray gun (HVLP) series 10

1.	Fan adjustment	1 counter-clockwise turn
2.	Fluid control (needle adjustment screw)	2 counter-clockwise turns
3.	Needle size	0.036"
4.	Air cap model	#11
5.	Cup pressure	4 PSI
6.	Atomization pressure	6 PSI
7.	Spraying distance (nozzle to panel)	14" - 16"
8.	Room temperature	70°F - 90°F
9.	Humidity	< 65%
10.	Air supply pressure	Minimum 80 psi

Setting for Devilbiss spray gun (HVLP) model JGHV-531

1.	Fan adjustment	1 counter-clockwise turn
2.	Fluid control (needle adjustment screw)	½ - ¾ counter-clockwise turn
3.	Needle size	0.034"
4.	Air cap model	46 MP
5.	Cup pressure	4 psi
6.	Atomization pressure	38 psi
7.	Spraying distance (nozzle to panel)	14" - 16"
8.	Room temperature	70° - 90°F
9.	Humidity	< 65%
10.	Air Supply Pressure	Minimum 80 psi

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Health and safety information

Refer to Material Safety Data Sheet 09070.

Important notice

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