

> BR[®] 6747-1 BONDING PRIMER

TECHNICAL DATA SHEET



DESCRIPTION

BR[®] 6747-1 corrosion inhibiting primer is a one part, chromate based, modified epoxy primer which contains no volatile organic components (VOC).

BR 6747-1 is 100% water-based and does not rely on exempt solvents to achieve its zero VOC level rating. It exceeds all state and federal VOC 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 – 350°F (121 – 177°C) curing adhesive systems.

BR 6747-1 offers wide application/processing latitude, simple processing with HVLP or standard air atomizing spray equipment and is insensitive to spray booth conditions — temperature from 65 – 95°F (18 – 35°C) and relative humidity from 30 – 70%. For applications which do not allow the use of chromate corrosion inhibitors, please see the Cytec Technical Bulletin for BR 6747-1 NC non-chromate-based corrosion inhibiting adhesive bonding primer.

FEATURES & BENEFITS

- Zero V.O.C., 100% water-based
- Short drying time, easy to determine when flash-off is complete
- Drips and runs less likely to occur, clean-up requires water only
- Spray gun clogging and tank scaling not an issue (rated at 600 hours continuous operation)
- Excellent corrosion resistance
- Can be cured from 250 – 350°F (121 – 177°C) and is compatible with a wide variety of 250 – 350°F (121 – 177°C) curing adhesives
- Approved primer for AC-[®]130 bonding prep process (Boeing's patented sol-gel technology)
- Mechanical properties equal to solvent-based primer systems with primer thickness from 0.00015 to 0.0004 inches
- Service temperature from -70°F to 350°F (-57°C to 177°C)
- Protects prepared surface from further oxidation, prevents hydrolysis of oxide layers
- MEK wipe resistant after 60 minute cure at 250°F (121°C)
- Long storage life: 12 months at 40 – 50°F (4.5 – 12.8°C)

SUGGESTED APPLICATIONS

- Bond primer for aluminium components where corrosion protection is critical
- Also very effective as a corrosion inhibiting paint primer for aluminium substrates.
- Effective adhesion promoter for other metals (stainless steel, titanium, and nickel)

> BR[®] 6747-1 BONDING PRIMER

TECHNICAL DATA SHEET

CHARACTERISTICS

Table 1 | Physical Properties (Liquid Primer)

Shelf Life	12 months from date of shipment at recommended storage condition: 40°F to 55°F (4.5°C to 12.8°C) 6 months at 56°F to 75°F (14°C to 24°C) DO NOT FREEZE
Shop Life	30 days at 75°F to 90°F (24°C to 32°C)
Solids	20% or 30% available
Color	Yellow
Density	20% solids: 8.78 lb/gal (1.05 g/cc) 30% solids: 9.10 lb/gal (1.09 g/cc)
Inhibitor	15% chromate (based on resin solids)
Recommended Products	FM [®] 73, FM 94, FM 300, FM 300-2, FM 309-1

PROPERTIES

Table 2 | Primer Properties (Properties of Cured Coating)

Pencil Hardness	8H+ after a standard 60 minute 250°F (121°C) cure cycle. 8H+ 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	A properly cured coating of BR 6747-1 will withstand 20+ wipes with a shop towel saturated with MEK
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% RH.

> BR[®] 6747-1 BONDING PRIMER

TECHNICAL DATA SHEET

Table 3 | Mechanical Properties with FM[®] 73, 250°F (121°C) Cure Adhesive

Test Type	Test Temperature	Result
Lap Shear, psi (MPa)	-67°F (-55°C)	7000 (48.3)
	75°F (24°C)	6500 (44.8)
	180°F (82°C)	4500 (31.0)
Floating Roller Peel, pli (kN/m)	-67°F (-55°C)	62 (10.9)
	75°F (24°C)	82 (14.4)
	225°F (107°C)	56 (9.8)
Metal	2024-T3 bare aluminum, surface treatment: FPL + PAA	
Adhesive	FM 73, 0.060 lb/ft ² (293 gsm) adhesive cured 60 minutes at 250°F (121°C) under 40psi (275 kPa) pressure	

Table 4 | Mechanical Properties with Metlbond 1146-3, 250°F (121°C) Cure Adhesive

Test Type	Test Temperature	Result
Lap Shear, psi (MPa)	-67°F (-55°C)	6500 (44.8)
	75°F (24°C)	6000 (41.4)
	250°F (177°C)	3600 (24.8)
Floating Roller Peel, pli (kN/m)	-67°F (-55°C)	35 (6.1)
	75°F (24°C)	60 (10.5)
	225°F (107°C)	50 (8.8)
Metal	2024-T3 bare aluminum, surface treatment: FPL + PAA	
Adhesive	Metlbond 1146M, 0.060 lb/ft ² (293 gsm) adhesive cured 60 minutes at 250°F (121°C) under 40psi (275 kPa) pressure	

Table 5 | Mechanical Properties with Metlbond 1113, 250°F (121°C) Cure Adhesive

Test Type	Test Temperature	Result
Lap Shear, psi (MPa)	-67°F (-55°C)	7300 (50.3)
	75°F (24°C)	6800 (46.9)
	180°F (82°C)	3800 (26.2)
Floating Roller Peel, pli (kN/m)	-67°F (-55°C)	55 (9.6)
	75°F (24°C)	82 (14.4)
Metal-to-Metal Climbing Drum Peel, pli (Nm/m)	75°F (24°C)	70 (311)
Metal	2024-T3 bare aluminum, surface treatment: FPL + PAA	
Adhesive	Metlbond 1113, 0.060 lb/ft ² (293 gsm) adhesive cured 60 minutes at 250°F (121°C) under 40psi (275 kPa) pressure	

> BR[®] 6747-1 BONDING PRIMER

TECHNICAL DATA SHEET

Table 6 | Mechanical Properties with FM[®] 123-2, 250°F (121°C) Cure Adhesive

Test Type	Test Temperature	Result
Lap Shear, psi (MPa)	-67°F (-55°C)	4600 (31.7)
	75°F (24°C)	5100 (35.2)
	180°F (82°C)	3400 (23.5)
Floating Roller Peel, pli (kN/m)	-67°F (-55°C)	40 (7.8)
	75°F (24°C)	57 (10.0)
Metal-to-Metal Climbing Drum Peel, pli (Nm/m)	75°F (24°C)	62 (276)
Metal	2024-T3 bare aluminum, surface treatment: FPL + PAA	
Adhesive	FM 123-2, 0.060 lb/ft ² (293 gsm) adhesive cured 60 minutes at 250°F (121°C) under 40psi (275 kPa) pressure	

Table 7 | Mechanical Properties with FM[®] 87-1K, 250°F (121°C) Cure Adhesive

Test Type	Test Temperature	Result
Lap Shear, psi (MPa)	-67°F (-55°C)	5600 (38.6)
	75°F (24°C)	6600 (45.5)
	250°F (121°C)	3400 (23.5)
Floating Roller Peel, pli (kN/m)	-67°F (-55°C)	42 (7.4)
	75°F (24°C)	66 (11.6)
Metal-to-Metal Climbing Drum Peel, pli (Nm/m)	75°F (24°C)	88 (391)
Metal	2024-T3 bare aluminum, surface treatment: FPL + PAA	
Adhesive	FM 87-1K, 0.060 lb/ft ² (293 gsm) adhesive cured 60 minutes at 250°F (121°C) under 40psi (275 kPa) pressure	

Table 8 | Mechanical Properties with FM[®] 300-2M, 250°F (121°C) Cure Adhesive

Test Type	Test Temperature	Result
Lap Shear, psi (MPa)	-67°F (-55°C)	4300 (29.7)
	75°F (24°C)	5000 (39.5)
	300°F (149°C)	1800 (12.4)
Floating Roller Peel, pli (kN/m)	75°F (24°C)	32 (5.6)
Metal-to-Metal Climbing Drum Peel, pli (Nm/m)	75°F (24°C)	30 (133)
Metal	2024-T3 bare aluminum, surface treatment: FPL + PAA	
Adhesive	FM 300-2M, 0.085 lb/ft ² (415 gsm) adhesive cured 60 minutes at 250°F (121°C) under 40psi (275 kPa) pressure	

> BR[®] 6747-1 BONDING PRIMER

TECHNICAL DATA SHEET

Table 9 | Mechanical Properties with Metlbond 1146, 350°F (177°C) Cure Adhesive

Test Type	Test Temperature	Result
Lap Shear, psi (MPa)	-67°F (-55°C)	6200 (42.8)
	75°F (24°C)	6000 (41.4)
	250°F (121°C)	3500 (24.1)
Floating Roller Peel, pli (kN/m)	-67°F (-55°C)	35 (6.1)
	75°F (24°C)	75 (13.1)
	250°F (121°C)	60 (10.5)
Metal	2024-T3 bare aluminum, surface treatment: FPL + PAA	
Adhesive	Metlbond 1146M, 0.060 lb/ft ² (293 gsm) adhesive cured 90 minutes at 350°F (177°C) under 40psi (275 kPa) pressure	

Table 10 | Mechanical Properties with Metlbond 1515-3M, 350°F (177°C) Cure Adhesive

Test Type	Test Temperature	Result
Lap Shear, psi (MPa)	-67°F (-55°C)	4600 (31.7)
	75°F (24°C)	4600 (31.7)
	350°F (177°C)	1700 (11.7)
Floating Roller Peel, pli (kN/m)	-67°F (-55°C)	14 (2.5)
	75°F (24°C)	24 (4.2)
Metal-to-Metal climbing Drum Peel, pli (Nm/m)	75°F (24°C)	21 (93)
Metal	2024-T3 bare aluminum, surface treatment: FPL + PAA	
Adhesive	Metlbond 1515-3M, 0.05 lb/ft ² (244 gsm) adhesive cured 90 minutes at 350°F (177°C) under 40psi (275 kPa) pressure	

Table 11 | Mechanical Properties with FM[®] 300, 350°F (177°C) Cure Adhesive

Test Type	Test Temperature	Result
Lap Shear, psi (MPa)	-67°F (-55°C)	5500 (31.7)
	75°F (24°C)	6000(31.7)
	350°F (177°C)	1700 (11.7)
Floating Roller Peel, pli (kN/m)	-67°F (-55°C)	14 (2.5)
	75°F (24°C)	35 (4.2)
Metal-to-Metal climbing Drum Peel, pli (Nm/m)	75°F (24°C)	35 (93)
Metal	2024-T3 bare aluminum, surface treatment: FPL + PAA	
Adhesive	FM 300, 0.05 lb/ft ² (244 gsm) adhesive cured 90 minutes at 350°F (177°C) under 40psi (275 kPa) pressure	

> BR[®] 6747-1 BONDING PRIMER

TECHNICAL DATA SHEET

Table 12 | Mechanical Properties with FM[®] 377S, 350°F (177°C) Cure Adhesive

Test Type	Test Temperature	Result
Lap Shear, psi (MPa)	75°F (24°C)	4160 (28.7)
	250°F (121°C)	3450 (23.8)
	350°F (177°C)	2150 (14.8)
Metal-to-Metal climbing Drum Peel, pli (Nm/m)	75°F (24°C)	24 (142)
Metal	2024-T3 bare aluminum, surface treatment: FPL + PAA	
Adhesive	FM 377S, 0.080 lb/ft ² (390 gsm) adhesive cured 90 minutes at 350°F (177°C) under 40psi (275 kPa) pressure	

PROCESSING AND APPLICATION

Primer Storage

BR 6747-1 may be stored at temperatures from 40°F to 55°F (4.5°C to 12.8°C) for up to 12 months, from 56°F to 75°F (13°C to 24°C) for up to 6 months and from 76°F to 90°F (24°C to 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) and above 90°F (32°C)

Mixing

It is not necessary to warm the container to room temperature before opening. Thoroughly mix BR 6747-1 upon opening and agitate during application. **NOTE:** During transportation and storage conditions the primer has 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 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 D2651.

Best results for aluminum are obtained by a four step procedure of solvent degreasing, alkaline cleaning, chemical deoxidizing (etching) and phosphoric acid anodizing*. 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 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. Refer to Tables 15 and 16 for specific equipment set-up recommendations.

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

> BR[®] 6747-1 BONDING PRIMER

TECHNICAL DATA SHEET

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: 0.00015 – 0.00035 inches (0.004 to .009 mm)]. 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 to dry completely (primed part color will change to lighter yellow 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 6747-1 primer. Clean the gun immediately after use by rinsing and spraying with deionized water.

Dry Time

15 to 60 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 6747-1 and then cured can be stored for six months and 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 6747-1 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.

> BR[®] 6747-1 BONDING PRIMER

TECHNICAL DATA SHEET

Spray Gun Settings

Table 12 | 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"
Air cap model	#11
Cup pressure	4 psi
Atomization pressure	6 psi
Spraying distance (nozzle to panel)	14" – 16"
Room temperature	70° – 90°F
Humidity	< 65%
Air supply pressure	Minimum 80 psi

Table 13 | 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"
Air cap model	46 MP
Cup pressure	4 psi
Atomization pressure	38 psi
Spraying distance (nozzle to panel)	14" – 16"
Room temperature	70° – 90°F
Humidity	< 65%
Air supply pressure	Minimum 80 psi

> BR[®] 6747-1 BONDING PRIMER

TECHNICAL DATA SHEET

PRODUCT HANDLING AND SAFETY

Refer to Materials Safety Data Sheets (MSDS) and product labels.

DISPOSAL OF SCRAP MATERIAL

Disposal of scrap material must 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

Winona, Minnesota
tel 507.454.3611
fax 507.452.8195

Greenville, Texas
tel 903.457.8500
fax 903.457.8598

Springfield, Massachusetts
tel 1.800.253.4078
fax 716.372.1594

Anaheim, California
tel 714.630.9400
fax 714.666.4345

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

Havre de Grace, Maryland
tel 410.939.1910
fax 410.939.8100

Orange, California
tel 714.639.2050
fax 714.532.4096

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.