METLBOND® 1515-3 FILM ADHESIVE

TECHNICAL DATA SHEET

DESCRIPTION

Metlbond® 1515-3 and Metlbond 1515-3 MHT are 350°F (177°C) curing modified epoxy supported film adhesives. Metlbond 1515-3 can also be cured at 250°F (121°C). Its maximum continuous service temperature range is 275°F to 320°F (135°C to 160°C).

Metlbond 1515-3 is available in medium- and high-tack (HT) versions which give the same mechanical and physical properties.

Metlbond 1515-3 is commonly used for BMS 5-154 metal-to-metal and composite bonding and BMS 8-341 cosmetic surfacing.

FEATURES & BENEFITS

- Industry standard for composite bonding and surfacing applications
- Designed for co-curing, secondary bonding, co-bonding of composite materials
- Provides excellent surfacing characteristics
- Good resistance to pre-cure humidity
- Available in a variety of weights and carriers
- Bonds metal-to-metal, metal-to-core and composites
- Co-cures with most 350°F (177°C) curing prepregs
- Shelf life of 12 months at 0°F (-18°C) or 1 month at 40°F (4°C)
- Shop life of 15 days at 75°F (24°C)

SUGGESTED APPLICATIONS

- Metal-to-metal bonding
- Composite bonding
- Cosmetic surfacing

CHARACTERISTICS

Table 1 | Metlbond 1515-3 Product Description

Nominal Weight, lb/ft^2 (g/m^2)	0.030 – 0.100 (146 – 486)
Supporting Carrier	Mat or nylon knit carrier
Roll Length, yds (m)	60 (55)
Roll Width, in (cm)*	36 – 48 (91 – 122)

* May be slit to your requirements

Table 2 | Physical Characteristics

Color	Blue
Room Temp. Tack	Medium
Shop Life	15 days at 75°F (24°C)
Volatiles	Less than 1%
Tg Dry	338°F (170°C) G' knee by dynamic mechanical analysis
Service Temp. Range	-65 to 320°F (-55 to 160°C)
Cure Temp. Range	250 to 350°F (121 to 177°C)

PROPERTIES

Table 3 | Mechanical Properties: Metlbond 1515-3M HT, BMS 5-154, pre-exposed Film 10 days at 90°F (32°C) and 50% R.H.

Property	Test Temperature	Grade 03 0.0325 lb/ft^2 (160 g/m^2)	Grade 05 0.05 lb/ft^2 (225 g/m^2)	Grade 08 0.08 lb/ft^2 (398 g/m^2)
Double Lap Shear psi (MPa)	65°F (-54°C)	4007 (27.6)	4111 (28.3)	3789 (26.1)
	75°F (24°C)	4093 (28.2)	4512 (31.1)	4246 (29.3)
	160°F (71°C)	4195 (28.9)	4161 (28.7)	3972 (27.4)
	270°F (132°C)	2064 (14.2)	2336 (16.1)	2522 (17.4)
Sandwich Beam Shear psi (MPa)	-65°F (-54°C)	695 (4.8)	688 (4.7)	676 (4.7)
	75°F (24°C)	596 (4.1)	667 (4.6)	613 (4.2)
	160°F (71°C)	634 (4.4)	596 (4.1)	608 (4.2)
Honeycomb Flatwise Tensile psi (MPa)	-65°F (-54°C)	950 (6.6)	887 (6.1)	877 (6.0)
	75°F (24°C)	838 (5.8)	883 (6.1)	904 (6.2)
	160°F (71°C)	848 (5.8)	907 (6.2)	873 (6.0)

Table 4 | Mechanical Properties: Metlbond 1515-3M HT, BMS 5-154

Property	Exposure Prior to Testing	Test Temperature °F (°C)	Grade 03	Grade 05	Grade 08
Double Lap Shear psi (MPa)	1000 hours at 160°F (71°C) and 100% R.H.	75°F (24°C)	4435 (30.6)	4823 (33.3)	4433 (30.6)
	14 days at 160°F (71°C) and 100% R.H.	160°F (71°C)	4237 (29.2)	4272 (29.5)	4369 (30.1)
Honeycomb Flatwise Tensile psi (MPa)	14 days at 160°F (71°C) and 100% R.H.	160°F (71°C)	551 (3.8)	677 (4.7)	588 (4.1)

Table 5 | Mechanical Properties: Metlbond 1515-3 0.05 lb/ft^2 (242 g/m^2), BMS 8-245B

Property	Substrate	Test Temperature	Result
Metal-to-Metal Lap Shear psi (MPa)	2024 T3 aluminum, no primer Tested at 270°F (132°C)	-65°F (-54°C) 75°F (24°C) 250°F (121°C) 300°F (149°C) 350°F (177°C)	4600 (32) 4700 (32) 3800 (26) 3000 (21) 1800 (12)
Metal-to-Metal Double Lap Shear psi (MPa)	2024 T3 aluminum, no primer	-65°F (-54°C) 75°F (24°C) 250°F (121°C) 300°F (149°C) 350°F (177°C)	5900 (41) 5900 (41) 4700 (32) 3500 (24) 2500 (17)
Composite-to-Composite Double Lap Shear psi (MPa)	Carbon epoxy composite per BMS 8-212	-65°F (-54°C) 75°F (24°C) 250°F (121°C) 300°F (149°C) 350°F (177°C)	4900 (34) 5400 (37) 2600 (18) 1900 (13) 630 (4.3)
Metal-to-Metal Bell Peel lb/in (KN/m)	0.063 in/0.025 in (1.60 mm/0.635 mm) 2024 T3 aluminum, no primer	-65°F (-54°C) 75°F (24°C) 250°F (121°C) 300°F (149°C) 350°F (177°C)	6 (1.0) 16 (2.8) 14 (2.4) 8 (1.4) 4 (0.7)

Table 6 | Mechanical Properties: Metlbond 1515-3 0.05 lb/ft^2 (242 g/m^2), BMS 8-245B, continued

Property	Specimen	Test Temperature	Result
Metal-to-Honeycomb Sandwich Peel ipiw (Nm/m)	See note A	-65°F (-54°C) 75°F (24°C) 250°F (121°C) 300°F (149°C) 350°F (177°C)	7.8 (34.7) 8.2 (36.5) 6.3 (28.0) 4.3 (19.1) 3.5 (15.6)
Composite-to-Honeycomb Flatwise Tensile psi (MPa)	See note B	-65°F (-54°C) 75°F (24°C) 160°F (71°C)	980 (6.7) 1000 (6.9) 980 (6.7)
Metal-to-Honeycomb Flatwise Tensile psi (MPa)	See note C	-65°F (-54°C) 75°F (24°C) 250°F (121°C) 300°F (149°C) 350°F (177°C)	1300 (9.0) 1100 (7.6) 670 (4.6) 430 (3.0) 230 (1.6)

(A) 0.02 in (0.508 mm) 2024 T3 aluminum skins, no primer on 5052 1/4 in (6.35 mm) cell, 7.9 lb/ft^3 density, 0.5 in (12.7mm) thick core

(B) Carbon epoxy composite per BMS 8-212 co-cured on HRP 3/16 in (4.75 mm) cell, 8.0 lb/ft^3 density, 0.5 in (12.7 mm) thick core

(C) 0.02 in (0.508 mm) 2024 T3 aluminum skins, no primer on 5052 1/4 in (6.35 mm) cell, 7.9 lb/ft^3 density, 0.5 in (12.7 mm) thick core

APPLICATION PROCEDURES

Recommended Cure Cycle

Recommended standard autoclave cure cycle for Metlbond 1515-3 is:

1. Apply full vacuum [26 in Hg (88 kPa)] and 45 psi (310 kPa) autoclave pressure
2. Vent vacuum to atmosphere at 20 psi (139 kPa)
3. Heat from room temperature to 350°F (177°C) at 1 – 5°F/min (0.5 – 3°C/min)
4. Hold at 350 ± 10°F (177 ± 5.5°C) for 120 minutes
5. Cool under pressure to < 140°F (<60°C)

For recommendations on other cure cycles and processes contact your Cytec Engineered Materials representative.

Surface Preparation

Cured Composite Substrates

Most high performance composites employ a removable peel ply of nylon or Dacron® fabric. Good bonding can be achieved with no surface preparation. Remove the peel ply and bond immediately.

For surfaces without peel ply prepare as follows:

1. Lightly sand the surface to be bonded using 240 – 280 grit sandpaper
2. Clean the composite using a clean, lint-free cotton cloth and MEK or acetone
3. Dry thoroughly at room temperature

Aluminum Skins

A clean, dry, grease-free surface is required for bonding. All standard cleaning techniques may be used with Metlbond 1515-3 including those involving solvent degreasing, alkaline cleaning, surface abrading, chemical deoxidizing, alodining, anodizing and/or priming. General guidance can be found in ASTM D 2651.

Best results for aluminum are obtained by a five step procedure:

1. Solvent degreasing
2. Alkaline cleaning
3. Chemical deoxidizing (etching)
4. Phosphoric acid anodizing*
5. Priming with BR® 6747-1, BR 6725-1 or BR 127 primer.

Aluminum Core

No cleaning is necessary unless the core has been contaminated by foreign matter. If contaminated, solvent clean or vapor degrease with MEK, acetone or trichloroethylene.

Other Substrates

Information concerning the surface treatment of substrates other than aluminum is given in MIL-A-9067.

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

Primer

The use of a primer is not a prerequisite for obtaining a structural bond. However, assemblies are commonly primed to improve production flow. Use BR 6747-1, BR 6725-1 or BR 127 primer. Consult the primer's datasheet for details.

Storage of Primed Surface

Primed details may be stored for extended periods, but must be protected from contamination by wrapping in non-waxed Kraft paper.

Prefitting of Details

Faying surfaces should have good contact over the entire surface area to be bonded and should be free from burrs, waves and other imperfections. Where feasible, details should be prefitted prior to assembly bonding.

Layup procedure

1. When Metlbond 1515-3 is removed from refrigerated storage, it must be allowed to reach room temperature before the roll is unpackaged.
2. Remove either of the interliners and place the adhesive against the surface to be bonded. Care should be taken to prevent air entrapment between the film adhesive and substrates, especially in large area bonds.
3. If additional tack is desired, the adhesive may be heated to as high as 140°F (60°C) without altering the adhesive properties. Before heat tacking be sure the film is in the proper position; removal will be difficult.
4. Remove the other interliner and complete the assembly.

PRODUCT HANDLING AND SAFETY

Cytec Engineered Materials recommends wearing clean, impervious gloves when working with adhesives 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.

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