FM® 355 EPOXY FILM ADHESIVE

TECHNICAL DATA SHEET

DESCRIPTION

FM 355 is a modified epoxy adhesive formulated to maximize toughness in applications requiring hot/wet performance to 350°F (177°C) cure. It contains no asbestos or aluminum fillers which is desirable for radar transparent applications.

FM 355 adhesive film is supported with a lightweight nylon carrier and will cure at 350°F (177°C) in one hour.

For composite bonding applications, FM 355 adhesive provides excellent toughness and shear strength properties. It was developed for co-cure as well as secondary bonding applications. In addition, FM 355 adhesive can be co-cured with epoxy or bismaleimide (BMI) composite systems requiring post-cures of up to 475°F (246°C).

FEATURES & BENEFITS

- Excellent strength in both metallic and composite structures
- 350°F (177°C) service temperature with good strength retention up to 420°F (216°C)
- Controlled flow
- Does not contain asbestos or aluminum fillers
- Radar transparent

CHARACTERISTICS

Table 1 | Product Description: FM 355 modified epoxy adhesive film

Form	Moderately tacky supported film
Color	Blue
Volatiles	Less than 1%
Weight	0.075 ± 0.005 psf 0.050 ± 0.005 psf
Nominal thickness	0.013 inches 0.008 inches
Shop life	9 days at 75°F (24°C) minimum
Shelf life	6 months from date of shipment when stored at recommended storage conditions
Recommended storage	Store at or below 0°F (-18°C)

Table 2 | Product Description: BR® 154 corrosion inhibiting primer

Color	Yellow
Solids	20 ± 1%
Weight	7.27 lb/gal (871 g/l)
Thinner	Methylethylketone (MEK)
Shelf life	6 months from date of shipment when stored at recommended storage conditions
Recommended storage	Store at or below 85°F (29°C)

PROPERTIES

Table 3 | Mechanical Performance: Tested with metallic substrates[1]

Property	Test Temperature °F (°C)	Strength psi (MPa)
1/2 inch lap shear, psi (MPa) [2]	-67 (-55) 75 (24) 250 (121) 350 (177) 420 (215) 450 (232)	3300 (22.75) 3100 (21.37) 3600 (24.82) 3000 (20.68) 2200 (15.20) 1600 (11.04)
Sandwich peel, in lb/3 in (Nm/m) [3]	75 (24)	27 (40.00)
Flatwise tensile, psi (MPa) [4]	75 (24) 350 (177)	1000 (6.90) 800 (5.52)

[1] FM 355 film adhesives
Core 3/16 inch cell, 6.0 lb, 0.0625 inch thick
Cleaning FPL etch ASTM D-2651-79 Method G, no primer
Cure Cycle Press rate to 350°F (177°C) plus one hour at 350°F (177°C), 40 psi (0.28 MPa)

[2] 1/2 inch laps, 0.064 2024-T3 Alclad

[3] Sandwich peel, 0.020 2024-T3 Alclad

[4] Flatwise tension, 0.064 2024-T3 Alclad

Table 4 | Mechanical Performance: Tested with non-metallic substrates[1]

Property	Test Temperature °F (°C)	Strength psi (MPa)
Sandwich peel, in lb/3 in (Nm/m) [2]	75 (24)	35 (52.00)
Flatwise tensile, psi (MPa) [4]	75 (24) 350 (177)	1000 (6.90) 725 (5.00)

[1] FM 355 film adhesives

Composite 2 plies Hexcel F 161-108 F50-1581 (uncured)

Core 3/16 inch, 4.0 lb HRP, 0.5 inch thick

Cure Cycle Apply full vacuum, apply 15 psi (0.10 MPa) pressure, release vacuum
Heat up at 2 – 6°F (1.1 – 3.3°C) per minute to 190°F (88°C)
Hold 30 minutes at 190°F (88°C)
Increase pressure to 45 psi (0.31 MPa)
Heat up at 2 – 7°F (1.1 – 4°C) per minute to 350°F (177°C)
Hold 90 minutes at 350°F (177°C)
Cool to room temperature at 2 – 6°F (1.1 – 3.3°C) per minute

[2] Canvas factor

Table 5 | 350°F (177°C) Thermal Aging Study: Tested at room temperature

Conditioning	Average Flatwise Tensile Strength per MIL-A-25463, psi (MPa)		
	Batch 156	Batch 157	Batch 158
None	865 (5.97)	910 (6.28)	860 (5.93)
1000 hours at 350°F (177°C)	655 (4.52)	620 (4.28)	570 (3.93)
5000 hours at 350°F (177°C)	550 (3.79)	540 (3.72)	535 (3.69)
10000 hours at 350°F (177°C)	290 (2.00)	235 (1.62)	285 (1.97)

APPLICATION NOTES

Preparation of Aluminum

FPL etch, ASTM D-2651-79 method G primed with BR® 154

Primer Application

Spray or brush coat to a dry primer thickness of 0.0001 to 0.0005 inches (0.0025 ± 0.013 mm). Spray technique consists of applying a smooth, even coat of primer. Good results have been obtained using a Devilbiss spray gun with Fluid Needle MBC-44F, Fluid Tip AV-15F and Air Cap No. 36. Air line pressure of 40 psi (0.28 MPa) is satisfactory. Since BR 154 primer settles rapidly, it requires thorough mixing prior to and constant agitation during application.

Air dry 30 minutes and follow with an oven dry of 30 minutes at 200°F (95°C).

Bonding Procedure

Metals must be properly prepared before application of the adhesive. Bond FM 355 adhesive at pressures ranging from 15 to 100 psi (0.10 to 0.69 MPa), depending on the application. Typical cure cycle for FM 355 adhesive is:

- 60 minute heat up to 350°F (177°C)
- 60 minute hold at 350°F (177°C) with 40 ± 5 psi (0.28 ± 0.03 MPa) pressure

PRODUCT HANDLING AND SAFETY

Cytec Engineered Materials recommends wearing clean, impervious gloves when working with epoxy resin systems 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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