



Product
Bulletin

E80-106

ALUMINUM FILLED EPOXY
 HEAT AND INDUCTION CURE EPOXY
 MAGNET BONDING EPOXY

GENERAL DESCRIPTION

ALFA E80-106 is 100% solids, one-part, non-sagging, thermally conductive induction curing structural epoxy. This aluminum filled epoxy exceeds the requirements of MMM-A-132 type 11 and is resistant to solvents, water, salt and impact shock. ALFA E80-106 is widely used in magnet assembly in permanent magnet motors and speakers, electrical motors, compressors, brake & clutch assembly, alumina assembly, metal assembly in wheel covers, automobiles, buses, RVs, and ceramic assembly, among others. It can also be used to replace brazing in air conditioner tube assembly.

ALFA E80-106 passes NASA's outgassing testing (ASTM E-595) and is listed in NASA's Outgassing Data for Selecting Spacecraft Materials list.

CURE SCHEDULE

Curing times for various temperatures are as follows:

- 20 min @ 115°C
- 10 min @ 120°C
- 5 min @ 130°C
- 2 min @ 140°C

Time measured from the time the bond reaches the specified temperature.

ALFA E80-106 has no exotherm during rapid cure.

NASA OUTGASSING RESULTS

TML (Total Mass Loss) %	0.57
CVCM (Collected Volatile Condensable Materials) %	0.00
WVR (Water Vapor Recovery) %	0.40

SPECIFICATIONS

Typical Properties of Cured Material:

Physical Properties:

Color	Metallic Gray
Viscosity	700,000 - 900,000 cps
Specific Gravity @ 25°C	11.7 ± 0.2 lbs/gallon

Cured Properties:

Hardness, Shore D @ 77°F	Min. 84
Tensile Strength	6,900 psi
Lap Shear Strength, Al	4200 psi

Cured two hours at 180°C and tested at room temperature 24 hours later. Zero induced gap unless otherwise noted.

Room Temperature Property	Typical Value
Steel Lap Shear Strength, psi	5950
Steel Lap Shear Strength, 10 mil induced gap, psi	5200
Zinc Galvanized Lap Shear Strength, psi	4000
Zinc Dichromate Lap Shear Strength, psi	3100
Steel to Ferrite (ceramic) Magnet Shear Strength, psi	
Impact Strength on Steel, J	>14.00

Cured two hours at 180°C and cooled to room temperature for >=24 hours. Aged at temperature for time indicated. Tested at room temperature.

Heat Aging Strength	Typical Value
Steel Lap Shear Strength, 150°C Two Weeks, psi	5950
Steel Lap Shear Strength, 180°C Two Weeks, psi	5200

Cured two hours at 180°C and cooled to room temperature for >=24 hours. Aged at conditions for time indicated. Tested at room temperature.

Strength After Heat and Humidity – 10 Days 120°F and 100% Relative Humidity	Typical Value
Steel Lap Shear Strength, 150°C Two Weeks, psi	4200

Sag Resistance	Max. 440 mils
Press Flow @ 42.5 psi	20 grams



Stroke Cure @ 160°C	50-57 sec.
Elongation	Min. 2%
Modulus	54 psi
Impact Strength	16.7 ft.lb./in
<u>Thermal Properties:</u>	
Glass Transition Temperature	> 125°C
Coefficient of Expansion	0.000062 in/in.°C
	0.000034 in/in.°F
Operating Temperature Range	-40°C to 155°C

Adhesives Shear Resistance Test Report

1. Task position

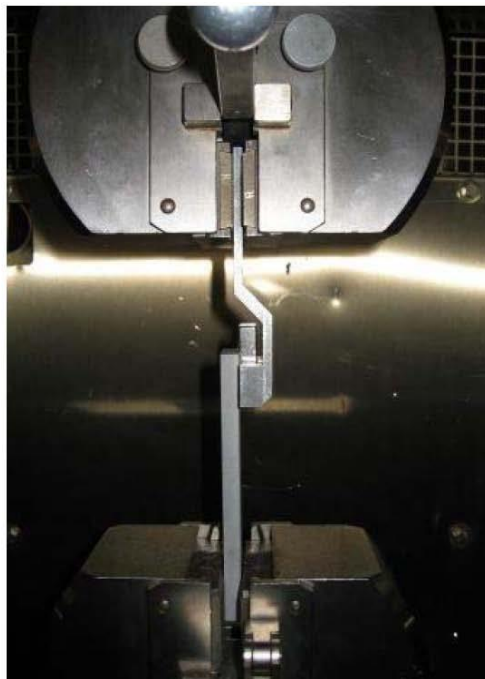
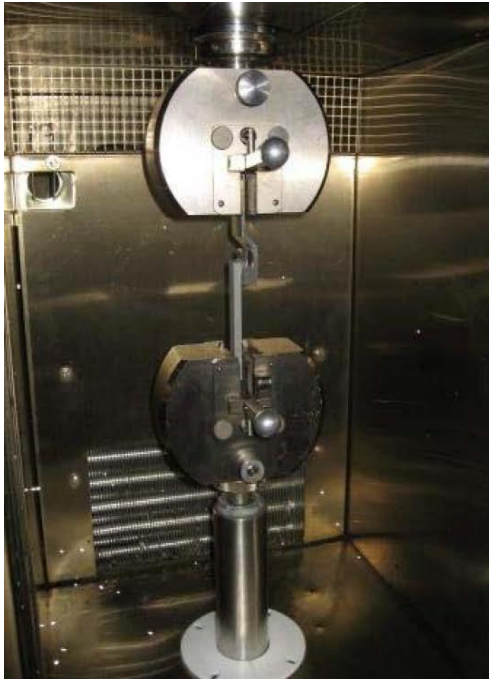
At gluing of stealing with magnet bodies the tension and shear resistance and the fracture patterns under different conditions are by means of the universal test equipment pinch 1455 to be determined.

2. Test specimens and adhesives

Magnet body:	polished, degreases with acetone - after OI plan 14816 FA-01
Steel test specimen:	prepared after OI plan 14816 FA-01
1) Competitors product	processed after OI plan 14816 FA-01
2) E80-106	processed after OI plan 14816 FA-01
Adhesive layer thickness:	0.1mm - after OI plan 14816 FA-01
Hardening by precipitation conditions of the adhesives:	after OI plan 14816 FA-01
Gluing surface:	14 x 14mm (196mm ²)
Number of regulations per test condition:	5

3. Examinations

- Static tension and shear resistance examination at ambient temperature (reference values)
- Static tension and shear resistance examination with 150°C in the test chamber pinch 1455 15Minuten of test specimens in the test chamber before-air-condition
- Dynamic tensile load examination after a climatic aging at ambient temperature
Climate conditions: 28 days with 60°C and 95% air humidity
Examination with 20% of the tension and shear resistance of the reference values - 100 cycles
- Dynamic tensile load examination with duplication of the being at ambient temperature after fulfilling the examination
C) - in each case with 100 cycles up to the break



4. Results

A) Static tension and shear resistance examination at ambient temperature (reference values)

Adhesive	Tension and shear resistance in [N/mm ²]	Deviation s in [N/mm ²]	Fracture pattern
1) Competitors Product	11.7	1.4	2 measurements: 100% Adhäsiver break at the boundary surface adhesive/magnet body 3 measurements: 100% cohesive break in the layer magnet bodies
2) E80-106	15.4	1.5	100% cohesive break in the layer magnet bodies

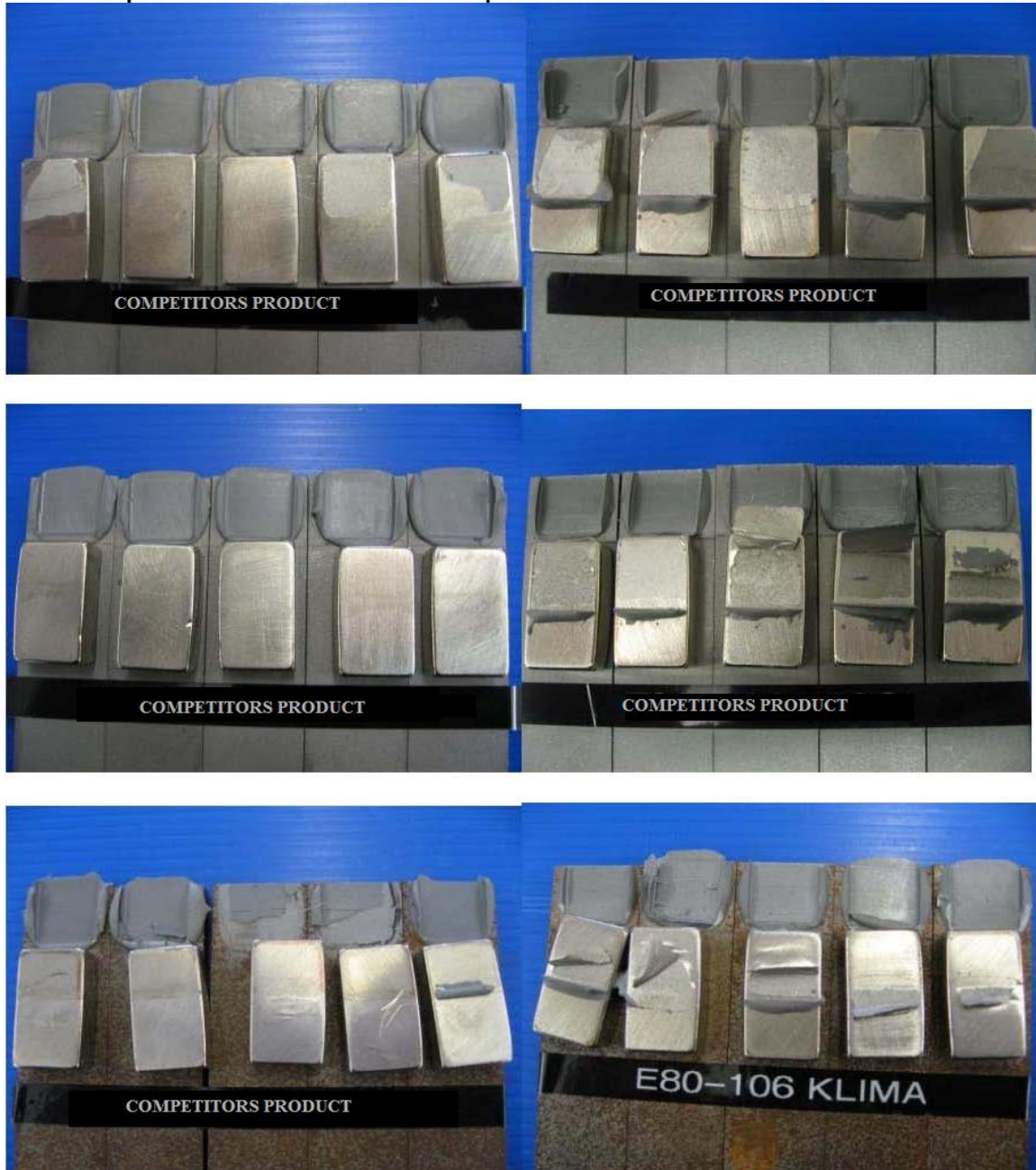
b) Static tension and shear resistance examination with 150°C in the test chamber pinch 1455

Adhesive	Tension and shear resistance in [N/mm ²]	Deviation s in [N/mm ²]	Fracture pattern
1) Competitors Product	4.4	0.7	100% Adhäsiver break at the boundary surface adhesive/magnet body
2) E80-106	18.7	1.2	100% cohesive break in the layer magnet bodies

c) Dynamic tension and shear resistance examination after a climatic aging at ambient temperature, 5-fold regulations

Adhesive	20% of the reference tension and shear resistance in [N/mm ²] and [N]	Test result after in each case 100 cycles				Breaking stress in [N]
1) Competitors Product	2,3 N/mm ² (460 N)	460 N	fulfilled	920 N	Break forwards 1 cycles	826
		460 N	fulfilled	920 N	fulfilled	1275
		460 N	fulfilled	920 N	Break after 46 cycles	920
		460 N	fulfilled	920 N	fulfilled	1729
		460 N	fulfilled	920 N	Break forwards 1 cycles	867 Sign of cohesive break in the layer magnet bodies 100% adhesive break at the boundary surface adhesive/magnet body
2) E80-106	3,1 N/mm ² (600 N)	600 N	fulfilled	1 ' 200 N	fulfilled	1880 N
		600 N	fulfilled	1 ' 200 N	fulfilled	1693 N
		600 N	fulfilled	1 ' 200 N	fulfilled	1850 N
		600 N	fulfilled	1 ' 200 N	fulfilled	1865 N
		600 N	fulfilled	1 ' 200 N	fulfilled	2270 N 30% cohesive break in the layer magnet bodies 70% adhesive break at the boundary surface adhesive/magnet body

5. Fracture patterns to the adhesion tests to pinch 1455



Data Ranges

The data contained herein may be reported as a typical value and/or range. Values are based on actual test data and are verified on a periodic basis.