

TECHNICAL DATA SHEET

AL 2020 with *AL 2021, AL 2022, or AL 2023 Hardeners*

HIGH PERFORMANCE LAMINATING SYSTEM FLAME RETARDANT, VARIABLE HARDENERS

DESCRIPTION

AL 2020 resin with AL 2021, AL 2022, or AL 2023 hardeners is a specially formulated flame-retardant system for laminated parts. It is suitable for use with glass, carbon and aramid fabrics, and parts can be heated immediately for faster process times.

APPLICATIONS

- *High performance automotive body panels used in NASCAR flame-retardancy applications*
- *Suitable for vacuum-bagging and RTM*
- *No need to wait for a room temperature gel, can be put directly into the oven*

PROPERTIES

- *Low viscosity for good wet-out*
- *R.T. and post-cured options*
- *Three hardener choices*
- *Non-Halogen flame retardancy*
- *Self-extinguishing*
- *RoHS and REACH compliant*
- *Epoxy (non-styrene system)*
- *Excellent bond to all fabrics*
- *Suitable for aramid fiber laminates*

Physical Properties – Handling

Property	Units	AL 2020 Resin	AL 2021 Hardener	AL 2022 Hardener	AL 2023 Hardener
Composition		Epoxy	Amine	Amine	Amine
Mix Ratio, by weight		100	22	24	30
Appearance		Clear Liquid	Clear Liquid	Clear Liquid	Clear Liquid
Color		Light Amber	Light Amber	Light Amber	Light Amber
Viscosity @ 77°F (25°C) Cps & mPa.s	Brookfield LVT	3,500	35	62	70
Viscosity, mixed @ 77°F (25°C) Cps & mPa.s	Brookfield LVT		1,000	1,375	1,300
Density @ 77°F (25°C) lbs./gal. (g/cc)	ASTM D 1480	9.74 (1.17)	7.99 (.96)	7.91 (.95)	7.97 (.96)
Gel time, 130g at 77°F (25°C)	Minutes		61	222	480

Neat Cured Properties tested at 74°F (23°C)

	Test Method	Unit(s)	With AL 2021 Hardener	With AL 2022 Hardener	With AL 2023 Hardener
Glass Transition Temperature (Tg) * R.T. Cure **150°F Post-Cure	ASTM E1545	°F (°C)	126 (52) 131 (55)	103 (39) 154 (68)	124 (51) 140 (60)
Glass Transition Temperature (Tg) <u>Δ</u> (Ultimate Tg via DSC test method)	ASTM D-3418	°F (°C)	226 (108)	203 (95)	199 (93)
Hardness * R.T. Cure **150°F Post-Cure	ASTM D-2240	Shore D	85 87	83 87	79 87
Flexural Strength * R.T. Cure ** 150°F Post-Cure	ASTM D790	psi (MPa)	10,128 (70) 15,500 (107)	11,303 (78) 18,800 (130)	11,390 (79) 12,500 (86)
Flexural Modulus * R.T. Cure ** 150°F Post-Cure	ASTM D790	psi (MPa)	490,440 (3,384) 495,000 (3,410)	338,972 (2,339) 490,000 (3,380)	352,537 (2,433) 380,000 (2,620)
Tensile Strength * R.T. Cure ** 150°F Post-Cure	ASTM D638	psi (MPa)	5,875 (41) 11,500 (79)	4,475 (31) 8,500 (59)	8,373 (58) 7,500 (52)
Tensile Modulus * R.T. Cure ** 150°F Post-Cure	ASTM D638	psi (MPa)	311,990 (2,153) 315,000 (2,170)	253,857 (1,752) 275,000 (1,900)	245,785 (1,696) 245,000 (1,690)
Tensile Elongation * R.T. Cure ** 150°F Post-Cure	ASTM-D638	%	2.2 5.1	2.0 4.0	6.0 3.7

*cured-7 days at 77°F (25°C) **cured 3 hours at 150°F (66°C)

Δ - Systems cured 3 hours at 170°F (77°C)

Results are average values on laboratory prepared test samples

PROCESSING

After mixing according to the indicated ratio impregnate the reinforcement according to the selected process. Accelerated cure schedule: The laminate can be immediately placed into up to 150°F (66°C) oven for three hours.

Normal cure schedule: Allow to set 24 hours at room temperature, then post cure up to 200°F if needed.

HANDLING PRECAUTIONS

Normal health and safety precautions should be observed when handling these products :

- Ensure good ventilation.
- Wear gloves, glasses and protective clothes.

For further information, please consult the Safety Data Sheets.

STORAGE CONDITIONS

- Product shelf life of resin and hardener is 12 months when stored in original unopened containers between 65 – 77°F (15 – 25°C). Any opened can must be tightly closed. Any opened can must be tightly closed.

PACKAGING

Packaging information on request, please contact your local sales representative or find your local contact on www.sikaadvancedresins.us

LEGAL NOTICE

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