COMPOSITE TECHNOLOGIES TECHNICAL DATA SHEET

AX-180

Low Heat Release & Fire Smoke Toxicity (FST) /
Non-Toxic / Flexible Cure Epoxy

Product

AX-180 material systems are flame-retardant epoxy products designed specifically for low viscosity, and low flow. AX-180 systems can be used to produce sandwich structures or laminates with excellent surface finish via a variety of process including platen press, autoclave, or crush core methods. Parts built with these systems are non-toxic, scratch resistant, and resistant to common industrial fluids. Hot melt processing provides volatile-free, non-toxic curing and handling. The recommended service temperature envelope for AX-180 systems is -55°C to 138°C (-67°F to 280°F).

Typical Applications

» Applications requiring flame retardance: FAR 25.853, ABD 0031, UL94 or EN45545-2
» Low heat release / OSU / FST requirements
» RoHS and REACH requirements
» Transportation interiors such as aircraft and railway car interiors
» Aircraft ducting, floorboards, and bulkheads
» Structures and sandwich panels requiring low porosity and excellent surface finish

Resin Variants

AX-180 material systems are available in the resin variants listed below. Unless specifically stated, the presented data is based on the standard formula.

» AX-180: Standard Formula
» AX-180SC: Snap Cure
» AX-180HT: High Tack Version

Our products are flexible by design:
Additional weights, roll sizes, and reinforcements are available.

Product Categories and Location of Production

Product Category	Description	AXIOM MATERIALS	KORDSA
AX-2180	Surfacing Film (Supported and Unsupported)	✓	✓
AX-3180	Fiberglass Fabric (E-Glass, S-Glass, and Quartz)	✓	✓
AX-4180	Aramid Fabric (Kevlar ®, Twaron ®, etc)	✓	✓
AX-5180	Carbon Fabric Prepreg (HS, IM, HM)	✓	✓
AX-6180	Unidirectional Tape	✓	✓

Product Reinforcements

Kordsa Composite Europe, Istanbul (Typical, *Additional weights, roll sizes, and reinforcements are available)*

Reinforcement Code	Fiber	Areal Weight (g/ m²)	Weaving Style	Warp Density (picks / cm)	Weft Density (picks / cm)
120	EC5 11 1x2	105	4HS	23.8 ± 0.6	23.0 ± 0.6
1680	EC6 33 1x0	188	8HS	28.4 ± 0.8	27.6 ± 0.8
7781	EC6 68 1X0	296	8HS	22.6 ± 0.5	21.5 ± 0,6
7628	EC9 68	203	PW	17.6 ± 0.4	12.0 ± 0.4
VR201	EC9 68	203	2x2 TW	17.6 ± 0.4	12.0 ± 0.4

Axiom, Santa Ana, CA (Typical, *Additional weights, roll sizes, and reinforcements are available)*

Reinforcement Code	Fiber	Areal Weight (g/ m²)	Weaving Style	Warp Density (picks / cm)	Weft Density (picks / cm)
-	Spun-bond polyester	145	Woven SV	-	-
-	Spun-bond polyester	220	Woven SV	-	-
-	Spun-bond polyester	295	Woven SV	-	-
104	Lightweight Woven fiberglass	19	PL	23.62	20.4
1080	Lightweight Woven fiberglass	48	PL	23.62	18.52
120	EGF	107	4HS		
7781	EGF	300	8HS		
7628	EGF	206	PL	17.32	12.20
120	Aramid 220 dtex	60	PL		
281	Aramid 2200 1210 dtex	172	PL		
285	Aramid 2200 1210 dtex	172	4H Satin	6.7	6.7
282	3K Carbon	197	PL	4.7	4.7
284	3K Carbon	197	2x2 TW	4.7	4.7

Resin Matrix Properties

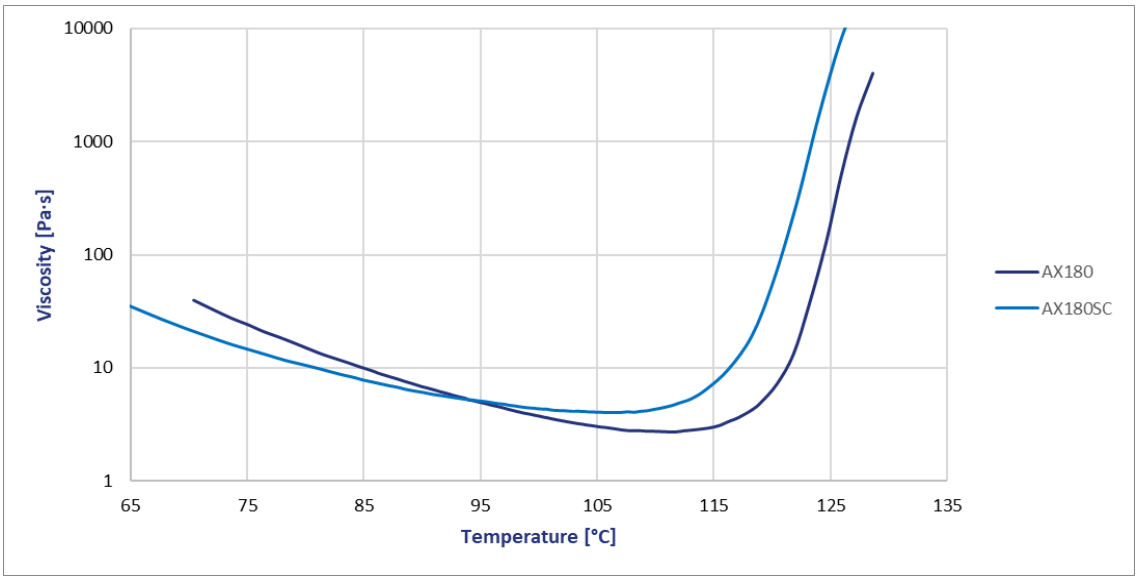


Figure 1 Rheology of AX-180 & AX-180SC

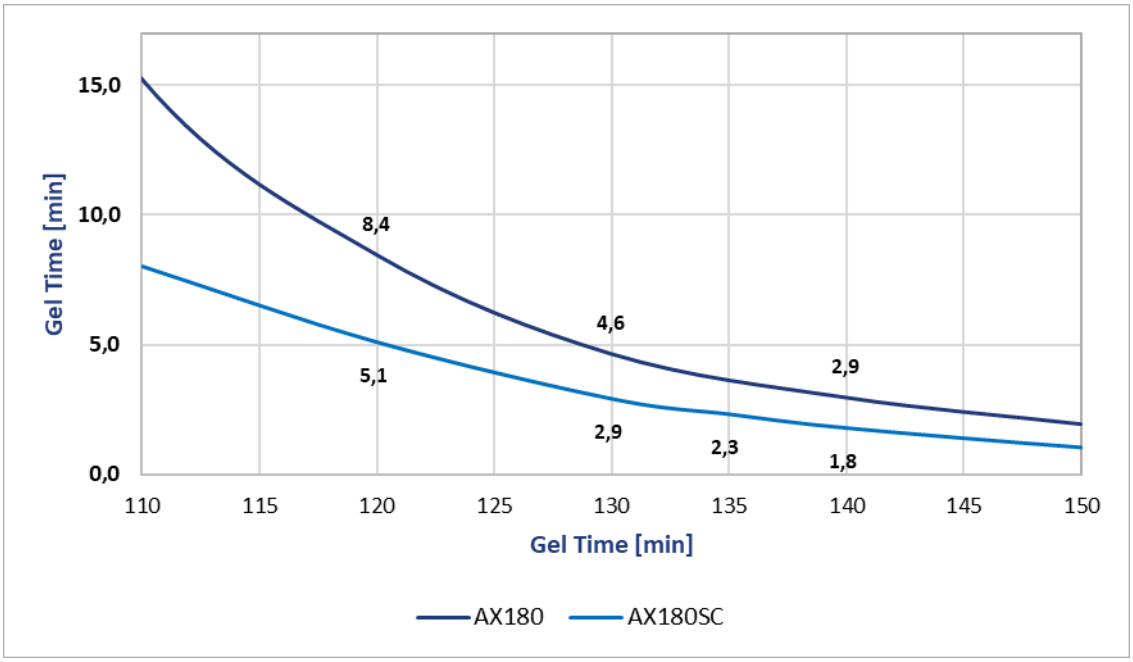


Figure 2 Gel Time of AX-180 & AX-180SC

Resin Properties

Property	Test Method	Value
Resin Density	ASTM D792	1.45 g/cm^3
Resin Color	N/A	Naturally White
Thermal Conductivity	-	

Recommended Cure Cycles

Optimum properties are achieved under vacuum and 3.5 bar or higher external pressure, and cured according to one of the following:

Cure Temperature °C (°F)	AX-180	AX-180SC
121 (250)	60 minutes	-
135 (275)	45 minutes	-
141 (285)	-	15 minutes
149 (300)	30 minutes	12 minutes
160 (320)	-	8 minutes

Processing Considerations

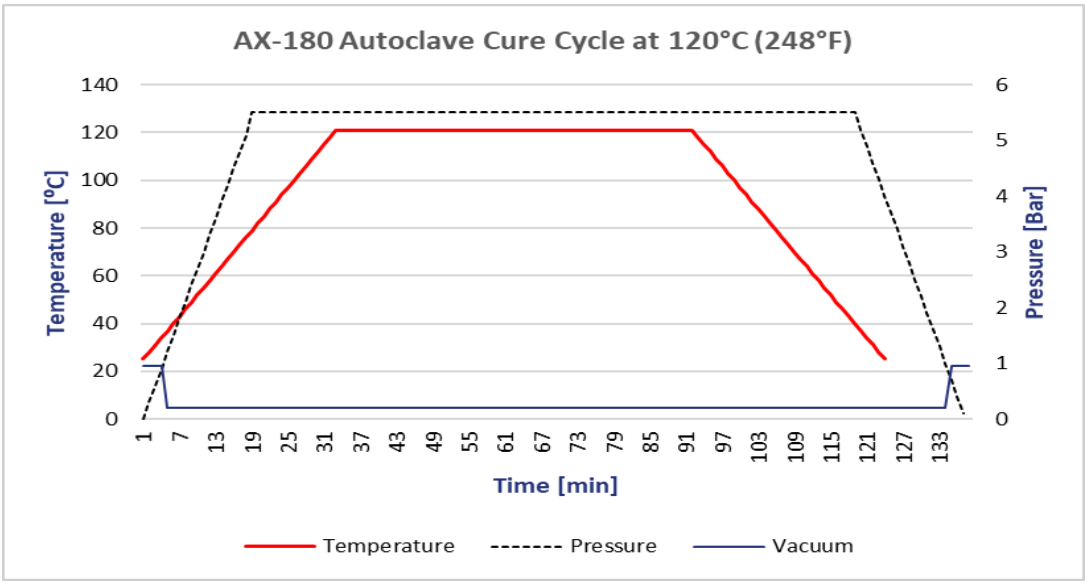
» Heat up and cool down under pressure is recommended, but not mandatory.

» Press cure autoclave recommended. Contact Kordsa Technical Support for vacuum bag only applications.

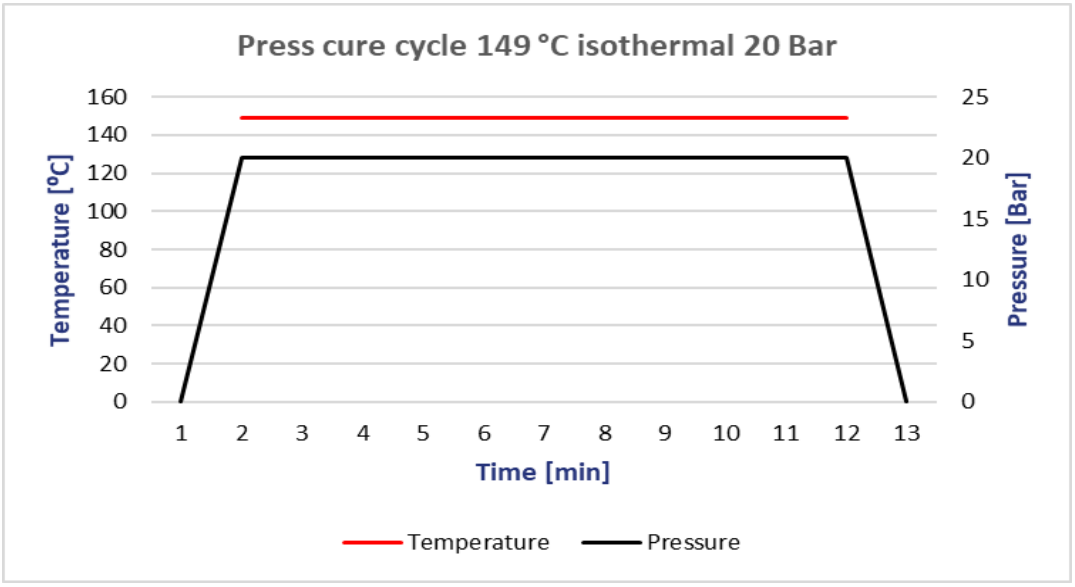
» Peak operating temperatures generally depend on cure temperature. For the 135°C (275°F) cure the recommended service temperature envelope is -55°C to 138°C (-67°F to 280°F).

Recommended Autoclave Curing Cycle at 121ºC (250ºF) of AX-180

1) Apply full vacuum (-1 bar).
2) Apply 7 bar positive gauge autoclave pressure with a speed of 0.25 bar/min.
3) Reduce the vacuum to a safety value of -0.2 bar when the autoclave pressure reaches approximately 1 bar gauge.
4) Heat-up at 3 °C/minute to 121°C (250ºF).
5) Hold at 121°C (250°F) for 60 minutes.
6) Cool at 3°C/min to 40°C (104°F).
7) Vent autoclave pressure with 0.25 bar/min when the component reaches 40°C (104°F) or below.



Recommended Press Curing Cycle at 149°C (300°F) of AX-180SC



Heat Release and FST Properties

Material	Test	Standard	Result
1 ply/1 ply AX-3180-EGF 8H Satin 300 38% RC sandwich panel with 28.8 kg/m^3 and 2.54 mm Nomex cured 60 mins at 127°C and 3.45 bar	Toxicity	BSS7239	Pass
	OSU Heat Release	FAR 25.853 Appx F, IV	Peak:23 kW/m^2 Total:30 kW-min/m^2
	Smoke Density	FAR 25.853 Appx F, V	19 Ds
2 ply/2 ply AX-3180-EGF 8H Satin 300 38% RC sandwich panel with 48.1 kg/m^3 and 6.35 mm Nomex cured 45 mins at 149°C and 6.90 bar	Toxicity	BSS7239	Pass
	OSU Heat Release	FAR 25.853 Appx F, IV	Peak:45 kW/m2 Total:50 kW-min/m2
	Smoke Density	FAR 25.853 Appx F, V	90 Ds
3-ply laminate AX-3180-EGF 8H Satin 300 38% RC cured 45 mins at 135°C and 6.90 bar	Flammability – 12 sec	FAR 25.853	Pass
	Toxicity	BSS7239	Pass
	OSU Heat Release	FAR 25.853 Appx F, IV	Peak:40 kW/m2 Total:40 kW-min/m2
	Smoke Density	FAR 25.853 Appx F, V	100 Ds

Physical and Mechanical Properties *(Examples only. For the wider prepreg range, please contact Kordsa)*

Typical AX-3180 Mechanical Properties

Autoclave Curing Cycle at 149 ºC, 7 bar

Property	Standard	Test Temp.	Property	45 % RC /TW210/68TEX	42% /8HS300/ EC6 66
Tensile	ASTM D3039 / D 638	25 °C	Tensile Stress MPa (ksi)	475 (68.9)	434 (62.9)
			Poisson's Ratio	0.16	-
			Modulus GPa (msi)	24 (3.5)	26 (3.8)
Compression	ASTM D3410 / D 695	25 °C	Compressive Stress MPa (ksi)	408 (59.2)	427 (61.9)
			Chord Modulus GPa (msi)	26 (3.8)	25 (3.6)
3 Point Bending	ASTM D790	25 °C	Flexural Strength MPa (ksi)	599 (86.9)	648 (94)
			Chord Modulus GPa (msi)	24 (3.5)	24 (3.5)
ILSS	ASTM D2344	25 °C	ILSS MPa (ksi)	72 (10.4)	62 (9)
IPSS	EN 6031	25 °C	Shear Strength MPa (ksi)	110 (15.9)	-
			Shear Chord Modulus GPa (msi)	3.9 (0.6)	-
DMA	ASTM D7028-07	Range	E' (°C) (°F)	124 (255.2)	-
			Tan (δ) (°C) (°F)	155 (311)	-
			E" (°C) (°F)	147 (296.6)	-
Composite Density	ASTM D792	25 °C	Density (g/cm^3)	1.90	-
DSC	EN 6041	Range	DOC (%)	96	-
Vertical Flame Test	DIN EN 60695 or UL94	Range	Flammability	V-0	-
Horizontal Flame Test	DIN EN 60695 or UL94	Range	Flammability	HB	-

Typical AX-4180 Mechanical Properties

Autoclave Curing Cycle at 149°C, 7 bar

Property	Standard	Test Temp.	Property	AX-180/40% /PL203/KEV258
Tensile	ASTM D3039	25 °C	Tensile Stress MPa (ksi)	541 (78.5)
			Poisson's Ratio	0.08
			Modulus GPa (msi)	30 (4.4)
Compression	ASTM D3410	25 °C	Compressive Stress MPa (ksi)	184 (26.7)
			Chord Modulus GPa (msi)	26 (3.8)
3 Point Bending	ASTM D790	25 °C	Flexural Strength MPa (ksi)	449 (65.1)
			Chord Modulus GPa (msi)	18 (2.6)
ILSS	ASTM D2344	25 °C	ILSS MPa (ksi)	35 (5)
IPSS	EN 6031	25 °C	Shear Strength MPa (ksi)	98 (14.2)
			Shear Chord Modulus GPa (msi)	2.1 (0.3)
DMA	ASTM D7028-07	25 °C	E' (°C) (°F)	99 (210.2)
			Tan (δ) (°C) (°F)	142 (287.6)
			E'' (°C) (°F)	118 (244.4)
Composite Density	ASTM D792	25 °C	Density (g/cm^3)	1.44
DSC	EN 6041	Range	DOC (%)	94
Vertical Flame Test	DIN EN 60695 or UL94	Range	Flammability	V-0
Horizontal Flame Test	DIN EN 60695 or UL94	Range	Flammability	HB

Typical AX-5180 Mechanical Properties

Autoclave Curing Cycle at 149 °C, 7 bar

Property	Standard	Test Temp.	Property	AX-180/ 42% /TW400/34700
Tensile	ASTM D3039	25 °C	Tensile Stress MPa (ksi)	684 (99.2)
			Poisson's Ratio	0.03
			Modulus GPa (msi)	62 (9)
Compression	ASTM D3410	25 °C	Compressive Stress MPa (ksi)	518 (75.1)
			Chord Modulus GPa (msi)	56 (8.1)
3 Point Bending	ASTM D790	25 °C	Flexural Strength MPa (ksi)	870 (126.2)
			Chord Modulus GPa (msi)	52 (7.5)
ILSS	ASTM D2344	25 °C	ILSS MPa (ksi)	64 (9.3)
IPSS	EN 6031	25 °C	Shear Strength MPa (ksi)	93 (13.5)
			Shear Chord Modulus GPa (msi)	4.5 (0.6)
DMA	ASTM D7028-07	25 °C	E' (°C) (°F)	137 (278.6)
			Tan (δ) (°C) (°F)	154 (309.2)
			E" (°C) (°F)	150 (302)
Composite Density	ASTM D792	25 °C	Density (g/cm^3)	1.63
DSC	EN 6041	Range	DOC (%)	97
Vertical Flame Test	DIN EN 60695 or UL94	Range	Flammability	V-0
Horizontal Flame Test	DIN EN 60695 or UL94	Range	Flammability	HB

Storage Requirements

Shelf life is from date of manufacturing according to storage temperature below. Working life is the cumulation of time outside of storage temperature.

Storage Condition	AX-180	AX-180SC
Shelf Life at -18ºC (0°F)	12 months	
Shelf Life at 4ºC (40°F)	6 months	
Working Life at 24ºC (75°F)	14 days	7 days

Handling & Safety Instructions

» Store prepreg suspended horizontally to avoid flat spots and thinning under the weight of the roll.

» Allow product sufficient time (at least 24 hours) to reach ambient temperatures after removal from cold storage to prevent condensation on the adhesive surface.

» Use the appropriate safety equipment for this product.

» Refer to the AX-180 Material Safety Data Sheet for specific safety instructions.

Technical Assistance

In a bind? Call us anytime. We provide fast and knowledgeable technical support:

Kordsa Composite Europe, İstanbul

PHONE + 90 216 300 10 00

EMAIL info@kordsa.com

Axiom, Santa Ana, CA

PHONE + 1 949 569-5934

EMAIL info@axiommaterials.com

Ver: August.2022

https://www.kordsa.com
https://www.axiommaterials.com
https://composite.kordsa.com