

# COMPOSITE TECHNOLOGIES

## TECHNICAL DATA SHEET

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### **KY14**

*Low Heat Release & Fire Smoke Toxicity (FST) /  
Non-Toxic / Bio-based*

#### **Product**

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KY14 material system is a flame-retardant bio-based on a PFA (Polyfurfuryl Alcohol) bioresin product designed specifically for low viscosity, and low flow.

Poly(furfuryl alcohol) (PFA) is a common thermosetting bioresin and derived from sugarcane waste. Furan resins have particular advantages in that they are derived from bio-sources and are based on furfuryl alcohol, which is less toxic than the formaldehyde used for synthesis of Phenolic resins. Plus, they have outstanding flame retardant properties, excellent temperature and chemical resistance.

KY14 system can be used to produce sandwich structures or laminates with excellent surface finish via a variety of process including platen press, autoclave, or VBO 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 KY14 systems is -55°C to 160°C (-67°F to 280°F).

#### **Typical Applications**

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- » Applications requiring flame retardance: FAR 25.853, UL94 or EN45545
- » 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

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

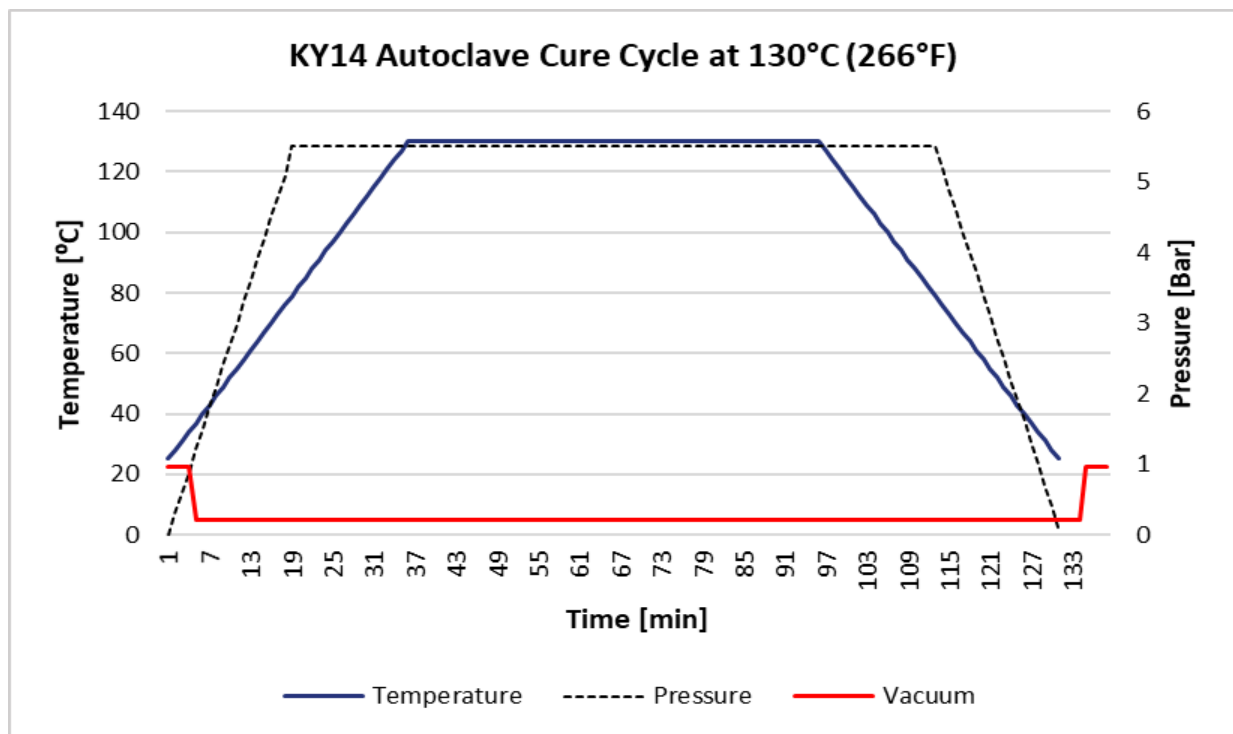
## Recommended Cure Cycles

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)	Cure Method	KY14
130 (266)	Autoclave / Oven	60 minutes
150 (302)	Press	12 minutes

### Recommended Autoclave Curing Cycle at 130°C (266°F) of KY14

- 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 130°C (250°F).
- 5) Hold at 130°C (266°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.

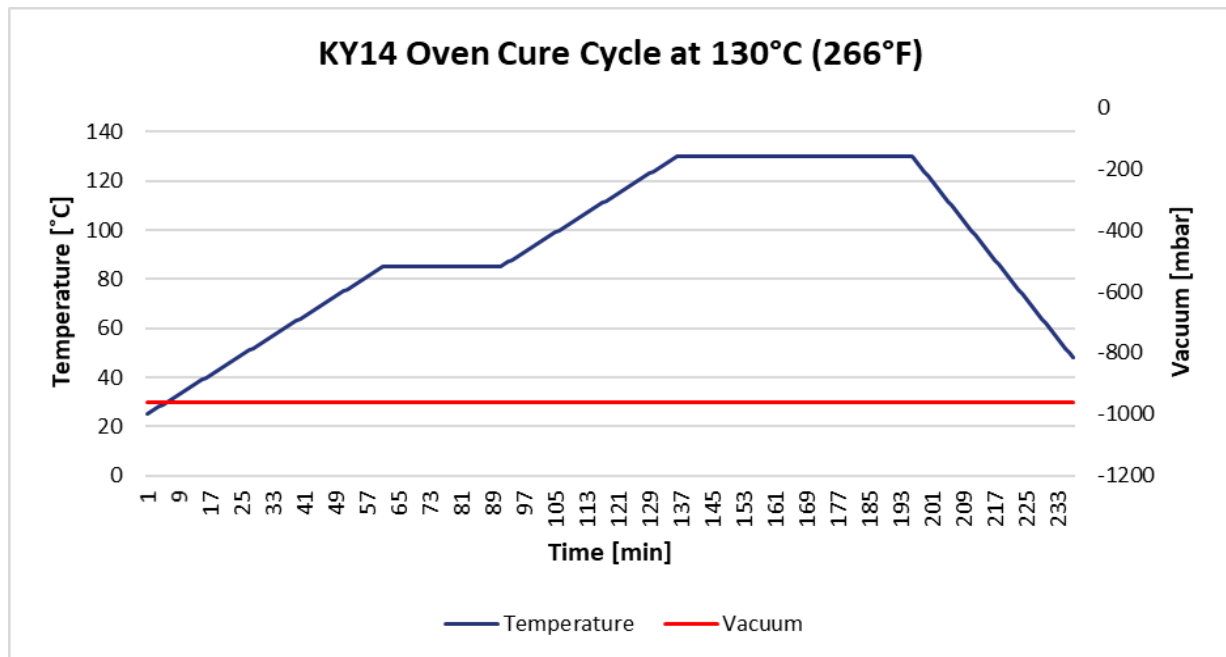


### Cure Considerations

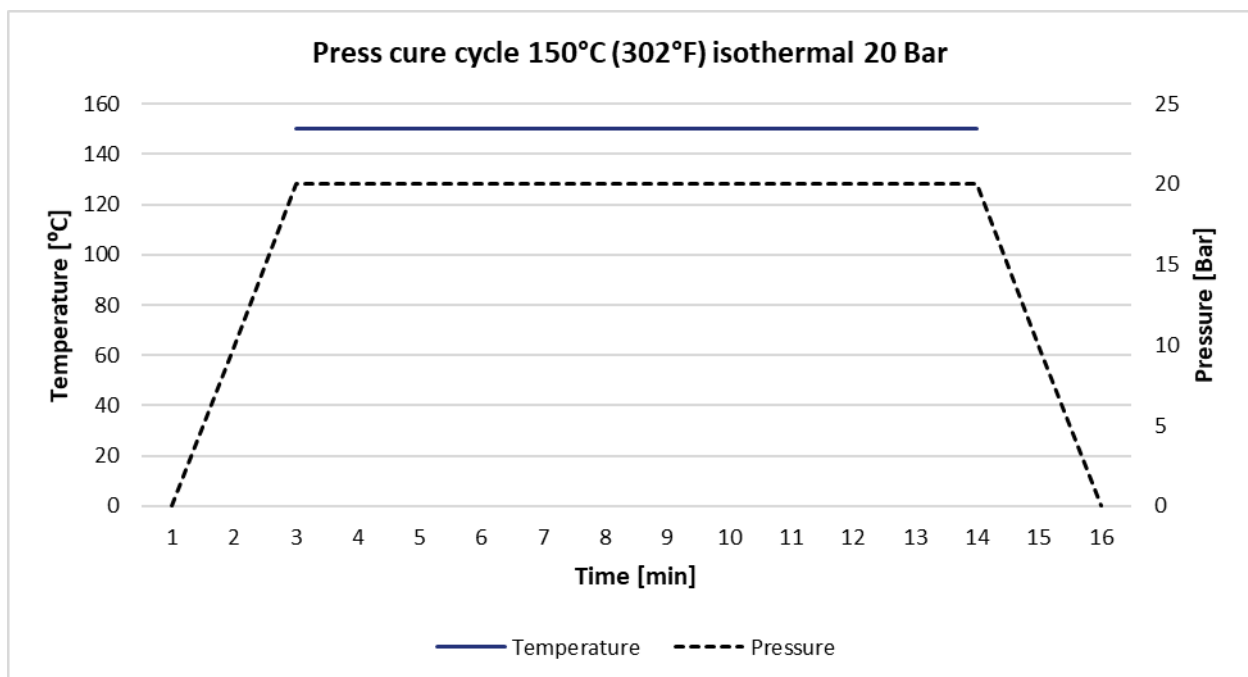
- » Temperature heat up and cool down under pressure is not mandatory.
- » KY14 prepregs are is vacuum-bag, platen press, and autoclave compatible.
- » Peak operating temperatures generally depend on cure temperature and post cure. For a 130°C (266°F) cure, the service temperature envelope is -55°C to 121°C (-67°F to 250°F).

### Recommended Oven Curing Cycle at 130°C (266°F) of KY14

- 1) Place thermocouple between the layers to track the temperature change,
- 2) Apply minimum 960 mbar vacuum at the beginning of the cycle.
- 3) Heat 1°C/min to the dwell temperature 85°C
- 4) Keep the laminate at 85°C temperature for 30 minutes
- 5) Ramp up the oven temperature with 1°C/min to 130°C
- 6) Keep the laminate at 130°C temperature for 60 minutes
- 7) Upon completion of cure, cool the part with 2°C/min to 50°C,
- 8) Before de-molding the laminate, the temperature should reach minimum 50°C.



### Recommended Press Curing Cycle at 150°C (302°F) of KY14



## Fire, Smoke & Toxicity Properties

### Aircraft Interiors - FAR/CS 25.853, Monolithic, Autoclave

Material - Monolithic	Test	Standard	Result
8-ply laminate KY14 US7781 296GSM 8HS 38% cured 1 hour at 130°C, Autoclave	60s vertical burn length	FAR 25.853	16 mm
	Heat Release	FAR 25.853 Appx F, IV	Peak:17.9 kW/m <sup>2</sup> Total:11.3 kW-min/m <sup>2</sup>
	Smoke Density	FAR 25.853 Appx F, V	5 Ds
	Toxicity	AITM 3-0005 (issue 2)	PASS
2-ply laminate KY14 US7781 296GSM 8HS 38% RC cured 1 hour at 130°C, Autoclave	60s vertical burn length	FAR 25.853	22 mm
	Heat Release	FAR 25.853 Appx F, IV	Peak:11.4 kW/m <sup>2</sup> Total:11.1 kW-min/m <sup>2</sup>
	Smoke Density	FAR 25.853 Appx F, V	4 Ds
	Toxicity	AITM 3-0005 (issue 2)	PASS
1-ply laminate KY14 US7781 296GSM 8HS 38% RC cured 1 hour at 130°C, Autoclave	60s vertical burn	FAR 25.853	2 mm
	Heat Release	FAR 25.853 Appx F, IV	Peak:16.2 kW/m <sup>2</sup> Total:8.3 kW-min/m <sup>2</sup>
	Smoke Density	FAR 25.853 Appx F, V	19 Ds
	Toxicity	AITM 3-0005 (issue 2)	PASS

### Aircraft Interiors - FAR/CS 25.853, Monolithic, Oven

1-ply laminate KY14 EGF US7628 PL203 38% RC cured 1 hour at 130°C, Oven	60s vertical burn	FAR 25.853	4 mm
	Heat Release	FAR 25.853 Appx F, IV	Peak:12.5 kW/m <sup>2</sup> Total: 11.6 kW-min/m <sup>2</sup>
	Smoke Density	FAR 25.853 Appx F, V	2 Ds
	Toxicity	AITM 3-0005 (issue 2)	PASS
2-ply laminate KY14 EGF US7628 PL203 38% RC cured 1 hour at 130°C, Oven	60s vertical burn	FAR 25.853	3 mm
	Heat Release	FAR 25.853 Appx F, IV	Peak:12.4 kW/m <sup>2</sup> Total: 11.4 kW-min/m <sup>2</sup>
	Smoke Density	FAR 25.853 Appx F, V	4 Ds
	Toxicity	AITM 3-0005 (issue 2)	PASS

## Aircraft Interiors - FAR/CS 25.853, Sandwich Panel, Oven

Material – Sandwich Panel	Test	Standard	Result
1-ply laminate KY14 EGF US7628 PL203 38% RC on each side of a Nomex AHN 4120 1/8 – 3 (hex), 1/8-inch thickness honeycomb, cured 1 hour at 130°C, Oven	60s vertical burn	FAR 25.853	9 mm
	Heat Release	FAR 25.853 Appx F, IV	Peak:12.8 kW/m <sup>2</sup> Total:13.2 kW-min/m <sup>2</sup>
	Smoke Density	FAR 25.853 Appx F, V	4 Ds
	Toxicity	AITM 3-0005 (issue 2)	PASS
2-ply laminate KY14 EGF US7628 PL203 38% RC on each side of a Nomex AHN 4120 1/8 – 3 (hex), 1/8-inch thickness honeycomb, cured 1 hour at 130°C, Oven	60s vertical burn	FAR 25.853	2 mm
	Heat Release	FAR 25.853 Appx F, IV	Peak:13.4 kW/m <sup>2</sup> Total:13.4 kW-min/m <sup>2</sup>
	Smoke Density	FAR 25.853 Appx F, V	5 Ds
	Toxicity	AITM 3-0005 (issue 2)	PASS

## Train Interiors - EN 45545-2, Monolithic, Autoclave

8-ply laminate KY14 US7781 296GSM 8HS 38% cured 1 hour at 130°C, Autoclave

Requirement Set	Test Method	Parameter	Result average	Class
R1, R7, R17	ISO 5658-2: 2006 + ISO 5658-2/A1: 2011	CFE (kW/m <sup>2</sup> )	50	HL3
R1, R7, R17	ISO 5660-1: 2015 + ISO 5660-1/A1: 2019	MAHRE (kW/m <sup>2</sup> )	7.7	HL3
R1, R7, R17	ISO 5659-2: 2017, 50 kW/m <sup>2</sup>	D <sub>s</sub> 4	31.9	HL3
R1, R7, R17	ISO 5659-2: 2017, 50 kW/m <sup>2</sup>	VOF4	61.2	HL3
R1, R7, R17	EN 45545-2: 2013 Annex C	CIT <sub>G</sub> (4 min)	0.06	HL3
		CIT <sub>G</sub> (8 min)	0.10	HL3

4-ply laminate KY14 US7781 296GSM 8HS 38% cured 30 min at 80°C, 1 hour at 130°C, Oven

Requirement Set	Test Method	Parameter	Result average	Class
R1, R7, R17	ISO 5658-2: 2006 + ISO 5658-2/A1: 2011	CFE (kW/m <sup>2</sup> )	50	HL3
R1, R7, R17	ISO 5660-1: 2015 + ISO 5660-1/A1: 2019	MAHRE (kW/m <sup>2</sup> )	0	HL3
R1, R7, R17	ISO 5659-2: 2017, 50 kW/m <sup>2</sup>	D <sub>s</sub> 4	22.1	HL3
R1, R7, R17	ISO 5659-2: 2017, 50 kW/m <sup>2</sup>	VOF4	52.7	HL3
R1, R7, R17	EN 45545-2: 2013 Annex C	CIT <sub>G</sub> (4 min)	0.01	HL3
		CIT <sub>G</sub> (8 min)	0.03	HL3



Tack Level of KY14

Standard	Level
NCAMP Standard*	5

\*NCAMP: National Center for Advanced Materials Performance

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

Typical KY14 Mechanical Properties

Vacuum Bag Only Curing Cycle at 130 °C, 1h

Property	Standard	Test Temp.	Property	38% /8HS300/ EC6 66
Tensile	ASTM D3039	25 °C	Tensile Stress MPa (ksi)	373.8 (54.2)
			Poisson's Ratio	0.13
			Modulus GPa (msi)	22.8 (3.3)
Compression	ASTM D3410	25 °C	Compressive Stress MPa (ksi)	332 (48.2)
			Chord Modulus GPa (msi)	22.7 (3.3)
ILSS	ASTM D2344	25 °C	ILSS MPa (ksi)	25 (3.6)
IPSS	ASTM D3518	25 °C	Shear Strength MPa (ksi)	49.2 (7.1)
			Shear Chord Modulus GPa (msi)	3.4 (0.5)

**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	KY14
Shelf Life at -18°C (0°F)	12 months
Shelf Life at 4°C (40°F)	6 months
Working Life at 24°C (75°F)	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 KY14 Material Safety Data Sheet for specific safety instructions.

**Technical Assistance**

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

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