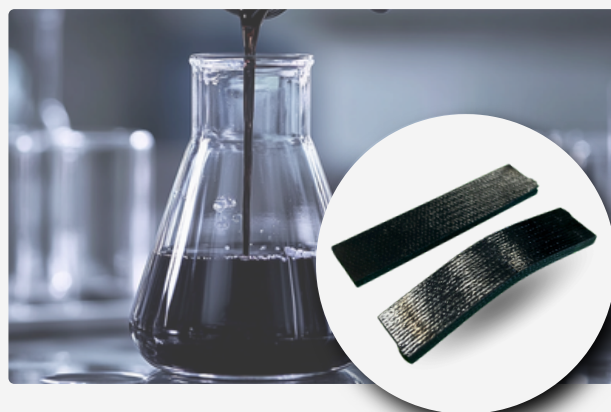


### INTRODUCTION

Phthalonitrile resins are **advanced thermosetting materials** renowned for their unprecedented **thermal stability, high glass transition temperature, flame retardancy, and superior mechanical strength**. These unique properties make them ideal for demanding **high-temperature applications** in industries such as aerospace, defense, marine, automotive, and electronics, where **performance and reliability** under extreme conditions are critical.



**SP-3414\_B** is a **single-component phthalonitrile resin** specifically formulated for **fiber impregnation** in the production of high-performance **prepregs**. **SP-3414\_B** features **tailored rheology** and an **optimized processing profile** that enable efficient **fiber impregnation** and **prepreg fabrication**, while ensuring **long shelf life**, ease of handling, and consistent curing behavior. These properties support the production of **lightweight, durable components** capable of **withstanding extreme thermal and oxidative environments**, making **SP-3414\_B** an ideal choice for **aerospace, defense, and other demanding applications** requiring **thermally stable** and **structurally robust composite materials**.

### KEY FEATURES

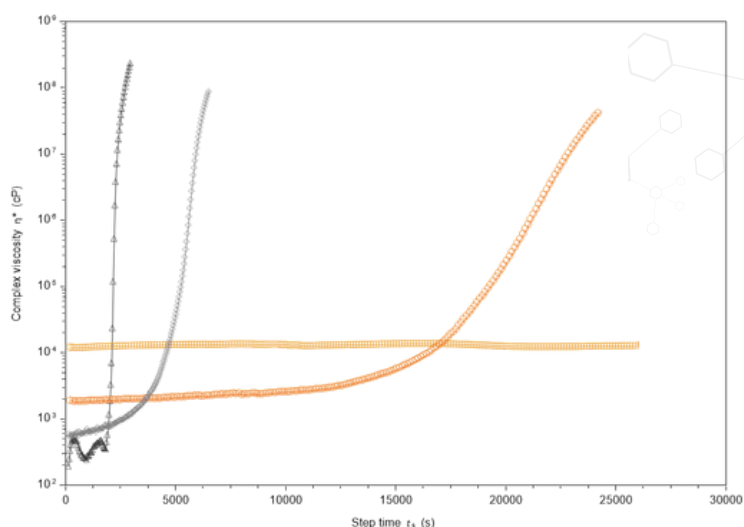
1. Optimized Rheology and Reactivity for efficient impregnation and consolidation
2. One-part crystalline-free system with indefinite shelf life at room temperature
3. Safety - Low reaction enthalpy
4. Non-combustible or self-extinguishing material with high char yield formation
5. Decomposition temperature onset > 460°C
6. Tack-Free System

### NEAT RESIN CHARACTERISTICS

	CHARACTERISTICS	DATA
Post-Cured 320°C	Ta (dry) (DMA - 3 Points Bending)	335 - 355°C
	Ta (wet) (DMA - 3 Points Bending)	340°C
	Decomposition temperature (Td5%)	460-480°C
	Char yield (at 900 °C) (TGA - under nitrogen)	74%
	Moisture absorption (15 days at 70 °C in water)	4.1 - 4.5 %
	Density	1.29 g/cm <sup>3</sup>
Uncured	Dry extract	100 %
	Density at 25 °C (modeled)	1.1 - 1.15 g/cm <sup>3</sup>
	Polymerization onset	230-240°C
	Polymerization enthalpy	150-250 J/g



### VISCOSITY PROFILES AND DATA



VISCOSITY (Pa.s)	> 50	50-25	25-5	< 5
TEMPERATURE (°C)	< 100	100 – 110	105 - 120	> 120

TEMPERATURE	POT LIFE	GEL TIME
110°C	> 7 h	/
130°C	3 h 40	7 h
150°C	35 min	1 h 30
180°C	20 min	35 min

### PROCESSING PARAMETERS

#### Prepegging process :

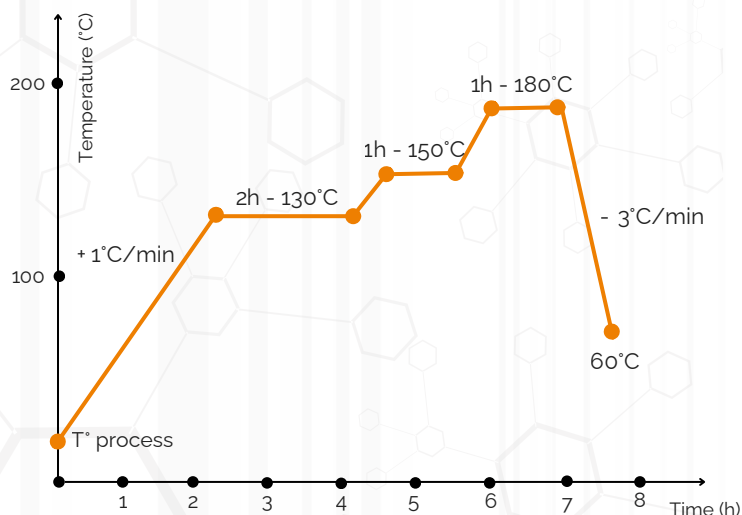
It is advised to degas the formulation before use at 100°C and 10 mbar for 30 min. The formulation can be process with an impregnation bath at 105°C.

#### Prepreg Layup – Advice :

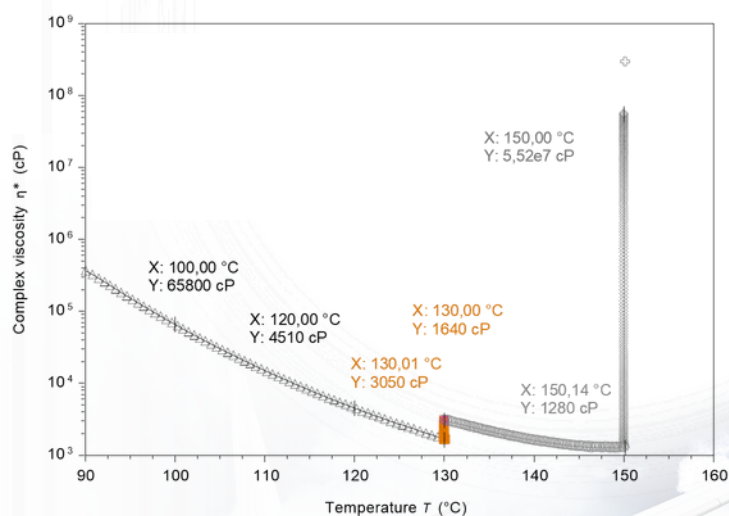
The Prepreg can be manipulated at room temperature, ensuring bonding by localized softening of the ply.

#### Prepreg Curing Conditions :

The formulation can be consolidated under pressure (vacuum bag or autoclave) according to the following cycles:



### CURE CYCLE VISCOSITY



Cure Cycle Viscosity Profile measured with HR-20 Rheometer : oscillation at 1 Hz and 10 % Strain

This curing cycle is indicative and has been developed to ensure a viscosity above 1000 cP, in order to prevent resin drainage during consolidation. It has been developed using thin film rheometry, and can be adapted to the process and equipment used.

Post-cure can be performed out of mold using the following steps:

1. Increase the temperature from room temperature to 320°C at a rate of 2°C/min
2. Hold at 320°C for 3 h
3. Before removing, cool down the mold until the temperature reaches at least 60°C at a rate not exceeding 3°C/min

