



AR4565HT Bismaleimide (BMI) Preliminary Data Sheet

Updated: 01/15/2015

AR4565HT is a Toughened Bismaleimide (BMI) Resin System.

Features:

- Low Temperature cure, as low as 375F, with Free standing post cure will provide Tg of **650F (see below)**.
- Intrinsically Toughened.
- Medium Tack
- Good Drape
- Good Work Time (Unitape Tack Retention) one weeks at Room Temperature.
- Good Out time (No Change in Gel Time) 2 weeks at Room Temperature.
- Available in most commercial fibers, and woven fabrics.
- Storage Time: 6 months at 40°F, 12 months at 0° F.
- It has medium high flow.
- [Neat Resin Gel Curve](#)
- [Neat Resin \(Complex\) Rheology, Viscosity vs. Temperature](#)
- [Neat Resin \(Complex\) Rheology, Viscosity vs. Hold Time.](#)
- [Isothermal Viscosity Curves.](#)

- It can be processed in autoclave, press or oven.
- The following **Autoclave Cure Cycle** was used to develop mechanical properties:

1. Applied Full Vacuum. [1B.RT@1F/min, 290F/45min.](#)
2. Vented @ 22 Psi, applied [85 Psi](#) Pressure.
3. Increased temperature [@2F°/min to 375°F/ 6hours](#)
4. Cool under pressure, Removed part at or below 140°F

Free standing Post Cure: In Oven at [2F°/min to 375F°/1hr, and 1F/min to 510F/ 6 hours.](#)
Cooled to room Temp slowly. Removed the part at RT

R&D

Prepreg Properties:

3K2x2-AR4565HT-204/42(2SP)

RC% (Wash Out):	ASTM D-3529	43.2%
Fiber Areal Weight (FAW):		200.7 GSM
Prepreg Areal Weight (PAW):		353.4 GSM
Prepreg Gel (Fisher Johns): Temperature: At 350°F	ASTMD-3532	3min 37sec
Flow: (4 x4"x4") Time: 20mins/Temp: 325°F/Pressure: 25 psi,(0,90,90,0)	ASTMD-3531	18.9%

Lay-up: 14 Plies (0°/90° Sequential)

Tool/Teflon/Silicone Dam Wrapped WL5200R/Prepreg Stack/Teflon/Caul Plate/WL5200R/2-ply Airweave N7/Teflon/Bag/Glass Tows
 ea. Corner/Double stack mastic tape wrapped with WL5200R Porous Peel Ply

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Cure:	Autoclave:		
Rate of rise: A. 3°F/min, to 250°F/45min, B.3°F/min to 375°F/6hr			
Pressure: Full Vac, 15psi at 250°F/45min, Vent @ 22psi, then applied 85 psi			
Cool: At 3°F/min, to 140°F.			
Post cure:	Free Standing, at 3°F/min to 375°F/1hrs, 3°F/min to 510°F/6hrs. Cool slowly to RT.		

Material	3K2x2-AR4565HT-204/42(2SP)		
Laminate Properties:	Test Method	Panel C	
Fiber Volume	by Weight Loss	47.8%	
Tg, C, DSC, 10C/min	ASTME 1356	364.4C	
Tg, C, TMA, 10C/min	ASTME 1545-00	353.5C	
CTE, TMA, 10C/min	ASTME 1545-00	32.9 ppm/C	
Tg, C, DMA 5C/min, Storage	ASTMD 5023	354.1C	
Tg, C, DMA 5C/min, Loss	ASTMD 5023	363C	
Tg, C, DMA 5C/min, Tan Delta	ASTMD 5023	377.4C	

Mechanical Properties:	Test Method	DRT	D375°F	D450°F	WRT	W375°F	200C/5 days Exposure		
							Mass Loss	DRT	D400°F
Tensile Strength, ksi	ASTMD 638 Type I	75.8	74.7	70.3	80.1	70.4			
Tensile Modulus, Mpsi	ASTMD 638 Type I	8.3	6.5	6.0	8.5	8.2			
Compression Strength, ksi	ASTMD 695	92.9	72.4	71.6	89.6	50.88*			
Compression Modulus, Mpsi	ASTMD 695	8.4	6.4	6.5	8.1	8.2			
Flexural Strength, ksi	ASTMD 7264	110.8	103.5	99.8	127.3	112.5	0.35%	103.7	104.5
Flexural Modulus, Mpsi	ASTMD 7264	7.8	7.5	7.7	7.9	7.7	0.35%	7.7	8.3
ILSS (Short Beam Shear), ksi	ASTMD 2344	4.7	4.8	4.7	6.2	5.2	0.94%	4.9	3.9

Wet Conditioning: (Hot/wet condition: Full immersion in DI water, place container in Humidity Chamber: 85% R.H., 160F to equilibrium saturation)

* Edge Delamination

		24 hour water boil			WRT	% Wt. Gain			
Flexural Strength, ksi	ASTMD 7264				109.3	0.59%			
Flexural Modulus, Mpsi	ASTMD 7264				7.8	0.59%			
ILSS (Short Beam Shear), ksi	ASTMD 2344				5.6	0.63%			

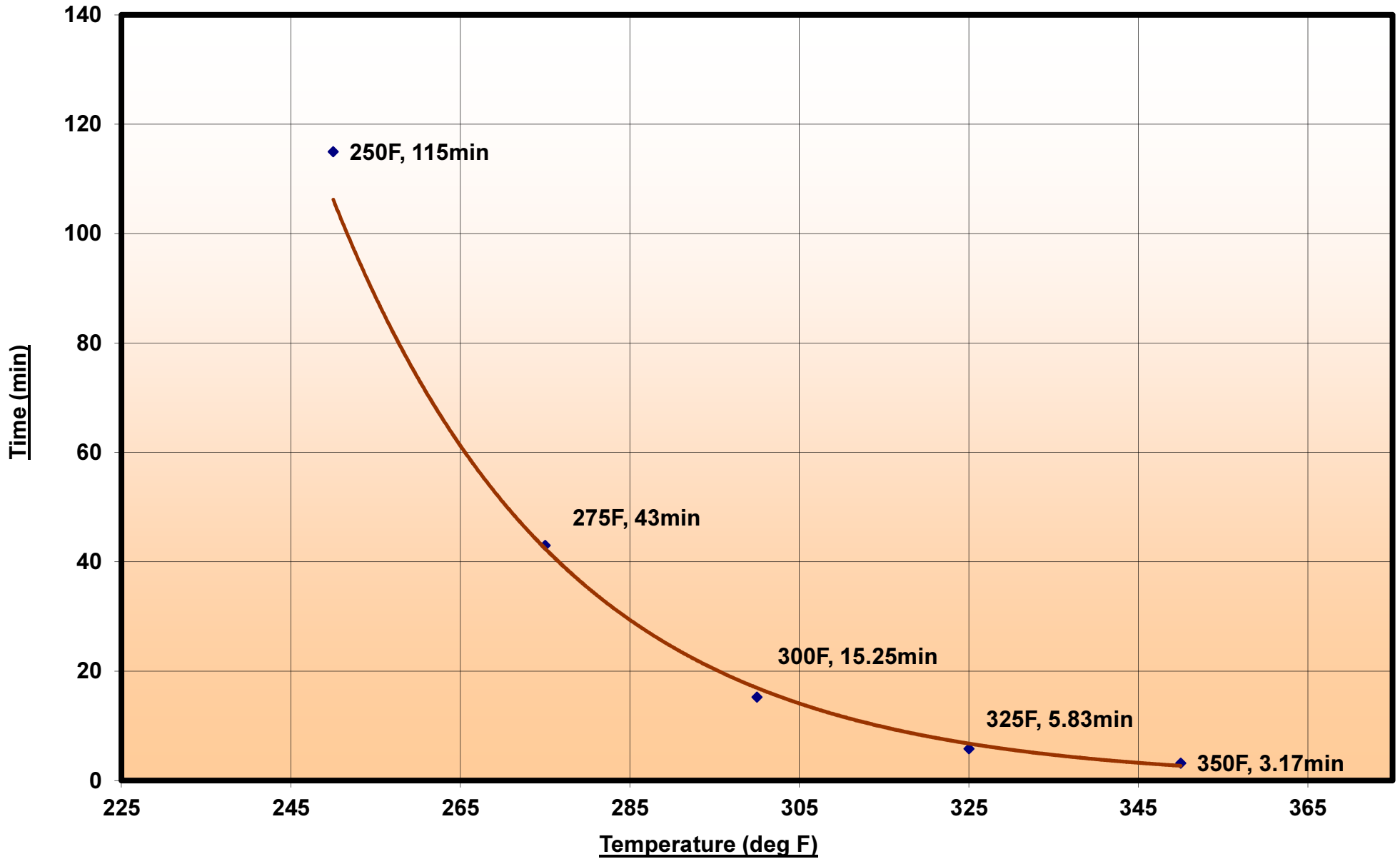
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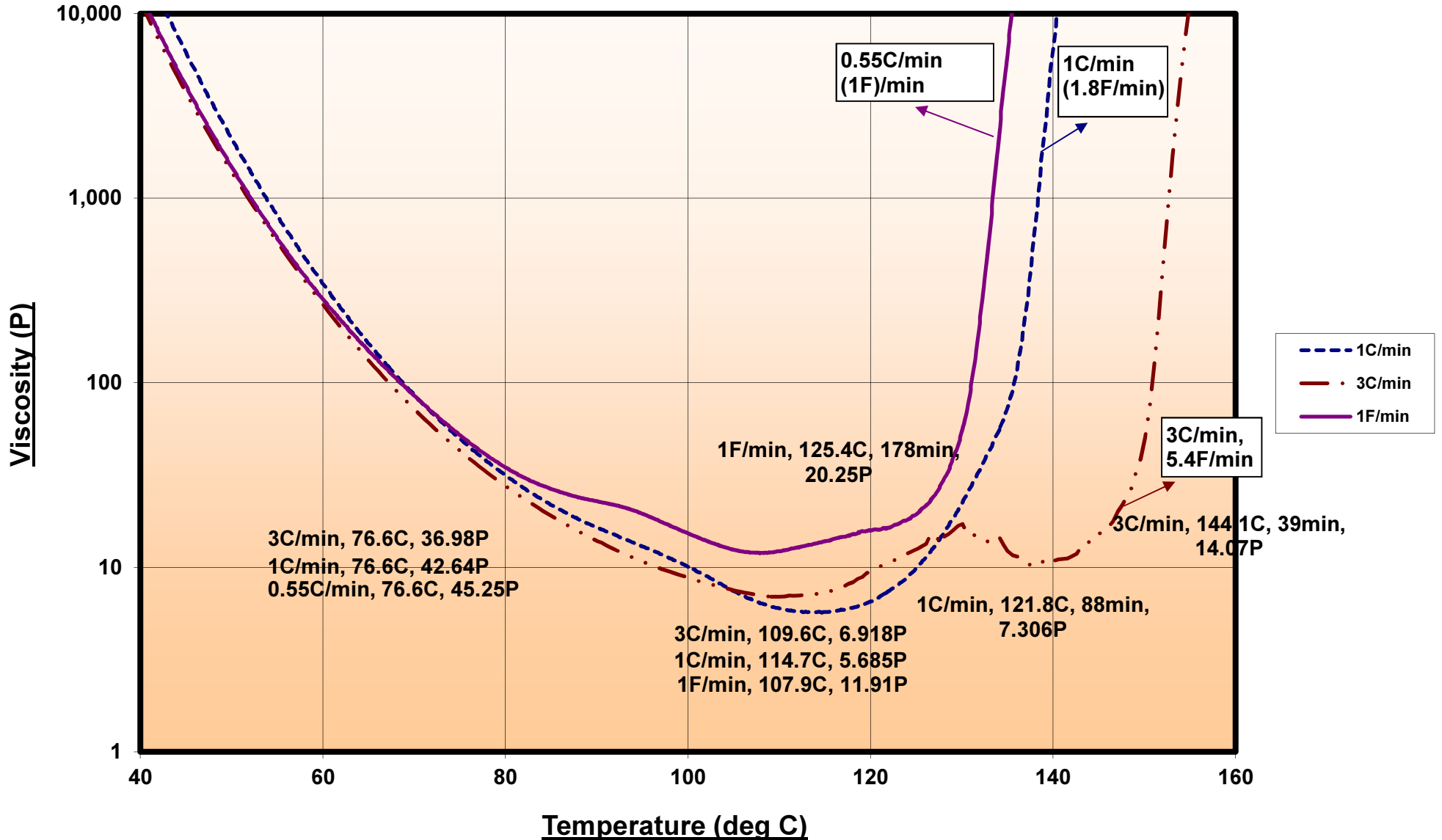
Gel Curve AR4565HT BMI

$$y = 1E+06e^{-0.037x}$$

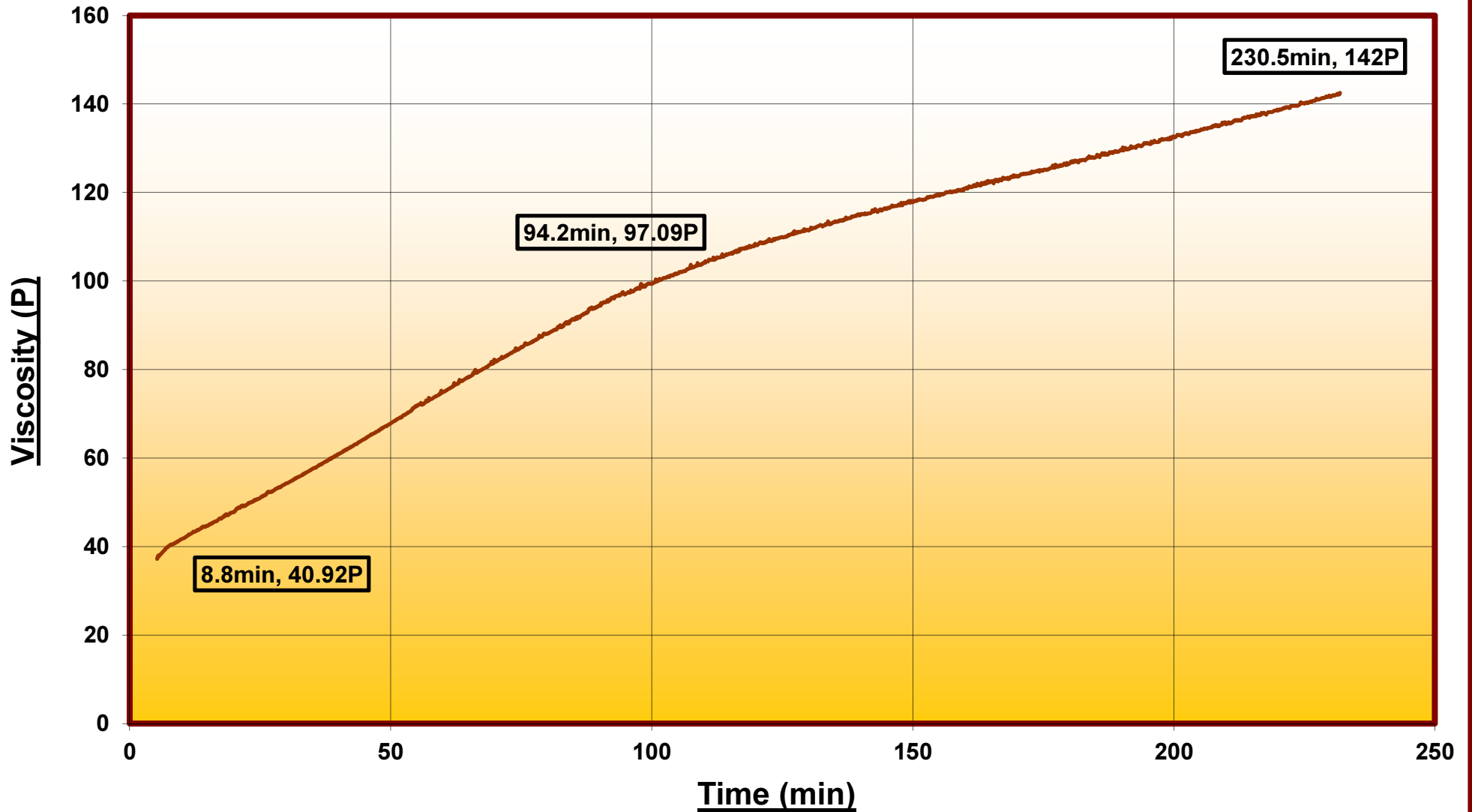
$$R^2 = 0.9923$$



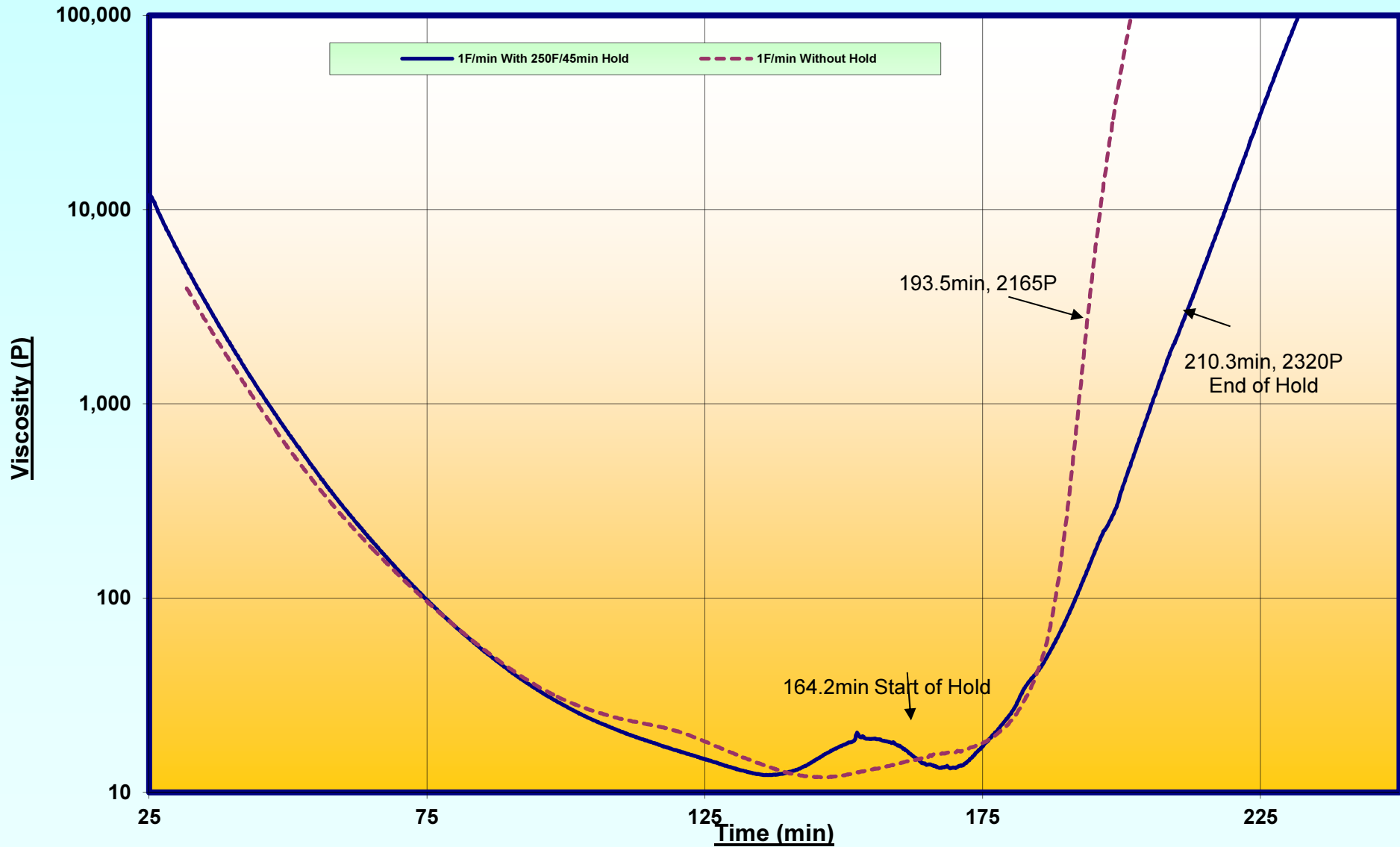
AR4565HT(BMI) Dynamic Viscosity vs. Temperature



AR4565HT (BMI) Isothermal Viscosity at 170F

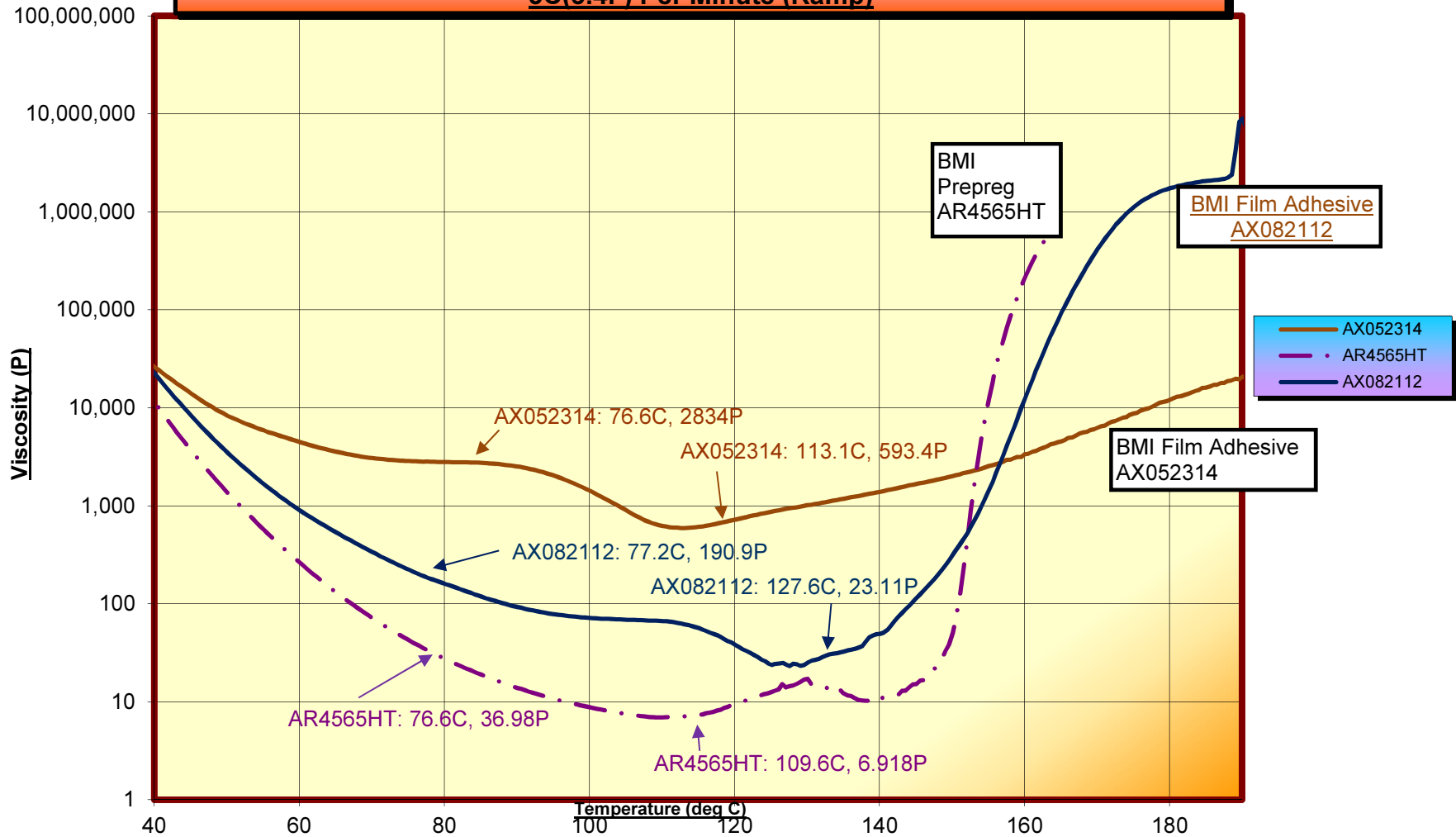


AR4565HT (BMI) Dynamic Viscosity with Hold at 245F/45 mins



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**AX052314 & AX082112 (BMI film Adhesive) vs AR4565HT Rheology vs Temperature
3C(5.4F) Per Minute (Ramp)**



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**AX052314 & AX082112 (BMI film Adhesive) vs AR4565HT Rheology vs Temperature
at 1F(0.55C) Per Minute (RAMP)**

