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Advanced Materials

Araldite® CW 9029 US Resin
Aradur® HW 9029 US Hardener

Recognized Polymeric System at 200ºC

Key properties

- Components are easily processed liquids
- Adequate working life at processing temperatures
- Rapid gelation at mold temperatures of 140°C and above
- Excellent mechanical and electrical properties
- Excellent fracture toughness characteristics
- Excellent performance in applications requiring thermal cycling
- Recognized insulation component with Thermal Index of 200°C

Description

Araldite® CW 9029 US resin with Aradur® HW 9029 US hardener is a liquid, hot curing two-component epoxy casting system containing mechanically reinforcing fillers. This system is readily processed into a resilient polymer having excellent mechanical and electrical characteristics. The cured product exhibits exceptional resistance to thermal cycling as well as thermal endurance properties, which qualifies for 200°C applications.

Applications

This system is recommended for the manufacture of electrically insulating components and for use as electrical insulation for indoor medium and high voltage applications including SF_6 insulated types

Typical Properties*

Araldite® CW 9029 US Resin	
Appearance	Viscous Liquid [1]
Specific Gravity	1.71 - 1.79
Viscosity, cPs.	
@ 25ºC	60,000 - 80,000
@ 50°C	4,000 - 8,000
@ 60°C	1,450 - 2,500
@ 70°C	1,000 - 1,500
Flash point, Closed Cup, °C	135
Aradur® HW 9029 US Hardener	
Appearance	Beige Viscous Liquid
Specific Gravity	1.88 - 1.96
Viscosity, cPs	
@25°C	6,000 - 10,000
@ 50°C	1,500 - 2,500
@ 60°C	900 - 1,800
@ 70°C	600 - 1,200
Flash point, Closed Cup, °C	140
Mixed	
Specific Gravity	1.81 - 1.85
Viscosity, cPs	
@ 25°C	35,000 – 65,000
@ 50°C	2,500 – 3,500
@ 70°C	700 – 1,200

* Product data are based on Huntsman's test methods. Copies are available upon request

[1] Available in Blue, Black and Beige (neutral) color versions

Mix ratios

	Parts by weight	Parts by volume
Araldite® CW 9029 US Resin	100	100
Aradur® HW 9029 US Hardener	100	90

Reactivity
(average values)

Gel time, 10 g sample, min	
at 120°C	29 - 35

Processing

Araldite® CW 9029 US resin and Aradur® HW 9029 US hardener system is ideally suited to processing by conventional techniques. When casting very large parts with this system, an extended cure cycle is recommended to reduce formulation of high stresses within the cured part. The optimum gelation and cure schedule in this case is dependent on the design of the part. General processing conditions are given below:

Smaller parts:
For relatively thin, low mass castings, a simplified cure schedule would be: within preheated mold at 80ºC - 100°C, mix materials at 40ºC - 80°C. Fill mold, then gel typically for 4 - 6 hours at 80°C or 2 hours at 100°C. Then post cure either 2 hours at 150°C, 4 to 6 hours at 140°C or 10 hours at 130°C.

Very large parts:
Within preheated mold and mixed materials at 60ºC - 80°C, cure with either a step or ramp cure cycle. For example, ramp cure from initial mold temperature to 140°C in linear ramp over a time of 16 - 24 hours. Then post cure for an additional 4-6 hours at 140°C. Cool slowly to 100°C or less over a period of several hours prior to de-molding.

APG Casting:
This system is suited to processing by the Automatic Pressure Gelation (APG) technique. However, it can be used to produce small sized castings by conventional means as above. In using the APG process, preheat mold to 140ºC - 160°C. Fill the mold in 2 - 5 minutes with the mixed material at 50°C to 60°C. Gel within mold under pressure of 1-3 atm for 7-15 minutes (dependent on part size and mixed material temperature). Then post cure for either 2 hours at 150°C, 4-6 hours at 140°C, or 10 hours at 130°C.

Physical Properties

Unless otherwise stated, the data were determined with typical production batches using standard testing methods. They are provided solely as technical information and do not constitute a product specification.

Tensile strength, psi	11,000-12,500	ASTM D 638
Tensile modulus, psi	1.50 - 1.55 x 10^6	ASTM D 638
Ultimate tensile elongation, %	0.80 – 1.20	ASTM D 638
Flexural strength, psi	18,000-19,000	ASTM D 790
Flexural modulus, psi	1.35 - 1.45 x 10^6	ASTM D 790
Hardness, Shore D	92 – 96	
Glass transition temperature, °C	110 - 120	DSC
Coefficient of thermal expansion, ppm/°C	See Figure 2	TMA
Water absorption, 24 hours @ 23°C,	0.020 – 0.025	ASTM D 570
Thermal Conductivity, W/m-K	0.7 – 0.8	ISO 8894-2/90
Thermal Endurance	See Figures 6 & 7	UL 746B

Electrical Properties

Unless otherwise stated, the data were determined with typical production batches using standard testing methods. They are provided solely as technical information and do not constitute a product specification.

Dissipation factor, @ 60 Hz	See Figure 3
Volume Resistivity	See Figure 4
Dielectric Constant @ 60 Hz	See Figure 5
Dielectric strength, V/mil @ 3 mm	420 - 480

Figure 1

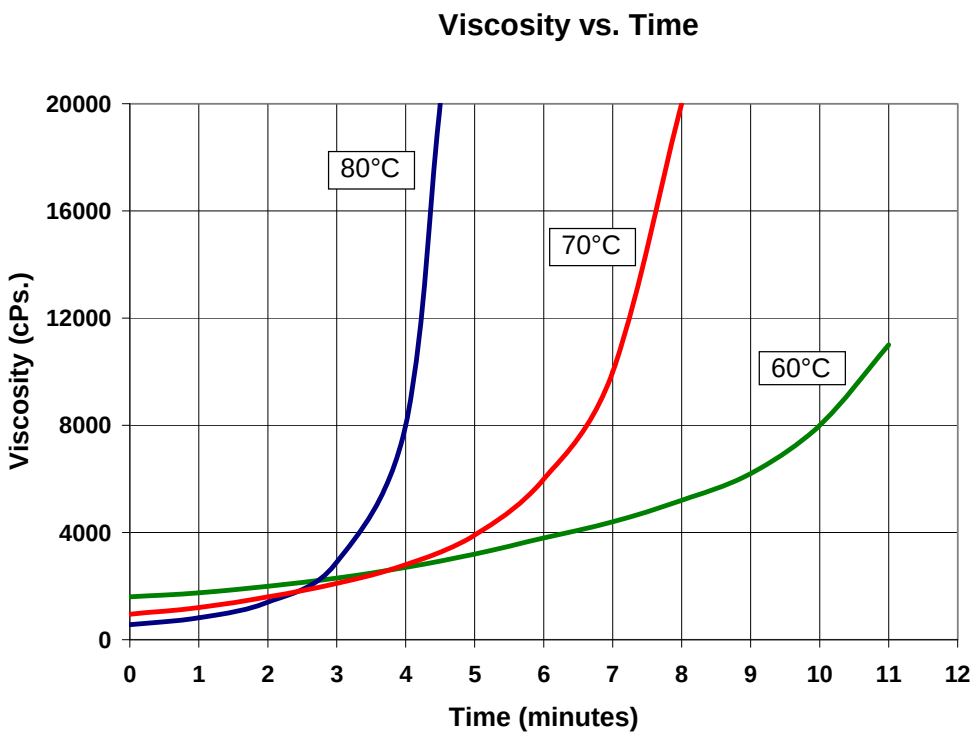


Figure 2

Coefficient of Thermal Expansion

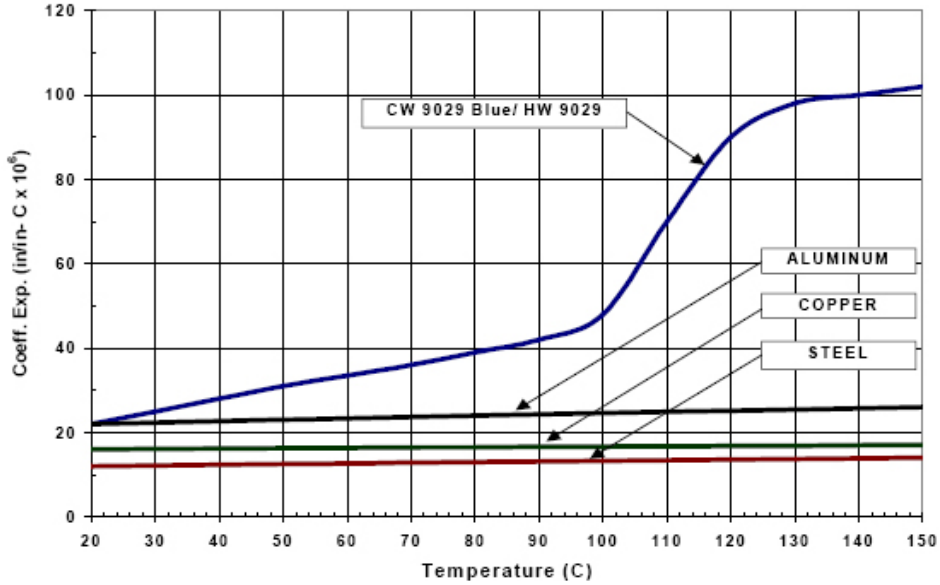


Figure 3

Dissipation Factor vs. Temperature @ 60 Hz

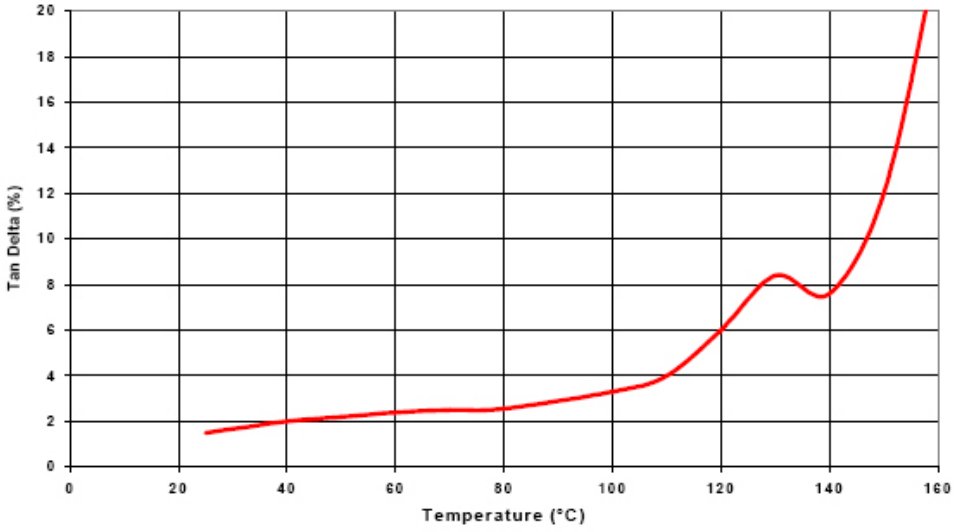


Figure 4

Volume Resistivity vs.Temperature

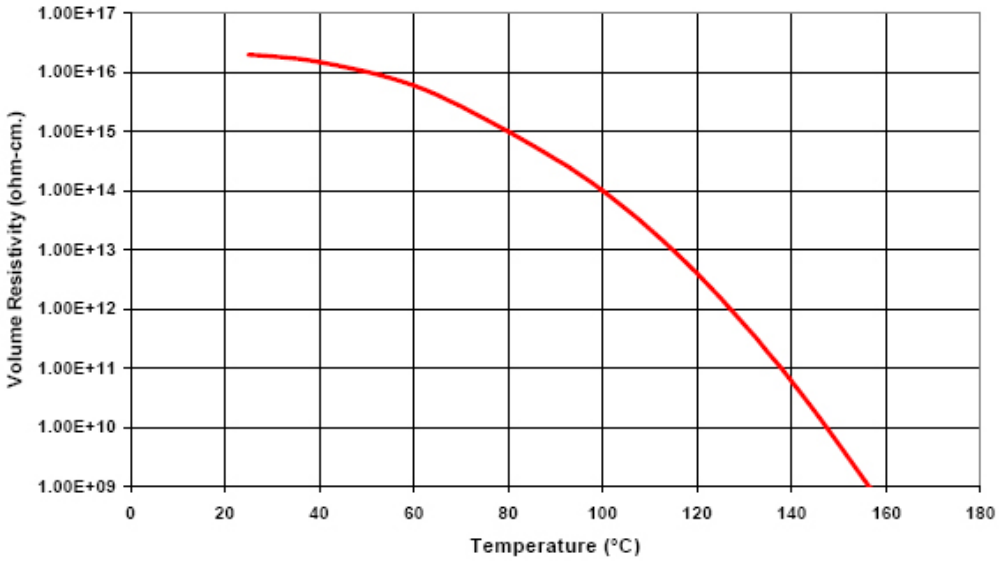


Figure 5

Dielectric Constant vs. Temperature @ 60 Hz

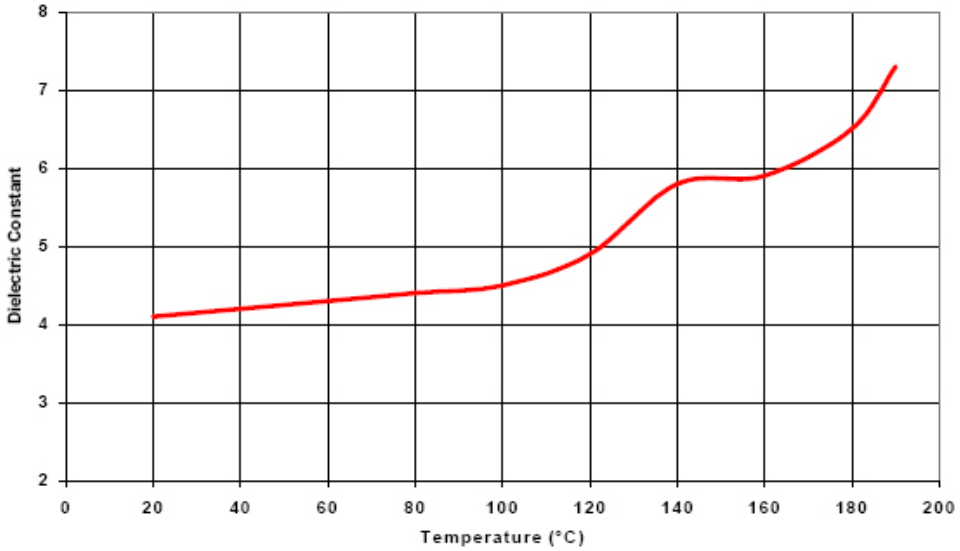


Figure 6

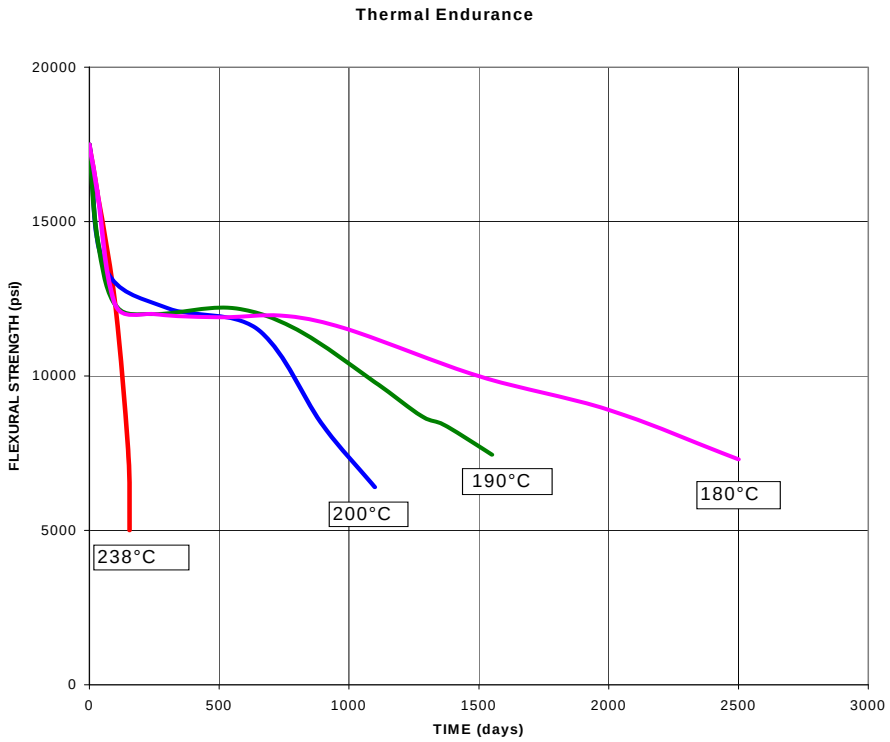
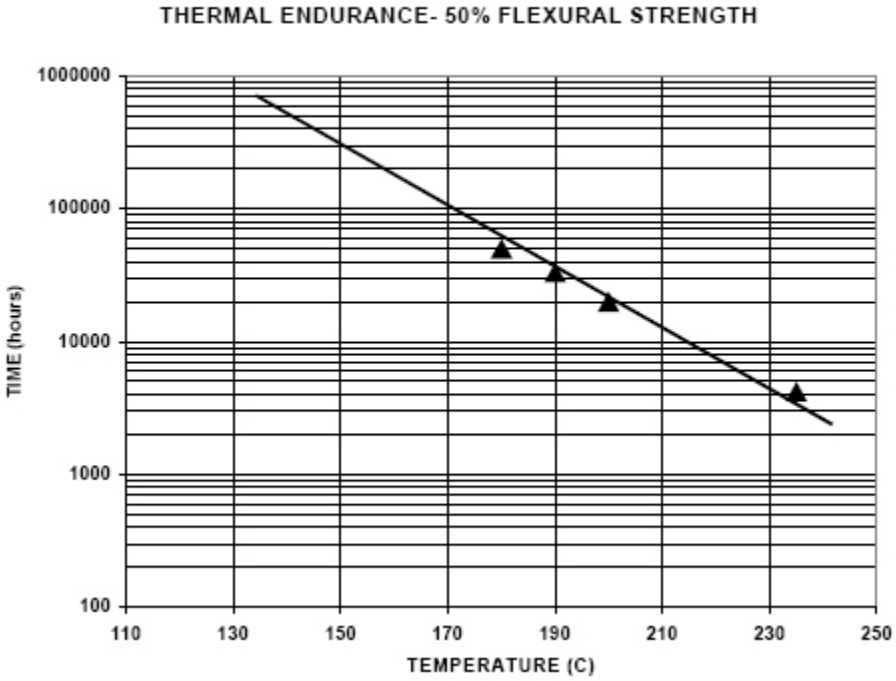


Figure 7



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Storage

Araldite® CW 9029 US Resin: Contains cure-accelerating additives. It should not be stored for long periods at temperatures in excess of 30°C nor should it be exposed to temperatures in excess of 100°C for more than 2 hours. Incorrect handling will result in an increase in viscosity and reduced cured-state properties.

Aradur® HW 9029 US Hardener: Contains cure accelerators. Storage at elevated temperatures (>80°C) for long periods (>5 days) will result in an undesirable increase in viscosity and impaired reactivity of the mixed system. This hardener is sensitive to moisture. Partially used containers should be closed immediately after use.

Araldite® CW 9029 US resin and Aradur® HW 9029 US hardener components may be stored for up to 1 year from date of manufacture at 18°C-25°C provided the product is stored in sealed container.

Handling precautions

Caution

Do not use this product until the MSDS have been read and understood. To protect against any potential health risks presented by our products, the use of proper personal protective equipment (PPE) is recommended. Eye and skin protection is normally advised. Respiratory protection may be needed if mechanical ventilation is not available or is insufficient to remove vapors. For detailed PPE recommendations and exposure control options consult the product MSDS or a Huntsman EHS representative.

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