HUNTSMAN

Advanced Materials

DATA SHEET

Araldite® CW 5625
Aradur® HW 5625-1

Pre-Filled Cycloaliphatic Epoxy Resin System:

Hydrophobicity - Transfer & Recovery
Excellent Arc Track and UV Resistance

General

Araldite CW 5625 with Aradur HW 5625-1 is a prefilled, cycloaliphatic, hot-curing, two component epoxy casting resin system recommended for medium voltage electrical applications in outdoor environments and in high humidity environments. It exhibits hydrophobic properties including hydrophobicity transfer and recovery as well as excellent arc tracking resistance and erosion resistance to UV radiation, excellent mechanical and dielectric properties, and good thermal shock resistance.

Applications

Outdoor electrical insulating components
Bushings, sensors
Instrument transformers
Line post and pin insulators in the medium voltage range.
All components for humid indoor medium and high voltage environments
Excellent indoor and outdoor switchgear components

Features

Hydrophobicity transfer and recovery
High mechanical properties
Excellent dielectric properties
Very good thermal shock resistance
High resistance to erosion under UV-radiation
High tracking and arc resistance
Extended life-time of insulation
Silanized fillers ensures stable dielectric properties in outdoor humid conditions

Typical Properties*

Araldite CW 5625	
Appearance	Grey Viscous Liquid
Specific Gravity	1.71 – 1.77
Viscosity @ 40ºC, cPs	20,000 – 35,000

Aradur HW 5625-1	
Appearance	Grey Brown Viscous Liquid
Specific Gravity	1.85 – 1.90
Viscosity @ 40ºC, cPs	15,000 – 30,000

* Typical properties are based on Huntsman's test methods. Copies are available upon request.

Packaging & Storage

Araldite CW 5625
Store at 70-90°F in a dry and well-sealed condition, if possible, in original containers. If only part of container is used, re-close to prevent contamination.

Aradur HW 5625-1
Store at 70-90°F in a dry well-sealed condition, if possible in original containers. This product is moisture sensitive and packaged under a blanket of dry nitrogen. Maintain factory seal. If only part of container is used, blanket with dry nitrogen and tightly re-seal.

Provided these materials are stored under the recommended storage conditions in their original containers, they will remain in usable condition for 1 year from date of manufacture.

Mix ratios

	Parts by weight
Araldite CW 5625	100
Aradur HW 5625-1	100

Processing and Cure

The two components should be mixed in the desired quantity under vacuum and at slight elevated temperature (up to 60°C). For mixing of medium- to high-viscous casting resin systems and for mixing at lower temperatures, we recommend special thin film de-gassing mixers that may produce additional self-heating of 10‹C -15 °C as a result of friction. Depending on the quantity, mixer device, mixing temperature and application, the mixing time is, under a vacuum of 1 to 8 mbar, 0.25 to 1 h.

The premixed components are packaged according to their mixing ratio. To minimize any filler sedimentation, it's recommendable to empty the container completely. Before partial use, the contents must be carefully homogenized at elevated temperature. We recommend also the same preheating temperature to prevent air entrapment.

In automatic feeding and mixing installations, both components are de-gased and homogenized under a vacuum of about 2 - 5 mbar in separate holding tanks. From time to time the prefilled products are agitated to avoid any sedimentation and irregular metering. After dosing and mixing with a static mixer, the system is fed directly to the vacuum casting chamber or, in case of the automatic pressure gelation process, directly to the hot casting mold. Several individual casting stations can be fed via separate feeding tubes.

The effective pot-life of the mixed system is about 1 to 2 days at temperatures below 25°C. Conventional batch mixers should be cleaned once a week or at the end of work. For longer interruptions of work, the pipes of the mixing and metering installations must be cooled and cleaned with the resin component to prevent sedimentation and/or undesired viscosity increase. Interruptions over a weekend without cleaning are possible if the pipes are cooled at temperatures below 18°C. For information regarding viscosity increase and gel time at various temperatures, refer to Figures 1 and 2.

Mold temperature

APG process	130 – 160°C
Conventional vacuum casting	80 – 100°C

Demolding times (depending on mould temperature and casting volume)

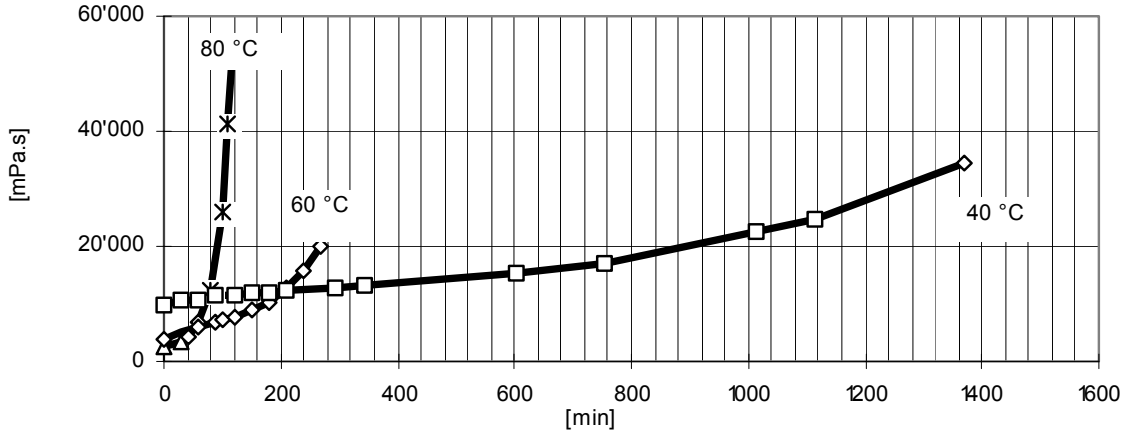
APG process	10 – 40 min
Conventional vacuum casting	2 – 8 h

Cure conditions (minimal postcure)

APG process	2 h @ 150°C (or) 4 h @ 140°C
Conventional vacuum casting	4 h @ 80°C and 4 h @ 140°C

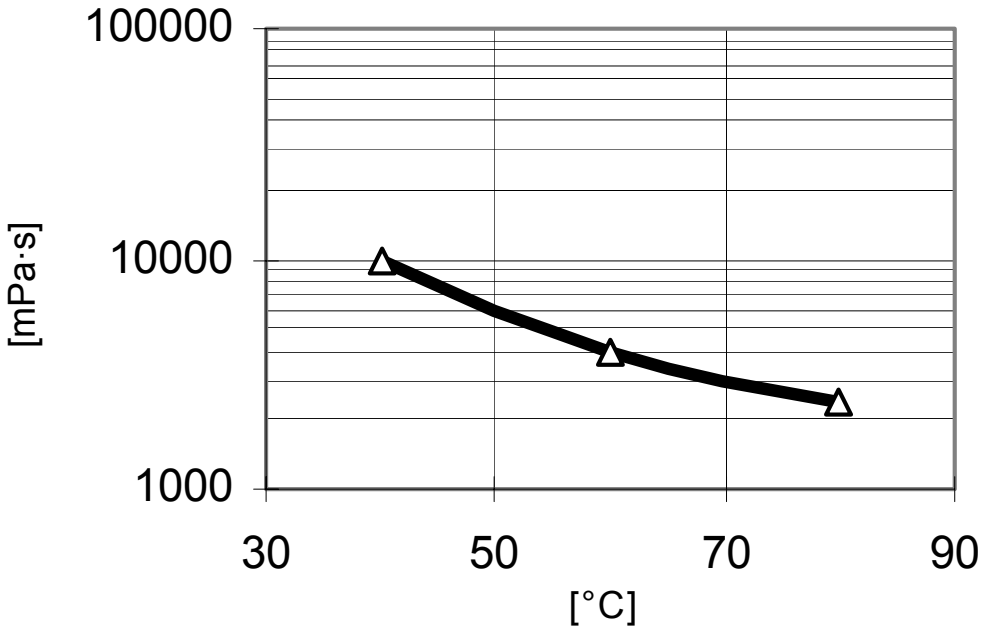
To determine whether cross-linking has been carried to completion and the final properties are optimal, it is necessary to carry out relevant measurements on the actual object or to measure the glass transition temperature. Different gel and post-curing cycles in the manufacturing process could influence the cross-linking and the glass transition temperature respectively.

Figure 1



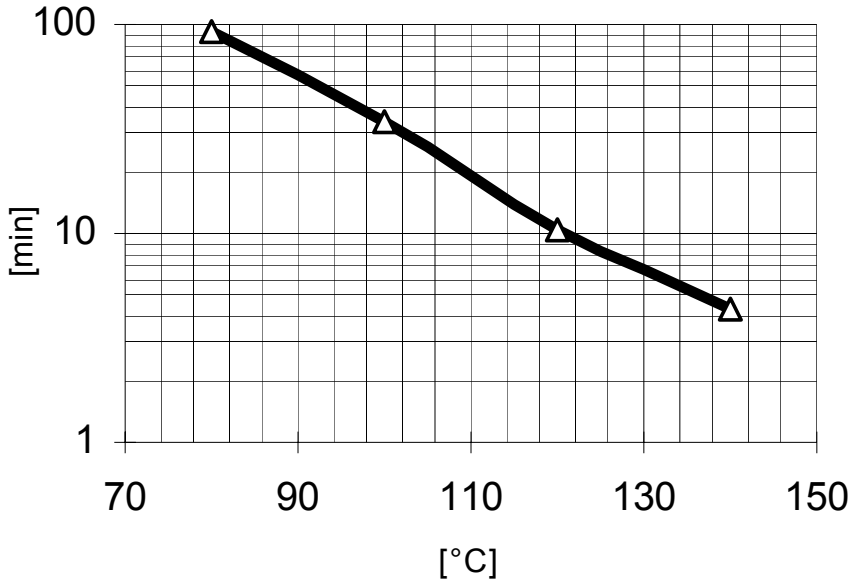
Viscosity increase at 40º, 60°C and 80°C (measurements with Rheomat 115 A, ; MS DIN 125, Shear rate D = 6.65 s^{-1})

Figure 2



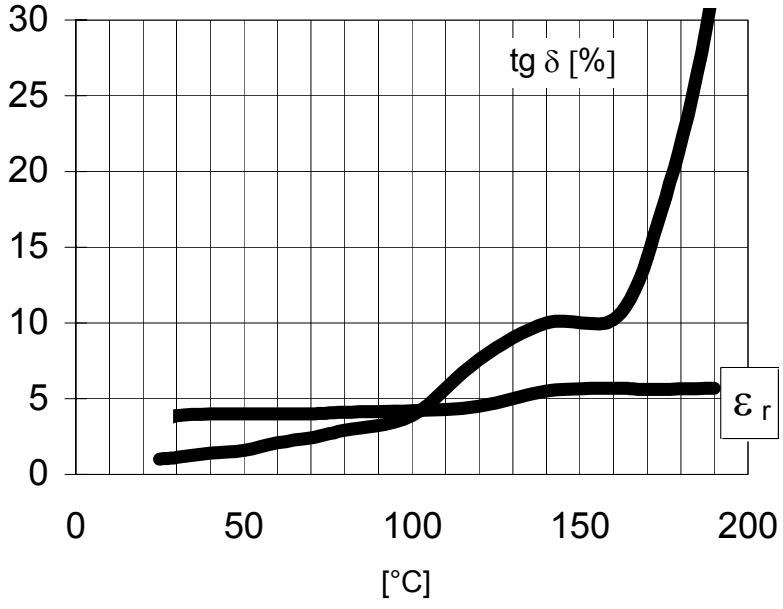
Initial Viscosity vs. Temperature
(measurements with Rheomat 115 A , MS DIN 125, Shear rate D = 6.65 s^{-1})

Figure 3



Gel Time vs. Temperature
(measurements with Gelnorm Instrument / DIN 16945)

Figure 4



Loss factor (tan δ) and dielectric constant (ε_r) as a function of temperature
(measurement frequency: 50 Hz / IEC 60250)

Physical Properties (typical values)

Determined on standard specimen at 23°C
Cured for 6h at 80°C + 10h at 140°C

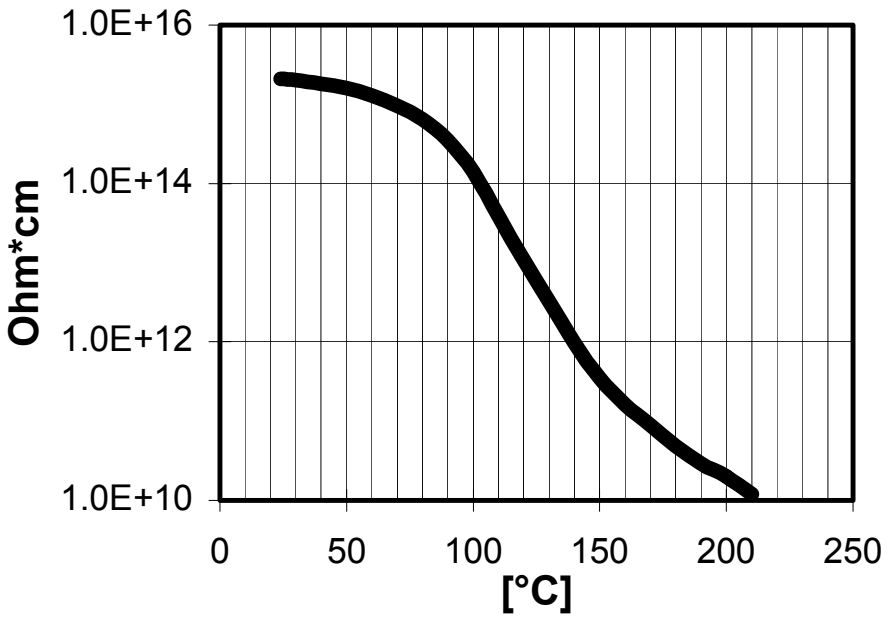
Tensile strength	ISO 527	MPa	65 - 90
Elongation at break	ISO 527	%	0.80 - 1.20
E modulus from tensile test	ISO 527	MPa	10600 - 11000
Flexural strength	ISO 178	MPa	125 - 145
Surface strain	ISO 178	%	1.30 - 1.60
E modulus from flexural test	ISO 178	MPa	11000 - 11500
Double Torsion Test	CG 216		
Critical stress intensity factor (K_{IC})		$MPa \cdot m^{½}$	2.30 - 2.50
Specific energy at break (G_{IC})		J/m^2	460 - 500
Glass transition temperature (DSC)	IEC 61006	°C	100 - 115
Coefficient of linear thermal expansion	ISO 11359-2		
Mean value for temp. range: 20 - 80°C	K^{-1}		$34 - 37.10^{-6}$
Thermal conductivity similar to	ISO 8894	W/m.K	0.90 - 1.00
Water absorption (specimen: 50x50x4 mm)	ISO 62		
10 days at 23°C		% by wt.	0.10 - 0.15
60 min. at 100°C		% by wt.	0.07 - 0.12
Decomposition temperature (heating rate: 10 K/min.)	DTA	°C	350
Density	ISO1183	g/cm^3	1.83 - 1.92

Electrical Properties (typical values)

Determined on standard specimen at 23°C
Cured for: 6h at 80°C + 10h at 140°C

Breakdown strength	IEC 60243-1	kV/mm	21 - 26
HV diffusion breakdown strength	DIN 57 441	Class	HD - Class 2
Temp. of specimen after test		°C	< 24
HV arc resistance	IEC 61621	s	183 - 186
Tracking resistance	IEC 60112	CTI	
with test solution A			> 600 0.0
with test solution B			> 600 M 0.1
HV tracking resistance	IEC 60587	class	1B3.5
Electrolytic corrosion	IEC 60426	grade	A-1

Figure 5



Volume resistivity (ρ) as a function of temperature
(measurement voltage: 1000 V / IEC 60093)

Handling/Safety Precautions

Mandatory and recommended industrial hygiene procedures should be followed whenever our products are being handled and processed. For additional information please consult the corresponding material safety data sheets.

Araldite CW 5625
Warning! Causes skin and eye irritation. May cause allergic skin reaction. Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated contact with skin. Do not breathe dust. Wash thoroughly after handling. Notice! Contains crystalline silica. Breathing dust may cause cancer and delayed lung injury.

Aradur HW 5625-1
Warning! Causes eye, skin, and respiratory irritation. May cause allergic skin and respiratory reactions. Avoid contact with eyes, skin, and clothing. Avoid breathing vapor or mist. Avoid prolonged or repeated contact with skin. Keep container closed. Use with adequate ventilation. Wash thoroughly after handling. Notice! Contains crystalline silica. Breathing dust may cause cancer and delayed lung injury.

First Aid

In case of contact:

Eyes: Flush eyes with plenty of water for 15 minutes and get prompt medical attention.

Skin: Wash skin thoroughly with mild soap and water; remove contaminated clothing before reuse. Discard contaminated shoes and other articles made of leather.

Inhalation: Remove person to fresh air.

Ingestion: Do not induce vomiting. Dilute with plenty of water and contact physician immediately. Never give anything by mouth to an unconscious person.

Important

The following shall supersede any provision in Buyer's forms, letters and papers. **THERE IS NO WARRANTY OR CONDITION, WHETHER EXPRESS OR IMPLIED BY ANY STATUTE OR OTHERWISE, INCLUDING WARRANTIES AND CONDITIONS OF MERCHANTIBILITY OR OF FITNESS FOR A PARTICULAR PURPOSE, FOR THE PRODUCT OR PRODUCTS REFERRED TO HEREIN. TECHNICAL ADVICE FURNISHED BY THE SELLER SHALL NOT CONSTITUTE A WARRANTY OR CONDITION, STATUTORY OR OTHERWISE, WHICH IS EXPRESSLY DISCLAIMED, ALL SUCH ADVICE BEING GIVEN AND ACCEPTED AT BUYER'S RISK**. While the information contained herein is believed to be accurate, Seller makes no representations as to the reliability of the results or as to the results of Buyer or as inducements to infringe any relevant patent, now or hereafter in existence. Testing for intended use is the sole responsibility of Buyer. The product(s) has not been tested for, and is therefore not recommended for, uses for which prolonged contact with mucous membranes, abraded skin, or blood is intended, or for uses for which implantation within the human body is intended. **UNDER NO CIRCUMSTANCES SHALL SELLER BE LIABLE FOR INCIDENTAL, CONSEQUENTAL OR OTHER DAMAGES FROM ALLEGED NEGLIGENCE, BREACH OF WARRANTY OR CONDITION, STRICT LIABILITY OR ANY OTHER LEGAL THEORY, ARISING OUT OF MANUFACTURE, SALE, USE OR HANDLING OF THE PRODUCT OR PRODUCTS REFERRED TO HEREIN**. The sole remedy of Buyer and the sole liability of Seller for any claims shall be limited to Buyer's purchase price of the product(s) which is the subject of the claim or the amount actually paid for such product(s), whichever is less.

Note

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Araldite CW 5625
with Aradur HW 5625-1
November 2004