

Araldite® CW 1302 Resin / Aradur® HY 1300 Hardener

Product Description

Araldite® CW 1302 Resin with Aradur® HY 1300 Hardener is a prefilled casting resin system that is optimized for processing and curing at room temperature or slightly higher temperatures to yield excellent thermal endurance. This resin system is recommended for the manufacture of transformers, filters, capacitors, or electrical devices that is used in potentially explosive environment. The resin system can be processed by casting or vacuum casting.

Features

- Good thermal conductivity
- Low water absorption
- Excellent thermal endurance
- Flammability of UL 94 V0 for 3.0 mm thick plaque
- UL 1446 System Temperature Class 180 (H)
- Railway certified EN 45545-2 R22 HL2 / R23 HL3

Typical Properties

Property	Araldite® CW 1302 Resin*	Aradur® HY 1300 Hardener**	Test Method
Appearance	Beige to gray viscous liquid	Clear yellowish liquid	Visual
Viscosity at 25 °C, mPas	20,000 – 27,000	150 - 190	ISO 3219 ISO 2555 ISO 12058
Specific gravity, g/cm ³	1.75 - 1.77 (at 25 °C)	0.99 - 1.01 (at 20 °C)	ISO2811

Note:

* Araldite® CW 1302 Resin is a modified, solvent free epoxy resin that is filled with inorganic filler. Viscosity was measured based on ISO 3219

** Aradur® HY 1300 Hardener is formulated, medium viscosity polyamine hardener. Viscosity was measured based on ISO 12058

Mixing Ratio

Product	Parts by weight	Parts by volume
Araldite® CW 1302 Resin	100	100
Aradur® HY 1300 Hardener	11	19

Mixed Properties

Property	Araldite® CW 1302 Resin / Aradur® HY 1300 Hardener	Test Method
Mixed viscosity at 40 °C, mPas	3,450 – 3,550	Rheomat
Gel time, minutes	at 25 °C	79 - 81
	at 40 °C	50 - 75
	at 60 °C	25 - 35
Pot life at 40 °C, minutes (Time to reach 15,000 mPas)	36 - 38	Rheomat

Processing Guidelines

Araldite® CW 1302 Resin contains fillers which tend to settle over time. It is therefore necessary to carefully homogenize the complete contents of the container before use. To prevent filler separation and inconsistent metering, the components should be gently stirred from time to time while they are present in the production equipment storage tanks.

Mixing

To facilitate stirring and handling, highly filled component should be heated to 40 - 50°C in their original container (e.g. overnight in an oven) before adding the hardener.

After a thorough mixing, the mixed material should be degassed under a 5 - 10 mbar vacuum to yield quality casting.

Curing

In manufacturing environment, the uncured impregnated parts will pick up moisture. Therefore, it is critical to fully cure the parts right after the impregnation or immediately store the uncured impregnated parts in a moisture-controlled area.

To determine whether cross-linking has been carried to completion and the final properties are optimal, it is necessary to carry out some relevant measurements on the actual part or to measure the glass transition temperature of the cured system. Different gel and cure cycles in the manufacturing process are likely to lead to a different degree of crosslinking, hence different glass transition temperatures.

The suggested curing process is 24 hours at room temperature (about 25 °C) plus 6 hours at 60 °C to yield parts with low shrinkage and best surface aspect. The minimum curing condition can be 48 hours at 25 °C.

Typical Properties

Unless otherwise stated, the data were determined with typical production batches using standard test methods. They are typical values only, and do not constitute a product specification. Data is collected on cured standard specimen at 23 °C. The specimens are cured 24 hours at 25 °C plus 6 hours at 60°C.

Physical Property	Value	Test Method
Glass transition temperature by DSC, °C	74 - 76	ISO 6721
Modulus in torsion G' at 25 °C, MPa	3,350 – 3,400	ISO 6721
Temperature index, °C	181	IEC 60216
System Temperature Class (UL File E206297)	180 (H)	UL 1446
Tensile strength, MPa	34 - 36	ISO 527
Tensile elongation at break, %	0.7 - 0.8	ISO 527
Tensile modulus, MPa	7,690 – 7,710	ISO 527
Flexural strength, MPa	64 – 66	ISO 178
Flexural modulus, MPa	8,450 – 8,550	ISO 178
Thermal linear coefficient, ppm/K - Alpha 1 (before Tg) Alpha 2 (after Tg)	41 - 43 104 - 106	ISO 11359-2
Thermal conductivity, W/mK	0.87 - 0.89	ISO 8894-1
Hardness, Shore D	88	DIN 53505
Flammability (UL file E96722) - 3.0 mm thickness 1.5 mm thickness	V0 HB	UL 94
Oxygen Index LOI, %	36.1	ISO 4589-2
Smoke Density, D _s (max)	238	ISO 5659-2
Smoke Toxicity, CIT	0.81	NF X 70-100
Water absorption, % by weight - 1 day at 23 °C 30 minutes at 100 °C	0.03 - 0.05 0.21 - 0.23	ISO 62

Electrical Property	Value	Test Method
Dielectric strength, kV/mm (for 2 mm thick plate)	26 - 28	IEC 60243-1
Dielectric strength, (3.68 mm, 4.0 kV at 140 °C)	>300 (passed)	EN 50028
Dielectric constant (ϵ_r) at 50Hz, 25 °C	4.9	IEC 60250
Dissipation factor ($\tan \delta$) at 50Hz, 25 °C, %	5.3	ISO 60250
Tracking resistance CTI, grade	> 600	IEC 60112
Volume resistivity (ρ) at 25 °C, Ωcm	1×10^{14}	IEC 60093
Electrolytic corrosion, Grade	A-1.2	IEC 60426

Figure 1. Dielectric constant as a function of temperature (IEC 60250)

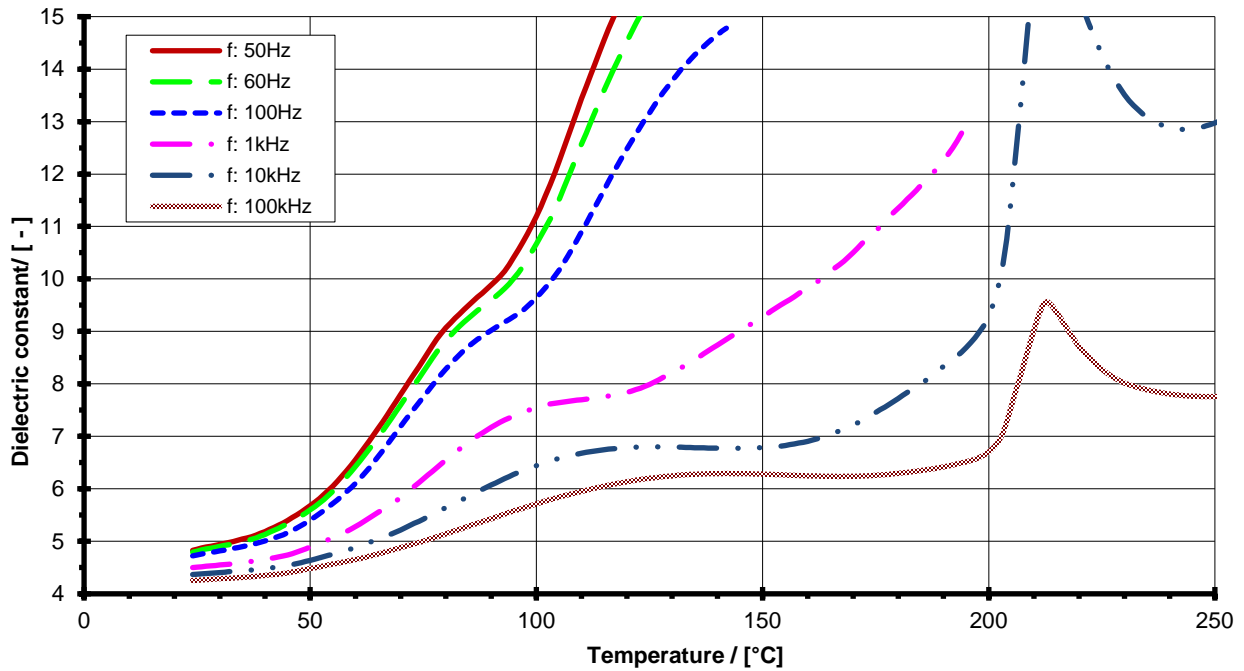


Figure 2: Dielectric loss as a function of temperature (IEC 60250)

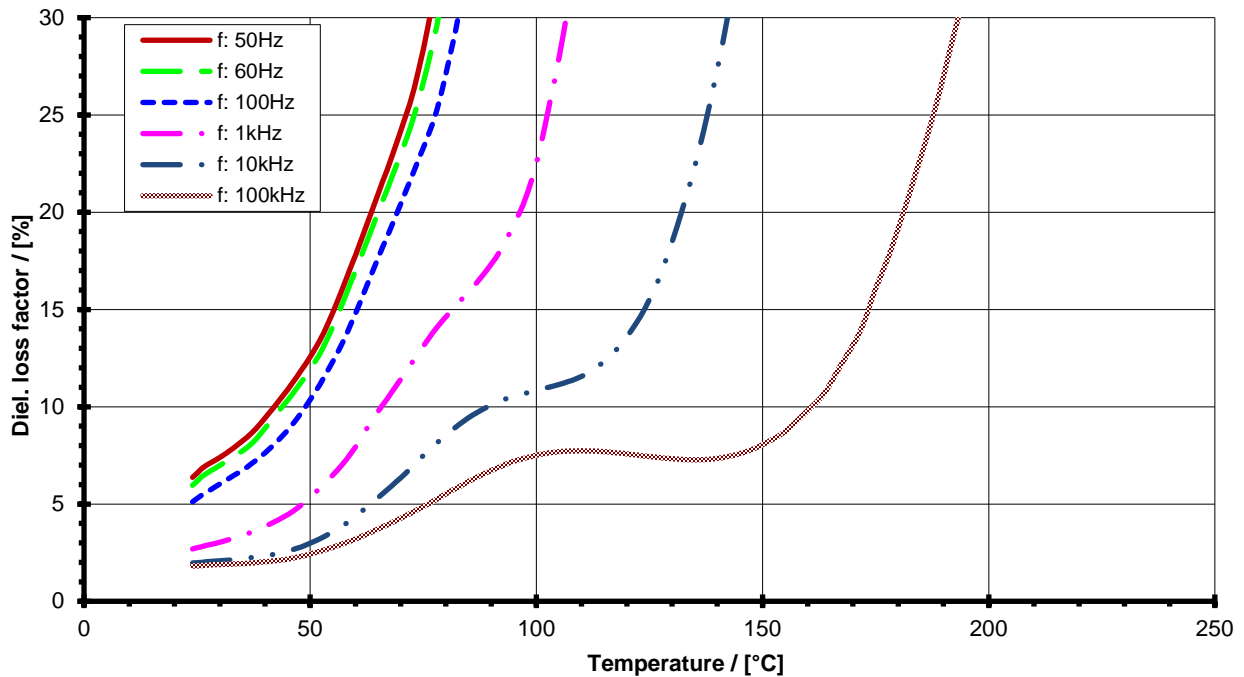
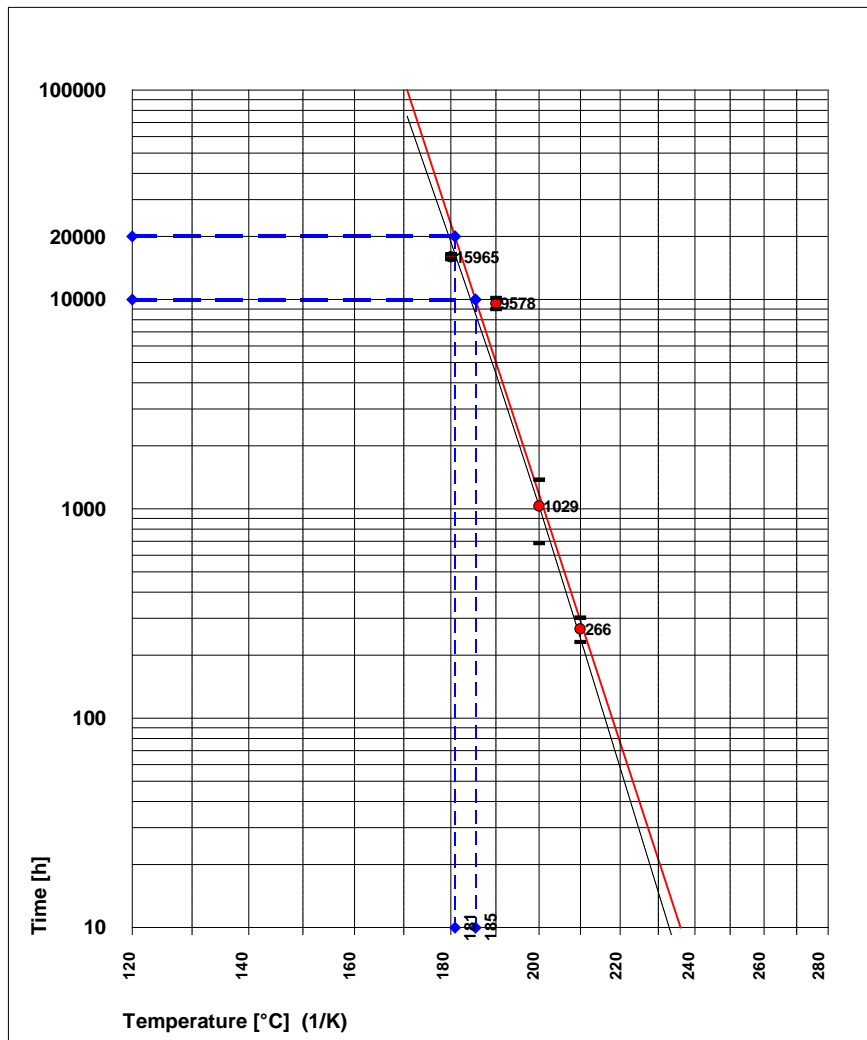


Figure 3: Thermal endurance profile (IEC 60216)

Thermal endurance profile (IEC 60216)	
HUNTSMAN	Date : 10.11.2004
Material :	CW 1302 GB/HY 1300 GB (100/11)
Investigated property :	Flexural strength (ISO 178)
Selected end point :	50 % of initial value (69.3 MPa)
T l g :	181
H I C g :	5
Statistical test variables :	CHI ² = 46.44
	F= 81.98
----- :	Lower 95% confidence curve T C : 180°C
Comments:	



Storage

Araldite® CW 1302 Resin contains some curing catalyst and / or accelerator. It should preferably not be stored for long periods at temperatures exceeding 40°C nor should it be exposed to temperatures more than 100°C for more than 2 hours. Incorrect handling will result in an increase in viscosity and reduced performance properties of the cured system.

Araldite® CW 1302 Resin should be stored in a dry place, in their sealed original container, at temperatures between **2°C and 40°C (35.6°F and 104°F)**. Under these storage conditions the shelf life is **1.5 years** (from date of manufacture). These products should not be exposed to direct sunlight.

Aradur® HY 1300 Hardener contains some curing catalysts and / or accelerators. Storage at elevated temperatures (>80°C) for extended periods (e.g. >5 days) will result in an undesirable increase in viscosity and will negatively affect the reactivity of the mixed system. This hardener is sensitive to moisture. Partially used containers should be closed immediately after use. The use of a desiccant venting device is highly recommended unless the material is going to be used rapidly after opening.

Aradur® HY 1300 Hardener should be stored in a dry place, in their sealed original container, at temperatures between **2°C and 40°C (35.6°F and 104°F)**. Under these storage conditions the shelf life is **3 years** (from date of manufacture). These products should not be exposed to direct sunlight.

Precautionary Statement

Huntsman Advanced Materials Americas LLC maintains up-to-date Safety Data Sheets (SDS) on all of its products. These sheets contain pertinent information that you may need to protect your employees and customers against any known health or safety hazards associated with our products. Users should review the latest MSDS to determine possible health hazards and appropriate precautions to implement prior to using this material.

First Aid!

Refer to SDS as mentioned above.

KEEP OUT OF REACH OF CHILDREN

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Main Offices:

Huntsman Corporation
10003 Woodloch Forest Dr
The Woodlands, TX 77380
888-564-9318

Huntsman Advanced Technology Center
8600 Gosling Rd.
The Woodlands, TX 77381
281-719-7400