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Advanced Materials

Araldite® CY 179 US system 100 pbw
Aradur® HT 907 system 105 pbw
Accelerator DY 072 system 8.5 pbw

ARALDITE® IMPREGNATING RESIN SYSTEM
LIQUID, VERY LOW VISCOSITY CYCLOALIPHATIC, HOT-CURING RESIN SYSTEM WITH EXCELLENT HIGH TEMPERATURE PERFORMANCE AND STABLE DIELECTRIC PROPERTIES COMBINED WITH SUPERIOR ARC, TRACKING AND UV RESISTANCE

APPLICATIONS:

Medium and high voltage electrical components such as coil insulation, motors and generators.

PROCESSING METHODS:

- Impregnation
- Filament winding

PROPERTIES:

- Low viscosity coupled with long working life
- Excellent dielectric properties
- Superior arc, corona and tracking resistance

PRODUCT DATA:

Araldite® CY 179 US

Liquid, low viscous, cycloaliphatic epoxy resin

Viscosity at 25°C	ISO 12058	mPa*s	250 – 450
Epoxy content	ISO 3001	Equiv/kg	7.00 – 7.70
Density at 25°C	ISO 1675	g/cm^3	1.160 – 1.175
Flash point	--	°C	118
Vapor pressure at 20°C	(Knudsen)	Pa	<0.1

Aradur® HT 907 System

Solid, anhydride Hardener

Viscosity at 40°C	ISO 12058	mPa*s	40 – 50
Density at 25°C At 60°C	ISO 1675	g/cm^3	1.36 – 1.40 1.15 – 1.20
Melting temperature	--	°C	28 – 38
Acid content	--	%	≤ 2
Flash point	ISO 1523	°C	140
Vapour pressure at 100°C	(Knudsen)	Pa	~ 390

Accelerator DY 072 System

Liquid accelerator based on alkali methoxide

Viscosity at 25°C	ISO 12058	mPa*s	850 – 1,700
Density at 25°C	ISO 1675	g/cm^3	1.00 – 1.05
Flash point	ISO 1523	°C	129
Vapour pressure at 20°C	(Knudsen)	Pa	2
Boiling point	--	°C	>200

REMARKS:

The Hardener Aradur® HT 907 system is sensitive to humidity. It is necessary to store this product in the sealed original container.

STORAGE:

The components have to be stored in tightly sealed and dry original containers according to the storage conditions on the product label. Under these conditions, the shelf life will correspond to the expiry date stated on the label. After this date, the product may be processed only following reanalysis. Partly emptied containers should be closed tightly immediately after use.
For information on waste disposal and hazardous products of decomposition in the event of fire, refer to the Material Safety Data Sheets (MSDS) for these particular products.

PROCESSING:
(Guideline values)

System tested: Araldite® CY 179 US / Aradur® HT 907 / Accelerator DY 072 system
Mix ratio: 100 / 105 / 8.5 pbw

Viscosity increase

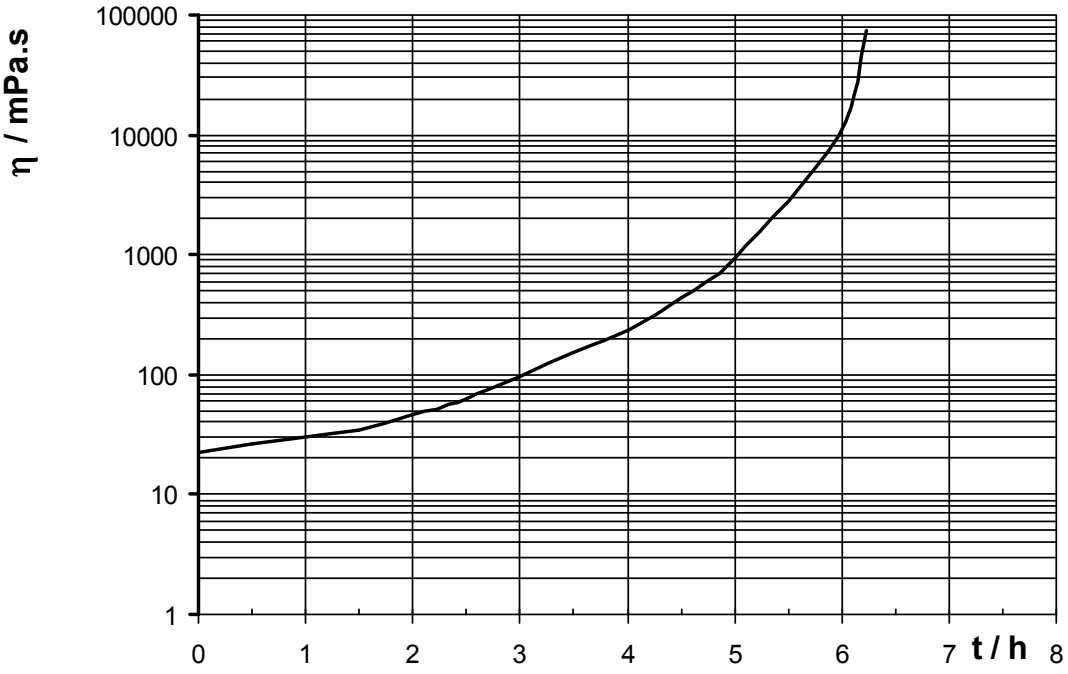

Fig.3.1: **Viscosity increase at 80°C as a function of time**
System: CY 179 US/ HT 907/ DY 072 (100/ 105/ 8.5)

Processing Properties

Amount of Accelerator DY 072 system **8.5 pbw**

Initial viscosity at 80°C	ISO 12058	mPa*s	21
Geltime at 80°C	Gelnorm (ISO 9396)	H, min	6h – 7h

To determine whether crosslinking has been carried to completion and the final proper-ties are optimal, it is necessary to carry out relevant measurements on the actual object or to measure the glass transition temperature. Different gelling and cure cycles in the manufacturing process could lead to a different crosslinking and glass transition temperature respectively.

MECHANICAL AND PHYSICAL PROPERTIES:
(Guideline values)

System tested: Araldite® CY 179 US / Aradur® HT 907 / Accelerator DY 072 system
Mix ratio: 100 / 105 / 8.5 pbw

Determined on standard test specimen at 23°C
Cured for 10h at 80°C + 16h at 140°C

Flexural strength Surface strain E modulus from flexural strength	ISO 178 ISO 178 ISO 178	MPa % MPa	95 – 105 3.0 – 3.5 3000 - 3200
Tensile strength Elongation at break E modulus from tensile strength	ISO 527 ISO 527 ISO 527	MPa % MPa	30 – 50 1.0 – 3 2800 – 3400
Glass transition temperature (DSC 8000)	ISO 11357-2	°C	160 – 190
Thermal conductivity at 25°C	ISO 8894-1	W/m K	0.15 – 0.20
Coefficient of linear thermal expansion Mean value for temperature range: 20 – 60°C	ISO 11359-2	ppm/K	65 – 75 x 10^{-6}
Water absorption (specimen 50x50x4mm) 60min at 100°C 10h at 100°C 100h at 100°C	ISO 62	 % % %	 0.30 – 0.50 0.50 – 1.40 3.00 – 5.00

ELECTRICAL PROPERTIES:
(Guideline values)

System tested: Araldite® CY 179 US/ Aradur® HT 907 / Accelerator DY 072 system
Mix ratio: 100 / 105 / 8.5 pbw

Determined on standard test specimen at 23°C
Cured for 10h at 80°C + 16h at 140°C

Breakdown strength	IEC 60243-1	kV/mm	18 – 24
Tracking resistance With test solution A With test solution B	IEC 60112	 CTI CTI	 600 - < 1 > 600M - < 1

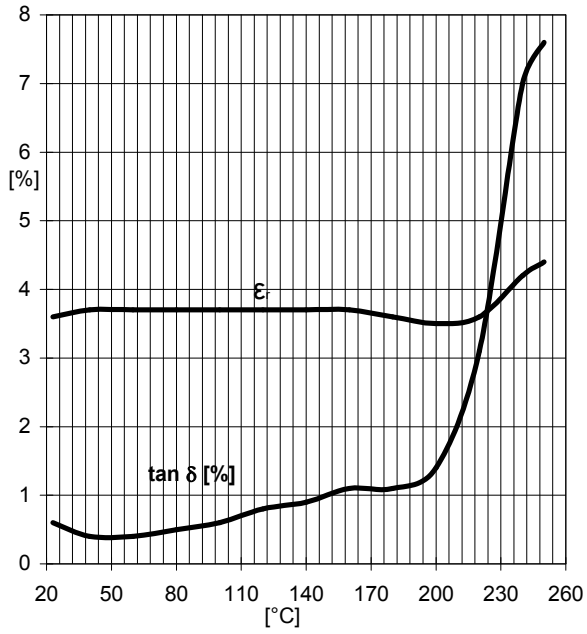

Fig.4.1: **Loss factor (tan δ) and dielectric constant (ε_r) as a function of temperature**
(measurement frequency: 50 Hz / IEC 60250)

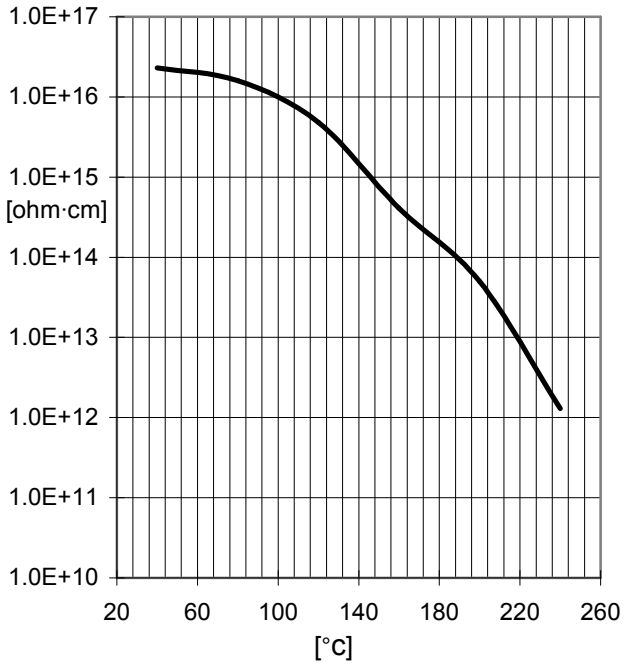

Fig.4.2: **Volume resistivity (ρ) as a function of temperature**
(measurement voltage: 1000 V / IEC 60093)

INDUSTRIAL HYGIENE:

Mandatory and recommended industrial hygiene procedures should be followed when-ever our products are being handled and processed. For additional information please consult the corresponding Safety Data Sheets and the brochure "Hygienic precautions for handling plastics products".

HANDLING PRECAUTIONS:

Safety precautions at workplace:	
protective clothing	yes
gloves	essential
arm protectors	recommended when skin contact likely
goggels/safety glasses	yes
respirator/dust mask	recommended
Skin protection	
before starting work	Apply barrier cream to exposed skin
after washing	Apply barrier or nourishing cream
Cleansing of contaminated skin	Dab off with absorbent paper, wash with warm water and alkali-free soap, then dry with disposable towels. Do not use solvents
Clean shop requirements	Cover workbenches, etc. with light coloured paper Use disposable breakers, etc.
Disposal of spillage	Soak up with sawdust or cotton waste and deposit in plastic-lined bin
Ventilation:	
of workshop	Renew air 3 to 5 times an hour
of workplace	Exhaust fans. Operatives should avoid inhaling vapours.

FIRST AID:

Contamination of the **eyes** by resin, hardener or casting mix should be treated immediately by flushing with clean, running water for 10 to 15 minutes. A doctor should then be consulted.
Material smeared or splashed on the **skin** should be dabbed off, and the contaminated area then washed and treated with a cleansing cream (see above). A doctor should be consulted in the event of severe irritation or burns. Contaminated clothing should be changed immediately.
Anyone taken ill after **inhaling** vapours should be moved out of doors immediately. In all cases of doubt call for medical assistance.

NOTE:

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