Vantico Ltd.

Electronic Polymers

vantico

Heavy Electrical

®Araldite Impregnating Resin System

Araldite	**CY 192-1**	**100 pbw**
Hardener	**HY 918**	**100 pbw**

Liquid, hot-curing, cycloaliphatic, solventless impregnating resin system

Low-viscosity, two-component system without reactive diluents.
Long pot life.

Applications

Motors and generators with medium and high power ratings

Processing methods

Vacuum Pressure Impregnation
(VPI - process)
for the impregnation of single conductors and for full-bath impregnation

Properties

High impact strength and shear strength
Outstanding arc and tracking resistance
Good thermal ageing resistance in conjunction with glass cloth and mica paper

Edition: Juli 2000
Replaces Edition: Juli 2000

Product data

(guideline values)

Liquid, solvent-less, cycloaliphatic epoxy resin with low viscosity at room temperature

Araldite CY 192-1	Viscosity	at 25°C	DIN 53015	mPa s	430 - 660
	Epoxy content		ISO 3001	equiv/kg	6.10 - 6.70
	Density	at 25°C	ISO 1675	g/cm³	1.22 - 1.26
	Flash point		DIN 51758	°C	> 190
	Vapour pressure	at 20°C	(Knudsen)	Pa	< 10^{-4}
		at 60°C	(Knudsen)	Pa	c. 10^{-3}

Liquid, unmodiifed anhydride hardener

Hardener HY 918	Viscosity	at 25°C	DIN 53015	mPa s	50 - 80
	Density	at 20°C	ISO 1675	g/cm³	1.18 - 1.24
	Flash point		DIN 51758	°C	> 135
	Vapour pressure	at 20°C	(Knudsen)	Pa	c. 10^{-2}
		at 60°C	(Knudsen)	Pa	c. 10^{-1}

Storage

Store the components dry at 18-25°C, in tightly sealed original containers. 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 and Mechanical End-properties

(guideline values)

Determined on standard test specimen at 23°C
Cured for 14h at 140°C

Warning : When processing Araldite CY 192-1/ Hardener HY 918 do not allow the uncured system to absorb any moisture following impregnation. Hydrolysis of the hardener, especially in thin layers, can lower the glass transition temperature far below the normal level.

Viscosity

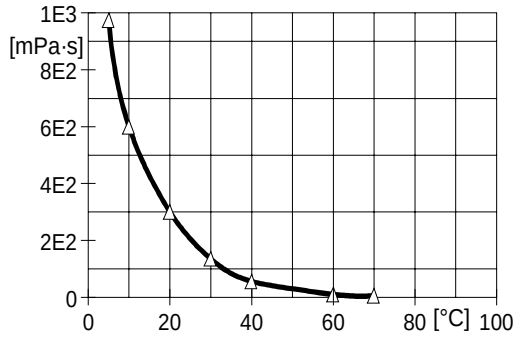

Fig.4.1: **Viscosity of the impregnation mixture as a function of temperature**

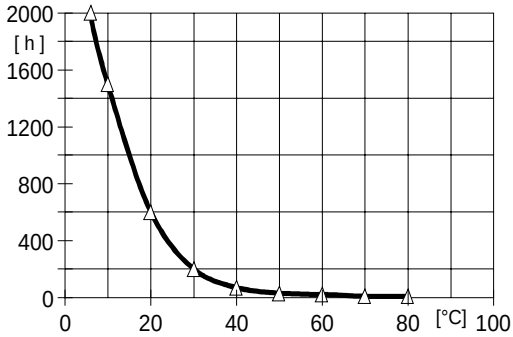

Fig.4.2: **Viscosity increase as a function of temperature**

Gelation time / Shear strength

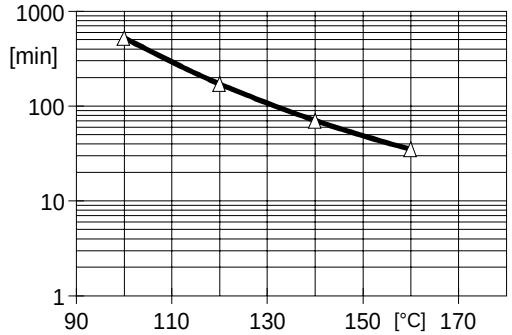

Fig.4.3: **Geltime measured as a function of temperature**

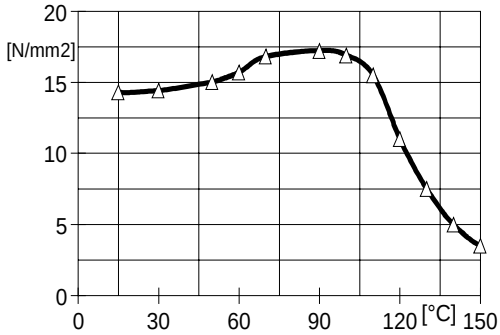

Fig.4.4: **Change in shear strength as a function of temperature**

Cure conditions

Minimum cure time	at 120°C	14h
	at 130°C	11h
	at 140°C	9h

Mechanical and Physical Properties

Flexural strength			
max. flexural stress	ISO 178	N/mm²	110 - 150
(σ_f max)	VSM 77103	N/mm²	145 - 165
Deflection	ISO 178	mm	5 - 8
	VSM 77103	mm	5 - 8
Impact strength	VSM 77105	kJ/m²	15 - 17
Shear strength	Ciba standard	N/mm²	14 - 17
Heat distortion temperature (Martens)	DIN 53458	°C	75 - 85
Glass transition temperature (DSC)	DTA	°C	90 - 95
Water absorption (specimen: 60x10x4 mm)			
4 days at RT	ISO 62	%	0.2 - 0.3
1 h at 100°C	ISO 117	%	0.4 - 0.5

Electrical and Ageing Properties

(guideline values)

Determined on standard test specimen at 23°C
Cured for 14h at 140°C

Dielectric strength, 1 min value, measured with 2mm sheet VDE 0360, Part 2/5.69 § 22		
after 2h/ 20°C and 65% r.h.	kV	57 - 83
after 96h/ 20°C and 92% r.h.	kV	38 - 50
at 150°C	kV	39 - 52
Volume resistivity after exposure to water VDE 0360, Part 2/5.69 § 24 (RT)		
initial value	Ω cm	ca. 10^{16}
after 24 h	Ω cm	ca. 10^{15}
after 48 h	Ω cm	ca. 10^{15}
after 96 h	Ω cm	ca. 10^{15}
after 240 h	Ω cm	ca. 10^{14}
Dielectric loss factor tan δ DIN 53483, 50 Hz		
at 23°C	%	0.4 - 0.5
at 60°C	%	0.3 - 0.4
at 80°C	%	0.5 - 0.6
at 100°C	%	ca. 3
Dielectric constant ε_r DIN 53483, 50 Hz		
at 23°C		3.5 - 3.8
at 100°C		3.8 - 4.0
Tracking resistance		
DIN 53480	grade	KA 3c
IEC 112	V	> 600
Arc resistance	s	180 - 190

Ageing

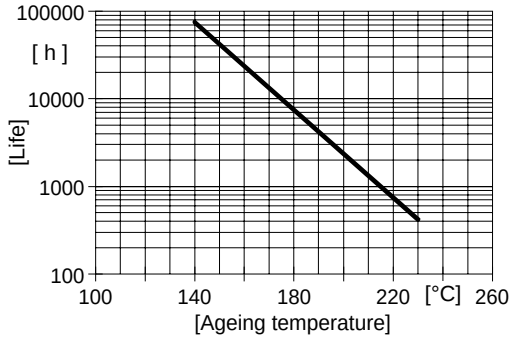

Fig.4.1: **Ageing diagramm for 3% weight loss according to VDE 0304**

Resistance to solvents

Solvent	Result
Acetone	no change
Benzene	no change
Hexane	no change
Methanol	no change
Carbon disulphide	no change

According to VDE 0170/0171/2.61 § 7a, immersion resin mixes for explosion-proof electrical equipment, protection (Ex)e, must be tested for resistance to solvent vapours. The solvents prescribed are acetone, benzene, hexane, methanol and carbon disulphide with a purity of at least DAB 6.

Industrial hygiene

Mandatory and recommended industrial hygiene procedures should be followed whenever 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 of Ciba Specialty Chemicals (Publ. No. 24264/e).

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.