

**Electrical Insulation Materials**



**Light Electrical**

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**® Araldite Casting Resin System**

<b>Araldite®</b>	<b>CY 220-1</b>	<b>100</b>	<b>- pbw</b>
<b>Araldite®</b>	<b>CY 221</b>	<b>-</b>	<b>100 pbw</b>
<b>Hardener</b>	<b>HY 956 EN</b>	<b>25</b>	<b>20 pbw</b>

**Casting systems for processing and curing at room temperature or slightly higher temperatures**  
**High filler addition possibility**

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Encapsulating or potting of low voltage and electronic components

**Applications**

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Casting

**Processing**

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The flexibility of castings can be adapted to requirements by combining CY 220 -1/ CY 221 in various proportions  
Low tendency to cracking

**Properties**

# Product data

(Guideline values)

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## Modified, medium viscosity solvent free epoxy resin

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<b>Araldite CY 220-1</b>	Viscosity	at 25°C	mPa s	ca. 5000
	Specific gravity	at 25°C	g/cm <sup>3</sup>	1.15
	Flash point	DIN 51 758	°C	190-200
	Epoxy content		Eq/kg	5.0
As supplied form	Pale yellow liquid			
Hazardous decomposition products	Carbon monoxide, carbon dioxide and other toxic gases and vapours if burned			
Disposal	Regular procedures approved by national and/or local authorities			

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## Modified, low viscosity, solvent free epoxy resin

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<b>Araldite CY 221</b>	Viscosity	at 25°C	mPa s	ca. 450
	Specific gravity	at 25°C	g/cm <sup>3</sup>	1.15
	Flash point	DIN 51 758	°C	190-200
	Epoxy content		Eq/kg	4.05
As supplied form	Clear, liquid			
Hazardous decomposition products	Carbon monoxide, carbon dioxide and other toxic gases and vapours if burned			
Disposal	Regular procedures approved by national and/or local authorities			

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## Modified, low viscosity hardener based on aliphatic polyamine

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<b>Hardener HY 956 EN</b>	Viscosity (Hoeppler)	at 25°C	mPa s	ca. 450
	Specific gravity	at 25°C	g/cm <sup>3</sup>	1.02
	Flash point	DIN 51 758	°C	175-185
As supplied form	Clear, light yellow liquid			
Hazardous decomposition products	Carbon monoxide, carbon dioxide and other toxic gases and vapours if burned			
Disposal	Regular procedures approved by national and/or local authorities			

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# Product data

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(Guideline values)

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## Filled systems

The addition of powdered inorganic fillers such as silica flour, microdol, chalk flour, Alumina, aluminium hydroxide etc., has been found to offer considerable advantages in many applications.

Specifically, the use of such fillers:

- enhance important mechanical and electrical properties
- reduce shrinkage and exothermic temperature rise during gelling and cure
- impart a lower coefficient of thermal expansion
- improve thermal conductivity
- impart a greater elasticity modulus whilst reducing elongation at break

We recommend the use of filled encapsulating systems in all applications that requiring high reliability and economical processing.

The following points should be observed when adding powdered mineral fillers to a casting mix.

- The filler increases the viscosity of the mix. To ensure thorough wetting of the filler, the resin should be heated up to 60-80°C before filler addition.
- When castings have to achieve stringent dielectric requirements the resin/filler mix should be degassed
- The hardener can be added when the resin/filler mix has cooled to room temperature or below 40°C.

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## Araldite Colouring Pastes

The colouring paste should normally be added to the resin component and mixed with it until homogeneous colouration results. Filled, high viscous resin components are best heated to 40-60°C to facilitate uniform dispersion of the colouring paste.

Coloured resin or mixes of several colouring pastes and resins are stable for some considerable time if stored at room temperature (see instruction sheet, colouring pastes)

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## Storage

Store the components in a dry place 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 after reanalysis. Partly emptied containers should be tightly closed immediately after use.

For information on waste disposal and hazardous products of decomposition in the event of a fire, refer to the Material Safety Data Sheets (MSDS) for these particular products.

# Processing

The resin component should be stirred and homogenized in the original container before use.

The casting mix is best prepared by heating the resin up to 40-50°C before stirring in the hardener. Brief degassing of the mix under 5-10 mbar vacuum improves the mixture homogeneity and enhances the dielectric properties of the castings.

The very low viscosity Araldite CY 221 provides flexible castings, whereas the medium viscosity Araldite CY 220 -1 provides more rigid castings.

The viscosity of the casting mix and/or the hardness of the castings can be varied by adjusting the mix ratio of the two resins.

Premixes of the two resins have a shelf life at room temperature of several months.

To reduce the cure time, the casting is often gelled at room temperature and then post cured for 2-6 hours at 60-80°C. Small castings can be processed and directly cured at slightly higher temperatures (40-60°C).

In case of humid environments ( $\geq 75\%$  relative humidity) it is advisable to effect a full cure in an oven at 40-60°C in order to prevent vapour absorption, leading to streaks on the surface of the castings.

Temperature exothermic rise on curing (e.g. at higher curing temperatures or/and large casting volumines) can be kept within acceptable limits by adding fillers to the mix.

System		1	2	3	4	
<b>Mix ratio</b>	Araldite CY 220-1	parts by weight	100	–	100	–
	Araldite CY 221	parts by weight	–	100	–	100
	Hardener HY 956 EN	parts by weight	25	20	25	20
	Silica Flour K8	parts by weight	–	–	140	140

System		1	2	3	4	
<b>Processing data</b> (Guideline values)	Initial viscosity (Hoeppler)					
	at 25°C	mPa s	2250	450	14 000	4000
	at 40°C	mPa s	650	75	5000	1500
	Pot life of 100 g batch					
	at 25°C	min	25	110	15	100
	Minimum curing time					
	at 25°C	h	24	24-36	24	24-36
	at 40°C	h	8-10	10-12	8-10	10-12
	at 60°C	h	3-4*	4-6*	3-4*	4-6*
	at 80°C	h	1-2*	2-3*	1-2*	2-3*

\*Large castings should be pre cured at room temperature

# Properties

Guideline values determined on standard test specimens cured for 6 h/60°C

<b>System</b>				<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
Colour of castings				yellowish	yellowish	grey	grey
Specific gravity	25°C	DIN 55 990	g/cm <sup>3</sup>	1.15	1.15	1.62	1.74
Shore D hardness (4 mm plate)	25°C	DIN 53 505		80	34	85	42
Flexural strength							
max. bending stress	25°C	ISO 178	MPa	120	–	80	–
Impact strength	25°C	ISO 179	kJ/m <sup>2</sup>	50	–	6	–
Compressive strength							
max. compressive stress	25°C	ISO 604	MPa	95	–	130	85
Tensile strength							
max. tensile stress	25°C	ISO/R 527	MPa	70	6	30	10
elongation at break	25°C	ISO/R 527	%	4	45	0.5	8
Martens deflection temperature		DIN 53 458	°C	75	<25	75	<25
Water absorption							
10 days	23°C	ISO 62	%	0.4	4.0	0.25	1.7
30 min	100°C	ISO 62	%	0.7	–	0.4	–
Electrolytic corrosion		DIN 53 489	grade	A-1	AB-B/1.4	A-1	A-1.2
Tracking resistance		IEC 112		CTI>600	CTI>600	CTI>600	CTI>600
Electric strength							
20 s value for 2 mm plate (50 Hz)	23°C	IEC 243	kV/mm	21	18	21	19

# 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".

<b>Handling precautions</b>	Safety precautions at workplace:	
	protective clothing	yes
	gloves	essential
	arm protectors	recommended when skin contact likely
	goggles/safety glasses	yes
	respirator/dust mask	no
	Skin protection before starting work after washing	Apply barrier cream to exposed skin 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 of workplace	Renew air 3 to 5 times an hour Exhaust fans. Operatives should avoid inhaling vapours.	

<b>First Aid</b>	Contamination of the <b>eyes</b> 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 <b>skin</b> 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 <b>inhaling</b> vapours should be moved out of doors immediately. In all cases of doubt call for medical assistance.
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<b>Note</b>	Araldite® is a registered trademark of Huntsman LLC or an affiliate thereof in one or more countries, but not all countries.
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