Advanced Materials

Electrical Insulation Materials

HUNTSMAN

Light Electrical

®Araldite Casting Resin System

Araldite® F
Araldite® CY 208
Hardener HY 956 EN

Casting systems for processing and curing at room temperature or slightly higher temperatures

Applications

Encapsulating or potting of low voltage and electronic components

Processing

Casting

Properties

The flexibility of castings can be adapted to requirements by combining Araldit F and CY 208 resin in various proportions
Low tendency to cracking

Edition: **May 2004**
Replaces edition: July 2003

Product data

(Guideline values)

Modified, medium viscous, solvent free epoxy resin

Araldite F					
	Viscosity	at 25°C		mPa s	ca.11 000
	Specific gravity	at 25°C		g/cm³	1.17
	Flash point		DIN 51 758	°C	> 200
	Epoxy content			Eq/kg	5.25
	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		

Modified, low viscosity solvent free epoxy resin

Araldite CY 208					
	Viscosity	at 25°C		mPa s	ca. 3500
	Specific gravity	at 25°C		g/cm³	1.13
	Flash point		DIN 51 758	°C	190-200
	Epoxy content			Eq/kg	2.35
	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		

Formulated, low viscosity polyamine hardener

Hardener HY 956 EN					
	Viscosity (Hoeppler)	at 25°C		mPa s	ca. 450
	Specific gravity	at 25°C		g/cm³	1.02
	Flash point		DIN 51 758	°C	180
	As supplied form		Clear, 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		

Product data

(Guideline values)

Fillers

The chemical reaction initiated by mixing resin and hardener results in the generation of exothermic heat. The peak temperatures attained are determined by the initial temperature, size and shape of the casting being produced.
Unfilled resin systems are suitable only for manufacturing castings weighing up to about 500 grams. Mineral fillers should be added to dissipate heat and damp the exothermic reaction when producing large castings.
There is very little exothermic reaction when producing very small castings or thin layers as the generated heat is rapidly dissipated. Curing is consequently delayed and the surfaces of castings may remain tacky. In such cases, an infrared heater or oven should be used to effect full curing.

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

Araldite Colouring Pastes

Castings are best coloured by adding epoxy based Araldite colouring paste. Such pastes have hardly any effect on the processing or end properties of the casting resin system.
The colouring paste should normally be added to the resin component and mixed with it until homogeneous colouration results. Filled, highly 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, Publ. No. 24 849/e).

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 208 provides flexible castings, whereas the medium viscosity Araldite F 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 curing 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).
Temperature exothermic rise on curing (e.g. at higher curing temperatures or/and large casting volumina) can be kept within acceptable limits by adding fillers to the mix.

	System	**1**	**2**	**3**	**4**
Mix ratios		parts by weight			
	Araldite F		100	80	50
	Araldite CY 208	100		20	50
	Hardener HY 956 EN	11	22	20	16.5

	System	**1**	**2**	**3**	**4**
Processing data (Guideline values)	Initial viscosity (Hoeppler) mPa s at 25°C	1800	7000	2500	3500
	Pot life (min at 25°C)	-	-	-	30-40
	Minimum curing time				
	h at 25°C				72
	h at 100°C				4*
	h at 120°C				1 1/2*

*large castings should be precured at room temperature

Properties

Guideline values determined on standard test specimens cured for 24 h/RT+6 h/60°C

System			1	2	3	4
Flexural strength(ISO 178)						
max. bending stress		Mpa	-	125	120	90
E modulus		Mpa	-	5100	5000	4900
Impact strength(ISO 179)						
		kJ/m^2	-	17	16	22
Tensile strength(ISO/R 527)						
at 23°C						
tensile stress (max.)		Mpa				
tensile stress (break)		MPa				
elongation (max.)		%				
elongation (break)		%				
Martens dimensional stability under heat						
(DIN 53 458)		°C	-	83	70	35
Loss factor tan δ (DIN 53 483)						
50 Hz	at 23°C	%	-	0.25	1.00	3.10
	at 40°C	%	-	0.40	1.90	6.00
	at 50°C	%	-	1.00	4.10	7.40
	at 60°C	%	-	1.30	8.50	9.90
Dielectric constant ε_r (DIN 53 483)						
50 Hz	at 23°C		-	4.20	4.30	4.80
	at 40°C		-	4.50	4.60	4.70
	at 50°C		-	4.80	4.90	4.95
	at 60°C		-	5.10	5.25	5.35
Volume resistivity ρ (DIN 53483)						
	at 23°C	Ω·cm	-	$2,0.10^{16}$	$8,7.10^{15}$	$4,2.10^{14}$
	at 40°C	Ω·cm	- $3,2.10^{15}$	$4,1.10^{14}$	$5,5.10^{12}$	
	at 60°C	Ω·cm	- $9,5.10^{13}$	$8,1.10^{11}$	$7,6.10^{10}$	
Dielectric strength (IEC 243)						
2 mm plate (50 Hz) at 25°C						
1 minute value		kV/mm	5	21	-	-

Notes

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”.

Handling precautions

Safety precautions at workplace:	
protective clothing	yes
gloves	essential
arm protectors	recommended when skin contact likely
goggles/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 beakers, 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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