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Advanced Materials

Araldite® LY 5210 / Aradur® 917 / Accelerator DY 070

STRUCTURAL COMPOSITES

APPLICATIONS

High performance composite parts

PROPERTIES

Anhydride-cured matrix system with a long pot life. Displays very high temperature resistance after post cure.

PROCESSING

Filament Winding
Pultrusion
Pressure Moulding

KEY DATA

Araldite®LY 5210

Aspect (visual)	Clear to yellow liquid	
Viscosity at 25 °C (ISO 12058-1)	2800 - 3200	[mPa s]
Density at 25 °C (ISO 1675)	1.2	[g/cm^3]
Flash point (ISO 2719)	170	[°C]
Storage temperature (see expiry date on original container)	2-8	[°C]

Aradur® 917

Aspect (visual)	Clear liquid	
Viscosity at 25 °C (ISO 12058-1)	50 - 100	[mPa s]
Density at 25 °C (ISO 1675)	1.20 - 1.25	[g/cm^3]
Flash point (ISO 2719)	195	[°C]
Storage temperature (see expiry date on original container)	2 - 40	[°C]

Accelerator DY 070

Aspect (visual)	clear liquid	
Viscosity at 25 °C (ISO 12058-1)	≤ 50	[mPa s]
Density at 25 °C (ISO 1675)	0.95 - 1.05	[g/cm^3]
Flash point (ISO 2719)	92	[°C]
Storage temperature (see expiry date on original container)	2 - 40	[°C]

STORAGE

Provided that the products described above are stored in a dry place in their original, properly closed containers at the above mentioned storage temperatures they will have the shelf lives indicated on the labels.

Partly emptied containers should be closed immediately after use.

Because Aradur 917 is sensitive to moisture, storage containers should be ventilated with dry air only.

PROCESSING DATA

MIX RATIO	*Components*		*Parts by weight*	*Parts by volume*
	Araldite® LY 5210		100	100
	Aradur® 917		140	135
	DY 070		0.5	0.5
INITIAL MIX VISCOSITY	at 25	*[°C]*	270 - 290	*[mPa s]*
	at 40		100 -130	
	at 60		30 - 50	
POT LIFE	at 23	*[°C]*	125 - 135	*[h]*
(Tecam, 100 ml, 65 % RH)	at 40		42 - 45	
GEL TIME	at 80	*[°C]*	150 - 160	*[min]*
(Hot plate)	at 90		70 - 80	
	at 100		25 - 35	
	at 120		10 - 12	
	at 140		5 - 7	
	at 160		1 - 2	

The values shown are for small amounts of pure resin/hardener mix. In composite structures the gel time can differ significantly from the given values depending on the fibre content and the laminate thickness.

TYPICAL CURE CYCLES

The optimum cure cycle has to be determined case by case depending on the processing and the economic requirements.

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PROPERTIES OF THE CURED, NEAT FORMULATION

GLASS TRANSITION TEMPERATURE (T_G) (IEC 1006,10 K/min)	*Cure:* 4h 100°C+1h 140°C+3h 180°C			*T_G) [°C]*
			Onset	180 - 190
			Midpoint	190 - 195
TENSILE TEST (ISO 527)			*Cure:* *2 h 100°C + 1 h 140°C + 3 h 180°C*	
	Tensile strength	[MPa]		30 - 35
	Ultimate elongation	[%]		1.0 - 1.2
	Tensile modulus	[MPa]		3100 - 3200
FLEXURAL TEST (ISO 178)			*Cure:* *2 h 100°C + 1 h 140°C + 3 h 180°C*	
	Flexural strength	[MPa]		70 - 85
	Elongation at flexural strength	[%]		2.0 - 3.0
	Ultimate strength	[MPa]		70 - 85
	Ultimate elongation	[%]		2.0 – 3.0
	Flexural modulus	[MPa]		3000 - 3100
FRACTURE PROPERTIES BEND NOTCH TEST (PM 258-0/90)		*Cure:*	*Cure:* *2 h 100°C + 1 h 140°C + 3 h 180°C*	
	Fracture toughness K_{1C}	[MPa√m]		0.5
	Fracture energy G_{1C}	[J/m^2]		65
WATER ABSORPTION (ISO 62)	*Immersion:*	*Cure:*	*Cure:* *2 h 100°C + 1 h 140°C + 3 h 180°C*	
	4 days H_2O 23 °C	[%]		
	10 days H_2O 23 °C	[%]		
	30 min H_2O 100 °C	[%]		0.2
	60 min H_2O 100 °C	[%]		0.35
COEFFICIENT OF LINEAR THERMAL EXPANSION (DIN 53 752)		*Cure:*	*Cure:* *2 h 100°C + 1 h 140°C + 3 h 180°C*	
	Mean value up to 20 - 100 °C	[10^{-6}/K]		65 - 70
	Mean value up to 100 - 120 °C	[10^{-6}/K]		75 - 80

PROPERTIES OF THE CURED, NEAT FORMULATION

INTERLAMINAR SHEAR STRENGTH (ASTM D 2344)

Short beam: E-glass unidirectional specimen
Laminate thickness t = 3.2 mm
Fibre volume content: 60 %

	Cure:	*2h100°C+1h140°C+3h180°*
Shear strength	[MPa]	58 - 63 MPa.

HANDLING PRECAUTIONS

Personal hygiene	
Safety precautions at workplace	
protective clothing	yes
gloves	essential
arm protectors	recommended when skin contact likely
goggles/safety glasses	yes
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
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 workplaces	Exhaust fans. Operatives should avoid inhaling vapours

FIRST AID

Contamination of the *eyes* by resin, hardener or 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.

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