

camattini spa thermosetting resins

Resin
PL 515Hardener
G 27Mixing ratio by weight
100:15

Applications: Encapsulation of: transformers, submersible pumps, capacitors. Sealing of electrical and electronic components.

Processing. Manual casting. Undervacuum casting.

Description: Two components polyurethane system filled with no-abrasive fillers. High impregnation properties. Low exothermic peak. Long pot-life. Moderate curing time. Good electrical and mechanical properties. High dimensional stability also after thermal aging at high temperature (>140°C).

SYSTEM SPECIFICATIONS**Resin**

Viscosity at:	25°C	IO-10-50	mPas	7.000	11.000
Density at:	25°C	IO-10-51 (ASTM D 1475)	g/ml	1,48	1,52
Gelation time	25°C	IO-10-52a (UNI 8701)	min	33	43

Hardener

Viscosity at:	25°C	IO-10-50	mPas	25	40
NCO groups		IO-10-55	% peso	31,40	32,60

TYPICAL SYSTEM CHARACTERISTICS**Processing Data**

Mixing ratio by weight	for 100 g resin	g	100:15
Mixing ratio by volume	for 100 ml resin	ml	100:19
Resin Colour			Black White
Hardener Colour			Blue Brown

Density at:	25°C	Hardener	IO-10-51 (ASTM D 1475)	g/ml	1,20	1,22
Pot life at:	25°C	(3.000 mPas)	IO-10-50 (*)	min	9	13
	60°C	(3.000 mPas)		min	5	10
	25°C	(10.000 mPas)		min	25	30
	40°C	(10.000 mPas)		min	18	25
	60°C	(10.000 mPas)		min	9	13

Initial mixture viscosity at:	25°C	IO-10-50	mPas	1.000	1.400
	40°C		mPas	800	1.000
	60°C		mPas	250	350
Gelation time	25°C (15ml;6mm)	IO-10-73 (*)	h	1,5	2,5
Demoulding time	25°C (15ml;6mm)	(*)	h	7	9
Post-curing	60°C	(**)	h	(15)	

TYPICAL CURED SYSTEM PROPERTIES
Properties determined on specimens cured: 24 h TA + 15 h 60°C

Surface				Bright
Density 25°C	IO-10-54 (ASTM D 792)	g/ml	1,47	1,51
Hardness 25°C	IO-10-58 (ASTM D 2240)	Shore D/15	55	60
Glass transition (Tg)	IO-10-69 (ASTM D 3418)	°C	5	15
Water absorption (24h RT)	IO-10-70 (ASTM D 570)	%	0,15	0,25
Water absorption (2h 100°C)	IO-10-70 (ASTM D 570)	%	0,70	0,90
Linear thermal expansion (Tg -10°C)	IO-10-71 (ASTM E 831)	10 ⁻⁶ /°C	44	52
Linear thermal expansion (Tg +10°C)	IO-10-71 (ASTM E 831)	10 ⁻⁶ /°C	133	153
Thermal shock (n°10 cycles passed)	IO-10-67 (inserto metallico Oliphant)	°C	-50	+170
Flammability	IO-10-68 (UL 94 V-0)	mm	6,4	
Max recommended operating temperature	IEC 60085 (***)	°C	130	
Thermal conductivity	IO-10-87 (ASTM C518)	W/(m°K)	0,55	0,65
Dielectric constant at: 25°C	IO-10-59 (ASTM D 150)		4,50	4,90
Loss factor at: 25°C	IO-10-59 (ASTM D 150)	x 10 ⁻³	30	40
Volume resistivity at: 25°C	IO-10-60 (ASTM D 257)	Ohm x cm	3,5 x 10 ¹⁵	4,5 x 10 ¹⁵
Dielectric strength	IO-10-61 (ASTM D 149)	kV/mm	19	22
Flexural strength		MN/m ²	n.a.	n.a.
Strain at break		%	n.a.	n.a.
Flexural elastic modulus		MN/m ²	n.a.	n.a.
Tensile strength	IO-10-63 (ASTM D 638)	MN/m ²	19	23
Elongation at break	IO-10-63 (ASTM D 638)	%	6,0	8,0

IO-00-00 = Camattini's test method. The correspondent international method is indicated whenever possible.

nd = not determined na = not applicable RT = laboratory room temperature (23±2°C)

Conversion units: 1 mPas = 1 cPs 1MN/m2 = 10 kg/cm2 = 1 MPa

(*) for larger quantities pot life is shorter and exothermic peak increases

(**) the brackets mean optionality

(***) the maximum recommended operating temperature is given on the basis of available laboratory information. Users should make their own assessments to verify the real component thermal class which is the result of the applied construction technology and used protective materials.

- Instructions:** In pre-filled products it is a good practice to check and carefully rehomogenize the material if some settlement is present. Add the proper quantity of the hardener to the resin, mix carefully. Avoid air trapping. For some applications it can be useful pre-heat the components and/or carry on a deaeration step under vacuum of the mixture before casting.
- Post-curing** For room temperature curing system the post-curing allows the fast stabilization of the material and the obtainment of the best electrical and mechanical properties. During curing process it is advisable to avoid thermal variations higher than 10°C/hour.
- Storage:** Polyurethane resins and the isocyanate based hardeners can be stored for six months in the original sealed containers kept in a cool and dry place. The hardeners may present an increase in viscosity that do not change the cured system properties. After that period, or if the material has been stocked in anomalous conditions, pre-filled resins can be settled down and their use is possible only if they are accurately re-homogenized with the help, if necessary, of a mechanical mixer. Both components are moisture sensitive therefore it is a good practice to close the vessels immediately after each use. Moisture absorption may cause the expansion of the product during application and/or the hardener may crystallize during storage. The isocyanates may crystallize at low temperatures. To restore the original conditions, heat the material at 70-80°C avoiding local overheating. Before use, the product must be rehomogenized and cooled down at room temperature.
- Handling precautions:** Refer to the data sheet and comply with regulations relating to industrial health and waste disposal.

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The information given in this publication is based on the present state of our technical knowledge but buyers and users should make their own assessments of our products under their own application conditions.