Definitions of properties

Properties	Standards	Definitions
Density	ISO 1183	Weight of a volume [V], ϱ = m / V
Viscosity	ISO 2555	Measure of the resistance to flow of a fluid under an applied force
Gel Time	ISO 9396	Time taken for a material to solidify or become extremely viscous
Glass Transition Temperature	ISO 11357-2	Approximate midpoint of the temperature range over which a material undergoes a phase change from a hard, glass-like state to a rubbery state or vice versa
Thermal Conductivity	ISO 8894-2	Heat flow per unit area divided by the temperature gradient [W/mK]
Temperature Index	IEC 60216 UL 746B	The temperature index (TI) is a measurement for the thermal stability. It provides the basis for classifying an insulating material into a thermal class. The TI allows different insulation materials to be compared, but only if the same end point criterion is applied (e.g. weight loss 10%, flexural strength 50%). The higher the TI, the better is the thermal behavior of the material.
Thermal Class	IEC 60085	Thermal classes Y = 90°C, A = 105°C, E = 120°C, B = 130°C, F = 155°C, H = 180°C, 200 = 200°C, 220 = 220°C
Shore Hardness	DIN 53805	Resistance against the penetration of a body of specified shape, applied under a specific spring load
Tensile Strength	ISO 527	Maximum tensile stress sustained by a material during a tensile test (stretching)
Flexural Strength	ISO 178	Maximum flexural stress sustained by a material during a bending test
Elongation at Break	ISO 527	Tensile strain at which the material breaks
Modulus of Elasticity	ISO 527	Stress [σ] required to produce unit strain [ε], E = [σ/ε] (Young's Modulus)
Water Absorption	ISO 62	Determination of weight after immersion compared with dry weight
Dielectric Dissipation Factor Tan δ	IEC 60250	The dielectric dissipation factor tan δ of a material indicates the electrical losses of the dielectric. It is the tangent of the dielectric loss angle δ. The dielectric loss angle δ of an insulating material is the angle by which the phase difference between applied voltage and resulting current deviates from 90 degrees, when the dielectric of the capacitor consists exclusively of the dielectric material.
Relative Permittivity ϵ_r	IEC 60250	The relative permittivity ϵ_r of an insulating material is the ratio of capacitance of a capacitor, in which the space between and around the electrodes is entirely and exclusively filled with the insulating material in question, to the capacitance of the same configuration of electrodes ion vacuum. The permittivity ε of an insulating material is the product of its relative permittivity ϵ_r, and the electric constant (or permittivity of vacuum) ϵ_0
Dielectric Strength	IEC 60243-1 IEC 60455-2 (1998)	The dielectric strength is the quotient of the breakdown voltage and the distance between the conducting parts between which the voltage is applied under prescribed test conditions.

www.huntsman.com/electronics

HUNTSMAN

Enriching lives through innovation

AMERICAS
Huntsman Advanced Materials
Americas Inc.
Americas Customer Service Center
10003 Woodloch Forest Drive
The Woodlands • Texas 77380 • USA
Tel + 1 800 369 2089
Fax + 1 281 719 7555

EUROPE
Huntsman Advanced Materials
(Switzerland) GmbH
EAME Customer Service Center
Klybeckstrasse 200
4057 Basel
Switzerland
Tel.: +41 61 966 3333
Fax: +41 61 966 3334

ASIA/PACIFIC
Huntsman Advanced Materials
(Guangdong) Company Limited
Asia Pacific Customer Service Center
Flying Geese Mountain Industrial Park
Shilour Town, Panyu City
Guangdong 511447 • P.R. China
Tel +86 20 848 65123
Fax +86 20 848 65122

JAPAN
Huntsman Japan KK
Tokyo Branch
Shibakoen Ridge Bldg.
3F, 1-8-21 Shibakoen
Minato-ku • Tokyo 105-0011 • Japan
Tel +81 3 5403 8188
Fax +81 3 5403 8186

www.huntsman.com/electronics
electronics@huntsman.com

Design by ZYGMUND - www.zygmund.fr

HUNTSMAN

Enriching lives through innovation

For advanced thermal management

Encapsulation and insulation systems

- Cold curing class F
- Low temperature flexibility
- Low modulus
- High temperatures
- UV transparent systems for optical applications

General Industry | Telecom | Automotive | Lighting

Build, structure, assemble a circuit board

Encapsulate, insulate and bond electrical/electronic components

HUNTSMAN

Enriching lives through innovation

Encapsulation and insulation of electronic components for advanced thermal management

Arathane® polyurethane and Araldite® epoxy systems

This product selector guide provides an overview on our key product systems for encapsulation and insulation of electronic components for automotive, telecom, lighting and general industry applications. Additional systems are also available. Our sales engineers will help you to find the ideal system for your individual application and process.

High flexibility → Low flexibility

			Araldite® CY 221 Aradur® HY 2966	XB 5601-1 XB 5600	XW 949-1 HY 5610	Araldite® CW 2243-2L Aradur® HY 1872	VB U6942 U001 B	Arathane® CW 5620 Arathane® HY 5610	Araldite® CW 5730 N Aradur® HY 5731	Araldite® CW 2243-2L Aradur® HY 2966	Arathane® CW 5631 Arathane® HY 5610	Araldite® DBF Aradur® HY 956 EN	Araldite® XB 2252 Aradur® XB 2253	Araldite® CW 1116-1 Aradur® HY 2123	Araldite® CW 1446 BDF Aradur® HY 2919	Araldite® CW 5725 Aradur® HY 5726	Araldite® CW 1302 Aradur® HY 1300
Description / Chemistry			Transparent multi purpose epoxy system	UV transparent flexible polyurethane system	Low temperature flexibility polyurethane system	Low temperature flexibility epoxy system	Multi-purpose polyurethane system	High-end polyurethane for automotive applications	Flexible impregnation epoxy system class F	Multi purpose epoxy system	Cold curing class F polyurethane system	Transparent multi purpose epoxy system	Cold curing class F epoxy system	High service temperature epoxy impregnation system	Multi-purpose epoxy impregation system	High service temperatures epoxy for ignition coils	High thermal conductivity
Type of System			Unfilled	Unfilled	Unfilled	Prefilled	Prefilled	Prefilled	Prefilled	Prefilled	Prefilled	Unfilled	Prefilled	Prefilled	Prefilled	Prefilled	Prefilled
Density of Cured Casting	g/cm³		1.10	0.97	1.00	1.42	1.49	1.44	1.59	1.58	1.52	1.10	1.541	1.62	1.66	1.71	1.65
Mixing Ratio Resin / Hardener	pbw		100 / 25	100 / 100	100 / 50	100 / 22	100 / 16	100 / 22	100 / 28	100 / 11	100 / 25	100 / 20	100 / 13	100 / 31	100 / 24	100 / 28	100 / 11
Viscosity at 25°C	mPa.s	Resin	450	500	5 550	8 000	5 000	2 500	90 000	8 000	10 000	1 500	7 500	30 000	20 000	8 000 @ 60°C	38 000
		Hardener	500	1 200	90	150	120	90	800	150	90	420	300	75	75	70	190
		Mixture	490	1 000	1 800	4 400	2 500	1 300	7 000	4 400	3 000	1 800	2 300	400 @ 40°C	3 500	420 @ 60°C	10 000
Pot Life (viscosity increase up to 15 000 mPa.s)	min		117 @ 25°C 54 @ 40°C	22 @ 25°C	35 @ 25°C	46 @ 60°C	40 @ 25°C	45 @ 25°C	380 @ 60°C 115 @ 80°C	40 @ 25°C	30 @ 25°C	120 @ 25°C 62 @ 40°C	37 @ 25°C	90 @ 80°C	220 @ 60°C	480 @ 60°C 130 @ 80°C	34 @ 25°C 28 @ 40°C
Gel Time	min		45 @ 40°C 10 @ 60°C 4 @ 80°C	16 @ 25°C	50 @ 25°C	110 @ 60°C	60 @ 25°C	70 @ 25°C	145 @ 80°C 36 @ 100°C	17 @ 60°C	60 @ 25°C	62 @ 40°C 15 @ 60°C	100 @ 25°C 60 @ 40°C 30 @ 60°C	23 @ 100°C	3 @ 140°C	160 @ 80°C 80 @ 90°C	120 @ 25°C 75 @ 40°C 30 @ 60°C
Minimum Curing Time	hrs		24 @ 25°C	24 @ 25°C or 6 @ 80°C	24 @ 25°C or 6 @ 80°C	2 @ 80°C	24 @ 25°C or 6 @ 80°C	24 @ 25°C or 6 @ 80°C	3 @ 80°C + 6 @ 100°C	24 @ 25°C + 2 @ 60°C	24 @ 25°C or 6 @ 80°C	24 @ 25°C or 4 @ 25°C + 6 @ 60°C	24 @ 25°C + 2 @ 60°C	2 @ 70°C + 4 @ 110°C	6 @ 60°C + 6 @ 100°C	2.5 @ 90°C + 2.5 @ 140°C	24 @ 25°C + 2 @ 60°C
Glass Transition Temperature	°C		25	22	- 62	8	20	20	25	37	47	64	65	122	92	144	75
Thermal Conductivity at 25°C	W/mK		0.15	0.2	0.19	0.53	0.55	0.50	0.61	0.8	0.60	0.15	0.66	0.55	0.67	0.65	0.83
Flammability UL 94			No	No	No	No	V-0; 6.4 mm	V-0; 6 mm	V-0; 6 mm	V-0; 6 mm	V-0; 6 mm	No	V-0; 6 mm	V-0; 6 mm	V-0; 6 mm	No	V-0; 3.2 mm
Thermal Class			E	E	B	E	E	B	F	B	F	E	F	F	H	H	H
Hardness at 23°C	Shore D		25	27	20	20	40	40	65	70	80	80	86	90	90	90	80
Tensile Strength / Flexural Strength at 23°C	MPa		5 / N.A.	4 / 4	4 / 3	4 / N.A.	4 / N.A.	7 / N.A.	5.6 / 6	16 / 24	30 / 53	58 / 107	41 / 70	51 / 86	47 / 91	N.A. / 90	30 / 63
Elongation at Break at 23°C	%		55	40	37	26	44	70	45	> 15	6	12	1.5	1.2	1.5	1.4	0.5
Modulus of Elasticity at 23°C	MPa		N.A.	13	16	18	26	21	50	960	2 100	2 900	5 100	6 400	7 600	7 800	8 400
Water Absorption	%	10 d / 23°C	1.80	2.04	0.20	N.A.	0.50	0.50	0.43	0.25	0.28	0.63	N.A.	N.A.	N.A.	0.08	N.A.
		30 min / 100°C	1.20	1.57	0.41	0.63	0.29	0.33	0.27	0.50	0.30	0.65	0.40	0.13	0.14	0.05	0.22
Dielectric Dissipation Factor Tan δ at 50 Hz / 23°C	%		7.2	14.0	1.0	14.0	13.0	11.0	5.0	5.0	3.0	0.8	4.4	1.3	4.0	0.5	6.4
Relative Permittivity at 50 Hz / 23°C			6.1	5.0	2.9	8.0	5.5	6.0	4.9	5.0	4.5	4.1	4.7	4.1	1.0	4.2	4.9
Dielectric Strength 2 mm plate at 23°C	kV / mm		35	19	26 (3 mm)	22	22	25	28	15	29	24	29	16	25	25	15

Please note that the values given in this selector guide are typical values determined by testing standard test specimens. They are not directly indicative of the in-service performance of a casting. Therefore, before initiating a production run, manufacturers are advised to carry out their own preliminary tests using preproduction models.

Hot curing systems **Cold curing systems**