

Hei-Cast 8260

1. Description

Hei-Cast 8260 is a flame retardant type polyurethane resin for vacuum casting application with the specific properties so far not obtainable with the prevailing urethane cast materials.

Well-balanced physical properties, difficult-inflammability and excellent dimensional stability of Hei-Cast 8260 makes it possible to apply this innovative product as a flame retardant type cast material for the manufacture of prototypes which require UL94 V-0 specification and for the monitoring of mechanical strength of the molded parts. Hei-Cast 8260 is also suited for short run production.

2. Basic Properties

Item		Value	Remarks
Appearance	A Comp.	Clear to pale yellow	Polyol
	B Comp.	Clear to pale yellow	Isocyanate
Color of Final Article		Milky white	
Viscosity (mPa.s, 25°C)	A Comp.	1000	Viscometer Type BM
	B Comp.	160	
Specific Gravity (25°C)	A Comp.	1.31	Specific gravity cup
	B Comp.	1.19	Standard Hydrometer
Mixing Ratio	A : B	100 : 150	Parts by weight
Pot Life	25°C	5 min.	Resin 100g
		4 min. and 50 sec.	Resin 300g
	35°C	3 min.	Resin 100g
S.G. of Finished Article		1.30	JIS K-7112

3. Basic Physical Properties I

Item		Value	Remarks
Hardness	Shore D	85	Wallace Hardness Tester
Tensile Strength	MPa	68	JIS K-7113
Elongation	%	15	
Bending strength	MPa	93	JIS K7171
Young's modulus in flexure	MPa	2200	
Impact strength	kJ/m ²	10	JIS K7110 Izod V Notch
Shrinkage	%	0.3	In-house specification
Deflection temp. under load	°C	80	JIS K-7207(1.80 MPa)
Coefficient of thermal expansion	/°C	8×10^{-5}	JIS K-6911
Coefficient of thermal conductivity	W/(m·K)	0.26	
Difficult-inflammability	UL-94	V-0	UL-94 test
Possible de-molding time		60 min.	Mold temp. over 60°C

Remarks: Color of cured material changes yellow on exposure to sun light or UV ray.

Curing condition: Mold Temp: 60°C, 60°C x 60 min. + 25°C x 24 hrs.

Physical properties listed above are typical values measured in our laboratory and not the values for specification. Please note that physical properties of final product may differ depending on the contour of article and the molding condition.

4. Physical properties vs. Temperature

Temperature°C	Bending strength (MPa)	Young's modulus in flexure(MPa)	Impact strength (kJ/m ²)
-20	118	2490	6.1
±0	112	2450	8.4
+20	93	2260	9.4
+40	75	2080	9.1
+60	51	1470	10
+80	3.6	220	11

Remarks: Measurement of physical properties at each environmental temperatures.

5. Chemical resistance

Chemicals	Weight change (%)	Loss of gloss	Discoloration	Crack	Warpage	Swelling	Degradation	Dissolution
Distilled water	0.07	○	○	○	○	○	○	○
10% Sulfuric acid	0.08	○	○	○	○	○	○	○
10% Hydrochloric acid	0.04	○	○	○	○	○	○	○
10% Sodium hydroxide	0.04	○	○	○	○	○	○	○
10% Ammonia water	0.12	○	○	○	○	○	○	○
Acetone*1	4.4	△	○	○	○	○	○	○
Acetone	25.3	×	×	×	×	×	×	×
Toluene	0.03	○	○	○	○	○	○	○
Methylene chloride*1	6.9	△	○	○	○	△	○	○
Methylene chloride	36.5	×	×	×	×	×	×	×
Trichloroethane	0.00	○	○	○	○	○	○	○
Ethyl acetate	7.7	△	○	○	○	△	○	○
Ethanol	1.5	△	○	○	○	△	○	○
Gasoline	0.01	○	○	○	○	○	○	○
Benzene	0.00	○	○	○	○	○	○	○

Tested according to JIS K-6911. Changes after 24 hrs. immersion in each chemicals were observed. Those marked with *1 were immersed for 60 min. respectively.

○: Good, △: Slightly No good, ×: Bad

6. Electrical properties

Measurement	Unit/Condition	Value
Surface resistivity	Ω	1.8×10^{15}

Volume resistivity	$\Omega \cdot \text{cm}$		4.2×10^{15}
Dielectric breakdown voltage	KV/mm		14.5
Dielectric constant ϵ	60Hz	25°C	4.5
		60°C	5.1
	100kHz	25°C	5.1
		60°C	4.4
Dielectric loss tangent $\tan \delta$	60Hz	25°C	0.017
		60°C	0.022
	100kHz	25°C	0.022
		60°C	0.026

7. Vacuum Molding Process

(1) Pre-degassing

Degass both A and B components in a de-gassing chamber for about 30 minutes. Degass material as much as you need. We recommend to degas the material which has been pre-heated to temperature of 40~50°C.

(2) Temperature of resin

Keep a temperature of 30~40°C for both A and B component during casting. The higher, the liquid temperature, the shorter is the pot life and the lower, the liquid temperature, the longer is the pot life. Extremely too low temperatures may cause insufficient mixing and improper curing.

(3) Mold temperature

Keep the temperature of silicone mold to 60~70°C in advance. Too low mold temperatures may cause improper curing to result in lower physical properties. Mold temperatures should be controlled precisely as they affect the dimensional accuracy of the finished article.

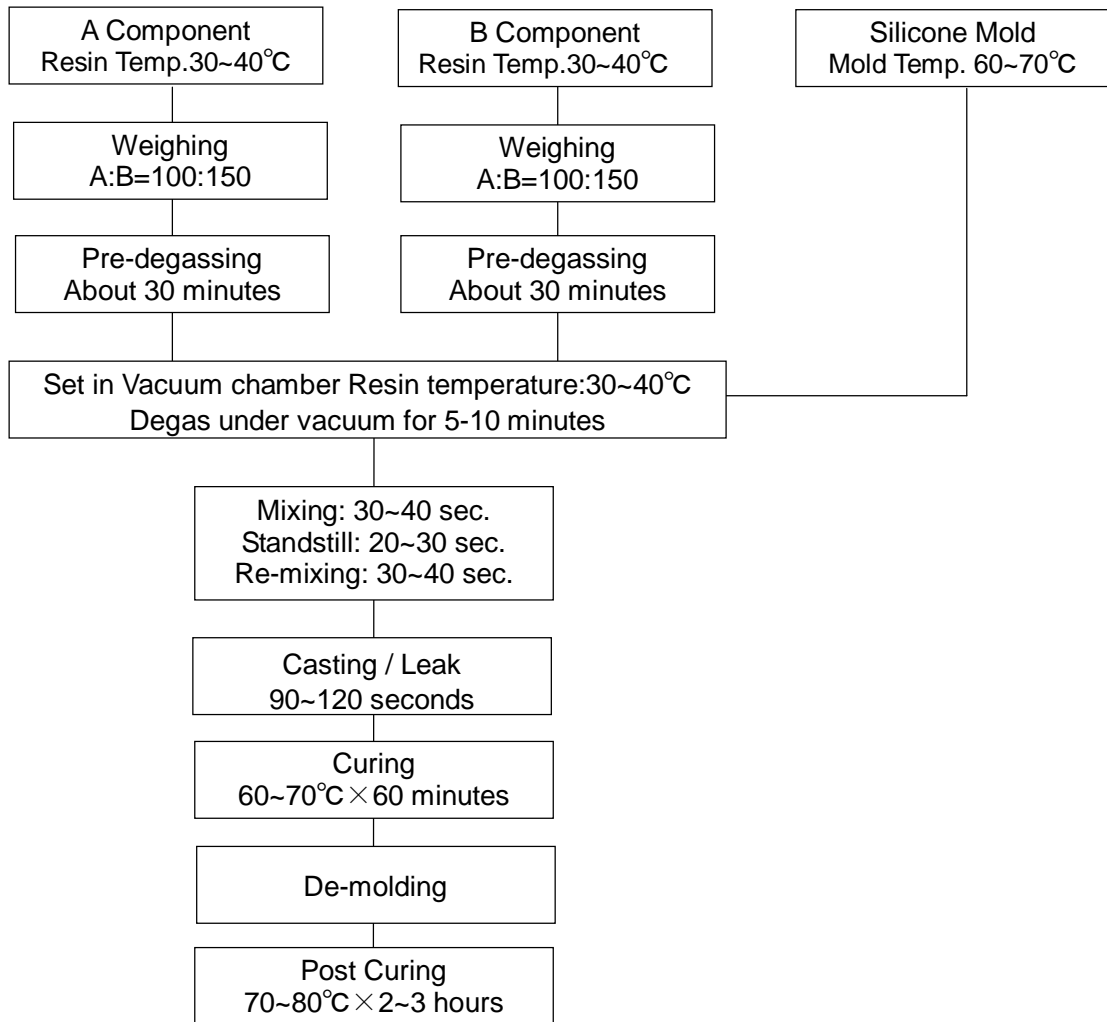
(4) Casting

Containers are set in such a way that A component is added to B component. Apply vacuum to the chamber and de-gass B component for 5~10 minutes while it is stirred from time to time. Add A component to B component, stir for 30~40 seconds and leave it for a while. Stir it again for 30~40 seconds and then pour the mixture into silicone mold quickly. Release vacuum in 1 and half to 2 minutes after commencement of the mixing.

(5) Curing condition

Place filled mold in thermostatic oven of 60~70°C for 45 to 60 minutes and demold the article. Perform post curing at 70~80°C for 2-3 hours depending on the requirements.

8. Flow chart of vacuum casting



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9. Precautions in handling

- (1) Both A and B components are sensitive to water. Don't allow water get into material or don't allow moisture in the air come into prolonged contact with the material. Close container tight after use.
- (2) Penetration of water into A component may lead to generation of much air bubbles in the cured product. If this should happened, we recommend to heat A component to 100°C and degas it under vacuum for about 30 minutes.
- (3) B component will react with moisture to become turbid or to cure into a solid material. Do not use the material when it has lost the transparency or it has shown any hardening as these materials will lead to much lower physical properties.
- (4) B component in part or in whole may freeze when it is stored for longer period of time at temperatures below 5°C. Frozen material can be used after melting. Warm up container to 60 ~70°C for 1~2 hours and use the material after stirring it well.
- (5) B component is prone to deteriorate by the prolonged heating at temperatures over 50°C and the cans can be inflated by the increased inner pressure.
- (6) When B component is stored in a frozen state, it deteriorates more quickly on age than a liquid material. We recommend to melt it completely and store at 20~25°C.

10. Precautions in Safety and Hygiene

- (1) B component contains more than 1% of 4,4'-Diphenylmethane diisocyanate. Install local exhaust within the work shop to secure good ventilation of the air.
- (2) Take care that hands or skin are not coming in direct contact with raw materials. In case of contact, wash with soap and water immediately. It may irritate hands or skin if they are left in contact with raw materials for longer period of time.
- (3) If raw materials get into eyes, rinse with flowing water for 15 minutes and call a doctor.
- (4) Ensure to Install duct for vacuum pump to exhaust waste air outside.

11. Dangerous Materials Classification according to the Fire Services Act

A Component: No.4 Petroleum Group, Dangerous Materials No.4 Group.

B Component: No.4 Petroleum Group, Dangerous Materials No.4 Group.

12. Delivery Form

A Component: 1 kg Royal can.

B Component: 1 kg Royal can.

<p>In using our products based on the technical information contained herein, you are requested to thoroughly test our products as to their suitability for your intended application and determine their validity with your own responsibility. As the applications and processing conditions of our products to be applied by users are beyond our control, we can not bear any responsibility for this technical information in terms of accuracy, the results obtained from their use and the possible infringement of patent rights of any third parties.</p>
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