

***** Hei-Cast 8150 *****

1. Description

Hei-Cast 8150 is an ABS grade urethane resin used for vacuum casting application.

Hei-Cast 8150 offers the properties so far unobtainable with conventional urethane cast material. Well-balanced physical properties, excellent cure properties and superior dimensional stability of Hei-Cast 8150 make it possible to use urethane resin for the manufacture of proto-types and for the monitoring of strength of general injection molded parts as a new cast material with sufficiently high practical strength. Hei-Cast 8150 is also suited for use in the parts which are produced in small lot.

2. Basic Properties

Item		Value	Remarks
Appearance	A Comp.	Beige/Black/Not colored	Polyols
	B Comp.	Clear, pale yellow	Isocyanates
Color of Article		Beige/Black/Milky white	
Viscosity (mPa.s,25°C)	A Comp.	800	Viscometer Type BM
	B Comp.	160	
Specific Gravity (25°C)	A Comp.	1.09	Specific Gravity Cup
	B Comp.	1.19	Standard Hydrometer
Mix Ratio	A : B	100 : 200	Ratio by weight
Pot Life	25°C	5 min	Resin 100g
S. G. of Finished Article	25°C	1.21	JIS K-7112

3. Basic Physical Properties

Item		Value	Remarks
Hardness	Shore D	84	Wallace Hardness Tester
Tensile Strength	MPa	73	JIS K-7113
Elongation	%	16	
Bending strength	MPa	78	JIS K-7171
Young's modulus in flexure	MPa	1790	
Impact strength	kJ/m ²	12	JIS K-7110 Izod V Notch
Shrinkage	%	0.3	Inhouse specification
Heat deflection temperature	°C	100	JIS K-7191(1.80 MPa)
Coefficient of thermal expansion	/°C	6×10 ⁻⁵	JIS K-6911
Flammability	UL94	Equivalent to HB	UL94HB Combustion Preliminary Test
Demold Time	Min	45 ~ 60	Mold temp. :above 60°C

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

Curing condition : Mold temperature:60°C 60°C×60 min.+25°C×24 hrs.

Physical properties listed above are typical values measured in our laboratory and not the values for specification. When using our product, it must be noted 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	112	2060	7.8
0	98	1840	9.1
20	86	1700	8.6
40	74	1650	9.8
60	59	1490	8.3
80	36	1250	9.5

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	0.14	○	○	○	○	○	○	○
10%Sulfuric acid	0.13	○	○	○	○	○	○	○
10%Hydrochloric acid	0.14	○	○	○	○	○	○	○
10%Sodium hydroxide	0.11	○	○	○	○	○	○	○
10%Ammonia water	0.17	○	○	○	○	○	○	○
Acetone*1	20	○	○	○	○	×	×	○
Toluene	0.00	○	○	○	○	○	○	○
Methylene chloride*2	13	△	○	×	○	×	×	×
Trichloroethane	0.02	○	○	○	○	○	○	○
Ethyl acetate	5.9	△	○	○	○	×	○	○
Ethanol	1.3	○	○	○	○	△	○	○
Gasoline	0.02	○	○	○	○	○	○	○
Benzine	0.00	○	○	○	○	○	○	○

Tested according to JIS K-6911. Changes after 24 hrs. immersion in each chemicals were observed. Those marked with *1 mark and *2 mark were immersed for 40 min. and 15 min. respectively.

○:Good, △:Slightly No good, ×: Bad

6. Electrical properties

Measurement	Unit/Condition		Value
Surface resistivity	Ω		10 ¹⁵
Volume resistivity	Ω · cm		10 ¹⁵
Dielectric breakdown voltage	KV/mm		19
Dielectric constant ε	25°C	60Hz	4.1
		10MHz	3.7
	80°C	60Hz	4.8
		10MHz	4.1
Dielectric loss tangent tanδ	25°C	60Hz	0.015
		10MHz	0.035
	80°C	60Hz	0.051
		10MHz	0.046

7. Vacuum Casting 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 40~60°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.

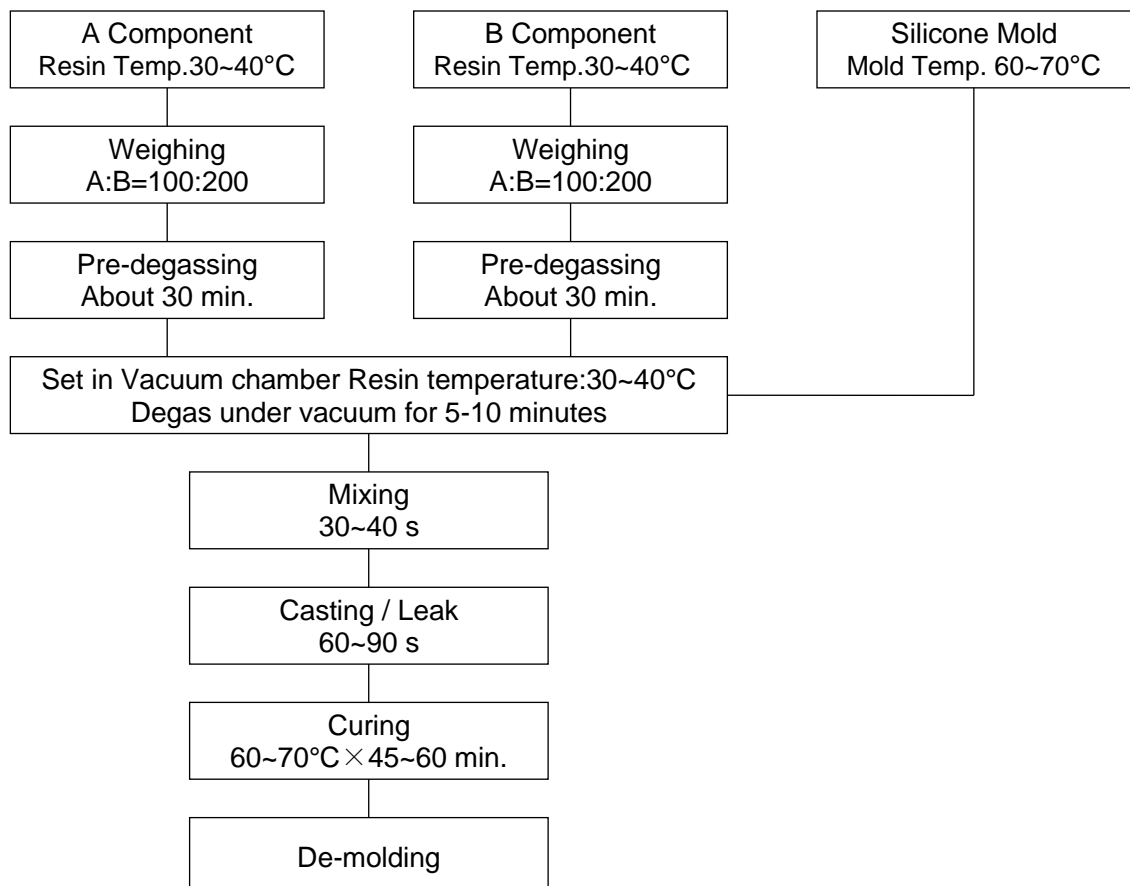
(4) Casting

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 and stir for 30~40 seconds and then cast the mixture quickly into the silicone mold. Release vacuum in 1 to 1 and half a minute 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



9. Precautions in handling

- (1) As 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) Install duct for vacuum pump to ensure that air is exhausted to the outside of the work shop.

10. Delivery Form

A Component: 1 kg tin can.

B Component: 1 kg tin can.

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.

20020309