

***** Hei-Cast 8477 *****

1. Description

Hei-Cast 8477 is a room temperature curing type polyurethane resin developed for food samples, molding and hobbies, and has the following features.

- (1) A resin layer with excellent transparency, which does not easily turn yellow and has good weather resistance can be obtained.
- (2) Since it cures at room temperature, it saves energy and is economical.
- (3) Since the heat generation temperature for curing is lower than Hei-Cast 3479 and the curing shrinkage is small, it is difficult to peel off when cured in a container such as a cup.

1. Basic Properties

Item		Value	Remarks
Appearance	A Comp.	Colorless clear liquid	Polyol
	B Comp.	Colorless clear liquid	Isocyanate
Color of Article		Colorless transparent	
Viscosity (mPa.s, 25°C)	A Comp.	780	Viscometer Type BM
	B Comp.	770	
Specific Gravity (25°C)	A Comp.	1.03	Standard Hydrometer
	B Comp.	1.12	
Pot Life	25°C	90min	Resin 100g 15000mPa·s arrival time

3. Basic Physical Properties

Item		Value	Remarks
Mixing ratio	A : B	100 : 18	Ratio by weight
Hardness	Type A	35	JIS K-7215
Tensile Strength	MPa	1.1	JIS K-7312
Elongation	%	180	
100%modulus	MPa	0.8	
Tear strength	N/mm	5	
Density of final product		1.05	JIS K-7112
Shrinkage	cured at 25°C	0.05%	In-house specification 80 mm diameter, 10 mm high and 50g resin amount
	cured at 60°C	0.5%	

Remarks: Curing condition for preparing test specimen to measure physical properties:

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

Physical properties listed above are typical values measured in our laboratory and not the values for specification.

Physical properties of final product may differ depending on the contour of article and the molding condition.

Please use our product after testing it under your specific condition.

4. Casting Method

Hei-Cast 8477 has a pot life of 90 minutes, so normal pressure casting is possible.

By performing vacuum casting, it is possible to cast products with a complicated shape and without entrapment bubbles.

4.1 Normal Pressure Molding Process

(1) Temperature of resin

When pouring into a container such as a cup: Keep both liquid A and liquid B at 20 to 30°C. Also, cure at room temperature. When the liquid temperature is high or when it is heat-cured, it is easy to peel it from the container such as a cup.

When injecting into a silicone mold and demolding: Keep both A liquid and B liquid at 20 to 50°C.

When the liquid temperature is high, the pot life is short, and when it is low, it is long.

If the liquid temperature is extremely low, poor mixing or poor curing may result.

(2) Container to cast and silicone mold

Please dry container and silicone mold before casting.

If water exists, it will leave many air bubbles in the hardened material.

Cast material will cure faster if silicone mold is pre-heated to 60 - 120°C in thermostatic oven. Extremely too low temperatures of silicone mold may cause improper curing to

result in lower physical properties. Mold temperature should be controlled precisely as it will affect the dimensional accuracy of the article.

(3) Dosing

Mixing ratio is 100:18. Weigh necessary amount of both A and B components with the weighing tolerance of $\pm 3\%$ to put them in the same container. Large deviation from exact mixing ratio will not provide expected physical properties and may cause improper cure too.

(4) Mixing

Mix A- and B-component with steel pallet, glass bar or laboratory stirrer for 1 to 5 min taking care not to entrap air bubbles.

Mix material in the bottom or at the wall of cup with special care, as such material is more difficult to mix.

Use of wooden bar may cause generation of air bubbles in the cured material due to moisture contained in the wood.

Insufficient mixing may lead to tackiness or faulty cure.

(5) De-gassing

Depending on needs, degas mixture in vacuum degassing chamber for 1 to 5 min.

(6) Casting

Cast mixture into casting container, silicone mold, etc., quickly.

(7) De-gassing

Depending on needs, degas mixture in vacuum degassing chamber for 1 to 5 min.

(8) Curing condition

When it is poured into a container such as a cup and cured at room temperature, it takes 1 day to cure. It may take longer if the amount of resin is small.

When cured in a constant temperature bath at 60°C, it cures in 120 minutes. The higher the mold temperature, the faster the cure.

If the temperature of the silicone mold or the liquid temperature of the resin is low or the cured product is small, it may take longer to cure. Even if the tack is strong after curing, the tack will almost disappear in about 3 days.

(9) About the vacuum casting equipment

Articles with no trapped air can be cast by mixing A- and B-component under vacuum.

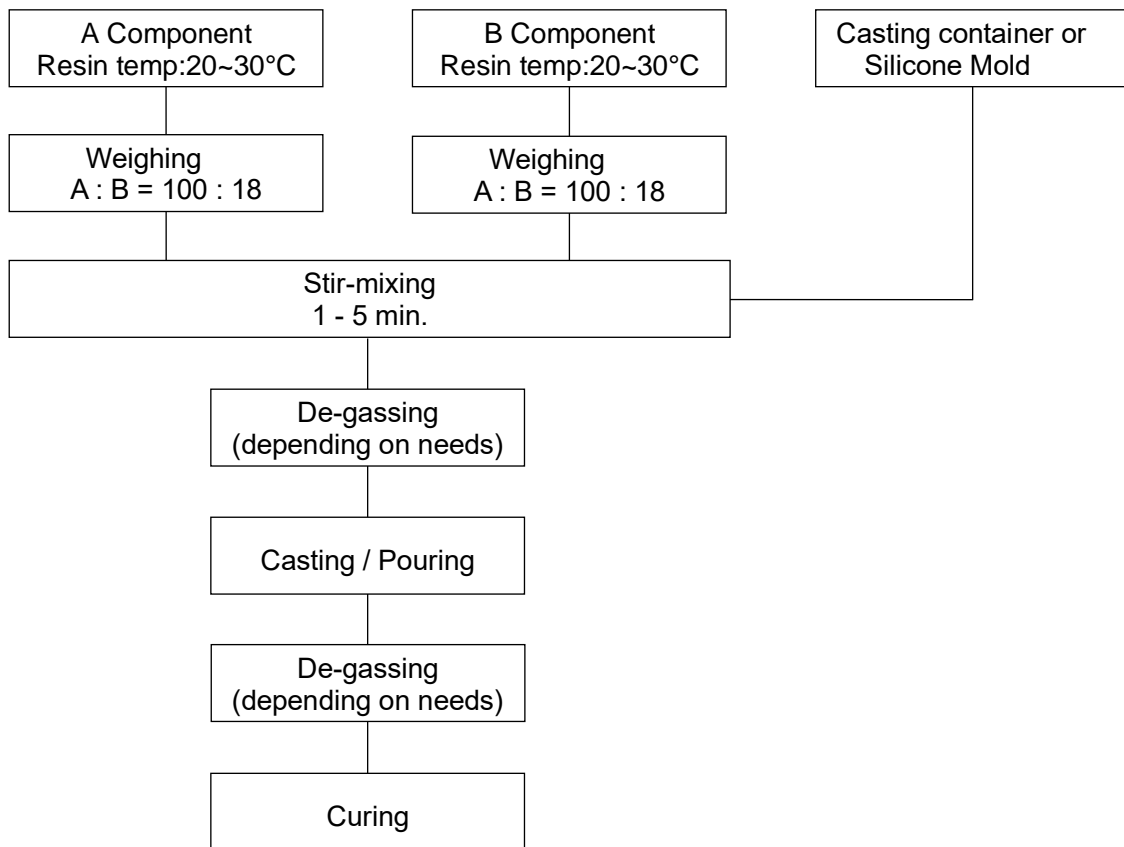
For further information please contact our sales staff.

(10) About the automatic dispensing machine

Mass production is possible through the use of 2 component dispensing machine which can perform metering, stir-mixing and cleaning of mix head automatically.

For further information please contact our sales staff.

4.2. Flow chart of normal pressure molding process



4.3 Vacuum Molding Process

(1) Pre-degassing

Degas both A and B components in de-gassing chamber for 5 - 20 min.
Degas material as much as you need.

(2) Temperature of resin

Keep a temperature of 20 ~ 50°C for both A and B components.

Higher the temperature of material, shorter the pot life of mixture and lower the temperature, longer the pot life.

Extremely too low temperatures may cause insufficient mixing or improper curing.

(3) Mold temperature

Pre-heat silicone mold to 60 ~ 120°C.

Too low mold temperatures may cause improper curing to result in lower physical properties. Mold temperature should be controlled precisely as it will affect the dimensional accuracy of final product.

When Hei-Cast 8479 is cast into poly-addition type silicone rubber, it can happen that it doesn't cure completely at the surface of silicone mold and leaves some tackiness.

Such tackiness can however be removed by post-curing the article at 60°C for about 60 min.

(4) Dosing

Mixing ratio is 100:18. Weigh necessary amount of both A and B components with the weighing tolerance of $\pm 3\%$ and put them in the same container. Large deviation from exact mixing ratio will not provide expected physical properties and may cause faulty cure too.

(5) Casting

Container is to be set in such a way that A component is added to B component.

While vacuum is applied to the working chamber, de-gas B component for 5 ~ 10 min. under stirring from time to time.

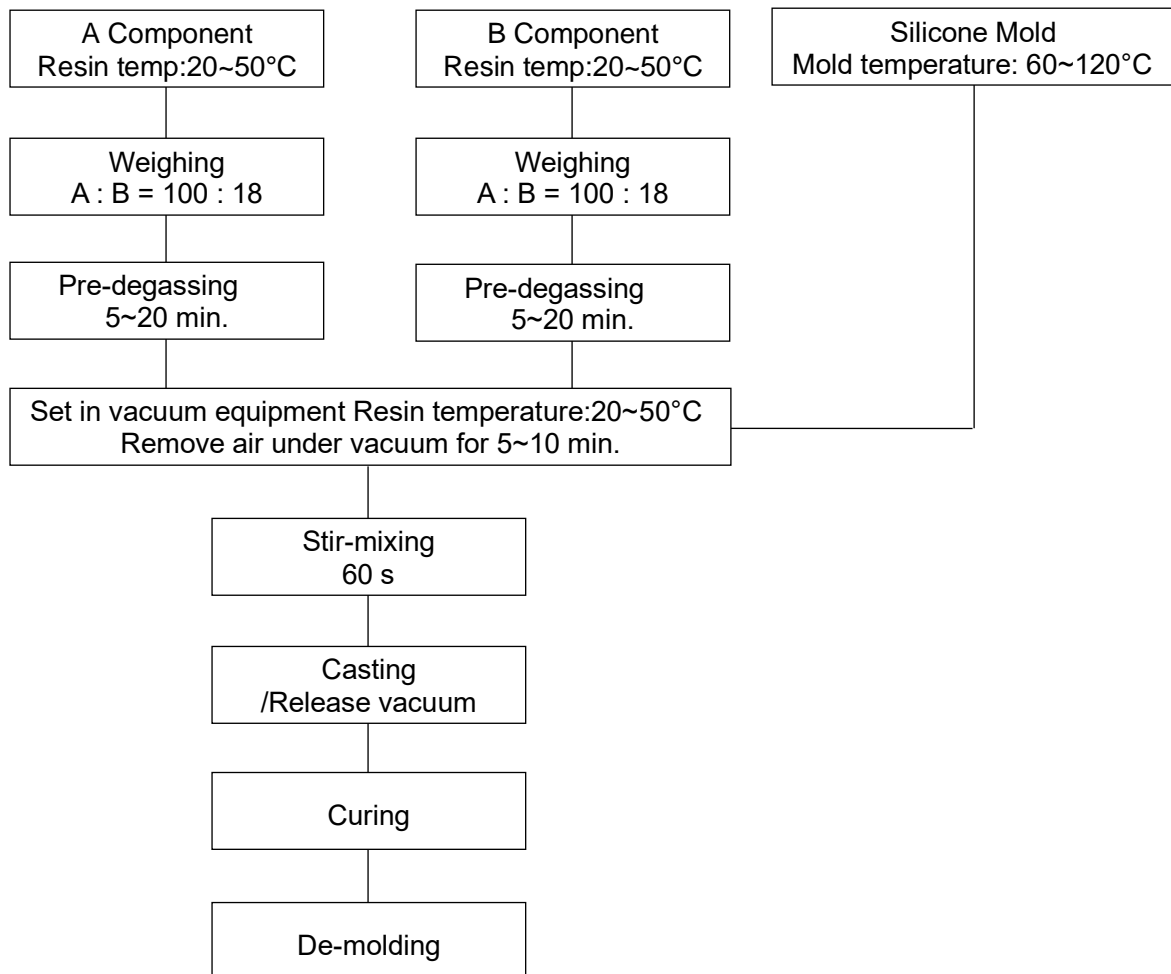
Add A component to B component, stir for 60 seconds and then cast the mixture speedily into silicone mold. Release vacuum.

(6) Curing condition

Put it in a constant temperature bath of 60 to 120°C, check the hardening, and remove the mold.

When cured in a constant temperature bath at 60°C, it cures in 120 minutes. The higher the mold temperature, the faster the cure. If the temperature of the silicone mold or the liquid temperature of the resin is low or the cured product is small, it may take longer to cure. Even if the tack is strong after curing, the tack will almost disappear in about 3 days.

4.4 Flow chart of vacuum casting



5. Precautions in handling

- (1) Both A and B components are sensitive to moisture. Don't allow water get into material or moisture come 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 such case, heat A component at 80~90°C and degas under vacuum for about 30 min.
- (3) B components may freeze at 0°C or lower and become cloudy. If it is cloudy, heat it to about 50°C and it will return to transparent.
- (4) B component will react with moisture to become turbid or to cure into solid material. Do not use material when it has lost transparency or shown any hardening as the use of such material can lead to much lower physical properties.
- (5) Prolonged heating of B component at temperatures over 50°C will affect the quality of B
- (6) Coloring with dyes and pigments is possible, but please contact us in advance as it may affect the cured product depending on the type.
- (7) When injected into an additional type of silicone rubber, the surface in contact with the silicone mold may not completely cure and may be sticky. We recommend using condensation type

silicone rubber.

6. Precautions in Safety and Hygiene

- (1) B component is based on isocyanate. Install local exhaust within the work shop to
- (2) Be careful not to let the raw material come into direct contact with your hands or skin. If you leave the product in contact for a long time, you may get a rash.
- (3) If the material gets into your eyes, immediately wash your eyes with running water for 15 minutes and then consult an ophthalmologist.
- (4) Install duct for vacuum pump in such a way that the emitted air is exhausted to outside of the work shop.

7. Dangerous Materials Classification according to the Fire Services Act

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

B Component: Dangerous Materials No.4 Group, No.3 Petroleum Group.

8. Delivery Form

A Component: 1kg, 17kg

B Component: 1kg

9. Condensation type silicone mold production

Condensation type silicone generates alcohol and other substances when it cures, so if H/C 8477 is cast into a newly created mold, H/C 8477 tends to cause curing failure at the contact surface with the mold.

Silicone type Recommended curing conditions

Room temperature x 12 to 24 hours curing → Master model demolding → 60°C to 120°C x 12 to 24 hours after cure → Casting H/C 8477

- (1) By curing after removing the master model, curing failure will be less likely to occur. If the H/C 8477 is cast immediately after the master model is demolded, or if the H/C 8477 is cast after the master model has been demolded and left at room temperature for 24 hours, then the H/C 8477 will contact the mold. It is easy to cause poor curing.
- (2) Adjust the conditions for after cure depending on the type of silicone and the size and shape of the mold.
- (3) In case of split mold, please do after-cure with the mold open.

10. Amount of NE-10(cure accelerator) and pot life

Pot life can be made shorter by adding NE-10(cure accelerator) to H/C 8477.

How to add NE-10

- 1) Add necessary amount of NE-10 to A component and mix well.

If not mixed thoroughly, there will be one area where cure takes place extremely fast and the other area where faulty cure can take place.

- 2) Mix A component containing NE-10 with B component well.

- 3) Refer to the following table to determine the amount of NE-10 to be added:

Amount of NE-10 to A component	0.02%	0.04%	0.06%	0.08%	0.1%	0.12%	0.14%	0.16%	0.18%	0.2%
Pot life(min.)	64	53	47	42	38	34	31	29	27	26

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