

***** Hei-Cast 8479 *****

1. Description

Hei-Cast 8479 is an ambient temperature curing polyurethane resin developed for cast molding food samples, models and hobby articles which offers the following characteristics: It is excellent in transparency and provides difficult-to-yellow resin layer of good weather resistance.

- (1) It is low in viscosity. It can fill the molds of complicate shape easily to get moldings of good accuracy.
- (2) It cures at ambient temperature meaning more energy saving and economical.
- (3) It develops less heat meaning less shrinkage during hardening.

1. Basic Properties

Item		Value	Remarks
Appearance	A Comp.	Colorless clear liquid	Polyol
	B Comp.	Colorless clear liquid	Isocyanate
Color of Finished Article		Colorless transparent	Viscometer Type BM
Viscosity (mPa.s, 25°C)	A Comp.	1000	Standard Hydrometer
	B Comp.	220	
Specific Gravity (25°C)	A Comp.	1.06	
	B Comp.	1.13	Parts by weight
Pot Life	25°C	30 min.	Resin 100g. Time to reach 15000 mPa.s

3. Basic Physical Properties

Item		Value	Remarks
Mixing ratio	A : B	3 : 1	
Hardness	Type A	50	JIS K-7215
Tensile Strength	MPa	1.4	JIS K-7312
Elongation	%	120	
Tear resistance	N/mm	4.8	
Specific gravity of finished article		1.10	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	0.8%	
Maximum heat development temperature	100 g	55°C	Temperature in the center
	300 g	66°C	
	500 g	69°C	

Tack-free time	25°C	300 - 360 min.	Resin 100g cup (Block shape)
	40°C	180 - 240 min.	
	50°C	80 min.	
	60°C	60 min.	
Possible de-molding time	25°C	300 - 360 min.	Cast in silicone mold
	40°C	180 - 240 min.	
	50°C	80 - 110 min.	
	60°C	60 - 90 min.	

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. Weather resistance [Xenon lamp Weather-o-meter] . Mechanical properties tested according to JIS K-7312

	Item	Unit	Original	100 hrs.	200 hrs.	500 hrs.	1000 hrs.
A:B=3:1	Hardness	Shore A	50	52	53	55	55
	Tensile strength	MPa	1.4	1.3	1.4	1.4	1.3
	Elongation	%	120	90	80	79	69
	Tear resistance	N/mm	4.8	3.0	3.6	4.4	4.3
	Appearance		-	No yellowing and no loss of gloss		Very slight yellowing	

Remarks: Accelerated exposure method: Xenon lamp Weather-o-meter

(No water mist, radiation rate: 42.00 w/m², black standard temperature: 63.0°C, relative humidity: 50.0%)

5. Durability

(450 g resin which is cast into glass cup and cured at 25°C is left at temperatures listed below for each described days to see whether it discolors and/or separates from inner wall of cup)

	After 7 days	After 30 days	After 60 days	After 90 days	After 150 days
On the table	O	O	O	O	O
By the window	O	O	O	O	O
-15°C	O	No discoloration but separates from glass wall	←	←	←
-5°C	O	O	O	No discoloration but separates from glass wall	←
40°C	O	O	O	O	O
60°C	O	Very slightly discolors to yellow but no separation	←	Slightly discolors to yellow but no separation	←
80°C	Slightly discolors to yellow but no separation	Discolors to yellow but no separation	←	←	←

Remarks: O = No noticeable discoloration and no separation from inner wall of glass cup). -15°C: left in refrigerator, -5°C: left in incubator, 40°C, 60°C and 80°C : left in thermostatic oven with warm air circulation.

Higher amount of resin, higher liquid temperature of resin and higher environmental temperature during cure will

result in higher shrinkage to lead cast material separate from the inner wall of container easier. Depending on the type of material and the shape of container in which material is cast, separation may take place rather easily. Please make preliminary trial with your specific container. Please also note that the material cast in container may discolor to yellow depending on the conditions you use.

6. Casting Method

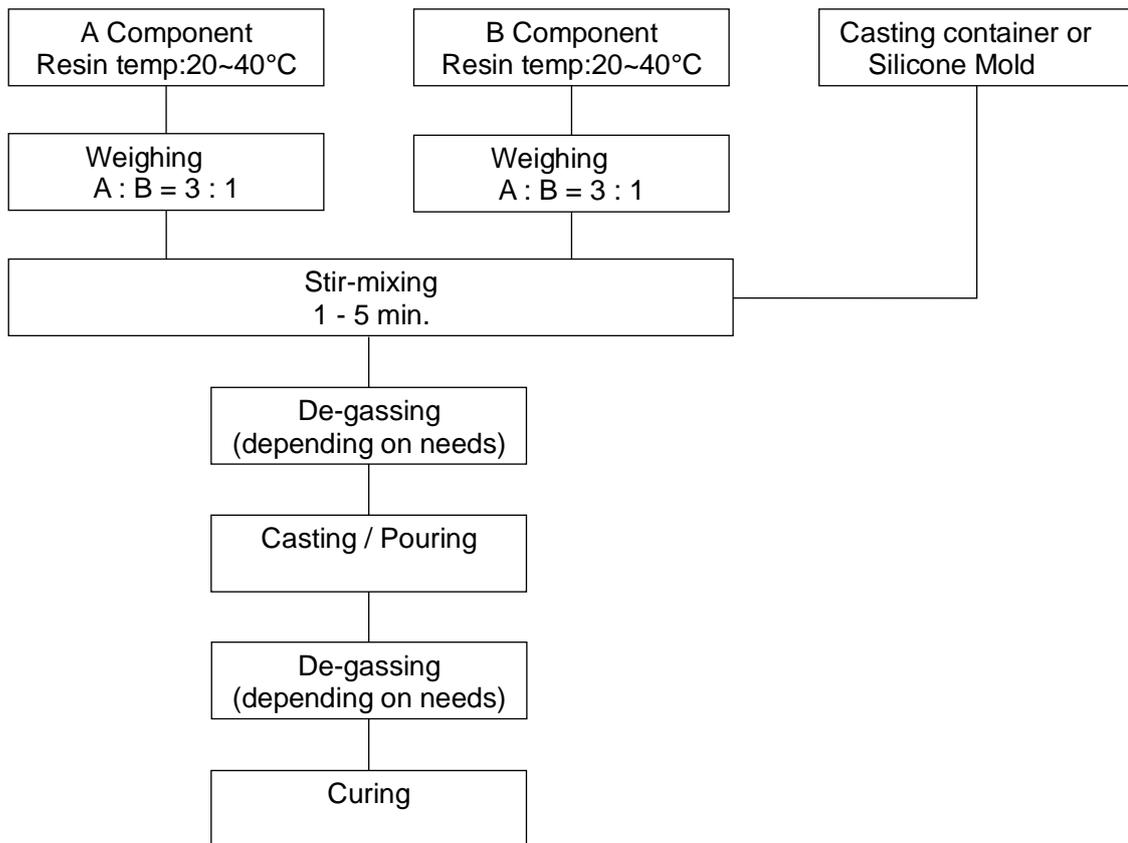
It is possible to cast Hei-Cast 8479 under normal pressure because it is a low viscosity material having a pot life of 30 min.

Articles with no trapped air can be obtained by means of vacuum casting even for complicated shape.

6.1 Normal Pressure Molding Process

- (1) Pre-degassing
Degas both A and B components in de-gassing chamber for about 5 to 20 min.
Degas material as much as you need.
- (2) Temperature of resin
Keep a temperature of 20-40°C for both A and B components. Higher liquid temperature means shorter pot life and lower liquid temperature longer pot life.
Extremely too low temperatures may cause insufficient mixing and/or improper curing.
- (3) 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 - 70°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.
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 3:1. Weigh necessary amount of both A and B components with the weighing tolerance of $\pm 5\%$ 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.
- (5) 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.
- (6) De-gassing
Depending on needs, degas mixture in vacuum degassing chamber for 1 to 5 min.
- (7) Casting
Cast mixture into casting container, silicone mold, etc., quickly.
- (8) De-gassing
Depending on needs, degas mixture in vacuum degassing chamber for 1 to 5 min.
- (9) Curing condition
100 g Hei-Cast 8479 in block shape will become tack-free after cure at 25°C for 300 to 360 min. For smaller amount or articles with thin section, cure will take more time to complete.
- (10) 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.
- (11) 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.

6.2. Flow chart of normal pressure molding process



6.3 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 ~ 40°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 ~ 70°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 3:1. Weigh necessary amount of both A and B components with the weighing tolerance of $\pm 5\%$ 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.

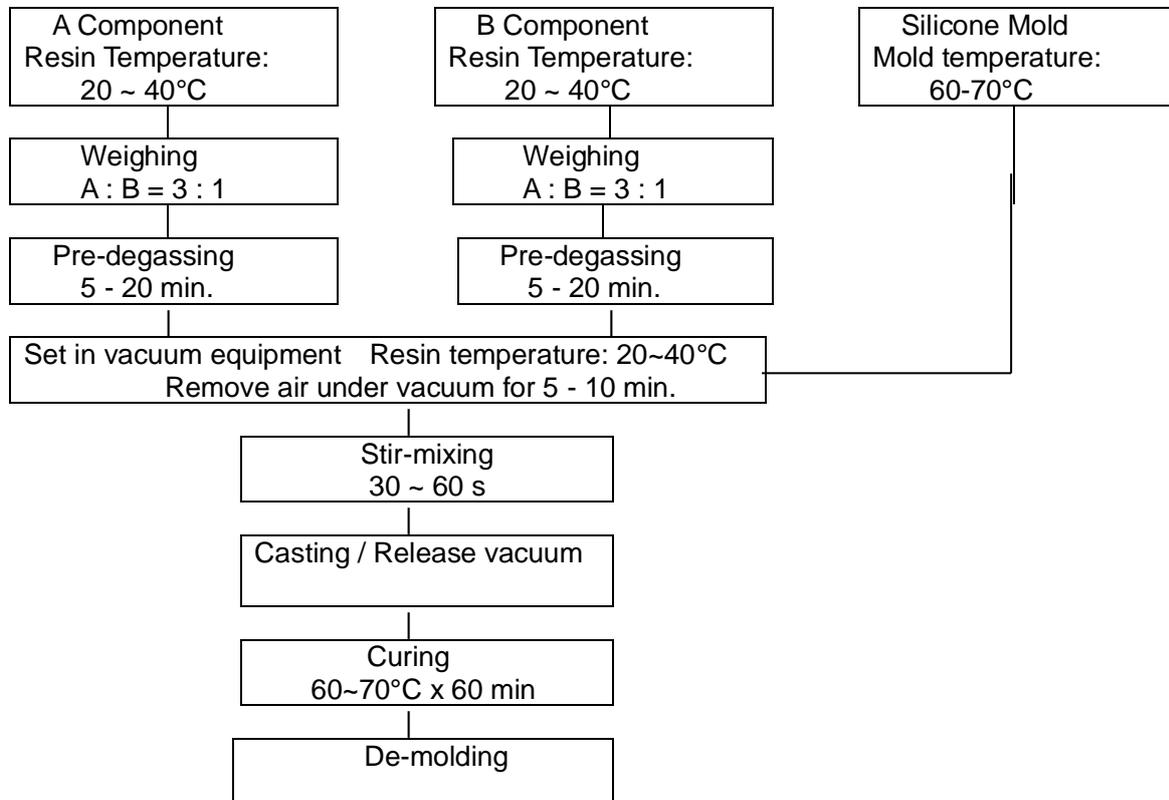
While vacuum is applied to the working chamber, de-gas B component for 5 ~ 10 min. under stirring from time to time.

Add A component to B component, stir for 30 ~ 60 seconds and then cast the mixture speedily into silicone mold. Release vacuum.

(6) Curing condition

Place filled mold in thermostatic oven of 60 ~ 70°C for 60 min. and then de-mold.

6.4 Flow chart of vacuum casting



7. 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 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.
- (4) Prolonged heating of B component at temperatures over 50°C will affect the quality of B component and the cans may be inflated by the increased inner pressure.
- (6) It is possible to color Hei-Cast 8479 with dyestuff or pigment. Please note however that there are those dyestuff or pigments which may affect the cure property. Please
- (7) consult with our sales staff beforehand .
- (8) When Hei-Cast 8479 is cast into poly-addition type silicone rubber, it can happen that
- (9) it doesn't cure completely at the surface of silicone mold and leaves some tackiness.
- (10) Such tackiness can however be removed by post-curing the article at 60°C for about 60 min.

8. Precautions in Safety and Hygiene

- (1) B component is based on isocyanate. Install local exhaust within the work shop to
- (2) secure good ventilation of the air.
- (3) Take care that hands or skin are not coming in direct contact with raw materials. In case of contact, wash with water and soap immediately. It may irritate hands or skin if left not removed for longer period of time.
If raw materials get into eyes, rinse with flowing water for 15 minutes and call a doctor.

(4) Install duct for vacuum pump in such a way that the emitted air is exhausted to outside of the work shop.

9. 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.

10. Colorants for Hei-Cast 8479

Product name	Product No.	Color shade	
Basic color	BLACK PASTE	0084	Black
	WHITE PASTE	305	white
	BEIGE PASTE	2107	Beige
	RED PASTE	4292	Red
	YELLOW PASTE	2258	Yellow
	BLUE PASTE	7206	Blue
Liquid toner	LIQUID TONER BLACK	MH	Black
	LIQUID TONER RED	GEH	Red
	LIQUID TONER ORANGE	2RNH	Orange
	LIQUID TONER YELLOW	RH	Yellow
	LIQUID TONER BROWN	BH	Brown
	BLUE SP-436		Blue

Remarks:

1) Necessary amount of colorants can be added directly to A component.

To obtain articles with uniform color, we recommended to disperse color paste or liquid toner in small amount of A component at first and then add it to the remaining whole amount of A component.

Please mix color paste well before use.(not necessary for LIQUID TONER)

2) Delivery Form

Basic color: 500 g round can

Liquid toner: 500 g royal can

3) MIBK or other solvents are contained in LIQUID TONER

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

Pot life can be made shorter by adding NE-10(cure accelerator) to Hei-Cast 8479.

It is helpful to use NE-10 when it is needed to remove article from silicone mold or casting container. Don't use NE-10 for casting and curing in container like a cup (e.g., sample of juice) because it will increase shrinkage to separate cast material from cup easily.

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	0.025%	0.05%	0.075%	0.1%	0.15%	0.2%	0.3%	0.4%	0.5%
Pot life(min.)	33	28	24	20	17	14	11	9	7	6

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