

HLH

Vacuum Casting (Urethane) Specification Sheets

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

[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.

[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
Mixing Ratio	A : B	100 : 200	Parts by weight
Pot Life	25°C	5 minutes	Resin 100g
S. G. of Finished Article	25°C	1.21	JIS K-7112

[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
Deflection temp. under load	°C	100	JIS K-7191(1.80 MPa)
Coefficient of thermal expansion	/°C	6×10^{-5}	JIS K-6911
Difficult-inflammability	UL-94	HB approved product	UL-94 test in our laboratory
Demold Time	Minute	45 ~ 60	Mold temp. : over 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 hours.

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.

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[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.

[Chemical resistance]

Chemicals	Weight change (%)	Loss of gloss	Discoloration	Crack	Warping	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	○	○	○	○	○	○	○
Benzene	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

[Electrical properties]

Measurement	Unit/Condition		Value
Surface resistivity	Ω		10^{15}
Volume resistivity	$\Omega \cdot \text{cm}$		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 $\tan \delta$	25°C	60Hz	0.015
		10MHz	0.035
	80°C	60Hz	0.051
		10MHz	0.046

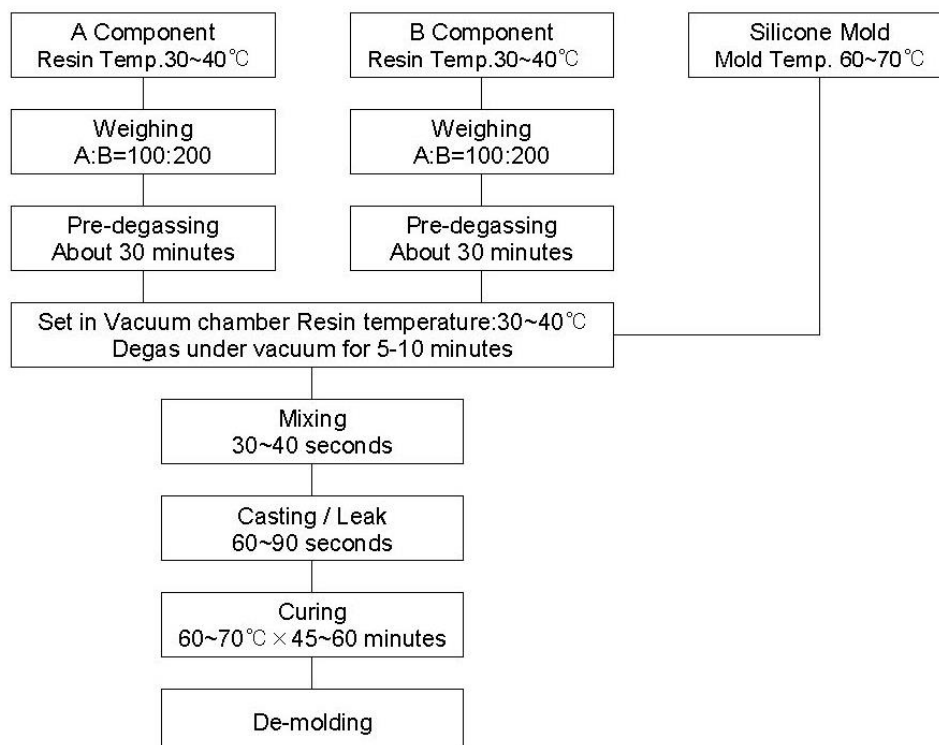
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[Vacuum Casting Process]

- 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.
- 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.
- 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.
- 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.
- 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.

[Flow chart of vacuum casting]



[Precautions in handling]

- 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.
- 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.
- 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.
- 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.
- 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.
- 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.

[Precautions in Safety and Hygiene]

- 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.
- 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.
- If raw materials get into eyes, rinse with flowing water for 15 minutes and call a doctor.
- Install duct for vacuum pump to ensure that air is exhausted to the outside of the work shop.

[Delivery Form]

- A Component: 1 kg tin can.
- B Component: 1 kg tin can.

***** Hei-Cast 8263 *****

1. Description

Hei-Cast 8263 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 8263 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 and 5VA specification and for the monitoring of mechanical strength of the molded parts. Hei-Cast 8263 is also suited for short run production.

2. Basic Properties

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

3. Basic Physical Properties

Item		Value	Remarks
Hardness	Type D	83	JIS K-7215
Tensile Strength	MPa	68	JIS K-7113
Elongation	%	15	
Bending strength	MPa	93	JIS K-7171
Young's modulus in flexure	MPa	2200	
Impact strength	kJ/m ²	10	JIS K-7110 Izod V Notch
Shrinkage	%	0.3	Inhouse specification
Deflection temp. under load	°C	80	JIS K-7207(1.80 MPa)
Coefficient of thermal expansion	/°C	8×10^{-5}	JIS K-6911
Difficult-inflammability	UL-94	V-0	2.5mm
		5VA	3.0mm
Demold Time	Minute	60	Mold temp. : over 60°C

Remarks: Test piece curing condition: Mold temperature: 60°C 60°C × 60 min. + 25°C × 24 hours.

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.

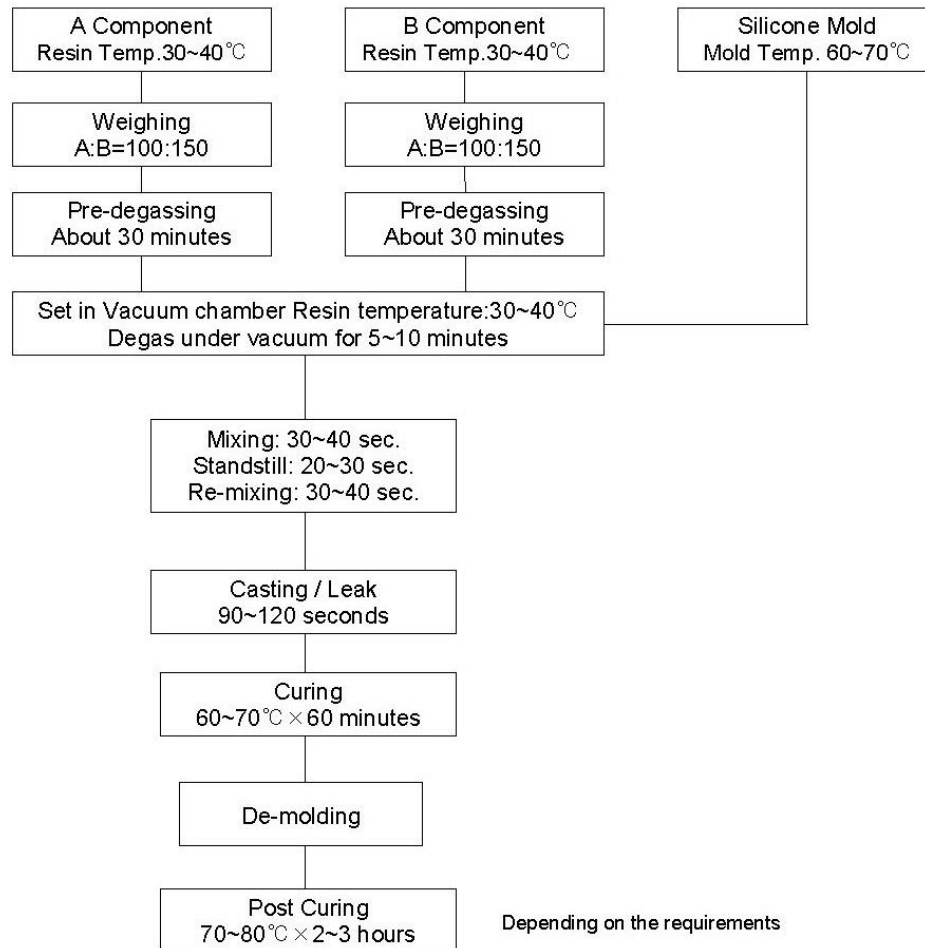
4. electrical properties

Item	Unit or Terms	Value
Breakdown voltage	kV/mm	14.8
CTI test	CTI	600

5. 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 40~50°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.

6. Flow chart of vacuum casting



7. Attention of the use

Hei-Cast 8263 includes fire retardants. They may make caustic substances by hydrolysis under the influence of temperature or humidity.
Please be careful, electronic board and aluminum board may be corrode, when used them with Hei-Cast 8263.

8. The Identification code of molding

JIS K6899-1/6899-4(Plastic-code and abbreviation) Part4:Fire retardant
PUR FR(14+41) PUR:Polyurethane resin
FR:Fire retardant
Code14:Aliphatic/Alicyclic bromine compound
Code41:Chloridizathion organic phosphorous compound

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.

11. Dangerous Goods Classification according to Fire Services Act

Part A Component: Dangerous Goods Class No. 4, Petroleum Class No. 4
Part B Component: Dangerous Goods Class No. 4, Petroleum Class No. 4

12. Delivery Form

A Component: 1 kg tin can.
B Component: 1 kg tin can.

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WI-10-8400-P1/7

Hei-Cast 8400**1.Description**

Hei-Cast 8400 and 8400N are 3 component type polyurethane elastomers used for vacuum molding applications which have the following characteristics:

- (1) Through the use of "C component" in the formulation, any hardness in the range of Shore A-20~90 can be obtained/selected.
- (2) Hei-Cast 8400 and 8400N are low in viscosity and show excellent flow property.
- (3) Hei-Cast 8400 and 8400N cure very well and exhibit excellent rebound elasticity.

2.Basic Properties

Item		Value		Remarks
Product		8400	8400N	
Appearance	A Comp.	Black	Clear,colorless	Polyol(Freezes below 15°C)
	B Comp.	Clear, pale yellow		Isocyanate
	C Comp.	Clear, pale yellow		Polyol
Color of article		Black	Milky white	Standard color is black
Viscosity (mPa.s 25°C)	A Comp.	600		Viscometer Type BM
	B Comp.	40		
Specific gravity (25°C)	A Comp.	1.11		Standard Hydrometer
	B Comp.	1.17		
	C Comp.	0.98		

Remarks:A component freezes at temperatures below 15°C. Melt by heating and use after shaking it well.

3.Basic physical properties <<A90・A80・A70・A60>>

Mixing ratio	A:B:C	100:100:0	100:100:50	100:100:100	100:100:150
Pot life resin: 100g	25°C	5~6 min.	←	←	←
	35°C	3 min	←	←	←
Hardness	Shore A	90	80	70	60
Tensile strength	MPa	18	14	8.0	7.0
Elongation	%	200	240	260	280
Tear strength	N/mm	70	60	40	30
Rebound Elasticity	%	50	52	56	56
Shrinkage	%	0.6	0.5	0.5	0.4
Density of final product	g/cm ³	1.13	1.10	1.08	1.07

Remarks): Mechanical properties:JIS K-7213. Shrinkage:Inhouse specification.

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

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4. Basic physical properties <<A50 • A40 • A30 • A20>>

Mixing ratio	A:B:C	100:100:200	100:100:300	100:100:400	100:100:500
Pot life resin:100g	25°C	5~6 min.	←	←	←
	35°C	3 min	←	←	←
Hardness	Shore A	50	40	30	20
Tensile strength	MPa	5.0	2.5	2.0	1.5
Elongation	%	300	310	370	490
Tear strength	N/mm	20	13	10	7.0
Rebound Elasticity	%	60	63	58	55
Shrinkage	%	0.4	0.4	0.4	0.4
Density of final product					

Remarks): Mechanical properties:JIS K-7213. Shrinkage:Inhouse specification.

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

5. Resistance against heat, hot water and oil <<A90 • A50 • A30>>

(1) Heat resistance [kept in 80°C thermostatic oven with circulating warm air]

A90	Item	Unit	Blank	100 hrs	200 hrs	500 hrs
	Hardness	Shore A	88	86	87	86
	Tensile strength	MPa	18	21	14	12
	Elongation	%	220	240	200	110
	Tear resistance	N/mm	75	82	68	52
	Surface condition			No change	←	←

A60	Item	Unit	Blank	100 hrs	200 hrs	500 hrs
	Hardness	Shore A	58	58	56	57
	Tensile strength	MPa	7.6	6.1	6.1	4.7
	Elongation	%	230	270	290	310
	Tear resistance	N/mm	29	24	20	13
	Surface condition			No change	←	←

A30	Item	Unit	Blank	100 hrs	200 hrs	500 hrs
	Hardness	Shore A	27	30	22	22
	Tensile strength	MPa	1.9	1.5	1.4	1.3
	Elongation	%	360	350	380	420
	Tear resistance	N/mm	9.2	10	6.7	6.0
	Surface condition			No change	←	←

Remarks):Curing condition: Mold temperature:60°C 60°C x 60 min.+ 60°C x 24hrs. + 25°C x 24 hrs.

Physical properties are measured after leaving exposed samples at 25°C for 24 hrs. Hardness, tensile strength and tear strength are tested according to JIS K-6253, JIS K-7312 and JIS K-7312 respectively.

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(2) Heat resistance [kept in 120°C thermostatic oven with circulating warm air]

A90	Item	Unit	Blank	100 hrs	200 hrs	500 hrs
	Hardness	Shore A	88	82	83	83
	Tensile strength	MPa	18	15	15	7.0
	Elongation	%	220	210	320	120
	Tear resistance	N/mm	75	52	39	26
	Surface condition			No change	←	←

A60	Item	Unit	Blank	100 hrs	200 hrs	500 hrs
	Hardness	Shore A	58	55	40	38
	Tensile strength	MPa	7.6	7.7	2.8	1.8
	Elongation	%	230	240	380	190
	Tear resistance	N/mm	29	15	5.2	Not measurable
	Surface condition			No change	←	Melt and tack

A30	Item	Unit	Blank	100 hrs	200 hrs	500 hrs
	Hardness	Shore A	27	9	6	6
	Tensile strength	MPa	1.9	0.6	0.4	0.2
	Elongation	%	360	220	380	330
	Tear resistance	N/mm	9.2	2.7	0.8	Not measurable
	Surface condition			Tack	Melt and tack	←

(3) Hot water resistance [immersed in 80°C tap water]

A90	Item	Unit	Blank	100 hrs	200 hrs	500 hrs
	Hardness	Shore A	88	85	83	84
	Tensile strength	MPa	18	18	16	17
	Elongation	%	220	210	170	220
	Tear resistance	N/mm	75	69	62	66
	Surface condition			No change	←	←

A60	Item	Unit	Blank	100 hrs	200 hrs	500 hrs
	Hardness	Shore A	58	55	52	46
	Tensile strength	MPa	7.6	7.8	6.8	6.8
	Elongation	%	230	250	260	490
	Tear resistance	N/mm	29	32	29	27
	Surface condition			No change	←	←

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A30	Item	Unit	Blank	100 hrs	200 hrs	500 hrs
	Hardness	Shore A	27	24	22	15
	Tensile strength	MPa	1.9	0.9	0.9	0.8
	Elongation	%	360	320	360	530
	Tear resistance	N/mm	9.2	5.4	4.9	4.2
	Surface condition			Tack	←	←

(4) Oil resistance [Immersed in 80°C engine oil]

A90	Item	Unit	Blank	100 hrs	200 hrs	500 hrs
	Hardness	Shore A	88	88	89	86
	Tensile strength	MPa	18	25	26	28
	Elongation	%	220	240	330	390
	Tear resistance	N/mm	75	99	105	100
	Surface condition			No change	←	←

A60	Item	Unit	Blank	100 hrs	200 hrs	500 hrs
	Hardness	Shore A	58	58	57	54
	Tensile strength	MPa	7.6	7.9	6.6	8.0
	Elongation	%	230	300	360	420
	Tear resistance	N/mm	29	30	32	40
	Surface condition			No change	←	←

A30	Item	Unit	Blank	100 hrs	200 hrs	500 hrs
	Hardness	Shore A	27	28	18	18
	Tensile strength	MPa	1.9	1.4	1.6	0.3
	Elongation	%	360	350	490	650
	Tear resistance	N/mm	9.2	12	9.5	2.4
	Surface condition			Swelling	←	←

(5) Oil resistance [Immersed in gasoline]

A90	Item	Unit	Blank	100 hrs	200 hrs	500 hrs
	Hardness	Shore A	88	86	85	84
	Tensile strength	MPa	18	14	15	13
	Elongation	%	220	190	200	260
	Tear resistance	N/mm	75	60	55	41
	Surface condition			Swelling	←	←

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WI-10-8400-P5/7

A60	Item	Unit	Blank	100 hrs	200 hrs	500 hrs
	Hardness	Shore A	58	58	55	53
	Tensile strength	MPa	7.6	5.7	5.1	6.0
	Elongation	%	230	270	290	390
	Tear resistance	N/mm	29	28	24	24
	Surface condition			Swelling	←	←

A30	Item	Unit	Blank	100 hrs	200 hrs	500 hrs
	Hardness	Shore A	27	30	28	21
	Tensile strength	MPa	1.9	1.4	1.4	0.2
	Elongation	%	360	350	380	460
	Tear resistance	N/mm	9.2	6.8	7.3	2.8
	Surface condition			Swelling	←	←

6. Vacuum Molding Process**(1) Weighing**

Decide the amount of "C component" according to the hardness you desire and add it to A component.

Weigh the same amount by weight of B component as A component in a separate cup taking into account the amount which may remain in the cup.

(2) Pre-degassing

Perform pre-degassing in degassing chamber for about 10~20 minutes.

Degass as much as you need.

We recommend to degass after heating material to a liquid temperature of 40~50°C.

(3) Temperature of resin

Keep temperature of 25 ~ 35°C for both A (containing C component) and B component.

When the temperature of material is high, the pot life of mixture will become short and when the temperature of material is low, the pot life of mixture will become long.

(4) Mold temperature

Keep temperature of silicone mold pre-heated to 60 ~ 70°C.

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

(5). Casting

Containers are set in such a way that B component is added to A component (containing C component).

Apply vacuum to the chamber and de-gass A component for 5 ~ 10 minutes while it is stirred from time to time.

Add B component to A component (containing C component) and stir for 30 ~ 40 seconds and then cast the mixture speedily into the silicone mold.

Release vacuum in 1 and half a minute after commencement of the mixing.

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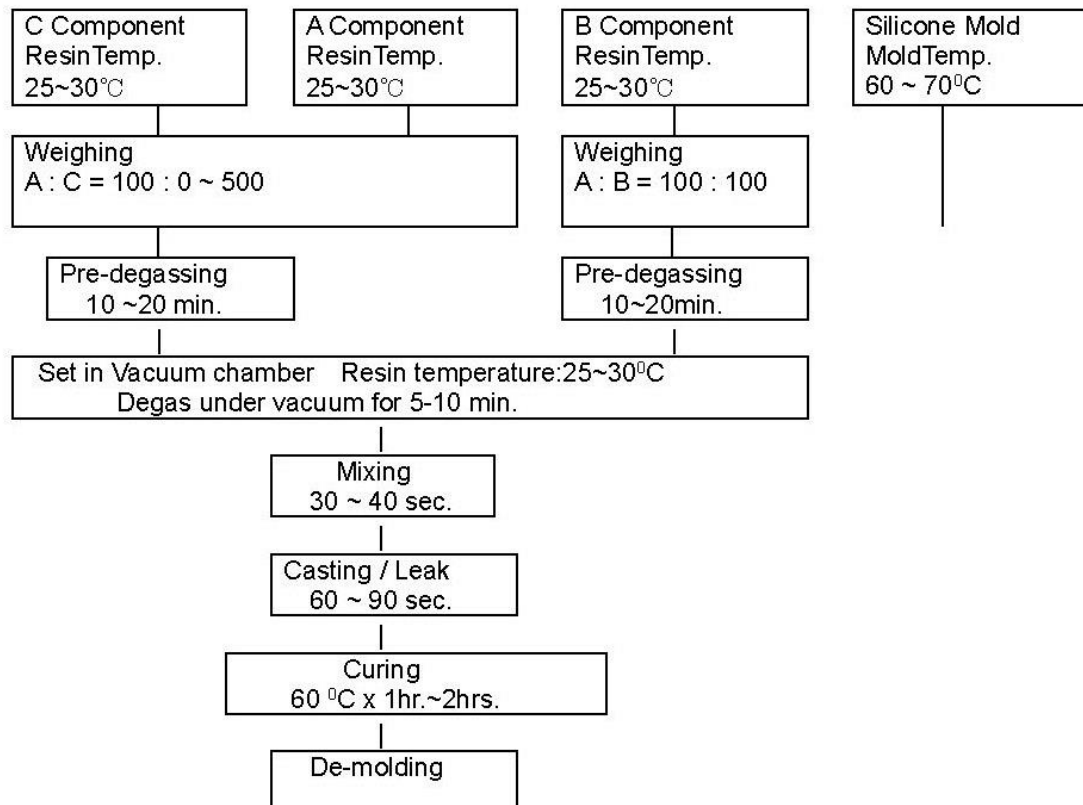
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(3) Curing condition

Place filled mold in thermostatic oven of 60 ~ 70°C for 60 minutes for Shore A hardness 90 and for 120 minutes for Shore A hardness 20 and demold.

Perform post curing at 60°C for 2 ~ 3 hours depending on the requirements.

7. Flow chart of vacuum casting**8. Precautions in handling**

- (1) As all A, B and C component are sensitive to water, never allow water get into the material. Also refrain from material coming long contact with moisture. Close container tight after each use.
- (2) Penetration of water into A or C component may lead to generation of much air bubbles in the cured product and if this should happen, we recommend to heat A or C component to 80°C and degass under vacuum for about 10 minutes.
- (3) A component will freeze at temperatures below 15°C. Heat to 40~50°C and use after shaking it well.
- (4) B component will react with moisture to become turbid or to cure into 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.

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(5) Prolonged heating of B component at temperatures over 50°C will affect quality of B component and the cans can be inflated by the increased inner pressure. Store at room temperature.

7. 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.

8. Dangerous Materials Classification according to the Fire Services Act

A Component: Dangerous Class III, No.3 Petroleum Group, Dangerous Materials No.4 Group.

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

C Component: Dangerous Class III, No.4 Petroleum Group, Dangerous Materials No.4 Group.

9. Delivery Form

A Component: 1 kg Royal can.

B Component: 1 kg Royal can.

C Component: 1 kg Royal can.

**DPI600**

真空浇注聚氨酯树脂

Similar to ABS

挠曲模量(Flexural modulus): 2600Mpa

热变形温度(Hot Deformation Temperature): 70°C

- ◆ Application:
- ◆ Based on the casting of silica gel moulds (prototype or small batch production), the properties of the thermoplastic materials are close to the flexural modulus of 2600 Mpa.

基于硅胶模的浇注（原形制作或小批量生产），性能接近于挠曲模量为 2600Mpa 的热塑性材料。

- ◆ Specification:

- low viscosity - spray paint - Good mechanical properties

Physical characteristics				
		A	B	After Mixing
Components		Polyols	Isocyanate	
Mixing Ratio (Weight)		100	100	
Appearance		Liquid state	liquid state	liquid state
Color		White	Pale yellow transparent	White
Brinell viscosity (at 25°C下, unit: mPa.s)		50-80	250-420	150-250
Pre-reaction density (at 25°C)	ISO1675-75 ISO2781-88	1.13-1.17	1.06-1.10	1.10-1.15
Post-reaction density (at 23°C)				
Operational time (200g, at 25°C)				8 Minutes

Operation(Based on)

Operational specifications (based on vacuum pouring machine):

Material of two components must be used at temperatures greater than 20°C.

- Pre-defoaming in vacuum before mixing
- Mix and stir for 1 minute.
- The temperature of silica gel mould is room temperature (or preheated to 40 C to accelerate reaction)

After defoaming, bake in oven at 80°C for 1 hour

Safety precautions:

Health and safety precautions are usually required in manual operation.

Verify that the working environment is well ventilated

Operators need gloves and safety glasses

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**DPI600**

真空浇注聚氨酯树脂

类似 ABS 产品

挠曲模量(Flexural modulus): 2600Mpa

热变形温度(Hot Deformation Temperature):

70℃

Mechanical properties (at 23℃)			
tensile strength	ISO527-84	Mpa	60
Extension of fracture	ISO37-77	%	18
Flexural strength	ISO178-93	Mpa	85
Flexural modulus	ISO178-93	Mpa	2600
Impact resistance	ISO179/ID-94	KJ/m ²	19
Hardness	-at 23℃, ISO868-85 -at 28℃, ISO868-85	Shore D1	82 75

Heat resistance & special performance			
Hot Deformation Temperature	T.M.A-Mettler	℃	70
Linear shrinkage	-	mm/m	1
Maximum pouring wall thickness	-	mm	5
Complete curing time (at 23℃)	-	day	4

Storage:

Each component should be placed in a dry environment at temperatures of 20-30 degrees Celsius. The validity period of each component in the original packaging container is 6 months.

◆ package:

Polyols: Part A

5.00kg

Isocyanate:Part B

5.00kg

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Design Polymers Innovation

DPI8150

Product Information

◆ PRODUCT DESCRIPTION:

DPI8150 is an ABS material for Casting Resin.

Physical Properties

ITEM	PART A	PART B	MIXED
Colour	Beige/Black/Notcolored	Clear, pale yellow	Beige/Black/Milky white
Composition	Polyol	Isocyanate	
Viscosity at 25°C(mPas)	750	180	320
Specific Gravity (25°C)	1.12	1.20	1.20
Pot life	25°C	5 -6min	100g
Time before demolding	60°C	45-60 (min)	2mm

Mechanical Properties

Item		Value
Hardness	Shore D	82
Tensile Strength	MPa	80
Elongation	%	10
Bending strength	MPa	80
Young's modulus in flexure	MPa	2240
Impact strength	kJ/m2	12
Shrinkage	%	0.3
Heat distortion temperature	°C	100

Design Polymers Innovation

DPI8150

Product Information

◆ Vacuum Casting Process

1). Pre-degassing

Remix Polyol before each weighing. Shell well each part before use.

2). Temperature of resin

If in the low temperature storage, the work will be A,B and C three liquid heating to 20°C.

3). Mold temperature

Pre-heated the silicone mold at 35°C- 40°C to accelerate the process.

4). Casting

Mix until a homogeneous and transparent, degas under vacuum for 5 minutes, cast in a mold pre-heated at 35°C- 40°C.

◆ Precautions in Handling

1). As all A,B and C 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 or C component may lead to generation of much air bubbles in the cured product. If this should happened, we recommend to heat A or C component to 60°C-70°C and degas it under vacuum for about 30 minutes.

3). 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.

4). 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.

Design Polymers Innovation

DPI8150

Product Information

◆ Precautions in Safety and Hygiene

- 1). Ensure good ventilation.
- 2). Wear glove. 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). Wear safety glasses. 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.

◆ Storage Conditions

Shelf life is 12 months in a dry place and in the original unopened containers at a temperature between 15 and 25°. Any opened container must be tightly closed under a dry gas blanket.

◆ Delivery For

A Component: 5kg tin can.

B Component: 5kg tin can.

PX 200**URETHANE CASTING FOR TECHNICAL
AND PROTOTYPES PARTS*****LEXURAL MODULUS 1800 MPa-Tg60°C*****APPLICATIONS**

Used by casting in silicone moulds for the realization of prototype parts and mock-ups whose mechanical properties close to those of thermoplastics.

PROPERTIES

Low viscosity
Good mechanical properties
Can be painted
Thermoplastic aspect

PHYSICAL PROPERTIES

	PART A	PART B	MIXING
Composition	POLYOL	ISOCYANATE	
Mixing ratio by weight	100	100	
Aspect	liquid	liquid	liquid
Color	Off-white	transparent	Off-white
Brookfield LVT viscosity at 25°C(mPa.s)	50-70	250-320	150-250
Specific gravity at 23°C	1.06-1.10	1.13-1.17	1.10-1.15
Pot life at 25°C on 200g			8 min
Demould time (70°C)			1.5 H

PROCESSINT

Weigh according to the indicated ratio. Mix until a homogeneous and transparent mixing is obtained.
Degas for 5 minutes.
Cast in silicone mold at room temperature or pre-heated at 35-40°C to accelerate the process.
After demolding cure 1.5 hours at 70°C in order to obtain the optimal properties.

PRECAUTIONS

Normal health and safety precautions should be observed when handling these products:

- . ensure good ventilation
- . wear gloves and safety glasses

For further information, please consult the product safety data sheet.

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PX 200**URETHANE CASTING FOR TECHNICAL
AND PROTOTYPES PARTS*****LEXURAL MODULUS 1800 MPa-Tg60°C***

MECHANICAL PROPERTIES AT 23°C AFTER HARDENING			
Final hardness	ISO868-85	Shore D	75
Maximal tensile strength	ISO527-84	MPa	55
Elongation at break	ISO37-77	%	16
Flexural modulus of elasticity	ISO178-93	MPa	1800
Maximal flexural strength	ISO178-93	Mpa	90
CHARPY impact strength	ISO179/IK-94	Kj/m ²	50

THERMAL & SPECIFIQUES PROPERTIES			
Glas temperature transition	TMA METTLER	°C	60
Linear shrinkage		mm/m	6
Maximal casting thickness		mm	5
Complete hardening time @23°C		d	4

(1) Average values obtained on standardized specimens/Hardening 12 hr at 70°C

STORAGE

Shelf is 6 months in a dry place and in original unopened containers at a temperature between 15 and 25°C any open can must be tightly closed under dry nitrogen blanket.

PACKAGING

PART A
5KG / PCE

PART B
5KG / PCE

PX 600**URETHANE CASTING FOR TECHNICAL
AND PROTOTYPES PARTS*****LEXURAL MODULUS 1800 MPa-Tg60°C*****APPLICATIONS**

Used by casting in silicone moulds for the realization of prototype parts and mock-ups whose mechanical properties close to those of thermoplastics.

PROPERTIES

Low viscosity
Good mechanical properties
Can be painted
Thermoplastic aspect

PHYSICAL PROPERTIES

	PART A	PART B	MIXING
Composition	POLYOL	ISOCYANATE	
Mixing ratio by weight	100	100	
Aspect	liquid	liquid	liquid
Color	Off-white	transparent	Off-white
Brookfield LVT viscosity at 25°C(mPa.s)	50-70	250-320	150-250
Specific gravity at 23°C	1.06-1.10	1.13-1.17	1.10-1.15
Pot life at 25°C on 200g			8 min
Demould time (70°C)			1.5 H

PROCESSINT

Weigh according to the indicated ratio. Mix until a homogeneous and transparent mixing is obtained.

Degas for 5 minutes.

Cast in silicone mold at room temperature or pre-heated at 35-40°C to accelerate the process.

After demolding care 1.5 hours at 70°C in order to obtain the optimal properties.

PRECAUTIONS

Normal health and safety precautions should be observed when handling these products:

- . ensure good ventilation
- . wear gloves and safety glasses

For further information, please consult the product safety data sheet.

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PX 600

URETHANE CASTING FOR TECHNICAL
AND PROTOTYPES PARTS
LEXURAL MODULUS 1800 MPa-Tg60°C

MECHANICAL PROPERTIES AT 23°C AFTER HARDENING			
Final hardness	ISO868-85	Shore D	75
Maximal tensile strength	ISO527-84	MPa	55
Elongation at break	ISO37-77	%	16
Flexural modulus of elasticity	ISO178-93	MPa	1800
Maximal flexural strength	ISO178-93	Mpa	90
CHARPY impact strength	ISO179/IK-94	Kj/m ²	50

THERMAL & SPECIFIQUES PROPERTIES			
Glas temperature transition	TMA METTLER	°C	60
Linear shrinkage		mm/m	6
Maximal casting thickness		mm	5
Complete hardening time @23°C		d	4

(1) Average values obtained on standardized specimens/Hardening 12 hr at 70°C

STORAGE

Shelf is 6 months in a dry place and in original unopened containers at a temperature between 15 and 25°C any open can must be tightly closed under dry nitrogen blanket.

PACKAGING

PART A
5KG / PCE

PART B
5KG / PCE

Product Information

PX 223**Description**

Vacuum casting resin for prototype parts.

Applications

Used by vacuum casting in silicone molds for the production close to those of thermoplastics.

Basic Properties

Item		Value	Remarks
Color of Article		Black/Tawny	
Density of cured mixing at 23°C		1.15	Standard Hydrometer
Pot Life	(25°C)	7 Min	Resin 160g
Time before demolding	70°C	70 Min	
Hardness	Shord D	80	
Tensile strength	MPa	60	
Elongation at break	MPa	11	
Flexural strength	MPa	80	
Charpy impact resistance	KJ/ m2	>60	
Glass Transition Temperature	°C	>120	
Shrinkage	%	0.4	

Vacuum Casting Process

- 1). Remix POLYOL before each weighing. Degas each part before use.
- 2). If in the low temperature storage, the work will be A and B two liquid heating to 20 °C.
- 3). Post-cure: 100°C for 1 hours ,110 °C for 2 hours or more.

PX2231/1

Product Information◆ **PRODUCT DESCRIPTION:**

PX-5118 is a kind of low-shrinkage vacuum casting polyurethane resin, which is applicable to molds casting of silicone rubber, and can be used in the production of first distinguished samples with high strength and mechanical properties, whose overall performance is similar to plastics such as ABS. It has low viscosity, good fluidity and is easy to operate.

Physical Property					
		PX-5118 A	PX-5118 AL	Constituent B	Mixture
Component		Polyol	Polyol	Isocyanate	
Mixing ratio(weight)		100	100	100	
Appearance		Liquid	Liquid	Liquid	Liquid
Color		Beige/Black/ Not colored	Beige/Black/ Not colored	Dark amber	Beige/Black/ Milky white
Brookfield Viscosity (at 25°C, Unit: mPa.s)		300	300	80	180
Density before reaction (at 25°C)	ISO1675-75				
Density after reaction (at 23°C)	ISO2781-88	1.00-1.04	1.00-1.04	1.13-1.17	1.05-1.08
Pot life (200g, at 25°C)		5 minutes	12 minutes		

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D P I**Design Polymers Innovation****PX-5118****Product Information****◆ Operating Procedure (using vacuum RT machines)**

- Heating the Constituent A and B respectively at 23 °C.
- Please shake Constituent A well before use until the color and the appearance of the product is homogeneous and transparent.
- Compounding the ingredients in proportion.
- Degassing the two constituents for 10 minutes respectively and mixing them together for at least 1 minute inside the vacuum RT machines.
- Casting the mixture into the silicone molds preheated to 70 °C under vacuum.
- demold.

◆ Precautions:

- Pay attention to the health and safety precautions during the manual operation
- Ensure excellent ventilation in the working area

Note: The information and data contained in this material are based on our products. Because the use and processing of the product has beyond our Company's control, the Company makes no guarantee whether the product is properly used and used for a specific purpose. The information contained here should not be considered as a substitute of pre-examination that shall be carried out by you, whose purpose is to confirm the product is applicable to a particular situation. Given that the user is responsible for determining whether a product complies with the operating requirements. The user shall take the responsibility to conduct a comprehensive testing, and is responsible to get satisfied results before use. The suggestion to the product should not be regarded as induction of violating against a particular patent.

D P I

Design Polymers Innovation

PX-5118

Product Information◆ **Physical and Mechanical Properties:**

Mechanical Properties(Under 23°C)			
Tensile Strength	ISO527-84	Mpa	55
Elongation	ISO37-77	%	8
Flexural strength	ISO178-93	Mpa	78
Flexural Modulus		Mpa	1800
Impact resistance	ISO179/ID-94	KJ/m ²	65
Hardness -at 23°C	ISO868-85	Shore D	80

Heat Resistance & Special Features			
Heat Distortion Temperature	T.M.A-Mettler	°C	70
Linear shrinkage	-	mm/m	2
The largest	-	mm	10

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thickness of casting wall				
Time for releasing mold at 70 °C		minute(s)	PX-5118 A 45	PX-5118 AL 120
Time for full curing (at 23 °C)	-	Day(s)	4	

Storage and Shelf Life: Each constituent should be stored at 20-30 °C in a dry environment, and the term of validity is up to six months in its original packaging container.



东莞市振邦模具材料有限公司
DONGGUAN ZHENBANG MOULDING LIMITED

产品技术数据表
PX-520

产品说明:

PX-520 是透明度好、低收缩真空注塑型树脂。

产品特性:

	A 组份	B 组份	混合后
组份	多元醇	异氰酸酯	
黏度 25°C(mPas) (根据检测方法 MQ-051)	300	200	250
比重 (25°C) (根据检测方法 MQ-032)	1.13-1.17	1.06-1.10	1.10-1.15
颜色	淡紫色透明	透明	透明

操作参数:

- ◆ 混合比 (重量) : 100/100 (A/B)
- ◆ 可用时间 (160g 树脂在 25°C 时) : 8 分钟
(根据检测方法 MQ-062)
- ◆ 离模时间 (样品 10mm 在 70°C 时) : 90 分钟
(根据检测方法 MQ-116)

PX-520 需在高于 20°C 的温度下按指示比例混。

操作注意事项:

- ◆ 仅限于真空注塑机中使用
- ◆ 模具加热至 70°C
- ◆ 如果低温储存, 材料需加热最少在 >20°C
- ◆ A 组分放在上面的料杯中
- ◆ B 组分放在混合料杯中
- ◆ 在真空机内脱泡分别抽真空10分钟, 混合搅拌 2 分钟直到材料完全透明
- ◆ 把树脂材料注入树脂模具中
- ◆ 在 70°C 时放到烤箱里 120 分钟
- ◆ 当模具冷却开始脱模

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ZHENBANG DONGGUAN MOULDING LIMITED

产品技术数据表
PX-520

物理和机械性能:

硬度 (根据检测方法 MO-063 / ISO 868)	80 Shore D
热变形温度 HDT (根据检测方法 MO-117)	70°C
断裂伸长率 (根据检测方法 ISO 527-2:1993)	10 %
弯曲模量 (根据检测方法 ISO 178:2001)	2000 MPa
最大挠曲强度 (根据检测方法 ISO 178:2001)	100 MPa
最大抗拉伸长率 (根据检测方法 ISO 527:1993)	7 %
拉伸弹性模量 (根据检测方法 ISO 527:1993)	2200 MPa
断裂拉伸强度	50 MPa
简支梁冲击强度 (根据检测方法 ISO 179:1994)	20 KJ/m ²
线形收缩 (根据测试样件尺寸 500 x 50 x 5 mm)	0.5%

储存条件: 在 25°C 到 30°C 间置于干燥环境中保持容器未开封, 产品保质期 6 个月。

包装: (1+1)kg

备注: 树脂在低温情况下会出现结晶现象, 这是正常情况, 只需把包装瓶盖松开, 放于烤箱里 60°C~70°C, 4~6 小时后, 树脂会自动恢复正常。

DPI PX521-HT**1. Description**

DPI PX521-HT Use by casting into silicone molds for transparent, prototype parts up to a 25mm thickness.

DPI521-HT is a High transparency, easy processing, easy to polish, have Good UV resistance vacuum casting polyurethane.

2. Basic Properties

Item		Value	Remarks
commodity		DPI521-HT	
Appearance	A Comp.	bluish	POLYOL
	B Comp.	colorless	ISOCYANATE
Color of Article		colorless	
Viscosity (mPa.s, 25°C)	A Comp.	1100	
	B Comp.	300	BROOKFIELD-LVT
	mixing	500	
Density of parts before mixing at 25°C	A Comp.	1.06	
	B Comp.	1.08	Specific Gravity Cup
Density of cured mixing at 23°C		1.07	Standard Hydrometer
Mixing Ratio	A:B	55:100	Parts by weight
Pot Life	(25°C)	19-20 Min	Resin 150g
Time before demolding	70°C	120 Min	10mm
Hardness	Shord D	87	Wallace Hardness Tester
Tensile strength	MPa	70	ISO 527:1993
Elongation	MPa	100	ISO 527:2001
Flexural modulus of elasticity	MPa	2100	ISO 527:2001
Charpy impact resistance	KJ/ m ²	26	ISO 179/2D:1994
Glass Transition Temperature (Tg)	°C	110	T.M.A Metter
Maximal casting thickness	mm	50	
Heat deflection temperature	°C	100	T.M.A Metter

3. Vacuum Casting Process

1). Pre-degassing

Remix POLYOL before each weighing. Degas each part before use.

2).Temperature of resin

If in the low temperature storage, the work will be A and B two liquid heating to 20 °C. 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

Degas under vacuum for 5-10minutes, Mix for approximately two minutes, cast in a mold pre-heated at 70°C minimum.

5). Curing condition

Allow to cure 120 minutes for 10mm thickness at 70°C before demolding.

4. 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 60°C-70°C and degas it under vacuum for about 30 minutes.

3). 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.

4). 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.

5. Precautions in Safety and Hygiene

1). ensure good ventilation

2). wear glove. 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). wear safety glasses. 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.

6. STORAGE CONDITIONS

Shelf life is 12 months in a dry place and in the original unopened containers at a temperature between 15 and 25°. Any opened container must be tightly closed under a dry gas blanket.

7. Delivery For

A Component: 0.55kg tin can.

B Component: 1kg tin can.

H&K Ltd. TECHNICAL INFORMATION

WI-10-T0387-P1/1

Hei-Cast T0387**1. Description**

Trial Product T0387 is a three component transparent polyurethane elastomer designed for vacuum casting.

- (1) Cured material is transparent.
- (2) Any desired hardness in a range from Shore A 30 to 80 can be obtained through the combined use of "component C" in different ratio.

2. Basic Properties

Item		Value	Remarks
Product No.		T0387	
Appearance	Comp. A	Colorless transparent	Polyol(Freezes at temp. below 15°C)
	Comp. B	Pale yellow transparent	Isocyanate
	Comp. C	Pale yellow transparent	Polyol
Color of Finished Article		Transparent	
Viscosity (mPa.s, 25°C)	Comp. A	450	Viscometer Type BM
	Comp. B	200	
	Comp. C	700	
Specific Gravity (25°C)	Comp. A	0.99	Standard Hydrometer
	Comp. B	1.19	
	Comp. C	1.18	
Pot Life	25°C	5 min. 30 sec.	Resin 100g

Remarks): A component will freeze at temp. below 15°C. Melt it by heating and use after shaking well.

3. Basic Properties for A80, A70 and A60. Physical properties tested acc. to JIS K-7312

Mixing Ratio	A : B : C	100 : 95 : 0	100 : 95 : 20	100 : 95 : 30
Hardness	Shore A	80	70	60
Tensile Strength	MPa	40	21	10
Elongation	%	300	300	300
Tear strength	N/mm	44	28	28
S. G. of Finished Article	g/cm ³	1.14	1.14	1.14

Basic Properties for A50, A40 and A30. Physical properties tested acc. to JIS K-7312

Mixing Ratio	A : B : C	100 : 95 : 80	100 : 95 : 150	100 : 95 : 200
Hardness	Shore A	50	40	30
Tensile Strength	MPa	4.0	2.0	1.5
Elongation	%	270	300	260
Tear strength	N/mm	17	13	10
S. G. of Finished Article	g/cm ³	1.15	1.16	1.16

Remarks) Curing condition: Mold temperature: 60°C 60°C x 120 min. + 25°C x 1 day.

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.

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