Vacuum (Urethane) Casting

Material List and Spec Sheets

Similar to ABS

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℃)	A Comp	800	Viscometer Type BM
	B Comp	160	
Specific Gravity (25℃)	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℃	5 minutes	Resin 100g
S. G. of Finished Article	25℃	1.21	JIS K-7112

PHYSICAL PROPERTIES VS. TEMPERATURE

Temperature℃	Bending strength (MPa)	Young's modulus in flexture(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.

Similar to ABS

Hei-Cast 8150

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	℃	100	JIS K-7191(1.80 MPa)
Coefficient of thermal expansion	/℃	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℃

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.

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℃	60Hz	4.1
		10MHz	3.7
	80℃	60Hz	4.8
		10MHz	4.1
Dielectric loss tangent tanδ	25℃	60Hz	0.015
		10MHz	0.035
	80℃	60Hz	0.051
		10MHz	0.046

Similar to ABS

Hei-Cast 8150

CHEMICAL RESISTANCE

Chemicals	Weight change (%)	Loss of gloss	Discolor ation	Crack	Warpa ge	Swell ing	Degra dation	Dissolu tion
Distilled water	0.14	O	O	O	O	O	O	O
10%Sulfuric acid	0.13	O	O	O	O	O	O	O
10%Hydrochlori c acid	0.14	O	O	O	O	O	O	O
10%Sodium hydroxide	0.11	O	O	O	O	O	O	O
10%Ammonia water	0.17	O	O	O	O	O	O	O
Acetone*1	20	O	O	O	O	X	X	O
Toluene	0.00	O	O	O	O	O	O	O
Methylene chloride*2	13	△	O	X	O	X	X	X
Trichloroethane	0.02	O	O	O	O	O	O	O
Ethyl acetate	5.9	△	O	O	O	X	O	O
Ethanol	1.3	O	O	O	O	O	O	O
Gasoline	0.02	O	O	O	O	O	O	O
Benzine	0.00	O	O	O	O	O	O	O

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

Similar to ABS

PU858

CHARACTERISTICS

- Flame resistant, UL-94 V-0 UL recognized (UL File Number E62027)
- Good flexibility
- Similar to ABS Resin

MAIN APPLICATION

- Vacuum prototype modeling
- Small lot production

PROPERTY BEFORE CURING

Item	Condition ・Unit	MU-858A	MU-858B
Appearance	Visual	Colorless transparent	Light yellow transparent
Specific gravity	25℃	1.28	1.19
Viscosity	25℃ mPa·s	850	200
Mixing ratio	By weight %	100 : 170	
Pot life	25℃、100 g	5 minutes	

STANDARD CURING CONDITION

- Resin Temperature 30～40℃
- Mold Temperature 60～70℃
- Curing 60～70℃ x 60～90minutes

PROPERTY AFTER CURING

Item	Condition	Unit	Typical value
Curing Condition			60℃×60minutes
Appearance	Visual		White
Hardness	JIS K-7215 25℃	Shore D	80
Flexural strength	JIS K-7171	MPa	90
Flexural modulus	JIS K-7171	MPa	2000
Impact strength	JIS K-7110 Izod with V notch	kJ/m²	10
Load deformation temperature	JIS K-7191 Load=1.8MPa	℃	85
Shrinkage	t＝4	%	0.3
Flammability	UL94 File Number E62027	3.0mm	V-0

The above values are typical , and not guaranteed values.

Similar to ABS

6061

APPLICATIONS

6160 is a high temperature resistant vacuum injection resin

PHYSICAL PROPERTIES

	PART A	PART B	MIXING
Composition	POLYOL	ISOCYANATE	
Brookfield LVT viscosity at 25°C(mPa.s)	280-380	250-350	220-320
Specific gravity （25°C）	0.98-1.0	1.21	1.20
Color	canary yellow	transparent	canary yellow

PHYSICAL AND MECHANICAL PROPERTIES

Hardness	ISO 868	80 Shore D
Glass transition temperature Tg	MO-117	>200℃
Tensile strength	ISO 527	58 MPa
Tensile rate	ISO 37	15%
Twist strength	ISO 178	115 MPa
Modulus of elasticity	ISO 178	2,100 MPa
Impact strength	ISO 178	35kJ/m²
Linear shrinkage		8-9 mm/m

Similar to PC

PX 520

APPLICATIONS

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

PROPERTIES

- Good transparency
- Low viscosity
- Easy to operate
- Easy to mold release
- Longer available time

PHYSICAL PROPERTIES

	PART A	PART B	MIXING
Composition	ISOCYANATE	POLYOL	
Mixing ratio by weight	100	100	
Aspect	liquid	liquid	liquid
Color	transparent	transparent	Off-white
Brookfield LVT viscosity at 25°C(mPa.s)	200 - 250	70 - 90	130 - 190
Specific gravity at 23°C	1.13 - 1.17	1.06 - 1.10	1.10-1.15
Pot life at 25°C on 200g			9 min
Demould time (70°C)			1.5 H

PROCESSINT

- Weigh according to the indicated ratio . First B, A set of parts into the vacuum machine to separate the vacuum for 10 minutes, after mixing the vacuum for 4 5 minutes, and then put a small, injection mold.
- the temperature of the material used in the two components must be greater than 20 0 C
- debubbling in the oven to bake for 90 minutes under the 70 0 C to achieve the best performance
- mold cooling after the start of mold release

PRECAUTIONS

Normal health and safety precautions should be observed when handing these products:
. ensure good ventilation
. wear gloves and safety glasses
For further information, please consult the product safety data sheet.

Similar to PC

PX 520

MECHANICAL PROPERTIES AT 23 ℃ AFTER HARDENING			
Final hardness	ISO868-85	Shore D	80
Maximal tensile strength	ISO527-84	MPa	55
Elongation at break	ISO37-77	%	16
Flexural modulus of elasticity	ISO178-93	MPa	2200
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	℃	60
Linear shrinkage		mm/m	2
Maximal casting thickness		mm	5
Complete hardening time @23°C		d	4

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

Similar to PA

PX 223

DESCRIPTION

Vacuum casting resin for prototype parts.

APPLICATIONS

Used by vcuum 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℃)	7 Min	Resin 160g
Time before demolding	70℃	70 Min	
Hardness	Shord D	80	
Tensile strength	MPa	60	
Elongation at break	MPa	11	
Flexural strength	MPa	80	
Charpy impact resistance	kJ/m^2	>60	
Glass Transition Temperature	℃	>120	
Shrinkage	%	0.4	

Similar to PP

UP 5690

APPLICATIONS

Casting for production of prototype parts and mock-ups having mechanical properties like PP and HDPE, such as instrument panel, bumper, equipment box, cover and anti-vibration tools.

PROPERTIES

- 3-components polyurethane for vacuum casting
- Flexural modulus adjustable
- High elongation
- High impact resistance, no breakable
- Easy processing
- Good flexibility

PHYSICAL PROPERTIES

PHYSICAL PROPERTIES					
		UP 5690 AW or AK	UP 5690 B	UP 5690 C	MIXED
Composition		Polyol	Isocyanate	Polyol	Polyol
Mix ratio by weight		100	100	0 - 50	0 - 50
Aspect		liquid	liquid	liquid	liquid
Colour		AW= White AK= Black	Colourless	Milk white	AW/B/C=White AK/B/C=Black
Viscosity at 23°C (mPa.s)	BROOKFIELD LVT	1000 - 1500	140 - 180	4500 - 5000	500 - 700
Viscosity at 40°C (mPa.s)	BROOKFIELD LVT	400 - 600	-	2300 - 2500	300 - 500
Specific gravity at 25°C Specific gravity of cured product at 23°C	ISO 1675 :1975 ISO 2781 :1988	1.06 -	1.15 -	1.06 -	- 1.13
Pot life at 25°C on 100 g (min)					10 - 15
Pot life at 40°C on 100 g (min)					5 - 7

PROCESSING CONDITIONS (Vacuum casting machine)

- Preheat Part B (isocyanate) to 23 - 30°C in case of being stored below 20°C .
- Preheat Part A and Part C to 40°C before using.
- Weigh the components according to the mixing ratio, put Part B into the upper cup, add Part C in Part A to premix.
- Pour Part B (isocyanate) into Part A (containing Part C) and mix for 1 - 2 minutes after degassing for 10 minutes seperately.
- Cast under vacuum in silicone mould preheated to 70°C.
- Demould after 60 - 90 minutes at 70°C (The more Part C is used, the longer demoulding time is needed).

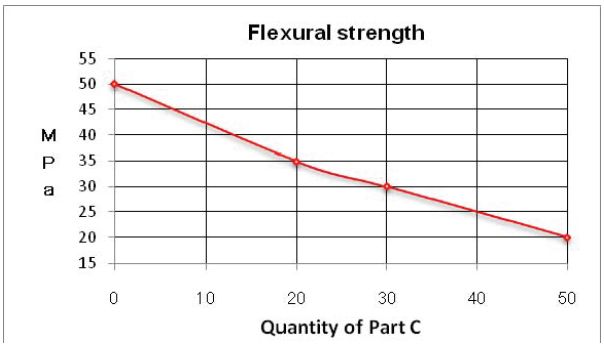
Similar to PP

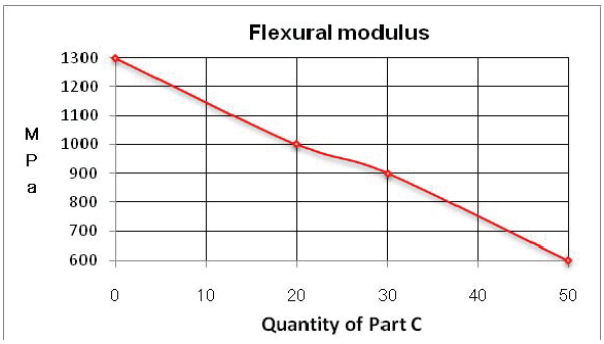
UP 5690

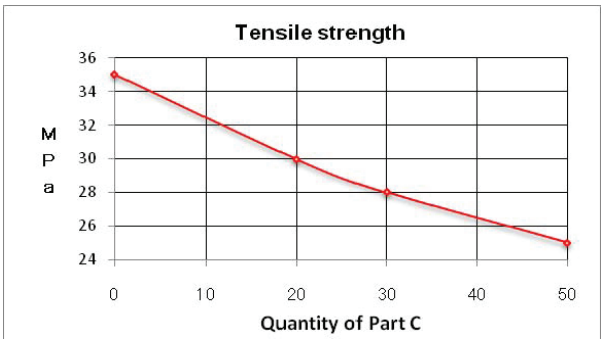
MECHANICAL PROPERTIES at 23°C(1)						
A/B/C			100/100/0	100/100/20	100/100/30	100/100/50
Hardness	ISO 868 : 2003	Shore D	83	80	78	75
Tensile strength	ISO 527 : 1993	MPa	35	30	28	25
Flexural strength	ISO 178 : 2001	MPa	50	35	30	20
Flexural modulus	ISO 178 : 2001	MPa	1300	1000	900	600
Elongation at break	ISO 527 : 1993	%	50	60	65	90
Impact strength (CHARPY) Unnotched specimens	ISO 179/2D : 1994	kJ/m²	100	90	85	75

THERMAL AND SPECIFIC PROPERTIES					
A/B/C		100/100/0	100/100/20	100/100/30	100/100/50
Glass transition temperature (Tg) (1)	°C	In process	In process	In process	In process
Linear shrinkage	%	0.35	0.35	0.35	0.35
Demoulding time (2 - 3mm) at 70°C	min	60 - 90			

(1) : Average values obtained on standard specimens / Hardening 16hr at 80°C after demoulding







Similar to PMMA

PX-5210

APPLICATIONS

Px-5210 is a vacuum injection polyurethane resin suitable for silicone rubber mold injection. It is a product with good transparency, easy polishing, yellowing resistance and UV resistance.

PHYSICAL PROPERTIES

	PART A	PART B	MIXING
Composition	POLYOL	ISOCYANATE	
Mixing ratio (weight)	66	100	
Appearance	liquid	liquid	liquid
Color	Light blue purple	transparent	transparent
Brinell viscosity (at 25 ℃, unit: MPa. S)	100-150	600-700	500-600
Density (at 23 ℃)	1.06	1.01	1.1
Operational time (200 g at 25 ℃)			10 minutes

MECHANICAL PROPERTIES (AT 23 ℃)

Tensile strength	ISO527-84	Mpa	65
Elongation at break	ISO37-77	%	15
Flexural strength	ISO178-93	Mpa	90
Flexural modulus	ISO178-93	Mpa	2000
Impact resistance	IZOT	J/m	60
Hardness		Shore D	83

HEAT RESISTANCE & SPECIAL PROPERTIES

Thermal deformation temperature		Bake at 70 ℃ for 1.5 hours	70℃
Thermal deformation temperature		Bake at 100 ℃ for 1.5 hours	90℃
Linear shrinkage	-	mm/m	4-5
Maximum pouring wall thickness	-	mm	5
Mold release time（2-3mmat 70 ℃）	-	minute	60-90

Transparent Soft Rubber

Hei-Cast T0387

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.

BASIC PROPERTIES

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

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

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/cm³	1.14	1.14	1.14

Transparent Soft Rubber

Hei-Cast T0387

Basic Properties for A50, A40 and A30. 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	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/cm³	1.15	1.16	1.16

Remarks) Curing condition: Mold temperature: 600C 600C x 120 min. + 250C 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.