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HPR65

References :

Polyol: HPR65-POLYOL-SL065000 **Isocyanate: HPR65-ISO-SL000065**

Definition :

➔ **HPR65 :**

Polyurethane resin for the realisation of PP-like of HDPE-like parts such as foundry models or any type of parts requiring impact resistance and abrasion resistance. Amber and colourable semi-rigid material. Possibility to be cured in an oven or at room temperature for the realisation of massive parts.
REACH-compatible material complying with the following European Directives :

- 2011/65/EU – 2015/863 – 2017/2102/EU (RoHS 1 and 2)
- 2002/96/EC (WEEE)
- 2000/53/EC (ELVs)
- 2000/11/EC

Average physical properties of the components :

	HPR65 Polyol SL 065 000	HPR65 Iso SL 000 065	HPR65 Mix SL 065 065
Aspect - Colour	Light to dark amber transparent liquid	Colourless transparent liquid	Amber liquid Amber solid
Brookfield LVT viscosity (mPa.s) According to MO-051	650	1200	
Density at 25°C According to MO-032	1,09	1,15	1,12

Application properties :

	HPR65 Polyol SL 065 000	HPR65 Iso SL 000 065	HPR65 Mix SL 065 065
Mixing ratio by weight	100	74	
Mixing ratio by volume	100	70	
Potlife on 174 g at 25°C According to MO-062			13 min.
Demoulding time at 25°C (on 3mm) According to MO-116			8h
Demoulding time at 70°C (on 3mm) According to MO-116			2h
Total curing time at room temperature (18-25°C)	7 days		
Total curing time in an oven	2h at 70°C + 24h at room temperature		

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Average mechanical properties of the solid material :

- **Average values obtained after curing: 2h at 70°C + 24h at room temperature**

	Standard	Unit	Values HPR65
Hardness	ISO 868 : 2003	Shore D1	65
Flexural modulus	ISO 178 : 2011	MPa	450
Maximum flexural strength	ISO 178 : 2011	MPa	19
Tensile modulus	ISO 527-1 : 2012	MPa	420
Elongation at yield	ISO 527-1 : 2012	%	14
Elongation at break	ISO 527-1 : 2012	%	78
Tensile strength at yield	ISO 527-1 : 2012	MPa	15
Tensile strengh at break	ISO 527-1 : 2012	MPa	18
Charpy impact resistance	ISO 179-1 : 2010 **notched**-1eA[b]	KJ/m²	20
Abrasion resistance	ISO 9352 : 2012 - Taber (1000Rev/H22)	mg/100U	43
Working temperature	-	°C	-20/+85
Linear shrinkage at 25°C	h=3mm	mm/m	6,5

- **Average values obtained after curing: 7 days at room temperature**

	Standard	Unit	Values HPR65
Hardness	ISO 868 : 2003	Shore D1	65
Flexural modulus	ISO 178 : 2011	MPa	500
Maximum flexural strength	ISO 178 : 2011	MPa	20
Tensile modulus	ISO 527-1 : 2012	MPa	530
Elongation at yield	ISO 527-1 : 2012	%	10
Elongation at break	ISO 527-1 : 2012	%	108
Tensile strength at yield	ISO 527-1 : 2012	MPa	16
Tensile strengh at break	ISO 527-1 : 2012	MPa	17
Charpy impact resistance	ISO 179-1 : 2010 **notched**-1eA[b]	KJ/m²	21
Abrasion resistance	ISO 9352 : 2012 - Taber (1000Rev/H22)	mg/100U	43
Working temperature	-	°C	-20/+85
Linear shrinkage at 25°C	h=3mm	mm/m	3

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Hygiene and safety for using :

Wearing appropriate safety clothes and accessories (gloves, glasses) is advised.
Work in a ventilated room.
For more information, please read the Medical and Safety Data Sheet of the material.

Operating conditions :

All the components have to be homogeneous before using the products. Depending on the storage conditions, a crystallization can appear into the polyol component.
In this case, place the container in a 40 - 50°C oven until the product is homogenous again.

➔ **Application process for mixing machine :**

1. Check the homogeneousness of the polyol and isocyanate components before pumping or filling the tanks of the machine.
2. The support (part or mould) must be totally dry, without any trace of moisture.
Make sure that a proper release agent is used.
3. If a pigment is added, it should imperatively be mixed to the polyol component, in the dedicated tank. A 1 to 3% rate of the total product quantity (polyol + isocyanate) is recommended.
4. Before casting, check the mixing ratio at the top of the mixing head.
5. Realize the injection on the support or inside the mould. Once the injection is done, let the polymerisation happen at room temperature to help the self-degasification of the product.
6. Demoulding is possible after :
   - 8h at room temperature, depending on the thickness of the part
   - 2 at 70°C, depending on the thickness of the part
7. The final hardness and mechanical properties of the material are obtained after :
   - 7 days at room temperature.
   - 2h at 70°C + 24h at room temperature

➔ **Application process in a vacuum casting machine :**

1. Pre-heat the polyaddition silicone mould at 70°C.
2. Weigh the separated components (Upper cup: Iso / Lower cup: Polyol), without forgetting the residual quantity to add in the upper cup. Then, put the cups and the mould inside the vacuum casting machine. If a pigment is added, it should imperatively be mixed to the polyol component. A rate of 1 to 3% of the total quantity of product (polyol + isocyanate) is recommended.
3. Degas for 10 minutes, with agitation in the lower cup (Iso).
4. Stop the agitation and pour the content of the upper cup (Iso) into the lower cup (Polyol).
5. Start the agitation and mix for approximately 1min 30s.
6. Release the vacuum in the chamber to a pressure of about 100 hPa (0.1 bar).
7. Cast the mixture into the silicone mould until complete filling.
8. Break the vacuum back to atmospheric pressure.
9. Immediately place the mould in an oven at 70 °C.
10. Demoulding is possible after :
    - 8h at room temperature, depending on the thickness of the part
    - 2 at 70°C, depending on the thickness of the part

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11. The final hardness and mechanical properties of the material are obtained after :
    - 7 days at room temperature.
    - 2h at 70°C + 24h at room temperature

➔ **Application process for hand casting :**

1. The support (part or mould) must be totally dry, without any trace of moisture. Make sure that a proper release agent is used.
2. Rehomogenise the polyol and the isocyanate.
   If a pigment is added, it should imperatively be mixed to the polyol component. A 1 to 3% rate of the total product quantity (polyol + isocyanate) is recommended.
3. Weigh the components and mix them with a spatula or a low- speed rotational mixer.
4. Degas the mixture under vacuum if necessary, depending on the complexity of the part and the details that are likely to retain air bubbles.
5. Cast the product on the support or inside mould. Once the casting is done, let the polymerisation happen at room temperature to help the self-degasification of the product.
6. Demoulding is possible after :
   - 8h at room temperature, depending on the thickness of the part
   - 2h at 70°C, depending on the thickness of the part
7. The final hardness and mechanical properties of the material are obtained after :
   - 7 days at room temperature.
   - 2h at 70°C + 24h at room temperature

Packaging :

- Box of 6 kits of (1,0 kg polyol + 0,74 kg isocyanate) = 10,44 kg
- Box of 2 kits of (5,0 kg polyol + 3,7 kg isocyanate) = 17,4 kg

Storage :

18 months in original and unopened containers, stored between 15 and 25 °C.

Once the packaging is opened, it must be closed back tightly, on a hermetic, moisture free way, after each use, if possible under an inert atmosphere.

Comment :

The final product colour can vary depending on its exposure to UV light, without altering its mechanical properties.

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