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HPE ELASTOMER SYSTEM

References :

Polyol: HPE 40A-POLYOL-SL240000	Isocyanate: HPE 40-85A-ISO-SL000105
Polyol: HPE 85A-POLYOL-SL285000	Isocyanate: HPE55D-ISO-SL000502

Definition :

➔ HPE system :

High performance elastomer system designed for the production of soft technical parts. This system consists of two polyols and two isocyanates, and covers a large range of hardnesses, going from a 40 shore A elastomer to a 55 Shore D semi-rigid resin. The HPE system has a natural transparent amber colour, it can be cured at room temperature or in an oven, while maintaining a high performance level.

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

Properties :

- Possibility to cure at room temperature (18°C-25°C)
- Possibility to cure in an oven to reach the characteristics faster
- High elongation at break
- Low exothermic reaction to facilitate mass casting
- Very high tear resistance, even on notched parts
- Good chemical resistance
- Good temperature resistance

Average physical properties of the components :

Product reference	Aspect - Colour	Brookfield LVT viscosity at 25°C in mPa.s According to MO-051	Density at 25°C According to MO-032
SL240000	Yellow to amber Opaque liquid	550	1,04
SL285000	Light to dark amber Transparent liquid	650	1,09
SL000105	Light amber Transparent liquid	3300	1,08
SL000502	Light amber Transparent liquid	2500	1,05

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Application properties depending on the requested hardness :

Shore hardness	40A	50A	60A	70A	85A	35-40 D	50-55D
HPE 40A Polyol SL240000	100	75	50	25	0		
HPE 85A Polyol SL285000		8	16	24	32	50	75
HPE 40-85A ISO SL000105	100	100	100	100	100	50	
HPE55D ISO SL000502						50	100
BROOKFIELD LVT viscosity at 25°C (mPa.s) According to MO-051	2000	2400	2700	3000	3200	1800	1300
Potlife on 200g at 25°C According to MO-062	60 min.	55 min.	50 min.	45 min.	40 min.	25 min.	18 min.
Demoulding time at 25°C	24h	24h	24h	24h	24h	12h	10h
Demoulding time at 70°C (on 3mm)	3h	3h	3h	3h	3h	2h	2h
Total curing time at room temperature (18-25°C)	5 to 7 days						
Total curing time in an oven	24h at room temperature + 16h at 70°C + 48h at room temp.						

Average mechanical and thermal properties of the cured material :

- **Average values measured on specimens after post-curing: 24h at room temperature + 16h at 70°C + 48h at room temperature**

	Unit	Standard							
Hardness	Shore A	ISO 868 : 2003	40	50	60	70	85	90	
	Shore D	ISO 868 : 2003						35-40	50-55
Working temperature	°C	-	-40/+90	-40/+90	-40/+90	-40/+90	-40/+90	-40/+90	-40/+90
Maximum casting thickness	mm	-	100	80	80	60	50	30	20
Elongation at break at 23°C	%	ISO 37 : 2012	270	400	500	800	900	460	325
Tensile strength at break at 23 °C	MPa	ISO 37 : 2012	2,7	3,6	6	7,2	13	14	16
Tear resistance at 23°C	kN/m	ISO 34-1 : 2015	11,5	18	27	40	54	58	70
Abrasion resistance	mg/100U	ISO 9352 : 2012 Taber (1000Tr/H22)	< 5	< 5	< 5	< 10	18	27	35

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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 components.
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. Depending on the selected hardness :
   - In Shore A hardnesses, the two polyol components have to be mixed in the chosen ratio before filling the tanks.
   - In Shore D hardnesses, the two isocyanate components have to be mixed in the chosen ratio before filling the tanks.
4. 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.
5. Before casting, check the mixing ratio at the top of the mixing head, according to the selected hardness.
6. Realise 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.
7. Demoulding is possible after:
   - 10 to 24h at room temperature, depending on the requested hardness and the thickness of the part
   - 2 to 3h at 70°C, depending on the requested hardness and the thickness of the part
8. The final hardness and mechanical properties of the material are obtained after :
   - 5 to 7 days at room temperature.
   - 24h at room temperature + 16h at 70°C + 48h 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 polyols and the isocyanates.
3. Depending on the selected hardness :
   - In Shore A hardnesses, the two polyol components have to be mixed in the chosen ratio before filling the tanks.
   - In Shore D hardnesses, the two isocyanate components have to be mixed in the chosen ratio before filling the tanks.
4. 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.

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5. Weigh the components and mix them with a spatula or a low-speed rotational mixer.
6. Degas the mixture under vacuum if necessary, depending on the complexity of the part and the details that are likely to retain air bubbles.
7. 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.
8. Demoulding is possible after :
   - 10 to 24h at room temperature, depending on the requested hardness and the thickness of the part
   - 2 to 3h at 70°C, depending on the requested hardness and the thickness of the part
9. The final hardness and mechanical properties of the material are obtained after :
   - 5 to 7 days at room temperature.
   - 24h at room temperature + 16h at 70°C + 48h at room temperature

Packaging :

- HPE 40A-POLYOL-SL240000 : Box of 6 x 1,0 kg = 6 kg / 4 x 5,0 kg = 20 kg
- HPE 85A-POLYOL-SL285000 : Box of 6 x 1,0 kg = 6 kg / 4 x 5,0 kg = 20 kg
- HPE 40-85A-ISO-SL000105 : Box of 6 x 1,0 kg = 6 kg / 4 x 5,0 kg = 20 kg
- HPE55D-ISO-SL000502 : Box of 6 x 1,0 kg = 6 kg / 4 x 5,0 kg = 20 kg

- System HPE kit 40-85 A, box of 1 kit with :
  (4 x 1,0 kg of HPE 40A polyol) + (2 x 1,0 kg of HPE 85A polyol) + (2 x 5,0 kg of HPE 40-85 A Iso) = 16 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 freeway, 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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