

PR500

References :

Polyol: PR500-POLYOL-SL500000

Isocyanate: PR500-ISO-SL000500

Definition :

→ **PR500 :**

Polyurethane resin for the realisation of ABS-like or PA-like with the vacuum casting process. The product has high thermal and mechanical properties. Transparent and colourable material, with a limited aggressiveness to silicone moulds.

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 :

	PR500 Polyol SL 500 000	PR500 Iso SL 000 500	PR500 Mix SL 500 500
Aspect - Colour	Colourless transparent liquid	Slightly yellow transparent liquid	Slightly yellow transparent liquid – transparent solid
Brookfield LVT viscosity (mPa.s) According to MO-051	450	950	1300
Density at 25°C According to MO-032	1,07	1,20	1,16

Application properties :

	PR500 Polyol SL 500 000	PR500 Iso SL 000 500	PR500 Mix SL 500 500
Mixing ratio by weight	40	100	
Mixing ratio by volume	45	100	
Mixing time at 25°C			1 min.
Potlife on 140g at 25°C According to MO-062			5 min.
Demoulding time at 70°C (on 3mm) According to MO-116			45 min.
Minimum curing time	1h at 70°C + 24h at room temperature		
Optimal curing time	2h at 70°C + 2h at 100°C + 24h at room temperature		

The values mentioned on this document are based on tests and researches carried out in SYNTHENE's laboratory, in precise conditions. This document cannot be, in any case, considered as a specification data sheet. It is the responsibility of the users to check the suitability of the product in their own conditions, defined and tried by themselves. Synthene company disclaims any responsibility for any consequence occurred by the use of this product.

Average mechanical and thermal properties of the cured material :

- Average values after post-curing : 1h at 70°C + 24h at room temperature**

	Standard	Unit	Values PR500
Hardness	ISO 868 : 2003	Shore D1	85
Flexural modulus	ISO 178 : 2011	MPa	2700
Maximum flexural strength	ISO 178 : 2011	MPa	100
Tensile modulus	ISO 527-1 : 2012	MPa	2800
Elongation at maximum strength	ISO 527-1 : 2012	%	4,5
Elongation at break	ISO 527-1 : 2012	%	6
Maximum tensile strength	ISO 527-1 : 2012	MPa	68
Tensile strength at break	ISO 527-1 : 2012	MPa	67
Charpy impact resistance	ISO 179-1 : 2010 unnotched-1fU ^c	KJ/m ²	40
Heat Deflection Temperature (HDT)	ISO 75-2 : 2013 method B	°C	70
Glass transition temperature (Tg)	ISO 6721-10 : 2015	°C	76

- Average values after post-curing : 2h at 70°C + 2h at 100°C + 24 h at room temperature**

	Standard	Unit	Values PR500
Hardness	ISO 868 : 2003	Shore D1	85
Flexural modulus	ISO 178 : 2011	MPa	2600
Maximum flexural strength	ISO 178 : 2011	MPa	102
Tensile modulus	ISO 527-1 : 2012	MPa	2800
Elongation at maximum strength	ISO 527-1 : 2012	%	6
Elongation at break	ISO 527-1 : 2012	%	10
Maximum tensile strength	ISO 527-1 : 2012	MPa	78
Tensile strength at break	ISO 527-1 : 2012	MPa	73
Charpy impact resistance	ISO 179-1 : 2010 unnotched-1eU ^b	KJ/m ²	69
Heat Deflection Temperature (HDT)	ISO 75-2 : 2013 method B	°C	93
Glass transition temperature (Tg)	ISO 6721-10 : 2015	°C	103

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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 :

Before using the material, check that the isocyanate component does not show any sign of crystallization (presence of particles, cloudy liquid).

In case of crystallization, stir the bottle, slightly open the cork and place the product in an oven at 70°C, until complete decrystallization (about 2 hours for 1kg of material – one can let the product in the oven overnight in case of a bigger quantity). If the product is not clear and homogeneous after this step, place in an oven at 100°C for 1h maximum.

If the isocyanate is not completely clear after this second heat treatment, the product should not be used.

After this temperature treatment, properly close the cork back. Let the material cool down to room temperature, or at 40°C, depending on your requested casted part. Multiple exposures to temperatures above 100°C can entail an accelerated ageing of the material and modify the shelf life. It is recommended to decrystallize only the immediate need for the casting. After opening, one should place the product under an inert atmosphere (with dry air or nitrogen) before closing the packaging back.

➔ Application process in a vacuum casting machine :

1. Preheat the polyaddition silicone mould at 70°C.
2. Rehomogenise and weigh the separated components (upper cup : Iso / lower cup : Polyol), with addition of the necessary residual quantity in the upper cup. Then, put the cups inside the vacuum casting machine.
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. Degas the products during 10 minutes, with agitation in the lower cup (Polyol).
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 at least 1 minute.
6. Slightly release the vacuum in the chamber to a pressure of about 100 hPa (0,1bar).
7. Cast the mixture into the silicone mould until complete filling.
8. Break the vacuum back to atmospheric pressure.
9. Place the mould in an oven at 70°C.
10. Demoulding is possible after :
 - 45 minutes at 70°C, depending on the thickness of the part

In order to obtain the mechanical properties of the material, it is necessary to realize a complete curing, demoulding time included, of :

- Minimum curing time : 1h at 70°C + 24h at room temperature
- Optimal curing time : 2h at 70°C + 2h at 100°C + 24 h at room temperature

Packaging :

- Box of 4 kits of (0,8 kg polyol + 2x1,0 kg isocyanate) = 11,2 kg

Storage :

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

Comment :

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