

# CRISTAL HRI 35

## References :

**Polyol : CRISTAL HRI 35-POLYOL-SL 350 000**

**Isocyanate : CRISTAL HRI 35-ISO-SL 000 350**

## Definition :

### → **CRISTAL HRI 35 :**

Clear transparent polyurethane casting resin for the production of massive optical parts and / or inclusion. High refractive index, high UV stability. Countertype of PMMA or PC. Colourable, easy machining and polishing.

REACH-compatible product complying with the following European Directives:

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

## Average physical properties of the components :

|                                                                | CRISTAL HRI 35 Polyol<br>SL 350 000 | CRISTAL HRI 35 Iso<br>SL 000 350 | CRISTAL HRI 35 Mix<br>SL 350 350                              |
|----------------------------------------------------------------|-------------------------------------|----------------------------------|---------------------------------------------------------------|
| <b>Aspect – Colour</b>                                         | Colourless<br>transparent liquid    | Colourless<br>transparent liquid | Colourless Transparent liquid<br>Colourless Transparent solid |
| <b>Brookfield LVT viscosity (mPa.s)</b><br>According to MO-051 | 400                                 | 800                              |                                                               |
| <b>Density at 25°C</b><br>According to MO-032                  | 1,28                                | 1,15                             | 1,21                                                          |

## Application properties :

|                                                                | CRISTAL HRI 35 Polyol<br>SL 350 000                 | CRISTAL HRI 35 Iso<br>SL 000 350 | CRISTAL HRI 35 Mix<br>SL 350 350 |
|----------------------------------------------------------------|-----------------------------------------------------|----------------------------------|----------------------------------|
| <b>Mixing ratio by weight</b>                                  | 65                                                  | 100                              |                                  |
| <b>Mixing ratio by volume</b>                                  | 58,5                                                | 100                              |                                  |
| <b>Mixing time at 25°C</b>                                     |                                                     |                                  | 2 min.                           |
| <b>Potlife on 165g at 25°C</b><br>According to MO-062          |                                                     |                                  | 35 min.                          |
| <b>Demoulding time at 70°C (on 3mm)</b><br>According to MO-116 |                                                     |                                  | 3h                               |
| <b>Maximum casting thickness</b>                               |                                                     |                                  | 100 mm                           |
| <b>Optimal curing time</b>                                     | 3h at 70°C + 16h 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 :

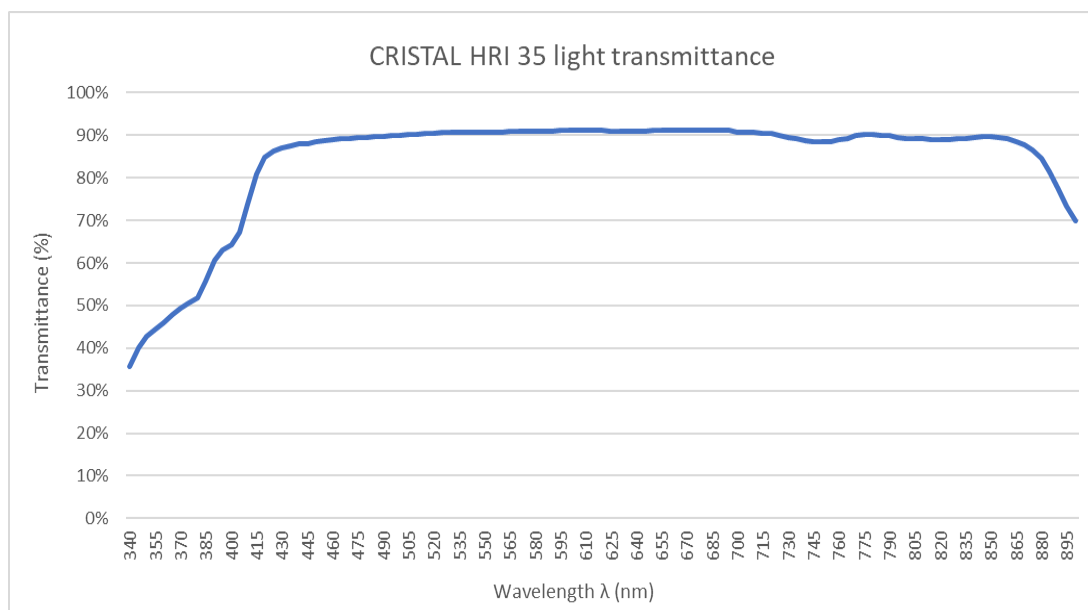
- Average data obtained after stabilisation : 2h at 70°C + 16h at 100°C + 24h at room temperature

|                                   | Standard                                       | Unit              | Values |
|-----------------------------------|------------------------------------------------|-------------------|--------|
| Shore D1 hardness                 | ISO 868 : 2003                                 | Shore D1          | 84     |
| Flexural modulus                  | ISO 178 : 2011                                 | MPa               | 2000   |
| Maximum flexural strength         | ISO 178 : 2011                                 | MPa               | 75     |
| Tensile modulus                   | ISO 527-1 : 2012                               | MPa               | 2200   |
| Elongation at break               | ISO 527-1 : 2012                               | %                 | 5      |
| Maximum tensile strength          | ISO 527-1 : 2012                               | MPa               | 60     |
| Maximum stress at break           | ISO 527-1 : 2012                               | MPa               | 60     |
| Charpy impact resistance          | ISO 179-1 : 2010<br>unnotched-1eU <sup>b</sup> | KJ/m <sup>2</sup> | 50     |
| Heat Deflection Temperature (HDT) | ISO 75-2 : 2013<br>Method B                    | °C                | 62     |

### Average optical properties of the cured material :

- Average data obtained after stabilisation : 2 h at 70°C +16 h at 100°C + 24 h at room temperature

|                                                              | Standard                          | Unit | Values |
|--------------------------------------------------------------|-----------------------------------|------|--------|
| Refractive index at 20°C                                     | ISO 489 : 1999                    |      | 1,54   |
| Hazen coloration on a 50 mm thickness                        | -                                 |      | < 30   |
| UV resistance -QUV-B accelerated ageing after 1000h (313 nm) | ASTM G154<br>-<br>ISO 4892-3:2016 |      | 4      |



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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 :**

#### **→ 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 2 minutes.
  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 :
    - 3 hours at 70°C, depending on the thickness of the part.
- Slightly cool down the mould with compressed air before extracting the part. If any distortion occurs, place the part in an oven at 70°C again, so it can take back its original shape.
- In order to obtain the mechanical properties of the material, it is necessary to realise a complete curing, demoulding time included, of :
- Optimal curing time : 3h at 70°C + 16h at 100°C + 24h at room temperature

If the part has been demoulded, use a shape holder to avoid any potential distortion of the part during the post-curing step.

#### **→ 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. Then, place the mould in an oven at 70°C.
6. Demoulding is possible after :
  - 3 hours at 70°C, depending on the thickness of the part.

7. Slightly cool down the mould with compressed air before extracting the part. If any distortion occurs, place the part in an oven at 70°C again, so it can take back its original shape.

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

- Optimal curing time : 3h at 70°C + 16h at 100°C + 24h at room temperature

If the part has been demoulded, use a shape holder to avoid any potential distortion of the part during the post-curing step.

**Packaging:**

- Parcel of 6 kits of (6 x 0,65kg polyol + 6 x 1kg isocyanate) = 9,9kg
- Parcel of 2 kits of (3,25kg polyol + 5kg isocyanate) = 16,5kg

**Storage:**

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