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Directions for processing transparent polyurethanes

Precautions
All parts of equipment and final product, that come into contact with the mixed product, should be dry, clean and fat- free. The A component is harmless. Be aware of safety instructions for working with the B component, see MSDS.

Preparation
In order to avoid air bubbles in the final product, both A component and B component should be processed under vacuum, if possible, and dry conditions. When using mixing/metering equipment, place the supply barrel under vacuum after (re-) filling.

Mixing and casting
Always use the fixed mixing ratio indicated in the datasheet of the product used. The ratio is given as weight to weight. During mixing, the product can become cloudy, depending on which B component is used. This is a normal effect, due to a slight incompatibility of components. In due time, this effect disappears, and the product becomes fully clear and transparent. To avoid bubbles use professional mixers and no household mixers or drilling machines. However, make sure to avoid any bubbles in the product during mixing! When mixing is done by hand, place the product under vacuum (ca. 30 mBar) for a short period of time, after mixing.

Make sure not to exceed the gelation time indicated on the datasheet. Once gelation takes place, the viscosity increases, and further processing (casting, potting etc.) is severely hindered. Therefore, do not mix more material than can be processed. The gelation time is indicated for processing at ca 20 °C. The evolving reaction heat speeds up the reaction further. The reaction rate is influenced by the parameters of the casting process. At higher content to surface ratios of the casted product, the reaction is accelerated more. Thus, bulky devices take less time to fully react, than thin layers do. If processed within the gelation time, the product is free flowing and can be easily processed further, e.g. by pouring into a mould. Eventually the casted object has to be evacuated once more to eliminate remaining air.

After ca. 2 hours, the product can be gently moved and handled, provided special care is taken to avoid damage. After ca. 3 days, the reaction is complete, rendering the product its final strength. Only the completely reacted product complies with the table of finished product properties mentioned in the datasheet. Do not expose incompletely reacted product to exterior or damaging conditions.

Always make sure that the mould or the device is levelled horizontally. Because of the good flow properties of the polyurethane there is a big chance of the casting to overflow. And because of these good flow properties you have to be absolutely certain that there are no leaks in the mould or device, since the polyurethane flows through the smallest opening.

Also be careful with the humidity in the air, especially when using slow systems, the maximum is appr. 70% because then it is possible that the B component will react with the moisture in the air and then the finished product will be useless.

Which B component to be used
There are several different B components that can be used with the A components.
There is the PUR G, this is the standard B component for each A component, it is best used when using mixing/metering equipment.
Then there is the PUR H, this is the best product when mixing is done manually.

hich moulds to use
When the casting has to be done in a mould, for later release, then a mould made of PP (polypropylene) should be used. The surface has to be very smooth to prevent the material from sticking. Never use a mould made of silicones because of possible reaction between the mould and the polyurethane.

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Frequently Asked Questions (FAQ)

1. After curing there are bubbles on the surface, while the surface was smooth when I started?
This is due to the appearance of very small air bubbles which become bigger when the temperature is rising due to the reaction (exothermic).
To prevent this effect the mixed material should be more properly evacuated.

2. Is it possible to use the transparent polyurethane on wood?
Because of the fact that wood contains a lot of water it is not possible to use the polyurethane directly on wood. However, if you use a primer, such as water-based PUR-primer, then, after 24 hours, you can apply the polyurethane on it.

3. I want to make a big product, should I cast in several layers?
When casting a big product, you should always use the complete amount of polyurethane. When casting in small layers you have to wait until each layer is cured before casting a new layer, this is time consuming.
What can happen when you are casting in one layer is that there is some small shrinkage on the surface. This depends on how big the product is, the bigger the product the more exothermic reaction you will have and the more shrinkage at the end.
There are several product grades with increasing speed of reaction. For bigger products to cast, relative slow polyurethane systems are needed. Please contact us for further product advices

4. After curing there is a slight haze on the surface, what is this and how can I prevent it?
The product used was not fast enough, or the product was not mixed properly. Retry with a better mixed product, or with a faster curing product.

5. The cured product can come in to contact with several solvents, is this harmful for the polyurethane?
At the moment the solvent resistance of the polyurethanes is tested. However the polyurethane is resistant to regular water as well as to seawater.

6. On which materials does/doesn't stick the polyurethane?
In general polyurethane sticks on a polar surface, such as: glass, polystyrene or PET, if the surface is not too smooth. On a non-polar surface, like: PP, PE or EPDM-rubber, the adhesion is very poor. However every situation should be tested in advance, since all individual materials may vary.

7. Can I use the polyurethane as a coating on a vertical surface?
Our transparent polyurethanes are not suitable to use as a coating on vertical surfaces, due to its flow properties
8. The polyurethane reacts very slow, I would like to speed things up, is that possible?
If you think that your reaction time is too long, please contact us for product advice. You should then always say how much faster the reaction has to be, and how much polyurethane you use for one casting, including the dimensions of your mould/device. Then we can select a faster product for you to test.

9. Is it allowed to heat up the polyurethane?
Heating up the polyurethane components or the polyurethane mixture, before it is completely cured, is highly discouraged. By heating the polyurethane, the reaction goes out of control and very strange things can happen, such as the appearance of very large bubbles.

10. How to clean?
Uncured polyurethane can be removed using standard organic solvents.
Fully cured polyurethane is difficult to remove. Solvents have no effect, so therefore remove mechanically.
Finished products can be cleaned by rinsing with water and detergent. Try to avoid mechanical damage: use soft cloth.