

# Frequently Asked Questions

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## POLYURETHANE

### **Q. My polyurethane unit has air bubbles on the surface.**

A. When mixing the two components of a polyurethane together air may be introduced in to the mix, and may not have time to escape before curing. To solve this problem the polyurethane may be vacuumed before pouring in to the mould to pull all the mixed air out of the product. The material can also be vacuumed in the mould if the potlife permits.

Moisture also has the effect of producing gas bubbles within a polyurethane. This can be avoided by ensuring the mould is moisture free and the polyurethane is kept in sealed containers.

### **Q. The part B (isocyanate) component of my polyurethane system has got crystals and lumps in it.**

A. Isocyanates have a tendency to crystallise (freeze) at temperature below 20°C. If the isocyanate has been stored in temperature below 20°C for long periods of time it may start to crystallise. Heating the isocyanate to 60°C for 30 – 60 minutes can reverse the crystallisation. It is important to let the isocyanate cool down again before using it as the potlife of the system will be drastically reduced.

Isocyanates will react with moisture to form a gas and a crusty solid material. This reaction cannot be reversed, if solids remain after heating as above, then it is likely that reaction with moisture has occurred. In this case the part B should not be used.

### **Q. Can I pigment my polyurethane?**

A. You can pigment polyurethanes with liquid polyurethane pigments. These are added and mixed in with the part A component of the system in concentrations of 1 – 3% by weight. The natural colour of the cured polyurethane can vary from beige to water clear depending on the product, therefore it maybe difficult to get exact colour matches, contact Alchemie for colour matching details.

### **Q. Why is my polyurethane unit brittle?**

A. Brittle parts are often caused by low mould temperature. If the mould being used is cold (below 20°C), then under-cure might take place and the unit may have poor mechanical properties.

### **Q. Can your polyurethanes be used for food applications?**

A. No, because the cured polyurethane contains a small amount of free isocyanate monomer.

### **Q. Why has my polyurethane part delaminated?**

A. If several pours have been used to build up cast thickness it is important to ensure that a layer has not cured too much before the next layer is cast. Delamination can also occur if the original surface is greasy not allowing a successful bond.

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## **Q. Why is my part undersize?**

A. Polyurethanes cure by exothermic reaction, this is a build up of heat when the products have been mixed together. This increase in temperature causes the material to shrink however the shrinkage can be controlled in a number of different ways:

### **1. Keep to maximum thickness specification**

Each material has a specified maximum thickness before excessive shrinkage occurs. Please refer to the product technical data sheet.

### **2. Workshop / ambient temperature**

Higher workshop temperatures increase shrinkage. Ideal workshop temperature should be between below 25°C.

### **3. Minimise section thickness**

Thicker sections create more heat and so increase shrinkage. Try to build up the part in layers, or fill the material with specified powders, see the technical data sheet.

Use a core to minimise the volume of resin required.

### **4. Tool material**

The thermal conductivity of the tool material also affects shrinkage. Materials with high conductivity, like metal, take the heat away from the part and therefore reduce shrinkage.

Insulating materials, such as wood, tend to increase shrinkage and will also invite moisture resulting in a poor surface finish.

### **5. Use a filler powder**

The use of filler powders reduce the amount of resin required and therefore reduce the amount of heat generated during the cure.

Aluminium powder or Aluminium trihydroxide powder are very good fillers for fast cast resin.

## **Q. Why does my polyurethane part have soft spots on the surface?**

A. Soft spots are generally caused by un-reacted material, which is due to insufficient mixing or more common, is scraping the last liquid parts out of the mixing container in to the mould. The liquid on the inside edge of a mix container will not be fully mixed, therefore by scraping the last bits from a container you could be adding unmixed material to the mould.

## **Q. Why is my polyurethane part stuck in the mould?**

A. It is essential that you use a release agent before casting. The release agent should withstand the exothermic peak of the resin when curing. Sufficient layers of release should be used to ensure full coverage of the mould surface. As a rule a minimum of 3 coats should be applied.

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## FURTHER INFORMATION

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