

1) RTV Silicone rubbers for Mould-making

Mouldlife supplies a range of silicone rubbers for a variety of mould-making applications. Materials cast into our rubbers include:-

- Polyurethanes - fast-cast, filled/un-filled, elastomeric/rigid, foamed/un-foamed
- Epoxy resins - casting, laminating, gel-coats etc.
- Waxes, plaster and concrete
- Styrenic resins such as Polyesters

There are multiple reasons for choosing a silicone rubber, but whatever rubber is chosen, a key factor is the number of mouldings that can be made from the tool; this is usually termed the "Mould Life".

2) What happens as an RTV silicone degrades?

RTV silicone rubbers will degrade over time when used with almost all casting materials, although some of these materials are notably more aggressive to rubbers than others.

The exact factors that contribute to the degradation of silicone rubbers are not fully understood, but it is believed that the relative porosity of the rubber (at least on an atomic level) can allow 'migration' both:-

- into the mould surface (from the casting materials), and,
- from the mould surface (commonly the silicone fluids that contribute to the 'lubricity' of the mould).

Hence over time the rubber surface becomes embrittled and 'leathery' and does not release effectively; this results in the casting material beginning to adhere to the rubber surface.

Initially, this causes the casting material to become difficult to demould, which will affect surface finish, and eventually will cause the mould to tear.

3) How many moulds can I expect?

This is a very difficult question to answer, as many factors can have an influence:-

- Choice of rubber/choice of casting material
- Mould/part design, in particular the level of detail
- Casting techniques
- Mould treatment - reconditioning, length of time between casts, how the moulds are stored if not in use etc.
- Use of release agent and barrier coats

This document deals mainly with mould handling techniques and the use of release agents and barrier coats; more information on material choices, mould design and casting techniques can be discussed with your Mouldlife account manager

If a mould rubber is carefully chosen and treated well, and assuming a moderate level of detail, a typical silicone rubber mould may last as follows:-

- | | |
|----------------------------|------------------|
| - With epoxy resins | 30-50 mouldings |
| - With polyurethane resins | 20-40 mouldings |
| - With polyester resins | 30-50 mouldings |
| - With Plaster/Concrete | 40-100 mouldings |

4) How can I maximise mould life?

There are a number of techniques for extending mould-life.

Technique?	Steps?	Impact on mould life?
<p>“Reconditioning” The user can attempt to replace silicone fluid lost from the mould surface - this can help to maintain the ability of the mould to release the casting materials.</p>	<ol style="list-style-type: none"> 1. The silicone mould surface can be reconditioned by using a low viscosity silicone fluid (say under 200cps); this should be <u>rubbed or brushed into the surface</u> and left. 2. <u>Aerosol silicone release agents are also acceptable</u> for this technique, although it must be confirmed that the release is a low viscosity silicone oil. 3. When the mould is to be used again, any <u>excess should be removed</u> otherwise this may interfere with the moulding process. 	Moderate
<p>“Resting” Elements from the casting materials may migrate into the rubber surface and reduce mould life - these should be allowed to evaporate if possible.</p> <p>Moulds can also retain heat if the casting material is exothermic (generates heat during cure) and allowing the mould to cool also helps reduce surface damage.</p>	<ol style="list-style-type: none"> 1. Leave moulds open (if possible) for a time between castings 2. If possible, try and allow moulds to cool to room temperature between cycles. 	Small to moderate
<p>“Baking Out” Elements from the casting materials may migrate into the rubber surface and reduce mould life - heating the moulds can help to drive these from the mould surface</p>	<ol style="list-style-type: none"> 1. Periodically expose moulds (opened if possible to expose the moulding surfaces) to elevated temperatures. <ul style="list-style-type: none"> - 90°c for 6-8 hours (or overnight if not practical) - 120°c for 1-2 hours 2. Apply a reconditioning step following bake-out. 	Small to moderate
<p>Use of barrier-coats This is a quick-drying coating applied to the mould surface; unlike a release agent, this forms a barrier between the mould surface and the casting material, thus almost completely protecting the mould surface from damage.</p> <p>On casting, the barrier coat will bond to the surface of the resin. This coating provides an excellent surface for post-painting.</p> <p>Barrier-coats specifically designed to apply a permanent decorative finish to the cast part are known as in-mould coatings (IMCs)</p>	<ol style="list-style-type: none"> 1. Select an appropriate barrier coat (speak with your Mouldlife account manager for advise). 2. Apply using suitable spray equipment, covering as much of the mould surface as possible; allow to dry. 3. Continue casting as normal. 4. Following demould, remove any remaining barrier coat to prevent build-up 	Potentially significant