GM FOAM FACTS OF LIFE

PROCESSING

1. Flow Increaser works as a high rise agent. To make high volume batches, we do not use High Rise Foaming Agent with the new High Grade Latex. Rather, we add 2 to 4 grams Flow Increaser (per 150 gms High Grade Latex Base) to the bowl prior to whipping. This causes a greater frothing action, and the foam rises higher, and more quickly. For still higher batches, we also increase the Foaming Agent to as much as 35 gms per 150 gms High Grade Base. IMPORTANT NOTE: This increased frothing lets you turn down the speed of the mixer at an earlier time than the standard run. Care must be taken to not retard the gel by pouring the Gelling Agent when there is still too much ammonia in the mix. Also, when using more than 30 gms Foaming Agent, there is a retarding effect on the gelation, see #2 below.

2. The gelation mechanism works as follows: All of the latex in the bowl is covered with a thin layer of Foaming Agent (soap) at all times. This coating persists throughout all of the whipping and refining stages. Every cell is coated with this thin soapy layer. At the time the Gelling Agent is poured, there is no exposed latex. The first job of the Gelling Agent is to break down the soapy layer. When the soap has been broken down sufficiently, gelation begins. It stands to reason that if there is a thicker layer of soap on the cells, the gel time will be longer. So in **very hot conditions** where more working time is needed, we prefer not to cut the amount of Gelling Agent too low. Rather, we add extra Foaming Agent (up to 35 gms per 150 gms High Grade Latex Base) for protection against gelling, and we pour the Gelling Agent sooner that the standard instructions. This gives a much better result than cutting the Gelling Agent down to less than 10 or 11 gms per 150 gms High Grade Base. In **cold conditions**, one may feel free to add more Gelling Agent to speed the gelation--up to 20 gms per 150 gms High Grade Latex Base, as well as adding time to the refining stage.

3. Pigment is added to the bowl mixture, not to the Gelling Agent. It would be nice to use the colorants as tracers in the Gelling Agent, but unfortunately our pigments and our Gelling Agent do not mix. The product of mixing the two is a thick gelatinous mass, which will not disperse properly. We add our pigments to the bowl mixture before or during whipping. When it is eventually time to pour the Gelling Agent, the observant user can see that the Gelling Agent causes a lighter color in the foam. We know this is not as effective as a color tracer in the Gelling Agent, but the conscientious user should be thorough with the gel mixing, irrespective of color. If we ever discover a way to make the pigments miscible with the Gelling Agent, we will make an announcement.

4. Foam can be made very dense and tough, if desired. This is accomplished by whipping to a lower volume. When doing this, one will need to add some time to the refing stage so as to compensate for less ammonia loss during the short whip cycle.

5. High rise foam shrinks less than low rise foam. All foam is a combination of foam ingredients and air. The foam ingredients include solids and water. In high rise foam, there is a greater proportion of air, and a lesser proportion of foam ingredients. This also means that there is a lesser proportion of water. The loss of water is what causes shrinkage, so less water loss will cause less shrinkage. In low rise foams, there is a lower proportion of air, and a greater proportion of foam ingredients (and greater proportion of water). This causes more shrinkage.

We have found that higher rise batches can be almost free from shrinkage. Firstly, the foam itself shrinks very little. Secondly, in the application, the foam is so soft and supple, it stretches without exerting much force. The very act of applying the piece usually stretches the foam sufficiently to behave as if there were 0% shrinkage.

An added factor in the shrinkage of foam is the mold material. A porous mold will cause foam to shrink less than a non-porous mold. Porous molds absorb part of the water in the foam, allowing there to be less water available for shrinkage. Non-porous molds will not absorb any of the water. We also feel that non-porous molds may cause a greater smelliness in the foam for the same absorbency reasons. This of course goes away when the pieces are washed.

FILLING MOLDS

1. Open Pour Method

We prefer to use a foam injector, even when open-filling molds. This protects the foam from contact with the air, so it doesn't skin over while you are working with it.

Molds are lined up with all the positives and negatives placed in the same configuration. Since we are right handed, we use the negative on the left with the positive on the right--opened like a book. When the negative has been filled, the positive is closed bookwise onto the negative, slowly lowered to let excess foam bleed out, then when contact is made, pressed firmly for five seconds, or strapped.

To fill, we shoot a thick swath of foam across the top edge of the negative sculpted area. We then pick up the negative and tilt it, so the foam flows down the entire sculpted area. It may take a couple of firm shakes to make the foam cover the entire area. As the foam flows downward, it tends to make a thin coating, and any air bubbles in the mix will become visible. They are popped with a wooden stick before the positives are closed onto the foam. Remember to let the positives gently settle onto the negatives. Excess foam must be allowed to vent. This creates less internal pressure, and allows less resistance between positive and negative, making thinner edges.

2. Injection, Unstrapped

If a two-piece mold is to be injected, it is convenient to fill by injection, and let the mold halves separate from the filling pressure. This allows flow over the surfaces and tends to flush out stray air bubbles. Once excess foam is seen venting out the edges of the mold, the injector is removed, and the two mold halves are presses together or strapped. When filling this way, have the negative piece on the bottom, with its sculpted interior facing upwards.

3. Injection, Strapped

Multi-piece molds usually need to be assembled prior to filling. Try to have the injection port open at a thick part of the sculpture. Have the attitude of the mold adjusted so the foam enters at the bottom of the cavity, and exits at the top. This only applies to the attitude of the fill--not necessarily having the sculpture right-side-up. We usually have air vent holes of 1/8" diameter drilled into the positive near the perimeter of the sculpture, staying well clear of the cutting edges, and turn the mold so that these holes will be at the top, when filling. Foam should enter the bottom of the cavity, and move upwards, expelling air at the top as it goes.

CURING

1. The cure "window" is larger at lower temperatures. At 185° F, foam may take 3-hours to cure, but at 4-hours, it could be overcured. This overcured foam loses tear strength, and in extreme cases, becomes crumbly.

   The same foam, cured at 165° F, may take 5-hours to cure, but even if cured for 7-hours, would still be fine. In other words, a low temperature cure could have a three hour window, where the cured foam would be usable. A 200°F cure may only have a 20-minute window where the foam is usable.

2. **Steam lakes** are areas of foam that have been pushed away from the mold surface by pockets of steam, then cured into that incorrect shape. These areas have all the detail of the sculpture, but they are depressed and too dense. This is a hazard in non-porous molds, such as epoxical and fiberglass. It is a problem that can be remedied.

   The first step is mold preparation. Non-porous surfaces are to be coated with a thin solution of paste wax (such as Johnson's wax for floors) that has been cut with 99% alcohol. This resulting "alcowax" should be very thin and "watery." Paint it into the inside of the mold, do not allow to pool, and when dry, brush it out with a dry brush. The mold surface will become polished and shiny. More importantly, the mold surface will be sealed from outgassing, which we feel causes sites for steam laking to begin.

   Secondly, cure at a lower temperature (for a longer time). We often use 165° F for 5-7 hours for this kind of mold.

   Despite these efforts, some molds (usually fiberglass) continue to be difficult. A final solution is to cure a skin of foam into the open mold, prior to filling completely. First, mix a small batch of foam that will be roughly enough to cover the inside of the negative. When it is ready, brush this foam into the negative, keeping the foam about 1/8-1/4" thick everywhere. Stay away from the edges. After the foam gels, put the mold pieces into the oven OPEN, and cure at a very low temperature. We have had to go as low as 125° F for 10-hours. Next, cool the mold, and fill with foam in the usual way, whether by closing and shooting, or by open pouring then closing. Cure this larger batch also at a low temperature--around 165° F--so that it won't overcure the skin that is already inside. If the skin is a little undercured, that is acceptable. The volatile Curing Agent will make plenty of fumes that will permeate the skin and cure it.

   Do not worry about the interface of the two layers of foam--the bond will be intimate. Do be careful to have a smooth interior that is free from areas which catch air bubbles when the bulk of the foam is filled.

   This method takes a lot of extra time, but it is worth it, when no other method will give satisfactory results.

3. Sometimes it is useful to have a rubber skin prepainted into the mold. This gives extra strength to areas of chafing, like the soles of feet. High Grade Foam Latex Base is simply painted into the mold where needed, and allowed to dry before filling with foam. No Curing Agent needs to be added to the Base; volatile Curing Agent fumes will cure this skin along with the foam.