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Ingredients for Art

Warehouse and Store: 1023 Factory St. Richmond, CA 94801
Store: 730 Bryant St. San Francisco, CA 94107
Ph.: (510)235-8411 Fax: (510)235-4211
WWW.DOUGLASANDSTURGESS.COM

Polyurethane Foam

Polyurethane foams consist of 2 liquids; an isocyanate and a blowing agent and when these materials are mixed in the appropriate ratio they will produce either rigid or flexible foams of various densities. There are certain guidelines that need to be met in order for these systems to set and cure properly. Mainly the components need to be measured accurately and mixed thoroughly for consistency from batch to batch.

Foam Type	Mix Ratio (A:B)	CreamTime-sec.	Rise Time-sec.	Tack Free Time-sec.	Nominal Density
3 lb. Rigid	50:50 By Volume	20-50	120-240	120-240	3 lb./Cubic Ft.
5 lb. Flexible	3:1 By Weight (B:A)	30	120	140	5 lb./Cubic Ft.

The 3 lb. Rigid is a rigid, closed cell foam, while the 5 lb Flexible is a flexible, open celled foam. The rigid foam may be used for floatation and insulation and also find use for casting a wide variety of items for various applications from architectural embellishments to taxidermy forms and simple mother molds for flexible rubber molds. The flexible foam finds use for making flexible toys, pads, cushions and novelty items, and may be cast into an existing latex skin to achieve a skin effect.

Hand Mixing Instructions: Add "A" component in the proper amount to a clean, dry pail. Measure "B" component in a separate container, being sure to exclude moisture which may cause premature foaming and contamination. Combine components. It is best to mix with a high speed mixer (3500 RPM or more- a drill attachment mixer is recommended) until the mixture looks like cream, then begin pouring into mold. If additional pour time is needed, mix so that you have no more than 5 seconds left in cream time (see chart above) before beginning to pour foam. Wait 15 minutes to add more material on top of fresh foam if necessary, and wait at least 60 minutes to demold. Material will be fully cured in 24 hours. These times are offered as a guide and will vary depending on ambient temperature, volume of the pour and relative humidity. It is recommended that the foam not be used at temperatures less than 65 degrees nor more than 90 degrees F. It is imperative that the given mix ratios be adhered to in order to achieve optimum foaming characteristics and physical properties of the cured foam. If adding colorant to the foam, it is recommended that the "B" component be colored before adding to the "A" component.

Safe Use of Polyurethane Foams: The most serious safety issues associated with the use of polyurethane foam concerns respiratory allergenic sensitization. This can occur when personnel are exposed to relatively high concentrations of the vapor evolved from the polymeric isocyanates which are part of the foam system. Generally, if the foam is used at room temperature and is not being sprayed, the chance of producing enough vapor concentration to cause the possibility of allergenic sensitization is minimal. It is recommended that the work space be ventilated well, especially while the foam is actually reacting. It is also recommended that personnel using these foams wear gloves, aprons and goggles to

avoid splashing the foam components onto the skin or into the eyes. Aside from sensitization, the principal hazard in handling polymeric isocyanates as liquids at room temperature is potential irritation to the skin and eyes. In humans, toxic effects from inhalation of polymeric isocyanate vapors range from mild irritation of the mucous membranes to tightness of the chest, irritation of the respiratory tract, coughing, headache and shortness of breath. Again, if ventilation is maintained, and the worker is prevented from splashing components onto the skin or clothing, the possibility of encountering any of these afflictions is minimal.

If you, or anyone who might be working with polyurethane foams has a history of allergenic or respiratory reactions, those persons should be kept from using these materials.

In summary:

1. Mechanical ventilation should be provided in immediate use areas.

2. Personnel should be provided with goggles, rubber gloves, and protective clothing to avoid contact with skin and eyes.

3. Containers of foam components should be covered when not in use.

4. If even a small amount of polymeric isocyanate ("A" component) enters the eyes, it should be removed immediately by irrigation with large amounts of water. Flushing for a minimum of 15 minutes at an eye bath or with a gentle stream of water from a hose or faucet is recommended. The eyelids should be held apart during irrigation. That person should then seek the attention of a physician.

If these guidelines are followed, there is little chance of sensitization, especially if the foam is not being sprayed. If use of the foam is minimal, it may be a good idea to pour the foam in an open garage or outside (preferably out of the sun) and move away from the foam while it is reacting. Once the foam has set, it is relatively inert and will only cause mechanical irritation of the mucous membranes if abraded and the dust is inhaled or gets into the eyes. If the foam is being sanded it is recommended that you wear goggles and a dust mask for nuisance dusts.

<u>Mold Release Agents</u>: It is necessary that when pouring polyurethane foams into molds that those molds be non-porous. For plaster or wooden molds, it is best if they are sealed with either shellac or polyester resin. Once the mold is sealed, a mold release agent must be used because polyurethane foams are very tenacious and will adhere to most surfaces. In general waxes make the best release agents for polyurethane foams, and we suggest the use of our RA-7310 or if a paste wax is preferred, Finish Kare 333MR. Silicone type release agents should not be used unless specifically formulated for use with foams because they may have a tendency to change the structure of the foam. For a guide giving the various release agents for all of the possible mold surfaces, please see our catalog number two pages 21 and 22.

<u>"Packing" the Foam</u>: It is possible to increase the nominal density of the foam by "packing" the foam into a closed mold. In other words, if you pour more foam than is required to fill the volume of that mold and completely seal the mold once it has been filled, when the foam rises, it will in essence increase the overall density of the foam contained therein. To do this consistently, a little practice is recommended in order to achieve the desired effect. But if done properly, one can use a three pound density foam for example and increase the density to four pounds per cubic foot and get a nice tough "skin" on the surface of the foam.

"The information and data contained herein are based on information we believe reliable. Each user of the material should test any application and independently conclude satisfactory performance before commercializing."