

AP 74-Series Polyurethane Rubbers

Technical Bulletin

DESCRIPTION: AP 74-Series Polyurethane Rubbers consist of two parts (A and B), which, after mixing, cure at room temperature to flexible, high-strength, mold rubbers. AP 74-Series Rubbers make durable, easy-releasing molds for casting plasters and waxes without release agents. When AP 74-Series molds are properly prepared, they are also excellent for casting concrete and various resins, such as epoxy, polyester, polyurethane and acrylic.

BEFORE USE: Thoroughly read Safety Data Sheets, product labels and the "SAFETY" section in this Technical Bulletin.

MODEL PREPARATION: Porous models, such as wood, plaster, stone, pottery or masonry must be sealed. Multiple coats of paste wax dried and buffed will seal most surfaces. Potters soap can be used as a sealer for plaster. Lacquer, paint, PVA, and AP 2550 Release Agent also work well as sealers for many surfaces. The properly-sealed model should then be coated with a release agent (e.g., AP 2550 Release Agent). Alternatively, a sealer and semi-permanent release agent, can be used on most porous or non-porous models. Porous models must be vented from beneath to prevent trapped air from forming bubbles in the rubber.

Models made of sulfur-containing modeling clay (e.g., Roma Plastilina) should be sealed with shellac. [CAUTION: When shellac is used as the sealer, it must be thoroughly coated with release agent because polyurethane rubbers bond tenaciously to shellac.]

Non-porous models (e.g., metals, plasticine, wax, glazed ceramics, fiberglass and polyurethanes) should be coated with release agent such as AP 2550 Release Agent.

PRODUCT LINE FEATURES

- Make durable, long-lasting molds owing to strength and elongation properties of cured rubber
- Pourable polyurethane rubbers that cure to soft to mid-range hardnesses
- Easily thickened for brush-on applications
- No release agents needed when casting many plasters, waxes and concretes
- Low-viscosity polyurethane rubbers capture detail from intricate masters

If there is any question about the compatibility between the liquid mold rubber and the prepared model surface, perform a test cure on an identical surface to determine that complete curing and good release are obtained.

MIXING AND CURING: Before use, be sure that Parts A and B are at room temperature and that all tools are ready. Surface and air temperatures should be above 60°F during application and for the entire curing period.

Check mix ratio. Several AP 74-Series Part Bs require stirring before use (i.e., 74-20, 74-29, 74-30 and 74-40). Weigh Part B into a clean metal or plastic mixing container and then weigh the appropriate amount of Part A into the same container. Mix thoroughly. Hand mixing with a Paddle is best to avoid mixing air into the rubber. While mixing,

PHYSICAL PROPERTIES

Product	74-20	74-24	74-29	74-30	74-30 Clear	74-30 HT	74-40	74-41	74-44	74-45	74-55
Mix Ratio By Weight	1A:2B	1A:1B	1A:1B	1A:1B	1A:1B	1A:1B	2A:1B	1A:1B	2A:1B	1A:1B	4A:1B
Shore Hardness	A20	A25	A30	A30	A30	A30	A40	A40	A45	A45	A55
Pour Time	20 min.	20 min.	30 min.	25-30 min.	25-30 min.	25-30 min.	20 min.	20 min.	20 min.	30 min.	15 min.
Demold Time @ 73°F	16 hr.	16 hr.	16 hr.	16 hr.	16 hr.	16 hr.	16 hr.	16 hr.	16 hr.	16 hr.	16 hr.
Cured Color	Yellow	Amber	Black	Amber/Varies	Transparent Amber	Amber/Varies	Varies	Amber/Varies	Gray	Yellow	Amber
Mixed Viscosity (cP)	800	2,000	2,800	2,000	2,000	2,000	3,400	2,000	3,500	2,000	4,000
Specific Volume (in ³ /lb)	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5
Specific Gravity	1.01	1.01	1.02	1.01	1.01	1.01	1.01	1.01	1.01	1.02	1.01
Elongation (%)	1,060	750	1,600	506	507	975	400	1,060	2,422	1,135	894
Tensile Strength (psi)	217	220	520	281	281	304	349	360	462	408	679
Die C Tear Strength (pli)	43	55	109	62	62	70	95	77	129	82	155

scrape the sides and bottom several times to ensure thorough mixing. Pour the rubber as soon after mixing as possible for best flow and air bubble release. Vacuum degassing helps to provide bubble-free molds, but is usually not necessary.

Allow rubber to cure at room temperature, 77°F (25°C). Carefully demold after approximately 16 hours. Final cure properties are obtained in about seven days, but molds may be used with care after curing for 24-48 hours. Heat accelerates the cure -- low temperatures slow the cure. Avoid curing in areas where the temperature is below 60°F (15°C).

Both Parts A and B react with atmospheric moisture and, therefore, should be resealed or used up as soon as possible after opening. Before resealing, Poly Purge, a heavier-than-air, dry gas, can be sprayed into open containers to displace moist air and extend storage life. For 55-gallon drums of Parts A and B, affix Drierite® cartridges on the small bung during dispensing to protect product from moist air entering the drum.

SOFTENING THE RUBBER: Add Poly 74/75 Part C Softener to 74-Series products for a lower viscosity mix and a softer cured rubber. When Part C is used, cure time is longer and there is some loss of strength in the rubber and increased tendency to shrink after repeated castings. To soften Poly 74-30 to Shore A15, mix 1A:1B:1C by weight. The quantity of Part C required to soften other products varies and should be determined through experimentation.

ACCELERATING THE CURE: Cure time can be shortened with the addition of an Accelerator, such as Poly 74/75 Part X, or by adding heat. Part X is most useful when making brush-on molds to decrease the time needed between coats. By adding 3% Part X (by weight of the total mix) to 74-30 or 74-29, the working time is reduced to approximately 8 minutes -- in the time it takes to mix the next batch, the previous layer gels enough to apply the next coat. Demolding is possible in as little as 4 hours after the final layer is applied. Rapid curing with Part X allows a shell or mother mold to be made in the same day. Exercise caution when using Part X for poured molds since the rapid onset of gelling may trap air bubbles on or near the surface of the master. Heat also accelerates the cure. It is recommended not to exceed 140°F (60°C).

THICKENING FOR BRUSH-ON: Add Poly Fiber II or Fumed Silica to mixed Parts A and B to thicken the liquid mix to a gel for application by brush or trowel.

USING THE MOLD: Typically, no release agent is necessary when casting plaster or wax in AP 74-Series molds. For casting plaster: sponge, dip or spray the mold with Pol-Ease® Mold Rinse and then pour plaster on the wet mold to reduce air bubbles in the plaster and aid release. For casting resin, first spray the mold with AP 2550 Release Agent. For casting concrete, use a form release, such as Pol-Ease® 2650 or 2601. Avoid solvent-containing releases since they can cause mold distortion (i.e., shrinkage or swelling).

After repeated casting with certain resins, plaster and concrete, molds may shrink slightly since these materials extract oils from the mold. The proper selection of release agent and/or barrier coat can minimize this effect. If shrinkage becomes evident, a light application of Pol-Ease® Mold Dressing can help to restore the mold to its original dimensions.

AP 74-Series molds last many years if stored undistorted on a flat, non-porous surface in a cool, dry location out of direct sunlight. If occasional outdoor use is required, add 0.5% UV Additive to the total mix weight to reduce the characteristic surface degradation caused by sunlight. Never store AP 74-Series molds outside as UV exposure will eventually degrade the rubber.

CLEAN UP: Wipe tools clean before the rubber cures. Denatured ethanol is a good cleaning solvent, but is highly flammable and must be handled with caution. Coat work surfaces with wax, AP 2550 Release Agent or PolyCoat so that cured rubber can be easily removed.

SAFETY: Before use, thoroughly read Safety Data Sheets and product labels. Follow safety precautions and directions.

Part A: Keep out of reach of children. Avoid breathing fumes, vapors, or mists. Use with adequate general or local exhaust ventilation to minimize exposure levels. If needed, a NIOSH-approved respirator with organic vapor cartridge may be used. If inhaled, remove victim to fresh air and keep at rest in a position comfortable for breathing. Wear impervious gloves, such as butyl rubber or nitrile rubber. Wash thoroughly with soap and water after handling. Take off contaminated clothing and wash before reuse. If skin irritation or rash occurs, get medical help. Wear eye protection, such as chemical safety glasses/goggles. If in eyes, rinse cautiously with water for several minutes, removing contact lenses if present and easy to do. If eye irritation occurs, get medical help.

Part B: Keep out of reach of children. Do not breathe fumes, vapors, or mists. Use with adequate general or local exhaust ventilation to minimize exposure levels. If needed, a NIOSH-approved respirator with organic vapor cartridge may be used. If inhaled, remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical advice if you feel unwell. Wear impervious gloves, such as butyl rubber or nitrile rubber. Wash thoroughly with soap and water after handling. If skin irritation occurs, get medical help. Wear eye protection, such as chemical safety glasses/goggles. If in eyes, rinse cautiously with water for several minutes, removing contact lenses if present and easy to do. If eye irritation occurs, get medical help. If spilled, collect spillage and avoid release to the environment.

SHELF LIFE: For best results, store products in unopened containers at room temperature (60-90°F/15-32°C). Use products within six months. Part Bs darken with age, but product performance is not affected.

DISCLAIMER: The information in this bulletin and otherwise provided is considered accurate. However, no warranty is expressed or implied regarding the accuracy of the data, the results to be obtained by the use thereof, or that any such use will not infringe any patent. Before using, the user shall determine the suitability of the product for the intended use and user assumes all risk and liability whatsoever in connection therewith.