Product Data

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DESCRIPTION/APPLICATION
HK RESEARCH GEL COATS

DESCRIPTION

Polyester gel coats are especially formulated, pigmented polyester resins that are designed for use as protective and decorative coatings for molded products. HK Research produced gel coats are designed to reproduce exactly the mold surface to which they are applied. Subsequent laminating or pouring of marble matrix then causes the gel coat to become an integral part of the molded product and provides a continuous clear/colored surface for the molded product without any further finishing operations.

Since the properties of polyester gel coats are highly dependent on the base polyester resin as well as the specific gel coat formulation, HK Research gel coats are available in either "A Series" Isophthalic polyester based, or "G Series" NPG-Isophthalic resin based systems. The choice between these two systems is one of user preference and resultant properties. The "A Series" are based on a premium Isophthalic resin system that reaches or exceeds most plumbing ware and general purpose application requirements. The "G Series" gel coats are based on an NPG-Isophthalic resin system and are formulated to provide excellent blister and weather resistance. Clear cultured marble gel coats based on this resin system are noted for their clarity, hardness and extremely high hydro-thermal shock resistance. The unique physical properties of the clear cultured marble gel coats are derived from its 100% NPG-Isophthalic resin system.

APPLICATION - MOLD PREPARATION

The finished appearance of cultured marble and/or fiberglass reinforced plastic parts is determined to a great extent by the surface condition of the mold from which the part is taken. The mold surface must be very carefully prepared in order to assure adequate release of the finished part and the best possible surface appearance.

The mold manufacturer will generally recommend a "break-in" procedure to assure adequate release of the polyester parts. A good general procedure for providing for adequate release and appearance after the mold surface has been properly prepared through appropriate "dry and wet" sanding and buffing with a FRP-type buffing compound and properly sealed is as follows:

I. Using a high carnauba wax content release agent designed for the FRP industry and clean "cheese cloth or white" rags, apply the first coat of wax and polish vertically using strokes (and elbow grease) sufficient to generate enough frictional heat and pressure to fuse and give even flow-out of the wax film. The finished appearance should be "glossy" and without streaks.

II. Allow the first coat of wax to harden for a minimum of four hours and then apply a second coat horizontally or in the opposite direction of the first coat using the same care and polishing to a high luster with no streaks.

III. After allowing the second coat of wax to cure a minimum of four hours, apply a third coat of wax with diagonal strokes. Using short strokes and appropriate care, polish thoroughly to a high gloss without streaks.

IV. After allowing the waxed mold to set for at least four hours to permit the complete evaporation of the solvent contained in the wax, the entire surface should be "hand-wiped" with a "white cloth" or cheese cloth to remove any dust and dirt. It is not recommended to use a mechanical buffer at this point for the final polishing, as the tool may burn through the waxed surface of the mold and cause wax deficient areas.

V. A PVA parting film may be used at this point to assure adequate release of the finished part from the mold. Although not necessary 100% of the time, it is a good safety factor to assure adequate release of the molded part from the mold.

After the initial part is "pulled" from the mold, steps II through V of the above procedure for wax application should be followed for the first three molded parts.

Rewax the mold following steps III and IV after the third part or when the parts are no longer easily demolded.

Over a period of time the wax surface may become hazy which indicates that there is a wax poly-styrene surface film present, and this film must be removed prior to rewaxing and continuing to mold cultured marble or FRP parts. The wax poly-styrene film can readily be removed via the use of Toluene or styrene monomer. Once the wax poly-styrene film has been removed the mold surface should be wiped dry and the waxing procedure should be done again.

Caution should be taken during all stages of this procedure to eliminate any possible source of ignition. Both the waxes and cleaning compounds described herein, generally are flammable materials.

APPLICATION - CATALYZATION OF GEL COAT

The standard HK Research gel coats are designed to be used with a good quality methyl ethyl ketone peroxide catalyst (9% active oxygen). At the recommended 2% by weight concentration, the gel coats generally will give a proper film cure in 45 minutes at ambient room temperatures of 75 to 80°F. Generally it is not recommended that concentrations less than 1.7% nor more than 2.5% be used since they may be detrimental to the long term physical
properties of the gel coat film.

The following table illustrates the various methyl ethyl ketone peroxide concentrations for various volumetric units of gel coat:

Gel Coat Volume		**Methyl Ethyl Ketone Peroxide Concentration**					
		1.5%		**2.0%**		**2.5%**	
		cc	fl. oz.	cc	fl. oz.	cc	fl. oz.
1pt.	16 oz	8	1/4	10	3/8	12	1/2
1qt.	32 oz	17	5/8	23	3/4	8	1
2qt.	64 oz	34	1 1/8	45	1 1/2	57	1 7/8
1gal.	128 oz	68	2 1/4	91	3	113	3 7/8

APPLICATION - SPRAY

. HK Research gel coats can be sprayed with conventional air atomized pressure pot systems equipped with a relatively large orifice. The following is typical of the systems that have been successfully used:

1. Binks 18 gun with a #63B fluid nozzle, a 63PB air nozzle and a 63A needle.
2. Devilbiss JGA or MBC gun with an AV-601-E fluid nozzle, AV-1239-704 air nozzle and JGA-402E needle.

These guns can be used with either a one or two quart pressure pot, or pressure tanks. Generally, 30-35 psi of pot pressure is required to deliver the gel coat to the spray nozzle and 40-50 psi is required on a 5 or a 10 gallon tank depending on the hose length. The atomizing air pressure should be set at 60-90 psi. The fluid supply valve should be set so that the desired delivery rate is obtained, and then open the atomizing valve far enough to break up the liquid stream into a very fine spray. If the gun sputters or spits, gradually close the fluid supply valve until the spray pattern is even. When applying the gel coat by air- atomized spray, spray the gel coat evenly onto the prepared mold surface to a thickness of 15-25 mils, using 3-4 passes with a steady even movement of the gun while holding the gun 18-24 inches (perpendicular) from the mold surface. When finished, it is necessary to immediately clean out the pot gun and the gun itself with a solvent such as acetone. Be sure that the equipment is free of solvent and moisture before adding the next batch of gel coat.

Typical of the many types of the airless and air-assisted airless equipment available we suggest the following as examples:

1. Binks "Maverick" airless system.
2. Binks 118AC air-assisted airless system.

Many other fine systems are available in the market place which can be utilized and will do the job properly. The advantages of the airless or air-assisted airless systems are that they minimize the "overspray" which reduces the loss of gel coat in the exhaust system and, in general, keeps the immediate environment around the mold cleaner. Since the catalyst is injected externally, a pot life is not a limiting factor with airless or air-assisted spray equipment.

These systems generally will supply catalyst to the gel coat stream through the utilization of a pressure pot and/or a "slave pump". In either case it is essential that the catalyst concentration be monitored on a regular basis, i.e. once a day.

Since pump configurations and ratios vary greatly, it is difficult to recommend a starting point for fluid pressure for the fluid pressure pump. In general, however, the fluid pump pressure should be progressively adjusted upward until the "fan" emitted from the nozzle is uniform over the entire spray pattern. When "tails" are noted on either end of the spray pattern, the pressure needs to be increased. If the spray pattern has a thick section towards the center the fluid pump pressure needs to be decreased. When a satisfactory spray pattern is obtained it then is a good time to calibrate the equipment. It is recommended that a 30 second sample be taken from the gel coat nozzle and likewise from the catalyst nozzle.

In the case of the air-assisted airless where air atomization is used to assist the airless pump and spray tip as well as "break up" the catalyst, it generally requires a minimum of 25 psi and frequently 40-50 psi to accomplish adequate catalyst break up. The air pressure required will vary from piece of equipment to piece of equipment but can be determined by visually inspecting the atomized catalyst stream alone. The catalyst, when sprayed alone and atomized, should be emitted as a very fine mist with no droplets falling from the spray pattern. The fine catalyst mist assures adequate mixing within the gel coat stream and minimizes porosity and non-uniform cure.

With either air-assisted airless or airless systems, it is necessary to apply the gel coat in multiple passes of 3-7 mils per pass. To allow for adequate mixing of the catalyst and gel coat streams as well as to allow adequate break up of the gel coat itself, the gel coat should be applied from a minimum distance of 24 inches from the mold and with the gun as nearly perpendicular to the mold as possible. After a film thickness of 20-25 mils has been attained, the gel coat should be allowed to cure for a minimum of 45 minutes prior to further processing.

The various spray systems have advantages and disadvantages in particular applications. Regardless of the system used, it is essential that they be maintained in "tip top" condition. Special attention to the spray nozzles, their cleanliness and normal "wear" should be made. The high pressure airless tips can and do wear, causing a poor spray pattern. These tips should be replaced as soon as a poor spray pattern is noted.

Application of polyester gel coats requires techniques which are learned from practical experience (or watching someone who knows how) and are very difficult to learn from the written word. A spray gun operator should be trained to visually recognize what a well atomized spray pattern should look like and how to maintain that spray pattern. The pressures suggested are only a starting point since they are highly dependent on the length of the lines involved as well as the size of the nozzles used in the gun and will vary from one piece of equipment to another.

MIXING

Prior to removal from the shipping container and catalyzation, it is recommended that the materials be mixed thoroughly to reincorporate any "settled" or "stratified" material. It is further recommended that the material in the shipping container be mixed at least once a week during its use period. This mixing procedure would assure the most uniform properties during application of the gel coat. Mechanical mixing is recommended and should be sufficient to "turn" the material 10 times. Most common gel coat mixing equipment will accomplish an adequate blend in less than 1/2 hour.

DO NOT MIX MATERIAL CONTINUOUSLY!---As this may cause loss of thixotropic properties. If the gel coat is inadvertently over-mixed, hold material for 4 hours without agitation before application.