

# Product Data



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## **B-1810 CLEAR VINYLESTER HYBRID TOOLING GEL COAT**

HK Research Corporation's Tooling Gel Coats are designed to provide the hard, durable, high-gloss surface required in a superior grade polyester tool. The toughness and chemical resistance of these tooling gel coats will develop within 24-48 hours after lamination and removal from the master or plug. This rapid development of physical properties allows the mold builder to develop the high-gloss, mirror-like finish required in polyester molds.

B-1810 Clear Vinylester Hybrid Tooling Gel Coat is especially formulated to increase this toughness and chemical resistance so as to produce a longer lasting mold surface that resists hazing and crazing.

B-1810 is formulated for spray application with standard cup or pressure pot spray equipment. B-1810 is also formulated for use with metallic fillers such as aluminum powders to make a metal-filled tooling gel coat. Several different aluminum pigments can be used. Two that we have evaluated that have given satisfactory results are as follows:

- 1) AL-101 Aluminum Powder  
Atlantic Equipment Engineers  
13 Foster St., P.O. Box 181  
Bergenfield, NJ 07621  
(201)384-5602
  
- 2) MD-2000 Aluminum Pigment  
Alcan-Toyo America  
1717 N. Naper Blvd., Suite 201  
Naperville, IL 60540  
(708)505-2160

A suggested starting formula for making a metal-filled tooling gel coat could be as follows:

B-1810 Clear	75-80 Parts by Weight
Aluminum Powder	20-25 Parts by Weight

The aluminum powder should be added gradually to the clear gel coat while mixing and mixing continued until a smooth gel coat mixture is obtained.

Some metallic pigments have a tendency to shorten the stability or shelf life of a reactive gel coat product such as B-1800 Clear Tooling Gel Coat. For this reason, we recommend that you mix the clear gel coat and the metallic pigment prior to each application. If you should want to carry over some unused material we suggest that it be kept in a tightly sealed container in a cool environment. Mix the material thoroughly before each use.

#### **TYPICAL PROPERTIES OF UNCATALYZED GEL COAT**

Weight Per Gallon, 77°F	8.9 lbs.
Specific Gravity, 77°F	1.1
Viscosity, Brookfield, 77°F	
6 rpm	12,000 cps
60 rpm	2,300 cps
Thixotropic Index	5.3
Shelf Life, 77°F	
Uncatalyzed	3 months minimum
Catalyzed, 2% MEKP*	16-20 minutes

#### **TYPICAL GEL AND CURE PROPERTIES @ 77°F**

Catalyst*	2.0%
Gel Time, 100 Gram Mass	16-20 minutes
Gel Time, 20 mil Film	25-35 minutes
Cure to Laminate Time	60-80 minutes
Barcol Hardness, Cured Film - 48 hours after catalyzation	45-50

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\*NORAC MEKP-925H

## TYPICAL PHYSICAL PROPERTIES

(Clear 1/8" Casting)

Barcol Hardness	40-45
Flexural Strength	18,000-20,000 PSI
Flexural Modulus	5.5-5.6 X 10 <sup>5</sup> PSI
Tensile Strength	9,000-10,000 PSI
Elongation at Break	2-3%
Heat Distortion Temperature	120°C

## APPLICATION

HK Research Tooling Gel Coats are pre-promoted and thixotropic as supplied. These gel coats should be applied only on properly prepared surfaces. All experienced mold makers understand that care in the preparation of the plug or pattern is essential to producing a good mold. We suggest that the gel coats be applied in multiple passes of the spray gun in order to slowly build up the desired thickness. It is recommended that only 3-5 mils be applied with the initial passes of the spray gun. The "several passes" technique will keep air entrapment at a minimum and result in a "pin hole and porosity free" film. A film thickness of 20-25 mils should be applied in order to obtain maximum mold life. HK Research Tooling Gel Coats are formulated to provide a rapid gel and cure time at a nominal 2% MEKP. Vinylester resins do require special catalyst systems to avoid gassing and pinholing of the gel coat surface. Our experience has shown that a "low water/low hydrogen peroxide catalyst" such as NORAC MEKP-925H or LUPERSOL DHD-9 will provide the optimum in pinholing resistance. Our tests have also shown that the NORAC MEKP-925H offers faster gel times than does the LUPERSOL DHD-9 on a given gel coat, but the cure rates of the two systems are similar. Typical gel times of B-1810 with these two catalysts are shown below:

2% NORAC MEKP-925H @ 77°F.	16-20 minutes
2% LUPERSOL DHD-9 @ 77°F.	25-30 minutes

It is essential that the mold temperature and ambient air temperature, as well as the material temperature, be within a temperature range of 65°F to 80°F for best results. Further assistance with particular problems and/or applications can be obtained from the HK Research Corporation Technical Service Laboratories at 1-800-334-5975.

It is suggested that the catalyst concentration used in the application of HK Research Tooling Gel Coats not exceed 2.5% or fall below 1.8% to retain maximum properties. The recommended range for the catalyst concentration within the applied film is 1.8% to 2.2% at 77°F.

Under normal conditions the gel coat is ready to "lay up" in 1 to 2 hours. The "time to laminate" is dependent on the room temperature, humidity and air movement, as well as the catalyst concentration and the film thickness. A wet film thickness of at least 20 to 25 mils is recommended for proper hiding, cure, and performance properties. These products should not be used when the temperature conditions, both mold and ambient, are below 65°F as the curing may be adversely affected.

### **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 gel coat is inadvertently over mixed, hold material for 4 hours without agitation before application.***

### **SAFETY CONSIDERATIONS**

HK Research Tooling Gel Coats are based on a resin system, which contains styrene monomer, which is a flammable liquid. Keep away from sparks, heat and open flame (including pilot lights). Electrical equipment should be vapor-proof and protected from breakage.

Styrene vapors are heavier than air and will tend to concentrate in the low areas of molds and in pockets immediately above the floor area. To keep vapors within a safe limit in all areas, adequate ventilation or suction fans should be used that will remove these styrene monomer vapors.

**All equipment must be grounded - including spray guns and molds.**

Both the gel coat and the catalyst may cause burns to eyes and skin. Do not get in the eyes! Avoid breathing vapors! Gel coat applicators should wear a NIOSH approved respirator effective for vapors, spray mist and dust. In case of accidental contact, remove contaminated clothing and wash affected skin areas with soap and copious quantities of water. Contact a physician if persistent skin irritation occurs. For eyes, immediately flush with plenty of water for at least 15 minutes; call a physician immediately. Wash contaminated clothing before using.