



# POLYCOR®

965BJ115 HP40 Black

965YJ071 HP40 Orange

## Tooling Gel Coat

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### Description

POLYCOR® 965 tooling gel coats are formulated specifically for mold making. In addition, these MC tooling gel coats utilize a selected vinyl ester resin that exhibits high heat distortion to withstand the repeated moldings of FRP laminates. These products do not contain lead. Both are formulated to provide abrasion resistance, excellent gloss retention, high heat distortion, and extended mold life. They are formulated ready-to-spray after the addition of the proper amount of an appropriate methyl ethyl ketone peroxide catalyst. Read application instructions carefully, because even though manufacturing precautions are used to make tooling gel coat, a mis-application of these products can produce unacceptable results. Also refer CCP's to **Composites Application Guide** for additional specific recommendations.

These tooling gel coats meet the EPA National Emission Standards for Hazardous Air Pollutants (NESHAP) for Boat Manufacturing, and the Reinforced Plastics Industry.

### Liquid Properties (at 77°F)

Typical liquid properties of POLYCOR® 965 series gel coats are shown below. These values may or may not be manufacturing control criteria; they are listed for a reference guide only. Particular batches will not conform exactly to the numbers listed because storage conditions, temperature changes, age, testing equipment (type and procedure) can each have a significant effect on the test results. Batches with properties outside of these ranges can perform acceptably.

Test	Value	
	Black 965BJ115 HP40	Orange 965YJ071 HP40
Viscosity, Brookfield RVF #4 Spindle @ 4 rpm	15,000 – 20,000 cps	15,000 – 20,000 cps
Thixotropic Index (2/20)	6.0 – 8.0	6.0 – 8.0
Flash Point	88°F	88°F
Hazardous Air Pollutants	Less than 40%, refer to MSDS	Less than 40%, refer to MSDS



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Volatile Organic Compounds	42.1 – 44.1%	40.8 – 42.8%
Weight per Gallon	8.87 – 9.17 lbs.	8.93 – 9.23 lbs.
Gel Time at 77°F with 2.0% HP-90	18 – 23 minutes	18 – 23 minutes
Lay-up Time	60 – 90 minutes	60 – 90 minutes
Sag Resistance	Good at 20 mils	Good at 20 mils
Hide (Complete)	4 – 9 mils wet	22 – 29 mils wet
Color Match, Maximum CMC DE	1.5 units	2.0 units
Barcol Hardness <sup>1</sup>	35 – 45	35 – 45
Heat Distortion Temperature		
One Week at Room Temperature	144°F	144°F
One Week after Post Cure of 150°F for 16 Hours	189°F	189°F

<sup>1</sup> **Barcol readings are very sensitive to catalyst/mass/temperature.** To help overcome this sensitivity, Barcol should be checked by:

1. Adjusting the tooling gel coat to 77°F.
2. Catalyzing at 2.0%.
3. Weighing 50 grams into an aluminum weighing dish placed on an insulated surface.
4. Maintaining the casting at 77°F ambient temperature.

Final determination (numbers) should be achieved in 75 minutes using the Model #934 Barcol.

**CCP has found it very erroneous to check Barcol on a film of tooling gel coat** (any film of gel coat) because of the inaccurate readings received by the Barcol needle penetrating inconsistent gel coat film thicknesses.

Refer to the MSDS for handling precautions. MSDS's are supplied automatically with the first order for material, and are available by product code upon request from CCP's Regulatory Department and CCP's website, [www.ccpcompositesus.com](http://www.ccpcompositesus.com).

## Application

POLYCOR<sup>®</sup> 965 gel coats must be mixed prior to use. This includes prior to spray application and when obtaining material for patching or any material that has been set aside for patching. Several suitable types of mixing equipment and styles of agitators are available for both pails and drums. Regardless of the specific type used, the equipment must have sufficient horsepower (relative to container size) to achieve thorough circulation from top to bottom and out to the sides of the container. The agitator must be properly sized for the container and must allow for uniform mixing regardless of the liquid level in the container. When using a suitable mixer, POLYCOR<sup>®</sup> 965 products should be mixed once per day for ten minutes.

Do not over mix POLYCOR<sup>®</sup> 965 gel coats. Over mixing can break down the polymer coating viscosity increasing the tendency to sag. Over mixing can also result in styrene loss which could contribute to porosity.



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Air bubbling should not be used for mixing. It is not effective and only serves as a potential source of water or oil contamination.

Tooling gel coats are applied to the part/plug to be duplicated. care must be taken when preparing the plug with wax and parting film to permit positive release. Best results are obtained by applying two coats at 18 (±2) mils wet each, and allowing the gel coat to gel and cure between coats. apply each coat with a minimum of two passes; three passes are preferred. For best results, ensure that the tooling gel coat is allowed to "breathe" for two minutes between each pass. do not allow over-spray and thin passes to go beyond 5 minutes without covering with a fresh pass. Do not apply more than 20 mils per coat, as this can result in crazing and cracking of the gel coat film after use. Do not apply less than 12 mils per coat, as poor cure can result in dulling of the mold in use. Thinner films will also exhibit more print-through and distortion. It is essential that no more than 40 mils (wet) total be applied with any of the tooling gel coats. these products are formulated for spray application. Brushing is not recommended. Best results are obtained using pressure pot spray equipment and batch mixing. The following equipment is recommended:

Binks Equipment		DeVilbiss Equipment	
Fluid Nozzle	66 or 67	Gun	P-JGA-502
Air Nozzle	63 PB or 67 PB	Nozzle Combination	704-E
Needle	65 or 67	More than 17 C.F.M. required	
More than 13 C.F.M. required			

Do not spray more than 2.5 pounds per minute of tooling gel coat. A minimum of 60 psi atomizing pressure (measured at the gun with fan full open) should be used to properly atomize the tooling gel coat.

**Application (airless)**

**Misapplication of this product can produce unacceptable results.**

These products were developed as a customer accommodation, and the customer must assure suitability for themselves of the product and process. These products can also be applied with conventional air atomized equipment.

Also, CCP does not typically recommend pumps or catalyst injection systems be used for spraying tooling gel coats, but realizes they are necessary for airless spraying. Even with the equipment properly calibrated, potential problems can occur due to poorly atomized catalyst; surging problems (gel coat or catalyst); poor tip alignment (catalyst to gel coat mix); contamination; and poor application procedures, which will quickly negate all benefits of calibration. The equipment (and application procedures) must be monitored on a routine basis to ensure proper application and cure of the gel coat. Ask about and adhere to all equipment manufacturers' recommendations.

Airless application yields best results when applied in two coats. To minimize sagging (whether using conventional or airless equipment), the first coat should be applied 18 (±) 2 mils wet in three passes. The



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second coat should be applied no more than 18 (± 2) mils wet in three passes. Allow the gel coat to attain lay-up time between each coat.

Production requirements might dictate the “calculated risk” of airless catalyst injection equipment for the spraying of production units and therefore the risk of a ruined or sub-par unit. This risk is much greater when building costly plugs and molds.

**IN ORDER TO REDUCE THE RISK OF A RUINED MOLD, SPECIFIC (BUT NOT INCLUSIVE) DIRECTIONS ARE:**

1. Calibrate daily or for each job:
  - a. Gel coat delivery of 1.5 to 2.5 pounds per minute.
  - b. Catalyst content--no less than 1.2% and no more than 2.4% (ideally 1.8% at 77°F).
  - c. Recommended gel coat tip size is .021 inches.
2. Ensure complete atomization and mixing of gel coat and catalyst. If air-assist is used, keep it as low as possible. Excess air-assist can result in trapping air in the film and sagging.
3. Do not let raw catalyst fall on the plug surface or on the sprayed gel coat.
4. Spray gun distance should be no less than two feet and no more than three feet.

Equipment and application should be constantly monitored to maintain effective calibration, gel coat/catalyst mixing, and procedures. This would require an assistant to ensure effective monitoring. When applied with care, tooling gel coat will provide a durable and long-lasting mold. However, when compared to a hot pot, where catalyst is pre-mixed into the gel coat, airless catalyst injection equipment and methods of application can cause problems such as:

Problem	Cause
Spotty cure sticking	Due to improper concentration, atomizing or mixing of catalyst from incorrect calibration and malfunctioning injector slave pumps.
Porosity	Due to excessive air-assist; flow rates greater than 2.5 pounds per minute; more than 6 to 8 mils wet in one pass; no catalyst.
Low initial gloss	Incorrect catalyst calibration; under-cured gel coat film; raw catalyst sprayed on plug.
Gloss dulling	Due to under- or over-catalyzation, hence under-cured gel coat.
Uneven film thickness	Operator error; excessive surges during spray-out
Sag	Excessive air-assist; too thick of film; spraying too close to the mold.

**Cure**

It is recommended that gel time be checked in the customer's plant because age, temperature, humidity and catalyst will produce varied gel times. All data referencing gel or cure refers specifically to Chemtura HP-90 catalyst. Norac NOROX MEKP-925 and NOROX MEKP-925H are expected to yield similar performance.

As the material ages, it may encounter slightly longer gel times. The longer gel time will extend the casting Barcol time, but the eventual Barcol should achieve the numbers as listed under “Typical Properties.”

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**Do not use more than 2.5% catalyst in the tooling gel coat, as this can cause excessive shrinkage of the gel coat and pull it away from the plug. For adequate cure, do not use less than 1.5% catalyst.**

Normally, tooling gel coats are ready to lay-up on (or spray with a second coat of gel coat) in 60 to 90 minutes--the time element being dependent on room temperature, air movement, humidity, catalyst type and concentration, and spray atomization.

For best results, it is recommended that the temperature be above 70°F.

When using conventional tooling resin, the gel coat should not be left overnight before being laminated onto, as the gel coat may pre-release and/or lose its tack and not provide a good bond between the gel coat and laminate. **If using a low shrink/filled laminate system, follow lay-up time recommendations for the system being used. Application temperature and lay-up time recommendations will vary.**

### Caution

**These products are made with a vinyl ester base polymer. UV and moisture resistance will be limited. It is recommended that molds stored outside are protected from UV and moisture exposure. This may be accomplished by covering the mold or inverting the mold so that the surface is not exposed to UV and that moisture cannot collect on the mold.**

These products are not compatible in the liquid state with isophthalic or ISO/NPG gel coats or resins. Spray and pumping equipment must be completely clean of these products before they can be used.

Do not add any material, other than recommended methyl ethyl ketone peroxide, to this product without the advice of a representative of CCP Composites US.

### Precautions

The primary reason for using tooling gel coats for the manufacture of fiberglass molds is to produce a blemish-free, durable, high-gloss surface. It is advantageous to exercise strict quality control and application procedures when using tooling gel coats. Proper application is very important, since many of the defects that result from poor application do not appear until the part has been removed from the mold. Many gel coat defects result from conditions that can easily be corrected. A few of these are listed below:

1. Do not use varnish as a sealer or finish coat when preparing a plug, as the styrene in the gel coat will soften the varnish, even when well-waxed and coated with a parting film.
2. Proper spray technique is very important to eliminate porosity in the gel coat film. Internal air-atomization spray equipment, airless, or catalyst injection spray equipment can result in porosity in the gel coat film if improperly applied. Tooling gel coats will not be as tolerant of inaccuracies in a catalyst injection system as are production gel coats.
3. Tooling gel coats appear thick in the container. After mixing the gel coat, it becomes sprayable. Do not over-mix, however. Over-mixing breaks down viscosity, increasing tendencies to sag and causes styrene loss, this could contribute to porosity. Tooling gel coat needs mixing when opened (and daily thereafter). The gel coat should be mixing to the sides and bottom of the container with the least amount of turbulence possible. Air bubbling should not be used. It is not effective and only serves as a potential for water or oil contamination.

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4. Always keep the container covered (except, of course, when transferring material). An open container is easily contaminated and allows for more styrene evaporation.
5. Each coat must cure as a total film, rather than several thin films which might cure independently of each other. It is essential to cover over-spray and thin passes as soon as possible--within 5 minutes. Thin, independently curing films can create a textured effect when the surface is sanded and buffed.
6. Never reduce tooling gel coat with a conventional paint or lacquer thinner, or acetone.
7. Disperse catalyst thoroughly in tooling gel coat. Poor distribution causes uneven cure, print-through, and premature release from plug before lay-up.
8. Do not over-catalyze. Excess catalyst plasticizes tooling gel coats.
9. Print-through (fiber pattern) and distortion are directly proportional to film thickness. Thicker films (not to exceed 40 mils wet total) resist print-through and distortion better than thinner films.
10. Atomize the tooling gel coat thoroughly when spraying. Low spray pressures will result in poor breakup, and will leave entrapped air in the gel coat. To check atomization for porosity, spray catalyzed tooling gel coat over glass to a film thickness of 18 ( $\pm 2$ ) mils. Laminate, pull, sand, stain and examine for entrapped air. This procedure should be followed before a plug is sprayed with tooling gel coat, and is recommended each time tooling gel coat is sprayed. These spray-outs should be saved along with other mold records.
11. In spray application of tooling gel coats, use slow, even strokes, triggering the spray gun at the end of each stroke to prevent excess buildup at overlaps.
12. Do not apply tooling gel coat over wet Polyvinyl Alcohol (PVA) parting film.
13. Install an oil and moisture trap on the compressed air line leading to the spray gun to remove lint, rust, oil and moisture.
14. Use the catalyzed tooling gel coat within its working life, with a proper allowance of time for cleanup of equipment.
15. Tooling gel coats may leave a certain amount of "color" when sanded and/or buffed. This is a function of the pigment used and is not an indication of cure.
16. Do not add anything, other than the appropriate methyl ethyl ketone peroxide, to these products.

## Storage

Uncatalyzed, these tooling gel coats have a usage life of 60 days from date of shipment from CCP when stored at 73°F or below in a closed, factory-sealed, opaque container and out of direct sunlight. The usage life is cut in half for every 20°F over 73°F.

## Data Sheets/MSDS

CCP data sheets and MSDS's are available in printable format at [www.ccpcompositesus.com](http://www.ccpcompositesus.com).

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Without limiting the generality of the foregoing, if any product fails to meet warranties mentioned above, Seller shall at Seller's option either replace the nonconforming product at no cost to Buyer or refund the Buyer the purchase price thereof. The foregoing is Buyer's sole and exclusive remedy for failure of Seller to deliver or supply product that meets the foregoing warranties. Seller's liability with respect to this contract and the product purchased under it shall not exceed the purchase price of the portion of such product as to which such liability arises. Seller shall not be liable for any injury, loss or damage, resulting from the handling or use of the product shipped hereunder whether in the manufacturing process or otherwise. In no event shall Seller be liable for special, incidental or consequential damages, including without limitations loss of profits, capital or business opportunity, downtime costs, or claims of customers or employees of Buyer. Failure to give Seller notice of any claim within thirty (30) days of shipment of the product concerned shall constitute a waiver of such claim by Buyer. Any product credit received by Buyer hereunder, if not used, shall automatically expire one (1) year from the date the credit was granted. Notwithstanding any applicable statute of limitations to the contrary, any action by Buyer relation to a claim hereunder must be instituted no later than two (2) years after the occurrence of the event upon which the claim is based. All the foregoing limitations shall apply irrespective of whether Buyer's claim is based upon breach of contract, breach of warranty, negligence, strict liability, or any other legal theory.

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### COMPOSITES SAFETY INFORMATION (October 2011)

All sales of products manufactured by CCP Composites US (CCP), and described herein, are made solely on condition that CCP's customers comply with applicable health and safety laws, regulations and orders relating to the handling of our products in the workplace. Before using, read the following information, and both the product label, and Material Safety Data Sheet pertaining to each product.

Most products contain styrene. Styrene can cause eye, skin and respiratory tract irritation. Avoid contact with eyes, skin and clothing. Impermeable gloves, safety eyewear and protective clothing should be worn during use to avoid skin and eye contact. Wash thoroughly after use.

Styrene is a solvent and may be harmful if inhaled. Reports have associated repeated and prolonged occupational overexposure to solvents with permanent brain and nervous system damage. Extended exposure to styrene at concentrations above the recommended exposure limits may cause central nervous system depression causing dizziness, headaches or nausea and, if overexposure is continued indefinitely, loss of consciousness, liver and kidney damage.

Do not ingest or breathe vapor, spray mists or dusts caused by applying, sanding, grinding and sawing products. Wear an appropriate NIOSH/MSHA approved and properly fitted respirator during application and use of these products until vapors, mists and dusts are exhausted, unless air monitoring demonstrates vapors, mists and dusts are below applicable exposure limits. Follow respirator manufacturer's directions for respirator use.

The International Agency for Research on Cancer (IARC) reclassified styrene as Group 2B, "possibly carcinogenic to humans." This revised classification was not based on new health data relating to either humans or animals, but on a change in the IARC classification system. The Styrene Information and Research Center does not agree with the reclassification and published the following statement: Recently published studies tracing 50,000 workers exposed to high occupational levels of styrene over a period of 45 years showed no association between styrene and cancer, no increase in cancer among styrene workers (as opposed to the average among all workers), and no increase in mortality related to styrene.

Styrene is classified by OSHA and the Department of Transportation as a flammable liquid. Flammable products should be kept away from heat, sparks, and flame. Lighting and other electrical systems in the work place should be vapor-proof and protected from breakage.

Vapors from styrene may cause flash fire. Styrene vapors are heavier than air and may concentrate in the lower levels of molds and the work area. General clean air dilution or local exhaust ventilation should be provided in volume and pattern to keep vapors well below the lower explosion limit and all air contaminants (vapor, mists and dusts) below the current permissible exposure limits in the mixing, application, curing and repair areas.

Some products may contain additional hazardous ingredients. To determine the hazardous ingredients present, their applicable exposure limits and other safety information, read the Material Safety Data Sheet for each product (identified by product number) before using. If unavailable, these can be obtained, free of charge, from your CCP representative or from: CCP Composites US, P.O. Box 419389, Kansas City, MO 64141-6389; 816-391-6053.

**FIRST AID:** In case of eye contact, flush immediately with plenty of water for at least 15 minutes and get medical attention; for skin, wash thoroughly with soap and water. If affected by inhalation of vapors or spray mist, remove to fresh air. If swallowed, get medical attention.

Those products have at least two components that must be mixed before use. Any mixture of components will have hazards of all components. Before opening the packages read all warning labels. Observe all precautions.

Keep containers closed when not in use. In case of spillage, absorb with inert material and dispose of in accordance with applicable regulations. Emptied containers may retain hazardous residue. Do not cut, puncture or weld on or near these containers. Follow container label warnings until containers are thoroughly cleaned or destroyed.

**FOR INDUSTRIAL USE AND PROFESSIONAL APPLICATION ONLY. KEEP OUT OF REACH OF CHILDREN.**