

POLYCOR® POLYESTER TOOLING GEL COAT

945GA104 GREEN

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DESCRIPTION

Polynt Composites Korea tooling gel coats are formulated specifically for mold making. These precision-formulated gel coats utilize selected resins that exhibit high heat distortion to withstand the repeated molding of FRP laminates. None of these products contain lead. They provide a high gloss and hard durable surface. These tooling gel coats are formulated ready-to-spray after the addition of the proper amount of an appropriate methyl ethyl ketone peroxide catalyst. They are formulated to be low in hide so that imperfections can be easily spotted. Read application instructions carefully, because even though manufacturing precautions are used to make tooling gel coat, a misapplication of these products can produce unacceptable results.

TYPICAL LIQUID PROPERTIES (at 25°C):

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 condition, temperature changes, age, testing equipment (type and procedure) can each have a significant effect on the test results. Gel coats with properties outside of these ranges can perform acceptably

<u>Test</u>	<u>Value</u>
Color	Green

Viscosity,

Brookfield RVF #4 Spindle @ 4rpm

15,000 – 20,000 mPa.s

Thixotropic Index (2/20) 6.5 – 8.5

Flash Point 31°C

Volatile Organic Compounds	46.5 – 49.5%
Gel Time ¹⁾	18 – 23 minutes
Lay-up Time	60 – 90 minutes
Barcol Hardness ²⁾	35 – 45
Hide Complete (wet)	22 – 29 mils

1) 100 grams at 25°C catalyzed with 1.8% NOROX MEKP-925.

2) Barcol readings are very sensitive to catalyst/mass/temperature. To help overcome this sensitivity, Barcol should be checked by:

- Adjusting the tooling gel coat to 25°C.
- Catalyzing at 1.8%.
- Weighing 50 grams in an aluminum weighing dish on an insulated surface.
- Maintaining 25°C ambient temperature.

Final determination (numbers) should be made within 75 minutes using the Model #943 Barcol Impresser.

Polynt Composites Korea has found it very erroneous to check Barcol on a *film* of tooling gel coat (any *film* of gel coat), because of the inaccuracies received by the Barcol needle penetrating inconsistent gel coat film thicknesses.

Refer to the MSDS for handling precautions.

APPLICATION:

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. **See special film thickness precautions for 945-GA-104.** 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 coat.

See special application precautions.

Polynt Composites Korea tooling gel coats are formulated for spray application. Brushing is not recommended.

APPLICATION (Conventional Air Atomized):

Best results are obtained using pressure pot spray equipment and batch mixing. The following equipment is recommended:

Binks Equipment

Fluid Nozzle	66 or 67
Air Nozzle	63 PB or 67 PB
More than 13 C.F.M. required	

DeVilbiss Equipment

Gun	P-JGA-502
Nozzle Combination	704-E
More than 17 C.F.M. required	

Do not spray more than 2.5 pounds per minute of tooling gel coat. A minimum of 60 psig atomizing pressure

(measured at the gun with fan full open) should be used to properly atomize the gel coat.

APPLICATION (Airless 945-GA-104 only):

Misapplication of these products can produce unacceptable results.

Airless tooling is a utility tooling, designed for good hardness and gloss retention with minimized porosity when applied through airless equipment. These products were developed as a customer accommodation, and the customer must assure suitability for themselves of the product and process. They can also be applied with conventional air atomized equipment.

Also, Polynt Composites Korea does not typically recommend that 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 tooling yields best results when applied in two coats. To minimize sagging (whether using conventional or airless equipment), the first coat should be applied 14 (±2) mils wet in three passes. The 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 mold.

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 3.0% (ideally 1.8% at 25°C).
 - c. Recommended gel coat tip size is 0.021 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, 945 airless tooling gel coats 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 NOROX MEKP-925 catalyst. ARKEMA Luperox DHD-9, NOROX MEKP-925H, and Crompton HP-90 are expected to yield similar performance. ARKEMA Luperox DDM-N, Norac NOROX MEKP-9, NOROX MEKP-9H, Akzo Nobel CADOX L-50a and CADOX D-50 may yield slightly longer gel and cure times.

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.”

Do not use more than 3.0% 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 1.2% catalyst.

Normally, tooling gel coats are ready to lay-up on (or spray with a second coat of gel coat) in 60 – 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 25°C.

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 (such as OPTIMOLD® or OptiPLUS™), follow lay-up time recommendations for the system being used. Application temperature and lay-up time recommendations will vary.

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 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 coat

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, which 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.

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 5minutes. 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 coat.

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 to 18 (± 2) mils. Laminate, pull, sand, stain and examine for entrapped air. This procedure should be followed 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 “coloring” 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 tooling gel coats have a usage life of 60 days from date of manufacture when stored at 23°C or below in a closed, factory-sealed opaque container and out of direct sunlight. The usage life is cut in half for every 15°C over 23°C.