

Gel Coat Troubleshooting Guide

Adherence

Problem	Cause	Suggested Remedy
In spots.	Contamination	Make sure no solvent, moisture or catalyst has been deposited onto coating surface before lamination.
	Unevenly applied mold release agent or wax penetrates coating surface and floats up at random spots.	Avoid excessive application of mold release agent.
Over large areas.	Over-cured gel coat. Catalyst level may have been too high.	Laminate within the first one to six hours.
	Laminating resins containing too much wax.	Contact laminating resin supplier.

“Alligatoring”

Problem	Suggested Remedy
Insufficient cure of coating prior to application of back-up resin.	Make sure no solvent, moisture or catalyst has been deposited onto coating surface before lamination.
Insufficient film-build to resist attack of styrene in back-up resin.	Increase coating thickness.
Long gel time.	Raise temperature. Adjust catalyst ratio. Check with material supplier; gel time may have drifted.

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Blisters

Problem	Cause	Suggested Remedy
Blisters appear shortly after part is pulled (especially after exposure to sunlight)	Poorly rolled laminate (air pockets).	Work air out of laminate with roller or brush.
	Un-reacted catalyst or under-cure of gel coat.	Check % catalyst.
	Improper metering of catalyst due to fluctuation of the equipment.	Catalyst over-spray.

Color Float

Problem	Suggested Remedy
Movement of coating on mold surface after application with resulting separation of color pigments.	Reduce rate of application in order to minimize movement.
Brush application.	Use gel coat designed for brush application.

Color Separation

Problem	Suggested Remedy
Possible water or oil contamination.	Ensure traps are used and maintained.
Excessive application causing sagging.	Use recommended delivery rate.
Flooding gel coat onto the mold surface.	Adjust application rate according to specifications.

Cracking

Problem	Suggested Remedy
Stress on coating surface from bending, impact or excessive force used to de-mold part.	<p>Increase laminate thickness or reinforcement to resist excess banding of coating.</p> <p>Check mold release.</p> <p>Poor laminate cure. Should have proper Barcol development.</p> <p>Check and correct de-molding and handling procedures.</p> <p>Avoid attaching hardware or other parts which concentrate stress in specific areas.</p>
Coating too thick.	Thickness should not exceed 26-28 mils.
Improper curing times or cycles.	Check curing cycle and adjust.
Weak laminate.	Recalibrate to determine correct glass/resin ratio.
Defect in mold.	Surface may be reproducing crack in mold. Inspect the mold.
Over catalyzed coating material.	Adjust catalyst level. Do not exceed 3% MEKP.

Cratering

Problem	Suggested Remedy
Contamination of coating from water, oils, silicones, dirty equipment, or air.	Drain air lines. Check mold release wax. Check equipment lubricating materials.
Contamination of mold surface interferes with coating wetting.	Clean mold surface with soap and water or solvent. Re-wax or apply parting agent.
Inadequate film thickness.	Measure with wet film gauge. Apply to specific wet thickness.
Viscosity too low.	Material too old. Rotate stock. Batch out of specification. Consult your laboratory.
Low atomization pressure.	Adjust pressure to obtain fine, non-floating mist.
Excess wax on mold.	Use high quality hard wax. Buff mold to high gloss.
Other.	Clogged gun. Clean all parts.
Wrong spray tip (airless).	Use smaller orifice.
Worn tip.	Replace.
Pump pressure too low (airless).	Increase pressure until fingers disappear.
Inadequate agitation of coating.	Agitate thoroughly for 15 minutes between shifts and with each new batch.
Mold contaminated with foreign matter.	Tack rag mold surface just prior to spraying.
Incorrect calibration.	Recalibrate according to specifications.

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Dirt Specks in Coating Film

Problem	Suggested Remedy
Coating improperly filtered.	Use fine weave paint strainer or 100 mesh silk bag.
Dirty hoses, gun, etc.	Flash all equipment regularly with acetone. Have spare parts available and perform regular preventive maintenance.
Dirty molds.	Tack rag mold just prior to spraying.
Loose dirt in the spray area.	Keep spray booth clean.

Dull or Foggy Surface Just after Part is Pulled

Problem	Suggested Remedy
Rough mold wax build up.	Polish and buff out mold to high gloss.
Polystyrene build up.	Scrub mold with brush and strong solvent solution. Follow precautions of solvent manufacturer.

Dull or Soft Spots

Problem	Suggested Remedy
Uneven coating material.	Use three passes.
Catalyst poorly mixed with coating.	Check catalyst flow rate. Check mixing action of spray fans.
Equipment surging.	Inspect air supply for proper volume and pressure. Inspect pump to ensure it is in proper working order.
Solvent trapped in coating.	Check cleaning procedures. Check catalyst to solvent ratio.
Poor film cure.	Calibrate equipment properly.
Pre-release film (will be dull in released areas).	If discovered before lamination, blow film out of mold. Repairs may be extensive.

The information and recommendations found in this guide are intended for FRP professionals. Results are dependent on many variables. No warranties of any kind are expressed or implied.

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Fading or Bleaching

Problem	Suggested Remedy
Under-cured coating.	Calibrate equipment regularly. Maintain catalyst level between 1.0 and 2.5%.
Water exposure to dark colors.	Be careful not to allow standing water in low spots before full cure. Use shrink wrap properly.
Exposure to harsh chemicals.	Check for improper use of cleaning agents.

Fiber Pattern on Surface Coating

Problem	Suggested Remedy
Insufficient cure.	Use proper catalyst level in coating and/or laminate. Allow more time before pulling mold. Check for low temperature.
Pattern transferred onto mold surface.	Resurface mold.
Glass pattern too coarse.	Use finer patterned glass.
Coating film too thin.	Use wet film gauges. Apply gel coat according to specifications.
High exotherm of laminate.	Use slower curing time. Apply in stages. Use lower exotherm laminating resin.

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Mottling - Uneven Color Density, Pigment Separation or Tearing

Problem	Suggested Remedy
Blowing of coating film during application.	Adjust spray technique so atomizing air does not distort or interfere with an even deposit of wet film.
Poor gel coat atomization.	Make sure gel coat is being used at specific temperature and flow rate.
Pigments separate from resin.	Check for water sources. Check viscosity and thix properties of each batch.
Thin film (poor hiding).	Use wet film gauges.
Heavy film (sagging).	Viscosity may be too low. Use wet film gauges.
Uneven catalyzation.	Check for obstruction in equipment lines or other malfunctions.

Poor Leveling - Coarse

Problem	Suggested Remedy
Viscosity too high.	Check coating temperature. Add styrene (3 PPH max.).
Gun held too close to surface or at improper angle.	Keep gun 10" - 36" from perpendicular to surface.
Atomization pressure too low (air support systems).	Adjust pressure for fine, even particle breakup without distorting the wet film.
Low fluid pressure (airless systems).	Adjust pressure upward until fingers disappear.

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Poor Leveling - Fine

Problem	Suggested Remedy
Overly rapid passes causing "dusting" and possible sticking.	Use smooth even arm movement. Allow enough flow to produce 6-8 mils per pass. Use wet film gauges.
Over-spray.	Reposition parts and check spray technique.
Atomization pressure too high causing dry spray.	Adjust for fine, even particle breakup, not a floating mist.

Porosity

Problem	Suggested Remedy
Gun held too close to the mold.	Hold gun 18" - 36" from the mold when spraying. Application too heavy. Check wet film thickness against specifications.
Catalyst atomization poor.	Check atomization pressures, flow rates, and tips.
Gel coat viscosity too high.	Consult coating supplier for correct styrene addition. Check to see that temperature of material is not below 65° F.
Gel time too fast.	Check catalyst ratio. Check gel time at current plant temperatures.
Water or solvent contamination.	Check for contamination in containers. Check for air line contamination wherever atomized equipment is used.
Worn tips.	Replace.

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Pre-Release

Problem	Suggested Remedy
Catalyst level too high.	Reduce catalyst level: (do not go below 0.75% MEKP).
Uneven film around radius causing uneven cure and shrinking.	Keep film uniform. Use wet film gauges for accuracy.
Uneven cure due to styrene vapor in low spots.	Ventilate the mold.
Trapped solvent or water.	Check for contamination.
Coating film allowed to stand too long before laminating.	Always laminate within two hours. Never allow to stand overnight, especially in warm temperatures.
Heavy coating of mold release.	Heavy coating of mold release. Heavy coating of mold release.
Part pulled too soon.	Allow thorough cooling before removal from mold.
Excessive styrene additions.	Check with coating supplier before any additions are made.
Raw catalyst on mold surface.	Start catalyst flow with gun away from the mold. Only thoroughly catalyzed mixture should come in contact with the mold surface.

Shrink Lines

Problem	Suggested Remedy
Resin drainage from laminate.	Excessive amount of resin. Use less in these areas.
Uneven laminate cure.	Watch for heavy build up.
Fast cure of laminate.	Adjust catalyst levels. Construct laminate in stages and permit each layer to exotherm separately.
Insufficient coating cure.	Allow longer cure time before lay up.