



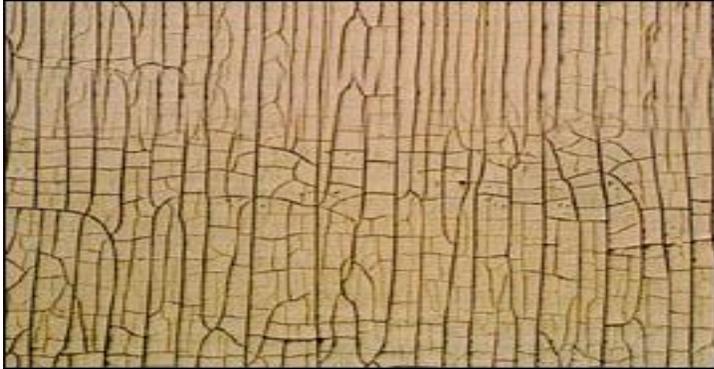
WILKO PAINT TROUBLESHOOTING TIPS

CAUSE - REPAIR - PREVENTION

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ALLIGATORING

Description: Patterned cracking in the paint film resembling the scales of an alligator. These cracks generally do not expose the substrate (e.g. the surface that has been painted).



CAUSE

1. Natural aging of oil-based paints due to temperature fluctuation. The constant expansion and contraction results in a loss of paint film elasticity.
2. Application of an extremely hard, rigid coating, like oil enamel, over a **softer**, more flexible coating.
3. Application of a topcoat before the primer or the base coat is dry.
4. Application of a coating over a glossy finish.

REPAIR

1. Remove old paint by blasting, scraping, sanding, chemical removers, or even a heat gun. Follow all manufacturers' cautions when using chemical removers or heat guns.
2. Remove all surface contamination by washing with an appropriate cleaner; rinse thoroughly and allow to dry.
3. Glossy surfaces should be sanded dull. Follow label and data page directions for the appropriate drying time for any product.

PREVENTION

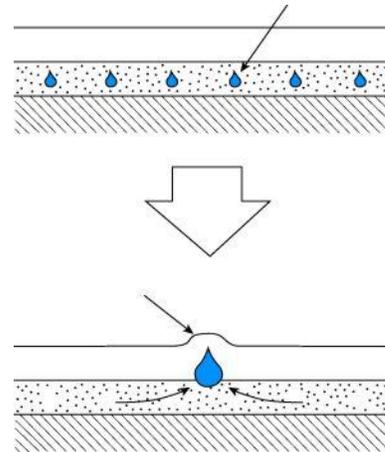
1. Use compatible primer and topcoat coating systems.
2. Make sure primer is completely dry before applying a topcoat.

BLISTERING

Description: (Pimples, Bubbles, Bumps) Swelled areas appearing as pimples or bubbles in the topcoat film, often months after application.



Photo



Diagram

CAUSE

1. Moisture trapped beneath the paint film due to:
 - a. Improper dry time after wet sanding
 - b. Contaminated air lines
 - c. Spraying in extreme high humidity conditions.
2. Trapped solvents from applying wet heavy coats with insufficient flash time between coats.
3. Improper dry time of undercoats before top coating.
4. Painting over grease, oil or rust.

REPAIR

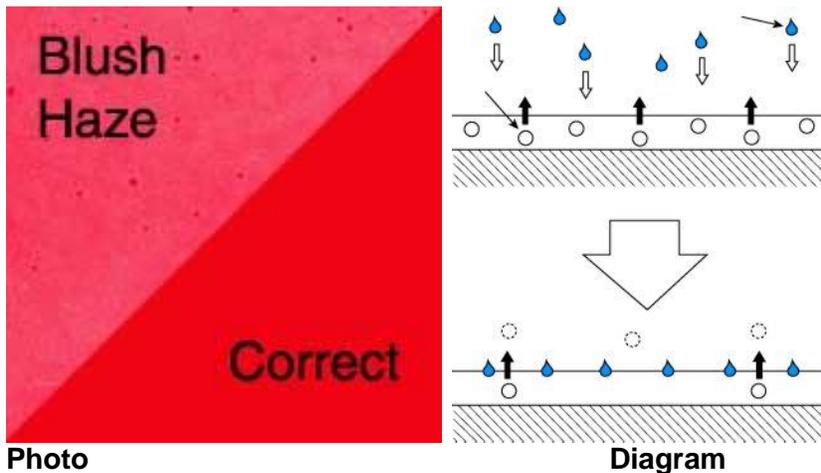
1. Remove affected area and refinish.
2. Extreme cases must be stripped to bare substrate before refinishing.

PREVENTION

1. If wet sanding is preferred, allow sufficient time for moisture to evaporate. Drain moisture from compressor and air lines regularly. Allow additional flash time between coats and/or add retarder when spraying in humid conditions, or spray at times of low humidity when possible.
2. Select proper thinner/reducer for spray conditions.
3. Apply materials according to product recommendations, allowing sufficient flash time between coats.
4. Allow undercoats to thoroughly dry/cure before top coating.
5. Clean and prep substrate using recommended products and procedures.

BLUSHING

Description: (Milkiness) A milky/opaque gray cloud appears on the surface of the paint film immediately or shortly after application. If cured during conditions of cool ambient temperatures, dropping temperatures, or high humidity, amine-cured epoxy resin coatings can develop a surface oiliness or exudates, commonly referred to as "amine blush" or "sweating". This is caused by the absorption of carbon dioxide and water into the coating film and its reaction with the amine-curing agent. Some of the problems can be: surface tackiness or greasiness, incomplete cure, poor adhesion, poor adhesion on over-coating, coating discoloration over time, poor gloss retention.



CAUSE

1. When spraying during humid conditions, air from the spray gun and solvent evaporation lowers the substrate temperature below the dew point, causing moisture in the air to "condense" in or on the paint film.
2. The condition is aggravated when a too fast drying or unbalanced thinner/reducer is used.

REPAIR

1. Should blushing occur during application:
 - a. Apply heat to the affected area, or
 - b. Add retarder and apply additional coats as needed.
2. If the finish has dried, minor blushing may be corrected by compounding or polishing.
3. Severe blushing will require sanding and refinishing.

PREVENTION

1. Always use a compatible and good quality solvent, and thin/reduce material according to label directions.
2. Select proper thinner/reducer for spray condition.
3. Add the recommended amount of retarder when spraying in humid conditions.
4. Apply heat after application to evaporate moisture.
5. Keep units/metal surfaces in controlled environment of a paint booth until the surface coating has "flashed".

BUBBLING

Description: (Foaming/Cratering) Formation of air bubbles (foaming) and resulting small, round concave depressions (cratering) when bubbles break in a paint film during drying.



CAUSE

1. Introduction of air into the paint solution by shaking a partially filled can of paint, or using too high of a speed when using a drill/mixer.
2. Excessive brushing or rolling – i.e., applying paint too rapidly – will drive excess air into the film.
3. Use of a roller cover with wrong/excessive nap length (ex. using a 3/8" when 1/4" is recommended).
4. Applying a gloss or semi-gloss paint over a porous or unsealed surface.
5. Forced high heat during application speeds up drying; bubbles or craters that form will dry before they can break and level out.
6. Using a thinner/reducer that is inappropriate for the coating.

REPAIR

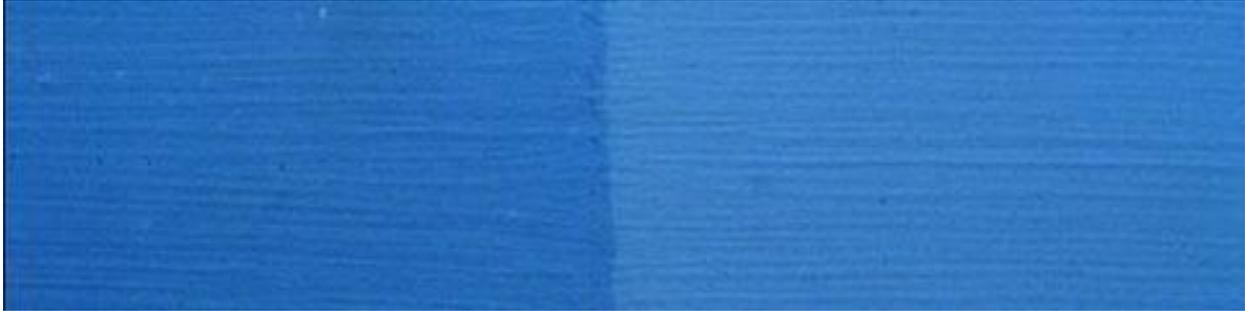
1. All paints will foam to some degree during mixing and application; most paints are designed to allow these bubbles to break and flow smooth during drying.
2. Allow the coating to dry thoroughly, then sand the coating smooth and repaint.

PREVENTION

1. Slowly stir partially filled containers to prevent entrapping excess air in the coating.
2. If there is a very noticeable amount of air bubbles during application, try slowing down application speed.
3. If the application calls for "brush and roll" follow label and data page directions for the appropriate applicator. Determine the correct roller cover type or nap based on the coating being applied and the surface to be coated. On smooth surfaces, a mohair, 1/4", or 3/8" roller nap is usually sufficient. On textured surfaces, a 3/4" nap or greater is needed.
4. Prime porous surfaces before top coating.
5. Allow each coating to dry properly before top coating.
6. Follow label and data page directions for the appropriate thinner/reducer and amount to use

CHALKING

Description: (Powdering) The formation of fine, white powder on the surface of the paint film due to weathering, which may give the appearance of color fading. Although some degree of chalking is normal and can be a desirable way for a paint film to wear, excessive paint film erosion may result in heavy chalking.



CAUSE

1. Oil-based paints and epoxy primers tend to chalk more than water-borne (latex) formulations.
2. Use of a low quality, highly pigmented paint.
3. Factory-finished siding can develop an excessively thick chalk layer and may require power washing to ensure complete chalk removal.
4. Use of an interior paint for an outdoor application.
5. Not adequately sealing a porous surface.
6. Over-thinning a coating (e.g. paint or stain).
7. Allowing an epoxy primer to remain outdoors for an extended period of time before a topcoat is applied.

REPAIR

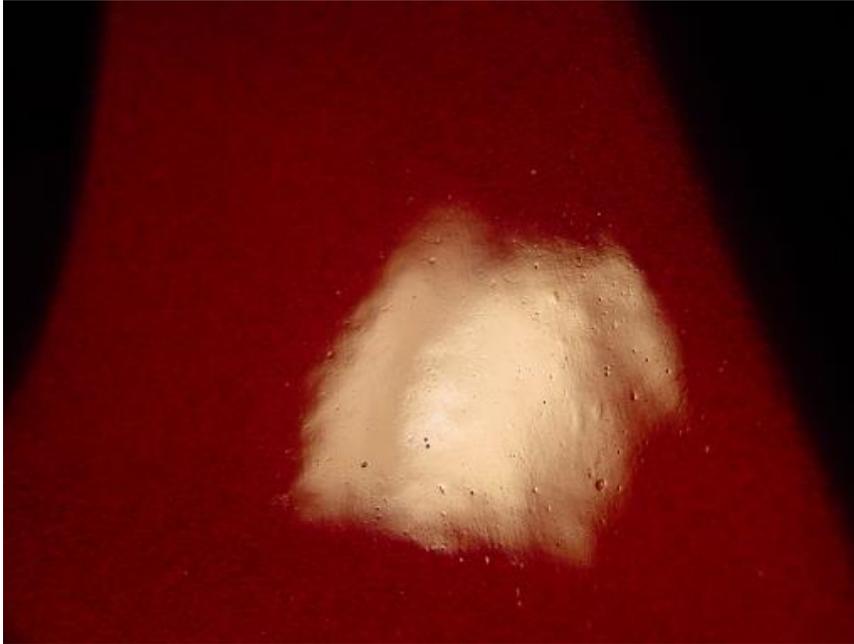
1. Remove chalk by washing or power washing the surface with an appropriate cleaner. If some chalk remains after first washing, then wash again for complete removal; scrubbing may be necessary.
2. Rinse well with clear water. Allow to completely dry.
3. Brick areas that are stained by “chalk run-down” should be scrubbed with a stiff brush and detergent.
4. With epoxy primers, hand sand or soda blast to remove chalk residue.
5. For the best resistance to chalking, use higher-quality acrylic and polyurethane coatings.

PREVENTION

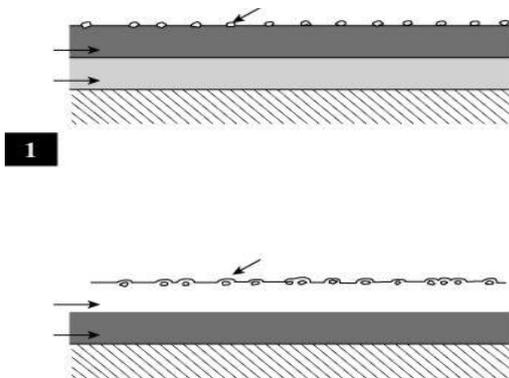
1. Avoid exposing of epoxy primers to excessive UV light and outdoor conditions until the topcoat is applied.
2. Apply recommended topcoat ASAP to give the UV protection for the primer coat.
3. Apply a clear coat of polyurethane to seal and to protect the topcoat.

DUST CONTAMINATION - very common

Description: (Dirt in finish) foreign particles become embedded in paint film.



Photo



1

2

Diagram

CAUSE

1. Inadequate cleaning of the surface to be painted.
2. Dirty spraying environment.
3. Inadequate air filtration or unfiltered air entering the booth.
4. Dirty or unsuitable work clothes that contain dust, lint, or fibers.
5. Particles from deteriorated air supply lines.
6. Using a poor grade masking paper.
7. Dirty spray gun.
8. Removing the vehicle from the spray booth before the finish is "dry and dust free".

REPAIR

1. Sand with 1200 or finer grit sandpaper, then compound and polish to restore gloss.
2. Or, sand smooth and refinish.

PREVENTION

1. Thoroughly blow off around windows, doors, jambs, hood, trunk, moldings, engine compartment, and wheel openings. Wipe the surface to be painted and the masking paper with a tack rag.
2. Maintain a clean working area.
3. Install proper air filters. Never use residential-type furnace filters in the spray booth. Repair any leakage found in the spray booth due to poor fitting doors, gaskets, seams or filters.
4. Wear a lint free paint suit during the spray application.
5. Use quality masking materials. "Wicks" found on newspaper can break away and blow into the wet paint.
6. Repair or replace defective air lines.
7. Properly clean and maintain spray equipment.
8. Vehicle should be kept in a clean environment until finish is "dust free".

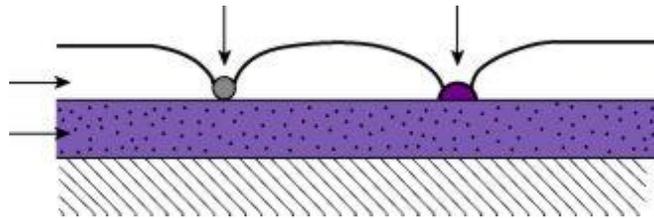
NOTE: the finish, creating an appearance almost identical to solvent pop, can encapsulate fine dust particles that fall on a tacky surface. This "solvent pop" appearance usually occurs on vehicles that are removed from the booth in a tacky condition and placed in another location to dry. Fine dust contamination can be removed by sanding and polishing. However, if the condition is solvent pop the finish will contain pinholes or small craters after sanding.

FISHEYES

Description: (Silicone Contamination, Cratering) Small circular, crater-like openings that appear during or shortly after the spray application.



Photo



Diagram

CAUSE

1. Spraying over surfaces contaminated with oil, wax, silicone, grease, etc.
2. Use of thinner/reducer in place of a solvent cleaner.
3. Spraying over previously repaired areas containing "fisheye eliminator" additive.
4. Using spray equipment (gun, lines, compressor) contaminated with oil, wax, silicon, grease,

REPAIR

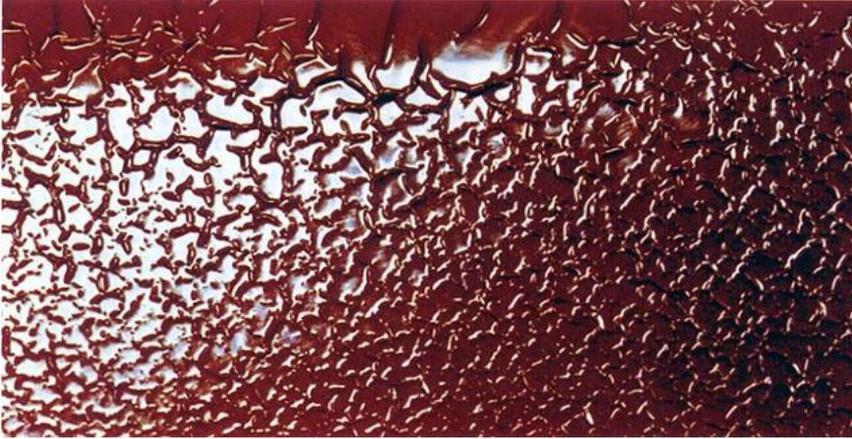
1. Remove wet paint film with solvent, clean and refinish.
2. Add the recommended fisheye eliminator (Wilko # 850.05) and re-spray the affected area.
3. If fisheyes appear in a base coat, allow the color to flash then spray a mist coat over affected area.
4. If the paint has dried, sand to a smooth finish below the fisheye cratering and refinish.

PREVENTION

1. Thoroughly clean the surface to be painted with detergent and hot water, followed by the recommended solvent cleaner. Wipe dry with clean rags.
2. Use fisheye eliminator that is specifically recommended for the topcoat.
3. Install an air filtering system that removes and prevents oil and moisture contamination.
4. Maintain air supply by draining, cleaning and changing filter(s) on a routine basis.

LIFTING

Description: (Wrinkling, Raising, Alligatoring, Shriveling, Swelling) the existing paint film shrivels, wrinkles or swells during new finish application or drying.



CAUSE

Solvents in a newly applied product attack the previous finish causing wrinkling, raising, or puckering of the paint film due to:

1. Re-coating enamels or urethanes that are not fully cured;
2. Exceeding maximum flash or re-coat times during application.
3. Re-coating a base coat/clear coat finish, where existing clear coat has insufficient film build.

REPAIR

1. Remove lifted areas by means of scraping or solvent wipe.
2. Apply two component primer surfacer and/or sealer as a barrier between the new and the old finish. When applying two component undercoats over soluble finishes, the complete panel must be coated.

PREVENTION

Check questionable finishes by rubbing a small inconspicuous area with a shop towel saturated with lacquer thinner. Finishes susceptible to lifting will soften, swell or shrivel as lacquer thinner is applied.

If any of these reactions occur, the following recommendations should be considered. Do not exceed a product's maximum re-coat time during or after application.

1. Allow enamels or urethanes to thoroughly cure before re-coating or attempting a repair.
2. Avoid applying undercoats or topcoats excessively wet.
3. Avoid the use of lacquer products over an air-dried enamel finish.
4. Use water borne undercoats to repair extremely sensitive finishes.
5. When insoluble material (enamel/urethane) has been applied over a soluble material (like lacquer): Avoid sanding through and exposing areas of the soluble material.

MUD CRACKING

Description: Deep, irregular cracks resembling dried mud in the dry paint film.



CAUSE

1. Paint is applied too thick.
2. Forced drying of a heaving coating application.
3. Paint is allowed to build up in corners during application.
4. Surface was not prepared properly; contaminants were not removed.

REPAIR

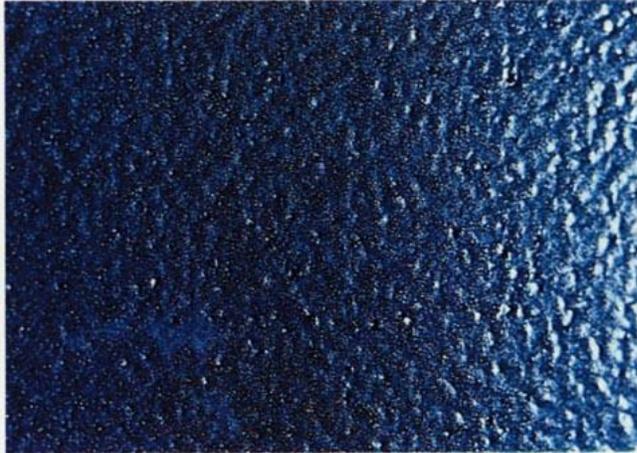
1. Smooth the coating by scraping and/or sanding.
2. Re-prime the affected area if needed, and repaint, checking air pressure and fluid pressure.
3. Quality paints with higher volume solids have very good application and hiding properties, which eliminate the tendency of an applicator to apply too thick a coat of paint.

PREVENTION

1. Follow manufacturer's product data page directions for the appropriate surface preparation.
2. Follow the product data page directions for the appropriate film build and use wet film gauge to measure thickness on sample surface to determine if spray gun is atomizing paint properly.
3. Drop down in spray tip size to reduce the quantity of paint being applied in each pass.
4. In a "brush and roll" application determine the correct roller cover based on the coating being applied and the surface. With high solid epoxy floor coatings, on smooth surfaces, a mohair 1/4", or 3/8" roller nap is usually sufficient. On textured surfaces, a 3/4" nap or greater is needed.

ORANGE PEEL - one of the most common issues.

Description: (Poor Flow, Texture) uneven film formation with hills and valleys in paint resembling the skin of an orange. The defect can be caused by improper application technique where the spray gun is too close to the surface or the air pressure is too low for proper atomization of the paint.



CAUSE

1. Under reduction and/or air pressure too low.
2. Thinner/reducer evaporates too fast for spray conditions.
3. Excessive film thickness or piling on of heavy wet coats.
4. Improper spray gun set-up.
5. Improper painting technique.
6. Aggressive blast profile (> 3 mils) that is not filled in with good epoxy primer.

REPAIR

1. Compound or polish to reduce surface texture.
2. Or, sand smooth with 1200 or finer grit sandpaper, compound and polish to restore gloss.
3. Or, sand smooth and refinish.

PREVENTION

1. Use proper reduction ratio and spray at recommended air pressure.
2. Select recommended thinner/reducer based on temperature, humidity, air movement, and size of repair.
3. Avoid heavy coats and excessive film thickness.
4. Use recommended spray gun, fluid tip and air cap for the material being sprayed. **Always adjust the gun for best atomization and balanced spray pattern before paint application.**
5. During paint application, hold the gun perpendicular and parallel to the surface. Adjust speed of pass, pattern overlap, and distance from the panel to achieve the desired appearance.
6. Reduce blast profile to 1.5 to 2 mils max and use good quality high solids epoxy primer to fill in peaks and valleys of the blast profile.
7. If necessary (with aggressive blast profiles) sand the surface following application of the primer.

PEELING/DELAMINATION

Description: A loss of adhesion, or a separation of the paint film from the substrate.



CAUSE

1. Improper preparation of the substrate (sanding and cleaning).
2. Omitting or applying an incompatible undercoat to a specific substrate (e.g. aluminum, galvanized, plastics, etc.).
3. Using different manufacturer for the primer and for the topcoat - incompatibility and no intercoat adhesion.
4. Insufficient flash/dry time is allowed, or application is exceeding the product's maximum re-coat time.
5. Insufficient film thickness of undercoat, or topcoat (check with dry film thickness gauge).
6. Oxidation on surface of the primer before the application of a topcoat - and failure to clean or to sand/blast off the oxidized surface particles.
7. Clear coat finishes (automotive and polyurethane/clear coat systems)
 - Insufficient film thickness of clear coat.
 - Solvent cleaning base coat before clear coating.
 - Sanding of the base coat without proper surface cleaning before applying additional base coat or clear coat.
 - Base coat accelerated and applied too dry.
 - Clear coat accelerated and applied too dry.
 - Baking or force drying of the base coat before applying clear coat.
 - Using excessive fisheye eliminator in base coat.
 - Incompatible clear coat with the base coat (stay with single manufacturer/product).
 - Use of incompatible "adhesion promoter".
 - Excessive base coat film thickness.
 - Over reduction, under reduction, or incompatible reducer used in base coat.

REPAIR

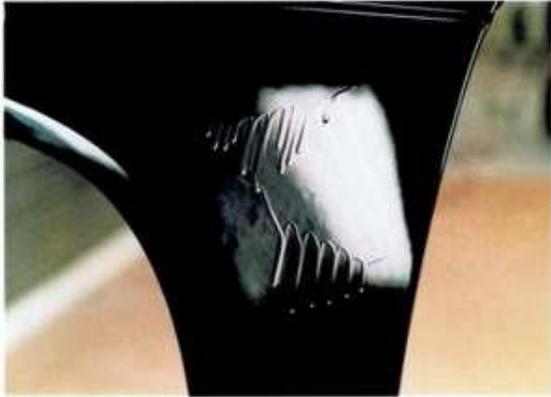
1. Remove the finish in the affected area, featheredge, and refinish.
2. Or, strip/blast to bare substrate and refinish.

PREVENTION

1. Clean and prepare all substrates according to product recommendations.
2. Use the recommended undercoat (primer) for the substrate being finished.
Plastic parts may require use of special primer and flex additive for maximum performance.
3. Re-coat all products within their recommended minimum and maximum re-coat time.
4. Apply a sufficient number of coats to obtain the recommended film thickness.
5. Follow primer/base coat/clear coat application procedures using only recommended/compatible products.
6. "Adhesion promoters" should only be used when specifically recommended.

RUNS

Description: (Hangers, Curtains, Signatures) Coatings that fail to adhere uniformly, causing beads, droplets, or slippage of the total film.



Photo



Diagram

CAUSE

1. Over reduction and/or too slow evaporating thinner/reducer.
2. Applying paint materials without proper flash time between coats.
3. Applying excessive wet coats due to:
 - a. Holding the gun too close to the surface
 - b. Slow gun speed;
 - c. Double coating.
4. Air pressure too low during spray application.
5. Improper spray gun set-up or an unbalanced spray pattern.
6. Material and/or substrate temperature too cold.

REPAIR

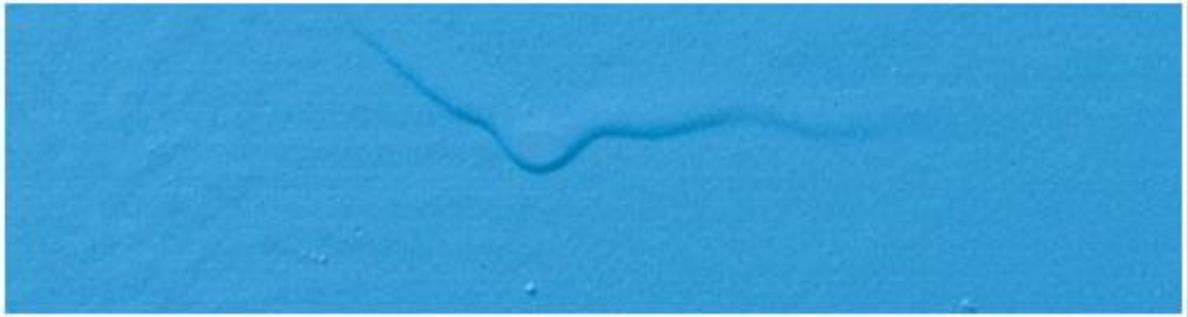
1. Remove the wet paint film with solvent, clean and refinish.
2. Or, after finish is completely dry, remove excess paint by block sanding with 1200 or finer grit sandpaper, compound and polish to restore gloss.
3. Or, block sand smooth and refinish.

PREVENTION

1. Mix according to product directions. Select recommended solvent for spray conditions based on temperature, humidity, air movement, size of repair.
2. Spray medium wet coats and allow sufficient flash time between coats.
3. Adjust the spray gun for the best atomization and balanced spray pattern before paint application. Hold the spray gun perpendicular and parallel to the panel. Adjust speed of pass, pattern overlap, and distance from the panel until the desired results are achieved.
4. Set air pressure at the gun according to product recommendations.
5. Use recommended spray gun, including fluid tip and air cap combination.
6. Allow the paint material and substrate to reach room temperature before application.

SAGGING

Description: Downward “drooping” of the paint film immediately after application, resulting in an uneven coating.



CAUSE

1. Application of too heavy a coat of paint.
2. Application in excessively humid and/or cool conditions.
3. Application of over thinned paint.
4. Painting over a glossy surface, which does not provide enough of a profile to which the coating to adhere to.
5. Painting over a surface contaminant.

REPAIR

1. If paint is still wet, immediately brush out or re-roll to redistribute the excess evenly.
2. If the paint has dried, sand and reapply a new coat of paint.

PREVENTION

Do not thin the paint unless recommended on the label or data page, and at only the recommended levels.

2. Use a Zahn cup or similar device to check the viscosity level to determine if the paint is within the manufacturer' performance specifications.
3. Sand glossy surfaces to a dull finish to provide a surface profile for the adhesion of the coating.
4. Follow the data page directions for the appropriate spreading rate (e.g., the recommended total area that can be painted) for the product. Two coats of paint at the recommended spread rate are better than one heavy coat.

SOFT FILM

Description: (Slow Dry) The paint film is soft to the touch, and will fingerprint or water spot within hours/days after application.



Photo 1



Photo 2

CAUSE

1. Applying undercoat and/or topcoat excessively wet.
2. Insufficient dry time between coats.
3. Improper shop ventilation or heating.
4. Adding too much, or too little hardener to the paint material.
5. Using the *incorrect* hardener for the paint material.
6. Using the incorrect thinner/reducer for spray conditions.
7. Omission of drier in enamel/urethane topcoats.

REPAIR

1. Allow additional dry time, maintaining a booth and shop temperature of 70 degrees Fahrenheit or above.
2. Or, force dry following temperature and time recommendations.
3. Or, remove soft paint film with an appropriate solvent and refinish.

PREVENTION

1. Use recommended spray gun, fluid tip and air cap for the material being sprayed. *Always adjust the gun for best atomization and balance spray pattern before paint application.*
2. Allow sufficient flash time between coats.
3. Maintain shop temperature at 70 degrees Fahrenheit or above for proper dry/cure.
4. Use the recommended hardener, measure accurately, and mix thoroughly.
5. Select appropriate thinner/reducer based on temperature, humidity, air movement, and size of repair.
6. *Allow additional flash time when spraying in high temperature/high humidity or low temperature/high humidity conditions.*

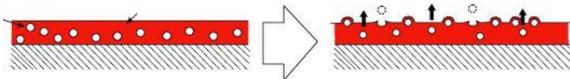
SOLVENT POPPING - PIN-HOLING

Description: (Boiling, Blowing) Small bubbles, pinholes or crater-like openings in, or on the paint film.



Photo 1

Photo 2



Diagram

CAUSE

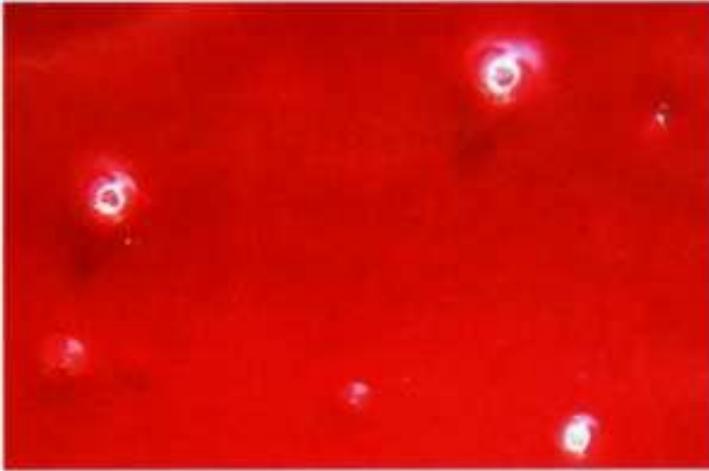
Liquid solvent (thinners/reducers) becomes "trapped" in the paint film when the surface layer skins over too quickly, preventing their evaporation into the atmosphere. Solvents that vaporize within the paint film leave bubbles, pinholes or craters as they push through and "pop" the surface. Solvents can be trapped due to:

1. Thinner/reducer evaporating too fast for spraying conditions;
2. Inadequate flash time between coats;
3. Excessive film thickness or "piling on" of heavy/wet coats;
4. Too much air movement-causing surface to "skin over" before solvents evaporate;
5. Excessive purge/flash time before force drying.

REPAIR

1. Allow finish to thoroughly dry/cure, sand smooth and refinish. Inspect surface carefully to insure all craters have been removed.
2. *Severe popping will require removal of the affected film. Prime, seal and recoat, as necessary.*

SOLVENT POPPING - PINHOLING (continued)



PREVENTION

1. Select recommended thinner/reducer based on temperature, humidity, air movement and size of repair;
2. Allow for proper flash time between coats.
3. Avoid "piling on" or double wet coats.
4. Restrict air movement over the surface being painted.
5. Avoid extended purge/flash time before force drying.

NOTE: the wet film, creating an appearance almost identical to solvent pop, can encapsulate fine dust particles that fall on a tacky surface. This "solvent pop" appearance usually occurs on painted surfaces that are removed from the booth in a somewhat tacky condition and placed in another location to dry.

Fine dust contamination can be removed by sanding and polishing. However, if the condition is solvent pop, the finish will contain pinholes or small craters after being sanded.

TRANSPARENCY

Description: (Poor Hiding, Poor Coverage, Translucent) The original finish or undercoat is visible through the topcoat.



Photo 1



Photo 2

CAUSE

1. Color not thoroughly stirred/agitated.
2. Color over-thinned/reduced.
3. Substrate not uniform in color.
4. Wrong color undercoat used.
5. Insufficient number of color coats applied.

REPAIR

1. Apply additional coats of color until hiding is achieved.
2. Or, sand and apply similar colored undercoat/ground coat and refinish.

PREVENTION

1. Stir or shake paint material thoroughly, making sure all pigment is in solution/suspension.
2. Thin/reduce according to product label directions.
3. Use a primer/sealer or base coat to provide a uniform color before top coating.
4. Use an undercoat that is similar in color to the topcoat.
5. Spray successive coats until hiding is achieved.

NOTE: SPRAY MONITORS (hiding power labels, opacity charts) provide a contrasting feature by which to observe the hiding power or transparency of topcoat color during spray application. When black and white can no longer be seen through the color, complete coverage is achieved.

WATER SPOTTING

Description: (Water Marking) Circles with raised edges or whitish spots resembling the various shapes of water droplets appear on the surface of the paint film.



Figure 1



Figure 2

CAUSE

1. Allowing water to come into contact with a finish that is not thoroughly dried/cured (Fig. 1).
2. Washing finish in direct sunlight (Fig. 2)

REPAIR

1. Wipe with a damp cloth, then polish.
2. Or, compound and polish.
3. Or, sand smooth with 1500-2000 grit sandpaper, compound and polish to restore gloss.
4. Or, completely sand and refinish.

PREVENTION

1. Do not allow water to come into contact with newly painted finish.
2. If a new finish does get wet, dry immediately with a soft cloth.
3. Wash new finishes in the shade and wipe dry.

Summary:

This Trouble Shooting guide is a simple tool to use in order to identify problem areas and to offer easy steps to solve the most common issues when painting.

This guide is designed for industrial applications using the most common application equipment in conventional pressure pot, HVLP, and airless systems. It does not address issues in e-coat or electrostatic/robotic application systems, even though the causes of these problems are very similar to conventional spray systems.

The best way to analyze your paint issues is to have a professional technical sales representative to come into your facility and to do a system audit. A competent professional technical sales representative will give you an honest appraisal of your complete system. He seeks to work with you as a partner in solving problems, not merely to sell paint or a spray system.

If Wilko Paint can be of further assistance to you, please feel free to give us a call, or to drop us an email.

We look forward to earning your business.

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