

TRANSTAR[®]

AUTOBODY TECHNOLOGIES, INC.

Paint Defect/ Troubleshooting Guide



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Paint Defaults & Defects

Identifying Paint Conditions:

An accurate paint condition diagnosis is necessary to ensure “Customer Satisfaction”. There are a wide variety of conditions that body shops may encounter resulting from:

- variations in paint process
- environmental conditions
- car owner care
- maintenance or lack of

Hence, it is critical to properly identify the paint condition’s cause before a recommendation for the repair is made. Poorly prepared substrates, and careless use of paint materials can result in a flawed paint job. Other factors in the paint process/working environment can also affect the end result such as humidity, temperatures, dry times, film thickness etc. Much depends on the painter’s craftsmanship and experience.

By studying the paint defects illustrated in this booklet, you can identify possible causes in the body shop and help find solutions to avoid such problems in the future.

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Chipping

Identification:

Small chips of finish losing adhesion to the substrate.

Cause:

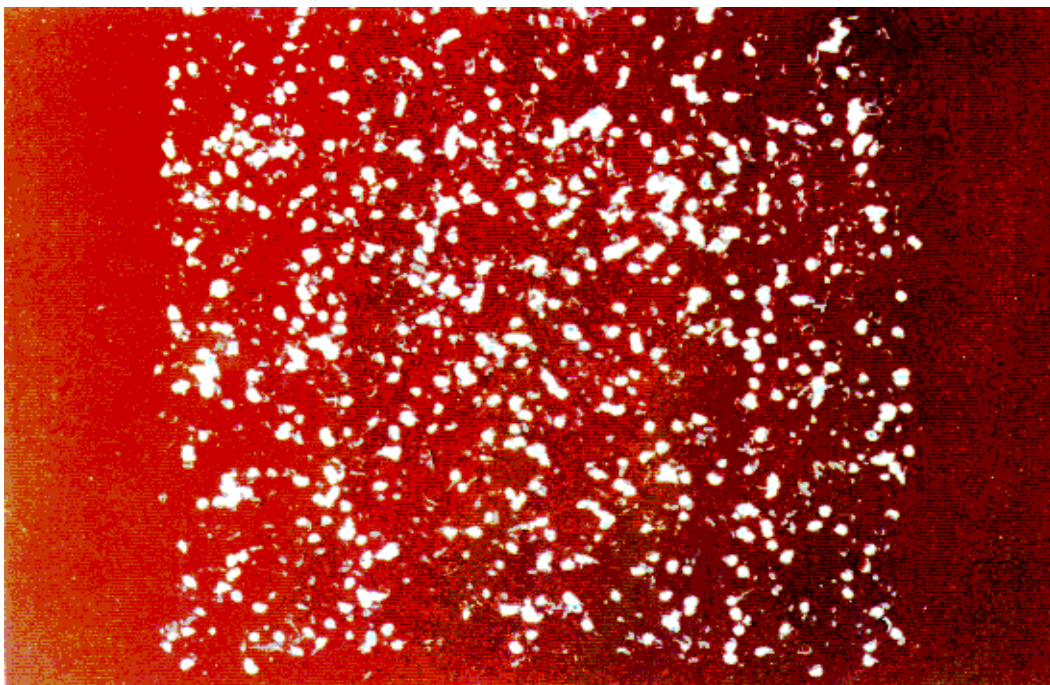
- Improper cleaning or preparation
- Improper metal treatment
- Materials not properly mixed
- Failure to use proper sealer

Prevention:

- Degrease and prepare substrate carefully
- Use correct metal conditioner (e.g. Self Etching Primer)
- Ensure all materials are measured and mixed uniformly
- Use compatible products/follow manufacturer's instructions

Repair Process:

- Remove finish from an area slightly larger than the affected area, sand smooth, prepare metal and refinish.



Paint Defaults & Defects

Blushing (Milkiness)

Identification

A milky white, gray cloud appears on the surface of the paint film immediately or shortly after application.

Cause:

- 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. The condition is aggravated when too fast drying or unbalanced thinner/reducer is used.

Prevention:

- Thoroughly degrease surface with a wax and silicone remover
- Regular maintenance of air supply/equipment

Repair Process:

- Should blushing occur during application:
 - (a) apply heat to the affected areaOR
 - (b) add retarder and apply additional coats.



Chalking (Fading, Oxidation, Weathering)

Identification

A chalky white appearance on the surface of the paint film.

Cause:

- Pigment is no longer held and protected by resin, resulting in a powder-like surface and lack of gloss due to:
 - Natural weathering of the paint film
 - Improper application of paint material
 - Excessive use of mist/fog coats when applying single stage metallic finishes
 - Using generic thinner/reducer and/or hardener in the paint material

Prevention:

- Weekly washing and occasional polishing or waxing will remove oxidation from the finish
- Thoroughly stir, shake or agitate all paint materials
- When spraying single stage metallic finishes, apply mist/fog coats panel by panel while finish is still wet
- Use the recommended thinner/reducer/hardener and measure accurately

Repair Process:

- Compound to remove oxidation and polish to restore gloss
OR
- Sand to remove “weathered” paint film and refinish



Paint Defaults & Defects

Clearcoat Yellowing

Identification

Clearcoat has a yellow hue to it.

Cause:

New paint:

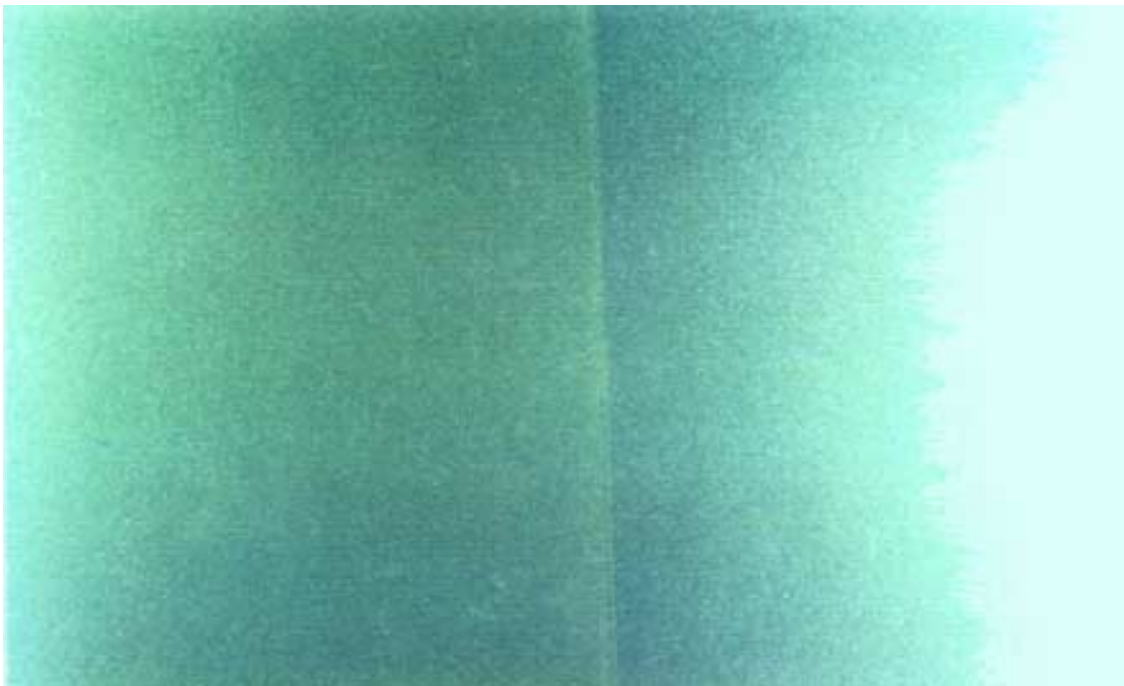
- Dirty mixing equipment
- Too much accelerator (i.e. Kicker) used

Old Paint:

- Clear coat too thin
- Contaminated hardener
- No cross link

Repair Process:

- Affected areas must be sanded smooth, sealed and refinished.



Edge Mapping (Edge Ringing, Featheredge Lifting)

Identification

Raised or lifted edges in the wet or dry paint film that outline sand throughs or featheredges

Cause:

- Solvent from the new topcoat penetrates a solvent sensitive substrate causing a lifting or wrinkling that outlines the featheredge

Prevention:

- Check questionable finishes by rubbing a small inconspicuous area with a shop towel saturated with lacquer thinner. Finishes susceptible to lifting will soften, wrinkle or shrivel as lacquer thinner is applied. If any of these reactions occur, the following recommendations should be considered:
 - Use acrylic urethane primer surfacer, waterborne primer surfacer or an acrylic lacquer primer surfacer thinned with non-penetrating thinner over sensitive substrates.
 - Use 400 or finer grit sandpaper when featheredging.
 - Avoid sanding through insoluble topcoat color or clear, exposing solvent sensitive or soluble finishes.

Repair Process

- Sand smooth or remove the affected area. (Final sand with 400 or finer grit sandpaper)
- Isolate affected area with two component primer surfacer and refinish.
- Or, apply waterborne primer surfacer, sand smooth, and refinish.
- Or, apply acrylic lacquer primer surfacer thinned with non-penetrating thinner, sand smooth and refinish.



Paint Defaults & Defects

Fish Eyes or Craters

Identification

Appears as a small crater - like an opening in the finish after it has been applied.

Cause:

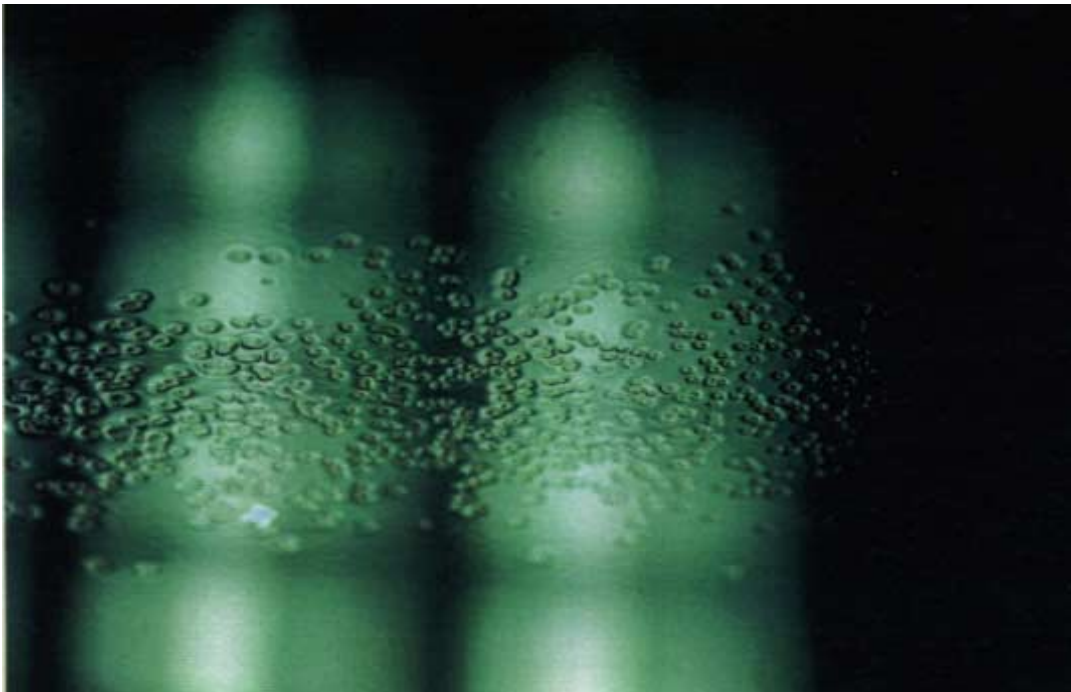
- Oil, wax, grease or silicone contamination. Many waxes and polishes contain silicone - the most common cause fish eye or craters
- Contaminated air lines
- Effects of old finish and previous repair (May contain excessive amount of silicone)
- Polishes, aerosol sprays that contain silicone (Interior cleaners)

Prevention:

- Thoroughly degrease surface with a wax and silicone remover
- Regular maintenance of air supply/equipment
- Add fish eye eliminator

Repair Process

- In severe cases, affected areas should be sanded down and refinished
- Apply mist coats
- Use fish eye eliminator (in severe cases)



Lifting (Wrinkling, Raising, Alligatoring, Shriveling, Swelling)

Identification

The existing paint film shrivels, wrinkles or swells during new finish application or drying.

Cause:

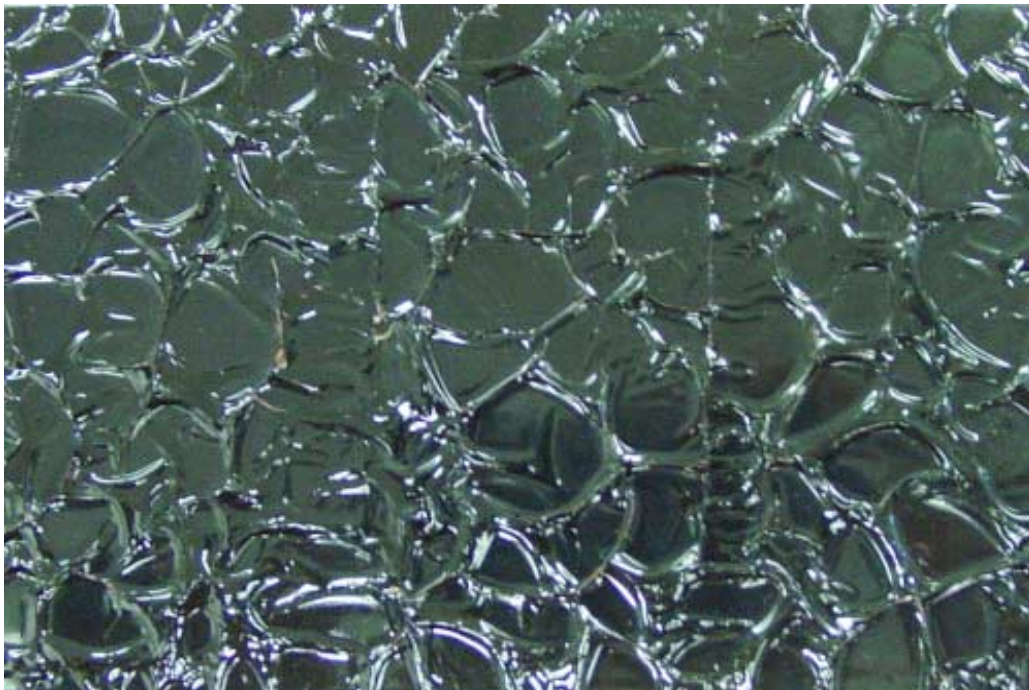
- Solvents in a newly applied product attack the previous finish causing wrinkling, raising, or puckering of the paint film due to:
 - Recoating enamels or urethanes that are not fully cured
 - Recoating a basecoat/clearcoat finish, where existing clearcoat has insufficient film build
 - Exceeding maximum flash or recoat times during applications

Prevention:

- Check questionable finishes by rubbing a small inconspicuous area with a shop towel saturated with lacquer thinner. Finishes susceptible to lifting will soften, wrinkle 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 recoat time before recoating or after application.
 - Allow enamels or urethanes to thoroughly cure before recoating or attempting a repair.
 - Avoid applying undercoats or topcoats excessively wet.
 - Use waterborne undercoats to repair extremely sensitive finishes.

Repair Process

- Remove areas lifted and refinish.



Paint Defaults & Defects

Loss of Gloss or Dieback

Identification

A noticeable loss of surface gloss.

Cause:

- Incorrect mixing or contaminated hardener where no cross link occurs
- Porous primer
- Poor flow of primer
- Attack of primer by solvent from the topcoats
- Interrupted baking/uneven temperatures
- Certain metallic basecoats
- Top coat applied too thin

Prevention:

- Use finer grade of sanding paper
- Increase film thickness/improve flow of topcoat
- Ensure adequate temperatures in cooler weather
- Do not interrupt baking cycle
- Allow adequate flash times, follow manufacturer's application instructions
- Seal solvent-sensitive primers (e.g. lacquer)

Repair Process:

- Buff and polish
- If extreme, sand and refinish



Orange Peel

Identification

Uneven surface formation, texture like skin of an orange

Cause:

- Improper spraying pressure/technique or application temperatures
- Improper flash or recoat times between coats
- Extreme shop temperatures (When air temperature is too high, droplets lose more solvent and dry out before they can flow out and level.)
- Use of improper reducer/thinner (Fast evaporating solvents cause the atomized droplets to dry before they reach the surface.)
- Materials not mixed correctly

Prevention:

- Use proper gun adjustments, techniques and recommended pressures
- Schedule paint jobs to avoid extreme temperature/humidity conditions
- Allow proper drytimes for undercoats/topcoats per manufacturer's recommendations
- Use recommended thinners per manufacturer's instructions
- Follow paint mixing instructions carefully per manufacturer's recommendations

Repair Process:

- Sand and buff using a mild polishing compound for enamel, rubbing compound for lacquer
- In extreme conditions, sand to smooth surface and respray topcoat



Paint Defaults & Defects

Peeling / Blistering / Adhesion Problems

Identification

Loss of adhesion between paint and substrate (topcoat to primer and/or old finish, or primer to metal).

Cause:

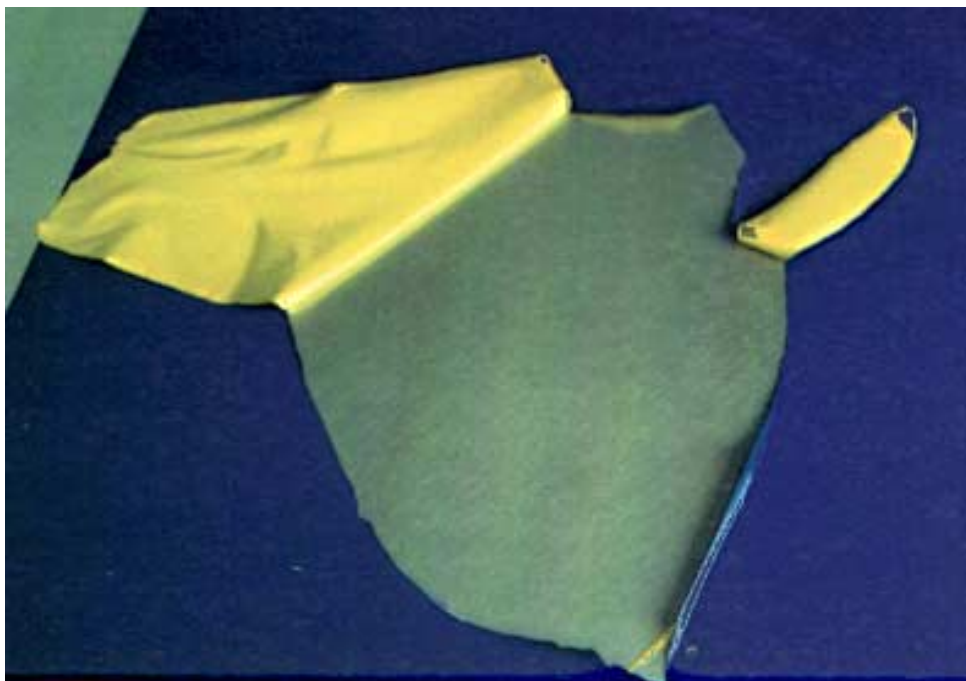
- Improper cleaning or preparation of substrate
- Failure to remove sanding dust or other surface contaminants
- Improper metal treatment
- Use of incompatible materials or not properly mixed
- Condensation on substrate due to temperature changes
- Flash off/drying times too short
- Formation of condensation on substrate between coats due to temperature fluctuations
- Applying excessive film thickness of primers or basecoat

Prevention:

- Thoroughly degrease, clean and prepare surface carefully
- Use correct metal primer (e.g. Self Etching or Epoxy Primer)
- Stir all pigmented undercoats and topcoats thoroughly
- Keep to specified dry times
- Follow manufacturer's application instructions

Repair Process:

- Remove finish from an area slightly larger than the affected area and refinish.



Pinholing

Identification

Tiny holes in the finish, putty or body filler usually the result of trapped solvents, air or moisture.

Cause:

- Improper surface cleaning or preparation - moisture left on primer-surfacers will pass through the wet topcoat causing pinholing
- Contaminated air lines (Moisture or oil in airlines will enter paint.)
- Wrong gun adjustment or spray technique (Gun too close to the substrate.)
- Improper dry method (Fanning a newly applied finish can drive air into the surface causing the surface to skin, which will result in pinholes when solvents retained come to the surface.)
- Improperly primed body filler
- Improperly mixed polyester, fiber glass bodies

Prevention:

- Thoroughly clean all surfaces and ensure surface is dry
- Drain and clean air pressure regulator to remove trapped moisture and dirt. Air compressor tank should also be drained regularly
- Use proper gun adjustments, techniques and pressures
- Allow sufficient flash and dry times. Do not dry by fanning
- Body filler should be sufficiently filled with primer-surfacer
- Body filler must be thoroughly mixed

Repair Process:

- Affected areas must be sanded smooth and refinished



Paint Defaults & Defects

Runs / Sags

Identification

Appears as a thick, raised uneven line on the surface

- Typically on vertical surfaces
- May be in clear or color coat

Cause:

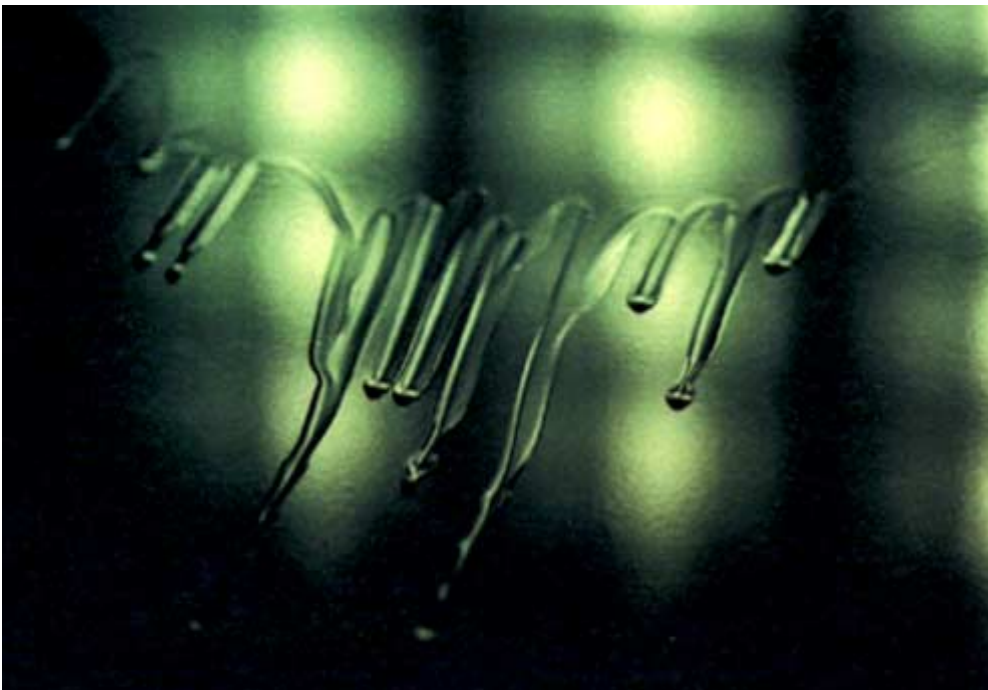
- Incorrect spraying viscosity, spray technique, flash off times between coats or film thickness
- Defective spray gun set up/incorrect pressure
- Temperature - shop too cold
- Wrong thinner/reducer/hardener used

Prevention:

- Do not “pile” on finishes. Allow sufficient dry times between coats
- Use proper gun adjustments, techniques and gun pressure
- Warm material/substrate to room temperature (60° - 75°F)
- Use correct hardeners, thinners

Repair Process:

- In clear coat: sand and buff
- In basecoat: (color coat or color/clear coat) clean affected area and let dry until surface can be resanded and repainted



Solvent Popping

Identification

Blisters on the paint surface.

Cause:

- Poor surface cleaning and preparation
- Wrong thinner/reducer, especially if material sprayed too dry or at excessive pressure
- Spraying too much, too fast - excessive film build (Too heavy on application of undercoats may trap solvents causing popping of color/clear coat as solvent escapes.)
- Incorrect gun set-up
- Booth with insufficient air flow

Prevention:

- Degrease and prepare surface carefully
- Apply at recommended film thickness
- Allow proper drytimes for undercoats and topcoats. Allow each coat of primer-surfacer to dry naturally - do not fan
- Check oven temperatures, follow manufacturer's recommendations
- Do not "pile" on coatings. Follow manufacturer's recommended film thickness and flash times

Repair Process:

- After drying, repaint without sanding (within 24 hours)
- If extreme, sand affected areas, refinish pinholes with a polyester filler, prime and refinish



Paint Defaults & Defects

Troubleshooting Spray Gun Problems

Problem: Gun is leaking from fluid nozzle.

Causes: Fluid nozzle loose, foreign particle or dried paint keeping needle from seating.

Remedy: Tighten nozzle or remove and clean nozzle.

Problem: Gun is leaking from needle sealing area.

Causes: Teflon packing is damaged or missing.

Remedy: Replace Teflon packing.

Problem: Gun sprays sickle shaped to the left or right) (

Causes: Air holes clogged on air cap or air cap damaged.

Remedy: clean air holes or replace air cap.

Problem: Tear drop or oval shaped spray pattern

Causes: Air cap clogged at fluid needle orifice.

Remedy: Remove and clean air cap and fluid nozzle.

Problem: Paint sputters from gun.

Causes: Insufficient material in cup, material not filtered, fluid nozzle loose, needle Teflon packing damaged, needle & nozzle dirty.

Remedy: Refill cup, filter material, tighten loose parts, replace Teflon packing, clean needle & nozzle.

Problem: Incorrect atomization.

Causes: inlet air pressure too low or material too thick; pressure too high or material too thin.

Remedy: Adjust air pressure and/or product viscosity.



Paint Defaults & Defects

Anti-Chip Coating: A special primer or film applied to lower vehicle areas to resist surface breaking due to impacts by small foreign objects.

Base Coat: A color topcoat that requires a clear topcoat applied over it.

Blisters: Bubbles or pimples appearing in the topcoat finish.

Checking: A type of failure in which cracks in the paint begin at the surface and progress downward, creating a straight V-shaped crack which is narrower at the bottom than the top.

Chemical Spotting: Blotchy, ringlet-shaped discolorations and small, irregular dark spots etched into a paint surface caused by airborne pollutants.

Chromium: A grayish-white very hard metallic element.

Clear Coat: A clear topcoat required to cover a color base coat.

Color/Clear Coat: A repair allowing clear and/or base coat removal from a panel area, but not the factor primer.

Corrosion: Oxidation (rusting) of a metallic substrate by moisture and chemical agents in its environment.

Cracking: Deep cracks in a topcoat finish and possibly in the undercoat.

Crazing: Small cracks, often called crow's feet, in a topcoat finish, which cover the surface in an irregular pattern.

Degradation: The gradual or rapid disintegration of a paint film; associated with clear coat.

Delamination: The loss of adhesion between the color coat and primer.

Dirt In Finish: Foreign particles in the finish.

ELPO: Electrocoat Deposition Primer.

Enamels: A pigmented gloss finish material, not requiring a clear coat.

Etching: A small chemical discoloration spot on the paint surface.

Fading: Change in color of an applied finish.

Finesse, Sand and Buff: A process to sand and polish a panel to remove minor imperfections.

Film Thickness: A measure of how much paint gets to the surface.

Flaking: The eventual splitting off of paint from the surface due to crazing or cracking.

Hiding: An ability of a color topcoat to completely prevent the color of surface underneath it to show through.

Hue: Gradation of color.

Holdout: An ability of a surface applied with an undercoat material to keep the topcoat from sinking in.

Lacquer: A finish material that dries by solvent evaporation.

Marring: Scrapes and/or scuffs on a paint surface.

Metallic: A finish material that has flakes added to the pigment.

Mil: A measure of paint film thickness equal to one thousandth of an inch.

Mottling: Spotty or striped appearance in metallic topcoat finishes due to uneven orientation of flakes.

Orange Peel: An uneven surface in a topcoat that resembles the skin of an orange.

Panel Repair: A type of refinish repair job in which a complete panel (door, hood, rear, deck, etc.) is repainted.

Peeling: Loss of adhesion between a topcoat and undercoat, or between an undercoat and the prepared surface.

Primer: The first coat of paint applied to a substrate.

Primer-Sealer: An undercoat which improves adhesion of the topcoat, and which seals old painted surfaces that have been sanded.

Primer-Surfacer: A high-solids undercoat material that fills small surface imperfections.

Refinish/Clear Coat: A repair used when some of the factory primer must be removed in order to refinish an entire panel.

Runs or Sags: Heavy application of sprayed material that fails to flow uniformly to the surface.

Rust: The corrosion product which forms on iron or steel when exposed to moisture.

Sagging: Excessive flow of an applied material on a vertical surface, resulting in drips and other imperfections.

Sanding: To smooth a surface with an abrasive paper or cloth (by hand or machine).

Stripping: A repair to remove the finish (color/clear or primer) from the panel area.

Ultraviolet Light: That portion of the spectrum which is largely responsible for the degradation of paints, invisible to the eye.

Weathering: The change or aging in a paint film by natural forces, such as sunlight, rain, dust wind, etc.

Wet Sand: A technique involving the sanding of a surface while it is being flushed with water.

Yellowing: A discoloration of a painted surface to a yellowish cast, caused by smoke, heat, grease, or certain gases, but more commonly, sunlight.

