Paint Defects

Identification and Correction
Overview

“Paint & Body Defects” is one of the 3 most consistent indicators when inspecting for ‘prior repairs’ that could ultimately indicate structural repairs, existing damage or alterations.

Use this guide to better understand the various paint and body defects.
Correcting Paint Conditions

★ Corrective processes not involving refinishing operations must maintain proper UV protection
  ★ Check film thickness before starting
  ★ Check film thickness after correction
  ★ If more than 0.3-0.5* mil of clearcoat is removed the affected area should be re-painted
  ★ *Varies by OEM paint process
Paint Condition List

- Acid Rain
- Industrial Fallout
- Water Spotting
- Scratches
- Environmental Contamination
- Polishing marks
- Stonechip
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- Sanding Marks - Topcoats
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- Pinholes - Topcoats
- Pinholes - Substrates
- Solvent Pop
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- Peroxide Staining
Acid Rain

- **Cause**
  - Rain containing airborne contaminants from manufacturing processes, chemical industries, and power stations
  - Contaminants may become acidic or alkaline when combined with water (sulfur dioxide - acidic, cement dust - alkaline)

- **Prevention**
  - Avoid heavily contaminated atmospheres
  - Wash surface immediately after exposure to remove and neutralize the contaminants

- **Remedy**
  - Neutralize the surface with mild detergent and water, thoroughly rinse
  - Sand, and polish
  - Sand, and repaint
Industrial Fallout

- **Cause**
  - Iron and steel particles from heavy industry, foundries, railroads

- **Prevention**
  - Thoroughly wash vehicle immediately after exposure
  - Protect vehicle from exposure to such environments, cover if possible

- **Remedy**
  - Clean surface with a suitable solution to dissolve the particles, neutralize, then polish
  - Remove particles, sand, and repaint
Water Spotting

**Cause**
- Droplets of water on paint which is not sufficiently cured due to:
  - Excessive film thickness, drying time too short
  - Failure of cross linking due to moisture contamination
  - Unsuitable thinner

**Prevention**
- Follow technical recommendations
- Ensure lids are tightly replaced after using hardeners

**Remedy**
- Remove marks by polishing
- Sand, isolate and repaint
Scratches

- **Cause**
  - Frequent use of brush or soft cloth automated car wash facilities
  - Wiping a dry surface instead of rinsing with water
- **Prevention**
  - Maintain and protect the finish with quality, non-silicone polish or wax
  - Rinse vehicle, never dry wipe the surface
- **Remedy**
  - Polish
  - For severe scratches, sand and repaint
Environmental Contamination

- **Cause**
  - Bird droppings, acid rain, other environmental influences

- **Prevention**
  - Immediately clean and neutralize the contamination with mild detergent and water before etching starts

- **Remedy**
  - Neutralize, sand, and polish
  - Neutralize, sand, and repaint
Polishing Marks

◊ Cause
  ◊ Top coat not through-dried
  ◊ Sandpaper too coarse
  ◊ Unsuitable polish
  ◊ Polishing through layers on edges

◊ Prevention
  ◊ Thoroughly dry top coat, if necessary re-bake
  ◊ Use suitable polish and equipment
  ◊ Use correct sandpaper
  ◊ Use polish, free of ammonia

◊ Remedy
  ◊ Thoroughly dry topcoat and re-polish
  ◊ Thoroughly dry topcoat, sand and repaint
Stonechip

- **Cause**
  - High use of gravel roads
  - Frequent highway use
  - Following vehicles too close
  - Improper film build

- **Prevention**
  - Careful driving habits
  - Proper film builds
  - Anti-chipping paint systems

- **Remedy**
  - Sand and repaint with proper systems
Corrosion

- **Cause**
  - Paint removed by chipping or scratching exposing bare metal
  - Inadequate pre-treatment of metal
  - Rust not removed before application of coatings
  - Metal surface contaminated before application of coatings

- **Prevention**
  - Remove all rust before applying coatings
  - Properly pre-treat metal substrates
  - Use correct coating materials

- **Remedy**
  - Thoroughly remove all rust
  - Sand and repaint with proper systems
Orange Peel / Texture

○ Cause
  ○ Incorrect spray pressure, gun setup, viscosity, technique, or application temperature
  ○ Wrong combination of solvents or non-system solvents
  ○ Substrate not sanded thoroughly

○ Prevention
  ○ Follow recommendations on technical data sheets
  ○ Prepare and sand substrate correctly
  ○ Use recommended gun set up
  ○ Always use system thinners

○ Remedy
  ○ Sand and polish
  ○ Sand and repaint
Dirt Inclusions

- **Cause**
  - Various types of contamination typically introduced during the application or drying process

- **Prevention**
  - Proper vehicle/technician cleaning procedures, booth/spray equipment maintenance, material preparation, masking, etc.

- **Remedy**
  - Sand, and polish
  - Sand, and repaint
Adhesion Problems with Plastics

- **Cause**
  - Insufficient cleaning, drying (tempering)
  - Incorrect primer has been used

- **Prevention**
  - Clean and degrease properly
  - Temper parts before priming
  - Ensure proper solvents evaporation
  - Use suitable adhesion primer

- **Remedy**
  - Remove damaged finish and repaint
  - Steam clean, sand, clean and repaint
Adhesion Problems - Clearcoat

- **Cause**
  - Excessive coat thickness of basecoat
  - Intermediate and final flash-off times of the basecoat too short
  - Wrong mixing ratio for clearcoat and hardener

- **Prevention**
  - Allow proper flash off time
  - Apply proper film thickness
  - Mix clearcoat correctly

- **Remedy**
  - Sand and repaint
Clouding / Mottling

○ Cause
  ○ Incorrect spray viscosity, technique, flash off times, spray temperature
  ○ Defective spray gun setup, incorrect spray pressure
  ○ Unsuitable thinners

○ Prevention
  ○ Use correct viscosity and spray gun setup
  ○ Keep spray gun parallel to object
  ○ Use correct thinner with sufficient flash off time
  ○ Observe recommendations in technical data sheets

○ Remedy
  ○ Use droplet method before spraying clear
  ○ After clear has thoroughly dried, sand surface and repaint
Contamination (Fish-eyes / Silicone)

- **Cause**
  - Oil, wax, grease or silicone contamination
  - Contaminated air supply
  - Use of polishes or aerosol sprays containing silicone (e.g. interior cleaners or dressings)
  - Insufficient cleaning

- **Prevention**
  - Regular maintenance of air supply
  - Thoroughly clean with a suitable wax and grease remover

- **Remedy**
  - Apply light coats of basecoat until defect is covered
  - Sand panel, clean / isolate, and repaint
  - If required, use fish-eye eliminator
Peeling Problems

- **Cause**
  - Substrate not sufficiently prepared (rust, grease, moisture, poor sanding or cleaning)
  - Use of incompatible material or an incompatible substrate
  - Flash off and drying times too short
  - Condensation of substrate due to temperature changes

- **Prevention**
  - Follow application recommendations
  - Degrease and prepare substrate carefully
  - Keep to specified drying times
  - Use compatible product systems

- **Remedy**
  - Sand damaged area and repaint
Sanding Marks - Topcoats

- **Cause**
  - Sanding paper too coarse
  - Soft, solvent reversible substrates (e.g. acrylic lacquer (T.P.A.))
  - Insufficient film build

- **Prevention**
  - Solvent test to identify soft, reversible substrates (T.P.A.)
  - Isolate soft finishes
  - Use recommended sandpaper
  - Apply proper film thickness

- **Remedy**
  - Thoroughly dry affected area
  - Sand, isolate, and repaint
Sanding Marks - Substrate Preparation

- **Cause**
  - Insufficiently sanded polyester stopper
  - Insufficient isolation of the polyester before topcoat application

- **Prevention**
  - Use suitable sanding paper
  - Isolate polyester areas with 2K filler

- **Remedy**
  - Thoroughly sand damaged area and repaint
Loss of Gloss / Matting

- **Cause**
  - Film thickness/air humidity
  - Solvent-sensitive substrate
  - Incorrect mixing or contaminated hardener, or unsuitable thinner
  - Insufficient airflow in oven or interrupted baking

- **Prevention**
  - Follow application recommendations on technical data sheets
  - Close hardener cans firmly after use
  - Ensure sufficient airflow in oven and do not interrupt baking cycle

- **Remedy**
  - Sand and polish
  - Sand and repaint
Hiding Power (Coverage, Opacity)

- **Cause**
  - Substrate not uniform (effect finishes)
  - Color coat film build too low

- **Prevention**
  - Spray a uniform substrate
  - Spray sufficient color to obtain opacity

- **Remedy**
  - Sand and repaint
Color Off-shade

- **Cause**
  - Weathered surface
  - Incorrect spraying technique  
    - too wet or dry, poor opacity
  - Incorrect spray gun setup or PSI
  - Incorrect mixing
  - Variations of the OEM finish (multiple color shades)

- **Prevention**
  - Check color for variations
  - Mix color correctly
  - Spray a test panel for verification
  - Apply with recommended procedures
  - Use blending techniques

- **Remedy**
  - Polish adjoining panel for color verification
  - Blend the color
  - Tint the color, sand, repaint
Clearcoat Yellowing

- **Cause**
  - Wrong or contaminated hardener
  - Insufficient clearcoat film thickness

- **Prevention**
  - Ensure lids are tightly replaced after using hardeners
  - Follow technical recommendations
  - Use system hardeners

- **Remedy**
  - Sand and repaint
Moisture Blisters

- **Cause**
  - Residue of sanding water in corners, edges, crevices, or below decorative strips
  - Contaminated air supply
  - Insufficient isolation of polyesters
  - Ambient humidity too high

- **Prevention**
  - Always remove exterior trim
  - Blow and dry carefully
  - Check air supply equipment regularly

- **Remedy**
  - Remove contaminated finish and repaint
Adhesion Problems - Polyester

**Cause**
- Substrate not carefully prepared
- Polyester material unsuitable for galvanized substrate
- Too high surface temperature while forced drying
- Undercured - too much or too little hardener

**Prevention**
- Clean and sand thoroughly
- Follow the manufacturer's instructions for forced drying
- Use proper mixing ratio
- Ensure the hardener is thoroughly mixed

**Remedy**
- Sand the damaged repair-area well
- Repair and repaint
Edge Mapping Due to Solvent Penetration

**Cause**
- Insufficient isolation where topcoat was sanded through to substrate
- Isolated with unsuitable filler
- Filler incorrectly applied
- Insufficient drying of substrate

**Prevention**
- Solvent Test to identify soft substrates
- Apply only several thin coats of 2K Primer Filler
- Avoid sanding through to soft substrate

**Remedy**
- Thoroughly dry affected area
- Sand, isolate, and repaint
Wrinkling, Rippling, Lifting

- **Cause**
  - Finish not fully cured (synthetic resin finishes)
  - Unsuitable substrate (aerosol paints, acrylic lacquer or nitrocellulose)
  - Excessive film build

- **Prevention**
  - Solvent test
  - Remove or isolate solvent-sensitive substrates
  - Ensure sufficient drying
  - Avoid excessive film thickness

- **Remedy**
  - Remove finish in affected area and repaint
Shrinkage / Edge Mapping

- **Cause**
  - Substrate not fully cured
  - Subsequent coats applied too soon to preparatory materials
  - Excessive film thickness
  - Sanding paper too coarse

- **Prevention**
  - Solvent test to identify soft substrates
  - Do not apply polyester products directly to soft substrates
  - Isolate with 2K filler, applying thin coats with sufficient inter-coat flash off
  - Dry prep materials thoroughly
  - Use proper grit sandpaper
  - Follow recommendations

- **Remedy**
  - Thoroughly dry affected area
  - Sand, isolate if necessary, and repaint
Striping / Banding

- **Cause**
  - Spray technique or PSI, material viscosity, or spray gun setup
  - Flash off time too short
  - Unsuitable thinner for application conditions

- **Prevention**
  - Follow application recommendations
  - Choose suitable spray gun setup
  - Keep spray gun parallel to object
  - Follow manufacturer's product system

- **Remedy**
  - Ensure even application
  - Keep spray gun in good working order
  - Thoroughly dry, sand, and repaint
Pinholes

- **Cause**
  - Fiberglass bodies
  - Insufficient mixing of polyesters
  - Solvent popping that has been sanded to open the top
  - Insufficient isolation of polyesters

- **Prevention**
  - Thoroughly mix polyesters
  - Do not sand solvent pop or completely remove defect before repainting
  - Isolate polyesters correctly
  - Use a sprayable polyester filler

- **Remedy**
  - Remove damaged finish
  - Sand and apply a sprayable polyester filler, prime, and repaint
Pinholes - Substrate Preparation

- **Cause**
  - Substrate insufficiently dried
  - Polyester material not sufficiently isolated
  - Pores not deeply sanded

- **Prevention**
  - Allow prep materials to dry thoroughly
  - Thoroughly sand pinholes and repaint
  - Thoroughly sand, re-apply polyester and repaint

- **Remedy**
  - Thoroughly dry affected area
  - Sand, isolate, and repaint
Solvent Pop

- **Cause**
  - Solvent or air trapped in film escapes during drying leaving pop marks
  - Caused by incorrect spray viscosity, spray pressure, flash off time, or improper drying
  - Incorrect choice of hardeners and thinners
  - Over application of material resulting in excessive film build
  - Incorrect drying of primer / fillers

- **Prevention**
  - Apply film at proper thickness
  - Allow proper flash off time
  - Follow technical recommendations

- **Remedy**
  - After drying, repaint without sanding (within 24 hours) or scuff with a gray scuff pad
  - After drying and sanding apply a sprayable polyester, or remove damaged layers; then sand, prime and repaint
 Runs

- **Cause**
  - Incorrect spray viscosity, flash off time, technique, or film thickness
  - Defective spray gun, incorrect gun setup, or spray pressure
  - Temperature of paint, substrate or room too low
  - Incorrect choice of hardener and/or thinner

- **Prevention**
  - Follow technical recommendations
  - Ensure that the spray gun is in good working order
  - Warm object and material up to room temperature of 20°C / 68°F
  - Use correct combination of hardener and thinner

- **Remedy**
  - Sand and polish
  - Sand and repaint
Peroxide Staining from Hardener in Polyester Body Filler

- **Cause**
  - Incorrect addition of hardener
  - Insufficient mixing

- **Prevention**
  - Use recommended amount of hardener
  - Check quantity of hardener, mix by weight or use a dispensing machine
  - Mix thoroughly

- **Remedy**
  - Remove polyester and re-do repair or
  - Sand, isolate with a sprayable polyester, prime and repaint
Sources

- DuPont Refinishing Systems
- Matt Arias, Director of Manheim Arbitration