

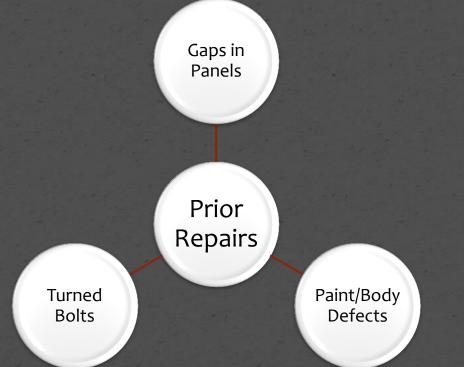
# **Paint Defects**

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**

- O Acid Rain
- Industrial Fallout
- Ø Water Spotting
- Ø Scratches
- O Environmental Contamination
- Ø Polishing marks
- Ø Stonechip
- Corrosion
- Orange Peel / Texture
- Ø Dirt Inclusions
- O Adhesion Problems with Plastics
- O Adhesion Problems with Clearcoat
- O Clouding / Mottling
- O Contamination / Fish-eyes
- Ø Peeling Problems
- Sanding Marks Topcoats

Sanding marks - Substrates O Loss of Gloss / Matting Hiding Power (Coverage, Opacity) O Color Off Shade Clearcoat Yellowing Moisture Blisters Adhesion Problems with Polyester Ø Edge Mapping O Wrinkling / Lifting O Shrinkage / Edge mapping O Striping / Banding O Pinholes - Topcoats O Pinholes - Substrates 0 Solvent Pop 0 Runs O 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

- ۶ 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

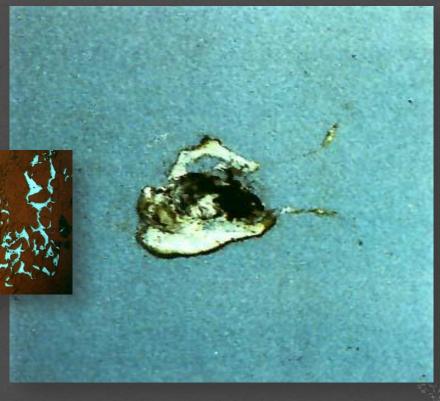
Ø Bird droppings, acid rain, other environmental influences
 Prevention

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

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Remedy

Neutralize, sand, and polishNeutralize, 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
- <sup>2</sup> 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

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Prevention

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

Remedy

Sand, and polishSand, and repaint

### **Adhesion Problems with Plastics**

#### Cause

- Insufficient cleaning, drying (tempering)
- Incorrect primer has been usedPrevention
- Clean and degrease properly
  Temper parts before priming
  Ensure proper solvents evaporation
- Use suitable adhesion primerRemedy
  - 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

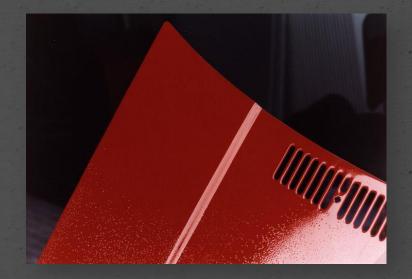
### **Contamination (Fish-eyes / Silicone)**

#### 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
- <sup>•</sup> 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

- Provide the second s
- 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**

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#### 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)

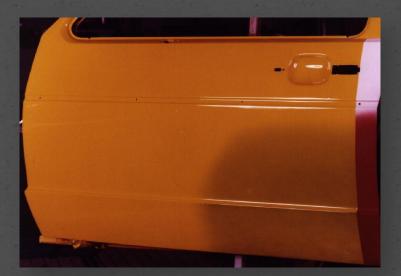
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#### Cause

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
- P 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

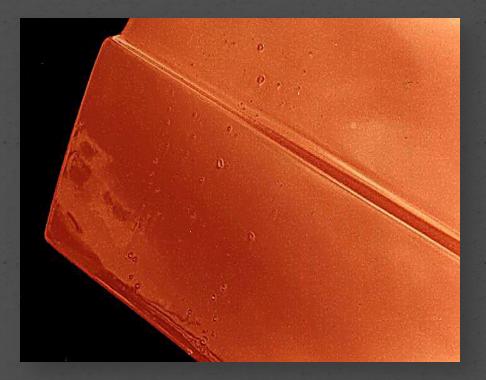
Sand and repaint



## **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

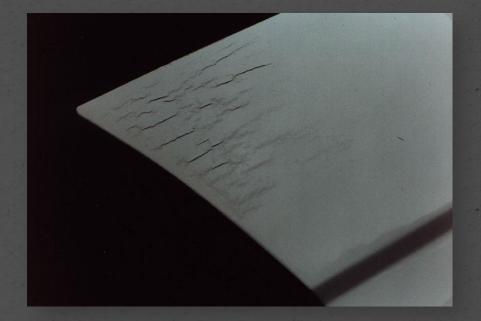
Thoroughly dry affected area Sand, isolate, and repaint



# 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 solventsensitive 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



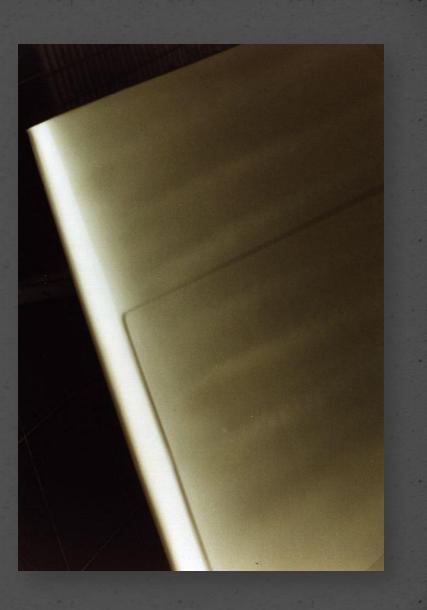
# **Striping / Banding**

#### 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

#### O 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**

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#### 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**

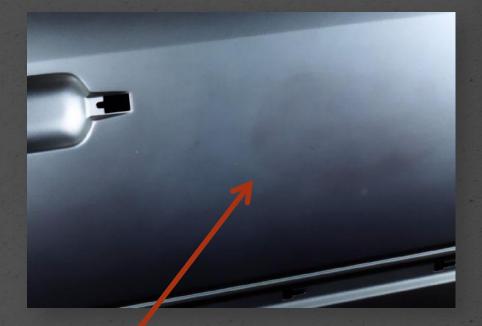
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#### Cause

- 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