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**Identifying and eliminating
paint defects.**



The Art of Refinishing.

Paint defects – inevitable but manageable.

Paint defects can have many causes. Maybe your customer had an accident, or maybe the car was exposed to aggressive atmospheric conditions. It is also possible, that mistakes were made during the coating process – maybe the coat thickness was not right or drying times were too short. Sometimes such damage is due to badly prepared substrates. And last but not least, the conditions prevailing in the workshop also play an important role.

In fact, it is not always easy to realise the cause at first sight. To repair a paint defect effectively, however, a thorough analysis is indispensable. This brochure is designed to assist you in the reliable assessment of paint defects. The different paint defects and their causes are illustrated along with tips and recommendations for their professional removal. To make the identification of flaws and defects easier, this brochure consists of two parts. The first relates to the potential sources of defects during the preparation and finishing processes, while the second takes a look at the impact our environment may have on the quality and looks of a car's paintwork.

You will thus be able to clearly identify the cause of a defect and eliminate it quickly – i.e. before your customer complains. This will not only save you a lot of trouble, time and money but also enhance your reputation as a professional refinisher delivering high quality results.





Refinish

Paint defects in alphabetical order

> Adhesion problems between base and clear coats	# 12
> Clouding	# 3
> Dirt and dust in basecoat	# 10
> Dirt and dust in clearcoat	# 11
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> Water spotting	# 2



Environmental

Paint defects in alphabetical order

> Acid rain	# 2
> Bird droppings	# 1
> Car wash abrasions	# 11
> Color fade / change	# 12
> Corrosion	# 10
> Industrial fall out/rail dust	# 8
> Insect secretion	# 6
> Lime or cement dust	# 9
> Stone chip metallic	# 4
> Stone chip solid	# 3
> Tar spots	# 7
> Tree resin / sap	# 5
> Water spotting	# 13

1 Runs



Cause

- Incorrect spraying viscosity, spraying technique, flash-off times between coats, and film thicknesses
- Defective spray gun set up
- Incorrect spraying pressure
- Temperature of paint, substrate or spraybooth too low
- Incorrect choice of hardeners and thinners

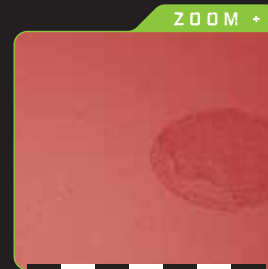
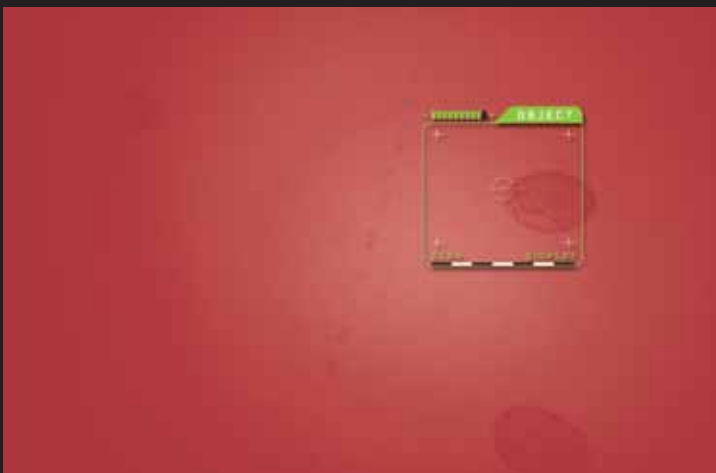
Prevention

- Follow application recommendations on technical data sheets
- 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 hardeners and thinners

Remedy

- Sand and polish
- Sand and repaint

2 Water spotting



Cause

- Topcoat not sufficiently cured
- Excessive film thickness, drying time too short
- Use of unsuitable thinner
- Incorrect hardener mixing ratio
- Wrong hardener used

Prevention

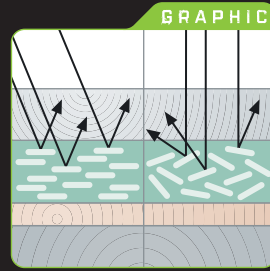
- Follow application recommendations on technical data sheets

Remedy

- After through-drying, remove marks by polishing
- Thoroughly dry topcoat, sand and repaint

Clouding

3



Cause

- Incorrect spraying viscosity, spraying technique, flash-off times, spraybooth temperature
- Defective spray gun set up, incorrect spraying pressure
- Unsuitable thinners

Prevention

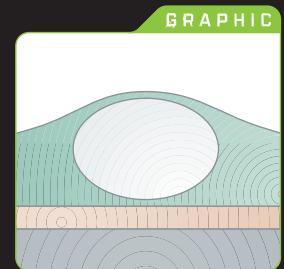
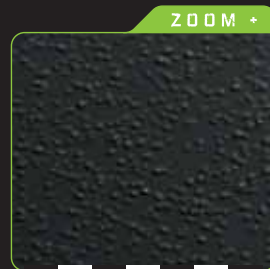
- Adjust material correctly
- Keep spray gun parallel to object
- Choose suitable spray gun set up
- Use manufacturer's thinners
- Ensure sufficient flash-off
- Follow application recommendations in technical data sheets

Remedy

- When using conventional basecoat: use droplet method before spraying clear
- After clear has through-dried, sand surface and repaint
- When using waterborne basecoat: apply uniform finish on wet basecoat in accordance with technical data sheet

Solvent popping

4



Cause

- Insufficient drying of primer filler in corners, edges, rebates and below decorative strips
- Solvent or air trapped in film, which then escapes leaving pop marks due to incorrect spraying viscosity, spraying pressure, flash-off times and drying times
- Incorrect choice of hardeners and thinners
- Film build too high
- Wrong spraying technique

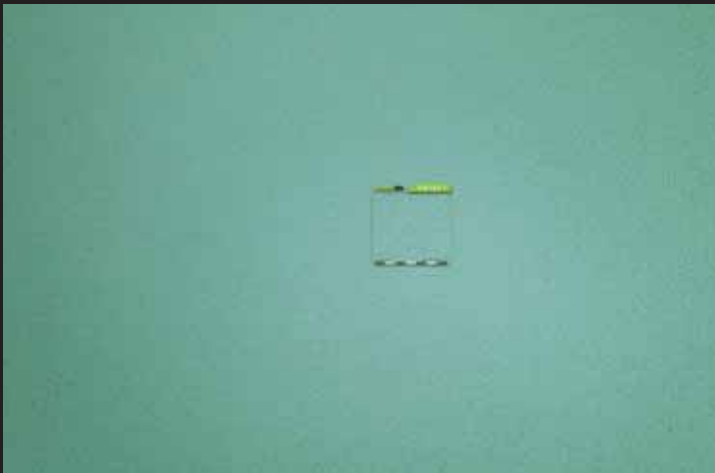
Prevention

- Apply normal film thicknesses
- Check oven temperature regularly
- Follow recommendations on technical data sheets

Remedy

- After drying, repaint without sanding (within 24 hrs) or sand with Scotch brite ultrafine
- After drying and sanding, fill pinholes with Polyester Spray Filler or remove damaged finish and repaint
- Sand, prime and repaint

5 Salt & pepper effect



Cause

- When using waterborne basecoats: over wetting of metallic basecoat produces very small black specks in light basecoat colors

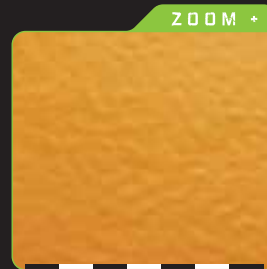
Prevention

- Use correct mixing ratio, spray pressure and technique for basecoat application

Remedy

- Normally only visible after clearcoat. Therefore sanding and refinishing of basecoat and clearcoat stages are necessary

6 Orange peel



Cause

- Incorrect spraying pressure or viscosity, spraying technique or application temperature
- Unsuitable combination of solvents or low quality solvents
- Insufficient sanding of substrate
- Incorrect spray gun set up
- Excessive temperature

Prevention

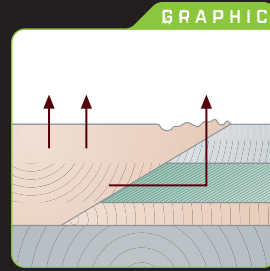
- Follow application recommendations from technical data sheets
- Prepare and sand substrate correctly
- Use recommended gun set up
- Always use recommended thinners
- Avoid application at very high temperatures

Remedy

- Sand and repaint
- Sand and polish

Edge mapping due to solvent penetration

7



Cause

- Area where topcoat was sanded through to substrate not isolated
- Isolated with unsuitable filler/primer
- Filler/primer incorrectly applied
- Insufficient drying of substrate

Prevention

- Solvent test to identify soft substrates
- Isolate using an EP filler or 2K filler; apply filler in several thin spray coats and observe flash-off times
- Avoid sanding through to soft substrate

Remedy

- Dry topcoat thoroughly
- Sand damaged area, isolate and repaint

Bleeding of peroxide hardener in Polyester Body Filler

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Cause

- Use of too much hardener
- Insufficient mixing
- Polyester not isolated

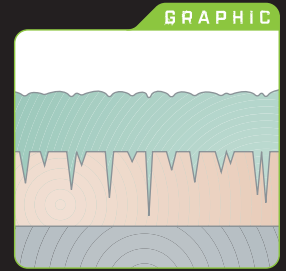
Prevention

- Use of dispensing machine
- Check quantity of added hardener, mix by weight
- Use recommended amount of hardener
- Mix thoroughly

Remedy

- Sand, isolate with Polyester Spray Filler, prime and repaint

9 Sanding scratches



Cause

- Sanding paper too coarse
- Filler sanded when soft
- Insufficient sanded polyester stopper
- Insufficient isolation of the stopper before topcoat application

Prevention

- Use recommended grade sanding paper
- Isolate repaired areas with 2K filler
- Dry filler thoroughly

Remedy

- Thoroughly dry and sand
- Isolate or remove substrate, repaint

10 Dirt and dust in basecoat



Cause

- Dirt entering wet film either from airborne contamination or from unfiltered basecoat

Prevention

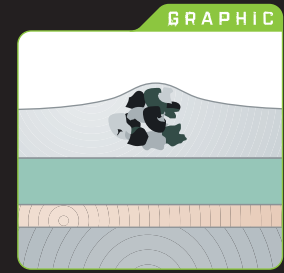
- Ensure the spraybooth is clean at all times
- Blow out crevices to ensure all dust is removed at every stage of preparation
- Wear lint free spraysuit
- Use paint strainer/filter

Remedy

- Denib dirt particles and re-apply basecoat to affected areas as required

Dirt and dust in clearcoat

11



Cause

- During application, dirt is attracted to the clearcoat and is trapped in the wet film
- Is seen as dark or light specks depending on the color of the surface

Prevention

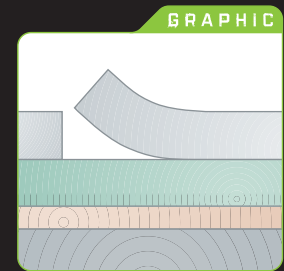
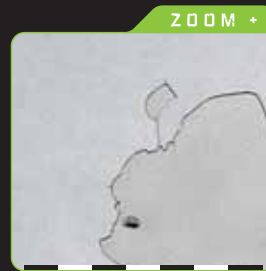
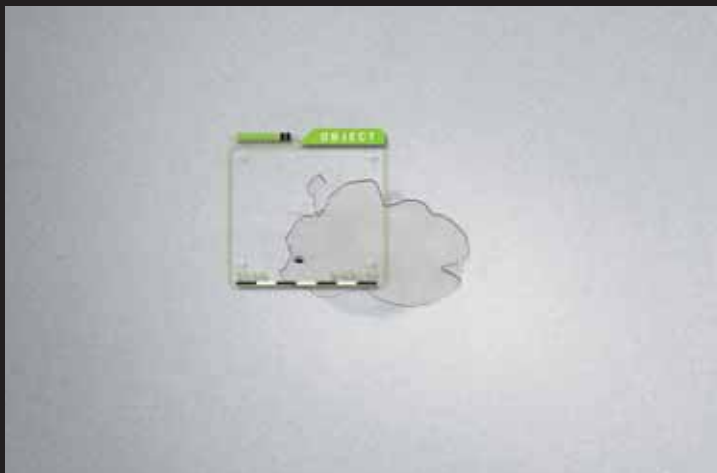
- Ensure the spraybooth is clean at all times
- Blow out crevices to ensure all dust is removed at every stage of preparation
- Wear lint free spraysuit

Remedy

- Sanding and polishing will only remove dirt on the surface of the clearcoat
- Otherwise refinishing of the basecoat and clearcoat is required

Adhesion problems between base and clear coats

12



Cause

- Excessive coat thickness of basecoat
- Intermediate and final flash-off times of the basecoat too short
- Wrong mixing ratio of clearcoat/hardener
- Incorrect hardener/thinner combination; system too fast

Prevention

- Apply basecoat film thickness according to technical data sheet
- Use the intermediate and final flash off times from the technical data sheet
- Choose and mix clearcoat, hardener and thinner according to technical data sheets

Remedy

- Sand and repaint

13 Poor opacity



Cause

- Substrate not uniform (Effect finishes)
- Topcoat film build too low
- Coating overthinned

Prevention

- Spray a uniform substrate
- Spray sufficient topcoat to obtain opacity
- Avoid excessive amounts of thinner

Remedy

- Sand and repaint

14 Moisture blisters



Cause

- Residue of sanding water in corners, edges, rebates and below decorative strips
- Contaminated air supply
- Insufficient isolation of polyesters
- Air humidity too high
- Waterborne products not completely flashed off/cured
- Dried salt residues

Prevention

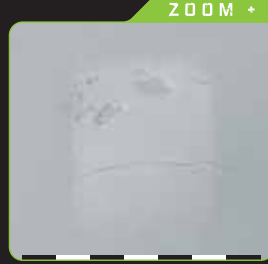
- Always remove exterior trim
- Blow and dry carefully with air
- Check air supply equipment regularly
- Ensure correct flash off/curing of waterborne products
- Before processing and spraying, clean according to instructions

Remedy

- Remove all contaminated finish and repaint

Poor adhesion – polyester stopper

15



Cause

- Poor substrate preparation
- Polyester material unsuitable for galvanized substrate
- Surface temperature too high while forced drying
- Undercured – too much/too little hardener

Prevention

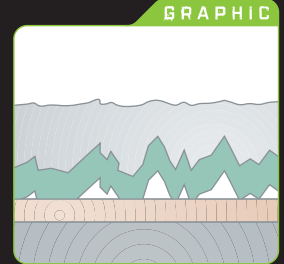
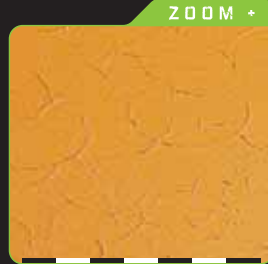
- Clean and sand thoroughly
- Only use Standox Stopper recommended for galvanized substrates
- Follow the manufacturer's instructions for forced drying
- Keep to the mixing ratio
- Ensure hardener is completely mixed into the polyester stopper

Remedy

- Sand the damaged repair area well to remove all polyester stopper
- Only use Standox Stopper recommended for galvanized substrates
- Repair and repaint

Lifting & wrinkling

16



Cause

- Occurs when chemical reaction takes place between two incompatible substrates
- High film builds
- Overcoating an uncured substrate
- Wet-on-wet system combined with incorrect hardener/thinner

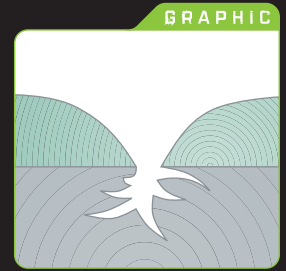
Prevention

- Avoid working on high film thicknesses
- Ensure all products used are part of a refinish system
- Allow materials to flash off and dry in accordance to technical data sheets
- Use recommended hardener/thinner combination

Remedy

- Remove all coating and refinish from metal stage
- Alternative remedies are not guaranteed and can be unstable

17 Pinholes in polyester



Cause

- Substrate insufficiently dried
- Polyester material not isolated with 2K filler
- Pores not deeply sanded

Prevention

- Allow preparation materials to dry thoroughly
- Deeply sand pores or re-apply filler / stopper
- Use a fine stopper to finish repair
- Mix hardener and stopper as completely as possible; avoid air bubbles
- Stopper application at a right angle prevents the formations of pores

Remedy

- Fill pinholes with spray filler
- Sand damaged area and repaint

18 Matting / gloss



Cause

- Film thickness or air humidity too high
- Substrate too sensitive to solvents
- Incorrect mixing or contaminated hardener
- Use of unsuitable thinner
- Insufficient airflow in oven
- Interrupted baking
- Clearcoat applied too fast
- Incorrect polish applied too soon after drying

Prevention

- Follow application recommendations on technical data sheets
- Close hardener cans firmly after use
- Ensure sufficient airflow in oven during drying cycle
- Don't interrupt baking cycle

Remedy

- Sand and polish
- Sand and repaint

Poor adhesion on plastic parts

19



Cause

- Insufficient cleaning, drying (tempering)
- Incorrect primer has been used
- Incorrect paint system

Prevention

- Temper parts before cleaning and priming
- Clean and degrease properly
- Ensure solvents have evaporated
- Use a suitable adhesion primer
- Work in accordance with data sheet

Remedy

- Steam clean, sand, reclean and repaint
- Remove damaged finish and repaint

Silver halo effect

20



Cause

- Typically caused by incorrect technique when blending in metallics
- Can also be visible as dark edge on light colors

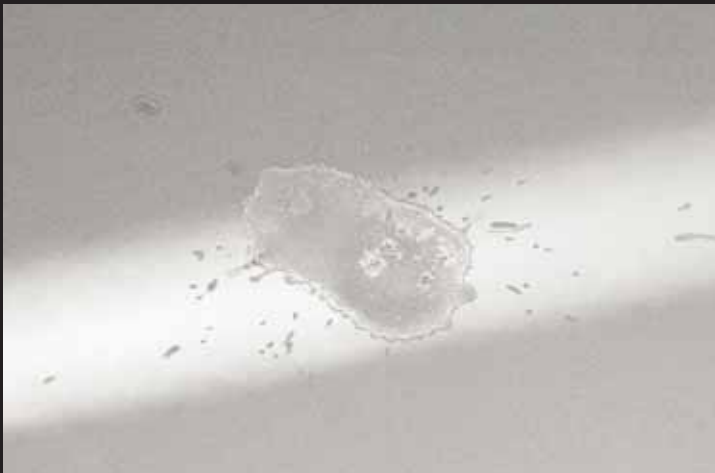
Prevention

- Observe recommendations on blend in technique
- Ensure correct mixing ratio and spray pressure for metallic basecoat

Remedy

- Respray affected area with correct technique, may be possible at basecoat stage before clearcoat

1 Bird droppings



Cause

- Acids present in bird droppings can penetrate the paint film and cause varying problems ranging from mild staining to penetration through to the Zinc layer

Prevention

- Remove droppings as soon as possible
- Protect finish with high quality wax polish (frequently)
- Avoid parking under trees

Remedy

- Cover with wet paper towel and leave for a few minutes
- Remove paper and wipe away dropping, and allow to dry
- Staining can be removed by polishing local area, or refinishing if damage is more severe

2 Acid rain



Cause

- Chemicals released into atmosphere reacting with hydrocarbons in the air
- Visible as rain drops on surface in areas where mixture is strong
- Can cause unrepairable damage

Prevention

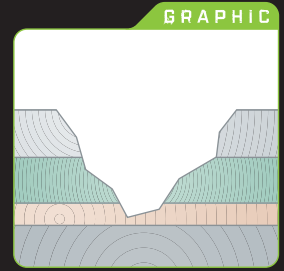
- Avoid parking in industrial areas
- Protect finish by frequent washing and waxing to provide resistance

Remedy

- Polishing may remove mild damage
- Refinish areas where film is broken
- Light marks can be removed with a cleaning clay

Stone chip solid

3



Cause

- The result of stones thrown up by vehicle tyres hitting the paint film
- Can lead to corrosion in extreme cases

Prevention

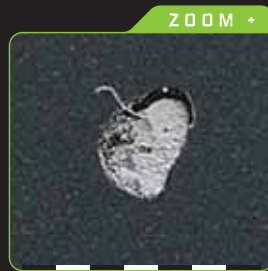
- Plastic film to cover susceptible areas on vehicle
- Fitting of mud flaps can reduce damages to lower areas
- Use paint systems recommended by vehicle manufacturer (see approval systems)

Remedy

- Minor damages can be repaired by careful touching
- Micro/Spot repair or complete refinishing is necessary for true rectification

Stone chip metallic

4



Cause

- The result of stones thrown up by vehicle tyres hitting the paint film
- Can lead to corrosion in extreme cases

Prevention

- Plastic film to cover susceptible areas on vehicle
- Fitting of mud flaps can reduce damage to lower areas
- Use paint systems recommended by vehicle manufacturer (see approval systems)

Remedy

- Very small areas can be repaired by careful touching in, although must be protected by clearcoat
- Micro/Spot repair or complete refinishing is necessary for true rectification



5

Tree resin / sap



Cause

- Secretions of tree resin/sap interacting with climate and time

Prevention

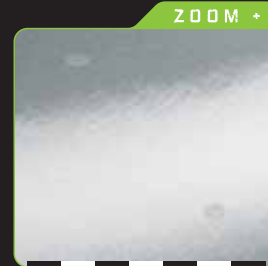
- Clean off immediately with water or mild detergent solution
- Protect by frequent wax polishing

Remedy

- Avoid parking under trees
- Minor defects can be removed by polishing
- Remove contaminated areas back to metal and refinish

6

Insect secretion



Cause

- Alkaline residue of insects during driving, in interaction with surface, climate and time

Prevention

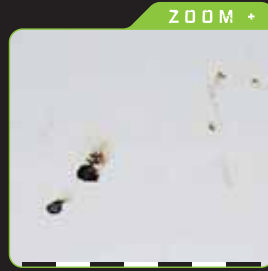
- Clean off immediately with warm water or mild detergent solution
- Protect by frequent wax polishing

Remedy

- Light defects can be removed by polishing
- Otherwise sand and refinish the affected area

Tar spots

7



Cause

- Driving over newly tarmaced road surfaces
- Visible as small black or brown specks

Prevention

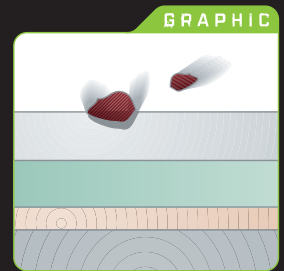
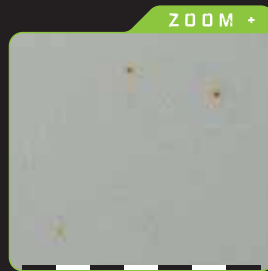
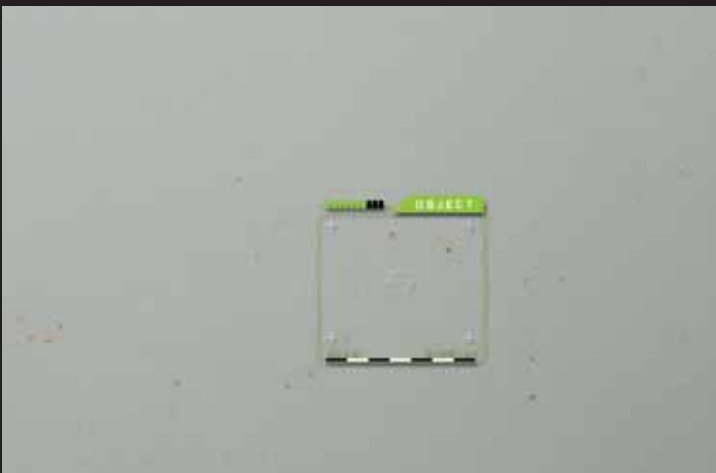
- Avoid driving on newly surfaced roads

Remedy

- Easily removed by solvent based cleaner, or with fine polishing abrasive
- Re-coat finish with wax polish after removal of spots

Industrial fall out / rail dust

8



Cause

- Contamination of the surface by very small pieces of metal
- These include rail dust, industrial fall out or grinding sparks

Prevention

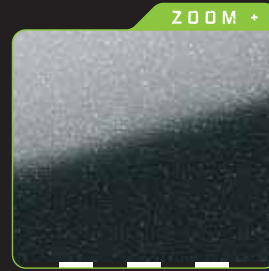
- Clean off surface immediately
- Frequent wax polishing to provide barrier for paint film

Remedy

- Minor defects can be removed by polishing
- Deeper damage must be removed and refinished

9

Lime or cement dust



Cause

- Etching effect on the paint surface caused by lime or cement, in interaction with climate and time

Prevention

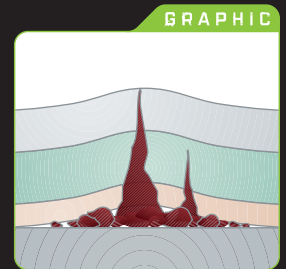
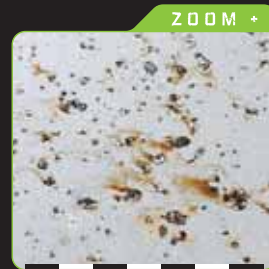
- Clean off immediately with water or mild detergent solution, followed by polishing
- Frequent wax polishing to provide barrier

Remedy

- Polishing with abrasive paste may work for mild damage, otherwise sand affected area and refinish

10

Corrosion



Cause

- Moisture penetration through broken areas in paint film
- Exposed bare metal areas
- Climate and time influence degree of corrosion damage

Prevention

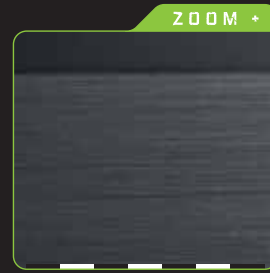
- Frequent washing and wax polishing of the vehicle, particularly in winter
- Refinish broken paint surfaces immediately to prevent corrosion starting

Remedy

- Remove affected paint areas, sandblast heavily affected areas
- Treat with neutralizing acid
- Refinish with approved system

Car wash abrasions

11



Cause

- Damaged or dirty automatic car wash brushes

Prevention

- Avoid automatic car wash machines
- Use scratch resistant clear in refinish process

Remedy

- Scratches can be removed by machine polishing with fine abrasive paste
- Avoid over polishing, can be checked with film thickness gauge

Color fade / change

12



Cause

- Sunlight UV light effect on certain paint pigments in surface
- Refinish paints of low quality with little or no UV blocker

Prevention

- Frequent wax polishing to provide protection

Remedy

- Can be removed in part by machine polishing with fine abrasive paste
- Avoid over polishing, can be checked with film thickness gauge
- Refinish if necessary

13 Water spotting



Cause

- Vehicles washed with water from "hard" water supply
- Visible on dark colors, particularly on vehicles washed in direct sunlight

Prevention

- Never wash vehicles with household detergent
- Rinse vehicle with chemically softened water
- Dry vehicle directly after washing

Remedy

- Wash vehicle with wax containing shampoo
- Dry with damp leather cloth
- Severe stains may need polishing to remove



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