



TROUBLESHOOTING PAINT DEFECTS

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BLEEDING (Staining)

4

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BLISTERING



Bleeding is a discoloration of the topcoat often occurring as a red or yellow color shadowing.

CAUSES

1. Soluble pigments (dyes) from the original coating are dissolved in the solvent of the repair materials and discolor the surface.
2. Bleeding/Staining can also occur when excessive peroxide from the polyester filler gets picked up by the solvent in the repair material and gets pulled to the top coat. The extra peroxide then reacts with pigments and bleaches the top coat.
3. The peroxide in some body fillers reacts with the polyester resin that cures the filler and creates a light sensitive photo reactive chemical which dissolves in the solvents and travels to the topcoat/clearcoat. This photo reactive chemical reacts with UV light and discolors the top coat/clear turning it yellow-brown over the filler spots over time. Light or low pigmented colors are particularly prone to this type of staining.
4. Bitumen or tar residues if not cleaned off thoroughly.

PREVENTION

Spray over the original coating preferably with an epoxy primer and only use the stated quantities of peroxide when mixing the polyester filler. Never allow the colored hardener to look streaky in the body filler when applied. Use high quality stain free body fillers and prime with an epoxy primer when using light colored or transparent two tone top coats. Make sure all contaminates are removed from the substrate before applying paint.

REPAIR

If the bleeding through is severe, all paint must be sanded off this area and cover with an epoxy primer first to seal area and then apply new color and clear coat.



Moisture blisters can develop in various forms, sizes, areas and density. Blistering can occur between the individual layers and also beneath the entire paint structure. The paint film is enclosed so that the blisters disappear in dry weather.

CAUSES

1. The surfaces to be coated (filler, bare metal etc.) have not been adequately cleaned. Contamination from soluble salts in water due to dirty water used for sanding or cleaning or sweat from hands (wipe marks like a "string pearls" with a clearly visible arrangement of the blisters) and subsequent effects of moisture on the newly refinished coating over a long period of time.
2. Wet sanding of polyester materials without allowing sufficient water evaporation times before processing with primer and topcoat materials.

PREVENTION

1. The surface to be coated should be thoroughly washed with clean water or with a hot water jet. Clean thoroughly with a Silicone and Tar Remover (universal cleaner) or with a metal cleaner.
2. Allow all moisture to evaporate thoroughly after wet sanding.
3. Only dry sand polyester materials.

REPAIR

Remove the paint right down to where the blisters start. Re-coat with primer and top-coat. Be prepared to strip and repaint if necessary. Then re-do using correct primers fillers.

BOILING

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In the case of this surface problem, blisters occur on the surface because of trapped solvent. The occurrence of these bubbles can have various different causes.

CAUSES

1. The coats were applied too thick or heavy.
2. The use of unsuitable reducer (too fast).
3. Too short a flash off/drying time between the individual spray coats.
4. Too high an object temperature to accelerate the drying.
5. Too long an air drying time for two component paints before the object is placed in the oven.
6. The use of infra red lamps can cause too high a surface temperature if the lamps are close to the object.

PREVENTION

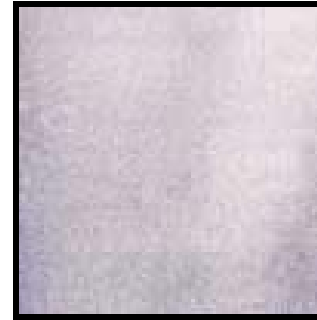
To avoid the occurrence of bubbles the correct reducer for the corresponding spray temperature should be used, and the recommended film build should not be exceeded. Use slower reducers and hardeners when temperature is very hot. It may be necessary to reduce the viscosity when temperatures are extremely hot (i.e. add more reducer), observe the correct flash off times and the drying temperatures, and ensure that there is an adequate distance between the surface and the infra red lamp.

REPAIR

Surface damage – solvent pops/bubbles must be sanded down to the level where they occur and affected areas should be repainted. Make sure all bubbles are removed when sanding to avoid having pin holes after repainting the area(s).

CLOUD

(Mottling-Floating-Flooding)



Clouding appears like dark and light patches/shadows in a metallic finish.

CAUSES

1. The base-coat has been applied in uneven coats – too heavy or too light.
2. The flash off of the base-coat was too short between coats or before the clear-coat was applied. This can cause the metallic coat to be re-dissolved. Result: The metallic and pigment particles float and change their position.
3. Too wet a spray application to the first clear-coat, causing a re-dissolving of the basecoat.

PREVENTION

Spray the metallic base-coat evenly and not too wet. Ensure that the correct flash off time is allowed between coats or before the application of the clear-coat in accordance with the manufacturer's instructions.

REPAIR

If cloudiness is visible before the clear-coat application, re-spray with base-coat thinned normally (do not over or under thin) and reduce the pressure of the spray gun. If clouding is only visible after the application of the clear-coat, sand the clear-coat when dry and re-coat with base-coat and clear-coat.

CRACKING

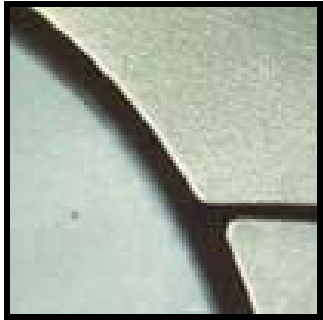
(Alligatoring - Crocodiling - Crazing)

8

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CRATERING

(Fish Eyes - Cissing)



Cracks of different length and width spread in various directions in the top coats.

CAUSES

Normally cracking occurs due to wide fluctuation of temperature acting on the paint film build under the following conditions.

1. When the paint film build has too high a coat thickness.
2. Application of a repair finish over old paint-work which already contains barely visible hairline cracks.
3. Use of paint materials which are not designed to adapt to each others hardness or flexibility (e.g. a hard and rigid polyester stopper or filler, applied to a thermoplastic acrylic T.P.A. top coat, will lead to cracking due to the tensions caused by different expansion and contraction forces).

PREVENTION

Only apply materials which are recommended for use with each other and keep to the film builds recommended by the manufacture.

REPAIR

Sand down thoroughly until all traces of cracks are removed and repaint as required. Ensure that paint used to refinish area on flexible surfaces is treated with flexing agent (elastic-flex) additive.



Craters are circular dents with raised edges in the topcoat or the intermediate coats.

CAUSES

1. Oil, fat, wax and silicone polish residue were not thoroughly removed from the surface to be coated.
2. Contamination from the air, e.g. spray mist from another type of paint.
3. Oils or water from the compressed air.
4. Silicones from the aerosol cans (Water repellents).
5. Foreign substances from industrial plants near by.

PREVENTION

Only a very thorough cleaning of the areas to be coated can prevent craters from forming. If products which contain silicone (polish, sealing compounds) are used this should be carried out in a separate area, totally away from the spray area.

REPAIR

If craters have formed sand away this layer of paint thoroughly clean and apply a new paint layer.

DUST CONTAMINATION

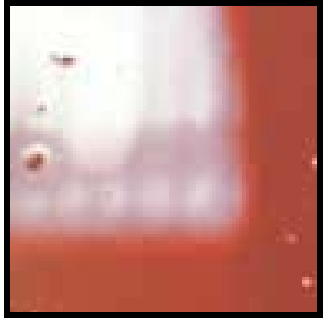
(Dirt- Bits)

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INDUSTRIAL FALL OUT

(Contamination - Staining - Lime Marking)



This contamination is due to visible dust particles of various sizes and forms which are embedded or form raised spots in the topcoat.

CAUSES

Dust contamination can be caused by various problems.

1. Inadequate cleaning of the vehicle after sanding.
2. Unsuitable working clothes which leave dust, dirt fibres.
3. Dust problems caused in the booth e.g. the dust filter is dirty or leaks, the pressure balance is incorrect, the booth is very dirty or there is no, or inadequate filtration of the pressurized air supply.

PREVENTION

Contamination can be avoided if everything is kept scrupulously clean. The objects to be painted must be carefully cleaned. Booth maintenance is important and filters should be changed as required. Spray guns must be kept clean.

REPAIR

Slight dust contamination can be sanded down with P 1200 - 2000 sandpaper and then polished with a fine polishing paste/fine cutting compound and finish with a high gloss polish (silicone free). Larger marks should be sanded down and then refinished.



The paintwork has been attacked and corroded or discolored by aggressive substances such as industrial waste gases, resins, petrol or chemicals, which in the worst cases, causes the surface finish to be destroyed.

CAUSES

1. In the case of discoloration by tar, components migrate into the paint surface and dirty brownish black specks are left.

2. Industrial waste gases, chemicals or tar penetrate into the surface of the paint and discolor the topcoat. This can be caused by a chemical reaction with the pigments (e.g. in the case of acids).

3. Aggressive substance such as resins, petrol and bird lime corrode the paintwork. Depending on the length of time the substance is left to react, the corrosive effects can be so bad that the paint is decomposed and therefore destroyed.

PREVENTION

To avoid the formation of contamination the vehicle should be washed more often and preserved from time to time with a high gloss polish or a protective wax.

REPAIR

Slight discoloration can often be removed by polishing with a fine polishing paste or a high gloss cleaner/polish (silicone free). Severe problems need to be sanded down beyond the affected coat and refinished.

LIFTING

(Crinkling - Sweating - Swelling)

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LOSS OF GLOSS

(Poor Hold Out)



This is old paint materials lifting/swelling when new paint is applied. It occurs sometimes with old paint around the edges of primers or body fillers or stopper spots. It may appear while painting or during the drying time.

CAUSES

The possible causes of these swelling edges are:

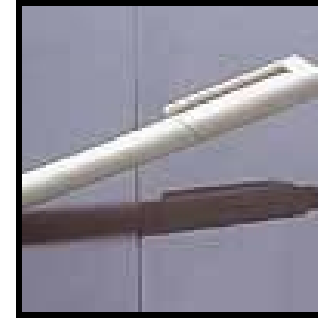
1. Recoating of solvent-sensitive layers (NC/TPA) with wrong repair materials or too thick.
2. Coats used as a sealer are not thick enough.
3. The filler was sprayed too thick and not allowed to dry sufficiently.
4. Old substrate is weak/not cured.

PREVENTION

Check the old substrate to make sure it is sound and use correct film thickness when applying products. When using a sealer it is better to cover the entire panel/s with correct film thickness to form a barrier between the old and new surfaces. Also, observe adequate flash off time.

REPAIR

The affected areas must be sanded down and refinished (filler and top-coat).



The topcoat surface dries with a dull or low sheen finish.

CAUSES

1. Insufficient curing of the primer before application of the topcoat, the drying time was too short, or the film build too high.
2. Too few coats of topcoats applied.
3. Topcoat applied too thickly and too short flash off time.
4. Wrong amount of, or incorrect hardener used.
5. New paint applied on top of old weak surfaces.

PREVENTION

Apply primer and topcoats only to the film builds recommended by the manufacturer and observe sufficient flash off and drying times between the different coats. Mix primers and paints according to recommended mixing ratios. Remove or seal old surfaces prior to priming or painting.

REPAIR

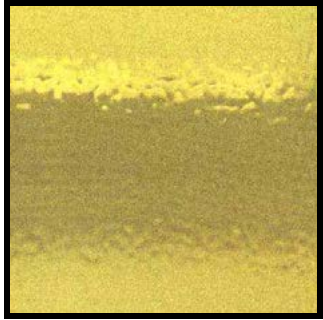
Allow the entire paint system to cure thoroughly and if necessary force dry. Sand surface and repaint.

ORANGE PEEL (Dry Spray- Poor Flow)

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POOR ADHESION (Peeling - Flaking)



The paint has an uneven texture which is similar to the skin of an orange.

CAUSES

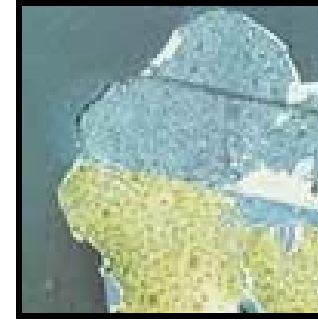
1. The spray gun is held too far from the surface being sprayed.
2. The spray pressure is too low and the atomization not fine enough.
3. The top coat is applied too lightly.
4. The spray application is too dry because the paint supply from the spray gun is set too low.
5. Viscosity of the paint is too high.
6. Thinner used is too fast for conditions or size of object.
7. Flash-off time too long between coats.

PREVENTION

To avoid this effect only use the recommended spray techniques for the particular paint material. Select the thinner corresponding to the spray temperature and adjust the spray viscosity according to the manufacturer's instructions.

REPAIR

If the effect is only minor, rub down with P 1200 paper and then treat with a fine polishing paste and a high gloss polish (silicone free). If the orange peel effect is very pronounced rub down with P 800 paper and then refinish.



Adhesion loss can occur in two different ways. Firstly there can be adhesion problems to the substrate (total paint structure) and secondly there can be an inadequate bond between the individual coats (Inter-coat Adhesion).

CAUSES

Adhesion loss can occur if:

1. Substances which cause adhesion problems are left on the substrate to be coated (e.g. Silicone, oil, fat, wax, rust, polishing residue, etc).
2. An incorrect primer was applied to the substrate.
3. Sanding of the substrate was inadequate or not carried out at all.
4. The primer or base-coat was too dry or too thinly applied.
5. Drying time between final coat of Base-Coat and top clear coat is too long.

PREVENTION

To avoid adhesion loss occurring, the correct primer should be used for problem substrates (e.g. Aluminum and plastics), the primer should be applied in sufficient film build and the manufacturers instructions should be followed. Apply wet spray coats, avoid applying basecoat too dry.

REPAIR

Remove the coats with poor adhesion by sanding and re-coating.

POOR HIDING

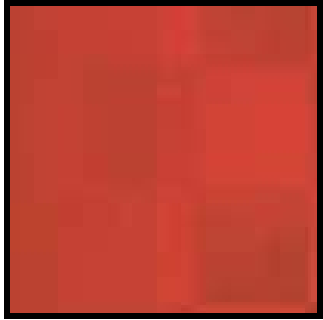
(Poor Covering - Poor Opacity)

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RUNS

(Sags - Curtains)



Old paint, spot primer or areas of filler are visible through the topcoat. The paint-work is “dappled” and uneven in color.

CAUSES

1. The substrate was not even in color all over the painted area.
2. The topcoat was not thoroughly mixed before use.
3. The incorrect quantity of reducer was used.
4. The coats of paint were too thinly applied.

PREVENTION

To obtain a good finish with good hiding power it is necessary:

1. To spray on a uniform base primer coat, or use recommended undercoat.
2. Stir the topcoat well before use.
3. Only use the reducer mix quantity as stated in the instructions for use.
4. Spray a sufficient film build of paint. The optimum film build for unicolors is 50 - 70, um (Exception: certain lead chromate free yellow and red tones). Target optimum film build for the two coat metallic colors is 15-30 um. (Exception: certain very transparent colors). We recommend the use of tinting filler for certain colors which do not cover well due to the pigmentation used.

REPAIR

If the hiding power is poor it is possible after drying to wet sand with P 800 and then refinish.



These are beads, droplets or even large globules, so-called “curtain effect” which have run vertically down the panel.

CAUSES

1. The nozzle on the spray gun was too large.
2. The spray technique was not suitable for the material. The material application was too wet because the gun was too close to the object or the spray movement was too slow.
3. The coats of paint were applied too thickly.
4. The flash off time between individual coats was not long enough.
5. Thinner or hardener was too strong for the particular spray conditions. This happens particularly when spraying small areas, or in low spray temperatures.
6. The paint was mixed too thin.

PREVENTION

To avoid the formation of runs it is necessary to observe that the spray guns, application technique and the adjustment of the paint materials are suited to the spray conditions, i.e. use correct hardener and reducer to suit the existing conditions. Where necessary use a smaller nozzle with better atomization and faster thinners.

REPAIR

Small runs can be removed once dry with a paint nib plane. Then rub down with P 1000 - 1200 paper and finally polish with fine polishing paste and high gloss polish. Large areas of “curtaining” must, however, be completely sanded down and refinished.

RUST

(Corrosion)

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SANDING SCRATCHES

(Sanding Marks)



Subsurface rusting is visible as paint damage due to irregular bumps in the paint (blisters). If the blisters burst or crack, brown spots of corrosion (rust) are visible. In the case of an aluminum body, white spots of corrosion (white rust) are visible.

CAUSES

1. Moisture penetration, due to cracks or mechanical damage (e.g. stone chips) to the paintwork, right down to the bare metal.
2. Before refinishing rust was not thoroughly removed. New rust appears due to the penetration of humidity in the air.
3. The surface of the metal has been contaminated, e.g. with hygroscopic salts or sweat from hands. Rust and water blisters form due to the reaction with moisture from the air.

PREVENTION

Rusting can be prevented by thoroughly washing the old paintwork with clean water if possible with demineralised water (or even better with a steam jet) to remove all dust salt and dirt.

REPAIR

Remove all rust thoroughly before refinishing (preferably by sand blasting) and carefully re- clean before repainting. Remove all stone chips and other mechanical damage immediately.

The damaged surface must be stripped with paint stripper or sanded down or removed with sand blasting. Rust must be thoroughly removed to leave the surface as perfectly clean metal. Use an anti-corrosive primer such as an etch primer filler or Epoxy primer filler before the new paint finish is applied.



Sanding marks are visible either individually or in a large number as grooves in the surface of the paint, which follow the lines of sanding operations prior to painting.

CAUSES

1. The primer and/or the filler was sanded with paper that was too coarse. The sanding marks then show up in the next coat of paint as small grooves in the surface of the paint.
2. The recommended drying times of primer were not adhered to. The sanding marks become visible after the drying of the paint finish sinks into the uncured primer material.
3. The use of sanding discs and papers on the car body which are too coarse, always increases the possibility of the appearance of sanding marks.

PREVENTION

It is possible to avoid sanding marks by first allowing fillers/ primers to dry properly and then using the recommended grade paper for the type of paint used and the application of a coat of black guide coat before the fine sanding of filler and primer materials.

REPAIR

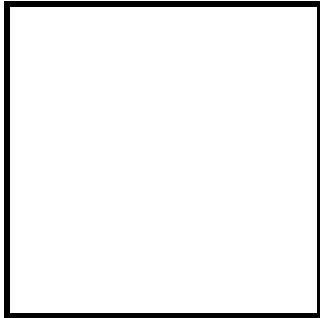
The marks in the substrate must be sanded down so that a new paint build up (Primer and topcoat) can be applied.

SEEDS (Specks)

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STONE CHIPPING



Seeds develops in varying shapes, sizes and number which are embedded in the surface of the paintwork.

CAUSES

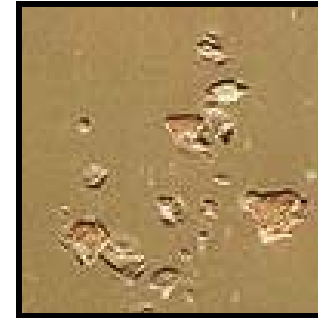
1. The use of paint which has been kept longer than its recommended storage life.
2. The addition of incorrect hardener or thinner.
3. The use of re-thinned 2K materials whose pot-life has already been exceeded.
4. Pigment conglomeration due to insufficiently stirred material.

PREVENTION

Always apply the paint materials in accordance with the instructions from the manufacturer (i.e. only the correct thinner and hardener) and ensure that the potlife is not exceeded. The paint should also be well stirred and filtered before use.

REPAIR

In minor cases the seed can be sanded with P 1200 paper and then polished with a fine polishing paste and a high gloss polish. If the surface damage is severe and covers a large area, the paint must be sanded off before new coats of paint are applied. It may be necessary to use a primer filler first.



Stone chips are small areas of damage to the paintwork caused by stones or loose chippings.

CAUSES

Stones or other hard substances (e.g. loose chippings) hit the vehicle with varying amounts of force (speed). Depending on the force of the impact not only the topcoat but the entire paint film build can be destroyed. Moisture can then penetrate the areas causing corrosion and further paint detachment.

PREVENTION

Stone chip damage to the paint surface is very difficult to prevent. However, the use of a stone chip and underbody protection primer when refinishing can minimise the extent of the damage and prevent penetration down to the metal.

REPAIR

In the case of minor damage to the topcoat improvements can be made with a touch up kit. However, if the damage affects a large area, the damaged area must be sanded down and new coats of paint applied (stone chip and underbody protection primer, stopper, filler & topcoat).

WATER SPOTTING

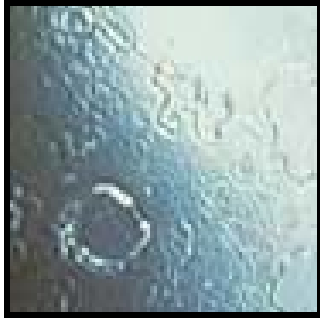
(Rain Spotting - Water Marking)

22

23

WRINKLING

(Crinkling - Puckering - Rivelling - Shrivelling)



Water spotting appear as circular, mainly whitish spots / marks on the surface of the paint.

CAUSES

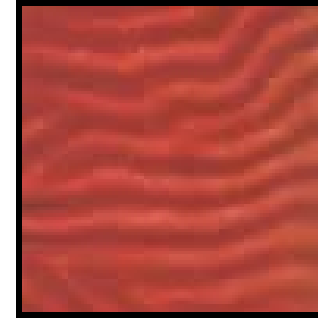
Water spots/marks appear if water droplets (rain or dew), together with pollution from the air (e.g. dust, chalk or salt) dries on to the surface. Normally no damage appears within the circular marks, only the edges are seen as raised marks. The problem of water spotting only occurs with freshly painted paint finishes which have not been thoroughly dried/cured.

PREVENTION

When refinishing, ensure the correct drying times and temperatures are used before the paintwork is subjected to moisture. If the vehicle (part) does get wet, we recommend that it is dried immediately by wiping with a soft chamois leather.

REPAIR

Normally to simply wipe the affected area with a damp leather and then treat with a high gloss polish is sufficient. If this is not successful the affected area must be dried and then sanded until matte with P 800 paper and then refinished.



Irregular grooves/ridges form on the surface if the surface layers of paint dry much quicker than the layers of paint below. The surface of the paint then "wrinkles". This only happens with synthetic paints which dry by oxidation.

CAUSES

1. The synthetic topcoats were applied too thick.
2. Unfavorable drying conditions (e.g. very high room temperature).

PREVENTION

Ensure that the correct film build are applied and that the temperature and drying conditions are suitable.

REPAIR

In the case of minor defects allow the surface to dry out completely then sand down to the cured layer and refinish. If the problem is severe, the entire paint system must be removed with paint stripper and the surface completely refinished.



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DRIVEN BY COLOR

