

## You should know this

---



# Table of contents

## You should know this

---

### Paint damage assessment

Paint testing and measuring equipment.....	16
Auxiliary devices.....	16
Auxiliaries (Consumables).....	16
Detergents.....	16
Other aids.....	17
Zone classification for damage assessment.....	18

### Preparation errors

Preparation of a paint job.....	20
Handling paint materials.....	20
When painting.....	20
Handling the spray booth.....	20
Workclothes.....	20
Handling paint spray guns and air supply.....	21
Rules for handling painting tools and booths.....	21

### Series painting processes

Paint thicknesses.....	22
Coating thicknesses in series painting.....	22
Painting process with filler application.....	22
Painting process without filler application.....	23
Powder coating process.....	23
Deviations in series painting.....	24

### Paint non-destructive test methods

Coating thicknesses in the refinishing process.....	25
Coating thickness test.....	25
Measuring methods and instruments.....	25
Non-destructive dry film measurement.....	26
Checking the hiding power.....	26
Gloss measurement.....	27
Color proofing. Colorimetry and color matching.....	29
Checking the color tone.....	29
Colour fan.....	29
Colour cards.....	30
Color measurement with a colorimeter (spectrophotometer).....	31
Painting into the adjoining areas.....	32
Basic concepts of color theory.....	32
What is color?.....	32
Spectral colours.....	32
Reflection and Absorption.....	33
Basic concepts of nuance.....	34
Prerequisites for shading.....	35
Find the desired shade.....	35
Viscosity measurement.....	36
Viscosity measurement according to DIN 53211 or ISO 2431.....	36

Viscosity determination with the Visco spatula according to Rossmann.....	36
---	----

## Paint destroying test methods

Testing the paint elasticity.....	37
Through-grindingmethod.....	38
Mechanical dry film measurement.....	40
Dry film thickness gauge, model 233.....	40
Wet film and dry film thickness gauge, model 296.....	40
Mechanical wet film thickness measurement.....	41
Generalinformation.....	41
Example: Wet Film Thickness Gauge, Model 234 R.....	41
Term hardness of lacquer.....	42
Paint hardness test with the hardness test rod.....	43
Lacquer hardness test according to Buchholz.....	44
Adhesion tests.....	46
Cross-cut test (Paint adhesion test) ISO 2409:2013.....	47
Scoringmethod.....	50
Testing the resistance to smashing.....	50
Adhesion test with the stone impact tester of Volkswagen AG (VAS 5102A).....	50
Mobile testing of the stone impact resistance of body finishes.....	50
Preface.....	50
Scope.....	50
Designation.....	50
Scrutiny.....	51
Devices and aids.....	51
Sampling.....	51
Sample plates.....	51
Conditioning.....	51
Testtemperature.....	51
Functional check.....	52
Implementation.....	52
Evaluation.....	53
Test report.....	53
Otherapplicabledocuments.....	54
Sample evaluation form.....	54
Handling.....	55

## Paint damage assessment

A correct paint damage assessment is only carried out in daylight. The lighting conditions for the assessment must not distort the damage pattern. Direct sunlight or cloudy skies are not suitable for an assessment. The best lighting conditions are slightly cloudy, diffuse but bright northern daylight. However, because these lighting conditions are not found every day, an assessment can also be carried out for artificial light using a special fluorescent lamp according to DIN 5035. In both cases of assessment, a viewing distance of approx. 1 m from the damaged part must be observed.

Before assessing paint damage, the overall condition of the vehicle must always be assessed first. This includes:

- to check the vehicle for external damage or accidental predamage
- Check the maintenance status
- check whether all vehicle data is available (vehicle registration document, service book, data carrier in the vehicle)
- If the vehicle is in a dirty condition, it shall be washed and dried before assessment.

A paint damage assessment is mainly carried out by the human eye, i.e. by visual inspection. It is also advisable to measure the thickness of the paint layer before each assessment. This allows certain conclusions to be drawn in advance about the paint condition and possible paint damage. In order to make an even more detailed statement about some paint damage, because the damaged areas are too small or come from the paint structure itself, additional testing tools and materials are required. For these extended tests it is necessary to maintain an ambient temperature of approx. 25° C and a humidity of approx. 50 %. If these conditions are not met, the vehicle should be left dry for 24 hours to regenerate.

### Paint testing and measuring equipment

- Paint film thickness gauge suitable for iron and non-ferrous metals as well as for plastics, ceramics, glass, etc.
- Hardness tester according to Buchholz
- Hardness tester according to Wolff-Wilborn
- Hardness test rod
- Cross-cut testers
- IR temperature measuring instrument
- Colorimeter

### Auxiliary devices

- Humidity meter (Hygrometer)
- Halogen spotlight (500 watt) or metal halide lamp
- Illuminated magnifier (at least 7x magnification and mm scale)
- Reflected light microscope
- Magnifying glass
- Digital camera with fast lens and macro range

### Auxiliaries (Consumables)

#### Detergents

- Benzine
- Dilution
- Silicone remover
- Paint cleaner
- Windscreen cleaners
- Industrial dust remover
- VE Water
- Cleaning cloths

## Other aids

- Coarse and fine polish
- Polishing cloths
- Masking material
- Plastic spatula
- Sanding block
- Abrasive paper and blossoms with different grit sizes
- Roll of adhesive tape
- Fabric tape with high adhesive strength
- Cutter knife
- Japanese knife
- Magnetic arrows and ruler for mooring

### ***Hint:***

*As a standard, Mercedes-Benz specifies a paint diagnostic case with the most common test tools and means for each of its workshops and repair departments. For specialist paint shops, a second test kit with an extended content of test tools and test media is also required. This should generally be regarded as standard equipment for all paint shops of all automobile manufacturers.*

## Zone classification for damage assessment

The assessments of paint defects or paint damage on a vehicle paint job are divided into 3 zones on the body. The assessment zones are determined by the perspective of the observer and by the quality standard of the vehicle manufacturer:

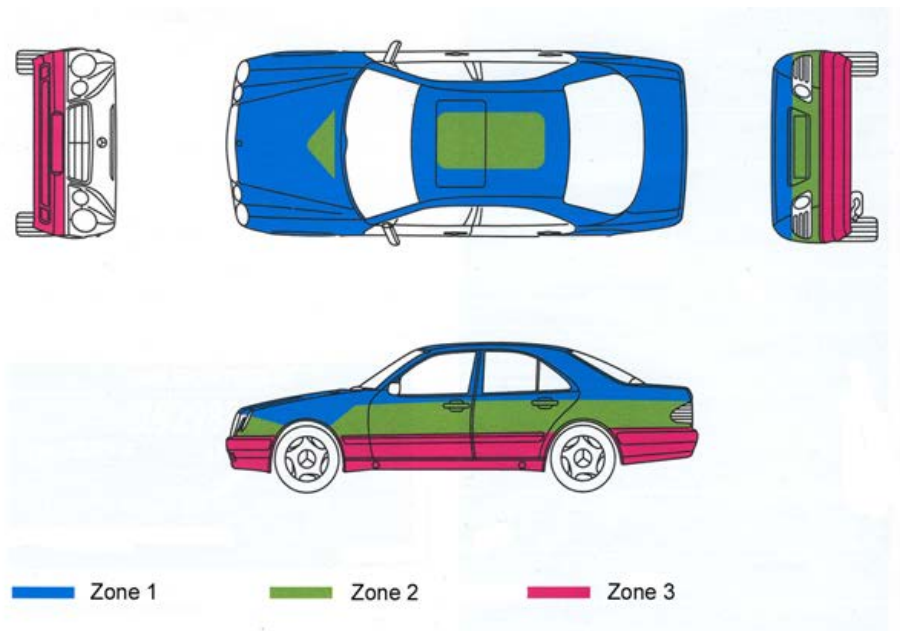
- **Zone 1** is in the direct field of vision of the observer, i.e. in areas in which paint defects are particularly quickly recognizable and can have a conspicuous or disturbing effect. Here, only small, individual, non-interfering paint defects at large intervals are permissible.
- **Zone 2** is not in the direct viewing angle of the observer. In this zone, paint defects are permissible, but they are not immediately recognizable and do not directly interfere with the overall optical appearance.
- **Zone 3** is in concealed areas and in vehicle interiors. Paint defects and body defects are permissible here. However, they must not impair the overall visual appearance either.



Graphic 1-001  
Picture source: Volkswagen AG



Graphic 1-002  
Picture source: Volkswagen AG



Graphic 1-003  
Picture source: Mercedes Benz

**Hint:**

The graphic representations of the Volkswagen and Mercedes-Benz zoning systems shown here are basically similar, but certain zones are evaluated differently. It is therefore essential to request the exact manufacturer's guidelines for expert opinions.

**Conclusion:**

However, the optical impression is always decisive for an assessment of coating defects in one of these coating zones.