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1 Area of application:

This quality requirement applies to all components with metallic base materials or with metallic base materials including galvanic and organic surfaces (galvanic zinc coating, hot-dip galvanising, etc.) which are treated with a cathodic dip coating, a powder coating, a duplex coating (cathodic dip coating and powder coating) and/or cavity preservation, etc.

2 Normative references:

The following cited documents are required for the application of this document. For dated references, only the referenced edition applies. For undated references, the latest edition of the referenced document (including all revisions) applies.

VDA 230-213	Testing procedure for product classes Prelube, Prelube2, Hotmelt, spot lubricant
DIN ISO 13715	Technical drawings — Edges of undefined shape — Vocabulary and indications
DIN EN ISO 2064 / 3882	Coating thickness measurements - non-destructive
DIN EN 6270-2	Paints and varnishes - Determination of resistance to moisture Part 2: Condensation (exposure in a climatic chamber with heated water tank)
DIN EN ISO 9227 SS	Corrosion tests in artificial atmospheres
DIN EN ISO 4628-1	Paints and varnishes — Evaluation of degradation of coatings — Designation of quantity and size of defects, and of intensity of uniform changes in appearance - Part 1: General introduction and designation system.
DIN EN ISO 4628-3	Paints and varnishes — Evaluation of degradation of coatings — Designation of quantity and size of defects, and of intensity of uniform changes in appearance - Part 3: Assessment of degree of rusting.
DIN EN ISO 4628-8	Paints and varnishes — Evaluation of degradation of coatings — Designation of quantity and size of defects, and of intensity of uniform changes in appearance - Part 8: Assessment of degree of delamination and corrosion around a scribe or other artificial defect
DIN EN ISO 2409	Paints and varnishes — Cross-cut test (ISO 2409:2007)

3 Material contamination

Material contaminants such as sanding dust, welding spatter, production dust, burnt-in oils and other liquids, pores, cracks, slag, scale and rust have a negative effect on the quality of the coating. This can lead to layer delamination, corrosion, pore formation, inclusions, blistering and similar.

When coating casted parts, outgassing can occur due to the curing conditions in the curing ovens. The consequences are unpredictable blistering, cratering, dents, infiltration and adhesion problems, for which we cannot accept any liability.

For components that receive a 'repair coating', the entire component must be cleanly removed of paint (including in the hollow parts) and free of rust. Contamination caused by chemical or thermal paint removal work will not be reworked by us and can therefore not be accepted. We would like to point out that only very light rust film can be removed in the course of chemical pre-treatment. More severe rust cannot be treated by us. Furthermore, the components are checked after receipt for any cavity preservation that may have been carried out - this should NOT be done before cathodic dip coating. Processing would then have to be rejected!

4 Lubrication - oils used:

4.1 Product requirements for oils:

The oils must be mineral oil-based base oils with additives to improve the deep-drawing and lubricating properties, with wear and corrosion protection additives as well as emulsifying agents to improve washability and KTL compatibility.

Compatibility with the processes during the body-in-white construction (welding, bonding) and painting (washability, cathodic dip painting compatibility) must be ensured in accordance with VDA 230-213.

4.2 Degree of lubrication:

Pressed and welded parts may only be covered with approved oils when delivered.

The oil coating of the components may consist of the cold band lubrication and the lubrication of the draw material.

The maximum oiling level of 3.0 g/m² per side is not allowed to be exceeded.

5 Causes of faults on the coating surface

5.1 Labelling:

Labelling with Edding (waterproof fibre-tip pens) must be avoided. Pens of this type are waterproof. These markings bleed through almost all coatings, i.e. what has been written once is still visible after powdering. This can also lead to adhesion problems with the coating.

5.2 Adhesive residues:

Adhesive residues (e.g. from adhesive tapes, labels etc.) are difficult to recognise and just as difficult to remove. The residues are so persistent that they cannot be removed by chemical pre-treatment.

5.3 Silicones:

The processing of parts with any products containing silicone must be strictly avoided. Silicones are heat-resistant, waterproof and largely resistant to chemicals and therefore cannot be removed by chemical pre-treatment. Therefore, contact with silicones must be strictly avoided before coating.

6 Weld Seams/Heat-Affected Zones:

6.1 Weld seams:

Weld seams must be pretreated in such a way that silicate and slag residues are removed to such an extent that flawless pre-treatment (e.g. phosphating) is possible.

- In the case of welding combinations of blank steel and galvanised components, the burnt "zinc residue" must always be removed mechanically.
- Weld splatter should be avoided as far as possible during the process, as this can lead to surface corrosion. Any areas to be masked must be free of weld splatter.

6.2 Heat-Affected Zones:

The heat-affected zones, if they are accessible, must also be treated in accordance with point 5.3.

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6.3 Authorised methods for removing residues:

Authorised methods for removing residues that arise during the welding process are mechanically abrasive methods. Currently approved methods are: mechanical brushing, abrasive laser treatment, ceramic blasting, barrel finishing (vibratory grinding), dry ice blasting, etc.

In some cases, an additional coating on the weld seams is also possible.

Which of the above options is appropriate depends on the component and must be decided and defined in consultation with the specialist departments.

7 Punched and cut edges:

7.1 Punched and cut edges:

Punched and cut edges must be designed in such a way that the edge protection required by the customer can be guaranteed.

Individual parts and assemblies must be processed or delivered burr-free (≤ 0.3 mm according to DIN ISO 13715) and without any swarf.

The following reworking options are available to improve the edge protection: grinding, brushing, barrel finishing (vibratory grinding), blasting, etc.

7.2 Laser-cut edges:

If components are laser-cut, oxygen-free cutting or cutting without active gas should be selected. If this is not possible, the edges must be reworked. The following reworking options are available: grinding, brushing, barrel finishing (vibratory grinding), blasting, etc.

8 Sandblasting

When sandblasting, care must be taken to ensure that no sandblasting residue remains in the cavities and surfaces. For corrosion reasons, the components must be delivered to us within 24 hours after sandblasting.

We would like to point out that only very slight flash rust can be removed in the course of chemical pre-treatment. More severe rust cannot be treated by us.

9 Suitable for dip coating

The components are suspended on crossbars and dipped; they cannot be turned or rotated. If air bubbles are trapped in hollow spaces due to the component design, then neither sufficient pre-treatment nor cathodic dip coating can be achieved in these areas.

This can be remedied by the targeted use of ventilation holes.

The coating process is carried out by dipping, which is why there must be an adequate number of vent holes and outlet holes for the fluids to flow in and out properly.

No scooping parts, e.g. blind holes

No sheet metal doublings

No closed hollow bodies (uplift)

10 Hanging/Suspension points

There must be hanging points in the form of holes, connecting flanges or similar to hold the components during the coating processes. These must be selected in such a way that reliable dip coating or powder coating can be guaranteed without the risk of damage to components, machine and system parts or persons.

The contact surfaces of the hanging or suspension points remain uncoated to a certain extent and must therefore be excluded from the corrosion protection requirements of the components.

11 Coating thickness KTL or powder coating

If no coating thicknesses are specified, we assume our standard coating thicknesses in accordance with our production capabilities.

Standard KTL coating: 15-25µm

Powder coating: 80-120µm

Coating thickness measurements (non-destructive according to DIN EN ISO 2064 / 3882) are always carried out on flat surfaces. The number of measuring positions and the measuring points themselves must be agreed with the customer.

12 Corrosion protection characteristics KTL coating with powder coating as top coat (two-coat structure)

The chemical pre-treatment must be "chrome VI and lead-free". The pre-treatment, coating material and coating process must be selected so that the requirements are met.

A two-stage system consisting of a primer with organic cathodic dip painting and powder coating as a top coat is possible in different powder qualities, gloss levels and structures. This system offers maximum corrosion protection (up to 1000 h resistance to base metal corrosion in the salt spray test in accordance with DIN EN ISO 9227 SS), combined with good thermal and mechanical resistance.

Basic requirement Corrosion resistance for steel:

Neutral salt spray test 1000 h resistance time according to DIN EN ISO 9227 NSS:

- Blistering/degree of blistering according to DIN EN ISO 4628-2: 0 (S0)
- Surface rust according to DIN EN ISO 4628-3: Ri 0 on machined cast surfaces and steel
- Infiltration at the scribe according to DIN EN ISO 4628-8: < 1 mm
- Edge rust according to DIN EN ISO 4628-1: KR 2
- Scratch test: K 2 60 min. after removal from the testing device on an undamaged surface
- Cross-cut according to DIN EN ISO 2409: Gt 0-1

Requirements Condensed water constant climate 240 h load duration according to DIN EN 6270-2:

- Blistering/degree of blistering according to DIN EN ISO 4628-2: 0 (S0)
- Surface rust according to DIN EN ISO 4628-3: Ri 0 on machined cast surfaces and steel
- Scratch test: K 2 60 min. after removal from the tester on undamaged surface
- Cross-cut according to DIN EN ISO 2409: Gt 0-1

Corrosion-endangered edges, corners, overlaps and areas that are difficult to access must be excluded from the corrosion protection requirements of the components.

13 Repair solutions:

In the case of cathodic dip painting or powder coating repairs, repair work instructions must be agreed and drawn up with the customer. Used coating materials must be tested on repaired components by a specialised department. If a repair coating is carried out, it should be noted that this may not correspond 100% to the originally specified requirement.