## Table of Contents



## Revision History

| *Revision* | *Changes* |
|---|---|
| 0 | - |
| | |
| | |
| | |
| | |
| | |
| | |

## Document Release

| | | | |
|---|---|---|---|
| Created by | **R.Treude** | on | **31.07.2025** |
| Changed by | **R.Treude** | on | **31.07.2025** |
| Verified by | **Hamann** | on | **31.07.2025** |
| Approved by | **R**.Treude | on | **01.08.2025** |

## 1 Terms and purpose

This company standard regulates the specifications for the surface finishing of components.

## 2 Applicable standards

| | |
|---|---|
| DIN EN ISO 1461 | Zinc coatings applied to steel by hot-dip galvanizing (piece galvanizing) – Requirements and tests |
| DIN EN ISO 12944-1 | Coating materials – Corrosion protection of steel structures by coating systems – Part 1: General introduction |
| DIN 55633-1 | Coating materials – Corrosion protection of steel structures by powder coating systems – Part 1: Evaluation of powder coating systems and execution of coating |
| BN 207-001 | Spacer tubes |
| GB-DB-00004 | Packaging regulations |

## 3 Procedure

When ordering with the required coating, reference is made to this company standard and the respective procedure is specified in accordance with the chapter. Furthermore, any special features of the respective coating process are indicated as well as whether any coverings of drill holes, threaded holes, or surfaces must be maintained. The necessary measures are explained individually in the respective chapter on coatings under the keyword "Protection." When ordering, the corresponding coating process is indicated for each item in the following format:

Coating 5.1.1 acc. to BN 005-001

## 4 Requirements for uncoated components and bare metal surfaces

If uncoated components are required, they must be delivered in a bare metal condition, free of rust and scale, suitable for painting or cleaning, and free of any silicones.

Surfaces that are still untreated after coating must be treated with suitable agents in accordance with DELLNER BUBENZER packaging regulation GB-DB-00004 to prevent corrosion. The selection of a suitable contact protection can be found in the aforementioned packaging regulation, depending on the weight, size, and material of the parts.

## 5 Finishing process

All of the following specifications apply to parts ordered with the corresponding keywords, unless otherwise specified in the order, in the article text, or on the drawing. If you are unsure, please contact the representative specified in the order.

Unless otherwise specified, the dimensions specified on the drawing are manufacturing dimensions without coating.

### 5.1 Wet paint

For the "wet paint" coating process, the corrosion protection class to be achieved in accordance with DIN EN ISO 12944 is decisive; the specified layer thicknesses are for guidance only. If the corrosion protection class can be demonstrably achieved with other layer thicknesses, this is also acceptable.

A cross-cut test in accordance with DIN EN ISO 2409 or a pull-off test in accordance with ISO 4624 shall be carried out to test the quality of the delivered product. The test locations shall be agreed with DELLNER BUBENZER's quality assurance department.

The individual layer thicknesses are to be understood as example values. The following tolerances apply to the total layer thickness:

Target value up to 160 µm -0% / +100%
Target value > 160 µm -0% / +50%

Individual "outliers" are permitted in accordance with Chapter 6.

#### 5.1.1 Paint finish, primer only

| | |
|---|---|
| Corrosion protection class | C2-M |
| Primer coat thickness | approx. 80 µm |
| Primer color | RAL 7001 |
| Top coat layer thickness | - |
| Top coat color | - |
| Gloss level | Matt |
| Alternative coating | - |
| Protection | All threaded holes > M8 and all fittings must be covered with suitable means and protected from paint penetration. |

#### 5.1.2 Paint finish, standard

| | |
|---|---|
| Corrosion protection class | C3-M |
| Primer Coating thickness | approx. 80 µm |
| Primer color | RAL 7001 |
| Top coat layer thickness | approx. 40 µm |
| Top coat color | RAL 3004 |
| Gloss level | Matt |
| Alternative coating | 5.1.3 / 5.1.4 |
| Protection | All threaded holes > M8 and all fittings must be covered with suitable means and protected against paint penetration. |

### 5.1.3 Paint finish, increased corrosion protection

| | |
|---|---|
| Corrosion protection class | C4-M |
| Primer Coating thickness | approx. 80 µm |
| Primer color | RAL 7001 |
| Top coat layer thickness | approx. 80 µm |
| Top coat color | RAL 3004 |
| Gloss level | Matt |
| Alternative coating | 5.1.4 |
| Protection | All threaded holes > M8 and all fittings must be covered with suitable means and protected against paint penetration. |

### 5.1.4 Paint finish, seawater resistant

| | |
|---|---|
| Corrosion protection class | C5-M |
| Primer layer thickness | approx. 80 µm |
| Primer color | RAL 7001 |
| Top coat layer thickness | approx. 160 µm |
| Top coat color | RAL 3004 |
| Gloss level | Matt |
| Alternative coating | None |
| Protection | All threaded holes > M8 and all fits must be covered with suitable means and protected from paint penetration. |

## 5.2 Coatings

### 5.2.1 Powder coating

| | |
|---|---|
| Corrosion protection class | - |
| Pre-treatment | Zn min. 6 µm + Zn phosphate |
| Top coat layer thickness | approx. 80 µm |
| Top coat color | RAL 9005 |
| Gloss level | Matt |
| Protection | All threaded holes > M8 and all fittings must be covered with suitable materials and protected from paint penetration. |
| Alternative coating | 5.2.3 |

### 5.2.2 Zinc flake coating

| | |
|---|---|
| Corrosion protection class | - |
| Pre-treatment | Zinc phosphating |
| Coating thickness | 5 – 15 µm |
| Protection | All threaded holes > M 8 and all fits must be covered with suitable means and thus protected against paint penetration, or the prefabrication dimensions according to the table on the drawing must be observed. |

### 5.2.3 KTL coating

| | |
|---|---|
| Corrosion protection class | - |
| Pre-treatment | Zinc phosphating |
| Coating thickness | 20 µm (+/- 5 µm) |
| Color | RAL 9005 |
| Gloss level | Matt |
| Protection | All threaded holes > M8 and all fits must be covered with suitable means and thus protected against paint penetration. If prefabrication dimensions are specified on the drawing, coating of the fits is also permissible. |

### 5.2.4 Electrogalvanized

| | |
|---|---|
| Corrosion protection class | - |
| Pre-treatment | Zinc phosphating |
| Coating thickness | 6–8 µm |
| Protection | - |

## 6 Measurement of dry film thickness

### 6.1 Testing device

- A calibrated DFT measuring device.
- The device must be verified and adjusted if necessary:
- Zero point verification with the calibration foil provided.

### 6.2 Test area & sample

- Define the inspection area (total area or defined section).
  - Unless otherwise specified, use the total area of the component.
- Number of measuring points according to Table 1 ISO 19840:

| Area (m²) | Minimum number of measurements |
|---|---|
| up to 1 | 5 |
| 1-3 | 10 |
| 3-10 | 15 |

For DB parts, 5 measurements per component apply.

### 6.3 Implementation

- Set up the measuring device according to the manufacturer's instructions.
- In the event of outliers (< 80% DFT or > max. DFT): Repeat at a maximum distance of 10 mm. Discard the original value and document the replacement value.
- Maximum number of repetitions according to Table 1 (normally 20% of measurements).

### 6.4 Evaluation criteria

The inspection area is considered to have passed if all of the following conditions are met:

- The arithmetic mean of all individual measured values (after deduction of the correction value) corresponds at least to the specified DFT (nominal dry film thickness).
- No individual value is below 80% of the DFT.
- A maximum of 20% of the individual values may lie between 80% and 100% of the DFT.
- No permissible maximum thickness is exceeded (if specified).

If these conditions are not met, the entire inspection area must be rejected.

Examples of limit values for paint film thickness:

| Coating thickness | 80% |
|---|---|
| 120 µm | 96 µm |
| 150 µm | 120 µm |
| 240 µm | 192 µm |

### 6.5 Documentation of the measurement

The results must be recorded with their values in the respective goods receipt report or EMPB.

## Appendix I

# DIE KORROSIONSSCHUTZKLASSEN NACH DIN EN ISO 12944 MIT SCHUTZDAUER

| Korrosivitäts-Kategorie, Korrosions-belastung | Korrosivität | Korrosivitäts-Schutzdauer (Klasse) | Schutzdauer (Jahre)* | Sollschicht-dicke in µm | Kondensieren von Wasserdampf in Stunden (h) | Einwirken von Salzsprühnebel in Stunden (h) | Beispiele typischer Umgebungen |
|---|---|---|---|---|---|---|---|
| C1 unbedeutend | sehr gering | kurz | 2 bis 5 Jahre | 70 | — | — | Nur Innenräume: gedämmte Gebäude (60% rel.F.) |
| | wenig aggressiv | mittel | 5 bis 15 Jahre | 70 | — | — | |
| | innen | lang | über 15 Jahre | 70 | — | — | |
| C2 gering | gering | kurz | 2 bis 5 Jahre | 80 | 48 | — | gering verunreinigte Atmosphäre, trockenes Klima, z.B. ländliche Bereiche |
| | mäßig aggressiv | mittel | 5 bis 15 Jahre | 120 | 48 | — | |
| | außen/innen | lang | über 15 Jahre | 160 | 120 | — | |
| C3 mäßig | mäßig | kurz | 2 bis 5 Jahre | 120 | 48 | 120 | Stadt- und Industrie-Atmosphäre mit mäßiger SO2-Belastung oder gemäßigtes Klima |
| | wenig aggressiv | mittel | 5 bis 15 Jahre | 160 | 120 | 240 | |
| | außen/innen | lang | über 15 Jahre | 200 | 240 | 480 | |
| C4 stark | hoch | kurz | 2 bis 5 Jahre | 160 | 120 | 240 | Industrie-Atmosphäre und Küstenatmosphäre mit mäßiger Salzbelastung |
| | mäßig aggressiv | mittel | 5 bis 15 Jahre | 200 | 240 | 480 | |
| | außen/innen | lang | über 15 Jahre | 240-280 | 480 | 720 | |
| C5-I sehr stark (Industrie) | sehr hoch, | kurz | 2 bis 5 Jahre | 200 | 240 | 480 | Industrie-Atmosphäre mit hoher relativer Luftfeuchte und aggresiver Atmosphäre |
| | aggressiv | mittel | 5 bis 15 Jahre | 240-280 | 480 | 720 | |
| | außen/innen | lang | über 15 Jahre | 320 | 720 | 1440 | |
| C5-M sehr stark (Meer) | sehr hoch | kurz | 2 bis 5 Jahre | 200 | 240 | 480 | Küsten- und Offshorebereiche mit hoher Salzbelastung |
| | maritim | mittel | 5 bis 15 Jahre | 240-280 | 480 | 720 | |
| | außen/innen | lang | über 15 Jahre | 320 | 720 | 1440 | |