BN 30.050	Broetje-Automation factory standard Coating	BROETJE AUTOMATION

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Status of change:

09	Total rework of standard	Hafermann	26.04.24
08	Adjustment of gloss level	Hafermann	06.06.23
07	Amendment chap. 2.5 Surface treatment	Siemer	08.03.18
06	Modification of article release	Garn	29.11.16
05	Modification of the release module	Otholt	26.11.14
04	Customization Item No.	Garn	10.11.14
03	Changes points 4, 5, 6	Garn	13.02.14
02	Changes point 1.1,1.2,2.3, 4, 5, 6	Garn	17.10.13
01	Creator	Muschard	25.06.13
Index	**Naming**	**Name**	**Date**

Release:

1 Scope and purpose

To avoid corrosion damage, the components must be coated in such a way that they offer few opportunities for aggressive media to attack.

The standard, through the correct application of the coating, is intended to help ensure the visual and technical equivalence of the coating of suppliers through the proper application of the coating. The aim is to evenly protect Broetje-Automation's products from corrosion by means of wet painting or powder coating and to maintain their value in the long term.

Deviations from this standard require the approval of the quality assurance department of Broetje-Automation and are documented separately.

2 Standards and corrosion protection

2.1 Standards

DIN EN ISO 12944	Corrosion protection of steel structures by Coating systems
DIN 55633	Corrosion protection of steel structures by Powder Coating System
DIN EN ISO 8501	Preparation of steel surfaces prior to the application of coating materials (comparable to SSPC)
DIN EN ISO 2409	Paints and varnishes - cross-section testing
DIN EN ISO 4624	Tear-off test to determine adhesion strength
Shades	RAL 840-HR for Wet Paints VDL RL-10 for powder coatings
Processing	according to the specifications of the coating manufacturer

2.2 Corrosion claim

Atmosphere type II: Industry in closed, dry hall C2
Atmosphere type III: Industry in a closed hall with a nearby coastal area C3

3 Surface Preparation

The surface preparation must have a purity and roughness suitable for the intended coating in order to allow good adhesion of the coating. All surface preparation work must be supervised and controlled. A subsequent coating may not be applied until the surface to be coated has been prepared in accordance with the principles of this specification.

All surfaces must be dry and free of adhesion-hindering substances, such as:

- Species-specific layers
  - Rust
  - Tinder
  - Rolled skin

- Layers alien to the species
  - Oils
  - Fats
  - Preservative
  - Dirt
  - Dust
  - Dew moisture
  - Detergent residues

- Acceptable cleaning procedures are:
  - Radiate
  - Sanding (avoidance of sanding marks in the surface)
  - Steam off
  - Wet Dry Cleaning

3.1 Drilling and tapping

Drill holes and threaded holes must be protected against penetration of the coating material and against corrosion.

3.2 Steel surfaces

The cleaned steel surfaces must be cleaned at the latest:

- 6 hours at relative humidity <70%
- 3 hours at a relative humidity of 70% to 85%

be protected by a base coat or a metallic protective layer.

3.3 Surface treatment

The base material can be ordered blasted or blasted after welding. Scale, rust and coatings must be removed to such an extent that residues remain visible only as slight shading due to tinting of the pores (surface quality SA 2 1/2 according to DIN EN ISO 8501-1 or SSPC-SP10).

The surface treatment of metallic materials to be painted and welded shall be carried out as follows:

Range	Request
Welds	The surface in the area of the weld seams must be smooth and also free of: Weld spatter, welding slag, edge notches, visible pores, visible end craters (EN ISO 8501-3, P3 Table 1).
Edges	For all steel, sheet metal and plastic parts, the edges must be broken in accordance with DIN ISO 13715 and absolutely burr-free. The edges must be smooth and must not have an irregular profile (EN ISO 8501-3, P2 Table 1).
General Interface	The surface must be free of: Holes and craters, visible scales, visible rollovers, rolled in foreign matter, indentations and markings from rolling (EN ISO 8501-3, P3 Table 1). The following surface roughness is to be achieved: • for wet painting Rz = 25 µm • for powder coating Rz = 30-40 µm

3.4 Bare surfaces

Uncoated surfaces must be **protected against corrosion with** Anticorit CPX 3373, Blasoprotect OV31 or comparable products.

3.5 Corrosivity category C3 and higher

If the corrosivity category C3 or higher is required in the order, open edges must be sealed with **Sikaflex-522® or comparable** so that crevice corrosion cannot occur.

4 Wet painting

4.1 Coating system

The following coating system according to the order is to be used:

Corrosivity Category		**C2**		**C3**		**C4**		**C5**	
Kind	Base	Number of layers	NDFT µm	Number of layers	NDFT µm	Number Stratify	NDFT µm	Number Stratify	NDFT µm
Undercoat	EP	**1**	**80**	**1**	**80**	**1**	**100**	**1**	**120**
Top coat	PUR	**1**	**80**	**2**	**80**	**2**	**100**	**2**	**120**
Total		**2**	**160**	**3**	**240**	**3**	**300**	**3**	**360**

The maximum total dry layer thickness must not exceed 300 µm for C2 to C3 or 400 µm for C4 and C5.

The corresponding manufacturers and article numbers can be found in Chapter 9.

4.2 Coating process

According to DIN EN ISO 12944, both the base coat and the top coat are to be applied by spraying process, preferably by airless.

Paint application by rollers is not permitted.

The manufacturer's processing information must be observed.

5 Powder coating

5.1 Coating system

The following coating system should be used:

Corrosivity category C2-C5			
Kind	**Base**	**Number of layers**	**NDFT µm**
Undercoat	EP	1	60
Top coat	PUR	1	60
	Total Layer Thickness	**2**	**120**

The corresponding manufacturers and article numbers can be found in Chapter 9.

5.2 Coating process

Both the base coat and the top coat must be applied in accordance with DIN 55633.

The **primer** is to be applied electrostatically or using the tribo method.

According to the technical specifications, the powder coating system must be completely baked:

- 15 minutes at 180°C / 350 F
- 10 minutes at 200°C / 400 F

The **top coat** must also be applied electrostatically or using the tribo method.

According to the technical specifications, the powder coating system must be completely baked:

- 15 minutes at 180 °C / 350 F (alternatively, see manufacturer's technical data sheet)
- Softening mechanisms for aluminium components must be taken into account.

6 Coating requirements

a)	Gloss level:	25 – 50 GE	at viewing angle 60°
b)	Cross-section:	max. Gt 1	DIN EN ISO 2409
	Pull-off force	min. 7 MPa	DIN EN ISO 4624
c)	Salt Spray Test:	480 h	DIN EN ISO 9227
d)	Condensation test:	240 h	DIN EN ISO 6270-2
e)	Colour accuracy:	see RAL 840-HR	for wet paints
		see VDL RL-10	for powder coatings

6.1 Inspection of the coating before delivery

The gloss level, the shade, the overall layer thickness and the surface structure must be checked after drying. The appropriate reference plate is to be used for the visual assessment, and the cross-section inspection is to be made, evaluated and documented on a reference surface on request (see Downloads - Broetje Automation (broetje-automation.de) → Quality assurance).

Inadmissible surface defects are shown in the following table:

No.	Criteria	Request
1	Structure and course	Visually visible deviations (e.g. orange peel, brush strokes, roller impressions, shading, etc.) are not permitted.
2	Visible material defects, rolling cracks, scars, sanding marks in the surface	Not allowed
3	Material scratches, burr formation, other damage	Not allowed
4	Bishop	Not allowed
5	Pinpricks, open pores	Not allowed
6	Blistering	Not allowed

6.2 Deviation from the Broetje-Automation standard

For reasons of colour accuracy, only the prescribed lacquer materials should be used. If, however, coating materials from other manufacturers are used for compelling reasons, the requirements a to f listed above, as well as the coating thicknesses specified in sections 4.1 or 5.1, must be ensured. This requires special approval from BA.

7 Control

The following tests must at least be carried out and documented by the coating company at appropriate intervals:

Test criterion	Test Preparation	Circum-ference	Documentation
Incoming Goods Coatings/Powder Coatings	Verification of the conformity of article no. on goods and delivery note	Each delivery	Note on delivery note, proof on request
Thickness	Measurement	Any order line	Note minimum and maximum values on the coating protocol
Adhesion	Cross-cut / pull-off test	On request	Evaluation from the measuring device
Thermal curing	Furnace Measurement	1/4 annually	Proof on request

8 Repair of damage

Transport and assembly damage must be repaired immediately with appropriate wet paints. Depending on the application and corrosivity category, different systems must be used here.

The following repair matrix provides an overview of the different options.

	Action
Pretreatment	Cleaning with Dilution
Undercoat	None
Top coat	a) Touch-up pen b) 2K PUR lacquer

Before using an appropriate repair system, suitability tests must be carried out on the component in advance.

The information in the current technical data sheets of the material manufacturer must generally be observed!

9 Supplier and contact person

If possible, all wet paints and powder coatings used are to be obtained from the approved supplier listed below. Commercial and technical support is provided by the paint manufacturers. Changes can be made by submitting an application to Broetje-Automation.

Link to the application:
BA Group_QA_FO_Application_for_rework_BA_deu_eng (broetje-automation.de).

9.1 Europe

Wet painting:

OSNATOL-Werk GmbH u. Co. KG
Bahnhofstraße 14
49191 Belm-Vehrte
Your contact person: Mr. Boris Vetter
vetter@osnatol.de

Kind	Material designation
Undercoat	OSNACRYL Aquaprime SBArticle 72508 Shade **Alternative:** OSNAPOX 2K-ZP-Basic SBA Item 72009-Shade-0060
Top coat	OSNACRYL PUR SBA SDM40 Lacquer Item 52040-xxxx-0011

Powder coating:

CENARIS GmbH
Industriestraße 20
28199 Bremen / Germany
Your contact person: Mr. Thomas Hock
thomas.hock@cenaris.com

Kind	Material designation
Undercoat	Cenaris Megaprimer Article 110 01 15000
Top coat	Cenaris Polyester Article 140 04 xxxx Broetje

Overview of article numbers:

Manufacturer's item no. Wet Paint (Os-natol)	Manufacturer's Item No. Powder Coating (Cenaris)	Article description	RAL
52040-97240-0011	140 04 9005 Broetje	Ebony	9005
52040-97220-0011	140 04 9003 Broetje	Signal White	9003
52040-79830-0011	140 04 7038 Broetje	Agate Grey	7038
52040-79840-0011	140 04 7037 Broetje	Dusty Grey	7037
52040-79850-0011	140 04 7023 Broetje*	Concrete Grey	7023
52040-57890-0011	140 04 5014 Broetje*	Pigeon Blue	5014
52040-35500-0011	140 04 3001 Broetje*	Signal Red	3001
52040-22780-0011	140 04 2004 Broetje*	Pure orange	2004
52040-22790-0011	140 04 1021 Broetje*	Rapeseed yellow	1021
52040-97230-0011	140 04 9010 Broetje	White	9010
52040-79810-0011	140 04 7035 Broetje	Light grey	7035
52040-79820-0011	140 04 7016 Broetje	Anthracite Grey	7016
52040-69760-0011	140 04 6011 Broetje	Reseda Green	6011
52040-57850-0011	140 04 5015 Broetje	Azure	5015
52040-57840-0011	140 04 5012 Broetje	Light Blue	5012
52040-57830-0011	140 04 5010 Broetje	Gentian blue	5010
52040-18240-0011	140 04 1007 Broetje	Daffodil yellow	1007

*from request delivery time 4-6 weeks

9.2 North America

Wet painting:

The Sherwin Williams Co. PCG #4387
5111 Dansher Road
Countyside, IL 60525
(P) 708-482-8131

Type	Material designation
Primer	2.8 VOC Catalyzed Epoxy Primer E61A280
Top coat	Polane® 8890 Polyurethane Enamel F63T105C

Powder coating:

The Sherwin Williams Co. PCG #4387
5111 Dansher Road
Countyside, IL 60525
(P) 708-482-8131

Type	Material designation
Primer	POWDURA® Epoxy Powder Coating EAS6-C0000
Top coat	POWDURA® Superdurable TGIC Free Polyester Powder Coating RAS3-*****

9.3 Asia

Wet painting:

Type	Material designation
Primer	Interseal 670HS, International Jotun, Primer Penguard EXA II Hempel, Primer Multi 500
Top coat	Interthane 870, International Jotun, Hardtop XPL Hempel, Hempathane 55190