Surface treatment and painting procedure

Global leader in advanced door, window and wall safety solutions

RAPP BOMEK

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Surface treatment and painting procedure

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1 INTRODUCTION

1.1 PURPOSE

The purpose of this procedure is to state how the surface treatment is taken care of such that all quality-affected activities are carried out in accordance with the requirements for surface treatment. A detailed coating procedure specification (CPS) shall be established as specified in NORSOK M-501 section 10.3. MED-B certified doors shall have a MED-B certified paint system.

1.2 SCOPE

The procedure covers all quality-affected activities connected with surface treatment and is divided into following areas:

- Pre-treatment and cleaning
- Priming and painting
- Repairs

1.3 RESPONSIBILITIES

The sales manager shall mark the sales order with the requirement for surface treatment system, this info will also appear in Rapp Bomek ERP-system (Microsoft Dynamics AX).
The scope of inspection is described in Annex 2, Paint inspection report.

Before starts up, and during the work, the air conditions shall be measured to ensure that it satisfies the specifications. Measuring shall be documented in the paint inspection report sheet.
Every operator shall inspect his/her work during execution, and on completion, before he contacts the foreman for inspection.

Refer also to Rapp Bomek internal health environment and safety procedures.

1.4 REFERENCE

NORSOK M-501
ISO 8501-1
ISO 8502-3
ISO 8502-6
ISO 8502-9
ISO 8502-4
ISO 8503-1

2 PRE-TREATMENT AND CLEANING

2.1 GRINDING

Besides the grinding every welder shall remove slag and splash after welding. Surface defects, sharp edges weld spatter etc. shall be removed prior to blast cleaning. Sharp edges shall be removed by rounding. Quality levels of imperfections, ref. ISO 5817:2014.

2.2 WASHING/DE-GREASING

The surface to be coated shall be clean, dry, free from oil/grease, and have the specified roughness and cleanliness until the first coat is applied. Dust, blast abrasives etc. shall be removed from the surface after blast cleaning such that the particle quantity and particle size do not exceed rating 2 of ISO 8502-3.

2.3 SALT TEST

Salt test to be carried out in accordance with ISO 8502-6 and ISO 8502-9
i.e. spot checks, maximum conductivity corresponding to 20mg/m² NaCl, repeated washing with potable water and retesting until acceptable.

3 BLAST CLEANING

Grit of approved type shall be used such that described cleanness and roughness of the surface is obtained. Compressed air, which is used, must be dry and must, if necessary, be fed through a de-humidifier, which is frequently drained.
All surfaces, openings or equipment which shall not be sandblasted shall be covered. Blast cleaning shall not be done near to painting works, or surfaces, which are susceptible to dust and particles.

All blast cleaning prior to priming & painting shall be done under satisfactory conditions in compliance with specification, and coating manufacturer's requirements.
Critical factors are (among others):

- General weather conditions
- Surface temperature of the products
- Air temperature
- Relative humidity
- Dew point

Blast cleaning shall not be carried out if the surface temperature of the product is less than 3 °C over the dew point or when relative humidity is higher than 85%. These conditions must be measured frequently by operator/foreman and shall be documented.
Blast cleaning to be carried out such that it removes the splash, rust, slag, marking etc. and the surface becomes as clean as is specified in the specification and the required roughness is obtained.
Upon completion the operator before final inspection from the foreman. For the extent of QC activities refer to NORSOK M-501 rev 05 table 3 (attached).

After blast cleaning of surface, primer shall be applied immediately, or within the specified maximum time limit. I.E. The substrate shall still comply with the specified degree of cleanliness.
If the primer is not added immediately after sandblasting, the QC-dept. shall be notified when the primer eventually is applied in order to inspect whether the surface has started to rust, and if so to ensure sandblasting is carried out again.
The following standards must be adhered to:

- Cleanliness acc. to ISO 8501-1
- Anchor profile according ISO 8503 grade medium G.

4 PRIMING AND PAINTING

Before priming starts all surfaces shall be inspected and approved as being in accordance with requirements. All surfaces must be duly cleaned (ISO 8501-1) free of dust (ISO 8502-3) before priming & painting starts.

All surfaces, opening or equipment, which shall not be primed or painted, are to be covered.

All priming shall be completed before any degradation of the blast-cleaning standard occurs.

All priming & painting shall be done under the same requirement to satisfactory weather conditions as for blast cleaning, where the same general guide-lines are to be followed, and where the same documentation will be done.

The primer and the paint shall be applied either by spraying or brush, or by roller where spraying is not applicable. Roller application is not accepted for the first primer coat ie. on bare steel. The number of coats shall be increased if application of high build qualities is by brush or roller as a substitute for air-less spray application in order to reach at specified dry film thickness.
Each coat will be dried and hardened before next coat is applied.

After each coat, there should be an inspection, approval and reporting before next coat starts.

Unpainted stainless-steel surfaces do not require primer after blast cleaning.

5 NORSOK M-501 (CARBON STEEL)

Blast-cleaned surface to SA 2 ½
Roughness: ISO 8503 Grade Medium G (50 µm to 85 µm, Ry5)

Paint specification: NORSOK M501 rev.6 system no. 1 (Carbon Steel)

Products	Dry film thickness (my), Average
Interzinc 52	**60**
Intergard 475	**170**
Interfine 691	**50**
Total=	**280**

Please note, -unless otherwise specified by the customer
(ref. NORSOK C-002, 7.11 Threshold):
Doors that have painted or coated frames shall have either a brushed stainless-steel threshold or a brushed stainless-steel cover plate, minimum 1 mm thick, for the entire length, and down to the floor on both sides, leaving no gaps and sharp edges.

6 NORSOK M-501 (STAINLESS STEEL)

Blast-cleaned surface to SA 2 ½
Sweep blasting with non-metallic and chloride free grit to obtain anchor profile of approximately 25 µm to 85 µm.

Paint specification: NORSOK M501 rev.6 system no. 6 (Stainless Steel)

Products	Dry film thickness (my), Average
Intergard 269	**50**
Intergard 475	**100**
Interfine 691	**75**
Total=	**225**

Please note, -unless otherwise specified by the customer
(ref. NORSOK C-002, 7.11 Threshold):
Doors that have painted or coated frames shall have either a brushed stainless-steel threshold or a brushed stainless-steel cover plate, minimum 1 mm thick, for the entire length, and down to the floor on both sides, leaving no gaps and sharp edges.

7 STAINLESS STEEL WITH BLASTED FINISH

Door and frame blast-cleaned to SA 2 ½

8 STAINLESS STEEL WITH BRUSHED FINISH

Door leaf with brushed finish (industrial finish)
Frame blast-cleaned to SA 2 ½

9 REPAIRS

In cases where damage (burn marks, transportation damage) or if mistakes (flaking, sinking, etc.), arise in the applied primer or painting, the surface shall be repaired. Under repairing of such mistakes, the area shall be re-blasted and primed and painted again.
In other cases where the application of coating is outside the customer's specification, one extra coat shall be applied of the actual paint, in sufficient amount to ensure that the surface becomes smooth and the customers requirement for film thickness is met.
If primer or paint is applied under unacceptable conditions, the actual areas are to be repaired by re-blasting and application of new coating.
Postponement of the repairs shall be entire on a "punch-list" which indicates the relevant areas outstanding.

10 REPAIRS OF DAMAGED SURFACE ON STAINLESS STEEL DOORS

Sandblasted with Aluoxid.
Smaller areas which has been damaged i.e. Scratches/Rust can be re-blasted with a mini-Blaster (with collection bag due to surroundings/ environment) using Aluminium oxide (type A1 i.e. finely graded, size 0,2 – 0,6mm). Other mineral abrasive agent can also be used).
Bigger areas ($>$ 1/2m^2) require a complete re-blasting of the whole door/frame.

Note that Rollers/Rails etc. must be protected before start of Blasting.

11 ANNEX 1, NORSOK STANDARD M-501, CHAPTER 11, TABLE 3.

NORSOK standard M-501 Edition 6, February 2012

11 Inspection and testing

Testing and inspection shall be carried out in accordance with Table 3. Surfaces shall be accessible until final inspection is carried out.

Table 3 - Inspection and testing

Test type	Method	Frequency	Acceptance criteria	Consequence
Environmental conditions	Ambient and steel temperature. Relative humidity. Dew point.	Before start of each shift + minimum twice per shift.	In accordance with specified requirements	No blasting or coating
Visual examination	Visual for sharp edges weld spatter slivers, rust grade, etc. ISO 8501-3	100 % of all surfaces	No defects, see specified requirements	Defects to be repaired
Cleanliness	a) ISO 8501-1 b) ISO 8502-3	a) 100 % visual of all surfaces b) Spot checks	a) In accordance with specified requirements b) Maximum quantity and size rating 2	a) Reblasting b) Recleaning and retesting until acceptable
Salt test	ISO 8502-6 and ISO 8502-9	Spot checks	Maximum conductivity corresponding to 20 mg/m^2 NaCl	Repeated washing with potable water and retesting until acceptable
Roughness	Comparator, stylus instrument or testex tape (see ISO 8503)	Each component or once per 10 m^2	As specified	Reblasting
Curing test (for Zn silicate).	ASTM D4752	Each component or once per 100 m^2	Rating 4 to 5	Allow to cure
Visual examination of coating	Visual to determine curing, contamination, solvent retention, pinholes/popping, sagging and surface defects	100 % of surface after each coat	According to specified requirements	Repair of defects
Holiday detection	ISO 29601. Voltage, see table 1	As per coating system specification	No holidays	Repair and retesting.
Film thickness	ISO 19840. Calibration on a smooth surface	ISO 19840	ISO 19840, and coating system data sheet	Repair, additional coats or recoating as appropriate
Adhesion	ISO 4624, using equipment with an automatic centred pulling force, and carried out when coating system are fully cured	Spot checks	See notes below	Coating to be rejected

NOTE 1 For coating system no. 2 A, adhesion during CPT shall be minimum 9,0 MPa. Adhesion measured during production shall be minimum 7,0 MPa for any single measurement.

NOTE 2 For coating system no. 3A, system no. 3C, system no. 3D, system no. 3E, system no. 3F and system no. 3G, maximum 30 % reduction from the CPT is acceptable. Absolute minimum value is 5 MPa.

NOTE 3 For sprayed on passive fire protection, maximum 50 % reduction from CPT value read as cohesion is acceptable. Absolute minimum values are 2,0 MPa for cement based products and 5,0 MPa for epoxy based products. Epoxy based passive fire protection may be used to glue the test dollies to the primer in order to measure the adhesive strength.

NOTE 4 For the remaining coating systems, 50 % reduction of average adhesion value from the CPT is acceptable as minimum adhesion during production coating. Absolute minimum value is 5 MPa.

NOTE 5 For adhesion test during CPT, glue failure with values below 15 MPa is not accepted. X-cut test can be used as a supplementary test for adhesion, when relevant.

NOTE 6 Spot checks shall be defined and agreed on before start of each project and included in the inspection and test plan (ITP).

12 ANNEX 2, RAPP BOMEK PAINTING INSPECTION REPORT.

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Paint Inspection Report

		Report No.:
		Page
		Drwg.No.:
Sales Order No.:	Date	Time
Client	Ref.spec	Originator
Po.No.:	Contractor	Shopwork

Subject		Coating						
		Paint system:						
		Coat nr:						
		Coat nr:						
		Coat nr:						
Salt test:	Dust test:	Coat nr						
Surface Preparation								
Method								
		Coat No	1	2	3	4	5	
Standard		Method						
Abrasive used		R.H						
R.H.		Temp						
Temp		Steel temp						
Steel temp		Dew poin						
Dew point		D.F.T. min						
Date/Time Start		D.F.T. max						
Date/Time Finish		No. of measurements						
Remarks and action		Average						
		Date/Time Start						
		Date/Time Finish						
		Adhesion test						

Approval Sign.	Approval Sign.
Rapp Bomek AS	Rapp Bomek AS
Client	Client
Senior Frosio Inspector.	Frosio Inspector.
Sub.Contr.	Sub.Contr.
Paint suppl.	Paint suppl.