# Base Load Power Hub (BLPH)

PAINTING PROCEDURE (including surface preparation)
H2 STORAGE VESSEL

Document Number: 1723001756-MAT-PRO-00008

Document Class: 2

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| 02 | 25/06/2024 | Accepted for Construction (AFC) | M.Rampazzo | P.Franzolin | M.Galli |
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| 00 | 03/04/2024 | Issue for Review (IFR) | M.Rampazzo | P.Franzolin | M.Galli |
| Rev. | Date | Description | Prepared | Reviewed | Approved |

BREMBANA&ROLLE

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**Revision / Change Log**

| Rev. | Description |
|---|---|
| 00 | Issue for Review (IFR) |
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**HOLDS LIST**

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# SURFACE PREPARATION AND PAINTING PROCEDURE

**REFERENCE DOCUMENTS:**

Project Spec. 123A90-DDL-MAT-SP-60006 Rev.02 Date 12/03/2024
B&R Dwg. 23096-01-ESP01 Rev.0 Date 08/02/2024
Norsok M-501 Edition 6, February 2012
SSPC SP1 Last Edition
ISO 8501 - 1 Last Edition
ISO 8501 - 3 Last Edition
ISO 8502 - 3 Last Edition
ISO 8502 - 6&9 Last Edition
ISO 8503 Last Edition
ISO 8504 - 2 Last Edition
ISO 4624 Last Edition
ISO 29601 Last Edition
ASTM D4228 Last Edition
ASTM D4285 Last Edition
ASTM D4414 Last Edition

**REVIEW FOR CONFORMANCE WITH REFERENCE CODE/DOCUMENTS REVISION:**

| Date: | Code Edition / Addenda: | Q.C.M. |
|---|---|---|
| | | |
| | | |
| | | |

| Rev. | Date | Description | Issued by<br>Q.C.I. | Approved by<br>Q.C. Manager |
|---|---|---|---|---|
| 0 | 03/04/2024 | Issued for approval | R.B. | M. Galli |
| 1 | 20/05/2024 | Issued for approval | L. Buzoianu | M. Galli |
| | | | | |

# Brembana & Rolle S.p.A.

**B&R Job No:** **23096**

**Project:** **CROSSWIND HOLLANDE KUST NOORD WIND PARK**

**Contract No:** **1723001756 123A90A**

**Client:** **ROSETTI MARINO – Ravenna (Italy)**

# Index

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# 1 – SCOPE

1.1. This document details the "Working procedure" for surface preparation, paint application, inspections and eventually repairs external surface of equipment, manufactured by Brembana & Rolle S.p.A., listed below:

**H2 Storage Vessel V25001 A/B/C/D/E/F MFR'S SERIAL No. 223096-01-SNA/B/C/D/E/F**

1.2. This procedure shall be read in conjunction with project specification, the instruction and recommendations written by the paint manufacturer in the Product Data Sheet and all the B&R's reference drawings.

# 2 – REFERENCE DOCUMENTS

- General painting Specification Doc. No. 123A90-DDL-MAT-SP-60006 Rev.02 Date 12.03.24
- Painting Plan Drawing Hydrogen Storage Vessel B&R Dwg. 23096-01-ESP01 Rev.0 Date 08/02/2024
- Surface preparation and protective coating Norsok Standard M-501 Edition 6, February 2012
- SSPC SP1 Last Edition, Surface Preparation Standard No. 1 Solvent Cleaning
- ISO 8501-1 Last Edition, Preparation of steel substrates before application of paints and related products, Visual assessment of surface cleanliness – Part 1: Rust grades and preparation grades of uncoated steel substrates and of steel substrates after overall removal of previous coatings. Informative supplement to part 1: Representative photographic examples of the change of appearance imparted to steel when blast-cleaned with different abrasives (ISO 8501-1:1988/Suppl:1994)
- ISO 8501-3 Last Edition, Preparation of steel substrates before application of paints and related products Visual assessment of surface cleanliness – Part 3: Preparation grades of welds, edges and other areas with surface imperfections
- ISO 8502-3 Last Edition, Preparation of steel substrates before application of paints and related products Test for the assessment of surface cleanliness – Part 3: Assessment of dust on steel surfaces prepared for painting (pressure sensitive tape method)
- ISO 8502-6 Last Edition, Preparation of steel substrates before application of paints and related products Test for the assessment of surface cleanliness - Part 6: Extraction of soluble contaminants for analysis - The Bresle method ISO 8502-9, Preparation of steel substrates before application of paints and related products - Test for the assessment of surface cleanliness - Part 9: Field method for the conductometric determination of water-soluble salts

- ISO 8503 Last Edition, Preparation of steel substrates before application of paints and related products - Surface roughness characteristics of blast cleaned substrates
- ISO 8504-2 Last Edition, Preparation of steel substrates before application of paints and related products Surface preparation methods – Part 2: Abrasive blast cleaning
- ISO 4624 Last Edition, Paints and varnishes – Pull-off test for adhesion
- ISO 29601 Paints and varnishes Last Edition, Corrosion protection by protective paint systems - Assessment of porosity in a dry film
- ASTM D4228 Last Edition, Standard Practice for Qualification of Coating Applicators for Application of Coatings to Steel Surfaces
- ASTM D4285 Last Edition, Standard Test Method for Indicating Oil or Water in Compressed Air
- ASTM D4414 Last Edition, Standard Practice for Measurement of Wet Film Thickness by Notch Gages

## 3 – QUALIFICATION OF OPERATORS AND INSPECTION PERSONNEL

3.1. Subcontractor operators employed in abrasive blast cleaning and coating operations (qualified in according to ASTM D 4228) shall be aware of the requirements of project specifications and B&R's procedure as well as the recommendations contained in the documents issued by the paint manufacturer.

3.2. The coating Contractor shall demonstrate their experience in the execution of similar coating work in terms of surface preparation as well as coating application for the coating systems described in NORSOK M-501 Annex A.

3.3. Personnel carrying out inspection or verification shall be qualified in accordance with NS 476, Inspector level II, Certified NACE Coating Inspector Level II or equivalent.

## 4 – SAFETY

4.1. Any blast-cleaning and coating activities shall be carried out and any paint, thinner, abrasive, material or equipment shall be used in accordance to all applicable local, national and international safety regulations.

4.2. Material Safety Data Sheets shall be available for review at shops during all the sandblasting and coating activities.

4.3. All operators shall be equipped with suitable Personal Protective Equipment.

4.4. Used solvents, paint, waste materials and cleaning materials shall be strictly handled in accordance with PDS & MSDS requirements.

## 5 – ENVIRONMENTAL CONDITION

5.1. Blast-cleaning shall not be executed when:
- Relative Humidity is above 85%, unless paint manufacturer specifies otherwise;
- Surface temperature is less than 3°C above the dew point;

5.2. Coating shall not be applied under the following conditions:
- Substrate is damp, wet or contaminated in any way;
- Substrate temperature is less than 10 °C or anyway outside the range recommended by the paint manufacturer;
- Surface temperature is less than 3°C above the dew point;
- When the relative humidity of the air is greater than the paint manufacturer recommendations or 85%, whichever is lower;

5.3. The solvent based inorganic zinc shell be only applied when Relative Humidity is above 50%.

## 6 – UNPAINTED SURFACES

6.1. Unless otherwise specified, the following surfaces shall not be coated:
- Un-Insulated Stainless Steel and Duplex Surfaces;
- All galvanized structural bolting;
- Bolts, Nuts and Washers;
- Name plates;
- Sealing surface of flanges;

6.2. All openings in the equipment and piping shall be plugged or blinded to protect internal surfaces from abrasive blasting and to prevent entry to used abrasive, and other debris generated during surface preparation and coating application.

## 7 – PRE-BLASTING PREPARATION

7.1. Before blasting all the components shall be thoroughly inspected to assure that sharp edges, fillets, corners, indentation, protrusion and welds have been adequately ground to smooth out the contour.
All flame and plasma cut surfaces shall be ground smooth before blasting.

7.2. Special attention shall be given to all weld areas for removal of welding flux, slags, welding spatters and other foreign materials.
Spot and discontinue welds shall not be allowed.

7.3. Any surfaces defects, particularly surface laminations or undercuts, likely to be detrimental to protective coating systems, shall be smoothened by grinding.

7.4. All surfaces shall be finished in accordance with ISO 8501-3 and preparation grade P3.

7.5. Prior to surface preparation, the surface shall be inspected for contaminants such as oil and grease deposits. If any, the deposit shall be solvent cleaned as per SSPC-SP 1.

## 8 – ABRASIVE BLAST CLEANING

8.1. Prior to blast cleaning, surface area difficult to be sandblasted shall be hand/power tool cleaned up to a result of ISO St 3 according to ISO 8501-1.

8.2. The compressed air used for blast-cleaning, blowing and spray application, shall be free from water and oil. The air compression system shall be equipped with adequate separators and traps and these shall be emptied regularly of water and oil to guarantee their efficiency.
Control of the compressed air cleanliness shall be done according to Standard ASTM D 4285.

8.3. The abrasive shall be dry, clean and free from oil, grease and other contaminants that could be detrimental to long term coating performance.
The blasting media shall comply with the requirements of SSPC AB 1 Class A (less than 1% crystalline silica) for mineral sands and slags and SSPC AB 3 for steel abrasive.

8.4. Abrasive blast-cleaning activities shall be in accordance with ISO 8504-2, or equivalent, to a grade of finish of Sa 2 ½ as per ISO 8501-1. The surface roughness shall be to grade medium G according ISO 8501-3.

8.5. The maximum content of soluble impurities on the blasted surface as sampled using ISO 8502-6 and distilled water, shall not exceed a conductivity measured in accordance with ISO 8502-9 corresponding to a NaCl content of 20 mg/m2.

8.6. Roughness measurement shall be carried out in accordance with ISO 8503-5 using Replica Tape method.

8.7. Any grinding performed after blast cleaning, must be re-blasted to required roughness.

8.8. After preparation of the surfaces any grit, dust, etc. shall be removed by blowing with clean and dry compressed air.

8.9. The test panels supplied by B&R for each paint system and item, shall receive the same surface preparation of the items.

# 9 – PAINT APPLICATION

9.1. Paint containers shall remain unopened until required for use.
No paint shall be used whose shelf life ("pot life") has expired.

9.2. Coating System no. 1 according to Norsok M-501 Edition 6 shall be pre-qualified.
Pre- qualification of paints shall be done adopting the ageing resistance method, according to ISO 20340, procedure A.

9.3. The maximum time allowed between blasting and coating application is 4 hours. If the blasting performed if not coated within 4 hours the surfaces have to be re-blasted and retested.
Prior coating, the blast-cleaned surface shall be vacuum cleaned or blown free of dust and other loose contaminants. All application data shall be in accordance with the PDS of the Paint Manufacturer.

9.4. No thinners are allowed, except where it is specified by the paint manufacturer.

9.5. Airless spray method shall be used.
Brushing or rolling is allowed only for stripe coating, touch-ups, and areas difficult to reach with spray. Stripe-coating will be done for each coat layer, to obtain the specified film thickness and to avoid holidays.

9.6. In the timeframe between coating and curing, the freshly applied paint shall not come into contact with handling equipment or any other items that may impact coating quality. Coated items shall be held in a covered area protected from dust, wind and rain.
Over-coating time shall be recommended by the Paint Manufacturer in the PDS.

9.7. The blast-cleaned test panels shall be painted contemporaneously with the same coating system and method as per the represented items.

# 10 – COATING SYSTEM

**B&R DWG. 23096-01-ESP rev. 0 Position 01 – Max Operating Temperature 20°C NOT Insulated**

**Norsok M-501 Edition 6 – System 1 – PRE-QUALIFICATION REQUIRED**

| Surface Preparation | Primer | Intermediate Coat | Top Coat |
|---|---|---|---|
| ISO 8501-1 **Sa 2 ½** (SSPC SP10)<br><br>Profile: **grade medium G per ISO 8501-3**<br><br>Remove residual dust by dry compressed air jetting. | Two component polyamide cured zinc rich epoxy<br><br>**Barrier 80 by Jotun**<br><br>**MDFT 60 µm** | Two component polyamine cured pure epoxy<br><br>**Penguard Universal by Jotun**<br><br>**MDFT 160 µm** | Two components chemically curing aliphatic acrylic polyurethane<br><br>**Hardtop AX by Jotun**<br><br>**MDFT 60 µm**<br><br>Colour: **Light Grey RAL 7035** |

# 11 – INSPECTION AND TESTING

| TEST TYPE | METHOD & REFERENCE STANDARD | TESTING FREQUENCY | ACCEPTANCE CRITERIA | CORRECTIVE ACTION (IF ANY) |
|---|---|---|---|---|
| **Environment conditions** | ISO 8502-4<br><br>Thermo hygrometer | Before and during Blasting and Painting operations<br><br>Before start of each shift + minimum twice per shift. | Air Temperature:<br>min. 10°C – max. 40°C.<br><br>The paint manufacturer shall specify the maximum and minimum application and curing temperature and other relevant limitations regarding application and curing conditions for each product.<br><br>RH: 85% max.<br>(for inorganic zinc RH 50% min.)<br><br>Steel Temperature:<br>min 10°C – max. 40°C, and 3°C min. above the Dew Point Temperature. | Unless these parameters are met the operations shall not proceed. |
| **Blotter Test** | ASTM D 4285 | Before start of each shift | A piece of clean white absorbent paper shall be positioned direcly in front of the air nozze outlet. After about 1 min. there shall be no trace/residue of water and oil on the paper. | Any accumulated moisture and oil in the traps, separators and filters shall be emptied. The air supply shall then be checked once again until conformity is achieved. |
| **Abrasives Quality** | SSPC | All supplied material | **Mineral**: AB1(Class A)<br>**Steel**: AB 3 | New products to be provided |
| **Pre-cleaning of surfaces** | SSPC-SP 1 | All surfaces | Surface contaminants such as oil and grease shall be solvent cleaned as per SSPC-SP 1. | If oil, grease and any exogenous compound is still visible on the surface with Black light UV Lamp, the operations shall be repeated until conformity is achieved. |
| **Surface Preparation Cleanliness** | ISO 8501-1 | All surfaces. | The required visual standard of blast cleaning shall correspond to ISO 8501-1 Sa 2 ½ (SSPC SP 10) | Re-blasting and re-testing until acceptable. |
| **Water Soluble Salts** | Bresle-kit<br>ISO 8502-6<br>ISO 8502-9 | N°1 for every 100 m2 | The salt concentration (chlorides) tested on the blast-cleaned surfaces shall not exceed 20 mg/m2. | Washing with water and retesting until acceptable. |
| **Blasted Surface Profile** | Replica tape<br>ISO 8503-5 | N°2 for each Item | See Para. 10 – Coating Systems | Re-blasting. |
| **Blasted Surface Dust Cleanliness** | Transparent adhesive tape<br>ISO 8502-3 | N° 1 for each item | The residual particle quantity and particle size shall be class 2, rating 2 using a spring-loaded roller for dust test measurement | Recleaning and retesting until acceptable. |

| TEST TYPE | METHOD & REFERENCE STANDARD | TESTING FREQUENCY | ACCEPTANCE CRITERIA | CORRECTIVE ACTION (IF ANY) |
|---|---|---|---|---|
| **Paint Material** | Visual Examination<br>Paint Datasheet | All paint materials | Paint within the Shelf Life. Paint not presenting to a large degree: Gel, skinning, high viscosity, sedimentation | Replace paint material |
| **Wet Film Thickness** | ASTM D 4414 | Always during application | As indicate in PDS. | Additional coat. |
| **Visual Inspection of Coating** | Visual | During all phases of coating application. | The coating shall be smooth, of uniform color, free of runs, sags, visible holidays, blisters, orange peel, scratches, dust inclusions, solvent retention or any other irregularities. | Repair and retesting. |
| **Dry Film Thickness** | Electromagnetic thickness gauge in accordance with ISO 19840 | On dry film before application of any other coats | 20 Measurement shall be taken. The average DFT shall be higher than the NDFT. 5% of measurements may be below the NDFT by ≤20%.<br>*DFT shall not exceed*:<br>- 140 µm for zinc dust primer;<br>- 200% of NDFT for oper. temp. ≤200°C<br>- 125% of NDFT for oper. temp. >200°C | Repair, additional coats or recoating as appropriate. |
| **Adhesion Test** | ISO 4624<br>Hydraulic "pull-off" testing devices shall be used. | On test panel as pre-production qualify-cation (CPT) and one test panel during production | Min 5 MPa (725 psi)<br>50 % reduction of average adhesion value from the CPT is acceptable as minimum adhesion during production coating.<br>Different values shall be reviewed case by case or according with coating manufacturer PDS. | Prepare a detailed repair procedure for Owner review/approval. |
| **Holiday Detection** | ISO 29601 | 100% of the surfaces | No holidays | Repair and retesting |

## 12 – COATING REPAIR

12.1. Damaged spots and holidays in the primer and/or areas which do not comply with the specified quality requirements shall be treated as follows:

- Further inspections shall be performed as requested to define the limits of the defective areas;
- The defective areas shall be repaired in accordance with the specified coating systems and this procedure;
- Repaired areas shall be 100% inspected.

12.2. Areas requiring to be re-primed shall be re-blasted or prepared by hand/power tool before to be repainted.

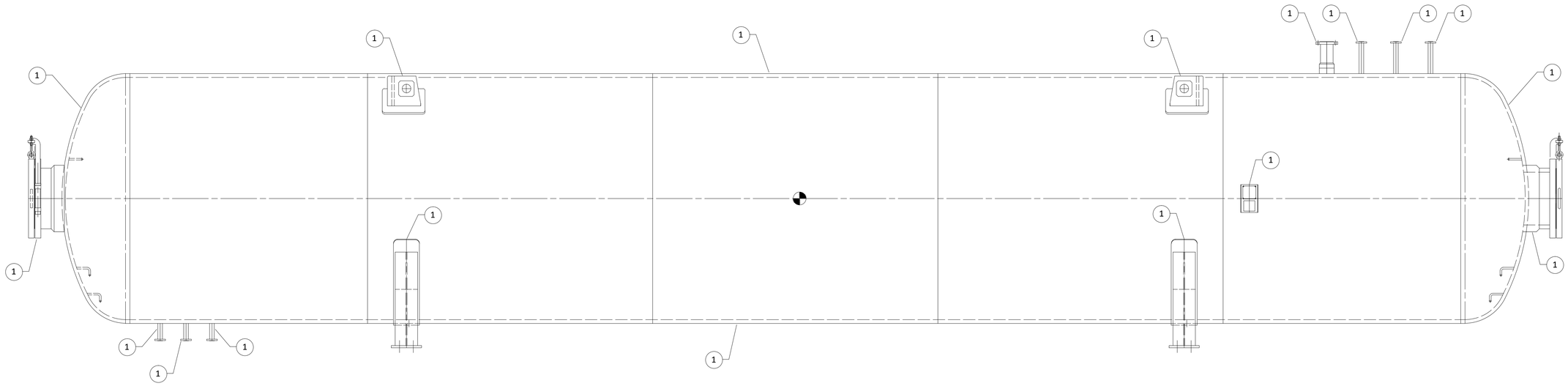
12.3. Re-priming shall be done with the same primer as originally applied. Where this is not feasible, the primer used shall be compatible and be suitable for the operating temperature.

## 13 – HANDLING OF COATED ITEMS

13.1. All shop-coated equipment shall be handled using nylon or rubber slings, or other approved lifting methods.
Coated items shall be handled and/or stored in a manner to protect the coating from damage, they shall not be dropped or impact against other objects.

## 14 – ATTACHMENTS

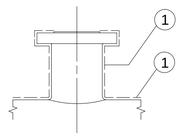
- **DWG 23096-01-ESP1 Rev.0**
- **Coating report draft**
- **Paint Material PDS's**



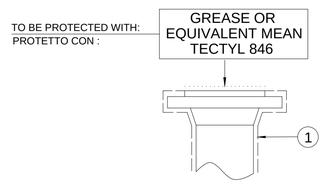

| POS. | m² | SURFACE PREPARATION | PAINTING TYPE | N°. OF COATS | THK. FOR COAT | COLOUR | THK. TOT. | T.OPERATING | INSUL. | FIREPROOF. |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | ~175 | SANDBLASTING SA 2-1/2 (According to ISO 8501-1) Medium roughness G ISO 8503-1 | TWO COMPONENT POLYAMIDE CURED ZINC RICH EPOXY COATING | 1 | 60 µm | -- | 280 µm | 20 °C | NO | NO |
| | | | TWO COMPONENT POLYAMINE CURED PURE EPOXY COATING | 1 | 160 µm | -- | | | | |
| | | | TWO COMP. CHEMICALLY CURING ALIPH. ACRYLIC POLYUR. COATING | 1 | 60 µm | Light Grey RAL 7035 | | | | |

## NOTES:

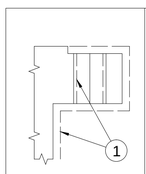
1) FOR EQUIPMENT ASSEMBLY, BILL OF MATERIAL & GENERAL NOTES SEE DRAWINGS: No. 23096-01-EGA1 & DWG. No.23096-01-EBM1.
2) PAINTING ACCORDING TO SPEC.: 123A90-DDL-MAT-SP-60006
3) BOLT THREADS OF OUTSIDE FLANGE CONNECTIONS TO BE COATED WITH ANTI-SEIZE PRODUCT TYPE "MOLYKOTE 1000 SOLID LUBRICANT PASTE".
4) BOLT HOLES OF FLANGES SHALL ALSO BE PAINTED.
5) THE GAP BETWEEN THE FACES OF COUPLES FLANGES SHALL NEITHER BE GRITBLASTED NOR PAINTED.
6) ALL INDICATED THKS. ARE MINIMUM DRY FILM THK (M.D.F.T.)
7) ALL EQUIPMENT THAT HAS RECEIVED POST WELD HEAT TREATMENTFOR WHATEVER REASON SHALL HAVE PAINTED ON ITS SIDE IN WHITE LETTERING THE FOLLOWING INSTRUCTION:
"STRESS RELIEVED ITEM NO WELDING PERMITTED"
(The lettering to be 100 mm high and the message written in english language.)



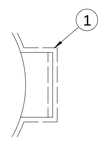
NOZZLES



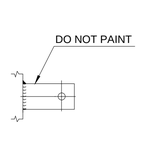
TYP. DETAIL FOR NOT BLINDED FLANGES



BOLT HOLES



SUPPORT. NAMEPLATE



EARTHING LUG

BREMBANA&ROLLE | VILLA & BONALDI

CLIENT : Rosetti Marino S.p.A.
PURCHASE ORDER No.: 1723001756 123A90A
PROJECT: CROSSWIND HOLLANDE KUST NOORD WIND PARK
LOCATION : NETHERLANDS, 18.5KM OFF THE COAST , NEAR THE TOWN OF EGMOND AAN ZEE.

B&R CAD FILE No: 23096-01-ESP1.dwg
MFR'S S.N. 23096-01-SNA/F
B&R DRAWING No. 23096-01-ESP1

| REV. | DATE | DRN | CHKD | APPD | DESCRIPTION |
|---|---|---|---|---|---|
| 0 | 08/02/2024 | AFJ | MAT | DSA | ISSUE FOR REVIEW (IFR) |

CROSSWIND | ROSETTI MARINO

# PAINTING PLAN DRAWING
# HYDROGEN STORAGE VESSEL ITEM : V-25001A/F

CONTRACT NO. CW-I-WP4-2023-05 / H2 STORAGE | SCALE 1:25
DRAWN A.FRANCO | CHECKED M.TONIOLO | APPROVED D.PASSERINI | DATE 08/02/24
A1 | DRAWING NO. 23096-01-ESP1 | SHEET 1 | REV. 0

File Name : 23096-01-ESP1.DWG

# Paint report

**Front page**

## PAINT REPORT

| | |
|---|---|
| **Date:** | |
| **PO No:** | **Paint system:** |
| **Manufactory Company:** | **Manufactures contact person:** |
| **Manufactures internal order no:** | |
| **Paint shop:** | **Paint shops contact person:** |
| **Paint shops internal order no:** | |
| **Paint inspectors name:** | **Paint inspectors signature:** |
| **Certification organization:** | **Certificate level and no:** |

Painted objects

| No off | Object | Size | Material | Tag no |
|---|---|---|---|---|
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**Inspection results pages**

| **Paint cycle** | | |
|---|---|---|
| First coat: | Nom. thickness, µm: | Thinner: |
| Second coat: | Nom. thickness, µm: | Thinner: |
| Third coat: | Nom. thickness, µm: | Thinner: |
| Fourth coat: | Nom. thickness, µm: | Thinner: |
| Comments: | | |

| **Visual receive control** | | | |
|---|---|---|---|
| Date of receive control: | | Steel preparation according ISO 8501-3 | |
| Edges rounded: | Major surface defects: | Weld splatters, slivers: | All signs off: |
| Continually welds: | All welds dressed: | Bolts and nuts protected: | End caps on: |
| Rust grade: | | | |
| Comments: | | | |

| **Cleaning** | | | |
|---|---|---|---|
| Date of cleaning: | | Oil, grease, corrosion inhibitors and salt removed: | |
| Method of cleaning: | | Type of detergent: | |
| If machined surfaces; strength of detergent: | | Cleaned with freshwater after use of detergent: | |
| Comments: | | | |

| **Abrasive blasting** | | | |
|---|---|---|---|
| Blasting machine: | | Open blasting: | |
| Abrasive type: | | Abrasive size: | |
| Start blasting, Date: | Time: | End blasting, Date: | Time: |
| Air temp, °C: | Surface temp., °C: | Humidity, %: | Dew point, °C: |
| Comments: | | | |

| **Surface cleanliness and roughness** | |
|---|---|
| **Requirements to cleanliness and roughness** | |
| Requirements to cleanliness: | Requirements to roughness: |
| Type of material to be blasted: | Abrasive quality: |
| **Tested cleanliness and roughness** | |
| Date of test of cleanliness and roughness: | |
| Test equipment for cleanliness: | Tested cleanliness: |
| Test equipment for roughness: | Tested roughness: |
| Comments: | |

| **Salt test** | |
|---|---|
| **Requirements to salt concentration** | |
| Requirements to max salt concentration: 20 mg/m² NaCl | |
| **Tested salt concentration** | |
| Date of test of salt concentration: | |
| Salt test equipment: | Tested salt concentration: |
| Comments: | |

| **Visual inspection after blasting** | | |
|---|---|---|
| Date of visual inspection: | | |
| All parts blasted without holidays: | Rust grade: | Edges: |
| Weld spatters and pores in welds: | Major surface defects: | Pores/holes in casting: |
| Comments: | | |

| **Each coat** | | | |
|---|---|---|---|
| Product name: | | Colour, RAL Code: | |
| Batch no.: | | Exp. date: | |
| Start application, date: | Time: | End application, date: | Time: |
| Application method: | | Stripe coat applied: | |
| Max. thinner allowed, %: | | Actual thinner added, %: | |
| Environmental control instrument: | | | Blotter test: |
| Air temp., °C: | Surface temp., °C: | Humidity, %: | Dew point, °C: |
| Comments: | | | |
| **Paint thickness, each coat** | | | |
| **Requirement to thickness according to CSDS:** | | | |
| Average DFT, µm: | Min. DFT, µm: | Max. DFT, µm: | |
| Measured thickness of each coat | | | |
| Date of test of paint thickness control: | | | |
| Film thickness control instrument: | | No. of measures: | |
| Average DFT, µm: | Min. DFT, µm: | Max. DFT, µm: | |
| **Visual inspection after coating** | | | |
| Date of visual inspection: | | | |
| Contaminations: | Solvent retention: | Pinholes/popping: | |
| Sagging: | Wrinkling: | Surface defects: | |
| Comments: | | | |
| **Adhesion** | | | |
| **Requirements to adhesion test** | | | |
| Adhesion test according to: | ISO 4624 | | |
| Absolute minimum adhesion based on NORSOK M-501, MPa | | Absolute minimum adhesion based on Coating Procedure Test (CPT), MPa | |
| Assumed temperature during curing, °C: | | Calculated necessary curing time (h): | |
| **Adhesion test results** | | | |
| Date of gluing dollies to the test plate: | | Date of pull-off: | Temp. during curing, °C: |
| Adhesion test instrument: | | Film thickness on tested surface, µm: | |
| Is the test performed on the object or on a test plate?: | | | |
| If test plate, has the test plate been treated as the object?: | | | |
| Diameter of dolly, mm: | Expiry date of glue: | Type of glue: | |
| Adhesion value (MPa): | Failure description (% adhesive/ cohesive/glue): | | |
| Comments: | | | |
| **Verification of curing (i.e. MEK-test or curing of phenolic epoxy)** | | | |
| **Requirement to curing** | | | |
| Measured film thickness, µm: | | Allowed range of air humidity, % RH: | |
| Assumed temperature during curing, °C: | | Calculated necessary curing time (h): | |
| **Curing log** | | | |
| Start curing, date: | Time: | End curing, date: | Time: |
| Mean temp. during curing, °C: | | Actual curing time, hrs.: | |
| Measured air humidity, % RH: | | Curing control method: | |
| Comments: | | | |
| **Holiday test** | | | |
| **Requirement to holiday test** | | | |
| Requirement to holiday test: No holidays | | | |
| **Holiday test result** | | | |
| Date of holiday test: | | Test instrument: | |
| Result of holiday test: | | | |
| Comments: | | | |

Technical Data Sheet

JOTUN

Jotun Protects Property

# Barrier 80

## Product description

This is a two component polyamide cured zinc rich epoxy coating. It is a high solids, high zinc dust containing product. It conforms to the compositional requirements of SSPC paint 20, level 2 and ISO 12944-5. It provides very good corrosion protection as part of a complete coating system. To be used as primer in atmospheric environments. Suitable for carbon steel, repair of inorganic zinc silicate coating and damaged galvanised steel substrates. This product complies with ASTM D520 type II zinc dust.

### Typical use

Protective:
Suitable for structural steel and piping exposed in corrosivity categories up to C5 (ISO 12944-2). Recommended for offshore environments, refineries, power plants, bridges, buildings, mining equipment and general structural steel. Specially designed as a primer for coating systems where extended durability is required.

### Approvals and certificates

Tested in accordance with ISO 12944-6, high expected durability in corrosivity category C5-I

Additional certificates and approvals may be available on request.

### Colours

grey

## Product data

| Property | Test/Standard | Description |
|---|---|---|
| Solids by volume | ISO 3233 | 61 ± 2 % |
| Gloss level (GU 60 °) | ISO 2813 | matt (0-35) |
| Flash point | ISO 3679 Method 1 | 27 °C |
| Density | calculated | 2.5 kg/l |
| VOC-US/Hong Kong | US EPA method 24 (tested)<br>(CARB(SCM)2007, SCAQMD rule 1113, Hong Kong) | 380 g/l |
| VOC-EU | IED (2010/75/EU) (theoretical) | 366 g/l |
| VOC-China | GB/T 23985-2009 (tested) | 371 g/l |
| VOC-Korea | Korea Clean Air Conservation Act (tested)<br>(Max. thinning ratio included) | 435 g/l |

The provided data is typical for factory produced products, subject to slight variation depending on colour.
All data is valid for mixed paint.
Gloss description: According to Jotun Performance Coatings' definition.

**Technical Data Sheet**
**Barrier 80**

JOTUN

## Film thickness per coat

**Typical recommended specification range**

| | | | |
|---|---|---|---|
| Dry film thickness | 40 | - 80 | µm |
| Wet film thickness | 63 | - 150 | µm |
| Theoretical spreading rate | 15.3 | - 6.8 | m²/l |

## Surface preparation

To secure lasting adhesion to the subsequent product all surfaces shall be clean, dry and free from any contamination.

### Surface preparation summary table

| | Surface preparation | |
|---|---|---|
| **Substrate** | **Minimum** | **Recommended** |
| Carbon steel | St 3 (ISO 8501-1) | Sa 2½ (ISO 8501-1) |
| Shop primed steel | Clean, dry and undamaged approved shop primer (ISO 12944-4 5.4) | Sweep blasted or alternatively blasted to Sa 2 (ISO 8501-1) of at least 70 % of the surface. |

Optimum performance, including adhesion, corrosion protection, heat resistance and chemical resistance is achieved with recommended surface preparation.

## Application

### Application methods

The product can be applied by

| | |
|---|---|
| Spray: | Use airless spray. |
| Brush: | Recommended for stripe coating and small areas. Care must be taken to achieve the specified dry film thickness. |

### Product mixing ratio (by volume)

| | |
|---|---|
| Barrier 80 Comp A | 3 part(s) |
| Barrier 80 Comp B | 1 part(s) |

**Technical Data Sheet**
**Barrier 80**

JOTUN

### Thinner/Cleaning solvent

Thinner: Jotun Thinner No. 17

### Guiding data for airless spray

Nozzle tip (inch/1000): 15-21

Pressure at nozzle (minimum): 150 bar/2100 psi

## Drying and Curing time

| Substrate temperature | 5 °C | 10 °C | 23 °C | 40 °C |
|---|---|---|---|---|
| Surface (touch) dry | 50 min | 20 min | 10 min | 4 min |
| Walk-on-dry | 3 h | 2 h | 1.5 h | 40 min |
| Dry to over coat, minimum | 3 h | 2 h | 1.5 h | 40 min |
| Dried/cured for service | 10 d | 7 d | 5 d | 2 d |

For maximum overcoating intervals, refer to the Application Guide (AG) for this product.

Drying and curing times are determined under controlled temperatures and relative humidity below 85 %, and at average of the DFT range for the product.

Surface (touch) dry: The state of drying when slight pressure with a finger does not leave an imprint or reveal tackiness.

Walk-on-dry: Minimum time before the coating can tolerate normal foot traffic without permanent marks, imprints or other physical damage.

Dry to over coat, minimum: The recommended shortest time before the next coat can be applied.

Dried/cured for service: Minimum time before the coating can be permanently exposed to the intended environment/medium.

## Induction time and Pot life

| Paint temperature | 23 °C |
|---|---|
| Induction time | 30 min |
| Pot life | 12 h |

## Heat resistance

| | Temperature | |
|---|---|---|
| | Continuous | Peak |
| Dry, atmospheric | 120 °C | 140 °C |

Peak temperature duration max. 1 hour

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The temperatures listed relate to retention of protective properties. Aesthetic properties may suffer at these temperatures.

## Product compatibility

Depending on the actual exposure of the coating system, various primers and topcoats can be used in combination with this product. Some examples are shown below. Contact Jotun for specific system recommendation.

Previous coat: inorganic zinc shop primer

Subsequent coat: epoxy, epoxy mastic, polyurethane

## Packaging (typical)

| | Volume (litres) | Size of containers (litres) |
|---|---|---|
| Barrier 80 Comp A | 3 / 6.75 | 5 / 10 |
| Barrier 80 Comp B | 1 / 2.25 | 1 / 3 |

The volume stated is for factory made colours. Note that local variants in pack size and filled volumes can vary due to local regulations.

## Storage

The product must be stored in accordance with national regulations. Keep the containers in a dry, cool, well ventilated space and away from sources of heat and ignition. Containers must be kept tightly closed. Handle with care.

### Shelf life at 23 °C

| | |
|---|---|
| Barrier 80 Comp A | 24 month(s) |
| Barrier 80 Comp B | 24 month(s) |

In some markets commercial shelf life can be dictated shorter by local legislation. The above is minimum shelf life, thereafter the paint quality is subject to re-inspection.

## Caution

This product is for professional use only. The applicators and operators shall be trained, experienced and have the capability and equipment to mix/stir and apply the coatings correctly and according to Jotun's technical documentation. Applicators and operators shall use appropriate personal protection equipment when using this product. This guideline is given based on the current knowledge of the product. Any suggested deviation to suit the site conditions shall be forwarded to the responsible Jotun representative for approval before commencing the work.

## Health and safety

Please observe the precautionary notices displayed on the container. Use under well ventilated conditions. Do not inhale spray mist. Avoid skin contact. Spillage on the skin should immediately be removed with suitable cleanser, soap and water. Eyes should be well flushed with water and medical attention sought immediately.

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## Colour variation

When applicable, products primarily meant for use as primers or antifoulings may have slight colour variations from batch to batch. Such products may fade and chalk when exposed to sunlight and weathering.

Colour and gloss retention on topcoats/finish coats may vary depending on type of colour, exposure environment such as temperature, UV intensity etc., and application quality. Contact your local Jotun office for further information.

## Disclaimer

The information in this document is given to the best of Jotun's knowledge, based on laboratory testing and practical experience. Jotun's products are considered as semi-finished goods and as such, products are often used under conditions beyond Jotun's control. Jotun cannot guarantee anything but the quality of the product itself. Minor product variations may be implemented in order to comply with local requirements. Jotun reserves the right to change the given data without further notice.

Users should always consult Jotun for specific guidance on the general suitability of this product for their needs and specific application practices.

If there is any inconsistency between different language issues of this document, the English (United Kingdom) version will prevail.

Technical Data Sheet

JOTUN

# Penguard Universal

## Product description

This is a two component polyamine cured pure epoxy coating. It is a fast drying, abrasion resistant, high solids, high build product. It provides excellent corrosion protection as part of a complete coating system. Can be used as primer, mid coat, finish coat or as single coat system in atmospheric and immersed environments. Suitable for properly prepared carbon steel, galvanized steel, shop primed steel, stainless steel, aluminium and concrete substrates. Suitable as maintenance coating on a wide range of aged coating surfaces. It can be applied at sub zero surface temperatures.

### Typical use

Recommended for offshore environments, including splash zones, refineries, power plants, bridges, buildings, mining equipment and general structural steel. Approved for PSPC cross over testing with a wide range of shop primers.

### Approvals and certificates

Certified in accordance with IMO Res.215(82) – PSPC Water Ballast Tanks
Certified in accordance with IMO Res.288(87) – PSPC Crude Oil Tanks

Pre-qualified in accordance with NORSOK M-501, Edition 6, System 1
Pre-qualified in accordance with NORSOK M-501, Edition 6, System 7.

When used as part of an approved scheme, this material has the following certification:
- Low Flame Spread in accordance with EU Directive for Marine Equipment. Approved in accordance with parts 5 and 2 of Annex 1 of IMO 2010 FTP Code, or Parts 5 and 2 of Annex 1 of IMO FTPC when in compliance with IMO 2010 FTP Code Ch. 8

Consult your Jotun representative for details.

Additional certificates and approvals may be available on request.

### Colours

aluminium, grey and selected range of colours

## Product data

| Property | Test/Standard | Description |
|---|---|---|
| Solids by volume | ISO 3233 | 72 ± 2 % |
| Gloss level (GU 60 °) | ISO 2813 | matt (0-35) |
| Flash point | ISO 3679 Method 1 | 30 °C |
| Density | calculated | 1.4 kg/l |
| VOC-US/Hong Kong | US EPA method 24 (tested)<br>(CARB(SCM)2007, SCAQMD rule 1113, Hong Kong) | 245 g/l |
| VOC-EU | IED (2010/75/EU) (theoretical) | 261 g/l |
| VOC-China | GB/T 23985-2009 (tested) | 212 g/l |
| VOC-Korea | Korea Clean Air Conservation Act (tested)<br>(Max. thinning ratio included) | 269 g/l |

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The provided data is typical for factory produced products, subject to slight variation depending on colour.

Gloss description: According to Jotun Performance Coatings' definition.

Gloss level may vary slightly with colour, application method, film thickness and with environmental conditions during application and drying/curing.

## Film thickness per coat

**Typical recommended specification range**

| | | | |
|---|---|---|---|
| Dry film thickness | 75 | – 300 | µm |
| Wet film thickness | 105 | – 415 | µm |
| Theoretical spreading rate | 9.6 | – 2.4 | m²/l |

## Surface preparation

**Surface preparation summary table**

| Substrate | Surface preparation | |
|---|---|---|
| | Minimum | Recommended |
| Carbon steel | St 2 (ISO 8501-1) | Sa 2½ (ISO 8501-1) |
| Aluminium | The surface shall be hand or machine abraded with non-metallic abrasives or bonded fibre machine or hand abrasive pads to impart a scratch pattern to the surface. | Abrasive blast cleaning to achieve a surface profile using non-metallic abrasive media which is suitable to achieve a sharp and angular surface profile. |
| Galvanised steel | The surface shall be clean, dry and appear with a rough and dull profile. | Sweep blast-cleaning using non-metallic abrasive leaving a clean, rough and even pattern. |
| Stainless steel | The surface shall be hand or machine abraded with non-metallic abrasives or bonded fibre machine or hand abrasive pads to impart a scratch pattern to the surface. | Abrasive blast cleaning to achieve a surface profile using non-metallic abrasive media which is suitable to achieve a sharp and angular surface profile. |
| Shop primed steel | Dry, clean and intact shop primer. | Sweep blasted or alternatively blasted to Sa 2 (ISO 8501-1) of at least 70 % of the surface. |
| Coated surfaces | Clean, dry and undamaged compatible coating | F Sa 2½ (ISO 8501-2) |
| Concrete | Minimum 4 weeks curing. Moisture content maximum 5 %. Mechanically prepare the existing concrete surface by scabbing, needle gun, mechanical disc grinding. | Minimum 4 weeks curing. Moisture content maximum 5 %. Prepare the surface by means of enclosed blast shot or diamond grinding and other appropriate means to abrade the surrounding concrete and to remove laitance. |

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Optimum performance, including adhesion, corrosion protection, heat resistance and chemical resistance is achieved with recommended surface preparation.

## Application

### Application methods

The product can be applied by

| | |
|---|---|
| Spray: | Use airless spray. |
| Brush: | Recommended for stripe coating and small areas, care must be taken to achieve the specified dry film thickness. |
| Roller: | May be used for small areas but is not recommended for first primer coat. However, when using roller application care must be taken to apply sufficient material in order to achieve the specified dry film thickness. |

### Product mixing ratio (by volume)

| | |
|---|---|
| Penguard Universal Comp A | 3 part(s) |
| Penguard Universal Comp B | 1 part(s) |

### Thinner/Cleaning solvent

Thinner: Jotun Thinner No. 17

### Guiding data for airless spray

Nozzle tip (inch/1000): 17-21

Pressure at nozzle (minimum): 150 bar / 2100 psi

## Drying and Curing time

| Substrate temperature | -10 °C | -5 °C | 0 °C | 5 °C | 10 °C | 23 °C | 40 °C |
|---|---|---|---|---|---|---|---|
| Surface (touch) dry | 27 h | 15 h | 11 h | 7 h | 5 h | 2 h | 1 h |
| Walk-on-dry | 73 h | 35 h | 24 h | 14 h | 10 h | 5 h | 2 h |
| Dry to over coat, minimum | 36 h | 25 h | 16 h | 10 h | 7 h | 4 h | 2 h |
| Dried/cured for service | | | 21 d | 14 d | 11 d | 7 d | 4 d |

For maximum overcoating intervals, refer to the Application Guide (AG) for this product.

Drying and curing times are determined under controlled temperatures and relative humidity below 85 %, and at average of the DFT range for the product.

Surface (touch) dry: The state of drying when slight pressure with a finger does not leave an imprint or reveal tackiness.

Walk-on-dry: Minimum time before the coating can tolerate normal foot traffic without permanent marks, imprints or other physical damage.

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Dry to over coat, minimum: The recommended shortest time before the next coat can be applied.

Dried/cured for service: Minimum time before the coating can be permanently exposed to the intended environment/medium.

## Induction time and Pot life

| Paint temperature | 23 °C |
|---|---|
| Induction time | 10 min |
| Pot life | 2 h |

## Heat resistance

| | Temperature | |
|---|---|---|
| | Continuous | Peak |
| Dry, atmospheric | 120 °C | 140 °C |
| Immersed, sea water | 60 °C | 70 °C |
| Immersed, crude oil | 80 °C | 90 °C |

Peak temperature duration max. 1 hour.

The temperatures listed relate to retention of protective properties. Aesthetic properties may suffer at these temperatures.

Note that the coating will be resistant to various immersion temperatures depending on the specific chemical and whether immersion is constant or intermittent. Heat resistance is influenced by the total coating system. If used as part of a system, ensure all coatings in the system have similar heat resistance.

## Product compatibility

Depending on the actual exposure of the coating system, various primers and topcoats can be used in combination with this product. Some examples are shown below. Contact Jotun for specific system recommendation.

| | |
|---|---|
| Previous coat: | inorganic zinc silicate shop primer, epoxy, epoxy mastic, zinc epoxy, zinc silicate |
| subsequent coat: | acrylic, alkyd, epoxy, polyurethane, polysiloxane, epoxy mastic, vinyl epoxy |

## Packaging (typical)

| | Volume (litres) | Size of containers (litres) |
|---|---|---|
| Penguard Universal Comp A | 15 | 20 |
| Penguard Universal Comp B | 5 | 5 |

The volume stated is for factory made colours. Note that local variants in pack size and filled volumes can vary due to local regulations.

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## Storage

The product must be stored in accordance with national regulations. Keep the containers in a dry, cool, well ventilated space and away from sources of heat and ignition. Containers must be kept tightly closed. Handle with care.

### Shelf life at 23 °C

| | |
|---|---|
| Penguard Universal Comp A | 48 month(s) |
| Penguard Universal Comp B | 48 month(s) |

In some markets commercial shelf life can be dictated shorter by local legislation. The above is minimum shelf life, thereafter the paint quality is subject to re-inspection.

## Caution

This product is for professional use only. The applicators and operators shall be trained, experienced and have the capability and equipment to mix/stir and apply the coatings correctly and according to Jotun's technical documentation. Applicators and operators shall use appropriate personal protection equipment when using this product. This guideline is given based on the current knowledge of the product. Any suggested deviation to suit the site conditions shall be forwarded to the responsible Jotun representative for approval before commencing the work.

## Health and safety

Please observe the precautionary notices displayed on the container. Use under well ventilated conditions. Do not inhale spray mist. Avoid skin contact. Spillage on the skin should immediately be removed with suitable cleanser, soap and water. Eyes should be well flushed with water and medical attention sought immediately.

## Colour variation

When applicable, products primarily meant for use as primers or antifoulings may have slight colour variations from batch to batch. Such products and epoxy based products used as a finish coat may chalk when exposed to sunlight and weathering.

Colour and gloss retention on topcoats/finish coats may vary depending on type of colour, exposure environment such as temperature, UV intensity etc., application quality and generic type of paint. Contact your local Jotun office for further information.

## Disclaimer

The information in this document is given to the best of Jotun's knowledge, based on laboratory testing and practical experience. Jotun's products are considered as semi-finished goods and as such, products are often used under conditions beyond Jotun's control. Jotun cannot guarantee anything but the quality of the product itself. Minor product variations may be implemented in order to comply with local requirements. Jotun reserves the right to change the given data without further notice.

Users should always consult Jotun for specific guidance on the general suitability of this product for their needs and specific application practices.

If there is any inconsistency between different language issues of this document, the English (United Kingdom) version will prevail.

Technical Data Sheet

JOTUN

# Hardtop AX

## Product description

This is a two component chemically curing aliphatic acrylic polyurethane coating. It has a high gloss finish with very good gloss retention. It has good chemical resistance. It is a high solids product. This product contains no solvents on the Hazardous Air Pollutants (HAPs) list. Minor amounts of such solvents may come in through tinting of some colours. To be used as topcoat in atmospheric environments.

### Typical use

Marine:
Recommended for topside, deck and superstructure.

Protective:
Recommended for offshore environments, refineries, power plants, bridges and buildings. Suitable for a wide range of industrial structures. Used as a topcoat in pre-qualified NORSOK systems.

### Approvals and certificates

This product contributes to the Green Buildings Standard credits. Please see section Green Building Standards.

APAS approved to specification 2911

When used as part of an approved scheme, this material has the following certification:
- Low Flame Spread in accordance with EU Directive for Marine Equipment. Approved in accordance with parts 5 and 2 of Annex 1 of IMO 2010 FTP Code, or Parts 5 and 2 of Annex 1 of IMO FTPC when in compliance with IMO 2010 FTP Code Ch. 8

Consult your Jotun representative for details.
Additional certificates and approvals may be available on request.

### Colours

selected colours over Multicolour tinting system (MCI)

## Product data

| Property | Test/Standard | Description |
|---|---|---|
| Solids by volume | ISO 3233 | 63 ± 2 % |
| Gloss level (GU 60 °) | ISO 2813 | gloss (70-85) |
| Flash point | ISO 3679 Method 1 | 28 °C |
| Density | calculated | 1.4 kg/l |
| VOC-US/Hong Kong | US EPA method 24 (tested)<br>(CARB(SCM)2007, SCAQMD rule 1113, Hong Kong) | 325 g/l |
| VOC-EU | IED (2010/75/EU) (theoretical) | 330 g/l |
| VOC-China | GB/T 23985-2009 (tested) | 321 g/l |
| VOC-Korea | Korea Clean Air Conservation Act (tested)<br>(Max. thinning ratio included) | 355 g/l |

The provided data is typical for factory produced products, subject to slight variation depending on colour.
All data is valid for mixed paint.

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Gloss description: According to Jotun Performance Coatings' definition.

The VOC values refer to white colour.

## Film thickness per coat

**Typical recommended specification range**

| | | | |
|---|---|---|---|
| Dry film thickness | 50 | - 100 | µm |
| Wet film thickness | 80 | - 160 | µm |
| Theoretical spreading rate | 13 | - 8.3 | m²/l |

Bright colours may need film thickness in the high end of the recommended specification range to achieve opacity.

## Surface preparation

To secure lasting adhesion to the subsequent product all surfaces shall be clean, dry and free from any contamination.

### Surface preparation summary table

| Substrate | Surface preparation | |
|---|---|---|
| | Minimum | Recommended |
| Coated surfaces | Clean, dry and undamaged compatible coating | Clean, dry and undamaged compatible coating |

## Application

### Application methods

The product can be applied by:

| | |
|---|---|
| Spray: | Use air spray or airless spray. |
| Brush: | Recommended for stripe coating and small areas, care must be taken to achieve the specified dry film thickness. |
| Roller: | May be used. However when using roller application care must be taken to apply sufficient material in order to achieve the specified dry film thickness. |

### Product mixing ratio (by volume)

| | |
|---|---|
| Hardtop AX Comp A | 4 part(s) |
| Hardtop AX Comp B | 1 part(s) |

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# Hardtop AX

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## Thinner/Cleaning solvent

Thinner: Jotun Thinner No. 26 / Jotun Thinner No. 10

Jotun Thinner No. 10 can be used where aromatic solvents are accepted.

Thinning is not normally required. Consult the local representative for advice during application in extreme conditions. Do not thin more than allowed by local environmental legislation.

## Guiding data for airless spray

Nozzle tip (inch/1000): 13–19

Pressure at nozzle (minimum): 150 bar/2100 psi

## Guiding data for air spray

Nozzle tip: Gravity gun: 1.6–1.8 (mm) / Pressure pot: 1.4–1.6 (mm)

Pressure at nozzle (minimum): Gravity gun: 3.2 bar / Pressure pot: 3.2 bar

Pressure at pressure pot: 1.6 bar

## Drying and Curing time

| Substrate temperature | 0 °C | 5 °C | 10 °C | 23 °C | 40 °C |
|---|---|---|---|---|---|
| Surface (touch) dry | 4 h | 3 h | 2 h | 1 h | 1 h |
| Walk-on-dry | 40 h | 24 h | 16 h | 8 h | 4 h |
| Dry to over coat, minimum | 24 h | 18 h | 10 h | 5 h | 3 h |
| Dried/cured for service | 20 d | 14 d | 10 d | 5 d | 3 d |

For maximum overcoating intervals, refer to the Application Guide (AG) for this product.

Drying and curing times are determined under controlled temperatures and relative humidity below 85 %, and at average of the DFT range for the product.

Surface (touch) dry: The state of drying when slight pressure with a finger does not leave an imprint or reveal tackiness.

Walk-on-dry: Minimum time before the coating can tolerate normal foot traffic without permanent marks, imprints or other physical damage.

Dry to over coat, minimum: The recommended shortest time before the next coat can be applied.

Dried/cured for service: Minimum time before the coating can be permanently exposed to the intended environment/medium.

## Induction time and Pot life

| Paint temperature | 23 °C |
|---|---|
| Pot life | 2 h |

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## Heat resistance

| | Temperature | |
|---|---|---|
| | Continuous | Peak |
| Dry, atmospheric | 120 °C | 140 °C |

Resistant to spills of most oils, aliphatic petroleum products and non aggressive chemicals.

Peak temperature duration max. 1 hour.

The temperatures listed relate to retention of protective properties. Aesthetic properties may suffer at these temperatures.

## Product compatibility

Depending on the actual exposure of the coating system, various primers and topcoats can be used in combination with this product. Some examples are shown below. Contact Jotun for specific system recommendation.

Previous coat: epoxy, zinc epoxy, epoxy mastic, polyurethane
subsequent coat: polyurethane

## Packaging (typical)

| | Volume (litres) | Size of containers (litres) |
|---|---|---|
| Hardtop AX Comp A | 4 / 16 | 5 / 20 |
| Hardtop AX Comp B | 1 / 4 | 1 / 5 |

The volume stated is for factory made colours. Note that local variants in pack size and filled volumes can vary due to local regulations.

## Storage

The product must be stored in accordance with national regulations. Keep the containers in a dry, cool, well ventilated space and away from sources of heat and ignition. Containers must be kept tightly closed. Handle with care.

### Shelf life at 23 °C

| | |
|---|---|
| Hardtop AX Comp A | 48 month(s) |
| Hardtop AX Comp B | 48 month(s) |

In some markets commercial shelf life can be dictated shorter by local legislation. The above is minimum shelf life, thereafter the paint quality is subject to re-inspection.

## Green Building Standards

# Technical Data Sheet
# Hardtop AX

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This product contributes to Green Building Standard credits by meeting the following specific requirements:

BREEAM® NOR (2016)
- Hea 02: VOC content for Two-pack performance Coatings SB (500 g/l) (EU Directive 2004/42/CE) and emission demands (ISO 16000-series).
- Mat 01: The product Safety Data Sheet confirms that the product does not contain any substances on the Norwegian A20 list.

BREEAM® NOR (2012)
- Hea 9: VOC content for Two-pack performance Coatings SB (500 g/l) (EU Directive 2004/42/CE) and emission demands (ISO 16000-series).
- Mat 1.5: This product Safety Data Sheet confirms that the product does not contain any substances on the Norwegian A20 list.

## Caution

This product is for professional use only. The applicators and operators shall be trained, experienced and have the capability and equipment to mix/stir and apply the coatings correctly and according to Jotun's technical documentation. Applicators and operators shall use appropriate personal protection equipment when using this product. This guideline is given based on the current knowledge of the product. Any suggested deviation to suit the site conditions shall be forwarded to the responsible Jotun representative for approval before commencing the work.

## Health and safety

Please observe the precautionary notices displayed on the container. Use under well ventilated conditions. Do not inhale spray mist. Avoid skin contact. Spillage on the skin should immediately be removed with suitable cleanser, soap and water. Eyes should be well flushed with water and medical attention sought immediately.

## Colour variation

When applicable, products primarily meant for use as primers or antifoulings may have slight colour variations from batch to batch. Such products and epoxy based products used as a finish coat may chalk when exposed to sunlight and weathering.

Colour and gloss retention on topcoats/finish coats may vary depending on type of colour, exposure environment such as temperature, UV intensity etc., application quality and generic type of paint. Contact your local Jotun office for further information.

## Disclaimer

The information in this document is given to the best of Jotun's knowledge, based on laboratory testing and practical experience. Jotun's products are considered as semi-finished goods and as such, products are often used under conditions beyond Jotun's control. Jotun cannot guarantee anything but the quality of the product itself. Minor product variations may be implemented in order to comply with local requirements. Jotun reserves the right to change the given data without further notice.

Users should always consult Jotun for specific guidance on the general suitability of this product for their needs and specific application practices.

If there is any inconsistency between different language issues of this document, the English (United Kingdom) version will prevail.