PAINTING PROCEDURE

External Surface

Application of paint system APCS 1B

EL.BE s.r.l

Rev.	No. Procedure	Date:	Issued By:	Verified By:	Approved By:
0	**2019-035**	**06/08/2019**	Edoardo Parotti	Edoardo Parotti	Rossana Della Foglia

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G4: Via A. Colombo, 130 – Gorla Minore (VA), Italy
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1 Scope

This document governs the application of coating as below detailed.

This Coating procedure Specification (CPS) provides the requirements during the receive control, cleaning, surface preparation, blasting, coating, packing and Quality Control Inspection for protective systems applied.

This Specification provides requirements for the selection, supply, preparation, application, inspection and testing of coating and painting systems in according to Reference Document **SAES-H-001** and Purchase Specification **09-SAMSS-069** for Application of Paint System **APCS 1B**.

This liquid coating procedure is for the external of carbon steel valves according to **SAES-H-001, SAES-H-002, or SAES-H-004.** The following are the conditions wherein this coating procedure shall be used.

a) Type of Exposure/Service: Above ground, onshore (per **SAES-H-001**), offshore (per **SAES-H-004**), buried/below ground (per **SAES-H-002**)

b) Maximum service temperature: As per maximum exposure/service temperature involved with valve requirement

SAPMT or valve end-user shall provide below details that are involved with their concerned valves Purchase Order (P.O.) in the Valve Information Sheet for Coating and Procedure Selection for proper coating selection

a) Specific type of exposure/service (onshore or offshore, above ground or buried in dry ground or in subkha, immersion)

b) Above ground exposure environment (mild atmosphere or corrosive industrial atmosphere)

c) Insulated or non-insulated

d) Maximum exposure/service temperature (deg. C.)

This coating procedure shall only be used when External Liquid Coating application is required.

Saudi Aramco Inspection Department (**SAID**) or Saudi Aramco Vendor Inspection Division (**SAVID**) representative shall review and approve the applicability of this coating procedure and the suitability of the selected coating system and materials to be used in this procedure based on the above information provided in the Valve Information Sheet prior to the start of coating application by the vendor.

The corresponding Valve Information Sheet shall be attached with this coating procedure when submitted to the **SAID** or **SAVID** representative prior to the review and approval of this coating procedure.

Provide the following General Requirements in accordance with **SAES-H-101V** and **SAES-H-102**.

a. Handling, storage, and preparation of materials

b. Abrasive materials acceptable quality

c. Acceptable ambient/climatic/weather conditions for surface preparation and coating application

d. General requirements of the vendor or manufacturer that are not covered by Saudi Aramco's coating standards.

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2 Normative References General

2.1 Saudi Aramco Engineering Standards (SAES)

SAES-B-067 Safety Identification and Safety Colors

SAES-H-002V Approved Saudi Aramco Data Sheets for the Pipeline and Piping Coatings

SAES-H-101V Approved Saudi Aramco Data Sheets – Paints and Coatings

SAES-H-102 Safety Requirements for Coating Applications

SAES-L-133 Corrosion Protection Requirements for Pipelines, Piping and Process Equipment

2.2 Saudi Aramco Materials System Specifications (SAMSS)

09-SAMSS-021 Qualification Requirements for Alkyd Enamel Coating System (APCS-6)

09-SAMSS-035 Qualification Requirements for Aluminum-Pigmented Alkyd Coating System (APCS-4)

09-SAMSS-060 Packaging Requirements for Coatings

09-SAMSS-067 Epoxy Coatings for Immersion Service

09-SAMSS-069 Epoxy Coatings for Atmospheric Service (with and without Polyurethane Topcoat)

09-SAMSS-071 Inorganic Zinc Primer (APCS-17A and APCS-17B)

09-SAMSS-087 Epoxy Coatings for Application on Damp Steel Surface

09-SAMSS-101 Epoxy Mastic Coating (Self-Priming, with and without Polyurethane Topcoat)

09-SAMSS-103 Qualification Requirements for High Temperature External Coatings in Atmospheric Services (APCS-11A and APCS-11B)

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09-SAMSS-107 Qualification Requirements and Application of Composite Fluoropolymer/Ceramic Coatings to Fasteners

12-SAMSS-007 Fabrication of Structural and Miscellaneous Steel

2.3 Saudi Aramco Inspection Requirement

175-091900 Safety Requirements for Abrasive Blast Cleaning

2.4 Saudi Aramco General Instruction

GI-0006.021 Safety Requirements for Abrasive Blast Cleaning

2.5 International Organisation for Standardisation (ISO)

ISO 9001 Quality management systems - Requirements

ISO 14001 Environmental management systems - Requirements

ISO 2063 Thermal spraying - Metallic and other inorganic coatings - Zinc, aluminum and their alloys

ISO 2178 Non-magnetic coating on magnetic substrates – Measurement of coating thickness – Magnetic method

ISO 2409 Paints and varnishes – Cross-cut test

ISO 2808 Determination of film thickness

ISO 4624 Paints and varnishes - Pull-off test for adhesion

ISO 4628 Paint and varnishes - Evaluation of degradation of paint coatings ***Part 2-3-4-5***: Designation of degree of blistering, rusting, cracking, flaking

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ISO 4677-1 Atmospheres for conditioning and testing – Determination of relative humidity – ***Part 1***: Aspirated Psychrometer method

ISO 8501-1 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

ISO 8501-2 Preparation of steel substrates before application of paints and related products - Visual assessment of surface cleanliness - ***Part 2***: Preparation grades of previously coated steel substrates after localized removal of previous coatings

ISO 8501-3 Preparation of steel substrates before application of paints and related products. Visual assessment of surface cleanliness. ***Part.3:*** Preparation grades of welds, cut, edges and other areas with surface imperfections

ISO 8501-4 Preparation of steel substrates before application of paints and related products. Visual assessment of surface cleanliness -- ***Part 4***: Initial surface conditions, preparation grades and flash rust grades in connection with high-pressure water jetting

ISO 8502-3 Preparation of steel substrates before application of paints and related products. ***Part 3:*** Tests for the assessment of surface cleanliness Assessment of dust on steel surfaces prepared for painting (pressure-sensitive tape method)

ISO 8502-4 Preparation of steel substrates before application of paints and related products - Tests for the assessment of surface cleanliness - ***Part 4***: Guidance on the estimation of the probability of condensation prior to paint application

ISO 8502-6 Preparation of steel substrates before application of paints and related products - Tests 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 tests for the assessment of surface cleanliness ***Part 9***: Field method for the determination of metric conduct water-soluble salts

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ISO 8503 Preparation of steel substrates before application of paints and related products. Surface roughness characteristics of blast-cleaned steel substrates

ISO 8504-2 Preparation of steel substrates before application of paints and related products - Surface preparation methods - ***Part 2***: Abrasive blast cleaning

ISO 11126 Preparation of steel substrates before application of paints and related products – Specification for non-metallic blast cleaning abrasives

ISO 11127 Preparation of steel substrates before application of paints and related products – Test methods for non-metallic blast cleaning abrasives

ISO 12944 Paints and varnishes - Corrosion protection of steel structures by protective paint systems.

ISO 14918 Thermal spraying - Approval testing of thermal sprayers

ISO 14919 Thermal spraying - Wires, rods, and cords for flame and arc spraying - Classification - Technical supply conditions

ISO 19840 Paint and varnishes - Corrosion protection of steel structures by protective paint system - Measurement of and acceptance criteria for the thickness of dry film films on rough surfaces

ISO 20340 Paints and Coatings - Performance requirements for protective paint systems for offshore and related structures

2.6 American Society for Testing and Materials (ASTM)

ASTM A123 Standard Specification for Zinc (Hot-Dip Galvanized) Coating on Iron and Steel Products

ASTM A385 Standard Practice for Providing High-Quality Zinc Coatings (Hot-Dip)

ASTM D516 Standard Test Method for Sulfate Ion in Water

ASTM D3359 Standard Test Methods for Measuring Adhesion by Tape Test

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ASTM D4138 Standard Test Methods for Measurement of Dry Film Thickness of Protective Coating Systems by Destructive Means

ASTM D4227 Standard practice for qualification of coating applicators for application of coatings to concrete surfaces

ASTM D4228 Standard practice for qualification of coating applicators for application of coatings to steel surfaces

ASTM D4285 Test Method for Indicating Oil or Water in Compressed Air Blotter test

ASTM D4414 Test Method for Measurement of Wet Film Thickness

ASTM D4417 Test Method for Field Measurement of Surface Profile of Blast Cleaned Steel

ASTM D4541 Test Method for "Pull-off Strength" of Coatings Using Portable Adhesion Testers

ASTM D4752 Tests Method for Measuring MEK Resistance of Ethyl Silicate (Inorganic) Zinc-Rich Primers by Solvent Rub

ASTM D4940 Test method for Analysis of Water Soluble Ionic Contamination of Blasting Abrasives

ASTM D5162 Standard practice for Discontinuity (Holiday) Testing of Nonconductive Protective Coating on Metallic Substrates

ASTM D7127 Measurement of Surface Roughness of Abrasive Blast Cleaned Metal Surfaces Using a Portable Stylus Instrument

2.7 National Association of Corrosion Engineers (NACE)

NACE NO. 1 White Metal Blast Cleaning

NACE NO. 2 Near White Metal b.c.

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NACE NO. 3 Commercial Blast Cleaning

NACE NO. 4 Brush-Off Blast Cleaning

NACE NO. 12 Specification for the application of thermal spray coatings (metallizing) of Aluminum, Zinc, and their Alloys and composites for the corrosion protection of steel

NACE RP 0287 Field Measurement of Surface Profile of Abrasive Blast - Cleaned Steel Surfaces Using a Replica Tape

NACE RP 0188 Discontinuity (Holiday) testing of protective coatings

NACE SP 0178 Design, Fabrication and Surface Finish Practices or Tanks and Vessels to be Lined for Immersion Service

NACE SP 0198 Control of Corrosion under Thermal Insulation and Fireproofing Materials

2.8 The Society for Protective Coatings (SSPC)

SSPC-PA2 Measurement of Dry Coating Thickness with Magnetic Gages

SSPC-VIS 1 Visual Standard for Abrasive Blast Cleaned Steel

SSPC-SP 1 Solvent Cleaning

SSPC-SP 2 Hand Tool Cleaning

SSPC-SP 3 Power Tool Cleaning

SSPC-SP 5 White Metal Blast Cleaning

SSPC-SP 6 Commercial Blast Cleaning

SSPC-SP 7 Brush-off Blast Cleaning

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SSPC-SP 10	Near White Blast Cleaning
SSPC-SP 12	Water Jetting
SSPC-SP 16	Brush-off Blast Cleaning of Coated and Uncoated Galvanized Steel, Stainless Steels, and Non-Ferrous Metals
SSPC-WJ-1	Waterjet Cleaning of Metals-Clean to Bare Substrate
SSPC-WJ-2	Waterjet Cleaning of Metals-Very Thorough Cleaning
SSPC-AB 2	Cleanliness of Recycled Ferrous Metallic Abrasive

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3 Responsibilities

3.1 Involved Parties:

Supplier	**ROSS COLOR srl**
Paint Manufacturer	**HEMPEL**
Customer	**EL.BE srl**
Client	**SAUDI ARAMCO**
Paint System	**APCS 1B**
Purchase Specification	**09-SAMSS-069**
Reference Document	**SAES-H-001**

3.1.1 Responsibility of the Supplier:

a) Quality Control (Q.C);
b) Quality Assurance (Q.A.);
c) Control Receive of goods;
d) Check of steel preparation in according to ISO 8501-3;
e) Make sure that all the Company prescriptions are respected and fully understood;
f) Carry out intermediate and final checks with verification of the finished works acceptability;
g) Write daily reports of the work carried out (as in the attached daily-log); to be transmitted to the Company representative;
h) Have suitable equipment to perform the specified checks, with calibration certification issued by the manufacturer or a recognize body, and a thorough knowledge of its use and reference standards;
i) Monitoring of the use of paints according to approved project specification;
j) Grant Company/Contractor's Coating Inspector free access and assistance to inspect all work performed;
k) Uses only operators employed in abrasive blast cleaning and coating qualified to tradesman level as Blaster or Painter.

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3.1.2 Responsibility of the Paint Manufacturer:

a) Supply the paint pre-qualified according to the painting system;

b) Supply all paint required in unopened containers clearly marked with the following details: name of manufacturer, material identification, color reference number, batch number. Other details to be supplied shall include: date of manufacture, quantity, shelf life, safety and technical data sheet;

c) Supply the paint before the expiry date.

3.1.3 Responsibility of Vendor:

a) Deliver the material only after the pressure tests have been performed with satisfactory results. It's responsibility of the Client to inform the Painting Supplier about the execution of the test. The Painter Supplier is not liable if the material were delivered without executing the test or if the test's results was not satisfactory;

b) Deliver material only after the steel preparation has been performed in according to ISO 8501-3 *(Steel Preparation)*.

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4 Health, safety and environment (HSE)

4.1 Introduction

Provide the requirements for health and safety in using this coating procedure according to Country / Government, Industry, and/or Company regulations, SAES-H-001 or SAES-H-004, and SAES-H-102.
Ross Color's aim is to have zero impact on the environment.
Ross Color's is certified for the quality management system ISO 9001:2015
Ross Color's is certified for the environmental management system ISO 14001:2015

4.2 Key environmental principles include:

a) Acting according to the precautionary principle;
b) Minimizing negative impact on the environment;
c) Complying with applicable legislations and regulations;
d) Setting specific targets and improvement measures based on relevant knowledge of the affected;
e) Working actively to limit the effects on climate change by addressing energy efficiency, emissions trading, etc., seeking to minimize the generation of waste.

4.3 General rules for safe access in the company

a) Obligatory registration in a special guest list and waiting attendant, delivery of risk information and, if necessary, DPI delivery. You will receive an identification card to wear for the entire safety stay in the company, to be returned at the exit, signing the register. Access to floors and business areas is allowed only with an attendant;
b) Access to restricted areas must be expressly authorized. It is forbidden to touch everything in the company without the necessary authorization;
c) When approaching plants, machinery and/or equipment is authorized, don't wear swirling clothing and keep your tie inside the shirt, to avoid being caught in moving parts;
d) Observe and follow internal signage;
e) Smoking ban in all departments. Prohibition of photo and/or video without the necessary authorization;
f) Pay attention to the requirement of use of personal protective equipment in the different areas;
g) In case of fire or evacuation follow the directions of the displacement guide and risk information given at the entrance.

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4.4 Summary of main risk:

a) Investment/collision by forklift trucks – pay attention to suspended load;
b) Investment by loads/materials fallen or slipped during handling;
c) Exposure to noise levels above the threshold, during using noisy equipment;
d) Risk of fall and slide.

4.5 EMERGENCY MANAGEMENT

4.5.1 Operative instructions in case of fire:

	When I receive the signal of evacuation (alarm bells) I have to leave the seat and reach a safe place (reference point) and waiting for more instructions

4.5.1.1 How to evacuate the place:

a) Use safety ways and the emergency exit;
b) Follow the instructions of the emergency team and reach the reference point;
c) Don't care for your personal objects.

4.5.1.2 In case of evacuation of the place full of smoke:

I have to crawl on all fours, if it's possible with a wet handkerchief on your mouth, avoiding to breathe the smoke doing short and spaced breaths.

4.5.2 Reference point:

	The reference points are: ***a) G3 external area;*** ***b) G4 external area;*** ***c) G6 external area.***

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4.5.3 Operative instructions in case of medical emergency:

Whoever into the place sees an injured person or a person sized by an illness immediately has to inform the company responsible, directly or through a worker

4.5.4 Operative instructions in case of black out:

The factory is provided, where is necessary, of emergency lights that lighted the safety ways. Whoever sees anomalies (smoke, fire, noise…) on electrical panels immediately has to inform the company responsible

4.5.5 Operative instructions in case of gas-escape:

Anyone into the factory who smells gas has to immediately inform the company manager and leave the area.

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5 Personal protective equipment (PPE)

Personal protective equipment (PPE) refers to:

a) Protective clothing;
b) Helmets;
c) Hearing protection;
d) Mask;
e) Gloves;
f) Glasses;
g) Other equipment designed to protect the wearer's body from injury.

PPE is needed when there are hazards present.

Protective clothing for abrasive blasting operation shall be in accordance to ISO 14877.

The hazards addressed by protective equipment include physical, electrical, heat, chemicals, and airborne particulate matter.

Compressors and any associated pressure vessels shall be protected against overpressure.

Remember that PPE does not eliminate the hazard at source.

Before and during use of the painting material, the painter must observe all safety labels on packaging and paint containers, consult the Material Safety Data Sheets and follow all local or national safety regulations.

Avoid inhalation, avoid contact with skin and eyes, and do not swallow.

Take precautions against possible risks of fire or explosions as well as protection of the environment.

Apply only in well ventilated areas.

Material Safety Data Sheets (MSDS) shall be available for review at shops where coating is applied.

Used solvents, paint, waste materials and cleaning materials shall be handled in strict accordance with MSDS requirements and applicable local and national disposal procedures.

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6 Classification of environments

6.1 ISO 12944 - 2

Corrosivity Category	Mass Loss g/m²	Thick. Loss µ	Exterior	Interior
C1 – Very Low	≤ 10	≤ 1.3	-	Heated buildings with clean atmospheres, e.g. offices, shops, schools, hotels
C2 - Low	> 10 to 200	> 1.3 to 25	Atmosphere with low level of pollution: mostly rural areas	Unheated buildings where condensation can occur, e.g. depots, sports halls
C3 – Medium	> 200 to 400	> 25 to 50	Urban and industrial atmospheres, moderate sulfur dioxide pollution; coastal areas with low salinity	Production rooms with high humidity and some air pollution, e.g. food-processing plants, laundries, breweries, dairies
C4 – High	> 400 to 650	> 50 to 80	Industrial areas and coastal areas with moderate salinity	Chemical plants, swimming pools, coastal ship and boatyards
C5 – Very High *(ex C5 I – C5 M)*	> 650 to 1500	> 80 to 200	Industrial areas with high humidity and aggressive atmosphere and coastal areas with high salinity	Buildings or areas with almost permanent condensation and with high pollution
CX – Extreme *(New)*	> 1500 to 5500	> 200 to 700	Offshore areas with high salinity and industrial areas with extreme humidity and aggressive atmosphere and subtropical and tropical atmospheres	Industrial areas with extreme humidity and aggressive atmosphere

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Category	Environment	Examples of environments and structures
Im 1	Fresh water	River installation, hydro-electric power plants
Im 2	Sea or brackish water	Immersed structures without cathodic protection (e.g. harbour areas with structures like sluice gates, locks or jetties)
Im 3	Soil	Buried tanks, steel piles, steel pipes
Im 4 – *(New)*	Sea or brackish water	Immersed structures with cathodic protection (e.g. offshore structures)

6.1.1 Correlation between preparation grades and corrosivity categories

Preparation Grade	Corrosivity Category
P1	C1 and C2
P2	C3 and C4
P3	C5 and CX

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7 Logistic Establishments

Ross Color total surface is over 15000 square feet between Gorla Minore (Varese) plants and Marnate (Varese) plants, all under controlled temperature.

Ross Color is divided into ***7 plants:***

a) **Plant G1:** Material check-in and job preparation area;
b) **Plant G2:** Stainless steel and alloy working area;
c) **Plant G3:** Under 10 Ton carbon steel working area;
d) **Plant G4:** Over 10 Ton carbon steel working area (Max 50 Ton);
e) **Plant G5:** Packing and shipping;
f) **Plant G6:** Carbon steel and stainless steel working area (Piping/Tank/Vessel Division);
g) **Plant G7:** Sawmill and cases building area;

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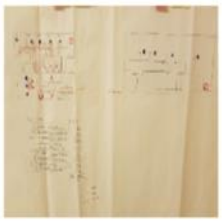
8 Ross Color's Approach to Lean Manufacturing

8.1 Our Lean Transformation process

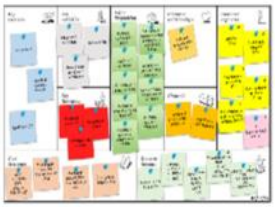
- In January 2018, we began our process of Lean Transformation which needs flow and working process analysis, using:

Value stream as is



Spaghetti chart

Swim lane job management



BMC

- The analysis output is:

Value stream to be

Cantieri

Quality Focus

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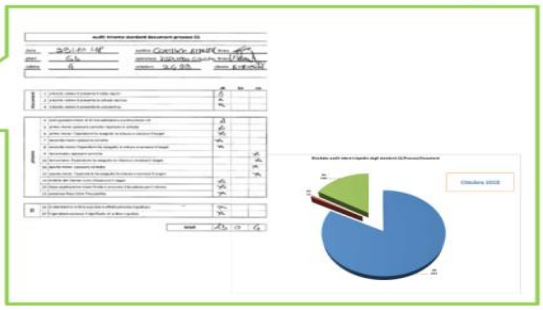
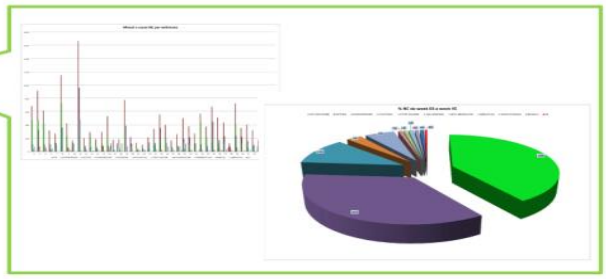
Quality Focus

- Staff training based on resources
- Daily audits on respect for standard process – document – 5S



- Weekly meeting, based on sharing of the quality data, between managers and operating team



Quality Focus

- The Kaizen paper for improving management

- Internal certification of thickness data

(Daily log)

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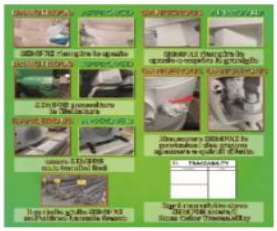
Kanban

Paints Kanban
- Zero missing
- Easy management

5S

- 5S: master station in all painting cabs – standardisation of painting process + warning



- 5S: tidy and clean cabs standard

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9 Incoming material checks

After the receipt of goods, it's necessary the Visual Control.

Control	Acceptance Criteria	Consequence
Steel Preparation	*Grade P3 as per ISO 8501-3*	*Rounded or smoothened by grinding to grade required (Edges shall be ground to a radius of > 2mm)*
Hard surface Layers	*No Hard surface layers*	*Remove by grinding prior to blast cleaning*
Cracks	*No Cracks*	*Remove by grinding prior to blast cleaning*
Welds	*No Welds cracks*	*Remove by grinding prior to blast cleaning*
Crevices	*No crevices*	*Remove by grinding prior to blast cleaning*
Joint Overlap	*No Joint Overlap*	*Remove by grinding prior to blast cleaning*
Protrusions	*No Protrusions*	*Remove by grinding prior to blast cleaning*

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10 Masking

Before abrasive blast cleaning and painting, all equipment which could be damaged by blast, dust or particulate matter shall be suitably protected by wrapping, taping, rubber, plastic caps or other means to prevent damage. This equipment shall include, but not necessarily be limited to, the following:

a) RTJ Flanges;
b) Sealing face of the flanges;
c) Compact flanges;
d) Bearings;
e) Control panels;
f) Control valves;
g) Instrument dials;
h) Nameplates/Code stampings;
i) Valve stems and position indicators;
j) Exposed moving parts;
k) Push buttons.

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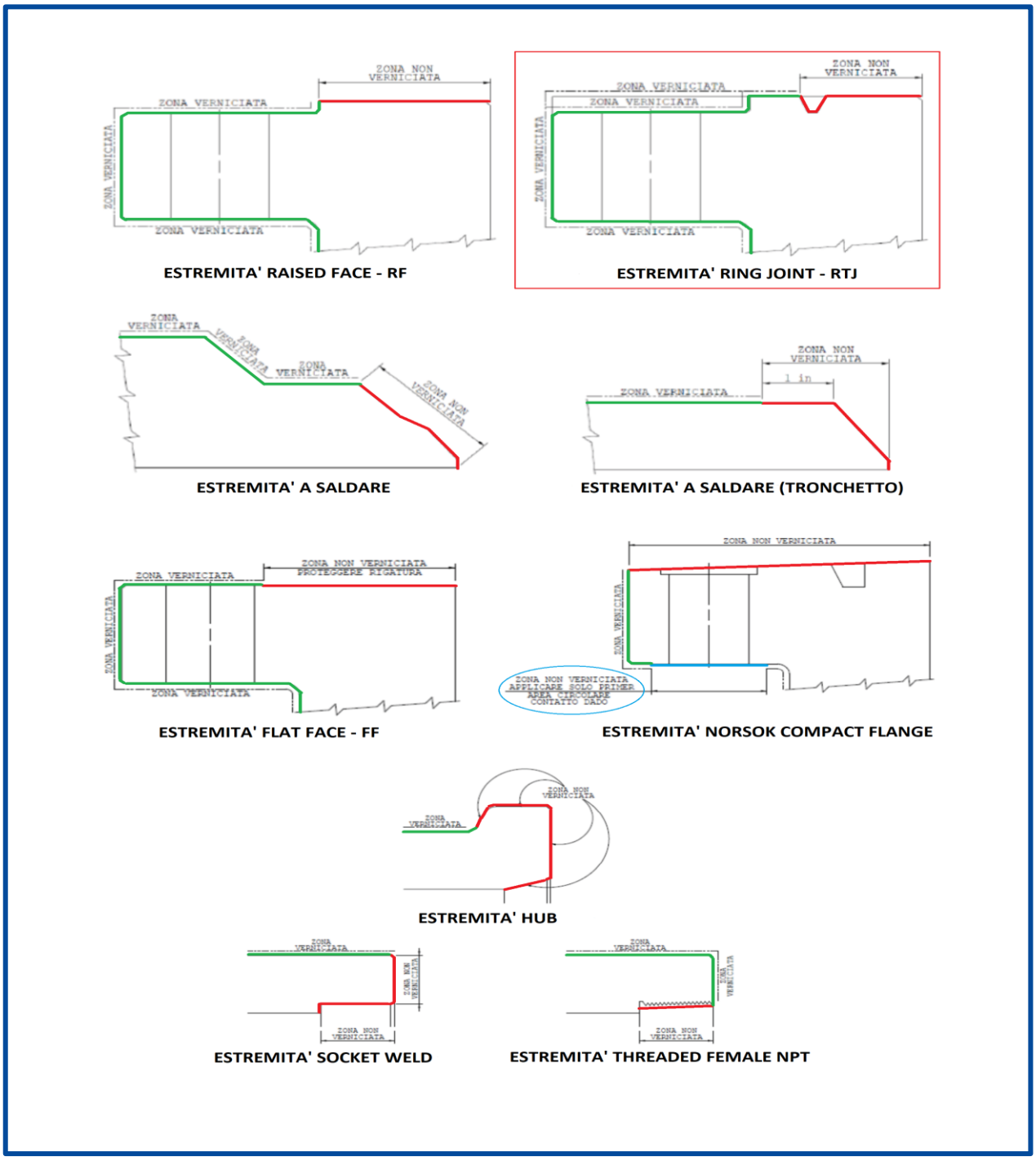
The following drawings show which areas are going to be painted:



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11 Ambient condition

No final blast cleaning or coating application shall be done if:

a) *The relative humidity is more than 85%, (Refer. To ISO 4677);*
b) *Steel temperature is less than 3°C related to the dew point;*
c) *When ambient and steel temperatures is below 10°C or above 35°C.*

All surface preparation and protective coating work shall be performed in indoors facilities with climate control ensuring that the conditions are in compliance with the specified requirements.

The application of painting should begin within 4 hours after the blasting end, and before visible rusting, and not more than 4 hours from its start without interruption until completing the protection of the prepared surfaces without substrate oxidation having occurred.

All surface preparation and protective coating work shall be performed in indoors facilities with climate control ensuring that the conditions are in compliance with the specified requirements**.**

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12 Pre-Blasting preparations

The surface shall be free from all surface contaminants such as oil, grease, residue, slivers, dirt etc., in accordance with ISO 12944-4. Prior to blasting operations, bolt holes shall be solvent cleaned using a suitable solvent, oil emulsifier, alkaline degreaser or other appropriate product in accordance to SSPC-SP1.

All degreasers shall be proven to be biologically degradable.
All surface should be washed with clean fresh water and completed dry prior to blast cleaning.
Stainless steel surface shall not be treated with carbon steel cleaning tools or any tools previously used on carbon steel and should be treated ***only in the G2 plant.***

Control	Acceptance Criteria	Consequence
Environmental condition	*Ambient and steel temperature. Relative humidity. Dew Point (see point 11)*	*No Blasting*
Oil and grease and other contaminations	*Remove of all surface contaminants prior to blasting operation (*UV Test with Black light)	*Remove of all surface contaminants prior to blasting operation*
Cleaning of surface	*ISO 8501-1 or SSPC VIS1*	*Cleaning with fresh potable water and solvent prior to blast in accordance to SSPC-SP1*
Surface totally dry	*Totally Dry*	*Re-Dry*
Steel Preparation	ISO 8501-3 *(Preparation Grade P3) and NACE SP 0178*	*Remove of all surface imperfection prior to blasting operation*
Blotter Test	ASTM D4285 (Every 4 Hours)	*Check plants for the production of compressed air*
Conductivity of abrasives	ASTM D4940 ≤ 1000 Microsiemens	*Changed of abrasive and retesting*

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13 Blast Cleaning

Cleaning of surfaces shall be done by dry blast cleaning as outlined in ISO 8504-2.
Steel subject to surface preparation shall as a minimum requirement be in accordance with rust grade B according to ISO 8501-1.
Size of abrasive particles for blast cleaning shall be such that the prepared surface anchor profile, is in accordance to the requirements.
Handling of degreased and blast cleaned surfaces, shall be done with clean gloves and with lifting equipment that does not contaminants the surfaces.
The surface profile shall be graded in accordance with ISO 8503 / NACE RP 0287

Note: Blast cleaned steel surface shall not be touched by bare hands.
No acid washes, cleaning solvents or other chemical treatments shall be used on metal surfaces after they have been dry blast cleaned.

Prior to initiation of blast cleaning, the applicator shall confirm that all environmental and safety requirements relating to blast cleaning have been met.

13.1 Surface Cleanliness grades

Grade of Surface Cleanliness	ISO 8501	SSPC
White metal	Sa 3	SP-5
Near-white metal	Sa 2 ½	SP-10
Sweep blast cleaning	-	SP-7
Solvent cleaning	-	SP-1
Power tool cleaning	St 3	SP-3
Power tool cleaning to bare metal	-	SP-11
Water jetting (ISO 8501-4)	Wa 2 ½	SP-12
Wet abrasive blasting	-	VIS 5

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14 Abrasive

Abrasives used for blast cleaning shall be free from oil, grease, moisture, chloride contamination etc., and supplied with certification documentation traceable to batches of material.

Abrasives for use in blast cleaning steels shall be in accordance with ISO 8504-2
The properties of abrasives used shall meet the requirements of the relevant parts of ISO 11124 and ISO 11126 respectively. Test methods shall be in accordance with the tests specified in ISO 11127.
Each batch of abrasive shall be tested to check that the abrasive meets the requirements as specified in the relevant ISO standard. The conductivity of abrasives for stainless steels shall be a maximum of 150 µS/cm. The Principal shall approve the use of alternative abrasive materials.

14.1 Abrasive type:

a) Steel Grits for carbon steel;
b) Inox Grits for stainless steel;
c) Garnet;
d) White Corundum.

14.2 Abrasive specification:

Type	Generic Name	Characteristics	Standard
Metallic	Iron grit	> 1,7% carbon	ISO 11124-2
	Steel grit	0,8% to 1,2 % carbon	ISO 11124-3
Natural Mineral	Staurolite	Iron / aluminum silicate	ISO 11126-9
	Specular haematite	Crystalline Fe_2O_3	
	Garnet	Calcium iron silicate	ISO 11126-10
Synthetic mineral	Coal slag	Aluminum silicate	ISO 11126-4
	Aluminum oxide	Crystalline corundum	ISO 11126-7

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15 Final surface condition

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 abrasive etc. shall be removed from the surface after blasting cleaning such that the particle quantity and particle size do not exceed rating 2 of ISO 8502-3.

The test panels supplied by Ross Color for each production batch shall receive the same surface preparation of the items.

Control	Acceptance Criteria	Consequence
Surface completely Clean	ISO 8501-1 / SSPC VIS1 (also UV Test with Black light)	*Remove of all surface contaminants prior to blasting Operation*
Roughness	ISO 8503 / NACE RP 0287	*Reblast and retest the surface profile*
Dust Test	ISO 8502-3 – Rating Max 2	*Recleaning and retetsing until acceptable*
Salt test on Before Blasted surface	ISO 8502-6 / ISO 8502-9 (See table given below)	*Repeat washing with potable water and retesting until acceptable*
Blotter Test	*ASTM D4285* - (Every 4 Hours)	*Cleaning compressed air*

Blast cleaned surfaces shall be paint as shortly as possible, but in no case may exceed intervals given below:

a) Immediately if condensation is likely to take place due to weather change or if weather conditions are likely to worsen;
b) 2 hours if weather is changing;
c) 4 hours if weather is stable.

15.1 Maximum chloride content on substrate

Coating category	New construction	Maintenance
External Coatings	< 40 mg/m² (4 µg/cm²)	*N/A*
Internal Coatings	< 20 mg/m² (2 µg/cm²)	*N/A*

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16 Control prior to paint application

Verify that storage, mixing, thinning, and application of primer and the others coat, is in accordance to the application data sheet.

All coating materials and solvents shall be stored in the original container bearing the manufacturer's label and instructions.

Each product shall have a batch number showing year and month of manufacturer and giving full traceability of production. ***(Ross Color Warehouse Traceability)***

Shelf life shall be included in the technical data sheet.

No paint shall be used whose shelf life has expired.

Verify that pigmented and catalyzed materials shall be thoroughly mixed using power mixers before and during the application.

In the case of two-component products, the two components should be mixed by weight in compliance with the proportions given in the data sheets.

Only thinners as per the specified MDS shall be used. These shall only be used at the rate recommended by the paint manufacturer for the specific application.

Retardants and accelerates are not permitted unless written authority is received from the paint manufacturer.

Continuous agitation type spray pots shall be used when applying metal pigmented coatings such as zinc.

Adhesion qualification test plates shall be prepared and coated at the same time and under the same conditions as the production coating work.

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17 Application

Provide the specific requirements based on the concerned APCS of SAES-H-001 or SAES-H-004 including manufacturer's recommendation.

Painting, including storage, mixing, thinning, pot life, application method, drying/curing period, and recoating period, shall conform to the coating manufacturer's published data sheets.

Ross Color provides to operators: brush (for spot repair, stripe coating or other irregular surfaces not suitable for spray application), Airless or conventional spray gun. The Method of application shall be as per recommendation of Coating Manufacturer.

For each coat, a stripe coat shall be applied by brush to all welds, corners, behind angles, edges of beams etc. and areas not fully reachable by spray in order to obtain the specified coverage and thickness.

17.1 Paint mixing

a) The condition of the paint shall be checked before preparation begins and any unsatisfactory materials shall be discarded;
b) Hand mixing may be used for containers up to 5 liters (1 gal). Mechanical agitators shall be used for containers larger than 5 liters (1 gal). If pigment separation readily occurs, e.g. zinc silicate primers, continuous mixing shall be carried out during application.

17.2 Two pack paints - mixing and pot life

a) Coating manufacturer's mixing instructions and maximum pot life of two pack paints shall be strictly adhered to;
b) Material shall be discarded once the pot life has expired regardless of apparent condition;
c) If stated in the application data sheet, materials shall be allowed to stand for the specified induction period subsequent to mixing but before application;
d) If two pack materials are being used, new material or solvent shall not be added to any old material left in the pot.

17.3 Priming

a) Prepared surfaces shall be primed before 4 hours (2 hours for TSA);
b) To minimize the time between abrasive blasting and priming, stripe coating of primer coats may be carried out following spray application of the full primer coat;
c) Prepared surface shall show no sign of deterioration before paint application and it shall:
    - Be applied to grit blasted surfaces only;

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- Be sealed with a tie coat as soon as practicable after complete curing has taken place;
- Tie coat shall achieve sound adhesion to the zinc silicate primer and be compatible with the subsequent coat;
- The inorganic zinc shall be subject to the control of polymerization according to ASTM D4752 with the following results: Level 4 Min (Mek Test only if applicable).

17.4 Application of paint

a) Paint shall be applied in a uniform over the entire surface without any runs, sags, or other blemishes;
b) Skips, runs, pinholes, blisters, holidays, sags and drops shall be avoided;
c) If two or more coats of the same paint are specified, they shall be of contrasting colours;
d) Crevices created by two surfaces in close contact, which cannot be protected by painting, shall be mastic sealed on both sides;
e) Brush application shall involve:
   - Utilisation in areas that cannot be properly spray coated;
   - Working paint into all crevices and corners;
   - Application without runs and sags;
   - The application of an additional stripe coating of primer or intermediate coat to sharp edges, corners, and welds before application of the final coat regardless of the method of coating application. This is in addition to the number of coats stated in the painting schedules.
f) Spray application shall conform to the following:
   - Compressed air supply shall have the capacity to meet the work requirement and shall be free from oil and water contamination;
   - Lines and pots shall be cleaned before addition of new materials;
   - Spray shall overlap the previous pass by 50%;
   - Large surfaces shall be painted with passes in two directions at right angles;
   - Over coating intervals shall conform to coating manufacturer's recommendations and shall be kept to a minimum to prevent contamination between coats. If contamination does occur, it shall be removed by washing with a proprietary detergent solution, rinsed with clean fresh potable water, and allowed to dry fully before the application of further coats;
   - Prior to over coating, coatings shall be dried and cured in accordance with the paint manufacturer's recommendations
g) Paint thickness:
   - The generic paint systems shall be applied to the recommended thicknesses;

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- Operators shall perform Ross Color internal calculation procedure (Theoretical WFT, Practical WFT and DFT) for each coat, using the equipment provided from Ross Color on" Ross Color **Master Station"**, which are available in each painting cabin.

All work shall be carried out only by operators employed in abrasive blast cleaning and coating qualified to Tradesman level as blaster or painter.

Control	Acceptance Criteria	Consequence
Environmental condition	*Ambient and steel temperature. Relative humidity. Dew point see point 11*	*No Coating Application*
Stripe Coating	*Shall applied in accordance to the thickness required on each item (is mandatory)*	*Reapplied*
Uniformly	*Uniformly over entire surface*	*Reblast and reapplied*
MEK TEST *Curing test only for Zinc Silicate* *(IF REQUIRED AND NOT APPLICABLE FOR STAINLESS STEEL)*	Not Applicable	*Allow to cure*
Visual examination of coating	*Visual to determine curing, contamination, solvent retention, pinholes/popping, sagging and surface defects. In accordance with specified requirements*	*Repair of defects*
Wet Film	In accordance to MDS e DFT required – ISO 2808 Method 1A – Comb gauge	*Re-applied*
Film Thickness Measurement	SSPC-PA2	*Repair, additional coats or recoating as appropriate*
Adhesion Test **	ASTM D4541 (Min 2,57 Mpa)	*Coating to be rejected*

****** Testing shall be done on fully cured systems only, usually after 15 days from the application of the last coat; Adhesion test shall be as per par. 9.3.5.d of SAES-H-001 and applicable SAMSS requirement.

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SSPC-PA2

Minimum Thickness: The average of the spot measurements shall not be less than the specified minimum thickness. Although no single spot measurement shall be less than 80% of the specified minimum thickness, it is possible for any single gage reading to under-run by a greater amount.

Maximum Thickness: The average of the spot measurements shall not be more than the specified maximum thickness. Although no single spot measurement shall be more than 120% of the specified maximum thickness, it is possible for any single gage reading to over-run by a greater amount.

Definition: Spot Measurement: The average of at least three gage readings made within a 4 cm (1.5 inch) diameter circle. Gage Reading: A single reading at one point.

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17.5 Remedial Work

17.5.1 General repair

Repair procedure of coatings shall be issued in accordance with the surface preparation and application requirements stated in the applicable APCS, SAES-H-101V, and SAES-H-002V.

Cover areas adjacent to defects with heavy duty textile or fabric adhesive tape before commencing repair or patch up.

Clean defective area by solvent or detergent wash.

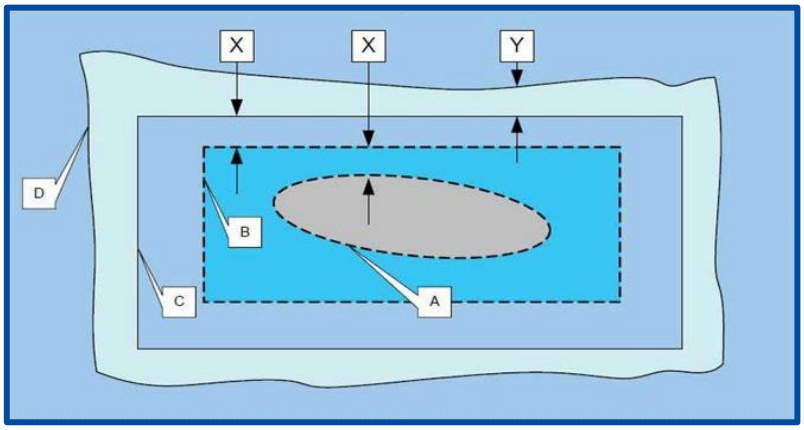
For areas less than 0.1 m², grind to a rough metal surface using at least an 80 grit disc sander. Alternatively spot blast or power tool cleaning to bare steel. Feather edge of coating at least 25 mm beyond bare metal.

For areas greater than 0.1 m², blast clean to obtain the metal surface pre-treatment originally specified. Feather edge the coating at least 50 mm beyond bare metal.

Remove dust and debris by brush or vacuum.

Apply coating by brush for areas less than 0.1 m² and by spray for areas greater than 0.1 m² to the original specification except that the first coat of a multi-coat system shall be thinned.

The full coat of the repair internal/immersed coatings shall be holiday tested when cured.



Repair Sketch

Legend:

A. Boundary of typical holiday or damage spot with feathered edges of existing coating system
B. Limit of first masking (1st coat of 2-coat system or 1st and 2nd coat of 3- or 4-coat system)
C. Limit of second masking (subsequent coat(s) of 2, 3, and 4 coat systems)
D. Visible boundary of abraded surface of existing coating
X. = 15 mm minimum, 25 mm maximum distance between boundaries
Y. = 5 mm minimum, 15 mm maximum distance between boundaries

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www.rosscolor.it

Phone: +39 0331 603423
Email: edoardo@rosscolor.it
VAT No: IT 02788590129
REA: VA288554 – **Reg. Imp.:** 02788590129

18 Paint System

18.1 Paint System: APCS 1B

Type of Coating: *Epoxy Coating System for Atmospheric Service (with Epoxy Primer)*
Service Condition Limitations: *Maximum Service Temperature 120°C*
Level of Surface Preparation: Sa 2½ (SSPC-SP10)
Roughness Profile: *40-65 µm*

Coat	Type of Paint	*Brand*	*Product*	Min. DFT	Max. DFT	*Colour*
1st Coat	Epoxy Primer	HEMPEL	**Hempadur 15570**	**55 µ**	**100 µ**	MS*
2st Coat	Epoxy Mastic	HEMPEL	**Hempadur Mastic 45880**	**110 µ**	**150 µ**	MS*
3st Coat	Epoxy Mastic	HEMPEL	**Hempadur Mastic 45880**	**110 µ**	**150 µ**	**Ral 9006**
				275 µ	**400 µ**	

* Manufacturer Standard

- All inspection results shall be recorded. Documentation requirements shall comply with par. 10.2 of SAES-H-001

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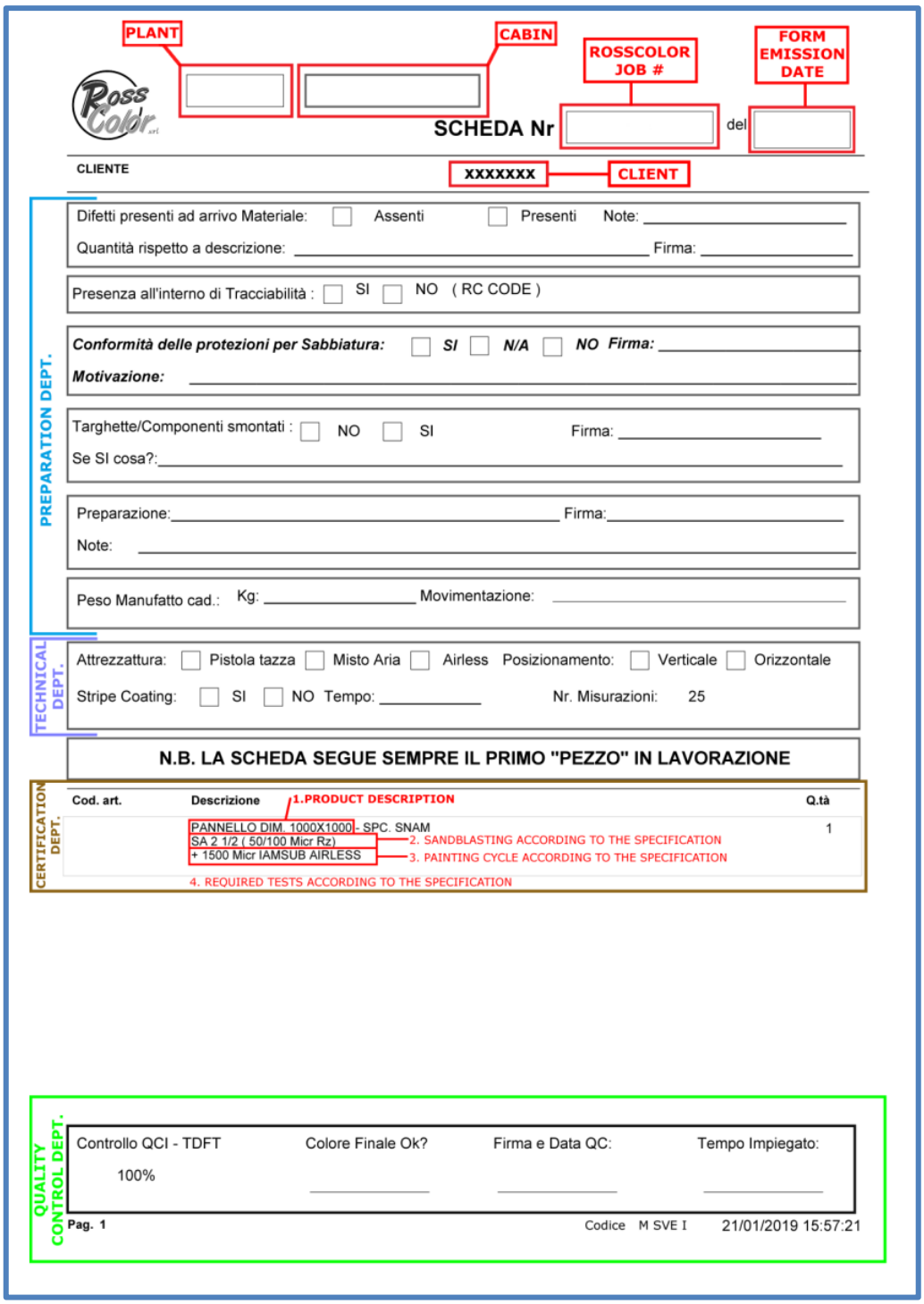
19 Daily log report (example)



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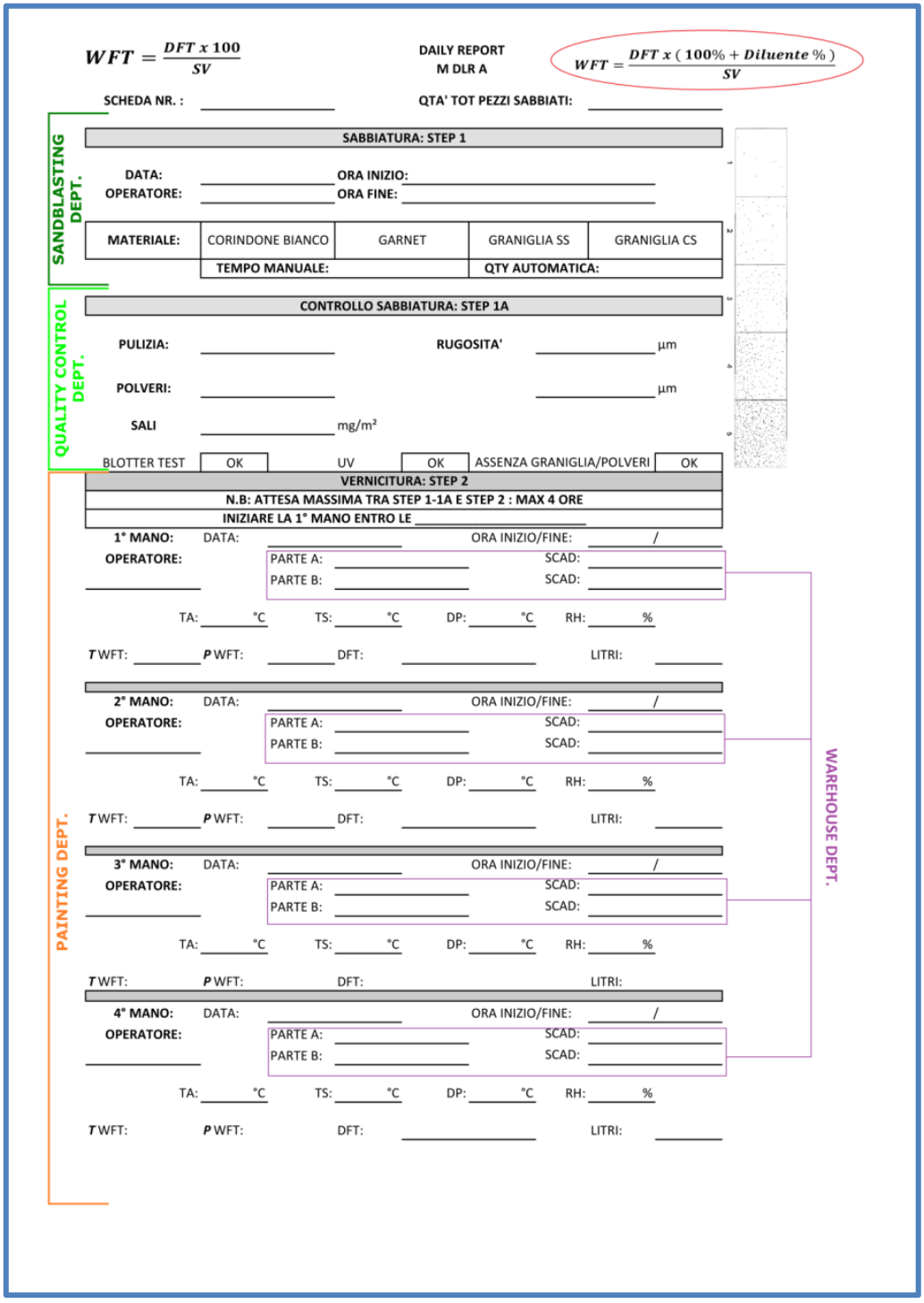

$$WFT = \frac{DFT\ x\ 100}{SV}$$

DAILY REPORT
M DLR A

$$WFT = \frac{DFT\ x\ (100\% + Diluente\ \%)}{SV}$$

SCHEDA NR. : _____ QTA' TOT PEZZI SABBIATI: _____

SANDBLASTING DEPT.

SABBIATURA: STEP 1

DATA: _____ ORA INIZIO: _____
OPERATORE: _____ ORA FINE: _____

MATERIALE:	CORINDONE BIANCO	GARNET	GRANIGLIA SS	GRANIGLIA CS
	TEMPO MANUALE:		QTY AUTOMATICA:	

QUALITY CONTROL DEPT.

CONTROLLO SABBIATURA: STEP 1A

PULIZIA: _____ RUGOSITA' _____ µm
POLVERI: _____ _____ µm
SALI _____ mg/m²

BLOTTER TEST [OK] UV [OK] ASSENZA GRANIGLIA/POLVERI [OK]

PAINTING DEPT.

VERNICITURA: STEP 2

N.B: ATTESA MASSIMA TRA STEP 1-1A E STEP 2 : MAX 4 ORE
INIZIARE LA 1° MANO ENTRO LE _____

1° MANO: DATA: _____ ORA INIZIO/FINE: _____ / _____
OPERATORE: _____
PARTE A: _____ SCAD: _____
PARTE B: _____ SCAD: _____
TA: _____ °C TS: _____ °C DP: _____ °C RH: _____ %
T WFT: _____ *P* WFT: _____ DFT: _____ LITRI: _____

2° MANO: DATA: _____ ORA INIZIO/FINE: _____ / _____
OPERATORE: _____
PARTE A: _____ SCAD: _____
PARTE B: _____ SCAD: _____
TA: _____ °C TS: _____ °C DP: _____ °C RH: _____ %
T WFT: _____ *P* WFT: _____ DFT: _____ LITRI: _____

3° MANO: DATA: _____ ORA INIZIO/FINE: _____ / _____
OPERATORE: _____
PARTE A: _____ SCAD: _____
PARTE B: _____ SCAD: _____
TA: _____ °C TS: _____ °C DP: _____ °C RH: _____ %
T WFT: *P* WFT: DFT: LITRI:

4° MANO: DATA: _____ ORA INIZIO/FINE: _____ / _____
OPERATORE: _____
PARTE A: _____ SCAD: _____
PARTE B: _____ SCAD: _____
TA: _____ °C TS: _____ °C DP: _____ °C RH: _____ %
T WFT: *P* WFT: DFT: _____ LITRI: _____

WAREHOUSE DEPT.

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REA: VA288554 – **Reg. Imp.:** 02788590129

20 Painting report (example)

CERTIFICATO n. 20611 — CERTIFICATE No 20611

PAINTING REPORT
Mod. M PRE D

CERTIFICATO n. 22162 — CERTIFICATE No 22162

ROSS COLOR SRL Via Italia, 21 - Marnate (VARESE)	Data *Date*	Nr *N°*
CLIENTE / *Client*	Nr. ORDINE / *Purchase Order N°*	DOCUMENTO DI RIF. / *Document Ref. N°*
	P.O.	DDT NR

CICLO DI VERNICIATURA / *Painting Cycle*

X	SA 2 1/2			BATCH A/B
X	FIRST COAT		µm	A: | B:
X	SECOND COAT		µm	A: | B:
X	THIRD COAT		µm	A: | B:
X	FOURTH COAT		µm	A: | B:
	SPESSORE TOTALE RICHIESTO / *TDFT*		**0 µm**	

1. PULITURA / *Cleaning*

METODO / *Method:* SOLVENT CLEANING AS PER SSPC SP1 — MATERIALE / *Material:* SKY NET

2. PREPARAZIONE SUPERFICIALE / *Blasting*

X	ROUGHNESS PROFILE	µm	Equipment:	REPLICA TAPE FTG 2000 ISO 8503-5 - SN 290320		
X	CLEANING CHECK	ISO 8501-1 SA 2 1/2			Results:	SATISFACTORY
X	COMPRESSED AIR	ASTM D4285	Equipment:	WHITE ABSORBENT PAPER	Results:	SATISFACTORY
X	DUST CHECK	ISO 8502-3	Required:	Level 2 MAX	Results:	Level 1 - SATISFACTORY
X	SURFACE PREPARATION BEFORE BLASTING	ISO 8501-3	Required:	Level P3	Results:	Level P3 - SATISFACTORY
X	SALT TEST	<20 mg/m2 ISO 8502-6	Equipment:	BRESLE KIT - SN 2251265	Results:	mg/m2
X	MASKING				Results:	WELL DONE
X	ENVIROMENT CONDITION		Equipment:	THERMOYGROMETER - SN 61268399		

3. VERNICIATURA PRIMA MANO / *First Coat*

NOME PRODOTTO / Name of product: FIRST COAT

X PENNELLO / With paint brush — X PISTOLA A SPRUZZO / Spray gun

SPESSORE RILEVATO / Thickness Detected — Min — Max — Ave — WFT

Air Temp. C° — *Steel Temp. C°* — *Dew Point* — *Humidity*

4. VERNICIATURA SECONDA MANO / *Second Coat*

NOME PRODOTTO / Name of product: SECOND COAT

X PENNELLO / With paint brush — X PISTOLA A SPRUZZO / Spray gun

SPESSORE RILEVATO / Thickness Detected — Min — Max — Ave — WFT

Air Temp. C° — *Steel Temp. C°* — *Dew Point* — *Humidity*

5. VERNICIATURA TERZA MANO / *Third Coat*

NOME PRODOTTO / Name of product: THIRD COAT

X PENNELLO / With paint brush — X PISTOLA A SPRUZZO / Spray gun

SPESSORE RILEVATO / Thickness Detected — Min — Max — Ave — WFT

Air Temp. C° — *Steel Temp. C°* — *Dew Point* — *Humidity*

6. VERNICIATURA QUARTA MANO / *Fourth Coat*

NOME PRODOTTO / Name of product: FOURTH COAT

X PENNELLO / With paint brush — X PISTOLA A SPRUZZO / Spray gun

SPESSORE RILEVATO / Thickness Detected — Min — Max — Ave — WFT

Air Temp. C° — *Steel Temp. C°* — *Dew Point* — *Humidity*

7. TEST RICHIESTI / *Required tests*

X	**TDFT**	**ISO 19840**	Equipment:	*MICROMETER SN 288924*	Results:	**SATISFACTORY**
X	**VISUAL INSPECTION**	**ISO 4628 1 - 6**		ON 100% OF COATED SURFACE	Results:	**SATISFACTORY**
X	**ADHESION**	**ISO 4624**	Equipment:	*POSITESTER SN AT10583*	Results:	**Min 5 Mpa***

***THE ADHESION TEST WILL BE DONE**

LISTA MATERIALE IN ALLEGATO / *Attached Material's List*

FIRMA FORNITORE *Supplier Signature*	*DATA* *Date*	*ISPETTORE CLIENTE* *Customer Inspector*	*TERZA PARTE ISPETTORE* *Third Part Inspector*
ROSS COLOR SRL Edoardo Parotti FROSIO Inspector Level II N° 9580			

Warranty 24 months from the date of the certificate. Remarks: All mechanical damages due the transport and assembling and in the particular for damages due to disassembling or tightening of nuts and bolts are excluded from the guarantee. This document is property of **ROSS COLOR S.R.L.** who will safeguard its right according to civil and penal provisions of the law.

Via Ambrogio Colombo 130 - 21055 Gorla Minore (VA) - Cancello: Via Redipuglia 25 - 21055 Gorla Minore (VA) - Tel. 0331/603423 - email: info@rosscolor.it - Web: www.rosscolor.it

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VAT No: IT 02788590129
REA: VA288554 – **Reg. Imp.:** 02788590129

21 Inspector

Ross Color has Internal Inspector, Mr. Edoardo Parotti Frosio Inspector Level II No 9580

GRUPPO ISPAC ISPETTORI ANTICORROSIONE

CERTIFICATE
Norwegian Standard NS 476
Inspector level II
Given name - Family name: Edoardo Parotti
Certificate no: 9580
Date of birth: 18 APR 1988
Valid from: 07 APR 2017
Date of expiry: 12 APR 2021
FROSIO
FROSIO The Norwegian Professional Council for Education and Certification of Inspectors for Surface Treatment

Spettabile
Parotti Edoardo
Ross color SRL
Via redipuglia25
21055 Gorla Minore (VA)

Muggiò (MB), Italy, May 19th 2016

Hello FROSIO certified Inspector!

Enclosed you will find your NS 476 certificate no. 9580 level II (green card) and we wish to be the first to say

CONGRATULATIONS!!!

We hope you will be proud of your FROSIO certificate, which is symbol of a high and professional level as inspector within corrosion protection and paints. We do hope it will be of great value in your work and that you will try to maintain the high standard associated with FROSIO and NS 476 inspectors.

Remember; - It is not an inspector's first duty to stop the work, but to secure that the defined quality is achieved. You should always try to be objective, creative and diplomatic in your work.

Certificate level II (green card) is valid for 5 years from the date of issue. It is your responsibility to upgrade when NS 476 condition are meet or renew it in due time (ref. NS 476). Please send the Gruppo IspAC secretary (e-mail segreteria@gruppoispac.org) documentation that the requirements in NS 476 are met; A minimum of two years experience as inspector during the 5 years certificate period.

If you pass the date of expiry without renewing your certificate, you have to go through and pass a new examination.

The approval may be withdrawn should Gruppo IspAC or FROSIO receive documented proof of negligence by an inspector

Gruppo IspAC provide also for your personal Frosio-Gruppo IspAC stamp to be used every time you need. The correct card , green, will follow shortly instead of the white one here transmitted

Roberto Baldocchi
Secretary Gruppo IspAC Ispettori Anticorrosione

Gruppo IspAC
Ispettori AntiCorrosione
Via G. Saragat, 1
20835 MUGGIÒ (MB-Italy)
C.F./Part. IVA 025378801

Gruppo Ispac c/o Studio Merati - Via G. Saragat, 1 - 20853 MUGGIO' (MB)
Telefono +39-366-1542695 - Fax +39-039-794122
C.F. e P.IVA 02567880162

CERTIFICATE
Norwegian Standard NS 476
Inspector level II
Given name - Family name: Edoardo Parotti
Certificate no: 9580
Date of birth: 18 APR 1988
Valid from: 07 APR 2017
Date of expiry: 12 APR 2021
FROSIO
FROSIO The Norwegian Professional Council for Education and Certification of Inspectors for Surface Treatment

GUIDELINES - RULES

The holder of this NS476 certificate has successfully passed the FROSIO examination.
The holder has documented sufficient relevant experience and inspection experience in accordance with the requirements given in NS 476.
The certificate is personal and cannot be transferred to others.
The certificate shall be shown upon request.
FROSIO reserves the right to withdraw the certificate if misused or falsified, e.g.
- Altering the scope of the certificate by copying and falsification
- Altering the validity date or name of the certificate
- Lending the certificate to others

The approval of certification can be withdrawn if FROSIO receives complaints on your work as an inspector.

FROSIO BOARD

www.frosio.no

FROSIO
P.O. Box 7176 Majorstuen
0307 Oslo
Norway

FROSIO Secretariat Manager
Ole Steen

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REA: VA288554 – **Reg. Imp.:** 02788590129

22 Documentation - ANNEX A: ISO CERTIFICATES

THE INTERNATIONAL CERTIFICATION NETWORK

CERTIFICATE

IQNet and its partner
CISQ/CERTIQUALITY S.r.l.

ROSS COLOR SRL

IT - 21055 MARNATE (VA) - VIA ITALIA 121
has implemented and maintains a
Quality Management System
which fulfills the requirements of the following standard
ISO 9001:2015
for the following activities Code IAF 17
Sandblasting, painting, metallization and packaging of handmade metal items.

in the following operative units
IT - 21055 GORLA MINORE (VA) - VIA RE DI PUGLIA 178/180

Issued on: 2017-03-23
Certified since: 2014-03-25
Expire on: 2020-03-22
Registration number: IT-78348

Michael Drechsel
President of IQNET

Ing. Claudio Provetti
President of CISQ

IQNet Partners**:
AENOR Spain AFNOR Certification France Vinçotte Belgium APCER Portugal CCC Cyprus
CISQ Italy CQC China CQM China CQS Czech Republic Cro Cert Croatia DQS Holding GmbH Germany
FCAV Brazil FONDONORMA Venezuela ICONTEC Colombia IMNC Mexico Inspecta Certification Finland INTECO Costa Rica
IRAM Argentina JQA Japan KFQ Korea MIRTEC Greece MSZT Hungary Nemko AS Norway NSAI Ireland PCBC Poland
Quality Austria Austria RR Russia SIGE México SII Israel SIQ Slovenia SIRIM QAS International Malaysia
SQS Switzerland SRAC Romania TEST St Petersburg Russia TSE Turkey YUQS Serbia
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* This attestation is directly linked to the IQNet Partner's original certificate and shall not be used as a stand-alone document
** The list of IQNet partners is valid at the time of issue of this certificate. Updated information is available under www.iqnet-certification.com

CERTIQUALITY

CISQ is a member of IQNet
www.iqnet-certification.com

CERTIFICATO n. 20611
CERTIFICATE No

SI CERTIFICA CHE L'ORGANIZZAZIONE
WE HEREBY CERTIFY THAT THE ORGANIZATION

ROSS COLOR SRL

IT - 21055 MARNATE (VA) - VIA ITALIA 121

NELLE SEGUENTI UNITA' OPERATIVE / IN THE FOLLOWING OPERATIVE UNITS
IT - 21055 GORLA MINORE (VA) - VIA RE DI PUGLIA 178/180

HA ATTUATO E MANTIENE UN SISTEMA DI GESTIONE QUALITA' CHE E' CONFORME ALLA NORMA
HAS IMPLEMENTED AND MAINTAINS A QUALITY MANAGEMENT SYSTEM WHICH COMPLIES WITH THE FOLLOWING STANDARD
UNI EN ISO 9001:2015

PER LE SEGUENTI ATTIVITA' / FOR THE FOLLOWING ACTIVITIES SETTORE CODE IAF 17

Sabbiatura, verniciatura, metallizzazione e imballaggio di manufatti metallici e caricamento container.
Sandblasting, painting, metallization and packaging of handmade metal items.

RIFERIRSI AL MANUALE DI GESTIONE QUALITA' PER L'APPLICABILITA' DEI REQUISITI DELLA NORMA
REFER TO MANAGEMENT SYSTEM MANUAL FOR DETAILS OF APPLICATION TO STANDARD REQUIREMENTS

IL PRESENTE CERTIFICATO E' SOGGETTO AL RISPETTO DEL REGOLAMENTO PER LA CERTIFICAZIONE DEI SISTEMI DI GESTIONE
THE USE AND THE VALIDITY OF THE CERTIFICATE SHALL SATISFY THE REQUIREMENTS OF THE RULES FOR THE CERTIFICATION OF MANAGEMENT SYSTEMS

PRIMA EMISSIONE / FIRST ISSUE 25/03/2014
EMISSIONE CORRENTE / CURRENT ISSUE 23/03/2017
DATA SCADENZA / EXPIRY DATE 22/03/2020

CERTIQUALITY S.r.l. - IL PRESIDENTE
Via G. Giardino 4 - 20123 MILANO (MI) - ITALY

ACCREDIA
Membro degli Accordi di Mutuo Riconoscimento EA, IAF e ILAC
Signatory of EA, IAF and ILAC Mutual Recognition Agreements

FEDERAZIONE CISQ
www.cisq.com
CISQ è la Federazione Italiana di Organismi di Certificazione dei sistemi di gestione aziendale.
CISQ is the Italian Federation of management system Certification Bodies.

CERT ED 009 010616

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REA: VA288554 – **Reg. Imp.:** 02788590129

CERTIQUALITY

CISQ is a member of IQNet
THE INTERNATIONAL CERTIFICATION NETWORK
www.iqnet-certification.com

IQNet, the association of the world's first class certification bodies, is the largest provider of management System Certification in the world. IQNet is composed of more than 30 bodies and counts over 150 subsidiaries all over the globe.

CERTIFICATO n. / *CERTIFICATE No* **22162**

SI CERTIFICA CHE L'ORGANIZZAZIONE
WE HEREBY CERTIFY THAT THE ORGANIZATION

ROSS COLOR SRL

For information concerning the validity of the certificate, you can visit the site www.certiquality.it

The validity this certificate depends on annual audit and on a complete review every three years of the Management System.

IT - 21055 MARNATE (VA) - VIA ITALIA 121

NEI SEGUENTI SITI / *IN THE FOLLOWING SITES*
IT - 21055 GORLA MINORE (VA) - VIA AMBROGIO COLOMBO 130
IT - 21055 GORLA MINORE (VA) - VIA RE DI PUGLIA 178/180

HA ATTUATO E MANTIENE UN SISTEMA DI GESTIONE AMBIENTE CHE E' CONFORME ALLA NORMA
HAS IMPLEMENTED AND MAINTAINS A ENVIRONMENT MANAGEMENT SYSTEM WHICH COMPLIES WITH THE FOLLOWING STANDARD

UNI EN ISO 14001:2015

PER LE SEGUENTI ATTIVITA' / *FOR THE FOLLOWING ACTIVITIES* SETTORE CODE **IAF 17**

Sabbiatura, verniciatura (di tipo: epossidica, inorganica, puliuretanica, acrilica, siliconica e fenolica), metallizzazione ed imballaggio di manufatti metallici.

Blasting, painting (types: epoxy paint, inorganic paint, polyurethane paint, acrylic paint, silicone and phenolic paint), thermal spray application and packing of metallic supports.

Certificazione rilasciata in conformità al Regolamento Tecnico ACCREDIA RT 09

IL PRESENTE CERTIFICATO E' SOGGETTO AL RISPETTO DEL REGOLAMENTO PER LA CERTIFICAZIONE DEI SISTEMI DI GESTIONE
THE USE AND THE VALIDITY OF THE CERTIFICATE SHALL SATISFY THE REQUIREMENTS OF THE RULES FOR THE CERTIFICATION OF MANAGEMENT SYSTEMS

PRIMA EMISSIONE *FIRST ISSUE*	12/05/2015
DATA DELIBERA *DECISION DATE*	08/05/2018
DATA SCADENZA *EXPIRY DATE*	10/05/2021
EMISSIONE CORRENTE *ISSUE DATE*	08/05/2018

CERTIQUALITY S.r.l. - IL PRESIDENTE
Via G. Giardino 4 - 20123 MILANO (MI) - ITALY

ACCREDIA
L'ENTE ITALIANO DI ACCREDITAMENTO
Membro degli Accordi di Mutuo Riconoscimento EA, IAF e ILAC
Signatory of EA, IAF and ILAC Mutual Recognition Agreements

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CISQ è la Federazione Italiana di Organismi di Certificazione dei sistemi di gestione aziendale.
CISQ is the Italian Federation of management system Certification Bodies.

CO1 ED.03 010616

IQNet®
THE INTERNATIONAL CERTIFICATION NETWORK

CERTIFICATE

CISQ/CERTIQUALITY S.r.l.
has issued an IQNet recognised certificate that the organization:

ROSS COLOR SRL

IT - 21055 MARNATE (VA) - VIA ITALIA 121
for the following scope
Blasting, painting (types: epoxy paint, inorganic paint, polyurethane paint, acrylic paint, silicone and phenolic paint), thermal spray application and packing of metallic supports.

has implemented and maintains a
Environmental Management System
which fulfills the requirements of the following standard
ISO 14001:2015

Issued on: **2018-05-08**
First issued on: **2015-05-12**
Expires on: **2021-05-10**
This attestation is directly linked to the IQNet Partner's original certificate and shall not be used as a stand-alone document
Registration number: **IT-99774**

IQNet — *Alex Stoichitoiu, President of IQNET*
CISQ — *Ing. Claudio Provetti, President of CISQ*

IQNet Partners*:
AENOR *Spain* AFNOR Certification *France* APCER *Portugal* CCC *Cyprus* CISQ *Italy* CQC *China* CQM *China* CQS *Czech Republic* Cro Cert *Croatia* DQS Holding GmbH *Germany* FCAV *Brazil* FONDONORMA *Venezuela* ICONTEC *Colombia* Inspecta Sertifiointi Oy *Finland* INTECO *Costa Rica* IRAM *Argentina* JQA *Japan* KFQ *Korea* MIRTEC *Greece* MSZT *Hungary* Nemko AS *Norway* NSAI *Ireland* NYCE-SIGE *México* PCBC *Poland* Quality Austria *Austria* RR *Russia* SII *Israel* SIQ *Slovenia* SIRIM QAS International *Malaysia* SQS *Switzerland* SRAC *Romania* TEST St Petersburg *Russia* TSE Turkey YUQS *Serbia*
IQNet is represented in the USA by: AFNOR Certification, CISQ, DQS Holding GmbH and NSAI Inc.

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REA: VA288554 – **Reg. Imp.:** 02788590129

23 ANNEX B: OPERATOR'S QUALIFICATION

EVALUATION

This is to certify that Mr.
Angelo Lorusso
Has been evaluated according to N.A.C.E. "Guide to qualification of tradesman industrial maintenance painters"
Blaster
Tester : NACE inspector: *Mr Giacomo Mazzoleni*
NACE certified coating inspector Level III No. 18715
Place: *Ross Color* facilities located in *Gorla Minore* (VA) Italy
Date: 07 Jan 2019
Tester Signature — Ross Color QA Manager Signature

EVALUATION

This is to certify that Mr.
Idrissa Bera
Has been evaluated according to N.A.C.E. "Guide to qualification of tradesman industrial maintenance painters"
Blaster
Tester : NACE inspector: *Mr Giacomo Mazzoleni*
NACE certified coating inspector Level III No. 18715
Place: *Ross Color* facilities located in *Gorla Minore* (VA) Italy
Date: 07 Jan 2019
Tester Signature — Ross Color QA Manager Signature

EVALUATION

This is to certify that Mr.
Moussa Zoumbare
Has been evaluated according to N.A.C.E. "Guide to qualification of tradesman industrial maintenance painters"
Blaster
Tester : NACE inspector: *Mr Giacomo Mazzoleni*
NACE certified coating inspector Level III No. 18715
Place: *Ross Color* facilities located in *Gorla Minore* (VA) Italy
Date: 07 Jan 2019
Tester Signature — Ross Color QA Manager Signature

EVALUATION

This is to certify that Mr.
Giacomo Vilardo
Has been evaluated according to N.A.C.E. "Guide to qualification of tradesman industrial maintenance painters"
Painter
Tester : NACE inspector: *Mr Giacomo Mazzoleni*
NACE certified coating inspector Level III No. 18715
Place: *Ross Color* facilities located in *Gorla Minore* (VA) Italy
Date: 07 Jan 2019
Tester Signature — Ross Color QA Manager Signature

EVALUATION

This is to certify that Mr.
Sergiu Cebotari
Has been evaluated according to N.A.C.E. "Guide to qualification of tradesman industrial maintenance painters"
Painter
Tester : NACE inspector: *Mr Giacomo Mazzoleni*
NACE certified coating inspector Level III No. 18715
Place: *Ross Color* facilities located in *Gorla Minore* (VA) Italy
Date: 07 Jan 2019
Tester Signature — Ross Color QA Manager Signature

EVALUATION

This is to certify that Mr.
Mihail Cebotari
Has been evaluated according to N.A.C.E. "Guide to qualification of tradesman industrial maintenance painters"
Painter
Tester : NACE inspector: *Mr Giacomo Mazzoleni*
NACE certified coating inspector Level III No. 18715
Place: *Ross Color* facilities located in *Gorla Minore* (VA) Italy
Date: 07 Jan 2019
Tester Signature — Ross Color QA Manager Signature

EVALUATION

This is to certify that Mr.
Junior Joabe Candido Da Silva
Has been evaluated according to N.A.C.E. "Guide to qualification of tradesman industrial maintenance painters"
Painter
Tester : NACE inspector: *Mr Giacomo Mazzoleni*
NACE certified coating inspector Level III No. 18715
Place: *Ross Color* facilities located in *Gorla Minore* (VA) Italy
Date: 07 Jan 2019
Tester Signature — Ross Color QA Manager Signature

EVALUATION

This is to certify that Mr.
Francesco Terame
Has been evaluated according to ISO 14918 as
Metallizer (TSA applicator)
Tester : NACE inspector: *Mr Giacomo Mazzoleni*
NACE certified coating inspector Level III No. 18715
Place: *Ross Color* facilities located in *Gorla Minore* (VA) Italy
Date: 07 January 2019
Tester Signature — Ross Color QA Manager Signature

EVALUATION

This is to certify that Mr.
Giacomo Vilardo
Has been evaluated according to ISO 14918 as
Metallizer (TSA applicator)
Tester : NACE inspector: *Mr Giacomo Mazzoleni*
NACE certified coating inspector Level III No. 18715
Place: *Ross Color* facilities located in *Gorla Minore* (VA) Italy
Date: 07 January 2019
Tester Signature — Ross Color QA Manager Signature

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REA: VA288554 – **Reg. Imp.:** 02788590129

24 ANNEX C: MATERIAL DATA SHEET

W Abrasives®

SCHEDA TECNICA PRODOTTO

Ref : GP018

Versione : 6 **Data :** 6/11/2015 **Pagina :** 1

PRODOTTO : W GP018

FORMA GENERALE : GRIT

SETACCI

SETACCI SPECIFICAZIONI No	SETACCI SPECIFICAZIONI Apuerta (mm)	SPECIFICAZIONI % rifiuto accumulato Min	SPECIFICAZIONI % rifiuto accumulato Max
12	1,700		TP
14	1,400		30
16	1,180		
18	1,000	85	
20	0,850	97	
25	0,710		
30	0,600		
35	0,500		

DENSITA (g/cm3)

	Min	Max
SPECIFICAZIONI	7,60	-
BULK		

MICROSTRUTTURA

MARTENSITE
FINE AND HOMOGENEOUS

COMPOSIZIONE CHIMICA

ELEMENTO	TENORE (%) Min	TENORE (%) Max
C	0,800	1,200
Si	0,400	1,200
Mn	0,600	1,200
S		0,050
P		0,040

DUREZZA

UNITA	HV1	HRC
Min	480,0	47,7
Max	550,0	52,4
DEVIAZIONE		

COEFFICIENTE DI FORMA

METODO	N/A not Applied
% MIN buona forma	

Accertato da : RQ

PHILIPPE SERT - WA

Approvato da : CV

SERGIO RUEDA

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REA: VA288554 – **Reg. Imp.:** 02788590129

Product Data
HEMPADUR 15570

HEMPEL

15570: BASE 15579: CURING AGENT 95570

Description:	HEMPADUR 15570 is a two component, polyamide-adduct cured epoxy paint, which cures to a strong and highly corrosion resistant coating, at temperatures down to -10°C/14°F. The Micaceous Iron Oxide pigmented reddish grey 12430 shade is also well suited for application under humid conditions, on damp steel surfaces, and may be applied on moist surfaces. The greyish yellow 21780 and the grey 11320 shades contains zinc phosphate.
Recommended use:	As a maintenance and repair primer, intermediate, and/or finishing coat in HEMPADUR systems in severely corrosive environment. As a finishing coat where a cosmetic appearance is of less importance. As a low temperature curing epoxy primer, intermediate, and/or finishing coat in paint systems according to specification. Well suited as a (blast) primer in epoxy systems. Mist coat on GALVOSIL.
Service temperature:	Maximum, dry exposure only: 140°C/284°F Ballast water service. Resists normal ambient temperatures at sea (Avoid long-term exposure to negative temperature gradients). Other liquids: Contact HEMPEL
Certificates/Approvals:	Complies with European Fire Standard EN 13501-1; classification B-s1, d0. Approved as a low flame spread material when used as part of a predefined paint system. Please refer to "Declaration of Conformity" on www.Hempel.com for further details. Complies with EU Directive 2004/42/EC:subcategory j. (see REMARKS overleaf)
Availability:	Part of Group Assortment. Local availability subject to confirmation.

PHYSICAL CONSTANTS:

Shade nos/Colours:	12430 (MIO)* / Reddish grey
Finish:	Flat
Volume solids, %:	54 ± 1
Theoretical spreading rate:	5.4 m^2/l [216.5 sq.ft./US gallon] - 100 micron/4 mils
Flash point:	25 °C [77 °F]
Specific gravity:	1.4 kg/litre [11.6 lbs/US gallon]
Surface-dry:	1 hour(s) 20°C/68°F
Through-dry:	5 hour(s) 20°C/68°F
Fully cured:	7 day(s) 20°C/68°F
VOC content:	415 g/l [3.4 lbs/US gallon]
Shelf life:	3 years for BASE and 3 years (25°C/77°F) for CURING AGENT from time of production. **other shades according to assortment list.*

The physical constants stated are nominal data according to the HEMPEL Group's approved formulas.

APPLICATION DETAILS:

Version, mixed product:	**15570**
Mixing ratio:	BASE 15579: CURING AGENT 95570 3 : 1 by volume
Application method:	Airless spray / Air spray / Brush
Thinner (max.vol.):	08450 (5%) / 08450 (15%) / 08450 (5%)
Pot life:	2 hour(s) 20°C/68°F
Nozzle orifice:	0.019 - 0.021 "
Nozzle pressure:	175 bar [2537.5 psi] (Airless spray data are indicative and subject to adjustment)
Cleaning of tools:	HEMPEL'S TOOL CLEANER 99610
Indicated film thickness, dry:	100 micron [4 mils] see REMARKS overleaf
Indicated film thickness, wet:	200 micron [8 mils]
Overcoat interval, min:	see REMARKS overleaf
Overcoat interval, max:	see REMARKS overleaf

Safety: Handle with care. Before and during use, observe all safety labels on packaging and paint containers, consult HEMPEL Safety Data Sheets and follow all local or national safety regulations.

Date of issue: November 2018 Page: 1/3

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REA: VA288554 – **Reg. Imp.:** 02788590129

Product Data
HEMPADUR 15570

HEMPEL

SURFACE PREPARATION:

New steel: Abrasive blasting to Sa 2½ (ISO 8501-1:2007). For temporary protection, if required, use a suitable shopprimer. All damage of shopprimer and contamination from storage and fabrication should be thoroughly cleaned prior to final painting. For repair and touch-up use: HEMPADUR
Other metals and light alloys: Thorough degreasing and (light) abrasive sweeping to remove contamination and to secure adhesion - surface profile depending on later exposure.
Stainless steel: (eg. ballast tanks of chemical carriers) to be abrasive blast cleaned to a uniform, sharp, dense profile (Rugotest No. 3, BN9a, ISO Comparator Medium (G), Keane-Tator Comparator 2. 0 G/S) corresponding to Rz minimum 50 micron. Any salts, grease, oil, etc. to be removed before abrasive blasting is commenced.
Maintenance: Remove oil and grease etc. thoroughly with suitable detergent. Remove salts and other contaminants by high pressure fresh water cleaning. Clean damaged areas thoroughly by power tool cleaning to St 3 (ISO 8501-1:2007) (minor areas) or by abrasive blasting to min. Sa 2, preferably to Sa 2½ (ISO 8501-1:2007). Improved surface preparation will improve the performance of the product.
As an alternative to dry cleaning, water jetting to sound, well adhering coat and/or to steel. Intact coat must appear with roughened surface after the water jetting. By water jetting to steel, cleanliness shall be: Wa 2 -Wa 2½ (atmospheric exposure) / minimum Wa 2½ (immersion) (ISO 8501-4:2006).
Acceptable flash-rust degree before application: maximum M (atmospheric exposure) / M, preferably L (immersion) (ISO 8501-4:2006). Feather edges to sound and intact areas. Dust off residues. Touch up bare spots to full film thickness. This should be done when the painted surface has reached the condition of being damp, possibly moist. In case of wet abrasive blasting a suitable inhibitor may be used. Surplus inhibitor and residual abrasives and sludge must be removed by (high pressure) fresh water cleaning before recoating. Cleaning with hot water is recommended.
Note 1: Inhibitors are generally not recommended for surfaces which will be immersed during service.
Note 2: Damp surfaces: water is not readily detectable, but the temperature of the surface is below the dew point. **Moist surfaces:** pools of water and droplets have been removed, but there is a noticeable film of water. **Wet surface:** droplets or pools of water are present.

APPLICATION CONDITIONS:

Use only where application and curing can proceed at temperatures above: -10°C/14°F.
At the freezing point and below be aware of the risk of ice on the surface, which will hinder adhesion.
The temperature of paint itself should be 15°C/59°F or above.
In confined spaces provide adequate ventilation during application and drying.
Occurrence of standing water or droplets on the painted surface immediately after application may result in discolouration.

PRECEDING COAT: None, or as per specification.

SUBSEQUENT COAT: None, or as per specification. Recommended systems are: HEMPADUR, HEMPATHANE, HEMPATEX

REMARKS:

VOC - EU Directive 2004/42/EC:

Product	As supplied	15 vol. % thinning	Limit phase II, 2010
1557012430	415 g/l	481 g/l	500 g/l

For VOC of other shades, please refer to Safety Data Sheet.

Weathering/service temperatures: The natural tendency of epoxy coatings to chalk in outdoor exposure and to become more sensitive to mechanical damage and chemical exposure at elevated temperatures is also reflected in this product.

Film thicknesses/thinning: May be specified in another film thickness than indicated depending on purpose and area of use. This will alter spreading rate and may influence drying time and overcoating interval. Normal range dry is: 50-125 micron/2-5 mils

Overcoating: Overcoating intervals related to later conditions of exposure: If the maximum overcoating interval is exceeded, roughening of the surface is necessary to ensure intercoat adhesion.
Before overcoating after exposure in contaminated environment, clean the surface thoroughly with high pressure fresh water hosing and allow drying.

A specification supersedes any guideline overcoat intervals indicated in the table.

Environment	Atmospheric, medium					
Surface temperature:	-10°C (14°F)		0°C (32°F)		20°C (68°F)	
	Min	Max	Min	Max	Min	Max
HEMPADUR	36 h	Ext.	18 h	Ext.	4 h	Ext.
HEMPATEX	18 h	3 d	9 h	36 h	2 h	8 h
HEMPATHANE	36 h	90 d	18 h	45 d	4 h	10 d
Environment	Immersion					
HEMPADUR	3 d	Ext.	1½ d	Ext.	8 h	Ext.

NR = Not Recommended, Ext. = Extended, m = minute(s), h = hour(s), d = day(s)

Note: **HEMPADUR 15570 For professional use only.**

ISSUED BY: HEMPEL A/S 1557012430

Date of issue: November 2018 Page: 2/3

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VAT No: IT 02788590129
REA: VA288554 – **Reg. Imp.:** 02788590129

Product Data
HEMPADUR 15570

HEMPEL

This Product Data Sheet supersedes those previously issued.
For explanations, definitions and scope, see "Explanatory Notes" available on www.hempel.com. Data, specifications, directions and recommendations given in this data sheet represent only test results or experience obtained under controlled or specially defined circumstances. Their accuracy, completeness or appropriateness under the actual conditions of any intended use of the Products herein must be determined exclusively by the Buyer and/or User.
The Products are supplied and all technical assistance is given subject to HEMPEL's GENERAL CONDITIONS OF SALES, DELIVERY AND SERVICE, unless otherwise expressly agreed in writing. The Manufacturer and Seller disclaim, and Buyer and/or User waive all claims involving, any liability, including but not limited to negligence, except as expressed in said GENERAL CONDITIONS for all results, injury or direct or consequential losses or damages arising from the use of the Products as recommended above, on the overleaf or otherwise.
Product data are subject to change without notice and become void five years from the date of issue.

Date of issue: November 2018 Page: 3/3

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REA: VA288554 – **Reg. Imp.:** 02788590129

Product Data
HEMPADUR MASTIC 45880

45880: BASE 45889: CURING AGENT 95880

Description:	HEMPADUR MASTIC 45880 is a two-component polyamide adduct cured, high solids, high build epoxy paint. It forms a hard and tough coating, has good wetting properties and low temperature curing.
Recommended use:	As a selfprimed, surface tolerant paint system or as an intermediate or finishing coat in heavy duty paint systems where low VOC and high film build are required. For immersed areas HEMPADUR MASTIC 45880 is only recommended for minor repairs as primer, and full applications as intermediate or topcoat. Can be specified where extended recoating properties for polyurethane topcoats are requested (typically travel coating). May be used directly on cured zinc silicate (GALVOSIL products) or spray-metallized surfaces to minimize popping. Shade 18600 can be used in paint systems complying with European ATEX Regulation EN 13463-1: 2001, please consult Hempel for specification advice. Please also note that Shade 18600 will have a lower gloss than usual for other shades.
Service temperature:	Maximum, dry exposure only: 120°C/248°F.
Certificates/Approvals:	In accordance with Aramco's specification APCS 1, APCS 12, APCS 26 and 26T. Tested according to section 175.300 of the Code of Federal Regulations Title 21 - Dry Foodstuff. Consult Hempel for details. Complies with European Fire Standard EN 13501-1; classification B-s1, d0. Tested for non-contamination of grain cargo at the Newcastle Occupational Health & Hygiene, Great Britain. Approved as a low flame spread material when used as part of a predefined paint system. Please refer to "Declaration of Conformity" on www.Hempel.com for further details. Complies with EU Directive 2004/42/EC: subcategory j.
Availability:	Part of Group Assortment. Local availability subject to confirmation.

PHYSICAL CONSTANTS:

Shade nos/Colours:	12170* / Grey. (see REMARKS overleaf)
Finish:	Semi-gloss
Volume solids, %:	80 ± 1
Theoretical spreading rate:	6.4 m^2/l [256.6 sq.ft./US gallon] - 125 micron/5 mils
Flash point:	25 °C [77 °F]
Specific gravity:	1.5 kg/litre [12.1 lbs/US gallon]
Dry to touch:	3 hour(s) 20°C/68°F
Fully cured:	14 day(s) 10°C/50°F
VOC content:	216 g/l [1.8 lbs/US gallon]
Shelf life:	3 years for BASE and 3 years (25°C/77°F) for CURING AGENT from time of production.

**Wide range of colours available via Hempel's MULTI-TINT system.*

The physical constants stated are nominal data according to the HEMPEL Group's approved formulas.

APPLICATION DETAILS:

Version, mixed product:	**45880**
Mixing ratio:	BASE 45889: CURING AGENT 95880 3 :1 by volume
Application method:	Airless spray / Brush
Thinner (max.vol.):	< 5% HEMPEL'S THINNER 08450, depending on purpose (see REMARKS overleaf)
Pot life (Airless spray):	1 hour 20°C/68°F
Pot life (Brush):	2 hour(s) 20°C/68°F
Nozzle orifice:	0.017 - 0.023 " (According to separate APPLICATION INSTRUCTIONS)
Nozzle pressure:	250 bar [3625 psi]
Cleaning of tools:	HEMPEL'S TOOL CLEANER 99610
Indicated film thickness, dry:	125 micron [5 mils] (see REMARKS overleaf)
Indicated film thickness, wet:	150 micron [6 mils]
Overcoat interval, min:	see REMARKS overleaf
Overcoat interval, max:	see REMARKS overleaf

Safety: Handle with care. Before and during use, observe all safety labels on packaging and paint containers, consult HEMPEL Safety Data Sheets and follow all local or national safety regulations.

Date of issue: September 2018 Page: 1/3

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REA: VA288554 – **Reg. Imp.:** 02788590129

Product Data
HEMPADUR MASTIC 45880

HEMPEL

SURFACE PREPARATION:

New steel: Abrasive blasting to minimum Sa 2½ (ISO 8501-1:2007) with a surface profile corresponding to Rugotest No. 3, N9a to N10, preferably BN9a to BN10, Keane-Tator Comparator, 2.0 G/S or ISO Comparator, Medium (G).

Zinc silicate painted or spray-metallized surfaces: Remove oil and grease, etc. with suitable detergent. Remove salt and other contaminants by (high pressure) fresh water cleaning. Zinc salts (white rust) must be removed by high pressure hosing combined with rubbing with a stiff nylon brush if necessary. It is recommended to recoat spray-metallized surfaces as soon as possible to avoid possible contamination.

Concrete: Remove slip agent and other possible contaminants by emulsion washing followed by high pressure hosing with fresh water. Remove scum layer and loose matter to a hard, rough and uniform surface, preferably by abrasive blasting, possibly by other mechanical treatment or acid etching. Seal surface with suitable sealer, as per relevant painting specification.

Repair and maintenance: Remove oil and grease etc. thoroughly with suitable detergent. Remove salts and other contaminants by high pressure fresh water cleaning. Clean damaged areas thoroughly by power tool cleaning to minimum St 2 (spot-repairs) or by abrasive blasting to min. Sa 2, preferably to Sa 2½ (ISO 8501-1:1988). Improved surface preparation will improve the performance of the product. As an alternative to dry cleaning, water jetting to sound, well adhering coat and/or to steel. Intact coat must appear with roughened surface after the water jetting. By water jetting to steel, cleanliness shall be: Wa 2 -Wa 2½ (atmospheric exposure) / minimum Wa 2½ (immersion) (ISO 8501-4:2006). Acceptable flash-rust degree before application: maximum M (atmospheric exposure) / M, preferably L (immersion) (ISO 8501-4:2006).

Feather edges to sound and intact areas. Dust off residues. Touch up to full film thickness. On pit-corroded surfaces, excessive amounts of salt residues may call for high pressure water jetting, wet abrasive blasting or, alternatively, dry abrasive blasting, high pressure fresh water hosting, drying, and finally dry abrasive blasting again.

APPLICATION CONDITIONS:

Apply only on a dry and clean surface with a temperature above the dew point to avoid condensation. Use only where application and curing can proceed at temperatures above: - 5°/23°F, preferably above 0°C/32°F. The temperature of paint itself should be 15°C/59°F or above. In confined spaces provide adequate ventilation during application and drying.

PRECEDING COAT:

None, or as per specification.

SUBSEQUENT COAT:

None, or as per specification.

REMARKS:

VOC - EU Directive 2004/42/EC:

Product	As supplied	5 vol. % thinning	Limit phase II, 2010
4588012170	216 g/l	248 g/l	500 g/l

For VOC of other shades, please refer to Safety Data Sheet.

Weathering/service temperatures:

The natural tendency of epoxy coatings to chalk in outdoor exposure and to become more sensitive to mechanical damage and chemical exposure at elevated temperatures is also reflected in this product.

Application(s):

Application onto zinc silicate or spray-metallized surfaces (thinning): It is recommended to apply the paint by using a "mist-coat" procedure **provided** the paint temperature is approximately above: 20°C/68°F. A thin, undiluted coat is applied (the mist coat) and after a few minutes, a second coat is applied in the full specified film thickness If the paint temperature is below: 20°C/68°F, thinning (max 15%) may be required.

Film thicknesses/thinning:

May be specified in another film thickness than indicated depending on purpose and area of use. This will alter spreading rate and may influence drying time and overcoating interval. Normal range dry is: 100-200 micron/4-8 mils. May be specified in lower film thickness for which purpose additional thinning is required, please see separate APPLICATION INSTRUCTIONS. **Avoid application of excessive film thicknesses.**

Shades:

The product is also available in a Micaceous Iron Oxide (MIO) pigmented shade (Shade no. 12430 – reddish grey).

This product is available in several aluminium pigmented shades with different volume solids content.

Overcoating:

Overcoating intervals related to later conditions of exposure: If the maximum overcoating interval is exceeded, roughening of the surface is necessary to ensure intercoat adhesion.

Before overcoating after exposure in contaminated environment, clean the surface thoroughly with high pressure fresh water hosing and allow drying.

A specification supersedes any guideline overcoat intervals indicated in the table.

Environment	Atmospheric, medium					
Surface temperature:	0°C (32°F)		10°C (50°F)		20°C (68°F)	
	Min	Max	Min	Max	Min	Max
HEMPADUR	54 h	Ext.	18 h	Ext.	6 h	Ext.
HEMPATEX	54 h	4.5 d	18 h	36 h	6 h	12 h
HEMPATHANE	54 h	Ext.	18 h	Ext.	6 h	Ext.
Environment	Immersion					
HEMPADUR	4.5 d	90 d	36 h	90 d	12 h	30 d

NR = Not Recommended, Ext. = Extended, m = minute(s), h = hour(s), d = day(s)

Overcoating intervals:

A specification supersedes any guideline overcoat intervals indicated in the table.

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Product Data
HEMPADUR MASTIC 45880

HEMPEL

Note:	**HEMPADUR MASTIC 45880 For professional use only.**	
ISSUED BY:	HEMPEL A/S	4588012170

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