

GENERAL SPECIFICATION

CORROSION

GS EP COR 450

**External protection of structures and equipment
by painting
Maintenance works**

11	11/2016	Update of Qualified Paint Supplier
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09	09/2013	Possibility to use abrasive metallic
08	01/2012	General review - Paint system review
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1. Scope

This General Specification defines the technical requirements for the execution of maintenance coating operations for the external protection of structures and equipment ([GS EP COR 350](#), [GS EP COR 351](#) and [GS EP COR 354](#)).

This specification does not cover painting systems for temporary works with requested durability less than two (2) years, for which alternative painting systems and surface preparation shall be submitted to Company for approval.

2. Reference documents

The reference documents listed below form an integral part of this General Specification.

External Documents

Unless otherwise stipulated, the applicable version of these documents, including relevant appendices and addendums, is the latest revision published at the effective date of this document.

Reference	Title
40 CFR 261.24	Electronic Code of Federal Regulations - 40 CFR - Part 261, Subpart C - Characteristics of Hazardous Waste, Toxicity characteristic
API Bull 91	Planning and Conducting Surface Preparation and Coating Operations for Oil and Natural Gas Drilling and Production Facilities in a Marine Environment (June 2007)
ASTM A380	Standard Practice for Cleaning, Descaling, and Passivation of Stainless Steel -Parts, Equipment, and Systems
ASTM D4285	Standard Test Method for Indicating Oil or Water in Compressed Air
ASTM D4752	Standard Practice for Measuring MEK Resistance of Ethyl Silicate (Inorganic) Zinc-Rich Primers by Solvent Rub
ASTM D4940	Standard Test Method for Conductimetric Analysis of Water Soluble Ionic Contamination of Blast Cleaning Abrasives
ASTM D5162	Standard Practice for Discontinuity (Holiday) Testing of Nonconductive Protective Coating on Metallic Substrates
Decision 2000/532/CE	Commission Decision of 3 May 2000 replacing Decision 94/3/EC establishing a list of wastes pursuant to Article 1(a) of Council Directive 75/442/EEC on waste and Council Decision 94/904/EC establishing a list of hazardous waste pursuant to Article 1(4) of Council Directive 91/689/EEC on hazardous waste
Decision 2003/33/CE	Council Decision of 19 December 2002 establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 and Annex II to Directive 1999/31/EC

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Reference	Title
EN 12457-2	Characterization of waste - Leaching; Compliance test for leaching of granular waste materials and sludges - Part 2: One stage batch test at a liquid to solid ratio of 10 l/kg for material with particle size below 4 mm (without or with size reduction)
ISO 12944 (Parts 4; 8)	Paints and varnishes. Corrosion protection of steel structures by protective paint systems - Parts 4; 8
ISO 16276 (Parts 1; 2)	Corrosion protection of steel structures by protective paints systems - Assessment of, and acceptance criteria for, the adhesion/cohesion (fracture strength) of a coating - Parts 1; 2
ISO 19840	Paints and varnishes - Corrosion protection of steel structures by protective paint systems - Measurement of, and acceptance criteria for, the dry-film thickness of coating on rough surfaces
ISO 4628 (Parts 1; 2; 3; 4; 5)	Paints and varnishes - Evaluation of degradation of coatings - Designation of quantity and size of defects, and of intensity of uniform changes in appearance - Parts 1; 2; 3; 4; 5
ISO 8501 (Parts 1; 3)	Preparation of steel substrates before application of paints and related products. Visual assessment of surface cleanliness - Parts 1; 3
ISO 8502 (Parts 3; 6; 9)	Preparation of steel substrates before application of paints and related products. Tests for the assessment of surface cleanliness - Parts 3; 6; 9
ISO 8503 (Parts 1; 2)	Preparation of steel substrates before application of paints and related products - Surface roughness characteristics of blast-cleaned steel substrates - Parts 1; 2
SSPC SP1	Solvent Cleaning

Total General Specifications

Unless otherwise stipulated, the applicable version of these documents, including relevant appendices and addendums, is the latest revision published.

Reference	Title
GS EP COR 001	Corrosion control on production facilities: Design and construction
GS EP COR 350	External protection of offshore and coastal structures and equipment by painting
GS EP COR 351	External protection of structures and equipment by painting. Floating structures
GS EP COR 354	External protection of onshore structures and equipment by painting

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3. General

Prior to start maintenance works process with call for tenders a complete inspection of structure, equipment and piping shall be performed.

All safety aspect shall be considered in particular to treat piping and equipment.

4. Environmental aspects

During the preparation of maintenance works, their potential impact on the environment shall be considered, in order to define the appropriate mitigation measures:

- Painting systems and application methods shall be selected considering solvent emissions and paint overspray minimization.
- Abrasives shall be selected according to paragraph 10.2.
- Spot abrasive blasting surface preparation of rusted areas shall be preferred to the full surface preparation to limit environmental potential contamination.
- To complete historical records on the painting systems in place, a representative sample of abrasive surface preparation of rusted area and sweep blasting on adjacent surface shall be taken during the qualification phase, to perform analyses and identify potential contaminants. These analyses shall be performed in accordance with local regulations when they exist. Without specific local regulation, EU or US regulations should be taken as reference (see Appendix 4).
- Wherever safe and practicable, blasting techniques, confinement methods and spent abrasive recovery means shall be defined to reduce the discharge of spent abrasive to the surrounding environment, in compliance with applicable local and international regulations:
 - Onshore: spent abrasive shall be recovered and collected in appropriate containers
 - Offshore: [API Bull 91](#) recommended practices should be used as guidelines.
- Waste generated during maintenance works (paint waste, spent abrasive, etc.) shall be categorised according to local regulatory constraints and affiliate Waste Management Plan. Disposal options shall be defined depending on anticipated quantities to be generated, contaminants content, and available waste disposal infrastructures (reprocessing & recycling, incineration, hazardous/non hazardous waste landfill, etc.) and shall be approved by Company.
- Among all disposal options, spent abrasive discharge at sea may be considered under the following conditions:
 - Discharge at sea is only acceptable when authorized by local legislation.
 - It should be justified with a cost - benefit analysis, considering from one hand the risk of discharge at sea, and from the other hand the efficiency and associated risks of access & containment means for the alternative option (recovery/skip to shore/onshore disposal).
 - The risk of discharge at sea should be assessed considering the spent abrasive quantities/contaminants content and the environment context (shallow water in

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sensitive areas, deep offshore, etc.). Criteria for acceptable risk level, including but not limited to contaminants content (see Appendix 4) should be defined by Company in a particular specification.

- Upon Company request, the risk evaluation should be supported by a modelling study, for example with DREAM/PARTRACK software. In such case, the parameters requested for the completion of this study (such as grain size, toxicity tests, biodegradation tests, etc.) should be defined on a case by case basis.

5. Painting systems

5.1 Qualified Paint supplier

Paint suppliers shall be selected among painting manufacturer listed in the Company Approved Vendor List.

5.2 Approved systems

The approved systems are given in the referenced lists:

- For structures and equipment in areas classified as corrosive categories C5-M, CX the approved systems are given in Appendix 3.
- For structures and equipment in areas classified as corrosivity categories C3 and C4 the approved systems are selected from the ACQPA reference systems and can be found on www.acqpa.com.

Corrosivity categories are given in accordance with **GS EP COR 001**.

5.3 Approval of alternative painting systems

For **Suppliers already qualified**, new systems can be submitted for approval to Company at any time. The system shall fulfill internal qualification protocol from Company.

5.4 Substitution rule

When selecting a painting system, a system designed to withstand environments with higher corrosivity shall always be applicable to lower corrosivity environments.

6. Certification of personnel

6.1 Operators

Operators shall be individually certified by an approved organization (ACQPA, FROSIO, etc.).

6.2 Scaffolders

Operators shall be individually certified by an approved organization (Conform, Setho, etc.).

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6.3 Inspectors

Inspectors shall be individually certified in accordance with NS 476 (Inspector certified level III) or NACE certified coating inspector level III. Certification shall be delivered by the following approved organizations:

- ACQPA
- FROSIO
- NACE.

7. Qualification of the application procedures

7.1 Application procedure

A detailed application procedure shall be established for Company approval based on the requirements of this specification. No painting work shall begin before the application procedure is approved by Company.

The application procedure shall follow [ISO 12944-8](#) and will include at the minimum the following information:

- Equipment/structure/piping to be coated
- Operating temperature of the equipment
- Type of substrate to be coated
- Surface preparation
- Methods of application and application requirements
- Painting cycle
- Painting Systems to be used
- Coating products to be used
- Product data sheets (abrasives and paint materials)
- Safety data sheets
- Health and safety requirements
- Test and inspections
- Certification of the personnel
- Handling and storage
- Repair method
- Template of painting daily report.

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7.2 Application procedures tests

One month before work commences, all the selected systems shall be applied on samples representative of the structure to be painted. The products used shall be sampled from the same batches as these intended for the works.

The system shall be applied in presence of the paint Supplier and the Company representative, in climatic conditions that are as similar as possible to the worst case conditions that can be foreseen during the work on the construction site. Application shall be performed by the painting specialist who will be responsible for application during the work, using the same dedicated equipment that will be used during the work. During surface preparation and paint application, all tests described in Appendix 1 shall be followed.

When the painting systems are fully cured, visual inspection and adhesion testing shall be carried out to confirm that the performance of the painting systems meet those specified for each system.

During qualification, a compatibility test shall be performed to evaluate the impact of the maintenance paint system on the existing paint system: The maintenance paint system shall, as a minimum, preserve the residual adhesion of the existing paint system. In case of reduction of the adhesion, a new maintenance paint system shall be chosen.

Characterization of spent abrasive shall be done for environmental impact.

8. Kick off meeting

A technical kick off meeting shall be organized by the Contractor in the presence of Company specialists (HQ Corrosion Department) and Supplier to review all the details regarding the work, application procedures, and inspection test plan. All the documentation shall be submitted to Company for review at least two (2) weeks prior to this meeting.

Supplier shall provide Contractor with technical assistance. All recommendations made by Supplier other than these outlined in datasheets or in the present specification shall be supported by a written statement from the Supplier head office.

9. Technical content of tenders

Tenders shall include the following information:

- Proposed paint systems for each category/location of item to be painted
- Product data sheets and MSDS (Material safety Data sheets)
- Proposed qualification program if any
- List of derogations to the present General Specification, if any. Derogations will not be granted for painting systems after Contract award.
- Terms and conditions of guarantee
- A statement showing that all parties involved (Contractor, Supplier, and Applicator) will be carrying out the work according to the present specification, or if relevant, to the project particular specification, including derogations duly agreed by HQ Corrosion Department before Contract award. This statement shall also show that the guarantee is jointly underwritten by all parties and specify the durations and performance levels of the