

GENERAL SPECIFICATION

CORROSION

GS EP COR 354

External protection of onshore structures and equipment by painting

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General Specification		GS EP COR 354
External protection of onshore structures and equipment by painting		
Rev.: 07	Effective date: 10/2012	Page: 2 of 25

Contents

1. Scope	4
2. Reference documents.....	4
3. Surfaces to be painted.....	5
3.1 Items not to be painted.....	5
3.2 Case of stainless steels	5
3.3 Painting of fastenings.....	6
4. Painting systems.....	6
4.1 Reference code for painting systems for onshore installations	7
4.2 Approved systems	7
4.3 Substitution rule	7
5. Certification of personnel.....	8
5.1 Operators.....	8
5.2 Inspectors	8
6. Technical content of tenders	8
7. Surface preparation	8
7.1 Design and preparation before blasting of surfaces to be painted	8
7.2 Quality of abrasives	9
7.3 Blast cleaning of carbon steel (AF).....	9
7.4 Blast cleaning of carbon steel (AF) on automatic production lines.....	10
7.5 Blast cleaning of stainless steels (AI)	10
7.6 Surface preparation of galvanised steel (AG).....	10
7.7 Preparation of zinc or cadmium plated bichromated surfaces (AB)	10
8. Paint application	10
8.1 Procurement and storage.....	10
8.2 Samples for QA/QC purposes.....	11
8.3 Qualification of the application procedures for the different systems	11
8.4 Kick off meeting	11
8.5 Application conditions	11

General Specification		GS EP COR 354
External protection of onshore structures and equipment by painting		
Rev.: 07	Effective date: 10/2012	Page: 3 of 25

8.6	Repairs	12
9.	Checks, inspection and acceptance.....	13
9.1	Checks.....	13
9.2	Inspection test plan	14
9.3	Company inspection	14
9.4	Provisional acceptance	14
9.5	Guarantee.....	14
9.6	Final acceptance	15
10.	Technical file	15
Appendix 1	Approved list of Suppliers*	16
Appendix 2	List of systems	17
Appendix 3	Suppliers' systems.....	20
Appendix 4	Colours Coding	21

1. Scope

This standard specification defines the technical requirements for the execution of coating operations for the high durability external corrosion protection of on shore structures and equipment, which are not located within coastal areas.

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 supplements, is the latest revision published at the effective date of this document.

Reference	Title
ACQPA	"Association pour la Certification et la Qualification en Peinture Anticorrosion". Certified systems by ACQPA
ASTM D 4752	Standard test method for measuring MEK resistance of ethyl silicate (inorganic) Zinc-rich primer by solvent rub
ASTM D 4940	Standard test method for conductimetric analysis of water soluble ionic contamination of Blasting abrasives
ISO 12944 (Parts 1; 2; 3; 4; 7; 8)	Paints and varnishes-Corrosion protection of steel structures by paint systems - Parts 1; 2; 3; 4; 7; 8
ISO 16276 (Parts 1; 2)	Corrosion protection of steel structures by protective paint systems - Assessment of, and acceptance criteria for, the adhesion/cohesion (fracture strength) of a coating - Parts 1; 2
ISO 19840	Paints and varnishes. Determination of dry film thickness. Non-destructive magnetic flux method
ISO 4628 (Parts 1; 2; 3; 4; 5; 6; 7; 8; 9; 10)	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; 6; 7; 8; 9; 10
ISO 8501 (Parts 1; 2; 3)	Preparation of steel substrates before application of paints and related products. Visual assessment of surface cleanliness - Parts 1; 2; 3
ISO 8502 (Parts 1; 2; 3; 4; 6; 9)	Preparation of steel substrates before application of paints and related products. Tests for the assessment of surface cleanliness - Parts 1; 2; 3; 4; 6; 9

General Specification		GS EP COR 354
External protection of onshore structures and equipment by painting		
Rev.: 07	Effective date: 10/2012	Page: 5 of 25

Reference	Title
ISO 8503 (Parts 1; 2; 3; 4)	Preparation of steel substrates before application of paints and related products. Surface profile of abrasive blast-cleaned steel - Parts 1; 2; 3; 4
RAL 840 HR	Colors standard

Total General Specifications

Unless otherwise stipulated, the applicable version of these documents, including relevant appendices and supplements, is the latest revision published in the applicable yearly collection.

Reference	Title
GS EP COR 350	External protection of offshore and coastal structures and equipment by painting
GS EP COR 352	Internal protection of equipment by painting

3. Surfaces to be painted

All surfaces shall be painted using the relevant specified system, except when otherwise stipulated hereafter.

3.1 Items not to be painted

Unless otherwise specified, the following surfaces shall not be painted:

- Galvanised steel gratings
- Concrete structures
- Plastic and plastic coated materials, provided their resistance to UV has been demonstrated, and colour coding is not necessary
- Non ferrous materials such as 90-10 and 70-30 copper nickel alloys, monel, aluminium bronze, and nickel alloys when not thermally insulated
- Machined surfaces.

3.2 Case of stainless steels

Stainless steels shall be painted when requested in the present specification. Only piping, pipelines and vessels or other pressure containing equipment are concerned.

3.2.1 Under thermal insulation

For temperatures ranging from 25 to 150°C (maximum operating temperature), system P05 second shall be used, whatever the stainless steel type.

Below 25°C, system P05 shall be applied whatever the stainless steel type.

General Specification		GS EP COR 354
External protection of onshore structures and equipment by painting		
Rev.: 07	Effective date: 10/2012	Page: 6 of 25

3.2.2 Without thermal insulation

The following applies:

Stainless steel type	General case	Paint system
AISI 304, 304L and 321	Painted in all cases	P05 for $T < 80^{\circ}\text{C}$ P05 second for $80^{\circ}\text{C} < T < 150^{\circ}\text{C}$
AISI 316 and 316L	Painted for $T > 50^{\circ}\text{C}$	P05 for $T < 80^{\circ}\text{C}$ P05 second for $80^{\circ}\text{C} < T < 150^{\circ}\text{C}$
AISI 904, duplex and super duplex	Painted for $T > 100^{\circ}\text{C}$	P05 second for $T < 150^{\circ}\text{C}$
All stainless steels to be protected from iron contamination when construction works are likely to continue after pickling and passivating	Painted for temporary protection against iron contamination (projections from power tooling & welding)	In case of protection deficiency by the construction yard all stainless steel shall be painted

In all cases, and if necessary, system P13 shall be applied for $T > 150^{\circ}\text{C}$. TSA (Thermally Sprayed Aluminium) can also be used as an alternative.

Zinc containing paints are prohibited on stainless steels.

All stainless steels shall be painted on areas in contact with carbon steel piping supports.

3.3 Painting of fastenings

For bolting, the following applies:

- Stainless steel: Not painted
- Carbon steel: Primer of system P06 (30 microns of epoxy) applied before assembly and the remaining layers (intermediate and finish coat) applied after installation.

For dudgeons, painting (system P06) will be applied after installation.

4. Painting systems

Paint systems are defined according to the following parameters:

- Type of substrate
- Atmosphere or environment
- Minimum and maximum Operating temperatures.

4.1 Reference code for painting systems for onshore installations

4.1.1 Coding system

Part 1: Atmosphere or environment

Atmosphere or environment	Category of corrosivity
Rural-RU	C3 / C4
Industrial-IN	C5 Ma

Part 2: Substrate

AF	Ferritic steel or cast iron
AI	Austenitic stainless steels and special alloys
AG	Galvanized steels
AB	Galvanized or cadmium-plated bichromated steels
PL	Plastics
BE	Concretes and similar products

Part 3: Operating temperatures

SNNN/SNNN: two-zone code containing the symbol (S) and three digits (NNN) indicating the minimum and maximum Operating temperatures.

4.1.2 Identification of systems

Systems are identified as follows:

RU	AF	+121/+300	XX
Parameter 1	Parameter 2	Parameter 3	System number

4.2 Approved systems

For structures and equipment in areas classified as corrosivity categories C3, C4, and C5I the approved systems are selected from the [ACQPA](http://www.acqpa.com) reference systems and can be found on www.acqpa.com.

4.3 Substitution rule

In selecting paint systems, a system designed to withstand high aggressivity shall always be applicable in a lower corrosivity environment.

General Specification		GS EP COR 354
External protection of onshore structures and equipment by painting		
Rev.: 07	Effective date: 10/2012	Page: 8 of 25

5. Certification of personnel

5.1 Operators

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

5.2 Inspectors

Inspectors shall be individually certified by an approved organization ([ACQPA](#), FROSIO, NACE International minimum level 3 with peer review, etc.).

6. 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
- 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 TEC/COR 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 guarantee. This statement can consist in either a certificate of homologation by OHGPI (Organisme d'Homologation des Garanties en Peinture Industrielles) or a letter signed by the head office of each party involved.
- Maximum thickness tolerable for each coat and for the each full painting system
- Surface preparation and painting procedures
- Inspection test plan with acceptance criteria and frequency of inspection
- A list of inspection and painting equipment to be used
- Colours to be used for each item of equipment and for the different coats, in accordance with the colour chart chosen for the project by Company
- Methods of protection of items to be painted against adverse weather conditions
- Certificates ([ACQPA](#), FROSIO, NACE, or equivalent) of Operators and Inspectors.

7. Surface preparation

7.1 Design and preparation before blasting of surfaces to be painted

All structures and equipment shall be designed according to [ISO 12944](#) international standard for high durability painting systems.