

GENERAL SPECIFICATION

CORROSION

GS EP COR 354

**External protection of onshore structures and
equipment by painting**

07	10/2012	General review
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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

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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.

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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.

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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.

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All sharp edges shall be rounded (minimum radius > 2 mm).

The design of the item to be painted shall be such that it creates no interstice and inaccessible area.

All oil or grease shall be removed by washing the item to be painted with appropriate solvents or any other suitable means before beginning of blast-cleaning operations. This includes bolt holes in piping assemblies.

Weld spatter and remains of temporary welds, deposits or surface defects shall be eliminated by appropriate means; removal by deep grinding is subject to Company approval.

All mating surfaces of equipment subject to outdoor exposure shall be coated with the full coating system prior to assembly (saddles, skirts, base plates, olded components, flanges, etc.).

Contractor shall protect all equipment that is not to be painted or may be affected by the presence of abrasives or paint. Special attention shall be paid to avoid splashes of zinc paint on equipment made of austenitic steels.

7.2 Quality of abrasives

Abrasives shall be sealed in watertight packaging. Any product delivered in defective packaging shall be rejected. Products must be stored sheltered from the elements.

Conductivity of abrasives shall be less than $150 \cdot 10^{-6}$ Siemens/cm as per [ASTM D 4940](#).

The use of copper slag or silica sand is **strictly** prohibited.

7.3 Blast cleaning of carbon steel (AF)

All surfaces to be coated shall be blast-cleaned according to:

- The grade of cleanliness ([ISO 8501](#) standard)
- The surface profile Ra ([ISO 8503](#) standard: roughness meter with adapted cut-off or visio tactile surface profile comparator)

specified for each system in Appendix 3.

After blast-cleaning, all dust must be removed using a vacuum cleaner before application of the paint in order to achieve the maximum dust level specified for each system in Appendix 3 ([ISO 8502-3](#)).

All blast-cleaned surfaces shall be coated before the deterioration of the "grade of cleanliness". In any case, any surface that has been blast-cleaned shall be coated on the same day.

Before painting works commence, checks for the contamination of the surface by salts shall be carried out ([ISO 8502-6](#) & [ISO 8502-9](#)).

The blast cleaning procedure shall be submitted to Company for approval.

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7.4 Blast cleaning of carbon steel (AF) on automatic production lines

In addition to the requirements of § 7.3:

- All surfaces shall be blast-cleaned to grade of cleanliness Sa 3 ([ISO 8501-1](#))
- Contractor shall ensure that the grit selected can achieve the required surface profile. This requirement includes determination of grit mix, as well as quantity and frequency of grit renewal. Surface profile shall be checked twice per shift and the results shall be recorded
- Dust level shall be thoroughly checked ([ISO 8502-3](#)).

The blast cleaning procedure shall be submitted to Company for approval.

7.5 Blast cleaning of stainless steels (AI)

Stainless steels shall be segregated, carbon steel supports for storage shall be systematically painted, and lifting equipment shall prevent iron contamination.

Stainless steel surfaces to be coated shall be etched or degreased and blast-cleaned with a non-ferrous and chlorine-free abrasive.

The blast cleaning procedure to be submitted to Company shall include:

- Abrasive composition to obtain a surface roughness of Ra = 10 microns (8 microns acceptable locally)
- Dust level (maximum level 2 maximum according to [ISO 8502-3](#))
- Substrate contamination checks. Ferrous contamination / direct colorimetry method using Prussian blue (potassium ferricyanide) - No surface pollution is acceptable.

7.6 Surface preparation of galvanised steel (AG)

Galvanized steel to be coated shall be cleaned, degreased and etched using the product specified for painting systems P05 (see Appendix 3).

7.7 Preparation of zinc or cadmium plated bichromated surfaces (AB)

Zinc or cadmium-plated bichromated surfaces shall be cleaned and degreased.

8. Paint application

8.1 Procurement and storage

The quantities of paint and thinners required to perform the entire job shall be procured before the work commences, except in cases where the shelf life of the product is less than the anticipated duration of the work.

Thinners, solvents, etc. shall be stored in a suitably ventilated fireproofed building, separate from other painting consumables.

The products shall be delivered in their original sealed packaging and stored in such conditions as to avoid their degradation (controlled temperature, etc.). The packaging shall be clearly marked with the product description, the batch number, the fabrication date and the expiry date.

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The shelf life from the fabrication dates are:

- For zinc ethyl silicate: 6 months
- For other products: 1 year
- Specific cases: according to Manufacturer's recommendation with Company approval.

8.2 Samples for QA/QC purposes

From each batch of products used during the work, the Contractor shall take two samples to be made available to Company.

8.3 Qualification of the application procedures for the different systems

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

The system shall be applied in the presence of the Supplier of the paint and the Company representative, in climatic conditions that are as similar as possible to 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 equipment that will be used during the work.

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.

8.4 Kick off meeting

A technical kick off meeting shall be organized by the Contractor in the presence of Company specialists (TEC/COR) 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 Supplier head office.

8.5 Application conditions

8.5.1 General

Paint shall always be applied to surfaces that are dry, clean and degreased, for both coating on substrate and previous coat.

Painting works shall not proceed if:

- Temperature of the substrate is less than 3°C above the dew point
- The relative humidity is more than 85% RH (90% RH for inorganic zinc silicates)
- The weather is rainy or foggy, except under shelter, and subject to verification of the atmospheric conditions

- The minimum or maximum temperature of the ambient atmosphere and the substrate are out with the limits given in the product data sheets (usually 10°C for epoxy based paint and 5°C for acryl-polyurethane topcoat).

Contractor shall keep a daily record of the dew point, relative humidity, ambient atmosphere and substrate temperatures (all measured before the work commences and twice per shift and when ambient conditions are obviously changing) to ensure that conditions are acceptable. These records shall be kept and made available to Company.

Application shall be by airless spray.

Stripe coats shall be applied by brush to all angles, corners, sharp edges, bolt or rivet heads, etc. with the same product than this to be applied on the surface to be painted. The only exception is inorganic zinc silicates where stripe coats shall be applied using the repair system primer i.e. zinc rich epoxy.

Different colours shall be used for all successive coats of the paint system. The finishing coat of the required colour shall be sufficiently opaque to cover the shade of the undercoat.

The thickness of each coat, including frequency and tolerance shall be checked by the Contractor according to [ISO 19840](#). The values shall be recorded and made available to Company.

8.5.2 Zinc ethyl silicate

During application, the product shall be stirred at all times.

If relative humidity is below 65%, the painted surface shall be sprayed with fresh water for at least two hours after application to enhance curing.

Before the subsequent coat is applied, this primer shall be subjected to a MEK test as per [ASTM D 4752](#) to ensure that hydrolysis is complete. If complete hydrolysis is not obtained within eight days of application, the coating shall be completely removed and re-applied.

8.5.3 Zinc or cadmium-plated bichromated bolting

All surfaces of the bolting assemblies, including threads shall be coated. The topcoat shall be applied after assembly is completed.

8.5.4 Painting of fastenings

For bolting, the following applies:

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

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

8.6 Repairs

Any defect shall be repaired before the application of further coats. Subject to the agreement of Company, and after determining the type and size of the defects, the following methods of repair shall be applied:

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8.6.1 Major defects

The paint shall be removed completely by abrasive blast-cleaning and the entire system shall be re-applied.

8.6.2 Minor defects (localized appearance, mechanical damage, scratches, etc.)

Subject to the agreement of the Supplier of the product, the system shall be removed by localized blast-cleaning, the edges of the sound coating shall be feathered back about 50 mm, and the repair system shall be applied.

9. Checks, inspection and acceptance

9.1 Checks

Throughout the duration of the work, Contractor's Quality Control department shall check the following points and record the results in its daily quality control report.

- Construction quality:
 - Rounding of corners, sharp edges to 2 mm radius minimum
 - Form, quality and continuity of welds.
- Surface preparation quality:
 - Grade of cleanliness: Sa 3 according to [ISO 8501](#)
 - Cleanliness: no grease or oil, dust level 2 maximum according to [ISO 8502-3](#)
 - Anchoring profile: G medium according to [ISO 8502](#).
- Contamination including chlorides: according to [ISO 8502-6](#) and [ISO 8502-9](#), 30 mg/m² maximum.
- Climatic conditions for application all measured before the work commences and twice per shift and when the ambient conditions are obviously changing): temperature of substrate at least 3°C above dew point, maximum humidity 85% RH (90% for inorganic zinc silicates), ambient temperature (> 10 C for epoxy, > 5°C for polyurethane), weather conditions.
- State of curing of primer and of each coat.
- For inorganic zinc silicate: record of spraying with fresh water to enhance hydrolysis (if relevant) and results of MEK test: Level 5 according to [ASTM D 4752](#).
- Interval between coats (in accordance with Supplier product datasheets).
- Wet film thickness for each coat immediately after application.
- Number of coats, DFT of each coat and of the final system according to [ISO 19840](#).
- Appearance and colour.

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- Adherence

The tests shall be carried out only when the system is completely dry and fully cured.

- Systems with DFT less than 200 µm: cross-cut test class 0 according to [ISO 16276-2](#)
- Systems with DFT above 200 µm: pull-off test according to [ISO 16276-1](#). Unless specified in the system sheet in Appendix 3, the minimum values acceptable are 3 MPa for checks made with mechanical equipment (type Ersad, Satec, or equivalent) and 5 MPa for checks made with hydraulic equipment (Type PAT or equivalent). The equipment must be fitted with a gauge indicating the pulling force.

The adhesion tests shall be performed with cyano-acrylate glue as LOCTITE 496 or equivalent.

- Visual inspection results: no defects such as "orange peel", cracking, bubbling, pinholes, runs and sags, blistering, etc.

9.2 Inspection test plan

An inspection test plan including all the points in section 9.1 shall be prepared and submitted to Company. The Inspection Test Plan shall clearly indicate frequency of testing for each check.

9.3 Company inspection

Company Inspector shall have free access to storage areas, workshops, yards where the works will be performed. Contractor shall also provide Company Inspector with all office facilities necessary for the execution of his work (telephone, fax, handling equipment, measuring instruments with valid calibration certificates, etc.).

Upon arrival of Company Inspector on site, Contractor shall supply him with all relevant documentation regarding the works to be carried out.

9.4 Provisional acceptance

For provisional acceptance, Company shall check that all inspections set out in section 9.1 have been carried out and that all results are satisfactory.

9.5 Guarantee

The Work shall be covered by a specific guarantee given by Contractor to complete Guarantees and warranties defined in the Engineering, Procurement, Supply, Construction and Commissioning Contract (EPSCC 1113 - Article 20 "GUARANTEES AND WARRANTIES").

Contractor guarantees that the Work shall be covered by performance warranties in accordance with the following requirements of the Contract:

- The maximum degree of rust shall be Ri2 according to [ISO 4628](#)
- The maximum degree of cracking, blistering, or flaking shall be 3S3 according to [ISO 4628](#).

Guarantee shall be provided for the duration defined for each paint system in Appendix 3.

Beginning of Warranty Period as defined for each paint system in Appendix 3 starts from the effective date of the PROVISIONAL ACCEPTANCE CERTIFICATE for painting works.

9.6 Final acceptance

At the end of the Warranty Period a joint inspection of Work by Company and Contractor shall be carried out before issuance of the FINAL ACCEPTANCE CERTIFICATE for painting works to determine if any claims are raised.

10. Technical file

Contractor shall hand over a technical file to Company at the end of the works which shall include:

- All inspection reports
- Provisional acceptance reports
- Guarantee certificates
- Insurance certificates for the guarantee.

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Appendix 1

Appendix 1 Approved list of Suppliers*

Supplier	Code	Phone No.	Fax No.	Remarks
CARBOLINE	C	+33 1 60 06 55 66	+33 1 60 06 55 70	Carboline.France @stoncor.com
HEMPEL	H	+33 3 44 08 28 90	+33 3 44 08 28 99	jmb@hempel.com dbo@hempel.com
INTERNATIONAL COATINGS	I	+33 2 35 22 13 72	+33 2 35 22 13 78	Frederic.coulon@akzonobel.com
FREITAG / SIGMA / AMERCOAT - GROUPE PPG	P	+33 1 70 03 11 11	+33 1 70 03 11 06	Pascal.digonnet@ppg.com
JOTUN	J	+33 1 45 19 38 87	+33 1 45 19 38 94	Xavier.dubois@jotun.com
MAESTRIA	M	05 61 67 97 40	05 61 67 48 17	dandreu@maestria.fr

* Another Supplier can be proposed subject to Company approval.

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Appendix 2

Appendix 2 List of systems

Important warning:

- For inorganic zinc silicates, interval considers water spray for 2 hours after application if RH below 65%.
- After application to ensure hydrolysis.
- The minimum interval between coats depends on the results of the "MEK test".
- Intervals between coats are given for 20°C and a relative humidity of 60%.
- The **ACQPA** systems are the corresponding certified systems.
- All others paint systems are specified in **GS EP COR 350** or **GS EP COR 352**.
- The temperatures indicated in the code are the mini/maxi Operating temperatures.
- Painting system with minimum level of solvent shall be preferred
- Lead chromates in paint are strictly forbidden.
- **ACQPA**: Internet address www.acqpa.com.

Structure	Code	System No.	Remarks
Structures			
Structures	RU AF -010/+080 IN AF -010/+080	ACQPA ACQPA	
Floors	RU AF -010/+080 IN AF -010/+080	ACQPA P02	
Galvanized surfaces	RU AG -010/+080 IN AG -010/+080	ACQPA P05	All galvanized surfaces, EXCEPT gratings, stairs and associated galvanized fasteners
Cd/bi Cr surfaces Zn/bi Cr surfaces	RU AB -010/+080 IN AB -010/+080	ACQPA P06	Above 80°C, system adapted to adjacent surfaces systems
High temperature structures	RU AF +121/+400 IN AF +121/+400	P11 P11	Flare type structures

Structure	Code	System No.	Remarks
Pressure vessels			
Uninsulated: $t \leq 80^{\circ}\text{C}$	RU AF -010/+080 IN AF -010/+080	ACQPA P01	
$81 \leq t \leq 120^{\circ}\text{C}$	RU AF +081/+120 IN AF +081/+120	P10 P10	Including adjacent surfaces
$121 \leq t \leq 400^{\circ}$	RU AF +121/+400 IN AF +121/+400	P11 P11	Including adjacent surfaces
Insulated: $t < 89^{\circ}\text{C}$	RU AF -030/+089 IN AF -030/+089	P12 P12	
$90 \leq t \leq 200^{\circ}\text{C}$	RU AF +090/+200 IN AF +090/+200	P13 P13	
Chassis	RU AF -010/+080 IN AF -010/+080	ACQPA P01	
Galvanized surfaces	RU AG -010/+080 IN AG -010/+080	ACQPA P05	All galvanized surfaces, EXCEPT gratings, stairs and associated galvanized fasteners
Cd/bi Cr surfaces Zn/bi Cr surfaces	RU AB -010/+080 IN AB -010/+080	ACQPA P06	Above 80°C , system adapted to adjacent surfaces systems
Piping			
Uninsulated: $t \leq 80^{\circ}\text{C}$	RU AF -010/+080 IN AF -010/+080	ACQPA P01	
$81 \leq t \leq 120^{\circ}\text{C}$	RU AF +081/+120 IN AF +081/+120	P10 P10	Including adjacent surfaces
$121 \leq t \leq 400^{\circ}$	RU AF +121/+400 IN AF +121/+400	P11 P11	Including adjacent surfaces
Insulated: $t < 90^{\circ}\text{C}$	RU AF -030/+089 IN AF -030/+089	P12 P12	
$90 \leq t \leq 200^{\circ}\text{C}$	RU AF +090/+200 IN AF +090/+200	P13 P13	
Galvanized surfaces	RU AG -010/+080 IN AG -010/+080	ACQPA P05	All galvanized surfaces, EXCEPT gratings, stairs and associated galvanized fasteners
Cd/bi Cr surfaces Zn/bi Cr surfaces	RU AB -010/+080 IN AB -010/+080	ACQPA P06	Above 80°C , system adapted to adjacent surfaces systems

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Appendix 2

Structure	Code	System No.	Remarks
Machines			
t ≤ 80°C	RU AF -010/+080 IN AF -010/+080	ACQPA P14	Supplier's system applied if approved by TOTAL
Rooms			
Open (workshop type)	RU AF -010/+080 IN AF -010/+080	ACQPA P15	Bulkheads, ceilings
Air conditioned	RU AF -010/+080 IN AF -010/+080	ACQPA	
Storage vessels			
External surfaces	RU AG -010/+080 IN AG -010/+080	ACQPA P01	For floating roof tanks extend by 1.5 m down on the inside
Galvanized surfaces	RU AG -010/+080 IN AG -010/+080	ACQPA P05	All galvanized surfaces, EXCEPT gratings, stairs and associated galvanized fasteners
Cd/bi Cr surfaces Zn/bi Cr surfaces	RU AB -010/+080 IN AB -010/+080	ACQPA P06	Above 80°C, system adapted to adjacent surfaces systems.



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Appendix 3

Appendix 3 Suppliers' systems

See [ACQPA](http://www.acqpa.com) internet site: www.acqpa.com

The minimum warranty shall be 5 years Ri 2.

Appendix 4 Colours Coding

1. Colours

Basic colours are:

- Yellow - [RAL 1003](#)
- Black - [RAL 9005](#)
- Red - [RAL 3001](#)
- Aluminium grey for high temperature.

If polychromy is required following specification could be applied.

2. Vessels and Piping identification

This appendix concerns only painted carbon steel marking.

Using stickers on stainless steel is strictly forbidden. In case of specific stainless steel identification procedure shall be submitted to TEC/COR for approval.

2.1 Subject

This part of appendix defines the high durability characteristics of the identification stickers on vessels and piping of offshore platforms.

2.2 Sticker definitions

2.2.1 Supports concerned

- Carbon steel painted according to the General Specification
- Stainless steel piping
- Monolar - Hypalon family on top sides insulated network.

2.2.2 Service temperature

- -29°C
- +200°C

2.2.3 Stickers sizes

Formats are determined according to pipe diameter.

Piping diameters	Sticker sizes
2" to 4"	300 x 150 mm
6" to 12"	450 x 225 mm
> 14"	600 x 300 mm

2.2.4 Adhesive material

Considering all technical constraint and durability required the selected material is **Scotchmark 7980** or equivalent.

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Appendix 4

This consists of white polyester film glued with high resistant acrylic adhesive.

Construction (nominal thicknesses of components):

- Polyester: 64 micrometers
- Adhesive: 25 micrometers
- Protection: 170 micrometers.

The support is specifically designed to obtain maximum adhesion of inks to guarantee high durability and resistance.

2.2.5 Printing

The printing is specially adapted to provide high durability.

Two colours are generally used per sticker coated with an anti UV varnish.

The colours are defined according to Pantone or RAL standards.

2.3 Application / Vessels and piping identification

The stickers are delivered already cut with separation at the back to facilitate the positioning.

The application is carried out by removing the finest protection in order to position the sticker correctly on support before gluing the final part.

The density of sticker application should be of 3 m and a maximum of 20D intervals and on either side of each valve, elbow, fitting, wall penetration and any other places where identification of fluid is necessary.

2.4 Storage condition

To preserve correctly they should be stored flat in a dry place with moderate temperature (<40°C).

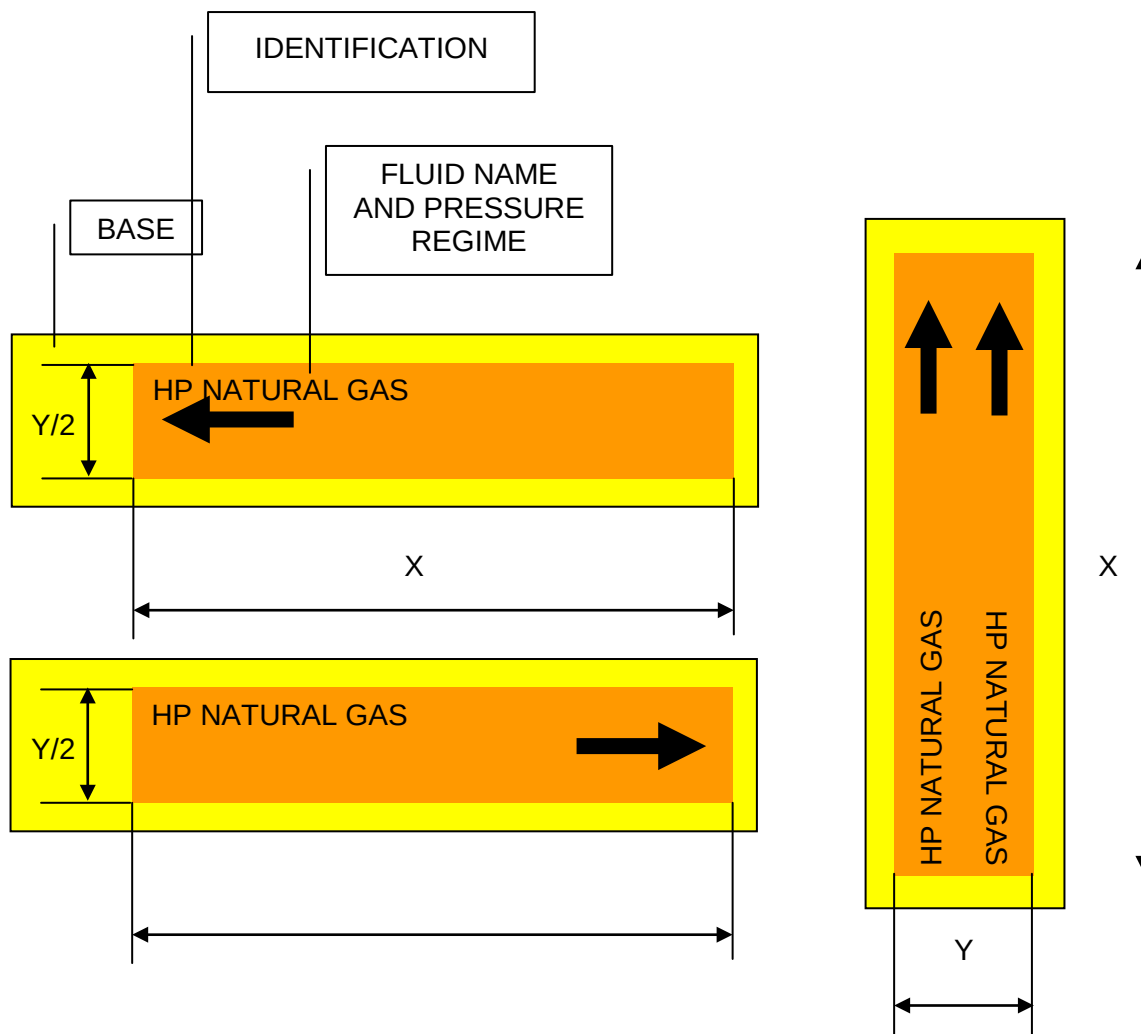
2.5 Checks

Stickers are applied without bubbles with full surface adhesion.

Peeling test conforms to DIN 500014. Minimum adhesion value is 5 MPa.

2.6 Examples

2.6.1 Principle



Both type of label should be acceptable.

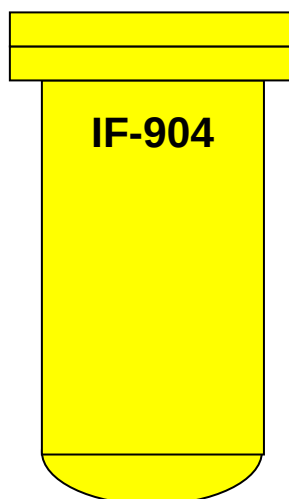
2.6.2 Piping Identification

	FIRE WATER	→	
	METHANOL	→	
	COOLING WATER	→	
	CLOSED DRAIN	→	
	INSTRUMENT AIR	→	
	HP FLARE	→	
	HP CRUDE OIL	→	
	MP CONDENSATE	→	

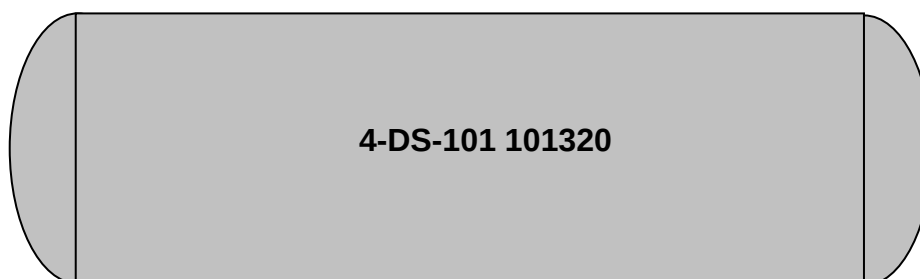
Note: French version is available.

2.6.3 Vessel identification

The tag number of pressure vessels and other process equipment shall be in black on both side of the shell with letters of maximum 300 mm height and minimum 150 mm height visible from all side of the vessel.



Operating temperature under 80°C.



Operating temperature above 80°C.