PETROBRAS	**TECHNICAL SPECIFICATION**	No. I-ET-3010.00-1200-956-P4X-001	
	CLIENT:		SHEET 1 of 10
	PROJECT:		
	ÁREA:		
SRGE	TITLE: **QUALIFICATION TEST FOR PAINT SYSTEMS**		INTERNAL
			ESUP

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INDEX OF REVISIONS

REV.	DESCRIPTION AND/OR REVISED SHEETS
0	ORIGINAL
A	GENERAL REVISION
B	GENERAL REVISION ACCORDING TO THE REQUIREMENTS OF IOGP S-715

	REV. 0	REV. A	REV. B	REV. C	REV. D	REV. E	REV. F	REV. G	REV. H
DATE	AUG/15/18	JUN/20/20	MAR/23/21						
DESIGN	ESUP	EEA	EEA						
EXECUTION	MMARROIG	MMARROIG	CJH4						
CHECK	FABIANA	FABIANA	HR7W						
APPROVAL	JUVENTINO	GONZALEZ	U32N						

SUMMARY

OBJECTIVE

This specification establishes the minimum technical requirements for the preparation of surfaces and painting by VENDOR for offshore environments. This specification complements:

- NORSOK M-501,
- IOGP S-715 and its amendments (IOGP S-715L and IOGP S-715Q)

This specification is written as an overlay to IOGP S-715, version 1.0, july 2020, following the section structure of this standard, to assist in cross-referencing the requirements. The IOGP S-715 specification is based on NORSOK M-501.

If a section or subsection of: NORSOK M-501 or IOGP S-715 is not mentioned in this document, it means that no supplementary requirements and no modifications are considered in this respective section. Then, the respective section of IOGP S-715 or NORSOK M-501 is mandatory. All modifications into NORSOK M-501 or IOGP S-715 requirements are identified in this document with: ***Add*** (add to section or add new section), ***Replace*** (part of or entire section) or ***Delete***.

In addition to the requirements of this technical specification, **CONTRACTOR** shall follow all the requirements of the Exhibit I (Scope of Work), as well as Exhibit III (Directives for Engineering Execution), Exhibit IV (Directives for Construction and Assembly), Exhibit V (Directives for Procurement), Exhibit VI (Directives for Planning and Control), Exhibit VII (Directives for Quality Management System) and Exhibit VIII (Directives for Commissioning Process).

The requirements herein listed are mandatory to VENDOR supplied equipment when mentioned this technical specification at specific project document. Otherwise I-ET-3010.00-1200-956-P4X-002 shall be followed.

This technical specification may be used by VENDOR in case of equipment specified following IOGP specification, whether overlayed by a respective OWNER technical specification or not, even when not mentioned at project documentation.

SECTION I – COMPLEMENTARY REQUIREMENTS TO IOGP S-715 AND NORSOK M-501

1 SCOPE

Replace 2º paragraph

This specification applies to shop applied coatings for new equipment and related structures and piping.

2 NORMATIVE REFERENCES

Add to List

NORSOK M-501	- Coating and Painting for Offshore, Marine Coastal and Subsea Environments

IOGP S-715 (July 2020)	- Supplementary specification to NORSOK M-501 Coating and Painting for Offshore, Marine Coastal and Subsea Environments
IOGP S-715L (July 2020)	- Information requirements for Coating and Painting for Offshore, Marine Coastal and Subsea Environments
IOGP S-715Q (July 2020)	- Quality requirements for Coating and Painting for Offshore, Marine Coastal and Subsea Environments

Delete to Section

IOGP S-715	- Supplementary Specification to NORSOK M-501 Coating and Painting for Offshore, Marine Coastal and Subsea Environments

Add to Section

2.1 CLASSIFICATION SOCIETY

VENDOR shall perform the work in accordance with the requirements of the Classification Society.

VENDOR is responsible submit to the Classification Society the documentation in compliance with stated Rules.

2.2 GOVERNMENT REGULATION

NR 26	- Sinalização de Segurança
NR-37	- Saúde e Segurança em Plataformas de Petróleo

Brazilian Government regulations and Classification Society Rules are mandatory and shall prevail, if more stringent, over the requirements of this specification and other references herein. In case of conflict, **CONTRACTOR** shall submit an issue to **OWNER**´s clarification.

2.3 REFERENCE DOCUMENTS

DR-ENGP-I-1.15	- COLOR CODING
I-ET-3010.00-1200-956-P4X-002	- GENERAL PAINTING
I-ET-3010.00-1200-940-P4X-002	- GENERAL TECHNICAL TERMS
I-ET-3010.00-0000-970-P4X-001	- REQUIREMENTS FOR PROCEDURES AND PERSONNEL QUALIFICATION AND CERTIFICATION

3 TERMS AND DEFINITIONS

Add to Section

Terms and definitions are also established in the latest revision of I-ET-3010.00-1200-940-P4X-002 - GENERAL TECHNICAL TERMS.

4 GENERAL REQUIREMENTS

Replace clause 4.13 heading with

4.13 Additional requirements for structurs, outffinting, equipment, piping and materials

Add to clause

Carbon steel suports for electric cables and lighting poles shall be HDG

Typical pipe supports shall be hot deep galvanized. This requirement may be waived in case of special pipe supports and supports with configuration that does not permit galvanization due to size and welds. In this case, the paint system 2 shall be applied.

4.13.2 Stainless steels

Add to clause

Austenitic stainless steel with service temperature over 50°C shall be coated

Duplex stainless steel with service temperature over 80°C shall be coated.

Superduplex stainless steel with service temperature over 90°C shall be coated.

Insulated inconel material shall be coated.

Delete section

4.13.7 Manufacturer standard, off-the-shelf items

Add section

4.13.8 COATING OF PIPING

The coating of the flange shall be up to the sealing area (contact area).

The outer flange corners of carbon steel flanges shall be rounded to the radii indicated in Table 1. Tolerance for corners radius is +2,0mm, -0,0 mm.

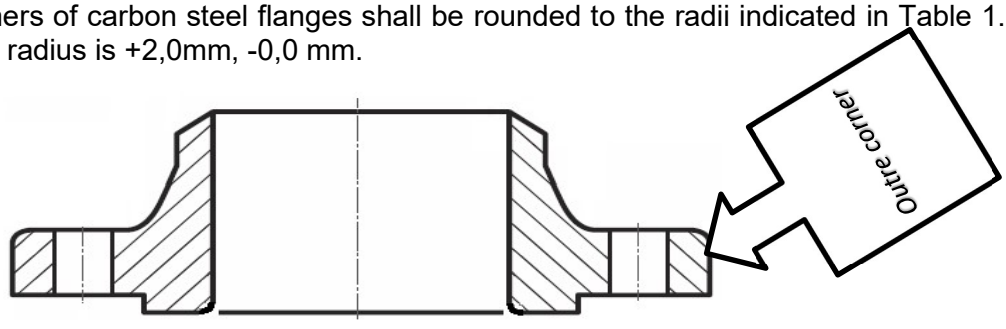

Figure 1 -Details of substrate preparation of flange.

Table 1 – Minimum radius required at flange outer corners

NPS	*Radius, mm*
½ to 6	*1*
>8	*1,5-3*

Add section

4.13.9. Design and Fabrication For Internal Coating

Equipment to be lined shall be sufficiently rigid that there is no possibility of deformation, which would result in damage to the lining during transportation, installation and operation. The arrangements for the lifting of the equipment shall be determined at the design stage.

Structural support members should be installed on the exterior of the vessel and/or equipment. However, if such members are installed internally, they shall be fabricated of simple shapes such as smooth round bars or pipe for ease of applying the lining material.

The design of all equipment shall allow for access during the preparation of the surface and application of the lining and for venting of fumes evolved during the operation. In completely enclosed vessels there shall be at least one manhole with a minimum diameter as large as practical for the vessel being lined and additional branch or openings should be provided in order to allow an adequate circulation of air.

Pressure vessel internal fittings which have to be installed after completion of the lining process shall be designed to be lined or fabricated from materials that will not be affected by the process conditions.

All field connections of the spool/equipment shall be flanged. If for any reason screw connections cannot be avoided, these parts shall be fabricated in corrosion resistant materials.

The bore of any internal fitting bolt hole shall be dimensioned for the diameter of the bolt plus the lining system thickness.

The pressure vessels nozzles bore diameter shall be larger enough in order to allow access for coating the nozzle with the lining.

Equipment internal surface, as well as equipment internal accessories (stiffeners, supports, etc.) welded to equipment walls or structure, shall be totally coated. Other accessories shall be analyzed by PETROBRAS, to determine if they shall be coated or not.

Pressure tests as required by the design codes of the lines/equipment shall be performed and approved before applying the coating.

In case there is a transition from corrosion protection method from CRA to coated carbon steel, there shall always be a superposition of the coating over the CRA of at least 20 mm, as shown in Figure 2 below.

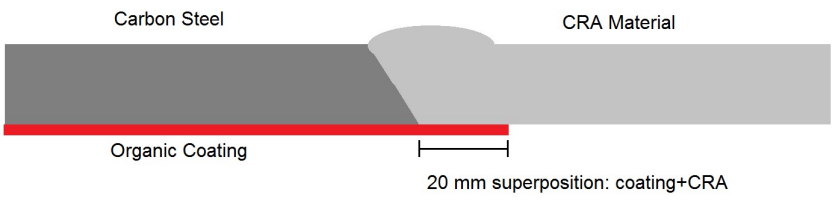

Figure 2 – Minimum superposition of 20 mm in transitions from coated carbon steel to CRA

4.13.9.1. Welds

All welds in the line/equipment shall be full penetration welds. They shall have been finished and properly inspected before applying the coating. Socket welds are not allowed, since they would leave a crevice that cannot be protected.

All welded supports and welded attachments shall be finished before applying the coating.

All NDT shall be finished and all welds approved before applying the coating.

All welds shall be continuous. Visual inspection of 100% of the length of the welds (root and face side) shall be performed, and the following is not acceptable:

- Lack of penetration;
- Lack of fusion;
- Excess penetration;
- Root undercut;
- Cracks;
- Pores;

Any defect that may affect the continuity of the coating.

The weld transition with the adjacent base metals shall be smooth (ISO 8501-3 Grade P3).

Crevices (as in socket welds) and sharp corners are not allowed. All corners shall be ground to a minimum radius equal to or greater than 5 mm.

4.13.9.2. Branch Connections

All branch connections shall be full penetration welds, as in “tees” or in integrally reinforced branch pieces. Branch connections that are connected by anything different from full penetration welds or that may result in any kind of crevice shall not be used.

All branch connections shall be short enough so that the visual inspection of the root of the connecting weld can be performed, as well as to facilitate the application of the coating and to perform the inspection that comes after coating.

All sharp corners in the branch connections shall be ground to a minimum radius of 5 mm (Figure 3).

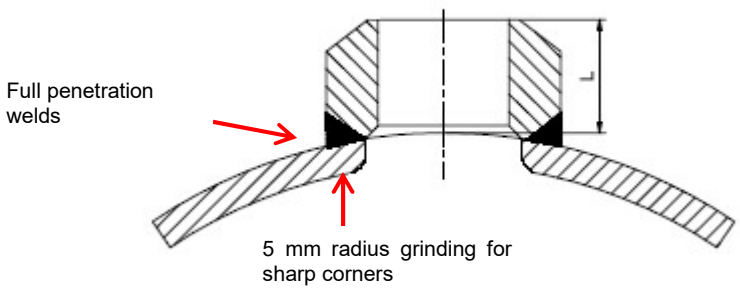

Figure 3 – Branch connections shall always be connected with full penetration welds, so that no crevices are formed. Sharp corners shall be ground to 5 mm minimum radius.

4.13.9.3. Flanges

The internal coating shall extend to the flange faces, as shown on the Figures below. This type of coating is only compatible with Flat Face (FF), Raised Face (RF) or Ring Type Joint (RTJ) flanges. Internal organic coating shall not be applied to compact type flanges, or any other type of mechanical connection or coupling.

All sharp corners in the flange faces shall be ground to a minimum radius of 5 mm (Figure 4).

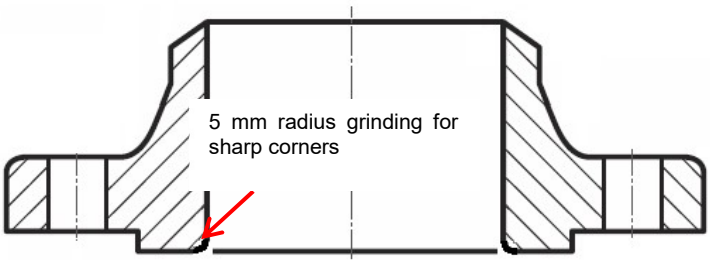

Figure 4 – Flange sharp corners shall be ground to 5 mm minimum radius.

Flat Face (FF) flanges shall be coated through all contact surface (Figure 5). Raised Face (RF) flanges shall be coated through all raised portion (Figure 6).

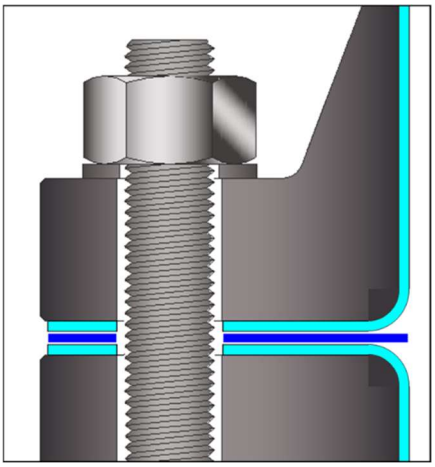

Figure 5 – Coating (light blue) in FF flange

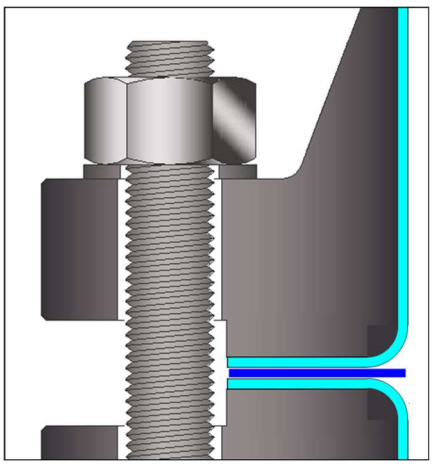

Figure 6 – Coating (light blue) in RF flange

RTJ flanges shall be covered through the entire raised portion until the groove. The groove shall be coated with Inconel 625 (Figure 7). The superposition of the CRA overlay with the coating region shall extend to a minimum of 10 mm (in flanges only; other areas of piping/equipment shall extend to 20 mm as in Figure 2).

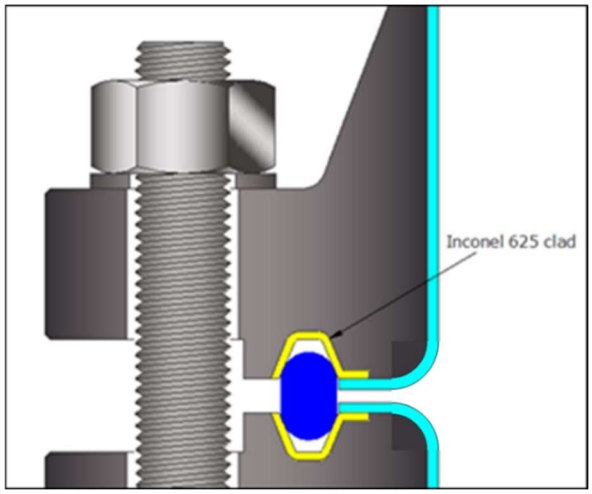

Figure 7 – Coating in RTJ flange. The ring grooves shall be coated in CRA

After applying the coating all flange faces shall be protected with a plastic or wood cover.

Add section

4.13.10. COLOR OF PAINT SYSTEMS

Color specification for paint systems, required identification of equipment, pipelines, structures, etc., or for safety reasons, is according to DR-ENGP-I-1.15- COLOR CODING

Bright and light colors shall be selected for internal coatings of tanks and confined spaces in order to facilitate the visual identification of corrosion spots during inspections.

10 QUALIFICATION REQUIREMENTS

10.2.2 Qualification of paint operators

Replace first paragraph with

Personnel carrying out surface preparation and coating application shall be qualified as specified at I-ET-3010.00-0000-970-P4X-001 -REQUIREMENTS FOR PROCEDURES AND PERSONNEL QUALIFICATION AND CERTIFICATION.

10.2.5 Qualification of supervisors, foremen and QC personnel

Replace first and second paragraph with

Personnel carrying out inspection or verification shall be qualified as specified at I-ET-3010.00-0000-970-P4X-001 -REQUIREMENTS FOR PROCEDURES AND PERSONNEL QUALIFICATION AND CERTIFICATION.

13 QUALITY MANAGEMENT AND PERFORMANCE ASSURANCE

Add new section

13.2. WARRANTY

The COATING WARRANTY shall be as stated at item 17 of I-ET-3010.00-1200-956-P4X-002.

SECTION II – IOGP S-715: SUPPLEMENTARY SPECIFICATION TO NORSOK M-501 COATING AND PAINTING FOR OFFSHORE, MARINE COASTAL AND SUBSEA ENVIRONMENTS

Supplementary-Specs
-to-NORSOK-M-501-(

SECTION III – IOGP S-715L: INFORMATION REQUIREMENTS FOR COATING AND PAINTING FOR OFFSHORE, MARINE COASTAL AND SUBSEA ENVIRONMENTS

Info-Reqs-for-Coatin
g-and-Painting-S-715I

SECTION V – IOGP S-715Q: QUALITY REQUIREMENTS FOR COATING AND PAINTING FOR OFFSHORE, MARINE COASTAL AND SUBSEA ENVIRONMENTS

Quality-Reqs-for-Coa
ting-and-Painting-S-7