

GENERAL SPECIFICATION

CORROSION

GS EP COR 420

External field joint coatings of pipelines

08	10/2012	Alignment with ISO 21809-3 – Approval of liquid product for onshore field joints
07	01/2011	Addition of requirements to avoid damages due to overheating during field joint coating application (§ 7.7)
06	10/2009	Removal of 1C type Change in Table 2 Addition of new requirements for HSS application Addition of salt contamination and dust level control
05	10/2008	Specification becomes limited to EP
00	10/2002	First issue
Rev.	Date	Purpose of the revision

Owning entity: DEV/TEC

Managing entity: DEV/TEC/COR

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1. Scope

This specification covers the external field joint coatings applied for ensuring the continuity of anticorrosion to the steel surface which is left bare when plant coated seamless or welded pipes are joined by welding to constitute pipelines used for onshore or offshore oil, gas or water transportation. Parent pipe coating shall normally be in compliance with [GS EP COR 220](#), [GS EP COR 221](#), [GS EP COR 222](#) and [GS EP COR 225](#).

Pipelines coated with these types of coatings are protected by means of cathodic protection.

As requested in [ISO 13623](#), field joints shall be protected with a coating system which is compatible with the line pipe coating and allow satisfactory application under the predicted field conditions. The performance of field joint coating should ideally meet or exceed the factory applied coating on line pipes.

This specification defines the possible different types of coatings for buried and immersed pipelines as described in Table 1 as a function of the plant coating existing on the pipes as defined in Table 2.

The type(s) of field joint coating(s) accepted for a given project is/are specified in a Project Specification in reference with the codification given in the present document.

For examples:

- Polyethylene based heat shrinkable sleeves applied on liquid epoxy primer: Field joint coating type 1B
- Flame sprayed polypropylene applied on a FBE primer: Field joint coating type 3A.

In absence of a Project Specification or specific requirement in the tender or order, the field joint coating type(s) accepted are given in Table 2 as a function of the plant coating of tubes.

Except when otherwise stated in the present document, requirements of [ISO 21809-3](#) fully apply for the different types of field joint coatings.

For each of the field joint coating type, the present document specifies the minimum requirements for the following:

- Applicator's obligations
- Nature, description and composition of coatings
- Application of coatings
- Characteristics of coatings
- Qualification testing
- Pre-production and production testing and inspection.

Repairs of plant and field joint coatings are also addressed in the present document.

2. Reference documents

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

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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
EN 10204	Metallic products - Types of inspection documents
ISO 11357-6	Plastics — Differential scanning calorimetry (DSC) — Part 6: Determination of oxidation induction time (isothermal OIT) and oxidation induction temperature
ISO 13623	Petroleum and natural gas industries - Pipeline transportation system
ISO 21809-3	Petroleum and natural gas industries – external coatings for buried or submerged pipelines used in pipeline transportation systems – Part 3: Field joint coatings.
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 8502 (Parts 3; 6; 9)	Preparation of steel substrates before application of paint and related products. Tests for the assessment of surface cleanliness - Parts 3; 6; 9
ISO 868	Plastics and ebonite - Determination of indentation hardness by means of a durometer (Shore hardness)

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 220	Three layer polyethylene external coating for pipelines
GS EP COR 221	Three layer polypropylene external coating for pipelines
GS EP COR 222	Fusion Bonded Epoxy (FBE) external coating for pipelines
GS EP COR 225	Polyethylene and Polypropylene coatings for bends and fittings

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3. Definitions of main parties involved

For the purposes of this specification, the following terms and definitions apply:

3.1 Company

Total or its subsidiary or agent acting on its behalf shall be referred to herein as the "Company".

3.2 Contractor

The Company, or their agents, designated in the Contract as being the selected main Contractor for the job to be performed, i.e. pipelines laying operations, shall be referred to herein as the "Contractor".

3.3 Manufacturer

The Company which produces and sells the products used for the field joint coating shall be referred to herein as the "Manufacturer".

3.4 Applicator

The Company in charge of the field joint coating application and quality control which is eventually sub-contracted by the Contractor shall be referred to herein as the "Applicator".

3.5 Inspector

The Company's representatives or members from Company elected Inspection Bodies for the time being or from time to time duly appointed in writing by the Company to act as its representatives for the purpose of the Contract shall be referred to herein as the "Inspector".

4. Information to be supplied by the Company

The Company or his representative will state in his inquiry and order, by a Project Specification, the following information:

- Maximum operating temperature, minimum temperature if relevant
- Joints coated in accordance with this specification designated by reference to the temperature class
- Type(s) of coating(s) accepted in accordance with codification of Table 1 and requirements of Table 2
- More specific information on the type of coating material and application process, including approved Manufacturer and trade of product if needed
- Acceptability of repairs
- Maximum number and dimensions of repairs (if allowed)
- Repair procedure
- Type of test certificate when different from requirements of the present document

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- Minimum thickness of the coating when different from requirements of the present document
- Overlap of the factory applied coating.

5. Applicator's Obligations

5.1 Approval of coating method and products

The Contractor shall, in his tender, submit the method of application and data sheets of all the coating materials selected by him for Company approval (field joint coating and coatings repair), in accordance with the present General Specification and the specific requirements given in the Project Specification, the tender or the order.

Once approved, the coating products and method shall not be changed by the Applicator without prior written authorisation of the Company.

The approval decision shall not in any case be considered as a guarantee from the Company with respect to the coating material but as most as an authorisation for use.

The time necessary for the various operations related to surface preparation, heating, coating application and testing shall be defined by Applicator and checked and approved by Contractor in order to suit with the pipeline laying operations.

5.2 Supply of coating products

The Contractor shall obtain through the Applicator from the Manufacturer(s) and submit to Company:

- The guarantee that the coating products delivered shall meet the required coating characteristics as set forth according to the specified methods
- Production test certificates for the coating products
- In case epoxy powder is used, one test certificate per batch, including respectively the test results as defined in the present document which shall be in conformity with the specified methods and acceptable values
- Standard Infra Red Scan of epoxy powder for each production batch
- Conditions of application of the coating products (field joint and repair of plant coating and field joint coating)
- Packaging and storage requirements of coating materials
- Marking on each packing of coating materials with mention of the following information:
 - Manufacturer's name
 - Name and complete identification of product including factory of origin
 - Reference to applicable coating standards
 - Production batch or cast number

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- Date of production
- Limit date of use.

5.3 Qualification of the coating systems

Except if a written derogation is given by Company (for field proven coating systems as per Company's experience), the coating system, products, application process, equipment to be used for surface preparation and application of the coating system and personnel which execute the job shall be qualified, in the presence of a Company representative, based on a Procedure for Qualification Trial (PQT). These tests should be carried out either independently of a specific job or two months before production start up at the latest for a given job, and shall be organised jointly by the Contractor, the Applicator or the Manufacturer. Tests and acceptable results are those specified in the present document in the chapters related to the different field joint coating systems.

In all cases, Manufacturer(s) shall assist Applicator for ensuring the right use of the coating product(s) and train the personnel. It shall also fully endorse application procedures written by Applicator by a written statement.

- The procedure to be used shall be submitted to Company for approval before PQT.
- Operators should be already familiar with the field joint coating type application.
- PQT shall be carried out on pipes having the same diameter and the same thickness that the actual pipes.
- Tests shall be carried out on test zones distributed along an actual pipe coated with the same process as the other pipes. The length of the test zones should be equivalent to the field joint coating length.
- A girth cap weld shall be added at the centre of each of the test zones in order to mimic the field weld.
- All equipment (induction heating, abrasive blasting, coating application equipment and also inspection equipment and tools) used for PQT shall be the same as the equipment which will be used for the actual field joint coating.
- **The time for coating application on a test zone shall not exceed the estimated field joint coating time on yard or on the barge.**
- **After pqt, the time for each step of the application procedure shall be established. These time data shall then be used as process control during field joint application offshore. In no case application offshore shall be quicker than the time established during pqt.**
- If PQT is related to the field joint coating type 3A, coating samples shall be collected to measure the Oxygen Induction Time.
- In all cases, ageing tests shall be performed at PQT stage, in order to assess the durability of proposed solution and application procedure. Testing shall be as follow: 28 days soak test in deionized water at 60 and 80°C or max operating temperature of samples taken from field joint. Location of sample shall be as follow: at weld seam and at overlap with parent coating. After 2 days test, samples shall be visually inspected for any

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type of disbondment (to be reported in a specific report), plus adhesion test to be carried out on both location. Results to be reported in a specific report. Typically, adhesion shall be no less than 70% of initial value and no visible disbondment shall take place. In any case, full test procedure shall be submitted to Company for approval.

The Contractor, Applicator or Manufacturer shall submit a complete report of the PQT results to the Company for approval at least one month before production start up.

5.4 Qualification of Operators

The personnel who will apply the field joint coating system and the repair products have to be individually qualified, through a Certification scheme (or during PQT). Technical assistance from the Manufacturer shall be ensured for training of personnel and verification of their qualification for a correct application of their product.

Contractor or Applicator shall not replace the qualified Applicators without informing Company. A new qualification test shall be organised for the new Applicators and at the Contractor's expense.

5.5 Notification prior starting coating work

The Contractor shall notify the Company, at least eight working days before coating application, of the dates of coating execution to permit mobilisation of the Company designated Inspector.

Upon arrival at the field joint coating facilities, the Inspector shall receive from the Contractor/ Applicator the documents supplied by the Manufacturer as specified in § 5.2.

5.6 Other requirements

The Contractor/Applicator shall supply all personnel, coating material and repair products, equipment, application material and inspection apparatuses.

The Applicator shall store the coating materials and repair products, perform coating application and inspection in conformity with the present document and all the relevant rules of practice.

The Inspector shall have free access to the field coating site. The Contractor shall provide the Inspector with all the facilities necessary for the proper execution of his mission. He will provide accommodation to him in case of offshore or remote locations.

Manufacturer shall send a representative on site at start of coating application (PPT) to ensure:

- Proper application of its product by Applicator (i.e. according to PQT procedure endorsed by all parties)
- Proper qualification of all Operators
- Test results and overall quality in accordance with this standard (and PQT).

Manufacturer shall send a representative for full supervision of all field joint activities offshore and onshore during production.

It shall be demonstrated by Contractor at PQT stage that all laying constraints have been considered and will not be detrimental to the quality of the applied field joint coating. Such constraints can be mechanical damages by stinger rollers and the likes.