



Exploration & Production

GENERAL SPECIFICATION

CORROSION

GS EP COR 223

Bituminous hot applied external pipeline coatings

04	10/08	General revision
03	10/07	Addition of international standards titles
02	10/05	Addition of "EP" root to GS identification
01	09/03	Change of Group name and logo
00	03/01	First issue
Rev.	Date	Notes

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1. Scope

This general specification refers to [EN 10300](#) in full for all requirements, except for those listed below, which shall overrule any statement within EN 10300.

This specification covers external anticorrosion coating of linepipes using hot applied bituminous materials for onshore and offshore oil, gas, or water lines.

The coating shall be plant applied, reinforced hot bitumen based enamel suitable for service temperature up to 55°C without concrete weight coating.

When coated with concrete weight coating, the reinforced hot bitumen based enamel coating is approved for service temperature according to [EN 10300](#), depending on the type of bitumen:

Oxidized bitumen: -15°C up to +75°C

Modified bitumen: -30°C up to +90°C.

In this document the wording:

- "Will" is normally used in conjunction with an action by COMPANY rather than by CONTRACTOR, Applicator, or MANUFACTURER
- "Should" indicates a non-mandatory advice, while "may" refers to options
- "Shall" and "is to be" are mandatory requirements
- "Must" is used only where a provision is a statutory requirement.

2. Reference documents

The reference documents listed below form an integral part of this General Specification. Unless otherwise stipulated, the applicable version of these documents, including relevant appendices and supplements, is the latest revision published at the EFFECTIVE DATE of the CONTRACT.

Standards

Reference	Title
EN 10300	Steel tubes and fittings for offshore and onshore pipelines – Bituminous hot applied materials for external coating
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 8502-3	Preparation of steel substrates before application of paints and related products -- Tests for the assessment of surface cleanliness -- Part 3: Assessment of dust on steel surfaces prepared for painting (pressure-sensitive tape method)
ASTM D 71	Standard test method for relative density of solid pitch and asphalt
ASTM D 36	Standard test method for softening point of bitumen
ASTM D 5	Standard test method for penetration of bituminous materials

Reference	Title
ASTM D 1000	Standard test methods for pressure-sensitive adhesive-coated tapes used for electrical and electronic applications
ASTM G 8	Standard test methods for cathodic disbonding of pipeline coatings
NF T 60-103	Petroleum products: Closed cup flash point of lubricants and fuel oils

Professional Documents

Reference	Title
Not applicable	

Regulations

Reference	Title
Not applicable	

Codes

Reference	Title
Not applicable	

Other documents

Reference	Title
Not applicable	

Total General Specifications

Reference	Title
GS EP COR 420	External field joint coatings of pipelines

3. Definitions of main parties involved

3.1 COMPANY

Total or its subsidiary or agents acting on its behalf, shall be referred to herein as "COMPANY".

3.2 CONTRACTOR

The company, or their agents, designated in the Contract as being the selected main contractor shall be referred to herein as "CONTRACTOR".

3.3 MANUFACTURER

Means the company which produces and supplies coating materials.

3.4 Applicator

Means the company which prepares the surface of the linepipes and applies the coating.

3.5 Inspector

COMPANY representatives or members from COMPANY elected Inspection Agencies duly appointed in writing by COMPANY to act as its Representatives for the purpose of the contract shall be referred to herein as "Inspector".

4. Applicator's obligations

4.1 Data sheets to be supplied during tender

CONTRACTOR shall, in his tender, submit the data sheets of all components, coating and repair products selected for COMPANY approval.

Once approved these components shall not be changed by Applicator without prior written authorisation of COMPANY.

COMPANY approval shall not be considered as a guarantee from COMPANY with respect to coating and repair products but as an authorisation for use.

4.2 Test certificates and condition of application for each component

CONTRACTOR shall submit to COMPANY the following information obtained from MANUFACTURER:

- A statement stipulating that the coating and repair products delivered shall meet the required coating characteristics as set forth in [EN 10300](#).
- Certificate of analysis and certificate of conformity for each batch of material to be used.
- Primer and bitumen enamel main application parameters:
 - Primer coverage
 - Minimum and maximum primer wet thickness
 - Primer drying time
 - Minimum and maximum heating temperatures for bitumen
 - Minimum and maximum application temperatures for bitumen
 - Maximum time during which bitumen can be kept at application temperature
 - Base material packaging and storage requirements
- Conditions of application of the repair products
- Packaging and storage requirements of coating materials and repair products

MANUFACTURER shall ensure that packaging includes legible marking or a delivery note for each container mentioning the following information:

- Name of MANUFACTURER

- Complete identification of the base material
- Number of production batch
- Date of production
- Shelf life or expiry date for use.

4.3 Pre-Qualification Testing

A PQT (Pre Qualification Test) shall be carried out at least a month in advance at Applicator's facility, and test results shall be in accordance with [EN 10300](#).

All tests results and process parameters shall be recorded during PQT.

At start of production, a PPT (Pre-Production Testin) shall be carried out to check conformity of all parameters with the ones recorded during PQT.

During production, all process parameters shall be within 5% of recorded values during PQT. This includes pipe travel velocity during blasting and coating operations.

4.4 Notification prior start of coating work

CONTRACTOR shall notify COMPANY, at least two weeks in advance, of the dates of coating application, in order to allow for the mobilisation of COMPANY designated Inspector.

The Inspector shall have free access to Applicator's workshops, storage yards and laboratory. Applicator shall provide him with all facilities necessary for the proper execution of his duties i.e. office, telephone, telex, personnel, handling equipment, calibrated measuring instruments, etc.

Upon arrival at the coating plant, Inspector shall receive from CONTRACTOR/Applicator the documents supplied by MANUFACTURER as specified in § 4.2.

4.5 CONTRACTOR/Applicator commitments

CONTRACTOR/Applicator shall:

- Supply all personnel, coating materials and repair products, equipment, application materials and inspection apparatus.
- Be in charge of unloading, acceptance and storage of bare pipes, storage and loading of coated pipes.
- Store coating materials and repair products, perform coating application and inspection in conformity with this specification.

4.6 Acceptance certificates

CONTRACTOR and Applicator shall sign jointly with Inspector the coated pipes acceptance certificate including the results of all tests and inspection as set forth in this specification.

The acceptance certificate of coated pipes shall certify that the tests and inspection have been performed by Applicator under the responsibility of CONTRACTOR and have been witnessed by Inspector.

One copy shall be transmitted to COMPANY and one copy shall be given to Inspector.

5. Description of coating and characteristics of raw materials

As per [EN 10300](#) chap 4, except for the following:

- Primer type 2 is not allowed
- Hot applied bitumen based tapes (chap 4.2.7) are not allowed

6. Application of the coating and repair materials

As per [EN 10300](#), except for the following:

The coating shall be plant applied on each pipe.

6.1 Surface preparation

All pipes shall be grit blasted to remove all oxide films.

Before blasting, the pipe surface shall be inspected and cleaned to remove all dirt (old coating, paints, loose particles, grease, oil, etc.).

All traces of oil and grease shall be brushed and wiped off using xylol and using a clean cloth. The use of dirty or greasy cloths shall be prohibited.

If pipes have been left in a marine and/or polluted atmosphere they shall be subject to chemical cleaning before shot-blasting to remove all traces of chlorides and/or sulfides.

All moisture shall be removed by pre-heating the pipes to a temperature of at least 40 °C.

Blasting shall be performed on dry surfaces using an automatic machine. Blasting shall not be commenced when:

- The surface is likely to be humid after surface preparation
- The surface temperature is less than 3°C above the surrounding air's dew point
- The air's relative humidity is greater than 85%.

If the air's relative humidity is greater than 85%, the surface preparation by abrasive blasting may be performed if the pipes have been preheated so as to keep their temperature at least 3°C above the surrounding air's dew point until surface preparation, primer application and enamel applications are completed.

The degree of cleanliness of pipes shall be Sa 3 according to [ISO 8501-1](#).

The blasting media shall be selected so that the roughness obtained is 75 microns +/-25 microns in Ry5, measured as per [ISO 8503-4](#) (stylus equipment). The use of replica tape is not allowed.

Just before primer application, all dust or grit shall be removed from pipe surface to reach a maximum dust level 2 as per [ISO 8502-3](#).

All pipes shall be primed within two hours of blasting. They shall not be allowed to stay in a moist atmosphere. All moist pipes shall be re-blasted. Any pipe not primed within two hours after blasting shall be re-blasted.

6.2 Application of primer

As per [EN 10300](#) (chap 5.2).

6.3 Application of reinforced enamel

As per [EN 10300](#) (Chap 5.3)

Enamel that has been heated in excess of the manufacturer's maximum recommended temperature shall be rejected.

6.4 Application of the outerwrap

As per [EN 10300](#) chap 5.3

6.5 Application of repair materials

All defects detected by holiday detector and damaged coating areas not over 1500 cm² in size resulting from destructive testing or mechanical accidents shall be repaired by means of inner wrap reinforcement impregnated with bitumen enamel.

Repairs shall be made after cleaning of the defective area and bevelling of the adjacent coating.

The repaired coating shall meet the thickness and electrical porosity requirements as defined in paragraph **Erreur ! Source du renvoi introuvable.**

All repair procedure and characteristics shall be validated during PQT.

6.6 Application of UV protection coat

After coating inspection and before storage the UV protection coating shall be applied either by brush or spraying.

UV protection shall be applied to 100% of the coated surface. No UV protection shall be applied on the bare pipe ends.

7. Characteristics of coating

As per [EN10300](#) (Chap 6).

8. Testing and acceptance methods - Acceptance criteria

As per [EN 10300](#) (Chap 6)

→ CD test is mandatory during PQT

→ Annex Q of [EN 10300](#) is mandatory and is fully part of this specification.

8.1 Inspection by COMPANY or appointed inspector

Applicator shall submit examination and test reports to Inspector, as work progresses.

Inspector shall have the possibility to choose the pipes to be tested. The tests shall be performed in the presence of the Inspector.

In case of unsatisfactory results on one pipe, Inspector may request further testing of five more pipes, generally those immediately preceding or following the defective one.

Inspector may request cutting of pipe sections for laboratory examination. He may also take samples from the coating materials for third party laboratory analysis.

8.2 Laboratory tests

If coated linepipes are rejected during production, or if QA/QC deficiencies are raised by Inspector, COMPANY may perform laboratory tests in a third party laboratory to determine:

- Materials compliance with the requirements of the present specification
- Compliance of the coating with the requirements of this specification or the particular specification.

The results of these tests shall be transmitted to Applicator.

If the results are not conclusive, Applicator may be requested to proceed, at his expense, with a contradictory check in another independent laboratory.

8.3 Quality control methods and frequency

As per [EN 10300](#) Chap 6 and Annex Q (mandatory).

In addition, residual magnetic intensity measured on each pipe, and at both ends shall be below 30 Gauss after coating.

9. Repairs

As per [EN 10300](#) (Chap 7).

10. Handling, shipping and storage

Applicator shall be responsible for unloading of bare pipes, storage, handling throughout coating works, up to and including loading of coated pipes onto shipping vehicles. He shall therefore be held responsible for any damage to the pipes during these operations.

Applicator shall therefore:

- Inspect the pipes upon arrival to ensure they were not previously damaged
- Take adequate steps to prevent bare or coated pipes being damaged.

11. CONTRACTOR obligations during welding and bending of coated pipes

11.1 Welding

No particular precaution shall be taken except in case of heavy wall pipe where wet rugs shall be used in order to cool down the pipe near the coating edge.

11.2 Bending

Where coating becomes damaged or detached during bending after completion of the coating, the coating shall be stripped off until sound coating is found. The damaged area shall be recoated using enamel and reinforcing material. The thickness of the repaired coating shall be checked and the repair shall be submitted to holiday detection.



12. Coating of field joints

Field joint systems and procedure shall be submitted to COMPANY for approval. Following approval of the procedures, PQT shall be performed in due time and at least two month prior to laying operations.

Field joint coating shall conform to **GS EP COR 420**.