



Exploration & Production

GENERAL SPECIFICATION

CORROSION

GS COR 250

**Friction-reduction internal coatings
for pipelines transporting non-corrosive gases**

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Rev.	Date	Notes



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1. Scope

This specification covers requirements and methods of tests for liquid epoxy paints and internal coatings of such paints in pipes and fittings for the conveyance of non corrosive gas. It also deals with the application and inspection of the paint. Other paints or paint systems are not excluded provided they comply with the requirements given in this specification.

The coating consists of one layer, which is normally shop applied on blast cleaned steel by airless spray or conventional spray techniques. **The applied and cured paint film must be smooth to give the desired reduction in friction. To that respect and if needed, more specific requirements will be documented for each project leading to more stringent application procedure (with regards to surface preparation and/or dry film thickness).**

Brush application shall be used only for repairs. Unless otherwise agreed, the coating shall be suitable for operating temperatures between -20°C and $+110^{\circ}\text{C}$.

The present general specification makes reference to and fully endorse the [ISO 15741](#), with the restrictions listed below.

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
ISO 15741	Paints and varnishes : Friction-reduction coatings for the interior of on and off shore steel pipelines for non corrosive gases
EN 10301	Steel tubes and fittings for on and offshore pipelines – Internal coating for the reduction of friction for conveyance of non-corrosive gas
ISO 2409	Paints and varnishes - Cross cut test
ISO 2431	Paints and varnishes - Determination of flow time by use of flow cups
ISO 2808:1997	Paints and varnishes - Determination of film thickness
ISO 8501-1	Preparation of steel substrates before application of paints and related products - Visual assessment of surfaces cleanliness - Part 1: Rust grades and preparation grades of uncoated substrates and steel substrates after overall removal of previous coating
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 adhesive tape method)
ISO 8503-1	Preparation of steel substrates before application of paints and related products - Surface roughness characteristics of blast cleaned steel surfaces - Part 1: Specifications and definitions for ISO surface profile comparators for the assessment of abrasive blast cleaned surfaces.
ISO 8503-2	Preparation of steel substrates before application of paints and related products - Surface roughness characteristics of blast cleaned steel surfaces - Part 2: Method for the grading of surface profile of abrasive blast cleaned steel - Comparator procedure

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
Not applicable	

3. Terms and definitions

As per [ISO 15741](#).

4. Coating materials

As per [ISO 15741](#).

4.3.9 Resistance to gas pressure variations

As per [ISO 15741](#) except that the adhesion value shall fulfil the requirements as given in 4.3.4 after conditioning for 24, 48 and 72 hrs at 18 to 25°C and lower or equal to 80% RH.

4.3.10 Resistance to water immersion

As per [ISO 15741](#) with the following additional requirements :

In complement, after removal from the chamber and then after conditioning for 24 hrs at 23°C +/- 2°C, the coating shall have an adhesion value conforming to paragraph 4.3.4 of the ISO standard.

5. Application of the coating material

As per [ISO 15741](#), except for the following paragraphs:

5.1 General

During application of the coating material, all step in the coating process shall be assessed and recorded. The parameters listed in table 4 shall be included:

Table 4: Minimum items to be checked and recorded during coating process

Items	Method	Frequency	Acceptance criteria
Coating material			
Name of product	Visual examination	Once per shift	As specified
Name of manufacturer	Visual examination	Once per shift	As specified
Batch number	Visual examination	Once per shift	As specified
Surface condition prior to surface preparation	Visual examination	Every pipe	As specified
Surface condition after surface preparation			
Surface cleanliness	ISO 8501-1	Every pipe	As specified
	ISO 8502-3	Twice per shift	As specified
Surface profile	ISO 8503-1	Twice per shift	As specified
Surface imperfections (dents, laps...)	Visual examination	Every pipe	Subject to agreement
Wet paint (mixed)			
Viscosity and temperature	ISO 2431	Every time paint is mixed and every time apinting is interrupted	As specified
Environmental conditions in the painting area			
Ambient temperature	Instrumental	Continuously	As specified
Steel temperature	Instrumental	Twice per hour	As specified
Relative humidity	Instrumental	Continuously	As specified
Dew point	Instrumental	Once per shift	As specified
Cured paint film on pipes			
Appearance and continuity	Visual examination	Every pipe	No sagging
Dry film thickness	ISO 2808:1997, method 10	3 per shift	As specified
Porosity (pinholes)	Wet sponge test Annex G of ISO 15741	The test shall be carried out only if porosity test on glass panels constitute a failure	As specified
Cured paint film on steel panels			Classification lower or equal to 1



Adhesion	ISO 2409	3 per shift	No loss of adhesion
Bend test	ISO6860	3 per shift	
Buchholz hardness	ISO2815	3 per shift	Hardness higher or equal to 94
Curing test	Annex F of ISO 15741	3 per shift	No softening, wrinkling, blistering
Paint film on glass test panel			
Porosity (pinholes)	Annex E of ISO 15741	3 per shift and every new batch	Max 5 pores

5.2 Surface preparation

First check that the surfaces are free from any foreign matter such as welding flux, welding spatter, salts, oil or grease. If necessary, wash the surfaces with a high pressure jet of fresh water. Remove organic contaminants using detergent or suitable organic solvents.

Then blast clean the surfaces to surface preparation grade Sa 2 1/2 in accordance to ISO 8501-1.

Remove, using suitable methods, any surface irregularities or imperfections which may have become visible.

The dust level shall be 2 maximum as per ISO 8502-3.

Check the surface profile. Unless otherwise agreed, it shall correspond to "G medium" as per ISO 8503-1.

During and after blast cleaning and prior to application of the coating material, the temperature of the steel surface shall be at least 3°C above the dew point or the minimum curing temperature given by the coating material manufacturer, whichever is the highest.

6. Production control

As per ISO 15741 with frequency reported in table 4.

7. Repairs

As per ISO 15741.

8. Handling, transporting and storage

As per ISO 15741.

9. Annexes

Refer to ISO 15741 (annex A to G apply).