DEP SPECIFICATION

EXTERNAL FUSION-BONDED EPOXY POWDER COATING FOR LINE PIPE (AMENDMENTS/SUPPLEMENTS TO ISO 21809-2:2007)

DEP 31.40.30.32-Gen.

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DESIGN AND ENGINEERING PRACTICE

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When Contractors or Manufacturers/Suppliers use DEPs, they shall be solely responsible for such use, including the quality of their work and the attainment of the required design and engineering standards. In particular, for those requirements not specifically covered, the Principal will typically expect them to follow those design and engineering practices that will achieve at least the same level of integrity as reflected in the DEPs. If in doubt, the Contractor or Manufacturer/Supplier shall, without detracting from his own responsibility, consult the Principal.

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PART I INTRODUCTION AND GENERAL REQUIREMENTS

1. INTRODUCTION

1.1 SCOPE

This DEP specifies requirements and gives recommendations for factory-applied external single and dual layer fusion-bonded epoxy (FBE) powder coating for corrosion protection of steel pipes, bends and fittings used for buried or submerged pipelines. It specifies the requirements for coating materials, coating application, inspection and testing, repair, handling and storage.

This DEP also gives procedures for qualification of coating materials and coating applicators.

Part II of this DEP amends, supplements and deletes various clauses of ISO/DIS 21809-2:2007. Part II follows the clause numbering ISO/DIS 21809-2:2007 for easy reference.

This DEP is a revision of the DEP of the same number and title dated April 2003; see (Part I, 1.6) regarding the changes.

1.2 DISTRIBUTION, INTENDED USE AND REGULATORY CONSIDERATIONS

Unless otherwise authorised by Shell GSI, the distribution of this DEP is confined to Shell companies and, where necessary, to Contractors and Manufacturers/Suppliers nominated by them. Any authorised access to DEPs does not for that reason constitute an authorization to any documents, data or information to which the DEPs may refer.

This DEP is intended for use in oil refineries, chemical plants, gas plants, exploration and production facilities and supply/distribution installations. This DEP may also be applied in other similar facilities.

When DEPs are applied, a Management of Change (MOC) process should be implemented; this is of particular importance when existing facilities are to be modified.

If national and/or local regulations exist in which some of the requirements may be more stringent than in this DEP, the Contractor shall determine by careful scrutiny which of the requirements are the more stringent and which combination of requirements will be acceptable with regard to the safety, environmental, economic and legal aspects. In all cases the Contractor shall inform the Principal of any deviation from the requirements of this DEP which is considered to be necessary in order to comply with national and/or local regulations. The Principal may then negotiate with the Authorities concerned, the objective being to obtain agreement to follow this DEP as closely as possible.

1.3 DEFINITIONS

1.3.1 General definitions

The **Contractor** is the party that carries out all or part of the design, engineering, procurement, installation, and commissioning or management of a project or operation of a facility. The Principal may sometimes undertake all or part of the duties of the Contractor.

The **Manufacturer/Supplier** is the party that manufactures or supplies equipment and services to perform the duties specified by the Contractor.

The **Principal** is the party that initiates the project and ultimately pays for its design and construction. The Principal will generally specify the technical requirements. The Principal may also include an agent or consultant authorised to act for and on behalf of the Principal.

The word **shall** indicates a requirement.

The word **should** indicates a recommendation.

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1.3.2 Specific definitions

The Applicator - the party that applies the fusion-bonded epoxy powder coating system in the coating plant.

Batch - the amount of materials produced within one uninterrupted production run of maximum 10 h under constant production conditions.

Chemical pre-treatment - the treatment of the blast-cleaned pipe surface with a chemical solution (e.g. phosphate) before application of the coating layer to improve the adhesion of the coating to the substrate.

Coating contractor - the party that is ultimately responsible for the coating operation, which may include supply of coating materials, application of the coating and transport of uncoated and coated line pipe as specified in the relevant contract. The Coating Contractor may be the Applicator, the Coating Manufacturer, the Line Pipe Manufacturer or the Pipeline Construction Contractor.

Holiday - a defect penetrating through the coating to the steel pipe surface, whereby its dimensions is detectable by means of the specified procedures.

Inspector - the party appointed by the Principal to witness the Applicator's quality control of coating materials and the coating process.

Qualification trial – process of application of the total coating system and subsequently inspection/testing of its properties to confirm that the coating system and coating applicator are adequate to produce the coating of specified properties. The qualification trial shall be carried out prior to any start of production coating.

Shift – duration of a normal work cycle of which the beginning and end coincide with a change in personnel. In the context of the quality control procedures of this DEP, the maximum duration of a shift is 10 hours.

Unit of production – unless otherwise specified, a set of pipes coated in one production run on the same coating line, having the same nominal diameter and wall thickness and coated with the same coating products. Breaks in production caused by equipment or plant breakdown, factory shutdown, or any break in production exceeding three days shall be the end of a production run. Subsequent start-up constitutes a new unit of production.

1.4 ABBREVIATIONS

AFC Approved For Construction

ITP Inspection and Test Plan

MP Manufacturing Plan

QP Quality Plan

1.5 CROSS-REFERENCES

Where cross-references to other parts of this DEP are made, the referenced section is shown in brackets. Other documents referenced in this DEP are listed in (Part III).

1.6 CHANGES FROM THE PREVIOUS EDITION

This DEP is a revision of the DEP of the same number dated April 2003. This revision is written in the form of amendments/supplements to ISO/DIS 21809-2:2007 and it is therefore impractical to summarise the changes here.

1.7 COMMENTS ON THIS DEP

Comments on this DEP may be sent to the Administrator at standards@shell.com, using the DEP Feedback Form. The DEP Feedback Form can be found on the main page of "DEPs on the Web", available through the Global Technical Standards web portal http://sww.shell.com/standards and on the main page of the DEPs DVD-ROM.

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2. GENERAL REQUIREMENTS

2.1 GENERAL

Part II of this DEP amends, supplements and deletes various clauses/paragraphs of ISO/DIS 21809-2:2007. Wherever reference is made to ISO/DIS 21809-2, it shall be understood to mean ISO/DIS 21809-2:2007 as amended/supplemented by this DEP.

For ease of reference, the clause numbering of ISO/DIS 21809-2 has been used throughout Part II of this DEP. Clauses of ISO/DIS 21809-2 that are not mentioned in this DEP shall remain applicable as written.

2.2 DOCUMENT HIERARCHY

In the event of conflicts between contract documents, AFC drawings, specifications and other referenced standards, the following document hierarchy shall apply:

- Contract or agreement (including any approved exceptions)
- AFC drawings – latest revisions
- Principal's specifications (including project specific information)
- Industry Standards (e.g. ISO, NACE)

2.3 SAFETY

Application of coatings can include the use of hazardous materials, operations and equipment. This DEP does not purport to address all the potential safety concerns associated with their use. It is the responsibility of the Applicator to establish appropriate safety and health requirements and determine any regulatory requirements or limitations prior to use

Health, Safety and Environment concerns shall be identified and included in the detailed coating procedure and pre-job discussions. All surface preparation and coating application systems shall undergo a complete safety inspection and checkout prior to use.

Adequate exhaust/ventilation equipment shall be used, as required, for removal of any air contaminated products to achieve acceptable air quality standards and to protect personnel.

The safe practices recommended in industry standards shall be followed. Waste material shall be handled and disposed of properly. Protective equipment requirements in the Manufacturer's Material Safety Data Sheet(s) shall be followed.

Coating work pieces shall be electrically grounded (earthed) as required to eliminate static charges associated with surface preparation and coating operations.

2.4 COMPANY ACCESS

The Principal's representative, including independent inspectors or consultants as may be engaged by the Principal, shall be permitted access to the coating application site at any time to conduct performance analyses, including quality control tests of the materials being used.

The Principal's representative has the right to reject any or all work or equipment that in his/her opinion does not conform to these requirements. Any work that in the opinion of the Principal's representative does not comply with these requirements shall be rectified at the Contractor's expense.

The Principal's representative has the right to request quality control tests at any time in addition to those completed at pre-determined intervals.

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2.5 PRE-JOB MEETING

The Applicator shall schedule a pre-job meeting to ensure that job requirements are fully understood.

The personnel present at the meeting shall include, but not be limited to, the Principal's representative and the Applicator's representatives for coating supervision, quality control and safety. If required a technical representative of the Manufacturer shall be present.

Roles and responsibilities shall be clarified at the pre-job meeting, such as when the Principal deals with the Applicator, who are the focal points and how administration procedures are executed. It shall be confirmed that all parties have the latest version of the Contract, technical specifications, AFC drawings and ITP.

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PART II AMENDMENTS/SUPPLEMENTS TO ISO 21809-2

1 SCOPE

Delete the second paragraph.

Add the following:

Suitability of a coating system for a particular temperature class shall be demonstrated by performing the qualification tests at the relevant test temperature given in this DEP. For a specific project, additional testing should be performed at the temperature specified in the project documentation.

The coating system described in this DEP shall be made with the use of FBE powder as the main coating material, by means of suitable surface preparation and application techniques to obtain the coating properties required for the intended installation and operating conditions.

3 TERMS AND DEFINITIONS

Definitions in (I-1.3) of this DEP shall also apply.

4 SYMBOLS AND ABBREVIATED TERMS

Abbreviations in (I-1.4) of this DEP shall also apply.

6 INFORMATION SUPPLIED BY THE PURCHASER

6.1 GENERAL INFORMATION

Delete and replace with the following:

For a specific project, the Principal shall submit all technical information to the Coating Contractor regarding the project, in particular the installation and operating conditions. This information shall include as a minimum:

- project name;
- type of coating required;
- maximum/minimum design and operating temperature of the pipeline;
- description of steel pipe;
- applicable line pipe specification;
- geographical area (land/sub-sea);
- expected field joint coating with application guidelines;
- cutback configuration and finish;
- expected ambient temperatures during installation;
- installation method;
- soil and backfill conditions for land pipelines;
- sea bed trenching, laying and burial conditions for sub-sea pipelines;
- subsequent coatings to be applied (weight coating, insulation);
- requirement for anti-slip treatment;
- requirements for temporary protection of pipe ends;
- types of cathodic protection.

The Principal shall indicate whether a specific brand of coating shall be used or whether the Coating Contractor shall select the coating.

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