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FIELD JOINT COATING AND REPAIRS PROCEDURE

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Appendix E. Inspection and test plan ITP # 001

Section 1

INTRODUCTION

This document is the XIOM field joint coating procedure for pipe sizes and wall thicknesses from 4 inch to 30 inch diameter and WT from 6 to 20mm. Wall thicknesses above this are covered in a different document due to the possibility of PWHT making the joint much monger than standard filed joint coating.

PURPOSE

This document sets out the process steps during preparation, application and curing of Dual FBE field joint coating. Also documented are records used specifically for recording process parameters which may f0rm part of the Inspection record. Inspection and test are those referred to from the ITP which is a separate document referenced throughout this procedure

LIMITATIONS

This document is specifically for the surface preparation and application parameters for Dual FBE filed joint coating and repairs to factory applied coating. It makes no mention of any weld cap treatment as this is the responsibility of the construction contractor. However, Xiom will work with the construction contractor to achieve welding finish which is consistent with excellent field joint coating performance and visual inspection of the weld finish will form part of the inspection processes detailed in this procedure and the ITP.

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Appendix A. Referenced Standards

ISO–International Organization for Standardization

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 8501-2	Preparation of steel substrates before application of paints and related products. Visual assessment of surface cleanliness. Preparation grades of previously coated steel substrates after localized removal of previous coatings
ISO 8501-3	Preparation of Steel Substrates Before Application of Paints and Related Products - Visual Assessment of Surface Cleanliness - Part 3: Preparation Grades of Welds, Edges and Other Areas With Surface Imperfections
ISO 8502 - 1	Preparation of steel substrates before application of paints and related products - Tests for the assessment of surface cleanliness
ISO 8502-3	Preparation of Steel Substrates Before Application of Paint 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)
ISO 8502 - 4	Preparation of Steel Substrates Before Application of Paints and Related Products - Tests for the Assessment of Surface Cleanliness - Part 4: Guidance on the Estimation of the Probability of Condensation Prior to Paint Application
ISO 8502-6	Preparation of Steel Substrates Before Application of Paints and Related Products - Tests for the Assessment of Surface Cleanliness - Part 6: Extraction of Soluble Contaminants for Analysis - the Bresle Method
ISO 8502-9	Preparation of Steel Substrates Before Application of Paints and Related Products - Tests for the Assessment of Surface Cleanliness - Part 9: Field Method for the Conduct metric Determination of Water-Soluble Salts

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ISO 8503-1	Preparation of Steel Substrates Before Application of Paints and Related Products - Surface Roughness Characteristics of Blast-Cleaned Steel Substrates 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 Substrates Part 2: Method for the Grading of Surface Profile of Abrasive Blast-Cleaned Steel - Comparator Procedure
ISO 8503-3	Preparation of Steel Substrates Before Application of Paints and Related Products - Surface Roughness Characteristics of Blast -Cleaned Steel Substrates Part 3: Method for the Calibration of ISO Surface Profile Comparators and for the Determination of Surface Profile - Focusing Microscope Procedure
ISO 8503-4	Preparation of Steel Substrates Before Application of Paints and Related Products - Surface Roughness Characteristics of Blast-Cleaned Steel Substrates - Part 4: Method for the Calibration of ISO Surface Profile Comparators and for the Determination of Surface Profile - Stylus Instrument Procedure
ISO 8503-5	Preparation of Steel Substrates Before Application of Paints and Related Products - Surface Roughness Characteristics of Blast-Cleaned Steel Substrates - Part 5: Replica Tape Method for the Determination of the Surface Profile

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NACE–National Association of Corrosion Engineers

NACE RP0105	Standard Recommended Practice Liquid-Epoxy Coatings for External Repair, Rehabilitation, and Weld Joints on Buried Steel Pipelines
NACE RP0287	Field Measurement of Surface Profile of Abrasive Blast Cleaned Steel Surfaces Using a Replica Tape
NACE RP0394	Application, Performance, and Quality Control of Plant-Applied, Fusion-Bonded Epoxy External Pipe Coating
NACE SP0188	Discontinuity (Holiday) Testing of New Protective Coatings on Conductive Substrates
NACE RP0402	Field-Applied Fusion-Bonded Epoxy (FBE) Pipe Coating Systems for Girth Weld Joints: Application, Performance, and Quality Control
NACE RP0490	Holiday Detection of Fusion-Bonded Epoxy External Pipeline Coatings of 250 to 760 Micrometers (10 to 30 Mils) Item No. 21045

SSPC–The Society for Protective Coatings

SSPC AB 1	Mineral and Slag Abrasives
SSPC AB 3	Newly Manufactured or Re-Manufactured Steel Abrasives
SSPC GUIDE 15	Field Methods for Retrieval and Analysis of Soluble Salts on Steel and Other Nonporous Substrates
SSPC PA 2	Measurement of Dry Coating Thickness with Magnetic Gages
SSPC SP 1	Solvent Cleaning
SSPC SP 2	Hand Tool Cleaning
SSPC SP 3	Power Tool Cleaning
SSPC SP 10	Near-White Metal Blast Cleaning (NACE NO. 2)
SSPC SP 11	Power Tool Cleaning to Bare Metal

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ASTM–American Society for Testing and Materials

ASTM D 4285	Standard Test Method for Indicating Oil or Water in Compressed Air
ASTM D 4940	Standard Test Method for Conducti metric Analysis of Water Soluble Ionic Contamination of Blasting Abrasives
ASTM D 5162	Standard Practice for Discontinuity (Holiday) Testing of Nonconductive Protective Coating on Metallic Substrates
ASTM D 6677	Standard Test Method for Evaluating Adhesion by Knife

Section 2. Terms and Definitions

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

Pre-production trial PPT to confirm that this FJC process is consistent with producing a coating with the same qualities as the factory applied pipeline coating

This APS is the document describing procedures, methods, equipment and tools used for coating application

Applicator--company that undertakes the coating application in accordance with the provisions of this part of ISO 21809 and clients specification

Batch-- quantity of material produced in a continuous manufacturing operation using raw materials of the same source and grade

Batch certificate- certificate of analysis issued by the manufacturer

Certificate of compliance one of the types of inspection documents defined by ISO 10474, issued in accordance with the purchasing requirements

Coating operative --individual undertaking coating activity on the work site, including surface preparation

Cutback length of pipe left uncoated at each end for joining purposes (e.g. welding)

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Client the company that owns and/or operates the pipeline system

Field joint area--weld zone-- uncoated area that results when two pipe sections or a pipe section and a fitting with coating cutbacks are assembled, by welding, in the field

Holiday-- coating discontinuity that exhibits electrical conductivity when exposed to a specific voltage

Inspection and testing plan - ITP document providing an overview of the sequence of inspections and tests, including resources and procedures

Inspector client and/or purchaser's representative responsible for one or more of the inspections specified in this document

Manufacturer-- Company responsible for the manufacture of coating material

Maximum design temperature of field joint coating - Tmax

Maximum continuous temperature that the field joint coating can resist

Maximum operating temperature

Maximum temperature that can be reached during operation of pipeline

Overlap --length of the field joint coating over the plant-applied coating including the coating bevel

Pipeline-- those facilities through which fluids are conveyed, including pipe, pig traps, components and appurtenances, up to and including the isolating valves

Pipeline system --pipeline with compressor or pump stations, pressure control stations, flow control stations, metering, tankage, supervisory control and data acquisition system, safety systems, corrosion protection systems, and any other equipment, facility or building used in the transportation of fluids

Pre-production trial - PPT application of coating and inspection/testing of its properties, to confirm that the APS is able to produce a field joint coating with the specified properties, carried out in the field immediately prior to start of production

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Primer-- material applied as a film on substrate (metal and/or plant coating) to ensure adhesion of the subsequent protective coating

Procedure qualification trial - PQT application of a field joint coating and subsequent inspection/testing of its properties, to confirm that the APS is able to produce a coating with the specified properties, carried out at the premises of the applicator or any other agreed location. Purchaser Company responsible for providing the product order requirements.

Section 3. Procedure

The application of fusion bond epoxy powder and liquid coatings in the field on a pipeline construction project, either on girth welds or various required repairs, is an essential element to the successful long–term integrity of a pipeline. This procedure is applicable for immersion and underground steel pipelines with applied Cathodic Protection in the oil and gas gathering, distribution and transmission industries.

3.1. This procedure presents best practices for establishing field installation parameters and inspection procedures to ensure proper application and performance of field-applied coatings. Included are methods for qualifying and controlling the quality of field-applied products, guidelines for proper application and inspection and repair techniques to ensure long-term performance.

3.2. These practices are applicable to field applied coating systems used to prevent external corrosion in immersion/buried service.

3.3. These practices are applicable to new construction and field repairs.

3.4. All applicable health, safety and environmental codes, rules and regulations shall be followed when using these practices including product and material safety data sheets.

Section 4. COATING MATERIAL HANDLING/STORAGE & TESTING

4.1. The applicator shall ensure that the materials used for surface preparation and the coating(s) comply with the material specification and that the manufacturer’s storage instructions are followed.

4.2. Powder shall be transported and stored in a sealed container that prevents the ingress of moisture or water.

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4.3. Transportation and storage climate shall be controlled to meet the manufacturer's requirements and conformance shall be demonstrated by temperature-indication tags or other logging devices.

4.4. Contractor shall request special procedures to be prepared by the manufacturer for field storage.

4.5. Contractor shall load only enough materials to be used for each day's shift. Avoid exposing coating materials to adverse climate conditions like sun, rain, snow and humidity.

4.6 Unused material shall be inspected to ensure useful life. Follow manufacturer's recommendation to ensure shelf life is not exceeded.

4.7. Abrasive blast media shall be stored in a dry and controlled environment.

4.8 testing- where required coating material shall be tested by powder gel time and dsc to determine that the powder has not deteriorated. Abrasives shall be tested for particle size, soluble salt content when required.

Section 5. Training and Qualification

5.1. The contractor shall provide a qualified coating foreman/crew by one of the following methods:

5.1.1. Pre-qualified coating foreman/crew members were previously trained by the coating supplier/applicator

5.1.2. The coating supplier provides a technician to train the contractor's coating foreman/crew at the job site. Company Representative should be involved in this training.

5.1.3. Coating foreman/crew members demonstrate on a production weld that they are trained and knowledgeable in the preparation of the pipe and the application of the specific coating being applied as agreed by the client. Recommend verification that the employees have been trained; i.e. card, hard hat sticker, letter, etc.

5.2. The contractor is responsible for maintaining trained personnel on the project through tocompletion.

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5.3. If Operator Qualification is required, assure that all covered tasks have been completed for the coating foreman/crew.

5.4. Company inspector shall be trained and knowledgeable in coating application procedures and in use of inspection instruments, have a complete set of inspection instruments and be able to demonstrate their use.

Section 6. Surface Preparation

6.1. Applicable worker health and safety regulations must be followed

6.2. Applicable environmental regulations must be followed to contain blast media and removed coatings. Effective containment also minimizes damage to nearby structures or property.

6.3. Abrasive blasting shall only be permitted under the following environmental conditions:

6.3.1. The temperature of the surface to be blasted or painted is more than 5°F (3°C) above the dew point temperature. Multiple surface temperature readings may be required for full-sun and shade readings.

6.3.2. The surface temperature and relative humidity is expected to remain reasonably stable for a sufficient time for the completion of abrasive blasting and applying coating.

6.3.3. The pipe and related components are dry.

6.3.4. Adverse conditions (e.g., fog, mist, rain, dust, or excessive wind) do not exist or are controlled.

6.4. Abrasive blast media shall conform to the following requirements:

6.4.1. Shall be supplied in original packaging from supplier/manufacturer

6.4.2. Conform to SSPC AB1, Abrasive Blasting Spec for Mineral and Slag Abrasives

6.4.3. Shall be suitable for achieving the required anchor profile

6.4.4. Blast media shall not be reused, unless utilize an automatic recovery system

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6.4.5. If preheating is required due to ambient temperatures, this should be done prior to blasting, however in low ambient temperatures additional heating may be required after blasting while maintaining surface temperature 5°F (3°C) above the dew point.

6.5. Air compressors utilized for abrasive blasting and/or air cleaning shall meet the following requirements:

6.5.1. Shall provide moisture and oil free air as verified by a 30-second white rag test. Filters, separation, and/or dehydration equipment shall be utilized as required to meet this requirement.

6.5.2. Shall be capable of providing recommended pressure at abrasive blast nozzle (typically 90-110psi) as measured with a hypodermic needle gauge.

6.6. Abrasive blast nozzle orifices are within 25% of their rated sizes. Non-conformant nozzles shall be replaced.

6.7.The weld zone and surfaces including bare and specified overlap to be coated shall be inspected and cleaned according to SSPC-SP1 to remove mud, oil, grease, moisture, and loosely adhering deposits. Visible oil and grease spots shall be removed by solvent wiping. Only safe, residue- free environmentally approved solvents shall be used.

6.8. It is Pipeline construction company responsibility to ensure all weld spatter, rough welds, burrs, and sharp steel surfaces shall be ground smooth prior to abrasive blasting

6.9. Blasted surfaces shall be inspected using replica tape or equivalent to verify that the specified anchor profile has been achieved. A minimum of two inspections per shift is required dependent upon applicators performance.

6.10. Blasted surfaces shall be verified to meet all agreed upon visual standards or equivalent.

6.11. Special attention shall be given to areas where local geometry complicates proper blasting (e.g., welds, corners, and lap joints). Special attention shall also be given to tight quarters and locations that are difficult to access.

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6.12.All bare surfaces to be coated shall be dry abrasive blast cleaned to "Near-White" metal in accordance with NACE #2/SSPC-SP10 (latest version) per SSPC-Vis 1. The anchor pattern profile shall be a minimum of 2.0 mils to a maximum of 4.5 mils. Variation in required anchor pattern profile may be altered based on manufacturer's recommendations with Company approval. Adjacent areas of sound/existing coating shall be feathered for at least in a 1 inch (25mm) minimum radius around the exposed metal or blast area. This process should remove approximately 1 mil of coating. Cleaned surface shall be dry air blasted to remove dust and debris, and shall be coated within 4 hours of blast cleaning. All blast-cleaned surfaces that are not coated before flash rusting occurs shall be re-blasted prior to coating.

6.13. All spent abrasive shall be disposed of in accordance with applicable regulation.

Section 7. Liquid Coatings Field Application (if required)

7.1. Liquid Coatings

7.1.1. Coating Identification. The liquid coating (client approved material) shall meet the requirements outlined by the customer.

7.1.2. Coating Application

7.1.2.1. The coating shall be applied following the manufacturers recommended guidelines and procedures. There are several application methods currently being used today. Spray application via plural component unit is typically employed when the scale of the project warrants its use. Use of this equipment is determined by the applicator. Hand application is also an acceptable means of applying liquid coatings today. Methods of application include roller, brush squeegee and in some applications glove/mitt. Regardless of the application method, always follow the manufacturer's recommended guidelines and procedures.

7.1.2.2. If mixing is required, ensure it is carried out in accordance with manufacturer's recommendation. Only mix full packages of parts A and B.

7.1.2.3. The coating thickness shall be as specified by the coating manufacturer or the coating specification provided by the pipeline owner.

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7.1.2.4. The steel surface temperature shall be at least 5°F (3°C) higher than the dew point temperature. The relative humidity and the steel surface temperature shall not be higher than the recommended maximum. The contractor shall use industry accepted equipment to monitor these environmental requirements.

7.1.2.5. Application shall be done in such a manner so as to minimize sags and runs, provide adequate coverage in angles and crevices, and to provide a reasonably uniform coating.

7.1.2.6. If several coats are required to achieve the specified coating thickness, follow the coating manufacturer's application recommendations for recoat times and procedures.

7.1.2.7. The coating shall be allowed to cure per the coating manufacturers recommendations prior to back filling, installation or handling.

7.1.2.8 Curing shall follow an established routine to ensure full cure of the coating. As per the ITP section

7.2.Fusion-bonded epoxy (FBE) powder coatings

7.2.1.Coating identification. The epoxy powder for a single-layer coating and for the base layer of a two-layer coating shall meet the requirements outlined by the customer and powder manufacturers Product data sheet.

7.2.2. Application of the DRBE/SFBE coatings:

7.2.2.1. Prior to application, the powder shall be allowed to acclimate for a period of at least 30 minutes or until the powder is at the ambient air temperature prior to opening the sealed bag. Failure to do this could result in the material absorbing water from the air.

7.2.2.2. Application of the coating shall be carried out in accordance with the material manufacturers application guide and current industry recognized standards.

7.2.2.3. When over-coating existing pipeline parent coating material at the overlap area the pipeline parent coating shall be sweep blasted to remove the gloss and provide a roughened surface suitable for over-coating. The parent coating shall be roughened prior to coating to enhance adhesion. The roughened

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surface shall be visually checked to ensure that it is adherent. If the parent coating is non adherent then the process shall be stopped and the causes investigated.

7.2.2.4. Existing pipeline parent coating shall be feathered to a minimum of 1 inch (2.54 cm) when coating adjacent bare steel, at the girth weld.

7.2.2.5. Prior to blasting the temperature of the field joint should be made as uniform as possible either by shielding the area from the sun or pre-heating. The more uniform starting temperature of a field joint can optimize the uniformity of the joint temperature when heated to coating application temperature.

7.2.3. Heating

7.2.3.1. The field joint area should be uniformly preheated, using a induction or infrared- heating coil to a temperature as recommended by the powder manufacturer. If a Pre-Qualification Trial is performed, the rate and uniformity of the heat pattern shall be verified and documented. The typical coating range for FBE is between 218°C and 253°C.

7.2.3.2. The temperature of the field joint shall be monitored using a temperature measuring device a hand held, direct reading thermocouple or contact thermometer to ensure that the application conditions are fully satisfied and the temperature is uniform across the steel substrate and the plant applied coating. The methods of monitoring and recording shall be specified by the customer.

7.2.3.3. The maximum pipe temperature shall not exceed 527°F (275°C) or temperature specified by Company The temperature shall be verified on each joint prior to coating application and recorded.

7.2.3.4. The heating time and the temperature shall not:

Damage the plant applied coating. With some coatings it should be remembered that re-heating will cause the coating to darken or take on a yellow or brown tinge.

7.2.3.5. If a delay results in surface cooling to below the temperature range specified by the powder manufacturer, the pipe shall be reheated, and if required the abrasive blasting shall be repeated to meet specification requirements.

7.2.4. Application of FBE epoxy powder

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7.2.4.1. The FBE shall be applied immediately after the substrate has attained the correct temperature. The field joint shall not be allowed to cool below the minimum application temperature before coating is applied. If the pipe does excessively cool it shall be re-blasted and re-heated. the pipe may be reheated providing the surface preparation criteria are not compromised up to maximum of 4 hours after abrasive blasting. Where surface preparation is compromised at any time the surface preparation criteria shall be met prior to coating. Minor surface dressing shall not require re-blasting.

7.2.4.2. Equipment Preparation

7.2.4.2.1. Ensure that equipment and hoses are free of powder build-up and contaminants as this has potential to dislodge during application and generate defects on the coating.

7.2.4.2.2. All powder application equipment and hoses shall be cleaned daily.

7.2.4.2.3. At the start of the shift and after any break the coating ring needs to be checked to ensure that the powder is uniformly flowing out of all applicators.

7.2.4.3. The FBE overlap onto the plant applied coating should be a minimum of 1 inch (2.54 cm).

7.2.4.4. The FBE powder should be uniformly applied, by means of a semi-automatic powder ring or carriage which is fitted to and rotates around the pipe to cover the blast cleaned and pre-heated surface, to provide the specified minimum dry film thickness (DFT). Alternative methods may be used with the approval of the client.

7.2.4.5. The coating shall be allowed to cure for the time recommended by the coating manufacturer prior to any movement or inspection taking place.

7.2.4.6. Temperatures for various inspection and test are as indicated in the ITP. Adhesion tests shall be done at 20C + - 10 C. Holiday testing shall not be carried out until the pipe has cooled below 60C?? Thickness checks shall; not be carried out above 80C

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Section 8. Inspection Procedures

8.1. Abrasive blast cleaning operations shall not be conducted on surfaces that are less than 5°F (3°C) above dew point. If the surface temperature is less than 5°F (3°C) above the dew point with Company approval, the exposed bare surfaces shall be pre-heated to 150°F (66°C). The surface temperature shall be measured with digital thermometers.

8.2. Anchor pattern profile shall be measured with either replica tape such as Press-O-Tape or digital surface profile gauges and the measurement results documented. The profile shall be in accordance with Section 4.14. The frequency of required documentation shall be site or project- specific and approved by Company personnel.

8.3. Dry film thickness on liquid and cured FBE shall be measured by an approved mil gauge calibrated twice per shift as per the ITP

8.3.1. All debris, moisture, or other contamination on the coating shall be removed before holiday testing.

8.3.2. Holiday detectors shall be calibrated according to manufacturer's specifications at a minimum of twice per day normally at the beginning of the day and approximately 1/2 way through the shift. The test voltage should be verified during calibration.

8.3.3. Jeeping or holiday detection shall be performed at each coating area. Detection voltage should be based on specified nominal pipe coating thickness and calculated in accordance with NACE Holiday Detection Standard, SP 0490, but other detection voltages may be set by the Company and set as per the approved ITP

8.4. The detector shall readily detect and indicate a holiday (natural or artificial [for calibration]) both audibly and visually. Under no circumstances shall brass brushes or angel hair be used for jeeping. The electrode shall be kept free of coating material and in suitable mechanical condition to maintain contact with the coated surface at all times.

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Section 9. – coating repair Inspection

9.1. The acceptable size and inspection frequency of field joint coating and the repair shall be subject to agreement between the purchaser and the applicator. The repair procedures shall be included in the specification as per the ITP

9.2. Holidays and damaged areas in the FBE coating shall be repaired using two-part epoxy, the repair materials shall be in accordance with the manufacturer's recommended practice and the Company's specification the use of melt sticks is not recommended.

9.3. Holidays shall be cleaned by removing all rust, scale, dirt, other foreign material, and loose coating.

9.4. The repair areas, both the holiday and the adjacent coating, shall be suitably roughened in accordance with the repair materials manufacturer's recommendations. Dust shall be removed with a clean, dry cloth, brush or air.

9.5. All repairs shall have a minimum dry film thickness at least equal to the minimum specified coating thickness for the parent coating. The overlap of the repair coating onto the parent coating shall be a minimum of 1 inch (2.54 cm).

9.6. All repairs shall be holiday tested as described in Section 6.

Appendix B. Procedure Qualification Test and Quality

Control Report # PQT1

PQT1 Qualification Test and Quality Control Test Report			
Applicator Team Leader Name:			Report No.:
QC Responsible Name:			Date:
Test Piece No.:	Test Piece Diameter [mm]		Page:
Product Data			
Coating	Batch/Lot #, Pt A	Batch/Lot #, Pt B	Batch Size

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Preheating			
Method	Initial Substrate Temperature, °C	Final Preheat Temperature, °C	Remarks

Environment Data						
No.	Location	Ambient Temperature °C	Substrate Temperature °C	Humidity %	Dew Point °C	Remarks

Post-Curing			
Method	Post-Heat Temperature	Duration, minutes	Remarks

Test Data for Coating	
Controlling Document #	

Test Results

No.	Test	Criteria	Test Results	Remarks
1	Abrasive	Conformance with SSPC AB 1 or SSPC AB 3		
2	Compressed Air Quality	No visible contamination per ASTM D 4285		
3	Pre-coating Visual Check	Visual per ISO 8501-1 and ISO 8501-3		
4	Salt Contamination Test	Less than 20 mg/m² ($1.4x10^{-3}$ grains/ft²) equivalent NaCl ISO 8502-6 or ISO 8502-9 or SSPC GUIDE 15		
5	Blast Cleaning Surface Profile	SA2.5 ISO 8503-4 or ISO 8503-5		
6	Blast Cleaning Degree of Cleanliness	SA2.5, NACE RP0394		
7	Application Temperature [°C]	Within Manufacturer's stated criteria		

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8	Coating Application Surface Visual Check	No popping, sagging, pinholes, or contamination. Defect density no greater than one defect or cluster per 1 m^2 (12 ft^2).		
9	Coating Application Thickness	0.6 to 1.25 mm (24-49 mils) per SSPC PA 2		
10	Holiday Detection Test	Per NACE SP0188, no holidays on test piece.		
11	Impact Test	Per ASTM G 14, 3.5 J (13 in.-lb) minimum		
12	Water Soak/Adhesion Test	Rating 1 to 3 per NACE RP0394, or 6 to 10 per ASTM D 6677		
13	Penetration Resistance	< 10% of DFT per ASTM G 17		
14	Cathodic Disbondment (CD) Test	Per NACE RP0394, 24-hour, < 6.0 mm (0.25 in.) radius		
15	CD Test No. 2			
16	CD Test No. 3			
17	Repair Procedure - visual	No visible defects.		
18	Repair Procedure – Holiday Detection	No holiday in or at edge of repair.		

Notes:

Result of the Procedure Qualification Test	We certify that the statements in this record are correct and that the application was done in accordance with the relevant procedure.
□ Qualified □ Not Qualified	

	APPLICATOR	CONTRACTOR
Name		
Signature		
Date		

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APPROVALS		
	COMPANY	OWNER
Name		
Signature		
Date		

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APPENDIX C

Applicator Qualification Report AQR # 1

AQR # 1 Applicator Qualification Test Report						
Applicator Team Leader Name:				Report No.:		
QC Responsible Name:				Date:		
Test Piece No.:		Test Piece Diameter [mm]		Page:		
Product Data						
Coating		Batch/Lot No., Pt A		Batch/Lot No., Pt B		Batch Size
Environment Data						
No.	Location	Ambient Temperature °C	Substrate Temperature °C	Humidity%	Dew Point °C	Remarks
Applicator Qualification Test						
Name of Applicator		Date of Birth		Nationality		Qualifications

Test Results				
No.	Test	Criteria	Results	Remarks
1	Coating Application Surface Visual Check	No popping, sagging, pinholes, or contamination. Defect density no greater than one defect or cluster per 1 m^2 (12 ft^2).		
2	Coating Application Thickness	0.6 to 1.25 mm (24–49 mils) per SSPC PA 2		
3	Holiday Detection Test	Per NACE SP0188, no holidays on test piece		

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11	Impact Test	Per ASTM G 14, 3.5 J (13 in.-lb) minimum		
12	Water Soak/Adhesion Test*	Rating 1 to 3 per NACE RP0394		
13	Penetration Resistance*	< 10% of DFT per ASTM G 17		
14	Cathodic Disbondment (CD) Test*	Per NACE RP0394, 24-hour, < 6.0 mm (0.25 in.) radius		
15	CD Test No. 2*			
16	CD Test No. 3*			
4	Repair Procedure – visual	No visible defects		
5	Repair Procedure – Holiday Detection	No holiday in or at edge of repair		
* Tests to be performed only during PQT activities				

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Notes AQR 1	
Result of the Applicator Qualification Test □ Qualified □ Not Qualified	We certify that the statements in this record are correct and that the application was done in accordance with the relevant procedure
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Name	
Signature	
Date	
APPROVALS	
COMPANY	OWNER
Name	
Signature	
Date	

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AQR1 Coating Inspection Report						
Applicator Name:					Report No.:	
QC Responsible Name:					Date:	
					Page:	
Product Data						
No.	Coating	Batch/Lot No., Pt A	Batch/Lot No., Pt A	Batch Size		
Abrasive Blast Media						
No.	Media Type/Brand	Lot Nos.	Length/No. sections	Remarks		
Environmental Data						
No.	Time	Ambient Temperature °C	Substrate Temperature °C	Humidity%	Dew Point °C	Remarks
1						
2						
3						
4						
Notes:						

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Appendix D

Daily Coating Report DCR # 1

DCR # 1	Coating Report											
Applicator Name:										Report No.:		
QC Responsible Name:										Date:		
										Page:		
Environment Data												
No.	Time	Ambient Temperature °C	Substrate Temperature °C	Humidity %	Dew Point °C	Remarks						
1												
2												
3												
4												
Coating												
		Coating	Blast surface inspection		Type of (Application Method			Coating Inspection		Adhesion Test		DFT
No.	Pipe/ Joint Number	Product Name	Salt Test	Profile check	Coating machine	Brush	Spray	Visual Check (OK?)	Holiday Test (OK)	Cross Cut		Dry Film thickness
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												

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11												
12												
13												
14												

Notes:

	APPLICATOR	CONTRACTOR	COMPANY
Name			
Signature			
Date			

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APPENDIX E
QUALITY CONTROL FIELD INSPECTION AND TEST PLAN
ITP # 001

W – Witness
S—Surveillance
H—Hold Point

Rev. 0

Item No.	Activity	Project Procedure	Frequency	Acceptance Criteria Manufacturer's Product data sheet and clients	Contractor Inspector	Client Inspection	Action/Record
1	Safety "JHA Prior to performing ANY duties the coating foreman must ID ALL Hazards	**Safety Manual/JHA**	Daily	Ensure ALL employees are wearing proper PPE for the relevant task at hand			• Driver safety • Appropriate P.P.E • Complete & sign JSA • Blasting Hood/Fresh Air Canister/Air Lines • Gloves • CO2 monitor • Excavation safety review

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2	Applicator qualifications	As per the approved procedure and clients Specifications	Per Project	Understanding of manufacturing installation techniques Verification of Operator Qualification as applicable			• Demonstrates knowledge of manufacturing installation methods / techniques • Field Verification report or equivalent
3	Inspection & Surface prep, (blasting)	Clients Specifications	2 per shift	• Test Pipe to see if non-visible contaminates exist. Clean as per Operator specification. • Blasted to a “NEAR WHITE” finish per NACE #2 or SSPC-SP 10 • Surface Profile will be checked and documented per NACE RP0287-2002 as applicable			• Inspect & Examine pipe for non-visible contaminates. • Blast and check profile • Remove all Frayed/Loose coating near cutback • Brush Blast existing FBE • Daily coating report.

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4	Coating Application	As per the clients specification and contractors approved procedure	2 per shift	• As per application specification. Pipe temperature has to be 5 degrees above dew point. • Pre-heat pipe as per specification			• Document temperatures • Do not handle, lower in, or backfill until completely cured • Measure dew point temperature and pipe temperature • Daily coating report

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5	Pipe Coating Inspection	Coat weld Joint As per the clients specification and contractors approved procedure	Each joint	• No damage • All coated pipe shall be tested at a minimum of three times: to locate holidays, after the holidays are patched, and just before pipe is lowered into the ditch. • Check for appropriate coating thickness. • Utilize holiday detector with voltage setting as specified in NACE SP 0490. • In addition the holiday detectors batteries shall be checked every 4 hours and replaced/recharged if required. • Calibrate holiday detector daily • All holiday detection and holiday repairs shall be conducted to the satisfaction of the Coating Inspector.			• Visual Inspect • Jeep/Holiday Test • No record

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6	Coating repair	Weld Joint As per the clients specification and contractors approved	As needed	Repair with two part epoxy in accordance with Operator specifications.			Record and complete coating report
7	Storage & Handling	Weld Joint As per the clients specification and contractors approved procedure	Daily	Maintained and stored in accordance with manufacturing specifications.			Ensure proper Storage

PLEASE NOTE THAT THE ITP SHALL BE ADJUSTED/ADDED TOO, TO INDICATE THE SPECIFIC INSPECTION CRITERIA OF THE CLIENT AND APPROVED PROJECT PROCEDURE

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