



Protal™ ARO

Plural Spray Application Specifications

1.0 Scope

- 1.1 This specification covers the external surface preparation and coating of pipelines for rehabilitation, welds, directional drill, fittings and fabrication.
- 1.2 All spray application personnel shall be trained by a Denso representative prior to application of Protal ARO. Additionally, all spray application personnel shall be trained in the proper spray pump operational procedures by the specific spray pump manufacturer.

2.0 Material and Storage

- 2.1 Material shall be Denso Protal ARO liquid coating system as manufactured by Denso North America, 9710 Telge Road, Houston, TX 77095 (Tel) 281-821-3355 (Fax) 281-821-0304 or 90 Ironside Crescent Unit 12, Toronto, Ontario, Canada M1X1M3 (Tel) 416-291-3435 (Fax) 416-291-0898. E-mail: info@densona.com.
- 2.2 Material shall meet the physical properties of the attached product data sheet.
- 2.3 Storage of the material shall be in a warm dry place, between 40°F (4°C) to 100°F (36°C). The containers shall be stored up right. Do not allow material to freeze.

3.0 Equipment

- 3.1 Graco XP70 Plural Component Sprayer designed to mix and atomize 100% solids epoxies. At a minimum the equipment shall consist of the following components:
 - 3:1 mix ratio set up with pressure relief valves and recirculation valving
 - 145cc: 48 cc displacement pump set up
 - 4 kW inline heaters
 - 25 gallon (94.6 L) heated tanks
 - 5:1 supply pumps in heated tanks
 - 45:1 Merkur solvent flush pump
 - Pressure monitor for ratio assurance (preferred)
 - 100' (30.4 m) heated hose bundle (½" / 12.7 mm resin, ⅜" / 9.5 mm hardener, ¼" / 6.4 mm solvent)
 - 2 each ⅜" (9.5 mm) x 12 element static mixers (stainless steel preferred)
 - ¼" (6.4 mm) whip hose (15' / 4.5 m to 25' / 7.6 m) with ¼" (6.4 mm) static mixing tip
 - All hoses need to comply with pressure ratio limits @ ARO PSI (49.6 MPa)
 - XTR Spray Gun
 - Tip size: .021 - .035

- 3.2 Part A should be heated and maintained to 150°F - 160°F (65°C - 71°C) and Part B heated to 150°F - 160°F (65°C - 71°C). Hose bundle shall be set at 135°F - 145°F (57°C - 63°C).

- 3.3 A solvent such as Xylene, MEK, Toluene, or a combination of the three is recommended to clean the equipment.

- 3.4 Wet film thickness gauges.

4.0 Surface Preparation

- 4.1 All contaminants shall be removed from the surface to be coated. Oil and grease should be removed in accordance with SSPC SP-1 using the solvent MEK or approved solvent.
- 4.2 Prepare FBE or other approved primary coating with a light sweep blast to remove gloss and roughen surface (approx. 1 mil / 25 microns). After sweep blast, wipe entire surface with MEK or approved solvent to remove all dust and other surface contaminations.

5.0 Application

- 5.1 The surface shall have no condensation, precipitation or any other forms of contamination on the blasted surface prior to coating.
- 5.2 The substrate temperature range for application of Protal is 50°F (10°C) to 170°F (77°C). The substrate temperature must be a minimum of 5°F (3°C) above the dew point temperature before proceeding with the coating operation. Ambient temperature may be lower than 50°F (10°C) if the substrate is heated. Preheating may be accomplished with a propane torch or induction coil prior to abrasive blasting.
- 5.3 Using the prescribed equipment (Sect. 3.0), Protal shall be applied using a wet on wet spray technique to the specified Dry Film Thickness (DFT). Protal ARO can be applied in a single coat from 20 to 50 mils (500 - 1250 microns) WFT.
- 5.4 The thickness of Protal should be checked continuously by wet film gauge to achieve the minimum/maximum film thickness specified. Notification to the applicator of any inadequately coated sections must be made immediately and repaired.

6.0 Inspection

- 6.1 The finished coating shall be smooth and free of runs, sags and/or holidays. All surfaces shall have the required minimum/maximum DFT. In general, the surface of the coating shall be no rougher than the base or substrate material.
- 6.2 After the Protal has cured to a hard cure condition, the owner's representative and/or contractor's inspector should measure the film thickness by magnetic gauge and notify the applicator of their acceptance.
- 6.3 For most applications, backfill can be accomplished when the coating reaches a Shore D of 75. Using a Shore D Durometer, measure the hardness on an area of the coating that measures a minimum 30 mils DFT. Several measurements should be taken at various locations circumferentially around the pipe to ensure sufficient cure.
- 6.4 An acceptable field test to check to see if the coating has a full chemical cure, a solvent such as Xylene, MEK or Toluene can be rubbed on to the coating. If the gloss/sheen is removed the coating is not fully cured.
- 6.5 Holiday detection shall be performed on all coated areas. Detection voltage should be based on specified nominal pipe coating thickness and calculated in accordance with the NACE SPO188 Standard.
- 6.6 Denso and/or the owner's representative immediately upon completion of the work shall make final inspection of the completed application. Notification of all defects must be made within a reasonable time frame from completion of the work to allow for all repairs within the allowed time frame for the project.
- 6.7 Recoating: If a second coat is required and passes the cure test as described in section 6.3, the surfaces shall be roughened by sweep blasting. If the coating is soft, no surface preparation is required.

7.0 Repairs

- 7.1 For small pinhole repairs: Surfaces of repair up to 1/16 inch (2 mm) in diameter, roughen the surface of the parent coating, to remove gloss, around the holiday for at least 1 inch (25 mm). Use 80 - 120 grit sandpaper or light sweep blasting.
- 7.2 Medium sized repairs: Surfaces of repair areas up to 4 in² (25 cm²) in size, shall be prepared by abrasive blasting, as specified in Section 11, or by power tool cleaning in accordance with SSPC- SP 11 to remove dirt, scale, rust, damaged coating and any other foreign material to a bare metal condition and retain or produce the surface profile required by Section 4.0.
- 7.3 Large repairs: Surfaces of repair areas exceeding 4 in² (25 cm²) shall be repaired by abrasive blast cleaning as specified in Section 4.0.

- 7.4 The adjacent parent coating and any holidays or damaged coating adjacent to the cutback area shall be roughened for at least 1 inch (25 mm) around the repair and the edges shall be feathered.
- 7.5 After abrading, all dust shall be removed from the prepared areas using compressed air, a clean, dry bristle brush, a clean dry cloth or removed in accordance with SSPC-SP-1 using acetone, xylene or MEK.

8.0 Safety Precautions

- 8.1 Follow the guidelines detailed in the Safety Data Sheets (SDS).
- 8.2 Keep containers closed when not in use. In case of spillage, absorb with inert material and dispose of in accordance with applicable regulations.
- 8.3 No open flames, smoking or welding will be allowed in the immediate vicinity during the spray application of Protal ARO liquid coatings.
- 8.4 Always refer to project specifications as they may supersede Denso specifications.



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