

## ISCO INDUSTRIES, LLC

# SAMPLE SPECIFICATION for HIGH DENSITY POLYETHYLENE PIPING LEACHATE COLLECTION SYSTEMS

---

### 1. GENERAL

This specification shall govern the materials and installation of high density polyethylene pipe for leachate collection and transport. Installation shall be performed in accordance with this specification.

### 2. SCOPE OF WORK

This contract is for the following items:

- 2.1. Installation of perforated high density polyethylene pipe and polyethylene pipe for transport of leachate. The installation of high density polyethylene manholes is part of this contract.
- 2.2. Butt welding of the high density polyethylene piping, assistance in field assembly of the high density polyethylene piping and high density polyethylene manholes shall be part of this contract.

### 3. MATERIALS

The leachate collection and leachate transport piping shall be made of high density polyethylene resin which meets the following requirements.

#### 3.1. High Density Polyethylene Specification

3.1.1 PIPE AND FITTINGS - The pipe supplied under this specification shall be high density, high molecular weight, polyethylene pipe, and supplied by ISCO Industries, LLC. The pipe shall conform to ASTM D3350 with a minimum cell classification value of 345464C. The fittings supplied shall be made from polyethylene resin which meets this same specification.

#### 3.1.2 PHYSICAL PROPERTIES OF PIPE COMPOUND

3.1.2.1 Density - the density shall be no less than 0.955 gms/ccm as referenced in ASTM D1505

- 3.1.2.2 Melt Index - the melt index shall be no greater than 0.15 gms/10 minutes when tested in accordance with ASTM D 1238 - Condition 3.2.3.
  - 3.1.2.3 Flex Modulus - flexural modulus shall be 110,000 to less than 160,000 psi as referenced in ASTM D 790.
  - 3.1.2.4 Tensile Strength at Yield - tensile strength shall be 3,200 to less than 3,500 psi as referenced in ASTM D 638.
  - 3.1.2.5 Slow Crack Growth Resistance shall be per ASTM F 1473 (PENT test). The results shall be greater than 100 hours.
  - 3.1.2.6 Hydrostatic Design Basis shall be 1,600 psi at 23° C when tested in accordance with ASTM D 2837.
- 3.2 Deviations - If a contractor chooses to submit a bid that does not meet all of the requirements of this specification, his bid shall include a written description of the deviations with data that show the magnitude of the deviations and the justification for the deviation from the specification. The decision to accept material deviating from this specification shall be the responsibility of the specifying engineer.
- 3.3 The owner or the specifying engineer may request certified lab data to verify the physical properties of materials not meeting the requirements of this specification.
- 3.4 Certification
- 3.4.1 The pipe supplier shall submit documentation that the pipe meets the specifications.
  - 3.4.2 The fabricator of the manholes shall submit drawings showing the position of the inlets, outlets and the overall dimensions.
  - 3.4.3 The fabrication technician shall perform work in accordance to butt fusion of high-density polyethylene per ASTM F 2620 and for extrusion and hot air welding per ASTM C 1147. The fabricator shall submit the written quality assurance program used during fabrication of the manholes. The fabricator may be required to submit their overall QA/QC program for fabricating thermoplastic structures, the welding certification program for the fabrication technician, and the facility safety program.
  - 3.4.4 The structure shall be tested with water or air when required. A written certification shall be sent to the engineer certifying the manholes are leak free. The test results shall become part of the submittals. An identification plate indicating, the job number,

testing data, and when built and by whom, shall be attached to the manhole.

- 3.5 Rejection - The leachate collection, leachate transport and high density polyethylene manholes may be rejected for failure to meet any of the requirements of this specification.

#### **4. LEACHATE COLLECTION PIPING (Perforated Pipe)**

- 4.1 Pipe supplied under this specification shall have IPS (Iron Pipe Size) OD unless otherwise specified.
- 4.2 The perforated piping shall have an OD of 6.625" and DR 17, unless otherwise specified on the plans. Hole size shall be 1/2". Four holes, at 90 degrees, on six inch centers will be drilled in the pipe. To maintain accuracy and uniformity, the pipe is to be drilled by a machine designed for perforating HDPE pipe. No drilling by hand will be allowed.
- 4.3 The pipe shall be joined by butt fusion.
- 4.4 Pipe installation shall be according to the Project Drawings and manufacturer's best practice.
- 4.5 Cleanouts for leachate piping are shown in the Project Drawings.

#### **5. LEACHATE TRANSPORT PIPING**

- 5.1 Leachate transport piping shall be solid wall HDPE pipe. Pipe size shall be as specified on the plans. The DR rating shall be 17.
- 5.2 The pipe shall be joined by butt fusion.
- 5.3 All valves shall be enclosed in an HDPE valve box. The valve shall be an Asahi Model 56 Butterfly valve, as supplied by ISCO Industries, LLC.
- 5.4 Flange adapters shall be used to connect the HDPE pipe to valves and similar materials.

#### **6. POLYETHYLENE MANHOLES**

- 6.1 The polyethylene manholes shall be made from solid wall HDPE pipe, with a nominal OD of 48", unless otherwise specified on the drawings. For manholes larger than 54" diameter, a profile wall cylinder can be used. Calculations must be provided to verify the wall thickness to be used.

- 6.2 The design of the manholes will be determined in accordance with ASTM F 1759. Calculations must be provided with the submittal package that justifies the thickness of wall and base plates of the manhole sections.
- 6.3 The inlets and outlets shall be extrusion welded on the inside and outside using good welding practice. Gussets shall be attached at 90, 180, 270 & 360 degrees around the inlets and outlets.
- 6.4 All connections shall be flanged or electrofusion connections.
- 6.5 Manholes shall be factory tested with 2 psi air for 30 minutes (with a 15 minute pressure equalization period) in the case of gas tight manholes or with a hydrostatic test for open top manholes. The owner or his representative may request to observe the test and/or review the test procedure specifics.
- 6.6 The ladder steps in the manholes, if specified, shall conform to OSHA requirements.
- 6.7 The top shall be flanged for easy access. The minimum sheet thickness shall be 1" for non-traffic areas. Reinforced concrete shall be used to spread loads above HDPE manholes in traffic areas. Traffic rated manhole cover and frames are required above manway entrances.
- 6.8 The manhole shall be made from HDPE pipe. Rotational molded sections or wall thicknesses of less than 1.5" will not be accepted.

## **7. CONSTRUCTION PRACTICES**

- 7.1 **HANDLING OF PIPE** - Pipe shall be stored on clean, level, dry ground to prevent undue scratching or gouging of the pipe. If the pipe must be stacked for storage, such stacking should be done in accordance with the pipe manufacturer's recommendations. The handling of the pipe should be done in such a manner that it is not damaged by dragging over sharp objects or cut by chokers or lifting equipment.
- 7.2 **REPAIR OF DAMAGED SECTIONS** - Segments of pipe having cuts or gouges in excess of 10% of the wall thickness of the pipe shall be cut out and removed. The undamaged portion of pipe can be rejoined after a new end piece has been welded to the pipe.
- 7.3 **PIPE JOINING FOR HIGH DENSITY POLYETHYLENE PIPE - HDPE** pipe shall be joined using butt fusion or electrofusion. Hot air welding will not be permitted.

7.4 HANDLING OF FUSED PIPE - Fused segments of pipe shall be handled so as to avoid damage to the pipe. Limit bending of the pipe. Nylon slings are preferred.