



# Standard Specification for Corrugated High Density Polyethylene (HDPE) Water Quality Units<sup>1</sup>

This standard is issued under the fixed designation F2737; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

## 1. Scope

1.1 This specification covers materials, structural design, physical dimensions and manufacturing requirements for monolithic or sectional corrugated high density polyethylene (HDPE) water quality units with volumes greater than or equal to 86 ft<sup>3</sup> or 640 gal (2,400 L).

1.2 The corrugated HDPE water quality units are placed as offline or inline treatment devices along storm drain pipe lines to remove total suspended solids (TSS), heavy metals and phosphorous. Typical sources of pollutants include construction activity, automotive transportation related wear and debris items, refuse, landscaping debris, agricultural activities, and other similar by-products.

1.3 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

1.4 This specification covers horizontally laid corrugated HDPE water quality units as illustrated in Fig. 1.

1.5 The following safety hazard caveat pertains only to the test methods portion, Section 9, of this specification. *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

## 2. Referenced Documents

### 2.1 ASTM Standards:<sup>2</sup>

**D1600 Terminology for Abbreviated Terms Relating to Plastics**

**D3212 Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals**

**D3350 Specification for Polyethylene Plastics Pipe and Fittings Materials**

**F412 Terminology Relating to Plastic Piping Systems**

**F477 Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe**

**F714 Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Outside Diameter**

**F2306/F2306M Specification for 12 to 60 in. [300 to 1500 mm] Annular Corrugated Profile-Wall Polyethylene (PE) Pipe and Fittings for Gravity-Flow Storm Sewer and Subsurface Drainage Applications**

2.2 *Plastic Pipe Institute*:<sup>3</sup>

**PPI TR-4 PPI Listing of Hydrostatic Design Basis (HDB), Pressure Design Basis (PDB), and Minimum Required Strength (MRS) Ratings for Thermoplastic Plastic Pipes**

2.3 *AASHTO Standard*<sup>4</sup>

**LDFD Bridge Design Specifications**

## 3. Terminology

3.1 For definitions of terms relating to plastics, see Terminology **F412** and abbreviations are in accordance with Terminology **D1600**, unless otherwise specified.

### 3.2 Definitions of Terms Specific to This Standard:

3.2.1 *access opening, n*—a hole in the top or crown of the water quality unit for access to the interior for inspection, cleaning and removing of sediment, hydrocarbons, floating debris, and pollutants without personnel entry.

3.2.2 *bypass, n*—an optional external piping intended to convey storm flow in excess of the treatment flow rate beyond the water quality unit.

3.2.3 *Compartment, n*—a separate and distinct section of the water quality unit designated for specific contaminant removal.

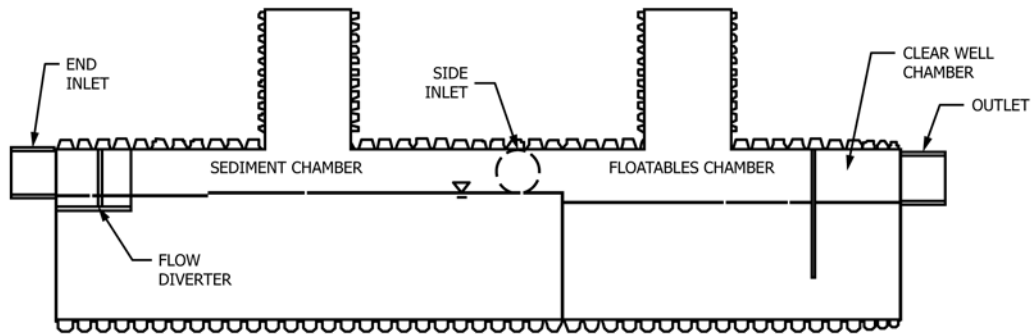
<sup>1</sup> This specification is under the jurisdiction of ASTM Committee **F17** on Plastic Piping Systems and is the direct responsibility of Subcommittee **F17.26** on Olefin Based Pipe.

Current edition approved Nov. 1, 2011. Published December 2011. Originally approved in 2010. Last previous edition approved in 2010 as F2737–10A. DOI:10.1520/F2737–11.

<sup>2</sup> For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

<sup>3</sup> Available from Plastics Pipe Institute (PPI), 105 Decker Court, Suite 825, Irving, TX 75062, http://www.plasticpipe.org.

<sup>4</sup> Available from American Association of State Highway and Transportation Officials (AASHTO), 444 N. Capitol St., NW, Suite 249, Washington, DC 20001, http://www.transportation.org.



HDPE water quality units contain three (3) chambers. A side inlet may be used in lieu of the end inlet and flow diverter when a full height longitudinal partition is constructed in the sediment chamber compartment to extend the particle travel length and isolate incoming flow from sediment build-up.

**FIG. 1 Horizontally Laid Corrugated HDPE Water Quality Units**

3.2.4 *first flush, n*—the first half inch to one inch of rainfall which results in overland flow during a storm event or as required by the regional water quality regulatory agency.

3.2.5 *flow diverter (partitions), n*—a device at the inlet of the water quality unit that extends partially between the top and invert intended to deflect influent downward and increase the length of the flow path of the liquid as it travels through the water quality unit.

3.2.6 *joint, n*—a physical separation where two sections of the water quality unit are in contact.

3.2.7 *monolithic corrugated HDPE water quality unit, n*—a single extruded piece of pipe with no internal joints and welded end caps that serves as the water quality unit.

3.2.8 *non-sealed joint, n*—a joint where a machined fit will minimize the movement of liquid from one side of a wall to the opposite side.

3.2.9 *orifice equation, n*—prediction of flow rate through a round opening of liquid given the opening size and the head above the opening.

3.2.10 *owner, n*—is by definition end user, customer, or purchaser.

3.2.11 *sealed joint, n*—a joint that is sealed to prevent liquid passing from one side of a wall to the opposite wall.

3.2.12 *sectional corrugated HDPE water quality unit, n*—a group of two or more extruded pieces of pipe connected with sealed joints that when combined serve as the principal unit.

3.2.13 *Stokes Law, n*—prediction of settling time for particles of various sizes in a liquid.

3.2.14 *treatment flow rate, n*—the flow rate for which the water quality unit is intended to treat such to provide removal of Total Suspended Solids (TSS).

3.2.15 *water quality unit*—a single unit or series of units in which pollutants from storm runoff from land drainage is received, detained, and treated and from which the liquid effluent, which is comparatively free from settleable, suspended, and floating solids, is then discharged to a public storm sewer, water detention / retention structure, or publicly owned waterway.

3.2.16 *weir, n*—a partition across the width of the sediment chamber that partially extends between the invert and top and is intended to trap pollutants.

#### 4. Ordering Information

4.1 The owner shall include the following information in bidding documents and on the purchase order, as applicable to the units being ordered:

4.1.1 Reference to this specification, and date of issue.

4.1.2 Quantity or number of water quality units.

4.1.3 Capacity of the tank in ft<sup>3</sup> or gal (L).

4.1.4 Project conditions such as peak storm flow rate, bypass diameter and associated piping elevations.

4.1.5 Acceptance will be based on a review of the calculations or testing submittals.

4.1.6 Design requirements such as depth of earth cover, live load applied at the surface, ground water level and joint requirements for bypass pipe.

4.1.7 Testing for water leakage shall not be required at the job site unless specifically required by the owner at the time of ordering.

#### 5. Materials and Manufacture

5.1 *Water Quality Unit, Access Risers and Fittings*—Shall be fabricated from pipe and fittings meeting the requirements of Specification F2306/F2306M. It is permissible to utilize other pipe materials as long as they meet the performance criteria in this standard and are approved by the owner.

5.2 *Inlet and Outlet Tees*—Shall be fabricated from pipe and fittings meeting the requirements of Specification F2306/F2306M for dual wall pipe or Specification F714 for solid wall pipe. It is permissible to utilize other pipe materials as long as they meet the performance criteria in this standard and are approved by the owner.

5.3 *Internal Tank Piping*—Internal piping within the water quality unit shall be fabricated from pipe and fittings meeting the requirements of Specification F2306/F2306M for dual wall pipe or Specification F714 for solid wall pipe. It is permissible to utilize other pipe materials as long as they meet the performance criteria in this standard and are approved by the owner.

5.4 *Weirs, Flow Diverters, and End Caps*—Weirs, flow diverters (partitions), and end caps shall be fabricated from either flat plates meeting the requirements of PPI TR-4 PE 3408 material.

5.5 *Pipe Connections:*