Designation: D8057 – 17

Standard Specification for Inlet Filters with a Rigid Frame[1]

This standard is issued under the fixed designation D8057; 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 (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This specification covers geosynthetic storm sewer inlet filters used in highway drainage, roadway, residential, commercial, and industrial applications. The inlet filter is comprised of a rigid frame and a removable geosynthetic sediment bag. The sediment bag hangs suspended from the rigid frame and includes a bypass that shall allow water flow into the drainage structure if the bag is completely filled with sediment. Water flow through the bypass shall equal or exceed the design flow of the inlet required at a specified drainage location.

1.2 The requirements of this specification are intended to provide an inlet filter system to collect sediment, trash, leaves, and other storm water contaminants from surface storm water runoff at drainage inlet locations during temporary site construction.

1.3 *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.*

1.4 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

D4439 Terminology for Geosynthetics

D5141 Test Method for Determining Filtering Efficiency and Flow Rate of the Filtration Component of a Sediment Retention Device

D7351 Test Method for Determination of Sediment Retention Device Effectiveness in Sheet Flow Applications

2.2 *AASHTO Standards:*[3]

AASHTO M288 Geotextile Materials

3. Terminology

3.1 *Definitions:*

3.1.1 For definitions of terms relating to geosynthetics, refer to Terminology D4439.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *design flow rate of the inlet, n*—the design flow to the drainage structure.

3.2.2 *treatment flow rate, n*—the design flow that is intended to be filtered through the sediment bag.

4. Classification

4.1 *General*—This specification covers geosynthetic storm sewer inlet filters used in highway drainage, roadway, residential, commercial, and industrial applications. The inlet filter is comprised of a rigid frame and a removable geosynthetic sediment bag fixed to the frame by a positive connection with adequate strength to support the weight of the sediment bag when completely full.

4.2 This product can be used with round, rectangular, gutter, rolled curb, and curb inlet types.

5. Ordering Information

5.1 When ordering material in accordance with this specification, the following should be specified:

5.1.1 The inlet type, grate length and width, or diameter,

5.1.2 The inlet clear opening length and width, or diameter,

5.1.3 The frame materials,

5.1.4 The geosynthetic bag physical properties,

5.1.5 The geosynthetic bag volume capacity,

5.1.6 The treatment flow rate, and

5.1.7 The design flow rate of the inlet.

6. Materials and Manufacture

6.1 *Basic Materials*—These products are comprised of a rigid frame and geosynthetic sediment bag. The sediment bag

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[2] 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.

[3] 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.

must be sized appropriately to meet the treatment flow rate required. The sediment bag hangs suspended from the rigid frame and includes a bypass that shall allow water flow into the drainage structure if the bag is completely filled with sediment. Water flow through the bypass shall equal or exceed the design flow of the inlet required at the specified drainage location.

6.1.1 *Frame*—The rigid frame shall be designed to support the design load on the frame. The frame must be capable of supporting the full design load without deformation when the grate is removed. The frame shall not interfere with or elevate the grate more than ⅛ in.

6.1.1.1 Calculate the design load, *P*, as follows:

$$P = 2\gamma_{sat}V \quad (1)$$

where:

P = frame design load, lb,
γ_{sat} = unit weight of saturated soil, 120 lb/ft^3, and
V = volume of sediment bag, ft^3.

6.1.1.2 The design engineer may specify a design load based on site-specific conditions, including a minimum design load.

6.1.1.3 When specifying the frame material, the design engineer should consider the material's ability to satisfy structural and durability requirements of the project, such as the ability to resist damage from impact and vehicle loading, deflection, and buckling, and the ability to support a long-term load.

6.1.2 *Sediment Bag Geosynthetic Materials*—The sediment bag shall be manufactured from a geotextile material or a composite of geotextile and geosynthetic reinforcement. Geotextiles shall meet the requirements of AASHTO M288 Class 1 or 2 for subsurface drainage. The sediment bag must maintain shape to be extractable when completely filled with sediment. The bag must be sized appropriately to meet the treatment flow rate required.

6.1.3 *Sediment Bag Geosynthetic Materials When Used for Trash Removal*—When used for removal of trash or large debris only, the geosynthetic sediment bag may be constructed of open-weave geosynthetic. The opening size of the open-weave geosynthetic will be as specified by the engineer and must be sized appropriately to remove the desired trash and large debris. The sediment bag must maintain shape to be extractable when completely filled with sediment, trash, or debris. The bag must be sized appropriately to meet the treatment flow rate required at the specified drainage structure.

6.1.4 *Bypass:*

6.1.4.1 *Bypass Located in the Frame*—The sediment bag hangs suspended from the rigid frame with a bypass that shall allow water flow into the drainage structure if the bag is completely filled with sediment. Water flow through the bypass shall equal or exceed the design flow of the inlet required at a specified drainage location.

6.1.4.2 *Bypass Located in the Sediment Bag*—Openings are included in the sediment bag that shall allow water flow into the drainage structure if the bag is filled with sediment to the level of the openings. The openings shall be sized so that water flow through the bypass shall equal or exceed the design flow of the inlet required at a specified drainage location. The volume of the bag shall be calculated as the volume below the bypass openings. The openings in the sediment bag shall be uniformly made and reinforced. The strength of the reinforced openings in the bag shall be ≥90 % of the specified grab strength of the geosythetic bag material.

6.1.5 *Frame Connection*—The sediment bag hangs suspended from the rigid frame. The geosynthetic is fixed to the frame by a positive connection capable of supporting the full weight of the geotextile bag when completely full with sediment. The geosynthetic bag must be removable to facilitate replacement. The sediment bag can be located in the frame or supported by the frame if the means of connection to the frame supports the full weight of the geotextile bag when completely full with sediment and allows for full bypass flow.

7. Test Requirements

7.1 When used for sediment removal, the filtration efficiency testing shall be conducted on representative inlet filter designs and meet a minimum of 80 % gross removal efficiency when tested in accordance with Test Method D7351, with flow diverted into an area inlet. Alternatively, testing can be completed on the filtration component of the geosynthetic per Test Method D5141. If desired, obtain representative samples of the site-specific soil that is significant to the design of the inlet filter on the construction project. If testing is not site specific, the general soil type to be used for testing shall be loam with target grain sizes and plasticity index as shown in Table 1, unless otherwise specified.

TABLE 1 Target Grain Sizes and Plasticity Indices

Measurement	Range
D_{100} (mm)	$D_{100} < 25$
D_{85} (mm)	$0.5 < D_{85} < 5.0$
D_{50} (mm)	$0.001 < D_{50} < 1.0$
D_{15} (mm)	$0.005 < D_{15}$
Plasticity Index	1 < PI < 8

8. Product Marking

8.1 The product shall be clearly marked as follows:
8.1.1 Manufacturer's name or trademark,
8.1.2 Manufacturer's product code,
8.1.3 Specification designation ASTM X XXXX, and
8.1.4 The date of manufacture or an appropriate code.

9. Keywords

9.1 geosynthetics; geotextiles; inlet filters; storm sewers

APPENDIXES

(Nonmandatory Information)

X1. AUTHORITIES

X1.1 Since this product has a wide variety of uses, approval for its use rests with various agencies. The design engineer or installer (or both) should contact the relevant authority to obtain local guidelines.

X2. MAINTENANCE AND INSPECTION

X2.1 Frequency of Inspections

X2.1.1 Inspection should occur following any rain event greater than 0.25 in. in 24 h.

X2.2 Maintenance Guidelines

X2.2.1 Empty the sediment bag if more than half filled with sediment and debris, or as directed.

X2.2.2 Dispose of sediment or debris as directed by the engineer or maintenance contract.

X2.2.3 Remove silt from sediment bag and reverse flush the sediment bag.

X2.2.4 Replace bag if torn or punctured.