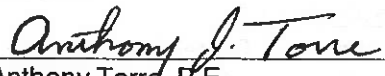


SUPERSEDED BY EB 15-031 EFFECTIVE 9/28/15		New York State Department of Transportation ENGINEERING INSTRUCTION	EI 11-011
Title: REVISION TO STANDARD SPECIFICATION §733-20 UNDERDRAIN FILTER MATERIAL			
Target Audience: ☐ Manufacturers (18) ☒ Local Govt. (31) ☒ Agencies (32) ☐ Surveyors (33) ☒ Consultants (34) ☒ Contractors (39) ☐ _____ ()		Approved:  Anthony Torre, P.E. Acting Deputy Chief Engineer (Research) 07-26-2011 Date	

ADMINISTRATIVE INFORMATION:

- This Engineering Instruction (EI) is effective beginning with projects submitted for the letting of January 12, 2012 .
- Superseded issuance(s): This EI modifies the §733-20 portion of EI 09-027.
- The revisions issued with this EI will be incorporated into the next update of the Standard Specifications.

PURPOSE: The purpose of this EI is to issue revised §733-20 *Underdrain Filter Material*.

TECHNICAL INFORMATION:

- The material requirements in §733-20 *Underdrain Filter Material* were revised to include an acceptable material substitution. Specifically, crushed glass will be allowed as a substitution for the crushed stone, sand, gravel, or screened gravel typically used to process Underdrain Filter, Types 1 or 2.

IMPLEMENTATION:

- The Main Office Design Quality Assurance Bureau will insert these standard specification revisions into contract proposals beginning with projects submitted for the letting of January 12, 2012 .

TRANSMITTED MATERIALS: This EI transmits standard specification revision §733-20 *Underdrain Filter Material*. Both Metric and U.S. Customary revisions are attached.

BACKGROUND: Glass aggregate and blends thereof are strong, safe, and economical. The main source of crushed glass utilized in the construction industry is via glass cullet. Glass cullet is comprised of the mixed colored glass fragments resulting from the breakage of colored glass containers, typically collected at Municipal Recovery Facilities (MRFs). Glass cullet, if properly sized and processed, can exhibit characteristics similar to that of gravel or sand.

In 1991, Executive Order #142 directed all State Agencies to make maximum use of recycled materials. In 1994, the Department issued EB 94-039 allowing crushed glass to be recycled on construction projects as a substitute for natural aggregates as part of a blended product. Subbase material may be a blend of Blast Furnace Slag, Stone, Sand, and Gravel, with not more than 30% by weight of glass. In addition, glass may be incorporated into embankments if it is thoroughly mixed with other suitable material so that glass constitutes no more than 30% by weight anywhere in the embankment.

REFERENCE: Further information on crushed glass may be found in such sources as:

1. "Where the Cullet Hits the Road"
Resource Recycling Magazine
February, 2010
2. Clean Washington Center
Pacific Northwest Economic Region
<http://www.cwc.org/>
3. U.S. Environmental Protection Agency
Markets for Recovered Glass
<http://www.epa.gov/osw/nonhaz/municipal/pubs/cok.pdf>
4. U.S. Department of Transportation
Federal Highway Administration
Publication No. FHWA-RD-97-148
User Guidelines for Waste or Byproduct Materials in Pavement Construction
<http://www.fhwa.dot.gov/publications/research/infrastructure/structures/97148/wg3.cfm>
5. Recycled Materials Resource Center
University of New Hampshire
User Guidelines for Byproducts and Secondary Use Materials in Pavement Construction
<http://www.rmrc.unh.edu/tools/uguidelines/wg1.asp>

CONTACT: Questions or comments regarding this issuance should be directed to Randall J. Romer, P.E., of the Geotechnical Engineering Bureau at (518) 457-4714, or via e-mail at rromer@dot.state.ny.us. Questions or comments regarding the technical aspects of the Standard Specification Section should be directed to Don Dwyer, P.E., of the Geotechnical Engineering Bureau at (518) 457-4724, or via e-mail at ddwyer@dot.state.ny.us.

UNDERDRAIN FILTER MATERIAL

Make the following changes to the Standard Specifications dated May 4, 2006 as modified by EI 09-027:

Delete §733-20 in its entirety and **Replace** it with the following:

§733-20 – UNDERDRAIN FILTER MATERIAL

SCOPE. This specification covers the material requirements and methods of testing underdrain filter material generally used in drainage systems. The following underdrain filter types are evaluated in this specification:

733.2001 – Underdrain Filter, Type 1

733.2002 – Underdrain Filter, Type 2

Underdrain filter types are based on the gradation of the material as outlined in Table 733-20A *Underdrain Filter Material Gradation* or alternate recycled material as outlined in Table 733-20B *Underdrain Filter Material, Glass Substitution Gradation*.

SAMPLING. Perform material tests and assurance methods pertaining to underdrain filter material requirements in conformance with the procedures contained in the geotechnical control procedure “*Procedure for the Control and Quality Assurance of Granular Materials*”.

MATERIAL REQUIREMENTS.

A. STOCKPILE. Stockpile underdrain filter material in accordance with the geotechnical control procedure “*Procedure for the Control and Quality Assurance of Granular Materials*” except as noted herein.

B. GRADATION. Provide material consisting of crushed stone, sand, gravel, or screened gravel having a gradation in accordance with TABLE 733-20A *Underdrain Filter Material Gradation*.

TABLE 733-20A UNDERDRAIN FILTER MATERIAL GRADATION		
Sieve Size Designation	Percentage Passing by Weight	
	Type 1	Type 2
25 mm	100	-
12.5 mm	30-100	100
6.3 mm	0-30	20-100
2 mm	0-10	0-15
850 µm	0-5	0-5

C DURABILITY. Provide material meeting the soundness requirements of §703-02 *Coarse Aggregates* or §703-10 *Lightweight Aggregates*. When electing to use material from sources not approved under §703-02 or §703-10, provide material having a Magnesium Sulfate Soundness loss less than 20% in conformance with the procedures contained in the geotechnical test method “*Test Method for Magnesium Sulfate Soundness of Granular Materials*”.

D. RECYCLED MATERIALS. The following material is an acceptable replacement for Types 1 or 2.

UNDERDRAIN FILTER MATERIAL

- **Alternate A.** Crushed glass backfill. Glass shall meet the requirements of §733-05 Glass Backfill and have a gradation in accordance with TABLE 733-20B *Underdrain Filter Material, Glass Substitution Gradation*.

TABLE 733-20B UNDERDRAIN FILTER MATERIAL, GLASS SUBSTITUTION GRADATION	
Sieve Size Designation	Percentage Passing by Weight
12.5 mm	100
9.5 mm	90 – 100
75 µm	0-5

BASIS OF APPROVAL. Stockpiles of underdrain filter material will be approved in accordance with the geotechnical control procedure "*Procedure for the Control and Quality Assurance of Granular Materials*".

BASIS OF ACCEPTANCE. Underdrain filter material from approved stockpiles will be accepted upon successful completion of the Quality Assurance (QA) program indicating that the material conforms to the specification. If the QA program is not introduced, underdrain filter material will be accepted upon the basis of the stockpile approval.

UNDERDRAIN FILTER MATERIAL

Make the following changes to the Standard Specifications dated May 1, 2008 as modified by EI 09-027:

Delete §733-20 in its entirety and **Replace** it with the following:

§733-20 – UNDERDRAIN FILTER MATERIAL

SCOPE. This specification covers the material requirements and methods of testing underdrain filter material generally used in drainage systems. The following underdrain filter types are evaluated in this specification:

733.2001 – Underdrain Filter, Type 1

733.2002 – Underdrain Filter, Type 2

Underdrain filter types are based on the gradation of the material as outlined in Table 733-20A *Underdrain Filter Material Gradation* or alternate recycled material as outlined in Table 733-20B *Underdrain Filter Material, Glass Substitution Gradation*.

SAMPLING. Perform material tests and assurance methods pertaining to underdrain filter material requirements in conformance with the procedures contained in the geotechnical control procedure “*Procedure for the Control and Quality Assurance of Granular Materials*”.

MATERIAL REQUIREMENTS.

A. STOCKPILE. Stockpile underdrain filter material in accordance with the geotechnical control procedure “*Procedure for the Control and Quality Assurance of Granular Materials*” except as noted herein.

B. GRADATION. Provide material consisting of crushed stone, sand, gravel, or screened gravel having a gradation in accordance with TABLE 733-20A *Underdrain Filter Material Gradation*.

TABLE 733-20A UNDERDRAIN FILTER MATERIAL GRADATION		
Sieve Size Designation	Percentage Passing by Weight	
	Type 1	Type 2
1 in.	100	-
½ in.	30-100	100
¼ in.	0-30	20-100
No. 10	0-10	0-15
No. 20	0-5	0-5

C. DURABILITY. Provide material meeting the soundness requirements of §703-02 *Coarse Aggregates* or §703-10 *Lightweight Aggregates*. When electing to use material from sources not approved under §703-02 or §703-10, provide material having a Magnesium Sulfate Soundness loss less than 20% in conformance with the procedures contained in the geotechnical test method “*Test Method for Magnesium Sulfate Soundness of Granular Materials*”.

D. RECYCLED MATERIALS. The following material is an acceptable replacement for Types 1 or 2.

UNDERDRAIN FILTER MATERIAL

- **Alternate A.** Crushed glass backfill. Glass shall meet the requirements of §733-05 Glass Backfill and have a gradation in accordance with TABLE 733-20B *Underdrain Filter Material, Glass Substitution Gradation*.

TABLE 733-20B UNDERDRAIN FILTER MATERIAL, GLASS SUBSTITUTION GRADATION	
Sieve Size Designation	Percentage Passing by Weight
½ in.	100
¾ in.	90 – 100
No. 200	0-5

BASIS OF APPROVAL. Stockpiles of underdrain filter material will be approved in accordance with the geotechnical control procedure "*Procedure for the Control and Quality Assurance of Granular Materials*".

BASIS OF ACCEPTANCE. Underdrain filter material from approved stockpiles will be accepted upon successful completion of the Quality Assurance (QA) program indicating that the material conforms to the specification. If the QA program is not introduced, underdrain filter material will be accepted upon the basis of the stockpile approval.