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SUPERSEDED BY EB 20-038 EFFECTIVE 9/3/20	*New York State Department of Transportation* **ENGINEERING INSTRUCTION**	**EI 95-055**	

Title: **DESIGN GUIDELINES FOR SMOOTH INTERIOR PERFORATED CORRUGATED POLYETHYLENE UNDERDRAIN PIPE AND SMOOTH INTERIOR CORRUGATED POLYETHYLENE CULVERT AND STORM DRAIN PIPE**

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Approved: P. J. Clark, Deputy Chief Engineer, Design Div. — Date: 12/11/95

This Engineering Instruction supersedes EI 93-032.

EFFECTIVE DATE:

This Engineering Instruction is effective with the letting date of 3/21/96

PURPOSE:

This Engineering Instruction provides English and Metric versions of the design guidelines for Items 18605.9810XX Smooth Interior Perforated Corrugated Polyethylene Underdrain Pipe and 18603.9801XX Smooth Interior Corrugated Polyethylene Culvert and Storm Drain Pipe.

These design guidelines will be added to Chapter 9 of the Highway Design Manual.

COMPANION REFERENCES:

This instruction has been written as a companion to EI 95-056 SPECIAL SPECIFICATION ITEMS 18605.9810XX AND 18605.9810XX M ,"SMOOTH INTERIOR PERFORATED CORRUGATED POLYETHYLENE UNDERDRAIN PIPE"

CONTACT:

Questions should be directed to Guy Hildreth of the Materials Bureau at (518) 457-5956.

DESIGN GUIDELINES: U. S. Customary Units

POINTS 1-9: SMOOTH INTERIOR CORRUGATED POLYETHYLENE CULVERT AND STORM DRAIN PIPE

POINTS 1-13 SMOOTH INTERIOR PERFORATED CORRUGATED POLYETHYLENE UNDER DRAIN PIPE

1. The pipe should be designed using a Manning "n" value of 0.013.

2. Maximum height of cover is 15 feet.

3. The minimum height of cover is 12 inches from the pipe's crown to the top of subgrade. When shallow covers in confined construction areas result, a significant cost increase for the PE pipe may result because of additional intermediate tasks required of the contractor to protect the PE pipe from damage. Precautions could include the installation of additional temporary backfill, installation of steel plates to bridge a shallow trench, etc. The designer should consider the use of optional pipe material specifications if these conditions are anticipated to allow the contractor flexibility to account for these variables.

4. The anticipated service life of PE pipe is 70 years, regardless of zone.

5. Partial height headwalls will require a special anchor bolt detail on the plans. Use the detail given in EI 83-42 but add a 1 5/16 inch washer. Hex nuts can be used to anchor the pipe to the headwall.

6. The product may be used in both open and closed drainage systems.

7. Polyethylene pipe has the potential to burn. However, the risk of burning has been determined to be very low. The designer should consider less flammable materials at locations where the risk is expected to be high.

8. The density of polyethylene pipe is less than water, therefore when wet conditions are expected and dewatering may be a problem, polyethylene pipe will float and should not be specified.

9. In situations where end sections are required they shall be galvanized steel conforming to Subsection 707-10, Galvanized Steel End Sections, of the Standard Specifications and shall be of a diameter one size larger than the polyethylene pipe being used.

10. The Regional Geotechnical Engineer should evaluate the conditions at the site to determine if this item is appropriate.

11. The pipe is recommended for use in poorly drained soils and in situations where ground water has collected due to a high water table, as well as in situations where water from other sources must be removed.

12. Excavation, underdrain filter and end sections are all separately measured.

13. The Designer must specify the perforation pattern to be used as per AASHTO M294. The Regional Geotechnical Engineer shall be consulted if there are any questions as to the appropriate perforation pattern to be used.

DESIGN GUIDELINES: Metric Units

POINTS 1-9: SMOOTH INTERIOR CORRUGATED POLYETHYLENE CULVERT AND STORM DRAIN PIPE

POINTS 1-13 SMOOTH INTERIOR PERFORATED CORRUGATED POLYETHYLENE UNDER DRAIN PIPE

1. The pipe should be designed using a Manning "n" value of 0.013.

2. Maximum height of cover is 4.5 meters.

3. The minimum height of cover is 300 mm from the pipe's crown to the top of subgrade. When shallow covers in confined construction areas result, a significant cost increase for the PE pipe may result because of additional intermediate tasks required of the contractor to protect the PE pipe from damage. Precautions could include the installation of additional temporary backfill, installation of steel plates to bridge a shallow trench, etc. The designer should consider the use of optional pipe material specifications if these conditions are anticipated to allow the contractor flexibility to account for these variables.

4. The anticipated service life of PE pipe is 70 years, regardless of zone.

5. Partial height headwalls will require a special anchor bolt detail on the plans. Use the detail given in EI 83-42 but add a 33 mm washer. Ordinary Hex nuts can be used.

6. The product may be used in both open and closed drainage systems.

7. Polyethylene pipe has the potential to burn. However, the risk of burning has been determined to be very low. The designer should consider less flammable materials at locations where the risk is expected to be high.

8. The density of polyethylene pipe is less than water, therefore when wet conditions are expected and dewatering may be a problem, polyethylene pipe will float and should not be specified.

9. In situations where end sections are required they shall be galvanized steel conforming to Subsection 707-10, Galvanized Steel End Sections, of the Standard Specifications and shall be of a diameter one size larger than the polyethylene pipe being used.

10. The Regional Geotechnical Engineer should evaluate the conditions at the site to determine if this item is appropriate.

11. The pipe is recommended for use in poorly drained soils and in situations where ground water has collected due to a high water table, as well as in situations where water from other sources must be removed.

12. Excavation, underdrain filter and end sections are all separately measured.

13. The Designer must specify the perforation pattern to be used as per AASHTO M294. The Regional Geotechnical Engineer shall be consulted if there are any questions as to the appropriate perforation pattern to be used.