

715-R-747 UNDERDRAIN OUTLET PIPE REQUIREMENTS

(Adopted 10-21-21)

The Standard Specifications are revised as follows:

SECTION 101, BEGIN LINE 50, INSERT AS FOLLOWS:

DBE	disadvantaged business enterprise
DCP	Dynamic Cone Penetrometer
DMF	design mix formula
DR	<i>dimension ratio</i>
DSR	dynamic shear rheometer

SECTION 101, BEGIN LINE 110, INSERT AS FOLLOWS:

PG	performance grade asphalt
POTW	Publicly Owned Treatment Works
PSM	<i>plastic sewer main</i>
PVC	polyvinyl chloride

SECTION 101, BEGIN LINE 125, INSERT AS FOLLOWS:

SAE	Society of Automotive Engineers
SC	slow curing asphalt
SCA	slow curing asphalt with additive
SDR	<i>standard dimension ratio</i>
SDS	Safety Data Sheet
SF	steel furnace slag

SECTION 715, BEGIN LINE 140, DELETE AND INSERT AS FOLLOWS:

(i) Underdrain Outlet Pipe

Pipe for underdrain outlets and drain tile outlets shall be PSM PVC pipe, profile wall PVC pipe, smooth wall polyethylene pipe, or smooth wall PVC pipe for outlets from the QPL of Thermoplastic Pipe and Liner Pipe Sources in accordance with 907.16 and 907.24. Schedule 40 PVC pipe in accordance with 907.24 is also allowable.

SECTION 718, BEGIN LINE 9, DELETE AND INSERT AS FOLLOWS:

718.02 Materials

Materials shall be in accordance with the following:

Coarse Aggregate, Class E or Higher, Size No. 8 or 9.....	904.03
Concrete, Class A.....	702
Geotextile for Underdrains	918.02(b)
Reinforcing Bars	910.01
Sod, including Nursery Sod.....	621
Structure Backfill	904.05
Underdrain Outlet Pipe.....	*715.02(i)
Underdrain Pipe	715.02(d)

~~* All thermoplastic pipes shall be from the QPL of Thermoplastic Pipe and Liner Pipe Sources in accordance with 907.16.~~

SECTION 719, BEGIN LINE 8, DELETE AND INSERT AS FOLLOWS:

719.02 Materials

Materials shall be in accordance with the following:

Concrete, Class A.....	702
Drain Tile Terminal Pipe.....	907.24
Flowable Backfill.....	213
Reinforcing Bars.....	910.01
Riprap.....	616.02
Structure Backfill.....	904
Rodent Screen.....	718.02

Drain tile materials shall be in accordance with 715.02(d). *Drain tile terminal pipe shall be underdrain outlet pipe in accordance with 715.02(i).*

SECTION 907, BEGIN LINE 218, DELETE AND INSERT AS FOLLOWS:

907.16 Thermoplastic Pipe Requirements

A QPL of thermoplastic pipe and liner pipe will be maintained by the Department. The list will specify the manufacturer and thermoplastic pipe designation. All of these materials shall comply with the applicable AASHTO or ASTM requirements listed in the following table and will only be accepted from qualified manufacturers. The manufacturer is defined as the plant which produces the thermoplastic pipe. The manufacturer shall become qualified by establishing a history of satisfactory quality control of these materials as evidenced by the test results performed by the manufacturer's testing laboratory.

Summary of Thermoplastic Pipe Specification Requirements				
Pipe Material	Standard Specification	AASHTO	ASTM	Manufacturer Requirement
Corrugated Polyethylene Drainage Tubing	907.17(a)	M 252		ITM 806, Procedure O
Corrugated Polyethylene Pipe	907.17(b)	M 294*		ITM 806, Procedure O
Corrugated Polypropylene Pipe	907.19	M 330		ITM 806, Procedure O
Perforated PVC Semicircular Pipe	907.18		D3034	ITM 806, Procedure A
<i>Profile Wall HDPE Liner Pipe</i>	<i>907.25(b)</i>		<i>F894</i>	<i>ITM 806, Procedure A or 916 Type A Certification</i>
<i>Profile Wall PVC Liner Pipe</i>	<i>907.25(c)</i>		<i>F949</i>	<i>ITM 806, Procedure A or 916 Type A Certification</i>
Profile Wall PVC Pipe	907.22 907.24(c)	M 304		ITM 806, Procedure O

Profile Wall Polyethylene Pipe	907.20		F894	ITM 806, Procedure A
Schedule 40 PVC Pipe	907.24(b)		D1785 or D2665	916, Type C Certification
Smooth Wall Polyethylene Pipe	907.21 907.24(d)		F714	ITM 806, Procedure A
Smooth Wall PVC Pipe	907.23 907.24(e)	M 278	F679	ITM 806, Procedure A
Solid Wall HDPE Liner Pipe	907.25(a)		F714	ITM 806, Procedure Q or 916 Type A Certification
Type PSM PVC Pipe and Fittings	907.24(a)		D3034	ITM 806, Procedure A
* Pipe in accordance with AASHTO M 294 shall be manufactured with virgin materials.				

907.17 Corrugated Polyethylene Drainage Tubing and Pipe

(a) Corrugated Polyethylene Tubing

Tubing and fittings shall be in accordance with AASHTO M 252. Perforations shall be required for tubing used as a longitudinal underdrain. ~~Qualification requirements for the manufacturers shall be in accordance with~~ Pipe may be added to the QPL by completing the requirements of ITM 806, Procedure O.

(b) Corrugated Polyethylene Pipe

Pipe and fittings shall be in accordance with AASHTO M 294. Pipe shall be manufactured with virgin materials; and be marked with the code "V". Pipe shall not be manufactured with recycled materials. ~~Qualification requirements for the manufacturers shall be in accordance with~~ Pipe may be added to the QPL by completing the requirements of ITM 806, Procedure O.

907.18 Perforated PVC Semicircular Pipe

Perforated PVC semicircular pipe may be used as an alternate to 6 in. or less diameter pipe or tile. Pipe shall be in accordance with ASTM D3034, SDR 35. This semicircular pipe shall have a smooth top and a smooth, semicircular bottom, nominally 4 5/8 in. in diameter, with perforations uniformly distributed along the top of the bottom section in accordance with AASHTO M 252 perforation requirements. The top section shall extend a minimum of 1/2 in. beyond the top of the semicircular section. The top section shall be approximately 6 3/8 in. wide including the sloping overhangs on each side. ~~Qualification requirements for the manufacturers shall be in accordance with~~ Pipe may be added to the QPL by completing the requirements of ITM 806, Procedure A.

907.19 Corrugated Polypropylene Pipe

Pipe and fittings shall be in accordance with AASHTO M 330. ~~Qualification requirements for the manufacturers shall be in accordance with~~ Pipe may be added to the

QPL by completing the requirements of ITM 806, Procedure O.

907.20 Profile Wall Polyethylene Pipe

Pipe and fittings shall be either closed profile or ribbed open profile in accordance with ASTM F894. ~~Qualification requirements for the manufacturers shall be in accordance with~~ *Pipe may be added to the QPL by completing the requirements of ITM 806, Procedure A.*

907.21 Smooth Wall Polyethylene Pipe

Pipe shall be in accordance with ASTM F714 for nominal diameters of 39 in. or less. Fittings shall be in accordance with ASTM F1055. The pipe sizes shall be in accordance with ISO sizing system. The pipe ~~dimension ratio~~ *DR* shall be 26 or less. The resin used in manufacturing this type of pipe shall have a minimum cell classification of 335434C in accordance with ASTM D3350 or a minimum grade of PE4710 in accordance with ASTM F714. *Pipe may be added to the QPL by completing the requirements of ITM 806, Procedure A.*

~~Qualification requirements for the manufacturers shall be in accordance with ITM 806, Procedure A.~~

907.22 Profile Wall PVC Pipe

Pipe and fittings shall be in accordance with AASHTO M 304. ~~Perforations~~ *Pipe shall be required perforated when used as a longitudinal underdrain or end bent drain pipe. Pipe shall be unperforated when used as an underdrain outlet pipe. Qualification requirements for the manufacturers shall be in accordance with* *Pipe may be added to the QPL by completing the requirements of ITM 806, Procedure O.*

907.23 Smooth Wall PVC Pipe

Pipe and fittings shall be in accordance with AASHTO M 278 for pipe sizes 4 in. through 15 in., and ASTM F679 for pipe sizes 18 in. through 27 in. ~~Qualification requirements for the manufacturers shall be in accordance with~~ *Pipe may be added to the QPL by completing the requirements of ITM 806, Procedure A.*

907.24 Smooth Wall Pipe for Outlets

Pipe and pipe fittings *used for outlets* shall be smooth *interior* wall, ~~non-~~ *unperforated* plastic pipe. ~~Qualification requirements for the manufacturers shall be in accordance with ITM 806, Procedure A.~~

(a) Type PSM PVC Pipe and Fittings

Pipe and fittings shall be in accordance with ASTM D3034, SDR 23.5. *Pipe may be added to the QPL by completing the requirements of ITM 806, Procedure A.*

(b) Schedule 40 PVC Pipe

Pipe shall be in accordance with ASTM D1785 or D2665 and shall have a minimum pipe stiffness of 150 psi at 5% deflection when determined in accordance with ASTM D2412. Material furnished under this specification shall reference ASTM D1785 or ASTM D2665 in the product print line. A type C certification in accordance with 916 shall be provided for the schedule 40 PVC pipe.

(c) Profile Wall PVC Pipe

Pipe shall be in accordance with 907.22.

(d) Smooth Wall Polyethylene Pipe

Pipe shall be in accordance with 907.21.

(e) Smooth Wall PVC Pipe

Pipe shall be in accordance with 907.23.

907.25 Thermoplastic Liner Pipe

Thermoplastic liner pipe shall be HDPE or PVC pipe with sufficient rigidity to withstand the installation operation and shall exhibit a minimum amount of distortion. The liner pipe shall be free from visible cracks, holes, foreign inclusions, or other defects. *Liner pipe shall be either from the QPL or a-A type A certification in accordance with 916 shall be provided for the HDPE liner pipe. The results of the tests listed in ITM 804 shall be shown on the certification.*

(a) Solid Wall HDPE Liner Pipe

Solid wall HDPE liner pipe shall be in accordance with ASTM F714. The maximum ~~standard-dimension-ratio~~, SDR, as defined in ASTM F412 for the liner pipe shall be 32.5. The actual calculated minimum ~~dimension-ratio~~, DR, as defined in ASTM F412 for the liner pipe shall be 30.0. The resin used in the manufacture of the liner pipe shall have a minimum cell classification of 345464C in accordance with ASTM D3350 or a minimum grade of PE4710 in accordance with ASTM F714. A 12 in. section of the liner pipe shall show no evidence of splitting, cracking, or breaking when compressed between parallel plates to 40% of its outside diameter within 2 to 5 minutes. Thermoplastic liner pipe may be added to the QPL by completing the requirements of ITM 806, Procedure Q.

SECTION 922, BEGIN LINE 1503, DELETE AS FOLLOWS:

(d) HDPE Schedule 40 or 80 Conduit

Conduit shall be smooth wall, Type III, Grade P-33, Category 5, Class C, coilable, HDPE. ~~Standard-dimension-ratio~~, SDR, 13.5 may be used for Schedule 40 HDPE and SDR 11 may be used for Schedule 80. Conduit and fittings shall meet the applicable requirements of ASTM D1248, ASTM D3350, ASTM F2160 and UL 651.

Schedule 40 or 80 HDPE conduit shall be marked in accordance with ASTM D3485 with the producer code and designation type indicated. HDPE conduit shall be produced from material with an orange color and ultraviolet stabilization code of C, D, or E in accordance with ASTM D3350. Schedule 40 HDPE conduit for use above ground shall be black.