

SECTION 948 MISCELLANEOUS TYPES OF PIPE

948-1 Polyvinyl-Chloride Pipe, or Acrylonitrile-Butadiene-Styrene Plastics Pipe.

948-1.1 For Bridge Drains: Polyvinyl-chloride pipe, for use in bridge drains which will be exposed shall conform to the requirements of ASTM D 1785, for Type II, Grade 1, Schedule 40 PVC pipe. For the portion of bridge drains encased in concrete, the pipe may be as specified in 948-1.4.

948-1.2 Pressure Pipe: Pressure pipe for direct burial under pavement shall conform to the requirements of ASTM D 1785, for Type I, Grade I, Schedule 40, for sizes up to and including 2 1/2 inches [60 mm], and Schedule 80 for sizes up to 4 inches [100 mm]. Pressure pipe 4 inches [100 mm] in diameter and larger shall conform to the requirements of AWWA C900-75, DR18, and ASTM D 1785, Type I, Grade I or other types as may be specifically called for in the plans or special provisions.

948-1.3 Pipe Marking: All polyvinyl-chloride pipe shall be marked as required by Article 8 of ASTM D 1785, and acceptance of the pipe may be based on this data.

948-1.4 Nonpressure Pipe: Polyvinyl-chloride pipe and Acrylonitrile-butadiene-styrene pipe, intended for direct-burial or concrete encasement, shall meet the following requirements:

(a) PVC Pipe: ASTM D 3034, SDR-35, or ASTM F 949, profile wall without perforations.

(b) ABS Pipe: ASTM D 2680.

The manufacturer of the PVC or ABS pipe shall furnish to the Engineer six copies of mill analysis covering chemical and physical test results.

948-1.5 Underdrain: Polyvinyl-chloride pipe for use as underdrain shall conform to the requirements of ASTM F 758 or ASTM F 949. Also, PVC underdrain manufactured from PVC pipe meeting ASTM D 3034, perforated in accordance with the perforation requirements given in AASHTO M 36 or AASHTO M 196 will be permitted.

948-1.6 Edgedrain: Polyvinyl-chloride pipe for use as edgedrain shall conform to the requirements of ASTM F 758, ASTM F 949 or ASTM D 3034 pipe shall be perforated in accordance with the perforation requirements given in AASHTO M 36 or AASHTO M 196. Additional perforations will be required as indicated in the Design Standards, Index No. 286 for pipes designated under ASTM F 758 and ASTM D 3034. Polyvinyl chloride pipe intended for direct burial in asphalt shall meet the following requirements:

(a) ASTM D 3034, SDR-35, or ASTM F 949

(b) NEMA TC-2 (pipe material and compounds) and NEMA TC-3 (pipe fittings) for PVC (90° C electrical conduit pipe) NEMA ECP-40 and NEMA ECP-80. Underwriter Laboratory Specifications referenced under NEMA specifications for electrical conductivity are not required.

(c) Pipe shall withstand asphalt placement temperatures specified without permanent deformation.

(d) Perforations shall be in accordance with AASHTO M 36M or AASHTO M 196M.

948-1.7 Polyvinyl Chloride (PVC) Pipe (12 to 48 Inches [300 to 1,200 mm]): Polyvinyl Chloride (PVC) Pipe for side drain, cross drain, storm drain and other specified applications shall conform to AASHTO M 278 having a minimum cell classification of 12454C or 12364C as specified in ASTM D 1784 for smooth wall PVC pipe, or AASHTO M 304 having a minimum cell classification of 12454C or 12364C for PVC ribbed pipe. For side drain and cross drain applications, mitered end sections as indicated in the Design Standards, Indexes 272 and 273 requires fabrication from another approved culvert material.

948-2 Corrugated Polyethylene Tubing and Pipe.

948-2.1 General: For underdrain, Corrugated Polyethylene Tubing and fittings shall meet the requirements of AASHTO M 252. For edgedrain, Corrugated Polyethylene Tubing and fittings shall meet the requirements of AASHTO M 252, except as modified in 948-2.2. For storm drain side drain, french

drain and cross drain. Corrugated Polyethylene Pipe shall meet the requirements of AASHTO M 294 and the additional provisions specified in 948-2.3.

The tubing or pipe shall not be left exposed to sunlight for periods exceeding the manufacturer's recommendation.

948-2.2 Edgedrain (4 to 10 inches [100 to 250 mm]): The requirements for Edgedrain as specified in AASHTO M 252 are modified as follows:

(a) Coiling of tubing 6 inches [150 mm] in diameter or greater is not permitted. Tubing shall have a minimum pipe stiffness of 46 psi [275 kPa] at 5% deflection.

948-2.3 Corrugated Polyethylene Pipe (12 to 48 inches [300 to 1,200 mm]): Corrugated Polyethylene Pipe for side drain, cross drain, storm drain and other specified applications shall conform to AASHTO M 294 with the following exception: corrugations may only be annular. Pipe shall also conform to the minimum cell classification 335420C as specified in ASTM D 3350. For side drain and cross drain applications, mitered end sections as indicated in the Design Standards, Indexes 272 and 273 requires fabrication from another approved culvert material.

948-3 Filter Fabric Sock for Use with Underdrain.

For Type I Underdrain specified in the Roadway and Traffic Design Standard Index 286, filter sock shall be an approved strong rough porous, polyester or other approved knitted fabric which completely covers and is secured to the perforated plastic tubing underdrain in such a way as to prevent infiltration of trench backfill material.

The knitted fabric sock shall be a continuous one piece material that fits over the tubing like a sleeve. It shall be knitted of continuous 150 denier yarn and shall be free from any chemical treatment or coating that might significantly reduce porosity and permeability.

The knitted fabric sock shall comply with the following physical properties:

Weight, applied (oz./sq. yd.)	3.5 min	ASTM D 3887
Grab tensile strength (lbs.)	50 min.*	ASTM D 5034
Equivalent opening size (EOS No.)	25 min.**	Corps of Engineers CW-02215-77
Burst strength (psi)	100 min.**	ASTM D 3887

*Tested wet.

**Manufacturer's certification to meet test requirement.

The knitted fabric sock shall be applied to the tubing in the shop so as to maintain a uniform applied weight. The tubing with knitted fabric sock shall be delivered to the job site in such manner as to facilitate handling and incorporation into the work without damage. The knitted fabric sock shall be stored in UV-resistant bags until just prior to installation. Torn or punctured knitted fabric sock shall not be used.