SECTION 945
ALUMINUM PIPE, INCLUDING UNDERDRAIN, PIPE ARCH AND STRUCTURAL PLATE PIPE AND PIPE ARCH

945-1 Corrugated Aluminum-Alloy Culverts and Underdrains.

Aluminum-alloy culvert pipe and underdrains shall meet the requirements of AASHTO M 196 [AASHTO M 196M] and the additional provisions contained herein. Except for underdrain, corrugated aluminum pipe including pipe arch shall be fabricated with helical corrugations with a minimum of two annular corrugations formed into each end of each pipe to accommodate a coupling band. Annular fabrication is not permitted unless specifically called for in the plans or specifications. Provide certification of the actual mean diameter of pipe shipped to the project. Include in the certification the minimum and maximum diameters used to certify the actual mean diameter. The certification shall be attested to by a person having legal authority to bind the manufacturing company.

For Sidedrains, unless shown otherwise in the plans the minimum thickness of the metal shall be as specified below.

NON SI UNITS

TABLE I
THICKNESS OF METAL FOR SIDEDRAIN PIPE

Nominal Diameter or Equivalent (inches)	Sheet Gauge No.	Mean Thickness of Metal (inches)
6	18	0.048
8	16	0.060
10	16	0.060
12	16	0.060
15	16	0.060
18	16	0.060
21	16	0.060
24	16	0.060
30	14	0.075
36	14	0.075
42	12	0.105
48	12	0.105
54	12	0.105
60	10	0.135
66	10	0.135
72 and over	8	0.164

SI UNITS	
TABLE I THICKNESS OF METAL FOR SIDEDRAIN PIPE	
Nominal Diameter or Equivalent (mm)	Mean Thickness of Metal (mm)
150	1.22
200	1.52
250	1.52
300	1.52
375	1.52
450	1.52
525	1.52
600	1.52
750	1.91
900	1.91
1,050	2.67
1,200	2.67
1,350	2.67
1,500	3.43
1,650	3.43
1,800 and over	4.17

Where bituminous coated aluminum pipe is specified the bituminous coating shall meet the requirements as specified for corrugated steel pipe in 943-5. Bituminous coated and paved aluminum pipe shall meet the additional requirements specified in 943-6 and 943-7, as applicable.

Class IV pipe shall not be used.

When rubber gaskets are to be installed in the pipe joint, the gasket shall be the sole element relied on to maintain a tight joint. Test pipe joints at the plant hydrostatically using test methods in ASTM D 3212 [ASTM D 3212M]. Soil tight joints must be watertight to 2 psi [13.8 kPa]. Watertight joints must be watertight to 5 psi [34.5 kPa] unless a higher pressure rating is required in the plans.

945-2 Aluminum Alloy Structural Plate Pipe, Pipe Arch and Arches.

945-2.1 General Requirements: Aluminum alloy structural plate pipe, pipe arch, and arches shall conform to AASHTO M 219 [AASHTO M 219M], with the exceptions and additions specified herein. The nominal thickness of the plate shall be as shown in the plans.

945-2.2 Bolts and Nuts: In lieu of shaped bolts and nuts, standard type bolts and nuts, with special shaped washers, may be used. For aluminum bolts and nuts the material shall conform to the chemical requirements shown in Table I of ASTM B 211 [ASTM B 211M], for Alloy 6061. Nuts shall be lubricated at the factory, with a suitable wax compound. The bolts may be sampled and tested before erection or may be accepted on the basis of the manufacturer's certification.

For steel bolts and nuts, the material shall meet the requirements of either ASTM A 307 or ASTM A 325 [ASTM A 325M], as appropriate, and shall be hot double-dipped galvanized.

Aluminized steel bolts, or other equally suitable devices for connecting the plates, may be used if approved by the Engineer.

945-2.3 Certification of Tests: For all aluminum materials, test certifications as specified in 965-2, shall be furnished.

945-2.4 Direct Purchases by the Department: The provisions of 944-9, for the conditions of direct purchase of structural plate steel pipe and pipe arches, shall also apply to Departmental purchases of aluminum alloy structural plate pipe, pipe arches and arches.