



Standard Specification
for

Steel Sheet, Aluminum-Coated (Type 2), for
Corrugated Steel Pipe

AASHTO DESIGNATION: M 274M-87 (1995)

1. SCOPE

1.1 This specification covers steel sheet used in the fabrication of corrugated steel pipe (CSP) used for drainage pipe and underdrains. The steel sheet is coated with commercially pure aluminum (referred to as Type 2) on continuous lines by the hot-dip process, and is produced in one coating mass only. The material is furnished flat in coils and cut lengths, and corrugated in cut lengths.

2. REFERENCED DOCUMENTS

2.1 AASHTO Standard:

T 213 Test for Mass of Coating on Aluminum-Coated Iron or Steel Articles

2.2 ASTM Standards:

A 463M Specification for Steel Sheet, Aluminum-Coated by the Hot-Dip Process, General Requirements (Metric)

A 754 Coating Thickness by X-Ray Fluorescence

E 376 Practice for Measuring Coating Thickness by Magnetic-Field or Eddy-Current Test Methods

pipe, and *purchaser* refers to the purchaser of the finished pipe.

4. ORDERING INFORMATION

4.1 All sheet covered by this specification shall be ordered only to the specified thicknesses listed in Table 5.

4.2 Unless otherwise specified in the purchase order, all material furnished to this specification will be chemically treated, dry or oiled.

4.3 Orders for material to this specification shall include the following information, as necessary, to adequately describe the desired product.

4.3.1 Name of material (aluminum-coated steel sheet for CSP).

4.3.2 AASHTO designation number and date of issue.

4.3.3 Corrugation size, if corrugated (see Section 8.3).

4.3.4 Dimensions (thickness; width, either flat or overall corrugated; and length, if cut length).

4.3.5 Coil size requirements (specify maximum outside diameter (OD), acceptable inside diameter (ID), and maximum mass).

4.3.6 Certification, if required (see Section 11.1).

4.3.7 Special Requirements.

NOTE 1—Typical ordering descriptions are as follows:

Aluminum-coated steel sheet for CSP conforming to AASHTO M 274-, 68 by 13 mm corrugations, 1.63 by 648 by 1500 m.

Aluminum-coated steel sheet for CSP conforming to AASHTO M 274-, 2.01 by 699 mm by coil, 1200 mm OD, 600 mm ID, 9000 kg max. certified with test report.

5. GENERAL REQUIREMENTS

5.1 Steel sheet material supplied under this specification shall meet the applicable requirements of ASTM A 463M unless otherwise specified herein. ASTM A 463M applies to aluminum-coated sheet, however tolerances, sampling, sample preparation, and methods of testing (except for mass of coating) all are applicable to aluminum-coated sheet.

6. CHEMICAL COMPOSITION

6.1 The base metal composition shall conform to the requirements of Table 1.

6.2 *Aluminum Bath Analysis*—The bath shall be produced from commer-

TABLE 1 Base Metal Chemical Composition by Cast Analysis

	Composition, Percent	Tolerance Over the Max Limit by Product Analysis, Percent
Sulfur, max	0.05	+0.01
Sum of carbon, manganese, phosphorus, silicon, and sulfur, max	0.70	+0.04

TABLE 2 Aluminum Bath Analysis

	Composition, Percent
Iron, max	3.0
Silicon, max	0.35
Magnesium, max	0.50
Other—each max	0.05
Other—total max	0.20

3. TERMINOLOGY

3.1 In this specification, *manufacturer* refers to the producer of the sheet, *fabricator* refers to the producer of the

**TABLE 3 Mechanical Requirements
(Properties of Flat Material Prior to
Fabrication)**

Tensile strength, min MPa	310
Yield point, min MPa	230
Elongation in 50 mm, min percent	20

cially pure aluminum and the bath analysis shall conform to the limits given in Table 2.

7. PHYSICAL PROPERTIES

7.1 The aluminum-coated steel sheet shall conform to the mechanical properties shown in Table 3, when tested prior to corrugating or other fabrication.

NOTE 2—Steel sheet tested after corrugating and other fabricating should conform to the tensile and yield strength requirements in Table 3, but due to cold working, conformance to the elongation requirement may not be obtained.

7.2 The mass of aluminum coating shall conform to the requirements prescribed in Table 4. The mass of coating is the total amount on both surfaces of the sheet expressed in g/m² of sheet.

7.3 Adherence of coating shall be such that no peeling occurs while the material is being corrugated and formed into pipe.

TABLE 4 Mass of Coating

Minimum Check Limit	Minimum Check Limit
Triple Spot Test g/m ²	Single-Spot Test g/m ²
300	270

TABLE 5 Sheet Thickness^a

Specified Thickness	Minimum Thickness
mm	mm
1.32	1.17
1.63	1.43
2.01	1.83
2.77	2.57
3.51	3.28

^a Thickness is measured at any point on the sheet not less than 10 mm from an edge, and if corrugated, on the tangents of corrugations.

TABLE 6 Flatness Tolerances (Cut Lengths Only)

NOTE—This table also applies to sheets cut to length from coils by the user when adequate flattening measures are performed.

Specified Thickness mm	Specified Width, mm	Flatness Tolerance (Max Deviation from a Horizontal Flat Surface), mm
1.32	To 900 incl	12.7
	Over 900 to 1500 incl	19
1.63 and thicker	To 1500 incl	12.7

TABLE 7 Corrugated Requirements

Nominal Size	Maximum Pitch ^A	Minimum Depth ^B	Inside Radius	
			Nominal	Minimum
All values in millimeters				
38 by 6.5	48	6.0	7	6.5
68 by 13	73	12	17	12
75 by 25	83	24	14	12
125 by 25	135	24	40	36

^a Pitch is measured from crest to crest of corrugations, at 90 degrees to the direction of the corrugations.

^b Depth is measured as the vertical distance from a straightedge resting on the corrugation crests to the bottom of the intervening valley.

8. DIMENSIONS AND TOLERANCES

8.1 Sheet thickness shall conform to dimensions prescribed in Table 5. The thickness of the sheet includes both the base steel and the aluminum coating.

8.2 Permissible variations in width, length, and camber of flat material shall be in accordance with ASTM A 463M. Flatness tolerances of uncorrugated sheet shall conform to the dimensions prescribed in Table 6.

8.3 Corrugations shall form smooth continuous curves and tangents. The dimensions of the corrugations shall be in accordance with Table 7 (Note 3).

NOTE 3—Some sizes of corrugations shown in Table 7 may not be available in cut-length sheets. The 38 by 6.5 mm size, especially, is generally used only for helically corrugated pipe.

8.4 Covering width of corrugated sheet shall be in accordance with Table

**TABLE 8 Covering Width Tolerance for
Corrugated Sheet**

Covering Width, mm	Tolerance Over and Under, mm
To 600 inclusive	6.4
Over 600 to 900 inclusive	9.5
Over 900 to 1200 inclusive	12.7

8. Covering width is the distance between the crests of the extreme corrugations. There is no established tolerance for overall width since the covering width and lip dimensions are the governing factors for the formed product. The lip dimension of corrugated sheets shall be in accordance with Table 9. This dimension is measured along the radial curvature from the crest of the corrugation to the edge of the sheet.

9. SAMPLING AND TESTING

9.1 Except as specified below, the manufacturer shall make adequate tests and measurements to ensure that the material produced complies with this specification.

9.1.1 Test results including chemical composition, mechanical properties, and mass of coating for each heat and coating lot shall be maintained by the sheet manufacturer for 7 years and shall be made available to the fabricator and purchaser upon request.

9.2 The purchaser of the sheet (fabricator), or purchaser or the pipe made from the sheet, may make such tests as are determined necessary to determine the acceptability of the material or to verify the correctness of a certification.

9.3 Mechanical properties shall be determined on sheet prior to corrugating or other fabricating, except tests may be