## Standard Specification for

# Precast Reinforced Concrete Box Sections for Culverts, Storm Drains, and Sewers with Less Than 0.6 m of Cover Subjected to Highway Loadings [Metric]

**AASHTO Designation: M 273M-17[1]**

**Technical Section: 4a, Concrete Drainage Structures**

**Release: Group 2 (June 2017)**

AASHTO

**American Association of State Highway and Transportation Officials**
**444 North Capitol Street N.W., Suite 249**
**Washington, D.C. 20001**

Standard Specification for

# Precast Reinforced Concrete Box Sections for Culverts, Storm Drains, and Sewers with Less Than 0.6 m of Cover Subjected to Highway Loadings [Metric]

**AASHTO Designation: M 273M-17[1]**

**Technical Section: 4a, Concrete Drainage Structures**

**Release: Group 2 (June 2017)**

## 1. SCOPE

1.1. This specification covers single-cell, precast reinforced concrete box sections with less than 0.6 m of cover subjected to highway loadings and intended to be used for the construction of culverts and for the conveyance of storm water, industrial wastes, and sewage.

1.2. This metric specification is equivalent to M 273 and is compatible in technical content.

**Note 1**—This specification is primarily a manufacturing and purchasing specification. However, standard designs are included and the criteria used to develop these designs are given in Appendix X1. The successful performance of this product depends on the proper selection of the box section, bedding, backfill, controlled manufacture in the plant, and care that the installation conforms to the construction specifications. The owner of the precast reinforced concrete box sections specified herein is cautioned that the loading conditions and the field requirements must be correlated with the box sections specified and inspection must be provided at the construction site.

**Note 2**—AASHTO M 259M is to be used for box sections subjected to highway loading with 0.6 m or more earth cover, or subjected to dead load only.

**Note 3**—If load-and-resistance factor design (LRFD) is required, then use ASTM C1577.

## 2. REFERENCED DOCUMENTS

2.1. *AASHTO Standards*:

- M 6, Fine Aggregate for Hydraulic Cement Concrete
- M 31M/M 31, Deformed and Plain Carbon and Low-Alloy Steel Bars for Concrete Reinforcement
- M 32M/M 32, Steel Wire, Plain, for Concrete Reinforcement
- M 55M/M 55, Steel Welded Wire Reinforcement, Plain, for Concrete
- M 80, Coarse Aggregate for Hydraulic Cement Concrete
- M 85, Portland Cement
- M 157, Ready-Mixed Concrete
- M 221M/M 221, Steel Welded Wire Reinforcement, Deformed, for Concrete

- M 225M/M 225, Steel Wire, Deformed, for Concrete Reinforcement
- M 240M/M 240, Blended Hydraulic Cement
- M 259M, Precast Reinforced Concrete Box Sections for Culverts, Storm Drains, and Sewers [Metric]
- M 262, Concrete Pipe and Related Products
- M 295, Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
- T 22, Compressive Strength of Cylindrical Concrete Specimens
- T 23, Making and Curing Concrete Test Specimens in the Field
- T 280, Concrete Pipe, Manhole Sections, or Tile
- *Standard Specifications for Highway Bridges*

2.2. *ASTM Standards*:

- C309-03, Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
- C1116/C1116M, Standard Specification for Fiber-Reinforced Concrete
- C1577, Standard Specification for Precast Reinforced Concrete Monolithic Box Sections for Culverts, Storm Drains, and Sewers Designed According to AASHTO LRFD

## 3. TERMINOLOGY

3.1. *Definitions*—For definitions of terms relating to concrete pipe, see M 262.

## 4. TYPES

4.1. Precast reinforced concrete box sections manufactured in accordance with this specification shall be of the types identified in Tables 1 and 2, and shall be designated by type, span, and rise.

## 5. BASIS OF ACCEPTANCE

5.1. Acceptability of the box sections produced in accordance with Section 7 shall be determined by the results of the concrete compressive strength tests described in Section 10, by the material requirements described in Section 6, and by inspection of the finished box sections.

5.2. Box sections shall be considered ready for acceptance when they conform to the requirements of this specification.

## 6. MATERIALS

6.1. *Reinforced Concrete*—The reinforced concrete shall consist of cementitious materials, mineral aggregates, and water in which steel has been embedded in such a manner that the steel and concrete act together.

6.2. *Cementitious Materials*:

6.2.1. *Cement*—Cement shall conform to the requirements for portland cement of M 85 or shall be portland blast-furnace slag cement or portland-pozzolan cement conforming to the requirements of M 240M/M 240, except that the pozzolan constituent in the Type IP portland-pozzolan cement shall be fly ash and shall not exceed 25 percent by mass.