



SECTION 1049

PRECAST CONCRETE BOX CULVERTS

1049.1 Description. These specifications cover precast concrete box culverts.

1049.2 Material.

1049.2.1 Aggregates. Fine and coarse aggregates for the concrete mixture shall comply with the requirements of [Sec 1005](#) except the requirements for gradation and percent passing the No. 200 (75 μm) sieve shall not apply.

1049.2.2 Cement. Cement shall comply with the requirements of [Sec 1019](#). Fly ash or GGBFS may be used to replace cement in accordance with [Sec 501](#).

1049.2.3 Mixture. The aggregates shall be sized, graded, proportioned and thoroughly mixed in such proportions of cement and water, as will produce a homogeneous concrete mixture of such quality that the units will conform to the test and design requirements. Admixtures or blends may be used with the approval of the engineer. In no case, however, shall the proportion of portland cement in the mixture be less than 564 pounds per cubic yard (335 kg/m^3) of concrete. Fly ash may be used to replace cement in accordance with the applicable provisions of [Sec 501](#).

1049.2.4 Admixtures. Admixtures may be used with the approval of the engineer.

1049.3 Design.

1049.3.1 Except as otherwise specified herein, the precast concrete box sections for the culvert shall be in accordance with the requirements of AASHTO M 259 for culverts with 2 feet (600 mm) or more cover, or AASHTO M 273 for culverts with less than 2 feet (600 mm) of cover, both subject to HS20 live loading, Table 1.

1049.3.2 Substituted precast concrete box culvert sections shall be designed for the earth cover shown on the plans for the cast-in-place box culvert and shall be equal in height and cross sectional area or as approved by the engineer.

1049.3.3 The manufacturer may request approval of modified designs which differ from the designs in AASHTO M 259 or AASHTO M 273. The request for such modified or special designs shall fully describe any deviations from those standards, including a drawing showing wall thickness, concrete design strength, the type, size and placement of reinforcement, and inside or outside dimensions of both of the box sections.

1049.3.4 The following requirements shall also apply.

1049.3.4.1 The minimum barrel length for box or end section shall be 2 feet (600 mm).

1049.3.4.2 End sections may be precast or cast-in-place. If precast, the barrel, floor and wing walls shall be cast as an integral unit. In either case they shall be constructed to the same

dimensions, shapes, and with the same reinforcement as shown in the standard plans for cast-in-place culvert.

1049.3.4.3 Segmented end sections may be provided, but are considered to be a modified design and require approval as such.

1049.3.4.4 Toe walls shall be provided on both the upstream and downstream ends as shown on the standard plans and may be cast-in-place or precast. Precast toe walls shall be connected to the end section floor.

1049.4 Manufacture.

1049.4.1 Curing shall be in accordance with the applicable provisions of [Sec 1026](#) until the concrete has developed the specified compressive strength.

1049.4.2 Hot or cold weather concreting and concrete testing equipment shall be in accordance with the applicable provisions of [Sec 703](#).