



Standard Specification for Corrugated Aluminum Box Culverts¹

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1. Scope*

1.1 This specification covers material, geometric, and wall section properties of aluminum box culverts manufactured from corrugated plate or sheet, with attached rib stiffeners, for field assembly. Appropriate fasteners and optional materials, such as aluminum invert plates and headwalls, are also described. Applications for aluminum box culverts include conduits for gravity flow drainage of surface water, such as culverts and storm drains, as well as for small bridges and grade separation structures such as pedestrian or vehicular underpasses, and utility tunnels.

1.2 This specification does not include requirements for foundations, backfill, or the relationship between earth cover or live loads and strength requirements. These important design considerations are described in the AASHTO LRFD Bridge Design Specifications and the LRFD Bridge Construction Specifications.

1.3 This specification does not include requirements for the hydraulic design of these structures. Hydraulic design, placement of footings or inverts, and end treatments to resist scour are described in FHWA HDS No. 5.

1.4 **Appendix X1** lists nominal dimensions of box culvert sizes commonly available. Also listed are cross-sectional area and hydraulic design parameters for these sizes.

1.5 **Appendix X2** lists manufacturer's suggested design properties for the rib stiffener types, spacing classes, and material thicknesses described in this specification.

1.6 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in non-conformance with the standard.

¹ This specification is under the jurisdiction of ASTM Committee B07 on Light Metals and Alloys and is under the direct responsibility of B07.08 on Corrugated Aluminum Pipe and Corrugated Aluminum Structural Plate.

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2. Referenced Documents

2.1 *ASTM Standards*:²

- A36/A36M Specification for Carbon Structural Steel
- A123/A123M Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
- A153/A153M Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
- A307 Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength
- A563 Specification for Carbon and Alloy Steel Nuts
- A563M Specification for Carbon and Alloy Steel Nuts (Metric)
- B221 Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes
- B746/B746M Specification for Corrugated Aluminum Alloy Structural Plate for Field-Bolted Pipe, Pipe-Arches, and Arches
- B790/B790M Practice for Structural Design of Corrugated Aluminum Pipe, Pipe-Arches, and Arches for Culverts, Storm Sewers, and Other Buried Conduits

2.2 *AASHTO Standard*:

- LRFD Bridge Design Specifications³
- LRFD Bridge Construction Specifications

2.3 *FHWA Standard*:

- HDS No. 5, Hydraulic Design of Highway Culverts, Third Edition. FHWA publication number HIF-12-02 (2012).⁴

3. Terminology

3.1 *Definitions of Terms Specific to This Standard*:

3.1.1 *box culvert*—a generally rectangular conduit having a cross section symmetric about a vertical axis, with a long radius crown segment, short radius haunch segments, and straight side segments, with rib stiffeners (see Fig. 1).

3.1.2 *crown*—the long radius top arc segment of a box culvert cross section (see Fig. 1).

² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

³ Available from American Association of State Highway and Transportation Officials (AASHTO), 444 N. Capitol St., NW, Suite 249, Washington, DC 20001, <http://www.transportation.org>.

⁴ Available from National Technical Information Service (NTIS), 5285 Port Royal Rd., Springfield, VA 22161, <http://www.ntis.gov>.

*A Summary of Changes section appears at the end of this standard