IOWA DOT
Highway Division

Single Precast Reinforced Concrete Box Culvert Standards

General Notes:

1. The precast RCB culvert sections are designed for HL-93 live load and earth fills of varying heights.
2. Vertical earth pressure, EV=0.120 kcf.
   Horizontal earth pressure, EHmax = 0.060 kcf max, EHmin = 0.030 kcf.
3. The precast RCB culvert sections are designed for class 2 exposure conditions.
4. The clear distance from face of concrete to near edge or end of reinforcing bar to be 1½" min. and 2" max. unless otherwise noted.
5. The reinforcement supplied for this structure shall be plain and/or deformed welded wire reinforcement (WWR) Fy = 65 ksi, and/or Grade 60 reinforcing steel in accordance with the standard specifications. The reinforcement areas are based on welded wire reinforcement. If reinforcing bars are substituted for welded wire reinforcement, the reinforcement areas shall be increased by 8%. The barrel sections in these standards were designed with plain WWR, Fy = 65 ksi.
6. All dimensions are in feet and inches unless otherwise noted or shown.
7. Any of the following combinations of reinforcement may be used:
   a. 1 or 2 layers of welded wire reinforcement or
   b. 1 layer of welded wire reinforcement and 1 layer of reinforcement bars or
   c. 1 layer of reinforcement bars.
   The reinforcement shall be developed in accordance with AASHTO LRFD specifications.
8. The maximum size of reinforcement bars shall be #6, except for parapet reinforcement as detailed.
9. The maximum welded wire reinforcement size shall be a W23/D23 per layer (maximum of 2 layers).
10. The spacing center to center of the transverse wires or bars shall not be less than 2" nor more than 4". The spacing center to center of the longitudinal wires or bars shall not be more than 8".
11. Welding will not be allowed on reinforcement bars or welded wire reinforcement, except that the original welding required to manufacture the wire reinforcement is acceptable.
12. When reinforcement is cut, additional reinforcement shall be added on both sides of the cut member to replace or exceed the cut reinforcement.
13. Eriksson Culvert software version 4.3.1.0 was used for the design of the barrel sections for these standards.
14. These culvert standards label all reinforcing steel with English notation (#3 is ⅜ inch diameter bar). English reinforcing steel received at the precast plant may display the following "bar designation". The "bar designation" is the stamped impression on the reinforcing bars, and is equivalent to the bar diameter in millimeters.

English Size	3	4	5	6	7	8	9	10	11
Bar Designation	10	13	16	19	22	25	29	32	36

15. The first precast barrel section adjacent to the outlet precast end section may be a double groove barrel to facilitate placement of outlet end sections and allow inlet and outlet end sections to be similar.

Index for Precast Culvert Standards:

Specifications:

Design:
AASHTO LRFD Bridge Design Specifications, 8th Ed., Series of 2017.

Construction:
Iowa Department of Transportation Standard Specifications for Highway and Bridge Construction, current series, plus applicable General Supplemental Specifications, Developmental Specifications, Supplemental Specifications and Special Provisions

Design Stresses:

Design stresses for the following materials are in accordance with the AASHTO LRFD Bridge Design Specifications, 8th Ed., Series of 2017:
Bar reinforcement in accordance with AASHTO LRFD Section 5, Grade 60.
Welded wire reinforcement in accordance with AASHTO LRFD Section 5.
Concrete in accordance with AASHTO LRFD Section 5, f'c for barrel sections as noted on culvert barrel detail standards, for end section design f'c = 5 ksi.

LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

Standard Design

Single Precast Reinforced Concrete Box Culverts

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Index and General Notes

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