

## SPECIFICATION

### 1.0 SCOPE:

- 1.1 This specification covers Bridge-Plate™, commonly referred to as deep corrugated structural plate and typically used in the construction of field assembled soil-steel structures.
- 1.2 This is a material specification. The main parts of the specification include approved manufacturers, materials, fabrication, hardware and accessories, and coating.
- 1.3 The plates shall be manufactured so that, when assembled, they shall form the size and shape of structure as shown on the plans.
- 1.4 Assembly and backfilling, not covered in this specification, shall follow the manufacturer's recommendations.

### 2.0 MANUFACTURER:

- 2.1 The manufacturer of the deep corrugated structural plate shall be Armtec, or an equal approved by the engineer.
- 2.2 An "approved equal" manufacturer must have written approval from the engineer prior to submitting a bid for the project. A manufacturer requesting approval from the engineer must supply a list of similar projects for review.

### 3.0 MATERIALS:

- 3.1 Plates shall be fabricated from a base steel made by the open-hearth, basic-oxygen, or electric-furnace process.
- 3.2 The chemical composition (by heat analysis) of the steel shall be such that it will have a composition with a maximum sulfur content of 0.04% and a maximum combined carbon, manganese, phosphorous, silicon, and sulfur content of 1.86%. The tolerances over the maximum limit (by product analysis) shall be +0.01% and +0.13% respectively.
- 3.3 The chemical composition shall be such that it does not negatively impact galvanizing of the plates.
- 3.4 The mechanical properties of the flat plates prior to corrugating shall be such that they will have a minimum yield strength of 275 MPa, a minimum tensile strength of 380 MPa, and a minimum elongation of 25% in 50 mm. These properties normally provide a minimum design yield strength of 300 MPa after the plates are corrugated.
- 3.5 Standard plate thickness' range from 3.0 mm to 7.0 mm in 1 mm increments. The minus tolerance on plate thickness is 0.3 mm. There is no over thickness tolerance.

### 4.0 FABRICATION:

- 4.1 Deep corrugated structural plate shall be formed from materials specified in the clauses under 3.0 Materials.
- 4.2 The plates shall be three corrugations wide.



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### 4.0 FABRICATION cont'd ...

- 4.3 The depth of the corrugation shall have a nominal dimension of 150 mm and shall be not less than 144 mm.
- 4.4 The pitch of the corrugation shall have a nominal dimension of 400 mm and shall be not more than 413 mm.
- 4.5 The inside radius of the corrugation shall have a nominal dimension of 81 mm and shall be not less than 74 mm.
- 4.6 All plates shall be punched for bolting at both longitudinal and circumferential seams.
- 4.7 The longitudinal seam shall be of the lap type of connection. The bolt hole arrangement shall consist of three rows of holes spaced at 100 mm on centres, with a hole located in the valley and crest of each corrugation. The centreline of the first row of holes shall be nominally 40 mm (at least 1.75 bolt diameters) from the end of the plate. All holes are 25 mm diameter unless noted. The three holes along each edge of the plate (the circumferential seam location) and two outside crest holes in the middle row of longitudinal seam holes are slotted holes measuring 24 mm wide by 29 mm long.
- 4.8 The designation used to describe the circumferential hole spacing is "H", which has a value of 425 mm. Plate lengths shall be a multiple of the circumferential hole spacing to accommodate circumferential staggering of the longitudinal seam in adjacent rings of plates. The centreline of the row of holes shall be nominally 40 mm (at least 1.75 bolt diameters) from the edge of the plate. All circumferential bolt holes are slotted holes measuring 24 mm wide by 29 mm long.
- 4.9 The plates shall be accurately curved to suit the shape of the structure cross section. All members of a similar type, thickness and length shall be interchangeable.

### 5.0 HARDWARE & ACCESSORIES:

- 5.1 Bolts shall be 3/4 inch [19 mm] diameter or 7/8 inch [22 mm] diameter ANSI B18.2.1 Heavy Hex Head Bolts to ASTM A 449 with a zinc coating to ASTM A 153 or B 695, Class 55. They shall have the bearing surface shaped to a 25 mm radius spherical surface.
- 5.2 Nuts shall be ANSI B18.2.2 Heavy Hex Nuts to ASTM A 563 Grade C with a zinc coating to ASTM A 153 or B 695, Class 55, and shall be sized to suit the bolts. They shall have the bearing surface shaped to a 25 mm radius spherical surface.
- 5.3 When specified, special galvanized metal channels, for the connection of arches to footings, are provided.
- 5.4 Anchor bolts for head walls, collars and anchorage of arches to footings shall be 3/4 inch [19 mm] diameter ANSI B18.2.1 Heavy Hex Head Bolts to ASTM A 307 with a zinc coating to ASTM A 153 or B 695, Class 55.
- 5.5 Nuts for anchor bolts shall be 3/4 inch [19 mm] diameter ANSI B18.2.2 Heavy Hex Nuts to ASTM A 563 Grade A with a zinc coating to ASTM A 153 or B 695, Class 55, and shall be sized to suit the anchor bolts.



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### 6.0 COATING:

- 6.1 The plates shall be galvanized after corrugating, punching and curving.
- 6.2 Zinc shall conform to ASTM B 6 and shall be at least equal to "Prime Western" grade.
- 6.3 The zinc coating mass (total on both sides) shall be not less than 915 g/m<sup>2</sup> when tested by the triple spot test, or 825 g/m<sup>2</sup> when tested by the single spot test.
- 6.4 The test for coating mass acceptance shall be by nondestructive magnetic thickness test methods in accordance with ASTM E 376. In cases of dispute, the basis for rejection shall be a chemical weigh-strip-weight test as specified in CAN/CSA-G164.
- 6.5 The 915 g/m<sup>2</sup> zinc mass is equivalent to a 64 mm zinc thickness measured on one side by the magnetic test method. The 825 g/m<sup>2</sup> zinc mass is equivalent to a 58 mm zinc thickness.
- 6.6 The zinc coating shall be free from injurious defects such as blisters, excessive flux, storage stains, foreign inclusions, and uncoated areas more than 3 mm wide.
- 6.7 Uncoated areas that are more than 3 mm wide and up to 50 mm in width shall be repaired by thorough cleaning followed by the application of a zinc-rich coating. The coating shall conform to CAN/CGSB-1.181 and shall be applied to a dry thickness of at least 50 mm.



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