

## 2018 AZZ GALVABAR GUIDELINES FOR CONSTRUCTION PRACTICES V1

Requirements for continuous hot-dip galvanized steel construction practices are delineated in the following guidelines. These guidelines are intended to serve as a resource for installing GalvaBar in accordance with Practice [A1094/A1094M](#).

### GUIDELINES FOR USE OF CONTINUOUS HOT-DIP GALVANIZED REINFORCING BARS INSTALLATION

- Coating damage incurred during shipment, storage, handling, and placing of continuous hot-dip galvanized reinforcing bars should be repaired with a zinc-rich formulation in accordance with Practice [A780/A780M](#). Prior to repairing damaged coating, rust should be removed from the damaged areas by suitable means.
- When handling, care should be exercised to avoid damaging the coating.
- Continuous hot-dip galvanized reinforcing bars should be off-loaded as close as possible to their points of placement or under the crane so that the bars can be hoisted to the area of placement to minimize rehandling.
- Continuous hot-dip galvanized reinforcing bars should be stored off the ground on protective cribbing, and timbers should be placed between bundles when stacking of the bundles is necessary. Space the cribbing sufficiently close to prevent sags in the bundles.
- Continuous hot-dip galvanized reinforcing bars and uncoated reinforcing bars should be stored separately.
- If the extent of damaged coating exceeds 2% of the surface area of the continuous hot-dip galvanized reinforcing bar in any 1-ft [0.3-m] length, the coated bar should be rejected.
- If the extent of damaged coating does not exceed 2% of the surface area in any 1-ft [0.3-m] length, all damaged coating discernible to a person with normal or corrected vision should be repaired with a zinc-rich formulation in accordance with Practice [A780/A780M](#). The 2 % limit on maximum allowed damaged coating should include previously repaired areas damaged before shipment as required by Specification [A1094/A1094M](#).
- Take note when uncoated steel reinforcement, or any other embedded metal dissimilar to zinc is permitted in the same structural concrete member with or in close proximity to continuous galvanized reinforcing bars (CGR).
  - *Zinc is naturally protective to steel, galvanized reinforcement can be safely mixed with uncoated in concrete. However, if galvanized steel and black steel are to be connected in concrete, say for example between different mesh layers of an exposed panel or the upper section only of reinforcement in a pile foundation in the ground, the best option is to ensure that the point of connection between the two materials is well embedded and sufficiently deep such that there is no corrosion risk for either material, but especially so the steel. If corrosion of the uncoated steel were to initiate at the connection, the zinc on the adjacent bar will simply act to cathodically protect the black steel. Clearly, the protection afforded by the dissolution of the zinc will cause the zinc to slowly dissolve and this is, of course, not the preferred outcome. To an extent this could be seen as wasting the benefit obtained by using galvanized steel in the first instance. So, to be safe, minimize the connections between galvanized steel and black steel as far as possible but if this is necessary then keep the point of connection deeply embedded in sound concrete where the risk of corrosion of the steel is minimal.*
- Continuous hot-dip galvanized reinforcing bars should be supported on wire bar supports that are hot-dip galvanized, on wire bar supports coated with epoxy or another polymer, or on supports made of plastic. When pre-cast concrete bar supports with embedded tie wires or dowels are used with coated bars, the wires or dowels should be coated with zinc or polymer. Reinforcing bars used as support bars should be hot-dip galvanized.
- Embedded steel items used with continuous hot-dip galvanized reinforcing bars should be zinc-coated (galvanized) or coated with non-metallic materials.
- Continuous hot-dip galvanized reinforcing bars should be fastened (tied) with tie wire coated with zinc or polymer.
- If continuous hot-dip galvanized reinforcing bars are cut in the field, the bar ends should be coated with a zinc-rich formulation in accordance with Practice [A780/A780M](#).
- After installing mechanical splices on continuous hot-dip galvanized reinforcing bars, damaged coating and areas of removed coating should be repaired with a zinc-rich formulation in accordance with Practice [A780/A780M](#). Exposed parts of mechanical splices should be coated with the same zinc-rich formulation that is used for the repair of damaged coating

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- After completing welds on continuous hot-dip galvanized reinforcing bars, damaged coating should be repaired with a zinc-rich formulation in accordance with Practice **A780/A780M**. Welds should be coated with the same zinc-rich formulation that is used for the repair of damaged coating
- After field bending or straightening continuous hot-dip galvanized reinforcing bars, damaged coating should be repaired with a zinc-rich formulation in accordance with Practice **A780/A780M**.
- After placement of continuous hot-dip galvanized reinforcing bars; the coated bars should be inspected for damaged coating prior to placing concrete. Where damaged coating exists, it should be repaired with a zinc-rich formulation in accordance with Practice **A780/A780M**.

### GUIDELINES FOR USE OF CONTINUOUS HOT-DIP GALVANIZED REINFORCING BARS SPLICING

- Continuous hot-dip galvanized reinforcing bars shall be furnished in the lengths indicated on the DRAWINGS.
- Splicing of bars, except where shown on the DRAWINGS, shall not be permitted without the written acceptance of ENGINEER.
- Continuous hot-dip galvanized reinforcing bars splices shall be staggered.
- In cases where permission is granted to splice bars, other than those shown on the DRAWINGS, the additional material required for the lap shall be furnished by CONTRACTOR at CONTRACTOR's own expense.
- The minimum distance between staggered splices for continuous hot-dip galvanized reinforcing bars shall be the length required for a lapped splice in the bar.
- All continuous hot-dip galvanized reinforcing bar splices shall be full contact splices.
- Splices shall not be permitted at points where the section is not sufficient to provide a minimum distance of two (2) inches between the splice and the nearest adjacent bar or the surface of the concrete.

### GUIDELINES FOR USE OF CONTINUOUS HOT-DIP GALVANIZED REINFORCING BARS WELDING

- Welding of continuous hot-dip galvanized reinforcing bars shall be done only if detailed on the DRAWINGS or if authorized by ENGINEER in writing.
- Welding of continuous hot-dip galvanized reinforcing bars shall be done by a certified welder.
- The welding shall conform to AWS D1.4/D1.4M with the modifications and additions specified hereinafter.
- Where AWS D2.0 Specifications for Welded Highway and Railway Bridges is referenced, the reference shall be construed to be for AWS D1.1.
- Where the term AWS D1.1/D1.1M is used it shall mean the American Welding Society Structural Welding Code, D1.5/D1.5M as modified and amended by the AASHTO Standard Specifications for Welding of Structural Steel Highway Bridges.
- After completion of welding, coating damage to continuous hot-dip galvanized reinforcing bars shall be repaired in accordance with Practice **A780/A780M**.
- When required or permitted, a mechanical connection may be used to splice continuous hot-dip galvanized reinforcing bars or as substitution for dowel bars.
- The mechanical connection shall be capable of developing a minimum of one hundred twenty five percent (125%) of the yield strength of the reinforcing bar in both tension and compression.
- All parts of mechanical connections used on coated bars, including steel splice sleeves, bolts, and nuts shall be coated with the same material used for repair of coating damage.

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### **GUIDELINES FOR USE OF CONTINUOUS HOT-DIP GALVANIZED REINFORCING BARS WITH NON-GALVANIZED STEEL FORMS**

- Continuous hot-dip galvanized steel reinforcing bars contain a zinc or zinc-alloy coated surface that is of a different electrochemical potential than uncoated steel or stainless steel.
- When forms for casting concrete are made of uncoated steel or stainless steel, the use of continuous hot-dip galvanized steel reinforcing bars necessitates an electrical isolation of the continuous hot-dip galvanized steel reinforcing bars from the forms.
- Should electrical contact between the two occur, the result will be a shadowing of a ghost appearance of the reinforcing bar on the finished concrete surface.
- Zinc ions will tend to migrate to the surface of the concrete and appear in a darker color, or shadow, on the concrete surface, in the shape of the reinforcing bar configuration.
- In more severe cases, the concrete can adhere to the metal forms.