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## SHEAR CONNECTOR STUDS

### GENERAL

Shear connector studs shall be accepted on a certification basis and shall be from an approved manufacturer. Inspection and acceptance of steel studs welded to steel, to connect members and connection devices to concrete shall meet the requirements of Section 2408.13 of the General Specifications and the following requirements:

1. Studs shall meet the requirements of ASTM A108 for steel bars, cold-finished, standard quality, Grades 1010 through 1020 inclusive either semi-killed or killed deoxidation.
2. Workmanship, pre-production testing, operator qualification and application qualification testing, shall be required.
3. Quality control and proper inspection of stud welding during production.
4. Mechanical properties of steel studs and requirements for qualification of stud bases (only studs with qualified stud bases shall be used).
5. Type and size shall be as specified in the contract document and specifications.
6. An arc shield (ferrule) of heat-resistant ceramic or other suitable material (approved by the engineer) shall be furnished with each stud. Ferrules shall be kept dry and protected from moisture or oven-dried at 250°F for two hours.
7. Finished studs shall be of uniform quality and condition, free of injurious laps, fins, seams, cracks, twists, bends or other discontinuities. Radial cracks or bursts in the head of a stud shall not be acceptable.

### ACCEPTANCE

Prior to being allowed to furnish studs on Department of Transportation projects, the manufacturer shall submit test reports showing conformance of their product to the applicable sections of ANSI/AASHTO/AWS D1.5/D1.5M-02, Bridge Welding Code.

Shear connector studs shall be manufactured in the USA. The supplier/manufacturer shall certify that the studs are of domestic origin.

These reports shall be forwarded to the Office of Materials for review.

If the reports are approved, the manufacturer will be placed on the approved list (Appendix A).

### **TEST METHODS**

Bend test – Studs shall be bend-tested by being bent 90 degrees from the original axis. Stud application shall be acceptable if the studs are bent 90 degrees and fracture occurs in the plate or shank of the stud, but not in the weld. Other test methods, such as torque testing, shall be acceptable if performed in accordance with Section 7.6.6.2 of the Welding Code D1.5/D1.5M-02.

### **CERTIFICATION**

Certifications shall be in the form of a manufacturer's test report on the studs, or from bar stock from which the studs were made. The test report shall indicate the mechanical properties of the studs and must be dated not more than six months prior to the manufacture of the studs.

### **MONITOR SAMPLING & TESTING**

Ten (10) specimens shall be tested using acceptable (approved) test methods. The Office of Materials may sample and test studs for certification monitoring purposes.