STEEL REINFORCEMENT

GENERAL

Acceptance of steel reinforcement and wire mesh shall be on the basis of certification from an approved steel manufacturer, fabricator and/or distributor. Steel reinforcement shall meet the specified requirements for type and grade.

Approval to furnish steel reinforcement and wire mesh on a certification basis may be withdrawn for deficient test results on monitor samples, inadequate documentation, improper identification of the materials, or the lack of identification (Mill Test Reports).

Approved fabricators, suppliers and distributors are listed in Appendix B. Approved suppliers of wire mesh reinforcement are listed in Appendix C. Approved manufacturers of reinforcing steel (plain and deformed bars) are listed in Appendix D. Approved suppliers of reinforcing steel mechanical splicing Products are listed in Appendix E. Refer to IM 451.03B for epoxy coated steel reinforcement.

MANUFACTURING MILL APPROVAL

Prior to furnishing reinforcing steel on a certification basis, the manufacturer shall request approval by submitting the following documents:

1. A letter of request shall be submitted to Central Materials Office detailing the location of the manufacturing plant and any distribution center(s).

2. A certification statement that steel is of domestic origin and reinforcing steel shall be melted and manufactured in the USA.

3. Quality control plan/procedures that the company has established to ensure material quality and identity through the manufacturing process as well as quality control testing

4. A typical example of certification documents that the mill will furnish for Iowa Department of Transportation (DOT) projects .

5. A Black & White picture showing the permanent mill-imprinted markings/symbols of the manufacturing mill (grade Mark ,Bar Size ,etc…)

6. Copy of an identification list, invoice or bill of materials. The documents shall show the project and design number, the size, length, grade, heat number, number and weight of pieces in the shipment and contain a certification statement that reads as follows:

   The material itemized in this shipment is certified to meet the requirements of the ASTM and the applicable specifications of the Iowa Department of Transportation.

7. Submit three 6 ft sample bars for testing representing the range of small, medium, and large diameter bars rolled by the producing mill.

Upon satisfactory review of this application, the manufacturing mill will be placed on the approved list in Appendix D.

DISTRIBUTOR, FABRICATOR OR SUPPLIER APPROVAL

Prior to furnishing reinforcing steel on a certification basis, the distributor, supplier, or fabricator shall request approval by submitting the following items:

1. A letter of request shall be submitted to the Central Materials Office in Ames, Iowa.

2. This letter shall contain the following documents:

   a. Sources of steel that would be handled by the company and fabricated and supplied to Iowa Department of Transportation projects.

   b. Quality control procedures the company has established to ensure material identity (as to heat numbers and inventory) from the time material arrives from a mill or a source, through fabrication process, and shipment. Refer to IM 451 Appendix G

   c. A typical example of certification documents the company will furnish for Iowa DOT projects.

   d. Copy of an identification list, invoice or bill of materials. The documents shall show the project and design number, the size, length, grade, heat number, number and weight of pieces in the shipment and contain a certification statement that reads as follows:

      The material itemized in this shipment is certified to meet the requirements of the ASTM and the applicable specifications of the Iowa Department of Transportation.

Upon satisfactory review of this application and satisfactory inspection of the facilities for compliance with quality control procedures submitted, the company will be placed on the approved list in Appendices B, C, and E.

DISTRIBUTORS/SUPPLIERS APROVAL ON PROJECT-BY-PROJECT BASIS

Prior to furnishing steel to a project, the manufacturer, distributor, supplier and/or fabricator shall request approval to supply steel reinforcement for a project prior to its use and/or incorporation.

The District Materials Engineer shall require the following:

1. Mill Test Certification-shall accompany each shipment

2. Proper Identification

a. Symbol of the producing mill

b. Type of steel

c. Grade mark

d. Bar size

3. Sampling Testing (at the required frequency) **NOTE:** If less than 30 tons a minimum of one sample shall be required for quality testing.

4. Copy of an identification list, invoice or bill of materials. The documents shall show the project and design number, the size, length, grade, heat number, number and weight of pieces in the shipment and contain a certification statement that reads as follows:

   The material itemized in this shipment is certified to meet the requirements of the ASTM and the applicable specifications of the Iowa Department of Transportation.

Approved manufactures, suppliers and/or distributors that can supply bar reinforcement on project-by-project basis are marked with an asterisk in the appendices. Approval shall be based on a satisfactory inspection of the facilities and satisfactory review of the quality control procedures.

CERTIFICATION ACCEPTANCE PROCEDURES

The steel fabricator, supplier, or distributor shall furnish an identification list, invoice, or bill of materials for each shipment to a project. It shall show the project and design number, the size, length, grade, heat number and number and weight of pieces in the shipment and contain a certification stating that the attached Mill Certifications are applicable to the material itemized. The fabricator, supplier, or distributor shall also provide summary quality documentation to the District Materials Office responsible for the project and the project engineer at the completion of the shipments to the project. The summary documentation shall be signed, include type, size, and grade, the total quantity of each, and the project number.

The Mill Certifications, which are to be attached as directed above, shall state the chemical, physical, or mechanical tests reported and the ASTM designation, type and grade for each heat.

One copy of the documents prescribed above shall accompany each shipment and be retained in the Project Engineer file. An additional copy shall be forwarded at time of shipment to the District Office responsible for the project administration.

Steel shipments, which are from approved sources and are documented as outlined above, may be incorporated in the work. Personnel from the District Materials Office shall secure random verification samples at the project destination, as outlined herein.

Mill Test Reports and pertinent records shall be kept on file for a period of not less than three (3)

years after production.

UNIDENTIFIED STEEL

All reinforcing steel not identifiable by heat number or not accompanied by the proper Mill Certification, will be accepted only on the basis of satisfactory test results on one sample per 10 tons (10 mg) for each size bar furnished.

VERIFICATION SAMPLING & TESTING

The amount of verification sampling and testing will generally depend upon the amount of steel required for the project. The District Materials Engineer Office should ensure that adequate verification samples have been secured.

1. Project Quantity Less Than 45 tons

   Acceptance will be based on certification of each heat with no verification samples required.

2. Project Quantity 45 tons and Over: One sample per project

   Sample one 6-ft. (2-meter) long piece of the most common bar furnished to the project. If the sample complies with the specifications, the shipment will be accepted. If the initial sample fails to comply with the specifications, two additional samples shall be taken out of the same heat number. If one or both of the additional samples fails to comply with the specifications requirements then the steel for that project will be subject to rejection, and all subsequent shipment from that mill to that project, shall be sampled at the rate of one sample per 10 tons for each size furnished. If both additional samples comply with the specifications, subsequent shipments to the project from that mill may be accepted on the basis of certification. See flow diagram for acceptance procedures in Appendix A.

STEEL SHIPPED FOR USE ON SEVERAL PROJECTS

Reinforcing steel, which is shipped to a fabricator or contractor for use on several projects, shall be sampled at the rate established under verification sampling and testing.
Examples of this would be shipments to prestressed/precast and concrete pipe plants or lighting and signing contractors where the steel may be used on several projects.

WELDING

Welding of reinforcing steel and wire fabric shall comply with the following:

1. If welding and/or tack welding is employed in placement of steel reinforcement or wire fabric, the requirements of Section 2407.03E of the Standard Specifications, IM 558 and the latest edition of American Welding Society (AWS) D1.4 including table 5.2 for minimum preheat and interpass temperatures shall apply.

2. Pre-approved weld procedures shall be required. Weld procedures shall be in effect until any one variable of the essential procedure has been changed.

3. Only qualified/certified welders and tack welders may perform the welding or tacking.

4. The carbon equivalent of reinforcing steel bars or wire fabric shall be calculated. The carbon equivalent shall not exceed 0.55%

5. Welding shall be performed with Shielded Metal Arc Welding (SMAW), Gas Metal Arc Welding (GMAW) or Flux Core Arc Welding (FCAW).

6. Other welding processes may be used when approved by the Engineer, provided that any special qualification test requirements not covered in this IM are met to ensure that welds are satisfactory for the intended application will be obtained prior to welding steel for projects.