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CRSI Concrete Reinforcing Steel Institute

CRSI Standard for
Epoxy-Coated Steel Reinforcing Bar Fabrication Facilities

1. INTRODUCTION

1.1. This standard describes standard practice for fabrication quality processes for epoxy-coated steel reinforcing bars.

2. REFERENCED DOCUMENTS

2.1. CRSI

2.1.1. Manual of Standard Practice 2009

2.2. ASTM International

2.2.1. ASTM D3963 Standard Specification for Fabrication and Jobsite Handling of Epoxy-Coated Steel Reinforcing Bars

3. DEFINITIONS

3.1. FQM – Fabrication Quality Manual

3.1.1. A manual describing the Plant commitment to and methods for obtaining quality.

3.2. PQS – Plant Quality Statement

3.2.1. A statement from a Company Senior Executive that outlines the plant's commitment to Quality.

3.3. QM - Quality Manager.

3.3.1. A manager responsible for all issues relating to quality of fabrication within a plant.

3.4. FQI – Fabrication Quality Inspector

3.4.1. Personnel responsible for fabrication quality activities and documentation.

3.5. CRSI CA – Concrete Reinforcing Steel Institute Certification Administrator

3.6. IA –Inspection Agency

3.7. Production shift – Consecutive run time, not to exceed 12 hours.

4. All plants shall develop and maintain a Fabrication Quality Manual (FQM). The FQM shall:

4.1. Be signed by an authorized representative of the manufacturing organization.

4.2. Document facility name, street address and telephone number and the name of the contact person at the facility.

4.3. Describe the fabrication processes at the plant.

4.4. Describe requirements for annual review and updating. Changes to the FQM shall be highlighted or underlined and tracked by revision date.

4.4.1. This review shall evaluate existing documentation for accuracy and conformance with current practice and applicable standards. Based on this review, changes to the FQM shall be made.

4.5. Include an organization chart, and a description of the duties and responsibilities assigned to key personnel in the quality program.

4.6. Identify the measuring and testing equipment used to determine that the product and materials meet minimum specifications.

4.7. Identify the frequency and methods of measuring and testing equipment calibration and requirements for record-keeping.

4.8. Include a PQS from a Company Senior Executive that outlines the plant's commitment to Quality and compliance with applicable ASTM standards and purchaser's specifications.

4.9. Describe access, including location, for all personnel involved in fabrication to:

4.9.1. The FQM

4.9.2. Applicable CRSI Standards

4.9.3. Applicable ASTM Standards

4.9.4. Applicable purchaser's recommendations or applicable standards

4.10. Describe methods for assurance and documentation of the presence of QM or FQI during production.

4.11. Describe the authority of QM and FQI.

4.11.1. Include frequency of training and methods used to train the FQI and to document this training including:

4.11.1.1. Training topics and materials provided to the FQI.

4.11.1.2. Requirements for QM (or designated representative) led meetings to review and evaluate the quality techniques of all FQI once every six months in the plant using the manufacturer's equipment and to assess compliance with the FQM.

4.11.1.3. Attendance forms signed by the FQI.

4.11.1.4. Minutes of QM/QI review and evaluation meetings.

4.11.2. Include frequency of training and methods used to train the plant personnel and to document this training including:

4.11.2.1. Training topics and materials provided to plant personnel.

4.11.2.2. Attendance forms signed by the plant personnel.

4.12. Define requirements for documentation, observation, and testing as part of a quality program as required in Sections 5 through 12 including:

4.12.1. Documentation of FQI inspections.

4.12.2. Minimum acceptable levels to ensure products comply with the purchaser's specifications.

4.12.3. Corrective action procedures to be taken when minimum acceptable levels are not achieved.

5. HANDLING AND STORAGE OF EPOXY-COATED REINFORCING BARS

5.1. Coated bars shall be handled and stored in a manner that minimizes damage to the coating.

5.2. Handling systems and storage racks shall have padded contact areas.

5.3. Bundling bands shall be padded or shall be made of a material that will prevent damage to the coating.

5.4. To minimize bar-to-bar abrasion from sags in the bundles, bundles shall be lifted with a strongback, spreader bar, multiple supports, or platform bridge.

5.5. The FQI shall examine the handling and storage systems for epoxy-coated bars once per week.

5.5.1. The FQI shall document the time and results of the examination.

6. BENDING AND SHEAR

6.1. Fabrication Process and Equipment

6.1.1. Drive rolls and backup barrels on bending equipment shall meet the requirements of ASTM D3963.

6.1.2. Contact points on shear lines shall be of suitable material and condition to minimize coating damage.

6.1.3. Epoxy-coated bars shall not be not dragged or dropped on non-protected abrasive material (like concrete or unprotected steel) during fabrication.

6.1.4. Coating on fabricated bars shall be inspected for visible cracks or damage and corrective action shall be taken if visible cracks or damage are observed.

6.1.5. The FQI shall examine the fabrication process and equipment to ensure compliance once per production day.

6.1.5.1. The FQI shall document time and results of the examination.

6.2. Dimensional Inspection of Fabricated Bars

6.2.1. Sheared lengths and dimensions of epoxy-coated bars shall meet specified dimensions within tolerances set forth by CRSI's *Manual of Standard Practice* or as specified by the purchaser.

6.2.2. All dimensions shall be checked per the FQM which shall include minimum documentation and frequency requirements.

7. BAR IDENTIFICATION AND REJECTED MATERIAL

7.1. The Plant shall maintain a bar marking and identification system that permits traceability of the bars to quality records and processes throughout the Plant.

7.2. Bars that are deemed nonconforming shall be clearly identified and marked according to the applicable standard and separated from acceptable material.

7.3. The FQI shall check inventory and bar identification tags for compliance with bar identification requirements and that rejected bars are identified and separated at least once per production shift.

7.3.1. The FQI shall document the time and results of the examination.

8. REPAIR MATERIALS

8.1. All patching material shall meet the requirements of the applicable standard.

8.1.1. Documentation that the patch material in use complies with the applicable standard shall be obtained from the material supplier.

8.1.2. The FQI shall document compliance with this requirement prior to use for each shipment of patching material.

9. REPAIR OF DAMAGED COATING

9.1. Repair Processes

9.1.1. Damaged coating shall be repaired in accordance with the patching material manufacturer's written recommendations.

9.1.1.1. The FQI shall maintain a file containing the manufacturers' written recommendations.

9.1.2. The patching material shall be used prior to its expiration date.

9.1.3. The maximum amount of repaired damaged coating shall not exceed the amount permitted by the applicable standard.

9.1.4. Repaired areas shall have a minimum coating thickness as required by the applicable standard.

9.1.5. The FQI shall examine the repair processes to ensure compliance at least once per production week.

9.1.5.1. The FQI shall document time and results of the examination.

9.2. Inspection and Repair of Damage

9.2.1. All epoxy-coated bars shall be inspected for damaged coating before shipment to the jobsite.

9.2.2. All damaged epoxy coating (to the point of shipment) shall be repaired with patching material.

9.2.3. The FQI shall examine the epoxy-coated bars prior to shipment to the jobsite to ensure all damage is repaired at least once per production shift.

9.2.3.1. The FQI shall document the time and results of the examination.

10. OUTDOOR STORAGE

10.1. Epoxy-coated bars shall be stored in a manner that protects them from exposure to moisture and direct sunlight if stored outside for more than 30 days.

10.1.1. The date of outdoor storage shall be documented.

10.2. The FQI shall examine any epoxy-coated bars stored outdoors at least once per week to assess length of outdoor storage and determine that the protective system is in place as required.

10.2.1. The FQI shall document the time and results of the examination.

11. EXTERNAL AUDITS

11.1. All documentation relating to external audits shall be retained in the Plant's files.

11.1.1. Action taken related to conformance shall be documented, and changes shall be made to the FQM, if required.

12. CUSTOMER COMPLAINTS

12.1. The QM or designated person addresses customer complaints and determines root cause.

12.2. Changes in procedures and/or training resulting from complaints shall be documented in the FQM.

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