AMERICAN MANUFACTURING COMPLIANCE AUTHORITY

HEAVY STRUCTURAL STEEL FABRICATION QUALITY STANDARD

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AMERICAN MANUFACTURING COMPLIANCE AUTHORITY (AMCA) QUALITY STANDARDS FOR HEAVY STRUCTURAL STEEL FABRICATION

1.0 Purpose and Scope

These AMCA Quality Standards establish the minimum requirements for the fabrication, inspection, handling, and documentation of heavy structural steel used in buildings, bridges, industrial facilities, and other load-bearing applications. The standards apply to all manufacturers, subcontractors, and certified fabricators working under AMCA compliance programs.

2.0 Materials Requirements

2.1 Base Materials

- Steel shall conform to applicable ASTM specifications (e.g., ASTM A36, A572, A588, A992) as required by contract documents.
- All materials shall be traceable through mill test reports (MTRs) containing chemical composition and mechanical properties.
- Substitution of steel grades is prohibited without documented engineering approval and AMCA notification.

2.2 Welding Consumables

- Welding fillers, flux, and electrodes shall meet AWS specifications for the applicable welding process.
- Consumables must be stored in accordance with manufacturer requirements to preserve mechanical performance and prevent moisture contamination.

3.0 Fabrication Requirements

3.1 Cutting and Shaping

- Thermal cutting shall produce smooth, uniform surfaces free of excessive slag, gouges, or heat-affected warping.
- Mechanical cutting tools shall be maintained to avoid burrs, tears, or deformation.
- Material distortion shall not exceed tolerances specified in AISC standards unless otherwise approved.

3.2 Forming and Bending

- Bending processes shall be controlled to prevent cracking or thinning.
- Cold bending shall only be done within steel grade limitations; hot bending shall follow controlled heating and cooling protocols.

3.3 Drilling and Punching

- Holes shall be round, clean, and free of excessive ovality.
- Sub-punching and reaming is acceptable only where specified.
- Misalignment of hole patterns shall not exceed 1/32 inch unless otherwise permitted by engineering drawings.

3.4 Welding

- All welding shall conform to AWS D1.1 unless project documents specify more stringent criteria.
- Welders must hold valid certification for the processes and positions they perform.
- Weld joints shall be prepared according to approved Welding Procedure Specifications (WPS).
- Preheat and interpass temperature shall be monitored and recorded for critical welds.
- Completed welds shall be free from cracks, undercut exceeding allowable limits, porosity clusters, and incomplete fusion.

4.0 Dimensional and Geometric Tolerances

4.1 Dimensional Accuracy

- Fabricated members shall meet or exceed AISC tolerances for length, camber, sweep, and squareness.
- Deviations must be documented and reviewed by a responsible engineer before release.

4.2 Assembly Fit-Up

- Bolt holes, connection plates, and bearing surfaces shall align within the tolerances required for field erection.
- Test fit-ups may be required for complex or critical assemblies.

5.0 Surface Preparation and Coatings

5.1 Cleaning and Preparation

- Surfaces shall be prepared to SSPC standards, typically SSPC-SP6 (Commercial Blast Cleaning) unless otherwise specified.
- All contaminants, including oil, dirt, scale, and corrosion, shall be removed prior to coating.

5.2 Coatings Application

- Coatings (paint, galvanizing, fireproofing, etc.) shall comply with project specifications and manufacturer recommendations.
- Film thickness shall be verified using calibrated gauges.
- Touch-ups of transport or erection damage must follow approved procedures.

6.0 Inspection and Testing

6.1 Quality Control (QC) Responsibility

- Fabricators must maintain an AMCA-approved QC program with documented procedures.
- QC personnel shall be trained and competent in inspection techniques, including weld inspection and dimensional verification.

6.2 Non-Destructive Testing (NDT)

- NDT shall follow AWS, ASNT, or other applicable standards.
- Required methods may include visual inspection (VT), ultrasonic testing (UT), magnetic particle testing (MT), dye penetrant testing (PT), or radiographic testing (RT).
- All indications exceeding acceptance criteria must be repaired and re-tested.

6.3 Inspection Records

- All inspections, measurements, and test results shall be recorded and retained for a minimum of five years or per project requirements.
- Records must link inspections to specific materials and welders for traceability.

7.0 Handling, Storage, and Shipping

7.1 Material Handling

- Steel shall be handled using appropriate lifting devices to prevent distortion and surface damage.
- Fabricators must implement procedures to prevent impact, dragging, or excessive stacking loads.

7.2 Storage

- Materials shall be stored off the ground with adequate support to prevent moisture accumulation and deformation.

- Coated materials must be protected from weather exposure until fully cured.

7.3 Shipping

- Members shall be secured to prevent shifting during transport.
- Sharp edges and protruding bolts shall be protected to prevent damage to coating systems or personnel.

8.0 Documentation and Traceability

8.1 Document Control

- Fabricators shall maintain controlled copies of approved drawings, specifications, WPSs, and revisions.
- Only current and approved documents shall be used in production.

8.2 Traceability Requirements

- Each fabricated piece must be uniquely identifiable through a marking system linking it to drawings and material certificates.
- Markings must remain legible through coating and transport processes.

9.0 Corrective and Preventive Actions

9.1 Nonconformance Control

- Fabricators must identify, document, and segregate nonconforming products.
- Rework plans must be approved by a qualified engineer.
- All repaired welds shall be re-inspected using the original acceptance criteria.

9.2 Continuous Improvement

- AMCA-certified facilities shall conduct periodic internal audits.
- Root-cause analysis and corrective actions shall be documented for recurring

quality issues.

10.0 Safety and Environmental Compliance

10.1 Worker Safety

- Fabricators shall comply with OSHA or equivalent safety regulations.
- Welding, cutting, and lifting operations must follow documented safety protocols.

10.2 Environmental Protection

- Waste materials, including slag, solvents, and coatings, shall be disposed of in accordance with federal, state, and local regulations.
- Fabricators should implement measures to minimize emissions, noise, and energy consumption.

11.0 Certification and Compliance

11.1 AMCA Facility Certification

- Fabricators seeking AMCA certification must undergo an initial audit demonstrating capability and compliance with these standards.
- Annual surveillance audits are required to maintain certification.

11.2 Project-Level Compliance

- Products delivered as AMCA-compliant shall include a Certificate of Conformance signed by an authorized quality representative.
- Non-compliant products shall not be labeled or represented as AMCA-approved.

12.0 Conclusion

These AMCA Quality Standards for Heavy Structural Steel Fabrication ensure consistent manufacturing practices, structural integrity, and accountability throughout the fabrication process. Compliance supports safe, reliable, and high-performance structural steel systems for all applicable industries.

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