AMCA
AMERICAN MANUFACTURING COMPLIANCE AUTHORITY

METAL FABRICATION QUALITY STANDARD

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AMERICAN MANUFACTURING COMPLIANCE AUTHORITY (AMCA)
QUALITY STANDARDS FOR METAL FABRICATION

1. Purpose and Scope

These Quality Standards establish the essential requirements for metal fabrication processes regulated under the American Manufacturing Compliance Authority (AMCA). They apply to all organizations involved in cutting, forming, machining, welding, assembling, finishing, and inspecting metal components intended for industrial, commercial, or structural use. The objectives of these standards are to ensure consistent product quality, operational safety, regulatory alignment, and customer satisfaction across the metal fabrication industry.

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2. Organizational Requirements

2.1 **Quality Management System (QMS)**
All fabricators shall maintain a documented QMS that includes policies, procedures, and controls covering the full production lifecycle. The QMS must define responsibilities, authority levels, process flows, and quality objectives aligned with AMCA requirements.

2.2 **Competency and Training**
Personnel involved in fabrication, inspection, and testing must be trained and competent for their assigned roles. Documentation of qualifications, certifications (when applicable), and periodic refresher training shall be maintained.

2.3 **Material Traceability**
A traceability system shall be in place to record the source, grade, and heat number of all metals used in production. Records must ensure that materials can be traced from initial receipt through final product delivery.

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3. Materials and Incoming Inspection

3.1 **Material Verification**
All incoming metals shall be verified against purchase specifications, engineering drawings, and certified mill test reports. Discrepant materials must be segregated

and reviewed before disposition.

3.2 **Storage and Handling**
Materials must be stored to prevent corrosion, contamination, physical damage, or mix-ups. Storage areas must be clearly labeled, and handling equipment must be suitable for the material type and weight.

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4. Fabrication Processes

4.1 **Cutting**
Cutting operations (laser, plasma, waterjet, saw, shear) shall follow process parameters documented to ensure dimensional accuracy and edge quality. Equipment must undergo regular calibration and maintenance. Deviations from specified tolerances shall be documented and corrected.

4.2 **Forming and Bending**
Forming processes must comply with engineering specifications for bend radius, angle tolerance, and material orientation. Press brakes and forming tools shall be maintained to prevent surface defects or dimensional variation.

4.3 **Machining**
Machining operations (milling, turning, drilling) shall follow validated setups and tool controls to meet surface finish, tolerance, and geometric requirements. Worn tooling must be replaced in accordance with documented criteria.

4.4 **Welding and Joining**
All welding processes must comply with AMCA welding procedures or qualified equivalents. Welding Procedure Specifications (WPS), Procedure Qualification Records (PQR), and Welder Performance Qualifications (WPQ) shall be maintained and current. Welds must be visually inspected and/or nondestructively tested as required by design or contract.

4.5 **Assembly**
Assembly operations must ensure proper fit-up, alignment, and fastener torque requirements. Fixtures and jigs should be inspected regularly to ensure repeatability and accuracy.

4.6 **Surface Preparation and Finishing**
Surface preparation (grinding, blasting, cleaning) must remove contaminants and meet specified surface profiles. Finishing operations (painting, coating, plating) shall follow manufacturer instructions and environmental controls for temperature,

humidity, and cure times.

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5. Inspection and Testing

5.1 **Inspection Plan**
Each product or job order must have an inspection plan that defines inspection points, measurement methods, acceptance criteria, and required documentation.

5.2 **Dimensional Inspection**
Dimensional verification must be performed using calibrated measurement tools. Results shall be documented and compared against engineering drawings and tolerances.

5.3 **Weld Inspection**
Welds shall undergo visual inspection at minimum. Additional nondestructive examinations (NDE), such as magnetic particle testing, dye penetrant testing, ultrasonic testing, or radiography, must be conducted when specified.

5.4 **Functional and Load Testing**
Where applicable, fabricated components shall be subject to functional testing, pressure testing, or load testing to verify performance requirements.

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6. Equipment, Calibration, and Maintenance

6.1 **Equipment Qualification**
Fabrication and inspection equipment must be suitable for the intended use and capable of meeting specified tolerances.

6.2 **Calibration Program**
All measuring devices and critical production equipment must be calibrated at defined intervals. Calibration records must identify the tool, date, method, and results.

6.3 **Preventive Maintenance**
A documented maintenance schedule must be in place to prevent unplanned downtime and ensure equipment reliability.

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7. Documentation and Recordkeeping

7.1 **Quality Records**
All quality-related documentation—including inspection reports, test results, material certifications, and process records—shall be retained for a minimum of five years or as otherwise required by contract or regulation.

7.2 **Document Control**
Procedures, drawings, and specifications must be controlled to ensure that only current, approved revisions are used.

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8. Nonconforming Product and Corrective Action

8.1 **Identification and Segregation**
Nonconforming materials or products shall be clearly identified, segregated, and documented to prevent accidental use.

8.2 **Disposition**
Disposition options include rework, repair (if allowed), scrap, or supplier return. All dispositions must be reviewed and approved by authorized personnel.

8.3 **Corrective Action**
When nonconformities recur or are considered high-risk, a corrective action process must be initiated. Root-cause analysis, corrective measures, verification, and closure documentation are required.

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9. Safety and Environmental Controls

9.1 **Workplace Safety**
Fabricators must comply with applicable safety standards, including proper use of personal protective equipment (PPE), safe machine operation, and hazard communication.

9.2 **Environmental Compliance**

Processes that generate dust, fumes, waste, or hazardous materials shall follow environmental regulations for containment, disposal, and emissions control.

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10. Continuous Improvement

Organizations are encouraged to use performance metrics, internal audits, customer feedback, and employee suggestions to drive ongoing improvements in quality, safety, and efficiency.

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11. Compliance Verification

AMCA may conduct audits, inspections, and documentation reviews to verify adherence to these standards. Organizations must provide access to facilities, records, and personnel when required.

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