AMCA
AMERICAN MANUFACTURING COMPLIANCE AUTHORITY

METAL STAMPING QUALITY STANDARD

AMERICAN MANUFACTURING CERTIFICATE OF AMCA REGISTRATION COMPLIANCE AUTHORITY

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AMCA Metal Stamping Quality Standards Adopted by the American Manufacturing Compliance Authority (AMCA)

Version 1.4 – Model Guidance Document

1. Purpose and Scope

These standards establish uniform quality requirements for the design, production, inspection, and delivery of metal-stamped components. They apply to all manufacturers, subcontractors, and facilities performing metal stamping operations under AMCA-aligned quality programs.

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2. Definitions

Metal Stamping: A forming process in which sheet metal is shaped, cut, or formed using dies and mechanical or hydraulic presses.
Critical Feature: Any dimension, characteristic, or surface feature that influences structural integrity, function, or safety.
Non-Conformance: Any deviation from specified requirements.

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3. Material Requirements

3.1 **Material Certification**

All incoming metals must be accompanied by mill test reports that verify alloy composition, mechanical properties, heat treatment (if applicable), and traceability to original batches or coils.

3.2 **Material Handling**

Materials must be stored to prevent contamination, corrosion, or mechanical damage. FIFO (First-In, First-Out) practices shall be used for inventory rotation.

3.3 **Material Identification**

Each batch must be clearly labeled with grade, thickness, lot number, and certification status throughout all stages of production.

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4. Tooling and Die Requirements

4.1 **Design Standards**
Stamping dies must be designed using validated engineering methods. Drawings must detail tolerances, surface finish requirements, and lubrication needs.

4.2 **Maintenance and Inspection**
Preventive maintenance schedules shall be followed for all dies. Inspection must be conducted before each production run to verify integrity, sharpness, alignment, and proper fit.

4.3 **Die Changeover Control**
Setup procedures shall ensure repeatable positioning, clamping force, and alignment. All changeovers must be documented and verified before operation.

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5. Process Control Requirements

5.1 **Press Operation**
Presses must be operated within manufacturer-specified load, speed, and stroke limits. Control panels shall be locked out from unauthorized adjustment.

5.2 **Process Parameters**
Key parameters—press tonnage, feed rate, lubrication rate, die temperature (if applicable)—must be recorded and monitored.

5.3 **In-Process Inspection**
Operators shall perform first-article inspections at startup and periodic inspections thereafter. Checks must include:

- Critical dimensions
- Burr height
- Edge quality
- Surface condition
- Flatness or formed geometry

5.4 **Lubrication Standards**
Lubricants must be compatible with the metal alloy and downstream finishing operations. Application devices shall ensure coverage uniformity and prevent contamination.

6. Dimensional and Visual Quality Standards

6.1 **Dimensional Tolerances**

All dimensions must meet drawing-specified tolerances. Critical features require 100% inspection unless documented process capability (CpK ≥ 1.33) is demonstrated.

6.2 **Surface Finish Requirements**

Finished parts must be free of:

- Deep scratches or dents
- Cracks or fractures
- Rust or oxidation
- Oil staining beyond acceptable levels
- Deformation exceeding tolerance limits

6.3 **Burr and Edge Conditions**

Burrs must not exceed customer-specified maximums; if unspecified, burr height shall not exceed 0.05 mm for standard parts and 0.02 mm for safety-critical components.

6.4 **Part Cleanliness**

Parts must be free of loose debris, metal chips, and residual lubricant inconsistent with downstream processing.

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7. Measurement and Testing Requirements

7.1 **Inspection Equipment**

Measuring tools (calipers, micrometers, CMMs, gauges) must be calibrated per ISO-acceptable practices at defined intervals.

7.2 **Testing**

For stamped parts requiring mechanical validation, tensile, hardness, or bend testing shall be performed according to specified materials standards.

7.3 **Documentation**

Inspection results must be recorded on controlled forms or digital systems and

retained per retention requirements.

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8. Non-Conformance and Corrective Actions

8.1 **Identification and Segregation**
Non-conforming parts must be clearly tagged and stored separately to prevent unintended use.

8.2 **Root-Cause Analysis**
Corrective actions must address underlying causes. Acceptable methods include 5-Why analysis, fishbone diagrams, or fault-tree analysis.

8.3 **Disposition**
Only authorized personnel may approve scrap, rework, or deviation requests. Reworked parts must undergo full re-inspection.

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9. Packaging and Shipping Standards

9.1 **Protection of Parts**
Packaging must prevent corrosion, abrasion, or deformation during transport and handling.

9.2 **Labeling Requirements**
Each package must display:

- Part number and revision
- Lot or batch number
- Quantity
- Manufacturer identification
- Special handling instructions (if required)

9.3 **Verification Prior to Shipping**
Shipments must be checked against purchase orders, inspection reports, and packing lists prior to dispatch.

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10. Personnel and Training Requirements

10.1 **Operator Qualification**
Press operators must be trained in equipment operation, safety protocols, inspection techniques, and defect identification.

10.2 **Ongoing Competency**
Annual refresher training is required for all production and inspection personnel.

10.3 **Supervisor Requirements**
Supervisors must demonstrate competence in quality system management and process troubleshooting.

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11. Safety Standards

11.1 **Machine Guarding**
All presses and feed equipment must be fitted with guards, sensors, and interlocks that comply with applicable safety regulations.

11.2 **Lockout/Tagout Procedures**
Maintenance, die changes, and troubleshooting must follow documented lockout/tagout protocols.

11.3 **PPE Requirements**
Minimum PPE includes gloves, eye protection, hearing protection, and protective footwear. Additional PPE may be required based on specific processes.

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12. Recordkeeping and Compliance

12.1 **Documentation Retention**
Records relating to material certification, inspection, testing, maintenance, training, and shipment must be retained for a minimum of five years or per contract.

12.2 **Audits and Reviews**
Facilities shall undergo internal audits at least annually. Findings must be documented with corrective actions tracked to completion.

12.3 **Compliance Certification**
Organizations claiming adherence to AMCA Metal Stamping Quality Standards

must maintain proof of compliance and make it available upon request.

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13. Continuous Improvement

Manufacturers are expected to implement continuous improvement practices, including statistical process control, scrap reduction initiatives, and equipment upgrades to enhance quality and efficiency.

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