

**QUALITY ASSURANCE 1st
TIER
MANUAL**

Brumund Foundry Inc.

**4400 West Carroll Ave.
Chicago, IL
773-287-9250**

PER ANSI/ASQC Q9002-1994

**THE PRESIDENT HAS DIRECTED THAT THE FOLLOWING POLICIES BE IMPLEMENTED
AT BRUMUND FOUNDRY.**

1 MANAGEMENT RESPONSIBILITY

1.1 Quality Policy

Document quality policy, objectives and commitment to quality. Maintain understanding of this policy at all levels of the organization.

1.2 Organization

1.2.1 Responsibility & Authority

Define the responsibility, authority and interrelation of personnel managing, performing and verifying work affecting quality: particularly for personnel needing organizational freedom and authority to:

- a) Initiate action to prevent casting nonconformance.
- b) Identify & record casting quality problems.
- c) Initiate & recommend solutions.
- d) Verify the implementation of solutions.
- e) Control further processing or delivery of nonconforming castings until the deficiencies have been corrected.

1.2.2 Testing resources & Personnel

Identify internal testing requirements, provide adequate resources and assign trained personnel to testing activities & quality audits.

1.2.3 Management Representative

Appoint a management representative with the authority and responsibility to maintain the requirements of Q9002. Ensure that the management representative reports to executive management on the suitability & effectiveness of the quality system.

1.3 Management Review

Review the quality system at appropriate intervals to ensure its effectiveness per the quality policy. Keep records of reviews.

2 QUALITY SYSTEM

2.1 Quality System Procedures

Maintain a documented quality system to ensure castings conform to requirements.

- a) Document quality system procedures to meet the requirements of Q9002.
- b) Implement the quality system procedures.

2.2 Quality Planning

Document how quality requirements will be met per Q9002.

- a) Use quality plans.
- b) Acquire processes, inspection equipment and skills needed to meet specifications.
- c) Ensure customer documents match within themselves.
- d) Update quality control and testing techniques.
- e) Identify measurements requiring capability beyond current abilities quickly enough to develop them.
- f) Identify testing during production.
- g) Clarify subjective requirements.
- h) Identify and prepare quality records.

3 CONTRACT REVIEW

3.1 Maintain procedures for contract review and coordination.

3.2 Ensure that:

- a) Requirements are adequately defined & documented and agreed.
- b) Requirements differing from those quoted are resolved.
- c) The plant is capable of meeting the contractual requirements. Maintain records of contract reviews.

3.3 Define how contract amendments are made and ensure that amendments are followed.

4 DESIGN CONTROL

4.1 General

Maintain procedures to ensure product design complies with specified requirements.

4.2 Design and Development Planning

- a) Prepare plans for each design and development activity.
- b) Define responsibility for each activity.
- c) Assign qualified personnel and resources for each activity.
- d) Update plans as required by design modification.

4.3 Organizational and Technical Interfaces

Define organizational and technical interfaces. Necessary information will be documented, transmitted, and regularly review by these interfaces.

4.4 Design Input

Identify and document applicable design requirements, including statutory and regulatory requirements, and review plans for adequacy. Resolve incomplete ambiguous and/or conflicting requirements. Take contract review activities into consideration during design input activities.

4.5 Design Output

Express design output in terms that can be verified and validated against design-input requirements. Design output will:

- a) Meet the design-input requirements.
- b) Contain or reference acceptance criteria.
- c) Identify those design characteristics that are crucial to safe and proper functioning of the product.

Review design output documents before release

4.6 Design Review

Plan and conduct documented review of design results at appropriate stages of design. Include representatives of all functions concerned with the design stage being reviewed, as well as other personnel as necessary. Maintain records of these reviews.

4.7 Design Verification

Perform design verification at appropriate stages of design to ensure that the design stage output meets the design stage input. Record design verification measures and activities.

4.8 Design Validation

Perform design validation to ensure that product conforms to specified requirements and/or user needs.

4.9 Design Changes

Authorized personnel will identify, document, review, and approve design changes and modifications before implementation.

5 DOCUMENT CONTROL

5.1 Document Approval & Issue

Maintain procedures to control documents relating to Q9002 requirements. Authorized personnel will review & approve these documents prior to issue. Procedures will:

- a) Make available pertinent documents where operations essential to the functioning of the quality system are performed.
- b) Promptly remove obsolete documents from points of use.
- c) Identify obsolete documents.

5.2 Document Changes

Review & approval of changes to documents will be by the department performing the original review & approval. The designated department will have access to information upon which to

base their review & approval. Identify the nature of the change in the document. Establish a document control procedure to identify the current revision of documents, to preclude use of obsolete documents. Re-issue documents after each change.

6 PURCHASING

6.1 General

Ensure purchased materials conform to requirements.

6.2 Assessment of Vendors

- a) Select vendors based on their ability to meet quality system and contract requirements. The selection of vendors and types of controls will depend on the product and on prior performance records. Ensure that vendor quality system controls are effective.
- b) Define the controls over vendors depending on the type of product, the impact of the product on casting quality, on quality audit reports and records of demonstrated performance.
- c) Maintain records of acceptable vendors

6.3 Purchasing Data

Describe the product ordered in purchasing documents and include:

- a) Precise identification
- b) Title and revision level of the specification, which will include the requirements for approval of the product.

Review & approve purchasing documents for adequacy of requirements before release.

6.4 Testing of Purchased Products

Customers have the right to verify in our vendor's plant, that materials being supplied to us meet requirements. Customer testing does not remove our responsibility to make acceptable castings or preclude later rejection. Customer testing at a vendor's plant will not be used as evidence of the vendor's effective control of quality.

7 CUSTOMER SUPPLIED PRODUCT

Maintain procedures for testing, storage, & maintenance of customer supplied product provided for tooling or incorporation into castings. Record & report product that is lost, damaged or is unsuitable for use to the customer

8 PRODUCT IDENTIFICATION & TRACEABILITY

Maintain procedures for identifying castings during production & delivery. If traceability is required, batches will have a unique identification. Record the identification.

9 PROCESS CONTROL

9.1 General

Identify & plan the production processes which directly affect quality. Control these processes. Control includes:

- a) Documented instructions defining production methods where the absence of instructions would adversely affect quality, use of suitable production equipment, suitable working environment, compliance with reference standards and quality plans.
- b) Monitoring and controlling processes & casting characteristics during production.
- c) Meeting reference standards and documented procedures.
- d) Monitoring and controlling process parameters and casting characteristics.
- e) Approval of processes.
- f) Written standards of workmanship.
- g) Maintenance of equipment to maintain process capability.

Use qualified operators and/or require continuous monitoring of process parameters for process which can not be verified by non-destructive testing.

10 INSPECTION

10.1 Receiving Inspection

- 10.1.1 Ensure incoming product is not used until it has been inspected. Do testing to documented procedures.
- 10.1.2 Do not use incoming materials before inspection. If this policy is changed, a procedure will be written to ensure immediate replacement and recall if the material is found to be nonconforming.
- 10.1.3 Determine the type of incoming inspection by considering the amount of controls exercised by the vendor and the inspection records the vendor provides.

10.2 In Process Inspection

- a) Inspect and identify castings as required by documented procedures.
- b) Establish casting conformance to requirements by use of process monitoring.
- c) Hold castings until inspection is complete or reports received.
- d) Identify nonconforming castings.

10.3 Final Inspection

Documented procedures for final inspection require that inspection, including those specified either on receipt of product or in-process, has been carried out and the data meets the requirements. Perform final inspections to documented procedures to provide evidence of the castings conformance to requirements. No casting will be dispatched until the tests specified in the documented procedures have been satisfactorily completed and the documentation is available & authorized.

10.4 Inspection Records

Keep records to prove that the castings passed inspection with defined acceptance criteria. Failed castings will be controlled under the nonconforming casting procedures.

11 INSPECTION EQUIPMENT

Control, calibrate & maintain inspection equipment, whether owned by us, on loan or provided by the customer, used to demonstrate the conformance of castings to requirements. Determine measurement error. Inspection equipment must be consistent with required measurement capability.

- a) Identify the measurements, the accuracy needed & select the appropriate inspection equipment.
- b) Identify & calibrate inspection equipment that can affect casting quality at prescribed intervals or prior to use against certified standards having a known valid relationship to national standards. Where no such standards exist, document the calibration basis.
- b) Document & maintain calibration procedures, including type, identification number, location, frequency of checks, check method, acceptance criteria and action to be taken when results are unsatisfactory.
- d) Mark inspection equipment to show calibration status.
- e) Maintain calibration records for inspection equipment.
- f) Assess & document the validity of previous inspection results when inspection equipment is found to be out of calibration.
- g) Ensure environmental conditions are suitable for calibrations & inspections being performed.
- h) Handle & store inspection equipment to maintain its' accuracy.
- i) Protect inspection equipment from adjustments invalidating calibration settings.

Where test hardware is used to inspect, check them to prove they are capable of verifying the acceptability of the castings prior to usage. Recheck them at prescribed intervals. Measurement design data will be made available to the customer to prove it is adequate.

12 INSPECTION STATUS

Identify inspection status by physical location or tag, which will indicate the passing or failure of inspected castings. Maintain identification through casting production to ensure that only castings passing inspection are dispatched. Records will identify the inspection authority responsible for releasing conforming castings.

13 CONTROL OF NONCONFORMING CASTINGS

Maintain procedures ensuring that castings not meeting requirements are prevented from inadvertent use. Control will provide for identification, documentation, evaluation, segregation, disposition & notification of the functions concerned

13.1 Nonconformity Review & Disposition

Define the responsibility for review & disposition of nonconforming castings. Review nonconforming castings using documented procedures.

14 CORRECTIVE ACTION

14.1 General

Document & maintain procedures for corrective & preventative action. Actions taken to eliminate causes of nonconforming castings will be appropriate to the degree of risk and magnitude of the problem.

14.2 Corrective Action

- a) Effectively handle customer complaints.
- b) Investigate the cause of nonconforming castings & record the corrective action needed to prevent recurrence.
- c) Determine the corrective action required.
- d) Ensure corrective action is taken and that it is effective

14.3 Preventative Action

- a) Analyze processes, concessions, audit reports, quality records, service reports & customer complaints to eliminate potential causes of nonconforming castings.
- b) Determine preventative actions to deal with problems
- c) Apply controls ensuring that corrective actions are taken and are effective.
- d) Management will review procedure changes.

15 HANDLING, STORAGE, PACKAGING & DELIVERY

15.1 Document & maintain procedures for handling, storage packaging & delivery of castings.

15.2 Handling - Provide methods of handling that prevent damage.

15.3 Storage - Provide secure storage areas which will prevent damage of castings pending delivery.

Stipulate methods for authorization receipt and dispatch to & from storage. Assess the condition of castings in storage for damage at appropriate intervals.

15.4 Packaging - Control packing processes to ensure conformance to requirements & identify, preserve & segregate castings from the time of receipt until our responsibility ends.

15.5 Preservation - Segregate & preserve castings while under the foundries' control.

15.6 Delivery - Arrange for the protection of the quality of the castings after final inspection. When specified, this protection will be extended to include delivery to destination.

16 QUALITY RECORDS

Maintain procedures for identifying, collecting, indexing, filing, storing, maintaining and disposing of quality records. Maintain quality records to prove achievement of the required quality & effective operation of the quality system. Subcontractor quality records are an element of this data. Keep quality records so they are legible & identifiable to the castings involved. Store quality records so they are readily retrievable, in facilities providing an environment to minimize deterioration. Record retention times of quality records. Make quality records available for evaluation by the customer for an agreed period.

17 INTERNAL QUALITY AUDITS

Perform internal audits verifying if quality activities comply with plans & determining the quality system effectiveness. Schedule audits depending on the status & importance of the activity. Perform audits & follow-up actions using documented procedures.

Report the documented results of the audit to the personnel with responsibility in the area audited. Take timely corrective action on audit deficiencies. Record implementation & effectiveness of corrective actions on follow-up audits.

18 TRAINING

Maintain procedures for identifying training needs & for training. Qualify personnel performing specific tasks on the basis of appropriate education, training & experience. Maintain records of training.

19 SERVICING

When specified, maintain procedures for performing services and verifying the services met the requirements.

20 STATISTICAL TECHNIQUES

Maintain procedures for identifying, implementing and controlling statistical techniques to verify the acceptability of process capability & casting characteristics.