



QUALITY ASSURANCE
AND QUALITY CONTROL



CCI's Zero Defects Commitment To Quality

At Control Components, we are committed to zero defects. That means providing you with exemplary service and flawless products that will perform safely, reliably and efficiently. To further this goal, we've developed a fundamental base of mandatory quality requirements that are followed for all contracts we receive. These basic requirements include procedures for a range of activities from contract review and manufacturing to final inspection and shipping.

CCI's Quality Assurance Program

Control Components' Quality Assurance Program (QAP) is a system of planned actions, to assure that all requirements are applied to all activities affecting the construction and function of our products. The Program executes quality assurance policies and procedures; assures compliance with contractual requirements; and certifies conformance to governing codes, specifications and standards.

KEY FEATURES

- Compliance to American Society of Mechanical Engineers (ASME) Boiler and Pressure vessel Codes; and requirement of the American National Standards Institute (ANSI), American Petroleum Institute (API), Nuclear Regulatory Commission (NRC) and National Electrical Manufacturing Association (NEMA).
- Comparable high quality for all product lines, commercial and nuclear.
- Non-destructive examinations performed in accordance with qualified procedures, by high level Quality personnel, certified in accordance with American Society of Non-Destructive Testing Recommended Practice SNT-TC-1A.
- Certified Quality Assurance and Quality Control personnel per ASME/ANSI-45.2.6.
- ASME N-Stamp; NPT Stamp
- Precise material verification for incoming and in-process materials.
- Welding procedures that are written, implemented, and qualified by CCI in accordance with ASME Code Section IX.

Beyond the high quality requirements mandated by our Quality Assurance Program, we offer a selection of QA options and accept special requirements to assure that your needs are met.

Program Structure

Administration of CCI's Quality Program is the responsibility of the Director of Quality Assurance. This individual assures the implementation and maintenance of the Program and its policies. The QAP provides a cohesive bond between departments, assuring smooth operation and the inclusion of all quality requirements from one stage to another. The Program operates independently of the operational pressures of the production cycle.

Quality Assurance Engineering

CCI's Quality Assurance Engineering area has the functional responsibility for developing and coordinating departmental policies within the QAP. QA Engineering interacts with Project Management, Manufacturing, Design Engineering and Purchasing to establish basic requirements and procedural control guidelines for producing the end product.

PREPARATION STAGE

During the proposal stage, QA Engineers first review customer quality requirements. Once the purchase order has been received, the QA Engineer reviews it to assure that all quality requirements from the original proposal and contract have been included. All deviations are resolved at this stage before the order is processed further.

MANUFACTURING STAGE

A document called a Production and Inspection Traveler describes all manufacturing processes, as well as inspection operations, for a specific component. It is used as a permanent record. Each traveler is assigned a work order number and a serial number to maintain traceability. As the material is issued, the purchase order and heat number, as applicable, are entered on the traveler. Upon acceptance of the parts and traveler by Final Inspection, the components are identified, tagged and placed in a designated area. All documents, in addition to the completed traveler, are then forwarded to Quality Assurance.

SHIPMENT STAGE

The QA Engineer reviews the assembly traveler for completion and adherence to all requirements. After QA approval, the valve/component is cleaned, painted and packaged for shipment.

Quality Audits

CCI periodically conducts product and system audits to guarantee the highest quality product output, and, if necessary, to change or eliminate activities not contributing to quality requirement levels. In addition to internal audits, customer audits as well as ASME and NCR audits are conducted routinely.

Quality Control

CCI's Quality Control System established and maintains traceability and controls throughout the production cycle to see that a final product meets specific dimensional and visual standards. The System also monitors, examines, inspects and tests the quality process at various points during manufacturing. Each of our QC Inspectors have the responsibility of detecting and handling problems during their stage of the production process. An Inspector may stop a product from being processed further if he or she feels it does not meet quality standards.

Another important aspect of CCI's QC process is maintaining a relationship with reliable subcontractors. Subcontractors must prove they will continually provide high quality products. Consistently outstanding subcontractors are honored with CCI's Superior Supplier Award.

The Design Process

Team effort and attention to detail are what make our Design Control process effective and efficient. Once a contract is received in Engineering it receives the personal attention of several department members. A Project Engineer designs a system that will meet your specifications, and performs design parameter calculations. A complete package of drawings, bills of material, and additional special test or process requirements is then assembled. Calculations and custom-designed components are reviewed and approved by a second engineer.

When the package is complete, it is then reviewed by CCI's Design Review Board, a group of management-level representatives from Engineering, Manufacturing and Quality Assurance. The Board reviews and approves all new releases to manufacturing, to assure sound engineering and manufacturing practices, and compliance with customer specifications. After Board review, if specified by the contract, customer approval of the package is sought.

Quality Assurance Requirements

CODES AND STANDARDS

The following codes and standards are, or may be, referenced in the fabrication of CCI valves:

- American National Standard Institute (ANSI)
- American Petroleum Institute (API)
- American Society for Testing Materials (ASTM)
- Canadian Z Standards (CSA)
- ASME Boiler and Pressure Vessel Codes
- Institute of Electrical and Electronics Engineers (IEEE)
- Manufacturers Standardization Society Specification (MSS-SP)
- National Association of Corrosion Engineers (NACE)
- Deutsches Institut für Normung (DIN)
- Swedish Standards Association
- Instruments Society of America (ISA)
- ISO 9001
- International Electrotechnical Commission (IEC)

Non-Destructive Examinations

CCI offers many Non-Destructive Examination (NDE) procedures covering parts and valve/piping component subassemblies. Personnel performing these procedures are certified and qualified in accordance with the American Society of Non-Destructive Testing, Recommended Practice No. SNT-TC-1A, and ASME Boiler and Pressure Vessel Code Section V. Optional NDE procedures are also available.

RADIOGRAPH EXAMINATION

Ref: ANSI B16.34; ASME Section V

This procedure is used to inspect castings and welds. The sources of radiation are X-ray machines, Iridium 192 and Cobalt 60. The following material thickness limits are imposed on the type of source:

X-ray	3/4 in. max.
Iridium	3/4 in. to 2 in.
Cobalt	2 in. to 8 in.

NOTE: Material thickness can be extended depending on the part/subassembly geometry.

LIQUID PENETRANT EXAMINATION

Ref: ANSI B31.1; ASME Section III, V, VIII; ASTM E-165; Mil-STD-271

This procedure is used to determine surface flaws in forged and cast metals, welds, and hard-faced surfaces.

FLUORESCENT PENETRANT EXAMINATION

Ref: ANSI B31.1; ANSI B16.34

Fluorescent Penetrant Examination is used to determine surface flaws in forged and cast metals and weldments, including hard-faced surfaces.

MAGNETIC PARTICLE EXAMINATION

Ref: ANSI B31.1; ASME Section III, V, VIII

This examination is also used for the determination of surface and sub-surface flaws in forged and cast materials and weldments. The source of current is alternate or direct-rectified current for magnetization during examination.

WET FLUORESCENT MAGNETIC PARTICLE EXAMINATION

Ref: ASME Section II, III, V, VIII; ANSI B31.1, B16.34

The wet fluorescent procedure used for magnetic particle inspection detects surface or near-surface discontinuities in ferromagnetic portions of forgings and castings, as well as weldments. Discontinuities are detected in any direction.

ULTRASONIC TESTING

Ref: ANSI B16.34

This procedure, performed by a subcontractor, is used to inspect the internal conditions of forged materials.

Standard Minimum NDE Procedures

I.	<u>PARTS</u>	<u>EXAMINATION</u>
	Body & Bonnet (casting)	Visual Inspection
	Body & Bonnet (forging)	Visual Inspection
	Plug & Seat Ring (hard-surfaced)	LPE
	Plug & Seat Ring (heat treated)	LPE or MPE
	Body or Bonnet-fabricated parts over 6 in. by welding	Radiograph
II.	<u>VALVE-TO-PIPING WELDS</u>	<u>EXAMINATION</u>
	Temperature over 750°F (400°C)	Visual Inspection LPE or MPE Radiograph (100% on all welds over 2 in. NPS)
	Temperature between 350-750°F (175-400°C) and pressure over 1025 psig (7100 kPa)	Visual Inspection Radiograph (100% on all welds over 2 in. NPS with a thickness over 3/4 in.)
	Other temperatures/pressures	Visual Inspection

III. ASSEMBLY TEST

Standard Assembly Tests - Based on intended service, the following standard tests are conducted:

- Hydrotest - CCI's standard is based on the valve being able to withstand 50% over design pressure without leakage. Testing is in accordance with ANSI B16.34 and ASME B&PVC Section III for nuclear valves. The procedure verifies that all components involved in forming the pressure boundary are adequate in design and quality.
- Seat Leakage - The procedure is in accordance with ANSI B16.34 and B16.104 (FCI-70.2) and established the level of seat tightness, and defines the acceptable values of seat leakage, according to the valve application.
- Operability Test - This test establishes the standards for valve control settings and smoothness of operation. It is used to simulate actual service performance. Valves are tested with actuator and auxiliary equipment in "as shipped" condition. Operability testing is conducted after hydrostatic and seat leakage tests have been performed. Other similar tests are listed below.

Optional Assembly Tests - The following tests are conducted when requested by the customer:

- Dynamic response sine wave testing
- Noise and flow testing
- Cv vs. stem position
- Dead band
- Independent linearity
- Hysteresis
- Repeatability

IV. MATERIAL PROCUREMENT/CERTIFICATION

At your discretion, certifications may accompany all applicable fabricated components with shipment, and/or prior to delivery. The required material procurement and

certification will be held at CCI headquarters for 10 years for commercial components, and 30 to 40 years for nuclear components.

Standard Documentation - Standard valve documentation includes hydrostatic, seat leakage, and operability test reports, and a certificate of conformance.

Optional Certificates (upon request) - Optional certifications include special water chemistry conductivity, certified material test reports on the materials' chemical and mechanical test results, certificate of compliance, and certified NDE results.

V. CLEANING AND CORROSION PROTECTION

CCI's procedures assure protection of machined and non-machined surfaces, and are not limited to only those surfaces mentioned. Surface protection procedures are selected and performed based on intended service, and the environment encountered during shipment, storage, assembly and construction. Cleaning procedures assure components are free of excessive scale, rust and other deleterious materials. Drying procedures are conducted on all valves undergoing an assembly test and/or cleaning procedures. Corrosion protection is provided for all valves that will undergo storage for an extended period of time.

VI. PAINT

Valves are usually painted after the completion of all testing. Surfaces are prepared by chemical cleaning or wire brushing, and are free from rust, scale, grease and oil. Paint procedures are in accordance with CCI standards, and based on the material and your needs.

VII. SHIPPING

CCI's equipment is completely assembled in its operating condition, and fully equipped with all accessories and parts unless size restricts shipment as a unit. Skids, containers and packages are provided by CCI. Nameplates and tags are affixed to the fabricated components for identification.

For additional information on Quality Assurance and Quality Control, call, fax or E-mail today:



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