



The Technical Standards and Safety Authority
Boilers and Pressure Vessels Safety Program
345 Carlingview Drive,
Toronto Ontario, Canada
M9W 6N9

***GUIDE FOR MANUFACTURERS, FABRICATORS, INSTALLERS, REPAIRERS,
ALTERERS AND AUDIT TEAMS***

FOR THE

**CERTIFICATION OF PRESSURE PIPING SYSTEM
FABRICATORS, INSTALLERS, REPAIRERS AND
ALTERERS**

IN ACCORDANCE WITH (AS APPLICABLE):

- **CSA B51 – Boiler, pressure vessel and pressure piping code**
- **CSA B52 – Mechanical Refrigeration Code**
- **ASME B31.1 – Power Piping**
- **ASME B31.3 – Process Piping**
- **ASME B31.5 – Refrigeration Piping and Heat Transfer Components**
- **ASME Section 1 – Rules for Construction of Power Boilers (For Boiler External Piping)**
- **CSA Z7396.1 – Medical Gas Pipeline Systems**

INTRODUCTION

This guide is prepared for the use of audit team leaders, members and applicants for TSSA Certificates of Authorization (C of A). It is not intended to replace or interpret the requirements of the CSA or the ASME Boiler and Pressure Vessel Codes. This guide does not list all the detailed requirements of the CSA and ASME Codes referenced, but rather lists the highlights that the applicant is required to include in the written Quality Control (QC) Manual.

In addition, to assist the TSSA audit team, this guide is provided to applicants for their use in identifying and verifying the paragraph(s) where their QC Manual addresses all applicable control requirements of the CSA and ASME Codes. The QC Manual must contain the description of the controls necessary for implementing the QC Program, but it is not required to contain all the programmatic requirements which will be found in the QC Program, such as written procedures.

The guide is based upon CSA B51, ASME B31.1, ASME B31.3, ASME B31.5, ASME Section 1 and CSA Z7396.1 requirements. The guide is subject to revision by TSSA based on changes made to the CSA and ASME Codes, from time to time, or based on feedback received from users.

An audit must cover a QC Manual and its implementation. It is recognized that the scope of work, QC Manual and Manual implementation will vary from one applicant to another, therefore, only those activities to be performed under the scope of an applicant's TSSA Certificate of Authorization are required to be addressed in the QC Manual. TSSA audit teams are advised that this guide may not outline all possible aspects of each audit. The QC Manual need not follow the format of this guide but shall described applicable requirements.

Questions of possible need for interpretation raised by the audit team members or the applicant shall be submitted to the TSSA Boiler and Pressure Vessel Chief Inspector for a resolution.

HOW TO USE THIS GUIDE

Review each item in the checklist against the QC Manual and:

- 1) Check the applicable column, "Yes", "No" or "N/A" (Not Applicable)
- 2) Note the paragraph number in the QC Program Manual which covers the subject addressed in the column labelled "Quality Program Reference".
- 3) Submit one copy of the completed checklist with one uncontrolled copy of the current QC Manual to TSSA Head Office for review, at least one month prior to the scheduled implementation audit date.

DEMONSTRATION OF THE QUALITY SYSTEM

The purpose of the demonstration item is to evaluate the applicant's Quality Control System (QCS) and implementation. For evaluation of the QCS, the applicant must demonstrate to the current Code rules sufficient administrative and construction of the QCS to show that they have the knowledge and ability to produce the Code items typical of those covered by the QCS.

It is expected that the construction functions be demonstrated using typical Code work. However, they may be demonstrated using current work, a mock-up, or a combination of the two. Any current Code work ongoing at the time of the audit is subject to the audit team's review. While that applicant must address each element of the QCS in the Code, the applicant need only demonstrate those elements within the intended scope of activities that apply to their program.

If the applicant holds a single Certificate of Authorization, the demonstration item must include the elements of the QCS on the item that will be constructed for the requested type of Certificate of Authorization. The demonstration item shall be based on the latest mandated Code Edition in effect at the time of the review. If the demonstration item is based upon current work that is being fabricated to a previous Code Edition, the applicant shall address changes in the Code that would require different actions in the demonstrations to be in compliance with the current Code.

For applicants requesting multiple Certificates of Authorization, it is not necessary to have a demonstration item for each Code section. An item fabricated to any one of the requested Certificates of Authorization may be used as the demonstration item.



QUALITY CONTROL SYSTEM CHECKLIST PRESSURE PIPING PARTS AND SYSTEMS

Company Name: _____

Reviewed by: _____ Date: _____

No.	Quality Element and Sub-Elements	Yes	No	N/A	Quality Program Reference
1	GENERAL QUALITY CONTROL SYSTEM REQUIREMENTS				
	(a) The QCS is documented in detail in a QC Manual that addresses all requirements of the applicable Code Section and includes: (i) a cover sheet that contains the company name, physical address, and a brief description of the program scope(s) as it will appear on the requested Certificate(s) of Authorization. <small>(NOTE: The cover sheet may also contain the effective date of the QC Manual, mailing address, phone number or other information desired by the certificate holder or applicant.)</small>				
	(ii) a brief description of the products being fabricated and/or work being accomplished under the Code or work the Certificate Holder wishes to accomplish under the code, including applicability of the QCS to shop activities, field activities, or both.				
	(iii) a Table of Contents page which includes each section by subject, number and revision number (as applicable).				
2	STATEMENT OF AUTHORITY AND RESPONSIBILITY				
	(a) The Statement of Authority and Responsibility shall include the following:				
	(i) A statement that all work carried out by the applicant meets all applicable Code and Jurisdictional requirements.				
	(ii) The authority and responsibility of those in charge of the QCS are clearly established and documented.				
	(iii) Persons performing QC functions have sufficient and well-defined responsibility, the authority and the organizational freedom to identify QC problems and to initiate, recommend, and provide solutions, including stop work orders if further processing would result in a non-conformance with the applicable Code section.				
	(iv) A statement that all disagreements in the implementation of the QCS is referred for resolution to a higher authority in the company.				
	(v) The Statement of Authority and Responsibility is signed and dated by a senior company official responsible for Code activities (i.e. President, Vice President, Plant Manager, etc.)				
3	MANUAL CONTROL				
	(a) Manual revision control system (i.e. is the QC Manual revised by page or by section, are the controls clearly described?)				
	(b) The title of the individuals responsible for revising the QC Manual.				
	(c) The title of the individual responsible for reviewing current TSSA Code Adoption Document, new ASME/CSA Code Editions and making any required changes to the QC Manual within six months from the new Edition issue date.				
	(d) Provision for review and approval of the QC Manual to maintain it is current.				
	(e) Provision for submittal of the QC Manual revisions to the TSSA Representative for acceptance prior to implementation including timely update of all copies to reflect approved revisions.				
	(f) In the case where the QC Manual exists in more than one language, at least one version is in English and identified as the authoritative version. In the case where the QC Manual exists in languages other than English, a statement by the C of A holder that the translation is correct shall be provided. <small>(NOTE: A glossary of terms is desirable from the standpoint of clarity and if abbreviated titles of personnel and control documents are used throughout the QC Manual.)</small>				
	(g) Provision for distribution of the revised QC Manual (controlled or uncontrolled), including hard copy and/or electronic controls.				



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No.	Quality Element and Sub-Elements	Yes	No	N/A	Quality Program Reference
4	ORGANIZATION				
	(a) An organization chart showing the relationship between management, engineering, purchasing, manufacturing, production, field assembly, field construction, inspection, and quality control (as applicable) exists and reflects the actual organization. <small>(NOTE: The purpose of this chart is to identify and associate the various organizational groups with the particular function for which they are responsible. The Code does not intend to encroach on the right to establish or alter whatever form of organization considered to be appropriate for Code work.)</small>				
5	DRAWINGS, DESIGN CALCULATIONS AND SPECIFICATION CONTROL				
	(a) Controls exist which assure that the latest applicable drawings, design calculations, specifications and instructions required by Code, as well as authorized changes, are used for manufacture, assembly, examinations, inspections and testing. Controls include provisions for:				
	(i) The title of the individual responsible for the preparation of the design calculations and drawings produced internally (where applicable).				
	(ii) The title of the individual responsible for reviewing and approving drawings, calculations and specifications prepared internally or supplied by the customer, to ensure Code compliance to the latest Code (approval by signature and date on all applicable documents).				
	(iii) The title of the individual responsible for computer aided design calculations and drawings. A detailed description of how this is verified to ensure the correct output has been obtained (where applicable).				
	(iv) The title of the individual responsible to ensure computer program revisions have been made within 6 months of Code revision changes. The verification process that ensures the revised program is producing the correct output is described (where applicable).				
	(v) The title of the individual responsible for the design registration with the appropriate jurisdictional authority and filing the registered designs upon request shall be described.				
	(vi) The title of the individual responsible for the distribution of drawings, calculations, specifications, and the removal of all obsolete drawings, calculations and specifications.				
6	MATERIAL CONTROL				
	(a) Controls exist to assure that the material received is properly identified and has the correct documentation, including Statutory Declarations, material test reports and/or certificates of compliance to satisfy Code requirements, as applicable.				
	(b) The material control system ensures that only accepted material is issued for Code construction.				
	(c) If substitution of materials is allowed, the applicable controls of this activity are documented, including designation of the individual authorized to approve substitutions.				
	(d) The title of the individual responsible for performing a receiving inspection of Code materials.				
	(e) Information to be provided to the individual receiving materials concerning characteristics of the material to be checked is documented.				
	(f) Controls exist for the handling of materials that are found to be non-conforming at receiving inspection.				
	(g) Measures have been established and documented to assure the proper marking, handling, and storage of materials, including welding/brazing material.				



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No.	Quality Element and Sub-Elements	Yes	No	N/A	Quality Program Reference
7	EXAMINATION AND INSPECTION PROGRAM				
	(a) Fabrication operations, including examinations and tests are described in sufficient detail to permit the AI to determine at what stages specific inspections are to be performed. Specifically:				
	(i) Provisions for the use of checklists, process sheets, travelers, etc., for a list of examinations and tests to be performed and for designation of inspection points. Checklists shall be made available to the AI prior to the start of fabrication.				
	(b) The title of the individual responsible for contacting the AI and providing them with the latest revised drawings, design calculations and all job-related documents for initial review and designation of inspection points on the checklist.				
	(c) Measures have been established to ensure:				
	(i) The AI is informed of approaching inspection points.				
	(ii) A proposed repair procedure is submitted to the AI for concurrence of repairs to any pressure retaining material.				
	(iii) Controls taken to ensure that all required inspections have been completed by the AI.				
	(iv) Statutory Declarations, material test reports or certificates of compliance, examination reports, test records, and other fabrication documents are available to the AI.				
	(v) Transfer of material markings to assure traceability is maintained. If a coded marking system is used, it is documented in the manual or written procedure acceptable to the AI.				
	(vi) Only BCuP-3 or BCuP-5 filler is used in medical gas piping installations per CSA Z7396.1 (if applicable).				
	(d) The title of the individual responsible for the preparation of the Piping Systems Installation and Test Data Report. The report shall be reviewed for correctness and certified by the individual accepting the workmanship on behalf of the company.				
	(e) Measures are established for the distribution of the Data Reports.				
	(f) Measures are established to control field activities, when applicable.				
8	BOILER EXTERNAL PIPING CONTROLS ADDITIONAL REQUIREMENTS				
	(a) Provisions exist for materials to be ordered to ASME SA, SB, or SFA Specifications and Material Test Reports reviewed and accepted to ASME Section II.				
	(b) Provisions exist for the Code stamping of piping.				
	(c) Provisions exist for the AI to witness all hydrostatic testing of the piping.				
9	NON-CONFORMANCES				
	(a) Controls exist for the correction of non-conformances. When the AI involvement is required, a procedure shall be agreed upon with the AI. Controls shall include:				
	(i) The title of the individual responsible for reviewing the non-conforming condition.				
	(ii) Identifying and controlling further processing of non-conforming items until final disposition.				
	(iii) Documenting the non-conformance, the disposition, and informing the AI of the non-conforming condition.				
	(iv) Addressing the non-conformance on the checklist with a hold point added.				
	(v) The final inspection and disposition shall be accepted by the QC and AI.				



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No.	Quality Element and Sub-Elements	Yes	No	N/A	Quality Program Reference
	(vi) When the disposition is "Use-As-Is", the disposition may require an engineering evaluation.				
10	WELDING AND BRAZING CONTROL (AS APPLICABLE)				
	(a) Welding and Brazing shall conform to the requirements of ASME Section IX and the Code of Construction, as applicable to the scope of work.				
	(b) The title of the individual responsible for certifying Welding Procedure Specifications (WPS), Brazing Procedure Specifications (BPS), Procedure Qualification Records (PQR), Welder/Welding Operator Certificates and Brazer/Brazing Operator Certificates (as applicable). The individual responsible shall:				
	(i) Be appointed by the Company.				
	(ii) Have a satisfactory level of competence in accordance with the QCS, and as a minimum be qualified by education, experience, or training.				
	(iii) Have a record maintained by the applicant containing objective evidence of all qualifications, training, or experience.				
	(c) The title of the individual responsible for ensuring the WPS/BPS and the welder/brazer assigned to each weldment/brazement is qualified and appropriate for the work to be completed.				
	(d) Measures are taken to ensure:				
	(i) WPS/BPS's are available to the welder in the work area.				
	(ii) Welder/Brazer qualifications are maintained in accordance with ASME Section IX, the TSSA Code Adoption Document and the Code of Construction.				
	(iii) A system is established for identifying the welds/brazes completed by each welder/brazer.				
	(iv) Removing or inspecting tack welds is completed per Code.				
	(v) Storage and conditioning of low-hydrogen electrodes is established (as required).				
	(vi) The control, issuance, and return of welding/brazing material to assure the proper welding/brazing material is used.				
	(vii) Provisions exist for revocation of welder/welding operator's or brazer/brazing operator's certification when there is reason to question their ability to make welds/brazes that meet the specification.				
11	NON-DESTRUCTIVE EXAMINATION				
	(a) Controls exist for identifying the appropriate NDE procedures applicable to the scope of work. These provisions assure that:				
	(i) NDE personnel are qualified in accordance with the applicable Code section requirements, and records made available to the AI upon request.				
	(ii) NDE (UT, MT, PT, RT and VT) examinations are performed in accordance with a written procedure demonstrated to the satisfaction of the AI (when required). Procedures to be made available to the AI upon request.				
	(iii) RT film and all NDE reports are retained in accordance with the applicable Code.				
	(iv) All NDE equipment is calibrated.				
	(v) The QC Manual addresses requirements that the Qualification and Certification of NDE Personnel meets the Canadian jurisdictional requirements of CAN/CGSB-48.9712 or SNT-TC-1A.				
	(vi) The QC Manual addresses the qualification requirements for personnel performing visual examinations in accordance with ASME B31.1 or ASME B31.3.				



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No.	Quality Element and Sub-Elements	Yes	No	N/A	Quality Program Reference
12	HEAT TREATMENT				
	(a) Controls are in place to assure that heat treatment is completed as required by the applicable Code.				
	(b) Measures are established to assure the proper placement of thermocouples and the use of charts.				
	(c) When heat treatment is subcontracted, measures are established to assure that the procedures are followed and that heat treatment charts are provided.				
	(d) The title of the individual responsible for maintaining traceability of the item being heat treated when sent to the subcontracted facility.				
	(e) Documentation is provided to the AI for assurance that all heat treatment requirements have been met.				
13	CALIBRATION OF MEASURING AND TEST EQUIPMENT				
	(a) Controls exist for the calibration of examination, measuring, and test equipment used in fulfillment of applicable Code requirements.				
	(b) Measures are established to ensure that:				
	(i) Calibration records are maintained and that status indicators are used to indicate the current calibration status of the equipment.				
	(ii) Calibration equipment is maintained in good condition, checked for signs of damage, and removed from service if found defective.				
	(iii) A calibration frequency is established and maintained, and results are traceable to National Standards.				
	(iv) When calibrations are performed in-house, the title of the individual responsible is identified and procedures are established.				
	(c) For brazed refrigeration (only) in accordance with CSA B52 and ASME B31.5, the calibration of pressure gauges is not required if the two-gauge method is used for pressure testing of piping systems.				
14	RECORDS RETENTION				
	(a) The manufacturer or assembler shall maintain the documents outlined below for a period as required by the Code of Construction (as applicable):				
	(i) Piping Systems Installation and Test Data Reports, including Partial Data Reports				
	(ii) Registered drawings				
	(iii) Design calculations				
	(iv) Checklists, process sheets, travelers, repair reports, etc.				
	(v) Material test reports and/or material certifications				
	(vi) Statutory Declarations				
	(vii) Welding Procedure Specifications/Brazing Procedure Specifications and Procedure Qualification Records				
	(viii) Welder Qualification Records for each welder or Brazing Qualification Records for each brazer				
	(ix) Non-Destructive Examination reports				
	(x) Repair procedures and records				
	(xi) Heat treatment records and test results				
	(xii) Non-conformances and dispositions				
	(xiii) Pressure test records				
	(xiv) Any other applicable documentation				
15	THE AUTHORIZED INSPECTOR				
	(a) All required inspections are to be performed by the AIA of Record (the AIA in Ontario is the TSSA).				
	(b) A controlled copy of the QC Manual is available to the AI at the plant or construction site where Code activities are being carried out.				



QUALITY CONTROL SYSTEM CHECKLIST PRESSURE PIPING PARTS AND SYSTEMS

No.	Quality Element and Sub-Elements	Yes	No	N/A	Quality Program Reference
	(c) The AI has access to all drawings, calculations, specifications, procedures, process sheets, repair procedures, records, test results, and any other documents necessary for the AI to perform their duties.				
	(d) Provisions exist for providing a liaison between the AI and the manufacturer or assembler.				
	(e) Provisions exist for access for the AI and the AI Supervisor to all areas involving Code activities.				
	(f) Provisions exist to assure that all Code required inspections by the AI are performed.				
16	PIPING REPAIRS				
	(a) Provisions exist for welded or brazed like for like replacements with the AI involvement. <small>(NOTE: When the Certificate Holder holds an ASME B31.5 Certificate of Authorization, repairs may not require the AI involvement.)</small>				
17	BRAZED REFRIGERATION CONTROL ADDITIONAL REQUIREMENTS				
	(a) Controls exist for brazed refrigeration systems, including:				
	(i) Pressure testing of systems.				
	(ii) Brazing control, including the maintenance of a brazers log and recording qualifications every 6 months per the TSSA Code Adoption Document.				
	(iii) Brazed refrigeration repairs are completed and recorded on a repair report.				
	(iv) All repair reports are retained and available to the TSSA Representative during tri-annual audits.				
18	SAMPLE FORMS				
	(a) Forms used to control functions relative to quality are included within the QC Manual and their use explained in the text of the QC Manual.				