CERTIFICATION OF MANUFACTURERS OF BOILERS & PRESSURE VESSELS

(Not applicable to ASME Section IV, Cast Iron and Aluminum Boilers, ASME Section VIII Division 1, UG-90(c)(2) and Graphite Vessels, ASME Section VIII Division 2 and Division 3, Section XII, and Engineering contracted under Section I)

ASME Section VIII Division 1
ASME Section I
ASME Section IV

GUIDE FOR MANUFACTURERS /INSTALLERS/REPAIRERS & AUDIT TEAMS

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

INTRODUCTION

This guide is prepared for the use of Manufacturers/Installers/Repairers and TSSA non-nuclear 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 B-51 Standard or the ASME Boiler and Pressure Vessel Codes. The checklist does not list all of the detailed requirements of CSA B51 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 TSSA Certificates of Authorization for their use in identifying and verifying the paragraph(s) where their QC Manual addresses all applicable control requirements of the CSA Standard 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 of the programmatic requirements which will be found in the QC Program, such as written procedures.

The guide is based upon CSA B51 and ASME Sections I, IV, VIII Division 1 requirements. The guide is subject to revision by TSSA based on changes made to CSA B51 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 survey 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 checklist 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".

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 its 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 with design calculations for each Code section. An item fabricated to any one of the requested Certificates of Authorization may be used as the demonstration item. However, if the demonstration item is not to the most stringent Code requirements, the applicant must provide additional calculations or another documentation package that contains Code calculations to the most stringent Code requirements and administrative documentation to sufficiently demonstrate compliance with all aspects of the applicants QCS.

If computer calculations are to be used, the applicant shall demonstrate that the computer program has the capability of producing acceptable calculations, including the verification documents or computer files.

QUALITY SYSTEM REVIEW CHECKLIST

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 of Authorization. (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.)	☐	☐	☐	
	(ii) a brief description of the products being fabricated and/or work being accomplished under the Code, or work the shop assembler wishes to accomplish under the code, including applicability of the QCS to shop activities, field activities, or both.	☐	☐	☐	
	(iii) Control features to demonstrate Code compliance.	☐	☐	☐	
2	**MANUAL REVISION 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 person responsible for revising the QC Manual.	☐	☐	☐	
	(c) The title of the person responsible for reviewing new ASME 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 Authorized Inspector (AI) 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 lease 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. (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.)	☐	☐	☐	

No.	Quality Element and Sub-Elements	Yes	No	N/A	Quality Program Reference
3	**AUTHORITY AND RESPONSIBILITY**				
	(a) The authority and responsibility for QC by management is documented. (NOTE: In practice, a statement of Authority and Responsibility must be signed by a senior company official responsible for Code activities (i.e. President, Vice President, Plant Manager, etc.).	☐	☐	☐	
	(b) The authority and responsibility of those in charge of the QC System are clearly established and documented.	☐	☐	☐	
	(c) 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.	☐	☐	☐	
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. (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.)	☐	☐	☐	
5	**DRAWINGS, DESIGN CALCULATIONS AND SPECIFICATION CONTROL**				
	(a) Procedures 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. Procedures include provisions for:	☐	☐	☐	
	(i) Review of customer supplied documents for Code compliance; the title of the person responsible for the review and approval of the customer calculations, specifications, and drawings to ensure Code compliance can be obtained. This approval must be identified by signature and date on all applicable documents.	☐	☐	☐	
	(ii) The preparation, review, approval and distribution of drawings, calculations and specifications.	☐	☐	☐	
	(iii) The title of the person responsible for the preparation of the design calculations and drawings produced internally.	☐	☐	☐	
	(iv) The title of the person responsible for reviewing and approving the drawings and calculations prepared internally in order to ensure Code compliance to the latest Code (approval by signature and date).	☐	☐	☐	

No.	Quality Element and Sub-Elements	Yes	No	N/A	Quality Program Reference
	(v) The title of the person responsible for computer aided design calculations and drawings. A detailed description of how this is verified to ensure the correct output has been obtained.	☐	☐	☐	
	(vi) Computer program revisions must be made within 6 months of Code revision changes. The verification process that ensures the revised program is producing the correct output is described.	☐	☐	☐	
	(vii) The title of the person responsible for the design registration with the appropriate provincial authority and filing the registered designs upon request shall be described.	☐	☐	☐	
6	**MATERIAL CONTROL**				
	(i) Procedures for material control exist to assure that the material received is properly identified and has the correct documentation, including material certifications, material test reports, to satisfy Code requirements, as applicable.	☐	☐	☐	
	(ii) The material control system ensures that only the intended material is issued in Code construction. (NOTE: The required certificates of compliance or material test reports may be electronically transmitted from the material manufacturer or supplier to the Certificate Holder.)	☐	☐	☐	
	(iii) If substitution of materials are allowed, the applicable procedures for control of this activity are documented, including designation of the individual authorized to approve substitutions.	☐	☐	☐	
	(iv) The title of the individual responsible for identifying the need for material test reports or certificates of compliance is cited.	☐	☐	☐	
	(v) The title of the individual responsible for performing a receiving inspection of Code materials is cited.	☐	☐	☐	
	(vi) Information to be provided to the material receiver concerning characteristics of the material to be checked is documented.	☐	☐	☐	
	(vii) A procedure exists for the handling of materials that are found to be non-conforming at receiving inspection.	☐	☐	☐	
	(viii) If further material testing is required to be performed at receiving inspection or during the manufacturing operations, the applicable procedures for control of this activity are documented.	☐	☐	☐	
	(ix) Measures have been established and documented to assure the proper marking, handling, and storage of materials.	☐	☐	☐	
7	**MINIATURE PRESSURE VESSELS (IF APPLICABLE)** (NOTE: Applicants shall also hold an ASME Section I and/or Section VIII Division 1 Certificate of Authorization)				
	The Certified Individual (CI):	☐	☐	☐	

No.	Quality Element and Sub-Elements	Yes	No	N/A	Quality Program Reference
	Is an employee of the applicant.	☐	☐	☐	
	(a) Meets the knowledge and training requirements and is qualified and certified by the manufacturer.	☐	☐	☐	
	(d) Is qualified and certified by the manufacturer or assembler. Qualifications shall include as a minimum:	☐	☐	☐	
	(i) Knowledge of the requirements of ASME Section VIII Division 1 for the verification of completeness and correctness of the nameplate stamping and Manufacturer's Data Report.	☐	☐	☐	
	(ii) Knowledge of the manufacture's or assembler's quality program.	☐	☐	☐	
	(iii) Training commensurate with the scope, complexity, or special nature of the activities to which oversight is to be provided.	☐	☐	☐	
	(b) Records developed, maintained and certified by the manufacturer or assembler, containing objective evidence of the qualifications of the CI and the training program provided.	☐	☐	☐	
	(c) Measures are established to assure that the CI performs all the required duties in the applicable Code, and duties as required below:	☐	☐	☐	
	(i) Verify that each miniature vessel meets all the applicable requirements of ASME Section VIII Division 1 and has a current capacity certification for the "UV" designator.	☐	☐	☐	
	(ii) Review documentation for each lot of miniature pressure vessels to be stamped, and that the requirements of ASME Section VIII Division 1 has been verified and completed.	☐	☐	☐	
	(iii) Sign the appropriate Manufacturer's Data Report for the miniature pressure vessel prior to it's release.	☐	☐	☐	
8	**EXAMINATION AND INSPECTION PROGRAM**				
	(a) Fabrication operations, including examinations and test procedures 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.	☐	☐	☐	
	(ii) Checklists are made available to the AI prior to the start of fabrication.	☐	☐	☐	
	(b) The title of the individual responsible for contacting the AI and make available to the AI the latest revised drawings, design calculations and all job-related documents for initial review and designation of inspection points on the checklist.	☐	☐	☐	

No.	Quality Element and Sub-Elements	Yes	No	N/A	Quality Program Reference
	(c) Material test reports or certificates of compliance, examination reports, test records, and other fabrication documents are available to the AI.	☐	☐	☐	
	(d) Measures are provided for transferring material markings to assure traceability is maintained.	☐	☐	☐	
	(i) If a coded marking system is used, it is documented in the manual or written procedure acceptable to the AI.	☐	☐	☐	
	(e) Measures are taken to ensure that the AI is informed of approaching inspection points.	☐	☐	☐	
	(f) A proposed repair procedure to be submitted to the AI for concurrence of repairs to any pressure retaining material.	☐	☐	☐	
	(g) Controls taken to ensure that all required inspections have been completed by the AI.	☐	☐	☐	
	(h) The title of the individual responsible for the preparation of the Manufacturer's Data Report. The report shall be reviewed for correctness and certified by the individual accepting the workmanship on behalf of the company.	☐	☐	☐	
	(i) The title of the individual responsible for verifying the nameplate stamping with the Manufacturer's Data Report before presenting the report together with the job file to the AI for review and signature.	☐	☐	☐	
	(j) Measures are established to assure that the final inspection is performed, and all specified requirements have been met prior to obtaining the AI's concurrence to attach the nameplate.	☐	☐	☐	
	(k) The AI shall verify the attachment of the nameplate to the correct vessel.	☐	☐	☐	
	(l) Measures are established for the distribution of the applicable Data Reports.	☐	☐	☐	
	(m) Measures are established to control field activities, when applicable.	☐	☐	☐	
9	**NON-CONFORMANCES**				
	(a) A procedure exists for the correction of non-conformances. When the AI involvement is required by Code, the procedure is agreed upon with the AI. The procedure shall include:	☐	☐	☐	
	(i) Identification of the persons responsible for the resolution of the non-conformances.	☐	☐	☐	
	(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) (NOTE: A non-conformance is any condition which does not comply with the applicable rules of the Code, QC Manual, or other specified requirements. Non-conformances must be corrected before the completed item can be considered acceptable to Code.)	☐	☐	☐	

No.	Quality Element and Sub-Elements	Yes	No	N/A	Quality Program Reference
	(v) The non-conformance is addressed on the checklist with QC involvement and the AI's concurrence with a hold point added.	☐	☐	☐	
	(vi) The final inspection accepted by the QC and AI.	☐	☐	☐	
	(vii) When the disposition is "Use-As-Is", the disposition shall involve an engineer to ensure an engineering evaluation has been carried out, when applicable.	☐	☐	☐	
10	**WELDING**				
	(a) Welding to 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) and Procedure Qualification Records (PQR). The individual responsible shall:	☐	☐	☐	
	(i) Be appointed by letter.	☐	☐	☐	
	(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) WPS's are available to the welder in the work area.	☐	☐	☐	
	(d) Measures are taken to assure continuous welder qualification in accordance with Section IX and the Code of Construction.	☐	☐	☐	
	(e) The title of the individual responsible for assuring that only qualified welders are assigned to perform Code work.	☐	☐	☐	
	(f) Measures are provided to ensure there is a system for identifying work completed by each welder.	☐	☐	☐	
	(g) Measures are established for removing or inspecting tack welds.	☐	☐	☐	
	(h) Measures are established for the storage and conditioning, as required, of low-hydrogen electrodes.	☐	☐	☐	
	(i) Measures are established for the control, issuance, and return of welding material to assure the proper welding material is used.	☐	☐	☐	
	(j) Measures for providing the AI the right to require and witness the requalification of a welder or procedure for just cause.	☐	☐	☐	
11	**NON-DESTRUCTIVE EXAMINATION**				
	(a) Provisions 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.	☐	☐	☐	

No.	Quality Element and Sub-Elements	Yes	No	N/A	Quality Program Reference
	(ii) NDE (UT, MT, PT, RT and VT) examinations are performed in accordance with a written procedure when required.	☐	☐	☐	
	(iii) RT film, UT and RT reports are retained in accordance with the applicable Code.	☐	☐	☐	
	(iv) All NDE equipment is calibrated.	☐	☐	☐	
	(v) Measures for providing the AI the right to require and witness the demonstration by NDE personnel of an NDE examination or NDE procedure for just cause.	☐	☐	☐	
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 chars.	☐	☐	☐	
	(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) A procedure exists for the calibration of examination, measuring, and test equipment used in fulfillment of applicable Code requirements.	☐	☐	☐	
	(b) Measures are established that assure calibration records are maintained and that status indicators are used to indicate the current calibration status of the equipment.	☐	☐	☐	
14	**RECORDS RETENTION**				
	(a) Procedures exist for the maintenance of Manufacturer's Data Reports, radiographs, Certificates of Compliance/Conformance and records which are required by the applicable Code section.	☐	☐	☐	
	(b) The manufacturer or assembler shall maintain the documents outlined below for a period of at least three years: (i) Manufacturer's Partial Data Reports (ii) Manufacturer's drawings (iii) Design calculations, including any applicable proof test reports (iv) Checklists, process sheets, travelers, etc., (v) Material test reports and/or material certifications (vi) Pressure parts documentation and certifications (vii) Welding Procedure Specifications and Procedure Qualification Records	☐	☐	☐	

No.	Quality Element and Sub-Elements	Yes	No	N/A	Quality Program Reference
	(viii) Welder Qualification Records for each welder who welded on the vessel (ix) Non-Destructive Examination reports (x) Repair procedures and records (xi) Process control sheets (xii) Heat treatment records and test results (xiii) Non-conformances and dispositions (xiv) Hydrostatic test records (xv) Copy of photograph of nameplate(s) (xvi) Any other applicable documentation				
15	**AUTHORIZED INSPECTOR**				
	(a) An inspection agreement is established and maintained with an ASME accredited Authorized Inspection Agency.	☐	☐	☐	
	(b) All required inspections are to be performed by the AIA of Record (the AIA identified on the application).	☐	☐	☐	
	(c) 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.	☐	☐	☐	
	(d) 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.	☐	☐	☐	
	(e) Provisions exist for providing a liaison between the AI and the manufacturer or assembler.	☐	☐	☐	
	(f) Provisions exist for access for the AI and the AI Supervisor to all areas involving Code activities.	☐	☐	☐	
	(g) Provisions exist to assure that all Code required inspections by the AI are performed.	☐	☐	☐	
	(h) TSSA is notified whenever the agreement is cancelled or changed to another accredited Authorized Inspection Agency.	☐	☐	☐	
	(i) Provisions exist for TSSA periodic inspection of electrical boilers as defined in ASME Section I, PEB 18.2.2.	☐	☐	☐	
	(j) Provisions exist for the review of miniature pressure vessel certification after the first and second year of each three-year review cycle. Review to be performed by the AI Supervisor and the report submitted to the TSSA.	☐	☐	☐	
16	**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.	☐	☐	☐	