

**GUIDE
FOR
ASME REVIEW TEAMS
FOR
REVIEW OF APPLICANTS
FOR
ASME RP CERTIFICATE OF AUTHORIZATION**

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New York, NY 10016**

INTRODUCTION

This Guide is prepared for the use of ASME Review Teams. It is not intended to replace or interpret the requirements of the ASME Boiler and Pressure Vessel Code (B&PVC).

In addition, to assist the ASME Review Team, this Guide will be provided to Applicants for ASME Certificates of Authorization for their use in cross referencing the paragraphs in their Quality Control (QC) Manual with the applicable control requirements of the Code, and as a guide as to what is expected for a demonstration of the QC System.

This Guide is based on Section X of the B&PVC. The Guide is subject to revision based on changes made in the aforementioned Sections in the B&PVC.

A Review must cover a QC Manual and its implementation. It is recognized that the scope of work, QC Manual, and Manual implementation will vary from Applicant to Applicant. Therefore, the ASME Review Teams are advised that all aspects of this Guide may not apply and that this Guide may not outline all possible aspects of each Review. The Manual need not follow the format of this Guide.

Questions of possible need for Code interpretation raised by Review Teams shall be submitted to the ASME Director, Audit and Conformity Assessment. When a request for an interpretation is to be submitted by an Applicant, the Team Leader shall advise the Applicant that all such inquiries must be submitted to the Secretary, Boiler and Pressure Vessel Committee, and that a copy of the inquiry and reply should be provided by the inquirer to the Applicant's Authorized Inspection Agency and cognizant Jurisdiction, if appropriate.

Suggestions for revisions or clarification to this Guide should be directed to the ASME Director, Audit and Conformity Assessment.

REVIEW DEMONSTRATION

The purpose of the Review Demonstration is to evaluate the Applicant's Quality Control System (QCS) and its implementation. For evaluation of the QCS, the Applicant must demonstrate to current Code rules sufficient administrative and fabrication functions 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 fabrication 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 joint review is subject to the Team's review.

While the Applicant must address each element of the Code in the QCS, the Applicant need only demonstrate those elements within the intended scope of activities that apply to their program.

Demonstration Item¹: An Applicant for a single Certificate of Authorization must demonstrate on an item or items that will be fabricated for the requested Certificate Designator and scope of Certificate of Authorization. The demonstration must be an implementation of ALL aspects of the QC System and shall include a demonstration of actual lamination method. Demonstration for implementation of some of the aspects of the QC System may be demonstrated on past completed work.

For Applicants requesting multiple class RP stamps, it is necessary to have a demonstration item or items with design calculations for each RP Class (except Class I). An item or items fabricated to each one of the requested class Certificates shall be used as the demonstration item (except Class II). However, if the demonstration item or items 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 company's QC System.

For example, an Applicant for RP Class I and II Certificates could demonstrate their QCS on a Class I pressure vessel including design. However, due to the nature of Section X Class II requirements, in addition to the Class I demonstration, an Examination and Inspection Plan and Fabricator's Design Report with supporting User's Design Specification in accordance with Section X Class II shall be prepared and presented. Certification of the Design documents by an Engineer meeting the criteria as defined in Section X Class II shall also be demonstrated. In addition, since there are four fabrication methods for Class I, two for Class II and one for Class III, the demonstration item or items shall also demonstrate the QCS for any of the fabrication methods to be used for a RP Class I, II or III certificate.

If computer calculations are to be used, the Applicant shall demonstrate that the computer program has the capability of producing acceptable calculations.

If the demonstration item or items are 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.

¹ The demonstration item or items shall be based on the latest Code Edition in effect at the time of the Joint Review

QUALITY SYSTEM REVIEW CHECKLIST

Item No.	Quality Element and Sub-elements	QC Manual References
1.	<p><u>GENERAL QUALITY CONTROL SYSTEM REQUIREMENTS</u></p> <p>(a) QC System is documented in detail in a QC Manual that addresses all requirements of Section X of the ASME Boiler and Pressure Vessel Code and includes:</p> <ul style="list-style-type: none"> (1) a cover sheet that contains the company name and physical address as it will appear on the requested Certificate of Authorization; <p>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.</p> <ul style="list-style-type: none"> (2) a brief description of the products being fabricated and/or work being accomplished under the Code including applicability of QC System to shop activities, field activities or both; (3) control features to demonstrate Code compliance; (4) Manual revision control system; (5) provision for review and approval of QC Manual to maintain it current; (6) provision for submittal of QC Manual revisions to the Authorized Inspector (AI) and for acceptance prior to implementation including timely updating of all copies to reflect accepted revisions; and (7) provision for the custody and control of the Certification Mark to prevent loss or unauthorized use. <p>(b) 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.</p> <p>Note: A glossary of terms is desirable from the standpoint of clarity if abbreviated titles of personnel and control documents are used throughout the QC Manual. This, however, is not mandatory.</p> <p><u>AUTHORITY AND RESPONSIBILITY</u></p> <p>(a) The authority and responsibility for QC by management is documented.</p> <p>Note: In practice, a Statement of Policy and Authority must be signed by a senior company official responsible for Code activities (e.g., President, Vice President, Plant Manager, etc.).</p>	
2.		

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Item No.	Quality Element and Sub-elements	QC Manual References
	<p>(b) The authority and responsibility of those in charge of the QC System are clearly established and documented.</p> <p>(c) Persons performing QC functions have sufficient and well-defined responsibility, the authority, and the organizational freedom to identify quality control problems and to initiate, recommend and provide solutions.</p>	
3.	<p><u>ORGANIZATION</u></p> <p>(a) An organization chart showing the relationship between management and engineering, purchasing, manufacturing, production, field assembling, field construction, inspection, testing and quality control, as applicable, exists and reflects the actual organization. Refer to Section X Mandatory Appendix 1.</p> <p>Note: The purpose of this chart is to identify and associate the various organizational groups with the function(s) for which they are responsible. The Code does not intend to encroach on the Certificate Holder's right to establish and, from time to time, alter whatever form of organization the Certificate Holder considers appropriate for their Code work.</p>	
4.	<p><u>DRAWING, DESIGN CALCULATIONS, AND SPECIFICATION CONTROL</u></p> <p>(a) Procedures exist which assure that the latest applicable drawings, design calculations, specifications and instructions, required by the Code, as well as authorized changes, are used for manufacture, assembly, examination, inspection and testing. Procedures include provision for:</p> <ol style="list-style-type: none"> (1) review of customer supplied documents for Code compliance; (2) the preparation, review, approval and distribution of drawings, calculations, and specifications; (3) use of the Design Specification including authorized changes; (4) {Applicable to RP Class II only} providing the Certified Fabricator's Design Report including authorized changes; (5) {Applicable to RP Class II only} certification of Design Specification and Design Report by an Qualified Designer meeting the criteria defined in Section X, RD-11; 	

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5.	<p><u>DESIGN QUALIFICATION (CLASS I AND CLASS III)</u></p> <p>(a) A production prototype qualification vessel shall be fabricated and subjected to the following tests which shall be documented on the quality control manual forms and accepted by the Authorized Inspector (AI) prior to production fabrication.</p> <ol style="list-style-type: none"> 1. Qualification checks and examinations including: <ol style="list-style-type: none"> i. Vessel thickness ii. Weight of resin and fiber iii. Vessel weight iv. Visual examination 2. A Barcol hardness test for resin cure. 3. A volumetric expansion test to verify the laminates used have a modulus of elasticity within the range specified by the Designer. (Class I and III) 4. A cyclic pressure plus hydrostatic qualification pressure test to demonstrate acceptable life and design pressure. 5. A hydrostatic qualification pressure test (Class I) or a hydrostatic burst pressure test (Class III) to determine design pressure. (Class I) 6. Suitable tests, utilizing loads simulating the expected loadings of vessels subject to bending and shearing caused by any expected combinations of loadings listed in the Design Specification. (Class I) 7. A temperature creep test to determine design adequacy at elevated temperatures. (Class III) 8. A flaw test to determine capability to withstand the design pressure when damaged. (Class III) 9. A permeability test to determine permeation rates on vessels with non-metallic liners or welded metallic liners. (Class III) 10. A leak test on the completed vessel to determine tightness. (Class III) 11. A torque test to determine if the vessel nozzle will rotate when tightened. (Class III) 12. A penetration test to determine the ability of the vessel to withstand an armor piercing bullet without failure. (Class III) 	

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6.	<p>13. An environmental test to determine if the cracks to the outer protective coating will cause failure to the vessel wall when subjected to chemical exposure. (Class III)</p> <p>14. Surface Examination for metallic pressure parts (Class III)</p> <p>15. Acoustic Emission Examinations (Class III)</p> <p>16. Pendulum Impact Testing (Class III)</p>	
	<p><u>PRODUCTION FLOW AND IN-PLANT INSPECTION AND CHECK-OFF</u></p> <p>(a.) Fabrication operations, including examinations and bursting test procedures (for RP Class III) are described in sufficient detail to permit the Authorized Inspector (AI) to determine at what stages specific inspections are to be performed. Specifically:</p> <ol style="list-style-type: none"> 1. Provisions for the use of checklists, process sheets, travelers, etc., for listing of examinations and tests to be performed and for designation of inspection points; 2. Such checklists, process sheets, travelers, etc. are made available to the Authorized Inspector prior to the start of fabrication; and 3. A basic production flow diagram exists and includes in-plant inspection and check-off points and means of recording the same. <p>(b.) Material test reports or certificates of compliance, examination reports, test records, and other fabrication records are available to the Authorized Inspector.</p> <p>(c.) Measures provide for transferring markings to assure traceability is maintained.</p> <ol style="list-style-type: none"> 1. If a coded marking system is used, it is documented and acceptable to the Authorized Inspector. <p>(d.) Measures assure that the Authorized Inspector is informed of approaching inspection points.</p> <p>(e.) AI concurrence is obtained for repairs to material or the vessel.</p> <p>(f.) Provisions for controls of hydrostatic testing</p> <p>(g.) Measures to ensure an internal inspection is performed prior to closure</p> <p>(h.) Measures are established to assure that a final inspection is performed to assure all specified requirements have been met prior to obtaining AI's concurrence for application of the Certification Mark.</p> <p>(i.) Measures are established to provide for the preparation, certification, and distribution of the applicable Data Reports.</p> <p>(j.) Measures are established to control field activities, when applicable.</p> <p>Note: Procedures should fully describe AI coverage of ASME Code work on all shifts.</p>	

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Item No.	Quality Element and Sub-elements	QC Manual References
	<p>(i.) Resin storage and handling</p> <ol style="list-style-type: none"> 1. Resin mixing procedures are specified; and 2. Measures are established covering storage, issuance, handling, and disposal of resins, catalysts, fillers, pigments or cements. <p>(j.) Assembling and bonding</p> <ol style="list-style-type: none"> 1. Procedures exist covering: <ol style="list-style-type: none"> a. assembly and fit-up of the pressure vessel and parts; and b. secondary-bonding of components <p>(k.) The program includes measures established to ensure the qualification of all procedure specifications to be used during the fabrication process.</p> <p>(l.) Provide for in-process inspection or monitoring, or both, as appropriate for activities affecting quality including:</p> <ol style="list-style-type: none"> 1. Inspection and distribution of received materials 2. Laminate reinforcement sequence 3. Component fabrication 4. Assembly procedures 5. Laminate imperfections are within tolerances 6. Control of resin handling and cure <p>(m.) Tests are performed in accordance with specified, written test procedures or other appropriate documents approved by the designated organization including:</p> <ol style="list-style-type: none"> 1. Resin cure 2. Dimension and laminate thickness 3. Laminate mechanical properties 4. Reinforcement control 5. Laminate imperfections 6. Pressure tests 7. Acoustic emission examinations 	

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7.	<p><u>MATERIAL RECEIVING CONTROL AND IDENTITY</u></p> <ul style="list-style-type: none"> (a) Procedures for material control exist to assure that the material received is properly identified and has documentation, including, as applicable, required material certifications or material test reports, to satisfy Code requirements as ordered. (b) The material control system assures that only the intended material is used in Code construction. (c) The title of the individual responsible for identifying the need for material test reports or certificate of compliance is designated. (d) The title of the individual responsible for performing a receiving inspection of Code materials is designated. (e) Information to be provided to the receiving inspector concerning the characteristics to be checked is documented. (f) A procedure exists for handling materials that are found to be nonconforming at receiving inspection. (g) If further material testing is required to be performed at receiving inspection or during manufacturing operations, the applicable procedures for control of this activity are documented. (h) Measures are established to assure the proper marking, handling and storage of materials. (j.) Procedure for inspection of incoming materials including; <ul style="list-style-type: none"> 1. Resin 2. Reinforcement 3. Curing agents 	
8.	<p><u>NONCONFORMING MATERIAL AND REPAIR</u></p> <ul style="list-style-type: none"> (a). A procedure exists for the correction of nonconformities. Where AI involvement is required by the Code, the procedure is agreed upon with the AI. The procedure provides for: <ul style="list-style-type: none"> 1. identifying those responsible for the resolution of nonconformities; 2. identifying and controlling further processing of nonconforming items until final disposition; 3. documenting the nonconformance and its disposition. (b). Repairs shall be approved by the Design Engineer and the Authorized Inspector prior to starting the repair. 	

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Item No.	Quality Element and Sub-elements	QC Manual References
9.	<p><u>RESIN CONTROL</u></p> <p>(a) specification and mixing procedures</p> <p>(b.) storage, issuance, handling, and disposal of resins, catalysts, fillers, and pigments</p> <p>(c.) method used to maintain identification of resins during fabrication</p>	
10.	<p><u>ASSEMBLY, FIT-UP AND DIMENSION CONTROL</u></p> <p>(a.) assembly and fit-up of the pressure vessel and vessel parts to ensure compliance with fabrication drawings</p> <p>(b.) adhesive bonding and secondary lay-up of components to ensure compliance with fabrication drawings</p> <p>(d.) dimensional checks as specified by the Code and to ensure compliance with fabrication drawings</p>	
11.	<p><u>CALIBRATION OF MEASUREMENT AND TEST EQUIPMENT</u></p> <p>(a.) A procedure exists for the calibration of examination, measuring and test equipment used in fulfillment of applicable Code requirements.</p> <p>(b.) Measures are established that assure calibration records are maintained and that status indicators are used to indicate the current calibration status of equipment.</p>	
12.	<p><u>FORMS</u></p> <p>(a) Appropriate forms shall be included and cross referenced with the items of Mandatory Appendix 1 of Section X as applicable.</p> <ol style="list-style-type: none"> 1. Process or traveler sheets 2. In-plant inspection and check-off forms 3. Procedure and performance qualification forms 4. Data Report forms 5. Other appropriate forms 	

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13.	<p><u>SELF-AUDITING</u></p> <p>(a) Procedures are in place for regular management review of the status and adequacy of the Quality Control System.</p>	
14.	<p><u>AUTHORIZED INSPECTOR (AI)</u></p> <p>(a) Per ASME CA-1 an inspection agreement is established and maintained with an ASME accredited Authorized Inspection Agency.</p> <ul style="list-style-type: none"> (1) All required inspections are to be performed by the AIA of Record (the AIA identified on the application). (2) Alternatively, if an AIA other than the AIA of Record is to perform inspections, the Certificate Holder is required to submit to ASME a request for use of an additional AIA. ASME may grant the use of an additional AIA in lieu of the AIA of Record when: <ul style="list-style-type: none"> a. The AIA of Record confirms they are unable to perform their required inspections, or b. The item will be supplied to a second party, who is a valid ASME Certificate Holder, and as part of the contract requirements requires the use of the second party' AIA of Record (3) When additional AIAs perform required inspections, the Certificate Holder' QC Manual shall include the following: <ul style="list-style-type: none"> a. Description of how different AIA' will perform activities under their Quality Management System; b. Evidence that the AIA performing the field or shop activities, or both, has a contract or agreement with the Certificate Holder. (4) The provisions for the use of an AIA other than the AIA of Record are not permitted for facilities operating under the Mass Productions provisions of the Code. (5) All additional AIAs performing work other than the AIA of Record during a three-year certification period may be required to be present during the Certificate Holder's renewal and/or make available diaries. (6) At their discretion, ASME is permitted to audit the Certificate Holder's shop and/or field Code activities and the additional AIA at the expense of the Certificate Holder. 	

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	<p>(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.</p> <p>(c) The AI has access to all drawings, calculations, specifications, procedures, process sheets, repair procedures, records, test results, and any other documents as necessary for the AI to perform their duties.</p> <p>(d) Provisions exist for providing a liaison between the AI and the Fabricator/Installer.</p> <p>(e) Provisions exist for free access for the AI and the Inspection Supervisor to all areas involving Code activities.</p> <p>(f) Provisions exist to assure that all Code required inspections by the AI are performed.</p> <p>(g) ASME is notified whenever the agreement is cancelled or changed to another accredited Authorized Inspection Agency.</p>	
15.	<p><u>NONDESTRUCTIVE EXAMINATION</u></p> <p>(a.) Provisions exist for identifying the appropriate NDE procedures applicable to the scope of Code work. These provisions assure that:</p> <ol style="list-style-type: none"> 1. NDE personnel are qualified in accordance with Section X of the Code. 2. NDE examinations are performed in accordance with written procedures when required 3. The AIA can require demonstration by NDE personnel of an NDE examination or NDE procedure for cause 4. NDE equipment is calibrated (Acoustic Emissions equipment calibrated in accordance with Section V, Article 11 	
16.	<p><u>RECORDS RETENTION</u></p> <p>(a) Procedures exist for the maintenance of Fabricator's Data Reports, radiographs and records as required by the applicable Section of the Code.</p>	
17.	<p><u>SAMPLE FORMS</u></p> <p>(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.</p>	