

QUALITY CONTROL SYSTEM MANUAL
FOR PRESSURE VESSELS
CONSTRUCTED TO
ASME BOILER & PRESSURE VESSEL CODE
SECTION VIII, DIVISION 1
AND
REPAIRS AND ALTERATIONS TO METALLIC PRESSURE
RETAINING ITEMS IN ACCORDANCE WITH
THE NATIONAL BOARD INSPECTION CODE
AND
JURISDICTIONAL REQUIREMENTS
FOR THE BELOW LOCATION AND FIELD SITES
CONTROLLED BY THE JOHN WOOD COMPANY

THE JOHN WOOD COMPANY
PO BOX 364
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OAKS, PENNSYLVANIA 19456

2013 EDITION REV. 0 DATE: 6/25/2013

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APPROVAL

[Signature]
Quality Control Chief Inspector

6-25-2013
Date

ACCEPTANCE

[Signature] NB B155 (A. N. I.)
Authorized Inspector

6-25-2013
Date

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SECTION I

STATEMENT OF POLICY AND AUTHORITY

The management of the John Wood Company is totally committed to meet all the requirements of the ASME Boiler and Pressure Vessel Code Section VIII Division 1 and the quality control system described in this manual, for the shop and field fabrication of pressure vessels.

All shop and field repairs or alterations to metallic pressure retaining items carried out shall meet the requirements of the National Board Inspection Code, this Quality Control Manual and the Jurisdiction.

The Quality Control Chief Inspector is responsible for the preparation, revision, and approval of this Quality Control Manual and for the administration and implementation of the quality control system in the shop and field.

Each member of the Quality Control Group is vested with the authority to either accept or reject any vessel, manufacturing process, material, or any other contributing element in accordance with the directives of this Quality Control Manual.

The Quality Control Chief Inspector has the authority to take whatever action is necessary to assure conformance to the Code and is directly responsible to the President of The John Wood Company.

The Quality Control Chief Inspector has the authority, responsibility and organizational freedom to identify quality control problems, provide their solutions and to verify resolution of such problems. Any problem, which cannot be resolved by the Quality Control Chief Inspector, shall be brought to the President for final resolution. That resolution shall be within Code requirements.



David A. Fix, President

25 June, 2013

Date

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SECTION II

DEFINITIONS

AUTHORIZED INSPECTOR (AI) The Authorized Inspector is the independent third-party inspector required by the Code, employed by the ASME accredited Authorized Inspection Agency with whom the Company has a contract to perform the inspection services required by the Code with the in service commission "IS" and new construction "A" endorsement.

CERTIFIED INDIVIDUAL (CI) The John Wood Company employee who is designated through qualification and certification to ensure that pressure vessels bearing the Certification Mark with the UM Designator meet all the applicable requirements of the Code.

CODE The ASME Boiler and Pressure Vessel Code, Section VIII, Division 1, Section II, A, B, C, D and Section V and Section IX or National Board Inspection Code as applicable.

DESIGNEE When a particular job title has defined responsibilities in the text of this manual (i.e. Engineering Manager), any qualified individual may perform the assigned function provided it is under the direction of the individual assigned the responsibility. The individual assigned the responsibility in this manual is still responsible for the activity performed.

DRAWINGS Refers to those prints used in the construction of Pressure Vessels.

QUALITY CONTROL INSPECTOR The John Wood Company employee who is not a production worker, but assists the Quality Control Chief Inspector in assuring that vessels are fabricated in compliance with the Code.

QUALITY CONTROL GROUP. Any John Wood Company employee functioning as a part of the overall quality plan for control of Pressure Vessels manufactured to the requirements of the Code. These are employees who are knowledgeable in the manufacturing and / or testing and / or inspection process and procedures involved.

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STANDARD REPAIR PROCEDURE A written, detailed description of the steps to be taken by qualified personnel to correct a specific type of non-conformity. When a Standard Repair Procedure has been approved by the Quality Control Chief Inspector and has the acceptance of the Authorized Inspector, it is the authority for the repair of the non-conformity.

STORES Refers to the John Wood Company stored material.

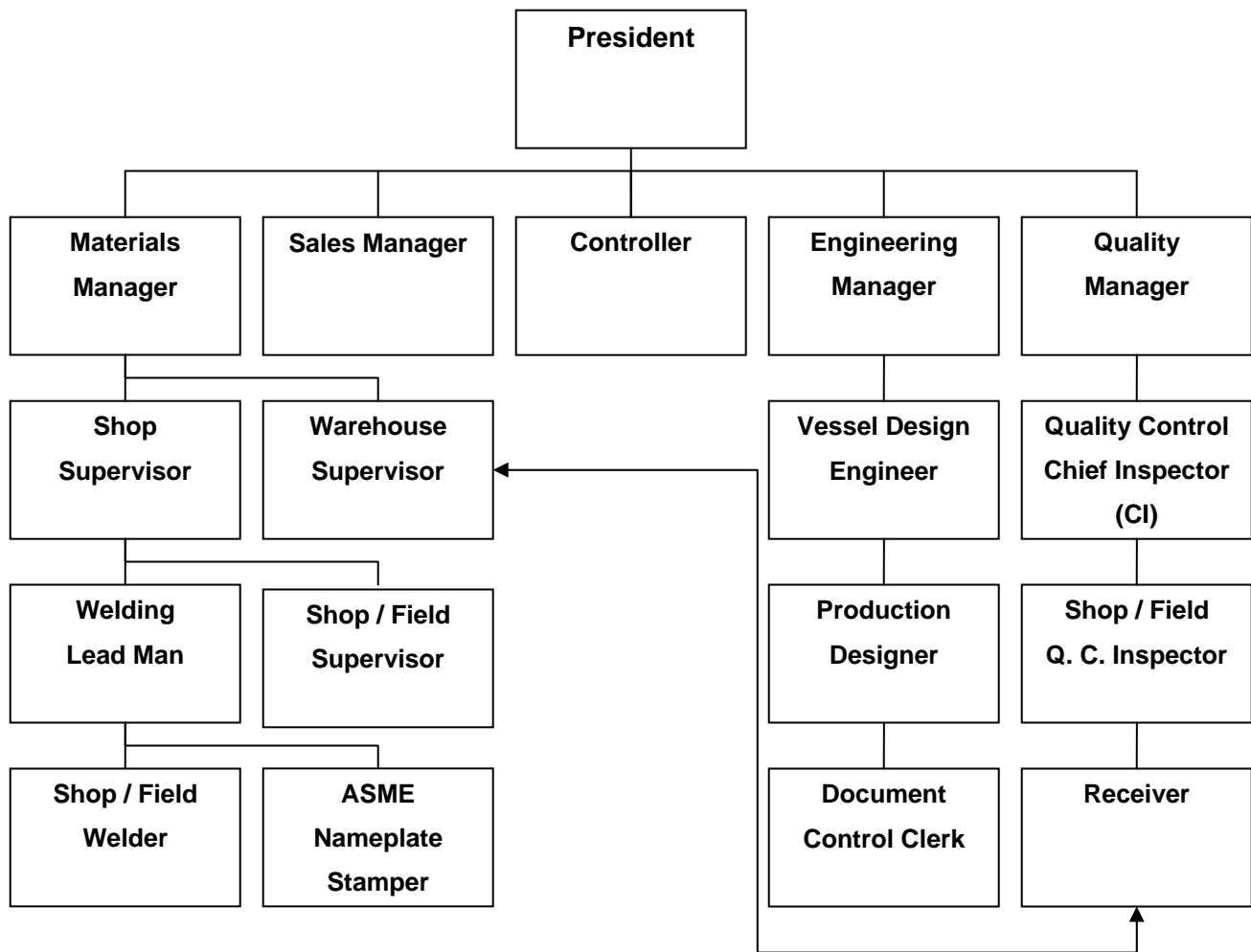
VESSELS Pressure vessels fabricated by The John Wood Company to conform to the requirements of the Code and this manual.

REPAIRS A repair work is necessary to restore a pressure retaining item to a safe and satisfactory operating condition.

ALTERATION Any change in the item described on the original Manufacturer's Data Report which affects the pressure containing capability of the pressure-retaining item. Non-physical changes such as an increase in the maximum allowable working pressure (internal or external), increase in design temperature, or a reduction in minimum temperature of a pressure-retaining item shall be considered an alteration.

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**SECTION III
ORGANIZATION CHART**



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SECTION IV

MANUAL CONTROL

1.0 Scope/Purpose

1.1 This section describes the controls used for preparation, revision and distribution of this Quality Control Manual.

2.0 Responsibilities

2.1 The Quality Control Chief Inspector is responsible for the preparation, revision, distribution and control of the Quality Control Manual.

2.2 The Quality Control Chief Inspector is responsible for assuring the manual is implemented by shop personnel.

3.0 Procedure

3.1 Requests for changes to this document must be made in writing to the issuing and approving authority together with documentation of which to base the review and approval. Revision level and approval of revision are recorded in the Table of Contents.

3.2 Revisions to the Quality Control Manual shall be done by section, with the page header indicating the revision number and date of the revision. Revised text will be indicated by a vertical bar in the right margin, next to the revised section.

3.3 The Table of Contents page shall be used to identify the revised sections and document the approval of the Quality Control Chief Inspector. The Authorized Inspector's acceptance of the manual and revisions will be documented by the Authorized Inspector's signature and date in the Table of Contents.

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- 3.4 Controlled Quality Control Manuals will be assigned unique serial numbers and be issued to the recipient as listed on the Distribution of Quality Control Manual form (Exhibit I) and be identified as a controlled copy on the cover page, or may be provided as an electronic read-only copy on the server.
- 3.5 A control copy of the Quality Control Manual and any future revision to the manual shall be distributed to the Authorized Inspector.
- 3.6 Any revision made in the Quality Control Manual shall be distributed by the Quality Control Chief Inspector with receipt acknowledged by the recipient by signature and date on the Distribution of Quality Control Manual Form. A letter of receipt is acceptable in lieu of signing the Distribution Form.
- 3.7 Uncontrolled manuals are so indicated and are not kept up to date and shall not be used in production
- 3.8 The Quality Control Chief Inspector, upon receipt of the new Code edition shall review the Quality Control Manual for any relevant changes. If any revisions are required, they shall be made within six (6) months of the implementation of the new Edition. This review shall be documented by initialing and dating the cover page for the affected year and will be retained by the Quality Control Chief Inspector. Any required changes will be prepared and submitted to the Authorized Inspector for his acceptance.

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SECTION V

DRAWING, DESIGN CALCULATION AND SPECIFICATION CONTROL

1.0 Scope/Purpose

1.1 This section describes the order entry system and the controls used for the preparation, revision and distribution of drawings, design calculations and specifications to assure compliance with the ASME Code and customer requirements.

2.0 Responsibilities

2.1 The Sales Manager is responsible for obtaining the required design information from the customer at the direction of the Engineering Manager. The Sales Manager is also responsible for assigning job numbers.

2.2 Serial and or job numbers shall be used to identify all Code vessels during production. These identifying numbers shall be applied at the earliest point in the fabrication process and shall remain on the vessels until they are painted.

2.3 The Engineering Manager is responsible for approval of all drawings, design calculations and specifications.

2.4 The Shop Supervisor is responsible for distribution of drawings to manufacturing personnel.

2.5 The Welding Lead Man is responsible for assuring that the correct revision of the drawing is distributed to shop personnel and obsolete drawings are retrieved and destroyed.

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3.0 Procedure

- 3.1 Upon receipt of an order for a Code item, to be designed by The John Wood Company, the design specifications are reviewed for correctness and for compliance to applicable Code requirements by the Engineering Manager. Any deficiencies are reconciled with the customer before starting design work.
- 3.2 Upon approval of the customer's design specification, the Vessel Design Engineer prepares and approves the drawings and calculations. Drawings shall include complete vessel component description.
- 3.3 Completed drawings and calculations are submitted to the Quality Control Chief Inspector for review and approval for Code compliance.
 - 3.3.1 Any incorrect documents are returned to the Vessel Design Engineer for correction and resubmittal.
 - 3.3.2 Revisions to the above documents are prepared and approved the same as the originals.
- 3.4 The Engineering Manager shall issue approved vessel drawings to the Material Manager for release to the Shop Supervisor using the Engineering Log Control Record stored electronically on the company server. The Engineering Change Notice system will control and record the distribution of all revision levels to John Wood drawings including STD SP-102 and STD SP-103. Upon request the above listed record systems are available for review by the Authorized Inspector.
 - 3.4.1 Revisions to shop and field drawings are prepared, approved and distributed in the same manner as originals.
 - 3.4.2 Superseded drawings are retrieved and destroyed by the Shop Supervisor, unless they contain notes, which require their retention, in which case they will be stamped "Void-For Information Only" and retained in the job file.

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3.5 The Quality Control Chief Inspector shall provide the Authorized Inspector with all drawings and design calculations for his review and acceptance, during normal shop visits.

3.6 Computer Generated Design Calculations:

3.6.1 The Engineering Manager is responsible for reviewing all calculations. This review will include verification of the latest calculation software revision. Verification calculations will utilize manual proof calculations which will satisfy current Code requirements.

3.6.2 The computer generated proof calculations along with manual calculations are available for review and acceptance by the Authorized Inspector upon request.

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SECTION VI

MATERIAL CONTROL

1.0 Scope/Purpose

1.1 This section describes the controls used for the procurement, identification, receiving, inspection and issuance of Code materials.

2.0 Responsibilities

2.1 The Materials Manager shall be responsible for purchasing of materials.

2.2 The Receiver shall be responsible for the receipt of materials and the review of documentation for physical inspection.

3.0 Procedure

3.1 All Purchase Orders (Exhibit III) for Code material, are prepared from information contained on the drawings and the material specifications by the Materials Manager, and shall list the following Code requirements.

3.1.1 The material specification, type or grade and all other requirements of the material specifications.

3.1.2 The Purchase Orders shall also include marking and Material Test Reports or certificate of compliance as required; any additional requirements of ASME Section VIII Division 1, such as UG-79, special testing or Charpy impact tests.

3.2 Copies of the Purchase Order shall be sent to the Receiver.

3.3 No material substitution will be allowed without the Engineering Manager and the Quality Control Chief Inspector approval and the concurrence of the Authorized Inspector.

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- 3.4 Receiving Inspection:
- 3.4.1 All Code material received at the shop or field site is placed in a "Hold" area pending receiving inspection.
- 3.4.2 The Receiver, using his copy of the Purchase Order examines all Code material for dimensions, material markings, condition and quantity. Receipt of material is documented on the Purchase Order and recorded into the electronic Material Receiving Log which is stored on the company server. The heat number and material specification of the material received is also recorded into the electronic Material Receiving Log. Material Test Reports will be forwarded to the Materials Department with an additional copy being given to Quality Control.
- 3.4.3 The Materials Manager shall review the Material Test Report for chemical analysis and physical properties, and other test results against those listed in the materials specification of ASME Section II.
- 3.4.3.1 When acceptable, the Materials Manager signs and dates the Material Test Report and releases the material to the shop or field site.
- 3.4.4 Material, which does not meet all Purchase Order and Code requirements, shall be tagged with a "Rejected Do Not Use" tag (Exhibit V) and retained in the "Hold" area, and controlled as described in Section VII.

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- 3.4.5 Prior to cutting Code material into two or more pieces, the entire material marking is transferred by a company employee and verified by the Quality Control Inspector. Where applicable, a color coded marking procedure as referenced in QA Document QA-01-004 may be used to identify each piece of subdivided pipe material. This method of marking shall be acceptable to the Authorized Inspector.
- 3.4.6 Copies of the Material Test Reports and or Certificates of Compliance, along with partial data reports will be furnished to the Quality Control Department and shall be available to the Authorized Inspector for his review.

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SECTION VII NON-CONFORMANCE

1.0 Scope / Purpose

1.1 This section contains the methods used to control non-conformances found in material, fabrication and construction. A non-conformance is a deviation from the drawing, specification, jurisdictional requirements, Code or this manual, which renders an item unacceptable until dispositioned by Engineering and or Quality Control.

2.0 Responsibilities

2.1 The Engineering Manager and or the Quality Control Chief Inspector have the responsibility to review all non-conformances and provide disposition. The Quality Control Chief Inspector shall determine if Engineering disposition is required.

3.0 Procedure

3.1 As soon as a nonconforming condition is reported, the Quality Control Inspector inspects the item, and if verified as a nonconformance, identifies it by attaching a "Rejected Do Not Use" tag (Exhibit V) to the vessel, recording the NCR number on the Fabrication Inspection Sheet (Exhibit VI) and initiates a Nonconformance Report (Exhibit IV).

3.2 The Non-conformance Report, containing his suggested disposition is signed and dated by the Quality Control Inspector and forwarded to the Quality Control Chief Inspector for review and approval.

3.3 Correction of Nonconformities

3.3.1 Use-As-Is: When the disposition is Use-As-Is, the Quality Control Chief Inspector consults with, and obtains the approval of the

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Engineering Manager. Any required revisions to drawings and calculations are made as described in this manual. All Code use-as-is dispositions shall be submitted to the Authorized Inspector for his review and acceptance.

- 3.3.2 Repair: All dispositions requiring repair may be carried out using company standard procedures, which have been approved by the Quality Control Chief Inspector and accepted by the Authorized Inspector.
- 3.3.3 For repairs to material, the proposed disposition is submitted to the Authorized Inspector for his acceptance of the method and extent of repair, and for his designation of inspection points.
- 3.3.4 Scrap / Return to Vendor: This disposition requires the Quality Control Inspectors to verify that the item has been removed from the work area and clearly marked "Rejected Do Not Use" to prevent its use before scraping.
- 3.3.5 The Quality Control Inspector shall re-inspect the item after completion of the disposition. When he is satisfied that the item meets Code requirements, including acceptance of the Authorized Inspector, he signs and dates both the NCR and the Fabrication Inspection Sheet and removes the tag and releases to manufacturing to continue production.
- 3.4 All non-conformance reports shall be maintained by the Quality Control Chief Inspector. These records shall be reviewed periodically to insure that any open NCR's have been resolved.
- 3.5 All records of Code non-conformances are made available to the Authorized Inspector for his review and acceptance.

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SECTION VIII

EXAMINATION AND INSPECTION

1.0 Scope/Purpose

1.1 This section describes the controls used for the inspection, testing and stamping of pressure vessels.

2.0 Responsibility

2.1 The Quality Control Chief Inspector shall be responsible for the preparation and implementation of inspection procedures. All procedures shall be approved by the Engineering Manager.

2.2 The Materials Manager is responsible for initiation of the Fabrication / Inspection Sheet (Exhibit VI) during shop order entry.

2.3 The Shop Supervisor is responsible for assuring that designated hold points on the Fabrication / Inspection Sheet are observed.

2.4 The Engineering Manager is responsible for the preparation of the Manufacturer's Data Reports.

3.0 Procedure

3.1 Fabrication of Code items are controlled using a Fabrication Inspection Sheet (Exhibit VI), which is prepared during shop order entry from the engineering drawings. The Fabrication Inspection sheet lists the sequence of fabrication, examination and preset inspection hold points.

3.1.1 The Fabrication Inspection Sheet is sent to the Quality Control Chief Inspector to review and include quality control requirements for inspection, examination and test. When received the Quality Control Chief Inspector reviews the Fabrication Inspection Sheet and shop drawings with the Authorized Inspector during normal shop visits.

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3.1.2 The Fabrication Inspection Sheet contains space for the initial and date of the Quality Control Inspector, the welder, and the Authorized Inspector to sign off those operations which have been accepted, no work shall proceed beyond this point.

3.2 Final Inspection

3.2.1 When shop fabrication or field assembly of a pressure vessel is completed, the Quality Control Inspector performs his final inspection. He initials and dates the Fabrication Inspection Sheet when the item meets all Code and drawing requirements.

3.2.2 The Authorized Inspector will make his final inspection following the hydrostatic test required by the Code.

3.2.3 When a pressure vessel is not provided with an opening or other means of access to inspect internal surfaces. An inspection point for the Quality Control Inspector and the Authorized Inspector will be shown on the Fabrication Inspection Sheet to permit internal inspection before starting the final closure weld.

3.3 Hydrostatic Tests

(Done in accordance with Section VIII Div. 1)

3.3.1 Code required hydrostatic tests are witnessed by the Quality Control Inspector and the Authorized Inspector. The test pressure is applied at a temperature of at least 30°F above MDMT, but shall not exceed 120° F.

3.3.2 At least one directly connected test gauge, visible to the operator controlling the pressure, and having a dial graduated over the range of about double the intended maximum test pressure but not less than 1½ nor more than 4 times that pressure shall be used.

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3.3.3 Upon completion of the test and final inspection, the Quality Control Inspector and the Authorized Inspector shall sign the Fabrication Inspection Sheet to signify their acceptance.

3.4 Code Stamping and Data Reports

3.4.1 The ASME Nameplate Stamper shall apply the Certification Mark with the appropriate Designator and all required data to the ASME nameplate (Exhibit X and Exhibit XI) prior to final inspection and Hydrostatic Test. The ASME Nameplate Stamper shall issue the pre-stamped nameplates to the Shop Supervisor. The Shop Supervisor is responsible for the care custody and control to assure that the nameplates are attached to the proper vessel. The nameplate is attached to the vessel after fabrication but before Hydrostatic Test. The Quality Control Inspector and the Authorized Inspector shall verify the correctness of the nameplate and the attachment to the proper vessel at Hydrostatic Test.

3.4.2 Upon completion of the Code vessel the Engineering Manager prepares the ASME Manufacturer's Data Report from the final records and submits it to the Quality Control Chief Inspector for review and certification.

3.4.3 The completed Manufacturer's Data Report, together with the final records, is then presented to the Authorized Inspector for his review. When he has satisfied himself that all Code requirements have been met, the Authorized Inspector will sign, date and endorse the data report with commission number and National Board endorsement.

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SECTION IX

WELDING CONTROL

1.0 Scope/Purpose

1.1 This section describes the controls used for assuring that welders and welding operators are qualified for the work assigned using qualified procedures and acceptable materials.

2.0 Responsibilities

2.1 The Engineering Manager shall document and prepare the Welding Procedure Specification (WPS).

2.2 The Quality Control Chief Inspector shall maintain the original copy of WPQ qualification tests. A list of qualified welders will be provided to the Shop Supervisor and the Welding Lead Man.

2.3 The Quality Control Inspector shall monitor the test and record the actual variables used in welding the test specimen. Sample preparation shall be as specified in ASME Section IX.

2.4 The Welding Lead Man shall assign a welder to weld the test specimen as specified on the WPS. He shall be responsible for the training and qualification testing of welders and welding operators.

2.5 The Shop Supervisor shall be responsible for assuring that qualified welders or welding operators are used in fabricating Code vessels. He shall also be responsible for the proper storage, issue and control of welding material.

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3.0 Procedure

3.1 Welding Control

3.1.1 All welding on Code work is performed using WPS, welders and welding operators qualified in accordance with the ASME Code Section VIII, Division 1 and the requirements of Section IX.

3.2 Welding Procedure Specification

3.2.1 WPS's shall be prepared by the Engineering Manager to include all variables for the process as required by ASME Code Section IX. The test welds shall be made under the supervision of the Welding Lead Man. Preparation of the test coupons is performed to meet Section IX requirements by a qualified testing laboratory. If the test results are acceptable, the Engineering Manager shall prepare and certify the Procedure Qualification Record (PQR).

3.2.2 Copies of the qualified WPS are provided to the Shop Supervisor for use by the welders and welding operators. The Engineering Manager maintains the WPS and PQR's in the engineering file.

3.2.3 WPS's and PQR's are submitted to the Authorized Inspector for his review and acceptance.

3.2.4 WPS's are revised whenever there is a change in a nonessential variable. When applicable, a new PQR is prepared and qualified whenever an essential or supplementary essential variable changes.

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3.3 Qualification of Welders and Welding Operators

3.3.1 All welders and welding operators used for Code welding shall be qualified to the requirements of the ASME Section IX and Section VIII Division 1 under the supervision of the welding leadman. Preparation and testing of the required specimens will be performed by a qualified testing laboratory. The Quality Control Chief Inspector shall review the test reports and if acceptable, he shall prepare and certify the Welder's Performance Qualification Record.

3.3.2 The WPQ's are available for review by the Authorized Inspector.

3.3.3 Each qualified welder is listed on a Welder's Continuity Log (Exhibit VIII) which is maintained by the welder from the WPS's supplied by the Shop Supervisor. The Welder's Continuity Log shall be maintained for five (5) years and be verified by the Welding Lead Man and the Quality Control Chief Inspector.

3.4 Requalification of Welders and Welding Operators

3.4.1 Welders are requalified: (In accordance with Section IX of the Code.

- (a.) When they have not welded with a process during a period of six (6) months or more, their qualification for that process shall expire.
- (b.) When there is a specific reason to question his ability to make welds that meet the specification, the qualification which supports the welding he is doing shall be revoked. All other qualifications not questioned remain in effect.
- (c.) The Authorized Inspector may request requalification of a welder or WPS.
- (d.) A change to a performance essential variable.

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3.5 Production Welding

3.5.1 The Welding Lead Man verifies that all production welders are qualified for the process to be used in accordance with the Qualified Welder's List (Exhibit VII). The Welding Lead Man is responsible for instructing the welder in the correct use of the qualified WPS for use in production welding. Each qualified welder will record the qualified WPS number on the Fabrication Inspection Sheet for each process used to weld vessels. The welder shall initial and date the Fabrication Inspection Sheet upon completion of production welding.

3.6 Tack Welds

3.6.1 Tack welds, whether left in place or completely removed, shall be made by a qualified welder using a qualified WPS. If left in place their starting and stopping ends shall be suitably prepared to ensure complete fusion into the weld.

3.7 Welder Material

3.7.1 All welding material is purchased on an as needed basis using a Purchase Order and is received as described in Section VI of this manual.

3.7.2 Welding material shall be stored in a clean dry area. Welding material specified on the WPS will be issued to the welders by the Welding Lead Man.

3.7.3 Low Hydrogen coated electrodes are received and stored in hermetically sealed containers. When opened, the electrodes are placed in a heated oven maintained at the temperature recommended by the manufacturer or Section II Part C. of the Code.

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- 3.7.4 Coated electrodes are issued only in a quantity sufficient to complete the weld or for a period of four (4) hours, unless stored in a portable caddy.
- 3.7.5 Unconsumed coated electrodes are returned for storage and are examined for cleanliness and identification before being return to an oven. Damaged or unidentified electrodes are scrapped or used for non-code welding.
- 3.7.6 All records mentioned in this section are available for review by the Authorized Inspector.

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SECTION X

HEAT TREATMENT

1.0 Scope/Purpose

1.1 This section describes the controls to be used when heat treating is required.

2.0 Responsibilities

2.1 The Engineering Manager is responsible for determining the heat treatment parameters.

2.2 The Quality Control Chief Inspector is responsible for assuring vendor compliance with the heat treatment parameters.

3.0 Procedure

3.1 If required for future Code work, heat treatment will be subcontracted using procedures written by the Engineering Manager and or a Designee thereof and furnished to the vendor.

3.2 Time - Temperature charts or chronological temperature recordings traceable to the item by serial number and initialed and dated by the vendor will be required for review by the Quality Control Chief Inspector for conformance with the written procedure and Code requirements.

3.3 All heat treatment records will be submitted to the Authorized Inspector for his review and acceptance.

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SECTION XI

NONDESTRUCTIVE EXAMINATION

1.0 Scope/Purpose

1.1 This section describes the controls used to assure that Nondestructive Examination (NDE) is performed by qualified personnel using procedures that comply with the Code.

2.0 Responsibilities

2.1 The Engineering Manager shall be responsible for determining the requirements for NDE as required by the Code and this information shall be entered on the Fabrication Drawing.

2.2 The Quality Control Chief Inspector shall be responsible for assuring that the examinations are performed by qualified personnel.

3.0 Procedure

3.1 Liquid Penetrant (PT) and Magnetic Particle (MT) written procedures will be developed and certified by the Quality Control Chief Inspector to be in accordance with the requirements of the Code.

3.2 The Quality Control Chief Inspector shall insure that all persons conducting and evaluating PT and MT examinations are certified competent as per Code, Section VIII, Division 1, Appendices 6 and 8.

3.3 PT and MT written procedures will be demonstrated capable of producing meaningful results to the satisfaction of the Authorized Inspector. This demonstration will be indicated by signature and date of the Authorized Inspector on the cover page of the written procedure.

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- 3.4 RT will be subcontracted to an NDE company whose written practice, personnel training, experience, qualifications and certifications comply with the latest Code accepted edition of ASNT SNT-TC-1A or CP-189 as required for the applicable method, and are certified as acceptable by the Quality Control Chief Inspector.
- 3.5 Written procedures accepted by the Quality Control Chief Inspector and which have been proven by actual demonstration to the satisfaction of the Authorized Inspector before use are required for any RT and UT methods used.
- 3.6 The Authorized Inspector may request re-demonstration of an examination or a procedure.
- 3.7 All personnel qualification records, examination reports and RT film will be available to the Authorized Inspector for his review and acceptance. Examination reports and RT film shall be traceable to the item by serial number.
- 3.8 This section of the manual will be revised as necessary to include all applicable controls required to meet Code requirements before using such additional NDE methods on Code work.
- 3.9 The Quality Control Chief Inspector will appoint the Level III by letter.

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SECTION XII

CALIBRATION OF MEASURING AND TEST EQUIPMENT

1.0 Scope/Purpose

1.1 This section describes the controls used to assure the accuracy of measuring and test equipment.

2.0 Responsibilities

2.1 The Quality Control Chief Inspector is responsible for the calibration of all measuring and testing equipment used.

3.0 Procedure

3.1 Test gauges for Hydrostatic Testing shall be calibrated every twelve (12) months or when error is suspected. A master gauge will be used for calibrating all test gauges. Master gauges will be calibrated every year by an outside testing laboratory approved by the Quality Control Chief Inspector.

3.2 Micrometers and calipers shall be calibrated every three (3) years. A master gauge block will be used to verify the calibration of all micrometers and calipers. The master gauge block will be calibrated every ten (10) years by an outside testing laboratory approved by the Quality Control Chief Inspector.

3.5 NDE equipment shall be calibrated annually.

3.4 A test gauge calibration log (Exhibit IX) is maintained by the Quality Control Chief Inspector and shall be made available to the Authorized Inspector. All gauges and test equipment are identified with a Calibration Sticker (Exhibit XIII).

3.5 All master and testing equipment shall be traceable to a national standard.

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- 3.6 When measuring and test equipment is found to be out of calibration during its use, the device will be removed from the work area and re-calibrated.
- 3.7 Code items checked with out of calibration equipment are considered nonconforming and shall be addressed in accordance with Section VIII of this manual.
- 3.8 Calibrated records maintained by the Quality Control Chief Inspector shall be made available to the Authorized Inspector for his review upon request.

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SECTION XIII

RECORDS RETENTION

1.0 Scope/Purpose

1.1 This section identifies the documentation that must be retained and the length of time that it must be held.

2.0 Responsibilities

2.1 The Engineering Manager is responsible for establishing and maintaining a system of records, which are required for conformance to the Code.

3.0 Procedure

3.1 The Quality Control Chief Inspector shall forward all records to the Document Control Clerk. Document Control Clerk shall file all records with the job history file.

3.2 The job history file will be available to the Authorized Inspector at any time upon request.

3.3 The job history file and documentation as outlined below shall be retained for a period of not less than five (5) years.

- A. Manufacturer's Partial Data Reports
- B. Manufacturing drawings
- C. Design calculations, including any applicable Proof Test Reports
- D. Material Test Reports and / or material certifications
- E. WPS / PQR and WPQ Records
- F. RT and UT reports
- G. Repair procedure and records
- H. Process control sheets
- I. Heat treatment records and test results
- J. Postweld heat treatment records
- K. Nonconformance reports and dispositions
- L. Hydrostatic Test Records
- M. Pressure Parts, Documentation and Certification

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- 3.4 All "UM" Designator stamped vessels fabricated by the John Wood Company shall be issued a unique manufacturer's serial number. The serial numbers shall be controlled by the Quality Control Chief Inspector. He shall maintain a record of issuance showing the serial number and drawing number. The ASME Certification Mark shall be retained by the ASME Nameplate Stamper.
- 3.5 All "U" Designator stamped vessels fabricated by The John Wood Company shall be registered with the National Board. National Board registered numbers shall be controlled by the Quality Control Chief Inspector and will be issued in consecutive order with no skips and gaps. The Quality Control Chief Inspector shall maintain a record of issuance showing national board number, manufacturer's serial number, date completed and date registered with the National Board. The ASME Certification and the National Board "NB symbol stamp shall be retained by the ASME Nameplate Stamper.
- 3.6 The Document Control Clerk shall submit to the National Board of Boiler and Pressure Vessel Inspectors the original Manufacturer's Data Report within 60 days of certification. As an alternative the Manufacturer's Data Report may be filed electronically. A copy of the Manufacturer's Data Report shall be furnished to the user or his designated agent and the Authorized Inspector if requested.

4.0 Field Operations

- 4.1 All of the above applies. Documentation shall be controlled by the Quality Control Inspector and returned to the Document Control Clerk.

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SECTION XIV AUTHORIZED INSPECTOR

1.0 Scope/Purpose

1.0 This section describes the provisions required by The John Wood Company for the Authorized Inspector to perform his assigned function.

2.0 Responsibilities

2.1 The Engineering Manager is responsible for assuring that the Authorized Inspector is given the cooperation required to perform his assigned function.

3.0 Procedure

3.1 The Authorized Inspector is the inspector required by the Code, employed by the ASME accredited Authorized Inspection Agency with whom the Company has a contract to perform the inspection services and has a new construction commission issued by the National Board.

3.2 If the Authorized Inspection agency of record changes, a notification shall be made to ASME within thirty days.

3.3 The Quality Control Chief Inspector arranges for the Authorized Inspector to have free access to the shop and field site whenever Code work is being done and to such parts of all facilities that are concerned with the manufacture and supply of materials for the vessel, when requested.

3.4 When requested by the Authorized Inspector, inspection hold points will be inserted on the Fabrication Inspection Sheet for those operations he may wish to witness or verify before work proceeds.

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- 3.5 The Quality Control Chief Inspector at the shop or the Quality Control Inspector at a field site is the Company's authorized representative and liaison with the Authorized Inspector and is responsible for keeping him informed of the progress of Code work so that he may make his designated inspections.
- 3.6 The Authorized Inspector has access to and is provided with all drawings, calculations, specifications, procedures, fabrication and inspection sheets, repair records, test and examination results, inspection records and any other documents required to perform his duties.
- 3.7 All Nonconformance Reports for Code nonconformities are submitted to the Authorized Inspector for his review and acceptance.
- 3.8 The Quality Control Chief Inspector or Quality Control Inspector will notify the Authorized Inspector sufficiently in advance of Hydrostatic Tests so that he may be present to witness them.
- 3.9 When all Code requirements have been met the final records, together with the completed ASME Manufacturer's Data Report signed by the Company's authorized representative, are submitted to the Authorized Inspector for his signature.
- 3.10 A current copy of the Quality Control Manual is available for use by the Authorized Inspector at the shop and field site.
- 3.11 The Authorized Inspector will review and accept all changes to the Quality Control Manual, which affect Code requirements, before they are issued to manual holders.
- 3.12 The Quality Control Chief Inspector will assist the Authorized Inspector Supervisor during his required audits, and the Authorized Inspector while monitoring the quality control system.

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SECTION XV

"UM" PRESSURE VESSELS

1.0 Scope/Purpose

1.1 This section describes the specific requirements for manufacturing vessels bearing the Certification Mark with the "UM" Designator.

2.0 Responsibilities

2.1 The Quality Control Chief Inspector is certified as the company's Certified Individual (CI) responsible for ensuring Code compliance during fabrication and final certification of vessels bearing the Certification Mark with the "UM" Designator.

2.2 The requirements for certification of the Certified Individual shall be as outlined below.

- A. Be an employee of The John Wood Company
- B. Be qualified and certified as competent by The John Wood Company
- C. Be knowledgeable of the requirements of ASME Section VIII Div. 1 concerning the application of the Certification Mark with UM Designator
- D. Be knowledgeable of the John Wood Company quality program
- E. Have training commensurate with the scope of the oversight to be provided
- F. Have a record, maintained and certified by the John Wood Company containing objective evidence of the qualifications and the training provided

3.0 Procedure

3.1.1 All of the preceding sections of this Quality Control Manual apply to shop fabrication of "UM" Designator pressure vessels with the exception of the references to the Authorized Inspector, whose duties are performed by the Quality Control Chief Inspector for vessels bearing the Certification Mark with the "UM" Designator.

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3.1.2 The Authorized Inspector may monitor the Quality Control System for shop fabrication of vessels bearing the “UM” Designator during his “U” designated inspections to verify compliance to the Code.

3.2 Fabrication Procedures:

3.2.1 The Fabrication / Inspection Sheet (Exhibit VI) is used to control the fabrication of “UM” Designator pressure vessels, having spaces for designation of hold points and sign-off of the Quality Control Chief Inspector.

3.2.2 Stamping and nameplates for vessels (Exhibit XI) with the Certification Mark with the “UM” Designator are controlled as described in Section VIII of this manual.

3.2.3 Upon completion of a “UM” Designator vessel, or one day's production of identical vessels, an ASME Certificate of Compliance (Form U-3) is prepared and signed in ink by the Quality Control Chief Inspector.

3.3 "UM" Audits

3.3.1 The AIA of record will audit implementation of the “UM” Quality Control System once a year for the required annual renewal of the Certificate of Authorization with the “UM” Designator, between the triennial joint review for renewal of all ASME Certificates of Authorization, as required by the Code.

3.3.2 The Quality Control Chief Inspector will accompany and assist the Authorized Inspector Supervisor during these audits.

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3.4 "UM" Records:

3.4.1 All records of "UM" fabrication, including audit reports, are available for review by the Authorized Inspector.

3.4.2 A copy of the Form U-3 Certificate of Compliance is maintained for five (5) years.

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SECTION XVI

REPAIRS AND ALTERATIONS

1.0 Scope/Purpose

1.1 This section describes the requirements for shop and field repair or alteration to metallic pressure retaining items that have been placed into service. These repairs or alterations are made in accordance with the applicable requirements of The National Board Inspection Code (NBIC), the Jurisdiction, ASME Code and this manual.

2.0 Responsibilities

2.1 The Quality Control Chief Inspector is responsible for compliance with the Quality Control Manual for shop repair or alteration to pressure retaining items and for preparation of the repair and alteration procedure.

3.0 Procedure

3.1 All repairs or alterations to pressure retaining items are subject to the acceptance of the Authorized Inspector.

3.2 The Quality Control Chief Inspector shall, prior to the start of work, provide the Authorized Inspector with drawings, calculations, procedures, a copy of the original Manufacturer's Data Report, and any other documents necessary for the Authorized Inspector to accept the repair or alteration and to designate his required inspection points.

3.3 For alterations to pressure retaining items, the Quality Control Chief Inspector will provide the Authorized Inspector with:

- (a.) Design calculations prepared as described in Section V of this manual.
- (b.) For physical changes, ASME Manufacturer's Partial Data Reports for welded Code Symbol stamped parts.

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- 3.4 Revised calculations shall accompany NBIC Form R-2, Report of Welded Alteration, and all such documentation shall be subject to acceptance by the Jurisdiction at the location of installation.
- 3.5 For alterations consisting only of re-rating, pressure tests applied by the Shop Supervisor as specified on the Fabrication / Inspection Sheet for the new service conditions, are witnessed by the Quality Control Chief Inspector and the Authorized Inspector.
- 3.6 The Quality Control Chief Inspector, if requested by the Authorized Inspector, arranges for his access to make such inspections of the pressure-retaining item he deems necessary to accept the repair or alteration.
- 3.7 The Quality Control Chief Inspector keeps the Authorized Inspector informed of the progress and completion of work so he may make his designated inspections, and accept the repair or alteration after his final inspection of its completion.
- 3.8 All materials used in making repairs and alterations shall conform to the requirements of the original Code Section used for construction and ASME Section II. Material of a different nominal composition, having an equal or greater allowable stress than the original, may be used for a repair.
- 3.9 All examinations, PWHT and tests required by the original code of construction for the pressure-retaining item are required on the repair or alteration. When impossible or impractical a alternate method acceptable to the Authorized Inspector may be used
- 3.10 Upon completion of the repair or alteration the pressure retaining item shall be subject to a pressure test according to the requirements of the NBIC or Jurisdiction as applicable.

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4.0 Routine Repairs

- 4.1 Routine repairs shall be performed as stated in the NBIC Part 3.
- 4.2 Prior to performing routine repairs the Quality Control Chief Inspector determines the types of routine repairs permitted by the Jurisdiction where the work is performed and contacts the Authorized Inspector.
- 4.3 The Authorized Inspector responsible for the repair, at his discretion, may accept routine repairs and give prior acceptance of the repair in accordance with the rules of the NBIC and the Jurisdiction.
- 4.4 Subject to the administrative rules of the Jurisdiction, the acceptance of the Jurisdiction and the Authorized Inspector, sign-off of the National Board Report Form by the Authorized Inspector and Stamping of Nameplates may not be required for routine repairs. All other requirements of this Manual shall be followed when performing routine repairs.

5.0 Stamping

- 5.1 If, during the repair or alteration of a pressure vessel, it is necessary to remove the original nameplate or stamping, the Authorized Inspector will, subject to Jurisdiction approval:
 - (a.) Witness the making of a rubbing or facsimile of the old and new stamping.
 - (b.) Witness removal and / or obliteration of the original stamping, and transfer of the nameplate or stamping, less the Code Symbol, to a new location on the new item. The Code Symbol shall not be re-stamped, unless permitted by the Governing Code of Construction
 - (c.) Any relocation shall be described on the applicable NBIC Form.
- 5.2 The Quality Control Chief Inspector shall stamp and attach a Nameplate (Exhibit XII) adjacent to the original stamping or nameplate on the repaired or altered pressure vessel, when authorized by the Authorized Inspector.

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5.3 The Quality Control Chief Inspector retains custody and control of the "R" Symbol Stamp. This symbol stamp is the property of the National Board.

6.0 Records

6.1 The repair or alteration is documented on the current NBIC Form.

6.2 When the work is completed, the applicable NBIC Form is prepared and certified by the Quality Control Chief Inspector.

6.3 The final records, together with the completed applicable NBIC Form and any ASME Manufacturer's Partial Data Reports, for alterations, a copy of the original ASME Manufacturer's Data Report, are presented to the Inspector for his review. When he has satisfied himself that all NBIC, Code, and Quality Control Manual requirements have been met, he will authorize application of the "R" Symbol to the nameplate and sign the applicable NBIC Form.

6.4 All records referenced in this section are available for review by the Inspector.

7.0 Distribution of NBIC Forms

7.1 One copy of Form R-1 Report of Repair and if required R-4 Report Supplementary Sheet with any ASME Manufacturer's Partial Data Reports attached, is distributed to the owner or user, the inspector, the jurisdiction if required and the Authorized Inspection Agency responsible for in-service inspection. A copy is filed in the job file.

7.2 One copy of NBIC Form R-2, Report of Alteration, and if required R-4 Report Supplementary Sheet with the original ASME Manufacturer's Data Report and any ASME Manufacturer's Partial Data Reports attached, is filed with the Authorized Inspection Agency responsible for the in-service inspection of the Code item, the owner/user, Jurisdiction, if required and to the National Board when the Code item is so registered. A copy is filed in the job file.

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- 7.3 The Quality Control Chief Inspector shall maintain a National Board “R” Report Registration Log (Exhibit XIV) for National Board Report Forms that are registered with the National Board. The Form R Numbers shall be issued sequentially without skips or gaps, without suffixes or prefixes, starting with the number 1. The Log shall record the Form R Number, the Form R-1 or R-2, the Owner / User’s name and location and the date the work was completed. R forms not registered with The National Board shall be maintained for five (5) years.

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EXHIBITS

Table of Contents

NOTE: These forms are typical of forms used in the shop. These forms may be changed without formal approval provided no information is deleted.

List of Current Forms

<u>Exhibit Number</u>	<u>Title</u>
I	Distribution of Quality Control Manual
III	Purchase Order
IV	Non-Conformance Report
V	“Rejected Do Not Use” Tag
VI	Fabrication / Inspection Sheet
VII	Qualified Welder’s List
VIII	Welders Continuity Log
IX	Test Gauge Calibration Log
X	“U” Designator Nameplate Exhibit
XI	“UM” Designator Nameplate Exhibit
XII	Re-rate / Repair / Alteration Nameplate
XIII	Calibration Sticker
XIV	“R” Report Registration Log

EXHIBIT I

DISTRIBUTION OF QUALITY CONTROL MANUAL FOR ASME PRESSURE VESSELS

Serial Number	Name	Title	Released Date	Received Date and Initial
1.	WILLIAM R. NORTON	AUTHORIZED INSPECTOR	6/24/13	
2.	JEFFREY H. BOWLBY	QC CHIEF INSPECTOR	6/24/13	
TO: ALL MANAGERS / ON LINE ELECTRONIC COPY / READ ONLY (PASSWORD PROTECTED UNCONTROLLED DOCUMENT) 6/24/13				

Immediately sign and return this sheet to the Quality Control Chief Inspector. This is the assurance that all outdated data has been removed from the system.

**THE
JOHN
WOOD
COMPANY**

www.johnwood.com

The John Wood Company
98 Highland Avenue
Oaks, PA 19456
United States of America

EXHIBIT III

Ph: 610-666-1225

Fax: 610-666-0193

Purchase Order

Number:

Date:

To

Ship To

The John Wood Company
98 Highland Avenue
Oaks, PA 19456
United States of America

Ph: 1-330-482-0200

Fax: 1-330-482-6488

Ph: 610-666-1225

Fax: 610-666-0193

Terms		Ship Via	FOB	Issued By
2% 10 Net 30		Pickup		
Quantity	Description	Unit Price	Amount	
	<p>***IMPORTANT NOTICE*** In order to reduce costs for our suppliers and in the total supply chain, The John Wood Company is automating its accounts payable process.</p> <p>Please contact us at: accounting@johnwood.com to learn how we can help you reduce costs.</p>	Total:		

JUNE_2013

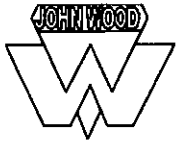


EXHIBIT IV

THE JOHN WOOD COMPANY Nonconformance Report

JOB N°:	NAT'L BOARD N°:	NCR N°:
CUSTOMER:	DRAWING N°:	
COMPONENT NAME:	DATE:	
DISTRIBUTION: ENGINEERING <input type="checkbox"/> ; MANUFACTURING <input type="checkbox"/> ; SALES <input type="checkbox"/> ; PURCHASING <input type="checkbox"/> ; AUTH. INSPECT.		
DESCRIPTION OF NON-CONFORMANCE:		
RECOMMENDED DISPOSITION: <input type="checkbox"/> SCRAP; <input type="checkbox"/> REPAIR AS NOTED; <input type="checkbox"/> OTHER (EXPLAIN); <input type="checkbox"/> ACCEPT		
WRITTEN DESCRIPTION OF ACTUAL REPAIR PERFORMED BY MANUFACTURER:		
MANUFACTURER SIGNATURE:	DISPOSITION BY:	
AUTHORIZED INSPECTOR SIGNATURE:	DATE:	
FINAL INSPECTION (Q.C. SIGN-OFF):	DATE:	

EXHIBIT V

**REJECTED
DO NOT USE**

Qualified Welder's List

NAME																						
WPS#		QUALIFIED WELDING POSITION / CERTIFIED WELDER QUALIFICATION RECORDS																				
SAW	SAW-11																					
	P1-1756																					
	P8-2173																					
	P1-2339																					
	P1-HT-2031																					
GTAW	T-11																					
	T-1175																					
	T-88																					
	P8-1837																					
	P8-2038																					
	P44-1247																					
	P1-HT-1639																					
FCAW	FC-11																					
	P8-1288																					
	P8-1836																					
	P8P1-1330																					
GMAW	M-11																					
	M-11-92																					
	P1-1387																					
	M-06																					
	P1-HT-1923																					
SMAW	S-11																					

TEST GAUGE CALIBRATION LOG

EXHIBIT IX

GAUGE NUMBER

RANGE


VERIFIED

DUE DATE

EXHIBIT XII

Required markings for repairs, with use of National Board Form R-1

REPAIRED BY _____
CERTIFICATE HOLDER




DATE REPAIRED

NATIONAL BOARD "R"
CERTIFICATE NUMBER

Required markings for alterations, with use of National Board Form R-2

ALTERED BY _____
CERTIFICATE HOLDER



M.A.W.P. _____ P.S.I.

AT _____ °F


* Minimum Required Relieving Capacity

DATE ALTERED

NATIONAL BOARD "R"
CERTIFICATE NUMBER

Required markings for re-ratings, with use of National Board Form R-2

RE-RATED BY _____
CERTIFICATE HOLDER



M.A.W.P. _____ P.S.I.

AT _____ °F


* Minimum Required Relieving Capacity

DATE ALTERED

NATIONAL BOARD "R"
CERTIFICATE NUMBER

Required markings for parts fabricated by welding, with use of National Board Form R-3

PART _____
CERTIFICATE HOLDER



P.S.I. AT _____ °F

M.A.W.P.

MANUFACTURER'S SERIAL NO.

YEAR BUILT

NATIONAL BOARD "R"
CERTIFICATE NUMBER

**STAMPING OR NAMEPLATE SHALL BE APPLIED
ADJACENT TO THE ORIGINAL MANUFACTURER'S
STAMPING OR NAMEPLATE**

EXHIBIT XIII

CALIBRATION STICKER

Hand Written Sticker To Include

1. I.D. Number
2. Inspected By
3. Inspection Date
4. Next Inspection Due Date

CALIBRATION	
I.D. No.	_____
By _____	Date _____
Due _____	

EXHIBIT XIV

"R" Report Registration Log

SEQUENTIAL LOG

R Number	Date of Repair or Alteration	Date Filed w / National Board	Original Manufacturer	Original National Board Number	Original Serial Number