

Quality Control System Manual
For ASME CODE SECTION VIII (DIVISION I), - “U”

VESSEL FABRICATION

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Edition No. 1
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Manual Number 1

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Statement of Policy and Authority

This Quality Control System has been established to assure compliance with the applicable sections of the ASME Boiler and Pressure Vessel Code. (ANSI/ASME BPV)

This System is intended to be used in the fabrication and /or repairs of billet, (slab header) standard, and custom-designed box headers and vessels, stamped in accordance with Section VIII Division I. In the event other types of vessels are to be fabricated or repaired in the future, the system will be expanded and /or revised as required. Repairs to existing pressure vessels shall be to the requirements of the National Board Inspection Code, Latest Edition (ANSI/NB-24).

The responsibility and authority for implementation of this system has been assigned to the quality control manager. The quality control manager has been given the authority and organizational freedom to identify quality control problems and to initiate, recommend and provide solutions. Problems that cannot be resolved by the quality control manager shall be brought to me for final resolution based on code requirements.

Changes or revisions to the manual shall be reviewed with, and have concurrence of, the assigned authorized inspector, prior to implementation.

Signature _____
Date _____
Title _____

Company Organizational Chart goes here

Abbreviations

ANSI	American National Standards, Institute, Inc.
ASME	American Society of Mechanical Engineers
AI	Authorized Inspector (ASME Code Inspector)
CODE	ASME Boiler and Pressure Vessel – Applicable Section
CI	Customer Inspector
DEPARTMENT	Refers to manager as department head or to this assigned. Such usage does not alter the manager's authority or overall responsibility for departmental activities.
GMAW	Gas Flux Core Arc Welding
GMAW-S	Gas Metal Arc Welding – Short Arc
GTAW	Gas Tungsten Arc Welding (TIG)
MS	Manufacturer's standard as described in Paragraph UG-11 c (2), Section VIII division I.
MTR	Material Test Reports or certificates of compliance as applicable.
NDE	Non-destructive examination
PQR	Procedure qualification record
QC	Quality control – department or manager
QCI	Quality control inspector
SMAW	Shielded metal arc welding
SAW	Submerged arc welding
WPS	Welding procedure specifications

Glossary of Terms

I. Authorized Inspector (A.I.)

All inspections required by the applicable code sections shall be by an inspector employed by a state municipality of the United States, a Canadian Province, and inspector, who is regularly employed by an insurance company authorized to write boiler and pressure vessel insurance. The inspector shall not be in the employment of the manufacturer.

II. CODE

American Society of Mechanical Engineers Boiler and Pressure Vessel Code. (ASME)

III. Examination

Are those performed by the manufacturer's quality control personnel.

IV. Inspections

Are those performed by the authorized inspector in all code work for compliance to code rules.

V. Nonconformities

Any materials, items or parts not in compliance with applicable rules of the code, job specification, or this quality control system. These are normally of two (2) types, those found during material receiving inspection and those found during fabrication and final testing.

Code Matter for Reference Only Section VIII, Division I for Pressure Vessels

Material	UG-5 through UG-15. Carbon Plate – Section II. Part A-SA-20. Identification UG-77 under tolerance UG-16. Restrictions UCS-6 forming restriction UCS-79
Welding	Processes, testing, identification, repairs and miscellaneous, UW-26 through UW-39, and UW-42.
NDE RT, UT.	(RT) UW-51, UW-52, Mag. Particle (MT) Appendix VI, Dye MT, PT Penetrant (PT) Appendix VIII.
Heat treatment	UG-85, UW-40, UGC-79, UCS-85, and UCS-56
Stamping & Reports	UG-115 through UG-120

Sample Name Plate goes here

Should include:

- place for stamps
- National Board Number
- certified by < company name >
- M.A.W.P.
- Temp
- Serial Number
- Year Built
- Model Number.

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Section I drawings, design calculations, and specifications control

- I.I Design calculations (exhibit No. I) shall be prepared and approved by the engineering department. Calculations for standard box headers are performed by computer, based on section VIII. App. 13, Div. 1 and proof test data where applicable. Detail calculations shall be prepared by the engineering department for each box header and/or cylindrical vessel. Design calculations for cylindrical pressure vessels shall be prepared by and approved by the engineering department. These calculations are performed by the designated designer and checked by the engineering department manager.
- I.II Drawings (Exhibit 1-a) shall be prepared by the drafting department and shall be reviewed with the assigned A.I. During the calculation review. The drawings shall contain all the information required to fabricate the vessel. This information shall include but not be limited to:
- drawing identification number. This number is the JOB NUMBER with an added suffix number.
 - Vessel job and serial number.
 - Design working pressure and temperature
 - All mandatory or required NDE and specific fabrication instructions.
 - Hydrostatic Test Requirements (Pressures).
- I. III A Bill of Material *** (Exhibit no. 2) that identifies all pressure retaining parts, for cylindrical vessels, is prepared by the engineering department. All pressure retaining materials shall be specified in accordance with ASME materials specifications except where otherwise provided in code cases or I the applicable paragraphs of Section VIII, Division 1.

*** Material for box headers is ordered as stock material as directed by the purchasing department manager. Requirements for identification and inspection are identical to those for cylindrical vessels.

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- I.IV ASTM specifications may be used in lieu of the corresponding ASME specification, providing that the requirement of the ASTM specifications are identical or more stringent than the ASME specification. Cast, forged, rolled, or die formed standard pressure parts shall be made of materials permitted by Section VII Division I, in an accepted standard such as ANSI or MS.
- I.V The Engineering Department specifies the materials to be used for cylindrical vessels and instructs the purchasing department on what to order by use of the Bill of Material.
- I.VI Engineering shall prepare all drawings. Engineering distributes these to the production manager who distributes these to the shop supervisor (Exhibit No. 3). Superseded drawing shall be retrieved by the shop supervisor from the welding shop.
- I.VII Serial and Job Numbers are controlled and issued by the sales department. (see separate section of control of national board numbers.)
- I.VIII As stated in I.VII job numbers are issued by the sales department. All information and records are traceable by this number. (See order transmittal, Exhibit No. 4 & 4-A)
- I.IX changes to drawings, calculations or specifications shall be handled in the same manner specified in I.I and I.2 for new jobs.
- I.X The operations manager is responsible for assuring the accuracy of computer calculations, for initial runs.

Sample Calculations goes here

go to www.aircoolertechnology.com under “Free Header Programs.

Same of Header Drawing Goes Here.

Same of Bill of Material Goes here

Sample of Drawing/Revision control Form goes here

Sample of Sales Order Form goes here

Sample of Packing List goes here

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Section 2.0 Material Control

- 2.I The purchasing agent is responsible for ordering materials using the bill of materials provided by the engineering department, or instructions provided by the engineering department, or purchasing manager. (See paragraph I.3.I) No. substitutions of pressure retaining materials are allowed unless approved by the engineering department. In the event of substitutions, the engineering department shall be responsible for revisions and assuring that the manufacturers data report reflects the material used. The QC Manager shall advise the assigned A.I. Of any material substitution.
- 2.II Purchasing orders (Exhibit No. 5) shall be prepared by the purchasing department. Purchase orders shall indicate complete material specification requirements. Materials for pressure retaining parts shall be ordered in accordance with the ASME specifications, except as covered in paragraph I.3. Welding materials shall be ordered in accordance with SFA specifications and/or AWS classification. A copy of the purchase order is used by the receiving inspector when receiving materials. The receiving copy of the purchase order, the material test report, and the shipping invoice shall be reviewed by the QCI. After review the copies of MTR's are placed on file or are sent to the purchasing agent for processing.
- 2.III Verbal procurement is possible, QCI shall receive material and indicate on the receiving report that the purchase order to follow. After the inspection, the QCI should verify the material ordered was the same as received.
- 2.IV Material Test Reports (MTR) shall be requested on the P.O. For all items that are required by Section VIII, Division I. Items that require material test reports are:
 - Plate or sheet material
 - Formed heads (does not include A234 caps)
- 2.V Material test reports shall be checked by the quality control department for compliance to the chemical and physical requirements of the material specifications, sec. II, prior to fabrication. Each MTR and certificate of compliance that is acceptable shall be initialed and dated the QCI or QCM to indicate acceptability. All MTR and certificates of compliance shall be kept on file the the QC department and made available ot the assigned A.I.
- 2.VI Plate shall not be used for fabrication until MTRs have been received, checked as described in paragraph 2.3.I, and identification (heat and billet numbers) on the materials compared with the MTR. The receiving inspector is responsible for this examination and shall mark the plate, using a paint marker, "OK for CODE." Plater that has not been cleared for fabrication shall be marked "HOLD" using a paint marker. Plate shall not be cut until it has been marked by the QC Department "OK for CODE."
- 2.VII Identification of all pressure parts shall be maintained so that code indentification markings will be plainly visible on each part until the assigned A.I. Has performed his final inspection.
- 2.VIII When identification markings are unavoidably cut out, or the material is cut into two or more parts, the identification markings shall be transferred, prior to cutting, by the person who cuts the material. The QCI shall be responsibie for monitoring this operation to assure that it has been accurately and properly performed.
- 2.IX Material identification transfer shall be the same method required for the original

marking (i.e., die stamping or paint stencil).

- 2.X Required heat numbers, or code marking, shall be recorded on the shop traveler (see section 3, paragraph 3.4) by the QCI. This form is kept as a part of the vessel record file.
- 2.XI Non conforming materials are handled as described in section 4.0
- 2.XII The requirements of UCS-79, for carbon and low alloy pressure boundary parts shall be shown on purchase orders. The engineering department shall advise the purchasing department, by bill of material, when the requirements of UCS-79 require hot forming or postweld heat treatment, after forming.
- 2.XIII A copy of the p.o. For pressure boundary (head and shell) materials shall be send to the receiving inspector. When these materials are received, they shall be checked against the p.o. To assure the received materials are as ordered. (see sample material receiving report, Exhibit No. 5a)
- 2.XIV See appendix A for specific inspection requirements by QC.

Sample Purchase Order goes here

Sample Receiving and Inspection Report goes here

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Section 3.0 Examination and Inspection Program

- 3.I the QCM is responsible for the examination inspection program.
- 3.II The QCM and/or QCI is responsible for initiating, completing and filing the shop traveler for each vessel. QCM or QCI will initial and date the traveler indicating that operation is acceptable.
- 3.III Specific inspection points requested by the A.I. Shall be listed on the traveler. The QCI shall be responsible for notifying the A.I. Of approaching inspection points.
- 3.IV Plate I.D. Numbers are recorded on the traveler by the QCI (see paragraph 2.7)
- 3.V The A. I. Will witness the final hydrostatic test. Final inspection of vessels, for code compliance, shall be performed the th QCM or QCI.
- 3.VI The dial range of gauges used for final hydrostatic testing shall be as specified in paragraph UG-102(b) (i.e. gauges shall have dials graduated not over a range of four times the test pressure but in no case shall the range be less than 1 ½ times that pressure.)
- 3.VII Routine repairs to weld seams are not referred to the A.I. Unless otherwise specifically requested by the A.I. The QCI shall advise the A.I. Of the location of repairs of leaks detected by preliminary testing prior to final hydrostatic testing.
- 3.VIII All code name plates are prepared by the QC department and presented to the A.I. For review. The code stamp shall be applied by the QCI only with the approval of the A.I.
- 3.IX The QC department is responsible for custody and use of the code stamp, as well as reviewing the nameplates for accuracy.
- 3.X The QCM and/or QCI is responsible for the preparation of ASME manufacturers data reports, and shall sign the data reports for the company prior to presentation to the A.I. For his review and signature.
- 3.XI The QC department shall have all necessary records available for the A.I. To review prior to his signing the data report for the completed vessel.
- 3.XII The shift foreman and operations manager are also authorized to sign data reports on behalf of the company.
- 3.XIII Shop Traveler (Exhibit no. 6) is used for standard and custom designed box headers. Shop traveler (exhibit 6a) is used for cylindrical vessels (e.g. mist extractors, scrubbers, and surge bottles).
- 3.XIV The assigned A.I. Will determine his required inspection or hold points during the initial review of each job.

Sample of Exhibit 6 Shop traveler goes here

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Section 4.0 Correction of Non Conformities

- 4.I Non-conformities shall be considered to be of two types, those found in material at receiving, and those found during fabrication and final testing.
- 4.II Material non-conformities found at receiving shall be tagged by the receiving inspector or marked "Hold Do Not Use". The receiving inspector shall then notify the QCM. The QCM, Production Manager, and Engineering department shall decide whether to return the material to the vendor, use as is, or to repair. If the disposition is to repair, or use as is, a non-conformity report (Exhibit 7) shall be prepared by the QCM. The non-conformity report shall be presented to the A.I. For his approval and assignment of hold points as necessary. When repairs are completed and the non conformity report has been signed by the QCM and the A.I., the jQCM shall remove the tag or may authorize the marking out of the "Hold", and marking "OK to Use" on the item.
- 4.III In process non-conformities shall be tagged or marked by the QCI and QCM, and a non-conformity report shall be initiated the the QCM, as described above. The A.I. Shall be notified, so his approval may be obtained.
- 4.IV All non conformities shall be documented on the QCI Daily Reject Chart, as well as in the QC Notebook.

Same of company non conformity report goes here

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Section 5.0 Welding

- 5.I Welding procedure specification (WPS) and procedure qualification records (PQR) shall be prepared and kept on file by the QCM for all procedures that are to be used. All welding shall be in accordance with Section IX of the Code, and the additional requirements of Section VIII, Division I.
- 5.II Manufacturer's record of welder or welding operator qualification test shall be prepared and kept on file by the QCM for each welder and/or operator. A welder log shall be kept by the QCM or QCI showing whether or not the welder's qualification has expired. This log shall be available to the A.I. At any time.
- 5.III An identification symbol (letter or number) shall be issued to each welder and/or operator and they will be instructed to identify their welds at three foot maximum intervals. Welds less than three feet in length shall be identified in at least one location. When material specification or customer requirements prohibit die stamping, welds may be identified by a paint marker. Welder identification is also shown on the shop traveler.
- 5.IV All weld material shall be purchased in accordance with SFA or AWS specifications, by the purchasing manager. The shift foreman shall be responsible for storage and issuance of weld materials. Materials shall be stored in accordance with the manufacturer's recommendations and requirements of ASM Section II, Part C. LOW HYDROGEN ELECTRODES shall be stored in heated ovens and no more than a two hour supply shall be issued at one time.
- 5.V The QCM and/or QCI shall be responsible for monitoring all welding to assure that welding procedures are being followed.
- 5.VI Tack welds shall be done to qualified welding procedure and shall be inspected for cracks by the welder. Tack welds that are cracked shall be removed by grinding or arc gouging prior to finish weld.
- 5.VII The Shift Foreman is responsible for instruction and supervision of the welders and/or operators.
- 5.VIII The A.I. May request the re-qualification of procedures or welders when there is specific reason to question the procedure or the ability of a welder.
- 5.IX Weld details, including bevels, weld sizes, and procedure number, for standard box headers are shown on the drawing. Each welder and/or operator is issued a copy of this form.
- 5.X Weld details, including bevels, weld sizes, and procedure numbers for cylindrical vessels are shown on the vessel drawing by the engineering department.
- 5.XI The QCI is responsible for assuring that weld materials ordered and received are in compliance with code requirements. Purchasing shall send a copy of P.O. To the QCI who will make out a receiving and inspection report. If material is found satisfactory, this report is sent to purchasing.

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Section 6.0

- 6.I Radiography is not required for all vessels that are being fabricated at this time. When radiography is required, the procedure described in paragraphs 6.II through 6.V shall be followed.
- 6.II Radiography shall be subcontracted to an inspection company. The level III examiner of the inspection company shall be accepted.
- 6.III The NDE subcontractor shall be required to furnish complete qualification records in accordance with SNT-TC_1A requirements for each examiner that performs radiography. The QCM shall keep a file of the RT and UT qualification records, and these records shall be available to the A.I. At any time. The QCM and/or QCI shall assure that proper qualification records are on file for any examiner that performs radiography.
- 6.IV Adequate equipment shall be provided for film viewing by the A.I. Either a densitometer or a calibrated stepwedge filmstrip (density strip) shall be available to the A.I.
- 6.V The location of spots, for spot-radiographed (RT-3) vessels, shall be chosen by the A.I., except that when the A.I. Has been duly notified in advance and cannot be present or otherwise make the selection of the spots. The number of film and results shall be shown on an interpretation sheet for each vessels as applicable.
- 6.VI Results of NDE including film and interpretation sheet shall be available for the A.I.'s review.
- 6.VII Mandatory Liquid Penetrant examinations (PT), when required, shall be performed in accordance with a written procedure, certified by QCD to be in accordance with the requirements of T-150 of Section V.
- 6.VIII All cut edges of plate for box header parts shall be examined by penetrant test in accordance with the requirements of paragraph UG-93 d (3). This examination shall be documented on the shop traveler.
- 6.IX All NDE procedures shall be demonstrated capable of producing meaningful results to the satisfaction of the A.I.
- 6.X The A.I. Shall have the right to ask for re-qualification of any NDE procedure or personnel for cause.

Sample of CERTIFICATION OF COMPETANCE FOR NDT EXAMINATION OPERATOR goes here

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Section 7.0 Heat Treatment

7.I All heat treating shall be sub-contracted.

7.II In the event heat treating is required, the project engineer shall:

- Indicate on vessel drawing.
- Provide written instructions or procedures on the purchase order to the vendor that specifies the heating, holding, and cooling time and temperature.
- Require the vendor to furnish a time-temperature chart, signed by an official of the heat treating firm, and review chart to assure the heat treatment is acceptable.

The QCM shall review the furnace calibrations to assure the calibrations are acceptable. The QCM shall make the time-temperature charts and procedures available to the A.I.

7.III All vessels sent to the sub-contractor for heat treating shall be stamped with a Serial Number. The purchase order shall require all time-temperature charts show the serial number of the vessel.

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Section 8.0 Calibration of Measurement and Test Equipment

- 8.I The QCM is responsible for the calibration of measurement and test equipment. The QCM shall assign the QCI or approve outside sources to perform the calibration depending on the equipment and expertise required.
- 8.II Hydrotest gauges shall be calibrated against a calibrated master gauge at any time there is reason to believe they are in error.
- 8.III Hydrotest gauges shall have a dial range as specified in paragraph 3.6, and shall be marked to indicate calibration date.
- 8.IV The shift foreman shall be responsible for maintenance of welding equipment and shall advise the QCM and/or QCI of any equipment that is not functioning properly.
- 8.V Measuring equipment shall be calibrated against a known standard at anytime there is reason to believe they are in error.
- 8.VI Measuring equipment shall be labeled to show last calibration date.
- 8.VII Measuring equipment shall be assigned a serial number.

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Section 9.0 Records Retention

9.I The following records shall be kept for a period of five years, minimum by the QCM.

- Manufacturer's data reports if vessels are not registered with the National board.
- Radiographs for full (RT-1_ and partial radiographed (RT-2) vessels, with interpretation sheet.
- Ultrasonic Records.

9.II Other records that shall be kept for at least one year shall include but not be limited to:

Vessel Drawings

Calculations

Heat treat charts and hydro charts (when used)

Material test reports

Shop Traveler.

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Section 10.0 Authorized Inspector

- 10.I the Authorized Inspector shall be permitted free access, at all times, while work is being performed, to all parts of the manufacturer's shop that concern the construction and testing of the vessel.
- 10.II The QCM and/or QCI shall be responsible for keeping the A.I. Informed of the progress of the work and shall notify him reasonably in advance when vessels will be ready for any required test or inspections .
- 10.III The A.I. Shall have access to all drawings, calculations, specifications, procedures, process sheets, inspection check list, repair procedures, records, test results, and any other documents necessary for the A.I. To perform his duties in accordance with Section VIII Division I of the ASME Code.
- 10.IV The Authorized Inspector shall be an inspector employed by an insurance company that is recognized by the ASME and National Board as an Authorized Inspection Agency.

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Section 11.0 AUDITS

- 11.I The Quality Control System will be audited annually by the Authorized Inspection Agency.
- 11.II The Quality Control Manager shall be responsible for attending to any recommendations made during this audit, and shall advise the company president of any serious deficiencies.

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Section 12.0 Manual Control

- 12.I Controlled copies of this manual shall be issued to or made available to: Engineering Department, Purchasing Department, Manufacturing department, QC department, and the Authorized Inspection Agency.
- 12.II The ACM shall be responsible for revising or updating this manual, as required, to comply with code requirements or specialized additional fabrication requirements.
- 12.III All changes to this manual concerning the methods of achieving results shall have the acceptance of the Authorized Inspector prior to incorporation and implementation.
- 12.IV The A.I.'s concurrence with revisions shall be indicated by his (the assigned AI) initials at the top of any page that contains a change or revision.
- 12.V Controlled copy is available in the QC Department for the A.I.
- 12.VI Manual revisions will be controlled by QC Manual and Revision Log.
- 12.VII Section to be revised will be highlighted with a delta symbol and the number, of the revision, placed inside the symbol and the symbol placed beside the section paragraph.

Manual Distribution List
Control Register

Name/Title

Manual No.

Q.C. Issue date

Quality Control Manual Revision Log

Section No.	Rev. No.	Description	Issued to:	Date
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Quality Control Manual
Revision Log

Section	Rev. No.	Description	Issued to	Date
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Section 13.0 Control of National Board Numbers

- 13.I The QCM shall maintain a log book that lists each National Board number that has been used and the corresponding vessel serial number. No. National Board Number shall be skipped or unused. When a National Board Number is assigned to a vessel that is canceled or not fabricated, this number shall be re-assigned to the next vessel that is to be registered with the National Board. (exhibit 11a)
- 13.II data Reports for vessels registered with the National board shall show the A.I.'s National Board Commission Number (in the lower right hand blank).
- 13.III The QCM shall be responsible for sending the original and first legible copy of the manufacturer's data report to the National board of Boiler and Pressure Vessel Inspectors, 1055 Crupper Avenue, Columbus, Ohio 43229, for each bvessel that is registered with the national board.
- 13.IV The use of the initials only "NB" for National board is not acceptable on name plates or data reports. The correct abbreviation is "Nat'l. Bd."
- 13.V The QCM shall assign National Board numbers to vessels or box headers that are to be registered with the National Board.

National Board Register

State	Type of equipment	National Board Serial No.	Manufacturer's Serial No.	Ship to
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Appendix A

Material Receiving Inspection and Identification

A. A copy of the purchase order for pressure boundary materials (i.e. plate, pipe, and/or heads) that is to be used in ASME stamped vessels or items, shall be available to the Receiving Inspector. When code material arrives, the QCI shall inspect the material for identification, specification, size, diameter, shape, nominal thickness and/or schedule number as indicated on the purchase order. Required identification, on each item, shall be as follows:

1. Plate (covered by SA-20) shall have identification stenciled or die stamped. Die stamping is required when thickness is 1/4" and over. Identification shall include: the name or brand of the manufacturer, heat and slab number, specification number and grade, class and type (where indicated in the material specification).
2. Pipe (SA-52 or SA-106) shall be legibly marked by rolling, stamping, or stenciling to show: the name or brand of manufacturer, the kind of pipe, that is furnace – butt welded (F), electric resistance welded A or B (ERW), seamless A or B (S), the schedule number including XS for extra strong and XXS for double extra strong; and the length in feet. For pipe size 1 1/2" and smaller which is bundled, this information may be marked on a tag which is securely attached to each bundle. When pipe sections are cut into shorter lengths by a subsequent process (i.e. vendor) the processor shall transfer the complete identifying information described above and also include the processors name, trademark or brand to each cut length.
3. Heads supplied as materials covered by UG-11 (b) shall be marked with the name or trademark of the parts manufacturer and with such other markings as will serve to identify the particular head with accompanying material identification.
4. Weld Caps (pipe caps) manufactured in accordance with ANSI B 16.9 shall be permanently marked to show the following:
 1. Manufacturers name or trademark
 2. Materials and product identification by use of the prefix "WP" in the grade symbol (e.g. "WPB" indicates 60,000 tensile strength carbon steel - "WPC" 70,000 carbon steel.)
 3. Schedule number or nominal wall thickness designation
 4. Size (NPS)

Material Test reports are not required for ANSI B 16.9 weld caps.

B. When plate and/or heads have been inspected as outlined in (A) and found to be acceptable it may be received but shall not be released for ASME fabrication until the required material test reports have been reviewed and the chemical and physical properties on the material are found to be acceptable. Plate or heads may be released for fabrication, prior to receipt of the material test reports, with the approval of the company president or his designee. However; in no case shall required data reports be signed by the company designee until all required material test reports have been reviewed and found to be acceptable.

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- C. When pipe has been inspected as outlined in (A) and found to be acceptable, each length shall be marked by the receiving inspector as indicated in section “D”. In any case, identification shall remain legible on pipe until the pipe is cut for fabrication. The marking, as described, shall indicate the pipe has been inspected and is acceptable for use in ASME fabrication.
- D. To maintain identification for pipe, when cut for fabrication, the following marking procedure shall be used:
 - 1. each piece shall be color coded as described:
 - a. SA-53 Type S Grade B marked with a BLUE stripe
 - b. SA-106 grade B marked with a YELLOW stripe
 - 2. In lieu of color marking described in (1), pipe and nozzle necks may be marked with a purchase of shop order number or other identification number that is traceable to the purchase order for the pipe. The described identification shall remain legible on each piece until the A.I. Performs his final inspection.
- E. Material and pipe for ASME fabrication shall be stored separately from non-code material.
- F. Material that is unacceptable for any reason including improper identification shall be considered as non-conforming material, legibly marked “HOLD DO NOT USE”, or similar wording, and keep segregated from acceptable material (see Section 4.0 of this manual).
- G. Bundled tubes shall be identified by a tag securely attached to the bundle and will not be accepted, until this identification has been checked by the receiving inspector. The receiving Inspector shall be responsible for inspection, using a gauge, to assure the tube I.D. and/or gauge is correct. Loose fourteen gauge tube sin stock, shall be stored separately from sixteen gauge on a rack that is identified “14 gauge tubes”
- H. To maintain identification of tube material, when loose or cut for fabrication, the following marking procedure shall be used:

each piece will be color coded as described:

SA Number	Grade	Color
SA-214		Grey
SA-179		Black
SA-249	TP 304	Green
SA-249	TP 304L	Green/White
SA-249	TP 316	Brown
SA-249	TP 316L	Brown/White
SB-111		Red

