

<b>QUALITY CONTROL MANUAL</b>  <b>QUALITY CONTROL IMPLEMENTATION</b>	SECTION NO.: 1
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	DATE: 09 Sept 1998
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MASTER COPY

# **ADDITIVE SYSTEMS, INC.**

**MANUFACTURER OF:  
OIL WATER SEPARATORS,  
MAGNETICALLY DRIVEN GEAR PUMPS,  
SKID MOUNTED PUMPING AND MEASURING UNITS,**

**FIELD INSTALLERS FOR INDUSTRIAL AND PETRO-CHEMICAL  
TERMINALS AND PLANTS**

## **HEADQUARTERS**

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**AND FIELD SITES CONTROLLED BY THE ASI HELD CONTRACTS**

**QUALITY CONTROL MANUAL**  
**QUALITY CONTROL IMPLEMENTATION**

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**PROPRIETARY**

This manual contains proprietary information of Additive Systems, Inc. and shall not be distributed or copied in part or in whole without the consent of the Quality Director.

**Jeff Fitzwater**  
**Quality Director**  
**Additive Systems, Inc.**

**Signed** \_\_\_\_\_

**Date** \_\_\_\_\_

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**QUALITY CONTROL IMPLEMENTATION**

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**STATEMENT OF AUTHORITY AND POLICY**

Additive systems, Inc. is committed to meeting the requirements of the customer's specifications in addition to jurisdictional requirements when applicable, and Additive Systems, Inc. standards.

To achieve these requirements, all personnel have the responsibility for controlling product quality in accordance with the customer requirements, applicable codes, and ASI standards.

The Quality Director is responsible for ensuring that this manual, the customer specifications, applicable requirements, and ASI standards are adhered to in all matters pertaining to quality. The Quality Director or Designee and employees have the freedom to identify quality problems and initiate corrective action. They shall have stop work authority when deemed necessary. This decision process will include review of customer, and design requirements.

If resolution cannot be agreed upon by the Quality Director or Designee and the affected individuals, the decision of the President will be final providing it does not compromise the specified Code or this manual.

Provisions of this quality manual have been reviewed and approved, and became effective as of the indicated date. This manual will be periodically reviewed and revised, as needed to reflect current policies and practices. When addenda are issued, revisions will be incorporated and implemented within six (6) months of the date of issue.

**Robert Roggendorff**  
**President and CEO**  
**Additive Systems, Inc.**

Signed \_\_\_\_\_

Date \_\_\_\_\_

**QUALITY CONTROL MANUAL**  
**DESIGN CONTROL, CALCULATIONS,**  
**DRAWINGS, AND SPECIFICATIONS**

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**1.0 PURPOSE**

To establish and document a system for controlling design, calculations, drawings, and specifications for projects.

**2.0 POLICY**

All projects shall be designed and manufactured to the applicable edition and addenda of the customer specified Code.

**3.0 RESPONSIBILITIES**

**3.1 THE QUALITY DIRECTOR OR DESIGNEE IS RESPONSIBLE FOR:**

- 3.1.1 Preparing and approving the design and initialing and dating the Design Calculation Sheet (exhibit A) to indicate approval of the design package.
- 3.1.2 Issuing design calculations to the Project Manager.
- 3.1.3 Reviewing and approving by initialing and dating, the shop drawings prior to release for manufacturing.
- 3.1.4 Preparing and approving design revisions in accordance with 3.1.1 and 3.1.2 revisions.
- 3.1.5 Providing one copy of Design Sheet to the Project Manager to use for procurement of Code material.
- 3.1.6 Verifying the computer design program input and output results are satisfactory.
- 3.1.7 Verifying the computer design program is updated to compensate for addenda changes by reviewing against the specific Code addenda yearly.
- 3.1.8 Reviewing and approving by initialing and dating, customer/sub-contractor supplied design documents.

**3.2 THE PROJECT MANAGER IS RESPONSIBLE FOR:**

- 3.2.1 Providing design sheets to the Purchasing Manager or Designee for procurement of Code material.

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**DESIGN CONTROL, CALCULATIONS,**  
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- 3.2.2 Reviewing and approving by initialing and dating, the shop drawings prior to release for manufacturing.
- 3.2.3 Routing drawings and revisions through the drafting department for proper distribution.
- 3.3 THE DRAFTING DIRECTOR OR DESIGNEE IS RESPONSIBLE FOR:
  - 3.3.1 Preparing drawings and Bills of Material (exhibit B) using appropriate references.
  - 3.2.2 Distributing drawings and BOM to the assigned personnel.
  - 3.2.3 Preparing drawing revisions and distributing them in same manner as the originals.
- 3.4 THE QUALITY DIRECTOR OR DESIGNEE IS RESPONSIBLE FOR:
  - 3.4.1 Ensuring items are manufactured in accordance with the latest drawing revision.
  - 3.4.2 Preparing and signing Manufacturers' Data Reports.
  - 3.4.3 Providing the Authorized Inspector with drawings, bills of material, calculations or other materials deemed necessary.
- 3.5 THE PLANT MANAGER OR DESIGNEE IS RESPONSIBLE FOR:
  - 3.5.1 Manufacturing products in accordance with the latest drawing revision.
  - 3.5.2 Retrieving obsolete drawings from the fabrication area and destroying them in such a manner that will preclude inadvertent future use.
  - 3.5.3 Ensuring items are manufactured in strict accordance with specified requirements.
- 4.0 CALCULATION AND DRAWING REQUIREMENTS**
- 4.1 Drawings shall indicate the following information:
  - 4.1.1 Specifications, with specific reference to the applicable section, edition and addenda that governs construction of the item.
  - 4.1.2 Supplemental information which is necessary for manufacturing the item.
  - 4.1.3 Dimensioned weld symbols indicating joint design.
  - 4.1.4 Nondestructive examination requirements.
  - 4.1.5 Applicable weld procedure specification identification.
  - 4.1.6 Hydrostatic or pneumatic test pressure.

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**MATERIAL CONTROL**

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**1.0 PURPOSE**

To establish and document a system of procuring, receiving, inspecting and handling materials.

**2.0 POLICY**

All materials for code items shall be purchased per the Code specified edition and addenda of the applicable section. They shall be purchased to an SA, SB, or SFA specification and verified as conforming to requirements prior to release for fabrication. The material type shall be identifiable during the fabrication process.

**3.0 RESPONSIBILITIES**

**3.1 THE PURCHASING MANAGER OR DESIGNEE IS RESPONSIBLE FOR:**

- 3.1.1 Preparing the purchase order (exhibit D), and purchasing material in accordance with the applicable specifications.
- 3.1.2 Procuring Code materials using the proper SA or SB identifiers. Weld consumables shall be procured using the proper SFA identifier.
- 3.1.3 Ensuring material suppliers provide the required material certification.
- 3.1.4 Ensuring the purchase order includes all supplemental requirements if specified by the design.

**3.2 THE QUALITY DIRECTOR OR DESIGNEE IS RESPONSIBLE FOR:**

- 3.2.1 Processing any nonconforming materials in accordance with the Nonconformities Section of this manual.
- 3.2.2 Preparing and maintaining an Equipment Material Record ( exhibit E) to tabulate material identification for completed items.

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**MATERIAL CONTROL**

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3.3 THE PLANT MANAGER OR DESIGNEE IS RESPONSIBLE FOR:

- 3.3.1 Receiving pipe and plate and equipment into the plant and verifying acceptability by use of a Receiving Report (exhibit F).
- 3.3.2 Verifying the chemical and physical values, material thickness, identification, and traceability conform to the corresponding material certification and applicable material specification prior to release for welded fabrication.

Material and the applicable material certifications are ordered and received via two separate methods:

- Job specific whereby an exact amount of material needed for the project is ordered and received directly into the plant for a known sales order and item. The material and certifications are reviewed against the purchase order for compliance and stamped and dated with a receiving inspection stamp if acceptable. A hard copy of the material test report is delivered to the QC Coordinator for incorporation into the job file.
  - Stock specific whereby the material is ordered and received into “stock” for general use as required fulfilling material needs. This material is allocated by the Company material resource planning system over an extended period of time and therefore the material test report must remain accessible for an undetermined period. These material test reports are electronically transferred by the vendor to the Company. The receiving inspector reviews the material test report and when satisfied that it meets the purchase order specifications transfers the electronic material test report into the electronic database indicating the material is acceptable and provides a means of document storage and retrieval. Upon removal from the electronic database the material certification is stamped and dated indicating the material is acceptable for the job application.
- 3.3.3 Ensuring floor stock materials are acceptable and conform to the bill of material and project specifications before use.
  - 3.3.4 Ensuring identification marking is applied and located in areas that will not interfere with the design intent. The method for applying the identification marking shall not be detrimental to the item.
  - 3.3.5 Identifying all materials which are pressure boundary or welded to a pressure boundary including batches and bundles such that traceability is maintained at all times.

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3.3.6 Marking of materials may be accomplished by any one or more of the following methods:

- a. Tagging individual parts.
- b. Tagging parts' container.
- c. Tagging bundles.
- d. Ink or paint marking.
- e. Color coding\*.
- f. Hard stamping.

The method of marking materials shall be acceptable to the Authorized Inspector.

\*Color code legend (exhibit G)

# QUALITY CONTROL MANUAL

## WELDING PROCESS CONTROL

SECTION NO.: 4

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### 1.0 PURPOSE

To establish and document a system of controls for welding processes, consumables, and personnel to assure that all welded products conform to specified requirements.

### 2.0 POLICY

All welding procedures and performance qualifications shall be qualified in accordance with the applicable construction Code Section. Welding consumables shall be purchased in accordance with Section 3 of this manual, conform to an SFA specification and be stored in accordance with the manufacturer's recommendations.

### 3.0 RESPONSIBILITIES

#### 3.1 THE PLANT MANAGER OR DESIGNEE IS RESPONSIBLE FOR:

- 3.1.1 Ensuring welder/welding operators perform welding only to the procedures and/or processes for which they have been qualified and certified.
- 3.1.2 Ensuring welder/welding operators stamp their individual welds with their assigned symbol.
- 3.1.3 Ensuring all welding procedure specifications are available for review by the welder/welding operator.
- 3.1.4 Ensuring welder/welding operator and procedure qualification tests are performed and comply with the applicable Code Section prior to using either for Code projects.
- 3.1.5 Ensuring compliance with these defined welding consumable requirements:
  - All welding consumables are purchased per SFA specifications.
  - All welding consumables are stored per the manufacturer's recommendations.
  - Low hydrogen class electrodes are issued by a process that prevents electrodes from being subjected to open atmosphere exposure greater than one shift and if any quantity of electrodes is subjected to open atmosphere storage greater than one shift the entire amount of exposed electrodes are discarded.
  - Job or construction code specific consumable types or lot numbers are issued for production per an approved process.
- 3.1.6 Ensuring a record is maintained listing qualified welder/welding operators for each process and that a Continuity Log (exhibit H) is maintained to verify the welder/weld operator has used each qualified process within six months.

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**3.2 THE SHOP SUPERINTENDENT IS RESPONSIBLE FOR:**

- 3.2.1 Preparing and maintaining weld procedure specifications, weld procedure qualification records, and welder/welding operator qualification records.
- 3.2.2 Development and documentation of new or revised welding procedures.
- 3.2.3 Preparing and administering weld procedure specification and welder/weld operator qualification tests.
- 3.2.4 Reviewing laboratory test results of weld procedure specification, procedure qualification, and weld/welding operator qualification tests.
- 3.2.5 Certifying acceptable procedure qualification records and welder/welder operator records by electronically printing the name of the superintendent or designee in the field marked "certified". This field is password protected for security and cannot be electronically altered. The password is maintained in confidence and is possessed only by the Quality Director.
- 3.2.6 Assigning applicable weld procedure identification to the Code portions of fabrication drawings/documents.
- 3.2.7 Issuing new welder identification stamps to qualified welders/welding operators and retrieving stamps that are no longer valid.

**4.0 WELDING PROCESS REQUIREMENTS**

- 4.1 Welding shall be performed to a weld procedure specification properly qualified to the requirements of the applicable construction Code Section.
- 4.2 Welding shall be performed by welder/welding operators properly qualified to the requirements for each process utilized by that individual.
- 4.3 Certified weld procedure specifications, procedure qualification records, and welder/welding operator qualification records shall be available to the Authorized Inspector.
- 4.4 The Authorized Inspector may require re-qualification of weld procedure specifications or welder/welding operators with cause.

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**WELDING PROCESS CONTROL**

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- 4.5 Welder/welding operators shall have access to the weld procedure specifications defined on the fabrication drawings/documents.
- 4.6 Welder/welding operator continuity logs shall be maintained to indicate each qualified process has been used within six month intervals.
- 4.7 Welder/welding operator qualifications shall expire for each welding process that is not used and documented within a six month period.
- 4.8 Welder/welding operator qualifications shall be revoked when the inability to produce conforming welds has been demonstrated.
- 4.9 Welder/welding operators shall be assigned a unique symbol to identify their welds. Weld symbols removed from service shall not be reassigned for a period of three months.
- 4.10 Welder/welding operators shall identify their welds by marking with the unique symbol adjacent to the weld at 36" intervals maximum. A weld map may be used to record the weld symbols if actual marking is not practical. The weld map shall be maintained concurrent with fabrication.
- 4.11 Weld consumables shall be stored in accordance with the manufacturer's recommendations.
- 4.12 Low hydrogen electrodes shall not be exposed to open atmosphere longer than one shift. Electrodes that exceed the one shift exposure limit shall be discarded.

Note: Unused low hydrogen electrodes that have been exposed to open atmosphere for greater than one shift shall be discarded. No re-heating in a storage oven or re-baking in a re-bake oven is allowed.

- 4.13 Submerged arc welding fluxes shall be neutral. Fluxes shall remain in a sealed moisture resistant or heated container until loaded onto the welding equipment.
- 4.14 Items welded by a sub-contractor shall be supplied with a certified Partial Data Report or be an acceptable ASME/ANSI product standard as defined per the applicable code.
- 4.15 Tack welds shall be made by qualified welders.

# QUALITY CONTROL MANUAL

## IN-PROCESS AND FINAL INSPECTION

SECTION NO.: 5

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ASI APPROVED: Robert Roggendorff

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### 1.0 PURPOSE

To establish and document a system of in-process and final inspections that assures components and finished items conform to the applicable Code Sections for new construction and for repairs and alterations.

### 2.0 POLICY

All items constructed or repaired and/or altered shall be subjected to calculation, drawing, and specification review to determine appropriate review, monitor, witness, and hold points. These inspection points shall be determined independently by the Company's Quality Control personnel and the Authorized Inspector with consideration to design and fabrication complexity, and service requirements. Inspection points shall be documented and properly managed to ensure the selected inspection activities are performed.

### 3.0 RESPONSIBILITIES

#### 3.1 THE QUALITY DIRECTOR OR DESIGNEE IS RESPONSIBLE FOR:

- 3.1.1 Preparing the Inspection and Test Plan (exhibit I) that defines project specifications and quality control inspection activities.
- 3.1.2 Providing the Authorized Inspector with the Inspection and Test Plan and the project drawings/documents for review and designation of authorized inspection hold points prior to start of the Code fabrication.
- 3.1.3 Maintaining the in-process Inspection and Test Plan concurrent with the fabrication status and secure from loss or damage.
- 3.1.4 Providing the Authorized Inspector with material test reports, inspection reports, NDE reports, pressure test reports, or other documents as required.
- 3.1.5 Advising the Authorized Inspector of impending inspection points and ensuring hold points are successfully completed.
- 3.1.6 Acting as the liaison with the Authorized Inspector to resolve Code related concerns.
- 3.1.7 Producing and submitting the Manufacturer's Data Report to the Authorized Inspector for acceptance and signature.

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**IN-PROCESS AND FINAL INSPECTION**

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3.2 THE PLANT MANAGER OR DESIGNEE IS RESPONSIBLE FOR:

- 3.2.1 Ensuring fabrication, inspection, and test activities are performed in accordance with the Inspection and Test Plan.
- 3.2.2 Providing authority to prevent fabrication from proceeding beyond the designated Authorized Inspectors' hold point(s).

**4.0 INSPECTION AND TEST REQUIREMENTS**

- 4.1 All items shall be subject to a series of examinations performed by Additive Systems, Inc. Quality Control Inspectors. The examinations may include, but not be limited to the following entries defined on the Inspection and Test Plan, approved drawings, or Codes:
  - 4.1.1 Verifying the calculation and drawing approval.
  - 4.1.2 Verifying the weld procedures and qualifications.
  - 4.1.3 Verifying the materials; type, rating, and identification.
  - 4.1.4 Witnessing/verifying the fit-ups as required.
  - 4.1.5 Verifying the weld joint details and in-process welding.
  - 4.1.6 Witnessing/verifying internal inspection of units prior to closure.
  - 4.1.7 Verifying the nondestructive examination results.
  - 4.1.8 Witnessing/verifying the final dimensional and visual examinations.
  - 4.1.9 Witnessing/verifying the pressure testing results.

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**IN-PROCESS AND FINAL INSPECTION**

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- 4.2 The Quality Control Inspectors' and Authorized Inspectors' inspection points are identified on the Inspection and Test .
- 4.3 The Quality Control Inspector and Authorized Inspector may apply hold points wherever necessary and at any phase of the manufacturing process.
- 4.4 Inspection point entries shall be acknowledged when satisfactorily completed.
- 4.5 Nonconforming items shall be dispositioned in accordance with Section 6 of this manual.
- 4.6 Nondestructive examination shall be performed in accordance with Section 7 of this manual.
- 4.7 All non-destructive reports will be available to customers with invoice for product.
- 4.8 Calibration of measurement and test equipment shall be performed in accordance with Section 9 of this manual.
- 4.9 Quality records shall be produced and maintained in accordance with Section 10 of this manual.
- 4.10 Pressure testing shall be performed in accordance with the applicable Code section.
- 4.11 Indicating pressure gauges shall have a range not less than 1-1/2 times or more than 4 times the intended maximum test pressure.
- 4.12 The appropriate test reports will be available for customer review upon completion.
- 4.13 The Quality Control Inspector shall be responsible for verifying the required inspections and tests comply with requirements prior to approval.

# QUALITY CONTROL MANUAL

## NONCONFORMITIES

SECTION NO.: 6

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### 1.0 PURPOSE

To establish and document a system for identifying, dispositioning and managing non-conforming elements of a project or item.

### 2.0 POLICY

A nonconformity is any condition that does not meet the applicable rules of the pertinent Code Section. Nonconformities shall be documented on a Variation and Disposition Report (exhibit K) per the outlined procedure. All nonconformities shall be routed to the Authorized Inspector for concurrence to the disposition as required.

### 3.0 RESPONSIBILITIES

#### 3.1 THE QUALITY DIRECTOR OR DESIGNEE IS RESPONSIBLE FOR:

- 3.1.1 Ensuring that nonconforming elements are positively identified and defined.
- 3.1.2 Ensuring that nonconforming elements are reported and dispositioned.
- 3.1.3 Providing segregation of nonconforming elements.
- 3.1.4 Providing a positive method of identifying, tagging, and/or marking when segregation is not practical.
- 3.1.5 Informing the affected individuals of the variation and obtaining concurrence of the disposition when required.
- 3.1.6 Dispositioning or concurring with the disposition of the properly executed VDR.
- 3.1.7 Providing the VDR to the Authorized Inspector for review and concurrence to the disposition as required.
- 3.1.8 Ensuring the nonconformance is corrected per the agreed disposition.

#### 3.2 THE PLANT MANAGER OR DESIGNEE IS RESPONSIBLE FOR:

- 3.2.1 Dispositioning or concurring with the disposition of the properly executed VDR when applicable.

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**NONCONFORMITIES**

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- 3.2.2 Ensuring that nonconforming elements are processed in accordance with the concurred disposition.
- 3.2.3 Ensuring that nonconforming elements are segregated or identified as determined by the Quality Director or Designee.

**4.0 VARIATION AND DISPOSITION REPORT PROCEDURE**

- 4.1 Should an employee detect or have a variation reported, the employee shall advise the Plant Mgr. or Designee and/or QC Inspector who shall ensure a VDR is prepared using steps number 4.1.1 through 4.1.5. (See the Nonconformance System - Variation & Disposition Report procedure for detailed instructions.)
  - 4.1.1 Prepare the VDR with nonconforming element description and explanation of the variance.
  - 4.1.2 Segregate or otherwise identify the nonconforming element as applicable.
  - 4.1.3 Provide the disposition and or concur in conjunction with other affected individuals and the Authorized Inspector as required.
  - 4.1.4 Obtain Authorized Inspector concurrence before processing the disposition.
  - 4.1.5 Process the disposition, re-evaluate as required, complete the VDR documentation and release the element for further operations.
- 4.2 The Quality Director or Designee shall determine the elements that require segregation and or identification until a concurred disposition is obtained.
- 4.3 The Project Manager shall retain one copy of the completed VDR in the project file.
- 4.4 The Quality Director or Designee shall retain one copy of the completed VDR in the QC file marked "Code Nonconformance Records".

# QUALITY CONTROL MANUAL

## NONDESTRUCTIVE EXAMINATION

SECTION NO.: 7

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APPROVED: Robert Roggendorff

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### 1.0 PURPOSE

To establish a system for executing nondestructive examination which conforms to the applicable code.

### 2.0 POLICY

The Company or a qualified contractor shall perform the required examinations. All personnel performing nondestructive examination shall be qualified to SNT-TC-1A Code specified edition. The Company shall appoint an ASNT TC-1A Level III and maintain a letter of acceptance to the appointment.

### 3.0 PROCEDURE

#### 3.1 GENERAL

- 3.1.1 The Quality Director or Designee and the appointed Level III shall mutually develop the Additive Systems, Inc.'s nondestructive examination procedures.
- 3.1.2 The nondestructive examination procedures shall be reviewed and accepted by the Authorized Inspector.
- 3.1.3 The Authorized Inspector may request requalification of nondestructive examination procedures or personnel qualifications with sufficient cause.
- 3.1.4 Magnetic particle examination and liquid penetrant examination may be performed by the Company in accordance with ASNT-TC-1A (Code specified edition) and the applicable Code Section.
- 3.1.5 Radiographic examination and ultrasonic examination shall be performed by a qualified contractor. Magnetic particle examination and liquid penetrant examination may be contracted on selected projects. For any method, RT, UT, MT, or PT, the contractor shall perform examinations in accordance with ASNT- TC-1A (Code specified edition) and the applicable Code Section.

#### 3.2 QUALIFICATIONS

- 3.2.1 The Company shall appoint as its representative, a properly certified ASNT TC-1A Level III examiner employed by the nondestructive examination contractor. This Level III examiner shall accept the appointment by written communication which shall be on file in the Company records.

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- 3.2.2 Personnel performing nondestructive examination shall be qualified in accordance with ASNT-TC-1A (Code specified edition).
- 3.2.3 Only properly certified ASNT-TC-1A Level III personnel shall establish techniques.
- 3.2.4 Only properly certified SNT-TC-1A Level II or Level III personnel shall interpret results of examinations.
- 3.2.5 Current NDE technician certifications per SNT-TC-1A (Code specified edition), shall be maintained and be available to the Authorized Inspector.

**3.3 EXAMINATION**

- 3.3.1 The engineering drawings/documents furnished by customer shall define NDE requirements.
- 3.3.2 The Plant Manager or Designee is responsible for obtaining contract NDE services. The information provided to the contractor shall be as a minimum:
  - a. The specified Code Section edition and addenda.
  - b. Material specifications and nominal thickness.
  - c. Nondestructive examination method specified.
  - d. Acceptance criteria.
- 3.3.3 The Quality Director or Designee shall review and approve the NDE procedures.
- 3.3.4 Current NDE procedures shall be maintained and be available to the Authorized Inspector.
- 3.3.5 Certified NDE personnel shall perform and record results of NDE examinations in accordance with the approved NDE procedure.
- 3.3.6 The Plant Manager or Designee shall review all NDE reports and radiographic film to ensure compliance with the specified procedure and Code Section.
- 3.3.7 Radiographic film and NDE reports shall be retained in accordance with the applicable Code Section requirements.

**QUALITY CONTROL MANUAL**  
**CALIBRATION OF MEASUREMENT,  
EXAMINATION, AND TEST EQUIPMENT**

SECTION NO.: 9

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**1.0 PURPOSE**

To establish and document a system for calibrating precision measuring devices, pressure test gauges/recorders, and nondestructive examination equipment.

**2.0 POLICY**

Precision measuring devices, pressure testing gauges/recorders and magnetic particle examination yokes shall be checked and verified at specified intervals to ensure measurement and test results are accurate. Checks and calibrations shall be performed and recorded per procedure.

**3.0 RESPONSIBILITIES**

3.1 The Quality Director or Designee is responsible for:

3.1.1 Maintaining records of gauge, tool, and test equipment calibration.

3.1.2 Re-calibrating or replacing test equipment as required.

3.1.3 Making records available to the Authorized Inspector.

**4.0 PROCEDURE**

4.1 Deadweight Tester and Master Gauges

4.1.1 A properly calibrated and certified deadweight tester shall be used to check and calibrate pressure indicating gauges. When checking/calibrating beyond the effective range of the deadweight tester, a master gauge shall be used.

4.1.2 Dead weight tester and master gauge(s) shall be calibrated annually by an independent laboratory.

4.2 Pressure Testing Gauges and Recorders

4.2.1 Gauges/recorders used to indicate pneumatic or hydrostatic test pressures shall be uniquely identified.

4.2.2 Production pressure test gauges shall be checked and calibrated against a dead weight tester or certified master gauge annually. Regardless of the certification date any gauge that appears physically damaged, is known to have experienced a sharp impact, or indicates questionable values shall be removed from service, re-calibrated and/or repaired as necessary.

**QUALITY CONTROL MANUAL**  
**CALIBRATION OF MEASUREMENT,  
EXAMINATION, AND TEST EQUIPMENT**

SECTION NO.: 9

PAGE 2 OF 2

APPROVED: Robert Roggendorff

DATE: 09 March. 1999

ACCEPTED: Jeff Fitzwater

DATE: 09 march. 1999

REVISION NO.: 1

4.3 Precision Dimensional Measuring Instruments

4.3.1 Micrometers and vernier calipers shall have unique identification.

4.3.2 Micrometer and vernier calipers shall be checked on standard gage blocks or gage rods before each use.

4.4 Magnetic Particle Testing Yokes

4.4.1 Magnetic particle examination yokes shall be checked in accordance with ASME Sec. V.

4.4.2 The magnetizing force of yokes shall be checked annually or whenever damage is suspected. Yokes that are out of service for one year or longer shall be checked prior to the first use.

4.4.3 Each alternating current electromagnetic yoke shall have a lifting power of 10 lb. minimum at the maximum pole spacing expected.

4.4.4 Each direct current or permanent magnet yoke shall have a lifting power of 40 lb. minimum at the maximum pole spacing expected.

4.4.5 Each test weight shall be weighed and marked with the applicable nominal weight before the first use. A weight need only be verified again if damaged in a manner that may have caused potential loss of material.

**5.0 RECORDS**

5.1 A record of the check and calibration results shall be documented on a pressure gauge calibration record (exhibit M).

5.2 Each item that is subject to calibration shall have the calibration status clearly identified on a calibration sticker affixed in a conspicuous position.

5.3 Certificates of calibration by outside laboratories and/or traceable to national standards when required shall be maintained in the quality control office.

**QUALITY CONTROL MANUAL**  
**QUALITY RECORDS**

SECTION NO.: 10
PAGE 1 OF 1
APPROVED: Robert Roggendorff
DATE: 03 Aug 1998
ACCEPTED: Jeff Fitzwater
DATE: 03 Aug 1998
REVISION NO.: 2

**1.0 PURPOSE**

To establish and document a system for producing, maintaining, and retaining quality records.

**2.0 POLICY**

A file for projects shall be produced and maintained in the QC department throughout the fabrication and testing portion of the project. The file content and retention period shall be as required by the applicable Code Section.

**3.0 RESPONSIBILITIES**

**3.1 THE QUALITY DIRECTOR OR DESIGNEE SHALL ENSURE:**

- 3.1.1 Manufacturers Data Reports are properly selected, prepared, and signed.
- 3.1.2 Manufacturers Data Reports are provided to the Authorized Inspector for signature.
- 3.1.3 Manufacturer's Data Reports are maintained and retained per procedure.

**4.0 PROCEDURE**

**4.1 RECORDS REQUIREMENTS**

- 4.1.1 Retain one copy of Section VIII Division 1 Manufacturer's Data Reports for five years from date of Authorized Inspector signature.
- 4.1.2 Retain one copy of Section I Manufacturer's Data Reports, radiographs and ultrasonic examination reports for five years from the date of Authorized Inspector signature.

**QUALITY CONTROL MANUAL**  
**QC MANUAL AND QC MANUAL**  
**REVISION CONTROL**

SECTION NO.: 11

PAGE 1 OF 2

ASI APPROVED: Robert Roggendorff

DATE: 03 Aug 1998

ACCEPTED: Jeff Fitzwater

DATE: 03 Aug 1998

REVISION NO.: 2

**1.0 PURPOSE**

To establish and document a system for controlling the distribution of Quality Control Manuals and preparing and distributing revisions to the Quality Control Manual.

**2.0 POLICY**

The Quality Control Manual shall be routinely reviewed for content. Changes in the Company's operating procedures or requirements affecting the content shall result in the required revisions being made accordingly.

**3.0 RESPONSIBILITIES**

**3.1 THE QUALITY DIRECTOR OR DESIGNEE SHALL ENSURE:**

- 3.1.1 The manual is current with operating procedures and related code requirements.
- 3.1.2 The manual revisions are properly documented and distributed.
- 3.1.3 The manual control and revision process is performed per procedure.

**4.0 PROCEDURE**

**4.1 MANUAL CONTROL REQUIREMENTS**

- 4.1.1 Each controlled copy of the manual shall be assigned a unique identification number.
- 4.1.2 The distribution list shall be controlled and maintained.
- 4.1.3 The Quality Director approval and Authorized Inspector acceptance of the manual shall be indicated on each page by handwritten initials and date.
- 4.1.4 Any Company employee or the Authorized Inspector may propose revisions.
- 4.1.5 Revision proposals shall be submitted to the Quality Director for evaluation.
- 4.1.6 Upon approval by the Quality Director, the proposed revision shall be provided to the Authorized Inspector for review and acceptance.

**QUALITY CONTROL MANUAL**  
**QC MANUAL AND QC MANUAL**  
**REVISION CONTROL**

SECTION NO.: 11

PAGE 2 OF 2

ASI APPROVED: Robert Roggendorff

DATE: 14 Mar. 1997

ACCEPTED: Jeff Fitzwater

DATE: 14 Mar. 1997

REVISION NO.: 1

- 4.1.7 The Quality Director approval and Authorized Inspector acceptance of revised portions shall be indicated on each page by handwritten initials and date.
- 4.1.8 Revised pages shall be distributed to the controlled manual holders upon acceptance by the Authorized Inspector.
- 4.1.9 One copy of the quality manual with current revisions shall be available to the Authorized Inspector at the plant location or field sites.

# QUALITY CONTROL MANUAL

## REPAIRS AND ALTERATIONS

SECTION NO.: 12

PAGE 1 OF 2

ASI APPROVED: Robert Roggendorff

DATE: 20, Nov. 1997

ACCEPTED: Jeff Fitzwater

DATE: 20, Nov. 1997

REVISION NO.: 0

### 1.0 PURPOSE

To establish and document a system for providing repair and alteration of pressure retaining equipment.

### 2.0 POLICY

Repair and alteration services shall be performed in accordance with the applicable code, Jurisdictional requirements, and the quality control system as defined by this quality control manual.

### 3.0 DEFINITIONS

#### 3.1 ALTERATION:

Any change in the item described on the original Manufacturer's Data Report which affects the pressure containing capability of the pressure containing item.

Non-physical changes such as an increase in the maximum allowable working pressure, internal or external, or design temperature shall be considered an alteration.

A reduction in minimum temperature requiring additional mechanical tests shall be considered an alteration.

#### 3.2 REPAIR:

The work necessary to restore a pressure containing item to a safe and satisfactory operating condition, provided there is no deviation from the original design.

### 4.0 RESPONSIBILITIES

4.1 The Quality Director or Designee shall assure overall responsibility for the performance of repairs and alterations and for originating the construction procedures necessary to direct the course of work. The method of repairs or alterations shall be made available to the Authorized Inspector responsible for the inspection of the item. The Quality Director or Designee shall make available to the Authorized Inspector proposed procedures for the method and extent of the repairs or alterations, including all examinations and tests to be performed. Under no circumstances shall work be started without authorization of the Authorized Inspector.

# QUALITY CONTROL MANUAL

## REPAIRS AND ALTERATIONS

SECTION NO.: 12

PAGE 2 OF 2

ASI APPROVED: Robert Roggendorff

DATE: 14 Mar. 1997

ACCEPTED: Jeff Fitzwater

DATE: 14 Mar. 1997

REVISION NO.: 1

### 5.0 MATERIALS

- 5.1 The materials used in making repairs or alterations shall conform to the requirements of the original construction standard. . Should the Company provide the materials; the procurement, inspection, and handling of material shall be in accordance with the applicable section of this manual. Should the material be provided by others, they shall provide sufficient documentation for acceptance of material by the Quality Control Inspector and the Authorized Inspector.

### 6.0 FABRICATION

- 6.1 Welding and nondestructive examinations, as required shall be in accordance with the requirements of the applicable Code and shall conform to the applicable sections of this manual.

### 7.0 TESTING

- 7.1 Pressure tests shall conform to the requirements of the specified engineered specifications, and shall be witnessed by the Authorized Inspector and the Quality Control Inspector.
- 7.2 When pressure testing is not practical, the Quality Control Manager shall obtain the approval of the Authorized Inspector. This approval must be obtained before performing any alternative examinations or testing.

### 8.0 REPORT DISTRIBUTION

- 8.1 The Quality Director or Designee shall distribute the completed reports as described:

- 8.1.1 ALTERATIONS -- Legible copies of the completed Form R-2 "Report of Alteration" together with attachments shall be distributed to the Authorized Inspection Agency responsible for the inservice inspection, the owner/user, and the jurisdiction if required.
- 8.1.2 REPAIRS -- Legible copies of the completed Form R-1 "Report of Welded Repair" together with attachments shall be distributed to the authorized inspection agency responsible for the inservice inspection, the owner/user, and the jurisdiction if required.

# QUALITY CONTROL MANUAL

## FIELD EXTENSION

SECTION NO.: 13

PAGE 1 OF 2

ASI APPROVED: Robert Roggendorff

DATE: 14 Mar. 1997

ACCEPTED: Jeff Fitzwater

DATE: 14 Mar. 1997

REVISION NO.: 1

### 1.0 PURPOSE

To establish and document a system for extending the quality control system to the field.

### 2.0 POLICY

Field assembly or fabrication performed or supervised by the Company shall be executed in accordance with this Quality Control Manual in its entirety except any deviations noted in this section.

### 3.0 DRAWINGS, DESIGN CALCULATIONS AND SPECIFICATIONS

3.1 The Project Manager or Designee is responsible for preparing drawings, bills of material or other documents limited strictly to materials used and work to be performed in the field.

### 4.0 MATERIAL CONTROL

4.1 Material used in field assembly and fabrication shall be purchased, received and inspected by the Quality Control Inspector in the field following procedures outlined in Section 3 of this manual.

### 5.0 PROCESS CONTROL - WELDING

5.1 Field welding shall be performed with Company approved sub-contract welders and welding operators or Company qualified welders and welding operators in accordance with the applicable weld procedure specification.

5.2 Field welding shall be supervised by the Company field superintendent.

5.3 Provisions shall be made for proper field storage of welding material per Section 4 of this manual.

### 6.0 IN-PROCESS AND FINAL INSPECTION

6.1 Examination and sign off by the Quality Control Inspector and notification of the Authorized Inspector shall be performed per Section 5 of this manual.

### 7.0 NONCONFORMITIES

7.1 Correction of nonconformities shall be as outlined in Section 6 of this manual.

**QUALITY CONTROL MANUAL**  
**FIELD EXTENSION**

SECTION NO.: 13

PAGE 2 OF 2

ASI APPROVED: Robert Roggendorff

DATE: 20, Nov. 1998

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DATE: 20, Nov. 1998

REVISION NO.: 0

**8.0 NON-DESTRUCTIVE EXAMINATION**

8.1 The engineered customer drawings/documents should specify the extent of non-destructive examination to be performed.

8.2 Procedure, personnel qualification and Authorized Inspector notification shall be performed per Section 7 of this manual.

**9.0 QUALITY RECORDS**

9.1 In-process records shall be maintained at the field site, permanent records shall be retained at the Company per Section 10.

**QUALITY CONTROL MANUAL**  
**AUTHORIZED INSPECTOR**

SECTION NO.: 14

PAGE 1 OF 1

ASI APPROVED: Robert Roggendorff

DATE: 25 May, 1998

ACCEPTED: Jeff Fitzwater

DATE: 25 May, 1998

REVISION NO.: 2

**1.0 PURPOSE**

To define the authority of the Authorized Inspector.

**2.0 POLICY**

The Authorized Inspector shall be an employee of an accredited Authorized Inspection Agency under contract with Additive Systems, Inc. or customer. Authorized Inspectors shall have been qualified by a written examination under the rules of any state of the United States or province of Canada which has adopted the applicable Code.

**3.0 PROCEDURE**

- 3.1 The Authorized Inspector shall have free access to the plant or field site where work is in progress.
- 3.2 In-process fabrication, examination, and tests may be monitored by the Authorized Inspector at any point. The Authorized Inspector may witness, or at his option, audit examination and test reports to determine the acceptability of the items involved.
- 3.3 Corrective action relative to nonconforming design, drafting, materials, fabrication, examination, or testing are subject to review and concurrence by the Authorized Inspector.
- 3.4 The Authorized Inspector may select inspection points prior to fabrication or repairs and may add any additional inspection points during the manufacturing phase he deems necessary.
- 3.5 Radiographic film viewing facilities, equipment, and film density strip shall be available to the Authorized Inspector at locations where work is being performed.
- 3.6 The Authorized Inspector shall witness final hydrostatic and pneumatic tests required by the specified code.
- 3.7 The Authorized Inspector may certify Manufacturer's Data Reports after the requirements of the applicable Code Sections have been satisfied and each Manufacturer's Data Report is correct and complete.