

## SELLER QUALITY REQUIREMENTS QCS-001 PROCESSING SOURCES

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**Notice:** A hard copy of this document may not be the document currently in effect. The current version is always the version on the Lockheed Martin network.

\* REVISED

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### **A. GENERAL REQUIREMENTS**

- \*\* 1. The terms "PO" and "Items" have the same meaning as the terms "Contract" and "Work," respectively, where the terms "Contract" and "Work" are used in the purchase order of which this document is a part.
- \* 2. Seller, where used herein, is defined as a QCS-001 Source performing work for either a Lockheed Martin Aeronautics Company (LM Aero) purchase order ("PO") or for a LM Aero sub tier's purchase order where work is performed for LM Aero Items. The QCS-001 Directory is used to identify both the process sources and the controlled processes that require LM Aero approval, prior to use for Items delivered to LM Aero.
  - \*\* Seller's documented quality system shall consist of Internet access for obtaining requirements of the PO which this document is a part.
  - \*\* Unless otherwise authorized in writing by Buyer, Seller shall ensure that all records, reports, work instructions, specifications, drawings and other documentation shall be in English.
- \*\* 3. Seller shall require control of quality at all points necessary to assure conformance to the PO's requirements, whether performed by Seller or by Seller's sub-tiers.
- \*\* 4. Seller's documented quality system shall provide for the review of the PO to ensure that quality requirements are incorporated into manufacturing planning, and inspection and test instructions, as applicable, to assure compliance with the PO.
- \*\* 5. Seller shall utilize written instructions for all manufacturing, processing and inspection operations. Instructions may be in the form of planning, manufacturing operation sheets, work orders, shop orders, travelers or any other identifying document. Such instructions shall identify in sufficient detail, the controls and conditions of manufacturing peculiar to the Item being manufactured, assembled, inspected and tested. Changes to work instructions shall be traceable and approved prior to use. Refer to paragraph N.1. through 5. for minimum work instructions and/or planning requirements.

- \*\* 6. Seller shall establish controls to prevent the use of non-certified materials when certified materials are required.
- \*\* 7. Seller shall establish controls to ensure that material subject to age control, shelf life, or environmental controls are properly identified, monitored and maintained.
- \*\* 8. Seller shall control drawings, specifications and supplemental instructions and changes thereto to the extent necessary to ensure that only documents of the revision specified in the PO are utilized.
- \*\* 9. Seller shall maintain a system to ensure removal of obsolete documentation from the manufacturing, inspection and test areas.
- \*\* 10. Seller shall notify Buyer when Seller and/or any of their sub-tiers are found to be non-compliant to Buyer specification, disapproved by Seller and/or a Government Agency, or a Government/Industry Data Exchange Program ("GIDEP") alert is required.

**B. Quality System**

- 1. Seller shall maintain a documented Quality System that meets the requirements of Appendix QJ and the PO for the Items (including "items" and "Work" as such terms may be used in the PO's definitions) covered herein.

**\* C. Access to Facilities**

- 1. Seller shall provide and obtain for Buyer, Buyer's Customers, and appropriate regulatory agencies access to any and all facilities, including those facilities of Seller's subcontractors, where work on Items is being performed or is scheduled to be performed under this PO. Buyer shall have the right to perform in-process inspection, audits, and system surveillance at Seller and Seller's subcontractors' facilities as part of verification of conformance to the requirements of the PO at any time Buyer requests reasonable access. Access denial may result in inactivation of Seller's approvals.

Work under the PO is subject to Buyer's periodic audit of Seller's compliance with Seller's internal procedures and other documents applicable to the PO.

Seller shall provide, at no increase in price, cost or fee to Buyer, Government or appropriate regulatory agencies, suitable facilities at Seller and Seller's subcontractors' manufacturing locations for Buyer, Government, and regulatory agency representatives to perform compliance verification.

Seller shall provide Buyer's Field Representative with internet access via one of the following methods:

- Direct Non-Digital telephone line
- ISDN Line
- DSL Line
- High-Speed Internet Access via Seller's Network

Seller shall include the provisions of this paragraph in each purchase order, if any, with each of its subcontractors where work is being performed or is scheduled to be performed in connection with the PO, and shall require that this paragraph is inserted in all subcontracts at every tier, and noting that the term Buyer refers to Lockheed Martin Corporation acting through its Lockheed Martin Aeronautics Company business unit.

#### **D. Contract Review and Planning**

- \* 1. Seller must maintain and control QCS-001 processes through written work instructions and/or planning.
  - \*\* NOTE: Seller shall ensure that work instructions and/or planning include, as a minimum, the applicable requirements in Paragraph N.
- \* 2. Seller shall have a system in place to ensure that all Buyer unique requirements are translated to operational work instructions and/or planning.
- 3. Seller shall review all purchase orders to ensure that purchase orders contain referenced specification(s), revision level(s) and drawing(s) requirement(s).
- \* 4. Seller shall have a documented system to ensure that work instruction and/or planning changes are reviewed, as a minimum, by production, engineering, and quality.
- 5. Seller shall clearly define control of processes, training, certification of personnel, interpretation of results, and final disposition of parts, in documented procedures.
- \* 6. Seller shall ensure that personnel have the required training and experience commensurate with the requirements necessary to perform work.
- \* 7. Seller shall inspect parts or materials received from Buyer or items from Buyer's sub tiers for verification of condition, quantity, serialization, when required and dimensional data, when required.

- \* 8. Seller shall have a documented quality system for controlling and maintaining traceability of Items processed.
  - 9. Seller shall review QCS-001 and ensure Seller is approved to perform each QCS-001 controlled process, prior to performing work.
  - \*\* 10. Seller shall ensure, that any furnace used for curing, or embrittlement relief, the furnace/oven chart(s) are identified with traveler number, time in, time out, quantity, stamped/signed off by operator.
- \* **E. Selection, Control and Requirements Flow Down to Every Tier**
- 1. Seller's documented quality system shall include procedures for determining the capability of sub-tier suppliers, prior to issuance of Seller's purchase order to any such sub-tier supplier.
  - 2. When Seller performs a Quality System Survey or Evaluation for a sub-tier supplier facility, Seller shall document the results of each survey or evaluation.
  - 3. Seller is responsible for ensuring all materials, services and components it procures for incorporation into the Items conform to all requirements of the PO.
  - 4. Seller shall define and establish a program for determining the need for periodic re-audit or re-evaluation of Seller's sub-tier suppliers to ensure compliance with the PO.
  - 5. Prior to production and award of subcontracts, Seller shall institute a program that will ensure control of the quality of all Items procured by Seller in support of the PO.
  - 6. Seller shall include the applicable portions of the PO in each of its purchase orders, if any, with each of its sub-tiers where work is being performed or is scheduled to be performed in connection with the PO and require that, where applicable, such portions are inserted in all subcontracts at every tier.
  - \*\* 7. Seller shall include in its purchase orders to sub-tiers the applicable revision or amendment level for referenced Buyer specifications and other documents.
  - \*\* 8. Seller shall include a complete description of Buyer requirements in purchase orders issued to its sub-tiers.
  - \*\* 9. Seller shall maintain a documented Receiving Inspection function to ensure material received from Seller's sub-tiers is inspected to and meets the requirements of the PO. Verification of Item conformance to drawings, specifications and requirements of the PO shall be per inspection plans, including sampling where applicable, audits,

and certifications of conformance at Seller or Seller's sub-tier facilities, as appropriate. Seller shall properly segregate inspected Items from Items awaiting inspection.

- \*\* 10. Seller shall identify and document incoming material as to acceptance or rejection status. Seller shall ensure that such material is identifiable to the PO and material certifications.

**\*\* F Selection, Control and Contract Flow Down to Quality Control Specification (QCS)-001 Sources**

- \* 1. QCS-001 is used to identify both the process sources and the processes that require Buyer approval, prior to use for Items delivered to Buyer. A controlled process is an operation performed on an Item where the operation is not readily inspectable subsequent to its conclusion. Controlled processes have verifiable controls inherent to the process i.e. heat treat, plating, nondestructive testing, etc.
- \* 2. The use of approved sources listed in QCS-001 are not applicable to standard hardware (nuts, bolts, washers, etc.) that is ordered to military, federal or industry specifications or standards (e.g., MS, AN, NAS, etc.) or to metallic raw material (plate, sheet, bar, extrusion, etc.) that is purchased from a mill.
- \*\* 3. Buyer accepts Seller's use of all Nadcap approved sources for Industry Standards controlled by QCS-001. Seller shall ensure that a source is currently approved by Nadcap, prior to a source performing work on Items. Seller can access Nadcap approved sources @ <http://www.pri.sae.org> or <http://www.eauditnet.pri.sae.org>. Upon request by Buyer, Seller shall provide Buyer with objective evidence that Seller selected and used a currently approved Nadcap source. Buyer does not mandate Nadcap and shall not be responsible for any cost associated with Nadcap accreditation or the use of a Nadcap approved source or process. Buyer reserves the right to validate, using normal survey, audit practices, any Nadcap approved source or process.
- \* 4. The list of both Buyer-controlled processes and Buyer-approved sources can be found on Buyer's Internet Home Page at: <http://www.lockheedmartin.com/material-management/>
  - Highlight "Quality Requirements"
    - Select "Supplier Quality Management System"
      - Select "Supplier Quality Management" and follow instructions
- \* 5. Seller shall use Buyer-approved sources for Buyer-controlled processes.

- \* 6. Seller shall review the list of Buyer-approved sources for Buyer-controlled processes, prior to using a process source for a controlled process listed in QCS-001, and select process sources that are approved by Buyer.
- \*\* 7. If Seller performs or directs Seller's sub-tier to perform work controlled by QCS-001 without Buyer's approval, Buyer may disapprove Seller's quality system.
- \* 8. Seller's utilization of Buyer-approved sources does not relieve Seller from the obligations to ensure subcontracted sources are in full compliance with applicable process specifications and to deliver conforming Items. Upon request by Buyer, Seller shall provide objective evidence that such compliance was attained and that such conforming Items were delivered.
- \* 9. Seller shall be responsible for ensuring that Seller or QCS-001 sources have the appropriate revision level of the process standards/specifications prior to performing work in connection with the Items.
- \* 10. Seller shall maintain objective evidence that each Buyer-approved process source selected by Seller is being monitored to ensure compliance with all applicable process specifications. Upon request by Buyer, Seller shall provide Buyer with objective evidence of such compliance.
- \* 11. Seller shall ensure process controls are established and required process control tests are accomplished at required intervals to ensure continued compliance to process specifications.
- \* 12. For all tiers to Seller, Seller shall ensure all Seller purchase orders and/or associated purchase order documents for Buyer-controlled processes include the following statements or the statement in the Note after 12.e.:
  - a) A statement with the words, "Work to be accomplished in performance of this purchase order is directly related to a Lockheed Martin Aeronautics Company purchase order and must be accomplished in accordance with process specification on this purchase order and Lockheed Martin Aeronautics Company Appendix QJ."
  - b) A statement that Seller's supplier must file and maintain a copy of all purchase orders containing the above statement and make these available for review by Buyer, upon request.
  - c) A statement that Seller's supplier must submit a Certificate of Conformance ("C-of-C") with a unique certification number containing the following information:
    - 1. title and specification number (including revision letter) of the process;

2. name and address of the process or NDT facility;
  3. Buyer's assigned processor number;
  4. date the C of C was issued;
  5. purchase order part number;
  6. quantity of parts (to include quantity accepted/ rejected);
  7. signature and title of authorized quality agent of Seller; and
  8. fracture durability classification or serialization when required.
- d) A statement to ensure Seller's supplier suitably wrapped, boxed or racked parts to guard against shipping damage and to apply rust or corrosion protection.
- \*\* e) A statement requiring Seller's supplier to identify specification(s) title, specific revision level(s) and drawing(s) requirement(s) to be performed by a QCS-001 source.

Note: Seller can also use the following statement in lieu of the above statements a. – e. to meet the requirements of this paragraph:

A statement with the words, "Work to be accomplished in performance of this purchase order is directly related to a Lockheed Martin Aeronautics Company purchase order and must be accomplished in accordance with process specification on this purchase order and Lockheed Martin Aeronautics Company Appendix QJ. All requirements of Appendix QR paragraph 12. a. - e. shall be accomplished. Appendix QR is located at <http://www.lockheedmartin.com/material-management/>."

13. Seller shall review testing lab C of C to ensure all required testing has been accomplished and meets all requirements of the testing specification.
14. Seller shall submit all requests for additional QCS-001 process approvals in writing to Buyer.

\*\* **G. Seller's Performance of QCS-001 Processes**

1. Seller shall, when performing QCS-001 Controlled Processes in Seller's facility, accomplish QCS-001 processes in accordance with the applicable process specification(s) and Lockheed Martin Aeronautics Company Quality Appendix QJ. Quality Appendix QJ can be found at:

<http://www.lockheedmartin.com/material-management/>

- Highlight "Quality Requirements" and select "Appendices"

\* **H Calibration**

1. QCS-001 Source shall maintain a calibration system that is compliant with the requirements in ISO 9001, ISO 10012-1, MIL-STD 45662A, or ANSI Z540.

**I. Control and Processing Nonconforming Material and Corrective Action**

- \* 1. Seller shall implement and maintain a documented quality system, which provides for identification, documentation, segregation and disposition of nonconforming material and shall ensure effective, positive corrective action is taken (including repetitive nonconformances dispositioned "Use As Is" by Buyer's or Seller's material review board ["MRB"] actions) to prevent, minimize, or eliminate nonconformances. Seller's quality system shall ensure that non-conforming material is not used for production purposes.
- \* 2. Seller shall maintain records of all nonconforming material, dispositions, assignable causes, corrective actions, and effectiveness of corrective actions for the period specified in the PO.
- \* 3. Seller shall evaluate each nonconformance for its potential to exist in previously produced or delivered Items. If a nonconformance exists, Seller shall notify Buyer, in writing, within 24 hours for issues impacting flight safety, and, in writing, within 5 working days for all other issues.
- \* 4. Seller shall respond to all Buyer requests for corrective action. In addition to completing Buyer Corrective Action Request ("CAR"), Seller shall perform specified checklist per the CAR, as required. When requested by Buyer, Seller shall provide trend data and findings for Buyer returned Items.
- \* 5. Seller shall assess all Buyer identified nonconformances and take the appropriate actions to ensure causes of nonconformance are corrected. Seller shall notify Buyer in accordance with the instructions at:  
  
<http://www.lockheedmartin.com/material-management/>
  - Highlight "Quality Requirements"
  - Select "Forms"
  - Select "Supplier Confirmation/Action Report(SCAR)" to view and print the form.
- \* 6. If Seller does not respond by Seller Confirmation Action Report ("SCAR") within 30 days of receipt by Seller of the nonconforming Item, Seller shall be deemed to have accepted responsibility for the identified nonconformance.



- \*\* 7. When Buyer has a direct PO with Seller and Seller identifies any nonconformance upon receipt of Item(s), Seller shall process all nonconformances in accordance with paragraphs J.4. and J.5. to obtain Buyer disposition.

\* **J. Material Review Authority**

\*\* **Material Review Authority (MRA) for Seller-Designed Items**

- 1. Seller has Material Review Authority (“MRA”), except for nonconformances that affect a parameter controlled by Buyer drawing or specification, where form, fit, function, interchangeability or reliability is affected. Seller shall submit dispositions of nonconforming Items, if any, regarding any such parameter(s) to Buyer for approval.

**MRA for Buyer-Designed Items**

- \* 2. Seller disposition authority is limited to scrapping of Items, eliminating the nonconformance by rework to engineering, or returning to vendor. On Items of Buyer design, Seller shall document nonconforming Items for submittal to Buyer’s Material Review Board (“MRB”) for dispositions as required by this PO. Seller’s continued processing, prior to Buyer’s MRB disposition, of any Buyer-designed Items containing a nonconformance prior to Buyer’s MRB disposition will be at Seller’s risk.
- \* 3. If Buyer has authorized “delegated MRA” to Seller on Buyer-designed Items, Seller shall exercise such MRA except for nonconformances of a parameter that affects form, fit, function, interchangeability or reliability.

Seller shall submit requests for MRA on Buyer-Designed Items in writing to Buyer.

**Material Review Board Submittals**

- \* 4. Seller’s request for Buyer MRB disposition of Seller or Buyer-designed Items shall be submitted in accordance with Buyer instructions located at:

<http://www.lockheedmartin.com/material-management/>

- Highlight “Quality Requirements”
- Select “Corrective Action”

- \* 5. Seller shall not incorporate any nonconforming Items into any product, process, procedure or data that affects a parameter controlled by Buyer drawing or specification or has an affect on form, fit, function, interchangeability or reliability unless and until Seller has received prior written approval from Buyer to do so.

- \* 6. Buyer and Buyer's customers shall each have the right to refuse to accept any nonconformances. When and to the extent Government Source Inspection ("GSI") is a requirement of the PO, and Buyer's customer has delegated MRA to Sellers cognizant government representatives, Seller shall submit material review dispositions to Seller's local Government representative for concurrence.
- \*\* 7. Prior to delivering items that have Buyer MRB dispositions, Seller shall ensure that root cause analysis and corrective action plan for that discrepancy has been initiated and/or completed. Corrective action shall be submitted to the Buyer with other final acceptance paperwork.

\* **K. Product Certifications and Acceptance**

- \*\* 1. Seller's documented quality system shall provide a means for maintaining the indications of inspection status.
  - a. Seller shall use inspection stamps of a design distinctively different from inspection stamps used by Buyer and Buyer's Customers.
  - b. Seller's documented quality system shall provide a method for the control and issuance of inspection stamps and for the prevention of unauthorized use of such stamps.
- \* 2. Seller shall prepare a C-of-C stating that Items provided under the PO meet all requirements of the PO. This C-of-C shall be included with Seller's shipping document to Buyer.
- \*\* 3. When QCS-001 controlled processes are performed by Seller or Seller uses an outside source(s), Seller shall provide Buyer, at time of Buyer's acceptance, objective evidence that Seller or outside source used is approved by Buyer on date of acceptance by Buyer, regardless of when work was performed. If Seller and/or source used were approved at the time work was performed but is not approved at time of Buyer's acceptance, Seller must contact Buyer for Item(s) disposition.
- \*\* 4. If and when Buyer's customer requires source inspection, Seller shall obtain objective evidence of Buyer's customer representative's inspection by signature and title or by stamp on any shipping documents required by the PO.
- \*\* 5. **Buyer Inspection at Source Requirements**

Seller shall not increase PO price, cost or fee, when Buyer Inspection at Source is being imposed on PO.

If and when the PO imposes Buyer Inspection at Source, Seller shall obtain evidence of Buyer's Field Representative's acceptance, prior to shipment. Seller shall notify Buyer's Field Representative within five (5) days of receipt of the PO and provide the Buyer's PO number, part number and scheduled ship date as well as whether any special clearances are required.

Seller shall also notify Buyer's Field Representative a minimum of 48 hours, prior to when the Item(s) are ready for shipment.

A directory of Seller's assigned Field Representative(s) may be obtained at:

<http://www.lockheedmartin.com/material-management/>

- Highlight "Quality Requirements"
  - Select "Supplier Quality Management System"
  - Select "Supplier Quality Management"
    - After LOG-IN, select "Supplier Summary"

- \*\* 6. If Seller has received Buyer delegation, Seller must ship product under the guidelines of the specific delegation. When any of the following conditions exist, Seller shall obtain evidence of Buyer's Field Representative's final acceptance on the applicable Procured Material Report (PMR) or DD250, prior to shipment:
- The Item(s) require First Article Inspection ("FAI")
  - The Item(s) require Government Inspection at Source
  - The Item(s) were rejected by Buyer and return to Seller for rework/repair and/or replacement
- \* 7. Seller shall prepare and submit with each shipment a Certificate of Conformance that includes the following information:
- a. title and specification number (including revision letter) of the process;
  - b. name and address of the process or NDT facility;
  - c. Buyer's assigned processor number;
  - d. date the C of C was issued;
  - d. purchase order part number;
  - e. quantity of parts (to include quantity accepted/ rejected);
  - f. signature and title of authorized quality agent of seller; and
  - h. fracture durability classification or serialization when required.

#### **L. Changes to Seller's Operations**

- \* 1. Seller shall notify Buyer, in writing, of any change in status of its documented quality system as a result of any Government or regulatory agency action.

- \* 2. Seller shall also notify Buyer, in writing, upon any sale, relocation or transfer of manufacturing operations, or organization change (change in Owner, President, Quality Vice-President, Director and/or Manager, NDT Level II or III or Chemist) or procedure change that could impact Item quality. Seller shall notify Buyer within 48 hours of each such change.
- \*\* 3. Seller shall notify Buyer's Field Representative of product changes which result in either an initial or delta FAI.

\* **M. Records**

- \* 1. Seller shall maintain complete records of all manufacturing, inspecting and testing in connection with the Items. At Buyer's election, and at no additional price, cost or fee, Seller shall provide such records to the Buyer, Buyer's Customers and/or appropriate regulatory agencies during the performance of the PO and for at least three (3) years after completion of the PO or for such longer periods, if any, as may be specified elsewhere in the PO. Upon Buyer's request therefor, Seller shall forward such records to Buyer at no price, cost or fee to Buyer.

For at least seven (7) years after completion of the PO, Seller shall maintain and provide to Buyer, upon request, records of all QCS-001 process control tests, e.g. monthly or by lot and inspection, of processed items performed by Seller.

- \* 2. Seller shall maintain activity data on each Buyer-approved process performed for Buyer or any QCS-001 Source utilized, if any, compile a quarterly report and submit it to Buyer at <http://www.lockheedmartin.com/material-management/> and select "Supplier Quality Management System". Seller shall submit the quarterly report within fifteen (15) calendar days of the end of each calendar quarter. The report shall contain the following information:
  - a. QCS-001 source name;
  - b. Buyer's assigned QCS-001 Source number,
  - c. Process specification used by specification number;
  - d. Quarterly frequency of use, and
  - e. Details ( such as specification, noncompliance and date work was performed) on all Seller rejections associated with work performed by a QCS-001 source

\*\* **N. Minimum Work Instructions and/or Planning Requirements**

Seller shall ensure that work instructions and/or planning include, at a minimum, the following requirements for each process performed:

Note: Seller shall provide copies of work instructions and/or planning upon Buyer request.

## 1. **Process Planning – Non-Destructive Testing**

### a. Penetrant

- Sensitivity level of penetrant used
- Dwell and development times
- Pre-cleaning method(s)/material(s), immersion times, temperatures and tank numbers
- Acceptance criteria used

### b. Magnetic Particle

- Approved technical data sheet (“TDS”) number
- Residual magnetism level
- Acceptance criteria used

### c. Radiography

- Approved TDS number
- Acceptance criteria used

### d. Ultrasonic

- Approved scan plan/technique number, when required by specification;
- Serial Number(s) of the standards used
- Acceptance criteria used

## 1. **Solid Film Lube/ Prime/Paint/Fuel Tank Coating**

- a. Processing parameters, including booth numbers, painting sequence, paint mix times and temperatures, atmospheric booth conditions at time of processing, time in booth, approved materials, paint and thickness;
- b. When Buyer unique specifications are required, include process flow charts indicating Engineering Materials and Process Specifications (“EMAPS”) approved chemicals by EMAPS item number;
- c. All lot/monthly testing requirements including required testing specification, accept/reject criteria double stroke, testing, adhesion testing, thickness and visual criteria. NOTE: If testing is accomplished at Seller’s facility, Seller shall have written testing procedures in accordance with applicable testing specification;

- d. Equipment listing, including booth size, baking ovens, frequency filters are changed, and the booth is cleaned. NOTE: All calibrated equipment must be listed with accuracies noted;
- e. Batch numbers, manufacturers of paint, lubricants, and/or fuel tank coatings, and
- f. Each operation stamped or signed. If signed, print name of individual signing operation.

## **2. Chemical Processing**

- a. Processing parameters, including tank numbers, tank sequence, make-up of tanks, (concentrations/ temperatures/times, materials, solution analysis frequency);
- b. When Buyer unique specifications are required, include process flow charts indicating EMAPS approved chemicals by EMAPS item number;
- c. All lot/monthly process and solution control testing requirements including required testing specification, accept/reject criteria adhesion testing, thickness and visual criteria. NOTE: If testing is accomplished at Seller's facility, Seller shall have written testing procedures in accordance with applicable testing specification, and
- d. Equipment listing: tank size, baking ovens, rectifiers/ammeters. NOTE: All calibrated equipment must be listed with accuracies noted.

## **3. Heat Treat**

- a. Complete processing requirements based upon material being heat treated. One for steels and one for aluminum, etc.;
- b. Part number, heat treat specification, material description, size of material, hardness/conductivity requirements, and Buyer PO or Buyer's sub-tier purchase order;
- c. All in process and final inspection criteria per industry heat treat standard;
- d. Reference or contain pyrometry procedure that meets AMS-2750;
- e. Frequencies of all "process control" tests required by industry heat treat standard to include applicable ASTM testing standard;
- f. Reference or contain hardness/conductivity procedure that will be used to test parts;
- g. Complete equipment list, including furnace classification, per AMS 2750, size, limits and accuracy;
- h. How furnace charts are identified, to ensure traceability. The minimum requirement is Buyer part number, quantity, unique traceability number, shop card and date, time in, time at temperature, and time out;
- i. Reference to any training of heat treat personnel, as required;
- j. Oil, water, or glycol temperature at time of quench
- k. How quench delay is monitored;

- l. Dew point/vacuum leak rate as required, during heat treat cycle;
- m. Hardness/conductivity values required and actual obtained;
- n. Document any in process testing, to include actual values obtained;
- o. Times and temperatures, furnace used, date of last uniformity survey, accuracy, set temperature of "Over temp" instrument;
- p. Each heat treat operation must include, time in, time at, time out of furnace in legible writing, and
- q. A statement, " All heat treat on this order has been accomplished using heat treat equipment that meets AMS 2750, all heat treat operations have been accomplished in accordance with the heat treat specification, and all required verification testing has been performed. No unauthorized changes or deviations to required heat treat specifications have been performed"

#### **4. Welding**

- a. date, quantity, part number and detail numbers;
- b. material;
- c. weld specification and class;
- d. type of weld (fillet, groove, etc.);
- e. approved weld procedure number;
- f. approved weld schedule/technique number, if applicable;
- g. welder number/identification;
- h. weld machine number;
- i. welding rod identification/traceability number and specification, if applicable;
- j. shielding gas, if applicable;
- k. purge flow rate, if applicable;
- l. pre-cleaning method and specification, and
- m. final weld inspection performed, by process and specification such as radiographic inspection, penetrant inspection, magnetic particle inspection, ultrasonic inspection, visual inspection and other.