

# AEROJET – A GENCORP COMPANY

• P.O. BOX 97009 • REDMOND, WA 98073-9709

## AUTOMOTIVE QUALITY ASSURANCE TERMS AND CONDITIONS

Aerojet – A GenCorp Company herein is referred to as Aerojet.

**NOTE:** A copy of this form is not sent with each order. It can be accessed at [www.aerojet.com/supplier/redmond/qa.php](http://www.aerojet.com/supplier/redmond/qa.php). When this form is referenced on a "Request For Quotation," the words "Request for Quotation" will be substituted for "Order" and "Purchase Order" appearing herein. **General Quality Requirements shall apply to all purchase orders.** DOD Acquisition Reform has resulted in cancellation of some military specifications, and in some cases no replacements are noted. Aerojet (Redmond) encourages its suppliers to request approval for use of alternate specifications that replace cancelled specifications. If a cancelled specification lists an alternate, that alternate does not need Aerojet (Redmond) approval.

### **GENERAL QUALITY REQUIREMENTS (APPLY TO ALL PURCHASE ORDERS)**

#### QUALITY MANAGEMENT SYSTEM (QMS)

The supplier must implement and maintain a quality management system with the obligation to have zero defect objectives, to continually improve delivery, product quality, and quality management system. Supplier must have a documented continuous improvement process.

As a minimum, supplier must be registered to ISO 9001:2000, or certified to AS 9000, QS 9000, or TS 16949. A valid certificate from a registered 3<sup>rd</sup> party must be present at supplier facility.

Supplier must immediately inform Aerojet of any changes to their quality management system certification status.

Aerojet Purchasing and Quality will evaluate the use of non-certified suppliers on a case-by-case basis. Evaluation will include Aerojet customer requirements, Aerojet audit results, quality performance, product type, alternatives, and the effect of the supplied product on Aerojet part quality, appearance, function, fit, and durability.

The supplier is to obligate his subcontractors to implement and maintain a comparable quality management system with the same zero defect obligations for his parts purchased and/or externally fabricated. Aerojet reserves the right to demand documented proof from the supplier that they have verified the effectiveness of his subcontractors QMS.

#### INVENTORY MANAGEMENT

If a supplier is controlling / managing the inventory of materials, parts, components, and/or hardware. The supplier is required to maintain inventory, preferably in an MRP system or equivalent. The supplier shall maintain traceability of all materials, parts, components, and/or hardware by lot or heat number. Traceability must be maintained for all materials, parts, components, and/or hardware per note 32 and records kept per note 20 of this document. The supplier must report any loss of traceability to Aerojet Procurement immediately. Any loss of traceability is considered scrap.

Inventory reporting is required on a weekly basis and shall be reported to Aerojet Procurement. Potential shortages are to be reported to Aerojet in a timely manner. Supplier shall take a manual inventory of materials, parts, components, and/or hardware in inventory and in WIP on a monthly basis.

#### MATERIAL REVIEW BOARD (MRB) / NON-CONFORMANCE NOTIFICATION

Material Review Board is a panel of technically, qualified individuals appointed for the purpose of reviewing, evaluating and determining (or recommending) disposition of non-conformances to defined engineering requirements.

MRB authority for "Rework", "Return to Vendor", and "Scrap" dispositions (or equivalents as approved by Aerojet) is delegated on the purchase order unless the material for the order is supplied by Aerojet. For all other MRB dispositions (such as "Use as is" and "Repair"), and for Aerojet-supplied material, the supplier shall document the nonconformance on an Aerojet (Redmond) Supplier Nonconformance Review (SNR) datasheet (form SS40916). The SNR datasheet is available at [www.aerojet.com/supplier/redmond/qa.php](http://www.aerojet.com/supplier/redmond/qa.php). The supplier's own nonconformance report may be submitted provided that it addresses the root cause and corrective/preventive action.

The completed form shall be submitted to Aerojet Procurement for Aerojet MRB review and approval. **NONCONFORMING ITEMS SHALL NOT BE SHIPPED UNLESS SPECIFICALLY AUTHORIZED BY THE AEROJET PROCUREMENT REPRESENTATIVE VIA THE AEROJET SNR PROCESS.** A copy of the approved SNR shall be included with the shipment and the SNR number shall be referenced on the supplier's Certification of Conformance.

#### NOTICE OF PREVIOUS REJECTION

The supplier's shipping paperwork for material submitted to Aerojet (Redmond) in response to a Return to Vendor (RTV) or Rework disposition on a Suppliers Nonconformance Report (NCR) or Aerojet (Redmond) Supplier Nonconformance Review (SNR) datasheet (form SS40916) shall include items 1 and 2 and may include item 3 as required.

1. A statement identifying whether the material was replaced or reworked.
2. The Suppliers NCR and/or Aerojet's SNR number.
3. If reworked, a description of the rework performed. If material is serialized, add the letter R after the serial number on both the paperwork and the hardware.

#### PURCHASE ORDER SUBCONTRACTING

Purchase order(s) shall not be subcontracted without the written authorization of Aerojet.

#### ADVANCED PRODUCT QUALITY PLANNING (APQP)

Suppliers shall participate in and meet APQP requirements for new parts. The major components of APQP are: a) request for quote, b) product design review, c) quality system review, d) PPAP review and e) resource review including a production trial run (run-at-rate). Suppliers may be asked to submit verifiable evidence of meeting the required automotive experience during the request for quote stage.

**Note: Copies of the Automotive Industry Action Group (AIAG) manuals are the responsibility of the supplier and may be obtained by contacting AIAG at (248) 358-3003, or online at [www.aiag.org](http://www.aiag.org). Suppliers are responsible for maintaining the latest edition of these documents.**

#### ASSOCIATED MATERIALS

- AIAG (Automotive Industry Action Group), Quality Requirements QS-9000.
- International Automotive Task Force, Quality Requirements ISO/TS 16949
- AIAG Production Part Approval Process (PPAP)
- AIAG Measurement Systems Analysis (MSA)
- AIAG Quality Systems Assessment (QSA)
- AIAG Advanced Product Quality Planning and Control Plan (APQP)
- AIAG Potential Failure Mode and Effects Analysis (FMEA)
- AIAG Statistical Process Control (SPC)

#### CALIBRATION SYSTEM REQUIREMENTS (Not Applicable to Distributors)

The supplier shall maintain a calibration system that complies with one of the following specifications (or an equivalent): ANSI Z540.1 or ISO/IEC 17025. This provision shall be applicable to all inspection, test and measuring equipment supplied by Aerojet for use by supplier, as well as the supplier's own equipment. All test equipment and gages used for calibration must be traceable to NIST standards.

Gage R&R goal must be less than 10% variation. Gage R&R of >10% variation must be evaluated and an action plan developed to improve the R&R to <10% variation.

#### STATISTICAL PROCESS CONTROL (SPC)

Supplier shall validate the acceptability of the product being manufactured/processed (at supplier's facility or at a sub-tier supplier's facility) on this order using statistical process control (SPC) techniques which meet the intent of the Automotive Industry Action Group (AIAG). AIAG's SPC reference manual may be used as a guideline for developing, implementing, and maintaining a process control system. As a minimum, the supplier shall retain SPC data on all characteristics identified as critical by Aerojet. SPC data being collected must demonstrate that the manufacturing process is capable of maintaining a Cpk of 1.67 or greater. At any time that the SPC charts indicate the process is "Out of Control" or the calculated Cpk value is less than 1.67, 100% inspection shall be implemented until the process can again demonstrate that it is in Control or the calculated Cpk value is again 1.67 or greater.

#### PACKAGING REQUIREMENTS

Packaging shall first conform to all requirements specified on drawings, specifications (CVPI-35890-301) and the purchase order and secondly to the following:

- All material shall be wrapped, bagged, and enclosed in cartons, boxes, or other containers to the extent necessary to provide protection from hazards of contamination and physical damage encountered in general handling, shipping and storage.
- When material consists of several piece parts or is an assembly with external hardware, it shall be packaged together as a set in a unit package. No bulk packaging of piece parts or hardware is acceptable.
- Material of different part numbers or revision, or items that are re-submittals in response to Return To Vendor disposition on an Aerojet Non-Conformance Report, shall not be mixed in a single container unless they are segregated in properly identified intermediate containers.
- The supplier must ensure identification and traceability of products supplied. Specified identification markings shall be clear and legible and applied to all outside containers as well as to all intermediate containers or wraps, and indicate, as a minimum, the part number, purchase order number, quantity and special handling, as applicable. If the shipment consists of more than one outside container, each container shall be identified relative to the total number of containers, e.g., 1 of 3, 2 of 3, 3 of 3, etc

- Bare metal material having surface protective treatment such as plating, painting, anodizing, conversion coating, etc., shall be wrapped separately in chemically-neutral craft paper or equivalent.
- Handling, protection, or packaging shall not be accomplished using tapes which have glass beads in the tape or on the tape as a separator. This requirement shall be placed in purchase order(s) to your sub-tier suppliers.

#### TRAINING

The supplier's employees must be competent and qualified for their job function. The supplier must ensure this through appropriate internal or external training courses. A training record must be available for all employees producing a product or service for Aerojet. Aerojet has the right to review these records upon request. A request may be made in response to a problem notification and/or reporting non-conforming materials, parts, or hardware.

#### AEROJET / CUSTOMER SURVEILLANCE AT SUPPLIER'S FACILITY

Aerojet reserves the right to assign representatives, including Aerojet's customer representatives, on an itinerant or resident basis at supplier's facility or those of lower-tier suppliers for the purpose of verifying all tests and/or inspections performed as a part of the terms and conditions of this purchase order(s). Supplier is required to provide Aerojet representatives with reasonable facilities and equipment and grant access to all operating sites, checkpoints, stores, adjoining areas, and related quality documents required to complete the audit. Appropriate restrictions will be accepted when identified by the supplier in advance of the audit to protect security of company secrets and/or confidentiality.

Aerojet will require the supplier to implement corrective action and/or action plans to improve product or processes based on the audit results, if applicable. Plan must include responsibility and due date for completion. Supplier will report the status of the plan per agreement with Aerojet.

**The following quality assurance requirements are applicable when the clause number is specified on the face of the Purchase Order and/or subcontract document. For example: "THE FOLLOWING SPECIFIC QUALITY REQUIREMENTS APPLY TO THIS ITEM: 4C, 38B".**

### **QUALITY ASSURANCE SYSTEM REQUIREMENTS**

#### **[1] CONFIGURATION CHANGES**

Supplier and its sub-tier supplier(s) agree not to make any change in materials, process or design details which would affect the part or any component part thereof with regard to: (a) part number identification, (b) physical or functional interchangeability, and (c) performance without prior written approval of Buyer. Copies of the revised drawings, specifications or ATP's (Acceptance Test Procedures) shall be forwarded to Buyer. This clause shall be placed in purchase orders to sub-tier suppliers.

[2] Unassigned.

[3] Unassigned.

#### **[4] PRODUCTION PART APPROVAL PROCESS (PPAP) REQUIREMENT**

All suppliers must have a completed and Aerojet approved PPAP on file with Aerojet prior to release and shipment of materials, parts, components, and/or hardware. The supplier is stating in the PPAP that the goods delivered are free of faults, have guaranteed characteristics and correspond to the requirements defined in the design and process records. Evaluation, testing, inspection, 6 piece dimensional layout, and process data from sample run must be documented in the PPAP package per AIAG PPAP Manual. Copies of the AIAG PPAP manual can be purchased at [www.aiag.org](http://www.aiag.org)

Supplier shall submit Control Plans 30 days prior to submitting Initial PPAP. The supplier is to submit for approval the manufactured first 5 samples off the production process and tooling in the agreed amount. Inspection frequency for capable processes will be per the control plan and non-capable processes require 100 % gauging or inspection or as agreed upon with Aerojet Quality Assurance.

Supplier shall contact Aerojet prior to making any changes of any kind, as it relates to material, process, testing, location, etc.

#### **CHANGES WARRANTING PPAP RE-SUBMITTAL OR DELTA PPAP**

- Changes to manufacturing process/materials (also from subcontractors) defined in the process documents, specifications, and design record.
- Changes to the inspection process, equipment, special processing, and/or services defined in the process documents.
- Change of Subcontractors
- Transfer of manufacturing location
- Transfer of the manufacturing equipment within the location, if and only if, the process or process steps change.
- The supplier must submit a new PPAP package at a minimum of annually.

Aerojet reserves the right to require a PPAP re-submittal/Delta within 2 weeks at no additional cost to Aerojet should it be determined that the manufacturing process, material, place of manufacturing, or process flow has changed. Supplier shall not make any changes to any process without verification from Aerojet as to its impact on the PPAP.

The capability of operating equipment and processes must be demonstrated. Unless otherwise stated by the OEM customer, the minimum requirement for capability is **Cpk ≥1.67**. If the process capability falls below 1.67 or SPC charts indicate the process is out of control, 100% inspection of the affected characteristics must be performed in accordance with Table B – Ongoing Process and Product Monitoring, page 72 of Quality System Requirements QS-9000 manual, 3<sup>rd</sup> edition.

#### Sub-Tier Supplier PPAP

Supplier is responsible for its sub-tier supplier(s) PPAP, compliance to Aerojet Engineering requirements and AIAG PPAP Manual. Supplier is also responsible to manage, monitor and review sub-tier supplier PPAP for content and accuracy on an annual basis. Sub-tier suppliers are not to make any changes in materials, process or design details without prior written approval. The supplier is to submit 5 samples of all materials, parts, components, and/or hardware produced by its sub-tier suppliers to Aerojet for review and approval. These samples must be manufactured from the production process and tooling.

Aerojet will impose one of the following level(s).

- A) Level 1 – To include, but not limited to: Part Submission Warrant (PSW)
- B) Level 3 – To include, but not limited to: Part Submission Warrant (PSW), Parts (to be maintained at Customer location), Drawings, Dimensional results, Product specifications, Inspection results, Laboratory results, Functional results, Appearance Approval Report, Process flow diagram, Process Control Plan, Process Failure Modes and Effects Analysis (PFMEA), Process Capability results, Gage study, and Weld Procedure Specification.
- C) Level 5 – To include, but not limited to: Part Submission Warrant (PSW), Parts (to be maintained at Supplier location), Drawings, Dimensional results, Product specifications, Inspection results, Laboratory results, Functional results, Appearance Approval Report, Process flow diagram, Process Control Plan, Process Failure Modes and Effects Analysis (PFMEA), Process Capability results, Gage study, Weld Process Specification, and Process Work Instructions. Level 5 submission will be verified during Source inspection of supplier.

#### [5] THREADED METALLIC FASTENERS

Threaded metallic fasteners must be manufactured by a source which supplier's quality assurance personnel have surveyed (method optional), or who is currently ISO 9001 registered by a registrar accredited by the National Accreditation Program of the American National Standards Institute and the ASQC Registrar Accreditation Board (RAB) or equivalent.

[6] Unassigned.

#### [7] REQUIREMENTS FOR CONTROL OF NON-DELIVERABLE SOFTWARE USED IN AUTOMATED MANUFACTURING OR TESTING OF DELIVERABLE HARDWARE

Prior to its use in production of hardware, the software purchased or developed for use in automated manufacturing or testing equipment must be listed in supplier's configuration control system and controlled by assigning release and revision identification codes. Records must be kept to document software release and revision dates, and must be made available for review by Aerojet.

Numbers 8 through 9 unassigned.

### PROCESS REQUIREMENTS

#### [10] SPECIAL PROCESSING

Supplier shall complete and submit Aerojet (Redmond) Form SS40809, "Special Process Certification," to Aerojet (Redmond) for review **within 30 days of acceptance of the purchase order or prior to start of parts fabrication/processing, whichever comes first**. This form can be found at [www.aerojet.com/supplier/redmond/qa.php](http://www.aerojet.com/supplier/redmond/qa.php). Aerojet (Redmond) retains right of disapproval of sources and adequacy of certification.

This supersedes [10] A) and B).

#### [11] AUTHORIZED AEROJET REPRESENTATIVE

An authorized Aerojet representative (manufacturing, M&P, quality engineer or quality field representative) shall be present during this process. Evidence shall be provided with shipment.

Numbers 12 and 13 are unassigned.

#### [14] WELD / BRAZE/ LASER SCHEDULE

The supplier shall develop a weld schedule, otherwise known as a Weld Process Specification (WPS) which must be demonstrated to be capable by producing weld samples that meet all requirements. The WPS must be approved by Aerojet (Redmond) prior to start of production. WPS(s) will be required for every weld joint and weld type. The WPS shall identify the process parameters and settings required for acceptable production including any information required by the engineering drawing or any applicable specifications. All WPS(s) must be developed by either an AWS (American Welding Society) certified weld inspector or equivalent, and/or an AWS (American Welding Society) certified weld engineer or equivalent.

Numbers 15 through 19 unassigned.

## CERTIFICATION AND DATA REQUIREMENTS

### [20] RECORD KEEPING

A) Supplier shall keep on file records reflecting that all materials and finished items were controlled and tested in accordance with and met the specifications. Such records shall be subject to Aerojet (Redmond) examination. Unless the record retention period is specifically modified by the purchase order, records shall be retained 10 years after final payment. Records shall be maintained for the retention period in a manner that prevents damage from fire, moisture, pests, or other deteriorating effect. Buyer shall be notified if conformance to this requirement cannot be certified.

B) Supplier shall keep on file records reflecting that all materials and finished items were controlled and tested in accordance with and met the specifications. Such records shall be subject to Aerojet (Redmond) examination. Unless the record retention period is specifically modified by the purchase order, records shall be retained 15 years after final payment. Records shall be maintained for the retention period in a manner that prevents damage from fire, moisture, pests, or other deteriorating effect. Buyer shall be notified if conformance to this requirement cannot be certified.

Unless otherwise specified, [20] A) is the default if only [20] is noted in the purchase order

Numbers 21 through 28 unassigned.

### [29] CERTIFICATION OF CONFORMANCE

Each shipment shall be accompanied by a legible certification which states that the items were produced, processed, and/or tested in accordance with stated applicable purchase order or subcontract requirements, including revision level(s) as appropriate. Key characteristics/critical features shall be monitored and recorded, as appropriate. Signature of a supplier representative and date signed is required. When parts are serialized, serial numbers shall appear on or be attached to the certification. The supplier may use the Aerojet C of C template available at [www.aerojet.com/supplier/redmond/qa.php](http://www.aerojet.com/supplier/redmond/qa.php) or the supplier's equivalent (provided it contains all the required information).

This supersedes [29] A) and D).

Numbers 30 and 31 are unassigned.

### [32] TRACEABILITY

A) Materials used must be identifiable by lot number, material type, heat number, and specification with applicable change level, and traceable to records of acceptance. Material fabricated by the supplier shall be traceable to a lot of material used. The supplier shall make all possible efforts to minimize the number of lots included in each shipment (if possible, one lot per shipment is preferred). If more than one lot of material is provided, each lot shall be segregated for packaging and shipment to Aerojet. Traceability records shall be available for review by an Aerojet (Redmond) representative.

B) The supplier's Certificate of Conformance (C of C) must include identification of the manufacturer and the specific production lot(s) of the material supplied. Lot identification shall be clearly titled as lot number, batch code, date code, date of manufacture, or equivalent. The supplier shall make all possible efforts to minimize the number of lot/date codes included in each shipment (if possible, one lot/date code per shipment is preferred). If more than one lot number of material is provided, it shall be packaged such that like lot numbers are grouped together. Traceability records shall be available for review by an Aerojet (Redmond) representative.

[33] Re-assigned to 71.

Numbers 34 through 37 unassigned.

### [38] SHIPMENT CONTROL BY SERIAL NUMBERS

A) Supplier shall identify by serial number the material shipped, and packing sheets shall show list of serial numbers included in the shipment. The supplier shall assign serial numbers to all delivered items. Serial numbers shall *not* be duplicated.

B) When serialization requirements are imposed by Aerojet (Redmond), all goods, including spares, test units, etc., with a single basic family number (e.g.: 1B54321) will be assigned sequential numbers, regardless of configuration (dash numbers). Serial numbers assigned will contain no duplications and will not exceed ten digits. Goods reworked to a new configuration with the same basic number will retain the original serial number and these will show a letter R after the serial number. Supplier may use its own serialization system within the limitations outlined above, unless otherwise specified by Aerojet (Redmond). Supplier will indicate serial numbers on all shipping reports. Listing serial numbers by ranges is acceptable providing that any breaks in the range are so noted (e.g.: S/N 1-10, 12-20, 25-30 for a total of 25 units/parts). If goods are delivered in multiple shipments, only the serial numbers of the goods in a given shipment will be listed in the shipping report for that shipment.

C) Serial numbers of delivered items shall be assigned by Aerojet (Redmond). Contact Aerojet (Redmond) buyers unless the assigned serial number(s) is already noted on the purchase order. Serial numbers shall not be duplicated and shall provide full traceability to all material, fabrication, assembly, inspection, and test documentation.

Numbers 39 through 49 unassigned.

### **INSPECTIONS**

#### **[50] SOURCE SURVEILLANCE/INSPECTION (INPROCESS AND FINAL)**

All items covered by this purchase order are subject to source surveillance inspection by Aerojet quality representative. This may include surveillance of the supplier's product throughout fabrication and final acceptance test to verify requirements of the purchase order are adequately satisfied. The supplier is required to provide the Aerojet quality representative with reasonable facilities and equipment to accomplish this task. The Aerojet quality representative may specify mandatory Aerojet inspection points in supplier's fabrication and testing documentation. Aerojet source surveillance inspection is mandatory for final acceptance testing unless specifically waived by Aerojet quality assurance. The Aerojet buyer shall be notified a minimum of five working days (excluding weekends and holidays) in advance to schedule such inspections. Evidence of source inspection shall be included with the order.

#### **[51] SOURCE INSPECTION (FINAL INSPECTION)**

All deliverable items covered by this purchase order require final acceptance inspection and/or test verification at the supplier's facility by an Aerojet quality representative or his delegate prior to shipment. The supplier shall make available to the Aerojet quality representative, at time of presentation of items, the supplier's inspection, manufacturing, traceability and material review records. The Aerojet buyer shall be notified a minimum of five working days (excluding weekends and holidays) in advance to schedule such inspections. Evidence of source inspection shall be included with the order.

Numbers 52 through 61 unassigned.

### **AEROJET (REDMOND) FLOW DOWN REQUIREMENTS**

Numbers 62 through 64 unassigned.

#### **[65] HARDWARE - SPECIAL PROCESSING**

Supplier shall utilize only special process sources approved by Aerojet (Redmond) or its customers. The supplier shall flow down this requirement to its subcontractors. The supplier shall retain documented evidence of compliance to this requirement for review by Aerojet (Redmond) or its customers upon request.

#### **[66] TOOLING – AEROJET FURNISHED TOOLING TO SUPPLIERS**

The supplier shall be responsible for proper handling, storage, maintenance, and usage of the tools provided by Aerojet (Redmond). Any tool provided by Aerojet (Redmond) that is lost, damaged, or is otherwise unsuitable for use (including expired calibration date) shall be recorded and reported to Aerojet (Redmond) immediately. The tools provided by Aerojet (Redmond) shall be returned with the parts upon completion of PO (Purchase Order) or immediately upon request by Aerojet (Redmond).

Numbers 67 through 70 unassigned.

#### **[71] HAZARDOUS MATERIAL AND EXPLOSIVES**

Suppliers shall provide Material Safety Data Sheet (MSDS) for hazardous materials with each shipment. For Explosive materials, the following documents shall be provided:

1. Material Safety Data Sheets (MSDS)
2. Competent Authority Approval document or DOD Interim Hazardous Classification, if applicable, or;
3. Explosives in a pipe bomb (w/DOT exemption)

Numbers 72 through 98 unassigned.

#### **[99] PART-SPECIFIC QUALITY REQUIREMENT**

When this note appears on the purchase order, additional requirement(s) apply specific to this part number. The **supplier shall contact** Aerojet (Redmond) Buyer for requirement definition.