Kaman Precision Products

Supplier Quality Requirements Manual

MIDDLETOWN, CT

COLORADO SPRINGS, CO

ORLANDO, FL (Range)

Title		E-Location		Number Control
Supplier Quality Requirements Manual		Policy & Procedure > Quality P&P's		SQRM-1
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Blue text indicates the changes for this revision.

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1.0 PURPOSE

This manual defines the essential elements of a supplier quality system and the requirements of such a system to assure the quality and on-time delivery of products supplied to Kaman Aerospace Corporation, Kaman Precision Products Middletown, CT and Kaman Precision Products Inc., Orlando, FL.

This document provides a guide for Kaman suppliers but is not intended to supersede any applicable contract or specification requirement. When conflicts occur, the order of precedence shall be:

1.1 The contract (Purchase Order, Statement of Work)

1.2 The engineering drawing.

1.3 Specifications called out on the engineering drawing.

1.4 This document

2.0 SCOPE

2.1 Effective management for quality shall be clearly prescribed by the supplier. The supplier must assume full responsibility for the quality, delivery and reliability of all materials and services provided to Kaman. The Kaman Purchasing Department is the main communication link between suppliers and other functions within Kaman.

2.2 Application:
The requirements within this manual are based upon current aerospace / defense industry standards. Kaman suppliers are expected to review, understand and comply with the requirements of the contract and of this manual. In addition, each supplier shall develop and maintain an effective quality system based on defect prevention rather than defect detection and support a continuous improvement program to improve quality, reduce flow time, and produce products at a competitive cost. If the supplier is unable to meet the requirements of this manual, they shall immediately notify the buyer. Kaman Quality and Supply Chain Management shall make the determination to: (a) terminate the business relationship; (b) impose a military specification quality system with on-site surveillance by Kaman representatives and / or (c) impose a quality system that is mutually acceptable to Kaman and Kaman customers.

3.0 RESPONSIBILITY AND AUTHORITY

3.1 Quality Leadership: Responsible for providing resources to implement and maintain the Supplier Quality Requirements Manual

3.2 Procurement: Responsible for flowdown of this manual to cognizant suppliers and ensuring supplier contractual compliance to this manual.

4.0 DEFINITIONS

4.1 CSCI - Computer Software Configuration Item; Computer software revisions and versions as specified by contract or design engineering.

4.2 CSI – Customer/Kaman Source Inspection

4.3 ECN – Engineering Change Notice

4.4 ECO – Engineering Change Order

4.5 ECP – Engineering Change Proposal

4.6 ECR – Engineering Change Request

4.7 ESD – Electrostatic Sensitive Device

4.8 FAI – First Article Inspection

4.9 FOD - Foreign Object Damage / Foreign Object Debris

4.10 Mission Assurance (MA) - A disciplined application of proven scientific, engineering, quality and program principles toward the goal of achieving mission success. It follows a general systems framework and uses risk management and independent assessment as cornerstones through its lifecycle.

4.11 MRR – Manufacturing Readiness Review. Drawing/specification and P.O. review with supplier prior to production.

4.12 Privacy Assurance - The identification of privacy critical to those CSCI's or portions thereof whose failure could lead to a breach of systems privacy.

4.13 QRP – Quality Requirements Procedure

4.14 Quality Score - Scores are derived from quantity rejected, late corrective actions, and total received quantity.

4.15 RFQ - Request for Quotation

4.16 Safety Assurance - The identification of safety critical components or portions thereof whose failure could lead to a catastrophic failure (could result in death, injury, loss of property or environmental harm).

4.17 Security Assurance - Identification of security that is critical to those CSCI's or portions thereof whose failure could lead to breach of systems security.

4.18 SOO – Safety of Objectives

4.19 SOW - Statement of Work

4.20 SQE - Supplier Quality Engineer / Engineering

4.21 SRV – Supplier Request for Variation – A document (QAF 05-12) used by a supplier to submit discrepancies disclosed by their inspection and cannot be reworked by the supplier. Submit variation request for process change, specification supersession/obsolescence or other issues needing KPP review and disposition. The reported discrepancies shall be evaluated and dispositioned by Kaman Precision Products specific program Integrated Product Team (IPT). Included with this SRV process is the Kaman internal TipQA VR# (Vendor Request Number) that will be assigned for traceability in the Kaman TipQA system. The SRV document is a supplier's mechanism into Kaman for disclosure and the VR number is Kaman's mechanism to notify the supplier of the disposition and for retention of the supplier disclosure.

4.22 SSE - Supplier "Source" Substantiation of Engineering. A type of comprehensive audit after production starts.

4.23 VR – A Type VR NC or Non-conformance write-up in Kaman's system. Vendor Request (TipQA System generated non-conformance location). Aligned with SRV.

5.0 PROCEDURES

5.1 Supplier Approval

5.1.0 Self-Survey

5.1.1.1 The supplier evaluates their quality system by completing the Supplier Evaluation Questionnaire.

5.1.1.2 The form is returned to the attention of the applicable Kaman Buyer or Supplier Quality Engineer. The questionnaire is reviewed and evaluated by Kaman Supplier Quality Engineering.

5.1.1.3 The mail in questionnaire is not required for active production hardware suppliers approved before January 1, 2011. Production hardware suppliers approved prior to January 1, 2011 have either supplied proof of a recognized quality system certification, completed and returned a mail-in questionnaire, or demonstrated performance deemed acceptable by past quality and purchasing personnel.

5.1.1.4 If the supplier is listed as approved, Kaman Supplier Quality Engineering evaluates the quality rating periodically.

5.1.1.5 If the supplier is not approved, the appropriate code is assigned in the database and no purchase orders may be placed with the supplier.

5.1.1.6 To gain and maintain approved status, the supplier is expected to maintain a minimum 99% quality rating. Kaman reserves the right to intervention actions when quality ratings fall below minimum standards. These interventions include but are not limited to in-process CSI, on-site process evaluation assessments, on-site quality system assessments, written corrective action plans by the supplier, and supplier meetings with Kaman Supply Chain Management at our Middletown, CT or Orlando, FL facility.

5.2 On-Site Assessment

Kaman shall have the option to conduct pre-award and periodic post-award assessments / surveys at any level in the supply chain inclusive of the suppliers' subcontractors. Kaman can assign Supplier Quality Engineering personnel at a suppliers' plant or suppliers' subcontractor to ensure continued compliance to quality system and product specifications. New suppliers and suppliers producing a new product or a new part number may be subjected to pre-award surveys / assessments.

Exception is when a supplier documents proprietary products or processes and Kaman agrees to the proprietary nature of these products or processes, supplier's and supplier's subcontractor's facilities, contracted products, procedures. Records shall be made available to Kaman Supplier Quality Engineering or an authorized representative to verify that the system or product conforms to Purchase Order, Engineering Drawing and Specification requirements. The supplier is responsible to answer corrective action requests resulting from assessments and surveys by the date stipulated on the corrective action request.

5.3 Supplier Performance Monitoring / Rating

Suppliers are rated monthly for quality and on time delivery performance (OTD). The minimum quality rating for approved suppliers is 99%. The minimum OTD rating for approved suppliers is 98%. The quality

rating is calculated by subtracting (the number of non-conforming parts (pieces) received divided by the total received quantity) from 100% for each month that items are delivered. The OTD rating is calculated by subtracting (the number of late parts (pieces) received divided by the total received quantity) from 100% for each month that items are delivered.

Regarding Delivery performance, a supplier's delivery score is measured against the date they commit for parts to arrive at Kaman compared to when it is received.

To gain and maintain approved status, the supplier is expected to maintain a minimum 99% quality and a 98% OTD rating. If a supplier fails to meet the monthly average of 99% quality or 98% OTD for three consecutive delivery months the suppliers may be subject to a corrective action request. The supplier's monthly quality score will be monitored by SQE for three consecutive delivery months. If the monthly scores meet the three-month rating requirement, no further action will be required. If monthly scores fail to meet the required ratings over a three-month period, then Quality Management, SQE Management and Supply Chain Management will decide which of the following actions may be taken.

5.3.1 Supplier submitting a formal correction action presentation during a meeting with Quality, Supplier Quality Engineering and Supply Chain Management at the Kaman facility in Middletown, CT or via online meeting.

5.3.2 Kaman quality system or process audit at the supplier's facility.

5.3.3 Kaman Source Inspection at the supplier's facility.

5.4 Part Qualification – Supplier Source Substantiation of Engineering (SSE)

Selected critical parts must be qualified by part number. Kaman Engineering identifies critical parts by program. When an SSE is required, it shall be so noted on the purchase order or contract. Non-conformances noted during an SSE assessment will require formal corrective action. The corrective action request will be issued from and traceable within the Kaman Quality System. See Appendix B for SSE requirements.

5.5 Request for Quotation (RFQ)

The supplier shall review the requirements related to the product. This review shall be conducted prior to the suppliers' commitment to supply products to Kaman, and shall ensure that:

5.5.1 Product requirements are clearly defined and understood.

5.5.2 The supplier has the ability to meet engineering and purchase order requirements.

5.5.3 Order requirements (exceptions) are resolved between the supplier and Kaman Purchasing.

5.5.4 The supplier shall maintain records of the review and actions arising from the review.

5.6 Contract / Purchase Order Review

The Kaman Purchase Order is an important document that the supplier must be thoroughly familiar with and completely understand. It is the contract to which work must comply. Failure to provide documentation or to meet any Supplier Quality Requirements clause of Appendix A of this document or, if applicable, Vendor Instructions (VI), or Detailed Specifications (DS) shall be reason for rejection of the product and may delay payment to the supplier. If product requirements are changed, the supplier shall

ensure that relevant documents are amended and that relevant personnel are made aware of the changed requirements. The purchase order may contain or make reference to additional documentation, which specify standard requirements for the order. These attachments may include the following:

5.6.1 Vendor Instruction (VI) / Detailed Specification (DS): These documents are part of the purchase order and contain specific instructions regarding the manufacture, inspection and test of the specified part number.

5.6.2 Appendix A Kaman Quality Notes Flowdown (Formerly QRP 0541.07 APP A): This document applies to product that is deliverable to Kaman, Middletown, Connecticut.

5.6.3 Engineering Change Request (ECR), Engineering Change Notice (ECN), or Engineering Change Notice (ECO): Documents a change to the drawing, standard, specification, product or process and must be incorporated into the product.

5.6.4 Kaman Customer Flow Downs: Indicated as an attachment on the purchase order and are required to be flowed down to all levels of the supply chain.

Copies of Kaman Quality Notes (QRP) requirements can be found on the Kaman website: https://www.kaman.com/brands/kaman-fuzing/suppliers/ and as specified on the purchase order or obtained from the Kaman Purchasing Representative.

Kaman offers the opportunity for a Manufacturing Readiness Review (MRR) designed so that Kaman and the Supplier can jointly review the Purchase Order and drawing requirements. The output of the review is a listing of identified issues requiring Kaman or Supplier action. The MRR can be requested by Kaman or the Supplier via the Kaman buyer. The meeting is held online and is hosted by the Kaman buyer and moderated by the Kaman SQE. A checklist (KPPF-QAF-071) is used to document the results of the MRR.

Note: MRRs are mandatory for any technical drawing changes such as material and process specifications and dimensional changes. Also mandatory for the first time a supplier is producing a part.

5.7 Manufacturing Control and Work Instructions

5.7.1 Manufacturing Document Instruction

The supplier shall assure that work affecting quality shall be prescribed in clear and complete documented instructions. The suppliers' system shall provide for quality assurance involvement in planning of the aspects of manufacture including procurement, manufacturing engineering, fabrication, assembly, test and packaging. Planning shall include assuring that work instructions, which clearly communicate requirements, and, wherever appropriate, pictures, drawings, or sketches are included. The suppliers' system shall include provision for the documentation of planning activities.

5.7.2 Manufacturing Document Control

The supplier shall provide documentation control, including change configuration management of work instructions, manufacturing records, and inspection and test records to preclude unauthorized changes and provide adequate verification of accuracy.

5.8 Manufacturing Traceability and Inspection Status

5.8.1 Trace and Inspect Status

The supplier shall establish a positive system for indicating the manufacturing status and inspection status of raw material, products in production and finished stores. Manufacturing and inspection status may be indicated by methods such as part markings, part travelers, marked containers or inspection records.

5.8.2 Characteristics

The supplier shall produce product characteristics to minimize the combined production labor and machine cost and the cost of quality losses such as scrap, rework and repair. The use of statistical tools such as machine capability studies and statistical process control are encouraged to establish and maintain a robust process. If SPC is required for a given process, it shall be included in the purchase order quality requirements.

5.9 Inspection and Test

5.9.1 Environmental Control

5.9.1.1 The supplier shall establish a positive system for indicating the manufacturing status and inspection status of raw material, products in production and finished stores. Manufacturing and inspection status may be indicated by methods such as part markings, part travelers, marked containers or inspection records.

5.9.1.2 Inspection Instructions

The supplier shall ensure the environment for performance of inspections and test is adequate in respect to temperature, humidity, vibration, lighting, water and air supply, and any other factors that could affect the accuracy of inspection and test results.

5.9.2 First Piece Inspection (FPI)

First piece inspection is the verification of a given operation or process. When specified on the purchase order as a quality requirement, (reference Appendix A, section A.20 and A.21) first piece inspection shall be performed as soon as practical in the production process and prior to producing the balance of the lot. First piece inspection shall be performed prior to any subsequent operation, which may obscure the engineering characteristic. First piece inspection is required for each process set-up and when the supplier incorporates an engineering change, revises the tooling, implements new tooling, implements a change in processes or is a new supplier for the part number.

5.9.3 First Article Inspection (FAI)

5.9.3.1 FAI is a verification of all engineering drawing characteristics, including drawing notes of a given part number. FAI is applicable when specified on the purchase order as a quality requirement (Reference Appendix A, section A.11, A.11A and A.11.C). FAI is performed on a randomly selected part or parts from a build lot, which is 100% complete to the purchase order and engineering drawing requirements. When assemblies and sub-assemblies are subject to FAI, each part and process within the assembly or sub-assembly shall have a separate FAI, additionally, an FAI shall be performed on the completed assembly or sub-assembly. The supplier shall complete the First Article Inspections using AS 9102 First Article Inspection Report Forms 1, 2, and 3 compliant with the AS9102 current revision. The forms are available on the Kaman Fuzing website https://www.kaman.com/brands/kaman-fuzing/suppliers/ . Forms other than those maintained on

the Kaman website may be used, however they must contain all “Required” and “Conditionally Required” information and have the same field reference numbers. Kaman reserves the right to witness First Article Inspection at any point in the supply chain. Upon notification to the supplier, the Kaman customer(s) shall be allowed access to the supplier’s facility to jointly witness the FAI with the Kaman representative. The supplier shall contact the applicable Kaman Buyer and advise that a part is ready for FAI. The supplier shall furnish the part number, purchase order number and lot quantity.

5.9.3.1.1 Supplier shall provide the FAI report to Kaman in the following manner:

5.9.3.1.2 Upload a copy of the FAI Report to the cognizant Buyer via the assigned secure portal folder.

5.9.3.1.3 The FAI Report must also include:

5.9.3.1.4 All certifications for parts, material and special processes.

5.9.3.1.5 Supplier’s Certificate of Conformance. (If the supplier’s ERP system allows generation of CofC prior to shipment)

5.9.3.1.6 If FAI source witness is required then refer to SQRM-1, Appendix A, Para A.11.B.

5.9.3.1.7 Once FAI Report is received, Kaman FAI Specialist will review the data. If acceptable, the FAI Specialist will sign the FAI customer approval field on page one of the FAI and will email the signed cover sheet back to supplier as acceptance.

5.9.3.1.8 The supplier is then directed upon receipt of the signed cover sheet to ship the Production Hardware to Kaman along with the signed FAI cover sheet.

5.9.3.1.9 The Supplier should also identify and segregate the FAI Unit from the rest of the shipment lot.

5.9.4 Sample Plan Inspection

Sample plans other than as prescribed in ASQ Z1.4 or Z1.9 require written approval from Kaman Supplier Quality Engineering. The supplier shall not use any sample plan with an acceptance level greater than zero.

5.9.5 Correlation of Inspection Measurements

When requested by Kaman, suppliers shall provide samples and data for correlation of their inspection techniques with those of Kaman. Accuracy of the correlation shall be as agreed upon by Kaman Quality Engineering and the supplier. Supplier shall take timely corrective action when correlation is unsatisfactory and such action is requested by Kaman.

5.9.6 Kaman / Customer Source Inspection (CSI)

When Kaman source inspection is required; it shall be noted in the quality assurance clauses of the Purchase Order, Vendor Instruction (VI) or Detailed Specification (DS). Reference Appendix A, section A.3. Suppliers shall contact the Kaman Purchasing Representative named on the Purchase Order to arrange for source inspection. Suppliers located within the State of Connecticut or Florida shall provide a minimum of three (3) working days advanced notice for source inspection. Suppliers located outside the State of Connecticut or Florida shall provide a minimum of ten (10) working days advance notice. When source inspection is required, the supplier shall not ship product until authorized by a completed Source Inspection and Test Surveillance Record signed by a Kaman Supplier Quality Engineer or designee. A copy of the source inspection record shall accompany the shipment. Source inspection may be waived at the discretion of Kaman. If waived, a copy of a Source Inspection Waiver signed by Kaman Quality Engineering or Supplier Quality Engineering must accompany the shipment.

5.9.7 Government Source Inspection (GSI)
When government source inspection is required, it shall be noted in the quality assurance clauses of the purchase order, Vendor Instruction (VI) or Detailed Specification (DS). Reference Appendix A, section A.2. The supplier is responsible for contacting their local Defense Contracts Management Agency (DCMA) office to arrange for government source inspection.

5.9.8 Visual Inspection
Supplier shall ensure that each individual performing visual inspection has an eye examination at intervals of not greater than two years and that, if necessary or if correction is prescribed, each individual uses the required corrective lenses when performing required visual inspections.

5.9.9 Electrostatic Sensitive Device (ESD) Control
Semiconductor devices that are considered electrostatic sensitive include but not limited to; diodes, transistors, IC's, hybrids, microcircuits and resistor networks. When ESD controls are required, it shall be noted in the quality assurance clauses of the purchase order or Supplier Instruction. When a product is defined as ESD sensitive, work shall be performed at ESD protected workstations. Exceptions taken by the supplier require written approval from Kaman Supplier Quality Engineering. ESD protected workstations shall meet the requirements of ANSI/ESD S20. 20.

5.10 Control of Non-Conforming Product

5.10.1 The supplier shall ensure that product which does not conform to engineering and specification requirements is identified and controlled to prevent its unintended use or delivery. Using the Suppliers Request for Variation form (SRV form KPPF-QAF-050), the supplier shall immediately notify Kaman in writing of all non-reworkable defects that include:

5.10.1.1 Deviations from the drawing, specification or standard prior to manufacture.

5.10.1.2 Defects discovered after manufacture shall be identified in writing using the Suppliers Request for Variation (SRV form QAF-05-12).

5.10.1.3 The supplier shall identify the root cause of the non-conformance and implement corrective action to eliminate non-conformances. Due to the negative impact non-conforming product has on the Kaman business flow; non-conforming shipments, or product presented for Kaman source inspection and found to be non-conforming, will result in cost considerations charged back to the supplier.

5.10.2 Suppliers' Request for Variation
The supplier may submit a Suppliers Request for Variation (SRV form QAF-05-12) when a non-conformance is discovered. The supplier shall state the engineering characteristic, engineering drawing zone, and the actual non-conforming condition of the characteristic. The root cause of the non-conformance and corrective action taken to eliminate the non-conformance is required. The supplier shall submit the SRV to the appropriate Kaman Buyer. Kaman will assign an SRV number to the form, disposition the non-conformance and return the form to the supplier. The supplier may not ship non-conforming product without an approved SRV disposition signed by Kaman Quality, Kaman Engineering and, if applicable, Defense Contract Management Agency (DCMA) representative. The supplier shall segregate and identify the non-conforming product with the SRV number. The approved SRV shall accompany the parts shipment. The SRV form QAF-05-12 is available on the Kaman website: https://www.kaman.com/brands/kaman-fuzing/suppliers/

5.10.2.1 To facilitate production, a pre-approved copy of Kaman's SRV form QAF 05-12 may be provided to allow use of redline drawings. Approval from Design Engineering, Manufacturing Engineering and

Quality Engineering must be present on the form, otherwise authorization-to-proceed (ATP) is not valid.

5.10.2.2 Conditions for use of the SRV form QAF-05-12 are inclusive as the purchase order must reflect the 'proposed' revision and the associated engineering change request (ECR) or engineering change order (ECO) must be processed with the new, updated drawing released prior to acceptance of parts at Kaman.

5.10.3 Rework and Repair

The supplier shall establish a documented system to ensure that characteristics that may be affected by rework or repair operations are re-inspected after these operations. Repair operations (operations which are outside the scope of the engineering drawing or specification) shall not be implemented without prior written approval from Kaman and if applicable, DCMA. If non-conforming product is received by Kaman and a rework or repair procedure is approved, Kaman and the supplier may determine that Kaman may undertake the procedure to preserve delivery commitments to the end customer. In these situations, Kaman may elect to charge the supplier back for time incurred for the rework or repair procedure. If the supplier agrees to Kaman rework this will, in no way, infringe on the supplier's warranty requirements reflected in the purchase order.

5.10.4 Corrective and Preventive Action

Requests for supplier corrective action are issued by Kaman utilizing the quality database system. These requests may result from review and analysis of receiving inspection, product rejection, results of a supplier audit, or other requested corrective actions. The supplier shall determine action to eliminate the causes of potential nonconformities in order to prevent their occurrence. Preventive actions shall be appropriate to the effects of potential problems.

5.10.5 Preventive action may include analysis of data from:

5.10.5.1 Internal non-conforming reports

5.10.5.2 Customer complaints

5.10.5.3 Customer quality and delivery rating reports

5.10.5.4 Internal audits

5.10.5.5 Customer audits

5.10.5.6 Third party audits

5.11 Use of Sub-Tier and Sub-Sub-Tier Suppliers

The supplier, in his purchasing documents to all sub-tiers, shall flow down the Kaman purchase order requirements and the Kaman quality requirements specified on the Kaman purchase order inclusive of all Kaman customer flow-downs that are included on the purchase order.

All suppliers performing special processes must be Nadcap certified **for the process**. Caution - a Nadcap certification is not a general certification for the facility. It is process specific. If there is a valid reason why Nadcap certification is not possible, contact the Kaman buyer for disposition. When the use of special process sub-tier suppliers is restricted to those specifically approved by Kaman or Customer directed or Kaman customer, it shall be noted in the quality requirements section of the purchase order, Vendor Instruction (VI) or Detailed Specification (DS). Reference Appendix A, section A.22. Contact the Kaman buyer to find out who the approved suppliers are.

The supplier shall establish and implement inspection and audit activities to periodically validate certificates of conformance and test reports for raw material. The supplier shall establish and implement the inspection or other activities necessary to ensure that all purchased products and services meet specification and purchase requirements. Verification activities may include test reports, statistical records, source inspection at the suppliers' facility or inspection of products and services upon receipt. Purchased products and services must not be used or processed until verification to specification and purchase requirements is completed. All inspection and audit results shall be maintained by the supplier and made available to Kaman upon request. Inspection and audit results are also subject to review by Kaman representatives during on-site visits to the suppliers' facility.

5.12 Control of Supplier, Kaman, Customer or Government Property

The supplier shall exercise care with Kaman or Government supplied property while it is under the supplier's control or being used by the supplier.

Upon receipt, the supplier shall inspect for identification, general condition, completeness, and proper quantity, type, size or grade. Perform functional testing, where applicable, prior to further processing or installation to ensure conformance to specifications.

The supplier shall immediately report damaged, malfunctioning or otherwise unacceptable items to Kaman Purchasing.

After the acceptability determination, the supplier shall provide for identification and protection, periodic inspections (calibration) and controls necessary to ensure against damage or deterioration during handling or storage. The supplier shall perform a visual inspection prior to each use.

5.12.1 Suppliers involved with Government bailed property shall establish procedures describing the requirements for initial and periodic inspections, adequate storage and protection and maintenance of such equipment. Inspection and maintenance records must be maintained.

5.13 Availability and Applicability of Specifications

The supplier shall be responsible for obtaining applicable Government and Industry specifications (e.g. Military Specifications, Aerospace Material Specifications, and American National Standards). Kaman Specifications or other applicable Kaman data stipulated on the Kaman Purchase Order that have not been previously furnished, shall be promptly requested from the Kaman Purchasing Department.

5.14 Control of Drawings, Standards and Specifications

The supplier shall establish and maintain a system for the control of drawings, engineering changes, and other configuration control data and specifications, which ensure that product produced for Kaman is processed in accordance with Purchase Order Requirements.

5.14.1 A documented procedure shall be established to define the controls needed to:

5.14.1.1 Approve documents for adequacy prior to use.

5.14.1.2 Review and update as necessary and re-approve documents, including internal manufacturing and inspection / test instructions.

5.14.1.3 Ensure that changes and the current revision status of documents are identified.

5.14.1.4 Ensure that relevant versions of applicable documents are available at points of use.

5.14.1.5 Ensure that documents remain legible and readily identifiable.

5.14.1.6 Ensure that documents of external origin are identified, and their distribution controlled.

5.14.1.7 Prevent the unintended use of obsolete documents and apply suitable identification to them if they are to be retained for any purpose.

5.15 Control of Measuring and Test Equipment

The supplier shall determine the measuring and test equipment needed to provide evidence of conformity of product to the applicable specifications. The supplier shall establish and maintain a documented procedure in compliance with ANSI - Z540 or ISO 10012-1 for the control of measuring and test equipment. Measuring and test equipment shall:

5.15.1 Be calibrated or verified at specified intervals, or prior to use, against measurement standards traceable to NIST or international standards. Where no such standards exist, the basis used for calibration or verification shall be recorded.

5.15.2 Be adjusted or re-adjusted as necessary.

5.15.3 Be identified to enable the calibration status to be determined.

5.15.4 Be safeguarded from adjustments that would invalidate the measurement result.

5.15.5 Be protected from damage and deterioration during handling, maintenance and storage.

Records of calibration shall be maintained. When equipment is found not to conform to requirements, the supplier shall take appropriate action on the equipment and shall notify Kaman Purchasing Department of shipped product, which may have been affected.

5.16 Records Retention

Records, which provide evidence of conformity to requirements and the effective operation of the quality management system, shall be maintained for a minimum of ten (10) years unless otherwise specified by the purchase order or regulatory requirement following completion of the order. The supplier shall not discard or destroy records following the ten (10) year period without written approval from Kaman. Records shall remain legible, readily identifiable and retrievable. Records include radiographic film and documents that indicate the quality requirements on which the supplier's final acceptance of the product is based and those documents that record completion and / or results of inspections / tests which satisfy each of the quality requirements. Inspection records shall as a minimum indicate the nature of the observations together with the number of observations made, the number and type of deficiencies found, the acceptability of product and the action taken on deficiencies.
The supplier shall retrieve and make available records requested by Kaman within twenty-four (24) hours after the request.

5.17 Foreign Object Damage / Debris (FOD) Control

The supplier shall establish and maintain an effective Foreign Object Damage / Debris Prevention Program (FOD). The program shall be proportional to the sensitivity of the design of the products(s) to FOD, as well as to the FOD generating potential of the manufacturing methods. The written policies and procedures developed by the supplier shall be subject to review by Kaman and disapproval if the policies and procedures do not meet their objectives or fail to meet specific Kaman purchase order quality clauses. The supplier shall establish methods and facilities for identifying, handling, and storing articles to ensure against damage, deterioration or substitution during manufacture, storage and shipment.
For components, sub-assemblies and assemblies susceptible to foreign object debris / damage, the supplier shall ensure articles are free from foreign objects and foreign object damage resulting from supplier processing. The supplier shall establish and maintain an effective Foreign Object Damage / Debris prevention program to reduce FOD using National Aerospace Standard 412 (NAS 412) or FOD Requirements for Aerospace AS9146 per Quality Note A.28 as a guideline.

5.18 Internal Audit

The supplier shall conduct internal audits at planned intervals to determine whether the quality management system conforms to the planned arrangements, the requirements of this manual, and to the quality management system requirements established by the supplier.
Internal audit findings shall be documented. The management responsible for the area being audited shall ensure that actions are taken in a timely manner to eliminate detected nonconformities and their causes. Follow-up activities shall include the verification of the actions taken and the reporting of the verification results.

5.19 Counterfeit parts

5.19.1 Application

This section is intended for use on Aerospace and High Performance / Reliability of electronic equipment applications. This standard is recommended for use by all contracting organizations that procure electronic parts, whether such parts are procured directly or integrated into electronic assemblies or equipment. SAE AS-5553 is generic and intended to be applied and flowed down to suppliers that procure electronic parts, regardless of type, size, and product provided. SAE AS-5553 is not intended to be a stand-alone document but to supplement a higher document such as AS9100, ISO9100 and other Quality management systems documents. If there is conflict between purchase order and other documents, SAE AS-5553 takes precedence. **Use of non-OEM authorized/franchised distributors is prohibited. Should no other avenue exist contact the Kaman buyer for assistance.**

5.19.2

5.19.3 Avoidance using SAE AS-5553

5.19.4 Counterfeit Parts Program

5.19.4.1 The supplier shall maintain a counterfeit parts program to accomplish the following policy. Supplier shall utilize SAE AS-5553 as the baseline. The following shall be accomplished as control:

5.19.4.1.1 Establish an Electronic Parts Control Program

5.19.4.1.2 Process Control Plan

5.19.4.1.3 Verification of purchased product

5.19.4.1.4 Material control

5.19.4.1.5 Reporting (i.e., internal, customers, government, organization)

5.19.4.1.6 Obsolescence management

5.19.4.1.7 Counterfeit detection using SAE AS-5553 as a guideline

5.19.4.1.8 Perform sample inspections

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5.19.4.1.15 Training

5.19.4.1.16 Audits

5.19.4.1.17 Rejection control program

5.20 Training

The supplier shall ensure that its personnel are aware of the relevance and importance of their activities, and how they contribute to the achievement of the quality objectives. The supplier shall:

5.20.1 Determine the necessary competence for personnel performing work affecting product quality.

5.20.2 Provide training or take other actions to satisfy requirements.

5.20.3 Evaluate the effectiveness of the actions taken.

5.20.4 Maintain appropriate records of education, training, skills, and experience.

6.0 REFERENCE DOCUMENTS

6.1 See Appendices

7.0 CONCURRING AREAS/APPROVALS

7.1 CONCURRING AREAS

7.2 Bill Daniel – Sr Manager Purchasing

Commented [DB1]: Approved

7.3 APPROVALS

7.4 Cathey Szeto – Director of Quality

Commented [CS2]: Approved.

APPENDIX A. Kaman Quality Notes Flowdown (Formerly QRP 0541.07 APP A)

A.0 (5.0) PROCEDURE / REQUIREMENT PARAGRAPHS: (older alpha-numeric in brackets)

A.1 (5.1) INSPECTION AND DOCUMENTATION:

Articles defined in this purchase order are subject to inspection when received and will not be accepted if the supplier fails to provide the documentation and fully conforming items specified in the purchase order

Suppliers must have written authorization from Kaman to ship deviated items using form QAF 05-12, "Supplier Request for Variation" (SRV). Deviated parts shall be segregated and identified by the supplier. The SRV when entered into the Quality database becomes a VR. The VR (Vendor Request: Kaman version from TipQA data base with electronic signatures) must be dispositioned and signed by Kaman Engineering/Quality prior to shipping parts. A copy of the signed and dispositioned VR must accompany the shipment and referenced on supplier's C of C (Certification). Deviated parts shall be tagged with the VR number. The SRV form is available on the Kaman website, https://www.kaman.com/brands/kaman-fuzing/suppliers/

A.2 (5.2) GOVERNMENT SOURCE INSPECTION:
Government Source Inspection is required prior to shipment from your plant. Upon receipt of this order, promptly (not later than forty-eight (48) hours) notify and furnish a copy to the Government representative who normally services your plant so that appropriate planning for Government inspection can be accomplished. Verification by the Government and or Kaman customer will not be used by Kaman as evidence of effective control of quality by the supplier and does not constitute product acceptance by Kaman. If a government representative does not service your plant, contact the nearest Army, Navy, Air Force, or Defense Supply Agency inspection office. In the event the representative or office cannot be located, Kaman purchasing agent shall be notified immediately.

A.3 (5.3) KAMAN SOURCE INSPECTION:
Items covered by this purchase order are subject to surveillance and inspection at points of manufacture specified by Kaman Quality Assurance Department. Hardware shall not be delivered without a Source Inspection & Test Surveillance Record (QAF 06-01) signed by a Kaman Supplier Quality Engineer, Kaman authorized quality representative or a copy of a waiver (QAF 05-31) signed by Kaman Quality Engineering or Supplier Quality Engineering. Suppliers located within the States of Connecticut or Florida shall provide a minimum of three (3) working days advanced notice for source inspection. Suppliers located outside the States of Connecticut or Florida shall provide a minimum of ten (10) working days advance notice for source inspection.

A.4 (5.6) CERTIFICATION OF COMPLIANCE FURNISHED
For all items identified in Section A.4, Kaman sub-tier Supplier C of C's must reference Part Number as identified on the Kaman purchase order. Any/all conformance exceptions, such as Deviations, Waivers, Specification changes etc. must be noted on the C of C. Additionally, CofCs from the original suppliers for raw materials and raw material distributors must be supplied demonstrating unbroken chain of traceability. Example: 304 SS is bought from a metal distributor. There must be a CofC from the distributor and the originating mill and any post mill processor, all showing unbroken chain of traceability. This usually is the originating mill's heat lot number.

A.4.1 (5.6.1) The supplier shall furnish a "Certificate of Compliance" (CoC) with each shipment that assures full conformity with the PO requirements. The C of C shall list the PO #, applicable drawings, dwg Rev, Lot #, Batch, Date Code, and specifications, as applicable. The certificate shall be validated and signed by an authorized supplier representative, including their title. NOTE: Electronic signature with original on file is acceptable.

A.4.2 (5.6.2) CERTIFICATE OF COMPLIANCE for verification of ferrous and non-ferrous metal and/or validation of Special Processes: for Raw Material or Special Process supplier.

A.4.2.1 (5.6.2.1) Supplier shall furnish a C of C that demonstrates the verification for all ferrous and non-ferrous metals and/or a validation plan for all outside special processes is in place and being adhered to.

A.4.3 (5.6.3) CERTIFICATON OF COMPLIANCE FURNISHED FROM DISTRIBUTORS:

A.4.3.1 (5.6.3.1) Electronic Components and other Commercial Off The Shelf Parts (COTS)
The distributor shall furnish a Certificate of Compliance from the OEM with each shipment that assures full conformity with the PO requirements. The C of C shall be traceable to the Kaman PO#, list applicable drawings, dwg Rev, Lot Number, Batch, Date Code and specifications as applicable. The certificate shall be validated and signed by an authorized OEM representative. NOTE: Electronic signature with original on file is acceptable.

When sub-tier or OEM, C of C validation is not feasible from the original manufacturer, the seller must notify the Kaman buyer at the time of quotation or prior the acceptance of the order and the shipment of the material, for the additional requirements which the Seller must perform, in order to certify the validity of the component and to allow for the acceptance and use by Kaman

A.4.4 (5.6.3.34) Supplier shall enforce controls to assure all design construction, components, fabrication, material, processing methods changes, facility relocation, management changes, change in sub-tier suppliers, or changes that may impact form-fit-function-performance-durability have not changed since the last successful Qualification, First Article Inspection, on-site survey, SSE, and Customer notification, Any such changes must be communicated, (via SRV) in advance of being implemented, to the appropriate Kaman Buyer, in order for Kaman and/or our Customers to review and communicate requirements which may be placed on the supplier/sub-tier supplier, for qualification and approvals of said change (before it can be introduced into the product).

A.4.5 (5.6.5) When parts are reworked or replaced as a result of a Kaman Non-Conformance Report, supplier shall state the Non-Conformance Report number on the Certification of Compliance. Applies to all C of C's and suppliers.

A.5 (5.7) PHYSICAL AND CHEMICAL ANALYSES:

a. The items or services addressed on this order require copies of actual chemical and physical test results showing actual readings taken, and conformance to applicable specifications. These documents shall be included with each shipment.
b. For non-ferrous parts and non-ferrous raw material, the material identification and applicable specification are required on the certificate of conformance in lieu of actual physical and chemical analysis data.

NOTE: When requirement paragraph A.5 (5.7) is specified on the purchase order without suffix a or b, paragraph A.5. (5.7) applies, unless an item is non-ferrous material, then "b" will apply.

A.6 (5.8) INSPECTION/TEST DATA REQUIRED:

A copy of inspection and/or test data (including time/temperature charts and SPC charts, if required) shall be supplied with each shipment identifiable to the serial numbers and/or date code of items supplied. The reports shall be validated and signed by an authorized supplier representative. Subcontract documentation shall be retained at the Tier 1 for the specified program duration and be included with each lot, if required on the PO.
NOTE: For Heat Treat hardness testing, Kaman authorizes statistical sampling in accordance with SAE AMS2759, unless otherwise specified in this purchase order.

Supplier shall perform inspection and/or acceptance tests and supply data for the appropriate requirements. Inspection and/or acceptance test reports shall reference a purchase order number, supplier's name and address and/or independent laboratory name and address, part number, serial number, if applicable, date and run time. These reports shall accompany each shipment to be delivered and shall be validated by an authorized supplier representative.

A.6.1 (5.8.1) (a) **Attribute Results:** List each inspection and test attribute with the corresponding specification limit(s). Record the number of items inspected, the number accepted, and the number rejected, if sampling plan is used. Indicate the plan used and the related accept/reject criteria.

A.6.2 (5.8.2) (b) **Variables Results:** Record inspection and test measurements for each item inspected or tested. Variables inspection data is applicable to the extent specified on the applicable drawing or in the purchase order.

A.7 (5.9) TEST SAMPLES-FABRICATED PARTS, ASSEMBLIES, FLEXIBLE CIRCUITS AND PRINTED WIRING BOARDS:

Concurrent with the shipment, the supplier shall furnish test samples, slugs, or coupons appropriately identified and traceable to the batch or lot number. When flexible circuits or printed wiring boards are purchased in accordance with an applicable specification, the supplier furnished coupons and data shall satisfy the requirements of the applicable revision of the Specifications and its amendments.

A.8 (5.11) AGE CONTROLS, PERISHABLE ITEMS:
Articles delivered under this order shall contain: (1) date of manufacture (2) shelf-life expiration date (3) batch or lot number. The remaining life shall not be less than 80% of the total shelf life at time of delivery, unless otherwise waived in Kaman email. In addition, materials purchased under this requirement shall include a copy of the manufacturer's technical bulletin describing use and precautions, and provide a copy of the Kaman shelf-life waiver email, if applicable.

A.9 (5.12) PRODUCTS, METHODS AND MANUFACTURING PROCESSES:
Supplier shall enforce controls to assure all design construction, components, fabrication, material, processing methods changes, facility relocation, management changes, change in sub-tier suppliers, test software changes or changes that may impact form-fit-function-performance-durability have not changed since the last successful Qualification, First Article Inspection, on-site survey, SSE, and Customer notification, have NOT been changed since previous or during purchases without written approval from Kaman. Supplier shall notify the Kaman buyer of any such changes via a SRV. Kaman quality will make a determination if any action, such as first article inspection or on-site survey is appropriate.

A.10 (5.13) SUPPLIER QUALITY SYSTEM:
The contractor's quality system shall be compliant to ISO 9001 or AS 9100, ISO/TS-16949, ISO 13485, Nadcap or meet the requirements of the Kaman Aerospace Corporation, Kaman Fuzing SUPPLIER QUALITY REQUIREMENTS MANUAL. The manual is located on the Kaman web site https://www.kaman.com/brands/kaman-fuzing/suppliers/ During the performance of this purchase order, the suppliers quality system, inspection system and manufacturing processes are subject to review, verification and analysis by Kaman, Kaman customer representatives and Government representatives as

applicable. Suppliers and their sub tier suppliers must be Nadcap certified for the special process performed on Kaman product.

A.11 (5.15) FIRST ARTICLE INSPECTION Per Flow Down requirements:

First article inspection per AS9102 is required on this order.

First Article Inspection by definition is a 100% inspection of all engineering characteristics including drawing notes on a random sample of parts from the production lot that is 100% complete to the engineering drawing and / or purchase order requirements. The supplier shall complete the First Article Inspection using AS9102 First Article Inspection Report Forms 1, 2 and 3. The forms are available on the Kaman Fuzing website: https://www.kaman.com/brands/kaman-fuzing/suppliers/ Forms other than those contained on the Kaman website may be used, however they must contain all "Required" and "Conditionally Required" information and have the same field reference numbers.

If this is the first time the supplier is manufacturing this part for Kaman then a FAI is required to ship the parts or assemblies.

If the supplier has not manufactured or processed this product for a period of two (2) years, defined as more than 2 years since the end of the last production/process run of the part to the beginning of the next production run, then a full FAI is required.

Kaman makes available a **FAI Requirement Determination Questionnaire** to assist the supplier in determining whether or not a FAI is required. It is available on the Kaman Fuzing website.

When assemblies and sub-assemblies are subject to FAI, each non-COTS (commercial off the shelf) part within the assembly or sub-assembly shall have a separate FAI. Additionally, an FAI shall be performed on the completed assembly or sub-assembly.

If the supplier revises the tooling, implements new tooling, implements a change in process flow or otherwise changes the process or venue, then an approved SRV (see note A.1) will provide direction on extent of FAI required.

If the supplier has not shipped product in to Kaman Precision Products for a period of time that would call for a FAI but the material is residual from a previous manufacturing run that had an approved FAI, a statement shall appear on the Certificate of Conformance stating "Residual material completed manufacture on MM/DD/YYYY, previous FAI included for reference."

If the supplier does not know how to perform an AS9102 First Article inspection and report, Kaman will provide training. Please contact the Kaman Buyer to arrange for the training.

Supplier shall provide the FAI report to Kaman in the following manner:

1. Send a copy of the FAI Report to the Cognizant Buyer via secure portal as assigned by the buyer. **Email must not be used**. NOTE: Sending through e-mail is an ITAR violation
   a. The FAI Report must also include:
      i. All certifications for parts, material and special processes.
      ii. Supplier's Certificate of Conformance.
      iii. If FAI source witness is required then refer to SQRM-1, Appendix A, Para A.11.B.
      iv. The uploaded file name must include the part number and PO number.

2. Once FAI Report is received via the above portal, Kaman QE will review the data. If acceptable, the QE will sign the FAI customer approval field on page one of the FAI and will email the signed cover sheet back to supplier as acceptance.
    a. The supplier is then directed upon receipt of the signed cover sheet to ship the Production Hardware to Kaman along with the signed FAI cover sheet
    b. The Supplier should also identify and segregate the FAI Unit from the rest of the shipment lot.

A.11.A (5.15 A) FIRST ARTICLE INSPECTION 1 YEAR:

Same requirements as A.11 except the 2-year redo of the FAI requirement is now 1 year.

If the supplier has not manufactured or processed this product for a period of 12 months, defined as more than 12 months since the end of the last production/process run of the part to the beginning of the next production run, then a full FAI is required.

A.11.B WITNESSED FIRST ARTICLE INSPECTION

The FAI is required to be performed and witnessed at the suppliers' facility. Please contact your Kaman purchasing agent to arrange for Kaman witnessing of the FAI Inspection. Parts shall not be delivered without a Source Inspection & Test Surveillance Record (QAF 06-01) signed by a Supplier Quality Engineer or authorized Kaman quality representative or a copy of a waiver (QAF 05-31) signed by Kaman Quality Engineering or Supplier Quality Engineering. If there is a signed waiver, it shall accompany FAI submittal. The waiver is issued to forgo the witnessing of the FAI inspection, but the completed FAI must be sent in with the parts shipment along with a copy of the waiver.

Suppliers located within the States of Connecticut or Florida shall provide a minimum of five (5) working days advanced notice for First Article Inspection. Suppliers located outside the States of Connecticut or Florida shall provide a minimum of ten (10) working days advance notice for First Article Inspection.

Upon notification to the supplier, the Kaman customer(s) shall be allowed access to the supplier's facility to jointly witness the FAI with the Kaman representative.

Supplier shall provide the FAI report to Kaman in the following manner:

Send a copy of the FAI Report to the Cognizant Buyer via the secure portal

a. The FAI Report must also include:
    i. All certifications for parts, material and special processes.
    ii. Supplier's Certificate of Conformance.
    iii. If FAI source witness is required then refer to SQRM-1, Appendix A, Para A.11.B.

A.11.C (5.15 C) FIRST ARTICLE INSPECTION 6 MONTHS:

Same requirements as A.11 except the 2-year redo of the FAI requirement is now 6 months.

If the supplier has not manufactured or processed this product for a period of 6 months, defined as more than 6 months since the end of the last production/process run of the part to the beginning of the next production run, then a full FAI is required.

A.12 (5.16) STATIC SENSITIVE MATERIAL:

Parts on this order are static sensitive devices. All work shall be performed at ESD protected workstations. ESD protected workstations shall meet the requirements of ANSI/ESD S-20.20. Exceptions taken by the supplier require written approval from Kaman Supplier Quality Engineering. Static sensitive parts shall be packaged in protective containers. Packing and marking shall comply with MIL-STD-1686 or EIA JESD625.

A.13 (5.18) CONTROL OF SPECIAL PROCESSES:

Suppliers who perform a special process such as welding, heat treating, brazing, plating, soldering, anodizing, passivation, painting, non-destructive testing, etc. shall be Nadcap Certified for the process and Kaman approved prior to the manufacture and/or processing of the articles defined in the purchase order. Special Process suppliers maintaining a current Nadcap certification is mandatory. Any change of Special Process Suppliers must be approved by Kaman via a SRV. Second-tier special process suppliers shall be controlled by the first-tier supplier. The first-tier supplier shall have established and maintained a positive method to verify the special process characteristics. Approved sources may be Program specific shall be noted on the purchase order or Vendor Instruction (V.I.). If there is a valid reason why Nadcap certification is not possible, contact the Kaman buyer for disposition.

A.14 (5.20) SOLDERING AND WORKMANSHIP REQUIREMENTS:

The requirements of the current revision of J-STD-001, "Procedures and Requirements for Preparation and Soldering of Electrical Connections" are applicable. The supplier's quality system shall contain documented evidence of compliance to J-STD-001, CLASS 3. The supplier shall furnish a Certification of Solderability with the electronic components specified on this PO. All personnel performing soldering per this paragraph shall be trained and certified according to IPC-J-STD-001 Class 3.

A.15 (5.22) SAFETY DATA SHEET OR MATERIAL SAFETY DATA SHEET:

The supplier shall furnish a Safety Data Sheet (SDS) or a Material Safety Data Sheet (MSDS) for the material specified on this Purchase Order Ref: Globally Harmonized System of Classification & Labeling of Chemicals (GHS).

A.16 (5.25) EXPLOSIVE DEVICES:

Hazardous Material Identification and Material Safety Data Sheet are required on this Purchase Order. DFARS 252.223.7002 "Safety precautions for Ammunition and Explosives" and 252.223.7003 "Change in Place of Performance-Ammunition and Explosives", DOD 4145.26M "Contractor's Safety Manual for Ammunition and Explosives", FAR 52.223-3 and Notification to Suppliers of Hazardous Material - No. P124 apply to this order.

A.17 (5.26) SOFTWARE CONTROL:

Software Controls per the Supplier Quality Requirements Manual Appendix D apply to this purchase order.

A.18 (5.27) CALIBRATION SERVICES:

Calibration services required by this order shall comply with the requirements of ANSI/NCSL-Z540-1 or ISO/IEC 17025:2005.

A.19 (5.28) CERTIFICATION OF COMPLIANCE ON FILE:

Record retention is required on this order.

(a) Documented evidence of conformance shall be on file for a minimum of (10) ten years from the delivery date or as specified on the Purchase Order and available for review upon request.

(b) Documented evidence of conformance shall be on file for a minimum of (15) fifteen years from the delivery date or as specified on the Purchase Order and available for review upon request.
(c) Documented evidence of conformance shall be on file for a minimum of (20) twenty years from the delivery date or as specified on the Purchase Order and available for review upon request.

A.20 (5.29) FIRST PIECE INSPECTION TWELVE (12) MONTHS

First Piece Inspection and acceptance may be required on this order. First Piece Inspection, by definition is the inspection of a given operation or process. The purpose of First Piece Inspection is to verify that process or operation will conform to engineering drawing requirements. If the supplier has not manufactured or processed this product for a period of twelve (12) months from the last date of manufacture, revises the tooling, implements new tooling, implements a change in processes or is a new supplier for this product, First Piece Inspection is required to be performed at the supplier's facility, prior to producing the balance of the lot, unless otherwise authorized in writing. Contact your Kaman purchasing agent to arrange Kaman witness of the First Piece Inspection. Hardware shall not be delivered without objective evidence of First Piece Inspection (Source Inspection & Test Surveillance Record QAF 06-01 signed by a Kaman Supplier Quality Engineer, authorized Kaman quality representative or a copy of a waiver (QAF 05-31) signed by Kaman Quality Engineering or Supplier Quality Engineering.

Suppliers located within the States of Connecticut a minimum of ten or Florida shall provide a minimum of three (3) working days advanced notice for First Piece Inspection. Suppliers located outside the States of Connecticut or Florida shall provide (10) working days advance notice for First Piece Inspection. Upon notification to the supplier, the Kaman Customer(s) shall be allowed access to the supplier's facility to jointly witness the FAI with the Kaman representative.

A.21 (5.34 A) FIRST PIECE INSPECTION SIX (6) MONTHS

First Piece Inspection and acceptance may be required on this order. First Piece Inspection, by definition is the inspection of a given operation or process. The purpose of First Piece Inspection is to verify that process or operation will conform to engineering drawing requirements. If the supplier has not manufactured or processed this product for a period of six (6) months from the last date of manufacture, revises the tooling, implements new tooling, implements a change in processes or is a new supplier for this product, First Piece Inspection is required to be performed at the supplier's facility, prior to producing the balance of the lot, unless otherwise authorized in writing. Contact your Kaman purchasing agent to arrange Kaman witness of the First Piece Inspection. Hardware shall not be delivered without objective evidence of First Piece Inspection (Source Inspection & Test Surveillance Record QAF 06-01 signed by a Kaman Supplier Quality Engineer, authorized Kaman quality representative or a copy of a waiver (QAF 05-31) signed by Kaman Quality Engineering or Supplier Quality Engineering.

Suppliers located within the States of Connecticut or Florida shall provide a minimum of three (3) working days advanced notice for First Piece Inspection. Suppliers located outside the States of Connecticut or Florida shall provide a minimum of ten (10) working days advance notice for First Piece Inspection. Upon notification to the supplier, the Kaman Customer(s) shall be allowed access to the supplier's facility to jointly witness the FPI with the Kaman representative.

A.22 (5.35) USE OF KAMAN APPROVED SUPPLIERS:
Inclusion of this quality paragraph requires that suppliers and sub-tier suppliers requiring subcontract services shall use subcontractors approved by Kaman for the performance of such services. Contact the Kaman buyer to find out who the approved suppliers are.

A.23 (5.36) X-RAY FLORESCENCE (XRF) REQUIRED:
Supplier shall provide XRF results with nickel or gold plating to show evidence of plating thickness.

A.24 (5.37) SPC REQUIREMENTS:
The supplier shall implement Statistical Process Control (SPC) per the requirements of the SUPPLIER QUALITY REQUIREMENTS MANUAL APPENDIX C.

A.25 (5.38) SOURCE SUBSTANTIATION OF ENGINEERING (SSE):
Source Substantiation of Engineering per the Supplier Quality Requirements Manual Appendix B applies to this purchase order. All corrective actions requests will be processed through the Kaman Quality system and require formal, written cause and corrective action from the supplier or Sub-tier supplier.

A.26 (5.40) SIX SIGMA and LEAN:
Six Sigma and Lean methodologies per the Supplier Quality Requirements Manual, Appendix D apply to this purchase order.

A.27 (5.41) REQUIREMENTS FOR SOLDERED/PLATED ELECTRICAL, ELECTRONIC ASSEMBLIES / HARNESSES / CABLES / COMPONENTS AND MECHANICAL ITEMS

Electronic, electrical, electromechanical, and mechanical piece parts and assemblies, including the internal fabrication of hardware, delivered to Kaman Aerospace Corporation under the provisions of the Purchase Order shall not have pure tin finishes. Any tin-lead plating or solder process/processing shall result in a finish of no less than 3% lead composition. The following surface finishes are exempt from this requirement: gold (ENIG), nickel-palladium, nickel-palladium-flash-gold, tin-silver, and tin-silver-copper. Note: This applies to “component leads and terminations (internal and external), carriers, bodies, cages, brackets, housings, mechanical items, hardware (nuts, screws, bolts), etc.”

Seller shall provide a Certificate of Conformance (C of C) with each shipment.

The C of C shall mean that the Seller or Seller's agent has verified and validated that delivered product meets the minimum 3 % lead (Pb) composition requirements, or the material meet at least one of the following provisions:
Seller or Seller's agent has contacted the Original Equipment Manufacturer (OEM) and verified that the specific Mfr. / Lot Date Code of delivered product meets the specified minimum lead (Pb) requirement if Tin (Sn) is present in the product.

(a) Seller or Seller's Subcontractor has verified by actual sample testing (X-ray Fluorescence testing is preferred) or other industry acceptable method that a minimum of 3% lead (Pb) is present in any process that uses tin (Sn).
(b) If the material ordered under this P.O. is governed by a MIL-SPEC or Kaman Control Drawing or Specification that specifies or allows the use of tin (Sn) that contains less than 3 % lead (Pb), Seller is to contact the Kaman Buyer to have this Quality Attachment removed from the Purchase Order.

Seller shall be responsible for managing compliance with this requirement with subcontractors or sub-tier suppliers and provide evidence of the appropriate flow-down and management of this requirement to the satisfaction of the Buyer or designate.

A.28 (5.43) FOREIGN OBJECT DAMAGE / DEBRIS (FOD) PREVENTION

(a) The supplier shall establish and maintain an effective Foreign Object Damage / Debris (FOD) prevention program to reduce FOD. The suppliers' program shall be proportional to the sensitivity of the design of the products(s) to FOD, as well as, to the FOD generating potential of the manufacturing methods. The written policies and procedures developed by the supplier shall be subject to review and audit by Kaman, and disapproval when the supplier's policies and procedures do not accomplish their objectives.

(b) The supplier shall establish and maintain an effective Foreign Object Damage / Debris prevention program to reduce FOD using National Aerospace Standard 412 (NAS 412) as a guideline.

(c) The supplier shall establish and maintain an effective Foreign Object Damage / Debris prevention program in accordance with AS9146 – FOD Requirements for Aerospace.

NOTE 1: When requirement paragraph A.28 (5.43) is specified on the purchase order without suffix a or b, paragraph A.28 (5.43) (a) applies.

A.29 (5.44) RE-TINNING OF ROHS OR LEAD-FREE TERMINATIONS (REF. GEIA-STD-0005-2 LEVEL 2C).

(a) Components with RoHS High Tin finish terminations (less than 10% Lead) and components with Lead-free (Pure Tin) termination shall be re-tinned with Sn/Pb (tin-lead) solder, Sn63Pb37 or Sn60Pb40 Other termination finishes i.e., Gold, Nickel-palladium, etc., do not apply.

(b) A RoHS & Lead-free components list shall be controlled and maintained; with approval and change notification to Kaman.

(c) A sampling plan of receipt material is required for materials / termination verification and shall be approved by Kaman.

(d) Pb-free tin finish is prohibited unless an exception is made (reviewed and approved by Kaman). Specific instruction on use of Pb-free tin finish and required control measures to be provided and reviewed on a case-by-case basis.

A.30 Test Readiness Review (TRR)

Prior to commencement of any testing identified on this purchase order the supplier shall contact Kaman and hold a Test Readiness Review (TRR) with a representative of Kaman's Test Engineering group.

The TRR shall include, but not be limited to the following items:

1. Review of test equipment including calibrations.
2. Review of applicable procedure(s).
3. Confirmation of certified personnel
4. Review of test sequence plan, including witness points, check points, items of interest etc…..

A.31 Manufacturing Readiness Review

A Manufacturing Readiness Review (MRR) is mandatory for the following situations:

1. **Drawing Revision level changes of a technical nature or the addition of approved deviation/change documentation ("Hanging Paper") to an existing drawing which adds a numerical designation to the Part Number Revision Level. For example - Part Revision A to A1.**

2. **Supplier is producing the part for the first time.**

If this Quality Note is applicable to this purchase order notify the Kaman Buyer to schedule a MRR upon receipt of the Purchase Order. Do not begin production until the MRR is held and documented as the outcome may result in further changes and potential fees. The MRR can also be held as part of responding to a Request For Quote (RFQ) to document and disposition exceptions.

Refer to Paragraph 5.6.4 of the main SQRM-1 for more details.

APPENDIX B Supplier "Source" Substantiation of Engineering (SSE)

B1.0 SUPPLIER SOURCE SUBSTANTIATION OF ENGINEERING

B1.1 Supplier Substantiation of Engineering (SSE) is the method used for the control of critical components.

B1.2.1 The requirements of this document shall be enforced whenever a component is identified as critical on the engineering drawing, Purchase Order, Vendor Instruction (VI), Detailed Specification (DS), Statement of Work or Engineering Information Memorandum.

B1.2.2 Following initial qualification approval of a critical component by Kaman, the supplier shall not change manufacturing method, manufacturing sequence or site location without prior written notification to Kaman. Kaman Supplier Quality Engineering shall determine if a follow-up SSE is required.

B1.3 The supplier shall define a system for controlling processes and process changes and it shall address:

a. Responsibility and methods for identifying controlled processes

b. Coordinating internal approval of process change (controlled and non-controlled).

c. Methods to assure changes are not introduced in the manufacturing process without formal approval by Kaman.

d. Tool Control; System and its identification of tools, life, marking, tracking and maintaining. Reference the SSE Tool Control section and the listing on purchase order.

B1.4 The supplier shall maintain on file the original copy of each of the following documents. Hard or electronic copies are acceptable.

1. Kaman Purchase Order
    a. SQRM-1 Appendix A Clauses (Formerly, QRP 0541.07 Clauses)
    b. Supplier Instructions
    c. Statement of Work
    d. Engineering Information Memorandum (EIM)
2. Manufacturing and Assembly Routing Sheets.
3. Manufacturing and Assembly Work Instructions
4. Inspection and Test Instructions
5. Inspection and Test Results; including receiving inspection of purchased goods and services.
6. Material Certifications
7. Process Certifications
8. Sub-Tier Certifications
9. Tool Control System including identification, marking and maintenance.
10. Line Qualification Data (Energetic Components)
11. Internal non-conformance reports with disposition
12. Any associated SRV's and/or Waivers/Deviations
13. Approved Source Inspection & Test Surveillance Records, as applicable
14. Kaman SSE Assessment Form.

B2.0 SSE REVIEW

B2.1 Kaman reserves the right to perform on-site review of the suppliers' processes in relation to the SSE documentation at any phase in the production cycle.

APPENDIX C Statistical Process Control (SPC)

C1.0 Statistical Process Control (SPC) is required when specified in the purchase order quality requirements, engineering drawing, statement of work, supplier instruction, or engineering information memorandum. When not required by purchase order, suppliers are strongly encouraged to use SPC as a tool for continuous improvement and to monitor and control their processes.

C1.1 When required, the supplier shall provide variable data control charts and a histogram / process capability study for the characteristics or products identified for control.

C1.2 A process is considered in-control when a CPK of 1.33 or greater is achieved and variation is within statistical control limits.

APPENDIX D Six Sigma (6σ) and Lean

Six sigma (6σ) and lean manufacturing are toolkits to reduce waste in business processes.

D1.0 SIX SIGMA (6σ)

Six Sigma (6σ) is a philosophy of doing business with a focus on eliminating defects through fundamental process knowledge. The goal of Six Sigma is to eliminate variability, defects and waste. Six Sigma can be understood or perceived at three levels:

a. **Metric:** 3.4 Defects Per Million Opportunities (DPMO). DPMO allows for the complexity of the product/process to be taken into consideration.

b. **Methodology:** Define, Measure, Analyze Improve and Control (DMAIC) is a process for continued improvement. It is systematic, scientific and fact-based. This closed-loop process eliminates unproductive steps and applies technology for improvement. Design for Six Sigma (DFSS) is a systematic methodology utilizing tools, training and measurements to enable the supplier to design products and processes that meet Kaman expectations and can be produced at Six Sigma quality levels.

c. **Philosophy:** Reduce variation in the processes and make customer-focused, data driven decisions.

D2.0 LEAN MANUFACTURING

Lean Manufacturing is a proven approach to reduce waste and streamline operations. Lean manufacturing embraces a philosophy of continually increasing the proportion of value-added activity through ongoing waste elimination. A lean manufacturing approach provides suppliers with tools to survive in a market that demands higher quality, faster delivery, lower cost, and controlled processes. Specifically, lean manufacturing:

- Dramatically reduces the waste chain.
- Reduces inventory and floor space requirements.
- Creates more robust production systems.
- Develops appropriate material delivery systems.
- Improves layouts for increased flexibility

Kaman suppliers are strongly encouraged to first, eliminate the non-value-added processes (Lean). Second, make the enduring processes robust using Six Sigma methods.

APPENDIX E Software Controls

E1.0 PURPOSE

This procedure provides requirements to the Supplier for Software Quality Assurance Control when required.

E2.0 SCOPE

E2.1 This procedure applies to Kaman deliverable software.

E2.2 This procedure does not apply to administrative (e.g. word processors, spread sheets etc.) software.

E2.3 Software development and/or control procedures shall be documented by the Supplier per IEEE/ISO/IEC 12207 or Equivalent activities accepted by Kaman Middletown Software Quality Assurance (SQA).

E3.0 RESPONSIBILITY

Supplier is responsible for the implementation and maintenance of the Software Development Program.

Supplier shall perform the following activities:

a. Reviews the contract for Quality requirements**,** attached S.I. or S.O.W. for contractual requirements.

b. Review the contract and specifications to identify required software products (e.g. software, Development/Deliverable Documents, test Procedures, etc.) and their evaluations, testing, and corrective action requirements per contract requirement.

c. Review the contract and SDP for software Development activities and their requirements (e.g. Software Development Process, Design Review, Technical Review, Program Review, SCCB Meetings, Testing, etc.).

d. Prepare a program-specific Software Quality Program Plan (SQPP) documenting SQA on-going support of the software development process and application software development process per the SQPP.

e. Prepare a program-specific evaluation manufacturing process plan, utilizing a checklist, and evaluate the software development activities and applicable software products.

f. If a system or component is developed in multiple builds, the activities and software (SW) products of each build are evaluated in the context of the objectives established for that build. An activity or SW product that meets those objectives is considered satisfactory even though it is missing aspects designed for later build.

g. Document evaluation results on the appropriate checklist, issue corrective action request, if necessary, and verify implementation of corrective action.

h. Prepare and maintain records of each SQA activity per SQPP.

i. Assure that the person responsible for conducting SQA activities is not the person who developed the software product, performed the activity, or are responsible for both.

j. Is responsible for ensuring compliance with the contract and has the resource, training, responsibility, authority, and organizational freedom to permit objective SQA evaluations and to initiate and verify corrective actions.

k. Is responsible for delivering Software and required documentation per contract requirement

E4.0 PRIVACY, SAFETY AND SECURITY ASSURANCE

E4.1 Supplier is responsible during Software Development to maintain Safety by identifying safety-critical components or portions thereof whose failure could lead to hazardous systems state (could result in death, injury, loss of property or environmental harm).

Supplier is responsible to identify Security components that are critical to those components or portions thereof whose failure could lead to breach of systems security.

Supplier is responsible to Identify Privacy critical to those components or portions thereof whose failure could lead to a breach of systems privacy.

E5.0 AUDITS, ASSESSMENTS AND SURVEYS

E5.1 Kaman reserves the right to assess, audit, and attend supplier software or inspection reviews. The supplier shall be notified of this requirement via purchase order quality requirements.

Document Revision History

Rev	Description of Change	Date Released	Training Required (KPP/KPPI only)
18	Removed section 5.42 as it had no comment other than the word, "removed"	01/16/2016	N
19	Removed, "QRP 0541.07 Appendix A" "wording" and any "wording" associated with this application. It is now within this SQRM-1 document.	03/30/2016	N
20	Updated SQRM-1 with all BLUE updates	05/03/2016	N
21	Updated; all Appendices to correct formatting.	05/03/2016	N
23	Updated the website link for supplier information at various paragraphs, and updated some text in blue Appendix A. Moved A4.5 below A4.4 and modified text to reflect, "A4.5 = Renumbered as A4.5 from "Renumbered as 5.6.5 from 5.6.2.2.5" …" Under Section A4.4 removed, "(side note: Renumbered as 5.6.4 …) Under Section A.11 removed, "Review section 5.5 of this document (QRP0540.01) for additional information pertaining to inspections. Revised Section A.11 and A.11A and add Section A.11B Under A.28 changed, "NOTE 1: When requirement paragraph A.28 5.43 is specified on the purchase order without suffix a or b, paragraph A.28 (a) 5.43(a) applies. Under A.19 removed, "Para 5.33 does not relieve the supplier from furnishing certifications and data requirements by PO test or other Quality Codes." Added under section 7.4 FAI report activity and function. providing instructions to suppliers on how to send in the FAI Updated 19.2 approvals section.	07/09/2018	N
24	Reviewed in accordance with Sunset Review; updated document with BLUE; Formatting; Updated to latest rev of template KPPF-001	7/26/2021	N
25	Updated section A.19 to have a), b) or c) requirement; add section A.11.C to define requirements for 6-month FAI submission; update requirements for C of C preparation in section A.4; update requirement for shelf-life material in section A.8; revise hyperlinks to match recent changes to web site.	4/19/2022	N
26	Updated appendix A, item A.4 to require exceptions to be noted on certificate of conformance.	9/28/2022	N
27	Extensively updated SQRM-1 to document current state.	5/16/2024	N
28	Added MRR and Nadcap requirements	12/10/2024	N
29	Added full traceability for raw materials and COTS items. Added Q Note 31.	2/5/2025	N