



Supplier Quality Assurance Requirements (SQAR)

Supplier Quality Assurance Manual

Applies to RAM's External Providers

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**SUPPLIER QUALITY
ASSURANCE REQUIREMENTS (SQAR)
SUPPLIER QUALITY MANUAL**
Applies to RAM's External Providers

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REVISIONS

REVISION	BY	CHANGE	PAGES AFFECTED
3/1/2019	CRH	Complete revision, new document and format generated based on previous version of SQAR and released	ALL
5/20/2020	CRH	Revised and released (changes from previous revision highlighted)	ALL
5/17/2021	CRH	Revised and released (changes from previous revision highlighted)	9-17, 23
9/20/2021	JA	Updated RAM name and special quality requirements in Q Codes	All
FEB 14, 2024	CRH	Revised format and content. Sections re-organized with section numbers updated (new and revised content, except section numbers, highlighted in yellow).	ALL

1.0 PURPOSE

The purpose of this document is to clearly define, for each purchase of products or services, the necessary and applicable technical and quality requirements with which the Supplier must comply to meet the requirements of RAM Aviation, Space & Defense, its customers and/or regulatory authorities. This document establishes general and special product assurance requirements clauses for use on the Purchase Order and is part of the terms and conditions when referenced on the Purchase Order. For the balance of this document RAM Aviation, Space & Defense shall be referred to as "RAM", the Customer which has entered into a Purchase Order agreement with the External Provider, also known as Suppliers and Sub-tier Suppliers (as applicable).

Failure to comply with any of the requirements flowed down in the Purchase Order, drawing or the applicable clauses of this document may result in investigations, monetary forfeitures, payment withholdings and/or contract termination. All questions about requirements must be understood and resolved before accepting the Purchase Order.

2.0 SCOPE

Unless expressly excluded by the Purchase Order, **Q010 applies to all Purchase Orders**. The **Quality Codes (Q-Codes)** listed in Section **5.2** apply only when the specified Q-Code is included in the Quality Assurance Requirements section of the Purchase Order.

The Supplier is responsible to flow-down all applicable requirements to any approved Sub-tier source they intend to use in the performance of this Purchase Order. This shall include both RAM and RAM's customer requirements, as stated on the Purchase Order, Drawing and any other documents included or referenced in the Purchase Order.

2.1 Exceptions to Quality Codes (Q-Codes)

Depending on the commodity and customer requirements, exceptions to the Supplier Quality Assurance Requirements may be approved. Any exception must be submitted in writing, approved by RAM, and documented on the purchase order, deviation request documentation, **or other written documented instructions**, prior to delivery. Notify RAM purchasing with any exception requests as soon as possible after a purchase order is received.

3.0 APPLICATION

3.1 Definitions

SQAR – RAM's Supplier Quality Assurance Requirements, also known as RAM's Supplier Quality Manual

Supplier – RAM's External Providers, providers of raw material, manufactured parts, special processes, external services, etc., referenced in the purchase order

Sub-tier Supplier – External Providers to RAM's Suppliers, providers of raw materials, special processes, external services, etc.

Customer – For the purpose of the SQAR, Customer refers to RAM's Customer or the end user of the parts or services referenced in the purchase order

3.2 Supplier Types and Quality Codes (Q-Codes) Reference

RAM purchases a variety of parts and services from multiple types of Suppliers. The following are examples of common Supplier Types and the most relevant Sections of the SQAR. Note: This is a reference list to help each type of Supplier focus on more relevant sections in the SQAR but does not relieve the Supplier of the requirement to be compliant with the complete SQAR Q010 General Requirements or Q020-Q200 Supplemental Requirements as noted on the Purchase Order unless waived in writing by RAM.

3.2.1 Raw Material (Bar Stock) Supplier

Q010 Sections 4.7 – 4.8, 4.13.4, 4.14.4, 4.21 – 4.21.2, 4.22 – 4.22.4, and Q Codes Q010, Q090

3.2.2 Machined Part Supplier (No Special Processes Completed)

Q010 Sections 4.9 – 4.9.1, 4.10, 4.12 – 4.14, 4.21 – 4.21.2, 4.22 – 4.31, and Q Codes Q010, Q030

3.2.3 Machined Part Supplier (Complete Parts with Machining and Special Processes)

Q010 Sections 4.9 – 4.9.1, 4.10, 4.12 – 4.14, 4.18 – 4.19, 4.21 – 4.21.2, 4.22 – 4.31, and Q Codes Q010, Q030, Q090

3.2.4 Special Process Provider

Q010 Sections 4.4 – 4.5, 4.8 – 4.10, 4.12 – 4.14, 4.18.1, 4.21 – 4.21.2, 4.26 – 4.31, and Q Codes Q010, Q030, Q090

3.2.5 Purchased Part Supplier (COTS, Electronics, Wire, Tapes, O-rings etc.)

Q010 Sections 4.4 – 4.8, 4.13.4, 4.21 – 4.21.2, 4.22, 4.22.3, 4.22.6, 4.28 – 4.31, and Q Codes Q010, Q090

3.2.6 Purchased Materials Supplier (Paints, Chemicals, Solders, etc.)

Q010 Sections 4.4 – 4.5, 4.7, 4.13.4, 4.21 – 4.21.2, 4.22.4 – 4.22.5, 4.28, and Q Code Q010

3.2.7 Calibration and Material Analysis Provider

Q010 Sections 4.13.4, 4.16, 4.21 – 4.21.1, 4.26 and Q Code Q010

Q010 – GENERAL REQUIREMENTS – Applies to all Purchase Orders

4.0 SUPPLIER REQUIREMENTS

4.1 Supplier Code of Conduct (Ethics and Safety)

Suppliers shall ensure operations are being performed in a manner that is appropriate, as it applies to their ethical, legal, environmental, safety and social responsibilities. This shall include, but is not limited to:

- Compliance with Local Laws and Regulations
- Compliance with Environmental, Health and Safety Laws
- Compliance to Product Safety
- Compliance to Non-Discrimination Laws/Regulations
- Compliance to Labor Laws
- Compliance to Ethical Behavior Standards and Supplier Ethics
- Any other requirements for the fulfillment of this purchase order

4.1.1 Code of Conduct and Policy Enforcement

This Code of Conduct applies to Suppliers and Sub-tier sources. The Supplier shall flow down these requirements to Sub-tier sources and shall be responsible for monitoring and verifying compliance.

4.1.2 Confidentiality

The Supplier shall ensure the confidentiality of RAM and RAM customers products, designs and intellectual property that may be shared as a result of working with RAM. Refer to RAM Non-Disclosure Agreements (NDA) for additional information.

4.2 Government Rated Contracts

If this Purchase Order is in support of a government rated order certified for national defense use, the Supplier is required to follow the provisions of the Defense Priorities and Allocations System (DPAS) regulations (15 CFR Part 700). Per the requirements of DPAS, a DO Rated order shall take precedence over any unrated orders. DX Rated orders shall take precedence over DO Rated orders or any unrated orders. The Supplier is required to accept this order electronically via email within 15 business days of receipt of DO-rated orders and within 10 business days of receipt of DX-rated orders. Rated orders are identified in the Purchase Order notes by a priority rating such as DX, DO, etc. This requirement also applies if the drawing or Purchase Order notes identify the order as in support of a government contract.

When an order is identified as DPAS Rated (DO/DX Rated) and/or the technical data provided by RAM is flagged with an "ITAR Requirements Apply" identifier, **United States International Traffic in Arms Regulations (ITAR)** also apply. The Supplier agrees that all technical data provided by RAM will be used in strict compliance with the ITAR requirements and solely for the performance of the work per the Purchase Order. The Supplier agrees to implement procedures for restricting access to the technical data to **U.S. Nationals only**. If during the performance of the work, the Supplier is required to provide such technical data or part to a Sub-tier source, the Supplier may do so provided that such Sub-tier source is also located in the United States and further provided that the Supplier has imposed upon the Sub-tier source the same ITAR obligation/restrictions as contained herein. Upon completion of the work hereunder, including any warranty period, the Supplier and all Sub-tier source(s) involved shall return all technical data to RAM.

Debarment Certification – For government rated Purchase Orders, Suppliers must be eligible for government contract work and must certify Sub-tier Suppliers are not debarred, suspended, proposed for debarment, or declared ineligible for government contract work. To verify a sub-tier source is eligible, visit <https://sam.gov/content/home>

4.3 Anti-Terrorism Policy

The Supplier agrees to comply with the Executive Order 13224 – blocking property and prohibiting transactions with persons who commit, or support terrorism notice of September 24, 2001 – and further agrees to include this statement in each Sub-tier contract or purchase order issued hereunder.

4.4 REACH Compliance

Suppliers must understand and comply with the December 18, 2006 European Union (EU) regulation titled "Registration, Evaluation, Authorization and Restriction of Chemicals (REACH)". Prohibited substances as defined by REACH must be disclosed to RAM prior to delivery and documented on accompanying Certificate of Conformance.

4.5 Mercury-Free Compliance

Suppliers must understand, comply with, and disclose non-compliance as required per customer, industry and government standards and regulations.

4.6 Country of Origin

All foreign origin articles imported into the United States must be marked with the English name of the country of origin. Seller's packing slip, invoice, and purchase order acknowledgement shall certify the country of origin for each item supplied (19 U.S.C. 1304 & 19 C.F.R. Part 134).

4.7 Counterfeit Raw Material and Electronic Parts: Avoidance, Detection, Mitigation and Disposition

Any Supplier providing raw materials or electronic components to RAM shall have a system in place compliant to AS5553 and/or AS6174 to detect and preclude delivery of any counterfeit components or materials to RAM. The Supplier shall ensure that only new and authentic materials are used in products delivered to RAM. The Supplier may only purchase raw materials directly from original melt sources, or authorized distributors who can provide evidence of certification from the original melt source. Electrical components shall only be procured from the original component manufacturers (OCM), OCM franchised distributors, or authorized aftermarket

manufacturers. **No product delivered to RAM is to be procured from brokers.** Use of products that were not provided from authorized sources is not allowed without prior written approval from RAM. The Supplier must present compelling support documentation (e.g. certification with the product from the melt source in the case of raw materials or from the OCM in the case of electronic components) that authenticates traceability of the product to the original source as proof that the product is authentic and conforming to these requirements.

4.7.1 Fraudulent Activities

As with counterfeit parts, fraudulent activity has the potential to allow unsuitable parts into service without any knowledge and can have a significant impact on functionality and performance of the parts. Examples of Fraudulent Activities can include but are not limited to intentional misrepresentation of test results, intentional omission of a processing step, use of inspection stamps by unauthorized personnel, or other unauthorized changes or falsification of documentation. Fraudulent activity could result in loss of approved supplier status and business, criminal or civil penalties, or catastrophic loss of life or equipment using defective or fraudulent parts.

If suspicion or evidence of Fraudulent Activity is discovered, Suppliers have the responsibility to report fraud. Suspect materials must be segregated and contained by the Supplier. RAM must be notified of any suspect material delivered against the Purchase Order. See Q010 Nonconforming Products and Notice of Nonconforming Products Delivered to RAM for notification and containment requirements.

4.8 Conflict Materials

The Dodd-Frank Act addresses concerns that conflict minerals are traded to finance groups that engage in violations of human rights. As defined in the Act, Conflict Minerals include gold, tin, tantalum, and tungsten. Conflict Minerals originating in the Democratic Republic of the Congo (DRC) or an adjoining country (Angola, Burundi, Central African Republic, the Republic of the Congo, Rwanda, South Sudan, Tanzania, Uganda, and Zambia) are not authorized to be supplied to RAM. The Supplier must be able to certify product containing any of the materials noted above as originating from a smelter that is validated as compliant in accordance with the Conflict-Free Smelter (CFS) Program and listed on the Compliant List. The Conflict-Free Smelter Program is a list of certified compliant smelters in accordance with EICC criteria. The full list and additional information are available at <http://www.responsiblemineralsinitiative.org>.

4.9 Cyber Security Requirements

Suppliers play an important role in safeguarding technical defense information. *DFARS 252.204-7012, Safeguarding Covered Defense Information and Cyber Reporting* was published by the DOD to prevent improper access of important, unclassified information in the supply base. Suppliers shall be familiar with cyber security requirements of DFARS 252.204-7012 and flow these requirements to sub-tier Suppliers.

4.9.1 Control of CUI

Controlled Unclassified Information (CUI) such as ITAR or government drawings, specifications, etc., must be protected by Suppliers and their sub-tiers. RAM has implemented a secure FTP in order to share CUI with Suppliers. When sensitive documents are to be shared with Suppliers, instructions for the Supplier to retrieve documents will be forwarded from RAM I.T. Suppliers shall use this portal when sharing CUI information with RAM. Suppliers shall also develop a plan that follows DFARS Cyber security requirements and industry best practices when they must share CUI with sub-tier suppliers.

4.10 Access to Supplier and Sub-tier Supplier Facilities

It is agreed that in the execution of this Purchase Order, RAM and/or its prime contractor, including FAA or Government representatives, will be permitted on site to review Supplier's facilities and procedures, as deemed necessary.

4.11 Basic Quality System Requirements

The Supplier shall maintain a Quality Management System with preference for a system compliant to ISO 9000, AS9100 or AS9120. However, RAM realizes that for some Suppliers it would not be economically feasible to comply with the level of these quality systems. When authorized by RAM's customer requirements, RAM holds the option to require compliance to systems such as MIL-I-45208, MIL-Q-9858 or equivalent, providing the quality of the product meets the flowed-down requirements from RAM and RAM's Customers. Compliance to these requirements shall be verified through Supplier surveys and/or onsite visits, as well as results from RAM's Receiving Inspection process.

4.11.1 Supplier Surveys and Third-Party Certification

To maintain ISO/AS registration and to meet customer requirements, RAM is required to survey Suppliers. Most surveys will be completed by the Supplier as a self-audit or may require an on-site audit conducted by a RAM representative. Periodic resurvey of existing Suppliers will be required every 2-3 years depending on the Supplier commodity, status, third party certification, and performance. The completion of the survey is required to maintain an approved supplier status for RAM. RAM will accept a Supplier's standard customer survey response if one is available, otherwise a RAM Supplier Survey form will need to be completed.

Suppliers with Third-Party Certification (ISO, AS, Nadcap, etc.) will send a copy of the current certification with the Supplier Survey. Suppliers will send copies of renewed certifications when issued or notify RAM of any change in certifications (non-renewal/no long seeking certification, suspended or revoked certification, etc.) prior to completing any open Purchase Orders.

4.12 Supplier Workmanship Guidelines

To support Supplier quality, RAM has developed RCS-2021 "Supplier Workmanship Guidelines". The purpose of this document is to provide details regarding RAM's quality expectations. RCS-2021 provides general guidelines and may not include all possible quality related issues. Meeting the guidelines of RCS-2021 does not relieve Supplier of any responsibility to perform according to RAM quality standards, industry standards and/or the terms of the Purchase Order. The Supplier Workmanship Guidelines are available on the RAM website <https://ramasd.com/services/#qualityassurance>

4.13 Document Sources

4.13.1 Order of Precedence Between RAM Documents

If any clause or requirement conflicts with a similar clause or requirement, contact RAM purchasing for clarification. Unless otherwise specified, the order of precedence between documents shall be as noted below:

1. RAM Purchase Order Notes and/or Instructions
2. RAM and/or Customer Supplied Drawing Notes and/or Instructions
3. RAM Supplier Quality Assurance Requirements (SQAR)
4. RAM Supplier Workmanship Standard RCS-2021
5. RAM Purchasing Terms and Conditions

If a clause or requirement is not outlined in a document with precedence, it is understood that this is not an omission of responsibility, and such requirements will be followed and incorporated accordingly.

4.13.2 RAM and/or Customer Drawings

Copies of RAM or RAM Customer proprietary documents (i.e. drawing, specification, etc.) required by the Supplier to comply with the Purchase Order requirements will be furnished to the Supplier by RAM with the Purchase Order.

For repeat orders, the Supplier shall confirm that the drawing on file matches the revision level indicated on the PO. The Supplier shall not proceed with the performance of the PO if the revision level of the drawing or any other documentation does not match the revision specified on the PO. The Supplier shall contact RAM for resolution of any revision issues before processing.

These proprietary documents shall be controlled such that they are not shared or utilized by personnel or other entities not associated with the performance of the Purchase Order. Once the purchase order has been completed these proprietary documents shall be returned to RAM with the final shipment. It is the Supplier's responsibility to maintain current revision copies of industry, national, international

or US government documents and standards that are required to comply with the drawing and purchase order requirements. Any problems experienced by the Supplier in obtaining the required documents shall be brought to the attention of RAM's buyer.

4.13.3 RAM Internal Specifications on Drawings (RPS, RCS, QMS)

RAM drawings may invoke internal RAM specifications (such as RPS-XXXX, RCS-XXXX, QMS-XX) and/or Industry Specifications (AMS, ASTM, etc.). When a RAM drawing invokes a RAM and Industry Specification, the Supplier will process to the Industry Specification. If the RAM drawing only includes the internal RAM specification, contact RAM purchasing for the appropriate industry or customer specification for the Purchase Order. Here are some common internal RAM specifications and the corresponding Industry Specification:

RAM Specification/Procedure	Industry Specification/Standard
RPS-1004 (Electroless Nickel Plating)	AMS 2404 (Electroless Nickel Plating)
RPS-1006 (Passivation of Corrosion Resistant Steels)	ASM 2700 (Passivation of Corrosion Resistant Steels)

4.13.4 Industry/MIL/Other Specification Document Revision Status

The Supplier shall use the most current revision, or superseding document, for specifications required on the drawing and/or purchase order. The only exception would be special instructions on the purchase order to use a superseded specification or a previous revision per RAM's customer requirements. Contact RAM's buyer for clarification of requirements prior to accepting the order.

4.13.5 Internal Document Control

The accuracy of documents and forms is of the highest importance. Where applicable, Suppliers shall have procedures in place regarding document control, revision control, digital forms, electronic signatures, etc.

4.14 Manufacturing and Process Changes

4.14.1 RAM Initiated Changes

The Supplier shall incorporate, at the specified and agreed upon effectivity points, all changes initiated by RAM and/or RAM's customer and communicated to the Supplier through a formal Purchase Order change and/or amendment. Such changes may be in the form of revised drawings, specifications, tests, inspection, or fabrication methods, etc., and may apply to products as well as to the Supplier's management and administrative systems. The Supplier's business management system shall include appropriate controls and records, including controls at the Supplier's Sub-tier sources, which provide objective evidence that changes were incorporated as required by the Purchase Order.

Objective evidence may be in the form of date, lot, serial number, revision letter, or other positive identification. Such records are subject to on-site verification by RAM at the Supplier's facilities or the facilities of the Supplier's Sub-tier sources.

4.14.2 Supplier Initiated Changes

The Supplier shall not make any **major** changes in product design, drawings, performance specifications, materials, or processes, without specific approval by RAM in writing prior to incorporating or making such changes in products or data. When applicable, the Supplier shall flow-down this requirement to the Supplier's Sub-tier sources. The Supplier may make changes **to** products under Supplier's proprietary engineering design control that **do not result in a major change**. The Supplier shall furnish a copy of **any** change to RAM prior to the initial delivery of the (changed) product, so that RAM can verify that the change does not violate the product specification requirements.

4.14.3 Drawing Change Classes

RAM defines changes as:

Major Changes (Class I) – Major changes are considered mandatory and shall have firm effectivity change points established and verified for traceability. Under no circumstances are major changes made which affect RAM or RAM's Customer requirements unless specific authorization by RAM (and/or RAM's Customer) has been granted. Proposed major changes will affect form, fit or function of the final assembled part and shall be submitted for approval to RAM, prior to implementation. Only when such approval is granted in writing from RAM will affected drawings, travelers, ATPs, or other affected documentation be revised. Major change is defined as a change to an existing product that has been qualified. Engineering will not make any changes in materials, process, design details or acceptance test procedure which may affect the part or the component part thereof with respect to part number identification, physical or functional interchangeability, and performance. Examples of major changes include:

- Change of manufacturing facility location or work transfer to a source that has not been qualified.
- Changes to manufacturing or special processes for 'Flight Safety Critical' and/or 'Locked Planning' parts.
- Changes that reduce or impact the specified performance requirements of the design.
- Changes that affect the reliability, maintainability, or survivability of the design.
- Changes to the interface characteristics.
- Changes that affect compliance to other technical requirements in the specification.

Minor Changes (Class II) – Minor changes are considered improvements to be accomplished as determined by manufacturing coordination. The cut-in or effectivity point of this type of change is at the option of engineering / manufacturing. This type of change does not affect form, fit, or function of the final assembled part. The old and new part must be fully interchangeable. RAM's customer controlled (Build-to-print) designs can only be changed with approval from RAM and RAM's Customer. RAM Engineering can create an equivalent RAM manufacturing sketch incorporating a minor change if the change clarifies the information or tightens the existing customer tolerance. The RAM design must continue to meet all original customer drawing requirements after the change. Examples of minor changes could include:

- Correction of a deficiency discovered during item functional checks that is necessary to ensure compliance with RAM or Customer requirements.
- Any change to a piece part print that does not affect form, fit or function of the final assembled part.
- Chemical or physical properties of a material used to manufacture the product.
- Any change in the manufacturing process that changes or alters the configuration, composition, or physical properties of the item produced.

RAM reserves the right to make the final determination if a requested change will qualify as a Major or Minor change.

4.14.4 Obsolescence Requirements

The Supplier shall perform an obsolescence analysis of the product Bill of Material (BOM) for any product being delivered to RAM where they control the design. The purpose is to categorize every item in the product BOM as to 1) known obsolescence; 2) potential obsolescence; and 3) small or no obsolescence concern. Should this analysis apply to the product being offered to RAM, the Supplier shall notify RAM of the part/material that is affected, and the recommended replacement, allowing RAM to get the necessary approvals from the customer.

4.15 Record Retention

Unless otherwise specified on the Purchase Order, the Supplier shall retain all quality records as objective evidence of conformance to Purchase Order requirements, including Supplier's and their Sub-tier source's records and certifications of the inspections and tests performed during procurement. Examples of quality records may include inspection records, special process records/certifications, manufacturing documentation, training records, internal audits, eye examinations, work instructions and/or any other quality records pertinent to the manufacture of the product supplied. These records shall be retained for a minimum of fifteen (15) years after completion of the order. Orders for parts and/or services that indicate 'Flight Safety Critical' shall be retained for a minimum of 40 years. Such records shall be maintained to ensure their legibility for two (2) reproductions (copies) and must be retrievable within 24 hours should RAM request copies be provided. In lieu of hard copy, the records may be kept electronically providing the electronic copy is fully legible. Prior to physical destruction or disposal of these records, the Supplier shall offer the records to RAM for retention at no additional cost to RAM and/or RAM's customers. This requirement shall be flowed down to any Sub-tier Supplier used in the manufacture of the product supplied.

4.16 Supplier Calibration System

Suppliers shall properly maintain all Measuring & Test Equipment (M&TE) used to measure and/or test product for final acceptance. Supplier's M&TE equipment must be calibrated by either an outside lab, or internally if the calibration is performed per ANSI/NCSL Z540 3. **Calibration laboratories shall be certified to ISO 17025.** Other Calibration services may be used with RAM approval. The Supplier shall notify RAM of any product accepted with equipment found with out-of-tolerance conditions. An out-of-tolerance condition is one where the uncertainty of the measurement equipment itself or the master standard(s) used to calibrate the equipment is found to exceed the limit called out in the specification cited above. The Supplier and/or Sub-tier source calibration certification(s) shall include a statement indicating the traceability number to the National Institute of Standards and Technology (NIST) used to calibrate the equipment. **The Supplier shall ensure that any internal or outside personnel performing calibration services have current annual eye exams on file** and those files are made available to RAM upon request.

For Suppliers performing Calibration services, calibration shall be performed in compliance to ANSI/NCSL Z540 3 and the Supplier shall be certified to ISO 17025. The Supplier performing the calibration shall notify RAM immediately of out-of-tolerance conditions. An out-of-tolerance condition is one where the uncertainty of the measurement equipment itself or the master standard(s) used to calibrate the equipment is found to exceed the limit called out in the specification cited above. Certifications shall be provided per Section 4.21, except instead of part number and revision, the certification shall reference the equipment identifier (ID #). The certification shall include a statement indicating the traceability number to the NIST standard used.

Any personnel performing calibration of equipment shall have on file an annual eye examination performed by a certified optometrist or medically qualified individual. See the table in Section 4.26.1 for visual acuity requirements for inspection and calibration personnel. A copy shall be available for review upon request.

4.17 Responsibility for Product Conformance

Neither audit, surveillance, inspection and/or tests made by RAM or RAM's representative at either the Supplier's or RAM's facility, nor Supplier's compliance with applicable quality assurance requirements clauses herein, shall relieve Supplier of the responsibility to furnish product(s) that conform to all requirements of the Purchase Order.

4.18 Sub-tier Source Selection

The Supplier shall not use Sub-tier sources for **raw material, manufacture or processing of any materials or processes on product(s) scheduled for delivery to RAM unless they meet the approval requirements of the Purchase Order. Requirements shall include but are not limited to material or process that requires RAM, RAM's Customer, or Government approved source, manufacturing or process that requires Nadcap approved source, or similar source approval requirements.**

If not specified, a Nadcap certified source shall be used for special processes. Special Processes are processes such as, but not limited to, metallurgical and chemical processes, metal joining, bonding, plating, coating, anodize, surface treatment, cleaning, material removal by non-conventional methods, and nondestructive inspection methods including Radiography, Ultrasonic, Eddy Current, Liquid Penetrant, Magnetic Particle Inspection, or any other process used to evaluate item conformance to design and quality requirements.

If a Supplier proposes to use a Sub-tier source that is not **Nadcap or RAM approved**, the Supplier must get prior written authorization from RAM before use. The Supplier shall submit to RAM **within five (5) calendar days following acknowledgement of this Purchase Order, the Sub-tier company name(s) and address(s) of all un-approved sources planned to complete the Purchase Order.** Failure to request approval from RAM **or using un-approved Sub-tier** sources may result in rejection of delivered items.

All requirements flowed down to the Supplier in the Purchase Order shall be flowed to Sub-tier Suppliers, including RAM and RAM's customer requirements.

4.18.1 Special Process Verification Tests

When a Supplier or Sub-tier Supplier performs a special process that requires destructive verification tests (i.e., hardness testing after heat treat), raw material coupons from the same manufacturing/heat lot shall be used. **Testing of actual parts is prohibited, unless specifically requested on the Purchase Order.** Destructive test results such as hardness indentations are detrimental and unacceptable to the end use of the part. **No actual part testing which causes deformation or damage to the part surface shall be performed without prior approval by RAM.** If a raw material sample is unavailable, A SAMPLE SCRAP PART may be used for testing. The sample part must be from the same material lot, clearly marked as 'Test Sample', and rendered unusable to prevent the sample from being mixed with the production lot. Test samples (raw material coupons or test sample parts) shall be processed with the lot to represent the same processing as the part(s).

4.19 Flow-down of Purchase Order Requirements

The Supplier shall flow-down the General Requirements Clauses (Q010) and any applicable Additional Quality Clauses (Q020-Q200) on this Purchase Order to Supplier's approved Sub-tier sources performing work for the Supplier that is scheduled for delivery to RAM. **This includes RAM and RAM's customer requirements.**

4.20 Supplier Performance

Suppliers are expected to provide conforming products and/or services that meet all agreed upon requirements, by the agreed upon due date.

4.20.1 Supplier Quality

Quality is critical to RAM. Supplier Quality is measured using RPPM (Rejected Parts per Million – calculated ratio of parts rejected per million parts received) and Quality Score (Percentage of conforming parts received over total parts received).

4.20.2 PO Acceptance and On-Time Delivery (OTD) Window

It is very important for suppliers to accept purchase orders in a timely manner or request any changes as soon as possible. Suppliers should accept purchase orders or request due date or other changes within seven (7) business days of receipt. After seven days, the due date is considered accepted, and any orders delivered after the due date will be considered late.

The Supplier shall make deliveries to RAM based on the following receiving window:

On-Time is considered received on the due date or up to 7 days early.

Unacceptable delivery performance is considered more than 7 days early or more than 1 day late.

All receipts of products outside this OTD window will be scored as LATE and will affect the Supplier's score card. RAM reserves the right to refuse early shipments and may elect to return them at Supplier's expense.

4.20.2.1 Partial Shipments

Partial shipments are not authorized unless requested or approved by RAM. When a partial shipment is authorized, the delivery will only be considered on time if the full shipment is received within the OTD window. If a partial shipment is received after the OTD window, the entire shipment (line/release) will be considered late.

4.20.3 Supplier Scorecard

Supplier Scorecards are typically reported at the end of each Quarter. Scorecards will include: Supplier Quality, Supplier On-Time Delivery, Supplier Responsiveness to Nonconformance and Corrective Action (Pass/Fail rating for responding/not responding to nonconformances and/or corrective actions).



**SUPPLIER QUALITY
ASSURANCE REQUIREMENTS (SQAR)
SUPPLIER QUALITY MANUAL**
Applies to RAM's External Providers

The Combined Score is the calculated score (weighted average) of Quality (45%), On-Time Delivery (45%), and Responsiveness to Non-conformance and Corrective Action (10%).

The Goals for Suppliers are:

	Goal	Needs Improvement	Unsatisfactory
RPPM	0 - 10,000	10,000 - 20,000	> 20,000
Quality	100% - 99%	98.9% - 98%	< 98%
On-Time Delivery	100% - 98%	97.9% - 90%	< 90%
Responsiveness to NCP and CAR	100% (Pass)	n/a	0% (Fail)
Combined	100% - 98.7%	98.6% - 94.6%	< 94.6%

4.21 Supplier Part and Process Certification Requirements

The Supplier shall provide a Certificate of Conformance (C of C) on company letterhead or other identifying document with a written statement that all product and/or services being provided to RAM were processed (i.e., manufactured, honed, heat treated, tested, plated, etc.) and comply with all requirements of the Purchase Order, drawing or other specifications. At a minimum, all certifications shall contain (as applicable): the material description, part number, revision, reference to all applicable material and/or process specifications, acceptance criteria specifications, Key Characteristics and Critical to Quality inspection requirements, quantity delivered, and RAM's Purchase Order number with both line and release. The C of C shall have the part number and drawing revision matching the part number and revision letter(s) on the PO. For example: P/N 1-11000 Rev A (C of C shall have P/N 1-11000 Rev A), P/N 1-11000/I Rev A.a (C of C shall have P/N 1-11000/I Rev A.a).

Certifications must be legible and reproducible for two generations. Material will be rejected if the certification is not legible.

A Certificate of Conformance meeting the requirements above shall be provided at no cost to RAM. Additional charges for material or process certifications shall be submitted with quote and approved by RAM prior to Supplier accepting the purchase order.

If you intend to deliver a few extra pieces over what is called for on the PO, the actual quantity being shipped must be noted on the C of C for traceability purposes. Excess quantities of 3% or more must be approved by RAM prior to acceptance. If approval is not received in advance these extra pieces may not be accepted by RAM and will be scrapped or returned to the Supplier at their expense.

4.21.1 Supplier Sub-tier Certifications

Machined Part Supplier (Complete Part per RAM Supplied Drawing with Machining and Special Processes)

In addition to providing a C of C meeting the requirements of Section 4.21, when a Supplier delivers parts or assemblies that required special processing (such as but not limited to: heat treat, plating, NDT, etc.), the Supplier shall furnish all certifications (material, process, etc.), issued by Supplier or Supplier's Sub-tier sources. All certifications shall be legible and remain legible for two (2) reproductions (copies). A copy of all certifications must be included in the shipment. The Supplier is responsible for verifying certifications furnished by Supplier's Sub-tier sources for their adequacy and compliance with the Purchase Order and the requirements of this document. To assure the adequacy and authenticity of all certifications furnished by Supplier, the certifications shall include the name of the issuing organization and shall be signed by an official of the issuing organization. Only actual signatures rendered in black (preferred) or dark blue ink by the signing official or digital signatures are acceptable to RAM. The Supplier or Sub-tier source official may use a quality or inspection stamp in lieu of a signature, providing that such stamp(s) identify the Supplier and the Supplier's authorized individual to whom the stamp is assigned, and that the issue, use and control of such stamp(s) are governed by Supplier's and/or Sub-tier source's documented procedures.

Purchased Part Supplier (COTS, Electronics, etc.)

Suppliers of COTS items (such as connectors) shall provide a C of C meeting the requirements of Section 4.21 at no cost to RAM. If the purchase order indicates all material and process certifications are required, any additional cost to provide Supplier's Sub-tier certifications must be quoted and included on the purchase order before the order is accepted.

Purchased Material Supplier (Welding Gas Tanks)

Mix ratio, gas mixture purity after mixing, purity requirements, certification to AWS A5.32/a5.32M and analysis of resulting dew-point or moisture PPM and purity as stated on PO must be stated on material certificate of conformance.

Calibration Supplier

For calibration services, the Supplier shall identify or provide traceability to requirements for the standard to be used, accuracy, range of use and number of points to be checked.

4.21.2 Part and Process Certification Requirements for Space Application (SP)

For Purchase Orders indicating Space Application, noted as 'Space', 'Space Application' or part numbers ending in 'SP', suppliers shall provide all raw material certifications, original manufacturer certifications (for purchased items i.e. COTS items), special process certifications and test reports. This shall include all Supplier and Sub-tier certifications for raw materials (metallic and non-metallic materials), machined parts, manufactured assemblies, special processes, material testing, original manufacturer certifications for COTS items and assemblies, etc. Full material traceability from every component to final assembly is mandatory to meet the customer requirements for Space Applications when indicated on the Purchase Order. The Supplier is responsible for providing these certifications, and if necessary, submitting a quote for the cost of additional certifications prior to accepting the Purchase Order.

4.22 Raw Material Source

All raw metallic materials provided on this Purchase Order and/or used to produce products or assemblies (except COTS items) manufactured per this contract **must be from a DFARS approved country and may also require Domestic Melt Material. Domestic Melt Material is required when ANY of the following apply: the purchase order or item number/description indicates "DM", "Domestic Melt", "Domestic Required" or similar, or when Q200 is required. When required, material must be Domestic Melt Source as indicated on the raw material certification. In addition, when indicated on the purchase order or if DFARS 252.225-7008 is flowed down, all raw material and products (including COTS items) must be from Domestic Sources. Unless prior approval is obtained from RAM to use non-DFARS or non-Domestic Melt source material (when Domestic Melt is required), any parts delivered from unapproved sources will be returned to the Supplier for replacement at the Supplier's expense.** A list of DFARS approved countries can be found by visiting the Defense Pricing and Contracting (DPC) system <https://www.acq.osd.mil/DPAP> (click DFARS/PGI and see DFARS Procedures Subpart 225.0). The origin of mill source must be identified on the supplied certifications. **Refer to Section 4.21 – 4.21.2 for more detail regarding certification requirements.**

For Specialty Metals, unless otherwise specified on the Purchase Order or other applicable documents, Suppliers shall be compliant to the requirements of DFARS 252.225-7009 '*Restriction on Acquisition of Certain Articles Containing Specialty Metal*'. In the case of conflicting requirements, RAM's purchase order requirements will take precedence over restrictions or exceptions to the DFARS clauses. RAM reserves the right to allow for exceptions as necessary, within customer and DFARS requirements.

When a RAM purchase order indicates that 'DFARS Material is Required', raw metallic material shall be from a DFARS compliant country whether the material is considered Specialty Metal or Non-specialty Metal.

The following definitions apply when the DFARS clauses are indicated on the purchase order:

DFARS Compliant Material Required – All raw metallic material (Specialty Metal and Non-specialty Metal) supplied or used to manufacture products shall be from a DFARS Compliant country per DFARS 225.872-1.

DFARS 252.225-7008 Required – All Specialty Metals, as defined in this clause, to be supplied or used to manufacture products shall be from Domestic Melt sources only.

DFARS 252.225-7009 Required – All Specialty Metals, as defined in this clause, to be supplied or used to manufacture products shall be from Domestic or DFARS compliant sources, unless exempt under the exceptions listed in the clause.

DFARS 252.225-7014 Required – For Specialty Metals, as defined in this clause, preference shall be given for Domestic or DFARS compliant material to be supplied or used to manufacture products for this order, unless exempt under the exceptions listed in the clause.

Raw Material is defined as metal in raw form (bars, sheets, strips, etc.) consisting of a basic metallic element and/or a mixture of one or more metallic, or non-metallic, alloying elements.

Product (or Assembly) is defined as an item forming a portion of a system or subsystem that can be supplied and replaced as an entity and incorporates multiple, replaceable parts.

Commercial Off-The-Shelf (COTS) Items are defined as commercially available items (components or assemblies) sold in substantial quantities in the commercial marketplace and are offered to the government without modification, in the same form as it is sold to the commercial marketplace. Unless otherwise noted, COTS items that are exempt from specialty metal requirements can be manufactured from non-DFARS raw material. See DFARS 252.225-7009 for the list of exceptions to Specialty Metal restrictions for COTS items.

Other materials, such as non-metallic raw material (i.e. plastic bar stock, molding powder, rubber, etc.) that do not fall under the above categories will be exempt from DFARS requirements, unless specified as DFARS or DM Required on the purchase order.

4.22.1 Raw Material Mill Certifications

When possible, raw metallic material certifications from the original mill shall be provided for all material used to fulfill the Purchase Order. A distributor certification or certificate of test may be acceptable but is subject to approval at RAM. At a minimum, Raw Material Certifications shall include the following:

Name of Distributor (if applicable)
Name of Mill
Country of Melt
Material Type/Grade
Applicable Specifications
Heat Lot Number
Mechanical and Chemical Analysis Results as Required per Specification
Name of Certifying Person with Signature/Stamp and Date

Certifications must be legible and reproducible for two generations. Material will be rejected if the certification is not legible.

4.22.2 Raw Material Single Heat Lot Traceability

To aid in raw material traceability between components and final assemblies, it is preferred that suppliers manufacture parts from single raw material heat lots. For purchase orders that indicate "Single Heat Lot Required", "Space Application – Special Material Traceability Required" or similar, all parts shall be manufactured from a single heat lot of raw material. See Section 4.21.1 for additional information regarding "Space" application parts. If the purchase order does not specify single heat lot requirements, RAM will accept parts manufactured from multiple heat lots. However, parts must be separated by heat lot and marked to identify which parts were manufactured from each individual heat lot.

4.22.3 Hardware Certifications

Commercial Off-the-Shelf (COTS) items and large quantity commercial hardware items including nuts, bolts, washers, etc. that are high volume and light weight shall be accompanied by a C of C, citing that the materials meet the specification called for on the Purchase Order. Material certifications may be required when indicated on the Purchase Order. The Supplier will be responsible for crediting RAM for any shortage of parts exceeding 3% of the order's line item(s). Overages will not be accepted for payment. The count of parts may be accomplished by weight. The scale used must be able to accurately weigh parts repetitively and be calibrated per the requirements of SQAR Q010.

4.22.4 Bulk-Item Certifications

Bulk items such as paint, potting, sealants, etc. furnished hereunder shall be accompanied by a Certificate of Conformance stating that the materials meet the specification called for on the Purchase Order. The certification shall meet all the requirements of [Section 4.21](#). Copies of certifications, as applicable, from actual material manufacturers shall be included with each shipment.

4.22.5 Age Sensitive Material

The material expiration, as applicable, shall be noted on the certification. **A minimum 80% shelf life shall remain** upon shipment unless waived by RAM in writing.

4.22.6 Tin Content

Raw materials and all electronic, electrical, electromechanical, and mechanical piece parts and assemblies shall not have pure tin finishes. All tin-lead plating or solder processes shall not result in coatings which contain more than 97% tin composition. The exception to this requirement is "Tin plated copper wire".

4.23 Supplier Furnished Raw Material

Suppliers of machined components shall provide material certifications and test reports with every delivery, covering the material used to fill this order. All certifications shall meet the requirements of Q010.

For metallic materials, each lot or heat of raw material used to fulfill this purchase order shall include, as applicable, the material name or designation, alloy, type, class, grade or condition, producer (mill) name, the lot or heat number, the material specification and revision and the chemical / physical test report(s) to which the material complies. The certifications shall also clearly state the country of origin of melt for all raw materials being provided or used to manufacture the product being provided.

For non-metallic materials, each lot of raw material used to fulfill this purchase order shall include, as applicable, the material name or designation, type, class, grade or condition, manufacturer name, the lot number, the material specification and revision and the chemical / physical test report(s) to which the material complies. The certifications shall also clearly state the country of origin for all raw materials being provided or used to manufacture the product being provided.

In addition, the seller shall ensure raw materials are compliant with the counterfeit parts requirements per Q010.

4.23.1 Heat Treat Coupons

The Supplier is responsible for providing raw material samples when:

- 1) a manufactured part is furnished using raw materials provided by the Supplier; and**
- 2) subsequent Heat Treat is required per the drawing or indicated on the Purchase Order.**

The Supplier shall review the drawing title block, drawing notes, and/or purchase order notes for heat treat requirements. If heat treatment is required but not completed by the Supplier, the Supplier shall furnish at least three 1" long samples of raw stock from the same material used to produce the parts delivered to RAM. These samples are for use by RAM for hardness verification testing after heat treatment of manufactured parts. These material samples shall be bagged and tagged with the following minimum information: material type, size, mill heat number, RAM purchase order number and RAM part number. If multiple heat lots are utilized, the parts shall be segregated by heat lot used and multiple segregated samples from each lot of material shall be provided and clearly marked with the relevant material lot information.

For orders with multiple releases, bar stock (Heat Treat) samples shall be included with every delivery (every line/release) of parts.

4.24 RAM Supplied Material

When indicated on the purchase order, RAM will supply the raw material. The Supplier shall verify the material is tagged with the material type and lot number and that the material type matches the drawing or purchase order requirements. When delivering the final product, a Certificate of Conformance meeting the requirements of Q010 shall be submitted with the shipment to RAM. In addition to the required information, the C of C shall include the statement: "Parts manufactured from material furnished by RAM Company." The disposition of any excess material will be RAM's responsibility. It is the responsibility of the Supplier to maintain control of RAM furnished material to avoid lost traceability or use on any other product while in their possession. Traceability at a minimum shall include the material identification (RAM P/N) and original RAM material purchase order number. This is the same information

provided with the material and shall accompany any excess material when returned to RAM. RAM works with many sizes and types of similar materials, which is why maintaining positive control and traceability of material is extremely important. If material traceability is lost (i.e. tag lost, bars misplaced without lot/tag information), the material is suspect and must be segregated, marked as suspect and returned to RAM for replacement at the Supplier's expense. **Material with no traceability shall not be used on parts delivered to RAM.**

4.24.1 Heat Treat Coupons (RAM Supplied Material)

The Supplier is responsible for providing raw material samples when:

- 1) a manufactured part is furnished using raw materials provided by RAM; and
- 2) subsequent Heat Treat is required per the drawing or indicated on the Purchase Order.

The Supplier shall review the drawing title block, drawing notes, and/or purchase order notes for heat treat requirements. If heat treatment is required but not completed by the Supplier, the Supplier shall furnish at least three 1" long samples of raw stock from the same RAM supplied material used to produce the parts delivered to RAM. These samples are for use by RAM for hardness verification testing after heat treatment of manufactured parts. These material samples shall be bagged and tagged with the following minimum information: material type, size, mill heat number, RAM purchase order number and RAM part number. If multiple heat lots are utilized, the parts shall be segregated by heat lot used and multiple segregated samples from each lot of material shall be provided and clearly marked with the relevant material lot information.

For orders with multiple releases, bar stock (Heat Treat) samples shall be included with every delivery (every line/release) of parts.

4.25 RAM (and Customer) Supplied Tooling and Hardware

Suppliers shall be responsible for procuring and maintaining required gages and tooling necessary to fulfill the Purchase Order. RAM and/or RAM's customers may loan and allow use of specialty gages by Suppliers as needed (if available). Suppliers must verify correct gages are used to accept product. Suppliers shall ensure RAM gages are handled with care and returned to RAM in working order or must notify RAM immediately of damaged or non-conforming gages.

When RAM or RAM's customer supplies raw material or hardware for the Purchase Order, the Supplier shall maintain traceability of material and hardware to the Purchase order and original material lot information. Material and hardware shall not be mixed and shall be returned to RAM after completion of the Purchase Order, unless otherwise specified by RAM in writing.

4.26 Inspection and Acceptance

4.26.1 Vision Tests

Unless waived in writing by RAM, all personnel performing final acceptance inspection activities and calibration shall have annual eye tests by certified optometrist or medically qualified personnel. These records shall be made available to RAM upon request. See Table 1 below for reference.

Vision Parameter	Requirement
Far Vision	Snellen Chart 20/50 or better
Near Vision	Snellen 14/18 or better (20/25 or better, Jaeger Type 1, Ortho-rated 8 or equivalent).
Color Vision	Average or normal (4 to 6 responses on Titmus, B+L, or American Optical testing machine, or a satisfactory response when tested with an Ishihara or Pseudoisochromatic plate). Ability to distinguish red, green, blue, and yellow colors as prescribed in Dvorine Charts, Ishihara plates or equivalent. A practical test using color-coded wires and/or color-coded electrical parts shall be acceptable.

Table 1 – Visual Acuity Requirements for Final Inspection and Calibration Personnel

4.26.2 Acceptance of Products and Services

The product(s) and service(s) pertaining to this Purchase Order are subject to inspection, testing and approval at all reasonable times and places by RAM, RAM's Customer or Government representative before, during and after performance and delivery. RAM may require the Supplier to rework, replace or reimburse the purchase price of rejected material or RAM may accept any materials and upon discovery of nonconformance, may reject or keep and rework any such nonconforming materials. Cost of repair, rework, replacement, inspection, transportation, repackaging, and/or re-inspection of nonconforming material by RAM shall be at Supplier's expense.

RAM's failure to inspect does not relieve Supplier of any responsibility to perform according to the terms of the Purchase Order. If sampling is used by the Supplier to accept parts, the sampling plan must meet the minimum quantity requirements of Q030. Note that sampling does not alleviate the additional inspection requirements for Key Characteristics/Flight Safety Features per Q010.

4.26.3 Visual Inspection Requirements

Whether lot sampling is acceptable, or when 100% inspection is required, the parts shall be inspected under 10X magnification to ensure conformity to visual acceptance requirements. See the Supplier Workmanship Guidelines for additional definitions and examples of conforming and non-conforming products.

4.26.4 Industry Specific Inspection Plan Requirements

When indicated on the Purchase Order, special inspection and/or sampling plans are required. For example, threads for space application require 100% inspection if noted on the Purchase Order.

RAM manufactures a multitude of products for a variety of applications in many industries. To raise awareness of specific requirements, RAM is implementing processes to specify the industry on supplier Purchase Orders. Purchase orders may include a color code indicating the customer industry:

Space (Blue): Components will be used in assemblies that are critical to space flight. Additional quality requirements will apply. Refer to drawings, purchase order notes, SQAR's and Workmanship Guidelines regarding Space application hardware.

Military (Green): Components will be used in assemblies that are critical to military operations, including flight and ground vehicles. Additional requirements will apply. Refer to drawings, purchase order notes, SQAR's and Workmanship Guidelines regarding military hardware.

Medical (Red): Components will be used in assemblies intended for medical use. Appropriate care must be taken to follow protocol and requirements for manufacturing and inspecting medical hardware. Refer to drawings and purchase order notes for specific requirements.

Industrial (Orange): Components will be used for non-flight industrial applications such as mail sorting or industrial fluid control. Hardware should be inspected to RAM's standard. Inspection and sampling plans may be reduced if allowed by customer and RAM requirements. Refer to drawings and purchase orders for specific requirements.

Commercial (Gray): Components will be used for commercial applications such as private aircraft. RAM standard quality and inspection requirements represent standard requirements for commercial hardware.

If the industry (color-code) is not indicated on the purchase order, the hardware should be considered Commercial hardware. Refer to purchase orders, drawings, SQAR's and Workmanship Guidelines for additional guidance and/or specific requirements.

When an industry (or color-code) is indicated on the purchase order, refer to the RAM Supplier Workmanship Guidelines and specific notes on the Purchase Order for additional inspection requirements that will apply. Note that the industry inspection requirements do not supersede additional drawing or purchase order inspection and acceptance criteria.

4.27 Flight Safety Critical (★FSC) and Critical to Quality (CTQ) Inspection Requirements

Key Characteristics of a Critical Item (Flight Safety Critical (FSC)/Critical to Quality (CTQ)) have the greatest impact to customer safety and/or performance and will be identified with Flight/Mission Safety Critical Characteristics: ★ (Black Star or FSC), KPC1, KPC2, Box '0' or Box '2'. Any feature identified as a Critical Characteristic requires special inspection criteria.

Special inspection criteria for features identified on the drawing by one of the following symbols:

- ★ – (Black Star or FSC) – Flight/Mission Safety Characteristics (FSC) requires 100% inspection.
- KPC1 - These characteristics require 100% inspection.
- KPC2 - These characteristics may be sample inspected per ASQ Z1.4, general inspection level II, .65% AQL or per Appendix A – RAM Sampling Plan AOQL .79. C=0 acceptance requirement applies for both inspection plans.
- ◻ – ('0' inside a box) - requires 100% inspection of this characteristic.
- ◻ – ('2' inside a box) - These characteristics indicate sampling per ASQ Z1.4 general inspection level II, .65% AQL or per Appendix A – RAM Sampling Plan AOQL .79. C=0 acceptance requirement applies for both inspection plans.

C=0 means if any nonconforming characteristic(s) are found the full lot shall be screened 100% for the nonconforming feature/characteristics and the nonconforming parts shall be removed from the lot before shipping to RAM.

For those features requiring additional/increased inspection, the Supplier must document that these FSC and/or CTQ dimensions were inspected as required per the characteristic designation. The shipment documentation must include a record of all measurements taken for each Key Characteristic type (FSC, KPC1, etc.). The supplier may use any preferred format, as long as each feature is identified, and the required number of measurements are documented. All documentation should include a reference to the part number and PO number (line & release). Failure to provide evidence of the required inspection may result in rejections and/or debits against the supplier for the cost of completing the required inspection at RAM (see Section 4.32.5 – Recovery of Costs for Nonconforming Material).

4.27.1 Flight Safety Hardware Locked Planning

All products or features being purchased, manufactured, or processed that are identified as Flight Safety Critical (FSC) on the drawing or purchase order shall have locked/frozen work instructions. Once the initial lot is approved and accepted at RAM, the manufacturing and/or process instructions must be locked/frozen and must not change without written approval from RAM prior to any proposed changes being implemented. See Section 4.14 for details regarding change control.

4.28 Material Handling

Damage due to handling is a frequent cause for rejection of product at RAM. The Supplier shall control product(s) during manufacturing, special processing, testing and shipment, to prevent damage, as well as visually inspect for and avoid dents, scratches, discoloration, contamination, etc. which violate the surface requirements of the product(s) drawing and specifications. For example, damage due to part-to-part contact or handling is not allowed. Surfaces identified as sealing or critical surfaces shall be processed and handled with extra care; scratches or damage are not allowed. The Supplier must verify surface finishes meet requirements called out on purchase order instructions and/or applicable drawings. **Nonconforming or damaged parts will be returned to the Supplier for rework or replacement at the Supplier's expense.** Refer to the Supplier Workmanship Guidelines, found by accessing RAM's website at <https://ramasd.com/services/#qualityassurance> for additional examples.

Unless otherwise specified in the Purchase Order, product(s) should be packaged to protect and shipped using best commercial practices for safe arrival at RAM's facility. This could include segregation of individual piece parts to prevent part-to-part contact damage to critical surfaces during shipment. Contact RAM's buyer for recommended trays and packaging.

4.28.1 Packaging and Trays

Suppliers are required to provide adequate trays to protect parts during handling and shipping. The Supplier may request sample trays from RAM for first time orders, but it is the Supplier responsibility to procure and provide trays for parts, unless specific RAM trays are required on the purchase order. Contact RAM's buyer for additional information regarding trays and instructions.

4.28.2 Glass Bead Tape (Nylon Reinforced Tape) Restriction

Handling, protection, or packaging shall not be accomplished using tapes which have glass beads in the tape (i.e., nylon reinforced tape) or on the tape as a separator. This requirement shall be placed in purchase orders to Sub-tier Suppliers.

4.29 Foreign Object Damage/Foreign Object Debris (FOD)

Foreign Object Damage/Foreign Object Debris (FOD) is not allowed. Supplier shall have a FOD prevention program compliant to NAS 412. Parts shall be cleaned, oiled, and packaged to prevent part-to-part contact, prior to delivery. Parts shall be handled during manufacture and shipping in a manner that will protect them from exposure to contamination by foreign objects or materials. Packaging and handling shall also prevent part-to-part contact or other handling damage. Protection may include clean trays and packaging materials which will not contaminate the surfaces, such as the use of protective caps, clean covered plastic trays, etc. **Loose packing materials, such as "Packing Peanuts", or any similar type of Styrofoam or other material is strictly prohibited.** Paper egg crate trays are not allowed for RAM parts unless specifically approved by RAM (purchase order, purchasing or quality approval). Refer to purchase order notes for additional tray and FOD requirements.

4.29.1 FOD - Burrs on Machined Components

Burrs are prohibited on **machined parts delivered to RAM**. Suppliers shall inspect all parts for burrs as necessary to ensure components are delivered burr-free. Inspection for burrs shall be at 10X magnification, minimum. See RAM's Supplier Workmanship Guidelines for definitions and examples of burrs.

4.30 Rust Prevention

To protect parts from rust and/or corrosion between the time they are manufactured and during storage, the Supplier shall coat the parts with rust preventative oil within 8 hours of manufacture. This requirement applies to materials such as, **but not limited to** C1026, C1117, C1215, Greek Ascology, 416, 440C, Mag Iron (**Electrical Iron**) or any other material containing iron that is prone to rust when exposed to moisture or high humidity during storage periods. RAM's preference is for ZC-010 or equivalent rust preventative oil.

4.30.1 440C Weld Assemblies

440C steel welded assemblies (i.e. Seat Weld Assemblies) are extremely susceptible to rust/corrosion and contamination. When processing assemblies through NDT (penetrant, magnetic particle), assemblies must be thoroughly cleaned, dried, and oiled with rust preventative oil. Suppliers shall use ZC-010 or equivalent to prevent rust/corrosion and build-up of FOD/contamination inside assemblies.

4.30.2 Silver-Coated Copper Wire Red Plague Avoidance

Silver-coated copper conductor is susceptible to galvanic corrosion in the presence of water or humidity and oxygen. The phenomenon is also referred to as 'Red Plague'. This corrosion can lead to electrical or mechanical failure of the affected wire. Once corrosion is initiated, corrosion of the copper conductor can continue indefinitely in the presence of oxygen. The Supplier shall take all steps necessary to prevent and detect the formation of corrosion (Red Plague) on wires per SAE ARP6400. The certifications provided with the wire shall state that the product has been verified to be free of any Red Plague corrosion per this specification.

4.31 Prohibited Practices

Deviations to any requirement must be approved by RAM in writing. Any violation of the Purchase Order, SQAR, Workmanship Standard, or any other requirements by the Supplier or their Sub-tier Supplier may result in the return of product and/or disapproval of the Supplier from future business with RAM.

4.31.1 Verbal Instructions Prohibited

The Supplier's Quality Management System shall be structured such that it does not allow verbal agreements or instructions as authorization or approval to proceed (e.g. on items that affect quality, fit, form or function). Any changes to purchase order agreements or drawing requirements must be requested in writing and approval communicated back in writing in the form of a modified PO change, approved deviation, or a signed drawing change before acceptance.

4.31.2 Unauthorized Changes to Facility, Process, Method, etc.

The Supplier shall notify RAM in writing at least 90 days in advance of any of the following changes:

- 1) The sale, relocation, or transfer of any manufacturing operations. This includes movement of equipment and/or changes in manufacturing methods.
- 2) Any condition deviating from the original approved manufacturing methods used to produce the original first article part, including any change which could have an effect on the product at the next assembly or affect function at the end item user.
- 3) Any proposed change of original Sub-tier Suppliers used to manufacture the first article product.

RAM may be required to notify and obtain approval from the customer for these types of changes. The Supplier is not authorized to proceed with the implementation of the change until written approval is obtained from RAM.

4.31.3 Unauthorized Product Repairs & Salvage

The Supplier may not perform any repairs such as welding, brazing, soldering, plugging, peening, bushing, use of paints, adhesives or plating, or use any standard or other repair practice or method on products damaged or found to be discrepant. This restriction also applies during fabrication or processing or on defects in casting or forgings unless such repairs are specifically permitted by the applicable drawing or specification or are specifically authorized by RAM in writing for each occurrence. Unless specifically authorized by RAM, this prohibition also applies to reworking products by removing plating (stripping) and re-plating. In the case where RAM-authorized product repair, salvage or stripping has been accomplished, the Supplier shall include on the packing list/shipper and on the Certificate of Conformance (C of C) that the product being delivered was subject to such RAM-approved repair, salvage or stripping and the method used.

4.31.4 Unauthorized Product Changes or Substitutions

The Supplier shall not make any changes or substitutions to any product(s) or services required by the applicable drawing, specification, or Purchase Order (PO) without prior written authorization by RAM. Authorization may be contingent on RAM or RAM's representative's review of proposed changes at the Supplier's facility.

4.31.5 Unauthorized Use of Non-Conventional Manufacturing Methods

Unless specified on the drawing, applicable specifications or Purchase Order, the Supplier shall not use any non-conventional manufacturing or processing methods, such as electrical discharge machining (EDM), electro chemical machining (ECM), laser or abrasive water-jet cutting or drilling, flame spray coatings, etc., on product(s) scheduled for delivery to RAM without prior written authorization of RAM.

4.31.6 Unauthorized Use of Glass Beads

The use of glass beads is prohibited during the manufacture of any products to be delivered to RAM.

4.31.7 Unauthorized Altering of Data on Documents

The use of any method that causes the original data on documents to be obliterated and unreadable (i.e. the use of correction fluids, correction tape, write-over, or other methods) to correct, modify or otherwise alter the data and/or entries on any certifications, test reports, or other documents required by the Purchase Order is strictly prohibited.

Any necessary correction shall be made by a single line through the incorrect data and the correct data entered as close as possible to the original entry. The change shall then be initialed or stamped and dated by the person making the change.

4.32 Nonconforming Products & Material Review (MRB) Authority

4.32.1 Supplier Material Review Authority

The only Material Review Authority granted to the Supplier is **Rework** to bring the product to full compliance with all requirements or **Scrap**. No other material disposition MRB authority is granted to the Supplier.

4.32.2 Notification, Segregation and Control of Nonconforming Products

Unless otherwise specified in the Purchase Order, all nonconforming material shall be documented and submitted to RAM Engineering for review and disposition. RAM can provide a template, or the Supplier may use their current format to notify RAM of the nonconformance, including the requirement and the dimensional or other characteristic deviation(s) from the requirement. A section shall be included which identifies the root cause and corrective action to avoid a recurrence of a future deviation. A non-conformance report (NCR) may be generated to track the request. Should RAM approve the deviation, a copy of the approval signed by a RAM representative(s) shall be returned to the Supplier. The Supplier shall segregate and clearly identify all nonconforming product. The identification shall include a reference to the deviation approval. When delivering nonconforming material, a copy of the signed approved deviation document shall be included with the shipment. A use-as-is or repair disposition by RAM does not relieve the Supplier of the legal responsibility and liability for such products.

4.32.3 Notification of Nonconforming Product Delivered to RAM

When the Supplier has determined that nonconforming product has been delivered to RAM, the Supplier shall notify RAM's buyer in writing within twenty-four (24) hours of the initial discovery. The Supplier shall use "receipt acknowledged" e-mail or other positive notification method. The initial notification shall be followed by a formal "Disclosure Letter" delivered to the RAM buyer within five (5) days of the initial notification. The Supplier shall again use "receipt acknowledged" e-mail or other positive notification method for disclosure. For initial notification and formal disclosure, a Supplier representative may contact RAM Quality Assurance for a recommended format. If the Supplier has a form that contains all the necessary information, that form may be used. At a minimum, the initial notification shall include the following:

Supplier Name
Purchase Order, Line and Release Number
Part Number and Description
Affected Quantities
Dates Shipped
Brief Description of the Nonconforming Condition

The formal Disclosure Letter shall be delivered within five (5) working days of the initial notification and shall consist of a complete description of the nonconforming condition(s), immediate action(s) by the Supplier to contain the nonconforming product(s), root cause analysis of the nonconforming condition(s), root cause corrective action(s) plan, schedule of implementation and the plan and schedule for verifying the effectiveness of the corrective action(s).

RAM reserves the right to participate in the nonconforming product investigation at the facilities of the Supplier or its Sub-tier sources.

4.32.4 Re-submittal of Products Previously Rejected by RAM

Products returned to the Supplier, re-worked or replaced and re-submitted to RAM shall be clearly identified as re-submitted products. **The Supplier's packing list/shipper shall include a statement that the products delivered are replacement or reworked to meet all applicable requirements and include a reference to a Non-Conformance Report (NCR) or approved deviation document as applicable.** All re-submitted product shall be re-inspected by the Supplier before submittal.

4.32.5 Recovery of Costs for Non-Conforming Material - Supplier COPQ

Supplier Cost of Poor Quality (COPQ) is the actual incurred cost to RAM due to Supplier non-conformance. To recover some of these costs, RAM reserves the right to debit the Supplier a processing fee of \$75 for every non-conforming shipment delivered to RAM. The initial \$75 processing fee only covers the administrative cost of processing paperwork related to non-conforming hardware. In addition to the processing fee, other costs incurred that will require debit may include cost to rework parts at RAM, cost of scrap parts (and

assemblies) at RAM, cost of returning parts for rework, replacement or credit, or other costs to RAM as a result of non-conforming hardware. A debit may be issued, up to the total COPQ incurred, due to non-conforming hardware delivered to RAM. The Supplier Quality Engineer will notify suppliers of debits and coordinate with purchasing and accounts payable to resolve claims.

4.32.6 Root Cause and Corrective Action

Suppliers are responsible for performing root cause investigation and corrective action when non-conformances are found. When RAM notifies the Supplier of a non-conformance, the Supplier shall act immediately to ensure the non-conformance is contained and eliminated. The Supplier shall verify that the root cause was identified, and corrective action has been effective. When the Supplier is requested to submit a formal corrective action, the supplier shall complete the investigation and submit the completed report by the required due date. RAM reserves the right to reject a root cause and/or corrective action and request subsequent investigation and/or corrective action as necessary. Failure to complete investigations and corrective actions within the time allotted is not acceptable and can result in a reduction of orders, cancellation of orders and loss of approved status as a RAM supplier. Extensions may be given but must be requested in writing prior to the required due date.

5.0 ADDITIONAL SUPPLEMENTAL REQUIREMENTS (Q CODES)

The general quality assurance clauses (Q-Codes) Q010 (Section 4) will apply to all Purchase Orders unless waived in writing.

Additional Supplemental Requirements (Specific Q-Codes) will apply when indicated on the Purchase Order. Refer to the Quality Assurance Requirements section of the Purchase Order (bottom right corner of the purchase order form) for applicable Q-Codes.

Q020 Adopted Additional Requirements

Due to the complexity of some of the quality requirements flowed down to RAM by our customers, RAM may adopt their requirements in addition to our internal requirements to form our total purchase order quality requirements. In these cases, copies of these documents will be provided with our Purchase Order. Examples of these documents could include MQIs, P9112, Supplier Quality Manuals, manufacturing process instructions, etc. RAM shall note the specific documents and requirements on the Purchase Order.

Q030 Lot Acceptance

For manufactured product(s), unless otherwise specified on the Purchase Order, the Supplier shall inspect each lot prior to delivery to RAM by using sampling per ANSI/ASQ Z1.4. Alternate lot sampling plans that meet RAM Sampling requirements are acceptable. See Section 4.26 and Appendix A – RAM INSPECTION SAMPLING PLAN, for required minimum AQL/AOQL for RAM and RAM's customers. Should any characteristic be found to be noncompliant, the lot shall be screened 100% for that characteristic(s) and all nonconforming parts shall be removed from the lot before shipment (c=0 rule). This applies to all characteristics other than Key Characteristics/Flight Safety Characteristics/Critical to Quality characteristics. For Key Characteristics, see Q010 Section 3.9.

When Q170 is required on the purchase order, Q030 (sampling plans) will not apply until the requirements of Q170 (APQP and PPAP) are met.

Q040 Source Inspection

Items on this Purchase Order are subject to inspection and/or test at Supplier's facility by a RAM quality representative prior to shipment. The representative may be accompanied by, or the representative may be, a RAM customer, FAA, or government source representative. The Supplier shall furnish, at no cost, acceptable facilities, equipment, personnel, and assistance as necessary for such inspectors or tests.

Evidence of source inspection shall accompany Supplier's shipment, but source inspection shall not constitute final acceptance of the material. Final acceptance shall be at RAM's facility only. The Supplier shall notify RAM at least 48 hours in advance of material readiness to schedule source inspection.

Q050 – Obsolete, added to Q010 Section 4.21 (Certificate of Conformance)

Q060 – Obsolete, added to Q010 Section 4.23 (Supplier Furnished Raw Material)

Q070 – Obsolete, combined with Q060

Q080 – Obsolete, added to Q010 Section 4.24 (RAM Supplied Material)

Q090 Special Process and Certification Requirements

Each special process to be performed in support of this purchase order (i.e. welding, plating, heat treatment, chemical film application, x-ray, dye penetrant inspection, magnetic particle inspection, brazing, etc.) shall be certified by the Supplier or Sub-tier source performing the process as having been performed to the applicable specifications called for on the Purchase Order. **All special processes must be performed by Nadcap approved suppliers** (as applicable). Depending on the commodity and customer requirements, exceptions may be approved, but the Supplier must submit requests for exceptions in writing, prior to delivery of parts. **When indicated on the Purchase Order, the Supplier must use special process Suppliers approved by RAM's customer.** Approved process Suppliers for RAM's various customers are available upon request. **All certifications shall meet the requirements of Q010 Section 4.21.** In addition to the process certification, when certified operators are a requirement as called out in the process specification, the certification shall include a statement similar to: "We hereby certify that [operator's name or other identifying information i.e. controlled stamp, etc.] performed the [name of process] required by [drawing number/specification], in accordance with [applicable specification]. Operator has been trained to perform stated process and objective evidence of their current qualification status is on file and available for review".

Suppliers and Sub-tier Suppliers performing special processes must immediately notify RAM if special process certification or customer approval is lost. See Q010 Section 4.32.3 regarding notification of non-conforming material delivered to RAM for additional details.

Testing of Actual Parts is Prohibited. Destructive test results such as hardness indentations are detrimental and unacceptable to the end use of the part. **No actual part testing which causes deformation or damage to the part surface shall be performed without prior approval by RAM.** These samples shall be processed with the lot in order to represent the same processing as the part(s).

For special processes (heat treat, plating, NDT, etc.), the certification shall report compliance with requirements of the applicable specification, including both acceptance criteria and actual test results. All certifications must meet the requirements of Q010.

Testing of Actual Parts is Prohibited. Per Q010, bar stock samples will be provided for testing in lieu of testing the actual part(s). Destructive test results such as hardness indentations are detrimental and unacceptable to the end use of the part. **No actual part testing which causes deformation or damage to the part surface shall be performed without prior approval by RAM.** These samples shall be processed with the lot to represent the same processing as the part(s). For heat treated or annealed materials, at least one of these 1" long samples used during the process shall be returned to RAM with the shipment for use by RAM to verify the reported hardness results. This sample shall be identified with the part number, Sub-tier outside process purchase order number and RAM purchase order number.

Sub-tier Special Process testing of Actual Parts is Prohibited. When the Supplier is providing raw material for manufactured parts, and subsequent processing such as heat treat is required, the Supplier shall provide a minimum of three 1" long samples to their approved Sub-tier source for testing in lieu of actual part testing. **The Supplier shall flow down to the Sub-tier source(s) the requirement that no actual part testing which causes deformation or damage to the part surface shall be performed without prior approval by RAM.** The Supplier shall require the Sub-tier source to return at least one of these 1" long samples to them for verification of hardness or other required test verifications. This sample shall be retained by the Supplier per the requirements of Q010 Section 4.1. The Supplier may also forward this sample to RAM, with the product delivery, for retention at RAM. This sample must be bagged and clearly marked with RAM's Purchase Order number and line, part number, revision, Supplier purchase order number, Sub-tier source, material type and specification.

Q100 – Obsolete, combined with Q090

Q110 Raw Material Analysis

Prior to manufacturing, the Supplier shall, at no charge, furnish a sample of material intended to be used to complete this Purchase Order. This sample shall be submitted to RAM for chemical and physical analysis. **When Q110 is required, any decision by the Supplier to fabricate parts prior to analysis and material approval shall be at Supplier's risk.**

Q120 Supplier Analysis

When required by RAM's customer flow down or when requested by RAM, the Supplier shall send a sample of material they intend for use on this Purchase Order to an independent testing laboratory for chemical and physical analysis at the Supplier's expense. **The independent laboratory shall be certified to ISO 17025. Any decision to fabricate parts with this material prior to analysis results and approval shall be at Supplier's risk.** The material analysis results must comply with the material composition and properties listed in the applicable material specification. This additional verification shall be performed at least once during a twelve (12) month period. The results of this analysis shall be reported to RAM. The Supplier will notify RAM of any material found to be non-conforming during verification, along with containment action plan within 24 hours (See Q010 – 4.32.3 Notification of Non-Conforming Product Delivered to RAM).

Q130 – Obsolete, added to Q010 Section 4.16 (Supplier Calibration System)

Q140 First Article Inspection Report (FAIR)

The Supplier shall prepare a First Article Inspection Report (FAIR) package per AS9102 and furnish a copy of the completed FAIR results (including all material, process and other certifications required by the Purchase Order and/or drawing notes) with the initial delivery of products on the Purchase Order. The FAIR shall be repeated and submitted any time an event specified in AS9102 occurs (such as a change to the revision of the drawing, significant changes in the manufacturing method, lapse in production of 2 years, etc.) or if the Purchase Order specifies a FAIR is required with each delivery. If specified on the Purchase Order the First Article part shall be submitted to RAM for review and acceptance prior to delivery of the lot. The First Article part shall be separately bagged and clearly identified.

Q150 Final Inspection Report (FIR)

Prior to each delivery of products to RAM, the Supplier shall perform final inspection on all products and document the results on a Final Inspection Report (FIR). The FIR shall represent the manufacturing lot to be shipped. The FIR format is optional but shall show each requirement and the actual result or range of inspection results obtained for each of the drawing or specification requirements. The FIR shall be submitted with the shipment to RAM.

Q160 – Obsolete, added to Q010 Section 4.30.2

Q170 – AS9145: APQP and PPAP Required

The Supplier shall comply to and provide the required documentation and support for Advanced Product Quality Planning (APQP) and Production Part Approval Process (PPAP) per AS9145.

Inspection sampling plans (Q030) are only allowed when the requirements of Q170 (APQP and PPAP) are met.

Q180 – AS13100 Quality Management System Required

The Supplier shall comply with the requirements of AESQ Quality Management System Requirements for Aero Engine Design and Production Organizations AS13100. This includes compliance and potential certification (if applicable) to one or more of the following: ISO9001, ISO17025, AS9100, AS9120, AS9145.

When Q180 is required, Q170 will also apply to the purchase order.

Q190 – Reserved

Q200 Domestic Melt Source Required

All raw materials and materials used to manufacture parts per this contract **must be Domestic Melt Material. Q200 (Domestic Melt Material) is required when ANY of the following apply: the purchase order or item number/description indicates “DM”, “Domestic Melt”, “Domestic Required”, or similar. Unless prior approval is obtained from RAM to use non-Domestic Melt source material, any parts delivered from unapproved sources will be returned to the Supplier for replacement at the Supplier’s expense.** The origin of mill source must be identified on the supplied certifications. Refer to Q010 and Section 4.21 for more detail regarding certification requirements.

Certifications must be legible and reproducible for two generations. Material will be rejected if the certification is not legible. Refer to Q010 for more details regarding records and record retention.

APPENDIX A – RAM EXAMPLE INSPECTION SAMPLING PLAN

Lot Size	AOQL .79	AOQL 1.9	AOQL 3.0	AOQL 4.94	Index 1.0	Index 2.5	AQL 1.0	Lot Size	AOQL .79	AOQL 1.9	AOQL 3.0	AOQL 4.94	Index 1.0	Index 2.5	AQL 1.0
1 - 1	1	1	1	1	1	1	1	54 - 58	26	15	11	7	13	11	13
2 - 2	2	2	2	2	2	2	2	59 - 63	27	15	11	7	13	11	13
3 - 3	3	3	3	3	3	3	3	64 - 64	28	15	11	7	13	11	13
4 - 4	4	4	4	3	4	4	4	65 - 69	28	16	11	7	13	11	13
5 - 5	5	5	4	4	5	5	5	70 - 76	29	16	11	7	13	11	13
6 - 6	6	5	5	4	6	5	6	77 - 83	30	16	11	7	13	11	13
7 - 7	7	6	5	4	7	5	7	84 - 88	31	16	11	7	13	11	13
8 - 8	7	6	5	4	8	5	8	89 - 89	31	17	11	7	13	11	13
9 - 9	8	7	6	5	13	6	9	90 - 91	31	17	11	8	13	11	13
10 - 10	9	7	6	5	13	6	10	92 - 96	32	17	11	8	13	11	13
11 - 11	9	8	6	5	13	6	11	97 - 101	32	17	12	8	13	11	13
12 - 12	10	8	7	5	13	6	12	102 - 112	33	17	12	8	13	11	13
13 - 13	11	8	7	5	13	6	13	113 - 124	34	17	12	8	13	11	13
14 - 14	11	9	7	5	13	6	13	125 - 131	35	17	12	8	13	11	13
15 - 15	12	9	7	6	13	6	13	132 - 139	35	18	12	8	13	11	13
16 - 16	12	9	8	6	13	6	13	140 - 150	36	18	12	8	13	11	13
17 - 17	13	10	8	6	13	6	13	151 - 156	36	18	12	8	29	13	50
18 - 19	14	10	8	6	13	6	13	157 - 177	37	18	12	8	29	13	50
20 - 20	15	10	8	6	13	6	13	178 - 203	38	18	12	8	29	13	50
21 - 22	15	11	8	6	13	6	13	204 - 232	39	18	12	8	29	13	50
23 - 24	16	11	9	6	13	6	13	233 - 235	39	19	12	8	29	13	50
25 - 25	17	11	9	6	13	6	13	236 - 278	40	19	12	8	29	13	50
26 - 26	17	12	9	6	13	7	13	279 - 280	41	19	12	8	29	13	50
27 - 28	18	12	9	6	13	7	13	281 - 334	41	19	12	8	29	16	50
29 - 29	18	12	9	7	13	7	13	335 - 369	42	19	12	8	29	16	50
30 - 30	19	12	9	7	13	7	13	370 - 416	42	19	13	8	29	16	50
31 - 31	19	13	9	7	13	7	13	417 - 500	43	19	13	8	29	16	50
32 - 32	20	13	9	7	13	7	13	501 - 541	43	19	13	8	34	19	80
33 - 34	20	13	10	7	13	7	13	542 - 741	44	19	13	8	34	19	80
35 - 38	21	13	10	7	13	7	13	742 - 758	44	20	13	8	34	19	80
39 - 41	22	14	10	7	13	7	13	759 - 1200	45	20	13	8	34	19	80
42 - 45	23	14	10	7	13	7	13	1201 - 1232	45	20	13	8	42	23	125
46 - 49	24	14	10	7	13	7	13	1233 - 3059	46	20	13	8	42	23	125
50 - 50	25	15	10	7	13	7	13	3060 - 3200	47	20	13	8	42	23	125
51 - 51	25	15	10	7	13	11	13	3201 - 10000	47	20	13	8	50	29	200
52 - 53	25	15	11	7	13	11	13								

c = 0 applies to all plans

Plan	Application
AOQL .79	KPC2, Box 2
AOQL 1.9	RAM Company Aerospace, Default
AOQL 3.0	Parker, Honeywell
AOQL 4.94	RAM Company commercial (Requires RAM approval)
Index 1.0	Aerofluid Products
Index 2.5	B/E, Collins, HS, P&WC, UTAS, UTC
AQL 1.0	Moog
100%	Black Star, FSC, KPC1, Box 0, SpaceX Threads

Example Instructions: Select sampling plan for supplier noted on drawing. If supplier is not listed, use RAM Default (AOQL 1.9).

**SUPPLIER QUALITY
ASSURANCE REQUIREMENTS (SQAR)
SUPPLIER QUALITY MANUAL**
Applies to RAM's External Providers

APPENDIX B – PURCHASE ORDER Q-CODES REFERENCE MATRIX

*THE Q-CODES REFERENCE MATRIX LISTS Q-CODES FOR VARIOUS PURCHASED ITEM TYPES. THIS MATRIX IS FOR REFERENCE ONLY. PURCHASE ORDER Q-CODE REQUIREMENTS MAY VARY FROM THE Q-CODES REFERENCE MATRIX BASED ON PURCHASE ORDER HISTORY, CUSTOMER REQUIREMENTS, INDUSTRY STANDARDS, AND/OR RAM QUALITY REQUIREMENTS. SUPPLIERS MUST COMPLY WITH THE Q-CODES LISTED ON THE PURCHASE ORDER.

PURCHASED ITEM CATEGORY	Q010	Q030	Q090	Q140	NOTES
RAW MATERIAL (BAR STOCK)	X				ALSO REQUIRED IS THE MILL TEST RESULTS FOR THE MATERIAL SHOWING ELEMENT COMPOSITION, MATERIAL PROPERTIES AND REFERENCING COMPLIANCE TO THE REQUIRED MATERIAL SPECIFICATION. C OF C MUST INDICATE THE MELT SOURCE.
MACHINED PARTS MADE COMPLETE WITH SUPPLIER FURNISHED MATERIAL AND SPECIAL PROCESSES PERFORMED BY THE SUPPLIER OR SUPPLIERS SUB-TIER PROCESSORS	X	X	X	X	SUPPLIER SUB-TIER SUPPLIERS MUST BE APPROVED BY RAM AND/OR BE NADCAP CERTIFIED FOR THE PROCESS. FOR PARTS THAT ARE HEAT TREATED THE FOLLOWING STATEMENT SHALL APPEAR ON THE PO "PROVIDE AT LEAST ONE BAR STOCK HEAT TREAT COUPON TO RAM FOR VERIFICATION OF HARDNESS.".
MACHINED PARTS MADE COMPLETE WITH RAM FURNISHED MATERIAL AND NO SPECIAL PROCESSES PERFORMED BY THE SUPPLIER	X	X		X	A NEW FAI TO AS9102 REQUIREMENTS IS REQUIRED IF ONE OF THE 5 CONDITIONS REQUIRING A FAI APPLIES.
INCOMPLETE MANUFACTURED PARTS (/I) DUE TO SPECIAL PROCESSES NOT BEING PERFORMED BY THE SUPPLIER - THE WORK NOT BEING PERFORMED SHALL BE STATED ON THE PO	X	X		X	A NEW FAI TO AS9102 REQUIREMENTS IS REQUIRED IF ONE OF THE 5 CONDITIONS REQUIRING A FAI APPLIES. IF THE PART REQUIRES HT THE FOLLOWING STATEMENT SHALL APPEAR ON THE PO "PROVIDE AT LEAST ONE HT COUPON TO RAM FOR VERIFICATION OF HARDNESS.".
MACHINED PARTS MADE WITH RAM SUPPLIED MATERIAL (/I) NO PROCESSES	X	X			C OF C PER Q010 REQUIRED
MANUFACTURED PARTS BEING PRODUCED COMPLETE (WITH RAM MATERIAL) WHICH INCLUDE SPECIAL PROCESSES	X	X	X	X	Q140 ONLY APPLIES WHEN THEY ARE MAKING THE PART FOR THE FIRST TIME OR IF WE HAVE NOT ORDERED IT IN OVER 2 YEARS. FOR PARTS GETTING H.T. A NOTE REQUIRING AT LEAST 1 COUPON TO BE SENT TO RAM FOR VERIFICATION IS REQUIRED.
PARTS (/OP) REQUIRING SPECIAL PROCESSES PERFORMED ON THEM I.E.: MAGNETIC PARTICLE, DYE PENETRANT, RADIOGRAPHIC, SPECIAL LEAK TESTS, SPECIAL SEALANTS OF COILS, ETC.	X	X	X		FOR /OP PARTS THAT ARE HEAT TREATED THE FOLLOWING STATEMENT SHALL APPEAR ON THE PO "PROVIDE AT LEAST ONE HT COUPON TO RAM FOR VERIFICATION OF HARDNESS."
CALIBRATION SERVICES	X				THE STANDARD USED FOR THE CALIBRATION SHALL BE TRACEABLE TO A NIST AND/OR OTHER INDUSTRY STANDARD AND THE C OF C SHALL REFERENCE THE ID OF THE STANDARD USED.
PURCHASED COMMODITY SUCH AS CONNECTORS PINS, TERMINAL LUGS, ETC. WHICH DO NOT REQUIRE ANY TYPE OF TESTING	X	X			ALSO REQUIRED IS THE MILL TEST RESULTS FOR THE MATERIAL SHOWING ELEMENT COMPOSITION, MATERIAL PROPERTIES AND REFERENCING COMPLIANCE TO THE REQUIRED MATERIAL SPECIFICATION. C OF C MUST INDICATE THE MELT SOURCE.
PURCHASED COMMODITY SUCH AS CONNECTORS, DIODES, OTHER ELECTRONIC DEVICES, ETC.	X				Q090 WILL APPLY WHEN INDICATED IN ITEM NOTES FOR PURCHASE ORDER. SPECIFIC CUSTOMERS AND PROGRAMS REQUIRE ALL RAW MATERIAL AND SPECIAL PROCESS CERTIFICATIONS FOR ELECTRONICS SUCH AS CONNECTORS.
PAINTS, POTTINGS, SOLDERS, FLUXES, O-RINGS, ETC.	X				MATERIAL ANALYSIS OR MANUFACTURER CERTS MAY BE REQUIRED, SEE PURCHASE ORDER ITEM NOTES
MAGNET WIRE, LEADWIRE, INSULATING TAPES, ETC.	X				SILVER COATED COPPER WIRE 'RED PLAGUE' AVOIDANCE APPLIES PER Q010
MATERIAL ANALYSIS	X				C OF C PER Q010 WITH APPLICABLE TEST RESULTS REQUIRED