

R F & M I C R O W A V E C O M P O N E N T S

**SUPPLIER QUALITY ASSURANCE REQUIREMENT CLAUSES – SPECIFIC CLAUSES**

**DOCUMENT NO.: 104100-043**

APPROVED MERCURY DEPT. MGR: Signature On File DATE: 02-12-2013  
Paul Mouldenhauer

QUALITY ASSURANCE MGR: Signature On File DATE: 02-12-2013  
Sandy Herrell

<b>REVISION</b>	A	B	C									
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A	ALL	10012	08-10-2012	Paul Mouldenhauer	New
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**1. INTRODUCTION**

There are two Supplier Quality Assurance Requirement clause documents, the “General” and the “Specific”. The “General” Supplier Quality Assurance Requirement clauses (codes: GSQXXX) apply to all Purchase Orders and are referenced by the procedure number on the order, unless otherwise noted. The “Specific” Supplier Quality Assurance Requirement clauses (codes: SSQXXX) apply when called out / referenced by code on the Purchase Order and shall compliment or override a “General” code of the same or related subject.

This Supplier Quality Assurance Requirements (SQAR) document details Mercury Commercial Electronics, Inc., a division of Mercury Systems, Inc., Specific quality requirement and expectation Purchase Order clauses. Mercury Commercial Electronics, Inc. (Mercury hereafter) is dedicated to continuous improvement in the quality and integrity of its products and services and to the satisfaction of its customer requirements and expectations. The Suppliers contribution to this approach through the quality and reliability of their products and services is a prerequisite. It is the intent of MERCURY to purchase from Suppliers who consistently meet MERCURY expectations for quality, delivery, value and service. This document forms a part of the MERCURY Purchase Order, unless otherwise specified herein. It contains general and specific information and quality requirements. The Supplier shall manufacture, service and deliver all products in accordance with the Purchase Order and all requirements identified on it. All products shall be manufactured strictly and in accordance with the Purchase Order. The delivery of incomplete product is not permissible unless specified on the Purchase Order. Enquiries concerning the content of this document and other referenced documents should be referred to the MERCURY Buyer responsible for the Purchase Order.

This document establishes the Specific Supplier Quality Assurance Requirement clauses for Purchase Orders issued to Suppliers providing materials, goods and services for use in MERCURY products. It is the intent of this document to assure that procured products or services are of the required quality and reliability. Any and all MERCURY documentation is for the sole use of fulfillment of the order. You should not, without written consent from MERCURY, disclose information or knowingly permit to be published any information directly relating to the business of MERCURY which is made available to you on a confidential basis or has otherwise come into your possession.

**2. SCOPE**

This document applies to Suppliers providing MERCURY with materials, products, processing, and services, including intra-company Suppliers and Sub-tier Suppliers at all levels when called out or referenced on a Purchase Order.

Additional Item-specific requirements may be included on the MERCURY Engineering Documents / Drawings and / or Purchase Order. Outsource Manufacturing Suppliers may also be required to enter into a supplemental agreement that will be published on the Purchase Order. In the event of any conflict between the requirements of the Purchase Order, the Engineering Documents / Drawings and this Document, the precedence is as follows:

1. Purchase Order,
2. Engineering Documents / Drawings,
3. “Specific” Supplier Quality Assurance Requirement clauses (SQAR codes: SSQXXX),
4. “General” Supplier Quality Assurance Requirement clauses (SQAR codes: GSQXXX),

The Supplier Quality Assurance Requirement clauses will be referred to as SQAR codes hereafter.

Depending on the specific Purchase Order, not all sections or sub-sections may apply. Any and all allowed exceptions or deviations will be documented and published on the Purchase Order. Deviations, including the selection of Suppliers Sub-tier Suppliers from specified requirements are only allowed after written approval by MERCURY’s Buyer. All documents are considered part of the Purchase Order requirements when referenced.

This document compliments the requirements of AS9100C and ISO9001 (current versions). Suppliers that have not been certified to AS9100C or ISO 9001 are expected to have a Quality Management System (QMS) that meets the requirements of these standards where it relates to the product being supplied to MERCURY. MERCURY requires each

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Supplier and their Sub-tier Suppliers to comply with the quality requirements set forth in this document and other applicable documents, and to maintain a quality system that ensures supplies and services comply with all requirements.

Objective evidence shall be available to demonstrate compliance with the requirements of this document and with any additional requirements which may be imposed on the Purchase Order.

If a Supplier cannot comply with any portion of this document, then the Supplier must advise the MERCURY Buyer in writing.

The MERCURY Buyer is responsible for processing all Supplier requests through the proper MERCURY authorization process pertaining to issues with this document, engineering documents and Purchase Orders.

This document supersedes and replaces all prior Supplier Quality Assurance Requirements documents. All prior documented Supplier quality requirements and flow down documents remain valid, unless otherwise stated in a revised Purchase Order or at the time of publication of this document to the Supplier.

**3. DEFINITIONS**

- 3.1. The term "Supplier" or "Sub-tier Supplier" or "Sub-Supplier" or "Contractor" or "Sub-Contractor" or "Distributor" or "Manufacturer" or "Producer" or "Retailer" or "Provider" or any other entity empowered to sell goods or services, or any entity that is receiving and fulfilling the Purchase Order, for the purpose of this document, shall have the same meaning as "Supplier". Supplier refers to the entity that is receiving and fulfilling the Purchase Order.
- 3.2. The term "Supplier", for the purpose of this document, shall always refer to all levels of "Sub-tier Suppliers", unless otherwise noted.
- 3.3. The term "MERCURY" used in this document refers to either MERCURY - the company, or MERCURY - the person, responsible for the Purchase Order.
- 3.4. "Item or Items" is an all-inclusive term used in place of any of the following: article, assembly, commodity, component, data, document, equipment, goods, machinery, material, merchandise, model, module, part, piece, product, report, service, subassembly, subsystem, supplies, support systems, system, test or unit, to name some.
- 3.5. In this document the terms:
  - 3.5.1. "shall" and "must" mean that the described action is mandatory,
  - 3.5.2. "should" means that the described action is necessary and expected with some flexibility allowed in the method of compliance,
  - 3.5.3. "may" means that the described action is permissible or discretionary.

**4. RESPONSIBILITIES**

- 4.1. It is the responsibility of the MERCURY Buyer and / or any MERCURY personnel issuing MERCURY Purchase Orders to adhere to this document and all related documents that are relevant.
- 4.2. It is the responsibility of the Supplier to deliver material that is 100% compliant with all the requirements of the Purchase Order, engineering documents / drawings, SQAR's and this document and for the performance of their Sub-tier Suppliers to do the same.
- 4.3. Engineering, Materials and Quality functions within MERCURY are responsible for developing and maintaining this document and leading Supplier quality and development initiatives within MERCURY and with MERCURY's Suppliers.

**5. SQAR CODE LISTING**

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- 5.1. All SQAR codes list minimum requirements unless otherwise noted.
- 5.2. General requirement SQAR Codes have a prefix of “GSQ” and apply to all Suppliers and Sub-tier Suppliers unless otherwise noted. See procedure 104100-042 for the General SQAR codes.
- 5.3. Specific requirement SQAR codes have a prefix of “SSQ” and apply to Suppliers and Sub-tier Suppliers when called out on the Purchase Order.
- 5.4. Specific SQAR Codes:

SQAR Code:	SQAR Description:
<b>SSQ001</b>	<p><b><u>FIRST ARTICLE INSPECTION:</u></b></p> <p>The Supplier is required to perform a First Article Inspection. The First Article Inspection Item shall be identified as “First Article Unit”.</p> <p>A First Article Inspection Report shall be required when the first production units are manufactured. The report shall include all drawing characteristics and notes, required tolerance range, actual measurement results and where physical testing is required, the results of the test(s).</p> <p>Supplier is required to perform 100 percent inspection and record the attributes for the first article of this Purchase Order. If the deliverable is an assembly, this inspection shall also include all of the piece Items that make up the assembly. The inspection records and data shall be per AS9102 and shall identify each characteristic and feature required by design data, the allowable tolerance limits, and the actual dimension measured as objective evidence that each characteristic and feature has been inspected and accepted by the Supplier’s quality and inspection department. When testing is required, the parameters and results of the test shall be recorded in the same manner.</p> <p>The First Article Inspection Report must show evidence of acceptance by the Supplier’s quality assurance representative.</p> <p>The First Article shall be produced on production equipment and using processes which will be utilized on production runs.</p> <p>Additionally, the Supplier shall perform additional First Article Inspection(s) following every major tooling or design change, and subsequent to any evident quality degradation for a specified Item.</p> <p>First Article Failure: Failure of items to pass First Article demonstration shall constitute rejection of the lot. The Supplier shall not re-present the lot until documented records can be provided that indicate:</p> <ol style="list-style-type: none"> <li>1. Root Cause and corrective action was taken by the Supplier to resolve the hardware, process, or documentation discrepancy (i.e., rework, repair, if authorized, replacement, scrap, revision of document contents, etc.)</li> <li>2. Preventive action was taken by the Supplier to prevent reoccurrence of the discrepancy in future production hardware.</li> <li>3. Non-conforming articles in the lot have been removed or updated for compliance with First Article Inspection requirements.</li> <li>4. Repeat First Article Inspection for affected characteristics. Issues or non-conformances resulting from the Supplier’s First Article Inspection failure shall require that the First Article Inspection be</li> </ol>

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SQAR Code:	SQAR Description:
	<p>held open until the root cause has been determined for the affected items and corrective / preventative action implemented, as applicable.</p> <p>Upon successful completion of First Article Inspection, any changes to procedures, methods, or tooling shall be provided to MERCURY in writing for review and approval prior to shipment of affected Items.</p> <p>Records of all first article activity will be documented and treated as quality acceptance records. Legible and reproducible copies shall be furnished with the shipment to MERCURY.</p> <p>The complete record of this First Article Inspection must accompany the first Items shipment. If other SQAR Codes are called out, shipment may not be performed until those codes have been satisfied.</p>
SSQ002	<p><b><u>FIRST ARTICLE INSPECTION APPROVAL REQUIRED – MERCURY APPROVAL:</u></b></p> <p>SSQ001 First Article Inspection data must be submitted for review and approved by MERCURY Quality Assurance prior to release for shipment. Data shall include a summary of the Supplier's entire nonconformance reports associated with the end Item and its sub Items.</p>
SSQ003	<p><b><u>FIRST ARTICLE INSPECTION - MERCURY WITNESS:</u></b></p> <p>SSQ001 (or part of) First Article Inspection shall be witnessed by a MERCURY Quality Assurance Representative.</p>
SSQ004	<p><b><u>FIRST ARTICLE INSPECTION – INDEPENDENT WITNESS:</u></b></p> <p>SSQ001 First Article Inspection shall be witnessed by an independent representative conforming to the requirements of AS9102 is required for items manufactured, assembled and tested to MERCURY controlled drawings and specifications. AS9100 certification of the Supplier's facility or AS9102 specific forms are not required unless otherwise specified.</p>
SSQ005	<p><b><u>FIRST ARTICLE INSPECTION – PURCHASE ORDER DEFINED:</u></b></p> <p>A First Article Inspection shall be performed as described per the Purchase Order.</p>
SSQ006	<p><b><u>FIRST ARTICLE SAMPLE REQUIREMENT:</u></b></p> <p>Samples produced from production tooling using normal production practices shall be submitted with inspection and test reports by the Supplier to MERCURY when any of the following events occur:</p> <ol style="list-style-type: none"> <li>1. Initial production of an Item.</li> <li>2. Change in process.</li> <li>3. Change in Item.</li> <li>4. Change in design.</li> <li>5. Change in tooling.</li> <li>6. Change in Sub-tier Supplier.</li> </ol>

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SQAR Code:	SQAR Description:
	<p>7. Change in manufacturing location.</p> <p>8. Change in the systems or requirements used to evaluate, accept, or approve the item(s) being furnished.</p> <p>In all cases, MERCURY requires complete reports with data to verify compliance with national or international standards. "Meet all specifications" or other similar words without supporting data is not acceptable. Suppliers of outside processing must reference MERCURY for minimum inspection levels.</p>
SSQ007	<p><b><u>PRE-CAP INSPECTION REQUIRED:</u></b></p> <p>Units to be delivered under this Purchase Order require "pre-cap" inspection by MERCURY at the Supplier's facility. The Supplier shall notify the MERCURY Quality Manager when units will be ready for this inspection. The Supplier shall have available copies of their actual inspection results.</p>
SSQ008	<p><b><u>SOURCE INSPECTION:</u></b></p> <p>Items ordered on this Purchase Order are subject to surveillance, inspection and test at MERCURY's discretion, by MERCURY's Quality Representative at Supplier's plant. Specific surveillance, inspection and test activities selected by MERCURY's Quality Representative may include review of all aspects of the production system, witnessing of processes, points of test, and in-process inspection / test as required verifying conformance to this Purchase Order.</p> <p>The Supplier should identify proprietary processes before entry by MERCURY personnel.</p> <p>Source inspection does not relieve the Supplier of any responsibility and / or liability for full compliance with all Purchase Order requirements. Product acceptance does not imply that the product will not be rejected upon receipt at the MERCURY facility or by our customer at our facility or the customer's facility.</p> <p>Note: MERCURY Quality Assurance reserves the right to waive source inspection as applicable.</p>
SSQ009	<p><b><u>GOVERNMENT SOURCE INSPECTION (GSI):</u></b></p> <p>The Items specified on this Purchase Order require Government Source Inspections (GSI) prior to shipment from the Supplier's facility. All shipments on this Purchase Order must be accompanied by objective evidence of government acceptance. The Items specified may require Government Quality Assurance Surveillance. Therefore, prior to commencement of any special test, notify the government representative. The government representative is requested to verify by signature all reports of testing accomplished, verifying only those portions actually witnessed. Such verification shall signify concurrence with the recorded data, but not necessarily with conclusions derived there from.</p>
SSQ010	<p><b><u>ACCEPTANCE TEST PROCEDURE (ATP):</u></b></p> <p>No shipment of procured material shall be made without a MERCURY approved ATP. It is recommended that the ATP be approved by MERCURY prior to the first production run. The ATP shall detail all testing, screening and inspection required for acceptance of the procured material, and include, as a minimum:</p> <ol style="list-style-type: none"> <li>1. Conditions and parameters under which each test or inspection is performed.</li> </ol>

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<b>SQAR Code:</b>	<b>SQAR Description:</b>
	<ol style="list-style-type: none"> <li>2. The sequence of the tests and inspections performed.</li> <li>3. The method of testing and inspection performed.</li> <li>4. Tooling and equipment utilized during testing and inspection.</li> <li>5. Accept/reject criteria and confirming data sheets.</li> <li>6. Traceability from every requirement on the drawing to a test or inspection on the ATP.</li> </ol> <p>A previously approved ATP need not be resubmitted unless:</p> <ol style="list-style-type: none"> <li>1. Revisions or updates have been made.</li> <li>2. MERCURY's approval is not indicated on the ATP documentation.</li> </ol> <p>MERCURY shall be notified in the event of a failure occurrence during acceptance testing. The Supplier shall maintain a copy of the approved ATP for seven years from the date of ATP approval.</p>
<b>SSQ011</b>	<p><b><u>NON-DESTRUCTIVE TEST (NDT):</u></b></p> <p>Non-destructive Testing and / or Analysis (NDT) are required as described on the Purchase Order. One or more of the following will be described in detail.</p> <p>NDT includes but not limited to: Magnetic Particle, Liquid Penetrant, Eddy Current, Ultrasonic, Radiography, Acoustic Emission and Holography. Special Processes include Heat Treatment, Mechanical Testing, Chemical Films, Welding, Soldering, Environmental Acceptance Tests and Plating to name some.</p> <p>Supplier shall furnish with each shipment to MERCURY, one copy of the certified test report for all tests and analysis performed. The report shall be issued by the organization actually performing the tasks, including a complete description of the test and analysis (test analysis name, specification type, method, acceptance criteria), the certified technician who performed and / or evaluated the test(s) and shall be signed by a responsible official of the issuing organization. All items subjected to tests shall be identified with the appropriate stamp. When applicable, radiographic reports shall be accompanied by the exposed film. When parts are serialized or identified with lot or batch numbers, such identification shall appear on reports and exposed film.</p>
<b>SSQ012</b>	<p><b><u>DESTRUCTIVE PHYSICAL ANALYSIS (DPA):</u></b></p> <p>Destructive Physical Analysis (DPA) is required as described on the Purchase Order. One or more of the following will be described in detail.</p> <p>DPA includes but not limited to: Bond Pull, Cross-Section, De-cap / De-lidding / Remove Encapsulant, Die Shear Testing, Energy Dispersive X-ray Analysis (EDXA), External Photos, External Visual Inspection, Glassivation Layer Integrity, Hermetic Seal Testing, Internal Visual Inspection with Digital Capture, Particle Impact Noise Detection, Radiographic Inspection, Scanning Electron Microscope (SEM),</p> <p>DPA is the process of disassembling, testing, and inspecting a component for the purpose of determining conformance with applicable design and process requirements. This process of sample testing is used to ensure that a high reliability component or device is fabricated to the required standards. Destructive Physical Analysis is also used effectively to discover process defects for troublesome production lot</p>

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	<p>problems.</p> <p>DPA is performed per the standard and method called out on the Purchase Order (MIL-STD-750, MIL-STD-883, MIL-STD-202, MIL-STD-810, MIL-PRF-19500, MIL-PRF-38534, MIL-PRF-38535, etc.)</p> <p>Supplier shall furnish with each shipment to MERCURY, one copy of the certified test report for all tests and analysis performed. The report shall be issued by the organization actually performing the tasks, including a complete description of the test and analysis (test analysis name, specification type, method, acceptance criteria), the certified technician who performed and / or evaluated the test(s) and shall be signed by a responsible official of the issuing organization. All items subjected to tests shall be identified with the appropriate stamp. When applicable, radiographic reports shall be accompanied by the exposed film. When parts are serialized or identified with lot or batch numbers, such identification shall appear on reports and exposed film.</p>
<b>SSQ013</b>	<p><b><u>FAILURE ANALYSIS (FA):</u></b></p> <p>Failure Analysis (FA) is required as described on the Purchase Order. One or more of the following will be described in detail.</p> <p>FA includes but not limited to: non-destructive analysis / testing, destructive analysis / testing, materials analysis, determination of failure mode and mechanism, fault isolation, verify failed condition, de-capsulation / disassembly, internal Inspection, cross section analysis, visual inspection.</p> <p>FA is performed per the standard and method called out on the Purchase Order with failure analysis, failure cause determination, and recommend corrective actions reported.</p> <p>Supplier shall furnish with each shipment to MERCURY, one copy of the certified test report for all tests and analysis performed. The report shall be issued by the organization actually performing the tasks, including a complete description of the test and analysis (test analysis name, specification type, method, acceptance criteria), the certified technician who performed and / or evaluated the test(s) and shall be signed by a responsible official of the issuing organization. All items subjected to tests shall be identified with the appropriate stamp. When applicable, radiographic reports shall be accompanied by the exposed film. When parts are serialized or identified with lot or batch numbers, such identification shall appear on reports and exposed film.</p>
<b>SSQ014</b>	<p><b><u>SUSPECT COUNTERFEIT ANALYSIS:</u></b></p> <p>Counterfeit testing is required to the following industry adopted standards (SAE AS5553 and IDEA-STD-1010A) as described on the Purchase Order.</p> <p>Supplier shall furnish with each shipment to MERCURY, one copy of the certified test report for all tests and analysis performed per SAE AS5553 and IDEA-STD-1010A.</p>
<b>SSQ015</b>	<p><b><u>RESIDUAL GAS ANALYSIS (RGA):</u></b></p> <p>Residual Gas Analysis (RGA) is required as described on the Purchase Order. One or more of the following will be described in detail.</p>



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	<p>RGA includes but not limited to:</p> <p>DPA is performed per the standard and method called out on the Purchase Order.</p> <p>Supplier shall furnish with each shipment to MERCURY, one copy of the certified test report for all tests and analysis performed. The report shall be issued by the organization actually performing the tasks, including a complete description of the test and analysis (test analysis name, specification type, method, acceptance criteria), the certified technician who performed and / or evaluated the test(s) and shall be signed by a responsible official of the issuing organization. All items subjected to tests shall be identified with the appropriate stamp. When parts are serialized or identified with lot or batch numbers, such identification shall appear on reports.</p>
SSQ016	<p><b><u>AS9100 QUALITY SYSTEM REQUIREMENTS:</u></b></p> <p>The supplier shall have a quality management system that complies with Society of Automotive Engineers (SAE), AS9100 Quality Management Systems – Aerospace – Requirements. Accredited third party certification or second party approval by Lockheed Martin is required. Organizations that obtain certification / registration to AS9100 and subsequently changes certification / registration bodies (CRB), loses its registration status, or is put on notice of losing its registration status, shall notify Lockheed Martin within three days of receiving such notice from the organization’s registration body (CRB)</p>
SSQ017	<p><b><u>ROHS COMPLIANCE REQUIRED</u></b></p> <p>The product stated on this purchase order must comply with the RoHS 2002/95/EC directive. A Certificate of Compliance (COC) or declaration of conformance to this directive must accompany the shipment stating the parts comply with RoHS and any pertinent information that will provide the ability to segregate our inventory and assure compliance.</p>
SSQ018	<p><b><u>INTERNATIONAL TRAFFIC IN ARMS REGULATIONS (ITAR) REGISTRATION:</u></b></p> <p><b>International Traffic in Arms Regulations (ITAR) Registration</b> – Unless otherwise specified, custom product, parts and components, and the related technical data and information or services related to MERCURY’s military programs are controlled for export purposes pursuant to the ITAR. It is a violation of the ITAR to export or re-export these products, any of their parts or components, or technical data related to them without first receiving authorization to do so from the U.S. Department of State.</p> <p>U.S. Government Export Control Laws and Regulations &amp; ITAR: The Supplier shall fully comply with the U.S. Government Export Control Laws and Regulations. Including the ITAR identified in clause 22 CFR PARTS 120-130 in connection with the performance of this Order.</p> <p>This provision incorporates, as though printed herein in full, the definitions set forth at CFR PART 120, in particular, Supplier should carefully note the definitions of the Terms, Technical Data (22 CFR 120.10), Defense Article (22 CFR 120.6) and Defense Service (22 CFR 120.9). All of which are incorporated into and made a part of this Provision, as though fully set forth herein.</p> <p>By accepting this order Supplier acknowledges notification that in connection with the performance of this order that:</p> <ol style="list-style-type: none"> <li>1. Technical Data that Supplier obtains,</li> </ol>

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	<p>2. Technical Data that Supplier develops,</p> <p>3. Defense Articles that Supplier obtains or fabricates, and</p> <p>4. Defense Services that Supplier performs may only be disclosed to, handled by, or performed by, or on behalf of one or more of the following classes or individuals:</p> <ul style="list-style-type: none"> <li>A. Citizens of the United States,</li> <li>B. Lawful Permanent Residents as defined by 8 USC 1101(A)(20), IE “ Green Card Holders “,</li> <li>C. Protected Individuals as defined by 8 USC 1324B(A)(3), or 4) Foreign Nationals for whom a current and directly relevant license or approval has been obtained from the U.S. Department of State, which license or approval is directly relevant to the work to be performed under the order.</li> </ul> <p>Supplier shall ensure that all the license or approvals required by the ITAR are obtained before handling or disclosing any Technical Data, or Defense Articles, or providing or receiving and Defense Service in connection with the performance of this order.</p> <p>Supplier Represents and Warrants that it is and will, for the duration of this order, remain in full compliance with the ITAR. Supplier further Warrants and Represents that it has advised its Employees and Consultants who are performing work in connection to this order or who have access to Technical Data or Defense Articles relating to this order of their Obligations regarding Compliance with the ITAR.</p> <p>Supplier shall be responsible for ensuring that the requirements of this provision are flowed down to any of its Suppliers and Sub-tier Suppliers that will receive from the Supplier or provide to the Supplier Technical Data, Defense Articles or Defense Services in connection with the performance of this order.</p>
SSQ019	<p><b><u>PREFERENCE FOR DOMESTIC SPECIALTY METALS AND ALTERNATE 1:</u></b></p> <p>Defense Federal Acquisition Regulation Supplement (DFARS): Supplier shall be aware that this clause restricts the country of origin for certain specialty metals used in products to be delivered to the US Department of Defense (DoD). The DFARS clause 252.225-7014, preference for Domestic Specialty Metals (ALT1) requires that any specialty metals incorporated into articles to be delivered to the DoD shall be melted in the United States its possessions or Puerto Rico or in certain qualifying countries. Supplier is required to obtain a copy of the DFARS clause 252.225-7014 and comply.</p> <p>The DFARS can be found at the following websites: <a href="http://www.acq.osd.mil/dpap/dars/index.htm">http://www.acq.osd.mil/dpap/dars/index.htm</a></p> <p><a href="http://farsite.hill.af.mil/VDFARa.htm">http://farsite.hill.af.mil/VDFARa.htm</a></p>
SSQ021	<p><b><u>NADCAP CERTIFIED SPECIAL PROCESSING:</u></b></p> <p>Special Processes require processing at a NADCAP certified facility.</p> <p>This requirement shall be flowed down to all sub-tier Suppliers. Supplier shall provide a Certificate of Conformance (C of C) certifying compliance with all Special Processes (SP) performed as required by this Purchase Order (PO) / Subcontract and any associated specifications and / or drawings. All Special Process Suppliers, and sub-tier Suppliers, utilized on this purchase order / subcontract shall have current accreditation by NADCAP. The Certificate of Compliance shall document all processes used in satisfying the</p>

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	<p>PURCHASE ORDER/ Subcontract and the NADCAP accreditation code(s) and date of last audit. SP's are as defined in AS9100 and as defined by NADCAP. All costs associated with NADCAP accreditation shall be borne by the Special Processor.</p> <p>Reference the PRI web site: <a href="http://www.pri.sae.org">http://www.pri.sae.org</a></p>
SSQ022	<p><b><u>WORKMANSHIP STANDARDS PHOTOS:</u></b></p> <p>The Supplier shall take multiple photographs of all interior / exterior workmanship of each Item and these photos shall be included with the deliveries. The photos shall be of sufficient resolution to show workmanship quality detail.</p>
SSQ023	<p><b><u>WORKMANSHIP STANDARDS:</u></b></p> <p>The Supplier shall document its Workmanship Standards, and they shall be available for review by MERCURY and MERCURY's Customer.</p> <p>Standards of workmanship shall be defined directly in hardware specifications and / or assembly drawings or by reference to Supplier, Industry, or Government documents.</p> <ol style="list-style-type: none"> <li>1. Soldering workmanship standards shall be as defined in the documents ANSI / EIA / IPC J-STD-001 (With Space Addendum, Performance Class 3), NASA-STD-8739.3, or MERCURY-approved equivalent.</li> <li>2. Cabling and harness workmanship standards shall be defined in JPR-8080.5 or equivalent.</li> <li>3. General workmanship shall meet the requirements of MIL-HDBK-454 or equivalent.</li> <li>4. Rigid PWBs must be procured and manufactured to MIL-PRF-31032 or IPC-6012B Class 3/A, and rigid-flex PWBs shall comply with MIL-PRF-31032 or IPC 6013 or equivalent.</li> <li>5. PWB design shall be in accordance with IPC-2221 or equivalent.</li> <li>6. Circuit cards and other electronic assemblies shall be conformal coated per NASA-STD-8739.1 using a low out-gassing material such as Parylene, Arathane (Uralane) or equivalent; any exceptions to the conformal-coating requirement must be approved by MERCURY. Deviations to this requirement may be acceptable with MERCURY approval. The conformal coating shall allow reasonable repair or rework.</li> </ol>
SSQ024	<p><b><u>DOCUMENT / RECORD RETENTION AND TRACEABILITY (10 YEARS):</u></b></p> <p>Suppliers and Sub-tier Suppliers shall maintain verifiable objective evidence of all records of analysis, assembly, conformance, inspections and tests performed, obtained results, and dispositions of non-conforming articles. These records shall be identified to associated articles, including heat and lot number of materials, unit or lot serialization when applicable and certifications. All data shall be traceable to the organization performing the testing, special processing and / or inspection(s). The Supplier shall retain Quality Assurance and Quality Control records, manufacturing data, engineering drawings and tooling. All factual information shall be included to demonstrate conformance of specification and / or Purchase Order requirements. These shall be made available for review to MERCURY or authorized MERCURY representatives or MERCURY authorized customer representative upon request.</p>

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SQAR Code:	SQAR Description:
	<p>The Supplier shall maintain records of Item traceability that ensures tracking of the supply chain back to the manufacturer of all Items being delivered. This traceability method shall clearly identify the name and location of all of the supply chain intermediaries from the manufacturer to the direct source of the product for the Supplier. Materials used must be traceable to the manufacturer's records of acceptance and identified by applicable lot number, date code, material, manufacturer s type, specification, applicable change letter or number, heat number, etc. Items fabricated by the Supplier shall be identifiable to the lot of material used.</p> <p>Unless extended retention requirements are specified elsewhere in this Purchase Order, records shall be retained by Supplier in a safe, accessible location for a period for ten (10) years following final Purchase Order payment. Records shall remain legible and readily retrievable for review during reasonable business hours. Anytime during or after the seven-year retention period, records shall not be destroyed without MERCURY's written concurrence. Supplier shall notify MERCURY of any activity at the Suppliers facility that may impact the retention of these records.</p>
SSQ025	<p><b><u>DOCUMENT / RECORD RETENTION AND TRACEABILITY (12 YEARS):</u></b></p> <p>Suppliers and Sub-tier Suppliers shall maintain verifiable objective evidence of all records of analysis, assembly, conformance, inspections and tests performed, obtained results, and dispositions of non-conforming articles. These records shall be identified to associated articles, including heat and lot number of materials, unit or lot serialization when applicable and certifications. All data shall be traceable to the organization performing the testing, special processing and / or inspection(s). The Supplier shall retain Quality Assurance and Quality Control records, manufacturing data, engineering drawings and tooling. All factual information shall be included to demonstrate conformance of specification and / or Purchase Order requirements. These shall be made available for review to MERCURY or authorized MERCURY representatives or MERCURY authorized customer representative upon request.</p> <p>The Supplier shall maintain records of Item traceability that ensures tracking of the supply chain back to the manufacturer of all Items being delivered. This traceability method shall clearly identify the name and location of all of the supply chain intermediaries from the manufacturer to the direct source of the product for the Supplier. Materials used must be traceable to the manufacturer's records of acceptance and identified by applicable lot number, date code, material, manufacturer s type, specification, applicable change letter or number, heat number, etc. Items fabricated by the Supplier shall be identifiable to the lot of material used.</p> <p>Unless extended retention requirements are specified elsewhere in this Purchase Order, records shall be retained by Supplier in a safe, accessible location for a period for twelve (12) years following final Purchase Order payment. Records shall remain legible and readily retrievable for review during reasonable business hours. Anytime during or after the seven-year retention period, records shall not be destroyed without MERCURY's written concurrence. Supplier shall notify MERCURY of any activity at the Suppliers facility that may impact the retention of these records.</p>
SSQ026	<p><b><u>VARIATION MANAGEMENT:</u></b></p> <p>Variation management in accordance with aerospace standard AS9103 is required for the Item(s) on this purchase order.</p> <p>The Supplier shall develop a process control document as defined in AS9103. The Supplier shall submit the process control document for buyer approval.</p>

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SQAR Code:	SQAR Description:
SSQ027	<p><b><u>PROHIBITED MATERIAL – PURE TIN (1):</u></b></p> <p>Pure Tin (Sn) alloy (greater than 97% Tin is prohibited). Tin alloy less than or equal to 97% and Lead (Pb) greater than or equal to 3% is acceptable.</p> <p>The use of pure unalloyed tin is prohibited as a surface finish for hardware, including the surface finish on components or parts used inside a hermetic cavity or encapsulated within an assembly. (For example, terminations on chip capacitors in hybrids shall not consist of pure tin; the potted portion of leads on devices that are encapsulated shall not be plated with pure tin).</p> <p>Solder-dipped tin alloy finishes shall contain at least three percent lead. All tin and tin alloy finishes shall contain at least three percent lead. Unalloyed tin or tin plate where tin is greater than 97% pure and the remainder is lead is prohibited. Tin with less than 97% tin and the remainder is lead is acceptable. Reflowed pure tin plating is not acceptable.</p> <p>Definitions:  <b>Solder:</b> a metal or metallic alloy used when melted to join two metallic surfaces.  <b>Plating / coating:</b> a thin layer of metal such as tin deposited on or applied to a single surface Examples: electrolytic plating, solder dipped leads, solder dipped housings.</p>
SSQ028	<p><b><u>PROHIBITED MATERIAL – PURE TIN (2):</u></b></p> <p>Pure Tin (Sn) alloy (greater than 96.5% Tin is prohibited). Tin alloy less than or equal to 96.5% and Silver (Ag) greater than or equal to 3.5% is acceptable.</p> <p>The use of pure unalloyed tin is prohibited as a surface finish for hardware, including the surface finish on components or parts used inside a hermetic cavity or encapsulated within an assembly. (For example, terminations on chip capacitors in hybrids shall not consist of pure tin; the potted portion of leads on devices that are encapsulated shall not be plated with pure tin).</p> <p>Solder-dipped tin alloy finishes shall contain at least three and one half percent silver. All tin and tin alloy finishes shall contain at least three and one half percent silver. Unalloyed tin or tin plate where tin is greater than 96.5% pure and the remainder is silver is prohibited. Tin with less than 96.5% tin and the remainder is silver is acceptable. Reflowed pure tin plating is not acceptable.</p> <p>Definitions:  <b>Solder:</b> a metal or metallic alloy used when melted to join two metallic surfaces.  <b>Plating / coating:</b> a thin layer of metal such as tin deposited on or applied to a single surface Examples: electrolytic plating, solder dipped leads, solder dipped housings.</p>
SSQ029	<p><b><u>INTERNAL AND EXTERNAL FINISHES AND SOLDERS:</u></b></p> <p>This code shall apply to all Electrical, Electronic, and Electromechanical (EEE) devices that contain multiple EEE components. (Examples: Modules, Oscillators, Hybrids, Converters, Relays, Commercial Off The Shelf (COTS) assemblies, etc.)</p>

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<b>SQAR Code:</b>	<b>SQAR Description:</b>
	<p>The following are acceptable internal and external materials for all conductive surfaces, solders, terminations, and board surface finishes:</p> <ol style="list-style-type: none"> <li>1. SnPb - Tin/Lead (Pb 3% minimum)</li> <li>2. Electroplated tin/lead finishes that are fused and conform to SAE-AMS-P-81728 are preferred.</li> <li>3. Palladium plated</li> <li>4. NiPdAu - Nickel/Palladium/Gold (gold flash)</li> <li>5. NiPd - Nickel/Palladium</li> <li>6. SnBi - Tin/Bismuth (Bismuth content of 2-5%)</li> <li>7. Electroless Nickel Immersion Gold (ENIG)</li> <li>8. Gold (internal) when the gold embrittlement requirements of ANSI / EIA / IPC J-STD-001 are met.</li> <li>9. Gold - external with nickel under plate Gold 0.4 µm [15.7 micro inches] or less on a surface mount part</li> <li>10. Gold 2.5 µm [98.4 micro inches] or less on a thru-hole part</li> <li>11. Pb-free tin that is either:             <ol style="list-style-type: none"> <li>a. Matte finish over a nickel barrier</li> <li>b. Matte finish that has been annealed</li> <li>c. Hot dipped over nickel barrier</li> </ol> </li> </ol> <p>Pb-free tin is defined as any finish containing tin which does not contain at least 3% Pb – this includes pure Sn, SnAgCu, SnAg and SnBi (Bi content cannot exceed 5%)</p> <ol style="list-style-type: none"> <li>12. The solder alloys used for hot solder dipping and component attachment, shall comply with solder alloys Sn60A (Sn60Pb40), Pb36B (Sn62/Pb36/Ag2), or Sn63A (Sn63Pb37) in accordance with J-STD-006.</li> <li>13. Nickel, Aluminum, Stainless Steel and their surface treatments or passivations for non-solder able surfaces. Any prohibitions against specific surface treatments or passivations, listed in the procurement documentation shall still be met.</li> <li>14. Exempt are parts made to applicable military standards, military specifications, and military performance based specification (MIL-STD-XXX, MIL-X-XXX, MIL-PRF-XXX) where use of any of the restricted finishes are deemed acceptable per the standard/specification.</li> </ol> <p>Components and components in completed subassemblies furnished under this Purchase Order shall be delivered with one of the approved termination finishes as listed below. The termination finish shall be capable of meeting the solder ability requirements of ANSI / EIA / IPC J-STD-002 or EIA / JESD22-B102 as a minimum. ANSI / EIA / IPC J-STD-002 is the preferred test method. When required, a double tinning or dynamic solder wave process shall be used for any gold plating removal.</p> <p>All other pure tin finishes are disallowed unless authorized by the MERCURY Buyer.</p>
<b>SSQ030</b>	<b><u>J-STD-002 CATEGORY 1 TESTING</u></b>

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	Items delivered must pass Standard: ANSI / EIA / IPC J-STD-002 Category 1 – Minimum Coating Durability
SSQ031	<p><b><u>J-STD-002 CATEGORY 2 TESTING</u></b></p> <p>Items delivered must pass Standard: ANSI / EIA / IPC J-STD-002 Category 2 – Typical Coating Durability</p>
SSQ032	<p><b><u>J-STD-002 CATEGORY 3 TESTING</u></b></p> <p>Items delivered must pass Standard: ANSI / EIA / IPC J-STD-002 Category 3 – Enhanced Coating Durability</p>
SSQ033	<p><b><u>J-STD-003 CLASS 2 TESTING</u></b></p> <p>Items delivered must pass Standard: ANSI / EIA / IPC J-STD-003 Class 2 – Dedicated Service Electronic Products</p>
SSQ034	<p><b><u>J-STD-003 CLASS 3 TESTING</u></b></p> <p>Items delivered must pass Standard: ANSI / EIA / IPC J-STD-003 Class 3 – High Performance Electronic Products</p>
SSQ035	<p><b><u>SOLDER-ABILITY TEST SAMPLES:</u></b></p> <p>To assure the solder-ability of plated parts are acceptable, Supplier shall furnish with each shipment a minimum of three samples from the same lot, which have been subjected to the solder-ability test of MIL-STD-202, Method 208 or MERCURY acceptable equivalent.</p>
SSQ036	<p><b><u>ELECTRONIC AND CIRCUIT / WIRING - BOARD / CARD ASSEMBLIES (TIN - LEAD SOLDER):</u></b></p> <p>Unless otherwise authorized in writing by MERCURY, the following shall apply: Electronic and electronic circuit card assemblies (CCA) shall be soldered to the requirements of ANSI / EIA / IPC J-STD-001, Class 3, or MERCURY acceptable equivalent as applicable to this Purchase Order. The Supplier shall implement and maintain a system that includes adequate process controls to assure conformance to the soldering, cleanliness, acceptance, material handling, storage, and shipping requirements. CCA's containing soldered Ball Grid Arrays (BGA's) shall be 100% inspected via x-ray or via an alternate mutually agreed method approved in writing by the MERCURY Buyer, which shall be traceable to the individual CCA and BGA, and shall be retained by the Supplier. The tin content of any constituent element (e.g., plating or finish), part, assembly, solder, etc., regardless whether internally or externally, shall not exceed 97 percent tin and shall be alloyed with a minimum of 3 percent lead, by mass. The item shall meet the cleanliness requirements of ANSI / EIA / IPC J-STD-001, cleanliness designator C-22. Rework, if required, shall be per IPC-7711.</p>
SSQ037	<p><b><u>ELECTRONIC AND CIRCUIT / WIRING - BOARD / CARD ASSEMBLIES (TIN - SILVER SOLDER):</u></b></p> <p>Unless otherwise authorized in writing by MERCURY, the following shall apply: Electronic and electronic circuit card assemblies (CCA) shall be soldered to the requirements of ANSI / EIA / IPC J-STD-001, Class 3, or MERCURY acceptable equivalent as applicable to this Purchase Order. The Supplier shall implement</p>

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<b>SQAR Code:</b>	<b>SQAR Description:</b>
	<p>and maintain a system that includes adequate process controls to assure conformance to the soldering, cleanliness, acceptance, material handling, storage, and shipping requirements. CCA's containing soldered Ball Grid Arrays (BGA's) shall be 100% inspected via x-ray or via an alternate mutually agreed method approved in writing by the MERCURY Buyer, which shall be traceable to the individual CCA and BGA, and shall be retained by the Supplier. The tin content of any constituent element (e.g., plating or finish), part, assembly, solder, etc., regardless whether internally or externally, shall not exceed 96.5 percent tin and shall be alloyed with a minimum of 3.5 percent silver, by mass. The item shall meet the cleanliness requirements of ANSI / EIA / IPC J-STD-001, cleanliness designator C-22. Rework, if required, shall be per IPC-7711.</p>
<b>SSQ038</b>	<p><b><u>TIN-COATED STRANDED WIRE:</u></b></p> <p>For stranded wire; Tin-coated copper, the date of manufacture cannot exceed six (6) months from the date of receipt at the buyer's facility. Each spool of wire procured under this purchase order shall be identified with the date of manufacture. Test reports are required and must be traceable to the wire manufacturer's lot number identified on each spool of wire received.</p>
<b>SSQ039</b>	<p><b><u>SERIAL NUMBERING:</u></b></p> <p>The supplier shall assign serial numbers to the Items on this Purchase Order. No two parts having the same part and option number (under this order or any other order) are to be identified with the same serial number. Records must be maintained by the Supplier, identifying the serial numbers of serialized subassemblies contained in deliverable Items.</p>
<b>SSQ040</b>	<p><b><u>VISION REQUIREMENTS:</u></b></p> <p>Suppliers are responsible for ensuring that individuals performing inspection, calibration, welding and soldering meet vision test requirements as a condition of proficiency. Unless an existing company vision testing program is approved by MERCURY, the following tests shall be required. The vision requirements may be met with corrected vision. The vision tests shall be administered by a qualified examiner, accepted by MERCURY, using standard instruments and techniques. Results of the visual examinations shall be maintained and available for review.</p> <p>The following are minimum requirements:</p> <ol style="list-style-type: none"> <li>1. Far Vision: Snellen Chart 20/50.</li> <li>2. Near Vision: Jaeger 1 at 355.6 mm (14 inches) or reduced Snellen 20/20, or equivalent.</li> <li>3. Color Vision: Ability to distinguish red, green, blue and yellow colors as prescribed in Dvorine Charts, Ishihara Plates or AO-HRR Tests.</li> </ol>