

REVISION HISTORY		
Rev.	Description of Change	Effective Date
A	Initial Release	1/15/2000
B	Updated to change the retention period to 7 years	10/03/07
C	Enhanced FAI requirements and added ESD Control	11/26/07
D	Added note for pure RoHS testing	10/14/10
E	Updated for Honeywell SPOC 165, 164 and 124 flow downs as applicable.	02/17/14
F	Updates to Section Q-1, Q-3, Q-6, Q-7, Q-9, Q-10, Q-11, Q-13, Q-14, Q-16	11/14/14
G	Updates to Section Q-11, Special/Controlled Processes	03/13/15
H	Updated Q-5 and Q-6	03/3/17
J	Added Q-Clause Q-17 for Key Characteristics Management	07/19/17
K	Added Q-Clause Q-18 for Prevention of Counterfeit parts flowdown. Added Fair example in Q-7, Updated requirement to deliver OCM cofcs in Q-6	01/23/18
L	Added provision regarding drop shipments to Q-6. Replaced Q-10 with supplier requirements for notification of obsolescence. Incorporated additional guidelines for supplier retention of documentation (Q-1F). Added provision regarding SPOC 128 to Q-9. Added cage code requirement for Honeywell product to Q-11. Clarified supplier deliverables for Q-17. Added FOD program requirement for suppliers (Q-1H).	1/6/2020

APPROVAL SIGN OFF

Name / Title	Date	Signature	Name / Title	Date	Signature
M. Wheeler – Qtly Sys	/ /		J. Freeto – Materials Mgr.	/ /	
J. Wood – QA Mgr.	/ /		D. Koss – Engr. Mgr.	/ /	
Prod. Mgr.	/ /		P. Shine – Ins. Sales Mgr.	/ /	
J. Franke - EH&S	/ /		T. Picco-Prod. Ctrl. Sys. Mgr	/ /	
	/ /		S. Weston - General Mgr.	/ /	

6. Dimensional and/or physical characteristics with tolerances listed
7. Actual measurements (raw data)
8. Associated test data
9. Documented evidence of all applicable drawings notes shall be recorded on the FAI Report.
10. The manufacturer must supply a copy of the drawing with all applicable drawing notes and dimensions ballooned on the print. The ballooning on the print must be numbered to correlate directly with the line items on the FAI report.
11. Date and signature of authorized company representative. The sample(s), certifications and First Article Inspection Report will be sent to TTM Technologies. Unit used for first article inspection shall be identified and communicated to TTM purchasing agent.
12. When specifically flow down on PO that "AS9102 FAIR" is flowed down the FAI Report must be documented using the AS9102 format forms 1, 2, and 3 and include all objective evidence including material/component certifications.

Click this PDF to review TTM's requirement for First Articles

Q-8 Age Control: Materials with defined characteristics, which over time are susceptible to quality degradation through use or storage, shall be clearly identified on the lowest level of unit packaging. The package shall be marked to indicate the critical date the shelf life was initiated and date of expiration. As a minimum, materials shall be marked with the date of manufacture, expiration date, storage temperature and humidity requirements, special handling conditions, in addition to the standard identification requirements. ***Materials at the date of receipt by TTM Technologies shall have a minimum of seventy-five (75) percent of the usable shelf life remaining.***

Q-9 Inspection and Test Plans: Manufacturers and fabricators (This Q-Clause does not apply directly to Distributors, however it is a required flow down to the OCM) are required to have internal inspection and test plans for materials processed that are delivered against this purchase order. If requested, a summary of these plans shall be made available to TTM Technologies including any associated QMS SOP or procedure controlling this and inspection or test plan. The inspection/test plan shall include the general manufacturing/processing sequences and associated product conformance checkpoints (e.g. in-process, final inspection or test points) in relation to procurement, manufacture and final acceptance.

NOTE: (For any material, component, or parts order against a Honeywell Controlled Drawing Number (excluding vendor item, specification controlled, or any other Honeywell drawing that identifies a COTS part) suppliers shall have a characteristic accountability methodology that meets the requirements of SPOC 128.)

Q-10 Notification of Obsolete Parts: Suppliers shall notify TTM of all part numbers that have become obsolete, or will become obsolete within the next twelve months. Notification shall be sent in a timely manner in writing through the following email address: obsolete@ttmtech.com. All affected TTM part numbers must be identified in the notification.

Q-11 Special and or Controlled Processing Specification:

A SPECIAL PROCESS is a manufacturing process defined as a process type controlled per NADCAP (Ref www.pri-network.org), or as defined by TTM's customer requirements which will be flowed down on our purchase order. (e.g.,

plating, non-destructive testing, chemical processing, non-conventional machining and surface enhancement, coatings, composites, Heat Treating (including Brazing), Welding (including Torch and Induction Brazing).

NOTE 1: (For any material, component or parts order against a Honeywell Controlled Drawing Number, the latest revision on the SPOC manual and SPOC 165 applies. All Honeywell controlled processes must be performed IAW the specification number and revision listed on the drawing, or per SPOC section 2.1 if revision is not listed directly on the drawing. Reference the Honeywell design activity CAGE Code (located on the drawing) during processing)

NOTE 2: (For any material, component or parts order against a UTAS Controlled Drawing or Specification, ASQR-01 requirements apply and all Special Processes sub-tier supplier SHALL be approved and listed on UTAS Report 80/85)

NOTE 3: (For any material, component or parts order against a Lockheed Controlled Drawing or Specification, all Special Processes SHALL be performed by an approved Special Processes supplier and listed on Lockheed's Special Process Approved Listed. Contact TTM Engineering to confirm Special Process Suppliers)

The subcontractor and sub-tier suppliers shall establish and document procedures for the control of all special processes (i.e. plating, heat treat, brazing, welding, bonding, coating, etc.). These "special process" documents and procedures must be revision controlled. Any changes to the controlled process will require a change to the supplier process documentation, and the revision will be changed.

- Special processing suppliers are required to be either an Approved Special Process Supplier for the specific customer for which the Customer or Source Controlled drawing and specification pertains too. Otherwise, Special processing suppliers that perform Special Processes controlled by NADCAP must be NADCAP certified for that process. If not, special approval must be obtained to allow use of that special process supplier.
- The subcontractor shall notify TTM Technologies in writing of changes and are required to perform a delta FAIR for the change. Changes are defined as changes to the process, equipment, sub-tier supplier, inspection/test methods or change in site location.
- Exempt from the Special Processing Suppliers Approvals:
 - Suppliers with design responsibility may use their own approved process suppliers provided that design and development is an element in their Quality Management System (Ref AS9100 or ISO9001) and Sub-tier supplier control must be an element in their Quality Management System.
 - Industry Standard Parts such as NAS, MS, etc.
 - Special processes used in the fabrication of catalog or commercial off-the-shelf (COTS) components, parts/commodities.

A Certificate of Compliance is required for each shipment by lot or date code in which material was produced utilizing a special process. Stated in this document shall be the special process used, applicable military and/or customer specification, and associated revision.

Q-12 Packaging Requirements, including Bar Coding of Boxes, Bags and Packing Slips: The subcontractor shall establish and maintain a documented system for the control and monitoring of its packaging and shipping practices. Included will be provisions for handling, preservation, storage, packaging and final shipment. The system must be designed to ensure the quality of deliverable material through prevention of damage, deterioration, and degradation.

Packaging requirements are as stated on the purchase order. When not specified, the method used will be "best commercial practice."

Q-13 Non-Conforming Product: The subcontractor shall establish and maintain a documented system for the control of nonconforming material and/or product. The system shall be designed to prevent the escape of nonconforming product being shipped. Included in the system will be provisions for notification if nonconforming product is discovered to have been shipped whereby TTM is notified within 48 hours of detection.

Q-14 Continuous Improvement: The subcontractor is required to establish and maintain a system for the application and implementation of continuous improvement including monitoring and control of the manufacturing processes that affect product quality and conformance. The subcontractor should identify internally key process characteristics and monitor and take corrective action when these processes are not in control. Supplier upon request shall be able to provide objective evidence of monitoring the performance of these indicators. Evidence may include but is not limited to; identification of key characteristics, methods of measuring performance, SPC Charts, CPK level, etc.

Q-15 ESD Control Program: TTM Technologies requires suppliers who are performing a process on partially loaded assemblies supplied by TTM to be in compliance with ANSI/ESD-S-20.20 requirements. Compliance to this requirement can be verified by a TTM Quality Representative during a site audit, if a site audit is not conducted the supplier must submit a copy of their ESD program procedure along objective evidence that training has been conducted. When TTM product is being worked on at the supplier's facility it must be in an ESD controlled area prior to removing it from its static shielding bag. Whenever TTM's products are not being worked on by the supplier or being transported, the units shall remain in their static shielding bags.

Q-16 Pure Tin/ RoHS Testing: Electronic or electrical components and/or assemblies, including the internal fabrication of hardware, delivered SHALL NOT have pure tin finishes (Tin Whisker Avoidance Program). Additionally, any tin-lead (SnPb) plating or solder process/processing shall result in a finish of no less than 3% lead composition. If any Electronic or electrical component and/or assembly cannot meet this requirement, then supplier is to formally notify TTM. Note: This applies to component leads and terminations, carriers, bodies, cages, brackets, housings, mechanical items, hardware (nuts, screws, and bolts), etc. This does not apply to MIL-SPEC Parts, Customer Controlled Drawings or TTM Drawings that allow the use of Tin (Sn) with less than 3% Lead (Pb).

Seller Certificate of Conformance (C of C) with each shipment shall mean that the Seller or Seller's agent has verified that delivered product meets the above listed composition requirements, or the material meets at least one of the following provisions:

- a. Seller or Seller's agent has contacted the Original Equipment Manufacturer (OEM) or Original Component Manufacturer and verified that the specific Mfr / Lot Date Code of delivered product meets the specified minimum lead (Pb) requirement if Tin (Sn) is present in the product.
- b. Seller or Seller's Subcontractor has verified and can provide objective evidence that components or part delivery have a minimum of 3% lead (Pb) is present in any process that uses tin (Sn).

Q-17 Suppliers' Key Characteristics (KCs) Management: *(For any material, component or parts order against a Honeywell Controlled Drawing Number the latest revision on the SPOC manual and SPOC 154 apply).* Suppliers shall be

responsible to review all TTM released drawings to identify, review and comply with the Key Characteristics. KCs are identified on the drawings with a special symbol (such as an asterisk *) or have the text "Key Characteristic" next to the requirements. Suppliers shall have a process and production control in place to ensure that the KC requirements are being met within tolerance. All key characteristics shall be identified by engineering and quality and incorporated into the work instructions or flown down to the sub tier supplier as applicable. Suppliers shall take Key Characteristics measurements on an approved sample plan. Key characteristic measurements shall be recorded for each date code for each PO delivery, and this data shall be sent to TTM prior to or with shipment of product. In cases where results fall outside the requirement(s), supplier shall contact TTM for disposition of the material on each lot.

Q-18 Counterfeit Prevention/Mitigation Plan: Suppliers shall establish and maintain a Counterfeit Parts\Material Prevention Plan to ensure that counterfeit goods are not delivered. The purpose of the plan shall be to develop a robust process to prevent the delivery of counterfeit commodities and control commodities identified as counterfeit. Suppliers shall only purchase products to be delivered or incorporated as goods to buyer directly from the Original Component Manufacturer (OCM)\Original Equipment Manufacturer (OEM), OCM\OEM authorized/franchised distributor chain, aftermarket manufacturer, or authorized reseller. These products shall have verification that goods are traceable to OCM\OEM; OCM\OEM authorized distributor chain, aftermarket manufacturer, or authorized distributor that identifies the name and location of all the supply chain intermediaries from the part manufacturer to the direct source of the product. When specific sources of supply are called out on the PO line item, goods shall be procured from and have verification provided as evidence of procurement from said source of supply.

Suppliers shall send their C of C along with the OCM C of C with un-broken traceability to TTM on every shipment; see Q-6 for deliverables.

If Goods can only be acquired from independent distributors or brokers in cases of diminishing material supply (DMS) or obsolescence, written notice shall be provided to Buyer prior to procurement of these goods. If written approval from this facility is received by supplier, goods shall be subjected to testing and screening process appropriate to the commodity using an approved third party laboratory. Records of evidentiary tests and inspections performed that ensure verification of the goods shall be provided for review and approval from Quality prior to shipment. Written notice is not required for raw material and standard hardware purchased from independent distributors or brokers, but products must be able to provide commodity level traceability to the OCM\OEM. Suppliers shall provide written notification to Buyer if they become aware or suspect that they have furnished Counterfeit Goods within 24 hours. Suppliers shall have a documented process in place to ensure Counterfeit goods are contained and do not reenter the supplier chain.

Suppliers shall include this clause or equivalent provisions in lower tier subcontracts for the delivery of items that will be included in or furnished as goods to the facility as applicable.

Suppliers eligible for utilization of the Government-Industry Data Exchange Program ("GIDEP") shall utilize the GIDEP process to alert the industry of encountered counterfeit parts. If supplier is not eligible for membership to GIDEP, an alternative service shall be utilized (i.e. ERAI).

Supplier shall ensure their Counterfeit Avoidance program includes training of applicable personnel to the requirements within this procedure.

Q-30 TTM Technologies Source Inspection: TTM Technologies will perform source inspection to the requirements of the purchase order at the subcontractor's facility, prior to the shipment of material. The subcontractor shall provide reasonable inspection facilities and measuring equipment necessary to validate the compliance to contractual

requirements. TTM Technologies reserves the right, should the need present itself, to verify processing methods with the exception of proprietary processes. This includes those processes of the subcontractor's sub-tier supplier. Subcontractor shall have available all documentation, shop order and/or rout sheet, drawings and specifications, inspection and test results, purchase order, test samples and material for inspection. The subcontractor shall notify the TTM Technologies buyer not less than five (5) working days prior to the time in which the material will be complete for source inspection. Source inspection acceptance by TTM Technologies does not relieve the subcontractor from the responsibility of providing acceptable product.