

## **Supplier Quality Assurance Clauses**

The following Quality Requirements define the responsibilities of the supplier to ensure conformance to Teledyne Micropac (TDY) Purchase Order (PO) requirements. All the following requirements are applicable to all POs unless specified otherwise on purchasing documentation. Failure to comply with these supplier quality requirements may result in product rejection and directly affect the supplier's quality rating. The Supplier's quality rating will consist of On-time Delivery and Delivered Quality at minimum. If goals are not consistently met, this may result in the issuance of a Supplier Corrective Action by Teledyne Micropac which may result in the Supplier being removed from TDY's Approved Supplier List (ASL). Goals and ratings are available upon request. For Commercial Off the Shelf (COTS) suppliers, the following QA codes, at minimum, apply to all purchase orders (POs) unless otherwise stated on the PO: QA1, QA3, QA4, QA5, QA6, QA8, QA9, QA10, QA12, QA13, QA16, & QA19. Any additional requirements will be communicated to the supplier at the time of purchase.

### **QA1 – ORDER ACKNOWLEDGEMENT**

Supplier shall review all po requirements and if any terms or conditions are disputed they must contact TDY within 48 hours for clarification.

### **QA2 - QUALITY SYSTEM REQUIREMENTS**

TDY prefers its suppliers to maintain a formal quality management system compliant or registered to one of the following standards, based on their business and type of product or service supplied:

- AS9100 (Manufacturers)
- ISO9001 (Manufacturers)
- AS9120 (Distributors)
- ISO17025 (Calibration/Testing)

Loss, suspension, or withdrawal of third-party certification shall be reported to Teledyne within three (3) business days of notification.

### **SPECIAL PROCESS REQUIREMENTS ARE AS FOLLOWS:**

Suppliers of "Special Process" services or products are required to have those special processes validated and approved by TDY. NADCAP accreditation or equivalent for special processes may be used in-lieu of TDY validation and approval process.

Process certifications are required for all suppliers performing special processing and shall state that the process has been performed to the drawing requirements.

TDY considers the following process categories as special processes:

- Non-Destructive Testing
- Heat Treating
- Material Testing Laboratories
- Chemical Processes
- Non-Conventional Machining and Surface Enhancements
- Welding
- Composites
- Powder Coat Paint
- Anodize

The supplier must notify TDY of all sub-tier special process suppliers used to produce TDY products. Any special process that is transferred requires specific prior approval by TDY and may be subject to further verification and validation by one of the following methods:

- TDY conducts an on- site surveillance of the special process supplier
- TDY approves the supplier's approval process for special process suppliers
- Customer or regulatory surveillances conducted on the special process supplier
- Special process supplier is NADCAP certified or equivalent

Buyer reserves the right to conduct surveillance at seller's facility to determine that seller's quality system meets the requirements of this clause. In addition, TDY requires its supplier to have a calibration system that is compliant, at minimum, to ANSI Z-540, ISO/IEC 17025, or ISO 10012.

### **QA3 – COMPETENCE, TRAINING AND AWARENESS**

The supplier shall ensure personnel performing work affecting the conformity to product requirements have the necessary competence/training. Supplier shall maintain appropriate records of education, training, skills, and experience of such personnel.

Supplier shall ensure that all personnel are aware of their contribution to product or service conformity, their contribution to product safety, and the importance of ethical behavior in accordance with AS9100 8.4.3 (m).

### **QA4 - CERTIFICATE OF CONFORMANCE**

The supplier shall submit with each shipment the following:

- (1) A Certificate of Conformance stating that the items furnished to TDY are in conformance to the Purchase Order and design data requirements applicable to the items being delivered, and
- (2) A copy of the manufacturer's C of C where applicable.

Any recognized Aerospace, Military and/or Industry Standard, when imposed by the drawing, specification or Purchase Order, must be specifically stated and form a part of the certification. Process certifications are required for all suppliers performing special processing and shall state that the process has been performed to the drawing requirements.

#### **PARTS WITHOUT CORRECT DOCUMENTATION ARE SUBJECT TO REJECTION.**

All certifications must show the part number, quantity, process being performed, specifications, revision number, the certifying signature and a legibly printed name and title of the person signing the certification. The supplier shall notify TDY prior to shipment if a specification has been replaced, suspended or updated. The supplier shall list the specification as shown on the drawing and the replacement specs with their current revision.

#### **FOR DISTRIBUTORS AND WAREHOUSES:**

These requirements apply without exception and include traceability and flow down of requirements on all purchased products to the sources of manufacture and their related acceptance documents.

In addition, material from different manufacturing sources shall be stored in a manner such that the material does not become intermixed and the manufacturing source and material identity is maintained at all times.

A signature on the certificate / document is a statement that all PO requirements were met in full, including all required sub-tier flow downs, when applicable.

**QA5 – NON-CONFORMING MATERIAL & LATENT DEFECT NOTIFICATION**

The supplier shall not ship or make any unauthorized repairs to product with the intent of delivering material that does not fully meet po or product specification requirements.  
The supplier shall notify TDY of potential nonconformances prior to shipment.  
Shipping nonconforming material without written prior approval may disqualify supplier from additional procurement or future orders.

**QA6 – CORRECTIVE ACTION REQUEST (CAR)**

Supplier is required to respond to TDY's Corrective Action Request (CAR) when nonconforming material has been determined.  
The supplier shall provide a written response by the requested response date noted on the CAR describing the root cause(s) of the problem and the action(s) taken to prevent the problem(s) from reoccurring.  
TDY reserves the right to verify the effectiveness of the action(s) taken to mitigate the problem(s), which may include onsite verification at the supplier or sub-tier supplier's facilities.

**QA7 – CONFIGURATION MANAGEMENT/REVISION CONTROL**

Supplier shall not make any changes to the processes or material specified under the PO.  
Supplier shall notify TDY prior to any proposed changes to supplier control design, parts, materials, changes of suppliers, fabrication methods, or processes that may affect function, interchangeability or reliability of hardware delivered to TDY.  
Suppliers shall identify and control all special requirements, critical items, and key characteristics when specified on drawings or purchase orders.

**QA8 – ELECTROSTATIC DISCHARGE (ESD) CONTROL**

Suppliers handling or packaging electrostatic-sensitive devices shall implement an ESD control program per ANSI/ESD S20.20 or MIL-STD-1686.  
Packaging and labeling shall clearly identify electrostatic-sensitive items.

**QA9 – SUPPLIER'S PURCHASE ORDERS**

Supplier is responsible for ensuring subcontracted work shall clearly describe the product ordered and must invoke the applicable requirements from TDY and our customers.  
Sub-tier special process and calibration service suppliers shall be compliant to the requirements of section **QA2**.

**QA10 – QUALITY RECORDS RETENTION**

All Quality records are to be legible, reproducible, and identifiable to the Purchase Order.  
Quality records are to be stored and maintained in such a way that they are readily retrievable in facilities that provide a suitable environment to minimize deterioration or damage and to prevent loss. This applies to our suppliers and any sub-tier suppliers. Retention period for quality records is 10 years from the time of final PO payment, unless otherwise specified.  
TDY, our customers, government or regulatory agency representatives shall have access to review quality records as they pertain to specific orders.

**QA11 – BUYER RIGHT OF ACCESS AND SURVEILLANCE**

TDY reserves the right to review control methods and inspect material supplied to TDY at the supplier's facility and at any sub-tier facility. Access rights shall be extended to our customers and government or regulatory agency representatives. Changes to suppliers or manufacturing location require TDY assessment and acknowledgement.

**QA12 – FIRST ARTICLE INSPECTION (FAI)**

If indicated on the Purchase Order, FAIs shall be performed in accordance with AS9102 on hardware originating from the initial qualification or production run intended for ongoing production.

When documenting the FAI, the seller is permitted to utilize either the forms provided by AS9102 or equivalent forms that encompass all the requisite information as stipulated by AS9102. The supplier shall provide the FAI report, relevant material certificates, and testing documentation with the product shipment.

Exceptions - unless contractually required, an FAI is not required for:

- Deliverable Software
- Development and prototype builds that are not considered as part of the first production run
- Single-run production orders not intended for ongoing production
- Procured standard catalogue items, or
- COTS products that have not been modified.

**BUILD-TO-PRINT ASSEMBLIES:**

The completed FAI report shall include FAIs for the assembly, subassemblies, and detail parts, the functional test results, if applicable, and verification of assembly, test operations and tooling, which is not required with product shipment, but should be maintained as a quality record.

**PRODUCTS MADE TO A TDY SOURCE / SPECIFICATION CONTROL DRAWING (SCD):**

The FAI shall address all SCD requirements and include the same constituent FAIs defined for build-to-print assemblies. The supplier shall maintain the constituent FAIs at its facility as quality records.

**DELTA FAI:**

A full or partial FAI shall be performed for affected characteristics, for the following events:

- Change in the design affecting fit, form or function of the part.
- Change in manufacturing source, location, process, inspection method, tooling or materials that can potentially affect fit, form or function.
- Change in numerical control program or translation to another media that can potentially affect fit, form or function.
- Natural or man-made events that may adversely affect the manufacturing process.
- Lapse in production of two years or as specified by the customer.

**QA13 –COUNTERFEIT ELECTRONIC PARTS**

The supplier shall meet the requirements of AS5553 counterfeit electronic parts avoidance, detection, mitigation and disposition. Items procured from sources other than the original equipment manufacturer, original component manufacturer, or their authorized distributors, is **not authorized** unless written approval from TDY is obtained by the supplier.

Failure to obtain TDY's written approval constitutes a material breach under the terms of this agreement. Items shall include unique traceability identifiers (e.g., lot code, date code, serial number, batch number, control number, casting number, work order number, etc). When size of hardware, or supplier's marking process, does not permit data application to individual hardware (such as standard parts), the information shall be similarly placed on bags, tags, or labels as applicable.

Unless otherwise specified in the purchase agreement, the supplier shall maintain traceability records on file and available for review by TDY. If supplier becomes aware or suspects that it has furnished counterfeit parts or suspect counterfeit parts to TDY, supplier promptly, but in no case later than thirty (30) days from discovery, shall notify TDY and replace, at supplier's expense, such counterfeit parts or suspect counterfeit parts with goods that conform to the requirements of this contract.

#### **QA14 –RAW MATERIAL**

As required by PO / SOW, supplier shall maintain a copy of all supplier's procured raw material certifications, which must be readily retrievable and shall include material specification, dimension/ description, type and condition.

The supplier shall maintain the original MILL certification and any secondary independent test laboratory certification(s) if any additional process was done after original MILL certification for procured material that shall include physical properties, chemical analysis and lot number(s). In addition, material must meet any other contractual requirements as stated in the Purchase Order, and any applicable DFARS.

The supplier shall maintain copies of certifications for all subcontracted special processes. Supplier shall also flow down a requirement for their sub-tiers to obtain and maintain raw material and process certifications. Supplier's material/special process and sub-tier supplier/processor certifications and test results shall be made available at no cost to TDY

#### **QA15 –SHELF-LIFE AND AGE SENSITIVE MATERIALS**

Suppliers shall identify all limited shelf-life or age-sensitive materials with the date of manufacture, expiration date, and special storage conditions.

Materials shall have at least 80% of usable shelf life remaining (or  $\geq 6$  months) upon receipt at Teledyne.

#### **QA16 – RELOCATION/TRANSFER OF WORK**

During the performance of this contract and applicable only to the products or services purchased by TDY, the supplier shall notify TDY of changes to processes, products, or services, including changes of their external providers or location of manufacture.

This allows TDY to determine if the change(s) adversely affect the fit, form, function, quality, or requirements of the product/service purchased.

Supplier must obtain TDY approval prior to proceeding with order fulfillment. In the event of a relocation/transfer of work, requalification of processes may be required.

#### **QA17 – FOREIGN OBJECT DEBRIS/DAMAGE (FOD)**

The supplier shall maintain a FOD prevention program appropriate to the commodity provided to TDY. This program shall be compliant to AS9146, NAS 412, or equivalent.

- **MASKING** – Where applicable, the supplier's FOD prevention program shall include operations designed to verify removal and accountability of all items and materials used for masking (e.g., tape, cap, or other masking material).
- **SHIPPING** – The supplier's FOD prevention program shall include FOD preventive practices for packaging. The supplier shall ensure that there are no foreign objects shipped in packaging and packaging containers.



**QA18– CALIBRATION SYSTEM, MEASURING AND TEST EQUIPMENT (M&TE)**

The supplier shall provide and maintain M&TE necessary to assure that product(s) conform to the technical requirements. M&TE equipment shall be calibrated against measurement standards traceable to international or national measurement standards (e.g., ISO 17025, ANSI NCSL Z540 or ISO 10012).

When no such standards exist, the basis used for calibration or verification shall be retained as documented information. The supplier shall maintain a register of the M&TE equipment. The register shall include the equipment type, unique identification, location, and the calibration or verification method, frequency, and acceptance criteria. The supplier shall establish a process with the capability of recalling product(s) if/when M&TE used to verify the product(s) is found to be out of tolerance.

M&TE can include, but are not limited to:

Torque wrenches, calipers, micrometers, multimeters, go/no-go gages, depth gages, crimpers, test hardware, test software, automated test equipment, and plotters used to produce verification data.

**QA19 – PART MARKING REQUIREMENTS**

The supplier shall mark all deliverable products as required by the Purchase Order and/or engineering drawing. Unless otherwise stated in the engineering requirements, the supplier shall apply the date of manufacture, date code(s) or other control identifier number (see examples below) to all deliverable hardware. When two or more parts are joined in an assembly, manufacturing and inspection records shall identify each part-by-part number, revision, and if applicable, per examples of traceable information below. Parts and materials shall be traceable to ingredients, raw material, manufacturing and inspection records. Hardware produced in lots, batches, groups, etc., shall have traceable control information applied. When size of hardware, or supplier's automated stamping process does not permit data application to individual hardware (such as standard parts), the information shall be similarly placed on bags, tags, or labels as applicable. The supplier may determine lot size unless otherwise specified in the purchase agreement or design document.

Unless otherwise specified in the purchase agreement, the supplier shall maintain traceability records on file and available for review by TDY. Examples of traceable information may include, but are not limited to:

- Date Of Manufacture
- Serial Number
- Lot Number
- Control Number
- Heat Lot Number
- Final Inspection Date
- Batch Number
- Casting Number
- Work Order Number

**QA20 – PRINTED CIRCUIT BOARDS**

PCB shall meet all requirements on the PO and drawing, and shall be fabricated per IPC-6011, 6012 and/or 6013, of a type and performance class specified on the drawing.

The board, its testing and test samples must meet all requirements of IPC-A-600, CLASS 2 or 3, as appropriate.

- *PCB Assemblies (i.e. PCBAs, PCAs, CCAs) shall meet all requirements of IPC-A-610, Class 2 or 3, as appropriate.*

**ADDITIONAL FAI REQUIREMENTS FOR PCBs ARE AS FOLLOWS:**

The supplier shall provide TDY the following data for each lot of PCBs if specified on the Purchase Order: test coupons/micro-sections, solderability samples, micro-section lab reports and electrical test and inspection reports shall accompany the FAI report and be kept on file for subsequent lots.

*NOTE: The supplier is responsible for ensuring that each electronic component is compliant to the current material declaration shown on the TDY Bill of Material for that component.*

- Electrical test failure print outs with specific defects (e.g., internal or external opens or shorts)
- Photo image of one randomly selected, unstressed micro-section and one thermally stressed (TS) micro-section for each Date Code lot.
- Micro-sections shall be fabricated from the IPC-2221 AB coupons that utilize the smallest plated hole and associated pad. The actual micro-sections shall be retained by the supplier.

END OF DOCUMENT