



## Supplier Quality Manual

Revision 04

May 10, 2021

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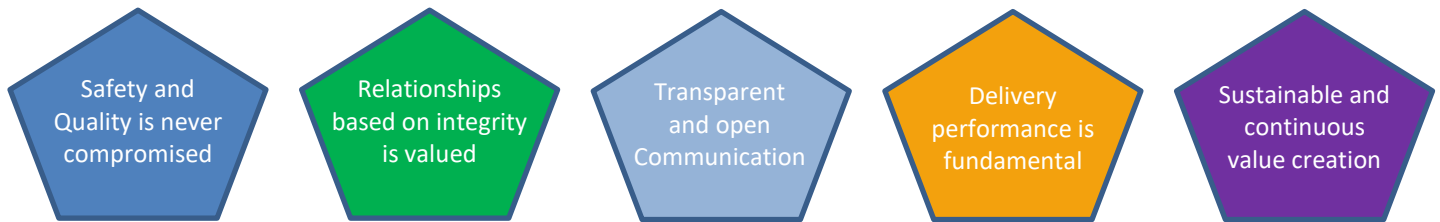
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**REVISION AND APPROVAL – Doc. M-7.4.3-Quality.003 Supplier Quality Manual 03 22414**

Rev.	Date	Nature of Changes	Approved By
01	Feb 24, 2014	Release	DKidd
02	Jan 02, 2015	Added Pak and Labeling	DKidd
03	Aug 17, 2016	ISO update	DKidd
04	May 10, 2021	Complete Re-Write	P.Finch

## TRONAIR SUPPLY CHAIN PRINCIPLES



### **Safety and Quality**

Safety is never compromised. We collaboratively design quality into all our products and services, with a goal of creating superior products at every stages of the production system.

### **Relationships**

Relationships are valued and we respect diverse thinking. We commit time and resources towards healthy relationships by build trust and doing what we commit too.

### **Transparent Communication**

Communication is based on honesty and integrity. We jointly advocate for the success and sustainability of our supply chain.

### **Delivery Performance**

Perfect parts and service are delivered every time. Sufficient capacity is maintained to meet demand. Requirements are shared as quickly as possible to enable delivery success.

### **Sustainable and Continuous Value:**

We meet the demand from our customers for continuous value creation. We objectively derive optimal cost data and drive cost reduction.

## INTRODUCTION

### Our Suppliers

Tronair recognizes the very important role our Suppliers have in the value we offer our customers. As an extension of our own operations, we rely on our Suppliers to provide material, products, and services which meet all of the requirements of Tronair contracts, applicable specifications, and the quality management requirements outlined herein.

### Purpose

The purpose of this manual is to inform component distributors, suppliers and contract manufacturers (hereafter refer as “all Suppliers”, unless otherwise specified) of Tronair of the requirements we have regarding suppliers’ quality management systems, design engineering and manufacturing process controls, required for the purpose of doing business with Tronair. This manual describes what Tronair expects its component distributors, suppliers and contract manufacturers to do to ensure that components, materials, sub-assemblies and systems meet Tronair’s requirements and expectations.

### Scope

The information in this manual applies to all Suppliers providing Tronair with materials, products, processing, finished products and related services, and when applicable, to Supplier sub-tier sources who have an interest in, or are doing business with Tronair.

### Requirements

In this manual, the terms "shall" and "must" mean that the described action is mandatory; "should" means that the described action is necessary and expected with some flexibility allowed in the method of compliance; and “may” means that the described action is permissible or discretionary.

### Questions

Questions concerning this manual should be directed to your respective Tronair Supply Chain Representative.

## SUPPLIER CODE OF CONDUCT

Suppliers shall ensure operations are being performed in a manner that is appropriate, as it applies to their ethical, legal, environmental, and social responsibilities.

## 1.0 QUALITY SYSTEM REQUIREMENTS

Tronair requires that all Suppliers maintain an effective, documented quality management system suitable to the products and services provided to Tronair by a recognized third-party and comply with the latest revision of the following standards. In addition, the Supplier must meet all other requirements of this manual.

In absence of a third-party certification, depending on the product type, its application, value and criticality, the Tronair purchasing and supplier quality representatives may provide authorization the acceptance of other evidence of compliance which may include an audit by Tronair or a self-assessment.

### 1.1 Quality Manual & Procedure

Upon request, the Supplier must furnish Tronair with a controlled copy of the Supplier's Quality Manual and supporting procedures in English. The quality management system documentation shall include Supplier's statements of a quality policy and quality objectives. The Supplier must notify Tronair of any substantive changes to the Supplier's quality management system, top-level management, and/or quality management.

All Suppliers of production materials to Tronair should be approved by Tronair prior to the issuance of contracts. All Suppliers must be approved by Tronair, regardless of approvals by customers or other entities.

## 2.0 SUPPLIER APPROVAL PROCESS

The Supplier Approval Process consists of the following three Approval elements:

- A Supplier Survey Questionnaire completed by the Supplier.
- A document audit of the Supplier's quality system procedures, if required.
- An on-site assessment, if required.

### 2.1 Initial Assessment

After Tronair Purchasing group determines that a Supplier potentially fits within Tronair's supply chain needs:

Tronair Purchasing group shall request the Supplier complete a Supplier Survey Questionnaire. When the Supplier returns the questionnaire, a Purchasing designate reviews the questionnaire with the Supplier Quality Engineer (or designee) to determine whether to proceed with approval of the Supplier and which approval elements are required.

Tronair Supplier Quality may also request the Supplier to provide a copy of its quality management system certificate and/or applicable regulatory certificates, and/or complete a self- assessment of its business and quality management system and capabilities (i.e., quality, delivery, technology, cost, and continual improvement objectives).

All Suppliers are encouraged to comply with the requirements of the latest ISO 9001 Standard.

### 2.2 Document Audit (If Required)

A Supplier Quality Engineer (or designee) is assigned to review the Supplier's Quality Manual and supporting procedures to determine if the documented quality system meets Tronair's requirements. In those cases, where a Supplier's quality management system has not been certified by an accredited certification body, Tronair may request a copy of the Supplier's Quality Manual and supporting procedures (and perhaps internal audit reports) to determine if the Supplier's quality management system meets Tronair's requirements.

### 2.3 Self & On-Site Assessment (If Required) & Approval

Prior to an on-site assessment, the Supplier is asked to fill out self-assessment forms. The Supplier will be given advanced notification of such assessments. Answers to the self-assessment forms will be used as a guideline during the on-site supplier audit.

Generally, when a Supplier is certified to a related standard by an accredited certification body, Tronair Buyer (or designee) and/or Supplier Quality Engineer (or designee) will not conduct an on-site assessment of the Supplier's quality management system against the same criteria. However, Tronair and/or its customers, due to product/process complexity or criticality, may elect to conduct on-site assessments of a Supplier's product or process capabilities. As a result, findings may be issued. These assessments could include:

- **Quality Management System (QMS) audit**– if necessary, as a result of (or in conjunction with) product or process capability assessments, to determine whether the Supplier's quality management system meets one or more of the applicable standards, and is functioning effectively.
- **Business assessment** - to determine whether the Supplier has the financial resources and other business resources needed to fulfill Tronair's needs and continuity of supply.
- **Manufacturing assessment** -to determine whether the Supplier has the production capacity needed to fulfill Tronair's volume production needs
- **Continuous Improvement assessment**– to determine if the Supplier's culture, methods and skills are present to actively pursue continual improvement.
- **Technology assessment** - to determine whether the Supplier has the needed technical resources, including production and inspection equipment, facilities, engineering resources, electronic commerce capability, etc.
- **Sub-Tier Supplier Control** – to evaluate the effectiveness of the Suppliers sub-tier management processes and ensure that products or services procured from sub-tier sources and delivered to Tronair conform to all applicable Tronair requirements.

If the assessment team determines that the Supplier meets all of the Tronair's requirements, Tronair awards the Supplier with Approved status. Tronair requires all Suppliers to be approved and listed on the Tronair Approved Vendor List (AVL) prior to the issuance of contracts to the Supplier.

## **3.0 GENERAL REQUIREMENTS**

The following set of general quality requirements applies to all Suppliers.

### **3.1 Tronair Designated Sources**

Where specified by contract, the Supplier shall purchase products, materials or services from Tronair designated sources. However, the Supplier is responsible to ensure that items procured from such sources meet all applicable technical and quality requirements. Supplier will manage all nonconformance activities independently. Supplier to inform Tronair on Tronair drawing or BOM related nonconformities or Tronair directed supplier issues.

### **3.2 Right of Entry**

All Suppliers that manufacture or provide services to Tronair-defined requirements shall be subject to audit by Tronair and its customers. Access must be granted to all facilities, processes, inspections and investigate records, work instructions and related record upon request. Supplier shall be notified in advance of Tronair's intent to audit and provide reasonable accommodation to support date(s) requested.

### **3.3 UL Requirements**

#### **3.3.1 UL IPI**

Where UL certification is required and upon UL receiving the information on the build location for that product, the Product Safety Engineer adds the manufacturer to the UL Tronair list of manufacturers to indicate what product they are authorized to build. After product is ready for manufacturing, UL announces that they will perform an IPI (Initial Product Inspection).

Tronair will schedule with UL for IPI at the designated factory to have UL verify product conformance to the UL requirements specified in the construction report.

Tronair's safety and regulatory engineer will schedule the meeting and notify the supplier or CM of the audit schedule ahead of time. Suppliers or CM will make arrangements to prepare and accommodate the visit. The Tronair safety and regulatory representative will participate in this visit.

#### **3.3.2 UL Follow-up Services**

Where applicable and upon completion of the IPI, UL will make an unannounced visit of the factory where the product is built. The frequency is normally 4 time per year. The Follow-up Services verifies that a manufacturer of a UL certified product is producing the product in accordance with the requirements of the Follow-Up Services Procedure.

### **3.4 Compliance with REACH Regulators**

When required by Tronair Drawing or Specifications, Supplier products shall be free of Substances of Very High Concern (SVHC) at a concentration of >0.1% per the European Union Commission Regulation EC 1907/2006, "Registration, evaluation, authorization and restriction of chemicals." (REACH)

### **3.5 Compliance with Ro HS Regulations**

When required by Tronair drawing or specifications, Suppliers working with PCBA components and assembly process shall comply with EU directives 2011/65/EU, "Restriction of hazardous substances" (RoHS II Compliance)



### 3.6 Conflict Minerals

All parts and/or material supplied cannot contain conflict minerals originating in the Democratic Republic of the Congo or the adjoining countries of Angola, Burundi, Central African Republic, the Republic of the Congo, Rwanda, South Sudan, Tanzania, Uganda, and Zambia (“Covered Countries”). Accordingly, Supplier shall certify:

- a) Whether the parts and/or material supplied contain conflict minerals – tantalum, tin, tungsten or gold; and,
- b) if the parts and/or material contain conflict minerals:
  - i. The relevant identification number(s) of the parts and/or material that contain conflict minerals and which conflict minerals are incorporated in each item;
  - ii. That the conflict minerals did not originate in a Covered Country;
  - iii. The supplier from which Seller obtained the conflict minerals; and
  - iv. The smelter used to produce the conflict minerals.

Supplier shall include this clause or equivalent provisions in lower tier subcontracts for the delivery of items that will be included in or furnished as WORK to Tronair.

### 3.7 Control of Sub- suppliers

The Supplier is responsible for the quality of materials and components provided by their sub- tier Suppliers and subcontractors. (This does not include Tronair-provided material.) Tronair Suppliers must have a process in place to ensure their sub-tier Suppliers comply with all Tronair applicable specification, standard requirements and Military DFAR requirements. This process shall:

- Provide (flow-down) applicable specification and standard requirements to sub-tier suppliers
- Provide (flow-up) of any changes/variances for Tronair approval prior to making any changes
- Ensure physical and/or functional inspection has been performed by the sub-tier suppliers
- Request and manage First Article Inspection from sub-tier suppliers
- On demand, provide objective evidence to Tronair personnel of compliance. Where appropriate, Tronair:
  - Specifies the sub-tier Suppliers that may be used.
  - Audits and certifies the sub-tier Supplier’s facilities.
  - Assists the Supplier in controlling the sub-tier Supplier.

Tronair reserves the right to audit such sub-tier Suppliers as necessary. In the event of any Tronair involvement, it does not eliminate the Suppliers’ full responsibility of its sub-tier Suppliers’ and sub-contractor’s quality performance.

### 3.8 Contract Manufacturer Documentation Access

Upon acceptance of Tronair PO, Contract Manufacturer agrees to provide to Tronair information and reports, in a format and on a frequency requested by Tronair including but not limited to full set of Tronair-developed process related documentation such as electronic copy of Floor Layout, Work Instructions, Yield Reports, FMEA, and Control Plans, etc.

### 3.9 Business Continuity

The Supplier should have a business continuity plan which would allow for the safeguarding, storage and recovery of engineering drawings, electronic media, and production tooling in the event of damage or loss. This plan should also contain contingency plans to satisfy Tronair's requirements in the event of significant utility interruptions, labor shortages, and equipment failure and field returns.

### 4.0 PART QUALIFICATION

This section defines the generic requirements for production part qualification and approval. The purpose is to determine if all Tronair design and specification requirements are properly understood by the Supplier and that the manufacturing processes have the capability to consistently meet these requirements.

In all instances where a product is manufactured to a new design, for a new system, or for a new application, it is important that Supplier and Tronair allocate responsibility for assuring that all performance, endurance, maintenance, safety and warning requirements are met. It is preferred that this allocation of responsibility be in writing.

#### 4.1 First Article inspection (FAI)

Supplier shall refer to the AS9102 Standard, as applicable, for First Article Inspection.

As a minimum, a First Article Inspection (FAI) is required to initially qualify a part/process for Supplier approval. The FAI requires that all features and characteristics defined in Tronair specified requirements be inspected and verified prior to production. Actual measured values shall be recorded as opposed to general statements of conformance or other notations simply indicating acceptance.

FAI is required to address any of the following changes:

- A change in the design affecting fit, form or function of the part.
- A change in manufacturing source(s), process(es), inspection method(s), location of manufacture, tooling or materials, that can potentially affect fit, form or function.
- A natural or man-made event, which may adversely affect the manufacturing process.
- A lapse in production for one year or as specified by the Customer.

In addition to FAI, Suppliers shall, as applicable, develop a Control Plan by identifying special product and process characteristics that are key to achieving quality. The Supplier shall also include those special characteristics designated by Tronair in the drawing, specification, or contract.

The inspection process is as follows:

- a) The Supplier inspects or tests each sample for ALL dimensions, drawing notes, material requirements, and specification requirements listed on the current revision of the Tronair drawing.
- b) The Supplier records the results on the First Article Report.
- c) The Supplier numbers a copy of the Tronair drawing and specification to correspond with the Supplier's results.

## 4.2 Production Part Approval Process (PPAP)

When required by the Tronair, the Supplier shall submit to Tronair a more comprehensive Production Part Approval Process (PPAP) qualification package. The Supplier is responsible for obtaining the latest revision of the applicable AIAG core tool reference manuals and forms

The AIAG Core Tools Manuals are:

- Advanced Product Quality Planning (APQP)
- Production Part Approval Process (PPAP)
- Potential Failure Mode and Effects Analysis (FMEA)
- Control Plan (CP)
- Measurement Systems Analysis (MSA)
- Statistical Process Control (SPC)

When PPAP is specified by the Tronair, the Supplier shall submit a “**Level 3**” PPAP package to Tronair which consists of the following items, unless otherwise directed. **See AIAG PPAP Manual, Table 4.2, for complete list of submission requirements for each level of PPAP.**

## 4.3 Pilot Fabrication

The Pilot Fabrication is a Supplier-produced production run of material for material qualification. The required quantity is specified in the Purchase Order. The material must be produced under volume-production conditions, including material, machines, tooling, processing parameters, cycle times, etc.

Any exceptions to the volume-production conditions must be approved in writing by the Supplier Quality Engineer, and recorded in the data package submitted to Tronair. The Supplier must coordinate the timing of the Pilot Fabrication so that the Supplier Quality Engineer (or designee) and other Tronair representatives can be present during the production run if required. Tronair must validate and verify the process before any product is shipped. (The Pilot Fabrication must be synchronized with Tronair volume demands.)

## 4.4 Sub- Supplier Certifications & Tests

For material and other specified requirements for which the Supplier does not have the equipment to test, the Supplier must obtain material certifications (or test reports) from their sub- Supplier(s) or other test agency.

The material certification reports must include the following information:

- Specification/Drawing number.
- Specified material/dimensional/physical requirements.
- Inspection/test results.
- Signature of the organization that performed the testing.

The reports must be traceable to the Supplier’s material through lot/heat/coil/ batch numbers or the like. A simple statement that the material meets the requirements is not acceptable.

## 4.5 Safety Data Sheets (SDS)

The Supplier must furnish Safety Data Sheets (SDSs) for all materials shipped to Tronair facilities if required.

## 5.0 MANUFACTURING CONTROL

### 5.1 Lot Control

A lot consists of product of one-part number and revision that are made at the same time, under the same processing conditions, from the same lot of raw materials.

Each container of material shipped to Tronair must be identified with the Supplier's lot number. Inspection records must be traceable to lot numbers. The primary purpose for identifying lots is to determine the scope of actions that must be taken when problems arise during further manufacturing or with customers.

The following are typical conditions that result in a change of lot numbers:

- Change of part number or revision.
- Change of part number or revision of components.
- Change to a different supplier.
- Interruption of continuous production (typically for more than a few hours).
- Repairs or modification to the tooling or equipment.
- Tooling changes (other than minor adjustment, or replacement of consumable tooling).
- Change to a different lot of raw materials.
- Change in shift.

### 5.2 Shelf-Life-Control

With each delivery of materials or products that have a limited or specified shelf life, the Supplier shall furnish data that shows:

- a) The cure or manufacture date,
- b) Expiration date or shelf life,
- c) Lot or batch number, and when applicable any special handling or storage requirements.

Unless otherwise specified by contract, for all shelf life limited materials or products delivered to Tronair, the remaining shelf life shall be a minimum of 75% of the total shelf life for the material.

### 5.3 Traceability

Traceability ties finished product back to the components used in the product. When traceability is specified, the traceability marking should be effective down to the individual component (i.e., lot code, batch, or serial should be identifiable at a customer rework station). Tronair will create and issue product specific traceability documents to suppliers when required.

### 5.4 Workmanship

When workmanship standards are not referenced on Tronair drawings or specifications, the Supplier is expected to follow industry-accepted standards for composites, plastics, metal-forming applications, printed circuit board assemblies, and electro-mechanical sub-assemblies. When in doubt, refer to the Tronair Supplier Quality Engineer (or designee) for clarification.

### 5.5 Foreign Object Damage / Foreign Object Debris Prevention (FOD)

FOD is any damage attributed to a foreign object that can be expressed in physical or economic terms which may or may not degrade the product's required safety and/or performance characteristics.

Supplier shall have provisions for the removal and prevention of Foreign Objects per AS9100 requirements. Suppliers shall maintain a FOD prevention program appropriate to their company and their product using National Aerospace Standard NAS 412 as a guideline.

### 5.6 Preventive Maintenance

The Supplier must maintain all facilities, manufacturing machines, tools, measuring devices, and other equipment in such a manner that the Supplier can support Tronair production requirements, and the quality of material, parts, or assemblies manufactured for Tronair are not degraded in any way. Preventive maintenance of equipment should be in line with manufacturers' instructions and recommendations. All process equipment preventive maintenance schedules need to be documented and records kept. All of the above maintenance requirements apply equally to any and all Tronair-supplied equipment and tooling. This customer-supplied equipment and tooling has an expected life that Tronair will identify. The Supplier is required to notify Tronair if any supplied equipment or tooling is expected to exceed its usable life within the following 12 months.

### 5.7 Counterfeit Parts

Supplier shall have policy or procedure to cover and apply requirements, practices and methods to mitigate risk of receiving and installing counterfeit electronic parts (reference SAE AS-5553 - Counterfeit Electronic Parts; Avoidance, Detection, Mitigation and Disposition). To prevent the inadvertent use of counterfeit parts and materials all fasteners and/or electrical, electronic and electro-mechanical parts delivered and/or used in the manufacture of deliverable products shall be from the Original Component Manufacturer (OCM)/ Original Equipment Manufacturer (OEM) or their franchised dealer or an authorized distributor chain. Parts shall not be used or reclaimed and misrepresented as new. Parts shall not be acquired from independent distributors or brokers unless specifically authorized in writing by the buyer. The supplier shall flow down this requirement to sub-tier suppliers.

### 5.8 Change Control Process

The Supplier shall have a process to ensure that relevant versions of applicable documents furnished by Tronair (as well as those specified of external origin) are available at points of use. The Supplier is responsible for the timely review, distribution and implementation of all Tronair engineering standards/specifications and changes in accordance with the schedule required.

The Supplier shall maintain a record of the date on which each change is implemented in production, the item number, revision, and serial/lot control number (when specified).

Implementation shall include updated documents.

### 5.9 Supplier Process Change Requests

The Supplier must request changes (prior to implementation) to a released part, process, drawing, or specification using a suitable form to relay all the information. Tronair may require the supplier to use Tronair's form when requesting changes. Tronair encourages that, before a change request is submitted to the Supplier Quality Engineer or Buyer (or Quality designee), the Supplier thoroughly reviews their FMEA and Control Plan to ensure that all process-related issues have been addressed and resolved.

The originator of a Supplier Process Change Request (SPCR) provides the following information:

- Drawing or part number and revision.
- Drawing or part title.
- Description of problem or recommended change.
- Reason for change or "rationale".
- Backup documentation or data supporting the change.
- Proposed effective date.
- Signature of originator.

The SPCR approval process is as follows:

- a) The Supplier submits the Supplier-initiated SPCR with the revised FMEA (if applicable) and Control Plan to the responsible Tronair Supplier Quality Engineer (or Quality designee) for evaluation of the following:
  - Supplier-demonstrated process capability and stability.
  - Comparison to First Article data.
  - Industry standards.
  - Supplier process engineering capabilities.
  - Supplier's adherence to Supplier Control Plans.
- b) After the Supplier Quality Engineer (or Quality designee) has completed the review, and concurs with the Supplier, the Supplier Quality Engineer (or Quality designee) documents the request on the appropriate Tronair form (Engineering Change, First Article, etc.).
- c) The request is processed through the appropriate Tronair personnel for approval.
- d) The Supplier Quality Engineer (or Quality designee) notifies the Supplier as to the final disposition of the SPCR and part submittal requirements and dates.
- e) Supplier to keep track of traceability for any changes.

### 5.10 Supplier Request for Deviation

A Supplier is never permitted to knowingly ship product that deviates from the print, specification limits, or design intent without prior written authorization from the Tronair Supplier Quality Engineer (or Quality designee). If such a condition exists, the Supplier may petition the Tronair Supplier Quality Engineer (or Quality designee) responsible for the item in question to allow shipment of the product under a signed written deviation from Tronair.

If directed by the Tronair Supplier Quality Engineer (or Quality designee), the Supplier must send samples of all nonconforming/to Tronair for evaluation. The cost of any testing required in determining the acceptability of the product will be charged to the Supplier.

## 5.11 Deviation Acceptance

Representatives from the applicable Tronair organizations will determine the item's acceptability and what actions (if any) are required beyond the deviation. The responsible Tronair Supplier Quality Engineer (or Quality designee) will communicate this to the Supplier. Tronair approval of a deviation is specific to the products for which it has been submitted and approved and shall not to be construed as a permanent engineering change.

## 5.12 Containment

In all cases, the Supplier must fully contain all product suspected of being nonconforming at the Supplier location and must begin work immediately to correct the condition. Failure to comply with the mutually-agreed upon closure date for the deviation, may result in the Supplier's rating being affected. Suspect Product must be traceable to the component level and possibly raw material level depending on the deviation.

In addition, nonconforming product may be returned to the Supplier at Supplier expense, or the Supplier may be required to sort any suspect product already shipped to Tronair sites or be charged back for the cost of sorting by Tronair. Any parts shipped to Tronair that have been approved for deviation shall be clearly identified as such externally on the box, container, or other packaging and on shipping documentation. Inside of each box shall contain a copy of the Tronair - approved deviation document.

## 5.13 CQI Processes (Continuous Quality Improvement)

The supplier should determine if any special processes are being performed and identify them. The determination should be based on the application section of the AIAG Standards for CQI-9 Heat Treat, CQI-11 Plating, CQI-12 Coating, CQI-15 Welding...etc., etc.

## 5.14 Test Equipment and Calibration Service Suppliers

Suppliers of measurement equipment, inspection, test or calibration services must be accredited to ISO/IEC 17025 by an accredited body of the ILAC MRA. Calibration reports provided must include the accreditation body logo. Tronair may ask for supplier's accreditation certificate to confirm compliance.

## 6.0 CONTROL OF NONCONFORMING MATERIAL AND PRODUCTS

Nonconforming material may not be sent to any Tronair or customer without a written deviation. For nonconforming products supplied to Tronair, including those that reach a Tronair customer, the Supplier must cover all reasonable costs to correct the nonconformance.

### 6.1 Inspection and Acceptance

- a) Tronair and its customer may inspect all product at reasonable times and places, including, when practicable, during manufacture and before shipment. Supplier shall provide all information, facilities, and assistance necessary for safe and convenient inspection without additional charge.
- b) No such inspection shall relieve Supplier of its obligations to furnish and warrant all supplied product in accordance with the requirements of this contract.
- c) Tronair 's final inspection and acceptance shall be at destination.
- d) If Supplier delivers non-conforming product, Tronair may, in addition to any other remedies available at law or at equity:
  - i. reject such product; or
  - ii. require Supplier, at Supplier's cost, to make all repairs, modifications, or replacements at the direction of Tronair necessary to enable such Work to comply in all respects with Subcontract requirements.

- iii. accept all or part of such product at an equitable price reduction following the lead of Tronair's Purchasing Representative.
  - iv. Any rejected product that is not dispositioned by the supplier within 90days of notification will be dispositioned solely by Tronair at the supplier's expense.
- e) Supplier shall not re-tender rejected work without disclosing the corrective action taken.

### **6.2 Control of Reworked Product**

Rework is defined as additional operations that are not part of the basic production process flow, which will bring product in full compliance with applicable drawings and specifications.

Instructions for rework, including re-inspection requirements, shall be accessible to and utilized by the Suppliers appropriate personnel. All rework shall be documented and accepted by Tronair Quality. On the other hand, repair is defined as using alternative manufacturing techniques, methods, materials, or processes.

### **6.3 Obsolescence**

Tronair requires that suppliers proactively notify the appropriate Tronair contact when product becomes obsolete so that suitable alternatives can be explored.

## **7.0 PACKAGING, LABELING**

Unless specified on the drawing, the Supplier must adequately plan for packaging designed to prevent product contamination, deterioration or loss and to eliminate shipping damage. Suppliers should provide expendable packaging or returnable containers, where appropriate, that provide for sufficient density and protection from any likely damage that may occur. Expendable materials and packaging must meet local and national standards for safe disposal and/or recycling.

Tronair encourages Supplier-initiated packaging improvements that have been validated by industry standard shipping tests (i.e., drop, vibration, crush). Tronair reserves the right to approve all packaging materials prior to their implementation.

- a) Unless otherwise specified, all Work is to be packed in accordance with good commercial practice.
- b) A complete packing list shall be enclosed with all shipments. Supplier shall mark containers or packages with necessary lifting, loading, and shipping information, including the Tronair item number, dates of shipment, and the names and addresses of consignor and consignee.
- c) Unless otherwise specified, delivery shall be FCA Destination, Incoterms 2010.
- d) Unless otherwise stated, part identification shall be done per its drawing note.

### **7.1 Shipping Containers & Pallets**

When palletizing a shipment, the pallets must, at a minimum, be two-way hardwood stringer pallets with bottom deck boards. Due to sizing, an exception may be requested, but that must be in writing and is subject to approval by Tronair.

One full layer of cartons on a pallet is sufficient volume to require that parts be palletized. Particularly sensitive, heavy or expensive shipments may require crating. Crating is subject to approval by Tronair. Pallet overhang is not allowed.



### 7.2 Securing Pallets

All shipping containers must be secured to pallets. Tronair requests that pallets be strapped by at least two bands lengthwise or two bands widthwise and by stretch or shrink wrap where applicable. Metal, polyester or nylon strapping is recommended. The weight of the load shall dictate the strapping material to use.

### 7.3 Container Contents

Whenever possible, only one-part number, and one lot will be contained on a pallet. Exceptions shall be subject to approval by Tronair.

### 7.4 International Shipment requirements

Special requirements for international shipments exist. Please follow the requirements for country of origin and destination. Any special requirements will be forwarded by Tronair Purchasing when Purchase Orders are placed. In case of doubt, contact your Tronair Purchasing Agent.

## 8.0 RECORD RETENTION

The Supplier shall retain quality records for a time period specified by its quality system or related reference documents. Upon request, the Supplier shall be capable of retrieving and delivering required records to Tronair within forty-eight hours from time of request by Tronair.

Unless otherwise specified by Tronair or regulation, the Supplier shall maintain all records that provide objective evidence of compliance for **a minimum of ten (10) years** after the last delivery of products and/or services on the contract include, but are not limited to, financial, proposal, procurement, specifications, production, inspection, test, quality, shipping and export, and certification records. At no additional cost, SELLER shall provide access to such records to the U.S. Government and/or Tronair upon request and in a timely manner.

Prior to discarding, transferring to another organization, or destruction of such records, the Supplier shall notify Tronair in writing and give Tronair the opportunity to gain possession of the records. These requirements are applicable to records generated by Supplier's sub-tier sources.

## 9.0 CORRECTIVE ACTION

To prevent a repeat occurrence, Tronair requires Suppliers to use a documented closed-loop corrective action system whenever an out-of-control condition is encountered in their manufacturing facility, or after the product has been shipped to Tronair.

### 9.1 Problem Solving Process

Suppliers should use a closed-loop corrective action process (preferably 8D reporting format) whenever a problem is encountered internally or upon notification from Tronair. For example:

Table 1. Problem Solving Process		
1	Describe the Problem	State what the problem “Is,” and “Is Not” with respect to what, where, when, who, how, and how many. Use quantitative terms.
2	Use a Team Approach	Consult and coordinate with relevant stakeholders.
3	Apply Containment	Immediately contain any suspect product, at all locations, to protect Tronair and its customers.
4	Root Cause Analysis	Identify potential causes, analyze causes for failure mode, validate root cause(s), and identify solutions.
5	Implement Permanent Corrective Action	Implement solution. Update applicable FMEA, control plan and work instructions.
6	Verify Effectiveness of Corrective Action	Use check sheets, auditing, sampling, and/or control plans to monitor process performance for effectiveness and sustained improvement.
7	Implement Preventive Action	Implement changes to prevent the same type of error from occurring in similar products/processes. Update applicable documents.
8	Management Support	Review, approve, and support. Provide resources and team recognition.

For additional guidance on problem solving methods, tools, training, and related references, refer to AIAG documents on Corrective Action.

### 9.2 DR Communication:

The Tronair Supplier Quality Engineer (or Quality designee) issues a Supplier Discrepancy Report (DR) via e-mail to the Supplier when nonconforming material, parts, or assemblies are found at any of the following:

- Receiving Inspection
- In production
- In test
- In audit
- By a Tronair customer



## 10.0 SUPPLIER MONITORING

Tronair continually monitors its Suppliers to ensure they continue to meet Tronair requirements, and to ensure that the Supplier continues to ship acceptable material, parts, or assemblies. This monitoring may consist of:

- A Quality System surveillance audit at the Supplier's facility.
- A normal Material Quality Verification of a lot.
- Source Inspection of product at the Supplier's facility.
- Review of Supplier-furnished Data Packages.

### 10.1 Supplier Audits

The Supplier must make their facility available for on-site process verification by the Tronair Supplier Quality Engineer (or designee) at any time without notice. The Supplier Quality Engineer (or designee) conducting the verification may be supported by the representatives from other Tronair organizations (i.e., Quality, Purchasing, Engineering, and Manufacturing).

### 10.2 Quality System Audit

Periodically, Tronair may audit the Supplier's Quality System. This may be a full or abbreviated documentation and on-site audit. The purpose of this audit is to evaluate any changes that may have occurred in the Supplier's quality system, and to assess the Supplier's continuing commitment to quality improvement.

### 10.3 QA & Production Inventory Control

Tronair expects its Suppliers to furnish material that conforms to all requirements. Tronair uses a C=0 Sampling Plan that rejects the lot when a single nonconforming part is found in the sample.

### 10.4 Source Inspection at the Supplier's Facility

Tronair and or its customers may inspect product at the Supplier's facility to detect potential problems prior to shipment. Tronair and or its customers may also inspect product at the Supplier's sub-Suppliers.

### 10.5 Supplier- Furnished Lot Documentation

Each Lot shipment must have a Certificate of Conformance. Tronair may require the Supplier to furnish inspection, test data, process performance, or other quality data with each shipment to ensure that the product meets Tronair's requirements.

### 10.6 Data Packages

When specified by the Supplier Quality Engineer (or Quality designee), the Supplier must submit via email monthly data packages to the Supplier Quality Engineer/or designee. Data packages typically consist of copies of 1st pass yield data, Pareto charts, control charts and Cpk & Ppk calculations for specified characteristics, or test results (ORT – Ongoing Reliability Testing).

Other data may be requested by the Supplier Quality Engineer or designee. Data must be submitted within 15 days of the end of the reporting period.

### 10.7 Discontinuation of Data Submission

Data submission from the Supplier can be discontinued based on previous data submissions showing that the Supplier consistently satisfies Tronair's requirements for process stability and process performance.

### 10.8 Delivery Performance

Delivery performance applies to all shipments to Tronair including samples, prototype and direct material parts.

Supplier responsibilities include:

- On Time Delivery
- Correct labeling in accordance to Tronair specifications.
- Proper packaging in accordance to Tronair specifications.

### 11.0 SUPPLIER PERFORMANCE

All Supplier performance will be reviewed monthly at minimum to determine the top low performing suppliers up to and including Quality, Cost and Delivery performance. A scorecard will be sent to those low performing suppliers with an expectation to correct all deficiencies.

### 12.0 ENVIRONMENTAL, HEALTH AND SAFETY

#### 12.1 ISO 14001

Suppliers must have an environmental system that conforms to the requirements set forth in ISO 14001. Tronair encourages Suppliers to certify/register the environmental management system.

#### 12.2 International Material Data System (IMDS)

Suppliers shall notify Tronair when a submission has been made in the International Material Data System (IMDS) and communicate the relevant ID number. Suppliers providing material shall submit a copy of the approved IMDS and may be required to resubmit based on change of revision level, mass, material or substance content. Suppliers providing only a process or service that does not add material are not required to submit IMDS.

#### 12.3 Waste Control

Any waste generated as a result of actions performed by Suppliers, Contractors and Supplier Representatives shall be controlled so as not to impact the environment inside the building as well as the natural environment. Appropriate containers shall be utilized and proper labeling attached, consistent with Local, State and Federal regulations.

#### 12.4 Safety

Suppliers should be aware of Tronair's commitment to have safe work processes and practices in the value streams that support product manufacturing. Tronair encourages their Suppliers to conform to the requirements set forth in OSHAS 18001. Additionally, suppliers shall provide a safe work environment, compliant to applicable regulation. Tronair reserves the right to validate compliance through a combination of supplier self-assessments and Tronair supplier safe work practice audits.

#### 12.5 Safety Data Sheet (SDS)

For Suppliers of actual or potential hazardous substances, a Safety Data Sheet (SDS) shall be provided to the Tronair Purchasing department prior to shipment of materials to Tronair.

## 13.0 CYBER-SECURITY

### 13.1 Information Security

The supplier shall take all appropriate measures to safe-guard all Tronair unclassified data, information and intellectual property from data breaches, intentional or unintentional. Tronair strongly encourages all suppliers to pursue compliance with the NIST 800-171 information security standard.

## 14.0 ACRONYMS & ABBREVIATIONS

The following terms, acronyms, abbreviations, symbols, and trademarks are used within this document.

### 14.1 Terminology

- Control Plan .....A detailed description of the Supplier’s proposed processing steps required to produce the part, and the controls that are put into place to control the quality at each step.
- Lot .....Product of one-part number and revision that are made at the same time, under the same processing conditions, from the same lot of raw materials.
- Pilot Fabrication .....A Supplier-produced production run of material used for material qualification.
- Process Capability .....A comparison of the inherent variability of a process output to specification limits under statistically stable conditions.
- Process Performance .....The comparison of the actual process variation to the specification limits.

### 14.2 Acronyms & Abbreviations

- BOM .....Bill of Material
- CAR .....Corrective Action Report
- CM .....Contract Manufacturer
- Cpk .....Process Capability
- e.g. ....For example
- i.e. ....That is
- LSL .....Lower specification limit
- MSDS .....Material Safety Data Sheets
- ORT .....Ongoing Reliability Testing
- OSHA .....Occupational Safety and Health Administration
- PFMEA ....Process Failure Mode and Effects Analysis
- PIC .....Production Inventory Control
- Ppk .....Process Performance
- QA .....Quality Assurance
- R&R .....Repeatability & Reproducibility
- SPC .....Statistical process control
- SPCR .....Supplier Process Change Request
- USL .....Upper specification limit Symbols

## 14.3 Symbols

- ™ .....Trademark ownership claimed
- Cpk .....Process capability
- Ppk .....Process performance
- DFAR .....Defense Federal Acquisition Requirements
- FAI .....First Article Inspection

Many of the designations used by manufacturers and sellers to distinguish their products are claimed as trademarks. Where those designations appear in this document, and Tronair was aware of a trademark claim, the designations have been printed in caps or initial caps.