

1. Purpose

1.1. This document establishes the minimum quality system requirements for suppliers to ensure that purchased products, materials, and services meet the required quality level for A.C.E. Tooling, Inc.

When A.C.E. Tooling, Inc. purchase order requirements differ from those defined herein, the purchase order requirements shall prevail. The order of precedence shall be:

- 1.1.1. Purchase order or contractual agreement (excluding this document);
- 1.1.2. Applicable purchaser's drawing;
- 1.1.3. Specifications referenced on drawings;
- 1.1.4. This document;
- 1.1.5. Specifications referenced in this document.

The requirements of this document are generic and are intended to be applicable to all organizations doing business with A.C.E. Tooling operations, regardless of the type, size, or product provided. Acceptance of a purchase order from A.C.E. Tooling binds the Supplier to this document, unless alternate conditions are agreed upon in writing.

1.2. **Notification of Changes:** The Supplier shall A.C.E. Tooling of changes that affect the operational proficiency of a facility; alterations in upper management or organization restructuring; alterations in the business name, location or ownership; processing capabilities, and any other pertinent changes that could hinder the capacity to conduct customary business activities or the quality of products and services. The Supplier shall immediately notify A.C.E. Tooling when the status of their required approvals and/or certifications, or the approvals or certifications of their sub-tiers have changed or been revoked.

1.3. **Confidentiality:** The supplier shall treat all product(s), material, and specification(s) received from A.C.E. Tooling as confidential in nature. Depending on the type of product or process, suppliers may be required to sign a nondisclosure agreement prior to doing business with A.C.E. Tooling. No A.C.E. Tooling or A.C.E. Tooling customer material is to be viewed or provided to subcontractors without prior written authorization from A.C.E. Tooling.

1.4. **Right of Entry:** A.C.E. Tooling, A.C.E. Tooling customers, and regulatory authorities reserve the right of access to all the applicable areas of the facility, at any level of the supply chain involved in the order, and to all applicable records, and to perform audits and/or inspections at the Supplier's and/or supplier's subcontractor's facility, when necessary to determine and verify the quality of contracted work, records, and product. All supplier material, records, routers, inspection, and test facilities shall be subject to review. Suppliers shall provide equipment, facility and necessary personnel for all on-site verifications of

External Provider Quality Flowdown

contract/purchase order compliance. (Also, see Right of Entry in 3.0 Supplier Control below.)

2. Supplier Quality Program Requirements

Supplier Type	Certification Required
Brokers / Traders, Component Suppliers, and Pass-Thru Distributors	ISO 9001 or satisfactory completion of Self-Assessment QF-006, at a minimum
Distributors	AS/EN/JISQ, ISO 9001 or satisfactory completion of Self-Assessment QF-006, at a minimum
Laboratory / Calibration Services	ISO/IEC 17025
Out-Plant Services	For Aerospace products: AS/EN/JISQ 9100 Non-Aerospace products: ISO 9001 or satisfactory completion of Self-Assessment QF-006, at a minimum
Quality Support Services	ISO 9001 or satisfactory completion of Self-Assessment QF-006, at a minimum
Raw Materials & Process Materials Suppliers	ISO 9001, or industry equivalent
Special Process Suppliers	For Aerospace products: AS/EN/JISQ 9100 or meet the requirements of SAE AS9003. Compliance to AS9003 is demonstrated by satisfactory audit to NADCAP AC7004; NADCAP accreditation in special process used Non-Aerospace products: ISO 9001 or satisfactory completion of Self-Assessment QF-006, at a minimum

2.1. Suppliers shall maintain a Quality System. The Supplier's quality system shall satisfy the requirements of the ISO9000 and/or the AS9100 standard, unless otherwise approved by A.C.E. Tooling. Any substantial changes to the Suppliers' quality system must be communicated to A.C.E. Tooling in writing.

2.2. Suppliers to A.C.E. Tooling must achieve Qualified Supplier status. Failure to achieve Qualified Supplier status may result in a cessation of the business relationship between A.C.E. Tooling and the Supplier. The Supplier shall meet the following criteria within an agreed upon time frame between the Supplier and A.C.E. Tooling:

2.2.1. Meet A.C.E. Tooling's quality requirements and achieve a 95% rating for the previous six months in OTD (On-time delivery) and Service Conformity. In the event that a 95% rating has not been achieved, Supplier will be placed on probationary status and monitored to determine if qualification will remain active.

2.2.2. Shall have evidence of ISO9000 or AS9100 compliance unless otherwise approved by A.C.E. Tooling.

2.2.3. A.C.E. Tooling reserves the right to revoke a Supplier's Qualified Supplier status at any time.

3. Supplier Control

- 3.1. The following additional Quality Requirements shall be required as applicable unless otherwise noted. If the Supplier is unable to meet any of the applicable requirements, the Supplier must notify A.C.E. Tooling before starting any work or fulfilling any Purchase Order.
- 3.2. Right of Entry – The supplier shall include right-of-entry provision in any subcontract. These provisions shall allow the supplier, its customers, and regulatory agencies to determine and verify the quality of work, records, and material at any place, including the plant of the subcontractor.
- 3.3. Special Processes – If indicated in the Purchase Order that a NADCAP approved Supplier is required, the Supplier must not perform any work or process any part if they are not NADCAP approved and listed in the PRI on-line QML (www.pri-network.org or www.eauditnet.com). Should a Supplier have a change to their NADCAP certification or accreditation, the Supplier MUST notify A.C.E. Tooling per the terms of the NADCAP requirements. If processing has been performed on parts where NADCAP certification is required and the processor is not NADCAP accredited or has lost their NADCAP accreditation, the Supplier will be responsible for the replacement costs of the parts including any expediting fees necessary for A.C.E. Tooling to meet our requirements to our customer(s).
- 3.4. Control of Confidential Information – The supplier shall establish nondisclosure agreements with subcontractors that receive or process A.C.E. Tooling product, blueprints or specifications, confidential proprietary technical data or other A.C.E. Tooling intellectual property prior to doing business with them.
- 3.5. Awareness – The supplier shall establish an awareness program with the view to ensuring all employees understand their responsibility to product & service conformity, product safety, & how ethical behavior affects these processes.

4. Quality Assurance Planning

- 4.1. Quality Planning – For new projects and/or programs with A.C.E. Tooling, the supplier shall engage in effective quality planning that embodies critical concepts of defect prevention and continuous improvement, i.e. contract review, resource planning, early change management, cost reduction, etc. Project/program management timelines shall be used to track critical project/program events, key dates, and assigned responsibilities.
- 4.2. Key Product and Process Characteristics – A key characteristic is an attribute or output of a product or manufacturing process that has a significant influence on product fit, performance, service life, or manufacturability. At a minimum, the supplier shall identify the characteristics as key for those products / processes

they supply and/or perform. These key characteristics shall be flowed down to sub-tier supplier(s). Suppliers shall identify these characteristics as key in the control plan.

4.3. Sampling Requirements – Ongoing product acceptance inspection shall be performed on specified characteristics per an agreed upon inspection plan with A.C.E. Tooling. This plan shall be defined in the detailed control plan. When using a sampling plan:

4.3.1. Inspection personnel shall be trained in the application of sampling methods.

4.3.2. All plans shall have a “zero acceptance” number.

4.3.3. The lot shall be rejected if a nonconformance is discovered in the sample. If a nonconformance is found in the sample, inspect all pieces in the lot for the nonconformance that had been noted and remove all nonconforming pieces from the lot.

4.3.4. Sampling plans shall be an industry approved C=0 plan or an alternate plan approved by A.C.E. Tooling.

4.3.5. Sampling inspection is not permitted for characteristics that are affected by repair and rework dispositions.

4.3.6. Sample(s) shall be randomly selected and representative of the population.

4.3.7. Additions or exchanges shall not be made to the original sample.

4.4. First Article Inspection – If required by the A.C.E. Tooling purchase order, the supplier shall submit a first article sample(s) with report for first build, revisions, and after a two (2) year lapse in production. AS9102 First Article Inspection (FAI) is the required format unless another format is agreed to in writing by the purchasing facility. The supplier shall furnish a first article sample(s) produced using the material, tooling, processes, and planning to be used for subsequent deliveries. The first article samples(s) shall be identified and submitted with a FAI report. The FAI report shall include the A.C.E. Tooling drawing with numbered characteristics corresponding to an itemized layout reflecting actual readings, and shall show compliance with all drawing characteristics, blueprint notes, and specifications. A photograph of the required part/item marking shall be included in the package. The method of measurement for dimensional characteristics shall be included with gauge identity. A photograph of the gauge(s) that were used may be requested. For subsequent revisions to the drawing, only those characteristics, notes, or specifications affected by the

revision are required to be reported. A copy of the raw material C of C (or C of A) is required for an initial build first article, and a first article submitted after a two-year lapse in production.

5. Process Control

- 5.1. Product or Service Acceptance – Product shall be inspected per the inspection plan or specification. Records that the product meets the defined requirements shall be maintained including the identity of the equipment or gage that was used to inspect each characteristic.
- 5.2. Control of Engineering Datasets Software – Suppliers to A.C.E. Tooling who receive CAD/CAM/CAI/CAE datasets or drawings from A.C.E. Tooling either in hardcopy or electronic format shall not alter or modify these datasets or drawings. Supplier must treat these datasets and drawings as A.C.E. Tooling confidential information and protect them as outlined in the non-disclosure agreement between A.C.E. Tooling and Supplier. The supplier shall have a process in place which includes Software Development and Validation Plan that are approved by the facility cognizant engineering organization and quality assurance representative. To control software that is used in design, manufacturing, inspection, test acceptance or calibration, which may have product impact.
- 5.3. Supplier(s) are not permitted to Update or Revise any Executable Program without notification and written approval from the cognizant engineering organization, designated information systems and quality systems representatives.
- 5.4. Calibration Traceability – For calibration Purchase Orders, all gauges and instruments must be calibrated using standards whose accuracies are traceable to the National Institute of Standards and Technology (NIST). All provided calibration certifications must specifically state this traceability. Tools and equipment used in the final acceptance of manufactured product shall be calibrated in accordance with ISO 17025 or ANSI Z540-1 or ISO 10012-1.
- 5.5. Product Serialization – If required by the product drawing and/or specification, product shall be serialized with unique serial numbers or number series for the product and shall be referenced on the C of C form.
- 5.6. Product Traceability - Traceability shall be maintained from receipt of raw material through finished product. Records and material shall be identified by lot number, material type, specification and applicable revision identifier or date of issue, heat number, serial number, etc., as required to maintain traceability. Records shall be maintained at the supplier's facility or a storage facility approved by A.C.E. Tooling, and shall be available upon request within two business days.

5.7. Change Management - In addition to change management requirements in the ACE Tooling product specification(s) applicable to the product being supplied, the external provider shall complete an External Supplier Change Request form and receive approval prior to making a change in the:

5.7.1. Process materials critical to the chemical and physical characteristics of the applicable product;

5.7.2. Manufacturing process that may affect the chemical or physical characteristics of the product;

5.7.3. Changes in manufacturing location, subcontractors, or significant process flow of the product;

5.7.4. Changes in product verification sampling plan and/or test methods

5.7.5. Change Request form shall be submitted to the Quality Coordinator. Please call or email to receive a change form.

6. Contamination Control

6.1. A Foreign Object Damage (FOD) program shall be introduced to all employees performing work directly or indirectly affecting conformity to A.C.E. Tooling product requirements. This training shall increase employee awareness on the causes and effects of FOD, along with emphasis on good work habits. This training shall be part of employee orientation, job activity assignment, and/or reassignment, and shall be reviewed on an annual basis to ensure employee-continued awareness.

6.2. Control of sub-suppliers – The supplier shall apply appropriate controls to its direct and sub-tier suppliers (external providers) to ensure that requirements are met.

6.3. Counterfeit Parts (as applicable) - Supplier shall maintain an effective Prevention and Control of Counterfeit Parts program using AS6174 and other applicable prevention and control of counterfeit parts program standard/ specifications as information and guidelines. If potential latent counterfeit parts are determined, a written notice to ACE Tooling Quality Coordinator is required within 24 hours of discovery.

7. Inspection and Testing

7.1. Eye Examinations – Employees performing visual inspection and/or other product acceptance activities that require visual acuity shall receive eye examinations, including visual acuity and color vision, as applicable, administered by medically qualified personnel or performed by personnel who have been trained by a medical professional, according to the following:

7.1.1. Intervals shall not exceed one year.

7.1.2. Individuals must meet the minimum standards in one eye, either corrected or uncorrected; ensuring that the optical aids used during the vision assessment are also used during product verification / inspection activities.

7.1.3. Color perception testing is required one time only. Individuals shall be capable of adequately distinguishing and differentiating colors used in the method for which certification is required, the process being performed, or inspection activity.

7.1.4. Records of vision testing shall be retained for the period that the relevant employee remains within the supplier’s organization, plus three (3) years.

Individuals performing....	Shall be compliant with....
Visual Inspection (i.e. calibration, non-weld, in-process, layout, dimensional)	Near vision requirements of Jaeger 1 @ 12 to 14 inches.
Visual Inspection on Welds	American Welding Society Standard (AWS) D17.1
Nondestructive Testing (NDT)	Aerospace Industries Association / National Aerospace Standard AIA/NAS 410
NOTE: Vision tests may be substituted for the options listed above providing the equivalence is verified and documented by a licensed optometrist.	

8. Certificates

8.1. All product, material, services and processes supplied or provided to ACE Tooling shall be accompanied by an appropriate Certificate of Conformance (C of C), Certificate of Analysis (C of A), Certificate of Test or Certificate of Calibration, etc. The supplier shall be responsible for maintaining and supplying this certification documentation as objective evidence of meeting purchase order and drawing/specification requirements. The supplier shall provide an appropriate certificate for each lot (shipment) of product supplied to A.C.E. Tooling.

8.1.1. Certificates shall contain at a minimum: (as applicable)

8.1.1.1. Data defined in the applicable A.C.E. Tooling technical specification

- 8.1.1.2. Supplier's name, address and, if applicable, supplier's product identification
 - 8.1.1.3. The A.C.E. Tooling purchase order number
 - 8.1.1.4. The A.C.E. Tooling product identification and drawing or specification with revision level
 - 8.1.1.5. Quantity supplied/shipped
 - 8.1.1.6. Statement that product, material, service, or process conforms to the purchase order requirements
 - 8.1.1.7. Authorized signature and date of quality representative or company official with title listed
 - 8.1.1.8. If applicable serial numbers, lot number and/or batch number.
 - 8.1.1.9. If outsourced processes are performed on A.C.E. Tooling product, the subcontractor's name, location, and the specific process(s) that were subcontracted.
- 8.2. Shelf Life – For limited shelf life (age/environmental sensitive materials) items, the certificate shall contain the specification number, if applicable, lot or batch number of the material, date of manufacture and/or cure date (month/year or quarter/year), the shelf life expiration date and any environmental storage conditions that apply shall be stated on the certificate as well as the container. Materials shall not be shipped with less than 80% of the required remaining shelf life to A.C.E. Tooling facility unless approved in writing by the A.C.E. Tooling facility or as otherwise stipulated in the Purchase Order.
- 8.3. Chemical and Metallurgical Analysis – For Chemical and Metallurgical Analysis, the material certification (i.e., Certificate of Analysis) shall contain the specification number of the material being supplied as it appears on the purchase order, revision letter, lot code of heat number, and shelf life if applicable. Actual test results that are required by the specification, such as mechanical test data, chemical properties, hardness, etc., shall be included on the certification.
- 8.4. Distributors – All material/product supplied by a distributor requires a copy of the sources certification to be supplied with each lot/shipment. If additional verification testing is performed by the distributor, copies of both certifications are required and shall accompany each lot/shipment.
- 8.5. Raw Materials – For raw materials a certification shall be provided with the shipment stating the material type, the material heat/lot number, and the quantity received as it appears on the purchase order. Material substitutions are prohibited without written approval by A.C.E. Tooling.
- 8.6. Catalog Items – For standard “off-the-shelf” (catalog) items, a packing list is acceptable. A reference to the A.C.E. Tooling purchase order number, manufacturer name and product number (no revision level required) is required for each item listed.

9. Shipping, Packaging, & Delivery

- 9.1. Supplier must assure that all product shipped is adequately packed and/or packaged to prevent damage, contamination, the introduction of Foreign Object Debris (FOD) and/or deterioration. Unless otherwise specified on the purchase order, seller must use best commercial practices (such as described under ASTM-D-3951) to prevent damage, contamination and/or deterioration to all products during transit. No loose fill material (i.e. foam peanuts) shall be used in the packaging of products.
- 9.2. Multiple Lots – Multiple lots shall be bagged separately and identified. No comingling of lots is allowed under any condition.
- 9.3. Delivery – The supplier shall ensure that the accompanying shipping documents are protected from damage, i.e. enclosed in a weather-protected envelope and marked "Shipping Documents" or facsimile.

10. Records and Retention

- 10.1. Part, material, product and service related tooling records, purchase orders, and amendments are to be maintained for the length of time that the contract is active plus one calendar year. Product related manufacturing and inspection records are required to be maintained for 10 years unless otherwise specified in the contract. Records shall be maintained in an appropriate environment and shall be available upon request within two business days. Quality system administrative records, such as internal audits and nonconformance(s), shall be retained for seven years unless otherwise stated in the contract. External suppliers that generate X-Ray, N-Ray and other NDT records on product purchased by APP, are required to provide those records to the procuring APP facility with shipment of the product.

11. Nonconforming Material

- 11.1. Material that departs from drawing, specification, or maintenance requirements shall be properly identified, segregated, and controlled to prevent unauthorized use or delivery to A.C.E. Tooling or other designated destinations.
- 11.2. Material Review Authority – The Supplier shall not use dispositions of 'use as is' or 'repair' without written approval by A.C.E. Tooling's Quality Manager. Action shall not be taken on any nonconformance which could affect safety of personnel; adversely affect performance durability, interchangeability or reliability, materially affect weight; or otherwise result in failure of the end article

to perform its intended function. All doubtful cases shall be submitted to A.C.E. Tooling for review.

- 11.3. Containment of Nonconforming Material(s) – When a nonconformance is discovered or the Supplier is notified of a discrepancy, the Supplier shall take immediate action to determine if the condition exists on any other work in process, in Stores at the Supplier’s facility, or in prior shipments. Containment action shall be taken and documented prior to the next shipment of the part number involved. Product identified on a Partial Shipment as source inspection accepted shall be re-inspected prior to shipment. The Supplier shall not wait for the discrepant product to be returned to begin an investigation.

12. Corrective Action

- 12.1. If nonconforming product escapes to A.C.E. Tooling, the supplier shall take corrective action immediately regardless of where the nonconformance was identified, i.e., the supplier’s facility, at A.C.E. Tooling, in transit, at an A.C.E. Tooling customer, etc. This is to ensure nonconforming product is contained, root cause of the problem is identified and proper actions are put in place to prevent the recurrence in the process. If nonconforming product has been identified, the supplier shall place their operations on immediate containment to protect A.C.E. Tooling from receiving additional defective material. Incidents of defective material may also require supplier containment at the A.C.E. Tooling facility. In such cases, the supplier shall be responsible for performing the sort inspection on-site (if possible). Some supplier related problems may require the use of a 3rd party source inspection at the cost of the supplier to ensure containment of the problem.

- 12.2. When performing corrective action investigation, at a minimum, the supplier shall perform the following actions:

- 12.2.1. Identify the problem
- 12.2.2. Quarantine all suspect material, including raw material
- 12.2.3. Establish a clear break point for the nonconforming material
- 12.2.4. Review all suspect product to determine a disposition
- 12.2.5. Identify root cause of the nonconformance
- 12.2.6. Implement appropriate corrective actions
- 12.2.7. Validate the effectiveness of the implemented corrective actions
- 12.2.8. Update all appropriate documents to include the new controls implemented
- 12.2.9. Apply corrective actions to all like and similar processes to prevent a recurrence of the issue.

- 12.3. Corrective action plans shall be reviewed with A.C.E. Tooling. Initial Supplier response shall be submitted in writing within 48 hours of problem notification to A.C.E. Tooling. Suppliers shall be measured on the timeliness of their responses. An adequate corrective action plan shall be submitted to A.C.E. Tooling within 10 business days, including responsibilities and planned completion dates. A.C.E. Tooling shall track completion of the action plan with the supplier.
- 12.4. If required, the 3rd party inspection shall remain in place until the root cause of the problem has been identified and A.C.E. Tooling is satisfied that the corrective action has been implemented and verified that it eliminates the problem.
- 12.5. Preventive actions shall be implemented to protect APP from receiving nonconforming product. If an escape to an APP facility is identified, the supplier shall not only correct the issue as identified above and provide APP with acceptable product, but also identify the deficiency in the quality planning process that allowed the nonconformance to occur and escape to A.C.E. Tooling.

13. General


- 13.1. Supplier Performance Reviews – Active and approved organizations that supply critical product, materials and services that directly influence the quality of A.C.E. Tooling manufactured products are subject to quarterly or annual performance reviews. Organizations with less than adequate performance will be required to take immediate corrective and preventive action. A failure to adequately address A.C.E. Tooling performance issues in a timely manner may result in disqualification and loss of business.
- 13.2. Preference for Domestic Specialty Materials – Supplier shall agree to comply with Defense Federal Acquisition Regulation Supplement DFAR 252.225-7014 and Alternate I, Preference for Domestic Specialty Metals when this clause is specified in the purchase order. Use of foreign specialty metals may only be used with written authorization from A.C.E. Tooling. Material substitutions are prohibited without formal approval by A.C.E. Tooling.
- 13.3. SDS –Safety Data Sheets are required for all raw materials and chemicals.

13.4. Product Safety – Suppliers shall control the processes to assure the product safety, when the product can perform to its designed or intended purpose without causing unacceptable risk of harm to persons or damage to property.

Record of Revision

Revision	Date	Description of Changes
A	02/23/2017	New Document
B	11/29/2017	Revised to add Table in s/c 2.0 & added s/c 13.4
C	03/21/2018	Revised header, added s/c 5.7, 6.2, 6.3, update s/c 13.3 to reflect SDS.
D	04/11/2018	Addition of s/c 3.5, Awareness to conform to new requirements of AS9100.

Approval

Written By Matthew Pollack Draper NDT Services & Consulting, LLC 	Reviewed by	Approved by
Date: 02/23/2017	Date:	Date: