



Aircraft Wheel and Brake, LLC

Supplier Quality Requirements Manual

May 2025

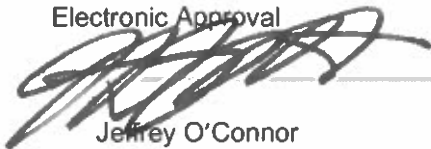
Supplier Quality Requirements Manual

REVISION HISTORY

Revision	Date	Description of Changes
NC	Apr-24	Initial Release.
A	May-25	Updated document for change from Aircraft Wheel and Brake by Kaman to Aircraft Wheel and Brake, LLC DBA Cleveland Wheel & Brake Systems (CWBS)

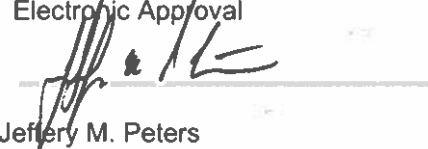
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Supplier Quality Requirements Manual

Table of Contents

AIRCRAFT WHEEL AND BRAKE, LLC (AWB)	5
INTRODUCTION	6
1.0 QUALITY SYSTEM REQUIREMENTS	7
1.1 Quality Manual	8
1.2 Aerospace Requirements	8
2.0 SUPPLIER APPROVAL PROCESS	9
2.1 Supplier Assessment	9
3.0 GENERAL REQUIREMENTS	11
3.1 Compliance to Contractual Requirements	11
3.2 AWB Designated Sources	11
3.3 Control of Sub-Tier Suppliers	11
3.4 Control and Release of CWBS Furnished Documents	12
3.5 E-Business Requirements	12
3.6 Electronic Documents	12
3.7 Federal Aviation Administration Regulations	13
3.8 Business Continuity	13
3.9 Facility Changes	13
3.10 Unauthorized Product Repairs & Salvage	14
3.11 Unauthorized Product Changes or Substitutions	14
3.12 Use of Non-Conventional Manufacturing Methods	14
3.13 Altering Data on Documents	15
3.14 Contract Changes & Their Effectivity	15
4.0 PRODUCT QUALIFICATION	16
4.1 First Article Inspection	16
4.2 Production Part Approval Process	18
5.0 PROCESS CONTROL	21
5.1 Special Characteristics	21
5.2 Error-Proofing	21
5.3 Work Instructions	22
5.4 Control of Monitoring and Measuring Devices	22
5.5 Statistical Process Control	22
5.6 Preventive Maintenance	22
5.7 Source Inspection	22
5.8 Traceability	23
5.9 Shelf-Life Control	23

Supplier Quality Requirements Manual

5.10 Sampling Inspection	24
5.11 Operator Self-Verification	24
5.12 Raw Material Lot Control	24
5.13 Electrostatic Discharge Control.....	25
5.14 Counterfeit Parts.....	25
5.15 Foreign Objects / Foreign Debris.....	25
6.0 CHANGE CONTROL.....	26
6.1 Change Control Process	26
6.2 Change Control Process	26
7.0 CONTROL OF NONCONFORMANCE PRODUCT.....	28
7.1 Supplier Request for Nonconformance Deviation.....	28
7.2 Control of Reworked Product	28
7.3 Supplier Containment	29
7.4 Recovery of Costs for Non-Confirming Material	29
8.0 PACKAGING, LABELING, DELIVERY & RECORD RETENTION	30
8.1 Preservation.....	30
8.2 Packaging.....	30
8.3 Labeling.....	30
8.4 Delivery.....	30
8.5 Record Retention	31
9.0 CONTINUAL IMPROVEMENT	32
9.1 Preservation.....	32
9.2 Corrective Action Request	32
10.0 PURCHASE PRODUCT VERIFICATION	34
10.1 Supplier Self-Verification Requirements	34
10.2 Supplier Self-Verification Suspension	34
10.3 Dock to Stock	35
10.4 Delegated Supplier Quality Representative (DSQR)	35
10.5 Source Inspection.....	36
10.6 Government Source Inspection (GSI).....	36
11.0 SUPPLIER PERFORMANCE.....	37
11.1 Performance Measures.....	37
11.2 Supplier Development Program.....	39
APPLICABLE DOCUMENTS	40
FORMS & EXHIBITS	42
APPENDIX P9112 - PURCHASE ORDER CLAUSES	

Supplier Quality Requirements Manual

AIRCRAFT WHEEL AND BRAKE, LLC (AWB)

Overview Aircraft Wheel and Brake, LLC (AWB) is the world's leading diversified manufacturer of motion and control technologies and systems, providing precision-engineered solutions for a wide variety of commercial, mobile, industrial, life science, and aerospace markets. For over 85 years, AWB has developed a recognized identity around its 'Cleveland' brand of wheels and brakes. To reinvigorate and strengthen this identity, AWB will be doing business under the registered trade name of 'Cleveland Wheel and Brake Systems' (CWBS).

Vision To be a preferred and socially responsible partner enabling innovative wheel and braking solutions

Mission To exceed customer expectations by leveraging engagement and core competencies through innovative products and processes. This means meeting customer requirements for product quality, service, and on time delivery. It also means anticipating our customer's future needs and expectations for new products and services with innovative designs and systems. CWBS aims to accomplish these objectives with strong leadership, a highly capable and empowered workforce, and partnering with best-in-class Suppliers.

Organization Structure

Web Page – Additional information about CWBS can be found at www.aircraftwheelandbrake.com.

Aircraft Wheel and Brake, LLC

DBA Cleveland Wheel & Brake Systems (CWBS)

CWBS Repair Station

CWBS Manufacturing

CWBS Quality

CWBS Purchasing

Supplier Quality Requirements Manual

INTRODUCTION

Our Suppliers CWBS 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 the requirements of CWBS contracts, applicable specifications, and the quality management requirements outlined herein.

Purpose CWBS serves diverse market sectors in aerospace. The purpose of this manual is to inform CWBS Suppliers of the core expectations we have regarding the Suppliers' quality management systems, design requirements, and manufacturing process controls required for the purpose of doing business with CWBS. This manual describes what CWBS expects its Suppliers to do to ensure that all CWBS requirements and expectations are met.

Scope This manual applies to all Suppliers providing CWBS or any of its affiliates throughout the world with materials, products, processing, and related services, including intra-company Suppliers, and when applicable, to Supplier sub-tier sources. The general requirements outlined herein do not supersede conflicting requirements in the CWBS contract, or drawing, including applicable engineering specifications and process specifications, or applicable long-term agreement(s).

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 CWBS Buyer.

1.0 QUALITY SYSTEM REQUIREMENTS

Suppliers shall maintain a Quality Management System (QMS) suitable to the products and services provided to CWBS that is certified by an accredited third-party certification body to the latest version of one or more of the following, as defined by CWBS purchasing.

- ISO 9001 - Quality Management System Requirements¹
- AS/EN/JISQ9100 - Quality Management System Requirements (Aerospace)²
- See the following sources for a listing of accredited certification bodies:

¹The U.S. accreditation body for management systems can be found at ANSI-ASQ National Accreditation Board, <http://www.anab.org>. For a list of Accreditation Boards from other countries, refer to the International Accreditation Forum at <http://www.iaf.nu>.

²For AS9100, see SAE OASIS database at <http://www.sae.org/iaqg/>

In the absence of third-party certification, depending on the product, its application, value, and criticality, the CWBS Buyer and Quality representative may authorize the acceptance of other evidence of compliance. This may include second-party (CWBS) audit or first-party (self) assessment to the applicable criteria above, or to a set of alternative basic quality requirements (such as those described in a 'CWBS Supplier Quality Assessment' checklist).

CWBS and AS9100 Plant Suppliers shall comply with the following requirements. CWBS suppliers are required to be certified to AS9100, AS9110, or AS9120 as applicable:

- Distributors/Stockists - shall establish and maintain a QMS that is certified to AS9120/EN9120, AS/EN/JISQ9100 or ISO 9001
- Calibration Suppliers - shall establish and maintain a measurement management system that is in compliance with either:
 - ANSI/NCSL Z540.3 - Calibration Laboratories and Measuring & Test Equipment Requirements,
 - ISO 10012 - Requirements for Measurement Processes and Measuring Equipment, or
 - ISO/IEC 17025 – General requirements for the competence of testing and calibration laboratories
- Special Process Suppliers - shall establish and maintain a QMS that is in certified to AS/EN/JISQ9100, ISO 9001, or PRI/Nadcap AC7004.
- Software Suppliers (Deliverable Software Only) - shall establish and maintain a QMS that is in compliance with RTCA/DO-178, AS9115 and the Software Engineering Institute (SEI) Capability Maturity Model (CMM) guidelines of Level 3, prior to CWBS approval.
- Commercial-Off-The-Shelf Suppliers (COTS) - Suppliers that provide commercial products shall establish a QMS certified to ISO 9001, or equivalent.
- Aerospace Maintenance organizations – shall establish and maintain a QMS that is certified to AS9110.

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- All Other Suppliers - shall establish and maintain QMS that is certified to AS/EN/JISQ9100, and a measurement management system which meets the requirements of either ANSI/NCSL Z540.3, ISO 10012, or ISO/IEC 17025.

Suppliers registered in accordance with AS9104 shall be listed in the SAE OASIS database.

1.1 Quality Manual

Upon request, the Supplier shall furnish CWBS with a copy of the Supplier's QMS Manual, which is to be current and approved by the Supplier's management, including or making reference to related documents. The QMS documentation shall include

Supplier's statements of a quality policy and quality objectives. Top management shall define quality objectives and measurements which should address customer expectations and be achievable within a defined period of time. The Supplier shall notify the CWBS Buyer of any substantive changes to the Supplier's QMS or personnel within 30 days.

1.1 CWBS and AS 9100 Plants require all Suppliers to provide:

- Access to the suppliers OASIS Tier 2 data (e.g., information and results of audits, assessments, nonconformance's, corrective action, scoring, and suspensions) upon request, unless justification can be provided (e.g., competition, confidentiality, conflict of interest).
- Immediate notification in the event certification has been lost.
- Notification of significant changes within the supplier's organization (e.g., changes related to address, ownership, key management, number of employees, scope of operations).

2.0 SUPPLIER APPROVAL PROCESS

CWBS requires all Suppliers to be approved prior to the issuance of contracts. All Suppliers must be approved by CWBS, regardless of approvals by customers or other entities. For the most part, all CWBS Suppliers are Aerospace suppliers. Requirements for Non-Aerospace suppliers will only apply when determined appropriate by CWBS.

2.1 Supplier Assessment

The Supplier Approval Process (SAP) may include the following:

- **Supplier Initial Assessment**
CWBS may request the Supplier to provide a copy of its QMS certificate and/or complete a self-assessment of its business and QMS and capabilities (i.e., quality, delivery, technology, cost, and continual improvement objectives).

Any special processes will require assessment as part of the SAP. Special processes and assessments are defined as outlined in the following:

- Aerospace suppliers: Nadcap
 - Non-Aerospace suppliers: AIAG PPAP Manual.
- **Documentation Audit**
In those cases where a Supplier's QMS has not been certified by an accredited certification body, CWBS may request a copy of the Supplier's Quality Manual and supporting procedures (and perhaps internal audit reports) to determine if the Supplier's QMS meets CWBS requirements.
- **On-Site Assessment**
Regardless of a supplier's QMS certification status, CWBS, and/or its customers, may elect to conduct on-site assessments of a supplier. As a result, findings may be issued. It is the supplier's responsibility to correct all findings in an agreed upon timeframe.

These on-site assessments could include evaluations of:

- **Product or Process Capability** – to determine the Supplier's ability to meet CWBS's requirements for complex and/or critical products/processes.
- **QMS** – to determine whether the Supplier's QMS meets one or more of the applicable standards and is functioning effectively; may occur in conjunction with other on-site assessments. On-site QMS assessments by CWBS should occur prior to approval of Suppliers with non-certified QMS.
- **Business and Manufacturing Operations** – to determine whether the Supplier has the financial resources, production capacity, and other business resources needed to fulfill CWBS volume production needs and continuity of supply.

- Continual Improvement Initiative – 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, CWBS-specified computer-aided design language/format, 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 CWBS conform to all applicable CWBS requirements.

All new CWBS Calibration Suppliers require an on-site assessment by CWBS or its representatives for compliance to ANSI/NCSL Z540-3 prior to approval.

All new CWBS special process Suppliers require on-site assessment by CWBS, including personnel approved by Materials & Processes, prior to a QMS audit by CWBS prior to addition of the Supplier to the Approved Process Suppliers List (APSL).

CWBS requires all Suppliers to be approved and listed on CWBS Approved Suppliers List (ASL) or the APSL, prior to the issuance of contracts to the Supplier.

CWBS requires all Special Process Suppliers to be PRI/Nadcap certified for the applicable process prior to being listed on the APSL. All special processing performed by suppliers of 'build to print' components shall be performed by a Nadcap approved supplier.

Site assessments may occur at any time per CWBSs discretion.

3.0 GENERAL REQUIREMENTS

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

3.1 Compliance to Contractual Requirements

Upon accepting a CWBS contract, the Supplier is responsible for compliance to all contract (e.g., engineering drawing, specification, purchase order) requirements. All documents, drawings and specifications, regardless of origin, are applicable to the Supplier when specified in the contract or documents referenced in the contract, and are required to be used at all levels of the supply chain. Unless otherwise specified in the contract, the document revision in effect on the date of issue of the contract applies to the contract. Neither audit, surveillance, inspection or tests made by CWBS, representatives of CWBS or its customer(s), at Supplier's facilities, at any sub-tier facilities, or upon receipt at CWBS, relieves the Supplier of the responsibility to furnish acceptable products or services that conform to all contract requirements; nor does it preclude subsequent rejection by CWBS or its customers.

3.2 Designated Sources

Where specified by contract, the Supplier shall purchase products, materials or services from CWBS-designated sources. However, the Supplier is responsible to ensure that items procured from such sources meet all applicable technical and quality requirements.

3.3 Control of Sub-Tier Suppliers

The Supplier, as the recipient of the contract, is responsible for meeting all requirements, including work performed by the Supplier's sub-tier Suppliers (also known as Sub-Suppliers or subcontract Suppliers). When the Supplier uses sub-tier sources to perform work on products and/or services scheduled for delivery to CWBS, the Supplier shall include (flow-down) on contracts, to its sub-tier sources, all of the applicable technical and quality requirements contained in the CWBS contract, including quality system requirements, regulatory requirements, the use of CWBS designated sources, and the requirement to document and control 'key characteristics' and/or 'key processes,' and to furnish certifications and test reports as required. CWBS and its customers reserve the right-of-entry to suppliers and all sub-tier supplier facilities, subject to proprietary considerations.

- Special Process Suppliers

Unless otherwise specified by contract, the Supplier shall only use special process sources that are approved by CWBS and listed on the APSL. This requirement applies to Suppliers who perform special processing such as heat treating, plating, etc., as part of their internal operations. The Supplier shall flow-down this requirement to its sub-tier sources. NOTE: Source Control Design items are excluded as they fall under the design authority QMS.

- Risk Management

All suppliers are expected to have identified all internal and external interested parties along with any significant risks that may impact the supplier's ability to meet the expectations of the interested parties (see ISO 9001:2015)

The Supplier shall establish a risk management program in accordance with the guidelines established by SAE ARP9134 (or equivalent) to effectively assess those elements from all aspects of the business that could affect the quality of the products and/or services scheduled for delivery to CWBS. A copy of the Supplier's risk management program shall be furnished to the CWBS Buyer upon request.

3.4 Control and Release of CWBS Furnished Documents

Documents furnished by CWBS to the Supplier are furnished solely for the purpose of doing business with CWBS. Proprietary documents may be furnished to the Supplier in hard copy, electronic or other media. The Supplier is responsible for controlling and maintaining such documents to preclude improper use, loss, damage, alteration and/or deterioration.

Unless authorized by the CWBS Buyer in writing, the Supplier may not transmit or furnish any CWBS furnished documents, or copies of such documents, to anyone outside the Supplier's business organization except to a sub-tier source used by the Supplier for performance of work on the CWBS contract. The Supplier shall return to CWBS, or purge electronic copies of, all proprietary documents with the last delivery of products or services on the contract. CWBS may request the Supplier to furnish objective evidence or certification that proprietary documents have been purged. The Supplier shall flow down this requirement to all sub-tier sources, when such sources will be in receipt of CWBS proprietary documents during performance of work for the Supplier.

3.5 E-Business Requirements

CWBS currently uses and is continually expanding the use of electronic business tools to facilitate day-to-day activities using electronic linkages between CWBS internal operations as well as with CWBS Suppliers and customers. Contracts, delivery schedules, notification of product rejections, requests for corrective action, etc. may be transmitted to Suppliers electronically, and CWBS expects that Suppliers will adopt these tools to reduce errors and improve efficiency. For a list of e-business requirements and opportunities contact the CWBS Buyer.

3.6 Electronic Documents

The accuracy and authenticity of electronic documents and forms submitted to CWBS is of highest importance. The following rules apply and may be subject to review by CWBS at Suppliers facilities:

- The issue of electronic documents and application of electronic signatures must be under the direct control of the individual whose name appears on the electronic document
- The electronic signatures may only be applied at the place where the individual is located and the individual must have direct access and responsibility for the products or services described in the electronic document.

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- The application of the electronic signature certifies that the signature (individual) represents an authorized company official.

The use of electronic forms and signatures must be described in and governed by Supplier's documented procedures.

3.7 Federal Aviation Administration (FAA) Regulations

The following requirements apply when the contract is for products/services under the authority of regulatory agencies (reference www.faa.gov):

- **FAA Certification**
When specified on the contract, the Supplier shall submit a completed FAA Form 8130-3, executed in accordance with the requirements of FAA Order 8130.21, for all work performed.
- **Parts Manufacturer Approval (PMA) Certification**
When the contract requires the Supplier to furnish replacement or modification parts, such parts shall be manufactured and certified in accordance with Title 14 CFR Part 21, Subpart K, §21.303. The parts shall be marked in accordance with Title 14 CFR 45, Subpart B, § 45.15 and submitted to CWBS with FAA Form 8130-3 executed in accordance with FAA Order 8130.21
- **Anti-Drug and Alcohol Misuse Prevention Program**
All Supplier employees (including any Supplier's sub-tier employees) performing maintenance or inspection of products scheduled for delivery to CWBS shall be included and part of a FAA approved Anti-Drug and Alcohol Misuse Prevention Program. The requirement applies both to pre-employment and random testing of current employees in accordance with the requirements of 14 CFR Part 121, Appendix "I" and Appendix "J". Evidence of compliance to this requirement shall be made available to CWBS upon request.

Exceptions. This anti-drug and alcohol requirement does not apply to employees performing safety sensitive functions outside the United States territory and persons contracted to perform safety sensitive functions for an employer who is located outside the United States territory.

3.8 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 CWBS requirements in the event of significant utility interruptions, labor shortages, equipment failure and field returns.

3.9 Facility Changes

During performance on the Contract, the Supplier shall give CWBS written notice prior to:

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- relocating any production, inspection or processing facilities;
 - transferring work between different facilities
 - initiating any changes in the source of major components procured by the Supplier and designated for use in or for installation on products scheduled for delivery to CWBS
 - making any other changes which may affect product quality, reliability or integrity.

Such changes are subject to approval/disapproval by CWBS prior to shipment of affected products. A change in ownership or a change in the individual designated as the management representative with respect to the Suppliers Quality/Inspection System shall be construed as a facility change and requires the Supplier to notify CWBS within 30 days.

The Supplier shall establish an internal procedure for formal notification to CWBS that includes; risk assessment/mitigation, transfer plan, demonstration of capacity and demonstrate the existence of buffer stock to mitigate risks to on-time delivery and quality.

3.10 Unauthorized Product Repairs & Salvage

The Supplier may not perform any repairs such as welding, brazing, soldering, plugging, peening, bushing, or, use of paints, adhesives or plating, or use any standard or other repair practice or method, on products damaged or found to be discrepant during fabrication or processing, or, on defects in castings or forgings, unless such repairs are specifically permitted by the applicable drawing or specification, or are specifically authorized by CWBS in writing for each occurrence. Unless specifically authorized by CWBS, this prohibition also applies to reworking products by removing plating (stripping) and re-plating. In those cases, where CWBS authorized product repair, salvage or stripping has been accomplished, the Supplier shall include on the packing list/shipper or on a separate attached document a list of the products that have been subjected to such CWBS approved repair, salvage or stripping, the method(s) used for the salvage or repair, and the nonconformance document number authorizing the salvage or repair.

3.11 Unauthorized Product Changes or Substitutions

The Supplier may not make any changes or substitutions to any products or services required by the Contract, drawing, specification, standard, or other applicable document without prior written authorization by CWBS. Authorization may be contingent on CWBS conducting an on-site review of the proposed product or service changes at the Supplier's facilities, or the facilities of the Supplier's sub-tier sources.

3.12 Use of Non-Conventional Manufacturing Methods

Unless required by the drawing, specification, or Contract, the Supplier may not use Electrical Discharge Machining (EDM), Electro Chemical Machining (ECM), laser or abrasive water jet cutting or drilling, flame spray coatings, or any other non-conventional manufacturing method or process on products scheduled for delivery to CWBS without prior written authorization by CWBS. This prohibition also applies to the use of such processes by the Supplier's sub-tier sources. Authorization by CWBS may be contingent on CWBS conducting a review and approving the method, facilities, equipment and qualified personnel at the Supplier's facilities or the facilities of the Supplier's sub-tier sources that will perform the operation

or process. In addition, when authorized, such operations and processes may only be performed by CWBS approved sources.

3.13 Altering Data on Documents

The use of any method that causes the original data on documents to be obliterated and unreadable (i.e. the use of correction fluids, correction tape, write-over, or other methods) to correct, modify or otherwise alter the data and/or entries on any certifications, test reports or other documents required by the Contract, is strictly prohibited. Corrections may be made on inspection reports such as 1st Article Inspection Reports (FAIR), providing it is clearly obvious that a correction was made and it is signed (initialed) or stamped by an authorized individual. Upon receipt at CWBS, products or services represented by documents that show evidence that they have been corrected or altered in an unauthorized manner are subject to return to the Supplier at Supplier's expense.

3.14 Contract Changes & Their Effectivity

- **CWBS Initiated Changes**

The Supplier shall incorporate, at the specified and agreed upon effectivity points, all changes initiated by CWBS and communicated to the Supplier through a formal Contract change and/or amendment. Such changes may be in the form of revised drawings, specifications, tests, inspection or fabrication methods, etc., and may apply to products as well as to the Supplier's management and administrative systems. The Supplier's business management system shall include appropriate controls and records, including controls at the Supplier's sub-tier sources, which provide objective evidence that changes were incorporated as required by the Contract. Objective evidence may be in the form of date, lot, serial number, revision letter, or other positive identification. Such records are subject to on-site verification by CWBS at the Supplier's facilities or the facilities of the Supplier's sub-tier sources.

- **Supplier Initiated Changes**

The Supplier may not make any changes in product design, drawings, performance specifications, materials or processes that will result in a Class I change (defined as changes that affect Fit, Form, Function, Reliability, Maintainability, or Safety without specific approval by CWBS in writing prior to making such changes in products or data. When applicable, the Supplier shall flow-down this requirement to the Supplier's sub-tier sources. The Supplier may make changes on products under Supplier's proprietary engineering design control that result in a Class II change (any change other than Class I as defined above). The Supplier shall furnish a copy of the Class II change to CWBS prior to the initial delivery of the (changed) products, so that CWBS can verify that the change does not violate the above requirements.

4.0 PRODUCT QUALIFICATION

This section defines the generic requirements for production part qualification and approval. The purpose is to determine if all CWBS 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 CWBS 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.

The supplier should be able to present objective evidence of their manufacturing capability on similar processes or products, to demonstrate technical competency, when a new process is being used in the production of product for CWBS. Objective evidence can include capability data, FPY, quality issues with other customers, and any existing supplier quality metrics.

4.1 First Article Inspection

All First Article Inspection (FAI)'s shall be documented in accordance with AS/EN/SJAC9102 unless otherwise specified in the contract. The Supplier shall furnish a copy of the completed FAIR results with the initial delivery of products on the Contract, and immediately following updates made in accordance with the following requirements. The supplier shall perform a full FAI or a Partial FAI for affected characteristics when any of the following occurs:

- A change in design.
- A change in any manufacturing source(s), processing source, sub-tier processor(s), process(es), inspection method(s) (including functional test requirements), location of manufacture, tooling, or materials.
- A change in numerical control program or translation to another media.
- A natural man-made event, which may adversely affect the manufacturing process.
- An implementation of corrective action required to complete a previous FAI.
- A lapse in production for two years shall require an update for any characteristics that may be impacted by the inactivity. This lapse is from the completion of last production operation to the actual restart of production.
- A CWBS drawing which references a standard hardware item (e.g., "NAS", "MS") and that item is modified from the original purchased configuration and/or has additional characteristics. In this case, the FAIR shall include data for only those characteristics that were changed and/or added.
- Altered Item Drawings with specific dimension requirements.
- CWBS made to customer print items
- When requested by either internal/external customer.
- When the revision of the drawing is changed, even if it has not affected the specific configuration.

Note: The potential impact to form, fit, and function exceptions as cited in AS9102 do not apply to CWBS products.

Note: If a supplier is planning to use statistical methods for product acceptance for production (less than 100% inspection) the requirements of SQRM paragraph 5.10 Sampling Inspection apply.

When it is not physically possible to perform the FAI on a single product, data from multiple products can be used, providing all parts have been manufactured using the same engineering definition, bill of material, supply chain, and method of manufacture (including measurement method). The FAI report shall be annotated to signify the use of multiple product and provide traceability of those products used to obtain the inspection results.

Programmers for Coordinate Measuring Machine (CMM) during FAI activity shall be independent to those programming product measurement equipment supporting the production process.

Note: Coordinate Measuring Machines used for FAI do NOT have to be independent to those used for product measurement during production activities.

When a CAD model is used for programming, the model shall not be used to create both the manufacturing and CMM/Inspection programs.

The supplier shall furnish a copy of the completed FAIR results with the initial delivery of products on the contract.

For Non-Aerospace Suppliers:

A FAI is required to initially qualify a part/process for Supplier approval, unless the PPAP process (below) is used instead. Furthermore, a new FAI may be requested if there is an extended gap of time since last production. The FAI requires that all features and characteristics on the design specification and control plan 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.

For FAI guidance, see AIAG PPAP Manual (Appendix C, D, & E) – Production Part Approval Process (available from www.aiag.org). When submitting a FAIR, the Supplier should use the form provided by the CWBS, or other convenient and equivalent form may be used with CWBS approval.

In addition to an FAI, and when required by the contract or CWBS buyer, Suppliers shall, as a minimum, 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 CWBS in the drawing, specification, or contract. The Control Plan available from CWBS or other convenient and equivalent version may be used.

4.2 Production Part Approval Process

When required by the CWBS contract, the Supplier shall submit to CWBS a more comprehensive Production Part Approval Process (PPAP) qualification package.

PPAP shall be in accordance with AS 9145. Unless otherwise specified, Level 3 shall apply. PPAP submittals may be managed by the CWBS required system.

For Non-Aerospace Suppliers only, the following AIAG requirements apply:

The Supplier is responsible for obtaining the latest revision of the applicable AIAG core tool reference manuals and forms (see Applicable Documents section for where these references may be obtained).

The AIAG Core Tools Manuals are:

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

When PPAP is specified on the CWBS contract, the Supplier shall submit a “Level 3” PPAP package to the CWBS Buyer unless otherwise directed on the purchase order. See AIAG PPAP Manual, Table 4.2, for complete list of submission requirements for each level of PPAP. Also, see AIAG APQP Manual for related guidance on associated product and process design and development methodology and techniques.

The supplier shall review and update, as necessary, all applicable items in the PPAP file to reflect the production process, regardless of whether or not the CWBS specified PPAP Level requires the item to be submitted. CWBS can request to review the documentation at any time.

A. Design Record, Change Documents, and Customer Approval

The Supplier shall have the design record for the saleable product/part and components; any authorized engineering change documents for those changes not yet recorded in the design record but incorporated in the product, part or tooling; and evidence of CWBS engineering approval. See AIAG PPAP Manual.

B. Process Flow Diagram

The Supplier shall have a visual diagram of the proposed or current process. This diagram shall clearly describe the production process steps and sequence, and meet the specified CWBS needs, requirements and expectations. See AIAG PPAP Manual.

C. Failure Mode and Effects Analysis

Suppliers with product design responsibility shall develop a Design FMEA in accordance with, and compliant to, CWBS-specified requirements. A single Design FMEA may be applied to a family of similar parts or materials upon approval by CWBS purchasing.

Suppliers shall develop a Process FMEA in accordance with, and compliant to, CWBS-specified requirements. A single Process FMEA may be applied to a process manufacturing a family of similar parts or materials if reviewed for commonality by the Supplier and if approved by CWBS purchasing. See AIAG FMEA Manual.

D. Measurement Systems Analysis

The Supplier must develop or obtain gages and standards to control their processes and to determine product conformance to specifications. Variable gages and measurements are preferred. Alternative methods, gages or standards may be used at CWBS to verify the Supplier's inspection results. CWBS may request the Supplier to participate in a correlation study to compare Supplier measurement results against results obtained by CWBS gages and methods.

The Supplier shall perform MSA studies, e.g., gage repeatability & reproducibility, bias, linearity, stability, for all new or modified gages, measurement, and test equipment. See AIAG MSA Manual. Documentation and results should be maintained and available to CWBS on request.

E. Control Plan

The Supplier shall have a Control Plan that takes into account the output from the FMEA and defines all methods used for process monitoring and control of special product/process characteristics. The control plan covers three distinct phases: prototype, pre-launch, and production. A single control plan may apply to a group or family of products that are produced by the same process at the same source. See AIAG APQP Manual. Product family Control Plans are acceptable upon approval from CWBS purchasing.

F. Process Capability Study

Process Capability Index (Cpk) is a comparison of the inherent variability of a process output to specification limits under statistically stable conditions. Most methods for estimating capability require that the characteristic being evaluated is approximately normally distributed, and in statistical control. The distribution should be determined prior to estimating capability. If the process is not in statistical control, all assignable causes must first be identified and removed. Special techniques are available for calculating capability when inherent assignable causes, such as tool wear, are present.

Definitions and calculations for Cpk and Ppk indices are found in AIAG PPAP and SPC Manuals. Unless otherwise required by CWBS, the Supplier shall use the following as acceptance criteria for evaluating initial process study results of special characteristics for processes that appear stable. Documentation and results should be maintained and available to CWBS on request:

<u>Results</u>	<u>Interpretation</u>
Index > 1.67	The process currently meets acceptance criteria.
$1.33 \leq \text{Index} \leq 1.67$	The process is marginally acceptable.
Index < 1.33	The process is not acceptable.

G. Certification and Test Reports

The Supplier shall provide evidence that the following verifications required by the design record and control plan have been completed and that results indicate compliance with specified requirements:

- Dimensional Results – for each unique manufacturing process, e.g., cells, lines, molds, patterns, a record of actual results of all characteristics.
- Material and Performance Test Results – for all parts and product materials with chemical, physical, metallurgical, and functional performance requirements.
- Qualified Laboratory Documentation – documentation showing laboratory results of the qualifications for the type of measurements or tests conducted and the standards used.
- Sample Product – actual samples as required by the applicable specification or CWBS contract.
- Master Sample – retain a master sample, when required by the Buyer, and make available upon request.
- Checking Aids – if requested by the Buyer, submit part-specific assembly or component checking aids.
- Records of Compliance – copies of records showing compliance to all applicable CWBS-specific requirements.

See AIAG PPAP Manual for applicable forms and instructions.

H. Part Submission Warrant

Upon completion of all PPAP requirements, the Supplier shall complete the Part Submission Warrant (PSW). A separate PSW shall be completed for each CWBS part number unless otherwise specified by the CWBS contract. Upon receipt, CWBS will review and either approve, reject, or provide interim approval. See AIAG PPAP Manual for forms and instructions.

5.0 PROCESS CONTROL

This section defines the basic necessities for Suppliers to control their manufacturing processes.

5.1 Special Characteristics

The Supplier shall demonstrate conformity to those special characteristics designated by CWBS through means of documentation and appropriate control methods. In addition to any special characteristics identified by CWBS, the Supplier shall also review, identify, document, and control other product and process characteristics that are key to achieving quality.

The Suppliers variation management program shall be in compliance with requirements of AS/EN/SJAC9103.

- Variation management of Key Characteristics using statistical methods to control manufacturing processes is required for key characteristics identified by CWBS on the drawing or by separate documentation, (MQI, CPI or other). The supplier will be required to measure those features and demonstrate capability by performing data analysis and calculating Cpk (or an equivalent attribute measure of Capability) for each characteristic.
- The supplier is required to provide copies of the capability study, with each delivery, until a minimum of three manufacturing lots, having a Cpk of 1.67 or greater, are shipped. Key Characteristic demonstrating capability may be monitored with statistical process control per SQRM Section 5.10. Key characteristics that have not achieved a Cpk of 1.67 will require data submittals, showing 100% inspection, with each delivery.
- Unless approved by CWBS, the sample Lot size shall be a minimum of thirty (30) pieces from a continuous manufacturing lot (Same material, Tooling and set up). Sample lot/batch number shall be documented on copies of capability studies.
- The supplier's variation management program is subject to audit, verification and approval by CWBS designated representative(s), or its customers.
- The requirements for process capability and control does not supersede drawing requirements and shall not be used as accept or reject criteria for the noted feature.
- When the supplier has achieved a Cpk of 1.67 on all key characteristics, a statement shall be included on supplier's certificate of conformity for the life of the program stating "The supplier certifies all key characteristics identified by CWBS meet or exceed a 1.67 Cpk".

5.2 Error-Proofing

The Supplier should use error-proofing devices and techniques as a form of process control; especially for repetitive functions, difficult tasks prone to mistakes, or where high RPN processes have been identified and error proofing is not possible, 100% inspection is required for all special characteristics.

5.3 Work Instructions

The Supplier shall prepare documented work instructions, for all employees having responsibilities for the operation of processes that impact product quality. These instructions shall be maintained current and accessible for use at the work station.

A curriculum of training requirements will be defined for every operator. Appropriate training is required in order for employees to demonstrate competency prior to working and potentially impacting quality. Training records must be maintained as well as updated on a regular basis for all operators.

5.4 Control of Monitoring and Measuring Devices

The Supplier shall determine the monitoring and measurement to be undertaken and the monitoring and measuring devices needed to provide evidence of conformity of product to determined requirements. As a minimum, where necessary to ensure valid results, measuring equipment shall:

- Be calibrated or verified at specified intervals, or prior to use, against measurement standards traceable to international or national measurement standards; where no such standards exist, the basis used for calibration or verification shall be recorded; and
- Be identified to enable the calibration status to be determined.

Unless otherwise specified by contract, the Supplier shall establish procedures to control Measuring and Test Equipment (M&TE) that are in compliance with the requirements of ANSI/NCSL Z540-3, ISO 10012, or ISO/IEC 17025.

5.5 Statistical Process Control

Where specified in the Control Plan, the Supplier is required to apply effective statistical process controls. Suppliers should consult the SPC manual published by AIAG for guidance, methods, examples, and related reference information.

Suppliers should maintain records of all data related to SPC of special characteristics, and be made available to CWBS upon request. Supplier shall provide evidence of proper controls for special characteristics when not meeting Cpk requirements.

Suppliers must demonstrate a continuous improvement process that utilizes internal, as well as external data, to provide ongoing improvement in the quality of products delivered to CWBS.

5.6 Preventive Maintenance

The Supplier should identify key process equipment and provide resources for machine/equipment maintenance activities and develop an effective planned total preventive maintenance system.

5.7 Source Inspection

Supplier's products or services may be subject to source inspection by CWBS, representatives of CWBS or applicable government or regulatory agencies. Source inspection requirement will be included on the contract and may apply to any and all operations performed by the Supplier or the Supplier's sub-tier sources, including prior to delivery of products to CWBS. The Supplier shall provide the necessary access, equipment and resources required to effectively accomplish the source inspection.

5.8 Traceability

Suppliers shall establish a lot traceability system that tracks components throughout the value stream, from raw material through shipment to CWBS. This includes all process steps including inspection and test procedures, rework and sub-tier supplier operations.

Where a 'shelf life' restriction applies, suppliers shall ensure that materials are tracked and controlled to prevent expired materials from being used in production.

5.9 Shelf-Life Control

- A. Materials - 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 CWBS, the remaining shelf life shall be a minimum of 75% of the total shelf life for the material.
- B. Elastomers and Seals - For CWBS, Suppliers scheduled to provide elastomeric seals or assemblies must meet the requirements for data recording procedures, packaging, and storage of elastomeric seals and seal assemblies which includes an elastomeric element per SAE AS5316.

5.10 SAMPLING INSPECTION

When statistical methods for product acceptance are planned, the supplier shall submit their proposed alternate inspection frequency plan to CWBS for review and concurrence prior to use. Statistical Product Acceptance Requirements shall conform to AS 13002 unless an alternate method is specified by contract.

Exceptions to AS13002:

In determining capability of the production measurement system, and when capability is demonstrated through the use of Gage R&R, the maximum acceptable R&R percentage is 10% (Ref. AS13002, section 5.1.5).

Note: An R&R percentage between 10 and 30 percent may be acceptable for some applications with CWBS approval.

Sample inspection shall be suspended immediately following any non-conformance and until corrective action has been implemented and the process has once again demonstrated acceptable capability through statistical data and/or appropriate technical justification as approved by CWBS (Ref. AS13002, section 5.6.3).

Any characteristic affected by process change and subject to a full or partial FAI, as defined in CWBS First Article Inspection Requirements, shall be reviewed with CWBS to determine what actions and/or re-approval may be required to continue with the alternate inspection frequency plan. As a minimum, all characteristics affected by the process change shall demonstrate acceptable capability through

statistical data and/or appropriate technical justification, as approved by CWBS, prior to continuing the alternate inspection frequency plan for those characteristics (Ref. AS13002, section 5.7.3).

A relevant capability analysis assessed against minimum acceptable criteria Ppk 1.65 for Key characteristics, 1.33 for Major characteristics or 1.0 for Minor characteristics is required as part of the Data Pack Contents (Ref. AS13002, section 7.1.1 Data Pack Contents Column).

In addition to AS13002 Sampling Tables (Ref. Table 2 - Major characteristics sampling table and Sample Table 3 – Minor characteristic sampling table) the following sampling table shall be used for all characteristics designated by CWBS as “Key” characteristics:

Key	Batch Size							
Ppk	Up to 10	11 to 20	21 to 30	31 to 45	46 to 60	61 to 90	91 to 120	121 to 150
2 and above	2	2	2	3	4	5	6	6
1.66 to 1.99	3	4	5	5	6	9	12	15
1.33 to 1.65	ALL	ALL	ALL	ALL	ALL	ALL	ALL	ALL
Less than 1.33	ALL	ALL	ALL	ALL	ALL	ALL	ALL	ALL

Key	Batch Size						
Ppk	151 to 200	210 to 250	251 to 300	310 to 500	501 to 750	751 to 1000	1001 to 2000
2 and above	8	10	12	20	30	40	50
1.66 to 1.99	20	20	20	25	38	40	50
1.33 to 1.65	ALL	ALL	ALL	ALL	ALL	ALL	ALL
Less than 1.33	ALL	ALL	ALL	ALL	ALL	ALL	ALL

NOTE: Batch sizes above 2000, sample size to be agreed upon with CWBS.

5.11 Operator Self-Verification

Suppliers may delegate inspection authority and product/process inspection and acceptance to production operators. In such cases, the Supplier’s operator self-verification program shall comply with the requirements of SAE ARP9162. Prior to implementation of the program on products/processes scheduled for delivery to CWBS, the Supplier shall request and obtain approval from CWBS in writing.

5.12 Raw Material Lot Control

The Supplier shall develop, document and implement a raw material (sheet, plate, bar, rod, etc.) verification program that will ensure that all material received from the Supplier's sub-tier sources meet all applicable technical and quality requirements. The Supplier's verification program shall include provisions for monitoring and testing all raw materials (every bar, billet, etc.).

Upon receipt of any raw material, Supplier shall compare the chemical, physical and mechanical properties data stated on the mill certification against the material specification requirements and document such comparison. The supplier shall implement appropriate storage and controls to preclude commingling of different heat/lots or batches of material. Additionally, the Supplier shall perform an over-check of the chemical composition to verify specification compliance by conducting a quantitative chemical analysis such as (X-ray Fluorescence (XRF), Optical Emission Spectroscopy (OES), Energy Dispersive X-ray Spectroscopy (EDS), etc.), or by having such a measurement performed by a laboratory meeting one of the following conditions: those listed on the APSL; a laboratory accredited by PRI-Nadcap, A2LA or other accreditation body recognized by the International Laboratory Accreditation Cooperation (ILAC) and listed in the Signatories to the ILAC Mutual Recognition Arrangements (MRAs). Records showing the results of the Supplier's material verification program and its effectiveness shall be available to CWBS for review upon request. Traceability shall be provided by identifying the raw material heat, lot, batch or melt number from the certification/test report on the product and/or on packaging (when used), or the products segregated and identified.

5.13 Electro-Static Discharge (ESD) Control

Suppliers scheduled to provide ESD sensitive devices to CWBS shall, prior to processing product, establish, document and implement an ESD Control Program plan in compliance with the requirements of MIL-STD-1686 or equivalent.

5.14 Counterfeit Parts

The 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.

5.15 Foreign Object Damage/Foreign Object Debris (FOD) Prevention

The supplier shall establish, document and maintain a program to control and eliminate Foreign Object Damage (FOD) and/or contamination during the supplier's manufacturing, assembly, test and inspection, and packaging/shipping (e.g. use of FOD causing materials like Styrofoam packing beads) operations. When applicable, the supplier's FOD control program shall include controls to preclude FOD or contamination at the supplier's sub-tier sources. AS9146 shall be used as a guide to establish and implement the supplier's FOD program. The supplier's FOD program is subject to on-site review and approval by CWBS.

6.0 CHANGE CONTROL

The Supplier is responsible for controlling changes and notifying the CWBS Buyer of all changes to the approved part design, manufacturing process, or site.

6.1 Change Control Process

The Supplier shall have a process to ensure that relevant versions of applicable documents furnished by CWBS (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 CWBS engineering standards/specifications and changes in accordance with the schedule required by CWBS. Timely review should be as soon as possible, and shall not exceed two working weeks. The Supplier shall maintain a record of the date on which each change is implemented in production. Implementation shall include updated documents.

6.2 Supplier Change Requests

Suppliers shall not make changes to their processes, location, facilities, equipment, material, product design (or any change which may affect product design or function) without written approval from the CWBS Buyer for:

- Correction of a discrepancy on a previously submitted part;
- Product modified by an engineering change to design records, specifications, or materials; or
- Any planned changes by the Supplier to the design, process, or manufacturing location, such as:
 - Use of other material than was used in previously approved part or product
 - Production from new, additional, replacement or modified tools, dies, molds, patterns, etc.
 - Production following upgrade or rearrangement of existing tooling or equipment
 - Production from tooling and equipment transferred to a different plant site or from an additional plant
 - Change of sub-tier Supplier for parts, nonequivalent materials, or services (e.g. heat treating, plating, etc.)
 - Product produced after tooling has been inactive for production for 12 months or more
 - Change to test/inspection method – new technique (no effect on acceptance criteria)
 - For bulk materials: new source of raw material from new or existing Supplier, or change in product appearance attributes, etc.
 - Use of any non-conventional manufacturing methods such as electro-discharge machining (EDM), electro-chemical machining (ECM), laser or abrasive water jet metal cutting, flame spray coatings, etc.

Before submitting to CWBS a request for a permanent change to a Supplier-controlled design, the Supplier shall review the FMEA and Control Plan, as applicable, to ensure that all process-related issues have been addressed and resolved. CWBS may require the Supplier to submit an updated FMEA and Control Plan prior to approval of such permanent changes. CWBS may also require other portions, or all, of the related qualification process to be repeated. In some cases, CWBS may elect to review Supplier proposed permanent changes at the Supplier's facility.

To request a permanent engineering change, the Supplier shall use CWBS's Part/Process Change Notification form, or other equivalent form of notification acceptable to the CWBS Buyer.

To request a one-time or temporary deviation, Suppliers shall use CWBS's Supplier Deviation Request, or other equivalent form acceptable to the CWBS Buyer.

Suppliers shall flow down the above stated requirements to the suppliers' sub-tier sources. The supplier shall submit production/process change notifications consistent with AS 9116 describing all design and process changes for CWBS approval, prior to making the change.

7.0 CONTROL OF NONCONFORMANCE MATERIAL

For nonconforming products supplied to CWBS, including those that reach a CWBS customer, the Supplier must cover all costs to correct the nonconformance including; assessment costs, administrative costs to process the nonconformance, and any rework or repair costs incurred by CWBS as a direct result from receiving nonconforming hardware from the supplier.

7.1 Supplier Request for Nonconformance Deviation

A Supplier shall not knowingly ship product that deviates from the drawing, specification limits, or design intent without prior written authorization from the CWBS Buyer. If such a condition exists, the Supplier may petition the CWBS Buyer, in writing, to allow shipment of the product under a written nonconformance deviation. The Supplier shall use CWBS's Supplier Deviation Request, or equivalent, unless otherwise directed.

If requested by the CWBS Buyer, the Supplier must send samples of such nonconforming items to CWBS for evaluation. The cost of shipping, inspection, and testing to determine the potential acceptability of such product will be charged to the Supplier.

CWBS approval of a deviation is specific to the products for which it has been submitted and approved and shall not be construed as a permanent engineering change. The Supplier must begin work immediately on corrective action. In all cases, the Supplier shall fully contain all product suspected of being nonconforming. 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 CWBS sites or be charged back for the cost of sorting by CWBS. Any parts shipped to CWBS 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 CWBS-approved deviation document.

Unless the Supplier is specifically granted material review and disposition authority by the contract, the Supplier shall document all nonconforming conditions in accordance with the requirements of AS/EN/SJAC9131 and submit them to the CWBS Buyer (MRB – Material Review Board) for review. CWBS MRB will not accept for review and disposition any product that can be reworked to meet drawing or specification requirements or are obviously scrap.

7.2 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 the responsible Quality organization. On the other hand, repair is defined as using alternative manufacturing techniques, methods, materials, or processes which may not bring product into full compliance with applicable drawings and specifications. Repairs are not allowed without written approval from CWBS.

7.3 Supplier Containment

For product quality problems reported by CWBS to the Supplier, until formal corrective action has been taken and approved, the Supplier shall provide documented evidence with subsequent shipments that such product has been inspected for the identified nonconformances and meets all applicable requirements.

7.4 Recovery of Costs for Non-Confirming Material

- A. When material is rejected, a debit shall be issued.
- For any rejected material (regardless of quantity), a minimum disposition fee of \$500 will be debited (general admin, etc.) along with the cost of the product multiplied by the number of pieces returned to the supplier (purchase order amount) with a 15% added processing charge. If further analysis is required (measurement, testing, etc.), a minimum \$100 per hour will be debited in 1 hour increments. Labor rates may vary by international regions.
 - Supplier shall be debited for any cost of poor quality charge fee incurred by CWBS (originating from the end customer) which could be inclusive of line down charges or any other such penalties.
 - When CWBS or CWBS's Customer conducts the sorting, inspection, or etc. on the shipment, the following charges shall apply.
 - Charges to the supplier are calculated for a minimum of one hour using the following rates (charged time in addition to the one hour minimum is rounded up to the next whole hour).
 - Indirect Labor - \$100 per hour (inspection, handling, sorting, scrap, general administration, etc.). Labor Rates may vary by international regions.
 - Direct Labor - \$100 per hour (rework, repair, including testing & processing). Labor Rates may vary by international regions.
- B. Freight to rectify non-confirming condition
- If rejected material is returned to the supplier, supplier shall arrange with their chosen carrier, provide account charge information, or CWBS will debit the amount incurred. This includes all intermediate shipments between the end customer and the supplier.
 - Replacement material shipment shall be shipped to CWBS at the supplier's expense.

8.0 PACKAGING, LABELING, DELIVERY & RECORD RETENTION

Preservation, packaging, labeling, and shipping methods must comply with common industry practices and CWBS requirements specified on the contract.

8.1 Preservation

In order to detect deterioration, the condition of product in stock should be assessed at appropriate planned intervals. The Supplier should use an inventory management system to optimize inventory turns over time and should assure stock rotation, such as “first-in-first-out” (FIFO).

The Supplier shall use adequate methods and materials to assure cleaning and preservation for all products to be delivered to CWBS.

8.2 Packaging

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.

8.3 Labeling

Labeling and bar code requirements may vary at CWBS. The CWBS Buyer will provide the Supplier with the necessary specifications.

8.4 Delivery

The Supplier should systematically inform CWBS of any delay in delivering product and provide a new dispatch date. The Supplier is responsible for additional transport costs due to delays.

Certificates of Conformance (CoC)

A signed CoC by the Suppliers head of quality or company officer (or their authorized delegate) attesting that all products and/or services delivered are in compliance with all contract requirements shall be furnished with each shipment to CWBS. All CoC's must be in the English language and may be in electronic format with electronic signatures. All signatures or signature blocks must clearly show title of the signatory. The CoC shall include:

- Supplier Name
- Part number
- Drawing/specification revision
- CWBS contract number
- Line/release number (when applicable)
- Quantity delivered

-
- Packing list/shipper number (when applicable)

When additional certifications/test reports are required for special processing, raw material, etc. the requirements will be specified on the contract.

8.4.1 Quality of Delivery Cost Recovery

- The Supplier shall immediately notify CWBS of any circumstances that may cause a delay in delivery. At time of notification, the Supplier will provide information stating the estimated period of delay and the reasons thereof.
- Unless expressly deemed unnecessary by CWBS in writing, the Supplier shall provide a written recovery plan on the day of delay disclosure, identifying all processes and durations required to achieve delivery. The Supplier shall use additional effort at its sole cost and expense, including without limitation premiums and expedited shipping methods to avoid or minimize delay to the maximum extent possible.
- All additional costs resulting from such efforts shall be borne by the Supplier. Nothing herein shall prejudice any of the rights or remedies provided to CWBS in the applicable Order or by remedy available at law.
- In the case of an unexcused late delivery of any product by Supplier, liquidated damages shall be enforced against Supplier (and not as a penalty) at a 2% price reduction per day of late delivery to the NEED date. The liquidated damages for late deliveries shall not exceed 25% of the delayed line item(s) value. In the event such liquidated damage cap is met and Supplier continues to fail to deliver on-time in accordance with this Section and any other existing Agreement, then, in addition to collecting liquidated damages assessed herein, CWBS shall have other remedies available at law or in equity. Supplier shall be debited for any cost for late delivery incurred by CWBS originating from customer.

Section 8.4.1 applies to turnaround time (TAT) on repair items as well as OEM deliveries. The standard TAT time allowed is 15 days. The 15 day TAT begins upon the Supplier's receipt of the return.

8.5 Record Retention

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

Unless otherwise specified by CWBS, the Supplier shall maintain all records that provide objective evidence of compliance to CWBS contract requirements for a minimum of Fifteen (15) years after the last delivery of products and/or services on the contract. Prior to discarding, transferring to another organization, or destruction of such records, the Supplier shall notify the CWBS Buyer in writing and give CWBS the opportunity to gain possession of the records. These requirements are also applicable to records generated by Supplier's sub-tier sources.

9.0 CONTINUAL IMPROVEMENT

Suppliers should define a process for continual improvement, (examples: lean and six sigma) Recommend ISO 9004, including Annex B. A copy of the Supplier's continual improvement program shall be furnished to CWBS upon request.

9.1 Problem Solving Process

Suppliers should use a closed-loop corrective action process whenever a problem is encountered internally or upon notification from CWBS. For example:

Discipline	Description
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 to protect CWBS 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 document CQI-10.

9.2 Corrective Action Preventive Action

CWBS may issue a request for a Corrective Action Preventive Action (CAPA) report to the Supplier when nonconforming material, components, or assemblies are found. When a formal reply is requested (whether hard copy or electronic media), the Supplier should use CAPA form provided by CWBS, or other convenient media of equivalent content. When documenting the root cause, the Supplier shall include the underlying reasons:

- why the specific nonconforming condition or incident occurred,
- why it was not detected by the Suppliers quality controls, and
- why the related process, from a systemic viewpoint, allowed the nonconformance (and potentially others like it) to occur.

Supplier Quality Requirements Manual

The Supplier should apply the following criteria to determine whether the underlying root cause has been identified:

- It initiates and causes the event you are seeking to explain.
- It is directly controllable.
- The elimination of that root cause will result in the elimination or reduction of the problem.

Statements from the Supplier indicating that the corrective action is to alert or retrain the operator, and/or increase inspection, alone, are NOT acceptable corrective actions. These kinds of actions would be considered insufficient and not address the real underlying root cause(s) of why the Supplier's policy, instructions, process, procedure, and/or system allowed the problem to develop and occur and not be detected by quality controls.

Unless otherwise requested by CWBS when notified, the Supplier shall respond to a request for corrective action as follows:

Required Action	Timeline (from initial notification by CWBS)
The Supplier shall promptly acknowledge receipt of notification and communicate to CWBS the immediate containment actions to be taken.	Within 24 hours
The Supplier shall provide an update of the containment plan to protect CWBS during the interim period. This update must include: • Confirmation that the Supplier has identified all suspect product in process, in stock, in transit, and potentially at any CWBS site by lot number, CWBS contract number, and quantity. • Additional specific containment actions needed to be taken by the Supplier and/or CWBS.	Within 72 hours
The Supplier must submit the completed CAPA indicating the permanent actions taken, or to be taken, to prevent recurrence of the same problem, to prevent the occurrence of similar problems, and the applicable effectivity dates. Failure to respond with adequate containment and/or corrective action in agreed upon timeframe may result in the Supplier being removed from CWBSs ASL.	Within 10 business days

10.0 PURCHASED PRODUCT VERIFICATION

CWBS expects to receive products from Suppliers with zero defects allowing products to move directly from dock to stock, or to the point of use, without incurring additional costs associated with receiving inspection. CWBS may charge Suppliers for costs to inspect, sort, evaluate, and/or return products that do not meet requirements. CWBS will administer their Purchased Product Verification program on the basis of individual part numbers, product families, or overall Supplier performance.

Purchased Product Verification may include Supplier Self Verification; Source Inspection at the supplier's premises or inspection upon receipt of product at CWBS.

10.1 Supplier Self Verification Requirements

Where implemented, Supplier Self Verification may include Dock to Stock and Delegated Product Release Verification (DPRV) programs. DPRV programs utilize a qualified Delegated Supplier Quality Representative (DSQR) approved by CWBS. Supplier Self Verification applies to material and components released for production that ship to a particular CWBS location. However, CWBS reserves the right to inspect any product upon receipt or at any other time, due to criticality or any other factor, or cancel the program at any time.

Supplier Self Verification typically does not include pre-released parts, samples, prototypes, pilot fabrication runs, first articles for new tooling or processes, and other low-volume applications.

To be considered for Supplier Self Verification, the product must meet the following requirements:

- Must be from an approved CWBS Supplier
- The Supplier must meet requirements for a certain number of consecutive lots of the same part number being accepted by the same CWBS location
- The Supplier must not be rated as having unacceptable product quality performance
- No open and delinquent corrective action requests for the part number (or products from the same family)

10.2 Supplier Self Verification Suspension

The Supplier's Supplier Self Verification privilege and DSQR designation can be suspended when any of the following conditions occur:

- A part number is detected as non-conforming
- The CWBS Buyer is made aware that the Supplier has a major non-conformance related to a second or third-party quality management system audit
- When results or audit evidence show the Supplier is not following their approved Control Plan or related work instructions

Generally, the suspension process is as follows:

- A. CWBS Buyer will notify the Supplier that their Supplier Self Verification privilege has been suspended.
- B. CWBS will issue a request for corrective action to the Supplier.

-
- C. The suspension should end when the Supplier satisfies the conditions outlined in the section above.

If the Supplier is put on suspension repeatedly, the CWBS Buyer may place the Supplier on new business hold and/or divert the business to an alternate Supplier.

10.3 Dock-to-Stock

Dock to Stock Suppliers have the authority to directly release product(s) for delivery to CWBS without the need for any additional inspections beyond the Supplier's normal inspection processes by CWBS, CWBS representatives or DPRV/DSQR.

10.4 Delegated Supplier Quality Representative (DSQR)

DSQR is a process whereby a supplier representative is delegated the authority to act on behalf of CWBS to verify and release products/services.

The DSQR inspections shall be performed on each release of product. DSQR inspections shall be performed after final inspection, as close to shipment as practical; conducted as an independent process by someone other than the person who performed the final inspection, unless waived by CWBS.

The DSQR role shall consist of, but not limited to:

- Contract / purchase order review.
- Supplier documentation review.
 - Verification that all required product realization operations and inspections are complete.
 - When applicable, verification that product nonconformance has been properly documented and processed, in accordance with CWBSs contractual requirements.
 - Verification that CWBS's requirements for FAI and/or PPAP have been satisfied.
- Physical product verification, including verification of product marking/identification and visual examination. DSQR shall validate special requirements, critical items, and key characteristics when contractually required by CWBS.
 - Sampling plans (as outlined in Section 5.10 – Sampling Inspection of this document) for product verification may be used with approval from the CWBS.
- Shipping / release documentation.

DSQR personnel shall validate and record the completion of the verification activity. When required, CWBS may provide a DSQR Checklist to document completion of the DSQR validations, otherwise the supplier can utilize their own checklist to satisfy CWBS's DSQR process criteria.

Specific stamps, identification numbers, etc. shall be used for product release when required by the delegating CWBS.

Product and/or documentation nonconformances detected during the DPRV process shall be processed in accordance with CWBS nonconformance and corrective action procedures and the contractual requirements.

The requirements of AS 9117; AS13001; and AS7106/5 – NADCAP Self Release Agreements – Requirements apply.

10.5 Source Inspection

Source Inspection when imposed, requires purchased product verification by a CWBS Quality Representative at the Supplier's facility prior to delivery to CWBS. The CWBS Quality Representative may be a CWBS employee or a CWBS authorized third party inspection contractor.

The Supplier shall notify CWBS, or the CWBS approved inspection contractor, at least forty-eight (48) hours in advance of the time the products will be ready for final inspection. Upon request, the Supplier shall make available to the CWBS Quality Representative any measuring and test equipment, facilities, records and personnel to facilitate the source inspection.

10.6 Government Source Inspection (GSI)

For CWBS Supplier's, GSI may be imposed at the discretion the US Government on any CWBS US Government contract.

Upon receipt of this Contract, the Supplier shall promptly notify the US Government representative who normally services the Supplier's plant, in order that the US Government representative can accomplish appropriate planning for conducting source inspection at the Supplier's facilities. If the Supplier cannot locate the US Government representative to arrange for the required source inspection, the Supplier shall notify CWBS immediately. Upon request, the Supplier shall make available to the US Government representative any measuring and test equipment, facilities, records and personnel to facilitate the GSI.

11.0 SUPPLIER PERFORMANCE

11.1 Performance Measures

- **QUALITY**

This metric defines the Rejected Parts Per Million (RPPM) shipped using the following formula. The definition of “rejected parts” is the total number of parts received from the Supplier that do not conform to the drawing, applicable specification, contract requirements or any other valid quality reason (including those caused by shipping and administrative errors). Quantities are to be reported in the units that they are purchased:

$$\text{RPPM} = \frac{\text{Number of Parts Rejected}}{\text{Number of Parts Received}} \times 1,000,000$$

RPPM is a measure of how CWBS perceives the quality of products delivered by the supplier.

Examples that count as rejected product are:

- Parts that are dimensionally inaccurate and reworked by CWBS.
- Parts that are reported out of specification even though CWBS uses them without modification.
- Parts that conform to the drawing but do not fit the intended use and where the supplier is responsible for the design for the intended application.
- The nonconforming parts found and returned after the whole consignment has been sorted either by CWBS or the supplier at CWBS’s or CWBS Customer facility.
- The whole consignment being returned by CWBS, even though the supplier may subsequently perform sorting at the supplier's facility and find a portion acceptable.
- Parts that were manufactured to specification but are received by CWBS damaged, mislabeled, or misdirected, with mixed stock, missing documents or inaccurate document data for which the supplier is responsible.
- Parts that conform but are returned due to wrong quantity delivered, duplicate shipment, or wrong parts sent for which the supplier is responsible.
- Parts returned for being delivered without the required CWBS/Customer approval (i.e., PPAP sub-missions, product design changes) and for which the supplier is responsible. This includes parts that may have been subsequently approved, but where the submission was incomplete, or the late approval disrupted CWBS/Customer's production.

Examples that do not count as rejected product are:

- Parts that conform to the drawing but do not fit the intended use and where CWBS is responsible for the design and/or selection.
- Parts that were manufactured to specification but are received by CWBS damaged or misdirected due to the supplier's carrier or their transportation company.
- Parts that are returned due to wrong quantity ordered, wrong parts ordered, or duplicate orders placed for which CWBS is responsible.

- Parts delivered without the required CWBS/Customer approval (I.e., PPAP submissions, product design changes), but where the parts are not returned, and approval is granted without disruption to CWBS/Customer.

Based on CWBS's current expectations, the following table describes the resulting actions for varying RPPM performance levels:

Premier	Meets requirement set by CWBS
Preferred	Satisfactory; no action required
Marginal	Systemic corrective action may be required
Unacceptable	Systemic corrective action is required and may require Supplier to meet with CWBS management representatives.

- **Delivery**

This metric defines the delivery performance rating using the following formula:

"On time" is based on the NEED date, or Kanban signal (unless other delivery requirements are explicitly applied to an individual order).

Based on CWBS's current expectations, the following table describes the resulting actions for varying delivery performance levels:

Premier	Meets requirement set by CWBS
Preferred	Satisfactory; no action required
Marginal	Systemic corrective action may be required
Unacceptable	Systemic corrective action is required and may require Supplier to meet with CWBS management representatives.

- **Continual Improvement**

This metric is the percent of savings to annual spend. Spend is defined as the dollar amount CWBS purchased from the Supplier. The following formula defines the calculation:

$$\% \text{ Savings} = \frac{\text{Dollar Value of Ideas Submitted}}{\text{Total Dollar Spend} \times \text{Continuous Improvement Commitment Percentage}}$$

Investigative requests will be used to initiate ideas generated by CWBS representatives. The requests are used to cultivate ideas within the Supplier's organization and to assist the Supplier in meeting the Process Continuous Improvement (PCI) targets. PCI objectives are the responsibility of the Supplier to meet, and are not dependent on the number of investigative requests submitted by CWBS.

11.2 Supplier Development Program

CWBS's Supplier Development Program is designed to improve the Supplier operations in multiple aspects of their business, which includes new product development, engineering, quality, communication, performance, delivery, and cost through the implementation of a Lean Enterprise and/or Six Sigma Program in conjunction with appropriate quality tools. For further information, you may contact your CWBS Buyer.

APPLICABLE DOCUMENTS

The following documents are referenced within this manual and may be applicable to the extent specified by CWBS in the contract and applicable reference documents. Copies may be obtained from the sources shown. It is the Suppliers responsibility to obtain applicable documents and to ensure that current revisions are maintained and available to its operations, as required.

Document	Document Title	Available From
ANSI/NCSL Z540.3	Requirements for the Calibration of Measuring and Test Equipment	www.ncsli.org
ISO 9001	Quality Management System Requirements (General)	www.ansi.org www.iso.ch
ISO 10012	Measurement Management Systems – Requirements for Measurement Processes and Measuring Equipment	www.iso.org
ISO/IEC 17025	General Requirements for the Competence of Testing and Calibration Laboratories	www.iso.org
AC7004	Nadcap Audit Criteria for Quality Management System	www.eauditnet.com
ARP9134	Supply Chain Risk Management Guideline	www.sae.org
AS5316	Storage of Elastomer Seals and Seal Assemblies Which Include an Elastomer Element Prior to Hardware Assembly	www.sae.org
AS5553	Counterfeit Electrical, Electronic, and Electromechanical (EEE) Parts; Avoidance, Detection, Mitigation, and Disposition	www.sae.org
AS/EN/JISQ9100	Quality Management System Requirements (Aerospace)	www.sae.org www.asd-stan.org
AS9003	Inspection and Test Quality System (Aerospace)	www.sae.org
AS9102	Aerospace First Article Inspection Requirement	www.sae.org
AS9103	Quality Management Systems – Variation Management of Key Characteristics	www.sae.org
AS9104	Requirements for Aviation, Space, and Defense Quality Management System Certification Programs	www.sae.org
AS9110	Quality Management Systems – Requirements for Aviation Maintenance Organizations	www.sae.org
AS9115	Quality Management Systems – Requirements for Aviation, Space and Defense Organizations – Deliverable Software	www.sae.org
AS9116	Notice of Change (NOC) Requirements	www.sae.org
AS9117	Delegated Product Release Verification	www.sae.org
AS9120	Quality Management Systems – Requirements for Aviation, Space, and Defense Distributors	www.sae.org

Supplier Quality Requirements Manual

AS9131	Quality Management Systems – Nonconformance Documentation	www.sae.org
AS9145	Requirements for Advanced Product Quality Planning and Production Part Approval Process	www.sae.org
AS9146	Foreign Object Damage (FOD) Prevention Program Requirements for Aviation, Space and Defense Organizations	www.sae.org
AS9162	Aerospace Operator Self-Verification Programs	www.sae.org
AS7106/5	National Aerospace and Defense Contractors Accreditation Program Self-Release Agreements – Requirements	www.sae.org
AS13001	Delegated Product Release Verification Training Requirements	www.sae.org
AS13002	Requirements for Developing and Qualifying Alternate Inspection Frequency Plans	www.sae.org
BPS4108	Cleaning Methods Including Corrosion Protection	CWBS Buyer
RTCA DO-178	Software Consideration in Airborne Systems and Equipment Certification	www.rtca.org
MIL-STD-1686	Electrostatic Discharge Control Program for Protection of Electrical and Electronic Parts, Assemblies and Equipment (Excluding Electrically Initiated Explosive Devices)	assist.dla.mil
APQP	Advanced Product Quality Planning & Control Plan Manual (for non-aerospace suppliers)	www.ansi.org www.aiag.org
PPAP	Production Part Approval Process Manual (for non-aerospace suppliers)	www.ansi.org www.aiag.org
SPC	Statistical Process Control Manual	www.ansi.org www.aiag.org
MSA	Measurement System Analysis Manual	www.ansi.org www.aiag.org
FMEA	Potential Failure Mode & Effects Analysis Manual	www.ansi.org www.aiag.org
CQI-10	Effective Problem Solving Guideline	www.ansi.org www.aiag.org
ISO 9004	Quality Management Systems - Guidelines for Performance Improvements	www.ansi.org www.iso.ch

FORMS AND EXHIBITS

Electronic versions of these and other CWBS forms may be requested from your CWBS Buyer.

Form Number	Form Title
CAPA	Corrective Action Preventive Action *
CPLAN	Control Plan *
FAI	First Article Inspection Report *
FMEA	Failure Mode and Effects Analysis
PPCN	Product/Process Change Notification *
SDR	Supplier Deviation Request *
SQA	Supplier Quality Assessment
ISO 9001	ISO 9001 Quality Management System Audit



Aircraft Wheel and Brake, LLC

Document: AWB-SQRM Appendix P9112	Revision: A	Date: May 2025
Title: Purchase Order Clauses		

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Contents

1	AQ010 - General Requirements Clause	5
1.1	Purpose	5
1.2	Scope and Application.....	5
1.3	Supplier Responsibilities	5
1.3.1	Prohibited Practices	5
1.3.2	Facility Changes	5
1.3.3	Unauthorized Product Repairs & Salvage	6
1.3.4	Unauthorized Product Changes or Substitutions	6
1.3.5	Use of Non-Conventional Manufacturing Methods	6
1.3.6	Altering Data on Documents	7
1.4	Contract Changes & their Effectivity	7
1.4.1	AWB Initiated Changes	7
1.4.2	Supplier Initiated Changes	7
1.5	Quality Management System Requirements for AWB Suppliers	7
1.5.1	Supplier Quality Management Systems	7
1.5.2	Applicability	8
1.5.3	Quality Management System – Requirements for Aviation Maintenance Organizations per 9110	8
1.5.4	Quality Management Systems – Requirements for Aviation, Space and Defense Distributors per 9120	8
1.5.5	Quality Management Systems – Requirements for Aviation, Space and Defense Organizations per 9100	9
1.5.6	Requirements for the Calibration of Measuring and Test Equipment per ANSI/NCSL Z540.3	9
1.5.7	Other Quality Systems as Directed by AWB Contract	9

Document: AWB-SQRM Appendix P9112	Revision: A	Date: May 2025
Title: Purchase Order Clauses		

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1.5.8	Quality Management System Approval	10
1.6	First Article Inspection Requirements (FAIR)	11
1.7	Certifications.....	12
1.7.1	Delivery Certification.....	12
1.7.2	Certification Requirements.....	13
1.7.3	Certification Language & Content	13
1.7.4	Acceptable & Authorized Signatures.....	13
1.7.5	Electronic Signatures.....	14
1.8	Nonconforming Products & Material Review	14
1.8.1	Identification, Segregation & Control.....	14
1.8.2	Preliminary Review Authority	15
1.8.3	Supplier Material Review Authority.....	15
1.8.4	Submittal to AWB MRB for Disposition	15
1.9	Special Process	16
1.9.1	Qualified Process Sources & Certifications	16
1.9.2	Supplier Notification of Nonconforming Products Delivered to AWB.....	17
1.10	Aircraft Wheel and Brake - Supplier Quality Requirements Manual (AWB-SQRM)...	18
1.11	Statistical Product Acceptance Requirements per AS13002	18
1.12	Supplier E-Business Requirements.....	19
1.13	Requirements for Calibration Laboratories per ANSI/NCSL Z540-3	19
1.14	Imported Product.....	19
1.15	Counterfeit Parts Prevention.....	19
1.16	Contract Line Item & Release Number	20
1.17	Certificate of Conformance (CoC)	20
1.18	FOD Control Program.....	20
2	Quality Assurance Purchase Order Clauses	21
2.1	Supplier Inspection & Quality System Requirements.....	21
2.1.1	AQ040 Variation Management Program per 9103.....	21

Document: AWB-SQRM Appendix P9112	Revision: A	Date: May 2025
Title: Purchase Order Clauses		

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2.1.2	AQ041 Continuous Improvement Plan	21
2.1.3	AQ055 SQA Program Requirements per RTCA/DO - 178	22
2.1.4	AAQ190 Final Source Inspection	22
2.1.5	AAQ195 Delegated Source Inspection.....	22
2.1.6	AAQ196 Supplier Self Release Authority	22
2.1.7	AQ200 Government Source Inspection (GSI)	23
2.2	Supplier Statements of Quality Requirements.....	23
2.2.1	AQ245 Material & Process Summary Report	23
2.2.2	AQ270 Source Control Drawing (SCD) Certification	24
2.2.3	AQ280 Fasteners – Manufacturer & Lot Identification	25
2.3	Control of Raw Material	25
2.3.1	AQ300 Raw Material Verification Program	25
2.3.2	AQ310 AWB Furnished Material.....	26
2.3.3	AQ320 Supplier Furnished Raw Material	26
2.3.4	AQ330 Traceability of Products to Raw Material	28
2.4	Control of Special Processes.....	28
2.4.1	AQ342 Nadcap Accreditation.....	28
2.4.2	AQ350 Heat Treat Certifications.....	28
2.4.3	AQ380 Nondestructive Test (NDT) Reports	29
2.4.4	AQ385 Radiographic (x-ray) Inspection	29
2.5	Control of Castings	29
2.5.1	AQ410 Foundry Control	29
2.5.2	AQ420 Production Castings	31
2.6	Control of Forgings, Extrusions & Pressings	31
2.6.1	AQ430 Pre-Production Controls.....	31
2.6.2	AQ440 Production Forgings, Extrusions & Pressings	32
2.7	Control of Age Sensitive Items, Electronic Devices & Components	32
2.7.1	AQ450 Age Limits for Elastomers.....	32
2.7.2	AQ451 Control of Aerospace Elastomeric Seals & Seal Assemblies.....	33
2.7.3	AQ452 Cure Date Marking	33

Document: AWB-SQRM Appendix P9112	Revision: A	Date: May 2025
Title: Purchase Order Clauses		

This procedure is proprietary property of Aircraft Wheel and Brake, LLC (AWB). Distribution, duplication, and/or usage of this document for use other than manufacturing parts for AWB, is prohibited. Suppliers are responsible to ensure this document's confidentiality. Printed copies are reference only and may not be the current revision.

2.7.4	AQ457 Packaging Requirements for Ethylene Propylene Soft Goods.....	33
2.7.5	AQ460 Limited Shelf Life Materials.....	34
2.7.6	AQ485 Aerospace Electronic Products – General Requirements.....	34
2.7.7	AQ490 Certifications & Test Reports – Electronic Devices.....	34
2.7.8	AQ500 Identification of Electronic Devices	35
2.8	Control of Contamination & Foreign Object Damage (FOD)	35
2.8.1	AQ520 FOD Control Program.....	35
2.8.2	AQ530 FOD Certification	35
2.9	Inspection & Test Reports & Documentation	35
2.9.1	AQ540 1 st Article Inspection at Source	35
2.9.2	AQ560 1 st Article Inspection Requirements (FAIR).....	36
2.9.3	AQ565 Controlled Planning	36
2.9.4	AQ570 100% Inspection Report.....	37
2.9.5	AQ580 Supplier Inspection Report (SIR)	37
2.9.6	AQ585 Supplier Inspection Report of Classified Characteristics	37
2.9.7	AQ590 Final Inspection Report (FIR).....	39
2.9.8	AQ600 Product Serialization Requirements.....	39
2.9.9	AQ605 Product Serialization by the Supplier	39
2.9.10	AQ610 Acceptance Test Procedure (ATP) Approval	39
2.9.11	AQ620 Functional Test Data Sheets.....	39
2.9.12	AQ630 Functional Test Certificate (FTC)	40
2.9.13	AQ645 Controlled Components	40
2.9.14	AQ650 Qualified Parts Certificate (QPC).....	41
2.10	Miscellaneous Requirements	42
2.10.1	AQ660 Manufacturers Catalogs, Drawings, etc.	42
3	Applicable / Reference Documents	42
4	Definitions	45
5	Revision Description.....	47
6	Approval History.....	47

Document: AWB-SQRM Appendix P9112	Revision: A	Date: May 2025
Title: Purchase Order Clauses		

This procedure is proprietary property of Aircraft Wheel and Brake, LLC (AWB). Distribution, duplication, and/or usage of this document for use other than manufacturing parts for AWB, is prohibited. Suppliers are responsible to ensure this document's confidentiality. Printed copies are reference only and may not be the current revision.

1 AQ010 - General Requirements Clause

1.1 Purpose

This document describes the general and special product assurance requirements that are in addition to the requirements in the Aircraft Wheel and Brake, LLC - Supplier Quality Requirements Manual (AWB-SQRM). The requirements specified herein will be used by the divisions of AWB and will be included on the purchase order, contract or other formal agreement (hereafter referred to as the contract) between a supplier and AWB. The purpose of this document is to clearly define for each purchase of products or services, all of the necessary and applicable technical and quality requirements with which the supplier must comply to meet the requirements of AWB, its customers and/or regulatory authorities. For the purpose of this document, the term "AWB" means Aircraft Wheel and Brake, LLC which has entered into a contract with the supplier.

1.2 Scope and Application

This document was developed and has been issued for use by AWB. Unless expressly excluded by the contract, clause AQ010, which includes Sections 1.1 through 1.18 herein applies to all contracts. The "Q" clauses listed in Section 2 apply only when the specific clause number is included on the contract. NOTE: When electronic documents are used by AWB to transmit requirements to the supplier, 'Q' clauses may be flowed-down to the supplier electronically, in attachments that are part of the contract, such as the Manufacturing Quality Instruction (MQI), or Manufacturing Work Instruction (MWI), or other designated method. Compliance by the supplier to all contract requirements is subject to on-site verification by AWB, representatives of AWB, its customers and/or regulatory authorities, or, AWB may request the supplier to provide objective evidence of compliance with all contract requirements.

1.3 Supplier Responsibilities

1.3.1 Prohibited Practices

The following acts and practices are prohibited, unless approved by AWB in writing. Any violation by the supplier may result in disqualification of the supplier for future business with AWB. In addition, the supplier shall invoke (flow-down) the requirements of sections 1.3.2 through 1.3.6 to all of the supplier's sub-tier sources performing work for the supplier that is scheduled for delivery to AWB on the contract.

1.3.2 Facility Changes

During performance on the contract, the supplier shall give AWB written notice 90 days before relocating any production, inspection or processing facilities; or, transferring work between different facilities; or, when applicable, prior to initiating any changes in the source of major

Page 5 of 47

Document: AWB-SQRM Appendix P9112	Revision: A	Date: May 2025
Title: Purchase Order Clauses		

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components procured by the supplier and designated for use in or for installation on products scheduled for delivery to AWB; or, making any other changes which may affect product quality, reliability or integrity. Such changes are subject to AWB review and concurrence prior to shipment of affected products. A change in ownership or a change in the individual designated as the management representative with respect to the supplier's Quality/Inspection System requires the supplier to notify AWB within 30 days. Supplier shall establish an internal procedure for formal notification to AWB that includes; risk assessment/mitigation, transfer plan, demonstration of capacity and demonstrate the existence of buffer stock to mitigate risks to on-time delivery and quality.

1.3.3 Unauthorized Product Repairs & Salvage

The supplier may not perform any repairs such as welding, brazing, soldering, plugging, peening, bushing, or, use of paints, adhesives or plating, or use any standard or other repair practice or method, on products damaged or found to be discrepant during fabrication or processing, or, on defects in castings or forgings, unless such repairs are specifically permitted by the applicable drawing or specification, or are specifically authorized by AWB in writing for each occurrence. Unless specifically authorized by AWB, this prohibition also applies to reworking products by removing plating (stripping) and re-plating. In those cases, where AWB authorized product repair, salvage or stripping has been accomplished, the supplier shall include on the packing list/shipper or on a separate attached document a list of the products that have been subjected to such AWB approved repair, salvage or stripping, and the method used.

1.3.4 Unauthorized Product Changes or Substitutions

The supplier may not make any changes or substitutions to any products or services required by the contract, drawing, specification, standard, or other applicable document without prior written authorization by AWB. Authorization may be contingent on AWB conducting an on-site review of the proposed product or service changes at the supplier's facilities, or the facilities of the supplier's sub-tier sources.

1.3.5 Use of Non-Conventional Manufacturing Methods

Unless required by the drawing, specification, or contract, the supplier may not use Electrical Discharge Machining (EDM), Electro Chemical Machining (ECM), laser or abrasive water jet cutting or drilling, flame spray coatings, or any other non-conventional manufacturing method or process on products scheduled for delivery to AWB without prior written authorization by AWB. This prohibition also applies to the use of such processes by the supplier's sub-tier sources. Authorization by AWB may be contingent on AWB conducting a review and approving the method, facilities, equipment and qualified personnel at the supplier's facilities or the facilities of the supplier's sub-tier sources that will perform the operation or process.

Document: AWB-SQRM Appendix P9112	Revision: A	Date: May 2025
Title: Purchase Order Clauses		

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1.3.6 Altering Data on Documents

The use of any method that causes the original data on documents to be obliterated and unreadable (i.e. the use of correction fluids, correction tape, write-over, or other methods) to correct, modify or otherwise alter the data and/or entries on any certifications, test reports or other documents required by the contract, is strictly prohibited. Corrections may be made on records such as First Article Inspection Reports (FAIR), providing it is clearly obvious that a correction was made and it is signed (initialed) or stamped by an authorized individual. Upon receipt at AWB, products or services represented by documents that show evidence that they have been corrected or altered in an unauthorized manner are subject to return to the supplier at supplier's expense.

1.4 Contract Changes & their Effectivity

1.4.1 AWB Initiated Changes

The supplier shall incorporate, at the specified and agreed upon effectivity points, all changes initiated by AWB and communicated to the supplier through a formal contract change and/or amendment. Such changes may be in the form of revised drawings, specifications, tests, inspection or fabrication methods, etc., and may apply to products as well as to the supplier's management and administrative systems. The supplier's business management system shall include appropriate controls and records, including controls at the supplier's sub-tier sources, which provide objective evidence that changes were incorporated as required by the contract. Objective evidence may be in the form of date, lot, serial number, revision letter, or other positive identification. Such records are subject to on-site verification by AWB at the supplier's facilities or the facilities of the supplier's sub-tier sources.

1.4.2 Supplier Initiated Changes

The supplier shall not make changes in product design, drawings, performance specifications, materials, special processes, or manufacturing processes, procedures, and methods without specific approval by AWB in writing prior to making such changes in products or data. The supplier shall flow-down this requirement to the supplier's sub-tier sources. The supplier will submit product/process change notifications consistent with AS9116 describing all design and process changes for AWB approval.

1.5 Quality Management System Requirements for AWB Suppliers

1.5.1 Supplier Quality Management Systems

AWB recognizes that one Quality Management System (QMS) will not fit all AWB suppliers, and that the supplier's quality management system requirements may be tailored to the products

Document: AWB-SQRM Appendix P9112	Revision: A	Date: May 2025
Title: Purchase Order Clauses		

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or services provided, therefore; the required specific detail quality requirements defined in one or more of the quality system documents referenced below may be required to ensure that the supplier's QMS is appropriate for the products and processes provided to AWB.

1.5.2 Applicability

Upon receipt of a AWB contract, the supplier is responsible for implementing, maintaining and demonstrating on-going compliance with the current revisions of the applicable QMS standards in paragraphs 1.5.3 through 1.5.6, unless otherwise dictated on contract per paragraph 1.5.7. The supplier's QMS is subject to audit, verification, approval and/or disapproval by AWB or its designated representative(s) including AWB customers, the US Government and other regulatory agencies.

The specific QMS document with which a supplier must comply is based on the type of products or services provided by the supplier to AWB. Suppliers may at their option, and at no additional cost to AWB, elect to establish, implement and maintain QMS or procedures that meet higher-level requirements than those specified herein. Audit of the supplier's QMS by AWB, representatives of AWB, their agents, and/or by a recognized third party certification body at the facilities of the supplier or the supplier's sub-tier sources, does not relieve the supplier of the responsibility to furnish products or services that conform to all contract requirements. The supplier shall notify AWB immediately upon loss of certification.

1.5.3 Quality Management System – Requirements for Aviation Maintenance Organizations per 9110

9110 - "Quality Management System – Requirements for Aviation Maintenance Organizations" certified by an accredited certification body in accordance with 9104-001 and listed on the SAE OASIS data base, is the minimum quality management system requirement for suppliers that perform tasks required to ensure the continuing airworthiness of an article, including any one or combination of overhaul, inspection, testing, replacement, defect rectification, and modification or repair.

1.5.4 Quality Management Systems – Requirements for Aviation, Space and Defense Distributors per 9120

9120 - "Quality Management Systems - Aerospace - Requirements for Aviation, Space and Defense Distributors" certified by an accredited certification body in accordance with 9104-001 and listed on the SAE OASIS data base, is the minimum quality management system requirement for suppliers that procure parts, materials and assemblies and resell these products to AWB. This includes organizations that procure products and split them into smaller quantities including those that coordinate a customer controlled service on the product.

Document: AWB-SQRM Appendix P9112	Revision: A	Date: May 2025
Title: Purchase Order Clauses		

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The 9120 standard is not for organizations performing product rework or repair, proceed per 1.5.5

Distributors authorized by AWB to procure Source Control Drawing (SCD) parts, materials and assemblies manufactured, assembled and tested to AWB Source Control Drawing drawings and/or specifications and reselling these products to AWB, must be assessed and found to be in compliance with the applicable elements of 9100 “Quality Management Systems – Requirements for Aviation, Space and Defense Organizations” by AWB.

1.5.5 Quality Management Systems – Requirements for Aviation, Space and Defense Organizations per 9100

9100 - “Quality Management Systems – Requirements for Aviation, Space and Defense Organizations” certified by an accredited certification body in accordance with 9104-001 and listed on the SAE OASIS data base, is the minimum quality management system requirement for suppliers that manufacture, assemble, and/or test products provided to AWB and/or perform rework or repair (delegation required for repair per AQ160) to AWB’s design.

1.5.6 Requirements for the Calibration of Measuring and Test Equipment per ANSI/NCSL Z540.3

The supplier shall establish, document and maintain a system that is in compliance with the applicable revision of ANSI/NCSL Z540.3 (Systems exceeding Z540 like ISO/IEC 17025 are acceptable). The supplier's calibration system is subject to audit, verification and approval and/or disapproval by AWB or its designated representative(s).

1.5.7 Other Quality Systems as Directed by AWB Contract

Regardless of compliance to 1.5.3 through 1.5.6, the contract may direct application of selected Quality Management Systems such as:

- Quality System - FAA-PMA Holder
- AWB Document BQMS-1000, FAA Part 21 Supplement
- Quality System – Production Certificate (FAA-PC) Holder
- Quality System – FAA-TSOA Holder
- Inspection System per NASA NHB 5300.4(1c) Inspection System Provisions for Aeronautical & Space Materials, Parts and Services
- Quality System per EASA Part 21
- Inspection System per US 14 CFR 145
- Inspection System for Maintenance Organization per EASA Part 145

Document: AWB-SQRM Appendix P9112	Revision: A	Date: May 2025
Title: Purchase Order Clauses		

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- or, other specific written contractual requirement.

1.5.8 Quality Management System Approval

Prior to addition of a supplier to the AWB Approved Supplier List (ASL), an initial on site assessment of the supplier's ability to comply with one of the applicable QMS requirements, as shown above, must be accomplished by AWB Quality. Such assessments may include the supplier's sub-tier sources.

AWB, at its option, may elect to forego subsequent assessments and consider the supplier's QMS acceptable if the supplier's QMS has been assessed and 'certified' to be in compliance with the industry standards shown above, by a recognized third party certification body. Certification bodies must be accredited and listed in the SAE OASIS database. Accreditation by certification body does not preclude AWB from conducting its own assessment nor relieve the supplier from meeting all requirements specified in the AWB contract.

AWB reserves the right to schedule and conduct supplier assessments at any time during contract performance. Such assessments may be product/service related and may cover specific QMS elements and/or a complete QMS re-assessment. The purpose of such assessments is to ensure that the supplier's QMS is effective in continuously providing product or service quality, as well as to examine objective evidence that the supplier is in compliance with all AWB contract requirements.

Suppliers that currently provide products and services to AWB are listed on the AWB Group ASL.

Periodic re-assessment of the supplier's QMS may be accomplished by AWB, or by an approved certification body. AWB may accept subsequent assessments by a certification body providing such assessment is conducted on site at the supplier within 12 months of the previous assessment. AWB reserves the right to participate in supplier assessments conducted by a certification body.

During contract performance, the supplier is required to give AWB written notice when making any changes to their Level 1 Quality Management System document (Quality Manual) or when significant changes in management personnel that have responsibility for quality of product or service furnished to AWB occur.

In those cases, where the initial assessment of the supplier's QMS was accepted by AWB and the supplier elects to allow the accreditation to expire, requests exemptions to any elements of the previously approved QMS standard, or if the supplier's QMS is disapproved by the certification body during a re-assessment audit, the supplier is required to immediately notify AWB in writing. The supplier will also provide to AWB, the details, circumstances and/or third party audit report that resulted in the QMS status change or disapproval. AWB, at its option, may elect to conduct an on-site

Document: AWB-SQRM Appendix P9112	Revision: A	Date: May 2025
Title: Purchase Order Clauses		

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evaluation to determine the impact of such changes on previous approvals or to assess the potential effect on product or service quality.

1.6 First Article Inspection Requirements

The supplier shall submit a First Article Inspection (FAI) in accordance with the requirements of the current revision of AS9102 for new product and when any of the following occur:

- A change in design.
- A change in any manufacturing source, processing source, process, inspection method (including functional test requirements), location of manufacture, tooling, or materials.
- A change in numerical control program or translation to another media.
- A natural or man-made event, which may adversely affect the manufacturing process.
- A lapse in production for two years or as specified by AWB.
- A AWB drawing which references a standard hardware item (e.g., "NAS," "MS") and that item is modified from the original purchased configuration and/or has additional characteristics. In this case, the FAIR shall include data for only those characteristic(s) that were changed and/or added.
- Altered Item Drawings with specific dimension requirements.
- AWB made to customer print items.
- When requested by either internal/external customer.
- When the revision of the drawing is changed, even if it has not affected the specific configuration.

Note: Each revision requires a First Article Inspection Report (FAIR). If multiple revisions are incorporated, they may be included on one FAIR and would include an update of all characteristics that changed for each revision.

Note: The potential impact to form, fit, and function exceptions as cited in AS9102 do not apply to AWB products.

Note: If the supplier is planning to use statistical methods for product acceptance for production (less than 100% inspection) the requirements of P9112 paragraph 1.11 apply.

Exceptions not requiring a FAI are:

- Parts and assemblies rejected on a previous FAI do not require another Full FAI. The characteristic(s) noted as nonconforming and any affected characteristic as deemed necessary by the responsible Quality Assurance Representative (QA) are inspected and documented on a partial FAIR.
- Standard hardware, proprietary off the shelf if unmodified and whose characteristics are established

Document: AWB-SQRM Appendix P9112	Revision: A	Date: May 2025
Title: Purchase Order Clauses		

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100% by non-customer drawings (e.g., NAS, MS), or deliverable software.

- Contractually excluded parts/assemblies.

The FAIR data package includes a ballooned drawing and completed 9102 forms as follows:

- Form 1 - a list of the applicable detail drawings;
- Form 2 - a list of the standard parts, material or processes; and
- Form 3 - the actual results for each drawing dimension and notes.

Excess products, remaining from a previous production lot, may not be used to fulfill the FAIR requirements.

When it is not physically possible to perform the FAI on a single product, data from multiple products can be used, providing all parts have been manufactured using the same engineering definition, bill of material, supply chain, and method of manufacture (including measurement method). The FAI report shall be annotated to signify the use of multiple product and provide traceability of those products used to obtain the inspection results.

Programmers for Coordinate Measuring Machine (CMM) during FAI activity shall be independent to those programming product measurement equipment supporting the production process.

Note: Coordinate Measuring Machines used for FAI do NOT have to be independent to those used for product measurement during production activities.

When a CAD model is used for programming, the model shall not be used to create both the manufacturing and CMM/Inspection programs.

The supplier shall furnish a copy of the completed FAIR results with the initial delivery of products on the contract.

1.7 Certifications

1.7.1 Delivery Certification

By delivering products or services to AWB required by the contract, the supplier certifies that such products or services are in compliance with all applicable requirements of the contract, and objective evidence of compliance is available and will be furnished to AWB for review upon request.

1.7.2 Certification Requirements

The supplier shall furnish with the initial delivery of products and/or services on the contract, all

Document: AWB-SQRM Appendix P9112	Revision: A	Date: May 2025
Title: Purchase Order Clauses		

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certifications, test reports and other documents (hereafter certifications), issued by the supplier or by the supplier's sub-tier sources that are required by the specific "Q" Clauses listed on the contract. The supplier is responsible to ensure that all certifications furnished by the supplier, or by the supplier's sub-tier sources, are complete, legible and reproducible, accurate and in compliance with all contract requirements. AWB reserves the right to return all products to the supplier at supplier's expense when the certifications that support the products and/or services are not properly executed. When the contract includes provisions for incremental deliveries by the supplier, after the initial delivery of products/services and required certifications, the supplier may, on subsequent deliveries, either provide additional copies of the certifications, or note on the packing list/shipper and the Certificate of Conformance (CoC), the date when the original certifications applicable to the current delivery were initially furnished to AWB.

1.7.3 Certification Language & Content

All certifications shall be in the English language and as a minimum include the following information and data:

- a) Name of the issuing organization (supplier and/or supplier's sub-tier source)
- b) Part number and revision. Unless specified by contract, revision status is not required for off-the-shelf electronic components, catalog items and/or standard parts
 - Control Systems Division only - Part number on the certification is not required for Raw Material (RM****) for the supplier's sub-tier source.
- c) Quantity processed and/or delivered
- d) Lot or batch number (when applicable)
- e) AWB contract number, and if applicable the line item & release number (AWB direct suppliers only)
- f) Title and signature that meets the requirements of 1.7.4 and 1.7.5, of the authorized official of the issuing organization.
- g) Certifications issued by supplier's sub-tier sources shall include information and data required by (a), (b), (c), (d), and (f) above
- h) Suppliers that are required to furnish certification(s) to AWB that were issued by their Sub-tier source shall reference the certification(s) on their shipping documents, Certificates of Conformance (Paragraph 1.17) and/or Materials & Processes Summary Report (AQ245).

1.7.4 Acceptable & Authorized Signatures

All certifications and test reports shall include the title and acceptable signature of the authorizing company official. The following methods are the only AWB approved and acceptable methods for applying signatures to certifications:

Document: AWB-SQRM Appendix P9112	Revision: A	Date: May 2025
Title: Purchase Order Clauses		

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- a) Actual signatures rendered in ink by the signing official;
- b) Facsimiles of actual signatures such as rubber stamps; or
- c) Machine or computer graphics generated facsimile signatures.

The title of the authorizing company official may be in a printed or hand written format. When quality or inspection stamps are used in lieu of actual signatures, such stamps shall clearly identify the issuing organization and the authorized individual to whom the stamp is assigned. The issue, use and control of such stamps shall be governed by documented procedures in the supplier's Quality Management System.

1.7.5 Electronic Signatures

When the supplier elects to use electronic signatures on electronic documents, the following rules apply:

- a) application of electronic signature must be under the direct control of the person whose name appears on the document,
- b) electronic signature may only be applied at the location or facility where the individual is located and the individual must have direct access to the products or services, and supporting data to monitor the process, perform inspections and ensure that the products or services conform to all contract requirements,
- c) the preparation of electronic documents and application of electronic signatures is governed by documented procedures in the supplier's Quality Management System to ensure the validity and integrity of all electronic documents, and
- d) by application of an electronic signature, the supplier certifies that the signature was applied by the authorized company official in compliance with (a), (b) & (c) above

1.8 Nonconforming Products & Material Review

1.8.1 Identification, Segregation & Control

Any products found to be nonconforming to AWB drawings, specifications, contract, or other applicable requirements either by the supplier or the supplier's sub-tier sources, shall be identified, segregated and reworked or replaced with conforming products prior to delivery to AWB. AWB reserves the right to reject and return any nonconforming products to the supplier at the supplier's expense.

1.8.2 Preliminary Review Authority

The supplier is authorized to conduct Material Review and disposition nonconforming products identified by the supplier using the following disposition alternatives:

Document: AWB-SQRM Appendix P9112	Revision: A	Date: May 2025
Title: Purchase Order Clauses		

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- a) rework to applicable requirements,
- b) scrap, or
- c) RTV – return to (the supplier's) sub-tier source for rework or replacement.

Nonconforming products are defined as any products that fail to meet the requirements of the AWB engineering drawing, specification, contract or other approved product description, including products (such as products under the supplier's proprietary design control) which fail to meet requirements established and controlled by the supplier or the supplier's sub-tier sources. The supplier may propose and formally request a “use-as-is” or repair (salvage) disposition from AWB by submitting the appropriate request to the AWB Buyer in accordance with the requirements defined in section 1.9.4 herein. The supplier's Material Review and nonconforming product disposition records, as well as the Material Review records at the supplier's sub-tier sources are subject to on-site verification by AWB to ensure that the supplier is in compliance with the requirements of this clause. The supplier shall have a documented system to mitigate risk when performing Rework and RTV dispositions to ensure that parts reworked at the supplier or its sub tier comply fully with blueprint requirements including process stability (e.g. Process FMEA analysis of the rework methods).

1.8.3 Supplier Material Review Authority

Unless the supplier is granted Material Review authority by inclusion of Clause AQ160 on the contract, all nonconforming material shall be submitted to AWB for disposition in accordance with 1.9.4.

1.8.4 Submittal to AWB MRB for Disposition

Unless otherwise specified in the contract, in order for the supplier to submit nonconforming products to AWB Material Review Board (MRB) for disposition, the supplier shall document all nonconforming conditions in accordance with the requirements of 9131 and submit a request to the AWB Buyer. AWB MRB will not accept for review and disposition any products that can be reworked to meet drawing or specification requirements, or, are obviously scrap. After review and disposition by AWB MRB, a copy of the form describing the MRB disposition will be returned to the supplier. A ‘use-as-is’ or ‘repair’ (salvage) disposition by MRB does not relieve the supplier of the legal responsibility and liability for such products.

1.9 Special Process

1.9.1 Qualified Process Sources & Certifications

All special processes must be performed by sources approved by AWB. Use of processes and/or

Document: AWB-SQRM Appendix P9112	Revision: A	Date: May 2025
Title: Purchase Order Clauses		

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process sources that have not been approved by AWB may result in return of all products to the supplier at the supplier's expense. Unless otherwise directed by the contract or the procuring AWB division, the supplier shall select process sources from the list of AWB approved process sources that can be found on the 'Internet' on AWB home page, or by contacting the AWB Buyer. The following requirements apply (excluding Source Controlled Product, Standard Hardware, and Raw Material Mill and Conversion Company):

- A. SPECIAL PROCESS – Is the application of chemical, metallurgical, nondestructive or any other special manufacturing, joining or inspection processes, controlled by Federal, Military, US Government, Industry (i.e. AWB, Boeing, General Electric, etc.), National, International, or other specifications. All special processes shall be performed only by those sources currently approved for the specific process by AWB. In addition, when required by a AWB customer, the supplier may be required to use customer approved special process sources. Upon request, AWB will provide the supplier with a list of the approved process sources.
- B. PROPRIETARY PROCESS – Prior to initial application of a process that is controlled by a proprietary specification developed by the supplier or the supplier's sub-tier source, the supplier shall furnish a copy of the specification, or sufficient technical data to AWB (subject to normal proprietary rights consideration and nondisclosure agreement) so that AWB can determine whether adequate process controls exist to ensure that the proprietary process will yield products that meet all AWB technical and quality requirements. In addition, the supplier shall notify AWB when any changes to the proprietary process are planned so that AWB can evaluate the potential impact on product technical or quality requirements.
- C. PROCESS CERTIFICATIONS - For all special processes required by the contract or reference documents, the supplier shall furnish to AWB, with the delivery of products, the certification/test report issued by company that actually performed the process. All certifications/test reports shall meet the requirements of section 1.7 herein, and as a minimum include a complete description of the special process performed, including:
 - a) process name, applicable specification and revision, type, class, grade, etc.,
 - b) when applicable, a statement that the process was performed by certified operator(s), and
 - c) in the case of priority process (ref. AQ341), that the process was performed in accordance with the AWB approved process control document.
- D. REWORK - In those cases where products have been subjected to AWB approved rework, repair and/or salvage processes (see section 1.3.3), the certifications shall include a description of the process used and the quantity of parts subjected to the process.

1.9.2 Supplier Notification of Nonconforming Products Delivered to AWB

When the supplier has determined that nonconforming product(s) have been delivered to AWB,

Document: AWB-SQRM Appendix P9112	Revision: A	Date: May 2025
Title: Purchase Order Clauses		

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the supplier shall notify the AWB Buyer within twenty-four (24) hours of the initial discovery. The supplier shall use receipt acknowledged e-mail or other positive notification method. The notification shall include the following information:

- a) supplier name
- b) AWB contract number
- c) part number and description
- d) affected quantity and serial numbers (if known)
- e) dates delivered (if known)
- f) brief description of the nonconforming condition

The initial notification shall be followed by a formal "Disclosure Letter" delivered to the AWB Buyer within five (5) days of the initial notification. The Disclosure Letter shall include the following information:

1. Complete description of the nonconforming condition(s)
2. The affected quantity of products (including serial numbers when applicable) and dates delivered to AWB
3. Potential effect of the nonconformance on the performance, reliability, safety and/or usability of the product(s) if known
4. Recommendations for AWB action including for products that AWB may have already delivered to its customers
5. Immediate action taken by supplier to contain the nonconformance and nonconforming products
6. Root cause analysis of the nonconforming condition
7. Root cause corrective action plan and schedule
8. The plan and schedule for verifying the effectiveness of the corrective action

In those cases where (1) through (8) above are under investigation and incomplete, the supplier may request, from the AWB Buyer, authority to submit an interim disclosure letter. The interim letter shall include as much information as available and identify the due date for completion of the investigation and the date final disclosure letter that includes all (1) through (8) data will be submitted to AWB. AWB reserves the right to participate in the nonconforming product investigation at the facilities of the supplier or its sub-tier sources.

1.10 Aircraft Wheel and Brake, LLC - supplier Quality Requirements Manual (AWB- SQRM)

The AWB-SQRM is applicable to all production contracts with suppliers.

Document: AWB-SQRM Appendix P9112	Revision: A	Date: May 2025
Title: Purchase Order Clauses		

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1.11 Statistical Product Acceptance Requirements per AS13002

When statistical methods for product acceptance are planned, the supplier shall submit their proposed alternate inspection frequency plan to AWB for review and concurrence prior to use. Statistical Product Acceptance Requirements shall conform to AS 13002 unless an alternate method is specified by contract.

Exceptions to AS13002:

In determining capability of the production measurement system, and when capability is demonstrated through the use of Gage R&R, the maximum acceptable R&R percentage is 10% (Ref. AS13002, section 5.1.5).

Note: An R&R percentage between 10 and 30 percent may be acceptable for some applications with AWB approval.

Sample inspection shall be suspended immediately following any non-conformance and until corrective action has been implemented and the process has once again demonstrated acceptable capability through statistical data and/or appropriate technical justification as approved by AWB (Ref. AS13002, section 5.6.3).

Any characteristic affected by process change and subject to a full or partial FAI, as defined in AWB FAI Requirements, shall be reviewed with AWB to determine what actions and/or re-approval may be required to continue with the alternate inspection frequency plan. As a minimum, all characteristics affected by the process change shall demonstrate acceptable capability through statistical data and/or appropriate technical justification, as approved by AWB, prior to continuing the alternate inspection frequency plan for those characteristics (Ref. AS13002, section 5.7.3).

A relevant capability analysis assessed against minimum acceptable criteria Ppk 1.65 for Key characteristics, 1.33 for Major characteristics or 1.0 for Minor characteristics is required as part of the Data Pack Contents (Ref. AS13002, section 7.1.1 Data Pack Contents Column).

In addition to AS13002 Sampling Tables (Ref. Table 2 - Major characteristics sampling table and Sample Table 3 – Minor characteristic sampling table) the following sampling table shall be used for all characteristics designated by AWB as “Key” characteristics:

Document: AWB-SQRM Appendix P9112	Revision: A	Date: May 2025
Title: Purchase Order Clauses		

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Key characteristics sampling table

Key	Batch Size							
Ppk	Up to 10	11 to 20	21 to 30	31 to 45	46 to 60	61 to 90	91 to 120	121 to 150
2 and above	2	2	2	3	4	5	6	6
1.66 to 1.99	3	4	5	5	6	9	12	15
1.33 to 1.65	ALL	ALL	ALL	ALL	ALL	ALL	ALL	ALL
Less than 1.33	ALL	ALL	ALL	ALL	ALL	ALL	ALL	ALL

Key	Batch Size						
Ppk	151 to 200	210 to 250	251 to 300	310 to 500	501 to 750	751 to 1000	1001 to 2000
2 and above	8	10	12	20	30	40	50
1.66 to 1.99	20	20	20	25	38	40	50
1.33 to 1.65	ALL	ALL	ALL	ALL	ALL	ALL	ALL
Less than 1.33	ALL	ALL	ALL	ALL	ALL	ALL	ALL

NOTE: Batch sizes above 2000, sample size to be agreed upon with AWB.

1.12 Supplier E-Business Requirements

AWB suppliers are required to use the AWB supplier Management System Web page.

1.13 Requirements for Calibration Laboratories per ANSI/NCSL Z540-3

Moved to AQ010 paragraph 1.5.6 for a better fit under the newly added QMS Requirements section 1.5.

1.14 Imported Product

Product imported into the U.S. shall be permanently, legibly, and conspicuously marked, in English, with the words "made in [foreign country]." If the product is imported in a package, such as a box or bag, the outside of the package should also be marked legibly and conspicuously with the words "made in [foreign country]." The outer packing crates and shipping boxes in which products enter the U.S. should also be legibly and conspicuously marked "made in [foreign country]."

1.15 Counterfeit Parts Prevention

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.

Document: AWB-SQRM Appendix P9112	Revision: A	Date: May 2025
Title: Purchase Order Clauses		

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1.16 Contract Line Item & Release Number

AWB may issue contracts that contain more than one contract line item and may also contain one or more release numbers against each contract line item. In such cases, the supplier shall include on the supplier's packing list/shipper the AWB contract line item & release number against which the delivery of products or services is made.

1.17 Certificate of Conformance (CoC)

With each delivery of products on this contract, the supplier shall include on the packing list/shipper or on a separate attached document, a written statement titled "Certificate of Conformance" which complies with the requirements of section 1.7 herein and is worded substantially as follows:

"This is to certify that all products or services delivered on this contract (number) and packing list/shipper (number) are in compliance with all requirements of the contract. Objective evidence to support this certification will be made available to AWB for review upon request."

Company Name:	
Address:	
Title of Authorized Individual:	
Signature/Stamp:	Date:

1.18 FOD Control Program

The supplier shall establish, document and maintain a program to control and eliminate Foreign Object Damage (FOD) and/or contamination during the supplier's manufacturing, assembly, test and inspection, and packaging/shipping (e.g. use of FOD causing materials like Styrofoam packing beads) operations. When applicable, the supplier's FOD control program shall include controls to preclude FOD or contamination at the supplier's sub-tier sources. AS9146 shall be used as a guide to establish and implement the supplier's FOD program. The supplier's FOD program is subject to on-site review and approval by AWB.

Document: AWB-SQRM Appendix P9112	Revision: A	Date: May 2025
Title: Purchase Order Clauses		

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2 Quality Assurance Purchase Order Clauses

("AQ" Clauses from Section 2 apply only when included on the contract)

2.1 Supplier Inspection & Quality System Requirements

2.1.1 AQ040 Variation Management Program per 9103

The supplier shall establish and maintain a Variation Management Program in compliance with the current requirements of 9103 - "Variation Management of Key Characteristics." 9103 requires the use of statistical methods to control manufacturing and processing operations. The supplier's variation management program is subject to audit, verification and approval and/or disapproval by AWB designated representative(s).

2.1.2 AQ041 Continuous Improvement Plan

Key Characteristics have been identified on this Purchase Order. Variation management of Key Characteristics using statistical methods to control manufacturing processes is required for key characteristics identified by AWB on the drawing or by separate documentation, (MQI, CPI or other). The supplier will be required to measure those features and demonstrate capability by performing data analysis and calculating Cpk (or an equivalent attribute measure of Capability) for each characteristic.

The supplier is required to provide copies of the capability study, with each delivery, until a minimum of three manufacturing lots, having a Cpk of 1.67 or greater, are shipped. Key Characteristic demonstrating capability may be monitored with statistical process control per P9112, Section 1.11. Key characteristics that have not achieved a Cpk of 1.67 will require data submittals, showing 100% inspection, with each delivery.

Sample Lot size shall be a minimum of thirty (30) pieces from a continuous manufacturing lot (Same material, Tooling and set up). Sample lot/batch number shall be documented on copies of capability studies.

The supplier's variation management program is subject to audit, verification and approval by AWB designated representative(s), or its customers.

The requirements for process capability and control does not supersede drawing requirements and shall not be used as accept or reject criteria for the noted feature.

When the supplier has achieved a Cpk of 1.67 on all key characteristics, a statement shall be included on supplier's certificate of conformity for the life of the program stating "The supplier certifies all key characteristics identified by AWB meet or exceed a 1.67 Cpk".

Document: AWB-SQRM Appendix P9112	Revision: A	Date: May 2025
Title: Purchase Order Clauses		

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2.1.3 AQ055 SQA Program Requirements per RTCA/DO - 178

The supplier shall establish and maintain a Software Quality Assurance (SQA) Management and Development Program in compliance with the current requirements of documents RTCA/DO-178. The supplier's SQA Management and Development Program is subject to audit, verification and approval and/or disapproval by AWB designated representative(s).

2.1.4 AQ190 Final Source Inspection

Products to be delivered on this contract require final source inspection, tests or both by a AWB Quality Assurance representative, prior to delivery to AWB. The supplier shall notify AWB at least forty-eight (48) hours in advance of the time the products will be ready for final inspection. Upon request, the supplier shall make available to the AWB representative any measuring and test equipment, facilities, records and personnel to facilitate the final source inspection.

Note: AQ185 or AQ195 may be called out in conjunction to this quality code.

2.1.5 AQ195 Delegated Source Inspection

Products or services to be delivered on this contract require final inspection, tests or both, by a representative(s) in the supplier's quality organization delegated and authorized by AWB to perform inspection and/or tests on behalf of AWB. Such inspection and/or tests shall be accomplished prior to delivery of products to AWB and be accomplished at the supplier's facilities and/or the facilities of the supplier's sub-tier sources. The delegated representative(s) is responsible for assuring that products delivered to AWB conform to all contract requirements. Upon receipt of this contract, notify the delegated representative(s) so that appropriate planning and scheduling can be accomplished to conduct the required inspection and/or testing to meet the contract required delivery schedules. The supplier shall make available to the delegated representative any measuring and test equipment, facilities, records and personnel to facilitate the delegated source inspection.

2.1.6 AQ196 Supplier Self Release Authority

Under the AWB supplier Self-Release Program, the supplier has been delegated authority to perform final inspection on behalf of AWB and release product(s) for delivery to AWB. AWB Quality Assurance reserves the right to conduct product integrity audits, quality system assessments, verify supplier's conformance to the AWB self-release program requirements and to revoke delegation authorization. Inability to maintain an acceptable level of quality performance by the supplier may result in cancellation of self-release authority by exclusion of specific part number(s) or the authority in its entirety. With each delivery of products on this contract, the supplier shall include on the packing list/shipper or a separate attached document a written statement titled "Self-Release Certificate" which complies with the requirements of section 1.7 herein and is worded

Page 22 of 47

Document: AWB-SQRM Appendix P9112	Revision: A	Date: May 2025
Title: Purchase Order Clauses		

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substantially as follows: "This is to certify that all products, Part (Number), authorized for self-release and delivered on this contract (number) and packing list/shipper (number) have been inspected in accordance with the AWB supplier Self-Release Program and comply with all requirements of the contract. Objective evidence to support this certification will be made available to AWB for review upon request"

Company Name:

Address:

Title of Authorized Individual:

Signature/Stamp:

Date:

2.1.7 AQ200 Government Source Inspection (GSI)

US Government Source Inspection (GSI) is required prior to delivery to AWB. Upon receipt of this contract, the supplier shall promptly notify the US Government representative who normally services the supplier's plant, in order that the US Government representative can accomplish appropriate planning for conducting source inspection at the supplier's facilities. If the supplier cannot locate the US Government representative to arrange for the required source inspection, the supplier shall notify the AWB Buyer immediately. Upon request, the supplier shall make available to the US Government representative any measuring and test equipment, facilities, records and personnel to facilitate the Government source inspection.

2.2 Supplier Inspection & Quality System Requirements

2.2.1 AQ245 Material & Process Summary Report

After 1st article approval, the supplier may, in lieu of providing AWB the original, or true copies of the original, certifications and test reports, issued by the supplier or the supplier's sub-tier sources, instead, furnish a completed Material & Process Summary Report with each delivery of products on the contract and meet the requirements of section 2.5 herein.

Unless otherwise specified, the Summary Report format is optional, however, as a minimum it shall contain the following information:

- a) part number;
- b) drawing revision;
- c) contract Number and if applicable the line & release number;
- d) packing list/shipper number;

Document: AWB-SQRM Appendix P9112	Revision: A	Date: May 2025
Title: Purchase Order Clauses		

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- e) material and/or process description;
- f) material and/or process specification number and revision, including type, grade, class, etc.;
- g) material and/or process quantity;
- h) name and location of AWB approved special processor (ref. AQ010 1.7) and/or material supplier, including country of origin for all raw material used
- i) material heat lot and/or traceability number to processes
- j) statement of conformance attesting that the information on the Summary Report is accurate and true; and
- k) the supplier's company name and the name and signature or stamp (per 1.7.4) and title of the authorized company official who issued the Summary Report.

In addition, all materials and processes listed on the Summary Report shall comply with the applicable requirements of Clauses AQ320 and AQ010 1.7 and when applicable, be performed by AWB approved sources. The supplier shall maintain the original certifications and test reports in a manner so that upon AWB's request, they can be retrieved and furnished to AWB within twenty-four (24) hours. In addition, the supplier shall notify AWB in writing prior to disposal or destruction of the original certifications and test reports listed on the Summary Report and give AWB an opportunity to obtain possession of the original certifications and test reports.

2.2.2 AQ270 Source Control Drawing (SCD) Certification

The supplier shall certify that the products have been designed and manufactured and are in compliance with all of the requirements of the current revision of AWB SCD, or, that the product is an existing Commercial-Off-The-Shelf (COTS) item, whose configuration is controlled by the supplier and the item is in compliance with all of the construction, performance, installation and interchangeability characteristics specified by the AWB SCD. With each delivery of products on this contract, the supplier shall include on the packing list/shipper or on a separate attached document a written statement titled "Production Certificate" which complies with the requirements of section 1.7 herein and is worded substantially as follows:

"This is to certify that the products delivered on this contract (number) and packing list/shipper (number) comply with all requirements specified by the AWB SCD. Objective evidence to support this certification will be made available to AWB for review upon request."

Company Name:

Address:

Title of Authorized Individual:

AWB SCD No.:

Rev:

supplier P/N:

Rev:

Title of Authorized Individual:

Signature/Stamp:

Date

Document: AWB-SQRM Appendix P9112	Revision: A	Date: May 2025
Title: Purchase Order Clauses		

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2.2.3 AQ280 Fasteners – Manufacturer & Lot Identification

The supplier shall provide on the packing list/shipper or on separate attached document information that identifies the fastener manufacturer and the manufacturer's production lot or batch number. In addition, the supplier shall verify and certify that the manufacturer (or other source) of the fasteners is not currently listed as a "debarred, suspended, or ineligible Contractor" on the current issue of the "lists of parties" published by the US Government, General Services Administration (GSA). For additional information and resolution of eligibility questions, contact the AWB Buyer.

2.3 Control of Raw Material

2.3.1 AQ300 Raw Material Verification Program

The supplier shall develop, document and implement a raw material (sheet, plate, bar, rod, etc.) verification program that will ensure that all material received from the supplier's sub-tier sources meet all applicable technical and quality requirements. The supplier's verification program shall include provisions for monitoring and testing all raw materials (every bar, billet, etc.). In addition to this testing the supplier shall compare the chemical, physical and mechanical properties data stated on the mill certification against the material specification requirements and document the comparison. The raw material verification program shall include a statistically valid over-check of the chemical composition to verify specification compliance for all raw materials. The over-check is accomplished by conducting a quantitative chemical analysis such as (X-ray Fluorescence (XRF), Optical Emission Spectroscopy (OES), Energy Dispersive X-ray Spectroscopy (EDS), etc.), or by having such a measurement performed by a laboratory meeting one of the following conditions: those listed on the AWB Approved Process supplier List (APSL); a laboratory accredited by PRI-Nadcap, A2LA or other accreditation body recognized by the International Laboratory Accreditation Cooperation (ILAC) and listed in the Signatories to the ILAC Mutual Recognition Arrangements (MRAs). Raw material verification programs must be approved by AWB. Records showing the results of the supplier's material verification program and its effectiveness shall be available to AWB for review upon request. The supplier shall implement appropriate storage and controls to preclude commingling of different heat/lots or batches of material.

2.3.2 AQ310 AWB Furnished Material

AWB furnished raw material (bar stock, castings, forgings, etc.), machined or partly machined parts (not for in-process manufacturing) and/or components (fittings, connectors, etc.) to the supplier for use in or on products to be delivered on this contract. The supplier shall establish and maintain strict accountability for all AWB furnished material to ensure that it is properly used and accounted for. The supplier shall establish required controls to ensure

Document: AWB-SQRM Appendix P9112	Revision: A	Date: May 2025
Title: Purchase Order Clauses		

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traceability of the raw material to the finished product and furnish material traceability records with the delivery of products to AWB. For components, unless individual component traceability is required by contract, the supplier shall ensure that such components are used only on products to be delivered to AWB on the contract. Unless otherwise specified by the contract, the supplier shall return any unused AWB furnished material to AWB with the last delivery of products on the contract. With each delivery of products on this contract, the supplier shall include on the packing list/shipper or on a separate attached document a written statement which complies with requirements of section 1.7 and is worded substantially as follows:

“This is to certify that all products delivered on this contract (number) and packing list/shipper (number), were manufactured using: (a) material furnished by AWB; (b) the material identified on the material and/or the AWB shipper, and (c) no material substitution was made. Objective evidence to support this certification will be made available to AWB for review upon request.”

Company Name:	
Address:	
Title of Authorized Individual:	
Signature/Stamp:	Date:

2.3.3 AQ320 supplier Furnished Raw Material

With each lot of raw material delivered or used to fabricate products on this contract, the supplier shall furnish a “Certification/Material Test Report.” When more than one heat/lot of raw material is delivered at the same time, each heat/lot of material shall be identified and provide traceability to its Certification/Material Test Report. In the event that more than one heat/lot of raw material was used to fabricate products, the products produced from each heat/lot shall be identified and/or packaged separately to maintain integrity and to provide traceability to the applicable material Certification/Material Test Report.

Raw Material from Foreign Sources – Prior to delivery or use of any raw material produced outside the United States, the supplier shall submit a request to the AWB Buyer for approval to use the raw material for each Part Number being supplied. AWB approval may be contingent on on-site evaluation of the source of the material as well as additional and independent material testing and analysis to determine that the material meets all applicable requirements. AWB reserves the right to reject and return to the supplier at supplier’s expense any raw material, or products made from raw material, when the source that produced the raw material is outside the United States. The supplier shall submit a copy of the AWB “approved” request to use raw material from foreign sources with each delivery of products where the raw material from the foreign source was used.

MATERIAL TEST REPORT. Unless otherwise specified by the contract, each Certification/Material
Page 26 of 47

Document: AWB-SQRM Appendix P9112	Revision: A	Date: May 2025
Title: Purchase Order Clauses		

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Test Report shall include name of the company that furnished the material and the following information and data:

- a) Material description, including, as applicable, name or designation, size or weight, alloy, type, class, grade or condition,
- b) Lot, batch or heat number, and
- c) The applicable specification and revision to which the material complies. With each delivery of raw material/products on this contract, the supplier shall include on the packing list/shipper or on a separate attached document, a written statement which complies with the requirements of section 1.7 herein, and is worded substantially as follows:

“This is to certify that all (material) (products) delivered on this contract (number) and packing list/shipper (number), (complies with) (were fabricated from material represented by) the attached Certifications/Material Test Reports. Objective evidence to support this certification will be made available to AWB for review upon request.”

Company Name:	
Address:	
Title of Authorized Individual:	
Signature/Stamp:	Date:

In addition to the requirements above, when the material furnished or used to fabricate products, is one of the types listed below, the Certification/Material Test Report shall include the following information and data:

- A. FERROUS MATERIALS. The Certification/Material Test Report shall include data that shows the actual test results obtained from the lot or heat of material versus the values required by the applicable material specification for:
 - a) chemical composition, and
 - b) physical properties
- B. NON-FERROUS MATERIALS. Unless otherwise required by the material specification or contract, the Certification/Material Test Report shall show:
 - a) the typical or range of values of the chemical composition of the material,
 - b) the range of physical properties of the material, and
 - c) include a statement that the material conforms to the applicable material specification.
- C. NON-METALLIC MATERIALS. The Certification/Test Report, issued by the manufacturer of the material, shall show:
 - a) the specification and revision to which the material conforms,

Document: AWB-SQRM Appendix P9112	Revision: A	Date: May 2025
Title: Purchase Order Clauses		

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- b) the lot/batch number (if applicable),
- c) the date manufactured,
- d) any other technical data (material test results, composition, chemical or physical properties, etc.) required by the applicable material specification or contract.

2.3.4 AQ330 Traceability of Products to Raw Material

For each lot of products delivered to AWB, the supplier shall provide positive traceability of each individual product to the material certification/test report that represents the raw material from which each of the products was manufactured. Traceability may be provided by identifying the raw material heat, lot, batch or melt number from the certification/test report on tags attached to each product and/or on packaging (when used). Heat/lot identification required by applicable specifications, such as for castings and forgings is acceptable for traceability purposes provided it is clearly marked and not obliterated by subsequent operations.

2.4 Control of Special Processes

2.4.1 AQ342 Nadcap Accreditation

Special processes shall only be performed by sources that are accredited and approved by Nadcap. This requirement applies whether the process is performed by the supplier or by the supplier's sub-tier sources. Use of sources not accredited by Nadcap shall result in return of products to the supplier at the supplier's expense.

2.4.2 AQ350 Heat Treat Certifications

With each delivery of products on this contract, the supplier shall furnish a time/temperature certification that includes the following data:

- a) part number and revision;
- b) quantity heat treated; and
- c) for each heat treatment cycle – the actual temperature range & duration (hrs.) of each heat treat cycle.

2.4.3 AQ380 Nondestructive Test (NDT) Reports

Unless otherwise specified by the contract, drawing or specification, NDT shall be performed on 100% of the lot of products. With each delivery of products on the contract, the supplier shall furnish a certified test report that shows that the required NDT (i.e. penetrant, magnetic particle, radiographic, ultrasonic, etc.) test was performed on all delivered products. The test report shall be issued by the organization that actually performed the NDT and include:

Document: AWB-SQRM Appendix P9112	Revision: A	Date: May 2025
Title: Purchase Order Clauses		

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- a) A complete description of the test, test name, specification, revision, type, method, etc.
- b) The acceptance criteria document number and revision, that applies to the NDT operation
- c) The number and revision level of the NDT procedure used, and
- d) When applicable, identity of the qualified/certified personnel who performed the NDT.

All products subjected to NDT and found to be acceptable shall be identified as required by the applicable NDT specification. When products are serialized the serial numbers shall be referenced on the NDT reports and certifications. NDT test reports shall meet the requirements of Section 1.7 herein.

2.4.4 AQ385 Radiographic (x-ray) Inspection

With each delivery of products on the contract, the supplier shall furnish a certified test report of radiographic (x-ray) inspection performed on the products. The document package supporting the radiographic inspection shall be issued by the organization that actually performed the radiographic inspection and include:

- a) A test report showing the accept/reject quantities, and
- b) A copy of the approved shooting sketch; the shooting sketch or test report shall include the number and revision of the approved radiographic technique. Unless Clause AQ386 is included on the contract, the supplier is not required to furnish the exposed x-ray film with delivery of the products; however, supplier shall maintain the film in accordance with the record retention requirements of the supplier's Quality Management System.

2.5 Control of Castings

2.5.1 AQ410 Foundry Control

Prior to making the first production run on any new castings, or castings for which new tooling (patterns or molds) have been made; or, when a change is made in gates, risers, chills, or as cast shape; or, when a pattern or mold is transferred to a different facility, the supplier shall establish a foundry control procedure and submit to AWB, for review and approval, the following:

- A. **SAMPLE CASTINGS** –Sample foundry control castings from the first production run representative of the controls, practices and processes to be used on the production castings. The quantity of foundry control castings shall be in compliance with the requirements of the applicable casting specification and/or as specified in the contract. 1st Article castings shall be in addition to the production quantities required by the contract.
- B. **1ST ARTICLE INSPECTION REPORT (FAIR)** – Showing the results of the FAI of the sample foundry control 1st article castings.

Document: AWB-SQRM Appendix P9112	Revision: A	Date: May 2025
Title: Purchase Order Clauses		

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- C. MECHANICAL PROPERTIES - The laboratory test report or certified statement of the test bar mechanical properties from the foundry control 1st Article castings. The test bars used for the mechanical testing shall be from the same melt and heat treat lot as the foundry control 1st article castings. The testing must be performed by a test facility with AWB (APSL) and Nadcap approval for Materials Testing. Test results submitted from a foundry with Nadcap Materials Testing Approval are also acceptable.
- D. CHEMICAL COMPOSITION - The laboratory test report or certified statement of the chemical analysis of the material (melt) used in the foundry control 1st Article castings. The test results shall contain the actual percentage of each element contained in the test sample. The testing must be performed by a test facility with AWB (APSL) and Nadcap approval for Materials Testing. Test results submitted from a foundry with Nadcap Materials Testing Approval are also acceptable.
- E. RADIOGRAPHIC PROCEDURE - The laboratory test report showing the sketch, radiographic technique, and approval from a AWB Approved (APSL) and Nadcap approved Level III NDT inspection service. Film may be maintained by the foundry in accordance with the 15 year retention requirement defined by the supplier Quality Requirements Manual.
- F. MACROSCOPIC EXAMINATION - If a macroscopic evaluation is required by the drawing, a pre-production sample shall be macrosectioned for the purpose of verifying the quality of internal surfaces inspectable only by radiography.

The macrosection(s) shall represent a full cross section of the casting. The samples shall be ground or polished (minimum 120 grit) and shall be lightly etched. The prepared surface shall be examined at 10X magnification to establish size, distribution and type of internal defects. The evaluation shall be correlated with the radiographic inspection results to verify that interpretation and grading was correct for the defects.

At the discretion of the supplier, the macroscopic evaluation may be performed by a test facility with AWB (APSL) and Nadcap approval for Materials Testing or by the AWB selected Materials & Processes Laboratory. A copy of the macroscopic examination report shall be submitted to AWB.

2.5.2 AQ420 Production Castings

The supplier shall produce production castings using the same foundry control practices established and approved by AWB as a result of foundry control defined in clause AQ410 With each delivery of production castings on this contract, the supplier shall furnish for each separate heat/melt of castings in the lot, all certifications and test reports required by the following 'Q' Clauses:

- a) AQ320 – The supplier Furnished Raw Material
- b) AQ010 1.7 – Qualified Process Sources & Certifications
- c) AQ350 – Heat Treat Certifications
- d) AQ380 – Nondestructive Test (NDT) Reports

Document: AWB-SQRM Appendix P9112	Revision: A	Date: May 2025
Title: Purchase Order Clauses		

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2.6 Control of Forgings, Extrusions & Pressings

2.6.1 AQ430 Pre-Production Controls

Prior to making the first production run of forgings, extrusions or pressings, or on any forging or pressing where dies or a technique has been changed, the supplier shall submit to AWB for review and approval the following:

- A. 1st ARTICLE – Sample 1st Article forging, extrusion or pressing from the first production run and representative of all manufacturing and processing operations scheduled to be used during production. The quantity of 1st articles shall be in accordance with the requirements of the applicable specification or as specified in the contract. 1st articles shall be in addition to the quantities required by the contract.
- B. 1ST ARTICLE INSPECTION REPORT (FAIR) – Showing the results (actual values) of the FAI.
- C. MECHANICAL PROPERTIES – The laboratory test report or certified statement of the test bar mechanical properties taken from the 1st Article.
- D. CHEMICAL COMPOSITION –The laboratory test report or certified statement of chemical analysis of the material used in the 1st Article, or a specimen taken from the 1st article, showing the actual percentage of each element contained in the 1st article or specimen.
- E. ULTRASONIC TECHNIQUE – When required by the drawing or specification, the written technique used to perform the ultrasonic inspection on the 1st Article and to be used during production.
- F. NONDESTRUCTIVE TEST (NDT) REPORTS – The laboratory test report of NDT accomplished in accordance with the applicable specification and showing acceptance of the 1st Article.
- G. GRAIN FLOW SAMPLE – When required by the applicable drawing or specification, the cross section and pictures of grain flow pattern taken from the 1st Article.

2.6.2 AQ440 Production Forgings, Extrusions & Pressings

Production forgings, extrusions or pressings shall be produced using the methods and controls established and approved by AWB during pre-production controls defined in Clause AQ430. With each delivery of production forgings, extrusions or pressings on the contract, the supplier shall furnish for each separate heat/lot, all of the certifications/test reports required by the following 'Q' Clauses:

- a) AQ320 – The supplier Furnished Raw Material
- b) AQ010 1.7 – Qualified Sources & Process Certifications
- c) AQ350 – Heat Treat Certifications
- d) AQ380 – Nondestructive Test (NDT) Reports

2.7 Control of Age Sensitive Items, Electronic Devices & Components

Document: AWB-SQRM Appendix P9112	Revision: A	Date: May 2025
Title: Purchase Order Clauses		

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2.7.1 AQ450 Age Limits for Elastomers

Unless otherwise specified by the contract, the age limit or maximum time between the date of manufacture of elastomers (i.e. rubber goods such as o-rings, seals, gaskets, etc.) to the date of delivery to AWB is a maximum of forty (40) quarters or ten (10) years. The supplier shall establish and maintain an effective system of age control of elastomers to ensure that the age limits are met. Individual or bulk elastomers delivered to AWB shall be properly identified in accordance with the applicable specification and include the cure date (quarter & year, i.e. 2Q03) either on the individual packages or on the bulk containers. With each delivery of products on this contract, the supplier shall include on the packing list/shipper or on a separate attached document, a written statement which complies with the requirements of section 1.7 herein, and is worded substantially as follows:

“This is to certify that all elastomers delivered on this contract (number) and packing list/shipper (number) have been manufactured and controlled in accordance with the age control requirements, have not been commingled with elastomers from other manufacturers, or other lots or batches and comply with all of the requirements of the contract. Objective evidence to support this certification will be made available to AWB for review upon request.”

Cure Date(s):	
Company Name:	
Address:	
Title of Authorized Individual:	
Signature/Stamp:	Date:

2.7.2 AQ451 Control of Aerospace Elastomeric Seals & Seal Assemblies

Unless otherwise specified by the contract, the supplier shall control elastomeric seals and seal assemblies in accordance with the requirements of document SAE AS5316 – “Storage of Elastomer Seals and Seal Assemblies Which Include an Elastomer Element Prior to Hardware Assembly”. With each delivery of products on this contract, the supplier shall include on the packing list/shipper or on a separate attached document, a written statement which complies with the requirements of section 1.7 herein, and is worded substantially as follows:

“This is to certify that all elastomers delivered on this contract (number) and packing list/shipper (number) have been manufactured and controlled in accordance with the requirements of SAE AS5316 and have not been commingled with like elastomers from other manufacturers, or other lots or batches and comply with all of the requirements of the contract. Objective evidence to support this certification will be made available to AWB for review upon request.”

Document: AWB-SQRM Appendix P9112	Revision: A	Date: May 2025
Title: Purchase Order Clauses		

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Company Name:	
Address:	
Title of Authorized Individual:	
Signature/Stamp:	Date:

2.7.3 AQ452 Cure Date Marking

All products delivered on this contract that include elastomeric seals and seal assemblies subject to age limitations shall be identified with a cure date (Quarter & Year, i.e. 3Q98) of the oldest elastomer contained in the product.

2.7.4 AQ457 Packaging Requirements for Ethylene Propylene Soft Goods

O-rings and other seals shall be individually packaged by the manufacturer. They shall be thoroughly clean before packaging. Packaging shall be done under conditions ensuring freedom from contamination or damage to the rings/seals. The unit package shall be of such material and construction as to protect the seal from contamination until the package is opened. Each package shall bear the following identification in purple colored print of a size that can be easily read.

Phosphate Ester
Packing, Preformed (O-Ring) or type of specialty seal
Vendor's Part Number (if any)
Industry Part Number
Industry Specification – (e.g. NAS1613)
Cure Date (Quarter and Year)
Legend "Ethylene Propylene" and "Do Not Fold"

2.7.5 AQ460 Limited Shelf Life Materials

With each delivery of materials on this contract, that have a limited or specified shelf life, the supplier shall furnish the following data:

- Cure or manufacture date;
- Expiration date or shelf life;
- Lot or batch number, and
- When applicable, any special storage requirements/handling procedures to be followed.

The above information shall be marked on each container or certification and shall be in addition to normal identification requirements such as material name, part or code number, drawing, specification number and revision, type, size and quantity and other markings as applicable. For each delivery of limited shelf life materials on the contract the time lapse between the cure or manufacturing date of such materials, and the date of scheduled receipt by AWB, shall not

Document: AWB-SQRM Appendix P9112	Revision: A	Date: May 2025
Title: Purchase Order Clauses		

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exceed one fourth (1/4) of the total shelf life of the material without prior written waiver from the AWB Buyer.

2.7.6 AQ485 Aerospace Electronic Products – General Requirements

The materials, methods, and acceptance criteria for producing soldered electrical and electronic assemblies shall meet the requirements of IPC-A-610 – “Acceptability of Electronic Assemblies”, and IPC/EIA J-STD-001 – “Requirements for Soldered Electrical and Electronic Assemblies” for Class 3 High Performance (Aerospace) Electronic Products.

2.7.7 AQ490 Certifications & Test Reports – Electronic Devices

With each delivery of electronic devices and/or components on this contract, the supplier shall submit to AWB certifications traceable to the manufacturing and/or screening process. Certifications and test reports shall meet the requirements of section 1.7 herein and include the following data:

- a) Applicable drawing and/or specification and revision;
- b) Part number and revision;
- c) Manufacturers identity,
- d) Manufacturers lot and date code; and
- e) The quantity delivered.

2.7.8 AQ500 Identification of Electronic Devices

Each electronic device or component delivered on this contract shall be identified in accordance with the applicable specification by lot or batch, traceable to the actual manufacturing process and manufacturer. The lot or batch number may be a date or the supplier shop order code, and shall provide the capability to effectively and positively screen the lot or batch to remove defectives, in the event that it is determined that a defective product condition exists in the lot.

2.8 Control of Contamination & Foreign Object Damage (FOD)

2.8.1 AQ520 FOD Control Program

Moved to AQ010 paragraph 1.18

Document: AWB-SQRM Appendix P9112	Revision: A	Date: May 2025
Title: Purchase Order Clauses		

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2.8.2 AQ530 FOD Certification

With each delivery of products on this contract, the supplier shall include on the packing list/shipper or on a separate attached document a written statement titled "FOD Certification" which complies with the requirements of section 1.7 herein and is worded substantially as follows:

"This is to certify that all products delivered on this contract (number) and packing list/shipper (number) have been produced, controlled and examined in accordance with the applicable requirements of the FOD Control Program. Objective evidence to support this certification will be made available to AWB for review upon request."

Company Name:	
Address:	
Title of Authorized Individual:	
Signature/Stamp:	Date:

2.9 Inspection & Test Reports & Documentation

2.9.1 AQ540 1st Article Inspection at Source

Inspection and/or testing and acceptance of 1st Article product by AWB is required prior to delivery of any products on this contract. The 1st Article product shall be complete, documented per 9102 and ready for delivery to AWB. The supplier shall notify AWB at least forty-eight (48) hours in advance so that the inspection and/or testing of the 1st Article product as well as review of supporting documentation can be scheduled and completed prior to the required product delivery date. Upon request, the supplier shall make available to AWB representatives any measuring and test equipment, facilities and/or personnel to facilitate the 1st Article inspection. Any mold impressions taken (e.g. Repro Rubber), and any sections of cut-up parts that were used to generate First Article data must be retained and made available to AWB upon request until after the First Article has been completed and accepted by AWB.

Note: The requirements of AQ010 paragraph 1.6 First Article Inspection Requirements (FAIR) apply.

2.9.2 AQ560 1st Article Inspection Required

The supplier shall submit a 1st Article product and supporting documentation, as required by current revision of 9102, for inspection and/or testing and acceptance by AWB prior to delivery

Document: AWB-SQRM Appendix P9112	Revision: A	Date: May 2025
Title: Purchase Order Clauses		

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of products on this contract. The 1st article shall be completely processed in accordance with contract requirements. When authorized by the contract, the 1st Article product may be included as part of the initial quantity delivered on the contract and included as part of the total contract order quantity. In such cases, failure of the 1st Article product to meet contract specified requirements may result in rejection and return of the delivered production quantity to the supplier at the supplier's expense.

Note: The requirements of AQ010 paragraph 1.6 First Article Inspection Requirements (FAIR) apply.

2.9.3 AQ565 Controlled Planning

The products on this contract are considered critical for aerospace applications and require strict control of manufacturing and processing operations. The supplier shall furnish a complete First Article Inspection Report (FAIR) in accordance with the requirements of the current revision of 9102, accompanied by copies of supplier's manufacturing and processing routing sheets to be used during production. Upon AWB review and approval of the first article and planning documentation, the supplier's manufacturing and process planning shall be considered as 'frozen'. Any changes proposed by the supplier to the approved frozen planning shall be submitted to AWB for review and approval prior to implementation. The supplier shall furnish a revised FAIR, reflecting the changes in product as a result of changes in planning approved by AWB, with the next delivery of products on the contract. With each delivery of products on this contract, the supplier shall include on the packing list/shipper or on a separate attached document a written statement which complies with requirements of section 1.7 and is worded substantially as follows:

"This is to certify that all products delivered on this contract (number) and packing list/shipper (number) have been produced in accordance with "controlled planning" approved by AWB. Objective evidence to support this certification will be made available to AWB for review upon request."

Company Name:

Address:

Title of Authorized Individual:

Signature/Stamp:

Date:

Document: AWB-SQRM Appendix P9112	Revision: A	Date: May 2025
Title: Purchase Order Clauses		

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2.9.4 AQ570 100% Inspection Report

The supplier shall perform 100% inspection of all characteristics on all products delivered on this contract. The supplier's 100% inspection data shall show the part number and drawing revision and the actual values obtained during inspection versus the requirements of the drawing (including block data and notes) or specification. When applicable, copies of material and/or process certifications shall be attached to the inspection report.

2.9.5 AQ580 Supplier Inspection Report (SIR)

When this clause is included in the contract, AWB will provide the supplier with blank copies of SIR forms and define the specific product inspection to be accomplished by the supplier on this contract. The supplier shall perform the required inspections and record the actual results on the SIR forms. The SIR shall include the name and signature of the supplier's authorized representative responsible for quality and be included with each delivery of products on this contract.

2.9.6 AQ585 Supplier Inspection Report of Classified Characteristics

Classification of characteristics on the drawing is a means by which AWB Engineering conveys the potential seriousness of non-conformance of certain product characteristics. Classification of characteristics is not intended to indicate that other drawing requirements are not important or need not be met. The purpose is to establish a common basis for placing emphasis on the more important characteristics during all phases of tooling, production, inspection, and testing. Any characteristic found to be nonconforming during inspection is cause for rejection regardless of classification.

On all products delivered on this contract, the supplier shall furnish an Inspection Report showing the actual results of inspection of all classified characteristics in accordance with the inspection requirements for each classified characteristic defined below. The supplier's inspection report shall show the part number, drawing revision and the actual values obtained during inspection versus the requirements of the drawing (including block data and notes) or specification. When applicable, copies of material and/or process certifications shall be attached to the inspection report. Inspection requirements for each classified characteristics are as follows:



Critical Characteristics: (1) Characteristics that judgment and experience indicates that if defective could result in hazardous or unsafe conditions for individuals using or maintaining the product or vehicle on which it installed. (2) Affect flight safety objectives, or (3) prevent performance of a military vehicle's operational function as a weapon (e.g., mission abort). Critical characteristics shall be inspected 100%.

Document: AWB-SQRM Appendix P9112	Revision: A	Date: May 2025
Title: Purchase Order Clauses		

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Critical Assembly Characteristics: Characteristics where omission of detail parts or subassemblies from the assembly or where improper installation of detail parts or subassemblies into the assembly would not be detected during acceptance testing. Assembly critical characteristics shall be inspected 100%.



Customer Interface Characteristics: Characteristics, which are determined, through coordination with the customer, as having an effect on installation or interchangeability. Customer Interface characteristics shall be inspected 100%.



Major Characteristics: Characteristics, other than critical, which if defective, could: (1) Result in product failure (other than critical), or (2) materially reduce the usability of the vehicle on which the defective product is installed. Unless otherwise specified in the contract, major characteristics shall be inspected in accordance with a AWB approved sampling plan.



Fracture or Fatigue Critical Characteristics: A fracture of fatigue critical area or part is one where the stress level is sufficiently high, that if a defect occurs in the area or part, it could result in a fatigue failure, which could result in the loss of an aircraft. All fracture or fatigue critical characteristics shall be inspected 100%.

2.9.7 AQ590 Final Inspection Report (FIR)

Prior to delivery of products to AWB, the supplier shall perform final inspection on all products and document the results on a FIR. The format of the FIR is optional; however, it shall show the actual inspection results obtained, versus the drawing or specification requirements. The supplier shall maintain the completed FIR as part of the supplier's quality records. Upon request, the FIR will be made available to AWB, or AWB customers or regulatory agencies for review.

2.9.8 AQ600 Product Serialization Requirements

Serial numbers for all products on this contract have been assigned by AWB and are defined in the contract or reference documents. The supplier shall apply the specified serial numbers on all

Document: AWB-SQRM Appendix P9112	Revision: A	Date: May 2025
Title: Purchase Order Clauses		

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products and record the serial numbers on all applicable documentation. If product has serial numbers already applied to the parts the supplier is to maintain serial number legibility, control to the specific contract and record serial numbers on all documentation. The assigned serial numbers may not be altered or replaced without written authorization from AWB.

2.9.9 AQ605 Product Serialization by the Supplier

Products ordered on this contract shall be serialized by the supplier using serialization scheme selected by the supplier. The supplier's serialization scheme shall include provisions to ensure that serial numbers are not duplicated on products with the same part number.

2.9.10 AQ610 Acceptance Test Procedure (ATP) Approval

Prior to initial delivery of products on this contract the supplier shall submit to AWB, for review and approval, a copy of the ATP or other quality conformance procedure that describes the final tests to be performed by the supplier on products scheduled for delivery to AWB. The ATP shall include a list of equipment used and any test diagrams or sketches necessary for technical interpretation of the ATP. Any revisions to a AWB approved ATP shall be submitted to AWB for review and approval prior to incorporation into production.

2.9.11 AQ620 Functional Test Data Sheets

With each delivery of products on this contract, the supplier shall furnish to AWB a functional test data sheet, which shows the actual results (values) obtained during the functional tests performed on each unit of product versus the requirements specified in AWB approved Acceptance Test Procedure (ATP) or specification. The test data sheets shall identify the part number and drawing revision, individual products by serial number, meet the requirements of section 1.7 herein and be signed or stamped (inspection or functional test/acceptance stamp) by the supplier's authorized representative.

2.9.12 AQ630 Functional Test Certificate (FTC)

With each delivery of products on this contract, the supplier shall include on the packing list/shipper or on a separate attached document a written statement titled "Functional Test Certificate" (FTC), which complies with the requirements of section 1.7 herein and is worded substantially as follows:

"This is to certify that all products delivered on this contract (number) and packing list/shipper (number) have been tested as required by the applicable drawing, specification, or approved acceptance/functional test procedure, and are in compliance with all requirements of the contract. Objective evidence to support this certification will be made available to AWB for

Document: AWB-SQRM Appendix P9112	Revision: A	Date: May 2025
Title: Purchase Order Clauses		

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review upon request.”

Company Name:	
Address:	
Title of Authorized Individual:	
Signature/Stamp:	Date:

2.9.13 AQ645 Controlled Components

The products ordered on this contract are designated as ‘Controlled Components’. A controlled component designation is applied to all products where judgment and experience indicates that if defective, the product could result in hazardous or unsafe conditions for individuals using or maintaining the product or vehicle on which it is installed; affect flight safety; prevent performance of a military vehicle’s operational function as a weapon e.g.: mission abort; result in product failure (other than critical); materially reduce the usability of the vehicle on which the defective product is installed or, one which has been determined, or through coordination with the customer, as having an effect on installation interchangeability.

Prior to start of production, the supplier shall submit to AWB, for review and approval, a written Process Control Document (PCD) describing the supplier’s methods, processes, key process parameters, process parameter settings and control methods related to the product and its sub-components which will be used to effectively control the product during the supplier’s manufacturing, inspection and testing operations and processes. When applicable, the supplier shall also submit to AWB, for review and approval, the PCD(s) applicable to operations performed by the supplier’s sub-tier sources. The supplier’s PCD shall describe the following in detail:

- a) Detail sequence of manufacturing operations and the product characteristics generated at each step of the manufacturing process.
- b) Method, type and points during the manufacturing sequence where special processing (heat treatment, plating, etc.) will be performed and the sources to be used.
- c) Points during (a) and (b) above, where inspections and/or tests will be accomplished and documented.
- d) Product characteristics that will be inspected and verified during (c) above.
- e) Methods of identification, preservation and packaging to be used.
- f) Handling and transportation precautions that will be implemented.
- g) Any other applicable controls as required by the contract.
- h) The supplier’s approved PCD shall be marked with the following legend that identifies the product is under a controlled component plan:

Document: AWB-SQRM Appendix P9112	Revision: A	Date: May 2025
Title: Purchase Order Clauses		

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CONTROLLED COMPONENT – FROZEN PROCESS This item is a controlled product and has been manufactured in accordance with process controls established and documented on the current Process Control Document (PCD) approved by AWB.

Subsequent to AWB approval, any changes to the PCD shall be submitted to AWB for review prior to implementing them in production. With each delivery of products on this contract, the supplier shall include on the packing list/shipper or on a separate attached document a written statement which complies with requirements of section 1.7 and is worded substantially as follows:

“This is to certify that all products delivered on this contract (number) and packing list/shipper (number) were manufactured and controlled in accordance with the current AWB approved Process Control Document (PCD). No changes to the approved PCD were made during the manufacturing and processing of these products. Objective evidence to support this certification will be made available to AWB for review upon request.”

Company Name: _____
Address: _____
Title of Authorized Individual: _____
Signature/Stamp: _____ Date: _____

2.9.14 AQ650 Qualified Parts Certificate (QPC)

With each delivery of products on this contract, the supplier shall include on the packing list/shipper or on a separate attached document a written statement titled “Qualified Parts Certificate”, which complies with the requirements of section 1.7 herein and is worded substantially as follows:

“This is to certify that all products delivered on this contract (number) and packing list/shipper (number) are listed on or have been approved for listing on the applicable ‘Qualified Products List’ (QPL) or ‘Preferred Parts List’ (PPL) of the applicable specification. Objective evidence to support this certification will be made available to AWB for review upon request.”

Company Name: _____
Address: _____
Title of Authorized Individual: _____
Signature/Stamp: _____ Date: _____

Document: AWB-SQRM Appendix P9112	Revision: A	Date: May 2025
Title: Purchase Order Clauses		

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2.10 Miscellaneous Requirements

2.10.1 AQ660 Manufacturers Catalogs, Drawings, etc.

With the initial delivery of products on this contract, the supplier shall furnish to AWB one (1) copy of the current manufacturers catalog, drawing, blueprint, or specification which fully and clearly describes the products delivered and can be used by AWB to verify product conformance to requirements.

3 Applicable / Reference Documents

Regulation:

- 14 CFR 21 (Title 14, Code of Federal Regulations, Part 21), Subpart K – Approval of Materials, Parts, Processes and Appliances
- FAR Part 21.93 Classification of Changes in Type Design. Click here to see this site:
[www.airweb.faa.gov/Regulatory and Guidance Library/rgFAR.nsf/mainframe?openframe&set](http://www.airweb.faa.gov/Regulatory%20and%20Guidance%20Library/rgFAR.nsf/mainframe?openframe&set)
- PUBLIC LAW 15 CFR 280 – Fastener Quality Act

Standard:

- 5316 – Storage of Elastomer Seals and Seal Assemblies Which Include an Elastomer Element Prior to Hardware Assembly
- 9003 – Inspection and Test System.
- 9100 - Quality Management System Requirements for Aviation, Space, and Defense
- 9102 – First Article Inspection Requirement
- 9103 – Variation Management of Key Characteristics.
- 9104-001 – Requirements for Aviation, Space and Defense Quality Management System Certification Programs
- 9115 - Requirements for Aviation, Space and Defense Organizations – Deliverable Software.
- 9116 – Notice of Change (NOC) Requirements
- 9120 – Quality Management Systems – Requirements for Aviation, Space and Defense Distributors
- 9131 - Quality Systems-Nonconformance Standard
- 9146 – Foreign Object Damage (FOD) Prevention Program – Requirements for Aviation, Space, and Defense Organizations
- 13002 – Requirements for Developing and Qualifying Alternate Inspection Frequency Plans
- SAE PRI AC7101 Nadcap Audit Criteria for Materials Test Laboratories
- ISO 17025 – General Requirements for the Competence of Testing and Calibration Laboratories

Document: AWB-SQRM Appendix P9112	Revision: A	Date: May 2025
Title: Purchase Order Clauses		

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Specification

- Air Transport Association (ATA) SPEC 2000
- ANSI/EOS/ESD S-8.1
- IPC/EIA J-STD-001 – Requirements for Soldered Electrical and Electronic Assemblies
- MIL-STD-130 – UID Labels
- MIL-STD-1686 – Electrostatic Discharge Control Program For Protection Of Electrical And Electronic Parts, Assemblies And Equipment (Excluding Electrically Initiated Explosive Devices)
- MIL-PRF-81705 – Military Specification: Barrier Materials, Flexible, Electrostatic Protective, Heat-Sealable
- MIL-PRF-121 – Performance Specification: Barrier Materials, Greaseproof, Waterproof, Flexible, Heat-Sealable
- MIL-PRF-131 – Performance Specification Barrier Materials, Water Vapor Proof, Greaseproof, Flexible, Heat-Sealable
- National Aeronautics and Space Administration (NASA) document NHB 5300

Guidance:

- IAQG Supply Chain Management Handbook
- RTCA/DO-178 – Software Considerations in Airborne Systems and Equipment Certification
- RTCA/DO-254 – Design Assurance Guidance for Airborne Electronic Hardware.

Document: AWB-SQRM Appendix P9112	Revision: A	Date: May 2025
Title: Purchase Order Clauses		

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AWB Document:

- AQ245 Material Summary Report Example:

CLEVELAND MATERIALS & PROCESSES SUMMARY REPORT
WHEEL & BRAKE SYSTEMS

Part Number	Revision
Contract Number	Line Item/Release No.
Packing List / Shipper Number	

Material and/or Process Description	Specification/Rev./Type/ Grade/ Class, Etc., Used (Ref. BPS4000)	Material and/or Process Quantity	Name & Location of Approved Special Processor and/or Material Supplier, <u>Including Country of Origin</u> for All Raw Materials Used	Heat, Lot or Traceability No. for Material and Processes

This is to certify that all the products delivered on this Contract (number listed above) conform to all applicable drawings, specification and Contract requirements. The data listed above is a true summary of the materials and processes used to fabricate the items on this Contract. Certifications and test reports for the materials and processes listed above are on file and will be made available to the Buyer upon request.

Document: AWB-SQRM Appendix P9112	Revision: A	Date: May 2025
Title: Purchase Order Clauses		

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4 Definitions

- Aviation Critical Safety Item (ACSI) – A part, an assembly, installation equipment, launch equipment, recovery equipment, or support equipment for an aircraft or aviation weapon system that contains a characteristic which failure, malfunction, or absence of could cause a catastrophic or critical failure resulting in the loss of or serious damage to the aircraft or weapon system, significant impact to mission capability, an unacceptable risk of personal injury or loss of life, or an un-commanded engine shutdown that jeopardizes safety or mission capability.
- Contract Specified Requirements– All requirements that are specified in a contract or reference document such as Source Control Drawings (SCD's), Specifications, or design requirements.
- Critical Characteristics – Any feature throughout the life cycle of a CSI/ACSI (e.g., dimension, finish, material or assembly, manufacturing or inspection process, installation, operation, field maintenance, or depot overhaul requirement) which if nonconforming, missing, or degraded could cause failure or malfunction of the CSI/ACSI. Critical characteristics may be identified on drawings, in technical data packages, in contract quality assurance provisions, or through other contract requirements/clauses.
- Critical Safety Item (CSI) – A part, an assembly, installation equipment, launch equipment, recovery equipment, or support equipment for an aircraft or aviation weapon system; ground based military vehicle; military vessel, or system that contains a characteristic upon which failure, malfunction, or absence could cause a catastrophic or critical failure resulting in the loss of or serious damage to the aircraft or weapon system, significant impact to mission capability, an unacceptable risk of personal injury or loss of life, or an un-commanded shutdown that jeopardizes safety.
- Customer Design Material– Parts subassemblies and assemblies on which all requirements, dimensions, tolerances, etc., are specified by a customer, i.e., 'make-to-print' items.
- Identification and Segregation– For the purpose of establishing control of nonconforming material, is defined as physically separating and/or positively identifying nonconforming material from acceptable material within the confines of the lot so that the nonconforming material can be readily identified and/or retrieved from the lot.
- Key Characteristic – A characteristic whose variation has the greatest impact on the fit, form, function, performance, or service life of the finished part or system from the perspective of the Customer.
- Major Nonconformance– A “major” nonconformance is defined for this specification as a nonconformance to the requirements specified in the contract, specification, drawing or other approved product description which is equivalent to a “major change in type design” as defined by FAR Part 21.93. It is also defined as a feature which, if nonconforming, left uncorrected, or unable to be reduced to a “minor” nonconformance by repair, may result in operational or functional failure of the item, or may materially reduce the usability, physical or functional interchangeability or durability of the end product for its intended purpose.

Document: AWB-SQRM Appendix P9112	Revision: A	Date: May 2025
Title: Purchase Order Clauses		

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- Minor Nonconformance– A “minor” nonconformance is defined for this specification as a nonconformance to the requirements specified in the contract, specification, drawing, or other approved product description which is equivalent to a “minor change in type design” as defined by FAR Part 21.93. It is also defined as a nonconformance that will not affect the usability of the product or material for its intended purpose. Minor nonconformances do not adversely affect health or safety; performance; interchangeability, reliability or maintainability; effective use or operation; weight or appearance (when a factor).
- MRB (Material Review Board) – A board consisting of qualified and specifically designated Design and Quality Engineering representatives responsible for reviewing, evaluating, and determining or recommending disposition of nonconforming product. Unless specifically required by contract or letter of delegation, a Government Quality Representative is not a member of the MRB.
- Nonconformance: – A failure of a characteristic to conform to the requirements specified in the contract, specification, drawing or other approved product description.
- Nonconforming Material– Any material, item, part, assembly or product with one or more characteristics with a nonconformance.
- Product Substitution: Substituting materials (whether considered equivalent or even superior) without notifying and/or obtaining customer approval, as required by contract; delivering similar goods made from lower quality materials without a waiver from the customer; delivering materials that have not been tested (or inspected) as required; providing foreign-made material when domestic materials are required by contract; performing unauthorized repair of a production part.
- Proprietary Design Material– Parts, subassemblies and assemblies that are within scope of AWB design authority, i.e. AWB developed and established dimensions, tolerances, test limits, process controls or any requirements which are specified by AWB, including requirements which are either more stringent than specified by contract or are not specifically covered by contract. Such requirements may deal with the physical configuration, tolerances, material or design criteria of detail parts, subassemblies and assemblies and which are included in AWB engineering, manufacturing and process drawings and specifications.
- Repair– Processing nonconforming material to an approved process designed to reduce, but not completely eliminate a nonconformance. The purpose of repair is to bring nonconforming material into an acceptable condition. Repair is distinguished from rework in that the item after repair still does not completely conform to the applicable drawing, specification or contract requirements.
- Rework– Processing applied to nonconforming material to make it conform completely to the drawing, specification or contract requirements.
- Scrap– Nonconforming material that is not usable for its intended purpose and cannot be economically reworked or repaired.

Document: AWB-SQRM Appendix P9112	Revision: A	Date: May 2025
Title: Purchase Order Clauses		

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- Standard Repair Process (SRP) – A documented technique for repair of a type of nonconformance developed by AWB and approved by the AWB MRB for recurrent use. It can be used when it has been demonstrated that the technique properly applied, will result in an adequate and cost-effective method of repair. When required by contract, SRP's shall be submitted to customer/government for approval.
- Supplier – The terms subcontractor, supplier, vendor, seller, or any other term used to identify the source from which the Division obtains support or product are considered synonymous for the purpose of this Policy.

5 Revision Description

Rev.	Change Detail:	Date:
NC	Initial Release.	4/25/2024
A	Updated document for change from Aircraft Wheel and Brake by Kaman to Aircraft Wheel and Brake, LLC DBA Cleveland Wheel & Brake Systems (CWBS)	5/22/2025

6 Approval History

Rev.	Prepared By:	Approval:	Date:
NC	Karen Sater	Jeff Peters	4/25/2024
A	David Maxwell	Jeff Peters	5/22/2025