

Hanwha Aerospace USA

Supplier Quality Requirements Manual

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i. HAU's Management System Policy

Hanwha Aerospace USA seeks to delight our customers by safely delivering the highest quality products on time with continual improvement of our performance. It is our goal to provide a work environment and culture that encourages open communication, social and environmental responsibility, while maintaining full compliance with all applicable requirements and regulations.

ii Introduction

To meet the objectives of this policy, HAU has implemented a quality system compliant with ISO 9001 and AS9100. This system is based on prevention and continuous improvement rather than defect detection.

HAU recommends all suppliers of components or materials to be, or become, third party registered to ISO 9001 International Industry Quality Standard or AS9100 Quality Management System Requirements for Aviation, Space & Defense Organizations. In cases where supplier is unable to obtain such registration HAU may conduct on-site assessments of suppliers to make a determination of the supplier's ability to meet HAU's requirements.

iii. Scope

This manual will be used as a basis for establishing workable relationships between HAU and all of its suppliers. It is part of the purchase order by reference. The direction in this manual will not relieve the supplier of the obligation to furnish material conforming to all the requirements of the purchase order. However, the document is not intended to supersede any applicable contract or specification requirement. When conflicts occur, the order of precedence shall be:

1. The contract or purchase order (PO)
2. The engineering drawing
3. Specifications called out on the engineering drawing
4. This document

This manual applies to all HAU's suppliers of production materials, parts and services. It does not apply to suppliers of office supplies, shop supplies, tools, lubricants, and other items/services not contributing directly to the manufacture of HAU's products.

HAU's suppliers are expected to review, understand and comply with the requirements of the contract and of this manual. This manual is part of the purchase order by reference.

Additional requirements are included that apply to suppliers of Aerospace products or services only. Aerospace orders can be identified by the inclusion of the statement of end use included in the purchase order. If the classification of Aerospace order is in question, please contact your HAU buyer for clarification.



1. Supplier Agreement, Responsibility and Certification

The supplier is responsible for establishing a quality system in accordance with this manual. The supplier's quality system shall prevent the shipment of nonconforming product, as well as minimize waste and costs.

The supplier is required to provide material in accordance with engineering specifications, statistical requirements and purchase order requirements, as outlined in this manual and as required by the purchase order.

The supplier is responsible for all materials supplied to HAU, whether manufactured or processed by the supplier or procured from a sub contracted-supplier (sub-tier). The supplier will provide a corrective action plan to correct non-conformances of supplied material within required time as specified in section 2.13 of this manual.

2. Quality System Requirements

HAU is required to use the ISO 9001 and AS9100 standards when developing its supplier base. The following is a summary of the standard requirements, including HAU's specific requirements where applicable. AS9100 requirements are included and are noted for **Aerospace suppliers** only.

Suppliers are expected to obtain their own copies of ISO 9001 or AS9100 as appropriate. The HAU's supplier survey reflects these requirements and is used for the initial qualification of HAU suppliers.

- Supplier Survey Form Number 145 will be used to assess Suppliers.

Note: When AS13100 requirements are invoked in the HAU Purchase Order, The Supplier shall be certified by an industry recognized and accredited QMS certification for the associated scope(s) of work. The Supplier shall cascade these certification requirements to its suppliers/sub-tiers in accordance with AS13100 Section 4.3.3 and Table 2.

2.1. Management Responsibility

Suppliers must adopt a process approach when developing and improving the effectiveness of their Quality System. The Supplier's top management shall define its policy for Quality, including its objectives and commitment for quality. The supplier shall have a documented organization structure that is appropriate for its requirements. The Supplier's quality objectives and policies shall be clearly understood at all levels within the organization.

The supplier shall have a continuous improvement plan for processes and quality systems, with the status periodically reviewed and updated.

The supplier shall be responsive to HAU's needs. They shall have a system in place to address any customer-related problems and track key events such as quotes, tooling, pricing, quality, delivery and engineering problems.

2.2. Quality System

The supplier shall maintain an effective documented Quality System. The documented quality system should be defined with manual, procedures and instructions in accordance with requirements of ISO 9001/AS9100, or equivalent specification(s). Systems not well defined in the manual shall be well defined in a procedure or work instructions.

2.3. Contract Review

The supplier shall establish and maintain documented procedures for contract review and for the coordination of these activities. They shall review all orders to ensure that:

- All requirements are adequately defined and all differences are adequately resolved.
- The supplier has the capability to meet the contract requirements. Including a risk-analysis, identifying any risk factors that may impact the supplier's ability to fulfill all contract requirements.
- Pricing is accurate and any discrepancies are resolved in advance of shipments.
- Delivery dates are confirmed within 7 work days after receipt of order.
- Supplier has all applicable end use customer specifications at the revision level current at the date of the contract. In the event the supplier does not have access to the end use customer's specification revision listing/portal, the supplier must notify HAU's Purchasing Department so that revision status can be provided. Any needed customer specification stated on the purchase order shall be promptly requested from HAU's Purchasing Department.

Note: it is the supplier's responsibility to purchase any applicable Industry Specification to the current revision. Any discrepancies or queries shall be resolved before the order or contract is accepted. Amendments and/or revisions to orders or contracts shall also be formally reviewed.

2.3.1. Technical Conflict

If there is a conflict of technical terms or conditions associated with a purchase order, the order of precedence shall be:

- Text of Purchase Order (PO)
- The Drawing(s) referenced on the order, including published changes.
- Documents/specifications referenced on the drawing or purchase order.
- Documents/specifications referenced in other documents/specifications including this manual. Conflict in such secondary documents requires resolutions by HAU's Purchasing supported by Supplier Quality Engineering (SQE).

2.3.2. Verbal Instructions

Decisions between the supplier and HAU's coordinating personnel shall not be binding upon either party unless authorized in writing by purchase order or amendment thereto.

2.4. Document and Data Control

The supplier must have a verifiable system and procedures for the distribution and updating of drawings, standards, specifications, procedures and work instructions. The system must prevent the use of outdated documents and assure that current documents are available and in use by all individuals and work areas which require them.

HAU provided specifications and drawings are strictly proprietary. Suppliers are not authorized to copy, or in any way make use of HAU provided information other than for the purpose of fulfilling specific contract requirements, without the written approval of HAU.

2.5. Purchasing

2.5.1. Subcontracting (Sub-Tiers):

Suppliers must use subcontractors that are approved by HAU's end use customer when applicable. The supplier shall be responsible to flow down all the HAU purchase order requirements (down to the lowest tier) and ensure their adherence.

HAU reserves the right to disallow work being performed by any subcontractor.

HAU reserves the right to evaluate and audit any supplier subcontractor. Any such action will not relieve the supplier of his responsibility to ensure the quality of any product or service obtained.

2.5.2. Subcontractor Controls:

The supplier shall conduct a survey of the source/subcontractor facilities before placing business with them. The supplier is expected to have a system to evaluate its sources and subcontractors.

The supplier shall document the methods and survey used to evaluate a source or subcontractor's capability and shall maintain documentation of this process.

The supplier shall have a documented Approved Supplier List.

The supplier is expected to have a system for the control of material/product purchased from subcontractors to assure all incoming material meets physical, chemical, visual, functional and dimensional requirement.

The supplier must encourage its sub-suppliers to comply with the requirements of ISO 9001, AS9100, or appropriate Industry specification(s).

The supplier shall plan, implement, and control processes, appropriate to the organization and the product, for the prevention of counterfeit or suspect counterfeit part use and their inclusion in product(s) delivered to the customer.

2.6. Control of Customer Supplied Product

The supplier shall establish and maintain documented procedures for the control of verification, storage and maintenance of HAU or HAU's customer's supplied product. Any such product that is lost damaged or is otherwise unsuitable for use shall be recorded and reported to HAU's Purchasing for resolution.

2.6.1. Supplier responsibility related to HAU owned inventory

HAU owned inventory should not be consumed or processed in any way without a purchase order and release from HAU.

Within 24 hours of receipt of HAU owned inventory the supplier shall provide information on part numbers and quantities received.

HAU reserves the right to inspect (with reasonable notification) any HAU owned inventory held by suppliers.

2.6.2. HAU provided tooling & fixtures

Upon receipt, the supplier shall inspect for identification and general condition. The supplier shall immediately report damaged, malfunctioning or otherwise unacceptable items to HAU's Purchasing.

HAU's provided tooling & fixtures shall remain the property of HAU. Supplier is responsible for the value of any lost/damaged tooling & fixture, other than normal wear and tear resulting from usage.

HAU's owned equipment may only be used for the production of HAU's orders. HAU reserves the right to audit and inspect HAU's furnished property and equipment.

2.7. Product Identification and Traceability

The supplier is required to establish a lot traceability system that provides for positive identification and record keeping for each part throughout the major phases of receipt, manufacturing, inspection, testing, to the finished product.

When suppliers are processing products with lot trace systems from other internal or external suppliers, they must maintain the identity of the original lot trace number.

2.8. Process Control

The Supplier shall develop and maintain documented procedures, operator instructions, process sheets and test instructions for production, where the absence of such documents could adversely affect quality.

The supplier shall notify HAU of any significant process or design change that may affect the fit, form or function of deliverable product. Included but not limited to changes of the location of manufacture, manufacturing method and/or material used in the process.

The Supplier shall comply with all HAU's and/or their customer's requirements for documenting and controlling special characteristics.

Section 5 of this manual describes the process control methodologies employed by HAU.

2.8.1. Special Processes

- Special Process Suppliers used in aerospace applications shall be certified to NADCAP AC7004 or AS/EN/JISQ 9100.
- Supplier shall submit Other Party Certificate(s) of Registration or NADCAP Accreditation Certificates/documentation to HAU if information has not been entered into the Online Aerospace Supplier Information System (OASIS) or NADCAP databases.
- Supplier shall permit HAU access to all data in OASIS and NADCAP databases including registration documentation, certification, audit reports, findings, corrective actions, etc.
- Supplier shall notify HAU of any changes in its certification, registration, or accreditation within 48 hours of receiving notification of the change.
- Suppliers not certified, or with a suspended certification, or demonstrating substandard performance shall be subject to removal from HAU's Approved Supplier List.
- Supplier and its supply chain shall use HAU's approved suppliers when a specific material or manufacturing special process is identified HAU.
- Supplier shall have a comprehensive special process management program in place for the special processes listed. When specified by purchase order, suppliers shall use customer-approved special process sources.
- All Special Process Suppliers used in aerospace applications shall be NADCAP accredited for the following special processes:
 1. Chemical Processing
 2. Coatings
 3. Heat Treating
 4. Materials Testing Laboratories
 5. Nonconventional Machining and Surface Enhancement
 - Nondestructive Testing
 6. Welding
- The Supplier approval program shall include maintaining a list of qualified special process suppliers along with their NADCAP approval status.

2.9. Inspection and Testing

Inspection and testing activities shall be performed at a minimum of:

2.9.1. Verification of Incoming Product

Verification of Incoming Product can include one of the following methods:

- Receipt of statistical data
- Receiving inspection and/or testing
- Second or third party assessment
- Part evaluation by accredited contractor or test laboratory
- Subcontractor warrants or certifications (in combination with one of the methods above.
- Incoming inspection may be waived if supported by statistical data.

2.9.2. Final Inspection and Testing

Final Inspection and Testing shall be conducted according to established processes. Records of all inspection activities will be maintained in accordance with supplier retention schedules and procedures.

Final Inspection Test data - When required by HAU drawing, contract or PO the supplier must assure reports are supplied with each shipment. Data must be reviewed for completeness and conformance as part of the final inspection process.



2.9.3. Visual Inspection (For Aerospace suppliers only)

Supplier shall ensure that each individual performing visual inspection has an eye examination at intervals of not greater than one year and that, if necessary or if correction is prescribed, each individual uses the required corrective lenses when performing required visual inspections.

All individuals performing visual inspection shall be capable of meeting the following eyesight requirement:

Near Vision: Snellen 14/18, (20/25), Jaeger 2 at 14 inches, or Ortho-Rater 8. Color: Ability to distinguish red, green, blue and yellow as determined by Standard Colored Plates.

Reference: ASQR-01 Aerospace Supplier Quality Requirements

2.10. Inspection, Measuring and Testing Equipment Control

The supplier must utilize and maintain adequate inspection, measuring and test equipment to ensure the accuracy of all materials supplied to HAU. The supplier shall ensure the environment for performance of inspections and test is adequate in respect to temperature, humidity, vibration, lighting and any other factors that could affect the accuracy of inspection and test results.

The supplier must maintain a documented calibration system for all measuring and test equipment. All personal measuring instruments are to be included in the program. The calibration program shall comply with the requirements of ISO 10012-1, ANSI/NCSL Z540-1, or equivalent and must be traceable to the National Institute of Standards and Technology (NIST).

Evidence of evaluation and calibration shall be recorded and made available to HAU upon request. The supplier shall notify HAU's Quality department in the event of any calibration failures that may affect any products previously supplied.

2.10.1. Gage Repeatability & Reproducibility (Gage R&R)

HAU may require that the amount of variation caused by the measurement system be determined by performing Gage R & R studies.

Gage R & R Studies are required whenever Critical Characteristics have been identified, either on the blueprint or purchase order. Total Gage variation shall not exceed 20% of the blueprint tolerance unless specifically authorized by HAU.

2.11. Inspection and Test Status

The inspection and test status of product shall be identified by suitable means, which indicates the conformance or non-conformance of product with regard to inspections and tests performed.

The identification of inspection and test status shall be maintained, as defined in a control plan and/or documented procedures, traceable throughout production and delivery of the product to HAU to ensure that only product that has passed the required inspections and tests are shipped.

Note: Location of product in the normal production flow does not constitute suitable indication of inspection and test status.

2.11.1. **Government Source Inspection / Customer Source Inspection (GSI/CSI)**

When GSI or CSI is a requirement, it shall be stated as such in the Purchase Order. Unless otherwise specified on the purchase order the following notifications are required:

- For GSI the supplier will be responsible for contacting their local Defense Contracts Management Agency (DCMA) office to arrange for government source inspection. Notification shall be made 48 hours in advance of the time the products are ready for inspection or test.
- For CSI or if the supplier doesn't have a government representative, HAU shall be notified immediately upon completion of production.

Upon request for source inspection the following information as a minimum shall be provided:

- purchase order number
- amendment number
- line item number
- drawing number
- piece or group number
- revision
- quantity
- type of inspection, either in-process or final

When required by contract, the Supplier shall pass this same requirement on to its subcontractors in procurement documentation.

Under no circumstances will GSI/CSI requirement relieve the supplier of their responsibility for complete inspection/test and production of quality parts.

When GSI/CSI is not required, both the Government and Customer reserve the right to inspect at the source, parts and/or services manufactured or performed within the supplier's facility or their subcontractor's facility.

2.11.2. **Technical Plan**

When a Technical Plan is required either by HAU or HAU's customer, the supplier will be required to develop a detailed Technical Plan describing the intended steps in producing the part.

The Technical Plan will be sent to HAU for approval. HAU will obtain approval from the customer or internally as necessary. When approved, a signed copy of the Technical Plan will be sent back to the supplier. In the event that the supplier's process is deemed proprietary, the supplier may submit the Technical Plan directly to the customer. The supplier shall not commence work until an approval has been obtained.

The supplier is expected to perform work in strict adherence to the proper revision of the Approved Technical Plan.

2.11.3. Certificate Of Conformance

A Certificate of Conformance, indicating parts meet all applicable specifications, is required for each shipment. This certificate must be signed or stamped by an authorized company representative. It must contain, as a minimum:

- Supplier Name And Address,
- HAU's Part Number And Revision Level
- Purchase Order Number
- Quantity Shipped
- Date Shipped
- Heat lot number (raw material, forgings, castings)
- Applicable Specifications & Revision level
- If a Technical Plan requirement is applicable, The proper revision of the Technical plan shall also be stated in the Certification

2.12. Control of Nonconforming Material

The supplier shall establish and maintain a system to ensure that all non-conforming and suspect product is immediately identified, segregated and dispositioned. The supplier is expected to properly record all non-conformances and dispositions.

When a supplier becomes aware that nonconforming or suspect material has been shipped to HAU, the supplier shall implement the following:

- Promptly notify HAU's Supplier Quality or Purchasing, that HAU may have received the nonconforming or suspect material.
- Communicate to HAU what corrective action has been taken.
- Any product or services provided by the Supplier which do not meet the acceptance criteria, whether found by HAU or HAU's Customer, will be rejected and the supplier will be responsible for correcting all nonconformances.

Lots determined to be non-conforming by HAU are subject to one or more of the following dispositions with the supplier's concurrence.

- Return to the supplier.
- Scrap at HAU's facility at supplier expense.
- HAU reworks the lot at supplier expense.
- HAU performs 100% inspection, at supplier expense, and returns defective products to supplier
- Use, but provide notice of non-conformance and make adjustments necessary to compensate for deficiencies.

2.13. Corrective and Preventive Action

When either HAU or the supplier discovers a non-conformance, the supplier must have a formal system to resolve the problem and verify that the solution implemented resulted in correcting the non-conformance.

The supplier shall utilize the Eight Discipline (8D), 5 Why method, or suitable alternative. The supplier shall take corrective action, when it is determined that the process is not stable or capable of producing the required product, and/or when it is verified that material does not conform to specifications.

Corrective actions must address the root cause of the nonconformance or instability, and may not be closed until the effectiveness of the action can be verified.

HAU reviews incoming production material to ensure conformance with all applicable specification requirements. Review of the material also extends up to the time of actual use of an item or when a production operation has been performed on an item. If a nonconformance is detected by HAU in any of these stages of review, a Supplier Corrective Action Request (SCAR) will be issued to the supplier. Nonconformance includes, but is not limited to, product nonconformance, administrative elements, (i.e. packing list errors, invoice errors, Document omissions, nonconforming packaging etc.)

Suppliers who fail to provide adequate corrective action by the due date assigned on the Supplier Corrective Action Request, may be subject to performance penalties up to and including suspension of the supplier's qualified status.

Nonconformance of a repeated nature is an indication of poor root cause identification, or correction. HAU will institute progressively stringent containment requirements, specific to the nonconforming material, on that supplier. The extent of the containment requirements will be based on the severity of the nonconformance, and the risk they pose to HAU or its customers. Action may include suspension of the supplier's qualified status.

2.14. Handling, Storage, Packaging and Preservation

The supplier shall establish controls to ensure that product is not damaged during manufacture or transportation to HAU. The supplier shall comply with special packaging and/or preservation requirements that may be included in purchase order specifications or drawings.



2.14.1. Foreign Object Damage (FOD) (For Aerospace Suppliers Only)

A FOD preventative program must be documented and implemented to protect HAU and its customer's product at all times. Suppliers shall establish methods and facilities for identifying, handling, and storing articles to ensure against contamination, corrosion, damage, deterioration and invasion of foreign objects or substances. For components, sub-assemblies susceptible to foreign object debris and damage, the supplier shall ensure articles are free from foreign objects and foreign object damage resulting from supplier processing. Specific attention should be given to:

- Food & beverage controlled
- Proper cleaning of internal cavities
- Tool and small part accountability control
- Loose objects

2.14.2. Preservation

All drawing oils and rust preventatives used by the supplier for the preservation of finished product must be in compliance with HAU's Environmental Policy (section 7). The supplier shall comply with any special packaging and/or preservation requirements that may be included in purchase order specifications or drawings.

2.14.3. Packing Slips:

Packing slips must be secured to accessible area on outside of carton(s) or pallet(s) and have suitable protection.

2.14.4. Delivery and Freight (Shipping to a non-HAU location)

General Instructions:

Unless directed by HAU's buyer all freight is to be shipped collect to the HAU's account. The supplier will be responsible for cost of all freight not shipped in accordance with HAU's Instructions.

HAU's Logistical Management will communicate documents that outline the preferred method of carriage. Carrier selection is based on the location, the size and weight of the shipment. Should the suggested carriers not service the shipper's location, call your HAU's Buyer for alternate routing.

2.15. Control of Quality Records

The supplier shall establish a documented procedure to define the controls needed for the identification, storage, protection, retrieval, retention and disposition of records. HAU requires that the Quality Records pertinent to the manufacturing of the product to be available for evaluation per the following record retention requirements.

- FAIRs (First Article Inspection Reports), control plans, tooling records, purchase orders and amendments shall be maintained for three calendar years after the last delivery of that product.
- Quality performance records (e.g., control charts inspection and test results shall be retained for seven calendar years after the year in which they were created, or per the end use customer requirement, whichever is longer.
- Records of internal quality system audits and management review shall be retained for three years.

Records must be complete, legible and identifiable to the corresponding product and shall be readily retrievable. Electronic records can be kept, but must be stored and maintained in the same manner as all "hard copy" records. All records shall be stored in such a way to prevent loss, deterioration or damage for the entire retention period.

Export control records shall be retained for a minimum of five years unless otherwise specified.

Note: These requirements do not supersede any governmental or customer requirements. All specified retention periods shall be considered "minimums".

For all Aerospace suppliers

Record Retention times shall conform to AS9100 in addition to the applicable customer requirements as flowed down in the purchase order.

2.16. Internal Quality Audits

The supplier shall have a formal documented method for auditing the complete quality management system. The audit shall verify whether quality activities and results comply with planning and to determine the effectiveness of the system.

2.17. Training

The supplier shall ensure that its personnel are aware of the relevance and importance of their activities and how they contribute to the achievement of the quality objectives.

The supplier shall establish and maintain a system for identifying the training needs and providing the training for all personnel performing activities affecting quality.

The supplier shall evaluate the effectiveness of this training and shall maintain appropriate records of training and job qualification.

2.18. Statistical Techniques



2.18.1. Statistical Process Control (SPC)

When deemed necessary or when HAU specifies on the purchase order SPC shall be used to monitor and control a process and/or part characteristic. When not required by purchase order, suppliers are strongly encouraged to use SPC as a tool for continuous improvement, to monitor and control processes and to demonstrate process capability.



For Aerospace Suppliers, some customers may require that statistical procedures be applied to all transformational processes. In such cases this requirement will be stated on the purchase order.

When SPC is required, the supplier shall provide variable data control charts and a statistical capability analysis on a quarterly basis as a minimum.

A process is considered in control when a Cpk of 1.33 or greater is achieved, and variation is normally distributed.

2.18.2. Containment Plan

When process measurement indicates a Cpk of 1.0 or less, a process Containment Plan shall be developed and implemented by the supplier.

This containment Plan shall be designed to ensure that nonconforming material does not get released to HAU or HAU's customers.

Some examples of Containment Plans are:

- Elimination of sampling plans
- 100% over-inspection
- Re-inspection of parts within 20% of specification limits



For Aerospace suppliers, Containment Plans will be subject to HAU and/or HAU customer's approval and must be implemented as quickly as possible when a need is discovered.

2.18.3. Sampling Plans

When a process is measured statistically and resulting evidence show a process is in control, supplier may request approval to implement a sampling plan. Sampling plans require written approval from HAU's Quality department. It is recommended that sampling plans be based on ANSI Z1.4, however supplier shall not use any sampling plan with an acceptance level greater than zero.



Note: Aerospace suppliers shall perform 100% inspection at all times unless specific permission is granted in writing by HAU Quality Department.

2.19. Production Part Approval - FAIR (First Article Inspection Report)

If a First Article Inspection Report is required it shall be noted on the Purchase Order.

When a FAIR requirement is required, a delta FAIR will automatically be required for the following circumstances:

- A change in the design affecting fit, form or function of the part.
- A change in manufacturing source(s), process(es), inspection method(s), location of manufacture, tooling or materials, that can potentially affect fit, form or function.
- A change in numerical control program or translation to another media that can potentially affect fit, form or function.

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- A natural or man-made event, which may adversely affect the manufacturing process.
- A lapse in production for two years or as specified by the Customer.
- Special circumstances resulting from product or process problems.
- HAU may request a FAIR as part of a SCAR.



For Aerospace Suppliers, the FAIR must conform to AS9102 as well as the appropriate customer specific requirement flowed down on the purchase order.

When a FAIR requirement is stated on the Purchase Order HAU will not accept responsibility for products or services produced prior to FAIR approval. The supplier assumes risk for any production prior to FAIR approval.

2.20. Continuous Improvement

HAU strongly recommends each supplier develop and institute a Continuous Improvement plan that includes Quality, Delivery, and Service.

Other areas for continuous improvement may include:

- Increase availability of product
- Increase cost competitiveness
- Improving productivity and process control
- More efficient use of resources
- Reducing testing frequencies
- Eliminating waste
- Reducing cycle time
- Customer satisfaction
- Excessive handling and storage

Performance indices shall be used to measure progress and effectiveness.

HAU is committed to supporting its suppliers in continuous improvement efforts wherever possible, and expects suppliers to participate in joint mutually beneficial projects.

The objective of this element is to improve quality and delivery performance and reduce cost.

2.21. Manufacturing Capabilities

Suppliers shall provide appropriate technical resources for tools and gage design, fabrication and full dimensional inspection as necessary. If any of this work is subcontracted, a tracking and follow-up system is required.

2.21.1. Preventative Maintenance

All key equipment used in the manufacture of HAU's product shall have a documented preventative maintenance plan in effect to ensure uninterrupted service and prevent unexpected delays in shipment. The frequency of such maintenance should be based primarily on statistical data, manufacturing equipment recommendations and past history.

2.21.2. Tooling

All tooling used in the manufacture of HAU's product shall be maintained in a condition that will assure that quality parts will be produced and reasonable tooling life will be maintained.

All tooling owned by HAU must be permanently identified, or otherwise controlled by electronic records, as the property of HAU with the HAU's tool number. Tooling owned by HAU shall only be used in the fulfillment HAU orders. HAU tooling designs and tools are deemed as confidential and are not to be viewed or discussed with any party not expressly authorized by HAU.

2.22. Software Control (Non-deliverable)

The supplier must establish a Software Control Plan that addresses verification to satisfy the intended application and configuration management as a minimum; software development and verification, test criteria, identification, change control, storage & handling documentation, library control, and subcontractor control.



2.22.1. For Aerospace suppliers

The supplier must establish a Software Quality Assurance Plan for the control of non-deliverable software that addresses the following:

- Organizational responsibility
- Identification of requirements
- Coding standards
- Verification and Validation
- Target Environment
- Version Control
- Change Control
- Access Control
- Archiving, Backup and Recovery
- Identification, Storage, Handling and Release
- Training and Maintenance requirements
- Documentation
- Supplier oversight (i.e., audit and product acceptance)
- Process for commercial off the shelf (COTS) acceptance prior to initial use
- Analysis of Risks and Criticality
- Software Support Tool Development Process
- Internal audit or review processes

Reference: ASQR-07.5 - Control of Software

2.23. Calibration Supplier Requirements

2.23.1. System Requirements

Supplier's calibration system shall meet the requirements of ANSI/NCSL Z540-1-1994 (formerly MIL-STD-45662A) or ISO/IEC 17025-2005.

Calibration Certificates shall be made available HAU and are to include, as a minimum.

- Instrument Model Number
- Instrument Serial Number
- Record of all readings taken (including "as found" readings)
- Calibration method / procedure / guidelines
- Signature of person performing the calibration
- Identity of master used traceable to N.I.S.T.
- Amount of uncertainty

Calibration status labeling shall include;

- Due date,

Supplier Quality Requirements

- Person performing the calibration
- Equipment's identification number.

Procedure or guidelines shall conform to ISO Guide 25-1990 or comply with commonly accepted industry standards.

The collective uncertainty will not exceed 4 to 1 ratio. Gages shall have a 95% reliability in-tolerance at the end of their interval schedule.

HAU's Quality Dept must be notified as soon as possible if a gage is found to be significantly out-of-tolerance (Exceeding 25% of product tolerance) so that proper arrangements for product risk analysis can be made.

3. Supplier Qualification

3.1. Approved Supplier

HAU will create and maintain an Approved Supplier List (ASL) for suppliers of production material and processes.

Suppliers are added to this list as they meet established criteria and maintain an acceptable performance rating.

HAU does not purchase materials or product related services from companies, which are not on the approved supplier list.

3.2. Methods of Qualification and Continued Qualification

- **Supplier Qualification Form** - The Supplier Qualification Form 145 is used by HAU to evaluate a new or potential supplier where applicable.
- **For Aerospace Suppliers:** Completion of Form 145 may be required prior to classification on HAU's Approved Supplier List as "Aerospace Approved".
- **Site Surveys** - Site Survey may be used by HAU to evaluate Suppliers as needed. HAU's purchasing and Quality representatives will determine the need for a Site survey.



3.3. Right of Entry

Employees of HAU or HAU's customer have the right of entry to the Suppliers facility. The Supplier must in turn include right of entry provisions in any authorized subcontractors. This right of entry provisions shall allow employees of HAU or HAU's customer that is authorized by HAU, to verify the quality of workmanship, records, materials, and physically review applicable production lines in process, at any facility of the supplier or subcontractor.

Note: Representatives of HAU or HAU's customer that require access to your facility, will sign any applicable non-disclosure agreements that you may deem necessary.

4. Purchasing Documents

It is the responsibility of the supplier to obtain any and all referenced documents on HAU's POs, drawings, or other communication.

All documents must be requested through the HAU's buyer to assure the correct revisions are provided.

HAU is not responsible for errors or omissions as a result of documents referenced but not supplied by HAU. It is the supplier's responsibility to perform a complete contract review.

5. Quality Planning

When required, Advanced Quality Planning of new or changed products shall be carried out by cross-functional teams that use appropriate techniques to establish process controls. Including but not limited to:

- Develop and review Process Failure Mode and Effects Analysis (PFMEA) when required by HAU.
- Develop a Process Control Plan.

Detailed PFMEA and control plan training materials and forms may be requested from HAU through the responsible buyer or SQE.

5.1. Control Plans

HAU requires a control plan for components, process or materials having significant or critical characteristics. Such characteristics are identified on the drawing or in an HAU provided specification. The control plan shall be reviewed and updated as required, especially after every design and process change or if non-conformances are produced by the process. Control Plans may represent families of similar items produced from the same process stream. New or revised control plans shall be approved by HAU's SQE and/or HAU's customer.

A Process Control Plan shall identify key process inputs and include a method for controlling each of them. A Process Plan should include the following as a minimum:

- Methods of manufacture
- Method of control
- Method of measurement
- Reaction Plan for out of control situations

5.2. Process Flow Chart

The supplier shall have a process flow chart that will be organized in a material flow sequence from incoming material to packaging and shipment. The flow chart should be reviewed and updated as required. Process Flow Charts may represent families of similar items produced from the same process stream.

5.3. Process Certification

A process can only be certified when all of the following have been achieved;

- A process Control Plan has been created and adhered to
- Gage R & R demonstrates gage variability is less than 20% of total tolerance.
- Preventative Maintenance Plan is in place
- The statistical analysis shows a normally distributed population with a minimum Cpk of 1.33
- Self-audits are completed and documented

6. Supplier performance and monitoring

6.1. Quality Rating Calculation

Product Quality is gathered using nonconforming data from incoming inspection as well as later rejections determined to be the supplier's responsibility after nonconforming material review.

This rating is calculated by dividing the number of nonconforming pieces divided by the total number of pieces received in that month

6.2. Delivery Rating Calculation

This rating indicates the delivery performance of material and services as measured against the agreed to lead time for the product. This data is gathered using receipt data for the supplier generated from the ERP system.

This rating is calculated by dividing the number of pieces received on time divided by the total number of pieces received in that month.

6.3. Score cards

Score cards are issued to the HAU Supply base on quarterly basis.

The scoring elements of the report card include Quality Performance (Product Quality and Responsiveness to RCCA Quality Concerns) and Delivery Performance (On-time/Promise Date, Complete Documentation Package).

Each element is rated separately and has its own maximum point score. Performance data is recorded monthly, and Scores are calculated as monthly data and as a Three-Month running Average for each scoring element.

The supplier's overall score is the sum of scores from each element. Each month and calendar quarter the supplier will be rated as shown below, based on the total of Three Month Running Average element scores. Suppliers are scored monthly/quarterly and assigned performance rating calculation as shown below.

The resultant rating puts the supplier into one of the following classifications:

Performance Rating	Classification
98-100	Preferred
85-97	Acceptable
75-84	Marginal
<75	Poor

Score card Scoring Criteria:

- Product Quality NCM**
Calculated by dividing the number of non-conforming pieces by the total number of pieces received that month: scoring criteria (max = 40%)
- SCAR – RCCA Responses-Completed-Accepted**
*Completed and On-time responses to the SCAR Scoring criteria (max = 10%)
5% deducted ea. Incomplete SCAR where no extension was requested.*
- On-Time Delivery – Promise Date**
Calculated by dividing the Number of Pieces received on time/promise date by the number of pieces received that month: scoring criteria (max = 40%)
- Required Document Package**
*2% deducted each delivery missing documentation upon receipt:
Scoring Criteria (Max.= 10)*

Supplier Quality Requirements

6.4. **Marginal classification**

If a supplier is in the **Marginal** classification a formal Supplier Corrective Action Request (SCAR) may be issued to the supplier or they may be required to participate in risk mitigation activities and remain on the Approved Supplier List.

6.5. **Poor classification**

If a supplier is in the **Poor** classification a formal SCAR may be issued to the supplier or they may be required to participate in risk mitigation activities, or may be put on Probationary status until their Performance Rating Classification can be improved to the next level.
A supplier in Probationary status may not be issued any new orders.

6.6. **Disqualification**

Under the discretion of the Quality Manager and/or the Purchasing Manager, a supplier can be disqualified for repetitive poor performance and who do not display a willingness to take positive corrective action. It will be at the discretion of the HAU Purchasing and Quality Departments to remove a Probationary supplier from the Approved Supplier List.

In order to be re-instated to the Approved Supplier List, a supplier must demonstrate effective implementation of any outstanding corrective actions and be subject to an on-site audit.

7. **Environmental And Hazardous Material Processes**

A supplier shall have a process to ensure compliance with all applicable government safety and environmental regulations, including those concerning handling, recycling, eliminating, or disposing of hazardous materials. Appropriate certificates or letters of compliance should evidence this.

Supplier Quality Requirements

Suppliers are encouraged to adopt the principles of the ISO 14001 Environmental Management System.

7.1. **Material Safety Data Sheets (MSDS)**

MSDS are maintained at all HAU facilities for all chemicals used in that facility. Any chemical being shipped to an HAU site must be accompanied by a MSDS or it must be supplied in advance of shipment.

7.2. **Visitors to HAU facilities**

Suppliers are required to comply with **HAU's Visitor/Contractor Environmental, Health and Safety Agreement** (EWI-06), when performing work at HAU's facilities or when performing any activity on our behalf associated with identified environmental aspects and/or significant hazards that could lead to deviation from our Integrated Management System Policy (section i), objectives and targets.

7.3. **Supplier Responsibility for REACH**

7.3.1 All HAU's suppliers must conform to the Registration, Evaluation, Authorization and Restriction of Chemicals (the "REACH Regulation") to the extent required and appropriate to their business.

7.3.2 HAU's suppliers are required to investigate and communicate to the HAU's buyer if there are any substances in the product they ship or used in their manufacturing, assembly, use, maintenance or repair that are listed in Annex XIV of REACH for Authorization, on the "Candidate List" (as published in accordance with Article 59.1 of the REACH Regulation) for which a REACH Annex XVII restriction exists or is proposed, in the "CoRAP" list for Substance Evaluation under REACH, or the International Aerospace Environmental Group's ("IAEG") AD-DSL ("Aerospace and Defense Declarable Substance List").

7.3.3 Upon request, supplier shall complete any required documentation/surveys with respect to the REACH regulation within the time frame required.

7.3.4 Where the Products or parts thereof meet the definition of "articles" under REACH and contain chemical substances listed on the Candidate List, the supplier must provide the HAU's Buyer with all relevant information on such Products and parts that Supplier and/or its suppliers are required to communicate down the supply chain under the REACH Regulation, including safe use information compliant with REACH.

8. **Confidentiality Agreement**

Supplier agrees not to make use of or disclose to third parties any data, designs, drawings, specifications and other information furnished to it by HAU except for the performance of any HAU purchase order.

All HAU order information is confidential between HAU and Supplier and it is agreed by Supplier that none of the details connected therein shall be published or disclosed to any third party without HAU written permission.


9.1 Change History

- 9.2** Rev. J – 12/5/19 – Cerrigione – EDAC, EDAC Technologies replaced with Hanwha Aerospace USA/HAU throughout. Par. 6.5, 6.6 revised.
- 9.3** Rev K – 11/23/20 – Cerrigione – par 6.1 deleted (weighted performance scores) and subsequent paragraphs re-numbered. Logo removed from first page.
- 9.4** Rev L – 4/27/21 – Cerrigione – par. 2.3 revised (stipulate that supplier must consult end use customer's specification revision listing/portal and notify HAU Purchasing Department if they don't have access to the end use customer's portal/specification revision listing.
- 9.5** Rev M – 04/03/2023 – Stoner – par.6.3 Added information for Supplier Score Cards and Scoring Criteria. Additional measurements moved to par. 6.7 (previous revision 6.4) Changed the Integrated Management System Policy to Management System Policy.
- 9.6** Rev N – 03/05/2024 – Stoner – par 2 revised to include reference to AS13100 Table 2 QMS requirements. Appendix A: associated documents (Bibliography) updated to include AS13100
- 9.7** Rev O- 08/19/2025- Couture- Para 2.15 Revised to include "Export control records shall be retained for a minimum of five years unless otherwise specified"

APPENDIX A:

Associated Documents (Bibliography)

The following publications contain additional information that will be of assistance to HAU suppliers:



ISO 14001 - Environmental Management System.
ISO 9001 - Quality Management Systems Requirements
AS13100 – Quality Management System Requirements for Aero Engine Design and Production Organizations
AS9100 – Quality Management System Requirements for Aviation, Space & Defense
AS9102 – First Article Inspection Requirements (SAE)
AS9103 - Variation Management of Key Characteristics
ANSI/ASQ Z1.4- Sampling Procedures and Tables for Inspection by Attributes
ASQR-01 - Aerospace Supplier Quality Requirements (UTC)
ASQR-07.5 - Control of Software (UTC)
UTCQR-09.1 - Process Certification Requirements (UTC)

Calibration related documents

ISO 10012-1 – Quality Assurance Requirements for Measuring Equipment
ANSI/NCSL Z540-1 - Calibration Laboratories and Measuring and Test Equipment
ISO/IEC 17025 - General Requirements for The Competence Of Testing And Calibration Laboratories

APPENDIX B:

Associated HAU Documents/Forms

HAU EWI-06 - Visitor/Contractor Environmental, Health and Safety Agreement
HAU Form 145 – Supplier Self-Survey / Audit