INTEGRAL AEROSPACE SUPPLIER QUALITY SYSTEM REQUIREMENTS

Specification Number: **S-IAS-1005**
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This specification is in addition to and in no way limiting, superseding, or abrogating any contractual obligation as required by the applicable procurement document.

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Applicability

This specification applies to suppliers of Integral Aerospace so when flowed down via purchase order or long term agreement:

Integral Aerospace

Throughout this document, UKAS will be accepted in place of ANSI for non-US suppliers.

A. INTRODUCTION

1. This document establishes the minimum quality system requirements necessary for production hardware, software, and service suppliers to Integral Aerospace (hereafter referred to as IA. Suppliers include manufacturers, process/special process suppliers (as classified by IA), customer tooling suppliers, sub-contractors, testing/calibration services, distributors and warehouses.

A. Manufacturer, customer tooling, and sub-contractor type suppliers, as identified by IA, shall meet the requirements specified in this document as well as the applicable requirements of AS/EN/JISQ 9100/9110 - "Aerospace Basic Quality System Standard". In case of requirement conflicts, this document will take precedence.

B. Material suppliers, as identified by IA, that provide raw material or applied material shall meet the requirements specified in this document as well as the applicable requirements of ISO9001 - "Model for Quality Assurance in Design, Development, Production, Installation, and Servicing". In case of requirement conflicts, this document will take precedence.

C. Processors/Special Processors, as identified by IA, shall meet the requirements specified in this document as well as the applicable requirements of AS/EN/JISQ 9100, AC7004, or NADCAP "Audit Criteria for Inspection and Test Quality System". Processors performing only Non-Destructive Evaluation (NDE) may meet this requirement with ISO/IEC 17025 certification. In case of requirement conflicts, this document takes precedence.

D. Distributors and warehouses (Non-IA IA that acquire material from other suppliers for delivery to the purchaser or other customers) shall meet the requirements of this document and SAE AS 9120 – "Quality Management Systems - Aerospace Requirements for Stock list Distributors" and/or applicable portions of AS/EN/JISQ 9100- "Aerospace Basic Quality System Standard In case of requirement conflicts, this document will take precedence.

E. Contractual requirements for the completion of third party quality certifications are listed in Appendix G of this document.

F. Calibration Services shall meet the requirements specified in this document as well as NCSL/UKAS Z540.3, and the applicable requirements of AS/EN/JISQ 9100, ISO9001, and or ANSI ISO/IEC 17025.

G. Suppliers who provide electronic components and/or electrical assemblies shall also meet the requirements of IA specification IA -553.

2. The Supplier will manufacture parts to the drawing revision in effect on the date of the Purchase Document. When the Supplier incorporates any additional Changes in Design (CID) or Engineering Change Notices (ECN), they will manufacture parts to the drawing revision in place at the date of the Purchase Document plus those CIDs/ECNs that have been incorporated.

3. In the event of conflict in IA quality system requirements, the order of precedence shall be:

1st Procurement Document or Contractual Agreement (excluding this document)

2nd Applicable Purchaser's drawing

3rd Specifications referenced on the drawing

4th This document

5th All other documents/specifications referenced in this document

4. Certificate of Conformance (C of C)

A. Certificate of Conformance (C of C) shall be provided with each lot. The C of C shall include a statement that the items meet the requirements of the purchase order and specifications referenced on the drawing and/or purchase order. C of Cs must include, as a minimum, the following information:

1) Supplier name and address
2) Serial number(s), if applicable
3) IA purchase order number
4) Quantity of parts in shipment
5) Part number on purchase order
6) Statement certifying product compliance
7) Applicable Specifications including revision
8) Part revision
9) Signature or stamp of authorizing agent
10) Date code(s) or lot number(s), if applicable
11) Original Manufacturer name and site of manufacture (any exceptions must be made prior to shipment)
12) Date of C of C
13) Shelf life, if applicable
14) Description
15) Customer name and address

16) Reference to IA approved deviations/waivers (production permit/concession).

5. Right of Access/Entry

A. The supplier shall grant right of access to IA, its customers and associated regulatory authorities to the applicable areas of all facilities and levels of the supply chain involved with the purpose of the visit. This access shall provide, at no increase in price, cost, or fee to IA, IA customers, or regulatory agencies, suitable facilities at Supplier's and Subtier Supplier's manufacturing location to perform inspections, surveys, or surveillance and access to all applicable records.

6. Changes

A. For IA designed product, or product designed exclusively for IA, the supplier shall notify and obtain approval from IA for changes in design, manufacturing or assembly processes, manufacturing location or source of supply of their products, whenever such changes affect applicable IA orders, prior to the contemplated change. (Also reference Paragraph N)

B. For supplier designed product, the supplier shall submit all Class I changes to IA for approval before implementation. Class I design changes rejected by IA are not to be incorporated into product shipped to IA, until the reasons for rejection have been resolved. The supplier shall also submit all Class II changes to IA for information/notification, prior to implementation.

C. No design activity shall be further sub-contracted by the supplier without the prior approval of IA. In all cases, the relevant GE design requirements shall be flowed down and verified by the supplier.

7. Language Requirement

A. Unless otherwise authorized by IA, all Seller records, reports, specifications, drawings, inspection, test results, correspondence, and other documentation shall be in English.

8. A counterfeit parts protection program shall be established by each supplier using SAE AS5553 or SAE AS6081 as a guide and meet the requirements of IA. This program is subject to Purchaser approval.

9. An obsolescence part management program shall be established for end of life and revision changed parts in accordance with the requirements in IA -553.

10. The following documents form a part of this document to the extent specified herein.

SOCIETY OF AUTOMOTIVE ENGINEERS/AEROSPACE/INDUSTRY STANDARDS

AS 5553	Counterfeit, Electronic Parts; Avoidance, Detection, Mitigation, and Disposition
AS 6081	Fraudulent/Counterfeit Electronic Parts: Avoidance, Detection, Mitigation, and Disposition - Distributors
AC7004	NADCAP Audit Criteria for Inspection and Test Quality System
AS/EN/JISQ 9100/9110	Aerospace Basic Quality System Standard
AS 9120	Quality Management Systems - Aerospace Requirements for Stock list Distributors
ISO 9001	Quality Management Systems
J-Std-001	Requirements for Soldered Electrical and Electronic Assemblies

IPC-A-610	Acceptability of Electronic Assemblies
IPC/WHMA-A-620A	Requirements and Acceptability for Cable and Wire Harness Assemblies
IDEA-STD-1010	Acceptability of Electronic Components Distributed in the Open Market
ANSI/ESD S20.20	Electrostatic Discharge Control Program
NCSL Z540.3	Requirements for the Calibration of Measuring and Test Equipment
ANSI/ESD S541	Packaging Materials for ESD Sensitive Items
Mil- Std-1686	Electrostatic Discharge Control Program
NAS 412	Foreign Object Damage/Foreign Object Debris (FOD) Prevention Program
JEDEC Standard No. 625A	Requirements for Handling Electrostatic-Discharge-Sensitive (ESDS) Devices
EIA-649	National Consensus Standard for Configuration Management

IA SPECIFICATIONS/DOCUMENTS

IA-553	INTEGRAL AEROSPACE ELECTRONIC COMPONENTS AND ASSEMBLY CONTROL
IAT1005-1	UNUSUAL VISUAL APPEARANCE FORM
IAT1005-2	SOURCE PROBLEM REPORT FORM
IAT1005-3	SUPPLIER NONCONFORMING MATERIAL REPORT FORM

B. DESIGN DOCUMENTS

1. Configuration Control

   A. Drawings, specifications and related documents, including referenced specifications and instructions, contained in the Purchase Document or revisions mutually agreed upon by both parties, shall be applicable to the Purchase Document, Electronic Data Interchange or another legal contractual conveyance document.

   B. Engineering Change Notice (ECN) / Change in Design (CID) shall be introduced and planned in accordance with the instructions.

   C. Assure manufacturing and quality plan revisions are accomplished in accordance with the issued ECN/CID.

   D. See Appendix A for handling requests for interpretation of drawings/specifications and approval of drawing/specification options.

   E. The Purchaser's requirements shall be recognized as such only when specified by the Purchaser's purchase document or when stipulated in a special contractual agreement between the supplier and the purchaser.

   F. Supplier designed components for IA specifications: The supplier shall have a system where:

      1) All design changes are submitted to IA prior to issuance for approval of design change (if change affects form, fit or function) or approval of classification (if change does not affect form, fit or function).

2) Design changes rejected are not to be incorporated into the supplier's drawing and into hardware shipped to IA.

C. CONTROL OF PURCHASES

1. For all processing (work) performed by subtler Suppliers:

   A. The manufacturer must ensure that all IA requirements applicable to the processes, characteristics or material contracted to the Sub tier Supplier are specified in the purchasing document.

   B. The manufacturer is responsible to flow-down any changes in IA requirements that affect the processing performed by a sub tier Supplier. This includes ensuring that sub tier suppliers have the latest revision of the necessary Drawings and Specifications, including IA-1005.

   C. When IA drawings identifies Source Control or Vendor Item control in the title block of the IA drawing, requirement is to use only source(s) and cage code(s) identified, when supplying hardware intended for IA end use.

   1) Both type drawings contain a table of sources:

      (a) Approved Sources of Supply (Source Control)

      (b) Suggested Sources of Supply (Vendor Item Control)

2. Purchased Raw Material and Special Processes:

   A. The supplier's material and special process control system shall ensure that:

   1) Material and Special Process Test Reports (i.e., material certifications, certificate of tests) are available and maintained on file for all material received. Testing shall be performed by a certified lab.

   2) Material and Special Process Test results reflect all requirements of the drawing and/or specification and conform to drawing and/or specification limits. Documented evidence of this conformity shall include a listing of each material element or test result in the applicable test report. The applicable test report, which shall be signed by a cognizant test laboratory person, shall clearly describe whichever of the following is correct (equivalent wording is permitted):

      (a) All tests and inspections have been performed and results meet the drawing and/or specification requirements, or

      (b) All tests and inspections have been performed and the results meet all the drawing and/or specification requirements.

      (c) All tests and inspections have been performed and the results meet all drawing and/or specification requirements.

   3) Material received is the material represented by the Material or Special Process Test Report, and properly identified per drawing and/or specification.

   4) Material shall remain identified until its identity is necessarily obliterated by processing.

5) Excess processing material will not be returned to storage until its proper identification has been re-established and restored.

6) Material shipped as the final product meets all purchase order, drawing and/or specification requirements as determined by evaluation of test reports and subsequent processing (when applicable).

7) Personnel responsible for the review of material and special process test reports shall be trained to read and confirm test results for ensuring that all drawing and/or specification requirements are met.

8) The method employed to evaluate material and special process test report results shall be documented and shall provide for the review of each test as required per the applicable drawing and/or specification. The methodology to be employed may be subject to Purchaser disapproval.

B. When material or special process services are subcontracted, the supplier shall provide the sub-contractor with a procurement document that reflects the applicable drawing and/or specification number and revision, test requirements to be performed, and a request for a certified report of all tests performed. See Appendix B for recommended procurement flow down requirements.

C. When the material test report received from the material source has been generated by a IA approved material testing laboratory, no initial or subsequent audit testing of purchaser ordered product will be required.

D. Suppliers shall institute an audit testing plan for material not tested by a certified material testing laboratory to ensure data received is representative of the raw material and the material is in conformance with requirements. The plan is subject to Purchaser disapproval and shall include the following minimum requirements:

1) Provisions shall be established for:

(a) Initial testing requirements to qualify for auditing (qualification shall be by material specification and material source).

(b) Subsequent auditing requirements.

(c) Criteria for disqualification to audit and for re-qualification.

(d) Incorporation of specific acceptance testing requirements when defined through the procurement document.

2) Audit testing shall be performed by a testing laboratory other than the one used by the material source.

(a) When audit tests are performed, for the alloy types listed below, full testing to the specification is not necessarily required. The following guidelines may be used:

(1) Nickel & Cobalt-Elevated and/or room temperature tensile, chemistry and microstructure.

(2) Titanium, Iron & Aluminum-Room temperature tensile, chemistry and microstructure.

(b) All other raw materials (not listed above) shall be tested to the extent required to verify full compliance with the material specification.

3) When a material test report received from the material source has not been generated by an approved material testing laboratory, testing shall be performed on each raw material lot as defined by the applicable specification, by an approved material testing laboratory.

4) Material testing of a Supplier designed component shall be performed by a certified material testing laboratory.

5) When raw material is procured from a source other than the raw material manufacturer (i.e., from a distributor, etc.) identification testing is required on each lot of raw material if it is not subject to more complete testing.

   (a) Such material, which still has the original raw material marking (roll stamp, punch stamp, etc.) and is directly traceable to the certified testing laboratory material certificates does not require the identification testing.

   (b) If material identification is lost, the material cannot be used on items that have a traceability requirement (i.e., serial number or lot number) without Purchaser's prior approval. This material may be used on items without traceability requirement if subjected to full specification testing.

   (c) When specifically indicated by the procurement document, the certificate of test received from the material supplier may, providing all test requirements are met, be the basis for release of raw material in lieu of material audit testing.

6) IA supplied material

   When material is supplied directly from IA, the supplier shall verify that the material arrived in good condition. No additional inspection or certificates are required; however, evidence is required that the material was shipped from a IA facility, e.g. Shipping Document.

   If material is purchased by IA and drop-shipped directly from a manufacturer, the supplier is responsible to verify that the shipment has evidence of Full Release.

D. QUALITY ASSURANCE PLANNING

1. Sampling of nondestructive testing (NDT) is not permitted when the NDT is performed to fulfill a drawing or specification requirement. This does not apply to in-process NDT used to increase yield.
2. All characteristics on all parts must be accounted for and verified on products and services provided to IA. Requirements for characteristic accountability, verification and product acceptance are defined in IA Quality Specification IAS-1007.
3. If a First Article (or Delta First Article) Inspection Report (FAIR) is required, the FAIR will be documented in accordance with IAS-1007 and submitted to IA in accordance with PQE instructions.

E. TRACEABILITY

1. Traceability Identification

The purpose of requiring serial number or lot number control of items is to assure traceability of certain parts or assemblies to associated records that are generated during processing of raw material, manufacture, assembly, test and ultimate use of these items. This traceability is necessary for the investigation of problems related to the performance or life of an item. Serial number and lot/batch number control is described as follows:

A. Acceptance records shall be traceable to each other. If serialized or lot numbered parts are manufactured from serialized or lot numbered material, then traceability shall be maintained to those details and their product acceptance records.

B. Serialized or lot/batch numbered assemblies (Purchaser or Supplier designed):

1) Each serialized assembly shall be traceable to the product acceptance records that are associated with the overall assembly. The assembly shall also be traceable to each serialized or lot/batch numbered sub-assembly or part and their product acceptance records. If serialized or lot/batch numbered sub-assemblies contain serialized or lot numbered parts, then traceability shall by maintained to those details and their product acceptance records.

2) Lot/batch numbered items: The lot product acceptance records shall be traceable to the parts/assemblies in the lot/batch.

2. Cross Referencing

A. Traceability is accomplished by cross-referencing records to individual parts for serial numbered parts or lots (batches) for lot/batch-controlled parts. When a serial number or lot/batch control is required, the following cross-reference information shall be included in the record~~s~~.

1) Part Identification Number

2) Serial Number, if required by drawing, specification or purchase order

3) Part Name

4) Material Specifications and Revision Designation

5) Order Number

6) Heat Number or Batch Number

7) Heat Treat Number

8) Heat Treat Designation

9) Casting or forging supplier and serial number when marked on the part

10) Raw Material supplier when required by drawing, specification or purchase order

11) Manufacturer's identification on finished parts if required by drawing, specification or purchase order

12) Lot/Batch number

13) Date Code

3. Serial Numbers

A. Requirements

Each IA drawing that specifies serial number marking requires that the item be marked in accordance with the marking specification identified in the drawing, with a unique serial number~~,~~ applied at the drawing level.

NOTE – IA serial numbers that were required by a lower level drawing shall not be removed or remarked unless so required by the drawing.

B. IA Serial Numbers

1) Letters, I, O, Q, X and Z shall not be used.

2) Serial numbers for each part number shall not be duplicated.

3) IA assigned serial number shall be used only for items that are to be supplied to IA or their agent, either directly or through another manufacturer who supplies them directly to IA. If product is provided to a customer other than IA or their agent, or other source manufacturer, (e.g., aftermarket sales, DOD, etc.) IA assigned serial numbers shall not be used.

4) Serial numbers shall be assigned, using a documented and issued procedure. This procedure is subject to review and disapproval by the Purchaser.

5) Once a serial number has been used to identify an item, (i.e., either a unique piece of hardware or an associated paperwork), it shall not be changed at any time or for any reason, even if the items are reworked and re-identified.

4. Lot Numbers

A. Requirements

When a drawing, or a specification referenced on a drawing, requires the application of a lot number, that lot shall be as defined herein.

B. Lot Information

Lots shall be formed by grouping items which have the same part number, and which are manufactured under essentially the same conditions, and at essentially the same time. Typical lots would be formed from a single heat, or a single melt or single heat-treat batch.

C. Once a specific lot number has been assigned to a lot, that lot number shall not be re-assigned. This requirement applies even if the parts involved are dissimilar in identification, design or function.

D. Once a lot number has been used to identify manufacturing or inspection records, it shall not be changed at any time, or for any reason, even if the items are reworked and re-identified.

E. When lot numbers are included as part marking, the five letters, I, O, Q, X and Z shall not be used.

5. Date Code

If the applicable drawing or specification requires the marking of a date code, year and week format shall be used (YYWW) unless otherwise defined by the drawing/specification or approved by IA.

F. RECORDS AND RETENTION

1. Records shall be maintained in accordance with Appendix C.
2. Unless otherwise specified in the purchase order/agreement or Appendix C, the minimum retention time for quality records generated by the supplier is 10 years.

G. NONCONFORMING MATERIAL/CORRECTIVE ACTION

1. Nonconformance shall be documented in accordance with Appendix D. In those instances where it is indicated that nonconforming material may have been shipped, the system shall provide for prompt purchaser notification.
2. The supplier is responsible for implementing a documented corrective action program
3. When requested by IA, the supplier will be required to provide prompt and effective written corrective action.

   When a sub tier Supplier is responsible for the root cause, the prime Supplier shall flow down a request for corrective action to the sub tier Supplier.
4. When the Supplier's corrective action program is ineffective in reducing or eliminating the correctable root causes of nonconformance, IA may elect to reject items or lots until effective corrective action has been implemented and verified.

H. PREPARATION FOR SHIPMENT

The system shall ensure the material is packaged in accordance with the applicable requirements and is accompanied by the required shipping and technical documents. See Appendix E.

I. SOFTWARE

Software shall be controlled in accordance with Appendix F.

J. CONFORMANCE AUDITS

In accordance with AS/EN/JISQ 9100, the supplier must have documented procedures for planning and implementing their internal Quality Audit Program. (See ISO 19011 "Guidelines for auditing management systems") Internal, registrar, or customer (other than IA) quality system conformance audit findings that have a potential or direct impact on product being produced for delivery to IA must be promptly reported to the Purchaser.

K. DISTRIBUTOR AND WAREHOUSE CONTROLS

1. Distributors (franchised and non-franchised) and Warehouses shall assure traceability (component) and flow down of requirements on all purchased products to the source of manufacture and their related acceptance documents. The actual source of all material shall be identified. Distributors (franchised and non-franchised) and Warehouses shall provide the

Manufacturer's (Original Equipment Manufacturer/OEM) Certificate of Conformance (C of C), intermediary C of C's, along with their own (reference Section A paragraph 4) for each lot/date code of parts shipped to IA. Distributors and Warehouses providing COTS parts may retain the manufacturer and intermediary C of Cs unless otherwise specified in the IA Purchase Order. Material from different manufacturing sources shall be stored in a manner that the material does not become intermixed and that the manufacturing source identity and material identity is maintained.

2. Distributors and Warehouses shall not modify, rework, or repair material in-house or by subcontracting unless approved by the Purchaser (i.e. Drawing, Specification, or Purchase Document) or the work is performed by the actual manufacturing source of the material.

3. Distributors and Warehouses may employ sampling plans provided their use ensures fulfillment of Purchaser's requirements. Acceptance sampling of critical characteristics is not acceptable under any circumstances; however, demonstration of process control through the use of SPC and an assurance of a capability index (Cpk) greater or equal to 1.33 is an acceptable means of verifying conformance of critical characteristics.

   A. All attribute lot-by-lot sampling plans must conform to zero acceptance number (C=0 - the number of rejects allowed in an acceptable lot).

   B. When non-conforming characteristics are found in the lot sample, the sampled lot will require 100 percent inspection of the nonconforming characteristic(s) in the lot. Results of the 100 percent inspection shall require the nonconformance to be submitted through the Nonconforming Material System or the return of the hardware to the manufacturer.

4. When a distributor procures hardware that is source controlled:

   A. The distributor shall only provide items from the approved source(s) of supply listed on the IA Source Control drawing or other IA document. The approved source Contract and Government Entity (CAGE) code and the manufacturer part identification information must be listed correctly on the IA drawing or document. If the approved source of supply or part identification information is not listed, the Distributor shall contact IA Sourcing or IA Quality Representative to request a change to the IA drawing or document.

   B. The approved distributor shall supply to the manufacturer all current specifications (i.e. latest revision) for the conformance to the IA purchase order requirements.

   C. Non-conforming material shall be properly documented for disposition per Appendix D by the Distributor.

5. Non-Franchised/Independent Distributor (Broker)

   (These requirements maybe waived by IA for COTS parts)

   A. Brokers shall meet the same requirements as Franchised/Authorized Distributors for traceability (reference Section K paragraph 1). The Broker must certify that the parts are new, unused, and have not been previously programmed, altered, refurbished, repaired, or used by any customer. The original manufacturer's (OEM) Certificate of Conformance (C of C) and any intermediary C of C's must be shipped along with the Broker's C of C (reference Section A paragraph 4) for each lot and date code shipped to IA.

B. If traceability cannot be met or if the broker cannot provide the manufacturer's C of C, IA must be notified. IA reserves the right to cancel the order, request or perform additional testing, or develop a plan for acceptance.

C. Marking Permanency Test - The broker shall perform a marking solvency test using acetone. The test will be performed on one component from each date or lot code using IDEA-STD-1010-A or similar method as a guide. Any component where the OEM's marking can be removed using this method will be grounds for rejection of the entire lot.

D. Orders placed through brokers may be subject to additional functional and/or physical validation when the order arrives at the IA location. IA reserves the right to reject the lot(s) for any indication of a functional and/or physical deviation to the manufacturer's specification.

E. Acceptance of this order by the broker constitutes an agreement that the broker will reimburse IA for the total price of the purchase agreement if the parts are found, through inspection and test methods used by IA and/or IA authorized test facilities, to be non-conforming. Parts found to be counterfeit or otherwise illegal will not be returned to the broker but will be offered to local law enforcement or appropriate bodies for destruction.

F. Additional requirements may be imposed on non-franchised distributors (brokers) via the IA purchase document.

L. PARTIAL AND FULL RELEASE

1. A Partial Release shall be used whenever all the requirements have not been met. Partial release authorization in writing is required by the IAQR prior to release of hardware.
2. A Full Release shall be used when all requirements have been met.

M. PRIME SUPPLIER RESPONSIBILITY

1. In addition to complying with all requirements listed in this document, prime suppliers are required to flow down applicable portions of this document that are imposed by IA purchase document to sub-tier sources.
2. Changes to facilities
   A. Suppliers/Manufacturers of IA designed material, material altered for IA, or material specifically designed for IA shall notify IA of any manufacturing location change or change in process locations ninety (90) days prior to the change.
   B. Changes in "distribution center" locations shall be provided prior to the initial distribution of the material.
   C. All other suppliers shall provide notification to IA Sourcing of manufacturing location changes.
   D. Prior to a move to a new facility or equipment move, contact the IAQR to determine if there is a need for re-audit, re-qualification of equipment, or other validation activity. Other validation activity may include submission of full FAI on unique parts, product family or as otherwise specified per S-1007, AS9102 and/or the IAQR.
3. The following is required for documents sent to IA.

A. Document Completion – Unless specifically directed otherwise by the documentation requiring the completion of a form or log, all blocks, lines, spaces identifying information to be entered require completion (i.e. entry of some form).

B. Manual forms - Acceptable entries include

1) Specific data/information as specifically required

2) N/A (indicating not applicable)

3) N/R (indicating not required)

Note: If specific restrictions exist relative to acceptable entries, they shall be clearly defined in the documentation requiring form completion.

C. Manual logs – Unless specified on the log, (i.e. instructions for completion) all lines require individual entries. The use of "ditto" marks, lines drawn through specific entry fields, etc. are not recognized as acceptable logging of information. Unless otherwise prohibited, entries as identified as acceptable in Manual forms (above) apply.

D. Electronic/on-line form completion – The requirement for entry into any particular field will be identified and controlled by the specific electronic application.

1) If a specific entry format is required, the application will assure proper entry.

2) If the entry format is not specified, entries identified as acceptable in Manual forms, specific data/information apply.

N. UNUSUAL VISUAL APPEARANCE

1. An unusual visual appearance (UVA) can exist when a IA product contains a technically acceptable visual appearance, which could result in unfavorable reaction or questions from a customer.

2. Examples include, but are not limited to:

A. Discoloration

B. Uneven surface condition

C. Evidence of rework/repair

D. Result of process change which alters the appearance of the part from parts shipped prior to the process change)

3. If the visual appearance violates an engineering requirement or is a result of a repair, see Appendix D for documentation instructions.

4. If the visual appearance does not violate engineering requirements, but is considered an "Unusual Visual Appearance", the manufacturing source must contact the responsible IAQR, who will work with Engineering for concurrence prior to the part being shipped. The manufacturing source will complete the UVA form (GT1005-1) to provide the IAQR a complete understanding of the appearance.

A. The UVA form shall include pictures of the unusual condition and "typical" condition.

B. The UVA form is available through the IAQR.

O. SHELF LIFE ITEMS

1. Items with a limited shelf life shall be marked on the item, package, or container with the manufactured date, storage temperature, special handling requirements, and expiration date of the items as applicable. When items are fabricated of rubber, the cure date of the rubber is to be shown in lieu of the date of manufacture. All identification markings shall be placed in accordance with applicable specifications.
2. Unless otherwise authorized via purchase order, IA will not accept materials with less than 80% of shelf life, without written authorization from the IA Buyer.

P. FOREIGN OBJECT DAMAGE/DEBRIS (FOD)

1. The Supplier shall develop and maintain a Foreign Object Debris (FOD) prevention program in accordance with NAS 412 (or equivalent) to identify and eliminate foreign object entrapment areas and paths through which foreign objects may migrate and cause product failure. The FOD program will include design, manufacturing, and process controls to prevent FOD in deliverable items.
2. The Supplier shall employ appropriate housekeeping practices to assure timely detection and removal of residue/debris generated, if any, during the manufacturing operations and/or normal daily tasks. All occurrences of product rejections due to FOD shall be documented and investigated to determine the root cause of the FOD and implement actions to prevent any recurrence.
3. The Supplier shall implement a FOD prevention program and shall provide initial and periodic FOD prevention awareness training programs.
4. The Supplier shall include periodic self-assessment of internal FOD prevention practices to measure effectiveness. Delivered material must be clean and free from any material/debris, such as wire clippings, machined chips, burrs, grinding dust, forming materials, corrosion, oil and other foreign material on surfaces to prevent FOD entrapment. The Supplier should have special emphasis controls in place appropriate for the manufacturing environments.
5. The Supplier shall ensure that FOD requirements are flowed down to the supplier's sub-contractor/sub-tier suppliers.

Q. ELECTROSTATIC DISCHARGE (ESD) CONTROL

1. The Supplier who manufacturers or handles in any way devices that are sensitive to damage caused by electrostatic discharge shall implement an ESD control program. The control program should follow the requirements established by ANSI/ESD S20.20 and JEDEC-Standard No. 625A or Mil-Std-1686. The control program is subject to review and disapproval by IA.
2. The control program must contain the following elements at a minimum:
   A. Training (initial and recurring/refresher)
   B. Signage
   C. ESD dissipation (ground straps, workstations)
   D. Proper static shielding packaging during movement/transportation/storage

R. SOLDERED ELECTRICAL AND ELECTRONIC COMPONENTS AND ASSEMBLIES

1. This section applies to IA designs, product designed for IA or assemblies produced for IA unless otherwise specified on the drawing, bill of material, purchase order/contract or IA buyer instructions. The supplier shall also meet the requirements of S-553.
   - A. Soldering and solder processes shall be in accordance with J-STD-001 Class 3.
   - B. Components not available with lead (Pb) in the finish shall not be utilized or delivered unless processed in accordance with IA written instructions.
   - C. Workmanship for soldered electrical / electronic assemblies shall be in accordance with the latest revision of IPC-A-610, Class 3, and Acceptability of Electronic Assemblies.
   - D. Lead free solders are not to be used unless authorized by drawing, or PO.
   - E. Solder shall be Sn63Pb37 or Sn60Pb40 in accordance with J-STD-006.
   - F. Flux, Solder Paste and Solder with or without Flux Cores shall conform to activity levels L0 and L1 for Rosin (RO) and Resin (RE) in accordance with J-STD-004, J-STD-005, and J-STD-006, unless otherwise flown down by Drawing or PO requirements.
   - G. Workmanship for cables and wire harnesses shall be in accordance with the latest revision of IPC/WHMA-A-620, Class 3, Requirements for Cable and Wire Harness Assemblies.
   - H. Printed Wiring Boards (PWB) repairs to internal or external circuitry is not authorized without written approval of the GE design authority. Reference Appendix D.
2. Applies to all electrical or electronic components:
   - A. Pure tin shall not be used as a base metal or as a plating material on solderable component leads unless written approval is received from the IA buyer.
   - B. Solderability shall meet the requirements of J-STD-002 or component solderability requirements of the specification for which they are procured.

S. CONTROL/CALIBRATION OF MEASURING AND TEST EQUIPMENT

1. Calibration systems shall be in accordance with ANSI/NCSL Z540.3 or equivalent standard.
2. Equipment used to monitor, measure and/or test product or process conformity will be calibrated or verified (or both) at intervals necessary to ensure continued accuracy. All reference standards used in calibration shall be traceable back to National Standards. Records will be maintained and made available upon request.

NOTE: Equipment also includes, but is not limited to: test hardware, test software, automated test equipment (ATE) and plotters. It also includes personally owned equipment.

3. Control, care, and calibration of IA furnished measuring/test equipment and tooling shall be the responsibility of the Supplier.

T. Special Processes/Processors

1. Special Processes such as welding, brazing, casting, molding, potting, non-destructive evaluation or testing, chemical conversion coating, etc. shall be in accordance with specifications and standards stated on the drawings and/or purchase order.

2. The supplier shall use either IA approved, IA customer approved, or NADCAP accredited Special Process Suppliers. For testing facilities 3rd party certification is required to ISO/IEC 17025 or any appropriate certification for the work being performed, and approved by the purchaser.

3. If the special process is listed on a IA, or IA customer drawing (Boeing, Lockheed, Airbus, Sikorsky, etc.), the requirements of that customer for special processes/processors will be flowed to the processor via Drawing, and or a unique purchase order requirements. (In this case NADCAP is not an acceptable substitute, unless it is allowed by the IA, or IA Customer requirements).

4. The use of the above listed special process suppliers does not guarantee satisfactory performance by the listed source. The Supplier remains responsible to deliver acceptable material or parts in accordance with the contractual requirements of the IA purchase document.

U. DEFINITIONS:

ACCEPT - A disposition provided by the purchaser when it is determined that the nonconforming product meets the definition of a minor nonconformance in its existing condition without any special handling, tooling, or procedures.

ATTRIBUTE – Measurement of a characteristic or property to determine whether or not it conforms to a given requirement (PASS or FAIL, GO, NO/GO, ACCEPT/REJECT - etc.)

CERTIFICATION BODY- a third party organization who conducts certification conformity

CERTIFIED - The initial and periodic qualifications of suppliers who have been subjected to an on-site evaluation of facilities, processes, procedures, personnel and controls and have satisfactorily demonstrated their ability to meet the applicable specification requirements. Includes third party certifications to applicable national/international industry standards.

CHARACTERISTIC- Dimensional, visual, functional, electrical, chemical, mechanical and material features or properties which describe and constitute the design of the item and can be measured, observed and identified to determine conformance to the requirements.

CLASS I- A change that affects form, fit, or function. Requires notification to IA prior to implementation (refer to EIA-649).

CLASS II- A change that has no affect to form, fit, or function. Requires notification to IA (refer to EIA-649).

COMMERCIALLY AVAILABLE SOFTWARE - Deliverable or non-deliverable software that has been developed for general use and is supplied in an "off the shelf" manner.

COMMERCIAL OFF THE SHELF (COTS) - one or more pieces, mechanical or electrical, developed for multiple commercial consumers, whose design and/or configuration is controlled by the supplier's specification or industry standard.

CORRECTIVE ACTION – The action taken to eliminate the cause of a noncompliance or nonconformance in order to prevent recurrence. The corrective action may be:

Containment – Short term actions taken to:

(a) Prevent escapes of nonconforming hardware (for example: through nonconformance document and purges).

(b) Address the immediate cause of the nonconformance or noncompliance (For example: replace the bad tools/gage, correct documentation, etc.)

Fix – long term action taken to prevent or reduce the likelihood of recurrence by addressing the root cause of nonconformance or noncompliance (for example: through process and/or procedural change, error-proofing)

COUNTERFEIT PARTS- A part or assembly that is a copy or substitute without legal right or authority to do so or one whose material, performance, or characteristics are knowingly misrepresented by a supplier in the supply chain. Reference AS 5553, S-553 and or AS6081 for additional information and definitions.

CRITICAL CHARACTERISTIC – A characteristic of an item which, if nonconforming, may result in a hazardous or unsafe condition for personnel using, maintaining or depending on the unit-of- product; or which may prevent or seriously affect the satisfactory operation or functioning of the unit-of-product.

DEVIATION/PRODUCTION PERMIT - A specific written authorization, granted prior to the manufacture of an item, to temporarily depart from a performance or design requirement of a specification, drawing or other document for a specific number of units or a specific period of time. A deviation/production permit differs from an engineering change in that an approved engineering change requires corresponding revision of the documentation defining the item, whereas a deviation/production permit does not normally contemplate revision of the applicable specification or drawing.

Note: Prior to the manufacture of an item means prior to the implementation of all planned process related elements necessary to produce the item. These elements may include but are not limited to material, tools, dies, molds, processes and procedures, etc.

DISTRIBUTOR (franchised) - Franchised distributor or agent, individual or corporate organization that is legally independent from the franchiser (in this case the electronic component manufacturer or OCM) and who agrees under contract to distribute products using the franchiser's name and sales network. Distribution activities are carried out in accordance with standards set and controlled by the franchiser. Shipments against orders placed can be dispatched either direct from the OCM or the franchised distributor or agent. In other words, the franchised distributor enters into contractual agreements with one or more electronic component manufacturers to distribute and sell said components. Distribution agreements may be stipulated according to the following criteria: geographical area, type of clientele (avionics for example), maximum manufacturing lot size. Components sourced through this route are protected by the OCM's warranty and supplied with full traceability.

DISTRIBUTOR (non-franchised)/BROKER DISTRIBUTOR- an independent reseller/distributor that typically acquires parts from non-authorized sources, including excess inventories of both customers of parts and also other distributors. They often work in a "just in time" environment whereby potential customers contact the broker distributor / reseller with the component requirements, identifying the part number, quantity, target price and date required. The broker distributor searches the industry and locates parts that meet the target price and other customer requirements and then attempts to buy them. A broker distributor usually does not obtain and store parts.

ECN/CID- Engineering Change Notice/Change in Design: any change notice from IA which authorizes a change to the IA drawing or specification via the change management system

ELECTRONIC DATA INTERCHANGE (EDI) - The electronic transfer of Purchase Document or certification data between IA and their suppliers.

FROZEN PROCESS – The approval and verification of a IA source and/or alternate source/process to manufacture parts and assemblies equivalent to parts originally qualified as defined by the engineering drawing(s) and applicable specification(s).

IA QUALITY REPRESENTATIVE (IAQR) - A GE employee or authorized representative with the authority to represent IA Sourcing Quality. Also known as Product Quality Engineer (PQE).

GROUND SUPPORT EQUIPMENT SUPPLIER - A supplier that only supplies tooling, test equipment, process equipment, and repair tools required for the development, production and maintenance of GE aircraft engines.

IDENTIFICATION TESTING - Those raw material acceptance tests necessary to qualitatively assure correct material and correct condition.

IN-PROCESS CHARACTERISTIC - An intermediate characteristic that does meet or will meet the engineering requirement prior to final delivery or use. Examples are machining stock, intermediate welds, engineering characteristics held to reduced tolerances and characteristics that will meet engineering requirements as a result of further processing.

LIBRARY CONTROL - The collection and control of software and related documentation designed to aid in software development, use or maintenance.

Life of Die - Time period during which a die/tool/mold or combination thereof, that are used to produce a component, remains unchanged. A change is defined as modification of an existing die/tool/mold, procurement of a new die/tool/mold (even if it is the same nominal design), or use of a combination of dies/tools/molds that has not previously been used

Life of Die (LoD) Waiver - A written authorization to accept material or items which are found to depart from specified requirements, but nevertheless are considered suitable for use "as is". This specific authorization applies to items that are generated from a specific die/tool/mold or combination thereof and that cannot be changed without modification to the die/tool/mold or combination.

> Note: Life of Die Waivers can only be used on commercial hardware.

LIMITED SHELF LIFE ITEM: Material such as adhesives, paint, sealant, coatings that the manufacturer specifies the length of time a material can be stored under specified environmental conditions, and will continue to

meet all applicable specification requirements and/or remain suitable for its intended function

LOT NUMBER - A unique identifier used to control and identify a definite number of items that have been produced by the same manufacturing cycle and usually submitted for acceptance at one time or place (i.e. acceptance lot). Typically lot numbers are heat lot number, heat treat lot number, and melt lot number, which are usually associated with raw material, castings, or forgings

MAJOR CHARACTERISTIC - A drawing or specification feature, which if nonconforming, may result in operational or functional failure of the item, or may materially reduce the usability, physical or functional interchangeability or durability of the IA end product for its intended purpose. Identified on IA drawings and specifications with symbols.

MANUFACTURER - A supplier that makes parts complete, or assembles parts into a sub-assembly (including suppliers of castings and forgings).

MATERIAL - Raw material, parts, or assemblies.

MATERIALS SUPPLIER - A supplier that only supplies materials used in the manufacture of components (This includes suppliers of weld wire, braze and thermal powders, chemicals, dry film lube, paint, plating materials, bar stock, sheet metal, non-metallic/composite material, melters and converters, and the like.)

MAY- Indicates a course of action which is permissible within the limits of the requirement

MINOR CHARACTERISTIC (No Symbol) - A drawing or specification feature, which if non-conforming, does not materially reduce the usability, physical or functional interchangeability or durability of the product, or are departures from established standards having no significant bearing on the effective use or Operation of the product.

MINOR NONCONFORMANCE - A nonconformance that shall not affect the usability of a IA product or material for its intended purpose. Minor nonconformance 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 a chairperson and an Engineering representative responsible for reviewing, evaluating, and determining or recommending disposition of nonconforming IA product referred to it.

NDE/NDT – Non-destructive evaluation/Non-destructive testing. Any test method that does not destroy, or damage a product.

NONCONFORMANCE - A failure of a characteristic to conform to the requirements specified in the contract, drawings, specifications, or other approved IA product description. The failure to perform all material tests and inspections required by the approved IA product description and/or the failure to perform tests and inspections required in the approved product description.

NONCONFORMANCE DOCUMENTATION – A record of a nonconformance either documented on a form or entered into a computerized system, which is capable of containing all pertinent information associated with the nonconformance.

NONCONFORMANCE MANAGEMENT SYSTEM - The system for disposition of supplier nonconformance. This system includes review, disposition, trending measurement, corrective action request, traceability and record retention.

NONCONFORMING MATERIAL - Any IA product containing one or more nonconformance

NONCONFORMANCE DOCUMENT, SHIP ON OPEN NONCONFORMANCE - A document used by the purchaser to record the reason for the open nonconformance document and to authorize shipment to purchaser prior to final disposition

OEM/OCM- Original Equipment Manufacturer/Original Component Manufacturer- the manufacturer of the new/original part or item.

OPEN NONCONFORMANCE DOCUMENT - A nonconformance document is considered "Open" when material and/or additional documentation is required to be sent to the purchaser for review prior to final disposition.

PRELIMINARY REVIEW (PR) - An initial evaluation of a nonconformance (or a departure to an in-process characteristic) to determine the appropriate disposition.

PRIME SUPPLIER – Prime Supplier is a supplier on the Purchase Document from the Purchaser.

PROCESSOR - A supplier that performs operations, or processes, on hardware owned by other companies (including special processes and machining), but does not make any parts complete for IA.

PURCHASER - The procuring activity of IA that issued the procurement document invoking this document. When this document is invoked by a U.S. Government purchasing activity (or such activity's designee), the purchaser shall mean such activity or designee as the case may be.

PURCHASE DOCUMENT - The formal legal contract between IA and a supplier covering the purchase of materials and services. PDs are typically hard copies

with approval signatures, but some PDs are transmitted electronically (EDI) or may take the form of a legal contractual conveyance document.

PURE TIN- base metal or finish which contains less than 3% lead or other metal/alloy.

RAW MATERIAL - Metallic or non-metallic material in its basic form (i.e., sheet, bar, wire, powder, etc.), including castings and forgings used to fabricate IA products, and which remains present in whole, or in part, in the finished product.

REPAIR - A procedure which may be applied to IA product with one or more nonconformance when it has been determined that the product does not meet the definition of a minor nonconformance in its existing condition without any special handling, tooling or procedures. The purpose of the repair is to bring nonconforming product into an acceptable condition.

Note: Repair is distinguished from rework in that the item after repair does not completely conform to the applicable engineering requirements.

REWORK - A procedure applied to a nonconformance that will completely eliminate it and result in a characteristic that conforms completely to engineering requirements (i.e., drawings, specifications, etc.).

SCRAP - Nonconforming material that is not usable for its intended purpose and cannot be economically reworked or repaired.

SERVICES - Processing operations performed on material (i.e., inspection, heat treat, joining, plating, forming, machining, etc.).

SHALL- Indicates a requirement.

SHOULD- Offers a guideline or recommendation that might be used or helpful to assure compliance.

SIGNIFICANT PROCESS - A process or process sequence that if changed could affect design intent; might affect material structure, mechanical, chemical or electrical properties; and cannot normally be evaluated without destructive testing. Applies to parts/assemblies that require source substantiation only.

SOFTWARE - Computer programs associated internal data, and related documentation.

SOFTWARE CONFIGURATION MANAGEMENT - The process of identifying and defining the functional and physical characteristics of software items, controlling the release and change of these items throughout the life cycle, recording and reporting the status of these items and change requests, and verifying the completeness and correctness of the items.

SOFTWARE QUALITY ASSURANCE - A planned and systematic pattern of all actions necessary to provide adequate confidence that software conforms to established requirements and standards, and that it achieves satisfactory performance over the entire life cycle.

SPECIAL PROCESSES - Those processes which modify or change the inherent physical, chemical, electrical or metallurgical properties of an item, or non-conventional methods which remove or deposit material on an item during or after fabrication which cannot be fully evaluated by nondestructive means, or those used to maintain process control such as nondestructive testing. These processes may require a demonstration of operator or equipment capability or proficiency and require special controls for monitoring per specification. Means for compliance are contained in individual specifications. Typical processes will be listed by IA, customers and approved sources.

STANDARD REPAIR PROCEDURE - A repair demonstrated to be technically adequate and cost effective which may be applied to a nonconforming IA product under defined conditions. Defined conditions shall include an expiration date or a finite limit on the number of application, or both.

SUB-TIER SUPPLIER – Any supplier performing operations, processes or providing raw material for a manufacturer.

SUPPLIER - Sources (including distributors, warehouses, revenue share participants and supplier participants) other than IA, who supply material, parts, processes, assemblies or services for incorporation into IA products.

TRACEABILITY (COMPONENT) - term used herein for components with full traceability back to the original manufacturer. This traceability means that every supplier in the supply chain is prepared to legally declare in writing that they know and can identify their source of supply, which goes back to the original manufacturer and can confirm that the components are brand new and were handled with appropriate ESD and MSD (moisture sensitive device) handling precautions. This authenticates the components being supplied are unused, brand new components with no ESD, MSD or other damage. This ensures that the components are protected by any manufacturer's warranties, have all of their useful life remaining and function according to the manufacturer's published datasheet, exhibiting the expected component life in the application for the OEM's reliability predictions and product warranty.

UKAS- United Kingdom Accreditation Service. May be used by non-US suppliers in lieu of ANSI.

WAIVER/CONCESSION - A written authorization to accept a configuration item or other designated items,

which during production or after having been submitted for inspection, are found to depart from specified requirements, but nevertheless is considered suitable for use "as is" or after repair by an approved method.

APPENDIX A SOURCE PROBLEM REPORT PROCESS

1. Scope

   This appendix describes the method of applying for the following types of Source Problem Reports (SPR). The SPR form (GT1005-2) is available through the IA QR.

   A. Request for Interpretation of a Drawing

   B. Request for Interpretation of a Specification

   C. Approval of Specification Options

   D. Producibility requests

   E. IA Drawing errors

2. Requirements

   To be used when:

   A. Disagreement exists or clarification is needed for a IA drawing or GE/Industry specification requirement

   B. Purchaser approval is required for an option provided for in a GE or Industry specification

   C. A IA drawing or IA specification change is needed to improve the manufacturability of a product

   D. A correction to a IA drawing or IA specification delineation is required

3. Procedure

   A. The source will complete the SPR and submit the form to the IA QR.

   B. A completed response with the appropriate IA signatures will become part of the source quality records.

   Note: The SPR process is not a substitute for drawing, specification, or significant operation changes controlled by other requirements.

APPENDIX B MATERIAL AND SPECIAL PROCESS TEST REPORTS

RECOMMENDED FLOWDOWN REQUIREMENTS

1. Scope

   This appendix provides a listing of recommended procurement flow down requirements to be used by a supplier when purchasing raw material(s) or special process(s) from a sub-tier. The following are designed to ensure that adequate information is contained in test reports for raw material or special process shipments that are received from sub-tiers for end product that is to be shipped to IA:

2. General Information

   A. Purchase document number

   B. Job number

   C. Quantity of parts

   D. IA specification number and issue number and/or drawing number, revision letter and drawing note number.

   E. Heat lot number

   F. Part number

   G. Serial numbers (applicable to serialized parts only)

   H. Billet locations for each forging

   I. Forging lot number (applicable to forged parts only)

   J. Heat treat lot number

   K. Specific heat treat cycle used

   L. As shipped condition of material (e.g. solution treated; solution and aged)

   M. Test specimen machining source (IA supplier code, name and address)

   N. Test specimen testing source (IA supplier code, name and address)

   O. Inspection source (IA supplier code, name and address) –

   P. Pages shall be identified "Page __ of __"

3. Data/Test Results Information

   A. Clear identification that each test result conforms to specification or drawing requirements

   B. Clear identification of any test or inspection required by specification or drawing but not performed

   C. Numerical results for all chemical tests (including tramp/trace elements) required by specification or drawing

   D. Numerical results for all mechanical tests required by specification or drawing

   E. Results of other tests required by specification or drawing (e.g. beta transus, grain flow direction)

   F. All results shall be stated in the required units of measure (e.g. English vs. Metric, Rockwell vs. Brinell)

G. All results shall use the same terminology as in the specification or drawing (e.g. Ni3cb vs. Delta Phase)

H. Conversions shall be noted (e.g. hardness conversions)

I. Test conditions shall be noted (e.g. temperature, stress rupture load, method of determining beta transus

J. When numerical tests are not applicable, a certificate of conformance shall be provided

K. For drawing and/or specification requirements (test or inspections), which are “capability tests”, a statement of capability shall be included.

APPENDIX C RECORDS

1. Scope

   This appendix establishes requirements for identifying and maintaining quality related records.

2. Requirements

   A. General

      1) These requirements apply to records of the types listed below which are generated in the manufacture of the item. These requirements also apply to all other records that are generated in compliance with the purchase document, the drawing and related documents.

      2) Records are to be documented in a manner or medium that, if altered, would be obvious that changes were made. Permanent ink shall be used, preferably blue or black. Changes to records shall be made by lining out the old data, entering the correct data, then initialed (or signed) and dated by authorized personnel. No erasures or "white-out" allowed.

      3) Customer and/or contractual requirements will supersede the record retention of this specification or purchase document.

   B. Types of Records

      1) Product Acceptance Records that provide the objective evidence of hardware acceptance are as follows:

         (a) Certificates of test and other laboratory results that are required to establish product acceptance.

         (b) Inspection and test results (includes First Article Reports and functional/environmental test data from Acceptance and/or Qualification Test Procedures)

         (c) Manufacturing, assembly and inspection operation sheets.

         (d) Records of the completion of manufacturing, assembly and inspection operations.

         (e) Inspection and statistical acceptance procedures.

         (f) Nondestructive Testing (NDT) records that provide values or results for product acceptance.

         (g) Material Review Board (MRB) disposition documents and repair procedures.

         (h) Source Problem Reports, Requests for Interpretation of Drawing/Specification option,

         (i) Fixed Process records which reflect IA approval status of the part number and any subsequent significant operation changes that have been incorporated into the part processing parameters.

      2) Serial and Lot Number Assignment

         Records of the assignment of individual serial numbers and lot numbers, identification number of the part or assembly, and the date of assignment. These records are only required when serial numbers and/or lot numbers are a drawing requirement.

      3) Administrative Records associated with the administrative control of the quality system, are as follows:

         (a) System, process and hardware audit results (including audit laboratory tests and metallographic mounts)

(b) Corrective action responses/nonconformance reports

(c) Certification of processes and personnel

(d) Tool, gage and instrument control records

(e) NDT maintenance records

(f) MRB administration

(g) Employee inspection and process stamp assignment records

C. Availability

1) General

(a) Records shall be readily available for on-site Purchaser, IA customer and/or Regulatory Agency review (within one [1] day). If the Purchaser requests records to be furnished for review, these records shall be made available for delivery within three working days of notification by the Purchaser.

(b) Maintenance and storage of records will be such that when requested for review, they are legible, and interpretable. If records are documented on a medium that can deteriorate over time or can become irretrievable due to obsolescence of an electronic systems (i.e. faxed copies, strip charts on thermal paper, electronic records, etc.), it will be the responsibility of the supplier to ensure that there is technology available to recreate the records so that they are maintained in an environment that will eliminate deterioration and/or provide for timely retrievability.

2) Retention Period

(a) Data stored in IA electronic systems is considered compliant to retention requirements.

(b) The requirements of Appendix C Paragraph 2.C.1 above shall continue in effect for the time period specified below from the date that the document was generated. The table below represents the record retention requirements:

Administrative Records	Five (5) Years
Radiographic Film	Ten (10) Years
NDE Inspection Records	Ten (10) Years
Parts identified as meeting the European Union Pressure Equipment Directive 97/23/EC	The longer of ten (10) Years or any applicable period identified below
Product Acceptance Records	Ten (10) Years
Pumps, gearboxes & valves	Ten (10) Years
Bearings	Ten (10) Years
Configuration and Test Acceptance records	Ten (10) Years
Records for all other parts not defined above	Ten (10) years

3) Delivery of Data

The delivery of data to the Purchaser does not release the supplier from any requirements herein with respect to that data except as agreed to in writing by the Purchaser.

4) Termination

(a) A supplier who ceases operations (i.e., goes out of business) shall contact the Purchaser to make arrangements for the transfer of all quality records to IA for storage.

(b) A supplier who discontinues acceptance of IA purchase documents, but whose business remains intact, shall be responsible for the archival of all quality-related records for the time periods specified in paragraph C.2 and/or the purchase order

5) Records

(a) Serial Number Assignment – The system for assigning serial numbers shall provide the following information:

(1) Purchaser's part or assembly identification numbers

(2) Date of assignment

(3) Explanation for deviations from expected sequence or practice

(4) Record of serial numbers assigned to rejected items

D. Microfilming

1) Microfilming of records shall comply with the following controls:

(a) All microfiche/microfilm shall be stored in a fireproof container, or equivalent method, such as redundant storage at an independent storehouse facility, etc.

(b) A system shall guarantee the film accurately reproduces the original document and assures legible retrievability throughout the duration of the retention period.

(c) A referencing system shall indicate what documents are stored

(d) A system shall provide for retrieval and reproduction of the data and control of log in/log out of the film.

E. Computer Generated Records (Including Laser Storage)

1) Information Resources Physical Security Requirements: Computer centers that retain Quality related records must establish the responsibilities and requirements for the physical security necessary to provide adequate protection for information resource.

2) Control of computer Systems Access and Data Access Requirements: Computer centers that retain Quality related records must establish the responsibilities and requirements for computer system access and computer data access.

3) Disaster Recovery Planning Requirements: Computer centers that retain Quality related records must establish a Disaster Recovery Planning Program or a similar sub-tier document.

APPENDIX D SUPPLIER NONCONFORMING MATERIAL: REVIEW AND DISPOSITION

1. SCOPE

   A. This appendix establishes requirements for identification, documentation, evaluation of corrective action, control, disposition and repair of nonconforming material.

2. NONCONFORMANCE DOCUMENTATION

   A. Initial Documentation - When any departure to requirements (i.e., nonconformance or departure to an in-process characteristic) is initially identified, it must be documented. Documentation may be via an electronic system or may be included as part of a shop router, traveler or Dispatch Order, a receiving report, a build-up record, a test fault sheet or similar documentation. Nonconformance records are an element of the historical records traceable to the product. The Supplier Nonconforming Material Report (SNMR), form IAT1005-3, shall be used to forward nonconforming material information to IA. Other forms may be used if they meet the requirements of this paragraph and are approved for use by IA. IAT1005-3 is available through the IA QR.

   B. Transferring to Other Documentation - When necessary, a nonconformance (or departure to an in process characteristic) may be transferred from one document to another by entering all pertinent information from the original document to the new document. The original document must be traceable to the new document, and vice versa.

   C. Waiver/Concession Request (MRB) – A Nonconformance Management System shall be used to document and request a waiver/concession

   D. General Requirements for Nonconformance Documentation initial and otherwise shall be prepared in accordance with this document.

      1) Documentation may be either typed, handwritten in permanent ink, or an electronic entry.

      2) Documentation must be complete, legible, and understandable by an independent third party.

      3) The supplier is responsible for maintaining traceability of all nonconforming records. Nonconformance records shall be retained in accordance with Appendix C.

   E. Minimum Requirements for Documentation

      1) Initiator of the document

      2) Date of initiation

      3) Identification of the document for traceability purposes (For example: nonconformance document number)

      4) Serial number traceability per IAS-1005 Section E - Traceability

      5) Total quantity of nonconforming items

      6) A detailed description of the nonconformance

         (a) A departure from a dimensional characteristic shall include the characteristic and must specify the extent of the departure (For example: .990" - 1.000" dimension actually checks 1.005"). A visual write-up shall be described by flaw type (For example: nick, scratch, dent), size (length, width and (or) depth) and where physically located on the part (or material).

      7) Identification of the affected specification, drawing, or other document if different than the part number.

8) A detailed disposition

9) Identification of the personnel making such disposition

F. Nonconformance Documentation

(1) The supplier shall assure that all information entered is accurate and complete.

(2) Only violations to engineering drawing/specification requirements will be submitted.

(3) After the nonconformance document is completed, it will be sent to IA for disposition.

(4) The nonconformance document consists of a unique identifier, which is used to prevent duplication.

(5) Changes to Nonconformance Documents – When a change needs to be made to a nonconformance document that does not contain any signatures on the document, the change can be made. If there are signatures on the nonconformance document, the change must be coordinated through IAQR.

(6) Attachments - Photographs, sketches or other information may be attached to the nonconformance document to clarify the description of the nonconformance(s).

(7) Nonconformance Document Quantity – The nonconforming quantity on the nonconformance document will refer to the total population of parts for MRB review. This number will include parts at and beyond the supplier that have not been previously addressed by MRB. Quantity shipped by source without approval is calculated by subtracting total nonconforming quantity addressed on document from quantity at manufacturing source.

(8) Nonconforming hardware shipped prior to issuance of CID/ECN shall be documented. If all affected hardware has been shipped the quantity at the manufacturing source will be zero.

3. PHYSICAL CONTROL OF NONCONFORMING MATERIAL

A. Identification - Nonconforming material must be conspicuously marked, tagged or referenced on the product's paperwork.

B. Material Control - Nonconforming material pending PR/MRB disposition shall be controlled to preclude its unauthorized processing or use.

C. Scrap Material

1) Mutilation or conspicuous marking is required for all scrap product or material.

2) Mutilation or conspicuous marking may be performed internally or by an external source.

3) Scrap may be shipped to other internal locations for accumulation prior to mutilation or conspicuous marking.

4) When mutilation or conspicuous marking is to be performed externally, the Supplier will submit for approval to the responsible IA function a procedure, which will outline the requirements for mutilation and ensure that scrap requiring mutilation or conspicuous marking is not sold for any other purpose.

4. SPECIAL CONSIDERATIONS

A. Unusual Visual Appearance (UVA)

1) Nonconforming Hardware - a nonconformance document (for example GT1005-3) will be used to document an Unusual Visual Appearance which does not meet engineering/drawing requirements.

2) Conforming Hardware - If the part is conforming to a GE drawing or specification requirement but is considered "Unusual Visual Appearance", the manufacturing source must contact the IAQR, who will work with Engineering and Customer for concurrence prior to the part being shipped. Submit the UVA directly on the UVA request form (reference Section O).

B. Parts with Special Cleaning Requirements - It is very important to keep these parts free of hard particles that may cause damage. For parts with cleaning requirements noted on the drawing the rework/repair procedure shall adhere to those requirements. Cleaning steps must be documented on the repair procedure.

C. Life of Die Waiver (LoD) – If waiver is for Life of Die/Mold/Tool the nonconformance record must identify it as a life of Die/Mold/Tool document.

1) Life of Die Waiver is only applicable to commercial hardware with the following applies:

(a) The quantity block shall be left blank and the nonconformance document will be identified as a Life of Die/Mold/Tool waiver

(b) The waiver is not required to be limited by quantity or specified time period, but applies directly to the life of the identified die/tool/mold or combination.

(c) The specific die/tool/mold identification number(s) must be documented in the nonconformance description.

(d) Any change to the die/tool/mold or combination will require re-evaluation of characteristics affected. Any new nonconformance identified as a result of the change will require a new waiver.

(e) All parts produced and/or shipped under a LoD waiver must be traceable to the specific die/tool/mold or combination listed on the waiver.

2) Hardware tagged as 'DoD or Military' with Life of Tool Nonconformance will be processed per standard nonconforming hardware requirements with the following exceptions:

(a) Identify nonconformance document as "Life of Die/Tool/Mold" document.

(b) The specific die/tool/mold identification number(s) must be documented in the Remarks field.

(c) The quantity block shall include a quantity which reflects all known nonconformance and an estimated future quantity to be produced in a reasonable timeframe based on demand and volume.

(1) Supplier shall state anticipated reasonable time frame based on demand, volume and processing considerations such as:

(a) Production volume on current Purchase Document and schedules

(b) Time for acquisition of statistical data for CID/ECN Consideration (i.e. typically up to 30 pieces)

(c) 4 months for CID/ECN processing time

(d) Production windows for reworking tooling

(2) Typical timeframes for completion of process up through issuing CID/ECN:

(a) 6 months for high volume hardware'

(b) 12-18 months for low volume hardware

(d) The waiver will be limited by quantity, but not limited by time.

(e) Quantity usage is not required to be entered in nonconforming document, Suppliers are responsible to track usage, retain documentation, and ensure approved quantity is not exceeded.

(f) All parts produced and/or shipped must be traceable to the specific die/tool/mold or combination listed on the waiver.

(g) Any change to the die/tool/mold or combination will require re-evaluation of characteristics affected. Any new nonconformance identified as a result of the change will require a new waiver.

5. APPROVAL OF PRELIMINARY REVIEW (PR) PERSONNEL

A. Requirements – Prior to performing the PR function, supplier personnel shall have at least six months working experience in either quality or manufacturing, shall be knowledgeable of the manufacturing processes and attend a training session based on the below requirements.

B. PR Training – The supplier is responsible for preparing the PR training package, including training and administration of the PR process. The training package shall include, as a minimum:

1) Documentation and control of nonconforming material.

2) PR review, evaluation and disposition.

3) IA contractual requirements (i.e., S-specifications, nonstandard remarks, remarks or special instructions) that are part of the purchase order.

4) PR issues affecting raw material and special processes.

C. Maintaining PR Approval - PR personnel shall complete periodic refresher training to maintain PR authorization. Training shall be completed every two years minimum.

D. PR Membership – The supplier is responsible for authorization of PR personnel at their facility and shall maintain documentation of those authorized to perform PR including their status (e.g., active, inactive) per the retention requirements.

6. PRELIMINARY REVIEW RESPONSIBILITY

A. When Special Processes and/or Significant Processes are affected, the appropriate ia Quality Representative will ensure the appropriate engineers are contacted for approval of special and significant processes. These approvals need to be done prior to rework or repair of a product, and before providing appropriate disposition.

B. Authorized Personnel- The disposition must be documented and signed/stamped by an approved PR person before the action is taken.

C. Authorized Dispositions - The following are dispositions that a PR person is authorized to make on nonconformance:

1) Rework – This disposition shall be utilized when it is economically feasible to perform the rework. The rework disposition must:

(a) Specify processing instructions.

(b) Include method to verify acceptability of part after its completion.

(c) If rework instructions include special processes different than required for normal processing, this needs to be classified as a Repair. (See below for processing of a repair. (For example: not a planned operation on the approved sequence list)

Note 1: Rework performed in conjunction with a repair procedure does not require re-submission to MRB.

2) Scrap – This disposition shall be utilized when nonconforming product is not usable for its intended purpose and cannot be economically reworked or cannot be repaired in a manner acceptable to MRB. Material, when given a "scrap" disposition, shall be processed in accordance with Appendix D paragraph 3.C.

3) Return – This disposition shall be utilized when it is more practical to return the product to the Sub-tier supplier or Manufacturing source from which it came.

4) Submit Nonconformance Document to Purchaser/MRB – When none of the aforementioned dispositions are appropriate, the nonconformance shall be documented and submitted to the purchaser for review and disposition (reference Appendix D paragraph 2.C).

D. MRB Directed Disposition - The PR person, when directed by MRB, shall document MRB dispositions in accordance with Appendix D paragraph 2.

1) If PR personnel utilize the MRB directed disposition it must be controlled to meet the documented limits of the directed disposition.

2) The use of the MRB directed disposition must be logged each time when the MRB directed disposition is applied.

E. Continue to Process (CTP) - At times, it can be more practical to continue processing a part with a documented nonconformance (or departure from an in-process characteristic) to a later point in the manufacturing process prior to effecting the appropriate action. The "continue to process" determination can only be applied by approved PR personnel and as long as the nonconformance (or departure from an in-process characteristic) shall not be altered or covered up to preclude its proper review and/or action. The PR person must document how far to continue and the appropriate action.

1) This provision does not allow the initiation of a repair of a nonconformance prior to MRB authorization.

2) Product history should be considered to assure manufacturing risk to process further is low or nonexistent.

3) As an alternative to submitting the nonconformance to MRB for disposition, the PR person may use CTP when a CID/ECN, is processed. An issued CID/ECN, which causes the part to fully conform to the new limits, shall be used to determine the previously identified nonconformance is no longer nonconforming and referenced on the nonconformance record.

4) Nonconforming product shipped to IA prior to issuance of CID/ECN shall be documented and processed as a nonconformance. This documents the existence of the condition and indicates engineering acceptance of the condition of parts shipped to IA.

5) The issuance of a CID/ECN after the completion date of manufacture does not retroactively make previously manufactured nonconforming material conforming.

F. Corrective Action - Consideration shall be given during the PR process relative to appropriate corrective action associated with the nonconformance(s) (reference Appendix D paragraph 11.

G. This provision does not allow deviation from IA design requirements unless a deviation/production permit has been authorized by the purchaser.

7. PURCHASER REVIEW/MRB DISPOSITIONS

A. Dispositions - The following are the types of dispositions utilized by the MRB. If sufficient information is not available on the documentation provided, additional information, inspections, etc., as necessary, shall be requested. Assure that any additional information is added to the nonconformance document to allow for future review. The disposition must be documented and signed by the all required review board members before action is taken.

1) Accept - Use as is

2) Repair (See Appendix D paragraph 8)

3) Reject - The purchaser will reject the nonconformance when an accept or repair disposition cannot be made. Once the nonconformance has been rejected, other actions may be considered, by the supplier, such as:

(a) Returning the nonconformance record to preliminary review for disposition;

(b) Developing a repair method and re-submitting the nonconformance to the purchaser.

B. Accept Disposition Based on Sample Inspection Data - In certain cases (for example: processes are in control, large quantities are produced, etc.), it is permissible for MRB to accept material based on inspection of a sample, which represents those parts. Any number of parts may be sampled provided parts are selected without bias from the available parts. The following procedure shall be used in such circumstances.

1) Statistical Analysis - Based on a sample greater than 30 parts, selected without bias from the available and inspectable parts and representative of the process that produced the nonconformance, a statistical analysis may be completed to generate +/- 3 sigma tolerance intervals. For instances where 30 or less parts are available, a statistical analysis may be performed which produces tolerance intervals with 95% confidence that at least 99% of all values are included. Analysis tools (e.g. Minitab) may be used. Samples of greater than 100 parts must utilize alternative methods. The acceptable analysis shall indicate when the data is distributed normally. If the data is not distributed normally, then a statistician shall be consulted for alternative analysis. The spreadsheet link provided reverts to an xbar +/- 3 sigma standard deviation estimate once the sample size is greater than 30. This insures that the historical standard of +/- 3 sigma will be met or exceeded for all sample sizes. The statistical analysis must include the number of parts used for the analysis and how those parts were selected. The nonconformance document shall clearly indicate when statistical analysis has been used to determine nonconformance condition. The statistical analysis shall be attached to or referenced within the nonconformance document and retained as a permanent part of the record.

2) Nonconformance Quantity - When a statistical analysis has been properly completed, the assumed nonconforming population quantity shall be calculated based on a 95% upper confidence limit on the percentage of the suspect population that was calculated to be defective, call this value p(d)*. The predicted nonconformance quantity that shall be submitted to MRB is p (d) times the total quantity of suspect parts still within IA/Supplier control. Use the statistical analysis worksheet or equivalent tool to calculate the predicted nonconformance quantity. When it is clear that all parts are nonconforming, the total suspect quantity will be submitted to MRB. The analysis worksheet or equivalent shall be included with the MRB by attachment, linkage or remark and include the total suspect population count, the predicted nonconforming quantity and evidence of the formula used for calculation.

(a) If n = sample size and d = number nonconforming in sample, then:

$$P(d) = d/n + (1.645)\left((d/n\,(1-d/n))/n\right)^{1/2}$$

C. Purchaser Directed Acceptance/ Directed Disposition - Purchaser may document dispositions for implementation by supplier PR personnel when the disposition is always the same for a certain nonconformance. The following details the types of MRB directed dispositions available and respective requirements.

Consideration for Use - When nonconforming product is submitted for disposition and meets the criteria as a minor nonconformance, MRB may consider acceptance of additional nonconforming product that is expected to be nonconforming as a result of a pre-existing condition caused by an error during manufacture: For example: the existing tooling or process is found to be incapable of producing material to the specified requirements, the existing process planning is found to depart from the specified requirements.

1) Direct Acceptance

(a) Authorization. All directed acceptance approvals will be clearly documented. Such approval shall authorize PR personnel to accept future nonconformance, subject to the documented limits of the approval. The directed acceptance recorded shall clearly state:

(1) That it is an MRB directed disposition

(2) The extent of the allowance

(a) Nonconformance limits

(b) Time period or quantity

(c) Any special requirements associated with the nonconformance

(b) Approvals shall not exceed a six-month period or the equivalent production quantity. All reasonable efforts should be made to reduce or eliminate the occurrence of such nonconformance. If additional time or quantity is required, any subsequent directed acceptance will require the documented approval of the responsible IA Site Quality Leader, prior to approval. The MRB Chair shall ensure that reference to this approval is noted in the MRB record by remark, linkage, or attachment.

(c) Implementation - The PR person will implement the MRB directed acceptance, referencing the approved nonconformance document, which established the MRB directed acceptance on the initial nonconformance record (For example: routing sheet, Traveler, etc.).

(1) The supplier will implement this allowance by applying the quantity of parts to the active directed disposition/acceptance for the nonconforming characteristics prior to shipping the hardware.

(2) The supplier is responsible to document each use of the directed disposition prior to shipping the hardware, assure compliance to quantity and time limits, and assure that no unapproved nonconformance is shipped. Nonconformance not approved by authorized directed dispositions shall be submitted to IA MRB for review.

2) Directed Disposition Standard Repair

(a) Authorization - All standard repair approvals will be clearly documented. Such approvals shall authorize PR personnel to repair future nonconformance, subject to the documented limits of the approval.

(b) The Standard repair acceptance record shall clearly state:

(1) That it is an MRB standard repair disposition

(2) The extent of the approval

(a) Nonconformance limits (part number and characteristic limits)

(b) Any special limitations associated with the nonconformance

(c) Approvals shall not exceed a twelve (12) month period or the equivalent production quantity. If additional time or quantity is required, a new standard repair authorization by MRB shall be required. Any subsequent directed disposition Standard Repair will require the documented approval of the responsible IA Site Quality Leader, prior to approval. The MRB Chair shall ensure that reference to this approval is noted in the MRB record by remark, linkage, or attachment.

(d) Implementation. Once the standard repair has been approved for use, PR personnel shall authorize (For example: "Repair per standard repair procedure FAB0001") its use, for nonconformance within the scope of the approved standard repair procedure, on the initial nonconformance record (For example: routing sheet, traveler, etc.).

(e) The Supplier shall assure each use of the standard repair is added to existing MRB data.

(1) The supplier will implement this allowance by applying the quantity of parts to the active directed disposition/standard repair for the nonconforming characteristics within the document.

(2) The supplier is responsible to document each use of the directed disposition prior to shipping the hardware, assure compliance to quantity and time limits, and assure that no unapproved nonconformance are shipped. Nonconformance not approved by authorized directed dispositions shall be submitted to IA for MRB review.

8. REPAIR OF NONCONFORMING MATERIAL

A. IA Repair Procedure Form (GT1005-4) will be used to document repairs. This form is available through the IA purchaser. Repair procedure documentation must provide for all appropriate approvals.

1) Repair Approvals - Nonconforming items on IA designed material will not be repaired by any method without approval by IA Material Review Board. Authorization to begin the repair will consist of an approved repair sign off in the nonconformance document, for a specific number of parts, defining a repair method. Repair status of released will not be granted until the following approvals have been obtained:

(a) Approvals:

(1) MRB Engineering representative

(2) MRB Chairperson

(3) DoD/International Defense representative, when applicable

(4) FAA/International Regulatory Agency representative, when applicable

(b) Repairs containing special process - Assure the facility performing this process is a certified/approved source for this hardware. This is the supplier's responsibility to assure the facility is approved.

NOTE: Listing the source on the repair procedure does not automatically make them a certified/approved source.

2) Annual review of repair forms - Repairs forms which contain dated approval signatures and are over one year old are reviewed and re-approved by all required approvers, prior to MRB repair approval.

3) Repair procedure content - The repair procedure will document, in detail, the exact method to be followed during the repair process i.e., restrictions or limitations on use of the repair, related characteristics that may be affected during the repair process, tooling, special processes, inspection or test requirements, and any other special requirements or considerations.

B. Nonconformance in conjunction with repairs - When another nonconforming characteristic will require MRB disposition in conjunction with a repair, it may be added to the affected nonconformance document (or cross referenced) for traceability. Nonconformance caused by the repair process shall be submitted to MRB for disposition unless authorized by the repair procedure.

C. Repair Completion

1) The repair shall be completed as soon as possible.

2) If more than six (6) months will be required to complete the repair, a note shall be added on the nonconformance document, with the reason why it will take more than six (6) months. The purchaser reserves the right to reject parts not repaired within six months.

3) The purchaser reserves the right to request evidence of repair completion.

(a) Review prior to acceptance or after repair. The IA MRB Chairperson shall assure the appropriate authorization for supplier release of product pending MRB disposition when a supplier's part(s) requires physical review prior to final disposition.

9. REQUEST FOR SHIPMENT WITH OPEN NONCONFORMANCE (Waiver or Concession)

A. When the purchaser request shipment of material with open nonconformance, the supplier shall:

1) Assure material and/or the requested documentation is forwarded to the purchaser.

2) Assure a partial release stamp is used on the shipping document/bar code label per IA-1005 Appendix E.

3) Ship nonconforming material separately

4) Notify the purchaser when material on an open nonconformance document is being scrapped or no longer requires purchaser disposition/review.

10. DEVIATION (PRODUCTION PERMIT)

A. Documentation - A request for minor deviation/production permit shall be submitted to IA using form IAT1005-3 (SNMR). A copy of this form may be obtained from the purchaser.

B. Purchaser Approval - Upon receipt of purchaser approval, the supplier may begin to manufacture. The affected material or items meeting the deviation acceptance limits shall be handled as conforming material and not require further purchaser disposition.

C. Deviation/Production Permit Limits - Characteristic accountability requirements (e.g. inspection, sampling, etc.) must be adequate, documented, and monitored in order to assure that product covered by deviations and waivers are within the specified acceptance limits. Manufacture beyond the scope (quantity or time period) of deviation shall be requested via another IA Deviation form. (Note: If material or item manufactured utilizing the approved deviation does not fully comply with the limits as documented, the material or item is nonconforming and shall be processed in accordance with Appendix D).

D. Deviation/Production Permit Versus Waiver/Concession - This paragraph details conditions under which either a minor deviation/production permit or a minor waiver/concession (not both) is required to authorize acceptance of items which are nonconforming or will be nonconforming after manufacture. This paragraph also defines the point at which manufacture of an item begins; a key concept in making the deviation/waiver decision.

1) Deviation/Production Permit Situations **-** A deviation/production permit shall be used in the following situations:

(a) A temporary departure from specified requirements is necessary to meet customer commitments. A CID/ECN shall be processed if the temporary departure is to become permanent.

(b) A temporary departure from specified requirements is necessary to allow data gathering to verify the need for a permanent change in requirements to improve the design or producibility of an item.

(c) A deviation/production permit shall not be used during manufacture to address a known error in the process, procedure, or tooling.

(d) Temporary use of an alternate material

(e) Temporary use of alternate tooling

(f) Temporary use of an alternate process

2) Waiver/Concession Situations- A waiver/concession shall be used in the following situations:

(a) Acceptance of a characteristic that has been generated and is determined to be nonconforming.

(b) Acceptance of a characteristic that is expected to be made nonconforming as a result of a pre-existing condition caused by an error during manufacture; e.g. the existing tooling or process is found to be incapable of producing material to the specified requirements, the existing process planning is found to depart from the specified requirements.

11. EVALUATION OF CORRECTIVE ACTION

A. Responsibility - The supplier has the responsibility to develop, document and maintain a corrective action system to reduce the amount of nonconforming product.

B. Consideration - Every nonconformance requires consideration for corrective action. The final decision as to the appropriateness of the supplier corrective action decision and plan, relative to nonconformance submitted to the purchaser for review and disposition, shall rest with the purchaser.

C. Supplier Documentation - Corrective actions, when taken, shall be documented and shall include, as a minimum, the following:

1) Pertinent information describing the problem requiring corrective action.

2) What went wrong and why (root cause and analysis).

3) The required corrective action.

4) The functions or individuals responsible for implementing the corrective action.

5) When the corrective action will be implemented, if not immediate.

D. Effectivity - The supplier shall follow up on corrective action to ensure effective implementation.

E. Purchaser Authority - When the supplier's corrective action program is ineffective in reducing or eliminating the correctable root causes of nonconformance, the purchaser may elect to reject items or lots containing non-conforming material.

F. Nonconformance Trending - Supplier nonconformance trends will be monitored by the purchaser. If an adverse trend is detected, the data will be evaluated and if deemed appropriate the purchaser shall issue a request for corrective action.

12. DISPOSITIONING AND NOTIFICATION OF NONCONFORMING PRODUCT THAT HAS BEEN INADVERTENTLY SHIPPED

A. The following provides a vehicle for providing purchaser disposition of nonconforming material shipped without having been dispositioned by the purchaser.

1) Documentation – The nonconformance document shall be prepared as normal per Appendix D.

2) Nonconformance - When documenting the nonconformance, it may be necessary to determine the nonconformance magnitude by either:

(a) Sample inspection data to establish the specific nonconformance magnitude.

(b) Determining the nonconformance magnitude by an alternate method such as analysis of historical data that is capable of representing the nonconformance magnitude.

(c) Conducting a controlled experiment that is capable of simulating the nonconformance magnitude.

13. SUPPLIER DESIGN

A. Any characteristic found nonconforming that is documented on the purchaser's drawing, and referenced specifications is required to go through the purchaser's MRB system. Any other product nonconformance will be subject to the Supplier's internal nonconforming material control system. The supplier's nonconforming material control system shall be the same as outlined in this appendix except as follows:

1) IA reserves the right to disapprove the supplier's internal MRB system with respect to the allowances listed herein. Additionally, an 'accept' or 'repair' disposition of any nonconforming characteristic on a detail part, sub-assembly, or assembly defined by a supplier drawing that could affect form, fit, function, life, reliability, or maintainability of such part, sub-assembly or assembly, must also include concurrence of IA design engineering and quality. The supplier's organization shall ensure that the extent of such IA involvement is incorporated into their non-conforming material control system.

2) Corrective Action Board (CAB) - The Supplier's CAB shall assure that corrective action needs and implementation are reviewed and effective for supplier and purchaser design characteristics.

3) Material Review Board (MRB) Responsibility - The Supplier is responsible for dispositioning nonconformance of their own designs. The MRB shall be chaired by a Quality representative

of their organization and shall include, as required, personnel representing other organizations within their facility, as necessary, to determine appropriate disposition on nonconforming material. As a minimum, the MRB shall consist of a Quality chairperson and one representative of the Engineering function that is responsible for product design.

(a) Approval of MRB Personnel

(1) Minimum Qualifications:

(a) The MRB quality representative must have at least three months working experience in either a quality or manufacturing function associated with the type(s) of IA hardware that will be evaluated in their MRB role.

(b) The MRB engineering representative must have a four year engineering/technical degree in a relevant design discipline or be a technical representative having credentials considered equivalent to the above criteria by his/her manager, have at least two years of design experience on the applicable type(s) of IA hardware, and an understanding of IA design requirements.

(b) Training - All MRB representatives must complete supplier provided training that is directed towards MRB requirements and details of the nonconforming material control processes. This training shall include, as a minimum, the following items:

(1) Documentation and control of nonconforming material.

(2) MRB review, evaluation and disposition of nonconforming material.

(3) IA contractual requirements.

(4) Corrective action requirements.

(c) Re-training - Every two (2) years, all Quality and Engineering MRB personnel must attend a refresher training session, which will include all items described in the preceding paragraph.

4) Government Involvement - Since IA is a contractor with the Department of Defense (DOD); the suppliers' applicable DOD agency will exercise the right to participate in activity related to nonconforming material control. The degree of government participation will be as determined by the applicable DOD agency. The supplier's organization shall assure that the extent of DOD involvement is incorporated into the non-conforming material control system.

5) Nonconformance Documentation

(a) The nonconformance document used shall be capable of being utilized for internal MRB disposition. The nonconformance document may be designed to accommodate both PR and MRB dispositioning. The nonconformance document may be computerized.

(b) Repair Forms - Repair procedures shall either be documented on the nonconformance document, or for more complex repairs, documented on a form suitable for the complexity of the repair.

(1) Repair Procedure Content - The repair procedure will document, in detail, the exact method to be followed during the repair process, (i.e. restrictions or limitations for use of the repair, related characteristics to be re-inspected after completion of the repair, tooling, special process inspection or test requirements and any other special requirements or considerations).

NOTE: Special consideration and instructions must be given to assure that foreign object damage or contaminants are not introduced into the component during the repair process.

(2) Approvals for Repair:

(a) MRB Engineering Representative

(b) MRB Chairperson

(c) DoD Representative, when required

(d) Supplier technical resource with responsibility for special process(s) that are referenced in the repair procedure

(3) Revisions to Repair Procedures - A revision to a repair procedure after being approved by MRB and the DOD representative, as applicable, require re-approval by all signers and/or the certifying agent where applicable. Strictly administrative changes need not go through the review process but must be signed for by the MRB chairperson.

(4) Repair Procedure Limitation - Authorization to perform a repair is limited to the provisions contained within the repair procedure. Items within the repair procedure are not to be performed more than once, unless specifically provided for within the repair procedure document. For example, re-welding a nonconformance more than once, unless specifically allowed, shall require MRB authorization.

(c) When it is determined that product was inadvertently overlooked and was shipped to the purchaser with nonconformance that were not dispositioned, but which do not affect the purchaser's requirements, the supplier shall:

(1) Promptly notify the purchaser of the escape, including the following information:

(a) Part number, program, quantity, and nomenclature

(b) Description of nonconformance

(c) Statement of material acceptability for use based on engineering evaluation or current status of engineering evaluation

(d) Serial numbers and ship dates of material which potentially exceed acceptance limits

(e) Proposed required action by the purchaser

(2) Provide a copy of the internal documentation that dispositions the nonconforming product to the cognizant IA Quality Representative.

6) Records shall be maintained of nonconforming material, dispositions, assignable causes, corrective actions, and effectiveness of corrective action per Appendix C.

B. Incorrect Parts

1) The Material Review Board will not be utilized to accept a part that is inadvertently installed into an assembly (inseparable or otherwise) or end item configuration which is different from the bill of material or parts list. The Material Review Board will not be utilized to accept an end item configuration or assembly that is missing a part or component from the bill of material or parts list. A design change rather than a waiver/concession shall always be used to introduce a new part number to a product model once the baseline configuration has been established. The Material Review Board will not be utilized to disposition shipped product. A

waiver/concession may be used when the item (part number) is required to complete an approved MRB Repair Procedure. (For example: Using an insert, or a larger insert than is called for on the parts list, to repair a hole that has been drilled oversize, while still using the correct bolt that is called out on the parts list.)

14. GOVERNMENT CONTRACT QUALITY ASSURANCE (GCQA)

    A. If Government Contract Quality Assurance applies (as required by the purchase document), the supplier shall submit a copy of the approved nonconformance document to the DOD representative at the time of shipment (for information purposes only).

    Note: This provision does not eliminate DOD approval of the nonconformance document, as required

APPENDIX E PREPARATION AND IDENTIFICATION OF SUPPLIES FOR SHIPMENT

1. Scope

   This appendix provides direction for preparation and identification of supplies for shipment.

2. Requirements

   A. Suppliers shall review Purchaser's requirements and their own internal procedures to ensure that required documentation is included with shipments and that parts/material are properly marked, identified and packaged. Shipments cannot be made until a Purchase Document is received from the Purchaser. Specific attention should be given to the following areas:

      1) Packaging/ Shipping materials and methods for electronic discharge sensitive devices shall meet ANSI/ESD S541 or equivalent requirements.

      2) When packing slips are used, a copy must be on the outside of the box/container, not only inside.

      3) If a bar coded shipping label is used for the shipment of a single box/container, a removable bar code label, as well as a permanent label shall be affixed to the outside of the box/container. When multiple boxes/containers comprise a shipment, the first box or container shall have a removable master bar code label, as well as a permanent master bar code label affixed to it and all additional boxes/containers shall have a single permanent bar code label affixed to them.

         (a) A removable bar code label may be affixed to the outside of their applicable box or container by placing it inside a transparent enclosure or envelope that will allow for the clear display of the label.

         (b) Bar coded shipping labels shall not be used for shipment of product to IA, unless required by purchase order.

      4) Examine carefully the Purchase Document/Contract requirements for the parts/material to be shipped. If authorization for shipment is required to be performed by the IAQR, and/or the government representative, make sure that all necessary inspections have been performed and signatures obtained before the parts/material are presented for review. Determine if the parts/material are on Partial Release for any reason. If they are, ensure that applicable "Partial Release" status and not "Full Release" status is reflected on the applicable packing slip, or shipping bar code label(s). A frequent cause for this situation is open nonconformance document, hardware for trial assembly, etc.

      5) When shipments require radiographic film and/or certifications to be included, ensure that they are with the parts/material to be shipped and that they are packed properly. Such material shall be packed with the Packing Slip or with the removable bar code label when a transparent envelope is used. If necessary, these items may be placed inside the first box/container. When placed inside, mark the top of the box to indicate what is packed inside.

      6) Boxes and containers must be properly marked per the Purchase Document requirements. Marking must be clear and legible.

      7) When a shipment is made using more than one box/container, each box/container must be labeled 1 of____, 2 of____, etc. Each box/container must have all the appropriate marking. The packing slip or removable master bar coded shipping label must be attached to the box/container labeled 1 of ____. The total number of boxes/containers, included in the shipment, shall also be identified in the upper right hand corner of the removable master bar coded shipping label.

8) Whenever possible, no more than one line item shall be packed in a given box/container. If more than one line item (or more than one Purchase Document) is included in the same box/container, then the outside of the box/container must contain the information per Purchase Document requirements.

9) Ensure that packages, cartons, boxes, containers and packaging material are suitable to adequately protect the parts/material contained within. See Environmentally Friendly Packaging paragraph for suggested tips.

3. Packaging Recommendation/Guidelines

   A. Serialized Parts – Serialized parts should include the SN of the hardware on the outside of the container. The SN could either be documented on the outside of the container or as a list attached to the outside of the container marked "S/N List".

   B. Packaging Design – Packaging design will withstand transportation hazards and packaged to protect material until point of use

   C. Package Quantities – Package quantity requirements to protect material until point of use and in accordance with any instructions furnished by IA via the purchase order.

   D. Questions regarding packaging requirements can be directed to the buyer.

4. Environmentally Friendly Packaging

   A. Before you order packaging, sign the next contract for packaging, or change a packaging process line, consider the following:

      1) Use returnable or multi-trip containers

      2) Use packaging made from recycled materials

      3) With multi-component packaging (i.e. cardboard/wood/plastic), use designs which allow the individual materials to be readily separated and recycled.

      4) Minimize additional packaging materials used solely for cosmetic rather than functional reasons.

      5) Avoid packaging materials that cannot be recycled or reused.

      6) Use unbleached paper and cardboard packaging

      7) Avoid printing inks that contain heavy metals or are difficult to bleach from recycled paper.

      8) Avoid packaging materials that may contain toxic stabilizers or additives.

      9) Whenever possible, directly reuse packaging in which material is shipped.

      10) Print specific instructions for recycling the packaging on the outside of the container.

      11) For efficient shipment to recycling centers, avoid overly bulky materials or other packaging that is difficult to break down.

      12) Investigate legislative trends to determine if your current packaging is potentially vulnerable to regional packaging bans, especially prior to making long-term contract or process commitments.

APPENDIX F REQUIREMENTS FOR SUPPLIER SOFTWARE QUALITY ASSURANCE PROGRAMS

1. Scope

   The purpose of this appendix is to set forth the minimum requirements for a Software Quality Assurance (SQA) Program for which a supplier must implement for IA product software or software developed or used in the design, manufacture, inspection, or test of IA products.

2. Applicability and Scope

   A. This appendix applies to software that is generated and/or used in fulfillment of Purchase Document requirements.

   B. This appendix covers the following CLASSES of source software: Class I: Software which comprises all or part of a product which will be delivered to IA or a IA Customer; Class II: software used to create/control/inspect/test characteristics on IA product, that are validated by virtue of the software being under an approval and change control system. For both Class I and Class II software, the supplier is responsible for notifying IA of proprietary right claims, in writing, prior to execution of the Purchase Document.

3. Requirements

   A. These requirements are in addition to other Purchase Document requirements.

4. General Requirements

   A. The objective of the software quality program shall be to ensure the quality of:

      1) Software and its documentation.

      2) The process used to produce software.

   B. Supplier personnel responsible for ensuring compliance with the software quality program requirements shall have the resources, responsibility, authority, and organizational freedom to permit objective evaluations and to initiate and verify corrective actions. The persons conducting software quality evaluations of a product or activity shall not be the persons who developed the product, performed the activity, or are responsible for the product or activity, (this does not preclude members of the development team from participating in these evaluations). The supplier shall assign responsibility for the fulfillment of, and for ensuring compliance with, the software quality program requirements.

   C. The software quality program, including procedures, processes, and products, shall be documented. The software quality program is subject to review by IA, and may be disapproved by IA whenever the program does not meet the requirements of the Purchase Document.

   D. A complete review of the Purchase Document to identify and make timely provision for acquiring or developing the resources and skills required for implementing the software quality program shall be conducted. The product/process source shall prepare plans for applying the documented software quality program to the Purchase Document. These plans shall be documented in a IA format, when so specified in the Purchase Document. Authorized personnel shall issue plans with a revision history maintained.

   E. The software quality program shall be implemented in accordance with the documented software quality plans and shall adhere to the program for the duration of the Purchase Document. The software quality program shall be fully integrated with the activities required by the Purchase Document.

F. The supplier shall conduct on-going evaluations of the processes used in software development and the resulting software and associated documentation to ensure that all supplier requirements have been met and that internal coordination has been conducted in accordance with the software plans.

G. The supplier shall prepare and maintain records of software quality program activities required by the purchase document.

1) A software quality evaluation record shall be prepared for each evaluation required by the Purchase Document. These records shall be in the product/process source's format and shall contain the following items as a minimum:

a. Evaluation date

b. Evaluation participants

c. Evaluation criteria

d. Evaluation results, including detected problems, with reference to the appropriate software problem reports, as applicable.

e. Recommended corrective action. (Generally, this type of record is maintained for Class I software).

2. All other software quality records shall be prepared in the suppliers' format. (Generally, this type of record is maintained for Class II software).

H. When a software-related problem or non-conformance has been detected, it shall be documented and shall serve as input for software corrective action. The supplier shall:

1) Ensure that action is initiated to correct the defect and the cause of the defect, and that adverse trends are identified and reversed.

2) Monitor and track the software corrective actions to ensure timely and positive corrective action.

3) Management shall review the software quality program at intervals as specified in the software quality program.

4) Ensure that applicable subcontracted software meets the requirement of this specification, as well as additional Purchase Order requirements.

5) Prior to the introduction of new or revised support software (e.g., compilers, operating systems, etc.) which is used for the computation, interpretation, assembly, linkage, or working environment of Class I or Class II software, a documented evaluation to determine the impact on the Class I or Class II software shall be conducted.

6) Software and software quality records shall be maintained in accordance with IA-1005, Appendix C.

5. Class I Software Requirements

A. A Software Quality Assurance program for all Class I software covered by the Purchase Document shall be documented and maintained in the form of a Software Quality Assurance Program Plan. This plan may be in supplier format unless otherwise specified in the Purchase Document.

B. The software quality assurance program shall provide for the performance of the following activities by personnel as defined in paragraph 4.B of this appendix:

1) The performance of both scheduled and non-scheduled evaluations of the software development, library control, corrective action, testing and software configuration management activities to ensure compliance with all applicable requirements, plans, procedures, and programming standards and conventions.

2) The independent review, prior to release to IA, of all contractually or regulatory required software plans, procedures, code, and documentation for:

   (a) Completeness

   (b) Compliance with applicable standards and conventions

   (c) Assurance that all approved and only approved changes are implemented

   (d) Traceability of requirements from one document to another

   (e) All necessary approvals

   (f) Compliance to additional purchase order requirements

   (g) Action items shall be documented and the disposition verified for all identified discrepancies

3) The participation in any scheduled software design reviews. All identified problems from these reviews shall be documented and have corrective action disposition, prior to the approval of the design.

4) The assurance that an analysis of software requirements for testability has been performed.

5) The review of test plans, specifications, and procedures for compliance with design requirements, and to ensure that all approved, and only approved changes are incorporated.

6) The monitoring or participation in the testing activities to ensure adherence to approved plans and procedures, to ensure that the identification of the software version has been documented, and to ensure the test results are accurately documented. The test results shall be reviewed for compliance to the test criteria.

7) The assurance that test related media and documentation are maintained.

8) The assurance that all software and software documentation released to IA conforms to all software related Purchase Document requirements.

9) The participation in any scheduled software configuration audits. All identified problems from these audits shall be documented and have corrective action disposition before production release of the software to IA.

10) The assurance that the software's integrity during handling, storage, preservation, packaging, marking, and shipping.

6. Class II Software Requirements

   A. A Software Quality Assurance program for all CLASS II software shall be documented and maintained. This program shall include:

      1) Software Requirements Definition: Prior to designing and coding, the quality assurance program shall ensure that an approved requirements definition document exists, (e.g. drawings/specifications).

2) Design Code Instructions/Documentation: The Software Quality Assurance program shall ensure properly structured and adequately documented software. This may be done through documented software development standards.

3) Test Program Validation: The quality assurance program shall ensure that the software performs as intended. Objective evidence of the validation process shall be maintained for new and revised software. For revised software, re-validation must be performed to the portion of the code that has been modified. Records shall be maintained of the test program validation activity including approval to release for use.

4) Software Identification/Change Control: The quality assurance program shall ensure that the software is uniquely identified. All software changes must be appropriately reviewed. The change control procedure for the software shall be documented, and a revision history maintained.

5) Identification of Software at Operations: The quality assurance program shall ensure that the software is uniquely identified in the appropriate work instructions.

6) Software Media Control: The quality assurance program must protect the software media from unauthorized changes. Protection methods could include, but are not limited to, password protection, write protect labels, checksums, quality audits, object-only code releases. Access to obsolete software for design, manufacture, inspection, or test of IA products shall be prevented.

APPENDIX G CONTRACTUAL REQUIREMENTS FOR BASIC QUALITY SYSTEM ACCREDITATION

1. 9100, 9120 or ISO9001 Accreditation (as applicable)
   A. Contact an approved Certification Body (CB) that is listed in the OASIS database. The URL to the OASIS database is http://www.iaqg.sae.org/servlets/index?PORTAL_CODE=IAQG. A free registration is required.
   B. Schedule the assessment to allow adequate time to address findings, investigate root cause, develop corrective action plan, implement corrective action, and have any findings closed by CB. This must be completed prior to the due date of the systems approval in the IA audit schedule.
   C. Ensure that the CB meets the requirements as listed below in completion of the 9100, 9120 or ISO9001 assessment.
   D. Send copies of all relevant data to IA QR upon receiving certification as objective evidence of compliance to IA's requirements.
      1) Certificate of certification to 9100, 9120 or ISO9001
      2) All findings from the assessment including corrective action as approved by the CB
      3) CB audit report
      4) Any other referenced documentation
      5) This documentation must be provided for initial approval and when requested by IA for periodic re-approval of the quality system.
2. Nadcap Accreditation
   A. The Nadcap program is administered by the Performance Review Institute (PRI), a division of SAE. PRI may be contacted at https://shop.sae.org/servlets/index?PORTAL_CODE=PRI or http://www.pri-network.org/.
   B. Scheduling of the audit should follow the same timing consideration as the 9100, 9120 or ISO9001 audits.

   As all audit results are maintained in the Nadcap database, no data submittal is required.