GKN AEROSPACE

Appendix A

GKN Aerospace - St. Louis Purchase Order Quality Requirements (QRs)

[MI 7.4-18 Rev F]

This document contains the quality requirements that are applicable when invoked by GKN Aerospace – St. Louis Purchase Orders. Use of this document is required for Contract Review and Quality Planning Activities.

QR # QC1000 – Kitting Quality Requirement Compliance Checklist
New - 04/18/03
Supplier is required to review all purchase order requirements (including applicable GKN Quality Requirements) for each constituent part/material of the supplied kit and then confirm compliance of the total kit to these requirements via completion of QR FORM QC1000 for each individual kit supplied prior to shipment to GKN. A copy of this completed form is to be included with the certificate of conformance transmitted with each shipment to GKN-STL.

QR # QC 1100 – Work related to Lockheed Martin Aeronautics Company Purchase Order
New 2/25/05
Revised – 8/25/09
Work to be accomplished in performance of this purchase order is directly related to a Lockheed Martin Aeronautics Company purchase order and must be accomplished in accordance with process specification on this purchase order and Lockheed Martin Aeronautics Company Appendices QJ, QX, and Quality Clause Q4R. All documents can be located at: http://www.lockheedmartin.com/material-management.

QR # QC1206 – Government Source Inspection – Variable (GSI Clause Q206S)
New: 05/11/11
Government inspection is required prior to shipment from Seller's facility.
Upon receipt of this contract, Seller shall promptly notify and furnish a copy of this contract and all subsequent change orders to the government representative who normally services Seller's facility so that the appropriate planning for government inspection can be accomplished.
During performance of this contract, the Seller's and Seller's subcontractor's Quality and Manufacturing processes are subject to review, verification, and analysis by authorized Government Representatives. The inspection required by this clause may occur at any manufacturing or processing sequence as specified by the government representative.
If a government representative does not normally service Seller's facility, Seller shall furnish a copy of this contract to the nearest Defense Contract Management Agency (DCMA) office. In the event the Government representative or DCMA office cannot be located, Seller shall immediately notify Buyer's Authorized Procurement Representative.
Evidence of government inspection (Eagle Stamp or DCMA representative signature) shall be shown on the shipping document.
Government inspection of goods or services provided hereunder shall be performed at Seller's address shown on this contract or contract change unless a different address is specified.

QR # QC1300 – Determination of (Prime) Design Authority and Appropriate Specifications
New: 9/30/07
Revised: 10/02/09
Suppliers shall use technical data retrieved from the secure GKN Virtual Community website to determine the Prime Design Authority, location of the Prime Design Authority, and the appropriate aircraft program. The Prime Design Authority and its location shall be used to determine the appropriate process specifications, material specifications and other relevant technical data to be utilized during all fabrication processes. If such processes are accomplished via sub-contractors, it is required that this information be transmitted (flowed down) to said sub-contractors.

Suppliers shall process / fabricate to the latest revisions of customer / design authority specifications and technical data as identified on the GKN Prime Design Authority Specification Matrix at the start of manufacture. The Specification Matrix is available on the GKN Virtual Community website and it is the supplier's responsibility to review the latest version of this matrix at the start of manufacture. Any questions regarding the Specification Matrix should be directed to the GKN Buyer or Supplier Quality Engineer.

QR # QC1305 – Material Substitution Prohibition – Boeing H900 Paragraph 26 Flowdown (Modified).
New: 4/18/2013

26. MATERIAL SUBSTITUTION PROHIBITION

A. Unauthorized Material Substitution (General)

Unauthorized material substitutions are not permitted on Buyer's Goods. Unauthorized material substitution includes any deviation from the engineering definition of a raw material. Engineering definition includes Buyer design drawing and applicable specifications, product specification, form, size, shape, chemistry, melt method, origin, temper/condition, product testing or surface finish. Alternate materials specified in the engineering definition (and often described as approved material substitutions therein) do not constitute unauthorized material substitution. Terms and definitions for metallic materials and processing used herein are clarified in ARP1917.

Contact Buyer's Authorized Procurement Representative for details regarding deviations to authorized materials. Seller agrees and understands that such deviations only apply to this purchase contract, and only as indicated in the Buyer's authorized document.

B. Metallic Materials (Specific)

Temper or Condition Conversion - Unless specifically authorized by the engineering definition, conversion of a raw material (i.e. heat treat to change the temper or condition of the material) constitutes material substitution of the condition provided by the manufacturer.

Metallic Raw Materials – Buyer's engineering drawings may refer to obsolete or superseded specifications covering several forms, thicknesses, widths, etc. of the alloy or alloys. The required characteristics of these materials are defined not only by the objective test standards of the specification, but by the processes/methods by which this final form is achieved. These requirements are often captured in the definitions of the required material forms, and may not be explicitly called out in the detailed requirements. The raw material certification results from both the process used to make it and the tests to verify basic properties.

Seller shall ensure that metallic materials covered by current or obsolete/superseded specifications are produced using the standard industry practices designed strictly for the production of stock to the specified thickness, diameter, width or cross sectional area, achieved by thermo-mechanical processing or casting process. Chemical, electrochemical and mechanical methods used for the removal of surface scale or contamination, or the production of the required surface finish, in accordance with the material specification are acceptable. Raw

material must not be re-certified with respect to thickness, diameter, width or cross sectional area or product form. Machining or cutting of thicker product or other product forms shall not be supplied in lieu of specified product unless specifically authorized by Buyer. Raw material certifications for material or parts shall reflect the form and size of the raw material as originally manufactured by the raw material producer.

C. Specification Supersession:

For government specifications and standards canceled after June 1994, Seller and subcontractors at all tiers shall use the last active revision of the canceled specification and standard until an acceptable replacement is included in the requirements of this Contract. Contact the Buyer's Authorized Procurement Representative in the event of any inconsistency in applicable specification or standard.

D. Reports (Full Pedigree from melt to final product) - Raw material certifications shall show clear traceability to the manufacturer(s) of the raw material including ingot source, all thermo-mechanical processing (i.e. forging, rolling, drawing, etc), heat treatment, chemical processing and inspections as required by applicable raw material specification requirements.

E. Chain of Custody (Disguising intermediate ownership) – Suppliers shall not disguise the pedigree of material or chain of ownership by removal of a previous supplier's name, nomenclature or identification.

F. Source of Additional Information - Buyer's Authorized Procurement Representative.

G. The substance of this Article shall be flowed in all subcontracts at every tier.

QR # QC1500 - Discretionary Government Surveillance
New 2/1/07
Obsolete 2/17/07

QR # QC1900 – Nonconformance Cost Recovery
New – 12/12/03
Revised: - 1/20/05
Supplier is subject to charges for recovery of costs associated with any/all supplier-responsible nonconforming parts/materials. Such charges will at a minimum include:

Charge Category	Part/Material Value ≤ $500	Part/Material Value > $500
Administrative Charge to process Nonconformance Documentation*****	$150/Nonconformance Document	$150/Nonconformance Document
Rework required at GKN-STL******	Minimum of $50/discrete unit	Minimum of $200/discrete unit
Correction of part mark errors/omissions at GKN-STL******	10% of discrete unit value	$50/discrete unit

Additional charges may also apply where parts or materials, as supplied by GKN and/or its customer, require scrapping at the supplier as a result of the supplier's actions. Additional

charges may also apply where supplied parts/materials require extraordinary rework at GKN or its customer.

*NOTE: Charges will be assessed for nonconformance tags initiated through the identification of nonconforming parts/materials by GKN and/or its customers as well as those initiated as a result of suppliers' own requests for disposition of nonconforming parts/materials.

**NOTE: The location of rework (GKN vs. Supplier) associated with nonconformances received by GKN will be at the discretion of the GKN Buyer in order to ensure the timely supply of conforming parts/materials.

QR # QC2000 – GKN-STL Supplier Quality Assurance Manual
New – 12/12/03
Revised – 02/26/09
In the performance of this purchase agreement, the Supplier is required to comply with the latest revision of the GKN Aerospace - St. Louis Supplier Quality Assurance Manual (MI 7.4-16). The contents of this manual, as well as all required forms, may be accessed at the following GKN Virtual Community website: https://gkn.talisentech.com

GKN Buyers will assist suppliers in gaining the necessary access to this website. Where Quality Requirements (QRs) other than QC2000 invoked by a GKN purchase order are in conflict with the GKN Supplier Quality Assurance Manual, such QRs will supersede requirements defined within the manual.

QR # QC2001 – GKN Receiving Address
New - 08/03/01
Obsolete – 05/12/04

QR # QC2002 – Engineering Rev Level Identification
NEW – 07/10/03
Seller shall record the end item part number, drawing level and engineering changes to which the delivered item has been manufactured to on the packing slip.

QR# QC2004 – GKN Inspection
New – 08/03/01
Obsolete – 05/12/04

QR# QC2005 – All Consigned Pre-Preg Material
New - 07/10/03
Pending GKN – St. Louis lab approval, all consigned pre-preg material will be allowed to be shipped up to 180 days from date of manufacture.

QR# QC2006 – Government Inspection (DLA)
New - 08/03/01
Revised -3/19/02
Obsolete 9/30/07

QR# QC2007 – Flight Safety / Critical Parts Traceability (Apache)
New - 08/03/01
Revised: 12/04/08
The part ordered herein is a flight safety or critical part and requires control during manufacturing per Boeing Engineering Process Bulletin (EPB) 17-119. If applicable, control during manufacturing per the latest revision of EPB 6-128 is also required. The Supplier shall provide and maintain a system of traceability from raw material to purchase order end item. The material control (MC) number and the serial number (SN) shall be recorded and maintained as a historical record per the requirements for record retention.

SHIPMENT DOCUMENTATION

1. Each shipment to GKN Aerospace - St. Louis shall provide certification of 100% inspection of all critical characteristics (300% inspection for hardness testing) and certification of processing in accordance with Boeing EPB 17-119 and EPB 6-128 (if applicable).
2. Shipping documents shall identify the (SN) and/or (MC) as applicable for all items in the shipment.
3. All processing done to specification shall be certified in writing with each shipment. Certifications must reference the applicable specifications, the requirements of the specification, and the quantity and (SN) and/or (MC) of each part processed.
4. Nondestructive testing certification shall be provided with each shipment and must specify by part number the (SN) and/or (MC) of those parts accepted.
5. Processes applicable to product delivered which include time between operations as a critical factor shall be certified in writing reflecting the correct temperature, time and date-in and time and date-out.

QR# QC2009 – Flight Safety Parts Program Plan & Program Planning Package (Apache)
New 08/03/01
Revised: 03/19/02
This purchase order contains requirements for flight safety parts. Prior to commencement of work, Seller will assure that its Flight Safety Parts Program Plan and Production Planning Package(s), as approved by Boeing are in accordance with the latest revision in Seller's possession and confirmed between Buyer and Seller, of Boeing Engineering Process Bulletin (EPB) 17-119. Notwithstanding any other provision of this order, any deviation from the approved plan and package(s), or any use of sub-tier suppliers, who are not identified therein for processes or operations, which generate critical characteristics, may result in rejection of parts by GKN –St. Louis. Approval of the Supplier's Flight Safety Parts Program and Production Plan(s) shall not waive the Supplier's obligation to comply with Flight Safety Program requirements nor shall it waive any obligation by the Supplier to meet drawing or specification requirements. Supplier shall certify that all flight safety parts conform to its approved Production Planning Packages(s). Certification of inspections of critical characteristics, as noted in the drawing, is required with each shipment. All data pertaining to the manufacturing of flight safety parts is to be retained for a period of seven (7) years following the delivery of the last item ordered herein.

QR# QC2011 – Records of Inspections, Test and Process Controls
New - 08/03/01
Revised: 05/12/04

Seller shall maintain records of all inspections, tests, and process controls associated with fulfillment of this purchase order contract. Unless alternate record retention requirements are specified elsewhere in this Purchase Order or its attachments, (i.e. engineering specifications, additional GKN Quality Requirement which specified a longer retention period, etc.) these documents shall be on file and available to GKN for four (4) years following the end of the calendar year in which the final entry was made or three years after the final payment under this contract, whichever expires first. At any time during the retention period, at GKN's request, Seller will deliver said records, or any part thereof, to GKN, at no additional cost to GKN.

QR# QC2015 – Chemical / Physical Analysis Test Reports
New - 08/03/01
Revised - 03/07/02
Obsolete – 9/30/07

QR # QC2016 – Boeing Hardness/Conductivity Testing Requirements
New - 09/23/02
Note: For overload contracts not involving machining operations for machined parts or sheet metal operations for sheet metal parts, these requirements do not apply.
Note: Exceptions to the following hardness testing requirement is granted for small complex geometry parts which, as a result of geometry do not allow for proper testing set-up or are subject to degradation as a result of testing. Engineering definitions that require hardness testing of a small, complex geometry part shall be coordinated with the procurement agent for changes.

Hardness and conductivity testing shall be performed in accordance with P.S. 21203 and/or P.S. 21207 (unless otherwise specified by engineering specifications) as specified below. This requirement must be met, regardless of the source for heat treatment of the material. Unless otherwise specified by the engineering definition, the material shall also meet the acceptance requirements of P.S. 23023. Records of this testing shall be maintained by the Supplier.
Hardness and conductivity is to be performed after all final operations, such as machining, forming, welding or thermal treatment. Hardness testing through any surface plating or coating is not recommended, and in no case shall hardness test impressions be made through a surface plating or coating which is harder than the base material.
Only personnel qualified in accordance with Boeing IDS Process Specifications P.S. 21203 or 21207 (unless otherwise specified by engineering specifications) shall perform hardness and/or conductivity testing.

Material	**Aluminum**		**Other (except Titanium)[1]**	
Test	Hardness	Conductivity	Hardness	Conductivity
Machined Parts	Sample[2]	100%	100%	None
Structural Sheet Metal Parts	Sample[2]	100%	100%	None
Castings	100%[3]	None	100%	None
Forgings & Pressings	Sample[2]	100%	100%	None
Composites	None	None	None	None
1 Hardness and conductivity testing is not required for Titanium material of any kind. 2 Sampling plans should conform to sampling requirements noted below.				

3 If values for a particular material type are not listed in P.S. 23023, hardness testing is not required.

Sampling Requirements:
Sampling inspection is allowed except for Mandatory Inspection Criteria (MIC's) and Key Characteristics (KCs) noted on the engineering definition or if otherwise specified in the GKN purchase order, engineering definition and/or Special Manufacturing Instructions (SMI). MIC's and KCs shall be verified on each part with variable data results recorded and made available on request. Sampling plans shall be in accordance with ANSI/ASQC Z1.4 for attribute inspections or ANSI/ASQC Z1.9 for variable inspections. Single sampling plan for Normal Inspection, General Inspection Level II, with no greater risk than an acceptance quality level (AQL) as noted in the table below for specific product types. Use of a sampling plan based on this requirement will constitute an approved sampling plan. Deviations from this requirement shall be submitted to GKN for review and submission to Boeing A & M St. Louis. Such deviations are subject to GKN and Boeing A & M - St. Louis disapproval.

Product Type	AQL
Machined Parts	2.5
Structural Sheet Metal Details	4.0
Castings, Forgings, and Pressings	4.0
Composites	4.0

QR# QC2017 GKN – Hardness / Conductivity Test for Machined & Sheet Metal Parts
New - 08/03/01
Revised: 05/12/04
This QR has been superseded by QR # QC2016 – Boeing Hardness/Conductivity Testing Requirements. If QC2017 GKN is invoked by GKN purchase order, please ensure compliance with QC2016 instead.

QR# QC2018 GKN – Castings, Forgings and Pressing Requirements
New - 08/28/01
Revised: 03/07/02
Seller of castings, forgings and pressings shall in preparation for delivery:

1. Copies of test reports for "fracture critical and fracture critical traceable" hardware shall be included in the shipping documents to GKN.
2. Castings - supplier's packing sheet/certification shall include the master melt and/or heat number, heat treat lot number as applicable.
3. Forgings and pressings - supplier's packing sheet/certification shall include the mill heat number, heat treat lot or serial number as applicable.
4. Forging Flash - forging flash shall be removed in accordance with applicable specification requirement.
5. Processing Operations - (tensile testing of forging and pressings) - when forgings or pressings are shipped in the annealed or normalized condition (in accordance with

specification requirements) and are to be heat treated later, the tensile specimens shall be heat treated to the specified condition on the end item (i.e. the finished machined part) and tested prior to shipment.

QR# QC2019 – Pratt & Whitney Stamp
New - 07/10/03
All documentation must have the applicable Pratt & Whitney source stamp per MCL Manual section F-17.

QR# QC2020 – Unconfirmed Failure Rejections
New 9/23/02
In the event hardware delivered on this Purchase Order is rejected and returned by GKN to the Supplier and the Supplier is unable to confirm the reported failure, the Supplier shall provide the following to the Buyer and hold shipment pending GKN disposition:

- Purchase Order Number
- Part Number
- Serial Numbers
- GKN Nonconformance Tag Number
- Applicable test procedures
- Results of special tests performed by the Seller
- Supplier's certification that test procedure used to verify the failure identified by GKN was adequate to detect those failures. Supplier shall provide the number and revision of test procedure(s) used.

QR# QC2021– Supplier CAD/CAM Inspection Data Control per D650-14831-1
New 9/23/02
Revised 10/13/03
If Supplier has Boeing DPD "Authority" during the entire product manufacturing and verification process and QR # QC2026 is on this GKN Purchase Order, the Supplier is exempt from requirements in this QR. If Supplier has not received and maintained Boeing DPD "Authority" the requirements of this QR apply. Supplier CAD/CAM nominal inspection data derived from master dimension identifier (MDI), master dimension definition (MDD), master dimension surface (MDS) or non-dimensioned features in the engineering CAD model will be verified and stamped as approved by Boeing Supplier Quality Management and returned to the Supplier with a cover letter stating the part number and engineering release to which the data is approved prior to use as inspection media. The data may be submitted for verification in a variety of formats including coordinate data lists, CMM program nominals, dimensioned sketches or drawings, IGES files, etc. The approved data will be used as an element of the inspection media for the specified part number. Any change in Boeing engineering and/or supplier data will require update approval and/or verification by Boeing Supplier Quality Management. Supplier CAD/CAM Q.A. data shall be controlled in accordance with D650-14831-1. Supplier shall maintain records of controlled inspection data and shall make those records available to GKN and Boeing upon request.

QR# QC2022– Requirements for Key Characteristics (KCs)
New 9/23/02
Revised 07/10/03

When Key Characteristics are specified on the drawing or purchase contract, the Seller shall utilize 100% inspection for these characteristics or employ control per SAE AS9103 – Variation Management of Key Characteristics. Data in support of either 100% inspection or control per AS9103 are to be made available to GKN and its customers upon request. Application of AS9103 does not invalidate the need to establish and document compliance with all requirements for First Article Inspection per AS9102.

QR# QC2023– Boeing Process vs. Military/Industry/Team Equivalents (F-22)
New 9/23/02
When Boeing design drawings are off-loaded by Boeing to outside suppliers for manufacture, the Supplier has the option of complying either with the parenthetically referenced Boeing Process or the corresponding military/industry/team specification listed.

On Fracture/Durability or Safety Critical hardware: Where the Supplier elects to use a military/industry/team specification, he shall submit his internal process to Boeing for parts, materials, and process technology approval prior to implementation.

QR# QC2024– Serialization/Traceability Requirements for Fracture Critical Category (F-22) Hardware
New 9/23/02
Supplier is required to provide a serialization and traceability listing on a certification of conformance for all fracture critical category I (FCI) parts including all FCI serialized parts that make up an assembly in accordance with the latest revision of 5PTPTT02. Include FCI serialization data of all sub-tier suppliers. If GKN furnished material is provided, begin the listing with the GKN provided end item serial number. This listing shall reference part numbers, serial numbers, and manufacturer's cage codes in relationship to each other.

QR# QC2025– GKN Process Assessment/On-site First Article Review
New 4/18/03
Prior to production part shipment approval, supplier is required to successfully pass an on-site verification of its First Article part as well an audit of applicable production part processes/systems including processes and systems designed to ensure serialization and traceability for critical parts as applicable.

QR# QC2026– Quality Assurance for Digital Data per D6-51991
New 10/13/03
When a supplier receives or uses Boeing digital data as authority for design and/or inspection, then the seller must comply with the requirements of D6-51991, Quality Assurance Standard for Digital Product Definition at Boeing Suppliers.

QR # QC2027 – Requirement for use of Boeing Specifications (F-22)
New - 02/17/04
When Boeing design drawings are off-loaded by GKN to outside suppliers for manufacture, the supplier shall comply with the parenthetically referenced cover-sheeted Boeing process specifications.

QR# QC2028 – Government Inspection (DoD, DCMA, DCMDI)
New – 08/03/01

Revised – 9/30/07
Government inspection is required prior to shipment from your plant. Arrangements for government inspection under this contract will be made by U.S. Department of Defense (DoD), Defense Contract Management Agency (DCMA), Defense Contract Management District International (DCMDI), or Defense Logistic Agency (DLA). For the correct DCMDI office, please refer to the DoD Contract Administration Services (CAS) Component Listing at: http://www.dcma.mil/casbook/casbook.htm

Upon receipt of this contract promptly provide the government representative who normally services your plant with a copy of the purchase order and also copies of all subsequent change orders so that appropriate planning for government inspection of the goods can be accomplished. Evidence of government inspection shall be shown on all shipping documents.

QR# QC2029 – FAR 43.13 Performance Rules & 145.57 Performance Standards
New - 08/03/01
Revised: 05/13/02
Obsolete 4/26/06

QR# QC2030 – Fastener Certifications
New - 08/03/01
Revised: 03/07/02
If this contract is for the procurement of ASTM, ASME, SAE, MS, BAC, AN, or NAS specification fasteners, (bolts, nuts, screws, studs, washers, rivets, pins, etc. then the following applies: Certification stating materials, processes (including applicable inspection processes) and finished items were controlled and tested in accordance with requirements of this contract and applicable specifications and that such records are on file (unless the material was Buyer provided). The certification shall identify the original manufacturers and their lot numbers for each lot in the shipment. Multiple lots within a shipment shall be kept separated and clearly identified as to the original manufacturer and the lot number(s). A copy of the certification shall be included with the packing sheet for each shipment.

QR# QC2031 – Calibration – MIL-Std 45662A
New - 07/10/03
Obsolete – 05/12/04

QR# QC2032 – Changes To Sellers Operations
New - 07/10/03
Obsolete – 05/12/04

QR# QC2037 – Quantitative Test Results
New - 08/03/01
Revised: 03/07/02
Seller shall submit with each lot, quantitative results of all tests required by the procurement specification and applicable part drawing. In addition, when part size or configuration prohibits conventional testing, the Seller shall obtain coupons of the same material and heat treat lot. These coupons shall be prepared in such a manner as to facilitate testing requirements and yield acceptable test results. Test results obtained from coupons shall be submitted with each lot and shall be identifiable to the shipment. Sellers other than original manufacturers shall not

rework, alter, or modify any manufactured item. Manufacturers performing rework shall, on completion, submit the item to required specification testing. The Seller shall identify unit packages and their associated records. Such identification shall include the heat treat lot number and/or the inspection lot number. Exceptions:

1. Coupon testing will not be required for fatigue life, tension-tension fatigue requirements, and mechanical property testing, except when specifically required by the applicable procurement specification.
2. Coupon testing does not apply to component type fasteners.

QR# QC2040 – Certificates of Conformance
New 08/03/01
Revised: 10/02/09

Seller shall furnish a certificate of conformance, signed by a company representative, attesting to the compliance with all requirements of this purchase order. Such certificates shall contain lists of individual part/material serial numbers where required by specification. Seller shall maintain records of inspections, tests, and process controls (including sub-tier supplier/processor certificates of conformance/test reports) in accordance with record retention requirements imposed by this contract, which serve to substantiate this certification. The GKN buyer shall be notified and approve any exception prior to shipment.
Certification shall attest to the following:

1. Material used on this purchase order conforms to all applicable specifications. Material Alloy must be listed on the submitted Certificate of Conformance with the delivery. If material is furnished by GKN, so indicate.
2. All requirements of this purchase order, including specification and revision level conformance, and compliance with applicable GKN Quality Requirements have been met. All special processes performed must be listed on the submitted Certificate of Conformance with the delivery.
3. Distributors and jobbers must, in addition to the above certification, include the manufacturer's name for each item shipped.

Attach one (1) copy of the certification to the material involved and one copy to the shipping document(s) with each shipment. Performance of this purchase order will not be complete and final payment will not be made unless the required certifications of conformance have been signed or stamped by a company representative and are received by GKN.
NOTE: In addition to the above, suppliers of raw materials will be required to support GKN periodic verification and validation of these materials to specified requirements when and as directed by the applicable GKN Buyer. Support of these activities may require one or more of the following:

1. Periodic submission of the actual raw material test report (mill test report, e.g.) that states the lot of material has been tested, inspected, and found to be in compliance with the applicable material specifications
2. Submission of material samples for subsequent validation testing by GKN, or
3. Substantiation to support the supplier's own program of periodic validation and verification where they are not the raw material manufacturer themselves.

Test reports will list the specifications, including revision numbers or letters, to which the material has been tested and/or inspected and the identification of the material lot to which it applies. When the material specification requires quantitative limits for chemical, mechanical, or physical properties, the test report will contain the actual test and/or inspection values obtained. Certifications for physical properties will likewise show actual values. If Supplier supplies

converted material produced by a raw material manufacturer, Supplier is responsible for ensuring performance of all physical tests where the manufacturing process has altered the properties from what had been certified by the raw material manufacturer. The data submitted must reflect the condition of the material as offered for delivery. This data is in addition to the raw material manufacturer's test report required above.

QR# QC2041 – Responsibility for Raw Material Certificate Review/Validation
New 03/14/03
Obsolete – 9/30/07

QR# QC2046 – Part Identification & Traceability
New 08/03/01
Revised: 03/07/02
Obsolete – 9/30/07

QR# QC2047 – Part Identification & Date of Manufacture
New 3/14/03
In addition to those part marking requirements identified on the associated blueprints/drawings, Supplier shall identify each item/part with the date of manufacture or a more process-specific lot designation in an area adjacent to the part mark identification. Identification shall be performed using those same methods and materials identified within the applicable part mark specifications referenced on the associated blueprints/drawings.

QR # QC2050- Use of Approved Suppliers / Processors
New 12/04/08
The customer or design authority governing parts made or procured by GKN may restrict the performance of certain Special Processes required in the manufacture of these parts to a limited group of companies on an Approved Supplier List (ASL). The company actually performing the Special Process (whether it be GKN's supplier or a subcontractor performing work for GKN's supplier) shall be listed on the ASL published by the design authority as qualified to perform that particular Special Process. If the supplier needs information about a design authority's ASL, they should contact the GKN Buyer. It is GKN's supplier's responsibility to impose this requirement on their subcontractors per QC2055.

QR # QC2051 – Disclosure and Approval of Subcontracted Processes
New 5/20/11
During performance of this contract, the Seller is required to submit to GKN for approval all plans to subcontract fabrication or processing of any kind. Subcontracting any work required to complete this contract without written consent from the GKN buyer is prohibited

QR # QC2055- Flowdown of Purchase Order & Quality Requirements to Sub-tier Suppliers
New 12/04/08
All Purchase Order Requirements and Quality Requirements invoked on a Purchase Order to a GKN supplier shall be flowed by the supplier to all related sub-tier suppliers (as applicable) performing work on the items listed in said Purchase Order. In addition, it is the supplier's responsibility to provide all documentation/information related to the Purchase Order Requirements and Quality Requirements to its sub-tier suppliers and enforce said requirements.

QR# QC2074H – Single Lot / Date Parts
New 08/03/01
Revised: 03/07/02
All parts supplied under this purchase order must be of the same Lot/Date Code.

QR# QC2077D GKN – Use of Boeing Qualified Sources
New 08/03/01
Revised: 05/12/04
This QR has been superseded by **QR # QC3030 – Use of Boeing Approved Special Processes.** If QC2077D GKN is invoked by GKN purchase order, please ensure compliance with QC3030 instead.

QR# QC2080 – Quality System (MIL-I-45208)
New 08/03/01
Obsolete – 05/12/04

QR# QC2080A – Quality System (MIL-Q-9858)
New 08/03/01
Obsolete – 05/12/04

QR# QC2080C GKN – Quality System (AS9100)
New 08/03/01
Revised: 02/26/09
Seller shall establish and maintain a quality assurance system that meets the requirements of the latest revision of SAE AS9100, *Quality Management Systems – Requirements for Aviation, Space and Defense Organizations*. Registration by an independent registrar is not required. Future registration will be required to maintain the status of active supplier for GKN Aerospace - St. Louis. Non-registered suppliers are subject to internal process audits to determine compliance to the latest revision of SAE AS9100 by GKN or a GKN designate.

QR# QC2081 – Supplier Inspection
New 08/03/01
Obsolete – 05/12/04

QR# QC2081A GKN – Control of Nonconforming Product
New 08/03/01
Revised: 12/04/08
The supplier shall control nonconforming product. This control shall provide identification, documentation, segregation (when practical) and notification of qualified supplier Quality Assurance personnel. The supplier's Quality Assurance personnel, with the assistance of Engineering if required, shall examine nonconforming material to evaluate if the material can and/or should be dispositioned rework to specification or scrap (notify GKN procurement before disposal for possible alternate use).

If product cannot be dispositioned as listed above, it shall be designated for GKN Aerospace - St. Louis Material Review Board (MRB) action. The supplier shall document the nonconformance on Form MI 7.4-16(b) – Supplier Nonconformance Record and submit this

document to their GKN Buyer. Any nonconformance-related attachments should be enclosed on Form MI 8.1-11 (e) or Form MI 8.1-11 (f) and submitted along with MI 7.4-16(b). The GKN Buyer will assign a GKN External Nonconformance Number and provide it to the supplier to revise Forms MI 7.4-16(b), MI 8.1-11 (e) or MI 8.1-11 (f) and to include on Form MI 8.1-3(d) – Deviated Supplied Parts Cover Sheet. If GKN elects to bring the nonconforming part in, the supplier shall complete MI 8.1-3(d) and submit it to GKN along with the nonconforming part, the completed MI 7.4-16(b) and the GKN External Nonconformance document. In addition, all supplier Certificates of Conformance shall note the GKN External Nonconformance Number. NOTE: The supplier is not authorized to ship the product to GKN unless explicit written direction has been provided by the GKN Buyer. Finally, when the product is delivered to GKN, the GKN nonconformance document number should be included in the product identification even if the nonconformance document has been closed.

The supplier shall retrieve the latest revisions of the documents above from their GKN Buyer or from the public library of the GKN Virtual Community website at https://gkn.talisentech.com/.

QR# QC2086 – Quality System (Attached Requirements)
New 08/03/01
Obsolete – 05/12/04

QR# QC2087 GKN –Critical Parts Traceability and/or Serialization Information
New 08/03/01
Revised: 09/23/02
This part includes a requirement for inclusion of critical traceability and/or serialization data. Supplier shall provide and certify, at minimum, the following information for each part supplied:

1. Part Number, Part Dash Number, Part Serial Number, Supplier Name, Supplier Internal Control Number
2. Starting Stock Part and Dash Number, Serial Number, Stock Supplier
3. Heat Treat Vendor & Lot Number,
4. Raw Material Specification Number, Parent Plate/Forging Lot Number/Extrusion I-Teat Lot, Producer.
5. Non-Destructive Test Method, Processor, Inspector ID, NDT Technique Number,
6. All Rejection Document Numbers

QR# QC2088 GKN – Boeing Non-Destructive Technique Approval
New 08/03/01
Revised: 05/12/04
Seller shall provide certification that Non-Destructive Testing (NDT) technique approval has been received from Boeing prior to shipment from Seller's facility to GKN.

QR# QC2089– Special Tooling Control (Boeing Integrated Defense Systems (IDS))
New 02/25/09
All Boeing or government-owned Special Tools that are fabricated, reworked or repaired by approved tooling suppliers, and Boeing, Government or supplier-owned Special Tools that are used for the acceptance of products fabricated for Boeing Integrated Defense Systems (IDS) or its customers shall be controlled in accordance with D950-11059-1 "IDS Seller Special Tooling Requirements. Written approval from GKN is required before any Government or Customer owned tools are reworked or repaired except for standard line maintenance".

QR# QC2090 – Property Control
New 03/07/02
Revised: 05/13/02

In the performance of this purchase agreement, the Supplier is authorized to use special tooling and/or test equipment identified herein. Such tooling and/or equipment are considered the property of GKN, GKN customer(s) or the Government and will be used solely for its intended purpose unless otherwise approved by GKN. No such tooling or equipment shall be destroyed, disposed of, or transferred without the written consent of GKN Aerospace – St. Louis. In the performance of this contract the Supplier shall be responsible for all periodic, inventory checks, inspections, maintenance and refurbishment or replacement required to manufacture, test and deliver the items ordered under this purchase agreement. The Supplier will be liable for shortages, loss damage or destruction to tooling or equipment provided in support of this purchase agreement. The Supplier's liability shall apply until GKN provides written release of such liability without regard to termination or expiration of this purchase agreement. The Supplier shall promptly investigate and report any loss, damage, or destruction of GKN, Customer or Government tooling or equipment. The reports shall include the following at a minimum:

- Purchase Agreement/Order number
- Description and item identification number
- Estimated replacement or repair cost
- Date and time of loss, damage, or destruction
- Actions taken to prevent further loss, damage, or destruction and to prevent repetition of similar incidents
- Statement that no insurance costs or other means of the subcontract covering loss, damage, or destruction of property were charged to this purchase agreement.
- Security classification of the item, if any
- All known facts or circumstances that led to the loss, damage, or destruction and a certification that the item was being used for its intended use.

The Supplier will assure the identification stickers, tags will remain on the tooling/equipment and that the identification stickers or tags are legible. The Supplier shall certify that the tooling/equipment provided herein will be recorded and maintained on the Suppliers property records.

The Supplier will maintain tools and equipment. At a minimum, tool maintenance shall consist of the following:

- Replace tooling pins and keys as required.
- Repair elongated tooling holes and worn keyways.
- Clean and polish working surfaces of dies as required to prevent scoring or marking of parts.
- Protect entire die with anti-oxidant after each run of parts.
- Any other minor rework not to exceed three (3) man-hours.

Cost of any tool rework or replacement, which is not covered by the above, shall be negotiated separately.

The Supplier will permit GKN, the Government, or GKN customers reasonable access to any customer or Government property. The Suppliers shall clearly identify all return shipments of tools or equipment with the purchase agreement number and the tooling/equipment identification number(s). Shipments must be accompanied by the appropriate shipping documents.

QR# QC2091 – F15 Tooling Precedence
New 7/26/06

Seller will manufacture all goods to be delivered under this contract in accordance with the buyer furnished build-to-package, which may include, but is not limited to, the GKN SMI, buyer furnished tooling and engineering drawings. In cases where the buyer furnished tooling and engineering drawings are different, the tooling shall take precedence as defined in the GKN SMI. Engineering dimensional call-outs shall not be required during First Article Inspection when a tool is the controlling media, as defined in the GKN SMI and the feature is validated to the buyer furnished tool.

QR# QC2092– Special Tooling Control (Boeing Puget Sound)
New 9/23/02
All Boeing or government-owned Special Tools that are fabricated, reworked or repaired by approved tooling suppliers, and Boeing, Government or supplier-owned Special Tools that are used as media of inspection (MOI) for the acceptance of products fabricated for Boeing Military Aircraft and Missile Systems Group (Puget Sound) or its customers shall be controlled in accordance with D658-10024-1 “Supplier Fabricated/Held/Owned Special Tools Inspection, Acceptance, and Control”. This document defines Quality Assurance requirements for acquisition and utilization of Special Tools, Tooling Supplier Surveys, Tool Design Reviews, First Product Inspections, Tool Routines, Release Status Control, Tool Inspections, Shipping/Receiving Screening Inspection, and Tool Discrepancy Control.

QR# QC2093 – Quality System (Boeing A0436 – Latest Revision)
New 06/12/04
The following requirements apply to the manufacture of parts and/or materials which are Boeing designed and that are produced for subsequent GKN delivery to Boeing Integrated Defense Systems, St. Louis. The Supplier to GKN for such parts/materials shall establish and maintain a quality assurance program in accordance with the latest revision of Boeing report number AO436. This document which outlines requirements supplemental to SAE AS9003 may be accessed at: http://www.boeing.com/companyoffices/doingbiz/quality

QR# QC2094 – Quality System (Boeing A0436 REV. Q)
New 09/23/02
Revised 6/12/04
This QR has been replaced by QC 2093. Suppliers are to ensure compliance with QC2093 as applicable when QC2094 is invoked.

QR# QC2095 – Quality System (Boeing A0436)
New 03/07/02
Revised 6/12/04
This QR has been replaced by QC 2093. Suppliers are to ensure compliance with QC2093 as applicable when QC2095 is invoked.

QR# QC2096 – MDC/MDHS Approved Sources (Apache)
New 03/19/02
Revised: 05/13/02

The following types of processes must be performed by sources approved by MDC/MDHS:

1. All processes for which the “Approved Vendor” paragraph (usually # 7) of the applicable MDHS process specification (HP) requires the processing source listed in the MDHS Approved Vendor List (AVL).
2. All processes listed in Appendix A of MDC Corporate Quality Assurance Regulation (CQAR) # 5.

The seller is responsible for assuring that the processing source has in their possession a current MDC/MDHS approval of their processing capability for the processes to be performed, prior to their performing the processing.

NOTE: The seller is to contact the GKN Buyer for current information regarding MDHS AVL.

Shipment Documentation:
Each shipment must be accompanied by a legible unaltered copy of the certification from the processing source demonstrating compliance with the specification for the processes to be performed and that the processor is/was approved by MDHS to perform the process at the time the product was processed.

QR# QC2097 – Boeing Approved Sources
New 03/19/02
Material of this purchase order shall be procured from an Approved Supplier as indicated on the applicable Boeing Approved Vendor List (AVL) or Qualified Product List (QPL).

Shipment Documentation:
Each shipment shall be accompanied by a certification stating the name and address of the Boeing AVL source or the Government QPL source and the specification number.

QR# QC2098 – First Article Inspection (AS9102)
New 04/08/02
Revised: 12/05/08
Suppliers of engineered components/parts shall perform, retain, and submit a First Article Inspection Report in accordance with the latest revision of AS9102 Aerospace First Article Inspection Requirement. Copies of the completed First Article data shall be submitted to GKN with the shipping documents of the first part or directly to the appropriate GKN Supplier Quality Engineer or Buyer and shall be maintained at the supplier’s facility. GKN reserves the right to request data packages, and the requested data must be supplied within 5 business days of the request. The supplier’s own equivalent forms may be used in place of those contained within AS9102 provided all required information is included. First Article Inspection Reports previously prepared in full compliance with QC 2098 are acceptable to GKN and may be retained in lieu of repeating the First Article Inspection, provided it has not been 2 years since parts were last manufactured. Any change to the manufacturing process after an approved First Article requires notification in writing to GKN.

Partial first articles are required per AS9102 section 5.3 and the requirements for submission and retention of partial first articles is the same as initial first articles. Supplier must inform GKN buyer in writing (email is acceptable) when a new or partial first article is required, as soon as the supplier plans a change, due to a change in; manufacturing location, process, equipment, sub contracting of operations, or change in tooling.

Copies of AS9102 and associated forms may be obtained by contacting SAE at http://www.sae.org

QR# QC2099 – F/A-18 E/F Control of Fracture & Maintenance Critical Parts (Dwg. 74A900054)
New 04/08/02
Revised: 05/13/02
Supplier shall ensure compliance with latest revision of Boeing drawing # 74A900054 – Control of Fracture and Maintenance Critical Parts for the F/A-18 E/F Aircraft.

QR# QC2100 – F/A-18 E/F Fracture Critical Traceable Parts (Dwg. 74A900053)
New 04/08/02
Revised: 05/13/02
Supplier shall ensure compliance with latest revision of Boeing drawing # 74A900053 – Serialization and Traceability Requirements for F/A-18 E/F Fracture Critical Traceable Parts.

QR# QC2101 – F/A-18 C/D Fracture & Maintenance Critical Parts (Dwg. 74A900004)
New 09/23/02
Supplier shall ensure compliance with latest revision of Boeing drawing # 74A900004 – Control of Fracture and Maintenance Critical Parts for the F/A – 18 Aircraft.

QR# QC2102 – F/A-18 C/D Serialization and Traceability Requirements (Dwg. 74A900003)
New 09/23/02
Supplier shall ensure compliance with latest revision of Boeing drawing # 74A900003 – Serialization and Traceability Requirements for F/A –18 Fracture Critical Parts.

QR# QC2103 – Traceability/Serialization per 17P9M2005
New 11/06/02
This part requires traceability/serialization in accordance with the latest revision of Boeing document 17P9M2005.

QR# QC2104 – Special Control per 17P9M2004
New 11/06/02
This part requires special control in accordance with the latest revision of Boeing document 17P9M2004.

QR# QC2105 – T-45A – Fracture Critical Traceable Parts
New 7/10/03
Supplier shall ensure compliance with the latest revision of Boeing Drawing # DA000A1000 – T-45A Control of Fracture Critical Parts for serialization and traceability of fracture critical parts.

QR# QC2110 – Control of Materials and Processes for Designated Parts and Components of Boeing Products per D6-1276
New 7/1/08

QR # QC 2800 – Winglet Technology Program Quality Requirements
New - 01/20/04

Obsolete 4/26/06

QR # QC3000 – First Article Engineering Evaluation
New 04/08/02
Revised – 9/30/07
Parts covered by this Quality Requirement are subjected to First Article Engineering Evaluation by Engineering Authority. Supplier shall perform a first article inspection in accordance with the latest revision of AS9102 Aerospace First Article Inspection Requirement. Two (2) copies of the First Article Inspection Report are to be submitted with the shipment of parts.

Supplier's own equivalent forms may be used in place of those contained within AS9102, provided all required information is included. Copies of AS9102 and associated forms may be obtained by contacting SAE at http://www.sae.org Supplier must notify the applicable GKN Buyer and/or Supplier Quality Engineer at least 10 days prior to the time the item(s) will be ready for First Article Inspection.

It is the supplier's responsibility to meet all specifications and other relevant purchase order requirements. Any results that do not meet specification requirements are cause for the supplier to withhold First Article parts and documentation. Suppliers are expected to expend every effort in order to correct the part/process so that all design record and purchase order requirements are met. If the supplier is unable to meet any of these requirements, the applicable GKN Business Unit Buyer and/or Supplier Quality Engineer shall be contacted immediately.

First Article Data Record Retention Requirements
Suppliers are to retain copies of First Articles for a period of 7 years, or in accordance with other Quality Requirements cited on the purchase order, whichever is longer. GKN Aerospace Services – St. Louis and its customers reserve the right to attend and witness any/all First Article inspections as conducted at the supplier's facility.

QR # QC3010 – Manufacturing Process/Quality Systems Reviews
New 04/08/02
Revised 01/20/04
Supplier's manufacturing processes, quality systems, and associated records/documentation are subject to review, verification, and analysis by GKN personnel, GKN Customer personnel, and/or representatives of applicable government and/or regulatory agencies/authorities on the supplier's premises at any time.

QR # QC3020 - GKN/Customer/Government - Product, Quality System and Mfg Process Surveillance
New 04/08/02
Revised 2/10/07
During performance of this contract, Seller and Seller's sub-tier suppliers' quality systems, manufacturing processes, associated records/documentation and product (as supplied under this contract) are subject to on-site (at supplier premises) review, verification, and analysis by GKN personnel, GKN Customer personnel, and/or representatives of applicable government and/or regulatory agencies/authorities. These reviews may be conducted on either a random or 100% (full –time) basis. Supplier will be notified in advance should GKN, GKN's customer, and/or government regulatory agencies/authorities elect to invoke this right. Government

inspection or release of product related to this contract prior to shipment is not required unless Seller is otherwise notified or a Form DD250 Government shipping document is required. If requested, Seller shall provide a copy of this contract to the Government Representative upon receipt.

QR # QC3030 – Use of Boeing Approved Special Processes
New 04/08/02
Revised: 06/12/04
The following requirement applies to the manufacture of parts and/or materials which are Boeing designed and that are produced for subsequent GKN delivery to Boeing. The Supplier shall be listed or shall utilize sources listed in the latest revision of Boeing Document D1-4426, Boeing Approved Process Sources, whenever the manufacturing and inspection type processes listed in D1-4426, or their equivalent, are used in performance of this contract, except as noted in D1-4426. If the supplier is not on distribution for the D1-4426 document, a copy may be referenced on the Boeing Web-site at http://www.boeing.com/companyoffices/doingbiz/d14426/
Supplier shall impose this requirement on their subcontractors as well.

QR # QC3040 – Retention of Inspection Records
New 04/08/02
Revised 05/13/02
Supplier shall certify that materials, processes and/or delivered items will be controlled and tested in accordance with and meet specified contract requirements and applicable specifications, and that applicable records are on file subject to examination and will be furnished to GKN upon request. Supplier shall include with the packing slip for each shipment a completed copy of the Supplier Certificate of Conformance form. A duplicate copy of this document is to be sent to the applicable GKN buyer. Supplier shall retain production records of quality control, reliability and inspection for a period of seven (7) years from date of final payment unless otherwise specified on the PO. Supplier will have a documented procedure on record retention defining specific records and applicable retention periods/methods.

QR # QC3050 – Disposition of Nonconformances (Boeing Philadelphia)
New 04/08/02
All nonconformances involving customer-supplied materials are to be documented for GKN and Boeing Philadelphia review on Boeing Philadelphia Rejection Report Form 29511 or Rejection Report Supplement Form 29512. Forms shall be completed per the latest revision of Boeing Document D8-4899.150 (sections V, VI, VII, XIV, and XV) “Instructions for Completing Supplier Initiated Rejection Reports and Supplements”. Completed forms are to be submitted to GKN (electronically where possible) for their coordination and review with Boeing. NOTE: Supplier is not to submit forms directly to Boeing Philadelphia unless explicitly directed to do so by GKN Supply Chain personnel. Supplier shall hold and segregate affected parts until the Rejection Report disposition decision has been received from GKN. Copies of the relevant sections of Boeing Document D8-4899.150 and Form 29511 & 29512 are available on the following Boeing Philadelphia website:
http://www.boeing.com/companyoffices/doingbiz/terms/rejection/rejection.htm.

QR # QC3060 – Corrective/Preventive Action
New 05/13/02
Revised 3/14/03

Supplier shall provide GKN with documented Corrective/Preventive Action for any/all supplier corrective action requests initiated by GKN procurement representatives. Supplier shall respond using the appropriate GKN Supplier Corrective Action Response Form as supplied by GKN and/or any applicable GKN Customer response forms. Failure to provide timely and comprehensive corrective/preventive action responses in a timely manner may result in negative impact to the supplier's GKN Supplier Performance Indicator rating.

QR # QC3070 – Quality System Requirements (Boeing X-23784)
New 5/13/02
Revised 4/26/06
Supplier is required to maintain a quality system in compliance with the latest revision of Boeing form X-23784. GKN reserves the right to conduct surveillance audits at the supplier's facility to determine that such compliance is maintained.

QR # QC3075 – Part Acceptance Stamping
New 03/14/02
Parts supplied under this purchase order are to be individually acceptance stamped by appropriate supplier personnel in accordance with systems described in Boeing form X-23784.

QR # QC3080 – Checklist Compliance
New 5/13/02
Revised 4/26/06
Supplier is to complete the latest revision of Boeing Checklist Form #57767 prior to each shipment in order to ensure compliance with applicable GKN contract requirements. If supplier fails to comply with any such requirement, GKN may back bill the supplier $200 per occurrence to correct the non-compliance.

QR # QC3085 – Comanche Program – Flight Safety (Helicopter Only)
New 04/18/03
Obsolete 4/26/06

QR # QC3090 – Packaging, Marking and Shipping (Boeing Helicopter)
New 05/13/02
Supplier shall package, mark and ship the items to be furnished under this contract in accordance with latest revision of Boeing document D37521-1 "Suppliers' Part Protection Guide Helicopter Division".

QR # QC4000 – Approved Process Sources (Comanche)
New 10/11/02
Obsolete 4/26/06

QR # QC4001 – Raw Material Test Results (Comanche)
New 10/11/02
Obsolete 4/26/06

QR # QC4002 – Non-Destructive Testing (NDT) Certification (Comanche)
New 10/11/02

Obsolete 4/26/06

QR # QC4003 – Compliance with MIL-I-45208A or Equivalent (Comanche)
New 10/11/02
Obsolete – 05/12/04

QR # QC5000 – Use of Chemtronics NMR (F-22)
New 10/11/02
Revised – 4/26/06
Supplier is to maintain a system to document nonconformances, investigate, determine root cause, initiate corrective action, and follow-up in order to eliminate causes of nonconformance. Any nonconformance to the purchase order or drawing requirements must be documented on Chem-tronics' Nonconforming Material Report. Disposition of nonconformance must have formal approval by the Chem-tronics material review board. Formal corrective action will be required. Supplier is liable for any cost incurred by GKN Aerospace Services-STL or Chem-tronics due to rework/repair of nonconforming hardware. A copy of Chem-tronics Nonconformance Material Report may be obtained from the assigned GKN Aerospace Services – STL buyer.

QR # QC5001 – Software Control in accordance with DOD-STD-2168 (Boeing F-22)
New 10/11/02
If software is involved in performance of work for GKN, the supplier shall maintain software control procedures that comply with DOD-STD-2168 software quality program requirements.

QR # QC5002 – Processor Certification Requirements (Boeing F-22)
New 10/11/02
Supplier shall include the following with each shipment:

Certification(s) identifying the processor, part number, purchase order number, process specification number, identification of process method used, acceptance criteria document and the applicable "quality control standard (CQS). Certifications must contain the document revisions.

QR # QC5003 – Manufacturing Plan Approval (Boeing F-22)
New 10/11/02
The Supplier shall submit to GKN Aerospace Services – STL, prior to production, a manufacturing plan, identified with a unique number and revision level, detailing all materials, operations, processes and tooling required to produce the hardware. Plan shall include any sub-tier's manufacturing plan. Manufacturing plan shall show evidence of quality review and shall include inspection steps necessary to ensure quality. Once submitted to GKN Aerospace Services – STL, no changes outside of the scope outlined in 5PTPTT02 are permitted without written approval from GKN Aerospace Services – STL.

QR # QC5004 – Boeing F-22 Processor Approval per 5PD90505P
New 10/11/02
Supplier is to ensure that all processors and suppliers utilized are approved to the level of requested process/suppliers per the latest revision of 5PD90505 – Approved Boeing F-22 Supplier/Processor listing.

QR # QC5005 – Mill Test Reports (Boeing F-22)
New 10/11/02
Raw materials procured in fulfillment of the purchase order must include the original mill source's certified measured test report providing mill identity and mill chemical and mechanical properties defined by the specification and furnished to GKN Aerospace Services – STL for each heat lot number.

QR # QC5006 – Variable Inspection Data Requirements (F-22)
New 10/11/02
Variable inspection data for each individual characteristic is required for 100% of the items manufactured under this purchase order. Sampling may be implemented where process capability is known and approved by GKN Aerospace Services – STL through Chem-tronics, prior to application, provided it assures fulfillment of purchase order requirements.

QR # QC5007 – Compliance with Engineering Requirements (Boeing F-22)
New - 10/11/02
Full compliance to the engineering requirements shown on the purchase order and drawing is mandatory. Material review board acceptance or repair of any drawing feature or referenced specification is not permitted.

QR # QC5008 – Subject to Chem-tronics Source Inspection (F-22)
New- 10/11/02
This order is subject to Chem-tronics source inspection. Chem-tronics' quality control must be notified forty-eight (48) hours in advance of the time the articles or processes are ready for inspection or test.

QR # QC5009 – Supplier Certificate of Conformance Requirements (Boeing F-22)
New - 10/11/02
A certificate of conformance shall be submitted with each shipment of items covered by this order. The C of C shall state that all material, processes, and dimensions meet the applicable drawings, specifications, or operation sheets cited in the purchase order. The C of C must reflect the revision level of all drawings and/or specifications referenced by the purchase order. If work is performed per operation sheet requirements, only the applicable operation sheet and revision level is required to be listed. A responsible representative must sign the C of C. Certification must include a statement that the material has not been subjected to any processes which may have chemically or metallurgically altered the material, except as allowed by purchase order, specification, or drawing.

QR # QC5100 – Nonconforming Material Control (Northrop Grumman)
New - 08/26/04
Revised – 12/04/08
When invoked, this Quality Requirement supersedes Quality Requirement # QC2081A. Nonconforming material must be identified, documented, evaluated, segregated, and dispositioned to prevent its unintended release or use. The supplier's disposition authority of nonconformances is limited to rework to specification, return to supplier and scrap. These terms are defined as follows:

1. ***Rework*** - Restore material to specification compliance in accordance with required process(s) and addressed by governing process specification(s). Parts subject to

subsequent processing not authorized by specification shall be submitted to GKN for disposition. Specific rework instructions shall be provided with rework dispositions.

2. ***Return To Supplier*** - Return of subcontractor product found to be discrepant for subsequent rework or replacement.
3. ***Scrap*** - Permanent removal from production and destruction of product found to be unfit for use. Scrapped product shall be controlled until destroyed.
4. ***MRB*** - If product cannot be dispositioned as listed above, it shall be submitted to GKN Aerospace – St. Louis for Material Review Board (MRB) action using Form MI 7.4-16(b) – Supplier Nonconformance Record. Any nonconformance-related attachments should be enclosed on Form MI 8.1-11 (e) or Form MI 8.1-11 (f) and submitted along with MI 7.4-16(b). The GKN Buyer will assign a GKN External Nonconformance Number and provide it to the supplier to revise Forms MI 7.4-16(b), MI 8.1-11 (e) or MI 8.1-11 (f) and to include on Form MI 8.1-3(d) – Deviated Supplied Parts Cover Sheet. If GKN elects to bring the nonconforming part in, the supplier shall complete MI 8.1-3(d) and submit it to GKN along with the nonconforming part, the completed MI 7.4-16(b) and the GKN External Nonconformance document. In addition, all supplier Certificates of Conformance shall note the GKN External Nonconformance Number. NOTE: The supplier is not authorized to ship the product to GKN unless explicit written direction has been provided by the GKN Buyer.

The supplier shall retrieve the latest revisions of the documents above from their GKN Buyer or from the public library of the GKN Virtual Community website at https://gkn.talisentech.com/.

QR # QC5101 – Quality Record Retention (Northrop Grumman)
New - 08/26/04
When invoked, this Quality Requirement supersedes Quality Requirements #QC2011. The supplier shall maintain quality records in accordance with the applicable quality system standard (i.e. – ISO 9001, AS/EN9100). The records shall be retained for a period of not less than ten (10) years from completion of purchase order (unless otherwise stated below). The supplier must impose this requirement on their sub-tiers.
Records shall include, but are not limited to:

- Evidence of inspection to assure adherence to applicable drawings or specifications and revisions
- First Article Inspection Report – The FAI shall be retained as a quality record for a minimum of three (3) years from completion of the last purchase order for that part number with the same revision level.
- Test reports
- Periodic inspection and control of inspection media
- Records to indicate control of special tooling and special test equipment
- Test data records of all qualification and acceptance test performed
- Certification of personnel as required by specification and/or contract
- Raw material and process certifications
- Material review reports

QR # QC5102 – Shipping Documentation Requirements (Northrop Grumman)
New - 08/26/04
The supplier shall maintain quality records in accordance with the applicable quality system.

1) ***Packing Slips -*** Supplier shall provide a packing sheet or attachments for each separate shipment with the following minimum requirements:
   a) Supplier's company name and address.
   b) Purchase order number, line item(s) and part numbers.
   c) GKN dispositioned nonconformance document number(s), as applicable.
   d) Interchangeable and Replaceable (I&R) designated control numbers.
   e) Required parts traceability forms, as applicable.
   f) Evidence of GKN source acceptance if purchase order required GKN source surveillance.
2) **Certificate of Conformance -** Supplier shall comply with GKN Quality Requirement #QC2040 – "Certificates of Conformance". All fabricated aluminum parts require 100% conductivity inspection. Use the AMS2658 Heat Treat Specification to determine the required conductivity range. The AMS2658 document is available from SAE International. http://www.sae.org When a supplier is contracted to build and deliver a given part number to a specific engineering revision level, an engineering document that is either equal to or later in revision level is an acceptable means of performing product acceptance. A later revision of an engineering drawing includes incorporation of revisions that would have been issued as addendums (Engineering Orders, Engineering Change Notices, etc) to the prior level change and are thereby incorporated in the later revision. Unless otherwise specified, the supplier shall work to the latest revision military process specifications referenced in the purchase order or the engineering documents.
3) **Suppliers of Age-Sensitive Materials -** Provide original manufacturing/cure date, lot number(s), expiration date or length of shelf life (if indefinite, so state). In addition, forward any special storage/handling instructions. Supplier is responsible to determine if acceptance test report submittal is required in accordance with applicable material specification. The supplier shall physically identify the shelf life expiration date on the deliverable product or the unit packaging according to the applicable standard. Elastomeric material with "No Shelf Life" requirement or "Unlimited Shelf Life" shall be marked as such
4) **Tooling – Suppliers of Special Tooling or Special Test Equipment -** In addition to sections "A & B" above, record the tool number, tool symbol, tool serial number (including the multiple number, as applicable), and assure a Northrop Grumman source surveillance stamp has been applied (see QR# QC5108 for additional tooling-related requirements).
5) **Rework/Repair/Replacement/Modified Items -** Supplier's Certification of Conformance and/or packing sheet document shall reflect the following requirements for rework, replacement, repair, modification, items returned to supplier, or work performed by supplier on-site at GKN's facility.
   a) The item(s) have been reworked, repaired, replaced, or modified (as applicable), in accordance with respective nonconformance documents or purchase order.
   b) The item(s) meet the requirements of the engineering document(s).
   c) The original configuration and qualification status of the item(s) remains in effect (as applicable).
   d) All applicable nonconformance document numbers or other references to insure traceability.
   e) **Note**: Discrepant material **shall not** be shipped to GKN or GKN's customer without prior written approval from GKN Procurement and Material Review Board (MRB) Engineering.
6) **Qualification Certification -** When the drawing, procurement specification and/or purchase order requires deliverable items to be "Qualified", suppliers shall certify that materials, parts, assemblies and/or related contract "Data Items" have been approved and all components of a deliverable item have been inspected and/or tested to applicable Acceptance Test

Procedures (ATP) and/or specification/control drawings (GKN, Northrop Grumman, and supplier originated). In addition, to sections “A and B” above, certification shall indicate revision level of engineering drawings, specifications, and applicable design/specification changes as stated in purchase order. Only authorized GKN Engineering and Procurement written consent shall allow end items to be delivered prior to completion of qualification testing.

7) **Material Certifications -** Supplier shall maintain a copy of all supplier procured raw material certifications, which must be readily retrievable and shall include material specification, description, alloy and condition. The supplier shall maintain the mill certification for procured metallic material that shall include physical properties, chemical analysis and lot number(s). Metallic raw material distributors (ref: SQAR Code “A”) shall include a copy of the original mill’s certification with the shipment of deliverable material. Supplier’s material and sub-tier supplier certifications and test results shall be made available upon request.

8) **Process Certifications -** Supplier shall obtain and furnish process certifications for all subcontracted processes with each shipment to GKN. Certifications shall state that parts have been processed/tested in accordance with Northrop Grumman Corporation, Military Aircraft Systems Division (NGMASD) approved procedures. This includes sub-tier supplier process certifications. Attach one (1) copy of the process certifications to the material involved and one copy to the shipping document(s) with each shipment. Process certification(s) shall identify the processor, part number, purchase order number, process specification number, identification of process method used, acceptance criteria document and the applicable quality control standard (CQS). Certifications must contain the document revisions. Additionally, suppliers shall maintain copies of all subcontracted special processes. Supplier shall also obtain and maintain sub-tier supplier process certifications. Supplier’s process and sub-tier supplier processor certifications and test results shall be made available upon request.

9) **Distributors of Standard Parts/Hardware -** Standard and purchase parts distributors shall comply with the requirements of Northrop Grumman’s Quality Assurance Test Procedure (QATP). Suppliers may obtain this document from the Northrop Grumman Oasis website or they may request a copy from their GKN buyer. https://oasis.northgrum.com/

QR # QC5103 – Nondestructive Test (NDT) Submittal Requirements (Northrop Grumman) New - 08/26/04

Supplier shall review the purchase order and associated drawings/drawing notes and related documents to determine if NDT is required. Submittal of NDT general procedures and part-specific techniques to GKN is required prior to production testing. Guidelines for the minimum content of general procedures/techniques are provided in the respective NDT process specification. After initial approval, any changes to subject documents must be resubmitted to GKN for approval. An EO change to a specification does not require resubmittal. A specification revision change does require submittal of a revised procedure/technique or letter of compliance. Suppliers using outside sources for NDT shall ensure that the selected NDT sub-tier has GKN & Northrop Grumman approval for the NDT procedure/technique used. An Approved Nondestructive Testing procedure/technique list is available on the Northrop Grumman Oasis website under Approved Processors. https://oasis.northgrum.com/

NDT technique shall be submitted to GKN in accordance with applicable specifications. In addition, suppliers will include with each shipment a certificate that lists the NDT performed. A record of the procedures or techniques used and actual results will remain on file for at least 10

years after shipment to GKN and will be furnished to GKN upon request. These records must include the inspector's signature or stamp and their NDT Certification Level.

QR # QC5104 – Control and Use of Digital Datasets (Northrop Grumman)
New - 08/26/04
When digital datasets are required to manufacture product, the supplier shall comply with the "SQAR Supplement for the Use and Control of Digital Datasets" located in the Quality Requirements section of the Northrop Grumman Oasis website. https://oasis.northgrum.com/

QR # QC5105 – Supplier Sub-tier Control (Northrop Grumman)
New - 08/26/04
Supplier is responsible for ensuring all items procured from its subcontractors conform to all requirements of the GKN purchase order. Supplier shall ensure all applicable provisions of this document are flowed down to its subcontractors. The sub-tier Supplier Quality system shall be compliant to either ISO9001: 2000 or AS/EN9100A, except FAA Repair Stations. All sub-tier suppliers are also required to utilize AS9102 for their first article inspection (See Quality Requirement #QC2098 – First Article Inspection (AS9102).

QR # QC5106 – Northrop Grumman Special Process Requirements
New - 08/26/04
When special processes listed in the Northrop Grumman "Approved Special Processors List" (ASPL), are required by drawing, specification, or purchase order, the supplier shall ensure that the processing source performing the work, including the supplier, is listed on the ASPL for that process prior to processing each batch of hardware. Special Processors are required to be accredited by the National Aerospace and Defense Contractors Accreditation Program (NADCAP). A processor's approval will be determined based on the Northrop Grumman review of the latest NADCAP audit report for those processors with valid NADCAP approvals. For processors without a valid NADCAP approval, the affected processors are encouraged to get the NADCAP accreditation as soon as possible. Northrop Grumman has subscribed to NADCAP for the following process categories with a full transition to NADCAP by August 2003:

- Nondestructive Testing
- Heat Treating
- Material Testing Laboratories
- Chemical Processes
- Coatings
- Welding

When the Processor requires the use of outside sources for salt spray, tensile testing and solution analysis, NADCAP accredited laboratories shall be used as of June 2004. The NADCAP approved Materials Test Laboratory list can be found on the PRI web site: http://www.pri.sae.org/ under Qualified Manufacturer List (QML) or eAuditnet. Northrop Grumman reserves the right to validate NADCAP compliances to any processes that are unique to Northrop Grumman or outside the scope of normal industry practice and/or NADCAP general audit practice. This requirement also applies to the first-tier suppliers with internal process capabilities. In addition, if the supplier utilizes any external special process sources, this requirement must be flowed down to the processing sources as soon as possible so as to avoid any problem during the transition in September 2003. All costs associated with NADCAP accreditation are to be borne by the processor.

The Performance Review Institute (PRI), a nonprofit affiliate of the Society of Automotive Engineers (SAE), must perform NADCAP accreditation audits. Any detail information regarding NADCAP accreditation process including the audit schedule can be obtained from PRI at (724) 772-1616 or from the PRI Website: http://www.pri.sae.org/

When processes listed in another prime aerospace company's Approved Processor List, (i.e., Boeing D1-4426, Lockheed Martin QCS-001, etc.), are required by drawing, another specification, or purchase order, the supplier shall ensure that the processing source for these processes, including those performed in house by the supplier, are approved prior to any processing of hardware.

The ASPL, D1-4426 and QCS-001 are available on OASIS: https://oasis.northgrum.com/

The processor may use a later revision of a process specification shown on OASIS, provided the following requirements are met:

1) There are no Northrop Grumman-initiated engineering orders associated with the process specification that the author of the specification has not incorporated in the latest revision.
2) There is no cost or schedule impact to deliverable hardware under contract. If an impact does exist as a result of using a later process specification revision than that shown on OASIS, the supplier shall contact the buyer for disposition instructions.

Note: Suppliers with Design authority may approve their own sub tier process source(s) to their process specifications. This authority does not extend to other Prime's process specifications, such as Boeing or Lockheed Martin. However, they are encouraged to subscribe to NADCAP by August 2003. Subcontracted processes of components of Supplier design must be performed by supplier-approved facilities whose capabilities and performance are supported by objective evidence of control such as: surveys and/or test results. A listing of all facilities being used must be available for review by Northrop Grumman which reserves the right of disapproval of those facilities not considered satisfactory. The suppliers shall not substitute their own process specification for the Northrop Grumman or customer process specification without prior written approval from Northrop Grumman Engineering.

The ASPL is organized by process type rather than by process specification. This listing of the ASPL indicates a Northrop Grumman approval of processor's capability to perform the process as required by the process specification.

Listing in the ASPL does not assure or imply that the work performed by the ASPL processor is acceptable, nor does it compel the listed processor to accept the work. It is the responsibility of the Supplier and/or the processor to review, perform, inspect and certify the processes specification as required by the purchase order. Since many specifications call out multiple alloys, grades, types, classifications and conditions for materials, it is also the supplier and/or the processor's responsibility to assure that you are approved for and capable of performing requested processing prior to any actual processing. Any departure from specification requirement requires the prior written approval of the Northrop Grumman engineering group responsible for the specification.

The ASPL processors tier shall also comply with the Northrop Grumman Program unique requirements such as submission of test coupon, written approval of the processor's detail procedure, use of specific chemicals and/or concentration, and witnessing of first part processing and etc., when required by the process specification.

QR # QC5107 – Manufacturing Plan Submittals for Critical and Designated Parts (Northrop Grumman)
New - 08/26/04

Parts designated or described as Fracture Critical, Fracture Critical Traceable, Fatigue Critical, Durability Critical, Maintenance Critical, or F-35 Critical Parts requiring traceability by engineering drawings, specifications or purchase order configuration, require submittal of the manufacturing plan to GKN at least forty five (45) days prior to start of production. The manufacturing plan shall contain sequential fabrication, processing, processor name, and inspection steps, in the order required by the applicable process specification(s) and/or engineering drawing(s). Upon approval of supplier's manufacturing plan, the supplier shall control all manufacturing, processing, testing and inspections as stated in the approved plan. No deviations, including the selection of supplier's sub-tier suppliers/processors, is permitted without GKN prior knowledge and written authorization. Manufacturing of product is not permitted until supplier has received GKN approvals.

QR # QC5108 – Tooling Requirements (Northrop Grumman)
New - 08/26/04
The Northrop Grumman Supplier Tooling Manual delineates requirements for suppliers who have purchase orders that require manufacture, rework or use of Special Tooling (ST) and Special Test Equipment (STE). These requirements are applicable to all Northrop Grumman ST and STE fabricated and/or used in the manufacture of deliverable end items, unless specifically stated otherwise on the purchase order. Suppliers shall flow down requirements identified in these manuals to their sub-tier suppliers that fabricate or design tooling on their behalf.
The Northrop Grumman Supplier Tooling Manual can be accessed on the Northrop Grumman Oasis website. https://oasis.northgrum.com/
Copies of other manuals/documents can be obtained by contacting the buyer.
At a minimum, Special Tooling (supplier manufactured or Northrop Grumman furnished) used as a media of inspection must be delineated in the supplier's manufacturing plan at the applicable operation/sequence where the inspection occurs. Inspection media tooling must be controlled as part of the supplier's "Periodic or Calibration" system prior to use in production. Periodic tool inspection detailed requirements are covered in the Northrop Grumman Supplier Tooling Manual.

QR # QC6000 – HTF7000-Specific Quality Requirements
New - 4/18/03
Revised – 11/28/12
Refer to the latest revision of Honeywell Special Purchase Order Conditions on the GKN Talisen website: https://gkn.talisentech.com.

It is the responsibility of the GKN Supplier to ensure that all items procured from subcontractors conform to all requirements of the GKN purchase order. The Supplier shall ensure all applicable provisions of this document are flowed down to its subcontractors.

1) Special Process Approvals

Some GKN parts require special processing per GKN process specifications (WAPS/WAMS) as required by the applicable drawing. A list of approved suppliers is available for review on the GKN Talisen website. Approvals are valid for the period listed and must be re-approved by GKN. It is the responsibility of the GKN Supplier and at the Supplier's sole cost to ensure that all suppliers processing parts in accordance with WAPS and WAMS specifications are certified by

GKN and maintain that certification. GKN Suppliers and their sub-tier suppliers may be required to submit objective evidence, offer technical advisement, implement process changes, and permit on-site audits in order to gain process approval. WAPS and WAMS approvals must be renewed prior to expiration (typically every three years).

GKN HTF7000 Program Quality Management should be contacted for any questions regarding this requirement.

2) Shelf Life Limited Items

GKN Supplier must maintain a documented system for the identification and control of limited shelf life compounds (i.e. sealants, adhesives, paints) and components (o-rings, grommets, etc.) so that items with expired shelf life are not used in the manufacture of GKN product.

GKN Supplier must not ship limited shelf life components (o-rings, grommets, etc.) to GKN that have expired or have less than 1 year remaining shelf life unless otherwise specified by the purchase order.

3) First Article Inspection QC2098 with the following exceptions:
First article inspections shall be carried out in accordance with AS9100. AS9102 forms must be used for FAI submittal; Supplier equivalent forms are not acceptable. Full FAI submittal is required every 3 years unless otherwise specified on Purchase Order.

4) Part Identification
Supplier shall identify part per the blueprint / drawing including all specified information (e.g. part number, serial number, lot number, inspection stamp, etc.), marking method and location. For parts on concession / production permit, an additional identification number may be required.

5) Quality Records
All Quality records shall be subject to the following retention requirements:

- Radiographic film – 11 years
- Non-traceable, non-serialized parts – 11 years
- Traceable parts as identified on drawing or PO – Indefinitely
- Serialized parts as identified on drawing or PO – Indefinitely
- Critical parts as identified on drawing – Indefinitely
- Distributor standard off the shelf product – 7 years

6) Characteristic Accountability
Suppliers shall have a verifiable methodology for controlling and recording inspection of all design characteristics, as well as a method of validating received components from sub-tiers. A Detailed Inspection Plan (DIP) must document the inspection plan for a part to ensure that all engineering drawing characteristics and notes are inspected and/or controlled by appropriate methods. DIPs shall be documented in a manner that is consistent with the intent of the AS9102 Form 3.
A DIP may be used as a record, or may reference supporting records such as routings, receiving or in-process inspection sheets, final test /inspection records, or statistical data as long as the DIP and/or supporting records is complete, accurate, and reproducible. The DIP shall define the

manufacturing operation at which the characteristic is inspected and the inspection method used, including the type of tooling/gauging instrumentation used. Characteristics that are subject to change after in-process acceptance (e.g. growth, shrinkage, and/or distortion) must be re-inspected prior to final acceptance.
DIPs which contain characteristics which are “tool controlled” (castings, molded parts, etc) may contain less than 100% of the drawing characteristics provided that the following conditions are met:

A number of characteristics shall be selected as “control” dimensions. Control dimensions shall be of quantity and type such that inspection of these characteristics will give the supplier enough information (based on tool construction, assembly, process variation, and drawing tolerance) to assure that all other drawing characteristics are in conformance.
The supplier shall maintain a plan which clearly documents the proposed control dimensions for all design characteristics.
DIPs are not applicable to Standard, Commercial and Catalog hardware identified as Industry / Commercially available hardware AN, MS or AS and other lower level hardware or details.
A copy of the part specific DIP must be made available upon request.
Sampling plans can be used but they must meet the requirements of Honeywell SPOC 128-Sampling Plan and must be approved for use by GKN HTF7000 Program Quality Management.

7) Certificate of Conformance
The supplier is responsible for maintaining and supplying accurate and legible certification documentation as objective evidence of meeting drawing, specification, technical data, or purchase order requirements. A Certificate of Conformance (C of C) shall be provided with each shipment. The C of C can be a separate document, or it can be included as part of the shipping declaration / packing slip text. The following items shall be included on each C of C:

- Supplier Name and Address
- Statement of conformity
- PO and line item number
- Original Manufacturer’ name and part number
- Part number and as applicable, part revision
- Quantity shipped (listed quantities to be broken out by lot, and also totaled)
- Date and authorized signature of quality representative or company official
- Manufacturing Country of Origin
- Lot numbers, serial numbers, date code (as required by drawing or technical data)
- Nonconformance MRB / concession number (if applicable)
- Date of shipment
- For returned parts, the supplier shall indicate if parts are reworked or replacements on the C of C

Additionally, shelf life limited items shall also have the following information stated on the C of C:

- Environmental storage conditions
- Date of manufacture and/or cure date (month/year or quarter/year)
- Shelf life expiration (MM/YY) If there is not Expiration Date or Shelf Life required, indicate as such (examples include “None”, “No Expiration Date”, etc.)

Parts that have been reworked at the supplier after being returned for a nonconformance must have a new C of C created that makes reference to the GKN nonconformance document.

8) Certification Package Requirements

The following items, when applicable to the drawing, specifications, technical data or purchase order shall be maintained and made available by the supplier unless otherwise specified on the purchase order to submit with shipment:

- Fixed process certification
- Device test traveler and assembly record cards
- Material certifications
- Controlled / Special process certification
- Test Reports or Functional Test Data sheets
- FAIR package
- Manufacturer's C of C
- Concession / Waiver / Production permit number
- Required and actual hardness values
- Physical and chemical analysis certified by an independent laboratory, if applicable

9) Foreign Object Damage (FOD) Control

The supplier shall ensure that Foreign Objects and subsequent Foreign Object Damage (FOD) is eliminated from all parts prior to shipment. All suppliers must maintain a FOD free environment during machining, manufacturing, assembly, maintenance, inspection, storage, packaging and shipping.

- Potential FOD includes but is not limited to burrs, chips, dirt, corrosion and contamination resulting from manufacturing, assembly, maintenance, processing, cleaning, storage and subsequent packaging of parts
- Suppliers must ensure all passageways – cast and/or machined are clear of chips, core material, dirt, breakout of cast walls, etc.
- Prior to closing inaccessible or obscured areas and compartments during assembly, supplier shall insure the areas are free from FOD.
- Suppliers must ensure all parts are clear and FOD free prior to shipment.
- Suppliers are required to maintain a FOD prevention program, which includes prevention and elimination of FOD from the manufacturing processes and work area.

Specific attention should be given, where applicable, to items such as:

- Housekeeping and cleanliness
- Food and beverage control
- Tool and small part accountability
- Loose objects
- Material handling and parts protection
- External cleaning following evidence of external contamination

Supplier shall ensure that the responsibility for the FOD prevention program is clearly defined and appropriate personnel have received FOD awareness training.

Suppliers are responsible for flow down of these requirements to their sub-tier suppliers to ensure FOD free products.

10) Containment of Non-conforming Material

When a nonconformance is discovered at the Supplier, or the Supplier is notified of a discrepancy, the Supplier must take immediate action to determine if the condition exists on any other work-in-process, in Stores at the Supplier's facility, or in prior shipments. Containment action must be taken and documented prior to the next shipment of the part number involved. Nonconforming Product Documentation - QC2081A with the following additions/exceptions Supplier shall notify and submit required documentation to HTF7000 program quality for review. The resulting disposition may require the Supplier to control the product using a traceable identification number that should be applied in addition to the original part marking. If rework/repair is dispositioned to be performed at the Supplier, the concession / production permit form must be stamped, dated, and returned, when complete, to program quality.
In order to produce items that do not meet all the technical requirements of the drawing the Supplier should contact program quality so that a Production Permit detailing the deviation can be submitted to engineering for evaluation. All approved Production Permits will be issued with a tracking sheet that must be provided with each shipment of parts as evidence of applicability

11) Post-Delivery Notification
The supplier shall provide prompt, written notification on supplier letterhead to both the GKN Buyer and Program Quality Manager if nonconforming product or process escapes are identified after shipment to GKN has taken place. The notification shall include part numbers, traceability (lot, serial, and manufacturer numbers), ship dates, quantities, and a description of the nonconformance. This applies to any nonconformance that departs from drawing, specifications, aftermarket maintenance technical data, or PO requirements

12) Prohibited Materials – Ozone Depleting Substance
Class 1 Ozone Depleting Substances (ODS) shall not be used in the design, test, manufacture, integration and assembly, handling, transportation, operations, maintenance or disposal of the hardware / components delivered to this order.

QC6500 – Work Related to Pratt and Whitney Purchase Order
New – 2/13/07

Work to be accomplished in performance of this purchase order is directly related to a Pratt and Whitney purchase order and must be accomplished in accordance with processes specified on this purchase order and Pratt and Whitney specification PWQA 6088 (latest revision). Further information can be found at http://www2.pratt-whitney.com/procurement/tphome.htm.

QC7000 – Work Related to United Technologies Corporation Purchase Order
New – 2/13/07
Work to be accomplished in performance of this purchase order is directly related to a United Technologies Corporation (UTC) member company. All work must be accomplished in accordance with processes specified on this purchase order and UTC specification ASQR-01 (latest revision). Further information can be found at http://www2.pratt-whitney.com/procurement/tphome.htm.

QC7010 - Calibration Quality Requirements
New – 05/30/08
Seller-Calibration Vendor

Buyer-GKN Aerospace
General calibration quality requirements-

Calibration authorities shall be ISO 17025 accredited.

Calibration services provided shall be certified in accordance with AS9100, ISO 10012, ISO 17025, and/or ANSI Z540 where applicable.

Written documentation including the calibration procedure and all calibration data must be provided at the time of certification and maintained by the seller for a period of 3 years.

Written documentation, including the stickers applied to the gage or its enclosure, must comply with ISO 10012, ISO 17025, or ANSI Z540.

All measurements and standards must be NIST traceable.

The seller shall provide qualified personnel and equipment to conduct calibration.

If required, the seller may be subject to process audits by the buyer. Auditors may include buyer's customer personnel.

Out of tolerance conditions- Equipment failing calibration criteria in the as found or as calibrated condition shall be documented by the seller as failing as found or as calibrated condition calibration.

QC7020 – Wire Spool Identification Requirements
New – 06/05/08

Wire purchased for use in chemical processing areas will be clearly identified with material type and alloy. Each individual wire spool shall contain a material identification label with the following information:
Manufacturer
Part number
Material type / alloy
Purchase Order number

QC7030 – GKN Sub-Tier Supplier Material Traceability Requirements
New – 07/11/08

All suppliers of parts produced from raw material purchased by the supplier or sub tier shall comply with traceability requirements consistent with AS-9100. At a minimum, supplier must be able to trace material heat lot, and where the raw material is serialized, (such as forgings, castings, flight safety, etc.). Part serialization traceability shall also be maintained. This information shall be traceable from the product identification backwards through the supplier's manufacturing documentation, to its originating manufacturer, to include supplier's sub-tier supplier(s) if applicable.

QC7040 – Control of Records (Sikorsky)
New – 08/08/08

(1) Electronic imaging/microfilming of records in lieu of storing actual inspection records is permissible. All electronic records must be controlled, retained, and retrievable per the same requirements identified for hard copy records. For electronic records that are transferred from computer files, the storage media must be capable of maintaining the data integrity for the full retention period.
Examples of Quality Records to be retained are, but not limited to:

- Deliverable and nondeliverable software verification & validation

- First article inspection reports
- In process / final inspection & test records
- Training records
- Manufacturing / fabrication records (e.g., planning sheets, routers, etc.,)
- Nonconforming material disposition
- Procurement documents (supplier placed orders)
- Process control records (used as acceptance criteria)
- Radiographs, technique sheets and related acceptance reports
- Receiving inspection Records (e.g., test reports and material certifications, etc.,)

(2) Retain Quality Management System (QMS) records as identified per AS9100. The following identified quality records shall be maintained for the minimum retention periods specified below.

- 40 years from time of manufacture for:
  Flight safety, Space Shuttle fuel cells, critical / major rotor parts (i.e., turbine and compressor disks, hubs, shafts, free turbine couplings and turbine disk side plates), serialized major engine (cast / fabricated) cases (i.e., inlet, fan, compressor, intermediate, diffuser, combustion, turbine and exhaust cases) and main shaft bearing supports, which are not integral to a major case.
- 30 years for Manned Space Program Hardware
- 10 years for all other parts except off-the-shelf industry standard parts.
- 4 years for off-the-shelf / industry standard parts (e.g., AN, AS, MS, JAN, etc.).

(3) Radiographs: The Supplier shall retain radiographs.

- 40 Years for:

Flight safety, Critical / major rotor parts (i.e., turbine and compressor disks, hubs, shafts, free turbine couplings and turbine disk side plates), Space Shuttle fuel cells as well as serialized major engine (cast / fabricated) cases, (i.e., inlet fan, compressor, intermediate, diffuser, combustion, turbine and exhaust cases), and main shaft bearing supports which are not integral to a major case and engine components traceable by Engineering Drawing / Quality Assurance Data required serial numbers.

- 10 Years for:

Castings or parts where the purchase order, engineering drawing or specifications require serial number traceability. Castings or parts where the purchase order, engineering drawing or specifications do not require serial number traceability, shall be retained only if no other inspection record is retained that documents completion and final acceptance of radiographic inspection.

- 5 Years for:

Military hardware – turbine airfoil (blades) casting radiographs for initial casting quality. Military hardware – Radiographs of airfoils for the presence of foreign material need not be retained provided an inspection record is retained that documents completion and final acceptance of radiographic inspection.

QC7050 – Approved Source List and Standard Parts Index (Sikorsky)
New – 08/08/08
Revised - 10/02/09

Supplier / Sub-Tier Supplier must only use approved sub-tier suppliers listed in the latest version of the Sikorsky Aircraft Approved Source List (ASL) for Special Processes and Laboratories.

Flight Safety Parts: Supplier / Sub-Tier Supplier must only use approved sub-tier suppliers listed in the latest version of the Sikorsky Aircraft SS9211 Flight Safety Parts Source Approval, Quality and Test Requirements.

Supplier / Sub-Tier Supplier must only use approved purchased Common-Off-The-Shelf-Items (COTSI) listed in the latest version of Sikorsky Aircraft Standard Parts Index.

QC7060 - Supplier Nonconformance (Sikorsky)
New – 08/08/08
Revised - 10/02/09
Supplier requiring Material Review Board (MRB) disposition actions for nonconforming material must submit the Supplier / Sub-Tier Supplier nonconformance to the Sikorsky Aircraft Material Review Board per the requirements of ASQR-01 Supporting Documentation – Main Text, Appendix A, Nonconforming Material Procedure.

QC7070 – Aerospace Supplier Quality Requirements (Sikorsky)
New – 08/08/08
Revised - 10/02/09
Supplier of Sikorsky Aircraft product must follow the requirements as outlined in the current revisions of the Sikorsky Aircraft Aerospace Supplier Quality Requirements of all relevant ASQR documents listed herein:

ASQR-01	Supplier Quality System Requirements – Common
ASQR-01	Unique Requirements
ASQR-01	Unique Requirements: Table of Contents
ASQR-01	Supporting Documentation – Main Text
	Appendix A Nonconforming Material Procedure
	Appendix B Gaging Methods & Geometrical Dimensioning and Tolerancing
Appendix C	Sikorsky Delegated Quality Representative (DQR) Operating Procedure
ASQR-01	General Supplier Information on “Doing Business With Sikorsky Aircraft”
ASQR-07.5	Control of Software
ASQR-09.1	Flight Safety Parts Program
ASQR-15.1	Handling, Storage, Packaging, Preservation and Delivery
ASQR-20.1	Supplier Sampling Requirements

SS7777 — Sikorsky Aircraft Material and Process Specification Index provides all revision levels, deviations, and amendments for all specifications related to the procurement of this PO line item. SS7777 can be found on the GKN Talisen portal. Each material and process specification and revision level must be included on all applicable documents, including certificate of conformance.

QC7080 – AS9102 First Article Inspection and Inspection Check Lists (Sikorsky)
New – 10/02/09
First Article Inspection:
Supplier / Sub-Tier Supplier of Sikorsky Aircraft product must perform, retain records thereof and submit to GKN Aerospace, completed AS9102 First Article Inspection Reports for all initial

representative first articles of production product. Only Sikorsky Aircraft approved AS9102 First Article Inspection Reports, forms one (1), two (2) and three (3) shall be used in-accordance-with the following documents:

AS9102 First Article Inspection
GKN GKQP-008 Appendix E, First Article Build Plans & AS9102 First Article Inspections
GKN SAC CH53K Program Sub-Contract Supplier Instructions for Completing the SAC AS9102 Forms
The organization of the first article packets must be submitted in accordance with Q/PDS No. SH-094-001 with all the required material and process certifications as well as traceability from the material and process certifications back to the supplier / sub-tier supplier's own certificate of conformance.

Inspection Check Lists:
Supplier / Sub-Tier Supplier of Sikorsky Aircraft product must perform, retain records thereof and submit to GKN Aerospace completed AS9102 Inspection Check Lists for all subsequent production products. Only Sikorsky Aircraft approved AS9102 Inspection Check Lists (First Article Inspection Reports, forms two (2) and three (3)) shall be used in-accordance-with the following documents:

AS9102 First Article Inspection
GKN GKQP-008 Appendix E, First Article Build Plans & AS9102 First Article Inspections
GKN SAC CH53K Program Sub-Contract Supplier Instructions for Completing the SAC AS9102 Forms

QC7090 – Critical Parts Traceability and / or Serialization Requirements (Sikorsky)
New – 10/02/09
This part includes a requirement for inclusion of critical traceability and / or serialization data in-accordance-with SS9070, Serial Numbering and Trademark Identification of Details, Assemblies and Equipment.

QC7091 – GIDEP Program
New – 12/1/11
All suppliers are required to implement a GIDEP program within their facility. Government Industry Data Exchange Program (GIDEP) Weekly Summaries and Parts Lists will be reviewed thru GIDEP notification hyperlinks for Parts List, Delimited List, R&M Summary, Engineering Summary, Failure Summary, Suspect Counterfeit Material Summary, Metrology Summary and the Product Information Summary on a weekly basis. In the event a GIDEP notification indicates a supplied material may be affected, suppliers will check all stock for applicable dates and quarantine, if necessary, until resolution is found. Suppliers will also notify GKN of any applicable product.

QC8010 – Approved Processor Source List (Bell Helicopter)
New – 05/03/13

Supplier/Sub-Tier Supplier must only used approved sub-tier suppliers in the latest version of QPS 101 Section III BHT Approved Process Sources.

Listing on the Approved Processor List means that a processor has been found capable of performing the BHT process involved. It is both the supplier's and the processor's responsibility to impose BHT process requirements and to exercise adequate controls to assure compliance

QC8020 – Control of Records (Bell Helicopter)
New – 05/03/13

Records required by applicable specification and objective evidence of compliance with requirements, including records of inspection, tests, nonconforming material and corrective action, engineering change incorporation, supplier/processor surveys/approvals, and other Quality Assurance activities, shall be maintained and made available for review upon request. Unless otherwise specifies, records shall be maintained by the supplier/processor for a minimum of five (5) years after completion of the purchase order.

Manufacturing and all quality records for controlled records containing "significant" or "critical" characteristics per QPS 300 are to be maintained for 10 years from completion of applicable contract purchase order and be available for review.

QC8030 – First Article Inspection (Bell Helicopter)
New – 05/03/13

Supplier/Sub-Tier Supplier of Bell Helicopter Textron product must perform, retain records thereof and submit to GKN Aerospace, completed AS9102 First Article Inspection Reports for all initial representative first articles of production product. In addition to AS9102 requirements, a FAI is required for configuration changes and lapses of shipments greater than two (2) years in which case if a lapse in shipment occurs then a copy of the most recent F.A.I. will suffice.

Supplier FAI reports for BHT must comply with the format of AS9102, and to BHT additional requirements for Conditional Required fields within the FAI forms as follows:

- Technical Data Package – form 1, Field 5
- Part Physical Change – Form 1, Field 5
- Date of Manufacture - Form 1, Field 5
- Manufacture Lot Number (when no serial number) – Form 1, Field 9
- Drawing parts list revision level (in addition to drawing revision level) – Form 1, Field 7

QC8040 – Aerospace Supplier Quality Requirements
New – 05/03/13

Supplier of Bell Helicopter Textron product must follow the requirements as outlined in the current revisions of the Quality Procurement Specifications in addition to standard purchase order, special manufacturing, drawing and/or model and Bell process specification requirements.