

I. PURPOSE

This document establishes specifically tailored Supplier Product Assurance Requirements for vendors of products and services. The Section III General Requirements form a part of the order, without specific invocation, as a condition of order acceptance. The following Section IV Supplier Product Assurance Requirements clauses, when specifically referenced in the Order by number, form a part of the Order in addition to all other clauses, terms and conditions, drawings, specifications, and standards which are made a part of the Order. Unless otherwise specified, documents referenced herein shall be of the issue in effect on the date of quotation.

II. DEFINITIONS AND ABBREVIATIONS

A. Order means the purchase order, subcontract or other written agreement with Supplier (Seller) into which this form 3071 is incorporated by reference.

B. Buyer or SSL means Space Systems/Loral, Inc.

C. Supplier means the legal entity that contracts with Buyer under this Order.

D. Supplier Survey: An evaluation of a prospective Supplier's quality assurance capability to perform under the terms of a proposed Order; normally conducted prior to issuance of the order.

E. Firmware: The combination of hardware device and computer instructions or computer data that reside as read-only software on the hardware device. The software cannot be readily modified under program control, the definition also applies to read-only digital data that may be used by electronic devices other than digital computers.

E. Special Processes: Special processes are those yielding products which cannot adequately be evaluated for conformance to requirements through inspection or nondestructive testing. These include welding, plating, heat-treating, bonding, soldering, crimping, etc. Special processes are typically characterized by the existence of training for personnel certifications, destructive testing of samples and detailed procedures.

III. GENERAL REQUIREMENTS

Unless otherwise specified in the Order, the following general requirements apply:

A. PROHIBITED PRACTICES

1. Product Baseline Change Supplier shall not implement any change to the product baseline without prior notification to Buyer and approval by Buyer. Changes that require Buyer approval prior to implementation include, but are not limited to, changes made in response to Buyer requirements change, product corrective actions, materials obsolescence and product improvements.

This requirement does not apply to Qualified Products List (QPL) and Qualified Manufacturer's List (QML) products manufactured by an approved QPL source.

Product baseline is defined to include:

- i) Parts, including change of parts suppliers

- ii) Materials
- iii) Processes
- iv) Hardware and software design
- v) Suppliers used for special processes

This requirement shall be flowed to and implemented by Supplier's subtler suppliers and vendors. The product baseline is initially established as a result of the formal approval of the supplier's product CDR or other equivalent formal product approval by SSL. The product baseline may be updated as a result of product qualification or by other specific approval by SSL.

The continued adherence to the approved product baseline is subject to verification by SSL through the performance of First Article Inspections, ongoing in-process and final inspections, EIDPs and other data submittal approvals, physical/functional configuration audits, quality audits and/or special audits.

2. Prohibited Materials All hardware construction and finishes containing pure cadmium or pure zinc are prohibited. "Pure" shall be defined as >95% elemental metal. The use of mercury metal other than as a trace constituent is prohibited. In addition, all hardware construction and finishes containing pure tin are prohibited unless they contain a minimum of 5 weight percent alloying element (such as lead). Tin-lead solder alloys are acceptable including SN96PB4. This prohibition is all inclusive and includes, but is not limited to: platings, overcoatings, internal applications, external applications, and parts, materials or products purchased from sub-tier suppliers for use in supplier's products.

3. Unauthorized Submittal of Production Parts When the Order requires Buyer acceptance of a first article, Supplier shall not submit parts from a production run for Buyer inspection prior to Buyer's acceptance of such first article.

4. Unauthorized Repairs Supplier may not repair by welding, brazing, soldering or adhesives, parts damaged or found to be faulty during fabrication, nor repair defects in castings or forgings by any method, unless authorized by Buyer in writing.

5. Improper Resubmittal Articles rejected by Buyer and subsequently resubmitted to Buyer shall be clearly and properly identified as resubmitted articles on Supplier's shipping document and shall include both a statement that articles are replacement, repaired or reworked articles and the Buyer's rejection document identifier.

6. Notification of Facility Change Supplier shall not relocate any production, manufacturing and/or processing facilities during performance of the Order without promptly notifying Buyer and affording Buyer an opportunity to examine each facility for compliance to Quality Assurance requirements, including any necessary approvals.

B. RESPONSIBILITY FOR CONFORMANCE

1. Neither surveillance, inspection and/or tests made by the Buyer or Buyer's representatives at either Supplier's or Buyer's facility, nor Supplier's compliance to all applicable Product Assurance requirements, shall relieve Supplier of the responsibility to furnish items which conform to all the requirements of the Order.

2. Supplier shall initiate a discrepancy report for any departure from drawing, specifications or other Order requirements and shall adequately



SUPPLIER PRODUCT ASSURANCE REQUIREMENTS (SPAR)

describe such departures, including a complete description of the cause, containment and preventive action taken to preclude recurrence. The discrepancy report shall be submitted to Buyer, who will arrange for material review. A copy of the discrepancy report will be returned to Supplier, showing material review action taken. Supplier shall receive Buyer's Quality Assurance concurrence clearance prior to shipment of materials.

3. Supplier shall refer to the discrepancy report number on each shipping document that covers items on the discrepancy report. Items shipped on a discrepancy report must be segregated from other items to permit separate identification to be maintained.

4. SSL's focus with its strategic partners is in Total Quality Management (TQM). Today's culture requires Quality in all aspects of our product. Therefore, we at SSL are dedicated to continuous improvement in the areas of: Statistical Process Control (SPC) for analysis and improvement, training, and innovation of new technology. To achieve this objective, we seek suppliers of goods and services as partners. By working together we can increase our product quality and customer satisfaction. We solicit supplier feedback in these areas to help us improve our communication as to your needs.

C. DOCUMENTATION

Buyer may refuse to accept items delivered under the Order if Supplier fails to submit the certification, documentation, test data or reports specified in the Order. Documentation includes SSL source inspection records when such source inspection is performed.

D. CERTIFICATION OF COMPLIANCE AUDIT

Certification furnished under the terms of the Order shall be supported by test records and data and is subject to audit by Buyer.

E. CORRECTIVE ACTION REQUESTS

Buyer will request corrective action from Supplier when a quality problem exists. Supplier shall respond to such requests within 30 days and shall include the following information: analysis of the cause of the problem, statement of the action taken and the effectivity of the action. When corrective action is required for Government source inspected items, Supplier shall coordinate such action with the Government Quality Assurance Representative assigned to Suppliers plant.

F. RESTRICTED ACCESS TO FACILITIES

Supplier shall identify any item, material, component or process to be used in this Order by Supplier or by a sub-tier supplier, to which access by Buyer or Government representatives for the purpose of quality assurance by inspection, test or process surveillance is restricted. In performance of this requirement, Supplier shall not disclose proprietary information. Such identification shall be made in writing to Buyer along with Supplier's quotation or offer to Buyer. If the proposed restricted access involves a sub-tier supplier not known to Supplier prior to award of the Order, such written identification shall be made as soon as Supplier actively considers award to such sub-tier supplier. The written identification shall state generally the basis for such proposed restricted access (e.g., that the process involves proprietary information), and shall include a proposed method of quality control/inspection by Buyer or Government representatives that Supplier (or sub-tier supplier) considers acceptable. The absence of such written identification is a representation by Supplier that all items (including end items), materials, components and processes are subject to inspection/test and quality control surveillance at all places and at

reasonable times prior to acceptance. If such written notification is given, Supplier agrees to negotiate promptly and in good faith with Buyer for agreement on acceptable arrangements for such inspection/test and quality control surveillance.

G. PRODUCT SAFETY

Supplier shall plan, implement, and control the processes needed to assure product safety during the entire product life cycle. Risk evaluation and mitigation for the product shall include, but not limited to, the product during manufacturing, testing, storage, handling and transportation. The safety of the personnel, test equipment, fixture, and environment shall also be considered.

IV. SUPPLIER PRODUCT ASSURANCE REQUIREMENTS

The following Supplier Product Assurance Requirement (SPAR) clauses are a requirement of the Order when specified by number in the Order.

SPAR-1 SOURCE INSPECTION

The inspections and tests indicated by the following subparagraphs are subject to SSL Source Inspection when they are included as part of the purchase order. **Notify SSL Supplier Quality Assurance office 3 to 5 days prior to required inspection/test**, but only after Supplier's Quality Department has accepted all variable data. In addition, Buyer reserves the right to perform in-process inspection and/or audits at any time during the life of the purchase order.

If Supplier uses automated testing programs for final acceptance, verification of the programs by Buyers Quality Assurance Representative is required, though only prior to submission of first lot quantity or when changes or modifications are effected. Only the SSL certified copy of the automatic test program shall be used for Source inspection. The master copy of the approved SSL software must be validated and sealed by SSL Supplier Quality Assurance.

A. In-process **and** Final inspection or tests or both are required. Parts, assemblies, processes and tests are subject to detailed inspection by

Buyer's Quality Representative **prior to assembly, test and/or delivery**. Mandatory Inspection Points (MIP's) will be imposed by Buyer's Quality Representative when a manufacturing flow plan is not required by contract.

B. Final inspection, **end item data review** or both by Buyer's Quality Representative are required prior to delivery.

C. In-process inspection, test witness and/or data review or tests or both by Buyer's Quality Representative are required prior to delivery.

D. Upon Completion of testing, Supplier will submit certifications/test data to Buyer for Quality review and approval. Receipt of the signed/approved certifications at Supplier will be considered authorization to ship material.

NOTE: When SPAR 1A or 1C is imposed in the Order, Buyer shall identify Mandatory Inspection Points (MIPs) covering recommended inspections and/or tests of in-process workmanship (i.e. solder joints) and testing, before such work is made inaccessible by further manufacturing or assembly operations. **Failure to have defined MIPs, lack of agreement to MIPs, or bypassed MIPs shall be cause for rejection of completed end items.**



SUPPLIER PRODUCT ASSURANCE REQUIREMENTS (SPAR)

SPAR-2 SUPPLIER'S QUALITY CONTROL SYSTEM

Supplier shall maintain a quality system that complies, at a minimum, with the specification designated below. Supplier's system may be subject to audit by Buyer's Quality Representative. Waivers to quality system requirements are not valid unless obtained in writing from Buyer.

A. ISO 9001:2000(E) or AS9100

B. Other, specified as: _____

C. Supplier must be approved to perform required special processes or use special process suppliers acceptable to Buyer. All special processes require approval or certification of the process equipment. Certification by a representative of Supplier shall be included with each shipment. Certification shall indicate all special processes performed, applicable specification (including class, type, grade, etc., as applicable) and name of special processor(s).

SPAR-3 CHEMICAL AND PHYSICAL ANALYSIS

Supplier shall submit a test report with each lot of material shipped. In the case of a 'drop shipment' to other than Buyer's plant, a copy of the report shall also be submitted to Buyer together **with a copy of the packing slip**, at time of shipment.

SPAR-4 SUPPLIER'S EQUIPMENT CALIBRATION SYSTEM

Supplier shall maintain a calibration system that complies with ANSI/SCSL 2540-1-1994 or ESA-PSSA-01-20, Supplier's system shall be subject to audit by Buyer's Quality Representative. Waivers to calibration system requirements are not valid unless obtained in writing from Buyer.

SPAR-5 GOVERNMENT SOURCE INSPECTION (GSI)

A. (GSI) - Government inspection is required **prior to shipment** from your plant. Upon receipt of this Order, promptly notify the Government Representative who services your plant so that appropriate planning for Government inspection can be accomplished. If a Government Representative does not service your plant, contact the cognizant Defense Contract Administration Service District (DCASD) for direction. In the event the Government Representative or office cannot be located, contact Buyers Purchasing Department immediately. Evidence of GSI must accompany each shipment.

B. (NASA) - All work on this Order is subject to inspection and test by the Government at any time and place. Notify the Government Quality Representative who has been delegated NASA quality assurance functions on this procurement immediately upon receipt of this Order. Notify the Government Representative forty-eight (48) hours in advance of the time articles or materials are ready for inspection or test.

NOTE: If you do not have a Government Representative servicing your plant, notify your local DCMAO Regional Office. If the representative of the Government Inspection Office cannot be located, notify the Buyer immediately.

C. Supplier's Quality Control or Inspection System and manufacturing processes are subject to review, verification and analysis by authorized Government Representatives upon request.

SPAR-6 SERIALIZATION

No two parts having the same part and option number (under this Order or any other Order) are to be identified with the same serial number unless otherwise specified. Electronic and electrical piece parts may repeat serial numbers providing the serial numbers do not repeat within a date lot code. Supplier must maintain records identifying the serial numbers of serialized subassemblies contained in deliverable end items.

A. The serial numbers to be assigned by part number are included with this Order.

B. Supplier shall assign serial numbers to those parts, assemblies and end items required by this Order.

C. With each shipment, Supplier shall submit a legible copy listing all serialized parts and sub-assemblies by part number, within the serialized end item shipped.

SPAR-7 INSPECTION/TEST REPORTS

A. Supplier shall submit one copy of the detailed results of all necessary inspections to verify and document the item's compliance with Order requirements with each shipment.

B. Supplier shall complete the Buyer Repair History Record, Form 2521/D001 or equivalent, for all returned/repair items describing the extent of repair including any replacement of parts/materials and testing to restore the repaired item to operable condition (Depot Repair Only).

C. Supplier shall submit a written report of the corrective action taken to restore the repaired item to operable condition.

D. Supplier shall submit a written report of the corrective action taken to preclude recurrence of the problem/failure. Corrective action statement can be included in B or C above when applicable.

E. The minimum requirements are: part number, revision letter, nomenclature, Order number, lot number, lot quantity, inspection sample size, characteristics/parameter inspected and/or tested, inspection/test data.

1. Electrical measurements shall be defined within the Supplier's performance specification, Buyer's furnished specification or Acceptance Test Procedure or Government furnished specification controlled drawings per applicable paragraph.

2. A written inspection of all dimensions with a tolerance of -1-.005 must be provided with the applicable parts at time of shipment.

3. A written 100% inspection record of the AQL sample size/quantity is required.

F. Any Supplier non-conformance data, e.g., rework or scrap, shall be provided at the time of source inspection.

Note: in the case of a "drop shipment" to other than Buyer's plant, a copy of the report shall also be submitted to Buyer together with a copy of the packing slip, at time of shipment.



SUPPLIER PRODUCT ASSURANCE REQUIREMENTS (SPAR)

SPAR-8 FIRST ARTICLE TEST/INSPECTION

The first article shall be identified as such, including the Order number, part number and part name. Buyer acceptance of first article is required prior to the production run. Supplier is required to:

- A. Submit the first article for test/inspection at Supplier's facility.
- B. Submit the first article to Buyer's Receiving Inspection Department for test/inspection at Buyer's facility.
- C. Submit the first article to Buyer's Receiving Inspection Department together with documented results of Supplier's first article test/inspection, including actual dimension or value for each specified characteristic.

SPAR-9 AUTOMATED MANUFACTURING AND TEST EQUIPMENT SOFTWARE CONTROL

Supplier shall implement baseline change control and configuration management of all manufacturing or test software, numerical control programs, automated processing equipment script files, programmable controller files and the like. These controls shall also include change authorization and independent first article change verification.

SPAR-10 AGE CONTROL

Supplier shall have an effective system of age control for items whose acceptability is limited by the age of the item. The system must include a method to identify the age of such items and provide for the rotation of stock. Age control of rubber goods shall conform to the requirements of SAE-AS1933 (for hose applications) or SAE-ARP5316 (for seal applications), unless otherwise specified in the Order. Time lapse between date of certification and date of receipt by Buyer under the Order shall not exceed 10% of the shelf life of the material. Supplier shall show the cure or manufacture date, expiration date, lot or batch number and special storage and handling conditions applicable to the contents of materials having specified shelf life (both for Supplier's in-plant containers and container in which material is delivered to Buyer) on either a Certificate of Conformance or Certificate of Agreement. This information shall be in addition to the normal identification requirements of the name, part or code number, specification number, type, size, quantity, warning and handling. Supplier shall record special handling conditions on certifications and shipping documents covering the material as delivered to Buyer in addition to normal identification information.

SPAR-11 FOUNDRY CONTROL OF CAST PARTS

Foundry control castings are required when new tooling (patterns or molds) is made, when a change is made in gates, riser, chills, or as cast shape, or when a pattern is transferred to a different Supplier. Submit foundry control castings to Buyer for review and approval, as required below, prior to initiation or continuation of production. Foundry control castings are in addition to Order end item quantity requirements.

Casting Requirements - Castings shall meet all applicable drawing requirements. An inspection report listing actual measurements of all cast dimensions must be supplied with the first article of the initial order and/or when changes to the mold or processes are made. All castings shall not exceed applicable limitations of porosity, distortion, shifts, corrosion, and shall meet dimensional requirements. Repair shall not be made to defective items without prior approval from Buyer's Quality Assurance Department.

Review and approval of radiographic film of foundry control castings and test report by Buyer's Quality Representative is required at Suppliers radiographic department or agency. Provide applicable film and test reports with foundry control castings delivered to Buyer.

A. Deliver to Buyer a minimum of one foundry control casting, heat treated and straightened to the casting drawing requirements, for examination and approval by Buyer. Such casting(s) shall be representative of the foundry practices and processes to be used for the production castings.

B. Submit a certified statement of the test bar mechanical properties with each foundry control casting. The test bar(s) must be from the same melt and heat treat as the foundry control casting.

C. Submit a certified statement of chemical analysis of the material used in the foundry control casting showing the percentage of each element contained in the specimen.

D. Radiographic film of foundry control castings and test report shall accompany such castings when delivered to Buyer for review and approval at Buyer's facility.

E. For destructive qualification testing from first production run, Supplier shall furnish Buyer one forging sample representative of all processing used. This test forging is in addition to the production quantities required.

F. Supplier shall submit two test samples from each heat of material used in each shipment. The samples shall be suitable to make specimens conforming to R-3 of Federal Test Standard No. 151, and be subjected to the same processing the forgings receive, including working and heat treatments.

G. The forgings shall be made with a detachable tab. The tab shall not be removed until completion of all processing including heat treatment. The tabs shall be removed and shipped with the forging to Buyer. The tabs shall be identified to material heats and heat treat lots, and shall include serial numbers when serialization is required.

SPAR-12 CONTROL OF NONDESTRUCTIVE TESTING (NDT)

Submit items requiring NDT, complete with part drawing or document establishing NDT requirement, to a laboratory acceptable to Buyer. Report test results, signed by a responsible laboratory representative, in writing to Buyer. Identify the laboratory and the certified technician who performed and/or evaluated the tests. An adequate method of identifying and cross-referencing each x-ray film exposure, report and item must be provided. When parts are serialized, serial numbers must appear on the report and film with the control number.

A. Minimum radiographic requirements are or will be included in this Order on sketches supplied by Buyer.

B. Radiographic film of each lot and other NDT results, including foundry control NDT, shall be inspected by Buyer at the laboratory performing the work prior to shipment. Notify Buyer when the film is ready for review.

C. NDT reports shall be submitted with each shipment to Buyer and shall include x-ray film when radiographic inspection is required.



SUPPLIER PRODUCT ASSURANCE REQUIREMENTS (SPAR)

SPAR-13 LOT CONTROL AND MATERIAL TRACEABILITY

A. Items furnished under this Order (packing list, certifications and other applicable documents) must be identified by manufacturing lot or batch number. Where impractical to stamp individual parts due to size or shape, the lot or batch number shall be stamped on identifying tags or the smallest unit package.

B. Materials used must be identified by lot number, material type, specification and applicable change number, heat number, etc., and traceable to the lot number(s) of material(s) used. Traceability records shall be made available for review by Buyer's Representatives.

C. Semiconductor, Microcircuit Devices and Hybrids
MIL-PRF-19500, MIL-M-38510, MIL-PRF-38535 and MIL-PRF-38534
Traceability Documentation

- Procurement traceability of JAN marked MIL-PRF-19500, MIL-M38510, MIL-PRF-38535, and MIL-PRF-38534 devices shall be confirmed by documentation certified by Supplier, and accepted by the Government Quality Representative (stamp and/or signature), whether the devices are procured directly from the original manufacturer or from another source such as a distributor. When other sources are involved, their documentation shall be IN ADDITION TO AND INCLUDE THOSE PROVIDED BY THE MANUFACTURER AND ALL PREVIOUS DISTRIBUTORS. As used herein, the term 'distributor' means any source other than the manufacturer. This documentation shall include the following information:

- Manufacturer's Documentation:

- Manufacturer's name and address
- Customer's or distributor's name and address
- Device type and product assurance level (i.e., JAN, JANTX, JANTXV, JANS, Class S, QML V, Class K)
- Inspection date or latest reinspection date

SPAR-14 ESD CONTROL PROGRAM

Items to be delivered under this Order are defined by Buyer as electrostatic discharge (ESD) sensitive. Manufacturing Suppliers shall have an ESD control program which precludes ESD damage during all phases of fabrication/testing/handling storage and packaging for delivery. Non-manufacturing distributors shall handle, store, package and identify such items under an ESD control program which ensures continuation of the manufacturer's ESD control program. **Shipping containers and packing slips shall have prominent marking/identification which identifies contents as ESD sensitive.**

SPAR-15 FASTENERS

A. Provide all military specifications parts (AN, MS, NAS, etc.) only from Buyer's list of manufacturers.

B. For purposes of traceability, indicate the manufacturer's name and lot number of the product on all packing lists and packing labels.

C. Send all shipments with a copy of the manufacturer's chemical/physical test data for each lot in accordance with their applicable procurement specification, such as FF-S-86, etc.

D. When possible, parts will all be from the same lot, and when this is not practical, all lots will be individually identified and will comply with items A, B, and C above.

E. All lots must be homogeneous.

F. All threaded fasteners, specified by the applicable military specifications or not, shall be chamfered for ease of threading the subject fastener to its mating part.

SPAR-16 DROP SHIPMENTS

Material described on the Order is to be shipped to other than Buyer's facilities. Include copies of the SPAR data with the shipment and mail one copy of such data to Buyer on the same day that shipment is made.

A. Source inspect at Freight Forwarder's.

B. Inspection by Q/A and/or Program Engineer at point of delivery.

SPAR-17 STANDARDS OF WORKMANSHIP

Supplier must maintain written standards of workmanship directly applicable to the nature and level of work performed under the Order. A copy shall be supplied to Buyer upon request. Buyer reserves the right to impose its own workmanship standards if Supplier's standards are considered unacceptable.

SPAR-18 PRODUCT MARKING

When this SPAR is imposed, this paragraph defines the additional requirements for product marking and identification that may not appear on Buyer's drawing. In the event of conflict between this document and other applicable documents, including Supplier documents, **this document takes precedence.** Supplier shall permanently and legibly mark each item in accordance with the applicable type drawing and/or document defining the procured item(s). Qualified Military products shall comply with the product marking specified by the applicable military specification/standard for all items procured to Qualified Product Listings (QPL). **Marking shall be capable of meeting the resistance to solvents tests of MIL-PRF-38535 or MIL-PRF-19500, as applicable. Surface mount diodes shall not have labels or tags attached to the body, Identification of the diodes shall be maintained by position in the package or tape with the serial number/lot location information supplied with parts.**

SPAR-19 PACKAGING

Unless otherwise specified in the purchase order, Seller shall package all material in a manner that will ensure protection against corrosion, oxidation, deterioration and physical damage during shipment to Buyer. **The packaging materials should satisfy standards for environmental safety and pose no hazards to operators who are in contact with them.**

Electronic parts such as resistors, capacitors, transistors, diodes, etc., **SHALL NOT BE BULK PACKAGED.** Each EEE part shall be packed and packaged in accordance with Mil-Std-129 and the applicable Mil-specification, Mil-performance specification, standard military drawing or equivalent P&M document.

SPAR-20 PRODUCT CHANGE APPROVAL FLOW DOWN

Supplier shall not make any changes in product design, composition, configuration (including form, fit, function or interchangeability), material or fabrication without prior approval by Buyer in writing. Supplier shall flow this requirement down to Supplier's sub-tier suppliers.

SPAR-21 PROCUREMENT OF QPL, SPECIFICATION CONTROL

DRAWING (SCD) ITEMS AND DESC STANDARD MIL

DRAWINGS (SMD) ITEMS

Material being supplied shall have been manufactured by a QPUQML approved source, or a suggested source listed on the SCD as applicable. All Certificates of Conformance offered with each shipment shall list the actual manufacturer of the items being supplied. Material supplied from sources not listed on the SCD require advance approval from Buyer's Reliability Department, Components Engineering.

SPAR-22 STATISTICAL PROCESS CONTROL

The Supplier shall develop a plan for implementing statistical process control techniques at his facility using the guidelines of IPC-9191. Supplier shall work with Buyer to obtain a mutually acceptable plan for process identification and control. The plan shall require Buyer's written approval. Supplier shall collect statistics on his process and shall have them available for review by Buyer. Process control techniques shall continuously monitor processes to ensure early detection of trends that could adversely affect quality or reliability. Process control charts shall be conspicuously displayed at locations where critical processes are performed. Buyer shall periodically monitor the effectiveness of Supplier's process control activities. **The quantity of samples required to establish process capability shall be statistically valid.**

SPAR-23 SPECIAL PROCESS CONTROL

Supplier shall demonstrate a degree of control over special processes that provides assurances that specifications are met and complied with. As applicable, Supplier shall provide adequate training for personnel certifications, destructive testing of samples and detailed procedures. Buyer reserves the right to review and disapprove Supplier's special process procedures. Copies of special process procedures and certifications shall be supplied to Buyer upon request. If Supplier uses facilities other than his own, that facility is subject to the same conditions as stated herein. All certifications supplied as objective evidence must indicate the name and location of the facility performing each special process.

A. Welding Qualifications - Fusion welding shall be performed by welders certified to SAE-AMS-STD-1595. Resistance welding machines shall be certified to SAE-AMS-W-6858. When specified in the purchase order, three resistance welding sheet specimens, prepared for each lot concurrently with the performance of welding, shall be supplied with each shipment. Personnel performing inspection shall be certified in accordance with NAS-410.

B. Radiographic Inspection shall be performed in accordance with SAE-AMS-STD-2175 and ASTM-E1742. Supplier shall furnish x-ray film and TWO copies of the laboratory report identifiable to the items x-rayed with each shipment.

C. Magnetic Particle/Penetration Inspection - As applicable, shall be performed in accordance with ASTM-E1444 or ASTM-E1417. Certified test reports shall be submitted with each shipment. Personnel performing inspections shall be qualified in accordance with NAS-410.

D. Chemical/Physical Analysis - Chemical/physical test reports identifiable to the product delivered shall be supplied to demonstrate compliance with applicable material specifications. Analysis must include actual test results related to material supplied.

E. Certified Light Test Data - Supplier shall take light measurements in accordance with the applicable specification and furnish data which includes high and low readings, identifiable by serial number and/or data codes to the delivered items. Method of measurements and data correlation are subject to Buyer's approval.

SPAR-24 HAZARDOUS MATERIAL

The items being ordered and delivered under this Order are defined as hazardous material. In order to be accepted the appropriate label and/or warnings must be on all containers, and all Material Safety Data Sheets must be on file at Buyer's facility.

SPAR-25 CERTIFICATION OF CONFORMANCE

A. With each shipment of items covered by this Order, Supplier shall submit a certificate of conformance, signed by a responsible representative, which shall constitute a representation by Supplier that:

1. Materials used are those which have been specified by Buyer and that the items delivered were produced from materials for which Supplier has, on file, reports of chemical or physical analysis and any other required evidence of conformance of such items to applicable specifications.
2. Processes used in the fabrication of items delivered were in compliance with applicable specifications forming a part of this Order.
3. The items as delivered comply with all specifications and other requirements of this Order.

In case of drop shipment, a copy of the above certificate shall be submitted direct to Buyer at time of shipment.

B. By making shipment under this Order, Supplier automatically certifies that the materials (except when they are furnished by Buyer) used in the items shipped and the processes applied to such items comply with the applicable drawings and specifications. Supplier agrees to retain objective evidence, including records, of the inspections and tests performed in the course of manufacturing, testing inspecting, preserving, packaging and packing of said items. These records shall be available to Buyer upon request.

C. Supplier shall verify that all Qualified Products List (QPL) products were manufactured by an approved QPL source. Evidence will be provided on the packaging slip for verification by Buyer.

D. Commercial-Off-the-Shelf/Commercial equipment to be provided under this contract shall adhere to published manufacturer specifications. Quality Control and final tests of this equipment will be performed at the site of manufacture prior to shipment of as a part of Acceptance Testing by Buyer. Buyer and Government personnel may visit the manufacturing facilities to view the final test of similar systems in progress and ensure Buyer and Government of the manufacturer's Quality Assurance Program in action. The manufacturer shall warrant that each piece of equipment will be in good working order on the date of receipt and that it will conform to the manufacturer's official published specification. This provision does not affect or void the manufacturer's warranty.

SPAR-26 SUPPLIER'S SOFTWARE QUALITY ASSURANCE SYSTEM

Supplier shall develop and maintain a software quality assurance system that complies, as a minimum requirement, with the standard(s) designated below. Suppliers system shall be subject to audit by the Buyer's SQA Representative. Waiver to quality requirements is not valid unless obtained in writing from Buyer.

A. DOD-STD-2168 (latest revision) **B.** Other,
specified as: _____

SPAR-27 SOFTWARE DEVELOPMENT PLAN (SDP)

Upon contract award, Supplier shall plan, develop, publish and implement a Software Development Plan (SDP). The SDP shall provide a description of Supplier's plans for conducting the activities of the software development process in accordance with DOD-STD-21 67A and the Order. When DOD-STD-2167A is not invoked the SDP shall include the items listed below and in either case shall be subject to review, audit and approval by Buyer's SQA Representative.

- A.** Identification of the resources and organization required to perform software development.
- B.** Plans for the management of Supplier's software development effort, including identification of the software development schedules and milestones.
- C.** Plans for performing software configuration management, including the procedures for controlling the software and its associated documentation utilizing a Software Development library (SDL).
- D.** The standards, procedures, methods and tools to be used in the Supplier's software development effort.
- E.** Plans for formal software testing.
- F.** Plans for software product evaluation.

SPAR-28 SOFTWARE QUALITY PROGRAM PLAN (SQPP)

Supplier shall plan, develop, publish and implement an SQPP which addresses all software quality requirements as set forth in the prime contract. The SQPP shall be used by Supplier to evaluate the quality of the software and associated documentation, and software development activities. This document shall be reviewed and approved by Buyer's SQA Representative.

SPAR-29 SOFTWARE DEVELOPMENT FILES (SDFs)

Supplier shall document the development of each Computer Software Unit (CSU), Computer Software Component (CSC), and Computer Software Configuration Item (CSCI) in Software Development Files (SDFs), Each SDF shall contain information pertinent to managing and statusing the software development effort. The SDF should contain at least the following sections/information:

- A.** File identification
- B.** Development Schedule
- C.** Development Status

D. Allocated Requirements

E. Design Material

F. Source Code

G. Test Information (cases, procedures, results) **H.**

Review Comments SDFs shall be subject to review

and audit by Buyer's SQA Representative.

SPAR-30 SOFTWARE DEVELOPMENT LIBRARY (SDL) CONTROLS

Supplier shall establish and maintain written procedures for the control and handling of source and object code, identification and documentation of different versions of software, tools and documentation, and placement of all these development products under configuration management control. These procedures are subject to audit/review by Buyer.

SPAR-31 REVIEW AND CONTROL BOARDS

A. Supplier shall submit for approval by Buyer any significant changes in product design, composition or configuration. Supplier shall flow down this requirement to Supplier's suppliers.

B. Supplier shall establish a Configuration Control Board (CCB) and a Software Configuration Control Board (SCCB). Supplier shall appoint an SQA engineer as a member of these two boards to assure that corrective actions are taken on all problem/change reports. These requirements are subject to audit/review by Buyer.

SPAR-32 PROCUREMENT SPECIFICATION PRODUCT ASSURANCE REQUIREMENTS

The Product Assurance requirements as defined in the appropriate procurement specification in this order apply.

SPAR-33 PROCESS FLOW DIAGRAM

A process flow diagram that includes all operations in sequential order from receipt of materials through storage and shipment of finished product shall be generated. This encompasses alternate processes and movement of product to and from external operations.

NOTE 1: The process flow diagram includes sufficient detail for each process step necessary to produce the product.

NOTE 2: The process flow need not include processes for procured materials, parts, components, and assemblies.

NOTE 3: Alternate processes are different processes used to achieve the same output (e.g., backup equipment, secondary source, change in sequence).

SPAR-34 PROCESS FAILURE MODE EFFECT ANALYSIS

Supplier shall perform a risk analysis of the manufacturing process and identify mitigation plans for high risks using the PFMEA methodology (reference SAE J1739), unless an alternate method is required and/or approved by the customer. Severity, occurrence, and detection ranking criteria shall be defined when SAE J1739 Appendices A, B and C do not adequately assess risk within the manufacturing process.



SUPPLIER PRODUCT ASSURANCE REQUIREMENTS (SPAR)

SPAR-35 PROCESS CONTROL PLAN REQUIREMENTS-GENERAL

Supplier shall develop control plans at the system, subsystem, component, and/or material level for the product supplied as appropriate. A control plan shall list the design and process characteristics to be monitored, during the manufacturing process, along with any required control methods. The control plan shall include and indicate all product and process KCs and CIs defined by the customer and the organization. The control plan shall specify the reaction plan to be invoked when the process becomes unstable or a failure occurs.

A. Supplier shall have a control plan that takes into account the design record requirements and process flow, as well as the design and process FMEA outputs.

B. Supplier shall have a process for reviewing and updating the control plan when changes occur (e.g., affecting product, production process, measurement, logistics, supply sources, PFMEA)

SPAR-36 PROCESS CONTROL PLAN REQUIREMENTS- SPC

Initial process capability studies using industry recognized statistical methods shall be completed for product and process KCs identified within the design record and supporting control plan.

NOTE: Capability studies should take into consideration the effects of people, machines, tools, methods, materials, measurements, and environmental conditions.

a. The quantity of samples required to establish process capability shall be statistically valid. This is determined in conjunction with the customer, prior to the start of the study.

b. Where it is impossible or prohibitively expensive to satisfy the stability and capability requirements of this section, the exceptions shall be documented by the producer and customer approval obtained, as required.

NOTE: Process capability indices (e.g., Cpk, Ppk) can only be calculated after the process is determined to be stable; using statistically valid methods for determining process capability and stability.

c. The following acceptance criteria (see Table 1) for the evaluation of initial process study results shall be applied, unless otherwise specified by the customer.

NOTE: The preferred capability index to be used for estimating initial process capability may be specified by SSL.

SPAR-37 MEASUREMENT SYSTEM ANALYSIS

Supplier shall submit Measurement System Analysis on the measurement methods for KCs (product and process) identified in the control plan (reference ASTM E2782). The analytical methods and acceptance criteria used shall conform to the requirements listed in the PO. Applicable MSA studies can be established using various methods (e.g. bias studies, Gage Repeatability and Reproducibility (Gage R&R), repeatability study, measurement uncertainty analysis, attribute agreement analysis). Supplier should demonstrate that all measurement methods and checking aids included in the control plan are suitable, capable, and supports the customer demand rate.