Quality Level 3 - Work Instructions CWI-00013 / B **Corporate**

Supplier Requirements (DAS SOP-7-17)

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1.0 Purpose

1.1 To define the quality requirements imposed upon suppliers to Ducommun AeroStructures.

2.0 Scope

2.1 This document serves as the general quality requirements for Ducommun AeroStructures, Inc. (DAS) suppliers and their sub-tiers. It is intended to define the requirements necessary to ensure that all products and services delivered to DAS comply with specified requirements for quality reliability and integrity.

2.2 Only suppliers who demonstrate and maintain compliance with these requirements will be eligible to receive DAS orders. Failure to comply with the requirements herein may result in the disqualification of the supplier.

2.3 The requirements contained herein are to be satisfied in addition to any other contractual requirements levied by DAS. The Supplier is responsible for the immediate communication to DAS of any conflicts between existing contracts and the requirements herein.

3.0 Responsibilities

3.1 The Supplier shall define and maintain a register of authorities granted to individual personnel within the organization (i.e. FAI authorized officials).

3.1.1 In case the Supplier has no certified Quality Management System, the waiver mentioned in section 6.0 must be obtained from DAS Quality prior to acceptance of work.

3.1.2 As appropriate, the Supplier shall inform DAS Quality of any changes to the quality system,

including changes in personnel with responsibility for the Supplier's quality functions. This does not include minor items such as clerical changes. DAS Quality will evaluate the change and the subsequent need for supplier re-qualification activities.

3.2 The Supplier shall provide contact information and access to the person responsible for ensuring that DAS requirements are promoted throughout the organization. Said person must have the authority to resolve quality concerns.

4.0 Definitions

4.1 **Supplier** – 1st tier source of products and services to Ducommun AeroStructures, Inc.

4.2 **DAS Quality** – Quality Department of the DAS Ducommun AeroStructures, Inc. site / division with which the supplier is doing business

4.3 **DAS Procurement** – Procurement Department of Ducommun AeroStructures, Inc. site / division with which the supplier is doing business

4.4 **Sub-Tier Supplier** – 2nd tier and lower suppliers who provide product or services which will be incorporated into 1st tier products

4.5 **Broker** – 1st or 2nd tier suppliers who do not have their own manufacturing capabilities and release authority but subcontract and manage the production/distribution of goods

4.6 **Material Review Board (MRB)** – Group of individuals who have the primary responsibility to disposition nonconforming material.

4.7 **Escape** - A defective part or unit that continues through to later process steps undetected by the inspection process.

4.8 **First Article Inspection** - The inspection of an item or items to determine compliance with the contract requirements as noted on the engineering drawing, including dimensions, materials, drawing notes, nondestructive testing, and special processes (plating, hardness, etc,), Actual values are recorded on an AS9102 FAIR form,

4.9 **Initial Reliability Requirement (IRR) -** The degree of confidence that a part will conform after completion of all manufacturing steps, or, the expected rate at which defect-free parts are produced. Operationally, it is the fraction of units of product that must conform to requirements before the supplier is eligible to perform acceptance sampling.

4.10 **Inspection** - The act of measuring, examining, testing, or gauging a part characteristic and comparing the results to specified requirements in order to determine conformity.

4.11 **Inspection Records** - Media containing the results of Inspection actions either internally by the supplier or by an outside agent (source inspector, customer, etc.) that has all critical data fields as demonstrated in Ducommun Detailed Inspection Plan (DIP) forms. DIP forms are available thru the Ducommun Purchasing Agent or Quality Representative.

4.12 **Lot -** A set of product bearing identification and considered uniform for sampling purposes.

4.13 **Major Characteristic** - A characteristic, other than critical, that is defined as such by drawing note or specification.

4.14 **Minor Characteristic** - Any characteristics other than critical or major.

4.15 **Sample** - One or more units of product drawn from a lot or batch the units of the sample being selected at random without regard to their quality.

4.16 **Sample Size, "n"** -The number of units selected as representative of a population.

4.17 **Stable Process** - A process that remains stable or predictable after the initial setup verification. Documented statistical evidence must be produced to a process is operating within defined control limits, and a reaction plan must be in place that defines actions to be taken if the process deviates from the control limits.

4.18 **Suspect Materiel** - Materiel, items, or products in which there is an indication by visual inspection, testing, or other information that it may meet the definition of fraudulent materiel or counterfeit materiel provided below.

> **NOTE:** Suspect Materiel can become Fraudulent or Counterfeit Materiel through further evaluation and testing. All counterfeit materiel is fraudulent, but not all fraudulent materiel is counterfeit.

4.19 **Fraudulent Materiel** - Suspect materiel misrepresented to the customer as meeting the customer's requirements.

4.20 **Counterfeit Materiel** - Fraudulent materiel that has been confirmed to be a copy, imitation or substitute that has been represented, identified, or marked as genuine, and/or altered by a source without legal right with intent to mislead, deceive or defraud.

5.0 Steps or Attachment

5.0 APPLICATION

5.1 Compliance to this document is imposed on the DAS Purchase Order (PO) and thus constitutes part of the contractual relationship.

5.2 New revisions to this document will apply to orders placed after the published release date for the revision. Each revision of this document will not be applicable to orders placed before the published release date unless through formal PO amendment.

5.3 The words "shall" and "must" indicate mandatory requirements. The words "may" and "should" indicate recommendations. "Notes" are used to explain and clarify requirements.

5.4 The Supplier is responsible for complying with all documents referenced herein. It is strongly recommended that the supplier obtain and maintain current revision levels of all referenced documents which may be deemed applicable.

5.5 Due to the variety of products provided to DAS customers, it is necessary to comply with distinct DAS Site/Division requirements flowed down as Quality Clauses on the Purchase Orders.

6.0 GENERAL QUALITY SYSTEM REQUIREMENTS

6.1 The Supplier shall have an established Quality Management System compliant with a recognized industry Standard (i.e.ISO 9001, AS9100, AS9120, etc.) or equivalent, to ensure that product provided meets DAS and applicable regulatory requirements. This requirement may be waived through formal letter from DAS Quality.

6.2 The Supplier's quality management system shall be subject to evaluation by DAS. and shall include, but not limited to, the following provisions:

6.2.1 DAS Quality shall be notified in writing when any changes are made to the quality system that may affect product quality.

6.2.2 The quality system shall be maintained so as to ensure that all products and services offered for acceptance are subjected to all of the examinations and tests required to prove conformance to contract or purchase order requirements.

6.3 DAS, DAS Customers and regulatory agencies reserve the right to access to the Supplier's and

relevant sub-tier supplier's facility and records as necessary.

6.3.1 The Supplier shall submit to initial and periodic reviews including but not limited to onsite audits, offsite reviews of quality documents, quality system surveys and source inspections to verify and validate the effectiveness of the quality management system.

6.3.2 The Supplier shall provide all necessary facilities, equipment, documentation and personnel required for these activities at no additional cost to DAS, which will be used to determine the supplier's approval status. Failure to submit to these reviews may result in the disqualification of the Supplier for future DAS Purchase Orders.

7.0 DOCUMENTATION REQUIREMENTS

7.1 Upon request, the Supplier shall grant DAS Quality access to quality system documentation including the quality manual, procedures and records. If requested, the Supplier shall translate the required documentation into English.

7.2 Control of Documents and Data

7.2.1 The Supplier is responsible for the control of DAS proprietary documents and ensuring that they are controlled in order to preclude their use for other than DAS contract work.

7.2.2 Unless otherwise specified on the contract or PO, the Supplier's quality system shall provide for procedures which will ensure that the latest applicable drawings, specifications and instructions required by the contract or PO as well as authorized changes thereto, are used for fabrication, Inspection and testing.

7.2.3 The Supplier is responsible for acquiring copies of industry or government documents and/or standards available from commercial sources. Any problem experienced by the Supplier in obtaining required documents should be brought to the immediate attention of DAS Procurement prior to acceptance of work.

7.3 Control of Records

7.3.1 Unless otherwise specified, the Supplier shall retain production documentation and quality records for 10 years minimum after final payment or as required by the applicable PO. This documentation must include all Material Certifications, Work Orders, Special Process Certifications, Test Reports, Inspection Records, and Shipping Documentation.

7.3.2 The Supplier is responsible for the transfer of records to DAS in the event that The Supplier ceases operation.

7.3.3 All documents used to demonstrate product conformance must be provided in English.

7.3.4 The Supplier shall remain responsible for the requirements above regardless of whether the Supplier remains an approved DAS supplier or whether for any reason, the Supplier no longer accepts Purchase Orders from DAS.

8.0 RESOURCE MANAGEMENT

8.1 The Supplier shall have a process to identify and perform training for all personnel who directly or indirectly affect product quality. The Supplier shall maintain records of this training (including On-The-Job training). These records shall be made available for review upon request.

8.2 During fulfillment of the PO, the Supplier shall give DAS Quality written notice a minimum of 60 days before relocating any production, inspection or processing facilities; or before transferring any work between different facilities, or making other changes which may affect product quality.

9.0 PRODUCT REALIZATION

9.1 Planning of Product Realization

9.1.1 Given the Supplier's resources, the Supplier shall determine the manufacturability and inspectability of the product prior to acceptance of work

9.1.2 Configuration Management: Unless otherwise specified on the contract or PO, the Supplier's quality system shall provide for procedures which will ensure that the latest applicable drawings, specifications, and instructions required by the contract or PO, as well as authorized changes thereto, are used for fabrication, inspection and testing.

9.1.3 Control of Work Transfers: The Supplier shall establish a process for the control of any work contracted to sub-tiers, including the verification of the conformity of the work, prior to shipment to DAS. The Supplier must ensure that DAS requirements contained herein are met by all sub-tiers and shall maintain records accordingly.

9.1.3.1 It is the Supplier's responsibility to ensure that DAS property and proprietary data are controlled per contractual agreements at all levels of the supply chain.

9.1.3.2 Brokering of products under DAS design control is strictly prohibited unless authorized by DAS Quality in writing.

9.2 Customer Related Processes

9.2.1 All documents including drawings, electronic design data & specifications are part of the PO requirements when specified directly on, or in documents referenced by, the PO.

9.2.2 The Supplier shall provide PO confirmation in writing within 5 business days of receipt, including identification of any exceptions, or DAS assumes that the Supplier has agreed to the terms of the PO and payment will be processed accordingly.

9.2.3 Communications related to fulfillment of PO requirements shall be in writing through DAS Procurement. Quality issues, such as nonconformities, corrective action and supplier assessment activities shall be submitted to both DAS Procurement and Quality.

9.3 Purchasing

9.3.1 Purchasing Process

9.3.1.1 The Supplier shall ensure that product scheduled for delivery to DAS from sub-tier suppliers (including DAS specified suppliers) complies with all applicable provisions of drawings, specifications, and other requirements of the DAS PO.

9.3.1.2 The Supplier shall maintain an Approved Supplier List. Criteria shall be established for sub-tier suppliers to achieve and maintain approved status, which shall not be limited to third party certifications. The Supplier shall establish periodic reviews of approved suppliers to determine their continued suitability.

9.3.1.3 When DAS establishes the requirement to use specific sub-tier suppliers, the Supplier's system shall assure that only the specified sub-tier suppliers are used to procure products or services for PO fulfillment. The Supplier shall maintain records of DAS authorization or selection of sub-tier suppliers.

9.3.1.4 All special processes shall be performed in accordance with the requirements of section 9.4.5 at all levels of the supply chain.

9.3.1.5 The purchase of surplus materials which do not comply with section 10.5 herein is prohibited without written approval from DAS Quality.

9.3.1.6 Suppliers using Digital Product Definition or Model Based Definition (DPD/MBD) data shall provide evidence of approval control of this data by a Prime, or shall be subject to audit by DAS.

9.3.2 Purchasing Information

9.3.2.1 The Supplier shall flow down all applicable product, regulatory, and quality requirements (including requirements for traceability, documentation, and software) to the Supplier's sub-tiers. The Supplier is responsible for ensuring and validating the compliance of the Supplier's sub-tiers and maintaining documented evidence of such per section 7.2.

9.3.3 Verification of Purchased Product

9.3.3.1 Supplier shall validate raw material certifications at no additional charge to DAS. Validation must be conducted by a certified verification source. Records of the validation shall be retained per section 7.2. The Supplier shall flow this requirement down to relevant sub-tier suppliers. Note: Please see the applicable appendix for frequency requirements.

9.3.3.2 Supplier shall provide a Certificate of Conformance for any work they or their sub-tier suppliers perform, which shall be flowed down throughout the supply chain.

9.4 Production and Service Provision

9.4.1 The Supplier shall employ a system for controlling, documenting and maintaining required product quality throughout the manufacturing process whether performed by the Supplier or the Supplier's sub-tiers. This shall include a step-by-step sequence of manufacturing operations and inspection points. This documentation shall provide objective evidence that the resultant product(s) conforms to the specified requirements.

9.4.2 Production Process Verification

9.4.2.1 The Supplier is responsible for completing a First Article Inspection Report (FAIR) per AS9102 for products under DAS design control. DAS reserves the right to review the first article inspection at the Supplier's facility. Should the initial submission be found discrepant, additional samples may be requested following correction of the cause of discrepancy by the Supplier.

9.4.2.2 DAS approval of an FAIR shall not relieve the Supplier of the responsibility for meeting all specifications and requirements on future shipments of the product. Please Note:

a) First Article samples must be made from production tooling.

b) After first article approval, no change in process, tooling or material specification can be made without first obtaining written permission from DAS Quality.

c) Partial or Delta FAI's will be required according to the requirements of AS9102.

d) Certification for material, components, and special processes (anodize, chemfilm, molycote, etc.) must be noted on the FAI form and be supplied with the FAI sample part.

9.4.3 Control of Production Process Changes

9.4.3.1 Processes documented and approved in First Article Inspection Records shall not be altered without prior approval by DAS Quality.

9.4.3.2 The Supplier shall define and implement a system that assures equipment used for production is inspected, maintained, and validated prior to use. A schedule of this planned activity shall be documented.

9.4.4 Post Delivery Support

9.4.4.1 As required, all documentation supporting the build and verification of the product shall be made available within 24 hours of the submitted request.

9.4.4.2 All process nonconformities identified subsequent to the shipment of product to DAS

shall be communicated per the requirements of section 11.3.

9.4.5 Validation of Processes for Production and Service

9.4.5.1 For products under DAS design control, the Supplier's in-house or contracted special processes shall be in compliance with the requirements of Table 1 below:

Table 1: Special Process Source Requirements

Special Process	Requirement
Nondestructive Testing (radiographic, ultrasonic, fluorescent penetrant, magnetic particle, etc.)	Process source must be NADCAP andEnd customer approved
Non-conventional Machining (e.g. Electrochemical Machining (ECM), Electrochemical Grinding (ECG) Electrical Discharge Machining (EDM), Laser Beam Machining (LBM), Chemical Milling)	Process source must be NADCAP certified and End customer approved
Shot Peening	Process source must be NADCAP certified and End customer approved
Chemical Processing (e.g. Plating, Anodizing, Chemical Cleaning, Chemical Milling, Conversion / Phosphate Coatings, Paint / Dry Film Coatings, Plating, Stripping, Surface Treatment / Passivation, Etching)	Process source must be NADCAP certified and End customer approved
Heat-treating, Hot Forming and Furnace Brazing	Process source must be certified and End customer approved
Painting	Process must be performed by trained and/or certified personnel and End customer approved
Oxygen Cleaning	Process must be performed by trained and/or certified personnel and End customer approved
Pressure Testing	Process must be performed by trained and/or certified personnel and End customer approved
Materials Testing (metals testing, hardness, conductivity, metallography, microhardness, mechanical testing, chemical analysis)	Process must be performed by trained and/or certified personnel and End customer approved
Welding (each welder must be Ducommun AeroStructures certified)	Welder must be Ducommun AeroStructures certified and End customer approved
NOTE: A listing of NADCAP approved sources is available at www.pri-network.org. At the discretion of DAS Quality, non-NADCAP approved sources may be approved for a given process, which shall be given in writing and must be signed by DAS Quality Management.	

9.4.5.2 A DAS process source recommendation or requirement does not absolve the Supplier of the responsibility to ensure that the requirements of Table 1 are met. DAS reserves the right to change or create deviations from the requirements of Table 1 through specification or written DAS Quality approval.

9.4.5.3 When a specific process source is required by a DAS drawing or manufacturing specification, the Supplier is responsible to ensure that only the specified sources are used. Two examples are shown below:

- Structural Bonding Primer
- Honeycomb panel fabrication

9.5 Identification and Traceability

9.5.1 The Supplier is responsible to maintain traceability of product and materials through all stages of production including at sub-tier processing sources. Supplier's system shall ensure that products are traceable back to the raw material batch or lot from which they were made, including traceability to the source mill. Supplier's system shall also provide means to trace where raw materials have been used.

9.6 Customer Property

9.6.1 While in the possession of the supplier, DAS furnished material shall be identified, segregated, protected and safeguarded for use or incorporation into final product.

9.6.2 When material is furnished to a supplier by DAS or DAS Customer, the supplier is responsible for ensuring that the materials meet applicable requirements upon receipt.

9.6.3 The Supplier shall be responsible for determining the accuracy and stability of DAS furnished equipment used for product realization and acceptance, which shall be periodically re-inspected and validated as required to ensure continued accuracy. DAS shall promptly be notified of any DAS tooling or equipment damage.

9.7 Preservation of Product

9.7.1 The Supplier's quality system shall ensure that items shipped are effectively preserved, protected, and packaged to guard against damage, degradation or loss during shipment. This is to be accomplished in accordance with best commercial practices unless otherwise specified on the PO or contract. The supplier shall implement production and packaging practices that assure detection and removal of foreign objects and debris.

9.7.2 Age sensitive materials or products must be properly identified and labeled to assure product conformity including necessary environmental conditions. Shipping documentation for age sensitive materials must include date of manufacture and expected product life or expiration date. Age sensitive materials must arrive at DAS with a minimum of 70% of remaining shelf life unless authorized by DAS in writing.

9.8 Control of Monitoring and Measuring Equipment

9.8.1 DAS shall be notified of any potential nonconformities resulting from equipment used to verify or validate the conformance of product found to be out of calibration. Please see section 11.3.

10.0 MONITORING AND MEASUREMENT

10.1 DAS Source Inspection:

10.1.1 Suppliers to DAS are subject to Source Inspection, either contractually or as situations dictate. Source inspections will be performed by DAS and / or DAS Customer representative(s) at the Supplier's facility prior to shipment of items. The Supplier shall furnish at no additional cost to DAS, necessary facilities, equipment, documentation, and personnel required to perform these inspections.

10.1.2 The source inspection may be a one time event or continue until the requirement driving the source inspection has been satisfied. When the Supplier has been notified that source inspection is required, no parts are to be shipped until the source inspection has been completed or waived by DAS Quality.

10.1.3 Source Inspection of parts or materials by DAS and / or DAS Customer should not be used as an effective control of quality by the Supplier.

10.1.4 If the Source Inspection is contractual, DAS must be notified at least 2 working days in advance of shipment to permit scheduling of Source Inspection.

10.1.5 If the Source Inspection is the result of a particular issue or on-going issues, Supplier is required to notify DAS as soon as possible prior to shipping.

10.1.6 Objective evidence of DAS and / or DAS Customer representative(s) Source Inspection must accompany each shipment. Such inspections shall not necessarily constitute Final Acceptance of the material and final acceptance shall be at the DAS facility.

10.2 Certificate of Conformance (C of C)

10.2.1 Suppliers shall submit with each shipment, a written statement signed and dated by an authorized representative, certifying that items or services provided are in accordance with specified requirements, and stating that evidence of compliance to applicable specifications is on file, traceable to the material/equipment and available for review.

10.2.2 The C of C must include, at a minimum, the Supplier's name and address, customer's name, PO number and line item, part number and revision level, part name as identified on the print, a list of the process specs accomplished, and the quantity shipped.

10.2.3 Also required, as applicable, are lot / batch numbers (in the case of raw materials, castings, and forgings), shelf life information / expiration dates, serial numbers, and any part number reference information, for example if the DAS part number is different from the Supplier's part number.

10.3 Control of Nonconforming Product

10.3.1 The Supplier shall establish a system for identification, segregation and documentation of any nonconforming product(s) found during the Supplier's manufacturing or inspection operations.

10.3.2 Neither the Supplier nor the Supplier's sub-tiers is granted Material Review Board (MRB) Authority.

10.3.2.1 Submittal of Nonconforming Product: The Supplier shall not ship any nonconforming product to DAS without authorization from the applicable DAS Site. These waivers and/or concessions must be referenced on the C of C and be included with the shipping paperwork.

10.3.2.2 Notification of Delivered Nonconforming Product: The Supplier shall notify the applicable DAS Quality representative in writing within 1 business day of the discovery, which shall contain applicable information concerning the defect; part numbers, lot numbers, quantities, ship dates, description of the nonconformance and the final corrective action plan.

10.3.2.3 Nonconforming Product Discovered at Ducommun AeroStructures: Any product found nonconforming at DAS may be returned to the Supplier with instructions from the applicable DAS-MRB.

10.3.2.4 Product Field Failure or Malfunction: When a product field failure or malfunction is reported by DAS, DAS may request the Supplier to conduct a formal failure investigation and analysis to identify the cause of the failure within the specified time required by the relevant DAS site / division.

10.3.3 The decisions and disposition instructions of the DAS MRB shall be binding to the Supplier's organization. Failure to comply with the given decisions and disposition instructions may result in the disqualification of the Supplier from the DAS ASL. If the Supplier does not agree with the disposition or can improve upon the disposition given by DAS MRB, contact DAS Quality for written approval prior to implementation.

10.3.4 Material to be scrapped shall have part number removed and be conspicuously and permanently marked or positively controlled, until physically rendered unusable. Note: Please see the applicable appendix for any site specific requirements.

10.3.5 If the Supplier does not agree with the liability/charges associated with a given rejection, the Supplier shall contact DAS Quality with supporting evidence within 2 business days of the original nonconformance notification.

10.4 Corrective Action

10.4.1 The Supplier shall take prompt action to correct assignable conditions which have resulted, or could result, in products or services being offered to DAS for acceptance which do not conform to any of the following:

a) The quality assurance provisions of the item specification

b) Inspections and tests required by the contract or purchase order

c) Other inspections and tests required to substantiate product conformance

d) The requirements contained herein

10.4.2 When a quality system or product nonconformance is identified by DAS, DAS may request a formal corrective action response from the supplier.

10.4.3 The Supplier shall complete the corrective action response within the time frame specified by DAS.

11.0 REGULATORY REQUIREMENTS

11.1 When required, an FAA Airworthiness Approval Tag (FAA Form 8130-3) or an equivalent (EASA Form 1) shall be submitted with the shipment of parts or material to DAS.

11.2 The Airworthiness Approval Tag must be issued by Seller's FAA approved designee or EASA Certifying Staff.

11.3 All relevant packages must have copies of the required documentation (i.e. 8130, FAA, EASA form 1 or CoC) clearly displayed on the outside of the box.

12.0 INITIAL RELIABILITY REQUIREMENTS (IRR)/SAMPLING INSPECTION

12.1 General - Product acceptance must be 100% for all characteristics, unless sampling plans specified here-in are used, or an alternate sampling plan is approved per 10.0 or 11.0.

12.1.1 When using sampling plans:

a) Samples must be randomly selected and representative of the population. The lot must be homogeneous and produced under essentially the same conditions at the same time.

b) Each inspection characteristic must be inspected on every part in the sample lot.

c) Critical characteristics must be inspected 100% regardless of sampling plan used.

d) Adequate records of all sampling results must be maintained.

12.2 Inspection Plan (IP) - An Inspection Plan (IP) is a method to record the inspections for a part to ensure that all engineering characteristics and notes are inspected by appropriate methods.

12.2.1 IP's shall be recorded:

a) On a form that meets the Intent of the sample Ducommun IP/FAIR form

b) To the same measurement system as the drawing.

c) With all dimensional characteristics being accurately measured and all engineering drawings notes accounted for with all material and process specifications embedded in any Top-Level Specifications individually documented and validated on the FAIR. The IP shall have all measurements recorded as actual, attribute, or ranges of data, and may need to reference supporting data reports, i.e.:

- Manufacturing Instructions (routing) operation
- Receiving
- In-process
- Final test/inspection reports
- Statistical data
- SATP reports

12.2.2 These should validate that the applicable drawing note or dimensional characteristic has been accepted at the lowest possible inspection level. For any engineering drawing dimensional inspection, the IP shall also define the manufacturing operation at which it is performed and the inspection method used, including type of tooling/gauging instrumentation used. Engineering drawing characteristics accepted during in-process operations (because of inaccessibility at final inspection) must be included in the IP and have actual attribute, or range measurements recorded as "accepted in-process". Noted characteristics that are subject to change after in-process acceptance (e.g., growth, shrinkage, and distortion) must be re-inspected prior to final acceptance. Also, if a measurable characteristic is rejected, variable data is required on the IP's until the IRR has been re-established. After the IRR is re-established, gauging or other measurement fixtures may be resumed.

12.3 Classification of Characteristics

12.3.1 The following general characteristic terminology will be used for all DAS sampling plans. Where not specifically noted, the characteristic and remarks will apply universally. Assume all dimensional tolerances can be measured as ± ((total tolerance)/2).

Table 2 - Critical Characteristics - inspected to 100 percent

Characteristic Description	Remarks
Structural Characteristics (SC)	
Hardness Characteristics (HC)	
Any characteristic defined as Critical	Per Engineering B/P or Specification

Table 3 - Major Characteristics - Inspected to 97 percent AQL

Characteristic Description	Remarks
Dimensional total tolerances equal to .0100 inch or less	
Any characteristics classified as Major	Per Engineering B/P or specification

Table 4 – Minor Characteristics - Inspected to 92 percent AQL

Characteristic Description	Remarks
Dimensional total tolerances equal or greater than .01001 inch	
All characteristics not classified	Per Engineering B/P or specification

Table 5 - Non-Linear Characteristics -Inspected to 100 percent

Characteristic Description	Remarks
All notes, materials, processes, functional testing, part marking & traceability related evidence	

12.4 Sampling Inspection Process Overview

12.4.1 The sampling inspection process has three basic steps:

Step 1 - The quality or "Initial Reliability Requirement" of the item under consideration must be determined to ensure that it is good enough to justify a sampling inspection.

Step 2 - Once the IRR has been met, lots may be sampled in accordance with the corresponding sampling plans.

Step 3 - If a reject occurs (at any point), 100% inspection requirement must be reinstated until the IRR is once again met. Once satisfied, lot sampling can continue.

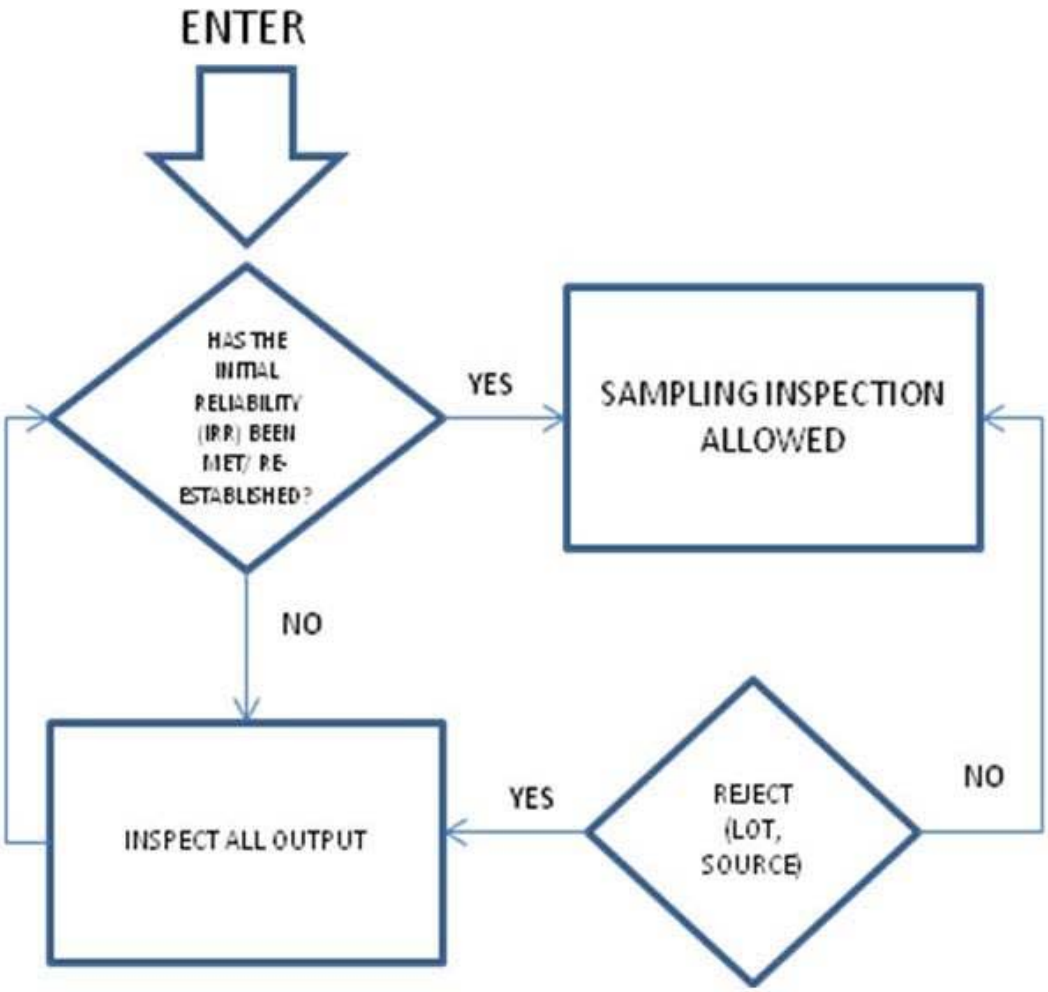


Figure 1. ***Lot Sampling Inspection Flow Diagram***

12.5 Establishing the Initial Reliability Requirement (IRR)

12.5.1 The Initial Reliability Requirement (IRR) is the degree of confidence that a characteristic will successfully function or defect free characteristics are produced.

Table 6 - IRR Table

Characteristic	Critical	Major	Minor
IRR	100%	97%	92%
Establishing Inspection of a Characteristic	100% Inspection	78 Accepted in a row	18 Accepted in a row

a) First time production must establish IRR level prior to sampling.

b) If sampling inspection or DAS reported nonconformance results in even one (1) reject (c=O), the lot shall be rejected and 100% inspected. Any reject of any characteristic resets the IRR for the complete part unless the supplier petitions and receives relief from an authorized Ducommun representative (i.e., QE, or Site OA Manager, etc.). Rejects coded for administrative issues that do not affect the form, fit or function of the part will not affect the IRR.

c) Once a nonconformity is detected, the IRR must then be re-established on the next consecutive production lot(s) prior to resuming of Lot or Continuous sampling methodologies.

d) The Quality Manager of the site issuing the purchase order may relax the 100 percent sampling requirement while establishing (or re-establishing) the IRR if the measurement is determined to be not practical or places an undue burden on the supplier to perform. This approval must be obtained in writing and be maintained as part of the suppliers sampling inspection records.

12.6 Sampling Requirements

Table 7 - Acceptance Sampling Requirements

Critical Characteristics IRR = 100% Reliability	
Lot Sizes	Sample Sizes
Critical characteristics are inspected 100%	

Major Characteristics IRR = 97% Reliability 176 in a row to establish IRR	
Lot Sizes	**Sample Sizes**
up to 9	All
10	9
11	10
12 to 13	11
14 to 15	12
16 to 17	13
18 to 20	14
21 to 24	15
25 to 29	16
30 to 35	17
36 to 44	18
45 to 57	19
58 to 78	20
79 to 118	21
119 to 233	22
234 to 2536	23
2537 & up	24

Minor Characteristics IRR = 92% Reliability 28 in a row to establish IRR	
Lot Sizes	**Sample Sizes**
Up to 5	All
6 to 7	5
8 to 11	6
12 to 19	7
20 to 53	8
54 & up	9

12.7 Process Control

12.7.1 SPC may be used as an option for inspection of individual characteristics for processes statistically validated as being under control. The measurements must be variable data (vice attributes), and valid measurements must be taken at appropriate sampling frequencies. After establishing that the process is in a state of statistical control and calculating capability Cp, determine appropriate actions, per the table below using the most recent point on the chart and the process capability ratio (Cpk).

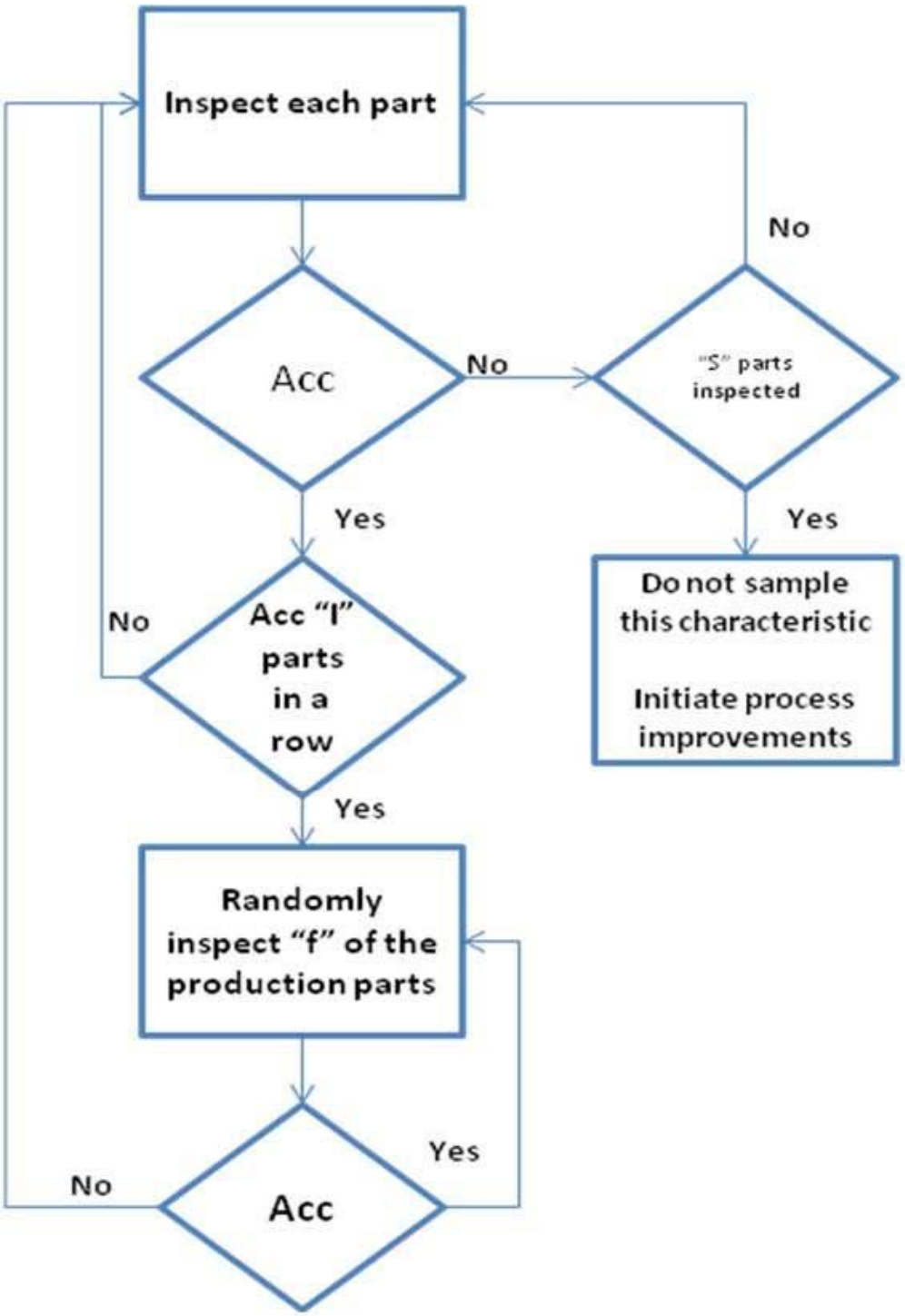
Table 8 - Requirements for Statistical Process Control

The most recent	**Required Actions**

point Indicates characteristic:	Based on the Process Capability Ratio (Cpk)		
	Less than 1.33	1.33 to 1.67	Greater than 1.67
Is in control	100% inspection or sampling plan	Accept product for the given characteristic	
Is out of control but all sample measurements within spec	Reset IRR, revert to 100% inspection	Inspect 100 % since last in-control point	Accept product for the given characteristic
Is out of control 1 or more sample measurements out of spec	Reset IRR, revert to 100 % inspection	Inspect 100% since last In-control point	

12.8 Continuous Sampling

12.8.1 Continuous sampling is designed for processes in which units are manufactured and accepted one at time. The product must be made in a continuous stream, since significant breaks in production invalidate the statistical protection. The flowchart below shows how continuous sampling works. Sampling is characteristic based.



Flowchart (& Sample table) definitions:
"i" value: The number of conforming units required in a row before the process may move down from 100% inspection to sampling inspection level.
f – value: The fraction of the units inspected on the sampling level
s – value: If this number ("s") of products has been 100% inspected and still "i" acceptable units in a row have not been achieved, it is inapplicable to apply sampling to this process.

Table 9 – Requirements for Continuous Sampling

Critical Characteristics	**IRR= 100%**

Reliability			
l	f	s	Minimum production rate per shift
Critical characteristics are inspected 100%			

Major Characteristics Reliability		**IRR= 97%**	
IRR		**76 in a row to establish**	
l	f	s	Minimum production rate per shift
10	1/2	17	2
16	1/3	36	2
21	1/4	57	9
25	1/5	76	26
31	1/7	109	91
38	1/10	164	501
46	1/15	241	1,201
57	1/25	390	3,201
72	1/50	733	10,001
89	1/100	1360	35,001
106	1/200	2150	150,001

Minor Characteristics Reliability		**IRR= 92%**	
IRR		**28 in a row to establish**	
l	f	s	Minimum production rate per shift
5	1/2	10	2
7	1/3	19	2
9	1/4	28	9
11	1/5	40	26
13	1/7	54	91
16	1/10	82	501
19	1/15	136	1,201
23	1/25	189	3,201
29	1/50	334	10,001
36	1/100	601	35,001
43	1/200	1025	150,001

12.9 Tool/Fixture Controlled with Periodic Accuracy Verification

12.9.1 Control dimensions may be established for periodic accuracy verification of tool controlled characteristics. Select control dimensions based upon tool constructions, pattern assembly, straightening, targeting, drawing tolerance and/or other factors know to affect the process variation. Control dimensions must be of sufficient quantity to qualify the drawing characteristics which will be documented as “tool controlled” on the plan, with the tool number adjacent to the characteristic being accepted.

12.10 Alternate Sampling Plans

12.10.1 Suppliers shall not institute Alternate Sampling Plans without written authorization / permission of Quality Manager for the site issuing the Purchase Order except where lot sampling tables are contained in related customer approved specifications.

13.0 COUNTERFEIT PARTS

13.1 Suppliers shall have a documented program to avoid, detect, mitigate and disposition counterfeit parts and materials.

13.2 Suppliers should utilize and reference AS6174 for guidance.

13.3 Suppliers shall also flow down counterfeit parts programs requirements to their sub-tiers, especially but not limited to:

- Electronic parts suppliers
- Raw material suppliers
- Distributors

Associated Items

Reason for Change

Date of Change	September 12, 2013	**Version**	A
Section Changed	All		
Change Made	Rolled from WI-00013 Rev A with no technical changes made. This will allow the system to visually differentiate between site and corporate org documents.		
Date of Change	January 2, 2014	**Version**	B
Section Changed	Multiple		
Change Made	4.18-4.20: Added Definitions for Suspect, Fraudulent and Counterfeit Materiel. 6.1: Modified to reference "...recognized industry Standard..." and add examples of some acceptable standards to identify it is not limited to AS9100. 12.10: Corrected numbering error (showed as 10.10). 13.0: Added new section regarding Counterfeit parts.		

Notification List

Notification Recipients

Approval Status Table

Approver Source **Approvers - QMS** **Parallel-Everybody** Segment

Approver	Action	Date	Comment
Ballinger, Christy 050494	Approve	December 19, 2013 11:19 AM GMT-6	
Hebben, Jonathan 031910	Approve	December 19, 2013 9:18 AM GMT-8	
McManus, Thomas 020411	Approve	December 19, 2013 12:36 PM GMT-5	
Murillo, Jose 090693	Approve	January 2, 2014 4:13 PM GMT-7	
Perez, Julio 032102	Approve	December 20, 2013 3:19 PM GMT-8	