

Supplier Quality Requirements

QAQ-82-001

Rev. 4

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Insitu Supplier Quality Requirements

1. Purpose and Scope

Insitu is committed to building strong supplier partnerships. This manual provides instructions for suppliers to be able to deliver to Insitu products produced to Insitu specified drawings or requirements that may affect Insitu product quality or delivery.

These requirements are in addition to the standard Insitu Purchase Order Terms & Conditions.

This document applies to suppliers that are Contract Manufacturers or Fabricators.

Insitu suppliers are required to have a quality program in place that assures delivery of quality product to Insitu.

2. Definitions

- 2.1. Contract manufacturers: perform final assemblies that go into or are used by Insitu's products. This includes, but is not limited to, final wing and winglet assemblies, final avionics unit, final engine assembly, launcher, final ground control unit assemblies, and finished carrying cases.
- 2.2. Control Plan: A control plan is a written description of the systems for controlling parts and processes.
- 2.3. Critical Product Characteristic(CPC ▷): Those product characteristics that if not controlled within the specified limits, may have an unacceptable affect to form, fit, function, safety, performance, agency approvals, or any governmental regulations. Critical Product Characteristics that deviate from specified drawing or specification limits cannot be accepted "as is" and must be reworked or repaired to bring them back to within required limits. Such repairs and reworks must be approved by Design Engineering, and as applicable, the customer.
- 2.4. Significant Product Characteristic (SPC ◇): Those product characteristics that if not controlled within specified limits will negatively affect form, fit, function, safety, performance, agency approvals, or any governmental regulations. Significant Product Characteristics can deviate from specified drawing or specification limits and be accepted "as is" if approved by Design Engineering.
- 2.5. ESD: Electro Static Discharge
- 2.6. Fabricators: perform processes to Insitu defined drawing requirements that will be part of final assemblies. This includes manufacturers of composite materials, metal fabrications, electronic subassemblies and custom packaging materials.
- 2.7. First Article Inspection: Is the initial inspection report that is to accompany the first production parts that is used as the means to verify the capability of a production process to manufacture a product that meets all drawing requirements and functional product specifications
- 2.8. Gage Repeatability and Reproducibility (R&R): A statistical tool that measures the amount of variation in the measurement system arising from the measurement device and the people taking the measurement.
- 2.9. Product Characteristics: Drawing or specification entities such as dimensions, tolerances, assembly interfaces, surface contours or shapes, materials, requirements for materials that would be an exception to an identified material specification, processes, surface preparations, etc.

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2.10. Site Quality Acceptance Rate: A rate defined as the minimum of either:

The ratio of the number of non-compliant parts divided by the total number of parts received in 3 consecutive calendar months

- or -

The number of lots received with defective parts, divided by the total number of lots received, in 3 consecutive calendar months.

3. References

QAP-83-005 Control of Nonconforming Product

QAF-82-007 Control Plan

QAF-82-008 Failure Mode and Effects Analysis

QAF-82-016 Gage Repeatability and Reproducibility

QAP-82-001 First Article Inspection

QAP-73-016 Procedure - Deviations, Waivers and Supplier Requests for Engineering Action (SREA)

QAP-56-001 Management Review

Forms are referenced in this procedure that may be used and modified by the supplier to suit their needs.

Any document referenced in this procedure will be made available electronically to our suppliers by emailing a request to quality@insitu.com.

4. Insitu Requirements to support Supplier Quality

- 4.1. Provides input on supplier qualification and on-going performance monitoring. Issue Supplier Corrective Actions Requests when required per section 9.2.
- 4.2. Provides suppliers with updated purchase orders reflecting approved Change in Designs.
- 4.3. Maintains records of supplier quality performance monitoring including nonconforming material reports via DevTrack and Supplier Corrective Actions Request (SCARs).
- 4.4. Reviews supplier quality performance and provides quality performance data to the Supply Chain Manager to include in periodic supplier performance reports to top management per section 4.2 as part of the management review process in accordance with QAP-56-001.

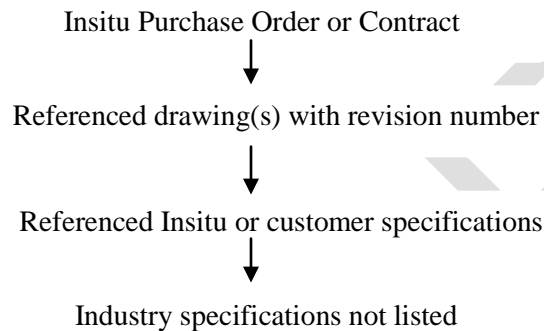
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- 4.5. Reviews all First Article Inspections and issues a SCAR for any specifications or dimensions that are not met on the First Article submission.
- 4.6. Identifies the Purchasing sole point of contact for all Insitu commitment communications with suppliers.

5. General Supplier Requirements

All products custom produced to Insitu supplied or approved drawings must comply with all drawing and purchase order requirements. These include materials, subcontracted processes and drawing tolerances.

Purchasing requirements take precedence in the following order:



When required, certification, inspection and testing requirements are specified on the purchase order or referenced documents. Certificates may include material, processing, inspection and testing results, traceability and conformance.

Contract Manufacturers and Fabricators are responsible for establishing and maintaining a documented quality system that includes the elements listed below. Insitu reserves the right to audit these systems upon request.

- Organization, personnel job descriptions, and training
- Purchase order / contract review
- Document and data control
- Product identification and traceability
- Process control
- Inspection and testing
- Maintaining internal quality metrics supporting systematic quality improvement.
- Control of qualification and inspection of measuring and test equipment
- Control of nonconforming product
- Corrective and preventive action
- Storage, handling and packaging

Suppliers are responsible for notifying Insitu Purchasing of any change to their quality system, their Quality Management Representative, and the effective date of any change requiring a First Article Inspection. When specifically requested by Insitu, the supplier will make specified quality data and or approved design data available in the English Language.

6. Records and Documents

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All documentation generated as a result of this specification must, at a minimum, be retained and kept available for review at the supplier's facility 7 years from the date of manufacturing.

If the supplier ceases to deliver product or services to Insitu within the 7 year period, all records become property of Insitu.

Records should include:

- *Who* completed the documentation
- *When* the record was made
- *Who* made additions or corrections and *when* they were made
- If the rationale for a change is not evident, additional documentation is highly recommended for explanation. A note to the side or memo to the file may serve this purpose.

Handwritten entries must be recorded legibly in ink. ***Any correction should be crossed out with a single line, initialed and dated with current date. This is so the original entry is not obscured.***

Not acceptable:

- Additions to source documents that are not initialed or signed and dated.
- Write-overs of the original entry
- Correction fluid (white-out)
- Pencil

7. Production Control

Suppliers must develop and maintain effective methods of production control. A control plan and written work instructions are the minimum requirement.

Insitu templates for control plan and failure mode and effects analysis (FMEA) forms are available to suppliers by sending a request to doc.control@insitu.com for:

QAF-82-007 *Control Plan*

QAF-82-008 *Failure Mode and Effects Analysis*

Other recommended methods of control include documented: production travelers or routers, control charts, the use of fixtures and numerically controlled equipment.

Where the supplier uses material with limited shelf-life control, a method for ensuring that the material has not exceeded the recommended shelf life prior to use is required.

When Insitu requires specific methods of production control due to the critical nature of the process or product, these requirements will be stated on Insitu purchasing documents and must be addressed in the written work instructions and the supplier control plan

8. Inspection and Testing

8.1. Incoming Inspection

Suppliers must perform an inspection prior to performing release of components/material for further processing or assembly. This inspection is to include verification that quantities/part descriptions match and that there is no damage or nonconformances. Suppliers must verify that any required certifications or test reports are included.

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Suppliers are fully responsible for controlling quality of their suppliers of subcontracted materials and processes.

In the case of Insitu-supplied items: if there is evidence of damage, nonconformances or paperwork discrepancies, the supplier must notify Insitu Quality within 3 working days of discovery. The Insitu Material Review Board will determine what action is required.

If the supplier fails to achieve and maintain 98% site quality acceptance rate, which is a prerequisite for delegated inspection authority awarded at Insitu's discretion, the supplier shall be responsible for one or more of the following as directed by Insitu:

- Obtaining source inspection from an Insitu qualified contractor at the supplier's expense
- Reimbursing Insitu for reasonable Insitu costs incurred at the point of manufacturer (i.e. supplier site) to verify product conformance
- Reimburse Insitu for reasonable Insitu costs incurred at the point of receipt to verify product conformance.

The site quality acceptance rate is a calculation of the ratio of acceptable units delivered to the total units delivered, or an alternate criteria quality acceptance rating equivalent to 98% as defined by the contracting Insitu sites.

8.2. First Article Inspection

The supplier must perform a first article inspection prior to release of production product to verify that all CPC/SPC dimensions, features, and product attributes meet specified requirements. Documentation of first article inspection must be submitted for review and approval by Insitu Quality prior to the first production shipment.

First article inspection must be performed from the first production run of a new part or following any subsequent change that invalidates the previous first article inspection result:

- The part is being introduced into production for the first time as a result of a new product development.
- The part is being sourced from a new supplier.
- The part manufacturing location has changed
- In the judgment of Insitu Engineering or Quality, that significant changes have been made to the manufacturing process/work instructions that could effect product conformance
- Changes have been made to features or characteristics identified on the engineering drawings as "Critical to Quality".
- There has been a material change as a result of a cost reduction, warranty reduction or producibility improvement effort.
- The part has been released at a new revision level

In the case of changes to an existing part, a partial first article may be acceptable if stated on the purchase order.

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Templates for first article inspection forms are available to suppliers by sending a request to doc.control@insitu.com for:

QAF-82-005 *First Article Inspection (Word format)*

QAF-82-006 *First Article Inspection (Excel format)*

The supplier may use either of these forms, modify them to best suit their needs or use their own equivalent documents.

First article inspection documentation must include:

- Part number and revision level
- Part name as shown on the drawing
- Part serial number, if applicable
- Drawing or Specification used for the inspection
- Characteristic number – a unique number for each design characteristic
- Reference location – drawing zone, page number and section, specification, etc.
- Requirement of the design characteristic including nominal and tolerances if applicable
- Measured Results for all non-referenced drawing requirements and specifications.
- Identification of acceptance or nonconformance
- Type, identification and qualification of measurement equipment used for critical/significant characteristic measurements.
- Who performed the FAI
- Date of the performed FAI
- The Control Plan that documents the supplier's plan that assures at a minimum that all Insitu defined CPC/SPCs are met.
- The results of the measurement studies/Gage R&Rs that validate the measured results on all the critical and significant characteristics.

First article characteristics found to be nonconforming are to be handled per section 9.

8.3 In-Process Inspection

Once approved for production, the supplier must monitor, at a minimum, all features identified as Critical and Significant Product Characteristics on the drawing and functional product specifications.

When sampling inspection is used by the supplier, the sampling inspection plans must be statistically valid and preclude the acceptance of lots whose samples have known nonconformities. Sampling AQL must be a minimum of 2.5.

An approved sampling plan is provided in Appendix A. If the supplier uses a different sampling plan, it may require Insitu approval, if requested.

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8.4 Inspection Records

Inspection documentation must include:

- Purchase order number with revision number from the drawing or specification specified in the purchase order
- Part or piece number inspected
- Dimension or attribute being inspected
- Criteria for acceptance and/or rejection
- A record of the measurement/inspection result
- Type of measurement instruments used
- Name of person performing the inspection and date of the inspection

See section 8.2 for specific requirements for first article inspections.

8.5 Manufacturer's Certificate of Conformance (C of C)

Unless specifically exempted by contract or purchase order, C of C's will be provided and contain the following information:

- Name and address of manufacturer
- Insitu Purchase Order or contract number
- Statement attesting that goods and services conform to all contract, and associated drawing requirements and functional product specifications, provided in the purchase request.
- Part number(s), as applicable
- Drawing number and revision level to which goods were manufactured
- Management signature & date

9. Supplier Nonconformances and Deviations on Production Product

9.1. Supplier Nonconformances found due to a supplier error are handled per QAP-83-005 *Control of Nonconforming Product*.

9.2. When Insitu notifies supplier of a detected nonconformance, the supplier shall immediately take action to eliminate the nonconformance on all products in the supplier's control. The supplier shall also maintain on file verification that root cause corrective action has occurred and has resolved the subject condition. At the specific request of Insitu, this verification shall occur for the next five (5) shipments after implementation of the corrective action to ensure detected nonconformance has been eliminated. Insitu reserves the right to review the verification data at the supplier's facility or have the data submitted to Insitu.

9.3. Supplier Corrective Action Request (SCAR): An evaluation is made to determine the extent and impact of the nonconformance. This is based on the risk to final product quality, delivery schedules and financial impact. The Quality department determines if a formal Supplier Corrective Action request is required and issues it to the supplier if required.

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- 9.4. The supplier must submit a deviation request for any known nonconformance to a Critical or Significant Product Characteristic that will not be scrapped or reworked by the supplier. Nonconforming material must be clearly identified and segregated where practical to prevent unintended use.

The supplier must have written approval from Insitu Purchasing (i.e.: a PO amendment, CID, ECN, fax, e-mail) for the deviation by Insitu prior to shipment.

9.5. Supplier Corrective Action Report

The supplier shall when requested, provide Insitu a corrective action report within fifteen (15) days of receipt of such a request unless an extension is otherwise provided by Insitu. Any corrective action report submitted to Insitu shall be in the format specified by Insitu. If after submittal to Insitu, the supplier determines need for revision, the supplier shall immediately notify Insitu of such revision. In the event the supplier is unable to respond within the allotted ten day time frame, the supplier shall submit a request for an extension which shall include the reason for the extension request and the time needed to complete the corrective action report.

The Supplier Corrective Action Report will identify:

The Root Cause of the non-compliance

The identification of the lot/serial numbers/etc. of non-compliant parts

The change in the supplier Control Plan that will eliminate the non-compliance in the future

The date the corrective action has been incorporated, and the first date the corrected material will be received at Insitu

Insitu reserves the right to reject any root cause and/or corrective action determination provided by the supplier, and may request subsequent investigation and/or corrective action to either Insitu or the Supplier initiated corrective action requests. If the supplier is late in responding to corrective action requests by Insitu, or if Insitu requires subsequent corrective action, Insitu reserves the right to withhold acceptance of shipments either at their source, or destination until the supplier corrective action is submitted to Insitu satisfaction.

9.6. Quality Metrics and Reporting

When requested by Insitu, the supplier agrees to collaborate with Insitu to develop and implement processes designed at improving the supplier's quality performance. Process will include sufficient detail to allow Insitu to evaluate the supplier's progress.

9.7. Supplier Recommendations

Suppliers are encouraged to partner with Insitu to make recommendations to material, design or processing changes that could benefit Insitu in the form of cost, time savings or product improvement during the design and development phases. **QAP-73-016** Procedure - Deviations, Waivers and Supplier Requests for Engineering Action (SREA), provide instructions for submitting an SREA.

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Once product is released for production, a deviation/SREA request is required for such a change.

The supplier must have written approval from Insitu Purchasing (i.e.: a PO amendment, CID, ECN, fax, e-mail) for the deviation by Insitu prior to making a change!

10. ESD

Insitu suppliers are required to provide ESD protection to ESD sensitive product, while it is being produced and in custody of the supplier.

11. Packaging & Labeling Requirements

Components, materials and assemblies shipped to Insitu or other Insitu suppliers for final assembly and packaging must be:

- Free of metal or fiber shavings, sharp edges or burrs.
- Free of evidence of delamination or dry weave in composite material
- Free of visible voids that cannot be cosmetically repaired by subsequent operations.
- Packaged in a manner to prevent any sliding, distortion, bending, or other damage during transit.
- Easily identified by part or assembly number clearly labeled on the packaging and additionally on the parts as identified on the part specification.

Open-cell foam shapes, closed-cell foam shapes, cardboard spacers and bubble wrap should be used to best suit the particular configuration and critical nature of the item to be shipped. Use shrink-wrap, pallets and other containers suitable to the product being shipped.

⚡ All electrostatic discharge (ESD) sensitive products must be wrapped in ESD protective bubble wrap or ESD protective bags prior to boxing. Apply identification label to the outside of the package.

Unless specified, recycled boxes or other suitable shipping containers may be used. The supplier must ensure that no prior identification labels remain on the container that may conflict with the actual contents.

Shipping documents and product labeling should provide for clear identification of contents, including purchase order number, part numbers, revisions and serial numbers. [The use of unique identifiers on product labeling, such as bar coding, is encouraged for all shipments to Insitu.](#)

Documents (packing list, MSDS, inspection sheets, etc) attached to the outside of the container must be attached to allow damage-free removal.

Document Revision History			
Rev	Date	Description	Author
0	1/6/06	Original issue to define supplier first article requirements	Paul Cater
1	8/22/06	Significant revision to expand requirements from only first article inspection to other requirements for suppliers of custom product and services. Referenced forms that can be provided to suppliers for first articles, control plans and failure mode and effects analysis. Defined AQL if sampling inspection is used and provided a statistically valid sampling plan in appendix A. Covered good practices for record keeping, defined how	Marcia Buser

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		long suppliers are to keep records based on requirements given in QAP-42-002 Records Retention. Changed title from Supplier Quality Inspection Requirements to Supplier Quality Requirements.	
2	11/28/06	Added Section 5.6, Manufacturer's Certificate of Conformance	Paul Cater
3	8/15/07	Added FAI requirements to conform to AS9102 including provision for partial FAI. Corrective action for AS9100 registration audit – see CAPA # 91, and recommendation by auditor for provision for partial FAIs. Added statement about shelf-life sensitive material control per CAPA # 94	Marcia Buser
4	4/30/08	Re-written to the Insitu format; Added the requirement for Insitu Suppliers to have a quality program in place; Added definitions and references.; Added Section 4. Insitu Requirements to support Supplier Quality; Revised record retention from 15 to 7 years; Added requirements for control plans, PFMEAs and Measurement Studies/Gage R&Rs; Enhanced 8.1 inspection requirements; Defined First Article Inspection requirements criteria; 8.2 Added Control Plan and Measurement Studies/Gage R&R requirements to First Article submission requirements; 9. Added Supplier Nonconformances and Deviations on Production Product paragraph; 10. Added ESD protection requirement.	Paul Cater; Peter Leon, Jim Lambo

**Appendix A:
C=0 SAMPLING PLANS
INDEX VALUES
(ASSOCIATED AQLS)**

From: *Zero Acceptance Number Sampling Plans*, 4th edition by Nicholas L. Squeglia

Note: The acceptance number in all cases in ZERO nonconforming

AQL⇒	.010	.015	.025	.040	.065	.10	.15	.25	.40	.65	1.0	1.5	2.5	4.0	6.5	10.0
LOT SIZE																
2 to 8	*	*	*	*	*	*	*	*	*	*	*	*	5	3	2	2
9 to 15	*	*	*	*	*	*	*	*	*	*	13	8	5	3	2	2
16 to 25	*	*	*	*	*	*	*	*	*	20	13	8	5	3	2	2
26 to 50	*	*	*	*	*	*	*	*	32	20	13	8	5	5	5	3
51 to 90	*	*	*	*	*	*	80	50	32	20	13	8	7	6	5	4
91 to 150	*	*	*	*	*	125	80	50	32	20	13	12	11	7	6	5
151 to 280	*	*	*	*	200	125	80	50	32	20	20	19	13	10	7	6
281 to 500	*	*	*	315	200	125	80	50	48	47	29	21	16	11	9	7
501 to 1200	*	800	500	315	200	125	80	75	73	47	34	27	19	15	11	8
1201 to 3200	1250	800	500	315	200	125	120	116	73	53	42	35	23	18	13	9
3201 to 10,000	1250	800	500	315	200	192	189	116	86	68	50	38	29	22	15	9
10,001 to 35,000	1250	800	500	315	300	294	189	135	108	77	60	46	35	29	15	9
35,001 to 150,000	1250	800	500	490	476	294	218	170	123	96	74	56	40	29	15	9
150,001 to 500,000	1250	800	750	715	476	345	270	200	156	119	90	64	40	29	15	9
500,001 and over	1250	1200	1112	715	556	435	303	244	189	143	102	64	40	29	15	9

*Indicates entire lot must be inspected

**SMALL LOT SIZE SUPPLEMENT
(ASSOCIATED AQLS)**

(Use for small lots when the associated AQL values are 1.5 and below)

LOT SIZE	.25	.4	.65	1.0	1.5
5-10	*	*	*	8	5
11-15	*	*	11	8	5
16-20	*	16	12	9	6
21-25	22	17	13	10	6
26-30	25	20	16	11	7
31-35	28	23	18	12	8