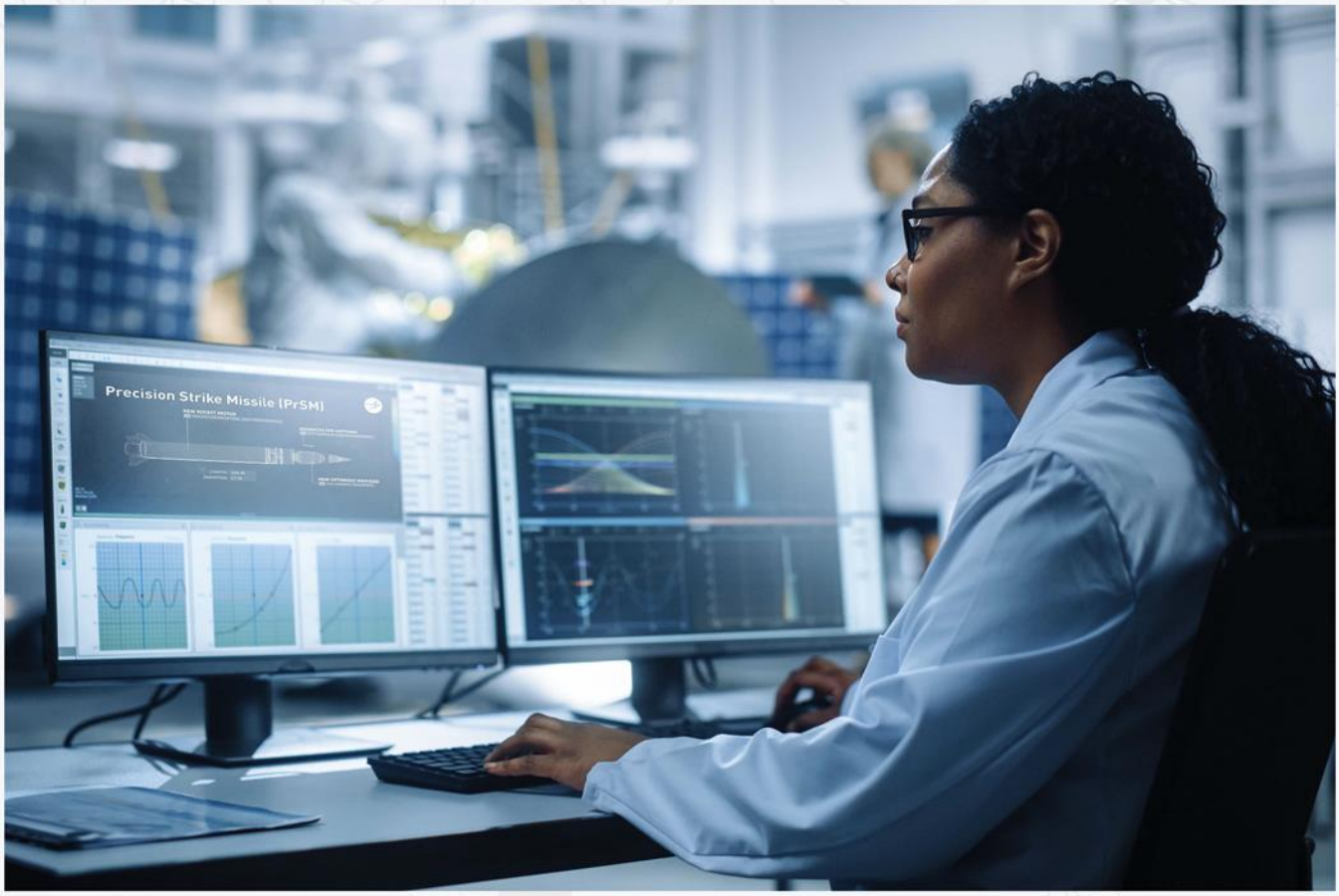
LOCKHEED MARTIN



MFC Supplier First Article Inspection Guidebook

2022 Edition

APPLICABILITY

This document applies to Lockheed Martin Missiles and Fire Control (LMMFC) procured material.

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INTRODUCTION

Purpose

This guidebook provides best practices on how to identify, plan for and satisfy Lockheed Martin Missiles and Fire Control (LMMFC) specific requirements for completing a compliant First Article Inspection (FAI). It is based on the latest revision of AS9102, Lockheed Martin Purchase Order (PO) Text Notes: MFC-IN-003, MFC-IN-004, MFC-IN-021, and MFC-IN-022, Legacy Purchase Order (PO) Text Notes: TCR823, TCR848, and 1818, and overall LMMFC expectations.

This guidebook is a reference only resource and is not a contractually binding document.

A FAI is performed to provide objective evidence that:

- All engineering, design, contractual and specification requirements are correctly understood, accounted for, verified and recorded.
- Materials, tooling, processes, documentation and personnel are capable of consistently producing compliant hardware.
- Part/assembly is 100% compliant, defined, base-lined and repeatable.

This document applies when MFC-IN-003, MFC-IN-004, MFC-IN-021, or MFC-IN-022; or Legacy TCR823, TCR848, or 1818 is required by the Purchase Order or any reference documents (such as a Statement of Work) and applies to all sub-tiers who produce design characteristics and/or sub-assemblies and detail parts including but not limited to casting, forgings, and modifications to Commercial-Off-the-Shelf (COTS) items.

Benefit

The benefit acquired from this guidebook will result in improved 1st pass yield of first article document reviews in association with continuous deliveries of compliant material that enhance a supplier's reputation.

Target Audience

The guidebook is addressed to MFC Suppliers - External Teammates such as: Supplier Quality managers, Quality Engineers, and Manufacturing Engineers.

REFERENCES

Reference Documents

- International Aerospace Standard 9102 Latest Released Revision
- LMMFC PO Requirement MFC-IN-003, MFC-IN-004, MFC-IN-021, or MFC-IN-022
- LMMFC Legacy PO Requirement TCR823, TCR848 or 1818

Forms

Description AS9102 Forms or Equivalent Forms:

- **AS9102 Form 1: PART NUMBER ACCOUNTABILITY**
  - This form is used to identify the product that is having the First Article Inspection (FAI) conducted on (e.g., detail part, subassembly, assembly) referred to as “FAI part.”

- **AS9102 Form 2: PRODUCT ACCOUNTABILITY - MATERIALS, SPECIAL PROCESSES, AND FUNCTIONAL TESTING**
  - This form is used if any materials, special processes, or functional testing is defined as a design characteristic.

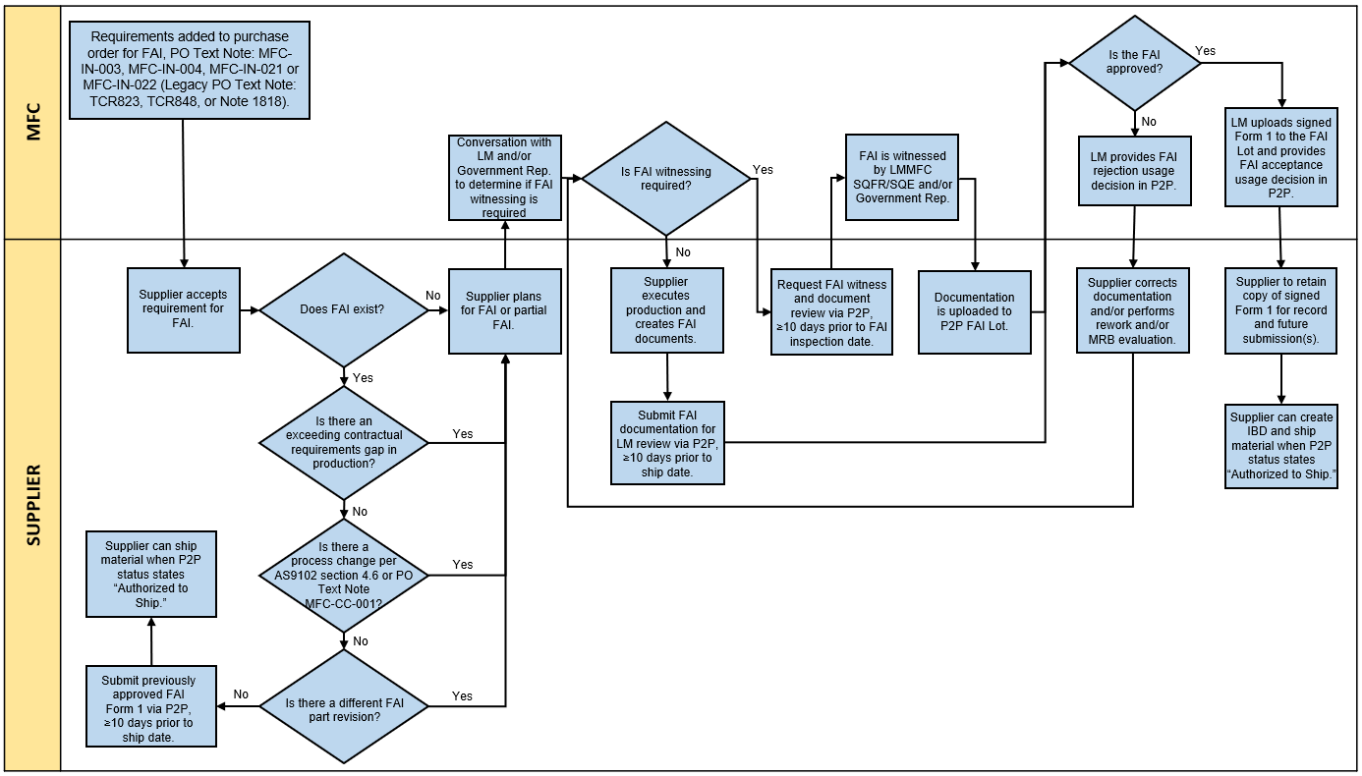
- **AS9102 Form 3: CHARACTERISTIC ACCOUNTABILITY, VERIFICATION and COMPATIBILITY EVALUATION**
  - This form is used to record inspection results for the design characteristics and to document any applicable non-conformances.

Online Resources:

- LM P2P Quick Reference Guide for Suppliers: Ship to LMC
- LM P2P Help Videos: LM P2P Videos
- AS9102 FAQ: 9102 First Article Inspection Requirement – IAQG
- MFC Procurement Website: Hosts templates, forms, and resources
- eAuditNet
- ipcvalidation.org.
- Exostar: http://portal.exostar.com.
- International Aerospace Quality Group: http://www.sae.org/aaqg/publications/

REQUIREMENTS.

The LMMFC First Article Process



Purchase Order FAI Requirement

MFC-IN-003, MFC-IN-004, MFC-IN-021, or MFC-IN-022 (Legacy TCR823, TCR848 or 1818): A FAI should be conducted by the seller and the documented results are to be accepted by a LMMFC supplier quality representative prior to any material shipment per the applicable PO Text Note, when levied on the purchase order contract. First Article Inspection is a LMMFC requirement that conforms to AS9102.

- FAI should be performed when a break in production exceeds time specified in contractual requirements per the applicable PO Text Note.
    - Production is defined as an active manufacturing process that changes the state of raw material, or components, or the assembly of components (Date of Work commencement).
    - Activities such as ordering material and issuing travelers DO NOT constitute production.
    - All other change requirements per AS9102 section 4.6 and MFC-CC-001 apply. Questions regarding FAI requirements should be directed to the buyer/procurement representative.

Program(s) may have requirement to conduct on-site FAI witnessing at supplier's facility.

- In accordance with MFC-IN-003, MFC-IN-004, MFC-IN-021, and MFC-IN-022 a request to conduct New or Partial/Delta First Article Inspection must be received at least 10 working days in advance of the planned inspection to allow for Buyer's participation if required.

- In cases where "FAI Required" is displayed within the Exostar Ship to Module, and the supplier is submitting a previously approved FAI Form 1, the supplier should request FAI Review no less than 10 days and no more than 120 days prior to the PO delivery date for each line item.
- Legacy PO Note 1818 requires 10 days advance notice prior to FAI witnessing.
- Legacy PO Note TCR823/TCR848 requires 5 days advance notice prior to the desired shipment date.

FAI Planning

The following items are to be taken into consideration prior to manufacturing compliant hardware and completing a FAI:

Pre-Planning Activities:

- Ensure that the process, planning and tooling that will produce the part being presented is one that is repeatable enough to consistently yield compliant hardware.
- Ensure that the Engineering package utilized is “Released,” and the revision is per the Purchase Order requirement.
- Hardware utilized for a FAI should be part of the first production run and may be part of the first lot of deliverable units. This FAI part should not be a qualification unit since ordinarily qualification is completed prior to FAI.
- Ensure all parts and materials included on Parts List are part of the FAI package and include a Certificate of Conformance for each.
- Verify 100% of drawing characteristics, notes, embedded specifications and subassemblies are achievable and supported with objective evidence. Ensure all process measurements are accounted for and verified prior to final assembly.
- Identify special processes for Lockheed Martin approved Special Processors in accordance with Purchase Order requirements. For LM unique special processes, such as, welding, brazing, or additive manufacturing requirements, that include industry specifications for which Nadcap or IPC does not provide accreditation, Exostar must be used to view current approvals. For Nadcap special processes accepted by Lockheed Martin, verify that the vendor is accredited and current for the special process(es) specified by using eAuditNet. For IPC special processes accepted by Lockheed Martin, verify that the vendor is accredited and current for the special process(es) specified by using eAuditNet or ipcvalidation.org.
- Ensure applicable FAI requirements are flowed down to sub-tiers and reviewed for compliance upon completion.
- Ensure controls and documented processes are in place to fulfill drawing requirements such as:
  - Quality Management Systems
  - Documented Production Processes
  - Qualification
  - Testing
  - Counterfeit Part Prevention
  - Inspection and acceptance tooling
  - Sub-tier Management
  - Appropriate training of all personnel
  - Approved Acceptance Test Procedure (ATP)/Verification Test Procedure (VTP)

- Ensure production baseline process controls are in place to achieve and maintain compliance to PO process change control requirements as defined by Purchase Order Text Note TCR842 and MFC-CC-001/Purchase Order Note 1880 – Supplier Process Change Control.
    - MFC-CC-001/TCR842/Note 1880: Supplier or contractor is to notify LMMFC of any changes to “material change” (any alteration to the design, technical specifications, materials, component sourcing, production process, facilities or location) whether instigated by seller or its sub-tier suppliers per the applicable PO Text Note, when levied on the purchase order contract.

- Purchase Order Text Note MFC-SS-004 or TCR809 Purchase Order Review: The seller should request Purchase Order Review upon receipt of the PO or prior to commencing performance and/or fabrication of the product under the PO per the applicable PO Text Note, when levied on the purchase order contract.

- Purchase Order Text Note MFC-SS-005 or TCR815 Source Inspection: Buyer reserves the right to perform in-process inspection, in-process surveillance and/or audits at any time during the life of the PO.

Equipment

- Have appropriate measurement equipment/methodology listed for each characteristic. Ensure all equipment is calibrated.

- Ensure equipment accuracy and ensure it is capable of performing the measurement. Supplier should always consider measurement system analysis studies for close tolerances such as Gage R&R.

Electronic Media Software

- Ensure use of LMMFC supplied models (this should be the latest approved model, revision, and version provided in accordance with the Purchase Order), software, etc.

- Referenced model is not to be used for manufacturing or acceptance.

- Software/Firmware – If applicable, the PO lists the Statement of Work (SOW), which contains the FAI software/firmware requirements. The SOW provides detailed instructions on the process and methods that are to be used when conducting a FAI for software/firmware requirements. Software/firmware revisions must comply with appropriate forms and specifications.

- Include document required Model/Software/Gerber file revision in Form 2 (Product Accountability – Materials, Special Processes and Functional Testing).

FAI Submittal

In accordance with MFC-IN-003, MFC-IN-004, MFC-IN-021, or MFC-IN-022 First Article Inspection:

- FAI items that do not require source inspection require documentation be provided to Lockheed Martin per MFC-IN-003, MFC-IN-004, MFC-IN-021, or MFC-IN-022 no less than 10 working days prior to the planned inspection date.

- Questions regarding FAI submittals should be directed to the Buyer's procurement representative listed on the Purchase Order.
- The FAI report is to be reviewed and approved by a LMMFC supplier quality representative prior to any material shipment per the applicable PO Text Note, when levied on the purchase order contract. Permission to ship comes after the FAI has been reviewed and approved by a supplier quality team member, and supplier has received authorization via P2P Ship-To module.
- For parts that require FAI and Source Inspection, requests must be made no less than 10 working days prior to the planned inspection date. Scheduling will accommodate any in process inspections identified during PO review. Requests are made by accessing your Exostar account at http://portal.exostar.com.

Partial FAI

The FAI requirement, once invoked, will continue to apply even after initial compliance.

The FAI requirements may be satisfied by a partial FAI that addresses differences between the current configuration and prior approved configurations. When a partial FAI is performed, the organization is to complete only the affected fields in the FAI forms. FAI requirements may also be satisfied by previously approved FAI(s) performed on identical characteristics of similar parts produced by identical means. When FAI requirements (partial or complete) are satisfied in this manner, identify the approved configuration in the index of part numbers on Form 1.

A Partial FAI is required when:

NOTE: **An asterisk (*) before the item indicates an LMMFC requirement in addition to the AS9102 forms.**

- A change in design potentially affects form, fit or function.
- A change in manufacturing source, process, inspection method, location of manufacturer, tooling, or material potentially affects form, fit or function.
- *For LMMFC designed products, a change in design (including Software/Firmware), technical specifications, component sourcing, manufacturing source(s), process(es), inspection method(s), tooling, material, facilities or location (from original manufacturing location).
- A change to numerical control program(s) or translation to another media potentially affects form, fit or function.
- A natural or man-made event which may adversely affect the manufacturing process.
- An implementation of a corrective action required to complete a previous FAI.

FIRST ARTICLE INSPECTION EXAMPLE

Ballooning an Engineering Drawing

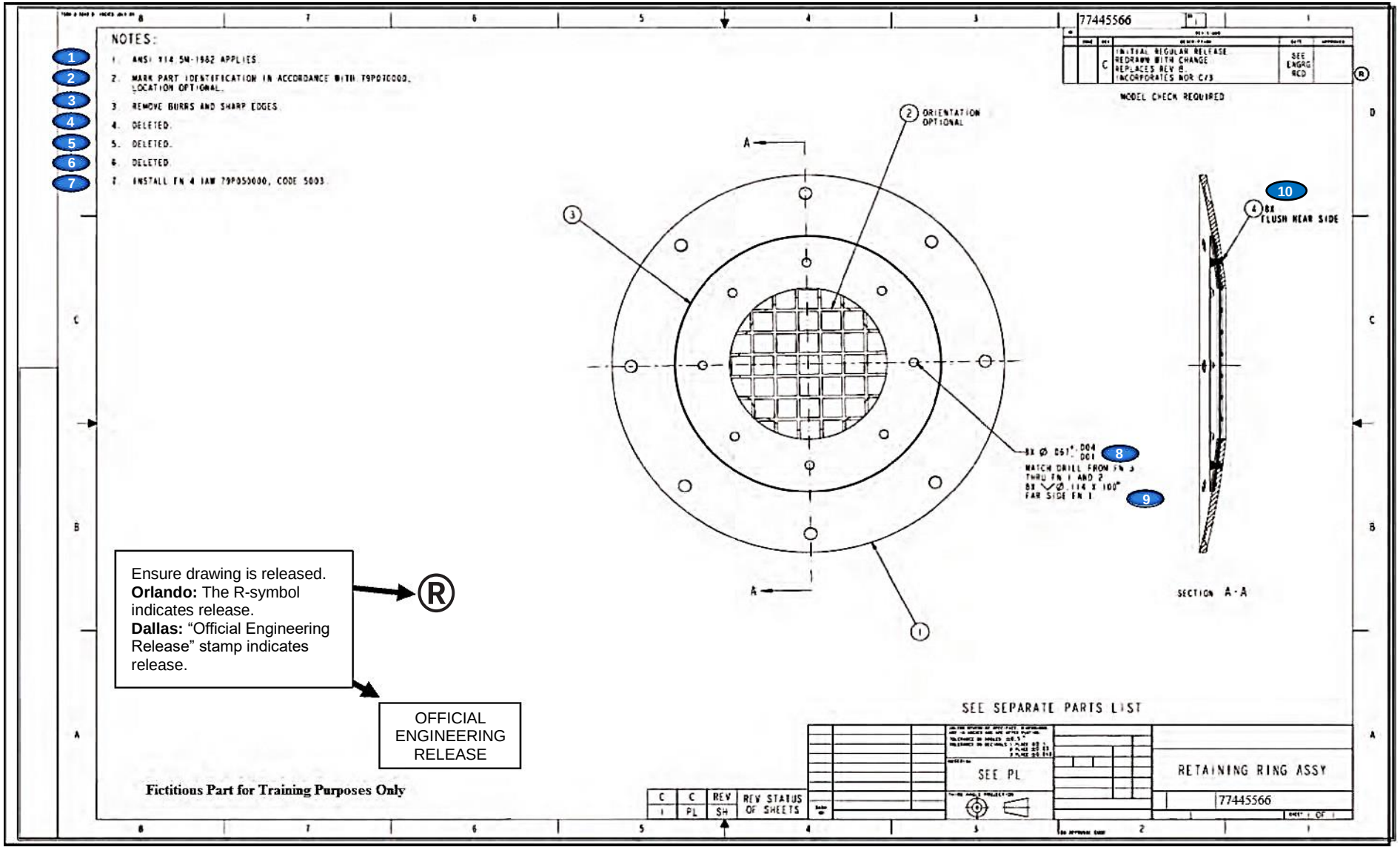
While conducting the FAI a common technique called “ballooning” is used to identify each characteristic on the drawing; this establishes an organized method to capture objective evidence that each drawing requirement is met. Ballooning is strongly recommended to ensure accuracy and completeness. It is preferred if a ballooned drawing of the accepted FAI is submitted as part of the officially documented FAI package. An alternate method to “ballooning” is to reference drawing sheet and zone location(s).

The below example highlights a top assembly drawing (with one sub-assembly) and illustrates how each required FAI form is filled out based on the example drawing requirements.

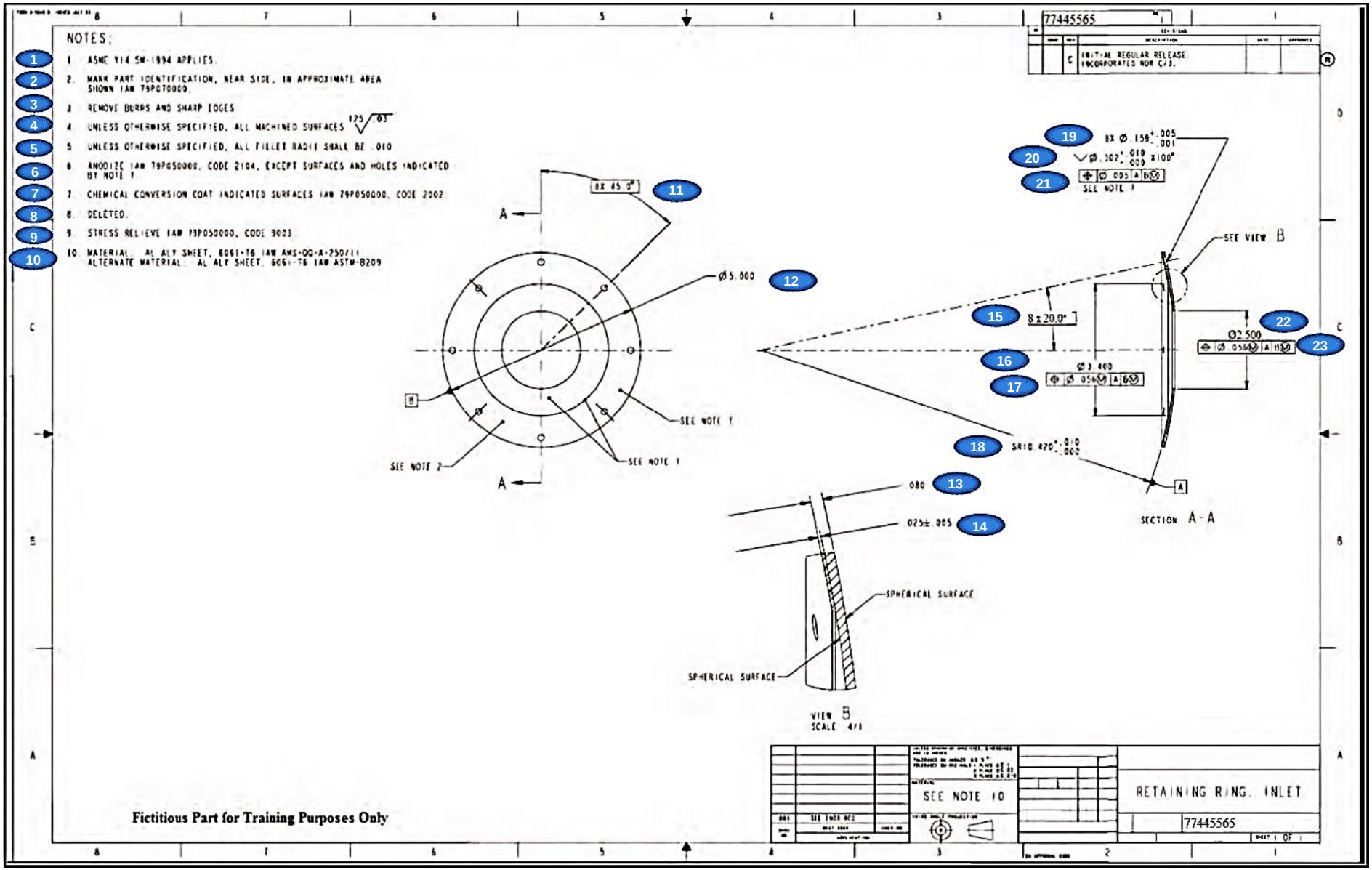
> *NOTE*: Assembly and sub-assembly FAIs are required for all LMMFC designed details, and sub-assemblies that constitute the end item as demonstrated in the example. First Article Inspection for LMMFC designed details and sub-assemblies should be performed as required by the LMMFC PO.

The example FAI contained herein will map from initial drawing ballooning all the way through completion of the FAI. The “balloons” in the example below are used to reference the item numbers listed on Form 3 (Characteristic Accountability, Verification and Compatibility Evaluation).

Top Assembly



Sub-Assembly



FAI FORM EXAMPLES

Each field in the forms below will be identified as:

- (R) Required: This is mandatory information. (These fields are depicted in bold font.)
- (CR) Conditionally Required: This field must be completed when applicable. (These fields are depicted in bold italic font.)
- (O) Optional: This field is provided for convenience. (These fields are depicted in standard font.)

AS9102 Form 1: Part Number Accountability

FORM 1 - PART NUMBER ACCOUNTABILITY

Sheet ___ of ___

1. Part Number:	2. Part Name:	3. Serial Number:	4. FAIR Number:
77445566-001	Retainer Ring Assembly	1	12345-67
5. Part Revision Level:	**6. Drawing Number:**	**7. Drawing Revision Level:**	**8. Additional Changes:**
Parts List Revision C	77445566	Revision C	N/A
9. Manufacturing Process Reference:	**10. Organization Name:**	11. Supplier Code:	12. P.O. Number:
1234	Supplier 123 Inc.	LM00123	41000000, Line Item 1
13. Detail Part: _____ **Assembly FAI:** X	**14. Full FAI:** X **Partial FAI:** _____ **Baseline Part Number (including revision level):** **Reason for Partial FAI:**		

a) If above part number is a detail part only, go to field 19.
b) If above part number is an assembly, go to the "INDEX" section below.

INDEX of part numbers or sub-assembly numbers required to make the assembly noted above.

15. Part Number:	16. Part Name:	17. Part Serial Number:	18. FAIR Number:
77445565-001	Retainer Ring	N/A	12345-89

19. Signature:		20. Date:
John Smith	X FAI Complete ___ FAI Not Complete	05/03/2015
21. Reviewed By: Jane Doe	Jane Doe	22. Date: 05/03/2015
23. Customer Approval :		24. Date:

MFC Expectation for Proper Form AS9102 Form 1 Completion

1. (R) Part Number: Number of the FAI part [e.g., customer part number contained on the purchasing documents; part number from the associated Bill of Materials (BOM); manufacturer part number from internal parts, when customer part number is not available].
2. (R) Part Name: Name of the FAI part.
3. (CR) Serial Number: Serial number of the FAI part; unique identifier assigned to a detail part, sub-assembly, or assembly by the organization or customer.
4. (CR) FAIR Number: Reference number that identifies the First Article Inspection Report (FAIR); this may be an internal report number.
5. (CR) Part Revision Level: Latest revision that affects the FAI part being inspected. If the part has not been revised indicate as such (e.g., N/C, No Change).

   NOTE: The latest drawing or DPD revision (see field 7) does not always affect all parts contained on a drawing or DPD.
6. (CR) Drawing Number: Drawing number or DPD data set associated with the FAI part; drawing may be from customer, internal system, or design definition.
7. (CR) Drawing Revision Level: The revision level of the drawing or DPD data set associated with the FAI part. If the drawing has not been revised, indicate as such (e.g., N/C, No Change).

   NOTE: Specify parts list revision level (if applicable) in addition to the drawing revision level.
8. (CR) Additional Changes: Provide reference numbers of any changes that are incorporated in the product, but not reflected in referenced drawing/part revision level (e.g., change in design, engineering changes, manufacturing changes, deviation or exclusion from certain drawing or DPD requirements).
9. (R) Manufacturing Process Reference: Reference number that provides traceability to the manufacturing record of the FAI part (e.g., router number, manufacturing plan number). Additional information such as lot number, batch number, date code, or line number may be included, as needed, to provide traceability to the specific manufacturing lot.

   NOTE: Add the Manufacturing Work Order Number information as required.
10. (R) Organization Name: Name of the organization performing this FAI.
11. (O) Supplier Code: A unique number given by customer to the organization; sometimes referred to as Vendor Code, Vendor Identification Number, or Supplier Number.

    NOTE: This unique code begins with LM and is followed by a distinct grouping of numbers for each supplier (LMXXXXXX).
12. (O) P.O. Number: Customer Purchase Order number, as applicable.
13. (R) Detail FAI/Assembly FAI: Check, as appropriate.
14. (R) Full FAI/Partial FAI: Check, as appropriate.

NOTE: For a partial FAI, provide the previous part number, (including revision level) to which this partial FAI is performed and the reason for its current FAI (e.g., changes in design, process, or manufacturing location). For partial FAIs based on similar parts (reference AS9102, 4.6), provide the approved configuration FAI part number, including revision level.

NOTE: Baseline Part Number: For a partial FAI, provide the previous FAI part number or approved configuration (including revision level) to which this partial FAI is performed. State the reason for the current FAI (e.g., changes in design, process, or manufacturing location). For a partial FAI based on similar parts (reference AS9102, 4.6), provide the approved configuration FAI part number, including revision level.

15. (CR) Part Number: Part number included in the assembly and items from the BOM included in the drawing, DPD, or next level assembly. Typically, these are the part numbers, standard catalogue items, or sub-assembly numbers required to complete the product noted in field 1.

    NOTE: This entry is required only if the part number in field 1 is an assembly requiring lower-level parts to be installed into the assembly.

16. (CR) Part Name: Name of the part installed in the assembly.

    NOTE: This entry is required only if the part number in field 1 is an assembly requiring lower-level parts to be installed into the assembly.

17. (CR) Part Serial Number: Serial number of the part that is installed in the assembly, as applicable.

    NOTE: This entry is required only if the part number in field 1 is an assembly requiring lower-level parts to be installed into the assembly.

18. (CR) FAIR Number: Report number for the detail parts and associated assemblies.

    NOTE: This entry is required only if the part number in field 1 is an assembly requiring lower-level parts to be installed into the assembly.

19. (R) Signature: Printed name or unique identification, and signature of the person approving the FAIR. This signature certifies the evaluation activities in AS9102, 4.5 are complete and the FAIR is approved. The preparer may be the Supplier. Check "FAI Complete" if all characteristics are conforming. Check "FAI Not Complete", if nonconforming characteristics are documented in accordance with AS9102

    NOTE: Electronic identification or signature are both acceptable.

20. (R) Date of Preparation: Date when field 19 was signed.

21. (O) Reviewed by (Quality Management or Designee): Printed name or unique identification, and signature of the person from the organization who approved the FAIR.

    NOTE: Electronic identification or signature are both acceptable.

22. (O) Date of Review: Date when field 21 was signed.

23. (O) Reviewed by Lockheed Martin Supplier Quality Engineer. Print name or unique identification, and signature of the person who approved the supplier FAIR.

    NOTE: Electronic identification or signature are both acceptable.

24. (O) Date of Customer Approval: Date when field 23 was signed.

AS9102 Form 2: Product Accountability – Materials, Special Processes and Functional Testing

FORM 2 - PRODUCT ACCOUNTABILITY - MATERIALS, SPECIAL PROCESSES, AND FUNCTIONAL TESTING

Sheet ___ of ___

1. Part Number:	2. Part Name:		3. Serial Number:		4. FAIR Number:
77445566-001	Retainer Ring Assembly		1		12345-67
5. Material or Process Name:	**6. Specification Number:**	7. Code:	**8. Supplier:**	**9. Customer Approval Verification:**	**10. Certificate of Conformance Number:**
Rivet Solid CS 1000	MS20426L	N/A	ABC Rivets, 10 Elm St. Boston, MA LM004321	N/A	PO 98765
Sealant	MIL-PRF-2333777D	N/A	Sam's Sealants, 99 43rd St., San Jose, CA LM 006789	N/A	PO 98765

11. Functional Test Procedure Number:	12. Acceptance Report Number:

13. Comments

14. Signature	15. Date
John Smith *John Smith*	05/03/2015

MFC Expectation for proper AS9102 Form 2 Completion

1. (R) Part Number: Number of the FAI part [e.g., customer part number contained on the purchasing documents; part number from the associated Bill of Materials (BOM); manufacturer part number for internal parts, when customer part number is not available].
2. (R) Part Name: Name of the FAI part.
3. (CR) Serial Number: Serial number of the FAI part; unique identifier assigned to a detail part, sub-assembly, or assembly by the organization or customer.
4. (CR) FAIR Number: Reference number that identifies the First Article Inspection Report (FAIR); this may be an internal report number.
5. (CR) Material or Process Name: Name of applicable materials or special processes.

   NOTE: List material certifications and any special process referenced on the engineering drawing.
6. (CR) Specification Number: Provide the following information:

   - Material specifications and material form (e.g., sheet, bar) for all materials incorporated into the FAI part (e.g., weld or braze filler).
   - Special process specifications: including class, if applicable, and permitted substitutions.
   - If standard catalogue items (e.g., fasteners) or COTS are modified, then list that standard hardware or COTS item.
7. (O) Code: Any required code from the Customer for material or process listing, as applicable.
8. (CR) Supplier: Identify supplier name, address, and code performing special processes or supplying material. Supplier name and address may be used when supplier code is not available or not adequate for identification.

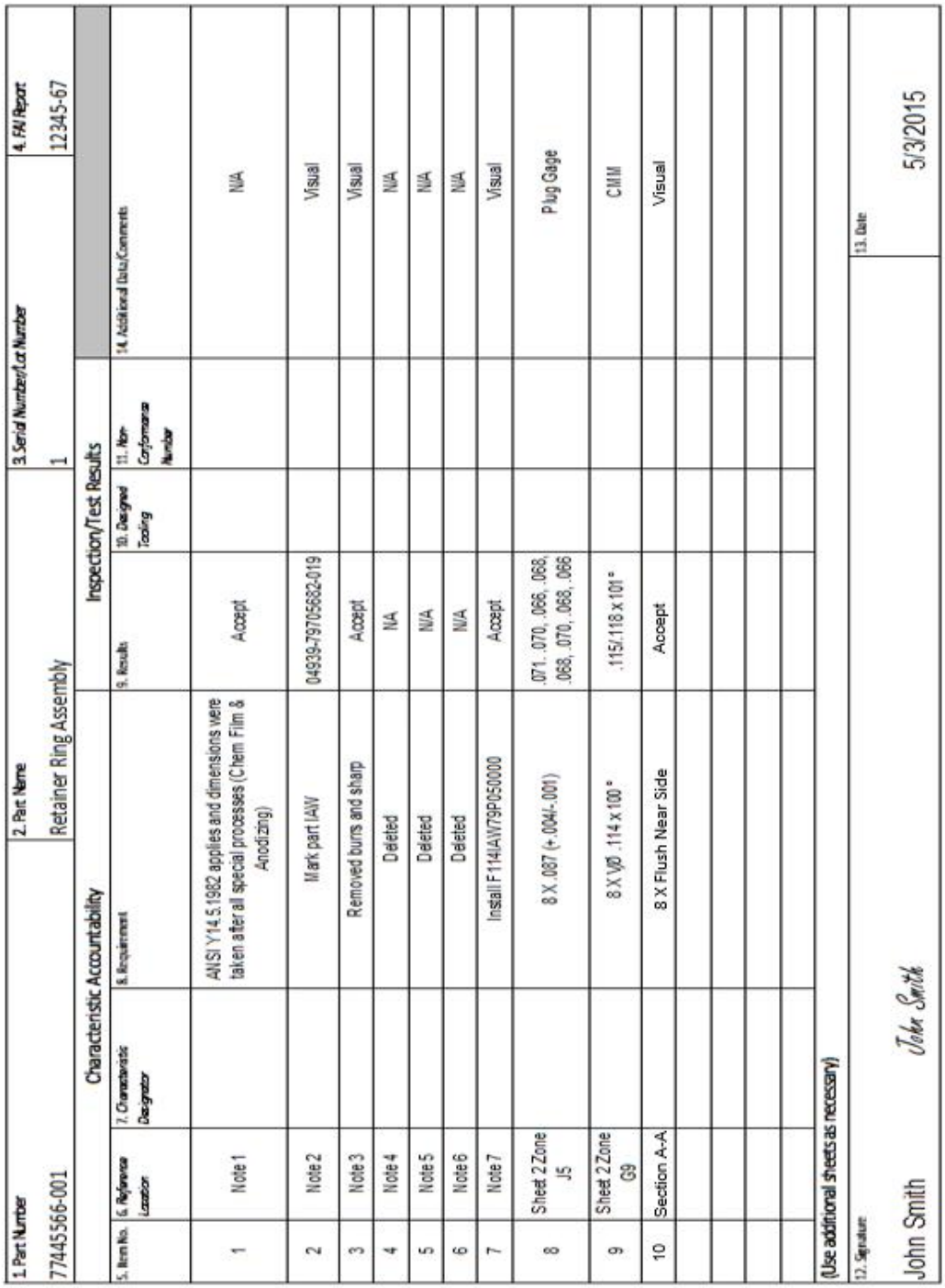
   NOTE: For Nadcap special processes, verify that the vendor is accredited and current for the special process(es) specified in block 5 by using eAuditNet.

   NOTE: For LMMFC unique processes, such as, welding, brazing and additive manufacturing, verify that the vendor is approved and current for the special process(es) in block 5 by using Exostar. Please refer to PO Note MFC-DC-020.
9. (CR) Customer Approval Verification: Indicate if the special process(es) or material sources are approved by Nadcap or the Customer. Enter “Yes” is approved; “No” if approval is required, but process source is not approved; or Write "NA" if Customer approval is not required.
10. (CR) Certificate of Conformance Number: The applicable certificate number (e.g., special process completion certification, raw material test report number, modified standard catalog item compliance report number, traceability number, P.O. number, lot number, job number etc.).
11. (CR) Functional Test Procedure Number: Functional Test Procedure number identified as a design characteristic.

12. (CR) Acceptance Report Number: The functional test certification indicating that test requirements have been met.
13. (O) Comments: Provide supporting comments, as applicable.
14. (R) Signature: Printed name or unique identification, and signature of the person who prepared and approved this form. Signature indicates that all applicable materials, special processes, and functional testing are accounted for, meet requirements, are properly documented, and all associated nonconformances are documented on AS9102 Form 3, “Characteristic Accountability, Verification, and Compatibility Evaluation”.
15. (R) Date: Date when block 14 was signed.

AS9102 Form 3: Characteristic Accountability, Verification and Compatibility Evaluation (Assembly)

FORM 3 - CHARACTERISTIC ACCOUNTABILITY, VERIFICATION, AND COMPATIBILITY EVALUATION



1. Part Number: 77445566-001			2. Part Name: Retainer Ring Assembly			3. Serial Number/Lot Number: 1			4. FAI Report: 12345-67
Characteristic Accountability				Inspection/Test Results					
5. Item No.	6. Reference Location	7. Characteristic Designator	8. Requirement	9. Results	10. Designed Tooling	11. Non-Conformance Number	14. Additional Data/Comments		
1	Note 1		ANSI Y14.5.1982 applies and dimensions were taken after all special processes (Chem Film & Anodizing)	Accept			N/A		
2	Note 2		Mark part IAW	04939-79705682-019			Visual		
3	Note 3		Removed burrs and sharp	Accept			Visual		
4	Note 4		Deleted	N/A			N/A		
5	Note 5		Deleted	N/A			N/A		
6	Note 6		Deleted	N/A			N/A		
7	Note 7		Install F114IAW79P050000	Accept			Visual		
8	Sheet 2 Zone J5		8 X .087 (+.004/-.001)	.071, .070, .066, .068, .068, .070, .068, .066			Plug Gage		
9	Sheet 2 Zone G9		8 X ⌀0 .114 x 100°	.115/.116 x 101°			CMM		
10	Section A-A		8 X Flush Near Side	Accept			Visual		
(Use additional sheets as necessary)									
12. Signature: John Smith *John Smith*							13. Date: 5/3/2015		

Assembly Example

AS9102 Form 3: Characteristic Accountability, Verification and Compatibility Evaluation (Sub-Assembly)

First Article Inspection Report

Form 3: Characteristic Accountability, Verification and Compatibility Evaluation

1. Part Number	2. Part Name	3. Serial Number	4. FAI Report
77445585-001	Retainer Ring	N/A	12345-89

Characteristic Accountability					Inspection / Test Results		
5. Item No.	6. Reference Location	7. Characteristic Designator	8. Requirement	9. Results	10. Designed Tooling	11. Non-Conformance Number	14. Additional Data/Comments
1	Note 1		ANSI Y14.5 1982 applies and dimensions were taken after all special processes (Chem Film & Anodizing)	Accept			N/A
2	Note 2		Parts marked 123456-01 in designated area Mark IAW 79P070000	Accept			Visual
3	Note 3		Removed burrs & sharp edges	Accept			Visual
4	Note 4		All machined surfaces exhibit 125 √ 0.3	Surface Finish √32			Profilometer
5	Note 5		Unless otherwise specified (UOS) Fillet Radii .010	Less than 0.01			Radius Gage
6	Note 6		Anodized IAW 79P050000 Code 2104	Accept			Certificate of Conformance from Plating Supplier (See attached certification)
7	Note 7		Chemical Filmed IAW 79P050000 Code 2002	Accept			Certificate of Conformance from Plating Supplier (See attached certification)
8	Note 8		Deleted	N/A			N/A
9	Note 9		Stress Relief IAW 79P050000 Code 9003	Accept			Certificate of Conformance from Heat Treat Supplier (See attached certification)
10	Note 10		Material AL ALY Sheet 6061-T6 IAW AMS-QQ-A-250/11 used for parts	Accept			Certificate of Conformance from Raw Material Supplier (See attached certification)
11	Sht.1 Zone C5		8 x 45.0° (Basic Dimension)	44.7/45.3°			CMM
12	Sht. 1 Zone C4		Ø 5.000 (+/-.010)	5.004			CMM
13	Sht. 1 Zone B3		0.080 (+/-.010)	0.087			CMM
14	Sht. 1 Zone B3		0.025 (+/-.005)	0.027			CMM
15	Sht. 1 Zone C3		8 x 20.0° (Basic Dimension)	20.3/20.5°			CMM
16	Sht. 1 Zone C2		Ø 3.400 (+/-.010)	3.405			CMM
17	Sht.1 Zone C2		⌖.056/A/B	0.003			CMM
18	Sht. 1 Zone B2		SR 10.420 (+.010)	10.428			CMM
19	Sht. 1 Zone D2		Ø 8 x .189(+.005/-.001)	0.16			Pin Gage
20	Sht. 1 Zone D2		8x √Ø.302(+.010/-.000) x 100° (+/-.5°)	.311 x 100°/.302 X 100°			CSK Micrometer
21	Sht. 1 Zone D2		8x ⌖.005/A/B	0.001/0.002			CMM
22	Sht.1 Zone C1		Ø 2.500 (+/-.010)	2.505			Caliper
23	Sht. 1 Zone C1		⌖.056/A/B	0.009			CMM

(Use additional sheets as necessary)

12. Signature		13. Date
John Smith	John Smith	05/03/2015

Sub-Assembly Example

MFC Expectation for Proper AS9102 Form 3 Completion

1. (R) Part Number: Number of the FAI part [e.g., customer part number contained on the purchasing documents; part number from the associated Bill of Materials (BOM); manufacturer part number for internal parts, when customer part number is not available].
2. (R) Part Name: Name of the FAI part.
3. (CR) Serial Number: Serial number of the FAI part; unique identifier assigned to a detail part, sub-assembly, or assembly by the organization or customer.
4. (CR) FAIR Number: Reference number that identifies the First Article Inspection Report (FAIR); this may be an internal report number.
5. (R) Char. No.: Unique assigned number for each Design Characteristic.

   NOTE: A single design callout that applies to multiple characteristics may be recorded as one characteristic number.
6. (CR) Reference Location: Location of the Design Characteristic [e.g., drawing zone (page number and section), DPD model location, specification callout].

   NOTE: If drawing is not ballooned, reference locations are required.
7. (CR) Characteristic Designator: If applicable, record characteristic type [e.g., critical items (see AS9100 clause 3.3), key characteristics (see AS9100 clause 3.4), flight safety, defined by customer].
8. (R) Requirement: Specified requirement for the Design Characteristic (e.g., drawing or DPD dimensional characteristics with associated nominal dimension and tolerances, drawing notes, specification requirements, etc.).

   NOTE: The organization should record the requirements in the units specified on the drawing, DPD, or specification, unless otherwise approved by the customer.
9. (R) Results: List measurement(s) obtained for the Design Characteristics. For marking, document actual part marking in Results field.

   NOTE: The organization should record results in the units specified on the drawing, DPD, or specification, unless otherwise approved by the customer.

   - For Multiple Characteristics, list each characteristic as individual values or list with the minimum and maximum of measured values attained. If a characteristic is found to be nonconforming, then that characteristic should be listed separately with the measured value noted.
   - When qualified tooling (e.g., radius gauges) is used as a go/no-go gage (reference AS9102, 4.7.3.b), record the results as an attribute (e.g., pass/fail).
   - When automated inspection tooling produces measurement results, those results may be referenced on AS9102 Form 3, identified as pass/fail, and attached only when:
     - The characteristic numbers are clearly linked in the attached report.
     - The results in the attached reports are clearly traceable to the characteristic numbers.

- The results are directly comparable to the design characteristic.

  NOTE: Coordinate Measurement Machine (CMM) data alone would not be acceptable for a positional tolerance; the results should show the actual positional value.

- If a Design Requirement requires verification testing, record the actual results on the form. If a laboratory report or certificate of test is included in the FAIR, the results may be recorded as an attribute (e.g., pass/fail) and the test reference number recorded on the forms. The laboratory report or certificate of test should show specific values for requirements and actual results. Attach copies of reports or certificate, as applicable.
- For characteristics with visual verification requirements that are rated against standard photographs, list the photo number of the closest comparison. A statement of conformance is acceptable; record the reference number on the forms.
- For processes that require verification per Design Characteristic, include statement of conformance (e.g., certification of compliance, verification indicator such as “accept,” etc.).
- For part marking, ensure that marking is legible, correct in content and size and properly located, per applicable specification.
- For characteristics verified by attribute inspection include statement of conformance (e.g., accept).

10. (CR) Designed/Qualified Tooling: When designed tooling or specially designed tooling, including Numerical Control (NC) programming as a media of inspection, is used for attribute acceptance, record the gauge value or range (e.g., minimum/maximum value), as applicable.
11. (CR) Non-Conformance Number: If the characteristic is found to be nonconforming, record a nonconformance document reference number.

    NOTE: Any nonconformances must be dispositioned and closed out per internal requirements (i.e., MRB, RC/CA, etc.). Supporting documents should be added to FAI package. If this is a Lockheed Martin part number, MRB authority must be granted by Lockheed Martin.

12. (R) Signature: Printed name or unique identifier, and signature of the person who prepared and approved this form. Signature indicates that all applicable design characteristics are accounted for and meet requirements or are properly documented (reference AS9102, 4.4).

    NOTE: Electronic identification and signature are both acceptable.

13. (R) Date: Date when field 12 was signed.
14. (O) Additional Data/Comments: This area is reserved for optional fields; add additional columns, as required, by the organization or customer.

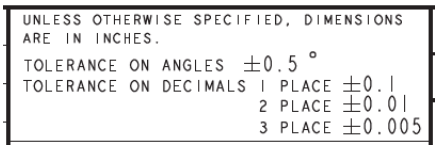
COMMON ERRORS WHICH CAUSE FAI REJECTION

The topics listed below are common mistakes found in submitted FAI packages.

- All Dimensions and/or notes not accounted for.
  - Any notes that contain a dimension should have a physical measurement recorded. The use of “accept” or “OK” is not permitted.

- Incorrect or missing special process flow down requirements such as:
  - Special process supplier(s) are to be LMMFC approved per purchase order requirements.
  - Supplier should build to Model Based Data Set Engineering Requirements per purchase order.

- Incorrect tolerances assigned to dimension resulting in part non-conformance.
  - Standard dimension tolerances such as .100 (three place decimal meaning +/- .005) are found in the tolerance block located in the lower right part of the drawing as shown below.



- Incorrect Raw material/adhesives information provided.
  - Shelf life cannot be expired; appropriate adhesive(s) are to be used on labels, etc.
  - Raw Material required to be indicated on AS9102 Form 2.

- Parts for an assembly identified on the wrong form.
  - Parts for an assembly are required to be indicated on AS9102 Form 1.

- Incorrect revision level.
  - Ensure PO revision matches released engineering specified for item(s) on FAI report. If part revision is not identified on the PO, contact Buyer's procurement representative prior to initiating FAI submittal.
  - Verify the required revision of LMMFC specifications, like 79P050000, by using the link provided on the PO or by contacting the Buyer's procurement representative. Indicate all revision levels in block 6 of AS9102 Form 2.
  - Ensure through LMMFC Procurement that you are working to the latest released engineering.

    NOTE: There are many types of drawings and release processes. Most drawings will have an (R) (Orlando)/or “Official Engineering Release” (Dallas) symbol normally at the top right of the first page of the drawing indicating released. If this does not appear, check with LMMFC Procurement.
  - Special Process certifications should be to the latest revision. This is a standard PO Note for all PO’s (TCR838/MFC-PR-001).

- Incorrect inspection equipment used or not noted on FAI report.
  - When inspection equipment is listed, ensure that inspection equipment has sufficient measurement accuracy for requirements being measured and ensure it is recorded on AS9102 Form 3. Use of Gage Repeatability and Reproducibility (R&R) to validate measurement repeatability should be a part of the process development effort.

- Wrong part number identified on FAI form(s).

- The part number listed on the FAI is to be the Lockheed Martin part number listed on the purchase order, not a COTS or manufacturer's part number.
- There are to be no typo's, missing dash numbers, and/or missing designators such as Q1, D1, TPSS, etc.
  Example: If the purchase order requires P/N 7979797-003 Q1 the FAI form is to read the full P/N: 7979797-003 Q1.

- Missing Certificates of Conformance, test reports, and FAI forms as part of the FAI package.
  - Ensure there is no Missing/Incomplete sub-tier supplier data such as:
    - Improper material alloy listed
    - Incorrect special process used
    - Incorrect specification revision levels listed
  - Ensure supplier equivalent forms meet the AS9102 form requirements.

- FAI form(s) not signed/approved by appropriate representative and/or dated.
  - AS9102 Form(s) 1, 2, and 3 should be signed by the preparer of the FAI.

- Incomplete recording of "multiple actuals."
  - A feature that is required multiple times requires recording multiple actuals.
    Example: FIN #6 must be installed in 12 places (need to indicate 12 places or measurements as defined by engineering). This can include a range with max/min indicated.
- Incorrect special processes type or class.
  - Ensure that the special process type and/or class is the same as called out on the drawing.

FREQUENTLY ASKED QUESTIONS

The items listed below describe and answer FAQs concerning Supplier First Article Inspection.

- What forms are required for a partial First Article Inspection?
  - AS9102 Forms 1 through 3 are required for all First Article Inspections. Complete only the affected fields for the characteristics that need to be revalidated.

- Do drawing notes that contain dimensions need to have a measurement recorded?
  - Yes. All dimensions should have a measurement, tolerance and inspection method recorded per AS9102.

- Will use of unapproved Lockheed Martin Special Processors cause my First Article to be rejected?
  - Yes. This is also considered a part nonconformance.

- Why was the equipment or instrument recorded rejected?
  - The Supplier Quality Engineer reviewing the First Article does not have confidence a valid, repeatable and reproducible measurement is obtainable.

- What are the most common documentation errors that cause a First Article Inspection Report to Fail?
  - Typo errors: (inverted numbers and tolerances, etc.)
  - Part numbers and subassembly parts missing (form 1)
  - Incorrect revision level (form 1)
  - Missing specification revision (form 2)
  - Visual inspection method used for a dimension (form 3)
  - Special process hierarchy not complete (form 2)
  - Special process supplier code & supplier missing (form 2)

- When a feature indicates multiple places are measurements required for each place?
  - Yes. A feature that is required multiple times requires multiple actual.

- If material certifications, test reports are not included will my first article be rejected?
  - Yes. All documentation is required for objective evidence to demonstrate the First Article meets requirements.

- Can I develop my own acceptance tooling for use without Lockheed Martin approval?
  - No. All supplier self-developed acceptance tooling must be approved by Lockheed Martin.

- What is the best process to ensure a measurement process will produce repeatable and reproducible results?
  - A Gage Repeatability and Reproducibility study.

- What should I do if a P2P FAI lot is rejected?
  - Select the line with the rejected FAI lot in the P2P Ship-To Portal.
  - Select "Lot Attachments" and the bottom on the page.
  - Select the line with rejection comments and select "Display."

    - Once rejection comments have been addressed, a new FAI lot will need to be initiated for the line item in the P2P Ship-To portal with uploaded documentation.

- How do I know if documentation successfully uploaded to the P2P FAI lot?
    - After uploading documentation, return to the P2P Supplier PO and FQR List page.
    - Select "Refresh Selection."
    - Documentation was successfully uploaded if an "X" appears in the "Lot Attachment" column of the FAI inspection lot line.
    - If there is no "X," select the FAI lot line item and select "Lot Attachments."
    - Upload documentation again.

- What is the limit on P2P upload attachment size?
    - 100 MB

- Does an FAI Lot apply to all line items of the same material on a PO?
    - No, each line item requires its own FAI lot and uploaded documentation.

- What if I have additional questions concerning the completion of a First Article Inspection?
    - Questions can be directed to Lockheed Martin Procurement.

- For any additional questions, please go to http://www.sae.org/aaqg/publications/.

DEFINITIONS

- **Approved FAI**: Documented approval from LMMFC Supplier Quality representative. Approval is required to ship material unless otherwise directed by LMMFC.
- **Ballooning**: This technique establishes an organized method to capture objective evidence that each drawing requirement is met. Ballooning is recommended to ensure accuracy and completeness. It is preferred if a ballooned drawing of the accepted FAI is submitted as part of the officially documented FAI package.
- **Certificates of Conformance (C of C)**: The Seller should submit with each shipment, a Certificate of Conformance which is to be dated and bear the signature, electronic equivalent, or electronically generated title of an authorized contractor's Representative, stating that the materials furnished to Lockheed Martin are in conformance with applicable requirements of the Contract, drawings, and specifications, and that supporting documentation is on file and will be made available to Lockheed Martin or Government Representatives upon request. Certification should include at a minimum: name of contractor of materials being supplied, quantity shipped, and Buyer Purchase Order Number, per the applicable PO Text Note MFC-DC-003, when levied on the purchase order contract.
    - An example of an acceptable statement of Certification of Conformance is as follows: “This is to certify that all items noted are in conformance with the Contract, drawings, specification and other applicable documentation, that all process certifications, chemical and physical test reports, are on file at this facility and are available for review by Lockheed Martin.”
- **Change Control**: Formal process used to ensure that changes to a product or system are introduced in a controlled and coordinated manner throughout the life cycle. This includes flowing the change through the appropriate channels within Lockheed Martin before incorporation.
- **Corrective Action**: Action(s) to eliminate the cause(s) of a detected nonconformity or other undesirable situation in order to prevent recurrence. The FAI is not complete until the organization closes all non-conformances affecting the part and implements corrective actions. The organization should implement corrective action(s) and perform a partial FAI for all affected characteristics on the next production run, after implementation of the associated corrective action(s). If the partial FAI does not clear all identified nonconformances, the FAI is still “not complete” and the requirement to complete the FAI is still in effect per AS9102.
- **Equivalent Form**: Interchangeable AS9102 or company specific AS9102 equivalent forms.
- **First Article Inspection**: A procedure that provides objective evidence that all engineering, design and specification requirements are correctly understood, accounted for, verified, recorded, and that the combination of material, tooling, processes, documentation and personnel is capable of producing compliant hardware. FAI includes the manufacturing/inspection planning, manufacturing processes, tooling and software, (Numerical Control (N/C) tapes and Coordinate Measuring machine programs), test, inspection methods and equipment used in the fabrication of products.

- **FAI Plan**: A documented plan for the company's FAI procedure. Preparation requires gathering all source documents including Contract requirements (Purchase Order), Ballooned engineering drawings, specifications referenced in drawings, embedded or layered specifications, raw material certifications, Capability Maturity Model data, planning/shop routers, documentation validating integrity, production processes (i.e., soldering, plating, heat treating, etc.)
- **FAI Rejection**: First Article Inspection Reports where nonconformance/s are identified will have Form 1 marked as "Not Complete." Nonconforming product cannot be delivered to the Buyer without being reworked, Material Review Board approval (Buyer approved Waiver or other document) or covered by drawing change. The FAI will remain in a not complete status until the corrective actions associated with nonconformance have been completed, a subsequent build has been accomplished and an acceptable FAI has been completed. Any non-conformances must be dispositioned and closed out per internal requirements (i.e., MRB, RC/CA, etc.). Supporting documents should be added to the FAI package.
- **Manufacturing Suffix Part Number**: A part number with a qualifier at the end (such as Q1, D1, TPSS). Part numbers with a manufacturing suffix have additional documentation indicating the part will deviate from engineering in some way. Ensure the technical data or engineering package received includes the required documentation. Contact the Buyer's procurement representative if the documentation is missing.
- **Partial FAI** (See MFC-IN-003/MFC-IN-004/MFC-IN-021/MFC-IN-022): See above section on partial/delta or complete re-accomplishment of a FAI.
- **Source Inspection**: LMC supplier quality reserves the right to perform in- process inspection, in-process surveillance and/or audits at any time during the life of the purchase order. Parts, assemblies, processes and tests are subject to detailed inspection by the LMC quality representative prior to assembly, test and/or delivery when required. Such inspections, tests and mandatory inspection points (MIPs) should be identified during the purchase order review process, and failure to comply with agreed upon MIPs with LMC supplier quality can be cause for rejection of completed end items per the applicable PO Text Note MFC-SS-005/TCR815, when levied on the purchase order contract.
- **Special Process**: A documented method used to manufacture products where a product undergoes a physical, chemical or metallurgical transformation where conformance to the specification cannot be readily verified by normal inspection methods, and the quality of the product depends on use of specific equipment operated in a specific manner, under controlled conditions, by trained personnel with instructions, procedures and standards. All special processes must be performed in accordance with LMMFC PO Text Note MFC-DC-020.
- **Sub-tier**: Any and all suppliers that the contracted supplier uses for products and/or services.
- **Variables Data**: Quantitative measurements taken on a continuous scale.
    - For example, the diameter of a cylinder or the gap between mating parts.

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