



FNM LLC  
Quality Assurance Provision

**FNMLLC Quality Assurance Provision**

This document is derived from U. S. Government documents, including but not limited to; SPEC MIL-W-13855, MIL-STD-1916, and QUALITY ASSURANCE PROVISIONS drawings 12993884 and is to be used in conjunction with the Supplier Quality Manual.

*This document is referenced on FN's Commercial drawings (non-military) and is to be used for the manufacturing and/or special processes for Commercial parts.*

Prepared By:	<i>Sylvia E. Williams</i>	Date:	9-27-11
Approved By:	<i>Frank Spaniel</i> Chief Engineer	Date:	9/27/2011
Approved By:	<i>[Signature]</i> VP of Operations/Engineering	Date:	9/30/11
Approved By:	<i>James T. O'Leary</i> Director of Quality Assurance	Date:	9/30/11



FNM LLC  
Quality Assurance Provision

## History of Changes to FNMLLC Commercial QAP

COVER – HISTORY OF CHANGES		
Date Issued	Revised by	Reason for Change
March 10, 2003	R. Oney	Initial Release created by Product Engineer
May 16, 2006	No history	No History
Jan 26, 2007	S. Williams	Section 2D, 4 & 5
July 27, 2007	R. Trace	Incorporate QA236A into the Supplier Quality Manual
June 30, 2008	S. Williams	Corrected QA236A to QA236C, 521 changed government approved fixture to FNMLLC and 522 removed Position C Major Characteristic 110 and 111
October 30, 2009	J. Curfman	Added the title of Director of QA
September 26, 2011	S. Williams	Minor revision; Added note about for use with commercial drawings only, grammar corrections and updates to Product Engineering document.

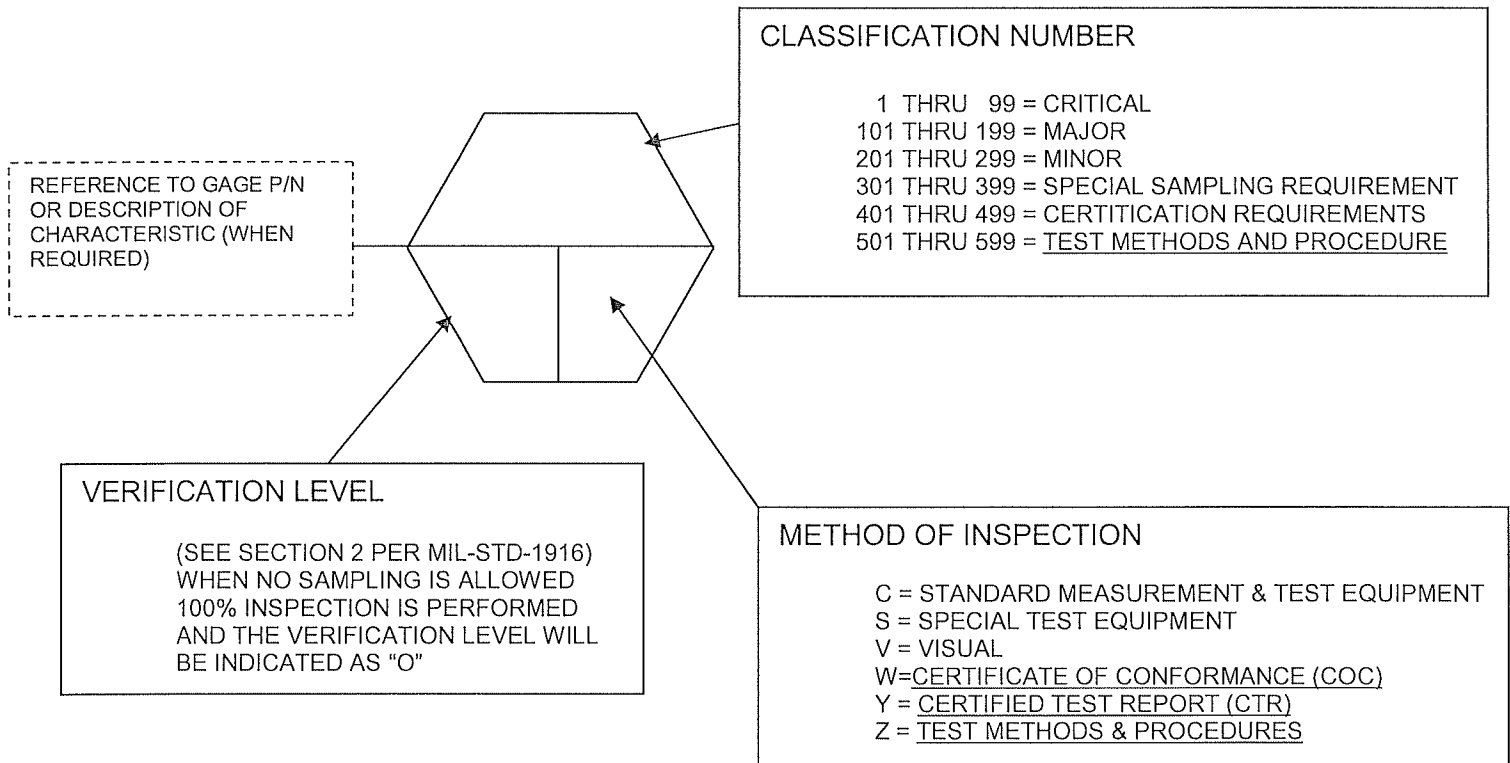


# FNM LLC

## Quality Assurance Provision

### 1. QUALITY ASSURANCE PROVISIONS:

- A. Unless otherwise specified in the contract, the contractor is responsible for the performance of all inspection requirements as specified herein and on applicable product drawings
- B. Classification of characteristics and inspection requirements are identified as follows





FNM LLC  
Quality Assurance Provision

2. Sampling

- A. Sampling inspection will be in accordance with **Table 1** unless otherwise specified. Alternative quality conformance provisions such as statistic process control, variable or continuous sampling plan may be used by the contractor in lieu of the inspection provisions contained herein only when such alternatives provide an equivalent or better level of quality assurance and the alternative quality conformance provision has prior approval of FMNLLC Director of QA.
- B. All approved alternative quality conformance provisions shall be incorporated into the contractor's quality program or inspection system.
- C. A first article sample is required utilizing five (5) samples when specified in the contract. Acceptance will be based on conformance to the requirements of this document, and applicable product drawings.
- D. Quality conformance inspection shall consist of 100% inspection of those characteristics classified as critical. Major, Minor, Certificates of Conformance (COC), Certified Test Reports (CTR), test methods and procedures are required as specified on each applicable drawing and per Supplier Quality Manual, if applicable.
- E. All other characteristics not specifically listed herein are subject to control under the contractor's quality program or inspection system.



FNM LLC  
Quality Assurance Provision

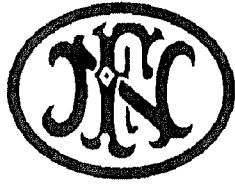
Table 1

Lot Size	Verification Levels						
	VII	VI	V	IV	III	II	I
	Sample size						
2 to 8	*	*	*	*	*	*	3
9 to 15	*	*	*	*	*	8	3
16 to 25	*	*	*	*	20	8	3
26 to 50	*	*	*	*	20	8	5
51 to 90	*	*	*	50	20	8	6
91 to 150	*	*	125	50	20	12	7
151 to 280	*	*	125	50	20	19	10
281 to 500	*	*	125	50	47	21	11
501 to 1200	*	500	125	75	47	27	15
1201 to 3200	1250	500	125	116	53	35	18
3201 to 10,000	1250	500	192	116	68	38	22
10,001 to 35,000	1250	500	294	135	77	46	29
35,000 to 150,000	1250	500	294	170	96	56	29
150,001 to 500,000	1250	750	345	200	119	64	29
500,001 and Over	1250	1112	435	244	143	64	29
* Indicates entire lot must be inspected 100%							

3. Workmanship:

In addition to requirements of applicable weapons specification, parts, assemblies, subsystems, and systems shall be visually examined to determine compliance with the following requirements:

- A. The quality of the workmanship will not adversely affect safety, function, performance, serviceability, interchangeability, and appearance.



FNM LLC  
Quality Assurance Provision

B. Completed parts and assemblies shall not exhibit defective material, or processing such as seams, laps, laminations, cracks, fins, extraneous material, visible steps or irregularities, sharp edges, nicks, scratches, burrs, tool scores and gouges, deformations, missing operations, improper assembly, missing parts, stains, corrosion, non-specified oxidation (rust), unauthorized salvaging operations (i.e. Hammering to shape, repair by welding, straightening, bending, etc.) unless otherwise specified.

4. Certification provisions:

If required on the product drawing per Supplier Quality Manual, Certified Test Reports in accordance with paragraph 4.1 shall be provided for the following:

- Material
- Heat Treatment
- Hardness
- Protective Finish
- Investment Castings
- Forgings
- Weldments
- Proof Firing
- Magnetic Particle Inspection

**Certified Test Reports (CTR)**

1. When specified in the contract or on documents referenced herein, the contractor shall make available to FNM LLC a CTR for each lot of parts, assemblies, subsystems and systems by lot number prior to acceptance. This test report is in addition to, and not in lieu of, any rights of FNM LLC under this contract or law. A CTR may be used as an element incident to, but shall not be used as the sole basis for FNM LLC acceptance of the contract item(s) unless indicated in the technical documentation or contract. As a minimum, the report shall contain the following:

- A. Name of company and date.
- B. Contract number or purchase order number, national stock number and drawing number.
- C. Complete nomenclature of supplies together with lot number or other identification. The quantity in each lot or shipment shall be given.



FNM LLC  
Quality Assurance Provision

- D. All inspections and tests required by contract (i.e., material, processes, performance, functional, etc.) shall be recorded in test reports. These reports shall identify each lot submitted for acceptance by lot number. The specification or drawing, revision and date, grade or type as applicable, number of specimens tested, specified characteristics and requirements, and actual results obtained.
- E. Reports of raw material producer's chemical, mechanical and physical analyses.
- F. A statement as follows, certifying that material meets all requirements of the contract.

The undersigned, individually, and as the authorized representative of the contractor, warrants and represents that all the information supplied above is true and accurate; the material covered by this certificate conforms to the contract requirements (including but not limited to the drawings and specifications). The inspection test results and the analyses appearing herein are true and accurate; and this certification is made for the purpose of inducing payment and with knowledge that the information and certification may be used as a basis for payment. Signature and title of certifying official.

#### Certificate of Conformance (COC)

- 2. A Certificate of Conformance must be supported by inspection and test data, material analysis, or certification from the raw material producer or processor, and shall be made available to FNMLLC for specifications covering raw material, processed material, and processes. The contractor shall make the COC available to FNMLLC prior to or with the request to perform acceptance inspection approval by FNMLLC. This is in addition to, and not in lieu of, any rights of FNMLLC under this contract or law. A COC may be used as an element incident to, but shall not be used as the sole basis for, FNMLLC acceptance of contract items unless so indicated in the technical documentation or contract. As a minimum the COC shall contain the following:
  - A. Name of company and date.
  - B. Contract number or purchase order number, national stock number and drawing number.



FNM LLC  
Quality Assurance Provision

- C. Complete nomenclature of supplies together with lot number or other identification. The quantity in each lot or shipment shall be given.
- D. A statement as follows, certifying that material meets all requirements of the contract.
- E. The undersigned, individually, and as the authorized representative of the contractor, warrants and represents that:

All the information supplied above is true and accurate; the material covered by this certificate conforms to the contract requirements (including but not limited to the drawings and specifications). The analyses appearing herein are true and accurate; and this certification is made for the purpose of inducing payment and with knowledge that the information and certification may be used as a basis for payment. Signature and Title of certifying official.

5. Special test methods and procedures:

The following test methods and procedures apply if required on the applicable product drawing.

**501- Hardness:**

Five (5) samples shall be selected from each heat treat batch. Testing shall be in accordance with ASTM E18. Each heat treatment batch shall remain segregated until all tests are completed. If any sample fails to comply with the hardness requirements, it shall be classified as defective and the lot shall be rejected. A heat treatment batch is defined as the parts that have been heat treated at the same time, in the same furnace and quench bath, for all phases of the heat treatment process.

**502 - Salt Spray Test:**

Five (5) parts shall be selected from each lot. The test shall be performed as specified in MIL-A-8625, as applicable, and ASTM B117 without the supplemental oil. Phosphate test procedures and equipment shall have the prior approval of FNMLLC. If any part shows evidence of corrosion, it shall be classified as defective and the entire lot shall be rejected.



FNM LLC  
Quality Assurance Provision

**503 - Coating Weight:**

Five (5) samples or five (5) test panels shall be selected from each batch. The test shall be performed as specified in MIL-A-8625, as applicable. Phosphate test procedures and equipment shall have the prior approval of FNMLLC. If any sample does not meet the requirement of MIL-A-8625, it shall be classified as defective and the entire lot shall be rejected.

**504 - Supplemental Oil Treatment, Salt Spray Test:**

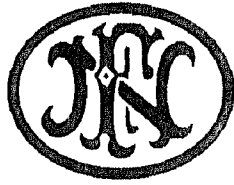
The test shall be performed for first article and at least semi-monthly during production. Three (3) test panels from each processing tank or dispenser shall be prepared and tested in accordance with MIL-L-3150, MIL-C-16173, or commercial equivalent (as applicable) and ASTM B117 using a 5% salt solution. The test duration and accept/reject criteria shall be as specified in the applicable specification. If any test panel fails to meet the applicable requirement, all items processed since the last acceptable test shall be rejected.

**505 - Case Depth Hardness:**

Three (3) samples shall be selected from each day's production from each carburizing furnace or salt pot used. Each sample shall be cut perpendicular to the cased surface and the cut surface shall then be prepared by grinding or rough polishing to remove the effects of the original cut. Etching will be done with a weak solution (1-10%) nitric acid in alcohol and sufficient time to develop a contrast in case and core structure. Unless otherwise specified on the applicable product drawing, "CASE DEPTH" in its entirety shall refer to total case depth. The total case depth shall be the total distance of penetration from the surface to the nearest point of uniform core structure as measured on a polished and etched specimen at a magnification not lower than 20-diameter (20x). The effective case depth, whenever specified, shall be the perpendicular distance from the surface to a point where the hardness is equivalent to Rockwell C 50 as tested in accordance with ASTM E 384, converted from micro-hardness survey data. If any sample fails to comply with the specified requirements, then it shall be classified defective, and the lot shall be rejected.

**506 - Primer Dry Film Thickness:**

Four (4) items selected randomly from each lot shall be tested in accordance with MIL-C-53072. Should any item fail to meet the applicable requirement, the quantity represented by the sample shall be rejected.



FNM LLC  
Quality Assurance Provision

**507- Primer Adhesion:**

Four (4) items selected randomly from each lot shall be tested in accordance with MIL- C- 53072. Should any item fail to meet the applicable requirement, the quantity represented by the sample shall be rejected.

**508 - Carc Dry Film Thickness:**

Four (4) items selected randomly from each lot shall be tested in accordance with MIL-C- 53072. Should any item fail to meet the applicable requirement, the quantity represented by the sample shall be rejected.

**509 - Carc Solvent Wipe:**

Four (4) items selected randomly from each lot shall be tested in accordance with MIL-C- 53072. Should any item fail to meet the applicable requirement, the quantity represented by the sample shall be rejected.

**510 - Carc Adhesion:**

Four (4) items selected randomly from each lot shall be tested in accordance with MIL- C- 53072. Should any item fail to meet the applicable requirement, the quantity represented by the sample shall be rejected.

**511 - Carc Corrosion Resistance:**

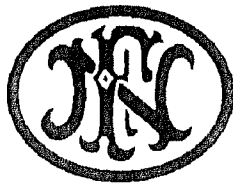
Four (4) items selected randomly from each lot shall be tested in accordance with MIL- C- 53072 and ASTM B117. Should any item fail to meet the applicable requirement, the quantity represented by the sample shall be rejected.

**512 - Protective Coating Supplemental Oil Treatment Salt Spray Test:**

Testing shall be accomplished on a per lot basis or per shift. i.e. at least once every eight hours. Four (4) specimens, distributed randomly and processed concurrently with the items, or four (4) items randomly selected shall be tested in accordance with MIL- C- 53072 and ASTM B117. The specimens shall conform to MIL- DTL-16232 and ASTM B117. If any item/specimen in the sample fails, the quantity represented shall be rejected.

**513 - Stress & Hydrogen Embrittlement Relief Test:**

Adequacy of the stress & hydrogen embrittlement relief treatment shall be demonstrated on a 120-day interval by testing one (1) specimen. The coated cylindrical test specimen shall be made in accordance with MIL- C- 16232 and figure 8 of ASTM E8 using 4340 steel of RC 51-55 hardness. The sustained tensile load (75% of the ultimate tensile strength) shall be



## FNM LLC Quality Assurance Provision

determined for the coated specimen by testing and averaging the ultimate tensile strength results from three (3) notched and uncoated specimens from the heat batch that the coated specimen was made. The length of the test shall be 200 hours. After completion of the test, the coated specimen shall show no evidence of cracks as specified in MIL– DTL– 16232. If the specimen fails, the quantity represented shall be rejected.

### **514 - Casting Inspection:**

Sampling shall be as specified in AMS - STD - 2175. Should any item fail to meet the applicable requirements, the quantity represented by the sample shall be rejected.

### **515 - SMUT Test:**

Testing shall be accomplished as described in MIL– DTL–13924, Paragraph 4.4.1. If the specimen fails, the quantity represented may be cause for rejection. A slight amount of smut, which is inherent in the process, is acceptable for all classes of coating and shall not be cause for rejection.

### **516 - Cadmium Plating Thickness:**

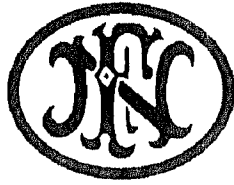
Testing shall be accomplished on a per lot basis or per shift i.e. at least once every eight hours. Four (4) specimens, distributed randomly and processed concurrently with the items or 4 items randomly selected shall be tested in accordance with AMS-QQ-P-416. The specimen shall conform to AMS-QQ-P- 416, paragraph 4.5. If any item/specimen in the sample fails, the quantity represented shall be rejected.

### **517 - Cadmium Plating Adhesion:**

Testing shall be accomplished on a per lot basis or per shift i.e. at least once every eight hours. Four (4) specimens, distributed randomly and processed concurrently with the items or 4 items randomly selected shall be tested in accordance with AMS – QQ – P- 416. The specimen shall conform to AMS –QQ-P- 416, paragraph 4.5.1. If any item/specimen in the sample fails, the quantity represented shall be rejected

### **518 - Cadmium Plating Corrosion Resistance:**

Testing shall be accomplished on a per lot basis or per shift, i.e. at least once every eight hours. Four (4) specimens distributed randomly and processed concurrently with the items, or four (4) items randomly selected shall be tested in accordance with AMS-QQ-P-416. The



FNM LLC  
Quality Assurance Provision

specimens shall conform to AMS-QQ-P-416, Paragraph 4.5.2 and ASTM B117. If any item/specimen in the sample fails, the quantity represented shall be rejected.

**519 - Cadmium Plating Embrittlement Relief Test:**

This test shall be conducted at a frequency of 120 days maximum. The coated cylindrical test specimen shall be made in accordance with AMS-QQ-P-416 paragraph 4.5.3 and figure 8 of ASTM E8 using 4340 steel of RC 51-55 hardness. The sustained tensile load (75% of the ultimate tensile strength) shall be determined for the coated specimen by testing and averaging the ultimate tensile strength results from three (3) notched and uncoated specimens from the heat batch that the coated specimen was made. The length of the test shall be 200 hours. After completion of the test, the coated specimen shall show no evidence of cracks as specified in AMS-QQ-P-416. If the specimen fails, the quantity represented shall be rejected.

**520 - Magnetic Particle Inspection:**

This test shall be conducted in accordance with ASTM EI444

**521- Proof Firing:**

Each barrel sub-assembly shall be tested in a FNMLLC approved fixture using a high-pressure test cartridge conforming to MIL-C-46936 or approved equivalent.

**522 - Reference Inspection:**

Due to measurement uncertainties and non-repeatability, actual air gauge readings, which are within +0.0025 mm of drawing requirements are acceptable. Make one pass each through the barrel bore and barrel rifling. Provided each pass is at least +0.0025 mm within the drawing tolerance limits, no further check is necessary. Otherwise, make an additional two passes each through both the barrel bore and barrel rifling, revolving the air spindle to the next adjacent land after each pass.

**523 -** Thirty two spare barrels randomly selected from each lot of 2000 units or less shall meet accuracy requirements as specified in MIL-M-63314 except that every two barrels of sample will be sequentially grouped to test for mean points of impact.

**524 -** One spare barrel randomly selected from each lot of 2000 units or less shall be tested (15,000 rds) for reliability requirements as specified in MIL-M 63314 except that only one barrel will be tested by alternating between firing schedules No. 1 and No. 2 using Gas Port Setting #1.