QUALITY ASSURANCE PROCUREMENT REQUIREMENTS (QAPR)

CAGE CODE 14578

GENERAL DYNAMICS-OTS

MARION OPERATIONS

6658 ROUTE 148

MARION, IL 62959

PURPOSE

This Quality Assurance Procurement Requirement (QAPR) defines the quality requirements for this purchase order (PO). **Applicable quality requirements shall be listed by the specific clause number.** Additional or supplemental requirements may also be specified in the body of the purchase order, and do not supersede the terms and conditions of the purchase order. Compliance with this QAPR and all additional or supplementary PO requirements does not relieve Supplier of the final responsibility to furnish acceptable supplies or services. Compliance to stated requirements may be subject to General Dynamic's on-site verification. Herein the Buyer will be addressed as "General Dynamics–OTS (GD-OTS)."

DEFINITIONS

- The term "Purchase Order" refers to the Purchase Order, Sub-Contract, or other written agreement between the Buyer and the Supplier (Supplier), in which this document is incorporated by reference.
- The term "Buyer" refers to GD-OTS acting by and through its division issuing the purchase order.
- The term "Supplier" refers to the legal entity that is the contracting party with the buyer with respect to the purchase order. The Supplier is the Supplier to the buyer.

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QAPR 0 General Requirements

A General Requirements

General requirements labeled A through P are applicable to all purchase orders.

B Government Source Inspection (GSI)

Government Source Inspection (GSI) may be required on this order. Refer to the body of the Purchase Order for applicability. If GSI is required, contact the Defense Contract Management Agency (DCMA) Quality Assurance Representative (QAR) who services your facility. If a DCMA representative cannot be located, inform the General Dynamics-OTS Buyer. Evidence of the Government acceptance must be shown on the inspection or shipping documents.

C Post Award Review

After award of the Purchase Order and prior to commencement of work, a Post Award Review will be conducted. This review may be by telephone or in person at the buyer or Supplier's facility. The purpose of this conference is to ensure that a complete understanding of the QAPR clauses and contract requirements is achieved.

D Supplier Responsibility

It is the responsibility of the Supplier to satisfy all requirements of the purchase order, including drawing/specification requirements, quality requirements, and deliverable documentation requirements such as Certifications of Conformance, Supplier Inspection reports, etc. All required documentation for each shipment of deliverable purchased product must be provided either prior to; or concurrent with the shipment's receipt at General Dynamics-OTS' facility unless specifically authorized otherwise by General Dynamics-OTS. It is General Dynamics requirement that procured hardware is processed using production equipment, tooling and process planning. A Supplier's inability to satisfy these requirements may result in an on-site audit, General Dynamics directed inspections, or third-party inspections performed at the Supplier's expense.

> NOTE: It is the Supplier's responsibility to notify General Dynamics of any possible exception to compliance with any or all requirements as published within the purchase order, drawings, or specifications.

E Records

The Supplier shall maintain adequate records of all required inspections (including any screening performed on component lots) and tests, including such records or certifications provided to the Supplier.

NOTE- ALL CERTIFICATION DOCUMENTS SHOULD BE SUBMITTED ELECTRONICALLY THROUGH EMAIL AT certs@gd-ots.com.

NOTE FOR SECURE SUBMISSIONS- ALL CERTIFICATION DOCUMENTS ARE TO BE SUBMITTED ELECTRONICALLY THROUGH THE GD-OTS SECURE EMAIL PORTAL.

Access the GD-OTS secure email portal at: https://gd-ots.kiteworks.com.

F Control of Nonconforming Material

The Supplier shall establish and maintain an effective and positive system for identifying, segregating, and controlling material found not to conform to requirements. ***Rework and repair are prohibited without GD-OTS approval***.

The Supplier shall notify the GD-OTS buyer immediately after discovery of any nonconformance or noncompliance that may exist in delivered product. The notification shall include a description of the nonconformance or noncompliance, potential risk or product impact, GD-OTS purchase order number, part number, lot number, affected serial numbers (if applicable), and quantity of nonconforming or noncompliant parts.

Rework – The reprocessing of nonconforming material to make it conform completely to the drawings, specifications or contract requirements.

Repair – The reprocessing of non-conforming material in accordance with approved written procedures and operations to reduce, but not completely eliminate, the non-conformance. The purpose of repair is to bring non-conforming material into a usable condition. Repair is distinguished from rework in that the item after repair still does not completely conform to all of the applicable drawings, specifications or contract requirements.

Rework procedures along with the associated inspection procedures shall be documented by the Contractor and submitted to the Government QAR (either at the supplier or at GD-OTS) for review prior to implementation. Rework procedures are subject to the QAR's disapproval.

Repair procedures shall be documented by the Contractor and submitted on a RFV, DD Form 1694, to the Contracting Officer for review and written approval prior to implementation. GD-OTS will write the RFV for submittal to the Contracting Officer.

Whenever the Contractor submits a repair or rework procedure for Government review, the submission shall also include a description of the cause for the non-conformances and a description of the action taken or to be taken to prevent recurrence.

The rework or repair procedure shall also contain a provision for reinspection which will take precedence over the TDP requirements and shall, in addition, provide the Government assurance that the reworked or repaired items have met reprocessing requirements.

G Drawing and Specification Control

The Supplier's system shall assure that only correct, current drawings and specifications as detailed in the contract and/or Purchase Order are used for fabrication, processing, and inspection and testing.

H Prohibited Practices

- Unauthorized repair - Supplier shall not repair non-conforming product by any means without prior approval by General Dynamics-OTS.
- Processes, Materials, or Procedures: The Supplier shall not change any process, material, or procedure without prior written consent of the GD-OTS Buyer. This specifically includes the Quality Management System. As to any product which has been subjected to Buyer or Government specified qualification procedures qualifying the Supplier's product or to permit the Supplier to become a qualified source for the product, the Supplier shall not change any process, material, or procedure from that used for qualification without prior notification and subsequent written approval by the Buyer or the Government, as appropriate.
- If this purchase order requires acceptance of a First Article inspection, Supplier shall not submit product from a production run for General Dynamics-OTS acceptance prior to General Dynamics-OTS approval of such First Article.
- Items rejected by GD-OTS and subsequently resubmitted to the Buyer shall be clearly and properly identified as resubmitted. The Supplier's shipping documents shall state that the items are replacements or reworked items and shall also reference, by number, the Buyer's rejection document.
- The Supplier shall not subcontract work, or processing (including that required by drawing or specification) or procure materials to be supplied to the Buyer (other than raw materials or catalog items), or release technical information included with the Request for Quotation or Purchase Order, to other subcontractors or sub-tier Suppliers without specific written approval of the GD-OTS Buyer. (GD-OTS may have Customer requirements to control special process sources.)
- Notification of Facility or Process change: Supplier and/or Supplier's Contractors shall not relocate any production, manufacturing or processing facilities, including production lines and equipment, during performance of this purchase order without prior notification and approval by General Dynamics-OTS. The Supplier shall not change, modify, or revise any process that has been approved by General Dynamics-OTS without prior notification. The Buyer shall be notified for survey / approval of the new facility or process prior to fabrication of deliverable product from that facility

or process. Approval may include an on-site transition evaluation by General Dynamics-OTS personnel.

I Corrective Action Request (CAR)

When an issue involving the quality or functionality of a part or process occurs, General Dynamics-OTS may request corrective action from the Supplier. General Dynamics-OTS may, at their discretion, withhold payment for any subject lot(s) under a Corrective Action until a satisfactory response is received. When corrective action is required for Government source inspected items, Supplier shall coordinate such action with the Government Quality Assurance Representative (QAR) assigned to the facility.

J Contract Change Approval

The Supplier is advised that only the GD-OTS Purchasing representative is authorized to invoke contract changes and approvals. No other GD-OTS representative, whether in the act of technical supervision, administration, or any other functional group is authorized to make any commitment to the Supplier, to perform or terminate any work, or to incur obligation. Project Engineers, Technical Supervisors, Quality Engineers, and any other groups within GD-OTS (or as an agent thereof), are not authorized to make or otherwise direct changes that in any way affect the contractual relationship of the Supplier and Buyer.

K Lot Acceptance

General Dynamics – OTS reserves the right to approve or disapprove sampling plans and or process controls used for product acceptance by the Supplier. If clause 3A is imposed, then MIL-STD-1916 is mandatory at the Supplier's facility.

General Dynamics-OTS reserves the right to use C=0 "Sampling Procedures and Tables for Inspection by Attributes, or MIL-STD-1916," DOD Preferred Methods for Acceptance of Product". Final acceptance will be determined at General Dynamics-OTS facility unless otherwise designated or prior arrangements have been made.

Neither surveillance inspection and/or tests performed by the Buyer, or their representative, at either the Supplier's or Buyer's facility, or the Supplier's compliance with all applicable Quality Assurance Requirements shall relieve the Supplier of the responsibility to furnish items that fully conform to the provisions of the Purchase Order in its entirety. Likewise, inspection and acceptance of product, by either the Supplier or the Buyer, in accordance with MIL-STD-1916 does not relieve the Supplier's responsibility to furnish all Purchase Order required quantities as fully conforming items in accordance with the Purchase Order requirements.

L Right of Access

The Buyer and/or the Government shall have the right of access to the Supplier's facilities for the purpose of inspection or verification of materials, processes, procedures, tooling, and equipment during performance of the contract or Purchase Order.

M The Supplier shall package all items for shipment or transport to GD-OTS, or other destinations as may be designated by the Buyer, in accordance with good commercial practices or as otherwise specified, assuring that the items are sufficiently protected so as to preclude damage such as abrasion, scratching, and denting due to contact between the items themselves and/or external damage in the course of normal commercial transport.

N Shipments

In the case where product shipment destination (drop shipment) is other than General Dynamics-OTS, Supplier must provide documentation with shipment and to General Dynamics-OTS as follows: Shipper, Certification of Conformance, Ammunition Data Card (if required, see QAPR clause 10), and Source Inspection Request, (if required, see QAPR 14), and any other documentation specified by imposed purchase order requirements.

O QAPR Roll Over Request/Carry over Approval

The Supplier may request a roll over or carry over approval for prior QAPR(s) clauses which have been approved on current or past purchase orders. An approval may be granted if there are no changes in product design, procedures, processes, and production has not ceased for more than 90 days. The QAPR clauses will still be applicable to this purchase order, but the Supplier may not be required to resubmit the already approved data items.

P Interested Parties

Marion Operations recognizes our Supplier/Supplier base as “interested parties” in accordance with ISO9001:2015 paragraph 4.2 of the standard and are relevant to the Quality Management System (QMS). Marion Operations would like to share our policy for review and consideration and invite any questions or the opportunity to discuss our policy.

Q Government-Industry Data Exchange Program (GIDEP)

The subcontractor shall participate in the Government-Industry Exchange Program (GIDEP) under the latest revision of GIDEP Requirements Guide, NAVSEAS0300-BU-GYD-010. GIDEP is an invaluable tool in the government’s war against inefficiency, and is limited to participating activities, GIDEP will retain and provide data and/or reports provided in compliance with this contract on a privileged basis. Compliance with the provisions of this clause shall not relieve the contractor from complying with other provisions of the contract. This clause is effective on any purchase order exceeding $500,000.

QAPR 1 Quality System

Supplier shall comply with a higher-level quality system conforming to ISO 9001 (latest revision) as described in DFARS 52.246-11. The Supplier shall provide evidence of a successful third-party audit by an accredited registrar. No exceptions are permitted without written permission. Any loss or suspension of certification the Supplier must notify the buyer within 24 hours. Supplier is expected to flow down this requirement to secondary (sub-tier) Suppliers/Suppliers.

Quality Systems compliant to ISO 9001 (latest revision) are subject to review and/or audit for compliance by the buyer or other representative.

QAPR 2 Inspection System

The Supplier shall maintain an inspection system conforming to as a minimum ANSI / NCSL Z540.3 or ISO 9001 / ISO 10012 (latest revision). Preferred system is conformance of calibration and general laboratories with ISO 17025 (latest revision). The Supplier shall provide a certified calibration report traceable to NIST standards upon request. Supplier's system is subject to review and/or audit for compliance.

QAPR 3 Inspection and Test Plans

Supplier shall prepare and maintain written plans and instructions for inspection and test, including First Article Acceptance Test (FAAT) to be performed on this purchase order. Plans unless otherwise directed will be prepared in accordance with DI-NDTI-81307A or latest revision as a minimum.

Plans shall be submitted for review and approval prior to First Article or production builds. All revisions must be submitted for review and approval prior to implementation.

Standards for acceptance of non-destructive test inspections to include secondary (sub-tier) Suppliers, or third-party inspections must be submitted for review and approval prior to implementation.

3A. Inspection and Test Plans shall conform to MIL-STD-1916 for sampling inspection requirements unless otherwise directed. Verification Level (VL) 4 for major characteristics and (VL) 2 for minor and unlisted characteristics as a minimum unless directed otherwise.

3B. Withdrawn.

3C. Standards used for acceptance of NDT Inspections by the supplier or any sub-supplier or third party are subject to approval by GD-OTS.

QAPR 4 Inspection Equipment List and Gage Designs

A. The Supplier shall prepare and submit for approval inspection equipment list (IEL) and gage designs that details the devices necessary to perform inspections and tests for manufacture, assembly, product conformance, and final inspection. Accuracy of acceptance equipment shall be of a ratio of 10 to 1 greater than the tolerance. All calibrations are to be certified and traceable to NIST standards.

Supplier to prepare and submit inspection and test procedures that support the characteristics to be verified.

Any changes proposed must be approved prior to implementation.

Approval of submission required prior to First Article or production build.

B. The Supplier shall prepare and conduct a measurement and inspection equipment system in accordance with DI-QCIC-81960.

Minor and unlisted characteristics shall be evaluated in accordance with ASTM E2782 (latest revision) and submitted for review and approval. Any change proposed must be approved prior to implementation.

Approval of submission required prior to commencement of First Article or production build.

MEASUREMENT SYSTEM EVALUATION (MSE)

(a) Definitions. This paragraph defines specific terms utilized throughout the rest of this section and in the accompanying CDRL and Data Item Description (DID). This aids in clarifying the MSE requirements to Government and contractor personnel.

(1) Acceptance Inspection Equipment (AIE). All equipment (includes Automated Acceptance Inspection Equipment (AAIE) defined below), special and standard, including dimensional gages, measuring equipment, test fixtures, electronic and physical test equipment, and other test equipment used for examination and test of a product to determine conformance to the TDP which may include drawings and specifications (e.g., Detail, Performance, Weapon specifications, and QAPs).

(2) AAIE. AIE in which the inspection and acceptance determination of the product is performed, in whole or in part, in an automatic manner.

(3) Contractor Inspection Equipment. Government-approved equipment utilized by the contractor to perform examination and tests to assure conformance to contract requirements.

(4) Commercial Inspection Equipment. Industry-developed inspection equipment of universal application, without limitations to a specific part or item, which is advertised or cataloged as available to the trade or to the public on an unrestricted basis at an established price. Examples follow:

(i) Standard Test Equipment. Multiusage equipment that is specific to a function rather than to an item. It includes such items as hardness testers, tensile strength testers, meters, weighing devices, standard gear testers, ohmmeters, voltmeters, and oscilloscopes.

(ii) Standard Measuring Equipment (SME). Multipurpose equipment and standards used for performing measurements. It includes such items as micrometers, rulers, tapes, height gages, and protractors, etc. Standards include visual inspection equipment such as scratch and dig standards, surface finish comparator, color standards (FED-STD-595), etc.

(5) Non-Destructive Testing (NDT). The development and application of technical methods to examine materials or components in ways that do not impair future usefulness and serviceability in order to detect, locate, measure and evaluate flaws; to assess integrity, properties and composition; and to measure geometrical characteristics. NDT includes Radiography/Radioscopic, Ultrasonic, Eddy Current, Magnetic Particle, and Liquid Penetrant.

(6) Measurement System Analysis (MSA). Per ASTM E2782 (Standard Guide for MSA), paragraph 3.1.7, MSA is any of a number of specialized methods useful for studying a measurement system and its properties.

(b) Scope. This section establishes requirements for design, supply, performance, and maintenance of AIE used for product inspection and acceptance. In addition, this section establishes requirements for the preparation, submission, and approval of AIE documentation.

(c) AIE. The contractor shall provide all AIE necessary to ensure conformance of components and end-items to contract requirements.

AIE shall include inspection, measuring, and test equipment whether Government furnished, or contractor furnished (including commercially acquired) along with the necessary specifications and procedures for their use (see ISO 10012, paragraph 6.2.1). The AIE shall not create or conceal defects on the product being inspected. All AIE documentation shall contain sufficient information to permit evaluation of the AIEs ability to test, verify, and/or measure the applicable characteristics or parameters (see applicable DID referenced in DD Form 1423).

(d) AIE Designs & Government Furnished Gages. AIE designs are of two types of Government designs (see (d)(1)) and contractor designs (see (d)(2)). When applicable, Government designs or Government furnished gages are designated in the TDP/contract; responsibility for all other AIE is assigned to the contractor. The designs, associated inspection procedures, and theory of operation shall have the level of detail to demonstrate capability of the proposed AIE to perform the required inspection.

(1) Government AIE Designs. Government AIE designs may consist of detailed drawings necessary for the fabrication and use of the AIE. Unless otherwise specified, the contractor may submit alternate or modified contractor designs of Government AIE designs.

(2) Contractor AIE Designs. Contractor AIE design drawings shall meet the requirements of ASME Y14.100, ASME Y14.5 and ASME Y14.43 and may include commercial inspection equipment. [Commercial inspection equipment is defined as shown in paragraph (a)(4) above. It shall be fully described by catalog listings or other means which provide sufficient information to permit identification and evaluation by the Government and may include illustrations and engineering data.] Designs shall be submitted for any special fixture(s) to be used. Unless otherwise specified, Gage Tolerancing Policy shall be in accordance with ASME Y14.43, Absolute Tolerancing (Pessimistic Tolerancing).

(3) Visual Inspection. Visual inspection standards used for the acceptance/rejection of product shall be submitted for approval.

(e) AIE Package Submittals. The contractor shall prepare the AIE package submittal in accordance with the DID referenced in the applicable CDRL (CDRL DD Form 1423). In addition, the contractor shall adhere to the following requirements:

(1) Designs for Approval. Contractor designs and/or the submission for the use of Government designs shall be approved by the Government. Partial submission of AIE designs is permissible in

order to expedite the approval process; however, the response date for design review will be based on the date of the final complete submission of designs.

(2) Correspondence in English. The contractor shall ensure all AIE correspondence and documentation are submitted in English.

(3) Units of Measurement. The units of measurement within the AIE package submittal shall be consistent with the requirements of the TDP.

(4) AIE Flow Down. The contractor shall flow down AIE requirements to sub-contractors at any tier who are performing acceptance inspections.

(f) Characteristics for Inspection. AIE documentation for Critical, Special, and Major characteristic inspections shall be submitted for approval IAW the CDRL (see DD Form 1423). AIE for Minor characteristic inspections shall be submitted for approval IAW CDRL (see DD Form 1423) and as required below:

(1) [X] Listed Minor (characteristics displayed on specifications and/or drawings)

(2) [ ] Government selected list (as attached or as provided herein):

Click here to enter text.

(3) [ ] Not submitted

(g) Automated Acceptance Inspection Equipment. The AAIE shall accept only conforming material. All characteristics requiring AAIE per the TDP shall utilize inspection equipment with a minimum demonstrated reliability of 99.8% at a 90% confidence level to detect non- conforming material unless otherwise specified below.

(1) Reliability of 99.5% at a 90% Confidence Level for Critical/Special Characteristics

(2) Reliability of 99% at a 90% Confidence Level for Major Characteristics

(3) For inspection of major and minor characteristics where contractor utilizes AAIE when it is not required by the TDP, the AAIE package shall be submitted for approval. If the Minor characteristic is not listed in paragraph (f)(2) or not required for submittal in paragraph (f)(3), then the AAIE requirements (e.g., verification, calibration, prove-out, etc.) of the inspection shall still be performed.

(4) All AAIE packages submitted for approval shall be in accordance with MIL-A-70625 (Automated Acceptance Inspection Equipment Design, Testing and Approval of). Furthermore, the contractor shall be responsible for producing the acceptance and rejection verification standards/masters' representative of the characteristics the AAIE is designed to inspect. The verification standards and frequency of use require Government approval prior to use. When verification standards are used for the VL-VII sampling plan per MIL-STD-1916 paragraph 4.4, verification standards and frequency of use shall require Government approval prior to use.

(5) If the AAIE accepts a critical characteristic reject standard the contractor shall notify GD-OTS and act in accordance with paragraph (f) of Critical Characteristic Control. In addition, if the AAIE accepts a major and/or minor characteristic reject standard the contractor shall act in accordance with paragraph 8.3 of ISO 10012 or paragraph 5.2.3 of ANSI/NCSL Z540.3.

(6) All AAIE shall be required to pass a Government-approved Acceptance (Prove-Out) Test. The contractor shall conduct this test per the approved test plan and shall submit a test analysis report for approval. See applicable DD Form 1423. This test shall be performed at the contractor's facilities whose manufacturing system has had the AAIE fully integrated and calibrated as per paragraph (j) of this section. The contractor shall allow GD-OTS and Government personnel access to this facility and unobstructed monitoring of this test.

(7) The contractor shall notify GD-OTS prior to a modification and/or relocation of the Government-approved AAIE. The modified AAIE designs shall be submitted for approval. The modified and/or relocated AAIE shall require submission of the acceptance test plan (prove-out) and results for review and approval prior to use. The modified and/or relocated AAIE shall be IAW paragraphs (g)(1) through (g)(6).

(h) Paragraph deleted.

(i) Robust AIE System. The contractor shall ensure the AIE, and its use is not negatively affected by any manufacturing/inspection environmental stimuli including, but not limited to production rate, noise, temperature, humidity, and vibration.

(j) AIE Calibration and Verification. The calibration system shall be in accordance with ISO 10012 or ANSI/NCSL Z540.3. All AIE shall be subjected to scheduled calibration intervals to ensure that the equipment will accept only conforming product and reject all non- conforming product for the duration of the approved calibration period. AIE shall be subjected to periodic verification to ensure that the equipment will continue to accept and reject product with the same consistency as it did at the time of its previous calibration.

(k) Non-Destructive Testing (NDT). Contractor shall submit detailed plans for qualifying and certifying NDT personnel and plans for qualification and ongoing use of NDT methods used for inspecting product. If re-qualification of NDT personnel and/or NDT methods is required, then the applicable plans shall be submitted.

(1) Personnel performing NDT examinations shall be qualified and certified in accordance with the standard practices prescribed by NAS 410 (NAS Certification & Qualification of NDT Personnel), ANSI/ASNT-CP-189 (ASNT Standard for Qualification and Certification of NDT Personnel), or SNT-TC-1A (Recommended Practice for Personnel Qualification and Certification in NDT), and additional procedures that may be identified by the Government. Acceptance of product using NDT shall be performed by personnel at a level of qualification consistent with that defined in the applicable standard.

(2) The NDT method(s) shall be applied in accordance with ASTM E 543 (Standard Specification for Agencies Performing NDT) and the current nationally recognized standard practices appropriate to the NDT method(s) employed, such as ASTM E-1742 (Standard Practice

for Radiographic Examination) and SAE-AMS-STD-2154 (Inspection, Ultrasonic, Wrought Metals, Process For). Each application technique shall identify the standard(s) utilized. NDT includes, but is not limited to, the following types of testing: Radiography/Radioscopic, Ultrasonic, Eddy Current, Magnetic Particle, and Liquid Penetrant.

(l) Contractor Alternate Inspection Method(s), Modifications and/or Relocation of AIE (Non-Automated) After Government Approval. If the contractor proposes an alternate inspection method and/or modifies the AIE design(s) affecting hardware, software, or procedures after Government approval the intended change(s) shall be submitted and approved by the Government prior to implementation. If an AIE is relocated and the relocation risks the integrity of the inspection system, notify GD-OTS to determine information needed to assess impact to AIE. See DD Form 1423.

(m) Responsibility for AIE Package Submittal. The contractor shall submit the AIE design documentation package within contractual timeframes per CDRL (See DD Form 1423). The Government will provide approval or disapproval within the timeframe specified in the CDRL. Disapproval of the AIE package will require re-submittal and subsequent Government review in accordance with the CDRL requirements. The AIE package and any required prove-outs must be approved prior to First Article (FA) (if required) or production start-up if FA is not required.

(n) Governments Right to Disapprove AIE. The Government reserves the right to revoke approval of any AIE that is not satisfying the required acceptance criteria at any time during the performance of this contract. See DD Form 1423.

(o) Navy Furnished Gages. When gages are listed in paragraph (o) (9) below, the Navy Special Interface Gage (NSIG) Requirement paragraphs (o) (1) through (o) (8) shall be satisfied.

(1) The NSIG(s) are provided for verification of selected interface dimensions and do not constitute sole acceptance criteria of production items or relieve the contractor of meeting all drawing/specification requirements under the contract.

(2) The contractor is responsible for contacting the Naval Surface Warfare Center (NSWC), Corona Division at least 45 calendar days prior to FAT (if required) or production, for the delivery of NSIG(s).

(3) NSIG(s) will be forwarded to the contractor for joint use by the Government and the contractor. Government furnished NSIG(s) shall not be used by the contractor(s) or subcontractor(s) as in-process or working gage(s).

(4) For production items that fail to be accepted by the applicable NSIG(s), an alternate inspection method may be submitted for approval.

(5) The contractor may substitute contractor designed and built AIE for the NSIG(s) noted in paragraph (o) (9) below. However, the designs require Government (Navy) approval and the contractor AIE hardware requires Government (Navy) certification. AIE designs shall be submitted in accordance with CDRL (see DD Form 1423).

(6) The Government (Navy) shall not be responsible for discrepancies or delays in production items resulting through misuse, damage, or excessive wear to the NSIG(s).

(7) Calibration and repair of the NSIG(s) shall only be performed as authorized by the NSWC Corona Division. Repair is at no cost to the contractor unless repair is required due to damage to the gages resulting from contractor fault or negligence. Damaged, worn, or otherwise unserviceable NSIG(s) shall be brought to the immediate attention of the CAO and NSWC Corona Division. The contractor shall not make any adjustments, alterations or add permanent markings to NSIG(s) hardware unless specified by the NSIG operating instructions or authorized by the NSWC Corona Division.

(8) Within 45 calendar days after final acceptance of all production items, the NSIG(s) shall be shipped to NSWC Corona Division, ATTN: Receiving Officer, Bldg. 575, Gage Laboratory, 1999 Fourth St., Norco, CA 92860-1915. The following shipping and marking specifications are applicable:

(i) Shipping, MIL-STD-2073, DOD Standard Practice for Military Packaging

(ii) Marking, MIL-STD-129, Marking for Shipment and Storage.

(9) The following NSIG9s) shall be provided and are mandatory for use except as noted by paragraph (o) (5) above.

Drawing 5871716 Rev D

Characteristic: Acceptance of Link Gage
NSIG: 2486253
Qty: 1
Dimensions: 14 X 1 1X 8
Weight: 14 LB
Value: $5,730.00

Characteristic: Max Distortion Gage
NSIG: 3236934
QTY: 1
Dimensions: 10 X 8 X 4
Weight: 7 LB
Value: $450

Characteristic: Pull Test Fixture
NSIG: 5517533
QTY: 1
Dimensions: 24 X 20 X 12
Weight: 38 LB
Value: $2,240.00

Characteristic: Link Extraction Fixture
NSIG: 6116865
QTY: 1
Dimensions: 40 X 19 X 41
Weight: 160 LB
Value: $11,500.00

SUPPLEMENT TO MSE:

Lower Level MSE Requirements: The Government's intent for detail specifications is to require full MSE submissions against listed characteristics for all specifications requiring a FAT. Submission of all critical, major, and minor characteristics in accordance with the MSE clause will be required. The Government recommends prime contractors flow all other lower-level specifications (not included as a FAT requirement) and their associated characteristics to subcontractors, however, MSE compliant submissions are not required for these lower-level specifications to the Government.

The Government's intent for performance specifications is to require MSE submissions for all critical, major, and minor characteristics in the top-level performance specification and all additional critical characteristics identified by the CICL. The Government recommends prime contractors flow lower-level characteristics to subcontractors, however, MSE compliant submissions are not required for these lower-level characteristics to the Government.

* Contractors will not be required to submit MSE documentation for Government test ranges.

QAPR 5 Statistical Process Control (SPC)

Statistical Process Control (SPC) Plans shall be prepared in accordance with DI-MGMT-81987 (latest revision) and MIL-STD-1916 as applicable (latest revision).

QAPR 6 First Article Inspection and Test

The first article shall be representative of items to be manufactured using the same processes and procedures and at the same facility as contract production. All parts and materials, including packaging and packing, shall be obtained from the same source of supply as will be used during regular production. All components, subassemblies, and assemblies in the first article sample shall have been produced by the Contractor (including subcontractors) using the technical data package documents.

The Supplier shall provide to the buyer at least 30 calendar days advance notice of the schedule production date and at least 15 calendar days for final inspection of the first article.

An additional first article sample or portion thereof, may be ordered by the buyer when a major change is made to the technical data, whenever there is a lapse in production for a period in excess of 90 days, or whenever a change occurs in the place of performance, manufacturing process, material used, drawing, specification or source supply to include sub-tier Suppliers.

Costs of the first article testing resulting from production process change, change in the place of performance, or material substitution shall be borne by the Supplier.

First Article Test Plans shall be prepared and submitted a minimum of days 45 in advance. Plans shall be prepared in accordance with DI-NDTI-81307A (latest revision) as a minimum.

First Article Test Plan shall include, at a minimum: A summary of testing to be performed, proposed location of testing with all applicable specification and drawing references cited, a summary and rationale for any analysis identified in requirement in TDP but excluded from test plan, contractor marked drawings, contractor inspection record sheets, reference to approved AIE gages, test/analysis methodology to be employed and sample size to be tested/analyzed (to include rationale as to why sample size differs from sample size identified in TDP when applicable).

(a) The FAT shall consist of:

FAT for Initial Production: Shall be conducted on all components per the respective specifications in each Services FAT requirements identified, unless otherwise defined by the PCO. Only components identified specifically in each of the specifications listed shall be inspected as part of FAT (specifications listed attached).

FAT during production: All requirements of (f) of FAT requirement statement apply.

Unlisted Characteristics: Unless otherwise specified in the TDP, each unlisted characteristic identified in the TDP, for those items subject to FAT as identified above, the following requirements shall apply: One hundred percent of all unlisted characteristics shall be analyzed on a sample of no less than five-piece parts. First Article may be rejected for non-compliance of unlisted characteristics.

FAT samples shall be examined and tested in accordance with contract requirements, the item specification(s), the Quality Assurance Provisions (QAPs) and drawings listed in the TDP.

(b) The first article shall be representative of items to be manufactured using the same processes and procedures and at the same facility as contract production. All parts and materials, including packaging and packing, shall be obtained from the same source of supply as will be used during regular production. All components, subassemblies, and assemblies in the first article sample shall have been produced by the contractor (including subcontractors) using the TDP provided by the Government.

(c) The first article shall be inspected and tested by the contractor for all requirements of the drawing(s), the QAP(s), and specification(s) referenced thereon, except for:

a. Inspections and tests contained in material specifications provided that the required inspection and tests have been performed previously and certificates of conformance are submitted with the FAT Report.

b. Inspections and tests for Military Standard (MS) components and parts provided that inspection and test have been performed previously and Certifications for the components and parts are submitted with the FAT Report.
c. Corrosion resistance tests over 10 calendar days in length provided that a test specimen or sample representing the same process has successfully passed the same test with 30 calendar days prior to processing the first article, and results of the tests are submitted with the FAT Report.
d. Life cycle test over 10 calendar days in length provided that the same or similar items manufactured using the same processes have successfully passed the same test within 1 year prior to processing the first article and results of the tests are submitted with the FAT Report.
e. Onetime qualification tests, which are defined as onetime on the drawing(s), provided that the same or similar item manufactured using the same processes has successfully passed the tests, and results of the test are on file at the contractor's facility and certifications are submitted with the FAT Report.

(d) Those inspections which are of a destructive nature shall be performed upon additional sample parts selected from the same lot(s) or batch (es) from which the first article was selected.

(e) A FAT Report shall be compiled by the contractor documenting the results of all inspections and tests (including suppliers inspection records and certifications, when applicable), The FAT Report shall include actual inspection and test results to include all measurements, recorded test data, and certifications (if applicable) keyed to each drawing, specification and QAP requirement and identified by each individual QAP characteristic, drawing/specification and characteristic and unlisted characteristic. The Government QAR findings shall be documented on DD Form 1222, Request for and Results of Tests, and attached to the contractor's test report. Two copies of the FAT Report and the DD Form 1222 will be submitted through the Administrative Contracting Officer (ACO) to the Contracting Officer with an additional information copy furnished to Product Quality Management (PQM).

(f) Notwithstanding the provisions for waiver of first article, and additional first article sample or portion thereof, may be ordered by the Contracting Officer in writing when (i) a major change is made to the technical data, (ii) whenever there is a lapse in production for a period in excess of 90 days, or (iii) Whenever a change occurs in place of performance, manufacturing process, material used, drawing, specification or source of supply. When conditions (i), (ii), or (iii) above occurs, the Contractor shall notify GD-OTS so that a determination can be made concerning the need for the additional first article sample or portion thereof, and instructions provided concerning the submission, inspection, and notification of results. Costs of the first article testing resulting from production process change, change in the place of performance, or material substitution shall be borne by the Contractor.

A. First Article Inspection and Test conducted at the Supplier's facility.
B. First Article Inspection and Test conducted at the General Dynamics facility.

QAPR 7 Special Process Approval

Control of Special Processes and Certification: The Supplier shall not perform, or subcontract to perform any "Special Processes" without written approval from the Buyer.

Special Processes are defined as: A method controlled by a contractually required specification where: When a product undergoes a physical, chemical, or metallurgical transformation or inspection, conformance to the specification cannot be readily verified by normal inspection methods.

- Or -

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.

Special Processes that require certification are: heat treating, plating, anodizing, chemical conversion coating (chemical film), passivation, abrasive blasting, oxide coating, painting, nitriding, case hardening, casting, forging, welding, brazing, soldering and others as may be specified. Supplier must maintain records evidencing approval and control of subcontractors and special processes. Separate CofC or shall be specified on the overall CofC required for Special Processes defined in this paragraph.

Inspection may also be included as a Special Process if the Supplier does not have the in-house capability, or resources, to perform inspections as specified on the Purchase Order. If the Supplier is required to use subcontracted inspection, the use of any subcontracted inspection must be approved by the Buyer with enough advanced notice to not delay the delivery schedule shown on the Purchase Order.

QAPR 8 Certificate of Conformance (C of C)

Supplier shall furnish a Certificate of Conformance (C of C) with each shipment of supplies or services that conforms to all purchase order requirements including drawings, and specifications. As a minimum the document will include the physical item description and identification or part number, quantity represented, and the name, title, and date of the responsible agent acknowledging conformance on behalf of the Supplier.

When the Supplier submits secondary or sub-tier Supplier's certificates of conformance the certificate must include the Suppliers name, date of manufacture, part number, and quantity.

Commercial Off The Shelf (COTS) certificates commonly reflect the entire lot quantity and not the specific purchase order quantity. This is an acceptable condition.

QAPR 9 Test Reports

Supplier shall furnish with each shipment designated test report(s) that are performed as part of the inspection plan prepared in accordance with DI-NDTI-80603A (latest revision) as a minimum. The reports shall be submitted IAW section E (Records) of QAPR 0.

A. Material test report providing actual values or ranges of values through chemical analysis or physical testing with which properties of materials are determined (all material certs).
B. If testing is not performed by the Supplier, the name and address of the company or agency actually conducting the testing shall be identified and included in the certifications.
C. Functional testing (i.e. operative inspections such as mechanical, electronic, hydraulic, destructive).
D. Pressure or leak testing.
E. Nondestructive test (i.e. magnetic particle, ultrasonic, dye penetrant, eddy current).
plan prepared in accordance with DI-NDTI-80603A (latest revision) as a minimum.
F. Environmental test (i.e. exposure methods, such as salt fog, shock, dust, vibration, humidity).
G. Radiography film and report.
H. Inspection records.
I. PCA data if required by QAPR 20.

QAPR 10 Ammunition Data Card (ADC)

A. The Supplier shall prepare ammunition data cards in accordance with MIL-STD-1168 current revision, DI-MISC-80043 (latest revision), the applicable DD Form 1423, and the Munitions History Program (MHP-WARP) repository. Directions will be provided to new users to the system. In some cases, an ammunition data card prepared in accordance with DD Form 1650 or equivalent will fulfill the requirement. The Buyer will advise when necessary.

The WARP application is accessed through the Munitions History Program (MHP) website.

The contractor shall prepare an ADC for each lot of item(s) being produced under this contract, regardless of whether or not those lots are accepted or rejected by the Government. The ADC shall comply with MIL-STD-1168 (latest revision) and WARP requirements.

Unless otherwise authorized by the Procuring Contracting Officer, the contractor shall include, in the components section on the ADC representing the deliverable item, as a minimum; all assemblies, sub-assemblies, components, explosives, and propellants listed on the attached to the QA-366 Form for the item being procured (including any sub-components in the attached).

Lot numbers shall be in accordance with MIL-STD-1168 lot number convention and the technical data package requirements. Lot numbers shall be used for all ammunition end items and their major components, including inert, dummy, or non-energetic items and

components. When not required by TDP and not an end item or major component, the component lot number may be constructed through contractor lot number convention.

All component RFVs/ECPs shall be listed on the ADC for the deliverable item, as well as on the component ADC, when that component is identified in the ADC. The WARP user's manual provides information on the level of detail required.

A sample ADC shall be developed and submitted to the WARP system 30 calendar days prior to First Article testing or 30 calendar days prior to production in the event a first article is not required. The WARP ADC program will not allow the submission of additional ADCs until such time as the sample ADC has been approved in the system.

MEARS submission required for sample ADC only, once sample is approved, Contractor will be responsible for loading a PDF version of the ADC in MEARS. Official approval will still be via WARP system.

B. The Supplier shall prepare ammunition data cards in accordance with MIL-STD-1168 (latest revision). In some cases, an ammunition data card prepared in accordance with DD Form 1650 or equivalent will fulfill the requirement. The Buyer will advise when necessary.

C. Loading Authorizations & Description Sheets shall be submitted in the WARP system in accordance with DI-NDTI-80809 (latest revision) paragraphs 10.2.6.4, 10.2.6.4.1, and 10.2.6.4.2. Loading authorizations shall be submitted for Propellant description sheets and/or description sheets for all propellant and high explosives used in production of end item of purchase.

Electronic submissions are made by accessing the Worldwide Ammunition Data Card Repository Program (WARP) housing the Description Sheets and Loading Authorizations modules which are located on the Munitions History Program (MHP) website at https://mhp.redstone.arlmy.mil.

The following explosives/energetics/propellants require Loading Authorizations/ Descriptive Sheets:

- All Propellants (Loading Authorization and Propellant Description Sheet)
- (All others require Description Sheet for Explosive/Chemicals only)
- All Incendiary Mix or pellets
- All Trace Mix or pellets
- Igniter Material/Composition or pellets
- Booster Material or pellets
- Explosive Pellets
- High Explosive/Incendiary Pellets
- DSECs will not be required for primer mixes.

QAPR 11 Traceability

Supplier shall maintain a receipt of raw material through finished product. Traceability is defined as that requirement that permits historical access from fabricated component identification or documentation to records identifying the unique raw material, special process, lot, material heat batch, melt, etc. from which the component was fabricated.

Lot numbering and applicable documents with the traceability requirements specified on the PO will be identified as follows:

A. Supplier's manufacturing lot number, heat number, or batch number.
B. Supplier shall maintain traceability and other identification on General Dynamics-OTS furnished or government furnished material (GFM).
C. Non-repeating serial numbers.
D. Ammunition Lot Number in accordance with MIL-STD-1168, "Ammunition Lot Numbering and Ammunition Data Card".
E. 2-D Bar Coding for verification required (use MIL-STD-129 and MIL-PRF-61002 latest revision for guidance).
    a. An approval of the suppliers 2-D Bar Code Label is required. A first-time sample of the suppliers initial 2-D Bar Coding Label, comprising of two (2) pallet labels, shall be submitted for approval to be read by a High-Performance Bar Code Verification system.
    b. Once approval of the 2-D Bar Code Label is received, the supplier may begin presenting product to GD-OTS.
    c. During life cycle management of the product, the Government may randomly perform checks of the integrity and conformity of the 2-D Bar Code labeling that is affixed to the supplier's product.
    d. The supplier is responsible for all costs associated with correcting 2-D Bar Code labels that do not meet contractual requirements.

Any change of the lot interfix number requires prior approval from GD-OTS.

QAPR 12 Shelf-Life Materials

The Supplier shall have and maintain an effective system for shelf-life items that have limited acceptability due to shelf-life constraints. The Supplier shall show on each container of materials having a limited or specified shelf life for both the Supplier's in-house containers and containers delivered to GD-OTS Marion Operations, the cure date, manufacture or start of life control date, expiration date, lot number, and any special storage and handling conditions applicable. This information shall be in addition to the normal identification requirements of; name, part number, specification number, type, size, quantity, etc.

For material delivered to Marion Operations with an expiration date, shelf life remaining must be in accordance with the following table at the time of shipping to Marion Operations:

SHELF LIFE	MIMIMUM REMAINING SHELF LIFE
3 months or less	90% at the time of shipping

4 – 12 months	80% at the time of shipping
13 – 24 months	70% at the time of shipping
25 months or greater	60% at the time of shipping

Any exception to the above table must be approved, in writing, by GD-OTS Marion Operations.

A. Withdrawn – Use Clause ID 29

QAPR 13 Test Samples

The sample units shall be randomly selected from the entire lot. Prior to selection of the sample units, the lot shall have been inspected to and meet all other requirements of the purchase order. A sample shall not be submitted from a lot rejected for nonconformance to the detailed requirements of the specification(s) and drawing(s) unless authorized by the buyer. The lot from which the samples are drawn shall not be shipped until notification has been provided by the buyer. If the production lot sample contains samples for ballistic or functional testing, the test samples shall be identified as such on the outer packaging. The Supplier's documentation must contain sufficient information to demonstrate traceability to the parent lot.

QAPR 14 Source Inspection

The Supplier shall notify the buyer 14 days in advance prior to the anticipated date to conduct source inspection. The Supplier must have available at the time of inspection the complete document package representing the product for inspection. The Supplier must provide reasonable facilities and specialty gages necessary to complete the inspection.

QAPR 15 Readiness Review

A Readiness Review will be conducted with the supplier as soon as possible after the purchase order has been issued. This will be done for all components/subassemblies determined to require such a review. The Readiness Review will include, but is not limited to, the respective Purchase Order, the item Technical Data Package (TDP), and quality requirements (QAPR clauses) in detail with the objective of ensuring that the product to be supplied to GD-OTS meets all TDP requirements. The Readiness Review is typically conducted with the supplier, Supplier Development & Supply Chain Management.

QAPR 16 Lot Acceptance and Test Samples

The Supplier shall furnish a randomly selected lot acceptance test sample representative of the lot to complete functional and ballistic testing requirements per the product specification. The LAT sample shall be identified as such on the outer packaging.

QAPR 17 General Dynamics-OTS Furnished Material

Supplier shall verify acceptability of General Dynamics-OTS furnished material upon receipt of such material. If the product is found discrepant, Supplier shall notify General Dynamics-OTS buyer by the most expedient method of communication.

QAPR 18 Rounding

Unless otherwise specified, the Supplier shall, during the course of inspection, utilize the standard practice of ASTM E29 (latest revision) with respect to rounding of digits (reference section 6). The accuracy of acceptance is a ratio of 10:1 greater than the tolerance of the feature being inspected. It shall be this last digit that is employed to determine the rounding of the other significant digits. In the case of MAX callout for a feature, rounding shall not be utilized, and the absolute method shall be employed (reference section 5).

QAPR 19 Additional Quality Requirements

The purpose of this QAPR is to alert the Supplier there are additional requirements in the form of separate attachments that are included with the purchase order. If such attachment(s) is (are) not included, contact the buyer for clarification.

QAPR 20 Physical Configuration Audit (PCA)

A. The Supplier shall produce a sample (quantity as directed by GD-OTS) to determine validity of the specification or drawing design in relation to the physical characteristics and interfaces are consistent with the sample produced. The report shall be prepared in accordance with DI-SESS-81022 (latest revision). The Supplier shall provide 15-day advance notice to the General Dynamics-OTS buyer to permit scheduling.
B. The Supplier shall perform a PCA on 10 components for every drawing requirement (including dimension and notes) every time a change is made (process change, or product change to line).

QAPR 21 Process Control Documentation (PCD)

The Supplier shall maintain a program and provide a detail listing of all documentation used in the fabrication of purchased item(s) that affect quality. As a minimum, the list will include document number, title date, and revision level. The PCD shall be submitted for review and approval prior to production. General Dynamics-OTS has 30 days for approval. Any change requires prior approval before implementation.

QAPR 22 Corrosion Prevention Control (CPC) Plan

A. The Supplier shall provide a CPC Plan detailing a discipline used in the manufacturing of components to ensure adequate protection from the environment has been established. This plan shall detail as a minimum: adequacy of the manufacturing process, material receipt and certification, in-process storage, control of materials, sub-assemblies, compatibility of cleaners and protective finish/coatings, application of surface preparation cleaners, protective finish/coatings, and appropriate packaging and storage. The CPC Plan shall be submitted for review and approval prior to the acquisition of materials used in production. General Dynamics-OTS has 30 days for approval.
B. Supplier shall follow the requirements of 90614_SPEC_PA (Packaging Specification, Corrosion Control of Carbon & Alloy Steel Ammunition Components).

QAPR 23 Failure Analysis and Corrective Action Report

The supplier shall notify GD-OTS via email within 24 hours after the occurrence of a failure during acceptance inspection/testing, including but not limited to, any failures during FAT/LAT and any destructive/nondestructive test failures. Formal submittal shall be no later than 10 days after reported failure. A final report, to include a full failure analysis and root cause investigation and identified corrective action, shall be submitted no later than 30 days after determining/conducting root cause/failure analysis, unless extension has been requested and granted by GD-OTS. The Failure Analysis and Corrective Action Report shall be in the supplier's format and shall summarize the results of the supplier's Failure Reporting, Analysis, and Corrective Action System and shall include a cumulative tabulation of failure data. The report shall include the following elements at a minimum:

- Failure number
- Failure analysis number
- Failure date
- Name of engineer responsible for failure analysis
- Failed part name
- Failed part number
- Manufacturer of failed part if not manufactured by the supplier
- Subassembly name and number if applicable
- Major assembly name and number if applicable
- Equipment name and serial number if applicable
- Failed part's accumulated test or field operational life data if applicable
- Test or mission being performed when the failure occurred if applicable
- Test or mission mode of operation and environmental and use conditions when the failure occurred if applicable
- Failure symptoms and description of detection or diagnosis methods if applicable
- Failure effects if applicable
- Repair action if applicable
- Failure mode description
- Description of engineering analysis method employed in failure analysis
- Failure mechanism/cause of failure
- Contributing factors, including multiple factor interactions, or secondary effects of the failure
- Categorization of failure (e.g. equipment design, equipment manufacturing workmanship, part design, part manufacturing workmanship, software errors, unverified, intermittent, non-relevant)
- Information on previous corrective actions for the same part or failure mode if applicable. Corrective action required to mitigate the failure mode including:
    - Identification of the failure mode
    - The recommended process or process control changes, when the failure cause was due to workmanship defects
    - Proposals for retrofit of all components already delivered or assembled, including recommended effectivity, in accordance with the Purchase Order
    - Disposition of all defective material and material rendered obsolete because of any necessary redesign, to assure their exclusion from end item product

  - Identification of previous functional and environmental qualification tests, if any, invalidated by the corrective action changes and a recommendation of those tests that should be repeated, in accordance with the terms of the Purchase Order, to demonstrate the corrective action's effectiveness
  - Effect on operational and diagnostic software programs and plan for changes, if necessary
- Corrective action status
- The recommended fix effectiveness factor to be applied to the failure mode based on the proposed corrective action
- Rationale for any open failure analyses past the Purchase Order specified closeout time
- Severity criticality ranking of the failure modes. The severity classification categories are:
  - I – Catastrophic – a failure which may cause death or system loss
  - II – Critical – a failure which may cause severe injury, major property damage, or major system damage resulting in mission loss
  - III – Marginal – a failure that may cause minor injury, minor property damage, or minor system damage which will result in delay or loss of availability or mission degradation
  - IV – Minor – a failure not serious enough to cause injury, property or system damage, but which results in unscheduled maintenance or repair.

QAPR 24 Foreign Object Debris (FOD) Elimination Program

The Supplier shall maintain a documented FOD elimination program in accordance with National Aerospace Standard NAS412 (latest revision). Procedures shall be submitted to the buyer and approved by General Dynamics – OTS.

QAPR 25 Electrostatic Discharge (ESD) Control Program

An ESD control program shall be documented and maintained in accordance with ANSI/ESD S20.20 (latest revision) as applicable to electrical and electronic parts, assemblies, and equipment subject to damage by ESD.

QAPR 26 Soldered Assemblies

The Supplier's facilities, tools, processes, and documentation pertaining to soldering shall comply with the requirements of J-STD-001 (Requirements for Soldered Electrical and Electronic Assemblies) and IPC-A610 (Acceptability for Electronic Assemblies).

QAPR 27 Flow Charts/Process Maps

Supplier shall prepare, maintain, and submit process flow charts or graphical representation of all operations utilized in the production of deliverable product to include any subcontractor. The flowchart or process maps shall include from start to finish as a minimum all inputs, pathways, circuits, decision points, and actions. Specialized processes shall include descriptions detailing the specialty.

Flowchart and or process maps shall be submitted for review and approval prior to shipping deliverable product. No flowchart or process map may be altered from the original approved

submission, without the written permission of GD-OTS and may be subject to GD-OTS' customer concurrence.

QAPR 28 Failure Modes Effects Analysis (FMEA)

Supplier shall prepare, maintain, and submit failure mode effects analysis (FMEA) of all operations utilized in the production of deliverable product to include any subcontractor. The FMEA will be utilized to determine possible causes of failures and to develop preventive action. As a minimum it will contain identified possible failure modes, will rank and prioritize possible causes, and will identify possible preventive action. The FMEA shall be submitted for review and approval prior to shipping deliverable product.

QAPR 29 Supplier Container and Packaging Identification

Supplier shall prepare, document, and submit graphical representation of the planned identification that will be utilized in the production of deliverable product. The Supplier's container or packaging identification plan shall be submitted for review and approval prior to first article or deliveries of deliverable product unless otherwise directed by GD-OTS. The Supplier shall also comply with any additional marking requirements dictated on the purchase order.

QAPR 30 Tool Control

Supplier shall prepare, implement, document, and maintain a tool control plan that shall be utilized in the production of deliverable product to include any subcontractor. The tool control plan will be utilized to prevent failures and to develop consistency. As a minimum it will contain the feature and the frequency for checking the feature, and the responsible agent for tracking and monitoring within the process. The Tool Control Plan shall be submitted for review and approval prior to shipping deliverable product.

QAPR 31 Visual Standard

Supplier shall prepare, maintain, and submit for approval any visual standard or graphical representation of a product to be considered. Any visual standard must be mutually agreed upon and may require customer concurrence for approval. The visual standard shall be submitted for review and approval prior to application of use on deliverable product.

QAPR 32 Critical Characteristics Control (CCC) Plan

The Supplier shall provide a Critical Item Characteristics List in accordance with DI-MGMT-81988 (latest revision) for all Critical Defects in the appropriate specification or otherwise identified as critical to GD-OTS processes. CICL must be submitted prior to all other CDRL submissions. The USG shall have 30 days to review the CICL prior to submission of additional CDRLs. CICL shall be submitted no later than 180 days prior to first delivery due date/FAT due date. The Government shall provide a response within 15 calendar days of initial submission. If further revisions are necessary, the contractor shall have 15 calendar days to approve revisions and the Government shall provide response within 15 calendar days. If applicable, the CICL

shall be approved prior to First Article Test (FAT), if FAT is required or prior to initiation of production.

The Supplier shall provide a CCC plan and all supporting documentation in accordance with DI-MGMT-81986 (latest revision) for any critical characteristics identified in the appropriate specification or otherwise identified as critical to GD-OTS processes. After initial approval, the Supplier must provide updated calculations annually as an amendment to the original document. The Supplier shall flow the substance of this clause to its subcontractors that produce a critical characteristic as part of their process.

The Supplier may provide a CPOA plan and all supporting documentation in accordance with DI-MGMT-81996 (latest revision) for any critical characteristics identified in the appropriate specification or otherwise identified as critical to GD-OTS processes. After initial approval, the Supplier must provide updated calculations annually as an amendment to the original document. The Supplier shall flow the substance of this clause to its subcontractors that produce a critical characteristic as part of their process.

A CCCP and CPOA Review Guide is available to assist Contractors on the DEVCOM Public Website (https://ac.ccdc.army. Mil/organizations/QESA/) in the application of the CCCP and CPOA requirement. The CCCP Review Guide's content, in its entirety, is provided solely for REFERENCE and GUIDANCE PURPOSES ONLY – it is not, nor is it intended to be, contractually binding. Accordingly, the information contained within the CCCP and CPOA Review Guide is expressly not, nor shall it be construed to be, incorporated either directly or by reference into the terms of the CCCP and CPOA requirement itself nor into the terms and conditions of any underlying contract which contains the CCCP and CPOA requirement.

A Critical Defect Investigation Report shall be submitted in accordance with DI-MGMT-81989 (latest revision) for any Critical defect created during First Article or production builds. Root Cause Investigation and Segregated Suspect Material Use: Contractor shall submit for approval and will receive response within 3 business days of receipt of original and any required revision. Unless otherwise stated, Contractor shall submit revisions within 10 days of receipt of Government Response. Request to Restart Operations: Contractor shall submit for approval and will receive response with 3 business days of receipt.

CRITICAL CHARACTERISTICS CONTROL

(a) The contractor's processes shall be designed with the objective of preventing the creation or occurrence of non-conforming critical characteristics (see paragraphs d & e). The contractor shall establish, document, and maintain a product specific, Critical Characteristics Control (CCC) plan that shall be submitted to and approved by the PCO IAW DD Form 1423. The CCC plan shall include or reference all procedures, work and handling instructions and process controls relating to any critical characteristics. Mistake Proofing techniques of the material handling and inspection systems shall be a part of the

CCC Plan. Guidance for developing this plan and submitting Critical Plans of Action (CPOA) (paragraph g) can be found at https://ac.ccdc.army.mil/organizations/QESA/ .

(b) The contractor shall assure its critical processes are robust in design, capable and under control, with the objective of not generating any critical non-conformances. The contractor shall calculate, document, clearly identify, and have a schedule that routinely assesses the reliability and effectiveness of its critical processes to prevent generating critical non-conformances as identified in the CCC Plan.

(c) An inspection and verification system shall be employed that will verify the robustness of all critical processes. The contractor shall calculate, document, clearly identify, and have a schedule that routinely assesses the reliability and effectiveness of its inspection and verification system to detect and prevent critical non-conformance escapes as identified in the CCC Plan. The Government expects that a contractor will allow zero critical escapes. To demonstrate its critical escape risk the contractor will utilize the nonconformance escape risk goal provided below.

(1) Unless otherwise specified immediately below, the calculated critical non-conformance escape risk is one in a million (.000001) items delivered. Or:
Alternate calculated Critical Non-conformance Escape risk: N/A

Unless otherwise approved by the PCO, the non-conformance escape risk is the sum of the individual characteristic escape rates.
The probability of escape for a single characteristic shall be calculated by multiplying the non-conformance rate(s) entering the inspection system(s) by the error rate of the inspection system(s). These escape rates are then summed and shall not exceed the tolerable critical non-conformance escape risk.

(2) Within 45 calendar days after award, the contractor can elect to submit a phased-in approach on how the non-conformance escape risk will be achieved over a period of time not to exceed 180 calendar days from the date of first article approval, or from initiation of production when first article is not required. Submission will require approval by the Government and is subject to a technical review and analysis. Allowance for a phased-in approach will then become a part of the contract. Disapproval of the contractor's submission does not relieve the contractor of its obligation to comply with the terms of this requirement.

(3) Based on the maximum error rate defined for the inspection system, the contractor shall develop a test procedure to demonstrate the error rate. As part of the test plan the contractor shall include sufficient test quantities to assure 90% statistical confidence in the resultant rates unless otherwise approved by the PCO. Once established, the contractor shall have a documented schedule to routinely monitor the non-conformance

and inspection system error rates to assure they do not exceed the maximum rates allotted.

(d) As a result of previous practices, the Government's technical data may refer to Critical I, Critical II, and Special characteristics. The use of the term critical characteristics within this section includes Critical I, Critical II and Special characteristics and the use of the term critical nonconformances includes those nonconformances pertaining to Critical I, Critical II and Special characteristics. Unless otherwise stated in Section C, these characteristics shall be subject to all requirements of this section.

(e) In addition to critical characteristics defined in the Government's technical data (drawings, specifications, etc.), the contractor shall also identify and document in its contractor developed technical data all known material, component, subassembly, and assembly characteristics whose non-conformances would likely result in hazardous or unsafe conditions for individuals using, maintaining, or depending upon the product. All additional critical characteristics identified by the contractor shall comply with the critical characteristic requirements of the TDP, supplemented herein. The Critical Item Characteristic List (CICL) review process shall be included in the CCC Plan. The contractor's additional critical characteristics shall be classified in accordance with guidance located at https://ac.ccdc.army.mil/organizations/QESA/ and shall be submitted to and approved by the PCO prior to production (see DD Form 1423).

(f) In the event that a critical non-conformance is found anywhere in the production process, the contractor, as part of its CCC Plan, shall have procedures in place to ensure:

(1) The non-conformance is positively identified and segregated to ensure that non-conforming product does not inadvertently remain in or reenter the production process. This control shall be accomplished without affecting or impairing subsequent non-conformance analysis. Final disposition of non-conforming product shall be documented and audited for traceability.

(2) The operation that produced the non-conforming component or assembly and any other operations incorporating suspect components or assemblies are immediately stopped. (See paragraph h. for exceptions)

(3) The GD-OTS is immediately notified of the critical non-conformance (electronic mail) (See DD Form 1423).

(4) Any suspect material is identified, segregated, and suspended from any further processing and shipment.

(5) An investigation is conducted to determine the root cause of the non-conformance and the required corrective actions. An evaluation shall also be conducted with regard to

suspect material to ensure that no additional critical non-conformances are present. A report of this investigation shall be submitted (See DD Form 1423). The use of the DID report shall not delay notification as required in paragraph f (3) above.

(6) A request to restart manufacturing or to use any suspect material associated with the critical non-conformance is submitted (see DD Form 1423). Restart of production shall not occur until authorized by the PCO, unless previously addressed in the approved CCC Plan. The Government will respond to a restart request within 3 working days. All objective evidence of the investigations to date shall be available for review at the time of restart. Suspect material shall not be used without PCO approval.

(7) The Government reserves the right to refuse acceptance of any suspect material until the root cause or reasonably likely cause of the critical non-conformance has been identified, corrective action has been fully implemented and sufficient evidence has been provided to exclude non-conforming material from the conforming population.

(g) The contractor may develop alternative plans and provisions, collectively referred to as a Critical Plan of Action (CPOA), relative to government or contractor identified critical characteristics. All CPOAs are independent and shall be evaluated by the government for this contract. The CPOA and any subsequent revisions submitted IAW DD Form 1423 require PCO approval prior to implementation. Unless otherwise specified at time of approval, contractor shall review and evaluate CPOAs for currency and process improvements at least on an annual basis and submit results to GD-OTS. Unless otherwise approved by the PCO, each critical characteristic shall require a separate CPOA. If the CPOA includes other documents by reference, they shall be submitted upon request. Guidance for the development of a CPOA can be found in the referenced guidance located at paragraph a of this section.

(h) The contractor may continue production with an approved CPOA provided that the critical non-conformance is consistent with the failure mode(s) and rates established in the CPOA. Failure to meet all CPOA requirements will require the contractor to revert back to paragraph f requirements.

(i) If a critical non-conformance is discovered beyond its designated inspection point and prior to Government acceptance the contractor shall take actions specified in paragraph f above. If a critical non-conformance is discovered after Government acceptance the Government has the right to invoke the requirements of paragraph f with respect to the contractors remaining production under this contract.

CCCP Supplemental Language

Supplement to Critical Characteristics Requirement

The following outlines minimum requirements to be included in the Critical Characteristics Control Plan and the voluntary Critical Plan of Action submissions.

Critical Characteristics Control Plan (CCCP):

Contractor shall outline its overall approach to critical defects, including (at a minimum): plan for prevention and segregation of critical defects, process for identifying suspect material, plan for eventual determination of usefulness of suspect material, process for conducting root cause investigation, process for notifying GD-OTS of critical defects, Government QAR involvement in root cause analysis, acknowledgement that a critical defect discovered at any point in the manufacturing process shall be treated accordingly and acknowledgement that each critical defect discovery requires the contractor to shut down and investigate root cause whether a CPOA is in place or not.

Escape risk shall be calculated using CHINV only and will be based on the most recent two years of production or most recent one million produced parts (unless otherwise agreed to by the Government). In either case, the contractor shall provide rationale/justification of its decision. No change in process that may affect critical defect rate shall have occurred during the chosen period. The contractor shall include an Excel spreadsheet showing its calculations/tables.

This spreadsheet shall clearly identify how the contractor has calculated its escape risk for each part or critical characteristic identified in the CCCP. At a minimum, the spreadsheet shall include: number of parts produced for the specified production interval, number of critical defects experienced per critical characteristic, number of masters ran per defect and designated point of inspection, number of masters accepted by AAIE, inspection error rate and inspection system reliability.

CCCPs shall include process maps which clearly identify in process inspection points as well as approved designated points of inspection. Process map shall also identify where in the process each of the critical characteristics could be produced.

CCCPs will be approved by the PCO for a period of one year. After initial approval, contractor must provide updated calculations annually as an amendment to the original document. Provided there are no changes to the previously approved CCCP, contractors are only required to submit escape risk calculations (excel spreadsheet). The annual submittal will need to reference the most recent CCCP in the submittal letter or email.

Assuming new CCCP escape risk calculations are submitted within the annual review cycle, contractors can continue to utilize previously approved CCCP until the IPT approves the new CCCP.

For annual submittals, CCCP escape calculations and CPOA thresholds can be submitted in the same excel file. One year approval will be given for both the CCCP and CPOAs.

For common components and component suppliers, the USG will allow submittal of component level CCCPs. Once the component level CCCP is approved the escape risk calculations can be rolled up into the applicable cartridge level CCCP for the remainder of the year. Submission of a CCCP for common components shall not preclude the inclusion of summary level information in a cartridge level CCCP. Detailed information specific to a common component shall, as a minimum, be provided in the cartridge level CCCP by reference to the PCO approval letter for the common component CCCP.

CPOA Supplemental Language

Contractor shall collect historic data to support proposed thresholds. Thresholds shall be based on the most recent two years of production or most recent one million produced parts (unless otherwise agree to by the Government). Production numbers shall be based on the same end item on contract or similar product. Contractor shall use Chi Inverse (CHINV) for calculating shutdown thresholds. The contractor must provide sample calculations which are clearly marked as sample, provide an Excel spreadsheet with formulas and explanations of how specific threshold numbers were derived.

Contractor may choose to express shutdown thresholds in terms of either a ratio or hard stop limit. In either case, the contractor shall provide all calculations. CPOA must clearly identify exactly when a shutdown and request for restart to the PCO must occur. If no production data exists, contractors may use similar production data (with Government approval) to calculate thresholds during phase in period.

For high volume critical defects, the USG may request that the contractor provide critical defect information/report on a monthly basis. Contractor shall provide a spreadsheet with formula used to calculate real time defect rate and escape risk along with this report. The contractor shall also report all critical defect occurrences on a per lot basis using the Critical Characteristics Module in WARP.

Contractor shall acknowledge in each CPOA submission that the CPOA and required production shut down applies to the PRODUCTION PROCESS and not a specific item or contract. For example, if production is shut down due to a critical defect escape experienced during production for contract A, the contractor may not instead use that same production line or process for production for contract B.

Contractors identified failure modes must be specific. Vague or generic failure modes such as broken tooling or machine wreck will not be accepted.

Once deemed acceptable, a CPOA will be approved for a period of one year. It is the contractor's responsibility to track expiration of the document. Assuming new thresholds are submitted within the annual review cycle, contractors can continue to utilize previously approved thresholds until the IPT approves the new thresholds.

QAPR 33 Calibration/ Gauge Vendors

Calibration service providers must have active accreditation to ISO 17025 with Certificate of Conformance (C of C). Calibration certificates traceable to NIST or other national or international standards must be provided.

QAPR 34 Coating Requirements

Supplier shall prepare, maintain, and submit written plans, instructions, and samples as required for a method when a product undergoes a physical, chemical or metallurgical transformation by use of any cleaning activity, chemical conversion, special process, or coatings as listed on applicable drawings and specification for the component, or as directed by GD-OTS. All plans and instructions shall be in a format that meets DI-NDTI-80603 (latest revision). Plan or instruction submission is due 30 days after purchase order (PO) approval date. Any revisions are requested to be completed within 15 days of notice.

Samples required for submission to the customer shall be submitted to GD-OTS unless directed otherwise. Samples shall be submitted at the same time as plans and instructions, unless directed otherwise.

All cleaning activity, chemical conversion, special processes, or coatings shall conform as a minimum to the requirements of TT-C-490 (latest revision), MIL-DTL-16232 (latest revision). Other applicable requirements are as follows: ASTM D2510, ASTM D3359, ASTM B117, SAE-AMS-STD-595, MIL-DTL-53072 (latest revision) and QA-002 Quality Assurance Procurement Requirements (QAPR) 19 Additional Quality Requirements. All document submissions are to be made electronically to the buyer listed on the purchase order.

QAPR 35 Support Equipment (Tooling and Related Hardware)

1. The supplier is required to retain certifications for all material/special processes and shall submit them to the Buyer upon request.
2. For 1018 through 1045, tool steels, and other low alloy steels requiring heat treatment, only chemistry certifications are required.
3. All steels other than plain carbon steel require a statement that the material was melted in the United States.
4. Identify the tool dash number, or find number, on each applicable certification.
5. Material Certifications and Certifications of Conformance require a signature and title by the approving source.

6. Where AN/MS, catalog type hardware, or material call outs within a specification are purchased, provide proof of purchase such as an invoice or bill verifying such.
7. Where epoxies or adhesives are purchased to an applicable MIL-SPEC, provide proof of purchase such as an invoice, bill or photocopy of the container or supplier data sheet.
8. Provide certification with a signature and title. Unless the drawing specifically excludes special test requirements, the certification shall include such test, and as applicable, results. Data is to be kept on file and shall be furnished upon request.