1.0 DEFINITIONS

- **Automated Acceptance Inspection Equipment (AAIE)**: Equipment for which no (or minimal) human involvement is required in the acceptance determination. This would include equipment employing probes, sensors, and transducers, for example, which is automatically manipulated to perform measuring and detecting functions. If a read-out is provided, the equipment is categorized as automatic even if operator interpretation is needed in the accept or reject decision.
- **Acceptance Inspection Equipment (AIE)**: All devices, including laboratory test equipment, used to measure, gage, test, inspect or otherwise examine items to determine compliance with specifications, drawings, and/or purchase order (PO) requirements. There are two types of AIE:
- **Government Designs** - Government Special Inspection Equipment (SIE) which are detailed drawings furnished by the Government that normally describe all information necessary for the fabrication and use of the item of inspection equipment.
- Contractor Designs that are required for all inspection equipment for which Special Inspection Equipment designs are not specified. They may include standard commercial equipment which the contractor proposes to use. (Standard commercial equipment is defined as unmodified equipment which is catalogued and available for purchase by the general public.) Contractor designs also include any drawings or special drawings of equipment required to be used with commercial equipment or with SIE designs. Tooling jigs, fixtures and such devices that may be used for inspection as described herein.
- **Gage**: A device or mechanism designed specifically for the acceptance or rejection of the dimensional features of parts.
- **Gage Tolerances**: Tolerances which are applied to gages in order to limit variations in size during the manufacture and use (wear tolerance) of the gages. The direction of the gage tolerance shall always be within the product limits.
- **Gaging Dimensions**: Dimensions which control the location and accuracy of precision gaging surfaces and, therefore, are of the utmost importance. It is imperative that these dimensions be carefully applied and accurately checked.
- **Measuring Equipment**: Devices which provide for a range of dimensional measurements.
- **Measurement Systems Evaluation (MSE)**: Measuring and inspection equipment system design documentation that covers a variety of measurement systems and equipment used to evaluate acceptability of units to meet requirements.
- **Test Equipment**: Devices or mechanisms designed specifically for the purpose of appraisal or calibration of the functions, electrical aspects, mechanical properties, or other phenomena exhibited by parts to be tested.

2.0 REFERENCES

- ASME Y14.5M (Latest revision unless specified otherwise): Dimensioning and Tolerancing.
- DI-QCIC-81960 (Latest revision unless specified otherwise): Measurement System Evaluation (MSE) – Measurement and Inspection Equipment System Design Documentation for Acceptance of Product.
- ISO/IEC 17025 (Latest revision unless specified otherwise): International Standard, General Requirements for the Competence of Testing and Calibration Laboratories.
- ISO 10012 (Latest revision unless specified otherwise): International Standard, Measurement Management Systems – Requirements for Measurement Processes and Measuring Equipment.
- MIL-A-70625 (Latest revision unless specified otherwise): Military Specification, Automated Acceptance Inspection Equipment Design, Testing and Approval, of.

3.0 PREFACE

This clause provides the requirements for Measurement System Evaluation, which incorporates all Standard Measurement Equipment (SME), Custom Functional Gages, Automated Acceptance Inspection Equipment (AAIE), Coordinate Measuring Machine (CMM), Tool Control, Non Destructive Testing (NDT), Destructive Environmental and Functional Testing (DEF) and the submission requirements that will be utilized by General Dynamics Ordnance and Tactical Systems (GD-OTS) subcontractors or GD-OTS operating facilities to accept product in fulfillment of PO obligations.

3.1 PREPARATION INSTRUCTIONS

1. Initially, the subcontractor/GD-OTS Operating Facility shall submit all MSE for evaluation and approval at least 60 calendar days prior to use, as specified in the PO or Interdivisional Work Authorization (GD-OTS Internal) (IDWA). All AIE/ AAIE shall be available for use at the time of First Article submission (if required) or the initiation of production. If Government approval is required for the applicable MSE, the Government will furnish disposition to GD-OTS within 45 calendar days after receipt.
2. Partial submission of MSE designs is permissible and encouraged. The completion date for design review will be based on the date of final submission of designs and the required delivery schedule as stipulated in the PO or IDWA.
3. When a revision is required to existing approved MSE or to MSE drawings, for any reason, approval of any such revision is mandatory prior to revision being made.
4. A composite inspection equipment matrix by component/sub-assembly part number shall be submitted along with the descriptive information detailed in section 3.3 of DI-QCIC-81960, as appropriate. This matrix will include, as a minimum:
    a. PO number, Prime Contract number, and Statement of Work (SOW) number.
    b. Contractor name and address, along with the name and contact information of individual(s) responsible for preparation/review of AIE submission.

c. Specification or Quality Acceptance Provision (QAP) number, revision level and date, and amendment number (if applicable).

d. Any Request for Variance (RFV), Engineering Change Notice (ECN), or Notice of Revision (NOR) if applicable to the component QAP or drawing referenced in the matrix.

e. Drawing number and revision letter and date of the component being inspected.

f. Classification of Defect (CD) numbers listed by paragraph number for all inspections of the relevant component/sub-assembly.

g. Equipment used for each inspection, including any backup/alternate gages (brief description is acceptable, i.e., digital micrometer, height gage, force gage, custom functional gage, etc.).

h. Gage ID number, drawing number, and revision level and date, for any non-standard test equipment as appropriate.

i. Gage ID number, manufacturer, and model number of standard commercial inspection equipment. Along with sufficient information to show it is capable and accurate enough to perform the inspection (i.e., resolution, accuracy, linearity, etc.)

j. Operating instructions/Calibration instructions (OICI)

k. Any manuals or literature required to operate and maintain the system

l. Personnel qualifications necessary to perform the inspection or operate the equipment

5. Descriptive Documentation

a. It is suggested that drawings, or descriptions of AIE/AAIE be submitted electronically, in the subcontractor's format and, as a minimum, will disclose design information sufficient to determine the adequacy and accuracy of the proposed equipment. All such submissions shall include:

i. Each design drawing with a unique number and revision level assigned to it.

ii. Each original drawing, including CAD drawings, shall be dated and signed to verify technical content and adherence to applicable standards.

iii. At a minimum, each drawing will have signature blocks "Drawn By" and "Approved By". Each block must be signed by a different person.

iv. Additional signature blocks may be entered.

v. Revisions to any design drawings shall be recognizable by a revision symbol, date, description, and signature or initial in the revision block area. The letters "I", "O", "Q", "S", and "Z" shall not be used in the revision symbol block.

b. For dimensional characteristic inspection (go/no go functional gages, standard measurement equipment, and set-ups):

i. Refer to DI-QCIC-81960 Section 3.4 and 3.5

ii. Standard measurement equipment shall be fully described by manufacturer catalog listings, part numbers, model numbers, or other means which provide sufficient information to permit identification and evaluation by GD-OTS and may include illustrations and engineering data along with sufficient information to show that it can perform the inspection. Any modifications to commercial equipment will be documented and submitted for approval. This would include, for example, replacing the standard probe on a dial indicator with a custom probe for inspection of a specific feature.

c. For dimensional characteristic inspection (CMM, and set-ups):

i. Refer to DI-QCIC-81960 Section 3.6 a.

d. Inspection characteristic that are measured indirectly by control of the tooling (Tool Control) used to manufacture:

i. Refer to DI-QCIC-81960 Section 3.6 b.

e. Inspection characteristics requiring Non-Destructive Testing such as Ultrasonic or X-Ray testing:

i. Refer to DI-QCIC-81960 Section 3.6 c.

f. Automated Acceptance Inspection Equipment (AAIE):

i. Submission of AAIE will be in accordance with DI-QCIC-81960 Section 3.6 d and MIL-A-70625.

ii. Approval of the AAIE shall occur in three phases. The first phase will be the design phase. In this phase, designs, either conceptual or detailed, will be submitted for evaluation. Design approval will authorize the subcontractor to proceed with fabrication of the AAIE, refer to.

The second phase is an acceptance test conducted by the subcontractor at the equipment manufacturer's facility.

The third phase will be the equipment evaluation phase. During this phase, an acceptance test will be conducted. Final approval of the inspection system will be contingent upon the performance of a successful test.

A plan defining the requirements of an acceptable test will be prepared by the subcontractor or GD-OTS operating facility and submitted for approval. The test will be witnessed by GD-OTS personnel and certain United States Government (USG) personnel, including the cognizant USG technical agency.

iii. The AAIE shall accept only conforming material. All characteristics requiring AAIE shall utilize inspection equipment with a minimum demonstrated reliability

of 99.8% at a 90% confidence level to detect non-conforming material along with an additional 10% of that quantity as conforming material, unless otherwise specified.

iv. Revision control of AAIE software shall be captured and provided to GD-OTS.

v. AAIE Verification:

1. When a verification standard fails, and there is no plan to resolve the failure within the AAIE prove out plan, GD-OTS must be notified immediately.

2. An investigation needs to be performed to determine possible root causes of the failure, then identify the corresponding corrective preventative actions. The results of the investigation must be submitted and approved by GD-OTS.

g. Inspection characteristics requiring Destructive, Environmental, and Functional tests (DEF):

i. Refer to DI-QCIC-81960 Section 3.6 e.

h. When 100% inspection is specified, non-operator dependent evaluation equipment should be utilized if/when possible.

6. The subcontractor/GD-OTS operating facility shall apply a unique identification number to all inspection equipment. The number shall provide positive identification of items and permit ready differentiation between like gages or inspection equipment.

7. For information regarding Measurement System Analysis (MSA), refer to DI-QCIC-81906 section 3.6 f. Submission of MSA documentation will only be required if Supplier Quality Clause S-10 is specified on contract or PO. S-10 should be referenced for MSA specific submission and acceptance criteria.

3.2 Approval Process

1. GD-OTS's review of all design categories, i.e., critical, major, and minor, will normally be accomplished within 30 calendar days after receipt of the designs. After GD-OTS approval to the appropriate government technical agency. Government review will normally be accomplished within 30 to 45 calendar days after their receipt.

2. Only approved designs will be forwarded to the Government. When GD-OTS does not agree with the proposed gage design or inspection method, the MSE SDRL submittal will be rejected in SoftExpert with comments on what specifically was disapproved. The subcontractor or GD-OTS operating facility will have 5 calendar days to respond.

3. Upon GD-OTS receipt of the Government approval, where required, GD-OTS will submit approval to the subcontractor or GD-OTS Operating Facility via SoftExpert.

4. When the review/approval requirements vary, the contract language shall take precedence.
5. All approvals and disapprovals will be transmitted through SoftExpert. The record of approval must be maintained on file by the subcontractor or GD-OTS Operating Facility and is subject to audit by GD-OTS and Government representatives. The subcontractor or GD-OTS Operating Facility shall provide their local Defense Contract Management Agency (DCMA) office with a copy of all AIE/AAIE approvals.
6. All new or revised gage designs, inspection equipment, or test equipment shall be submitted to GD-OTS prior to implementation.
7. Inspection equipment for all characteristics, including unlisted characteristics, shall be available to GD-OTS or the Government for review upon request.
8. MSE are not automatically authorized for use on this subcontract. Prior approval of MSE on other Government contracts does NOT guarantee roll-over approval of MSE on this subcontract. Approval of all MSE is required prior to production and/or First Article Acceptance Test (FAAT). If the subcontractor would like to "roll-over" or resubmit an MSE that has been previously approved, and there have been no equipment changes to said MSE (including revision level of gaging); the subcontractor will need to submit the previously approved MSE along with a cover letter requesting a roll-over of the previously approved MSE.

3.3 Periodic Inspection of Inspection Equipment

The subcontractor or GD-OTS Operating Facility shall perform periodic inspections of all acceptance inspection equipment in order to detect deficiencies before wear or tolerance limits are exceeded, in accordance with ISO 10012, ISO 17025, or equivalent. The results of all calibrations performed shall be recorded on gage record cards or electronically recorded at the time of the calibration.

Subcontract Specific Requirements:

MSE designs shall include sufficient information to permit accurate and timely evaluation by GD-OTS and the Government. All MSE designs shall be in the same units of measure and meet the same Y14.5M requirements as specified in the Technical Data Package (TDP).

MSE are not automatically authorized for use on this subcontract. Prior approval of MSE on other Government contracts does NOT guarantee roll-over approval of MSE on this subcontract. Approval of all MSE is required prior to production and/or First Article Acceptance Test (FAAT).

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4.0 QUALITY CLAUSE DELIVERABLES (QCD)

Microsoft Office or PDF formats are preferred. All subcontractor data submittals shall be in English. These data items shall be submitted to GD-OTS in accordance with the QCDs as indicated below. The method of submission to GD-OTS St. Petersburg is specified in the General Supplier Quality Clause "S1" located on GD-OTS's Supplier Portal https://www.gd-ots.com/suppliers/quality-clauses/ under GD-OTS St. Petersburg, FL. Unless otherwise agreed upon, deliverables required within this QCD contain CUI and must be marked and transmitted in accordance with DoDI 5200.48, "Controlled Unclassified Information (CUI)."

NO.	TITLE	CUI	GD-OTS APPROVAL REQUIRED	SUBMITTAL TIMING/FREQUENCY
S9-1	MSE Matrix and AAIE Prove-Out Plan	Yes	Yes	Unless otherwise directed in the Subcontract/ PO or Special Instructions document provided by GD-OTS; QCD is due 120 calendar days after PO acceptance or 30 calendar days for subcontractors within the Continental United States (CONUS) or 100 calendar days for subcontractors Outside Continental United States (OCONUS) calendar days prior to production, FAAT, or Physical Configuration Audit (PCA), whichever comes first.
S9-2	AAIE Prove-Out Report	Yes	Yes	Unless otherwise directed in the Subcontract/PO or Special Instructions document provided by GD-OTS; The AAIE Prove-Out Report is to be submitted within 7 calendar days of Prove-Out completion.

5.0 REVISION HISTORY

REV	DATE	CHANGE
0	06/09/2023	ECN23315-Initial Release
1	01/11/2024	CUI Updates
2	06/09/2025	Clarification to include AAIE Prove-Out Plans with MSE Matrix submission.