

## DOCUMENT TEMPLATE QS-TP-10.7.8

### INSTRUCTIONS FOR THIS TEMPLATE

1. Assign a unique document number. (this number will be assigned by GD-OTS)
2. Complete the document in accordance with the requirements in your Purchase Order.
3. Fill in required information as instructed in the **Green Text**.
4. Attach required documents in the Appendices. Ensure these documents are complete.
5. DELETE THIS PAGE prior to routing for approval.
6. Ensure all green text is filled in properly (or deleted) and changed to black. Ensure all red text is deleted.

Review and approve the document prior to submitting it to GD-OTS. Ensure the document number, revision, and date are part of the file name.

File name will be in the following convention:

CDRL/DocumentNumber-ContractRef-ITE-Plan-PN-Description---Initials of Author-DDMONYR

Example:

X060-xxx-D0023-ITEP-pn-descr---INI-DDMMYY.docx

*(NOTE: **File Names** must be under 64 characters long and cannot contain spaces or the following invalid characters: ~ " # % & \* : < > ? / \ + { | } due to SharePoint file naming requirements.)*

7. Submit the approved document through SharePoint.

#### **Plan Format**

The preferred format for ITE Validation Plan submissions is MS Word (Office 2007 or later, .docx version). Supporting documentation including Process Flow, Process Control Document, etc, may be embedded in the document. This template is to be used for ITE used to inspect characteristics classified as Special, Critical, or Major.

**Black** = Standard text. Do not delete or change.

**Green** = Replace with applicable information.

**REMOVE THIS PAGE PRIOR TO SUBMITTING TO GD-OTS**

Please refer to QS-GD-10.7.2 Plan and Report Completion Guide for more information on using this template.

**HYDRA-70 2.75-INCH ROCKET SYSTEM (HYDRA-70)****FY20-24 PRODUCTION****TEST PLAN****INSPECTION AND TEST EQUIPMENT (ITE) VALIDATION PLAN****SUPPLIER NAME****SUPPLIER LOCATION****APPLICABLE ITE TITLE****VALIDATION SUBJECT**

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| DOCUMENT CHANGE LOG |             |                     |
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| -                   | DD MMM YYYY | Initial Issue       |
|                     |             |                     |

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## 1 INTRODUCTION

This Inspection and Test Equipment (ITE) Validation Plan was created to satisfy the contract W31P4Q-20-D-0023 Statement of Work paragraph C-5.1.1.2.1 Inspection and Test Equipment. GD-OTS requires this ITE validation to ensure all ITE is capable of the required accuracy and precision for determining conformance to all technical and contractual requirements. This plan is not a Contract Data Requirements List (CDRL) requirement.

This document provides the test approach to validate the ITE used for conformance acceptance inspection of the <Part Name> part number (P/N) <Part Number>, and supports Baseline Qualification First Article Test (BQFAT) Plan (A005-XX). This plan addresses all ITE used for conformance acceptance inspection of Safety, Special, Critical, and Major Characteristics as identified by the Technical Data Package (TDP). The goal of this validation is to ensure that all ITE is capable of the required accuracy and precision for determining conformance to all technical and contractual requirements.

ITE will be identified as one of the following types:

- Visual – an acceptance inspection that is accepted or rejected based on a visual inspection of the characteristic by either a human or vision system.
- Data Reduction – an accept or reject decision based on the calculation of data gathered from the acceptance inspection.
- Attribute – an acceptance inspection (other than visual) that results in an output of accept or reject.
- Variable – an acceptance inspection that results in a numerical output upon which an acceptance or rejection is based.
- Attribute/Variable – an acceptance inspection that results in an output of accept or reject but uses a variable piece of inspection equipment. An example would be a Dial Indicator with an upper and lower limit marked and an accept decision is made if the output is between the upper and lower limits and a reject decision is made if the output is either over the upper limit or under the lower limit.
- Certification – an acceptance inspection that is based on the review and acceptance or rejection of a certification, usually a sub-tier supplier certification.
- Support Equipment – equipment that is used to aid in one of the measurements above, but does not by itself allow an accept or reject decision to be made. Examples would be surface plates, v-blocks, etc.

The Master Test List (MTL) in Appendix A identifies each piece of ITE covered by this plan, the characteristic to be inspected, and the type of ITE in accordance with the definitions above.

<Keep next sentence if validating more than one part number.> There is a separate MTL data sheet for each part number in Appendix A. < Keep next sentence if ITE includes attribute gages and/or test equipment,> Additional description information for go/no go gages and special test equipment is provided in Appendix C.

Where Standard Measuring Equipment (SME), such as calipers and micrometers, is used, any one of several similar pieces of SME may be used in production. In the Description of Equipment column, the words “or equivalent” will follow the description to identify equivalent

SME that may be used in production. Equivalent SME is defined as the same type of equipment with, at a minimum, the same accuracy.

### 1.1 Schedule

|                                | <u>Expected Completion</u> |
|--------------------------------|----------------------------|
| ITE Validation Plan Approval   | MMM YYYY                   |
| Conduct ITE Validation         | MMM YYYY                   |
| ITE Validation Report Approval | MMM YYYY                   |

### 1.2 Location

ITE validation activities will be performed by <Supplier Name> located at <Supplier Address>.

No Government test facilities will be used in this validation.

### 1.3 Security

There are no security requirements for this validation as all activities are unclassified.

## 2 APPLICABLE REFERENCE DOCUMENTS

Table I identifies the document baseline for this validation and any outstanding changes that may affect the configuration baseline.

**Table I. Applicable Documents**

| DOCUMENT<br>NUMBER | TITLE | REV | NORs |
|--------------------|-------|-----|------|
|                    |       |     |      |
|                    |       |     |      |

## 3 TEST DESCRIPTION

The purpose of this current validation effort is to verify the current state of the ITE is acceptable and has the accuracy and precision required for determining conformance to the applicable technical and contractual requirements.

ITE accuracy analysis will be based on manufacturer's statements of accuracy. If a manufacturer's statement of accuracy is not available, the ITE accuracy will be determined by a Gage Repeatability and Reproducibility (R&R) study.

ITE accuracy will be evaluated against the requirements listed in quality clause Q718 Inspection and Test Equipment Validation Plans and Reports and Q740 Inspection and Test Measurement

Guard Banding. ITE not meeting these requirements will be identified as not meeting the requirement and a guard banding approach will be provided in the ITE Validation Report.

The MTL in Appendix A identifies the ITE to be validated, the method of validation, acceptance criteria for each validation, the related TDP characteristic, and additional information.

The current calibration reports will be reviewed to verify all calibrated features are within tolerance.

Table II identifies the characteristics and equipment that require R&R studies. R&R studies are required as part of the ITE validation for test equipment and inspection equipment that is new or modified. Other conditions may also require R&R studies as determined by GD-OTS. Variable R&R studies shall have a precision to tolerance (P/T) ratio less than or equal to 0.25 (25%) in accordance with Q-clause Q718. Attribute R&R studies are acceptable when the seven (7) “good” parts are accepted each time and the three (3) “bad” parts are rejected each time. A description of the test protocol and acceptance criteria for each R&R study, along with an accompanying data sheet, is contained in Appendix B.

**Table II. Gage R&R Requirements**

| Test No. | Part # | Category /<br>Classification of<br>Characteristic I.D.<br>/ Spec. Para. | Test/Inspection<br>Description | Equipment | Attribute /<br>Variable |
|----------|--------|-------------------------------------------------------------------------|--------------------------------|-----------|-------------------------|
| 1        |        |                                                                         |                                |           |                         |
| 2        |        |                                                                         |                                |           |                         |
| 3        |        |                                                                         |                                |           |                         |
| 4        |        |                                                                         |                                |           |                         |

All dimensions are in the units specified in the TDP.

The accept/reject criteria is defined as stated in the Master Test List and Gage R&R studies.

If any ITE fails the validation, a Stop Ship Quality Assurance Temporary Notice (QATN) will be put into effect until a successful validation for replacement ITE is performed. If replacement ITE is identified at the time of the validation, that ITE may undergo the tests identified for the failed ITE. Results shall be documented in the report.

#### **4 DATA REDUCTION, ANALYSIS AND PROCEDURE FOR VALIDATION OF TEST RESULTS**

Actual test and inspection data records (actual recorded data) will be included in the report. The data records will be signed and dated by the person who performed the test or inspection as well as the supplier management representative and GD-OTS witness. Actual signed data records may be supplemented with, but not replaced by, electronic spreadsheets to allow for data reduction.

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Original data sheet(s) will be included in the report even if data sheets are transposed to electronic files.

Calibration reports shall demonstrate traceability to the National Institute of Standards and Technology (NIST) or equivalent international standards. Copies of calibration reports will be included in the report. The blank data sheets contained in the appendix section describe all data to be recorded during this validation. The data will be reviewed prior to submission of the validation report.

**Figure 1. Left for ease of formatting, delete if not needed.**

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#### Appendix A. MTL Data Sheets

| Number | Description | File                                                                                                                              |
|--------|-------------|-----------------------------------------------------------------------------------------------------------------------------------|
| A1     |             | <br>ITE-Gage-Validation_<br>MTL-DataSheet_2020 |
|        |             |                                                                                                                                   |

#### Appendix B. R&R Documentation

| Number | Description | File                                                                                                                              |
|--------|-------------|-----------------------------------------------------------------------------------------------------------------------------------|
| B1     |             | <br>Variable-Gage-R&R<br>-Protocol_Template_  |
|        |             | <br>Attribute-Gage-R&<br>R-Protocol_Template |

#### Appendix C. ITE Equipment Descriptions

| Number | Description | File                                                                                                                             |
|--------|-------------|----------------------------------------------------------------------------------------------------------------------------------|
| C1     |             | <br>Descriptions_partn<br>umber_Template.do |
|        |             |                                                                                                                                  |