

MIL-W-63150 (AR)  
1 August 1977

## MILITARY SPECIFICATION

### WEAPONS AND SUPPORT MATERIEL

#### STANDARD QUALITY ASSURANCE PROVISIONS FOR

This specification is approved for use by the U.S. Army Armament Research and Development Command, and is available for use by all Departments and Agencies of the Department of Defense.

#### 1. SCOPE

1.1 This specification establishes quality assurance requirements for parts, assemblies, subsystems, and systems.

#### 2. APPLICABLE DOCUMENTS

2.1 The following documents, of the issue in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein:

#### SPECIFICATIONS

##### MILITARY

MIL-C-6021	- Castings, Classification and Inspection of
MIL-I-6866	- Inspection, Penetrant Method of
MIL-I-6868	- Inspection Process, Magnetic Particle
MIL-R-11468	- Radiographic Inspection; Soundness Requirements for Arc and Gas Welds in Steel
MIL-R-11469	- Radiographic Inspection; Soundness Requirements for Steel Castings
MIL-R-11470	- Radiographic Inspection; Qualification of Equipment, Operators and Procedures
MIL-M-11473	- Magnetic Particle Inspection; Soundness Requirements for Weldments

FSC: 10GP

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, US Army Armament Research and Development Command, Attn. DRDAR-QA, Dover, New Jersey 07801 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

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- MIL-P-14232 - Parts, Equipment and Tools for Army Materiel, Packaging and Packing of
- MIL-I-45607 - Inspection Equipment, Acquisition, Maintenance, and Disposition of
- MIL-C-45662 - Calibration System Requirements
- MIL-R-45774 - Radiographic Inspection, Soundness Requirements for Fusion Welds in Aluminum and Magnesium Missile Components

## STANDARDS

## MILITARY

- MIL-STD-105 - Sampling Procedures and Tables for Inspection By Attributes
- MIL-STD-109 - Quality Assurance Terms and Definitions
- MIL-STD-130 - Identification Marking of U.S. Military Property
- MIL-STD-171 - Finishing of Metal and Wood Surfaces
- MIL-STD-202 - Test Methods for Electronic and Electrical Component Parts
- MIL-STD-252 - Wired Equipment, Classification of Visual and Mechanical Defects
- MIL-STD-271 - Nondestructive Testing Requirements for Metals
- MIL-STD-410 - Nondestructive Testing Personnel Qualification and Certification
- MIL-STD-453 - Inspection, Radiographic
- MIL-STD-454 - Standard General Requirements for Electronic Equipment
- MIL-STD-1261 - Welding Procedures for Constructional Steels
- MIL-STD-1263 - Qualification and Certification of Inspection Personnel (Ultrasonic)
- MIL-STD-1460 - Soldering of Electrical Connections and Printed Wiring Assemblies, Procedure for

(Copies of specifications, standards, drawings, and publications required by suppliers in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

2.2 Other publications. The following documents form a part of this specification to the extent specified herein. Unless

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otherwise indicated, the issue in effect on date of invitation for bids or request for proposal shall apply.

American National Standards Institute (ANSI)

- ANSI B46.1 - Surface Texture  
ANSI Y32.3 - Welding Symbols

(Application for copies shall be addressed to: American National Standards Institute, 1430 Broadway, New York, N.Y. 10018.)

American Society for Testing and Materials (ASTM)

- ASTM E 8 - Method of Tension Testing of Metallic Materials  
ASTM E10 - Method of Tests for Brinell Hardness of Metallic Materials  
ASTM E16 - Free Bend Test for Ductility of Welds  
ASTM E18 - Method of Tests for Rockwell Hardness and Rockwell Superficial Hardness of Metallic Materials  
ASTM E23 - Notched Bar Impact Testing of Metallic Materials  
ASTM E94 - Radiographic Testing, Recommended Practice For  
ASTM E99 - Steel Welds, Reference Radiographs For  
ASTM B 117 - Method of Salt Spray (Fog) Testing  
ASTM E142 - Controlling Quality of Radiographic Testing  
ASTM E155 - Inspection of Aluminum and Magnesium Castings, Series II, Reference Radiographs For  
ASTM E186 - Heavy Walled Steel Castings, Reference Radiographs For  
ASTM E190 - Guided Bend Test for Ductility of Welds  
ASTM E310 - Tin Bronze Castings, Reference Radiographs For  
ASTM E390 - Steel Fusion Welds, Reference Radiographs For  
ASTM E446 - Steel Castings Up to Two Inches In Thickness, Reference Radiographs For

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(Application for copies should be addressed to: American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pa. 19103.)

(Technical society and technical association specifications and standards are generally available for reference from libraries. They are also distributed among technical groups and using Federal agencies.

### 3. REQUIREMENTS

3.1 Responsibility for Inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or order, the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. In addition, the Government reserves the right to perform any of the inspections set forth in this specification where inspections are deemed necessary to assure that supplies and services conform to prescribed requirements.

3.1.1 The contractor shall be responsible for complete compliance with and conformance to all contract, drawing and specification requirements.

3.2 Quality assurance terms and definitions. Quality assurance terms used herein shall be as defined in MIL-STD-109.

3.2.1 For purposes of interpretation within this specification, the term "inspection" incorporates the meaning of examination, inspection and testing, as required.

3.2.2 Commercial items, for purposes herein, are considered to be those items which are industry-developed and manufactured and are available off-the-shelf to industry, the Government, and the general public.

3.3 In-process control. The contractor shall establish in-process inspection at strategically located points throughout his manufacturing processes to assure continuous control of product quality. Except for unmodified Military Standard and commercial parts (see 3.5.2), the contractor's inspection system shall provide for inspection and approval of the first piece at

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each operation, and/or the finished part, before quantity production. In addition, the contractor shall provide and maintain work gages and other measuring and testing devices necessary to accomplish inspection and control quality during his manufacturing processes.

3.4 Inspection records. The contractor's records of inspection shall be accurate, complete and available to the Government upon request. The contractor's records of inspection shall provide, as a minimum, the following information:

- a. Contract order number
- b. Drawing and specification number with revision letter and date
- c. Nomenclature of items inspected
- d. Number of pieces inspected
- e. Individual characteristics inspected
- f. Conformance/nonconformance criteria
- g. Description and quantity of defects found
- h. Results of inspection (e.g., identification of conforming and of nonconforming product). Actual inspection and test results shall be recorded when actual measurements and tests were the basis for conformance/nonconformance decisions.
- i. Date of inspection
- j. The following shall be included when sampling is used:
  - (1) Sampling plan
  - (2) Acceptable Quality Levels (AQL's) used
  - (3) Lot size and lot number
  - (4) Sample size

3.4.1 The contractor shall make available to the Government representative records of qualifications of operators and equipment for special processes (i.e., welding, magnetic particle, radiographic, etc.) to applicable specifications and standards. This shall apply whether the special processes are performed at the subcontractor's facility or at the contractor's plant. All inspection records, including certified test reports, operator/process certifications, test reports, reports of visits to the subcontractor, etc. shall be maintained on file at the contractor's plant and made readily available to the Government representative, upon request, for the duration of the contract and for three (3) years thereafter.

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3.5 Certification provisions.

3.5.1 Certified test reports (CTR). When specified in the contract or in documents referenced therein, the contractor shall make available to the Government a CTR for each lot of parts, assemblies, subsystems and systems by lot number prior to acceptance. Certified test reports are not required for Military Standard and commercial items (see 3.2.2 and 3.5.2). This test report is in addition to, and not in lieu of, any rights of the Government under this contract or law. A CTR may be used as an element incident to, but shall not be used as the sole basis for, Government acceptance of the contract item(s) unless so indicated in the technical documentation or contract. As a minimum, the report shall contain the following:

- a. Name of company and date
- b. Contract number or purchase order number, national stock number and drawing number
- c. Complete nomenclature of supplies together with lot number or other identification. The quantity in each lot or shipment shall be given
- d. All inspections and tests required by contract (i.e., material, processes, performance, functional, etc.) shall be recorded in test reports. These reports shall identify each lot submitted for acceptance by lot number, the specification or drawing, revision and date, grade or type as applicable, number of specimens tested, specified characteristics and requirements, and actual results obtained
- e. Reports of the raw material producer's chemical, mechanical, and physical analyses
- f. A statement, as follows, certifying that material meets all requirements of the contract:

"The undersigned, individually, and as the authorized representative of the contractor, warrants and represents that: All the information supplied above is true and accurate; the material covered by this certificate conforms to all contract requirements (including but not limited to the drawings and specifications); the inspection and test results, and the analyses appearing herein are true

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and accurate; and this certificate is made for the purpose of inducing payment and with knowledge that the information and certification may be used as a basis for payment."

g. Signature and title of certifying official.

3.5.2 Certificate of conformance (COC). A certificate of conformance is required for Military Standard and commercial items. When a Certified Test Report (See 3.5.1) is not required for material and process specification requirements, a COC, supported by inspection and test data, material analyses, or certification from the raw material producer or processor, shall be made available to the Government for specifications covering raw material, processed material, and processes. The contractor shall make the COC available to the Government prior to or with the request to perform acceptance inspection approval by the Government. This is in addition to, and not in lieu of, any rights of the Government under this contract or law. A COC may be used as an element incident to, but shall not be used as the sole basis for, Government acceptance of contract item(s) unless so indicated in the technical documentation or contract. As a minimum, the COC shall contain the following:

- a. Name of company and date
- b. Contract number or purchase order number, national stock number and drawing number
- c. Complete nomenclature of supplies together with lot number or other identification. The quantity in each lot or shipment shall be given
- d. A statement, as follows, certifying that material meets all requirements of the contract:

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

- e. Signature and title of certifying official

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### 3.6 Examination, Inspection and Test Provisions

3.6.1 Quality Assurance Provisions. Quality Assurance Provisions, used in conjunction with this specification, specify those product characteristics considered to be minimum inspection requirements for acceptability to assure conformance with performance and interchangeability requirements of the item. The application of Quality Assurance Provisions and use of this specification and Supplementary Quality Assurance Provisions (SQAP's) shall not relieve the contractor from his responsibility to submit to the Government only product complying with all contract, drawing and specification requirements.

3.6.2 Application of SQAP's. The inspection provisions specified in SQAP's and 3.6.4 should be applied at the earliest practical point in manufacture at which it is feasible to inspect for acceptance without risk of change in the characteristic by subsequent operations. Reinspection of these characteristics on the completed product is not required provided assurance exists that the characteristic has not been changed, degraded or damaged by subsequent manufacturing, assembly or handling, and that adequate inspection records are maintained. In any event, the Government reserves all rights under General Inspection Article 5, Standard Form 32.

3.6.3 Parts and assemblies covered by SQAP's. Where SQAP's are specified in the contract, the inspection provisions of the SQAPs are the minimum requirements for those parts and assemblies to which the SQAP pertains. The SQAP number is usually the same as the number of the product drawing to which the SQAP relates. Unless otherwise specified on the SQAP, the drawing, or in the contract, the contractor shall perform, as a minimum, the inspections prescribed in each SQAP in accordance with the criteria and inspection methods specified for parts and assemblies. Where a SQAP is specified for an assembly of parts, the parts of that assembly shall have been inspected for acceptability in accordance with the SQAP's for those parts (listed in Part I of the assembly SQAP). Only those parts found to be acceptable in accordance with the applicable SQAP and this specification shall be used in assemblies. Unless otherwise specified, Inspection Level II shall be used initially and individual AQL's applied in accordance with MIL-STD-105.



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AQL's apply to each characteristic and not to a group of characteristics. In addition, the contractor shall comply with this specification.

3.6.4 Parts and assemblies not covered by a SQAP or detail specification. The contractor shall develop and implement, as part of his required inspection system, written detailed procedures and criteria for inspection of all parts and assemblies not covered by a SQAP. As a minimum, requirements for such parts and assemblies shall include:

Material identification and control, inspections to be performed (including inspection for workmanship, finish, missing operations and protective coating, as well as dimensional features), defect classification, sampling criteria and procedures in accordance with MIL-STD-105 or other appropriate Government sampling standards, method of inspection (gages, measuring and test equipment), and provisions for control and disposition of non-conforming items. Specified sampling criteria shall not be less stringent than Inspection Level S-4 using an AQL of 1.5 percent.

3.6.5 Inspection of parts produced and controlled by highly repeatable manufacturing techniques. When characteristics of the part are established and controlled by highly accurate and repetitive manufacturing techniques, the first production part(s) shall be examined and inspected completely and the recorded results scrutinized very carefully to assure that those characteristics conform to drawing, specification and contract requirements. If the first production part(s) have been found acceptable to drawing, specification and contract requirements, each of those characteristics, provided they are unchanged by later operations, or have no more stringent inspection requirements specified in other documents, may be inspected using Inspection Level S-2 and an AQL of 1.5. Before implementation of this limited inspection procedure, the contractor shall secure the written concurrence of the Government Quality Assurance Representative (QAR). The types of manufacturing that should be considered for this procedure are as follows:

Die Forging	Extrusions	Numeric-Controlled
Die Stamping	Investment Castings	Machines and
		Processes, etc.

3.6.6 Inspection methods. The following provisions shall be applicable to the prescribed inspection methods. Requests for a method other than that specified shall be submitted for Government approval (see h. below):

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- a. Where "Visual" is specified as the inspection method for protective coating, the coating shall be visually examined for completeness, uniformity in appearance and color, and for freedom from pits, corrosion, scratches, and worn or bare spots.
- b. Where "Visual" is specified as the inspection method for dimensional inspection, the characteristic shall be either scaled, or compared with a specimen of known acceptable quality that has been established as an inspection standard, for conformance to the requirements of the drawing.
- c. Where "Visual" is specified as the inspection method for assemblies, the assembly shall be visually examined for completeness, security, function and conformance to specified requirements. When possible, the functioning of the assembly shall be inspected by manual operation.
- d. Where "Visual" is specified as the inspection method for surface roughness values, a comparison standard conforming to ANSI B46.1 shall be used. If determination of surface roughness by a comparison standard is questionable, a surface-measuring instrument shall be used.
- e. Where "SMTE" (Standard Measuring and Test Equipment) is specified as the method of inspection, the contractor may use any type of industry-developed, commercially available, multi-usage equipment or special inspection and/or testing equipment approved by the Government. (Previously identified as: "SME", Standard Measuring Equipment, and "STE", Standard Test Equipment). The contractor shall be responsible for utilizing SMTE which will assure full form for the entire surface of the specified characteristic.
- f. When Government-furnished Acceptance Inspection and Test Equipment (identified as "Gages" on the SQAP), is specified as the method of inspection in the contract or on the Data Lists, the contractor shall use inspection equipment fabricated in accordance with the Government drawing referenced.
- g. Where "STM" (Special Test Method) is specified as the method of inspection, the methods and procedures shall be as specified in the applicable SQAP.
- h. Alternative inspection methods and inspection equipment may be used by the contractor when such methods

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and equipment equal or exceed the specified accuracy and provide, as a minimum, the quality assurance required in the contractual documents. Prior to applying such alternative inspection methods and inspection equipment, the contractor shall describe them in a written proposal and shall demonstrate, for the approval of the Procuring Contracting Officer (PCO), that their effectiveness is equal to, or better than, the contractual quality assurance method or equipment.

- 3.6.7 Protective coating. Unless otherwise specified, the inspection of the finishing of metal and wood surfaces shall be in accordance with MIL-STD-171 and Section 4 of the applicable specification referenced therein.
- 3.6.8 Marking inspection. Parts and assemblies shall be subjected to examination to determine compliance with marking requirements of the drawing and MIL-STD-130.
- 3.6.9 Workmanship. In addition to the workmanship requirements of applicable item specifications, parts, assemblies, subsystems and systems shall be visually examined to determine compliance with the following requirements. The quality of workmanship shall not adversely affect safety, function, performance, serviceability, interchangeability, and appearance. Completed parts and assemblies shall not exhibit defective material or processing such as: seams, laps, laminations, cracks, fins, extraneous material, visible steps or irregularities, sharp edges, nicks, scratches, burrs, tool scores and gouges, deformations, missing operations, improper assembly, missing parts, stains, corrosion, nonspecified oxidation (rust), unauthorized salvaging operations (e.g., hammering to shape, repair by welding, straightening, bending, etc.). Unless otherwise specified for electrical and electronic parts and assemblies, the workmanship provisions of MIL-STD-454 shall apply.

3.7 Test methods. Unless otherwise specified, the following test methods as required by the contract, drawings, and specifications shall apply to each of the sample units to be inspected.

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3.7.1 Magnetic particle inspection. The contractor shall subject each part to magnetic particle inspection in accordance with the criteria specified on the drawing. The magnetic particle inspection procedure, including the demagnetizing technique, shall be available to the Government. Personnel performing magnetic particle inspection shall be qualified in accordance with MIL-STD-410.

3.7.1.1 Procedure. The written magnetic particle inspection procedure shall include, at least, the following information:

- a. Statement of part material, size, shape and surface condition
- b. Equipment to be used
- c. Surface preparation
- d. Inspection medium (powder, wet slurry, color, etc.)
- e. Magnetizing and demagnetization methods
- f. Magnetizing current characteristics
- g. Sketches, charts or drawings to demonstrate the required inspections (location and direction)

3.7.2 Penetrant inspection. The contractor shall subject each part to penetrant inspection in accordance with the criteria specified on the drawing. The penetrant inspection procedure shall be available to the Government. Personnel performing penetrant inspection shall be qualified in accordance with MIL-STD-410.

3.7.2.1 Procedure. The written penetrant inspection procedure shall include, at least, the following information:

- a. Statement of part material, size, shape and surface condition
- b. Special processing to increase sensitivity, e.g., preheating, increased dwell time, additional dye applications
- c. Penetrant classification - type and method
- d. Penetrant material characteristics (manufacturer's data)
- e. Sketches, charts or drawings to demonstrate the required inspection

3.7.3 Ultrasonic inspection. The contractor shall subject each part to ultrasonic inspection in accordance with the criteria specified on the drawing. The ultrasonic inspection

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procedure shall be available to the Government. Personnel performing ultrasonic inspection shall be qualified in accordance with MIL-STD-410 or MIL-STD-1263.

**3.7.3.1 Procedure.** The written ultrasonic inspection procedure shall include, at least, the following information:

- a. Statement concerning part material, size, shape, and surface condition
- b. Equipment to be used, e.g., immersion, contact, bubbler, plus any special auxiliary equipment for material handling, signal display, recording, or alarms
- c. Kind of ultrasonic inspection; pulse-echo (to include longitudinal, transverse, surface or other wave modes), through transmission, or resonance
- d. Sketches, charts or drawings to demonstrate the required inspection

**3.7.4 Inspection of welds.** The contractor shall subject each part to the inspection of welds which shall be performed in accordance with MIL-I-6866, MIL-I-6868, MIL-M-11473, MIL-STD-271, MIL-STD-1261, and, as applicable, the following ASTM Standards: E 16, E 99, E 190, and E 390. The welds on each part shall also be inspected for conformance to the requirements of ANSI Y32.3 as indicated on the product drawing.

**3.7.5 Radiographic inspection.** The contractor shall subject each part to radiographic inspection which shall be performed in accordance with the applicable drawing and MIL-STD-453, MIL-C-6021, MIL-R-11468, MIL-R-11469, MIL-P-45774, and, as applicable, the following ASTM Standards: E 94, E 99, E 142, E 155, E 186, E 310, and E 446. Qualification of equipment operators and procedures shall be in accordance with MIL-R-11470.

**3.7.5.1 Procedure.** The written radiographic inspection procedure shall include, at least, the following information:

- a. Statement concerning part material, size, shape and surface condition
- b. Equipment to be used, e.g., radiation source (x-ray machine, radium, cobalt, etc.), intensifying screens, and film type
- c. Extent of radiographic inspection (areas and items to be radiographed)

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- d. Point in fabrication radiography is to be performed
- e. Certification of radiographic procedures and film processing
- f. Sketches, charts, or drawings to demonstrate the required inspection

3.7.6 Case hardness depth. The carburized depth of case hardness is established as the total distance of hardness penetration from the outer cased surface to the nearest point of uniform inner core structure as measured on a polished and etched test specimen at a magnification not lower than ten (10) diameters. The test specimen shall be a component, a scrap component, or a test piece of the same material and of similar cross section. The test specimen shall be cut perpendicular to the case hardened surface and the cut surface shall then be prepared by grinding and/or rough polishing to remove the effects of the original cut. The prepared surface shall be etched with a weak (1-10%) solution of nitric acid in alcohol and for sufficient length of time to develop a contrast in case and core structure. Tests shall be performed on not less than three (3) items or test specimens strategically located within, to portray furnace temperature extremes, and processed simultaneously with, the respective heat treat batch. Where carburized case depths are specified on the drawing, the contractor shall record and maintain on file, for the Government representative, certified test reports of case depth tests conducted and the tested specimens from each heat treat batch. The test reports shall contain, as a minimum, carburized case depth test data as follows:

- a. Test specimen identification
- b. Material identity
- c. Item identity (nomenclature)
- d. Heat treat batch number
- e. Specification and/or drawing number with revision symbol and date
- f. Test method and criteria applicable
- g. Number of specimens tested and specific test results obtained.

3.7.7 Effective case hardness depth. The effective case hardness depth is the perpendicular distance measured from the outer cased surface toward the inner softer core structure to a point where the nearest point of hardness is equivalent to Rockwell C-50. Where effective case hardness depths are specified on the drawing, the contractor shall record and maintain

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on file certified test reports and three test specimens from each heat treat batch. The test specimen shall be a component, a scrap component, or a test piece of the same material and of similar cross section. The test specimen shall be cut perpendicular to the case surface and the cut surface shall then be prepared by grinding and/or rough polishing to remove the effects of the original cut. A hardness test capable of providing a valid reading shall be used to establish the Rockwell C-50 point for the effective case depth. Where the validity of a Rockwell "C" test is suspected, an alternate test such as Rockwell Superficial, Rockwell Microficial, Knoop, or Diamond Pyramid Hardness should be used to establish the equivalent Rockwell "C" point. Tests shall be performed on (3) items or test specimens strategically located within, to portray furnace temperature extremes, and processed simultaneously with, the respective heat treat batch. The test reports shall contain, as a minimum, effective case hardness depth test data as follows:

- a. Test specimen identification
- b. Material and item identity
- c. Heat treat batch number
- d. Specification and/or drawing number with revision symbol and date
- e. Test method and criteria applicable
- f. Number of specimens tested and specific test results obtained.

3.7.8 Tensile test. Tensile tests shall be performed in accordance with ASTM E 8.

3.7.9 Hardness test. Brinell hardness tests shall be performed in accordance with ASTM E 10. Rockwell hardness tests shall be performed in accordance with ASTM E 18.

3.7.10 Charpy impact test. The charpy impact examinations and tests shall be conducted with testing equipment certified annually to ASTM E 23 in accordance with the specified requirements of the applicable drawing. One hundred percent inspection of the charpy V-notch impact test specimens shall be performed.

3.7.11 Macro-etch examination. Macro-etch examination shall be performed in accordance with the applicable drawing. The report shall contain the results of the examination and test performed and shall include the material data on each specimen or sample. In no instance will a sample face deformed by shearing or exhibiting flowed metal be selected or inspected for macro acceptance.

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3.7.12 Salt spray test. - Salt spray tests shall be performed in accordance with ASTM B 117.

3.7.13 Torque. When torque tests are specified, the contractor inspection personnel shall witness the application of torque on a sufficient number of units of initial production quantities to determine that the torque is being applied and inspected properly. The contractor inspection personnel shall witness the application of torque for surveillance inspection at periodic intervals thereafter. In addition, the following shall apply: Not less than 10 calendar days prior to performing the initial torque operations, the contractor shall furnish written notice to the QAR of the time, date, and location of the torque operation testing so that the Government may witness the testing.

The foregoing procedures for witnessing application of torque do not relieve the contractor of actually conducting torque tests (application of required disassembly torque or reapplication of assembly torque) when so specified in the technical documentation or contract.

3.7.14 Electrical tests for wiring harnesses or cable assemblies.

3.7.14.1 Continuity test. Using SMTE, a continuity test shall be performed on each wiring harness or cable assembly. The test shall be performed to assure that all wiring is in accordance with the drawing specified for the applicable wiring harness or cable assembly.

3.7.14.2 Dielectric withstanding voltage test. When dielectric strength is specified on the applicable drawing, a dielectric test shall be performed in accordance with MIL-STD-202, Method 301.

3.7.14.3 Isolation test. Using SMTE, an isolation test shall be performed on each wiring harness or cable assembly to assure that conductor paths are isolated from each other and from connector shells.

3.7.14.4 Insulation resistance test. When insulation resistance is specified on the applicable drawing, an insulation resistance test shall be performed in accordance with MIL-STD-202, Method 302.



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3.7.14.5 Inspection requirements. In addition to specific inspection provisions in the contract, general inspection requirements shall be in accordance with MIL-STD-252 or MIL-STD-454, as applicable. Soldering shall be in accordance with MIL-STD-1460.

3.7.15 Electrical tests for electrical/electronic assemblies/subassemblies. Except where circuit elements (transistors, resistors, capacitors, inductors, transformers, tubes, etc.) may be damaged by high voltage, each unit shall be subjected to tests in accordance with MIL-STD-202, Methods 301 and 302, and other tests (including continuity and isolation tests) as required, to determine that the unit will perform according to applicable drawings and/or specifications. Also, in addition to specific inspection provisions in the contract, general inspection requirements shall be in accordance with MIL-STD-252 or MIL-STD-454, as applicable, and MIL-STD-1460.

### 3.8 Acceptance inspection and test equipment.

3.8.1 Acceptance inspection and test equipment. INSPECTION EQUIPMENT USED SHALL BE CAPABLE OF REPEATABLE MEASUREMENTS, BY VARIOUS EXPERIENCED INSPECTION/TEST PERSONNEL, TO AN ACCURACY OF 10% OF THE TOTAL TOLERANCE OF THE CHARACTERISTIC BEING INSPECTED.

In the event the contractor desires relief from this requirement for electrical testing, a technically supported request for relief or waiver shall be submitted thru the QAR and the Defense Contract Administration Services Region (DCASR) to the PCO.

a. The contractor is responsible for providing all standard measuring and test equipment required.

b. Government-designed inspection and test equipment, when required, shall be as specified in the contract or referenced in the technical documentation.

c. When so specified in the contract or technical documentation, design responsibility for all other inspection equipment is assigned to the contractor. Such designs may include commercial equipment which the contractor proposes to use. (Commercial equipment is defined as unmodified equipment which is cataloged and available for purchase by the general public). Contractor designs shall include appropriate operating instructions, calibration procedures and maintenance procedures. Commercial equipment shall be fully described by catalog list-

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ings 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 prepared for any special fixture(s) required to be used with commercial equipment, or with Government designs if not otherwise covered thereby. Contractor designs shall be approved by the Government prior to fabricating or procuring the equipment. Designs shall be submitted for approval in accordance with the stipulations, time frame and distribution specified in the Contract Data Requirements Lists (DD Form 1423) or in the contract.

d. The contractor is responsible for requisitioning the Government-designed inspection and test equipment shown as available in the contract.

e. The Government-designed inspection and test equipment shown as not available in the contract shall be provided by the contractor in accordance with MIL-I-45607. This equipment shall be in accordance with the applicable Government drawings.

f. The contractor is responsible for providing such quantities of all inspection and test equipment, calibrated in accordance with MIL-C-45662, as required to support:

- (1) Similar multiple inspection at the contractor's facilities
- (2) Inspection operations at subcontractor's facilities
- (3) Required periodic calibration, maintenance, or replacement.

3.8.2 Equipment utilization. - Use of contractor's or Government-furnished inspection equipment, when desired by the Government representative, shall be permitted without charge. Government-furnished acceptance inspection equipment shall not be used by the contractor in lieu of contractor work gages and equipment.

3.8.3 Inspection standards. - Inspection standards shall be utilized for those characteristics requiring inspection decisions by visual (eyesight) means. Items selected as visual comparison standards shall be mutually agreed to by the contractor and the Government, within drawing and specification requirements, and shall be used to assist in determining configuration and minimum acceptance criteria. The visual comparison standards selected shall be subject to approval by the responsible technical agency. Each comparison or inspection standard shall be

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kept under the control of the contractor's inspection element and be positively identified as to the characteristic or condition the standard represents, date established as the standard, number of the standard, and identity of the contractor and the Government inspection personnel establishing the standard.

3.8.4 Government approval. - The Government reserves the right to inspect the Contractor's inspection equipment and determine that he has available, and utilizes correctly, gages, measuring and test equipment of the required accuracy and precision and that the instruments are of proper type and range to make measurements of required accuracy.

3.9 Inspection for acceptance. - The contractor shall perform inspection for acceptance upon completion of all manufacturing and in-process inspection operations prior to packaging and packing. Inspection for acceptance shall include, but is not limited to, all inspections specified by the contractor's required inspection system and those of the applicable specifications and SQAP's, as well as characteristics not previously inspected, and characteristics that may have been altered or changed as a result of subsequent operations after prior inspections were completed.

#### 3.10 Inspection of preparation for delivery.

3.10.1 Packaging inspection. - Unless otherwise specified, inspection to determine compliance with cleaning, preservation, packaging, packing and marking requirements of the applicable packaging documentation, for the level designated in the contract, shall be as specified in MIL-P-14232.

3.11 First article inspection. - When applicable, requirements for the submission of a first article sample by the contractor shall be as specified in the contract. Number of sample items, inspections to be performed and rejection criteria shall be as specified in the technical documentation (specifications or SQAP's) or in the contract.

#### 4. QUALITY ASSURANCE PROVISIONS

This section is not applicable to this specification.

#### 5. PREPARATION FOR DELIVERY

This section is not applicable to this specification.

#### 6. NOTES

MIL-W-63150 (AR)

6.1 Intended use. - This specification is intended to be used, either wholly or in part, as a part of contractual documents by reference in the contract, for the procurement, production, manufacture and inspection of weapons and support materiel (e.g., parts, assemblies, subsystems, and systems). It establishes the minimum Government-prescribed inspection criteria and is to be applied with or without SQAP's.

6.2 Ordering data. - Procurement documents should specify the following:

Title, number, and date of this specification.

6.3 Unlisted defects. - The technical documentation stipulates only those inspection characteristics (examinations and tests) which will be used to determine acceptability. However, if the Government Representative during the performance of verification inspection finds a defect which is not listed in the specified inspection characteristics, he will reject the item containing the defect and return it to the contractor. The discovery of any unlisted defect shall be reported along with regular inspection reports.

Custodian:  
Army-AR

Preparing Activity:  
Army-AR

Project Number: 10GP-A001

## STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

*(See Instructions - Reverse Side)*

<b>1. DOCUMENT NUMBER</b>	<b>2. DOCUMENT TITLE</b>
<b>3a. NAME OF SUBMITTING ORGANIZATION</b>	<b>4. TYPE OF ORGANIZATION (Mark one)</b> <input type="checkbox"/> VENDOR  <input type="checkbox"/> USER  <input type="checkbox"/> MANUFACTURER  <input type="checkbox"/> OTHER (Specify): _____
<b>b. ADDRESS (Street, City, State, ZIP Code)</b>	
<b>5. PROBLEM AREAS</b>	
<b>a. Paragraph Number and Wording:</b>          <b>b. Recommended Wording:</b>          <b>c. Reason/Rationale for Recommendation:</b>          	
<b>6. REMARKS</b>	
<b>7a. NAME OF SUBMITTER (Last, First, MI) - Optional</b>	<b>b. WORK TELEPHONE NUMBER (Include Area Code) - Optional</b>
<b>c. MAILING ADDRESS (Street, City, State, ZIP Code) - Optional</b>	<b>B. DATE OF SUBMISSION (YYMMDD)</b>