INCH-POUND

MIL-W-13855D
w/AMENDMENT 5
15 March 2011
SUPERSEDING
(See 6.7)

MILITARY SPECIFICATION

WEAPONS: SMALL ARMS AND AIRCRAFT ARMAMENT SUBSYSTEMS, GENERAL SPECIFICATION FOR

This specification is approved for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers general requirements for small arms weapons and aircraft armament subsystems, attachments, accessories, equipment, parts and assemblies thereof, as applicable.

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3 or 4, of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements of documents cited in sections 3 and 4 of this specification, whether or not they are listed.

2.2 Government documents.

2.2.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

Comments, suggestions, or questions on this document should be addressed to: Commander, US Army ARDEC, ATTN: RDAR-QES-E, Picatinny Arsenal, NJ 07806-5000, or emailed to ardecstdzn@conus.army.mil. Since contact information can change, you may want to verify the currency of this information using ASSIST Online database at https://assist.daps.dla.mil.

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COMMERCIAL ITEM DESCRIPTIONS

A-A-52557	-	Fuel Oil, Diesel; for Posts, Camps and Stations

DEPARTMENT OF DEFENSE SPECIFICATIONS

MIL-PRF-372	-	Cleaning Compound, Solvent (For Bore of Small Arms and Automatic Aircraft Weapons)
MIL-PRF-680	-	Degreasing Solvent
MIL-PRF-3150	-	Lubricating Oil, Preservative, Medium
MIL-A-8625	-	Anodic Coatings, For Aluminum and Aluminum Alloys
MIL-PRF-14107	-	Lubricating Oil, Weapons, Low Temperature
MIL-PRF-16173	-	Corrosion Preventive Compound, Solvent Cutback, Cold Application
MIL-DTL-16232	-	Phosphate Coatings, Heavy, Manganese or Zinc Base
MIL-PRF-22750	-	Coating, Epoxy, High Solids
MIL-L-46000	-	Lubricant, Semi Fluid (Automatic Weapons)
MIL-PRF-46147	-	Lubricant, Solid Film, Air Cured, Corrosion Inhibiting
MIL-L-46150	-	Lubricant, Weapons, Semi Fluid (High Load Carrying Capacity)
MIL-DTL-53039	-	Coating, Aliphatic Polyurethane, Single Component, Chemical Agent Resistant
MIL-PRF-63460	-	Lubricant, Cleaner and Preservative for Weapons and Weapons Systems

DEPARTMENT OF DEFENSE STANDARDS

MIL-STD-130	-	Identification Marking of U. S Military Property
MIL-STD-171	-	Finishing of Metal and Wood Surfaces
MIL-STD-889	-	Dissimilar Metals
MIL-STD-1916	-	DOD Preferred Methods for Acceptance of Product
MIL-STD-2073-1	-	Standard Practice for Military Packaging

(These documents are available on line at https://assist.daps.dla.mil or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

2.2.2 Other government documents, drawings, and publications. The following other Government documents, drawings, and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

U.S. ARMY ARDEC DRAWINGS

7274018	-	Gage, File Test Specimen
7792555	-	General Data - Electrical

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12993884 - General Requirements for Quality Assurance Provisions (Small Caliber Weapon systems)

(These drawings may be requested from US Army ARDEC, ATTN: RDAR-EIS-PE, Picatinny Arsenal, NJ 07806-5000, or by email from: pica.Drawing.Request@conus.army.mil.)

2.3 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

ASTM INTERNATIONAL

ASTM D 4814 - Standard Specification for Automotive Spark-Ignition Engine Fuel
ASTM E 18 - Standard Test Methods for Rockwell Hardness of Metallic Materials

(Application for copies should be addressed to the American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428.)

SOCIETY OF AUTOMOTIVE ENGINEERS

SAE-AS7788 - Panels, Information, Integrally Illuminated

(Application for copies should be addressed to the Society of Automotive Engineers, 400 Commonwealth Drive, Warrendale, PA 15096 0001. http://www.sae.org/)

AMERICAN SOCIETY FOR QUALITY CONTROL

ASQ Q9000 - Quality Management Systems Fundementals and Vocabulary

(Application for copies should be addressed to the American Society for Quality, 600 North Plankinton Avenue, Milwaukee, WI 53202.)

AMERICAN WELDING SOCIETY

AWS-A2.4 - Standard Symbols for Welding, Brazing and Nondestructive Test

(Application for copies should be addressed to the American Welding Society, 550 N.W. LeJune Road, Miami, FL 33126.)

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AMERICAN SOCIETY OF MECHANICAL ENGINEERS

ASME-B46.1	-	Surface Texture
ASME-Y14.38	-	Abbreviations and Acronyms
ASME-Y14.5	-	Dimensioning and Tolerancing
ASME-Y14.6	-	Screw Thread Representation

(Copies of this document may be ordered from www.asme.org or ASME Information Central Orders/Inquires, P.O. Box 2300 Fairfield, NJ 07007-2300.)

2.4 Order of precedence. Unless otherwise noted herein or in the contract, in the event of a conflict between the text of this document and the references cited herein (except for related specification sheets), the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless specific exemption has been obtained.

3. REQUIREMENTS

3.1 Precedence. Materiel covered by this specification shall conform to the requirements specified herein and those specified on drawings, specifications and standards applicable to the specified item of procurement. Should any conflict exist between the requirements of the applicable documents or between the contract and the applicable documents, the order of precedence shall be as follows:

a. Contract.
b. Drawings.
c. Detail specifications for the item being procured.
d. This specification.
e. Detail specification for materials or operations.
f. General specification pertaining to classes of materials or operations.
g. Federal standards.
h. Military standards.
i. Other publications.
j. Supplementary Quality Assurance Provisions (SQAPs) shall be added for items not supported by a specification.

3.2 First article. When specified (see 6.2), requirements for submission of first article shall be as specified in the detailed specification for the item or in the procurement documents. The first article shall be representative of the production process to be used during quantity production of the entire contract. Unless otherwise specified (see 5.1 and 6.2), the first article shall include the pilot pack.

3.2.1 Manufacturing models. When specified in the procurement documents (see 6.2), the contractor shall proffer the specified number of completely assembled items of each type to be manufactured before proceeding with quantity manufacture. Each sample shall be marked for identification. Upon approval by the contracting officer, items of each type shall be returned to the contractor for use as a standard for general workmanship, functioning, appearance, finish and

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all other qualities for which definite requirements and tests are not prescribed. Samples retained by the Government during the period of manufacturing shall be returned to the contractor in time to allow their inclusion in shipments under applicable contracts.

3.3 Materials. Materials (see 6.3.5) shall conform to the applicable specifications and drawings. No change or substitutions in materials shall be made without prior approval of the responsible Government technical agency through the contracting officer.

3.3.1 Concealed defects. Any material hammered, filed, or treated in any other manner to conceal defects therein shall be subject to immediate rejection.

3.3.2 Commercial quality material. Material specified as "commercial quality" or prescribed by merely a name in general commercial use, such as "steel", "forged steel", "bronze", "cast iron", "brass", "drill rod", etc. will not ordinarily be subject to tests or analyses. However, the Government reserves the right to make such tests as it deems necessary to verify the quality of the material.

3.3.3 Metal manufacturing methods and technologies. Unless specified on the drawing(s) the following shall not be used for fabrication of metallic parts (see 4.4.1)

a. Castings (including investment and die castings)
b. Powdered/sintered metal
c. Metal Injection Molding (MIM)

3.4 Design.

3.4.1 Prescribed design. When contracts for items or parts of a prescribed design are awarded, the Government will furnish the contractor a set of drawings for use in manufacture. The contractor shall adhere to the design specified on the drawings and in no case shall the drawings be scaled. Should drawing changes or interpretation to clarify any requirements of the drawings be desired by the contractor, application therefor shall be made through the contracting officer. All drawings furnished by the Government are for use of the contractor only in the prosecution of the Government contract for which the drawings were provided.

3.4.1.1 Three dimensional (3-D) Technical Data. At the Government's option, technical data (see 3.4.1) may be provided as three dimensional models in lieu of drawings. Quality assurance symbols and requirements that appear in the models shall be interpreted in accordance with drawing 12993884 (see 4.2)

3.4.2 Contractor's design. When specified (see 6.2), the contractor shall provide technical data as specified on the Contract Data Requirements List (DD Form 1423) for items or parts which the Government does not prescribe the design.

3.4.2.1 Chemical resistance. Unless otherwise specified, nonmetallic parts and coatings shall not be affected by the following;

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a. insect repellents, personal application NSN 6840-01-284-3982
b. small arms lubricants (MIL-PRF-14107, MIL-L-46000, MIL-L-46150)
c. small arms cleaner, lubricant and preservative (MIL-PRF-63460)
d. gasoline (ASTM D 4814)
e. diesel fuel (A-A-52557)
f. preservative oil (MIL-PRF-3150),
g. dry cleaning solvent (MIL-PRF-680)
h. cleaning compound (MIL-PRF-372).

Testing shall be in accordance with 4.5.10.

3.4.3 New design. The maximum use of military standard parts, items in the supply system and commercial items shall be employed in development and design of new items. The purpose of this requirement is to prevent the unwarranted entry of a new item in the supply system (see 4.4).

3.4.4 Dimensioning and tolerancing. Definitions of terms and symbols used in specifying dimensions and tolerances shall be in accordance with ASME Y14.5.

a. For phosphate coated parts, the dimensional and surface roughness provisions of MIL-DTL-16232 shall apply.

b. For anodized coated parts, the dimensional provisions of MIL-A-8625 shall apply.

3.4.4.1 Dimensions before or after finish. When a drawing does not specify whether dimensions apply before or after application of a surface coating, the following interpretation shall be used:

a. Unless otherwise specified, dimensional limits and surface roughness designations shall apply after the application of inorganic finishes, except (see 3.4.4) for phosphate coated parts. In the event of a dispute regarding dimensional compliance of phosphate coated parts, the phosphate coating shall be removed for the purpose of determining dimensional compliance.

b. Unless otherwise specified, where organic finishes, such as varnishes, enamels, epoxies, urethanes, etc. are used, dimensional and surface roughness designations must be met prior to the application of the organic finish.

3.4.4.2 Concentricity and symmetry. Concentricity and symmetry shall be as specified on the applicable drawings. Where concentricity or symmetry are not specified on drawings, surfaces depicted as having a common centerline shall not be eccentric or unsymmetrical relative to each other by more than one half of the sum of the differences between the actual measured dimensions and the maximum material conditions specified by drawing dimensions. (Half the sum of the differences represents half of the allowable TIR.) All surfaces depicted in the same direction as the centerline without locational dimensions are considered to have a common centerline.

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3.4.4.3 Corners and edges. Unless otherwise specified on the drawings, all exterior edges and corners shall be broken with radii, or approximately 45° chamfers, from 0.005 to 0.015 inch (0.127 to 0.381mm); all interior corners and edges shall be rounded with fillet radii from 0.005 to 0.015 inch (0.127 to 0.381mm); and other edges and corners shall be broken or rounded with radii, or approximately 45° chamfers, from .005 to .015 inch (0.127 to 0.381mm). Chamfers shall be as defined in ASME-Y14.5. (Corners and edges are defined in 6.3.5.)

3.4.5 Surface texture, surface roughness, waviness and lay. Definition of terms and symbols used in specifying surface texture, surface roughness, waviness and lay shall be in accordance with ASME-B46.1.

3.4.6 Interchangeability. Unless otherwise specified on the drawings, all parts of separable assemblies shall be interchangeable without filing or selective assembly.

3.4.6.1 Commercial Repair Parts. Repair parts specified by commercial designations shall be interchangeable. If these parts are no longer manufactured, the contractor shall furnish the procuring activity a statement to that effect with information, including name and number, regarding the part he proposes to furnish. Each such part shall be interchangeable with the part originally specified and shall be approved by the procuring activity prior to acceptance. If not interchangeable, the contractor shall furnish information on adaptation required to utilize the part he proposes to furnish in place of the part originally specified.

3.5 Construction.

3.5.1 Manufacturing equipment. All necessary working gages, templates, dies, jigs, fixtures and other equipment required for manufacturing shall be furnished by the contractor, except such as the Government may prefer to furnish (see 6.2).

3.5.2 Joining operation. Unless otherwise specified, when parts are brazed, riveted, welded, press fitted, pinned, staked or combined by any means into an assembly, or if an assembly is heat treated or protective finished, the parts of the assembly after any such operation shall be in accordance with dimensions specified on the respective part and prior assembly drawings and applicable specifications.

3.5.2.1 Welding and brazing. Definitions of symbols for welding and brazing shall be in accordance with AWS-A2.4.

3.5.2.1.1 Welding. Joints shall be correctly prepared and welds shall show good fusion without dimensional or structural defects (i.e. warpage, incorrect weld size, incorrect weld profile, porosity, nonmetallic inclusions, incomplete penetration, undercutting, cracking, surface defects, etc.).

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3.5.2.1.2 Brazing. Brazing materials shall be controlled to prevent spreading over adjacent surfaces. Unless otherwise specified, a fine line of brazing material shall be visible at the joints.

3.5.2.2 Rivets and riveting. Unless otherwise specified on the drawings, all rivets shall be driven in place, shall be tight and shall completely fill the rivet holes. Heads of rivets shall be full form without excess metal and concentric with rivet body and within good industrial practice. Loose, burned, malformed or otherwise defective rivets shall not be allowed. Surfaces and sections that are riveted together to make a rigid assembly shall make good contact with each other. After riveting, the joined parts shall be undamaged and shall show no relative movement of parts. Parts joined by riveting to make a flexible assembly (e.g. where a rivet serves as a pivot for moving parts within the assembly) shall be undamaged after riveting, shall be retained in the assembly and shall allow movement of parts through their full range of travel.

3.5.2.3 Fastening devices. All screws, pins, bolts and similar parts shall be installed in such a manner to prevent loss of tightness without damage to screw threads or attached parts. When special securing means are required, they shall be in accordance with applicable drawings.

3.5.3 Heat treatment. Unless otherwise specified on the drawings, heat treatment methods indicated thereon are for guidance, except that time at temperature shall not be reduced below that specified on the part drawing. Heat treating methods and processes shall be in accordance with the highest grade practice used in manufacturing military weapons. Heat treatment shall be applied uniformly throughout the part, and the methods, control, and equipment used shall produce the physical properties and hardness requirements specified on the drawings, without causing injurious decarburization or scaling and shall not result in excessive coarseness, overheated, improperly quenched or tempered material.

3.5.3.1 Whenever the recommended heat treatment calls for a carburizing treatment, the use of the straight cyanide bath or carbonitriding process will not be permitted without the prior approval of the responsible Government technical agency through the contracting officer.

3.5.4 Mechanical properties. The abbreviations used in the "Mechanical Properties" b1ock on drawings shall be interpreted in accordance with ASME-Y14.38.

3.5.4.1 Hardness requirements. Unless otherwise specified on the drawings, hardness requirements shall apply on all surface areas of the parts. When specific locations for hardness tests are indicated, tests may be made on additional areas to determine uniformity of heat treatment.

3.5.4.2 Hardness scale. Hardness requirements shall be checked by using the hardness scale specified on the component drawing or assembly drawing.

3.5.4.3 Hardness testing. Except where otherwise noted, hardness limits apply to tests made on sufficiently smooth, flat, and properly supported surfaces. Hardness tests made under other conditions may be used only when necessary if results are compensated for the error introduced by such conditions. Test methods for determining the Rockwell hardness and

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Rockwell superficial hardness of metallic materials shall be in accordance with ASTM E18.

3.5.4.4 Case hardness depth requirements. Unless otherwise specified, the case hardness depth requirements shall be defined as follows:

3.5.4.4.1 Total/Carburized case depth. The total case depth shall be as specified on the drawings and is established as the total distance of carbon penetration from the outer cased surface to the point of uniform inner core structure.

3.5.4.4.2 Effective case depth. The effective case depth shall be as specified on the drawings and is established as the perpendicular hardness measured from the outer cased surface toward the inner softer core structure to a point where the hardness is equivalent to Rockwell C-50.

3.5.4.4.3 File hard. When the term "file hard" is used, it indicates a requirement for a hard, wear resistant surface on thinly case hardened parts (minimum hardness of approximately Rockwell C60). Testing for file hardness shall be in accordance with 4.5.6.

3.5.5 Protective finishes. Unless otherwise specified, the exterior surfaces of individual weapons, crew served ground weapons or other weapons applications, where reflective surfaces would be detrimental to combat employment of the item, shall be dull, non-reflective, corrosion resistant, and black or approaching black in color. Exterior surfaces of weapons and parts used in aircraft weapons subsystems may not require dull non-reflective surface if they are enclosed in a pod or contained inside the aircraft. However, consideration must be given to objectionable reflective surfaces inside of the cockpit and to disassembly for cleaning or repair in a combat area where reflection could be a hazard.

3.5.5.1 Finish not specified. Where no protective finish is specified, natural finish of the material or the finish obtained from heat treatment is permissible, provided that surfaces are free of scale and corrosion.

3.5.5.2 Finishing of surfaces. Preparation, painting, and finishing of metal and wood surfaces shall be in accordance with MIL-STD-171. Unless otherwise specified on the component drawing, the following shall apply to the phosphating and oxidizing processes:

a. Phosphate coated parts and black oxide parts shall be rinsed as prescribed in the applicable specification. On emergence from the prescribed rinse, parts shall be thoroughly dried before applying the supplementary preservative. Unless otherwise authorized, drying shall be accomplished by the use of drying ovens, heated forced air circulation or filtered compressed air. The drying temperature shall not exceed 200° F.

b. Black oxide finishes shall be coated with a film of oil conforming to MIL-PRF-16173, Class II, Grade 3.

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c. No carry over of residues from the phosphating solutions to the supplementary preservative oil shall be permitted. Periodic tests of the oil shall be made at least semi monthly to insure that the oil continues to meet specification requirements for corrosion protection.

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3.5.5.3 Touch up procedures. The materials, procedures and systems prescribed herein and in Table I may be used in lieu of refinishing with the original specified finish for restoration of small areas of finishes which are damaged or otherwise removed as a result of fabrication or assembly operations. Unless otherwise specified, this touch up procedure shall not apply to functional areas or areas that will be immersed in oil or grease. Touch up shall not be used as a means of concealing poor workmanship.

3.5.5.3.1 Materials. All materials used in the refinishing procedure shall conform to the requirement of the applicable specification. Should it be determined that a material, procedure or system, other than that specified herein is necessary or more suitable, such material, procedure or system may be used only upon prior approval by the responsible government technical agency through the contracting officer.

3.5.5.3.2 Surface condition. The area to be touched up shall be free from soils and corrosion products such as grease, oil, solder flux, welding flux, rust, scale or other foreign material that might interfere with the intimate application of the finish. The area to be touched up shall be cleaned immediately before the refinishing operation and shall be accomplished by wiping with a clean lint-free cloth saturated with an oil free solvent that will not harm the original specified finish.

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TABLE 1. Touch-up (refinishing) of metal surfaces

Original Specified Finish MIL-STD-171	Touch-Up (Refinishing) Schedule
1.1.2 or 1.1.3	6.4.2 + MIL-PRF-46147
1.2 through 1.2.5	MIL-PRF-46147
3.2	MIL-PRF-46147
3.3	MIL-PRF-46147
4.1, 4.4 with All Paint Systems	MIL-PRF-46147 and MIL-C-53039: Color: As Applicable
4.3 + 20.8	MIL-PRF-46147 and MIL-C-53039: Color: As Applicable
5.1.1, 5.1.2 or 5.2 with All Paint Systems	MIL-PRF-46147 and MIL-C-53039: Color: As Applicable
5.3 All Finished	MIL-PRF-46147
7.1.1, 7.2.1, 7.3 series or 7.5[1] (Non-Dyed)	Brush Applied 7.3 Series Colorless
7.1.2 or 7.2.2 (Dyed)	Brush Applied 7.3 Series + MIL-PRF-46147 and MIL-C-53039: Color: As Applicable
7.1.1, 7.2.1, 7.3 series or 7. 5[1] with Primer	Brush Applied 7.3 Series + Original Primer
7.1.1, 7.2.1, 7.3 series or 7. 5[1] + Specified Primer with All Paint Systems	Brush Applied 7.3 Series + Original Primer + Original Paint
20.1 through 24.5	Original Specified System
Notes: 1. Touch-up for finish 7.5 shall not be used on surfaces subjected to wear. These surfaces shall be reprocessed.	

3.5.5.3.3 Touch up coating. The touch up coating shall be lusterless, have uniform and satisfactory hiding power and be approximately the color of the surrounding surface. The touch up coating shall be smooth and free of excessive material, runs or other imperfections and shall show good adhesion to basic material and to paint coatings as applicable. Unless otherwise specified, the touch up of any paint system shall consist of only the topcoat or coats of original paint.

3.5.5.3.3.1 Application of solid film lubricant. When spray solid film lubricant is specified, it may be dispensed into a suitable container and applied by brushing in difficult or confined areas (see 4.4.2)

3.5.5.3.3.2 Touch up of rivets. When touch up is required for the manufactured head or upset head of rivets, the finish of the surrounding surface shall be considered the original finish specified and the touch up schedule for that finish shall be applied to the rivets.

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3.5.5.3.3.3 Total touch up area. The total area covered by the touch up materials shall not exceed approximately twice the damaged area to which it is applied.

3.5.5.3.4 Refinishing of edge lit plastic panels (SAE-AS7788). If the mar or scratch penetrates both the black outer finish and white undercoat, the following touch up procedure shall be utilized: touch up the bare surface with a fine brush using lusterless white epoxy coating in accordance with MIL-PRF-22750 and when dry, cover all white epoxy coating using brush applied lusterless black CARC in accordance with MIL-C-53039. If the mar or scratch penetrates only the black outer finish, use brush applied black CARC in accordance with MIL-C-53039. Touch up coating colors shall match the original finish colors. (see 4.4.2)

3.5.6 Screw threads. Unless otherwise specified on the drawings screw threads shall be in accordance with ASME-Y14.6.

3.5.7 Aircraft armament electrical wiring. The requirements for the wiring of electrical and electronic assemblies for aircraft armament subsystems shall be in accordance with Drawing C7792555 unless otherwise specified.

3.5.8 Compatibility of dissimilar metals. Intermetallic contact of various metals shall be in accordance with the general requirements for compatibility of dissimilar metals. Reduction of corrosion at intermetallic contact points shall be as specified in MIL-STD-889 or as specified on the applicable drawings.

3.6 Marking. Each item and part for which markings are specified sha1l be clearly marked in the positions and type sizes indicated on the applicable drawings in accordance with MIL-STD-130.

3.6.1 Serial numbers. Blocks of serial numbers applicable to weapons being procured will be assigned to the contractor for each contract (see 6.2). If a block of serial numbers is not provided to the contractor, the contractor shall ask the contracting officer for the serial numbers. When a block of serial numbers is not assigned by the procuring agency, the manufacturer's serial number shall be entered (if the manufacturer employs a serial number system.) Application of serial numbers to weapons will be in accordance with MIL-STD-130.

3.6.2 Manufacturer's identification. Wherever practicable, parts furnished by the prime contractor shall be marked as specified in MIL-STD-130 with his contractor and government entity (cage) code number. If parts are furnished by a subcontractor, it is permissible to include the subcontractor's CAGE code number or registered trademark, provided such marks are desired by the prime contractor. All manufacturers’ marks shall be subject to the approval of the responsible government technical agency through the contracting officer.

3.6.3 Heat, melt or lot identification. For material and parts to be tested for physical qualities or chemical composition, the contractor's system of marking shall be such as to enable the inspector to positively identify any or all portions of each heat, melt or lot.

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3.7 Assembled items.

3.7.1 Parts or items disassembled in connection with examinations, tests or preparation for delivery shall be reassembled using parts originally contained therein.

3.7.2 Assemblies and subassemblies containing moving parts shall function as intended.

3.8 Workmanship. Workmanship and finish shall be in accordance with the highest grade practice used in manufacturing military weapons. Finished items and parts shall not exhibit poor material and processing such as seams, laps, laminations, cracks, visible steps, sharp edges, nicks, scratches, burrs, deformations and missing operations which may affect serviceability, functioning, operation, appearance or safety. Fins and other extraneous metal shall be removed from cast or forged parts. Hammering to shape, reworking of material, salvage operations (including repair by welding) or other similar practices shall not be permitted without the prior approval of the responsible Government technical agency through the contracting officer.

3.9 Failure Analysis. In the event of a failure, a failure analysis shall be conducted to identify the cause and corrective action. The failure analysis shall include as necessary a metallurgical and/or chemical analysis of the failed item, dimensional analysis of the failed item or items from the same production lot, stress/strain analysis, or other additional testing/investigations as necessary to identify the cause and corrective action. Other investigations or tests may be required to confirm the cause of the failure or the adequacy of the corrective action.

4. VERIFICATION.

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

4.2 Quality assurance terms and definitions. Inspection terms and definitions used herein are in accordance with ASQ-Q9000. Whenever the term "inspector" is used herein, it denotes Government representative. Quality assurance symbols and requirements, that appear in three dimensional solid models and two dimensional drawings, shall be interpreted in accordance with drawing 12993884.

4.3 Sampling. Sampling inspection of each lot shall be performed in accordance with MIL-STD-1916, utilizing the classification of defects in the applicable document. The Government reserves the right to inspect every unit or product and to inspect for any requirement, whether or not it is listed in a classification of defects. In such cases, rejection on a lot basis may not be proposed, and items and parts may be rejected individually.

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4.3.1 Inspection lots. Lot sizes shall be in accordance with applicable detail specifications. Items and parts not covered by detail specifications shall be submitted for inspection in lot sizes satisfactory to the inspector. A lot shall be as large as practicable in consideration of quality history, manufacturing conditions, and contractor's delivery schedule. Unless otherwise specified, a lot of parts shall consist of:

a. Parts made from one lot of raw material, unless physical characteristics have been previously checked on a heat treat lot or batch basis, in which case a 1ot may contain parts made from more than one lot of raw material. A heat treat lot or batch shall be limited to one material lot.

b. Parts made from one manufacturing process. In general, lots of assembled parts need not agree with material lots but shall be dependent on changes in manufacturing processes affecting chemical or physical characteristics or dimensions.

c. A collection of units of products manufactured or packaged under essentially the same conditions and submitted for inspection at one time.

4.3.2 Examination samples. Unless otherwise specified, sample sizes for examination shall be in accordance with MIL-STD-l916.

4.3.3 Test samples. Test samples shall be selected in accordance with applicable drawings, specifications and other documents or as specified in the contract. Sampling for packaging tests shall be conducted in accordance with MIL-STD-2073-1. Sampling for cleanliness tests shall be performed on lots of parts or items rather than on lots of packages.

4.4 Examination. Manufacturing models and designs shall be examined as necessary to insure compliance with Section 3. Production parts shall be examined as necessary to assure compliance with drawing requirements and with the dimension, construction, protective finish and marking and identification requirements of Section 3. Items shall be visually examined for completeness of manufacture, assembly, finish and workmanship. When doubt exists concerning acceptability of the contractor's workmanship, the questionable physical items shall be forwarded to the responsible technical agency for decision. Barrel chambers and bores shall be examined for rust, pits, powder fouling, burrs and other defects. Items having movable parts shall be operated by hand to ascertain that the final adjustments have been made to assure proper operation. Before final acceptance of any lot, the inspector shall make whatever final inspection deemed necessary to assure that items and parts have undergone all examinations and tests prescribed therefore, and that items and parts have been thoroughly cleaned and prepared for shipment as required by Section 5 and by other applicable documents.

4.4.1 Metal manufacturing methods and technologies. Objective evidence shall be examined to determine conformance to the requirement.

4.4.2 Touch up procedures. Objective evidence shall be examined to determine conformance to the requirement.

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4.5 Tests.

4.5.1 Materials, parts and items. Materials, parts and items shall be tested as necessary to insure compliance with the requirements of Section 3 and with detail item specifications or other applicable documents as listed in the contract. When test methods and procedures are not specified in detail specifications or other applicable documents, they shall be in accordance with the applicable provisions of this specification.

4.5.2 Testing by contractor. Unless otherwise specified, all testing of materials, parts and items and the handling, sampling, preparation of test specimens, chemical analysis and other operations necessary for such testing shall be done by the contractor under the surveillance of the inspector.

4.5.3 Test items in addition to contract deliverables. Unless otherwise specified, all samples, specimens, parts and items (including those expended in reliability tests) destroyed in testing required by detail specifications to determine compliance with the requirements shall be in addition to the quantity specified in the procurement documents and shall be furnished as part of the order or contractual agreement.

4.5.4 Test of metals. Unless otherwise specified, all tests of metals shall be made in accordance with the applicable ASTM test methods specified on the drawing. The number and location of test specimens when not prescribed in the contract, on the drawings, or in detail specifications, shall be determined by the inspector. Specimens shall be so taken as to fairly represent the applicable piece or lot. Where determined practicable, test specimens taken from one or more pieces shall represent the lot. The lot shall be accepted or rejected on the basis of the test results.

4.5.5 Protective finish tests. The use of panels shall not be allowed unless authorized by the contracting officer. Scrapped parts of recent manufacture may be used provided they are processed concurrently with, and in the same manner as, normal production parts of the same likeness.

4.5.6 File hardness test. A 6 inch #0 Swiss Pattern Pillar Testing File of Rockwell C65 minimum hardness is used to test for this requirement. The unworn flat cutting surface of the file shall be placed on an edge or curved surface of the part being tested. While applying a three to five pound force perpendicular to the flat surface of the file, the part is given a very short stroke (not exceeding 1/4 inch) by the test file. The part shall be considered file hard if the sticking or cutting action of the file is the same or less than that obtained when the file is used on a Rockwell C60 test prover (Drawing B7274018) or a test piece hardened to Rockwell C60. The inspector should develop a "feel" for this test by practicing it on test provers or test pieces of known hardness.

4.5.7 Concurrent repair part interchangeability test. At least two of the items previously tested for interchangeability in accordance with the applicable detail item specification, disassembled as before, shall be reassembled using repair parts being concurrently procured with the item. Testing shall be structured and conducted such that no concurrently procured repair

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parts mate in any test item. There shall be no hand refinement and the items shall operate and function properly. This test may be performed independently of the item interchangeability test and at more frequent intervals using accepted items taken from current production.

4.5.8 Total/carburized case depth test. When total case depths are specified on the drawing, the contractor shall record and maintain on file for the Government representative certified test reports of total case depth tests of three samples 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 cased 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 1-10% so1ution of nitric acid in alcohol and for sufficient length of time to develop a contrast in case and core structure. The measurement of total case depth shall be determined at a magnification not lower than 10 diameters. Tests shall be performed on three items or test specimens strategically located within, and processed simultaneously with, the respective heat treat batch. The three items or test specimens shall be retained by the contractor. The test report shall contain, as a minimum, total case depth test data as follows:

a. Test specimen identification.
b. Material identity.
c. Item identity (nomenclature).
d. Furnace 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.

4.5.9 Effective case depth test. When effective case depths are specified on the drawing, the contractor shall record and maintain 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 cased 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 C50 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. Test shall be performed on three items or test specimens strategically located within, and processed simultaneously with, the respective heat treat batch. The test reports shall contain, as a minimum, effective case depth test data as follows:

a. Test specimen identification.
b. Material identity and item identity.
c. Furnace heat treat batch number.
d. Specifications 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.

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4.5.10 Chemical resistance test. One sample of each nonmetallic material shall be submerged in each chemical listed in 3.4.2.1 for 24 hours at ambient temperature. The samples shall be removed, rinsed with tap water, dried and visually and manually inspected. No sample shall display softening, checking, deformation or other adverse effects.

4.6 Rejection, reinspection and retests. No allowance will be made to the contractor for time consumed in reconditioning or retesting of materials, parts or items. (See 6.2.1 and 6.2.1.1 for contract language that must be included to ensure the proper procedures are followed in the event of a failure during performance testing.)

4.6.1 Firing retests.

4.6.1.1 Misfires. If misfires occur during firing tests on weapons, the weapon concerned shall be subjected to appropriate examination and tests to determine whether the weapon is at fault. Weapons responsible for such malfunctions shall not be accepted until corrected. Malfunctions that are not definitively attributable (see 4.6.1.2) to other causes shall be attributed to the weapon.

4.6.1.2 Malfunctions not attributable to item. Malfunctions in any test assignable to improper linking of ammunition, improper feeding of ammunition to the item, defective ammunition, defective links, defective clips or defective magazines (when not considered part of the weapon or weapon system), test equipment or other similar equipment shall not count against the item being tested.

4.7 DELETED

4.7.1 Ammunition and small arms items and parts. Unless otherwise specified (see 6.2), ammunition for all testing, including a reasonable additional amount for normal retesting as determined by the contracting officer (approximately 10 percent), will be furnished by the Government without cost to the contractor. However, the contractor shall bear the cost of ammunition used in testing to determine the quality of any deviating material.

4.8 Failure Analysis. Objective evidence shall be examined to determine conformance to the requirement.

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When packaging of materiel is to be performed by DoD or in-house contractor personnel, these personnel need to contact the responsible packaging activity to ascertain packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activities within the Military Service or Defense Agency, or within the military service's system commands. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

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6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. This specification may be used either wholly or in part in the manufacture and inspection of military weapons and weapon system items and parts being procured by the Government.

6.2 Ordering data. Procurement documents should specify the following:

a. A list of applicable drawings and specifications pertinent to the item or part on order, showing applicable revision dates.
b. Block of serial numbers when required (see 3.6.1.).
c. Requirements for first article (see 3.2) if required.
d. When manufacturing models are required (see 3.2.1).
e. Applicable packaging data sheet or packaging instruction and level of packaging required (see 5.1).
f. Place of inspection (see 6.3.1).
g. Responsibilities for furnishing ammunition and small arms items, if different (see 4.7.1).
h. Responsibilities for furnishing manufacturing equipment (see 3.5.1).
i. Responsibility for supply, maintenance and disposition of acceptance inspection equipment(see 4.1.1).
j. Technical data requirements, where required (see 3.4.2).
k. Failure requirements and Government approval, when required (see 3.9)

6.2.1 Weapon or component performance test failure. In the event of a performance test failure, unless otherwise specified, the supplier must immediately notify the contracting officer through the inspector. Pending guidance from the contracting officer, the failed weapon or component will be secured by the supplier in the as failed condition except that any unfired ammunition may be removed from the weapon.

6.2.1.1 Responsibility for compliance. The absence of any inspection requirements in the contract, drawings or QAPs does not relieve the contractor of the responsibility of assuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling (see 4.3) in quality conformance does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to acceptance of defective material.

6.2.1.2 Inspection Equipment. The supplier is responsible for the furnishing, calibration, maintenance and disposition of acceptance inspection equipment, except such as the Government may wish to provide (see 6.2).

6.3 Miscellaneous notes.

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6.3.1 Place of inspection. Unless otherwise deemed necessary, inspection and tests should be performed at the plant of the prime contractor (see 6.2).

6.3.2 Notification and information. As soon as practicable after receiving an order, the contractor will inform the inspector when work will be started and of the general plans and methods he intends to follow. When action by a testing agency is required, work programming will be effected with the testing agency at the earliest practicable date. During the progress of the work, the contractor will furnish the inspector the following information:

a. Notification of the time when each operation the inspector is required to witness is to take place. Such notice will be sufficiently in advance to enable the inspector to be present.

b. Such other notifications as may be required to insure that the inspector has the opportunity to witness any particular portion of any operation previously indicated by the inspector.

c. Certified reports of tests for materials and processes and statements of compliance with applicable documents as required.

6.3.3 Interpretation. Any doubt as to the meaning of this specification or any obscurity in its wording, will be explained and all directions and explanations necessary or proper to make more definite and certain any of the provisions of the specifications will be given by the contracting officer.

6.3.4 Confidential agreement. If the contractor so desires and so notifies the contracting officer through the inspector, the Government will hold the details of the contractor's operations as confidential.

6.3.5 Definitions. For the purposes of this specification the following words and terms are defined:

a. Corner. An intersection of edges.
b. Edge. A line of division bounded by two surfaces.
c. Exterior corners and edges. Corners and edges having included angles less than 180^{o} (measured through the material).
d. Interior corners and edges. Corners and edges having included angles greater than 180^{o} (measured through the material).
e. Item. A complete subsystem, weapon, accessory, attachment or related equipment.
f. Material. Raw material.
g. Part. A component or assembly forming part of an item.
h. Surveillance. Surveillance is not intended to mean continuous observation by an inspector. Adequate control of performance can be effected by frequent and unexpected spot checks of tests and processes.

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6.4 DELETED

6.5 DELETED

6.6 Subject term (key word) listing.

Design	Gun	Touch Up	Finishing
Small Caliber	Workmanship	Drawings	Surface Finish
Chemical Resistance	Dimensioning	Edge Lit Plastic	Serial Number
Interchange	Manufacturing		

6.7 Superseding. This document supersedes the following amendments:

Interim Amendment 4	Interim Amendment 3	Amendment 2
9 October 1984	20 April 1983	30 May 1975

6.8 Amendment notations. The margins of this specification are marked with vertical lines to indicate modifications made by this amendment. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations.

Custodians:
Army – AR
Air Force – 99
Navy - OS

Preparing activity:
Army – AR

(Project 1005-2009-005)

Review activities:
Air Force – 84
Navy – AS, MC

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