

NOT MEASUREMENT
SENSITIVE

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SUPERSEDING
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MILITARY SPECIFICATION MANUALS, TECHNICAL: DEPOT MAINTENANCE WORK REQUIREMENTS (DMWR)

This specification is approved for use by the Department of the Army and is available for use by all departments and agencies of the Department of Defense.

1. SCOPE.

1.1 Scope. This specification contains the requirements for preparation of DMWR for Army materiel except conventional and chemical ammunition.

1.2 Figures. The figures used in this specification are examples only. The text of this document takes precedence over the examples.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to the USAMC Logistics Support Activity, ATTN: AMXLS-AP, Redstone Arsenal, AL 35898-7466 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC A6967

AREA TMSS

DISTRIBUTION STATEMENT A. Approved for public release;
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1.3 Applicability. DMWR publications contain the information needed by depot level maintenance personnel, government, or contractor to perform their authorized maintenance tasks. Some requirements in this specification are not applicable to all equipment or all situations. It is necessary to tailor optional requirements for each acquisition in accordance with (IAW) appendix A of this document. The term, "equipment," as used in this specification, means end item, assembly, subassembly, component, or items covered by the DMWR.

2. APPLICABLE DOCUMENTS.**2.1 Government documents.**

2.1.1 Specifications, standards, and handbooks. The following specifications and standards form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense (DOD) Index of Specifications and Standards (DODISS) and supplement, thereto, cited in the solicitation (see para 6.2.).

SPECIFICATION, MILITARY

MIL-I-45607	Inspection Equipment, Acquisition, Maintenance, and Disposition of
MIL-M-13231	Marking of Electronic Items
MIL-M-38784	Manuals, Technical: General Style and Format Requirements
MIL-M-49502	Manuals, Technical: Repair Parts and Special Tools List
MIL-M-85337	Manuals, Technical: Quality Assurance Program; Requirements for
MIL-Q-9858	Quality Program Requirements
MIL-W-63150	Weapons and Support Materiel Standard Quality Assurance, Provisions for

STANDARDS

MIL-STD-12	Abbreviations for Use on Drawings, Specifications, Standards, and in Technical Documents
MIL-STD-109	Quality Assurance Terms and Definitions
MIL-STD-120	Gage Inspection
MIL-STD-129	Marking for Shipment and Storage
MIL-STD-130	Identification Marking of U.S. Military Property
MIL-STD-410	Nondestructive Testing Personnel Qualification and Certification
MIL-STD-453	Radiographic Inspection
MIL-STD-882	Systems Safety Program Requirements
MIL-STD-973	Configuration Management

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MIL-STD-1686	Electrostatic Discharge Control Program for Protection of Electrical and Electronic Parts, Assemblies, and Equipment (Excluding Electrically Initiated Explosive Devices)
MIL-STD-1806	Marking Technical Data Prepared by or for the DOD
MIL-STD-2000	Standard Requirements for Soldered Electrical and Electronic Assemblies
MIL-STD-2219	Fusion Welding for Aerospace Applications
MIL-STD-45562	Calibration Systems Requirements

(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from Standardization Documents Order Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

2.1.2 Other government documents, drawings, and publications.
The following other government documents, drawings, and publications form a part of this specification to the extent specified herein. Unless otherwise specified, the issues shall be those in effect on the date of the solicitation.

TM 39-1-1	Joint Nuclear Weapons Publications Systems (JNWPS), Operating Procedures, Specifications, and Standards
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(This document can be obtained from the Field Defense Nuclear Agency, ATTN: FSPSP, 1680 Texas Street, S.E., Kirtland, NM 87117-5669.)

AR 310-25	Dictionary of United States Army Terms
AR 750-2	
AR 380-5	Army Materiel Maintenance Wholesale Operations
	Department of the Army Information Security Program

(Copies of this regulation are available from the U.S. Army Publications Distribution Center, 2800 Eastern Boulevard, Baltimore, MD 21220-2896.)

AMC-P 25-32	Guide for Preparation of Equipment Publications Contract Packages
AMC-R 702-32	Critical Safety Item Program
AMC-R 750-51	Maintenance Expenditure Limits (MEL)
DA PAM 738-750	Functional Users Manual for The Army Maintenance Management Systems (TAMMS)
DA PAM 738-751	Functional Users Manual for The Army Maintenance Management System - Aviation (TAMMS-A)

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DOD 5220.22-M	Industrial Security Manual for Safeguarding Classified Information
FM 1-511	Army Aircraft Quality Control and Technical Inspection
FM 21-11	First Aid for Soldiers
TB ORD 1030	Army Vehicles: Installation and Use Overhaul and Overhaul/MWO Plates
TM 55-1300-206	Ammunition and Explosives Standards
TM 55-1500-343-23	Cleaning and Corrosion Prevention/ Control Avionics
TM 55-1500-344-23	Cleaning and Corrosion Prevention/ Control Aircraft Weapon System
MICOM-PAM 702-1	Quality Engineering Handbook for the Preparation and Maintenance of Quality Assurance Requirements and Provisions

(Copies of specifications, standards, and other government documents required by depot/contractors in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting activity.)

DESCOM-R 702-1 DESCOM Product Assurance Program

(This document can be obtained from the U.S. Army Depot Systems Command, ATTN: ASQNC-DQ-IP, Chambersburg, PA 17201-4170.)

CDA PAM 18-1-2 AMDF Retrieval Microform Systems (ARMS),
Packaging

(This pamphlet can be obtained from the USAMC LOGSA, ATTN: AMXLS-C, Redstone Arsenal, Alabama, 35896-7466.)

2.2 Other publications. The following document(s) form a part of this specification to the extent specified herein. Unless otherwise specified, issue of the documents which are DOD adopted shall be those listed in the issue of the DODISS specified in the solicitation. Unless otherwise specified, the issues of documents not listed in the DODISS shall be the issue of the nongovernment document(s) which are current on the date of the solicitation.

American Society for Testing and Materials (ASTM)

ASTM D 3951 (DOD adopted)	Standard Practice for Commercial Packaging
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(DOD activities can obtain copies from the Standardization Documents Order Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19120-5099. Other government activities, contractors, and private concerns must obtain copies from the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.)

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2.3 Order of precedence. In the event of a conflict between the text of this specification and references cited herein, the text of this specification shall take precedence. Nothing in this specification, however, shall supersede applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS.**3.1 General.**

3.1.1 Style and format. Unless otherwise specified by the contracting activity, the general style and format of the DMWR shall be IAW MIL-M-38784.

3.1.2 National stock numbers (NSN) and part numbers. NSNs, part numbers, and Commercial and Government Entity Code (CAGEC) shall not be used in the narrative portion or procedures in the DMWR unless they are essential for identification of the item.

3.1.3 Level of coverage. The information provided in the DMWR shall be directed to the least experienced technicians expected to use it. The reading grade level shall be the level specified by the contracting activity. MIL-M-38784 shall be used to determine the reading grade level of the DMWR.

3.1.4 Language. The text of the DMWR shall be concise, accurate, and in the simplest English that will convey the intended message.

3.1.5 Abbreviations and acronyms. Abbreviations, throughout the DMWR, shall be IAW MIL-STD-12. The first use of the abbreviation or acronym shall have the word or words spelled out completely. The abbreviation or acronym shall appear in parenthesis immediately after the word(s).

3.1.6 Equipment names or nomenclature. Only approved item names or nomenclatures shall be used in the DMWR. The use of names and nomenclatures shall be consistent throughout the DMWR.

3.1.7 Illustrations. Unless otherwise specified by the contracting activity, only line drawing illustrations shall be used in the DMWR. Engineering drawings shall not be used, unless approved by the contracting activity. Illustration views shall be presented as the DMWR user would view the item in the performance of the associated task. Locator numbers used on illustrations shall be numbered consecutively in a clockwise direction, beginning with the lowest number at the 11 o'clock position. For Best Commercial Practice (BCP), engineering drawings and other existing documentation, provided they reproduce legibly, shall be used to the maximum extent practicable.

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3.1.7.1 Functional and schematic diagrams. Voltage and waveforms shall be provided at designated points for normally functioning equipment. Nominal values shall be used. If space limitations do not allow for waveforms, they shall be provided IAW paragraph 3.1.7.2 below.

3.1.7.2 Waveform diagrams. If not provided on functional and schematic diagrams and required in support of maintenance tasks, these diagrams shall show the waveforms and nominal values at designated points for normally functioning equipment or systems as seen on an oscilloscope.

3.1.8 DMWR divisions. The DMWR shall be divided appropriately into volumes, chapters, sections, and paragraphs. There shall be at least two of each division used. For example, if there is a volume 1 there shall be a volume 2, a chapter 1 then a chapter 2, and so on for each division. When the thickness of a DMWR exceeds 1,500 pages (750 sheets), it shall be divided into volumes. Each volume shall not exceed 1,500 pages (750 sheets).

3.1.9 Referencing. Reference to other documents and information within the DMWR shall be based upon economic consideration, required data may be duplicated rather than referenced. Reference shall be made to other documents only when they are normally available to the user. If a reference to another document is necessary, the reference shall include the document name or publication number. Reference made to other documents or other parts of the DMWR shall include only specific and necessary location data such as chapter, page, paragraph, table, or figure number.

3.1.10 Security classification markings. Security classification markings shall be applied IAW MIL-M-38784.

3.1.11 Nuclear weapons. Markings for DMWR covering nuclear weapon support equipment shall be IAW TM 39-1-1.

3.1.12 Warnings, cautions, icons, and notes. Warnings, cautions, icons, and notes shall be used IAW MIL-M-38784. A warning shall precede the text for a procedure where injury or death may occur to the person doing the procedure, not the person who will use the equipment when it is issued. Cautions shall precede the text for a procedure where damage to the equipment could occur. Notes shall precede text and are used to highlight an essential operating or maintenance procedure, condition, or statement. When warnings, cautions, or notes occur for the same text, the warnings shall appear first, cautions second, and notes last.

3.1.12.1 Icons. Each single warning icon used in the tasks/text shall be defined in the warning summary. (See appendix B of this specification for the approved listing of single hazard icons and definition.)

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3.1.13 Hazardous materials warnings and icons. Whenever a warning can be presented as an icon or a combination of icons in lieu of text, this format shall be used. Icons used shall be either on the approved list in appendix B of this specification, or shall be added to or changed in the appendix as specified and approved by the contracting activity. Each hazard icon used shall be defined in the warning summary at the front of the DMWR.

3.1.14 Expendable and durable items numbering. Each time an expendable or durable item (material) appears in the text, it shall be identified by the item name and the item number. Each item shall be listed in appendix C, as described in paragraph 3.10.3. For example, "Use silicone grease (item 7, Appx C)."

3.2 Content. The DMWR shall contain those depot maintenance tasks identified by the applicable maintenance allocation chart (MAC) and programmed to be performed at depot level. These tasks shall be developed and presented to include reliability centered maintenance (RCM), as prescribed in AR 750-2, and produce the intended/expected reliability, availability, and maintainability -durability (RAM-D). The DMWR shall consist of the following divisions:

- a. Front matter.
- b. Chapter 1, Introduction.
- c. Chapter 2, Technical Support Requirements.
- d. Chapter 3, Preshop Analysis.
- e. Chapter 4, Overhaul/Maintenance Procedures.
- f. Chapter 5, Quality Assurance Requirements.
- g. Chapter 6, Preservation, Packaging, and Marking.
- h. APPENDIX A, References.
- i. APPENDIX B, Repair Parts and Special Tools List.
- j. APPENDIX C, Expendable and Durable Items.
- k. APPENDIX D, Depot Mobilization Requirements.
- l. Other appendixes.
- m. Glossary.
- n. Index.
- o. Authentication Page.

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(When any of the above divisions, or any portion thereof specified herein is not applicable to a specific DMWR, the chapter, section, or paragraph number, and title shall appear in sequence and be followed by the statement: "NOT APPLICABLE".)

3.2.1 Logistic support analysis record (LSAR). Technical content preparation shall be developed using the LSAR. The technical data instructions developed by the requirements of MIL-STD-1388-2, DOD Requirements for an LSAR shall be used as the baseline to prepare the DMWR.

3.2.2 Core elements. The DMWR shall provide all required overhaul procedures utilizing BCP where applicable, and shall, as a minimum, provide the following core elements:

- a. Mandatory inspection points/criteria.
- b. Preshop analysis requirements to include troubleshooting procedures necessary to define scope of work.
- c. Final inspection criteria.
- d. Configuration control document which accurately defines the required output configuration(s).

3.3 Front matter. The front matter shall consist of the following.

3.3.1 Cover. The cover shall have a publication number provided by the contracting activity and a title which identifies the equipment covered in the DMWR by official nomenclature, NSN, End Item Code (EIC), part number, and CAGEC. It shall identify all related items by item name, NSN, EIC, and all related items covered by the DMWR which, when the work is complete, may be turned in to supply separately. See figure 1 for an example of a DMWR cover.

3.3.1.1 Distribution statement, destruction notice, and export warning notice. The applicable distribution statement, destruction notice, and export control warning notice (provided by the contracting activity) shall be prepared IAW MIL-M-38784, and shall appear on the cover below the availability statement.

3.3.1.2 Supersession notice. If the DMWR supersedes another DMWR or publication, a supersession notice, provided by the contracting activity, shall be placed on the cover IAW MIL-M-38784.

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3.3.1.3 Warning summary. A warning summary shall include first aid data (see figure 2 for an example). It shall appear on the inside front cover to provide the user with important warnings that appear throughout the DMWR. The summary shall include each general type of warning and icon used within the DMWR. The summary shall not be a list of specific warnings that pertain to peculiar procedural steps, but it shall include general subject data such as radiation, chemicals, voltage, gas pressure, laser light, or other hazards that may be encountered by the user. See figure 2 for examples of warnings and icons.

3.3.1.4 Warning and first aid data page. A warning and first aid data page shall be included and shall:

a. When warnings cannot be summarized on the inside front cover, warning pages shall be prepared instead of a warning summary. Warning pages shall include the same data as the warning summary and shall be the first pages following the cover. Warning pages shall be numbered with lowercase letters a, b, c, etc.

b. Include reference to FM 21-11. The text shall describe any first aid data not included in FM 21-11, but needed due to the dangers that may be encountered with the equipment.

c. Include reference to TM 9-1300-206 and related publications for weapons involving the use of ammunition items. First aid instructions needed to ensure safety, and applicable for including here, shall be described.

3.3.2 Title block, reporting errors, and recommending improvements statement, distribution limitation statement, destruction, and export warning notices.

3.3.2.1 Title block. The title block page shall follow the warning summary page. This page shall contain the same title as on the cover, the DMWR number, date of publication, official nomenclature, NSN, EIC, part number, and CAGEC. This page shall additionally include the reporting errors and recommending improvements statement (see para 3.3.2.2.) and may contain table of contents data (see para 3.3.3). This page shall start on a right-hand page. The title page and table of contents pages shall be numbered consecutively, in lowercase Roman numerical numbers (e.g., i, ii, iii, etc). See figure 3 for an example of a title block page.

3.3.2.2 Reporting errors and recommending improvements statement. The following statements shall appear on the title block page as appropriate:

a. Unclassified DMWR. Unclassified DMWRs shall include the following:

MIL-M-63041F (TM)**"REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS.**

You can help improve this DMWR. If you find any errors or if you know of a way to improve this DMWR, let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this DMWR directly to: (enter name and address of proponent). A reply will be furnished to you."

(One filled-out sample copy and three blank copies of DA Form 2028-2 shall be included at the back of every DMWR.)

b. Classified DMWR. Classified DMWRs shall include the following:

"REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this DMWR. If you find any errors or know of a way to improve this DMWR, write and tell us about it. Address your correspondence to (enter name and address of proponent). When dealing with classified information, make sure that your correspondence is properly marked and is handled in accordance with AR 380-5."

3.3.2.3 Distribution limitation statement, destruction, and export warning notices. The same applicable statement and notices that appear on the cover shall be repeated under the reporting errors and recommending improvements statement. See figure 3 for an example of a title block page.

3.3.3 Table of Contents. If space permits, the table of contents shall begin on the same page as the title block and required statements. If space does not permit, the table of contents shall begin on the next page. A table of contents shall list chapters, sections, and primary paragraphs in the same order and with the exact titles as used in the text, with page number reference. The table of contents shall be prepared IAW MIL-M-38784. See figure 3 for an example.

3.4 Chapter 1, introduction. Chapter 1 shall consist of Section I (General Information); Section II (Equipment Description); and Section III (Mobilization Requirements).

3.4.1 Section I, general information. Section I shall consist of the following paragraphs:

a. Scope. The scope shall be a brief narrative describing purpose of the DMWR. The paragraph shall identify equipment to be worked on and work that will be accomplished.

b. Forms, records, and reports. All forms, records, and reports shall be referenced that are required during the performance of depot maintenance. Instructions shall be provided for their use and disposition as provided by the contracting activity.

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c. Quality deficiency reports (QDR). The following statement shall be included:

"If the (insert equipment/item short name) needs improvement, let us know. Send us a QDR. You, the user, are the only one who can tell us what you don't like about the equipment. Let us know why you don't like the design or performance. Put it on an SF 368 (Product Quality Deficiency Report). Mail it to us at (enter name and address of proponent). A reply will be furnished to you."

d. Engineering change proposals (ECP). The ECP paragraph shall include the following statement:

"Engineering change proposals (ECP) will be submitted using DD Form 1693 (Engineering Change Proposal (Short Form)). (See MIL-STD-973 for instructions.) Completed forms should be mailed direct to (enter the name and address of the responsible command or activity). A reply will be furnished to you."

e. Deviations and exceptions. The DMWR shall include the following statement:

"Requests for deviations or exceptions to this DMWR will be processed in accordance with MIL-STD 973."

f. Corrosion prevention and control (CPC).

(1) The CPC information provided shall contain numbered subparagraphs similar to the following:

"Corrosion Prevention and Control (CPC) of Army materiel is a continuing concern. It is important that any corrosion problem with this item be reported so that the problem can be corrected and improvements made to prevent the problem in future items.

While corrosion is typically associated with rusting of metals, it can also include deterioration of other materials, such as rubber and plastic. Unusual cracking, softening, swelling, or breaking of these materials may be a corrosion problem.

If a corrosion problem is identified, it can be reported using SF 368, Product Quality Deficiency Report. Use of key words such as "corrosion," "rust," "deterioration," or "cracking" will ensure that the information is identified as a CPC problem. The form should be submitted to the address specified in DA PAM 738-750 and DA PAM 738-751."

(2) For aircraft DMWRs, this paragraph shall include a reference to TM 55-1500-343-23 and TM 55-1500-344-23.

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g. Cost considerations. The DMWR shall contain the following cost considerations paragraph:

"This work requirement shall be the basis for establishing the extent of overhaul while taking into consideration cost factors. A determination shall be made on all subassemblies/assemblies to replace worn or damaged components which are available in supply, if acquisition cost is less than the cost to repair and restore to the DMWR standard. The cost to repair/restore any individual item with an established Maintenance Expenditure Limit (MEL) to the DMWR standard shall not exceed the MEL, unless a waiver has been approved in accordance with AMC-R 750-51. This requirement does not apply to items exempted from MEL in accordance with AMC-R 750-51."

3.4.2 Section II, equipment description. The equipment description shall include the following:

a. Description. A brief description of the equipment, including its purpose, use, capabilities, and features, shall be provided. Tabulated data shall not appear in this paragraph.

b. Data plates. A list and an illustration of each data plate and location of all existing and newly required data plates, including the overhaul data plate, shall be included.

c. Tabulated data. Table(s) containing technical data such as weight, overall dimensions, turning radius, power requirements, signal input and output levels, environmental characteristics, ranges, limits, or other characteristics needed by the DMWR user shall be provided. See figure 4 for an example.

d. Configuration data. Configuration data for all models covered by the DMWR shall be provided. The differences between models, configurations, serial number groups or ranges, or other differences in configuration shall be explained in detail. The modifications and major parts affected by them shall be described. It shall list the serial number groups or other identification data for modified equipment and equipment with

minor model differences. This information shall be illustrated, tabulated, or narrated, whichever is most appropriate to provide the necessary information.

e. Components not covered. If applicable, an end item DMWR shall have a paragraph(s) that identifies components of the end item/system that are not covered by the DMWR but are covered in a lower-level maintenance manual(s). The components and their manuals shall be identified or referenced in narrative or tabular format, as applicable.

3.4.3 Section III, mobilization requirements. This section shall have the following statement:

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"All requirements of this DMWR may be exempted or revised in the event of mobilization. Only those procedures necessary to return the (insert equipment name) to a serviceable condition will be performed. The exemptions and revisions are explained in Appendix D."

3.5 Chapter 2, technical support requirements. This chapter shall consist of three sections: Section I (Support Items); Section II (Mandatory Replacement Parts; Critical Safety Items, Flight Safety Program Parts, Repair Parts, and Modifications); and Section III (Standards).

3.5.1 Section I, support items. This section shall consist of the following:

a. Facilities. A description of all facilities, such as test stands, test tracks, clean rooms, shielded rooms, or other facilities, that are required to do the work specified in the DMWR, shall be included. Reference shall be provided for any specifications or standards that these facilities must meet.

b. Special tools and equipment. A list of all special tools and test, measurement, and diagnostic equipment not contained in lower-level technical manuals or appendix B, and required to perform the procedures in the DMWR, shall be included. This list shall include any special inspection equipment used only for the item that the DMWR covers. The list shall contain the following data: NSN, part number and CAGEC, paragraph or figure number where the tool or equipment is referenced, nomenclature, use or application of the tool/equipment, and a reference to any applicable calibration document. See figure 5 for an example.

c. Fabricated tools and equipment. Any fabricated tools, equipment, or fixtures shall be identified that are needed to perform the procedures in the DMWR. If applicable, this paragraph shall refer to the appendix prepared to provide specific information on fabricated tools and equipment. See paragraph 3.11.

3.5.2 Section II, mandatory replacement parts, critical safety items, flight safety parts (aircraft only), repair parts, and modifications. Section II shall consist of the following paragraphs:

a. Mandatory replacement parts list. A mandatory replacement parts list, consisting of all items that must be replaced during the repair and overhaul of the equipment, whether or not they have disturbed or not. When an item or component is not disassembled based on PSA, the item will not be disassembled for the sole purpose to add a mandatory part. All items that must be replaced during overhaul or repair procedures (based on usage intervals such as miles, time, or rounds fired, or replaced

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on a time between overhaul (TBO) interval shall be included in the parts list table. The table shall contain, as a minimum, the following data elements: item description, part number, CAGEC, NSN, and total quantity per equipment. See figure 6 for an example.

b. Critical safety items (CSI) list and flight safety parts (FSP) program. As applicable, this paragraph shall include a tabular listing of all CSI required by AMC-R 702-32 and provided by the contracting activity. Each CSI and associated characteristic(s) shall be clearly identified within overhaul/repair procedures. The location of the critical safety procedures or processes within the DMWR shall be referenced (see para 3.7.2g).

For aircraft, FSPs, and installations identified under the FSP program, shall require special handling during overhaul. A critical characteristic is any dimension, tolerance, finish, material manufacturing, assembly or inspection process, or other feature, which if nonconforming or missing, could cause failure of malfunction of the critical item. Flight safety parts are listed in a table, which includes nomenclature, part number, CAGEC, and critical characteristic. Throughout the overhaul procedures, warnings appear emphasizing critical instructions to be followed. These warnings are FSP warnings and inserted whenever and wherever necessary (see para 3.6.9, 3.6.10, and 3.7.2g).

c. Repair parts and special tools. Reference shall be made to the equipment RPSTL or other parts listing data, or appendix B of the DMWR where the RPSTL can be found for the item covered by the DMWR. (See figure 7 for an example of an RPSTL.)

d. Modification Work Order (MWO) and ECPs. MWOs and ECPs shall be identified for all modifications which have been incorporated into the work required by the DMWR. MWOs shall be reported as outlined in DA PAM 738-50. The applicable MWOs and ECPs shall be listed (title and number). This listing shall be supplied by the major subordinate command (MSC).

3.5.3 Section III, standards. Section III shall consist of the following paragraphs:

a. Quality of material. A statement(s) similar to the following shall be included:

"Material used for replacement, repair, or modification must meet the requirements of this DMWR. If quality of material requirements are not stated in this DMWR, the material must meet the requirements of the drawings, standards, specifications, or approved engineering change proposals applicable to the subject equipment."

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b. Electromagnetic compatibility standards. When applicable, reference shall be made to the electromagnetic compatibility standards (such as MIL-STD-461 and MIL-STD-462) that apply to the equipment covered in the DMWR.

c. Electrostatic Discharge Sensitive (ESDS). When applicable, the electronic parts, assemblies, and equipment that require ESD protection, and their ESDS classes that require ESDS protection, shall be identified. A reference shall be included to the appropriate documents, such as MIL-HDBK-263 and MIL-STD-1686, that contain ESDS control procedures and material necessary to protect these items.

d. Nuclear hardness. If the equipment covered in the DMWR has nuclear survivability requirements, the following applies: (1) a statement stating nuclear hardness survivability requirements shall be provided; (2) applicable warnings shall be incorporated into the text to ensure that hardness of the equipment is not degraded during overhaul/maintenance procedures; (3) all hardness critical processes/steps shall be marked IAW MIL-M-38784; and (4) the following statements shall be included:

"All hardness-critical processes (HCP) paragraphs in this DMWR shall be marked with the HCP symbol as follows:

a. When an entire paragraph, including all subparagraphs, is considered hardness critical, only the major paragraph will be marked by the symbol HCP placed between the paragraph number and the title, e.g., "1.2 HCP LRU repair").

b. When only certain processes/steps within a paragraph are hardness critical, only the applicable processes/steps will be marked by placement of the HCP symbol between each applicable step number and the text."

3.6 Chapter 3, preshop analysis. When specified by the contracting activity, a preshop analysis chapter shall apply when RCM data indicates that an inspection or test is more effective in determining useful life of a system, subsystem, or component than a mandatory disassembly. When the chapter is not required, the words, "NOT APPLICABLE," shall follow the chapter heading. When applicable, this chapter shall consist of the following sections:

3.6.1 Section I, general. Section I shall consist of the following paragraphs:

a. Scope. The scope shall state the purpose and coverage of the preshop analysis.

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b. Checking attached documents. Instructions shall be provided for checking all tags, forms, and documents attached to the item to determine the reason for its return and identify any other obvious faults or damage.

c. Unpacking and special handling. A statement of procedures for removing the item, assemblies, subassemblies, or components from the shipping containers and packaging material shall be included. This paragraph shall contain needed handling requirements for hazardous material, ESD, precious metal content, classified material, or critical material and any special condemnation procedures for the item and its assemblies and subassemblies.

d. External inspection. The procedures for external inspection of the item, to determine if it is complete and if there is any obvious external damage, shall be provided.

e. Component check list. When specified by the contracting activity, a component check list shall be prepared as an appendix. The appendix shall be referenced in this paragraph and located in the back of the DMWR, so it may be removed or copied for completion. The check list shall be preceded by a brief explanation of its use. The check list shall contain the following data, as applicable:

Name/nomenclature of the equipment/item _____ .
 Serial number _____ .
 Date received _____ .
 Received from (identify unit) _____ .
 Component name _____ .
 NSN _____ . Part number and CAGEC _____ .
 Quantity required _____ . Quantity received _____ .
 Visible damage found _____ .

f. Cleaning and preservation. Instructions shall be included for cleaning the item to prepare it for the preshop analysis testing. They shall include the procedures for any temporary preservation or corrosion protection measures needed to protect the item until the work required by the DMWR is started.

3.6.2 Section II, Preshop analysis procedures. Detailed procedures to do a preshop analysis shall be provided. These procedures shall be prepared in either narrative format or tabulated checklist format, as specified by the contracting activity.

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3.6.2.1 Narrative format. If narrative format is the norm, then unless otherwise specified by the contracting activity, procedures shall be presented in narrative format. Test and analysis procedures shall be presented in a logical sequence, so they do not cause any unnecessary disassembly, and in the order in which they should be done, usually in top-down breakdown sequence. Each procedure shall be identified by a step number. When applicable, procedures shall be arranged in groups by major components, assemblies, and subassemblies. Each group shall be headed by an applicable title. When a procedure is extensive (more than four pages), it may be placed in an appendix at the back of the DMWR, and if so, the appendix shall be referenced in the paragraph.

3.6.2.2 Preshop analysis checklist. When specified by the contracting activity, a preshop analysis checklist shall be prepared and include the following:

a. Cover sheet. The cover sheet shall contain spaces to record the following item information: part number, CAGEC, serial number, NSN, modifications required, reason for overhaul or repair, unpacking of secondary items required, review of tags or forms with the item, name and signature of person doing the analysis, and date. See figure 8 for an example.

b. Table of tests and inspections. This table shall have an entry for each test and inspection procedure. Each entry shall have, as a minimum, the following information: name of item to inspect or test, test or inspection procedure, results of the test or inspection procedure, and recommended repair or overhaul action. See figure 9 for an example.

3.7 Chapter 4, overhaul procedures. Chapter 4 shall provide all required overhaul procedures using BCP where applicable (see para 6.5.1). As a minimum, the procedures shall be broken out as follow: scope, general safety, general inspection, and one or more for overhaul procedures. A section shall be included to cover each major assembly, each subassembly or component of the equipment, and to the final assembly and testing. (The exact number of sections will be determined by the complexity of the equipment.) The overhaul procedures sections shall appear in a top-down breakdown sequence, beginning with the end item if practical. If not practical, the first section shall start at the highest possible level of assembly. The last section of the chapter shall cover the final assembly and testing of the highest assembly of the item after overhaul procedures are completed. When specified by the contracting activity, the use of separate chapters, instead of sections for major assemblies, subassemblies may be permitted.

3.7.1 Section I, scope and general safety. Section I shall consist of these paragraphs:

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a. Scope. The scope paragraph shall contain a brief summary of the procedures in the chapter. It shall explain the sequence of procedures, identification of quality assurance procedures, and any unusual or critical procedures. It shall also describe the measurement system used and shall provide references to any conversion tables provided in the text or appendices.

b. General safety precautions. When specified by the contracting activity, the general safety precautions shall contain general shop related safety precautions. These precautions shall not be repeated in the text of the procedures. For example, use safety glasses while soldering, use care when lifting heavy objects, or ensure a fire extinguisher is available for use. The precautions should be those that concern common conditions encountered while working on the equipment. If the precaution applies to a specific task and meets warning criteria in paragraph 3.1.12 of this specification, MIL-M-38784, the precaution shall be included as a warning in the text.

c. General inspection procedures. When specified by the contracting activity, the general inspection procedures shall contain general inspection procedures paragraph that apply to the equipment and are expected to be practiced by the technician during overhaul. These procedures shall include inspecting solder joints on an electronic item, welds on an armored vehicle, fluid leakage on vehicles, connectors on electronic devices, and other items to identify defects that must be corrected.

d. Overhaul operation flowchart. When specified by the contracting activity, a flowchart shall be provided to show typical workflow to do the prescribed tasks.

3.7.2 Section II, overhaul procedures for (end item/assembly). Section II shall contain the overhaul and repair procedures for the highest assembly, subassembly, or component of the equipment. Illustrations shall be used to augment the text when necessary. The procedures shall, as applicable to the item, include the following paragraphs:

a. Removal. The removal paragraph shall provide procedures for the removal of assemblies or subassemblies from the next higher assembly. It shall provide instructions for recording the condition of the item/assembly, marking, handling, and storing items. The procedures shall identify items which must be indexed, matched, or precision mated when installed later.

b. Disassembly. The disassembly paragraph shall provide instructions for the required disassembly of the equipment for inspection and maintenance purposes. These instructions shall ensure that matched parts are identified. Routine tools and procedures shall not be covered. Illustrations shall be used to augment the text and show the use of special tools or jigs that

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are necessary for disassembly. Instructions shall not include separation of bonded, welded, or other permanently attached parts unless unavoidable for cleaning, inspecting, testing, or accessing lower assemblies.

c. Cleaning. The cleaning paragraph shall provide general and specific cleaning instructions and all cleaning materials with necessary instructions for the item. The paragraph shall contain temporary corrosion prevention instructions for metal parts which have been cleaned.

d. Inspection. All inspection procedures required for the item shall be included. All procedures that have a quality assurance impact shall be identified with the boldface letters "QA" preceding them. The paragraph shall also contain instructions for tagging all rejected parts, other than mandatory replacement parts, and listing the reasons for the rejection. The instructions shall be sufficient to determine whether or not items conform to the standards in the DMWR and referenced standards. Visual inspection procedures to detect defects such as burrs, cracks, bends, or dents shall be included in this paragraph. The paragraph shall not contain vague terms such as excessive wear or operates smoothly, but shall contain requirements which can be accurately determined or measured. The inspection procedures in the paragraph shall apply only to the item covered by the section. Accurate and measurable acceptance or reject requirements and standards shall be provided which will allow the user of the DMWR to determine if the item under inspection conforms to the tolerances, wear limits, fit, or other standards and requirements presented. Support items used to perform these inspections shall be listed in Chapter 2.

e. Overhaul inspection procedure (OIP) tables. Unless otherwise specified by the contracting activity, OIP tables shall be prepared for items with critical characteristics or tolerances. Each OIP table shall be integrated within the procedure to which it applies and shall immediately follow the reference thereto. When specified by the contracting activity, all OIP tables shall be placed in an appendix (identified by alphabet and numeric sequence) and the procedures refer to the appendix for the appropriate table. If an illustrated parts breakdown or RPSTL is used, include a reference to the appropriate figure and index number in the OIP table. As applicable, illustrations shall be integrated within the text of the OIP table. The tables shall be assigned table numbers consecutively within each chapter. The number shall consist of two part Arabic numerals separated by a hyphen, e.g., 2-12 (see MIL-M-38784). The table shall contain, as a minimum, characteristics being inspected for, inspection methods, standards that must be met, and prefix the items with "QA" in bold type. See figure 10 for an example.

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f. Mandatory replacement parts. Instructions for the replacement of mandatory replacement parts listed in Chapter 2 that are applicable to the equipment, assembly, or subassembly, shall be listed in this section only. It shall contain guidance for disposition of the replaced parts. If figures with item numbers are used in the text of the section, figure and item numbers shall also be included in a table. The text shall clearly identify and provide complete instructions for replacing these items. See figure 6 for an example of the table.

g. CSI and FSP. If CSIs are used in the equipment, this paragraph shall include instructions for replacement and disposal procedures of these items (see para 3.5.2b). Each CSI and associated characteristic(s) shall be clearly identified within overhaul procedures.

For aircraft, if FSPs are used, this paragraph shall include instructions for replacement and disposal procedures of these items (see para 3.5.2b). Each FSP and associated characteristic(s) shall be clearly identified within overhaul procedures.

h. Repair, replacement, and adjustment. Repair, replacement, and adjustment instructions shall be included. Instructions shall be presented in a logical sequence. When it is necessary, illustrations shall be used to support the text. The instructions shall consist of step-by-step procedures and shall list all jigs, fixtures, materials, test equipment, and other items required to perform the tasks. Instructions for automatic test or diagnostic equipment shall be included. Schematics, wiring diagrams, parts location drawings, and other visual aids shall be used where necessary. Tolerances, torque values, clearances, adjustment information, and other parameters shall be provided. All procedures or steps in this paragraph which have a major quality assurance effect shall be prefixed with the boldface letters "QA" to identify them. For aircraft DMWRs, refer to FM 1-511.

i. Assembly. The step-by-step instructions for assembling the item shall be included. Illustrations shall be used to support the text where necessary. Drawings provided with the DMWR may be referenced to support the text. Tolerances, clearances, torque values, and all other parameters required for completing the assembly of the item shall be provided. See figure 11 for an example. All assembly procedures which have a major quality assurance effect shall be prefixed by the boldface letters "QA" to identify them. The paragraph(s) shall contain instructions for lubrication that must be performed during the assembly procedure. The lubrication instructions shall provide a list of lubricants required and lubrication methods to be used.

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j. Lubrication. Lubrication instructions for the item after it is assembled shall be included. It shall contain a list of the lubricants and methods required to do the tasks. The paragraph(s) shall not duplicate the instructions in the assembly paragraph(s) above except to check that the assembly lubrication was completed. All lubrication procedures which have a major quality assurance effect shall be prefixed by the boldface letters "QA" to identify them.

k. Testing. Testing procedures required to be done before installation of the item into the next higher assembly shall be provided. Instructions for recording results of the testing shall be provided. The paragraph(s) shall include a list of tools and test equipment, and any applicable setup procedures required. The paragraph(s) shall also include or reference instructions for any automatic or diagnostic test equipment required to complete the procedures. All testing procedures that have a major quality assurance effect shall be prefixed by the boldface letters "QA" to identify them.

l. Painting, refinishing, and marking. Instructions for painting, refinishing, and marking the item prior to its installation into the next higher assembly of the equipment shall be provided. Instructions shall include a list of the materials and facilities required for the tasks.

m. Final assembly or installation. Instructions for installing or assembling the item with the next higher assembly shall be included. Any materials, such as sealing compounds, lubricants, or corrosion prevention compounds used during the final assembly shall be listed. These listings shall meet the requirements of paragraphs 3.7.2i and 3.7.2j.

n. Data plates required. For data plates which require replacement, the type of material shall be indicated. Detailed preparation and attachment instructions shall be included. TB ORD 1030 addresses installation and use of overhaul/MWO plates. The instructions for stamping data plates shall include initials of the facility performing the overhaul or modification, contract number (if applicable), date of overhaul or modification, part number, and total operating time since new (if applicable). The instructions shall specify the letter and number sizes and shall indicate their placement (e.g., adjustment to manufacturer's data). The following statement shall be included:

"When sufficient space is not available on the existing data plate to add information, the plate shall be replaced and all pertinent data transferred to the new plate. Data shall not be stamped directly on any part, assembly, or item of equipment except when approved by the Government."

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3.7.3 Section (last section of Chapter 4), final testing. The last section shall appear after the overhaul procedure section(s) and shall be numbered accordingly. The section shall cover the final testing of the highest assembly or equipment/end item that the DMWR covers to ensure that the parameters of RAM-D are met. This section shall contain the following paragraphs:

a. Scope. A general explanation of the arrangement of the section and procedures in it shall be provided.

b. Inspection. The inspection procedures that are required prior to final testing to ensure that the item is complete and ready for final testing shall be provided. When applicable, it shall include instructions for any minor preparation tasks for final testing.

c. Lubrication. Any final lubrication procedures that need to be done prior to final testing shall be included. It shall list all necessary lubrication materials and contain instructions for the lubrication methods.

d. Final testing. The test procedures, performance standards, and tolerances to be met before the equipment is adequately overhauled and ready for issue without qualifications shall be included. The procedures shall list all tools, test, measurement, and diagnostic equipment (TMDE), jigs, fixtures, and other support items required for the test. Government approved operating instructions for special test equipment shall be included. Illustrations, charts, and checklists shall be used to augment the text where necessary. Procedures for minor adjustments that can be done without disassembling equipment shall be included in the paragraph. Complete procedures for burn-in or run-in tests shall also be included. A test data report shall be included to identify all acceptable or rejected criteria.

e. Final painting, refinishing, and marking. Procedures for any final painting, refinishing, and marking that could not be done during the overhaul procedures shall be provided. The materials and tools required to do the job shall be identified.

3.8 Chapter 5, quality assurance requirements. This chapter shall consist of these general information paragraphs:

a. Responsibility statement. The responsibility statement shall consist of the following:

"The depot/contractor is responsible for complying with all the quality assurance requirements of this DMWR IAW MIL-Q-9858 (Quality Program Requirements) and DESCOM-R 702-1 (DESCOM Product Assurance Program), as appropriate. The contracting activity reserves the right to perform inspections to verify that the work being done meets the quality standards of the DMWR and preserves the inherent reliability of the item."

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b. Definitions. All quality assurance terms extensively used in the DMWR shall be listed and defined. These definitions shall be IAW MIL-STD-109 and MIL-W-63150.

c. Special requirements for inspection tools and equipment. When specified by the contracting activity, any special requirements for the maintenance and calibration of tools and test equipment used for quality assurance inspections shall be listed. These requirements shall be met IAW the applicable standards, specifications, or regulations such as MIL-STD-120, MIL-I-45607, MIL-STD-45662, or DESCOM-R 702-1.

d. Certification requirements. When specified by the contracting activity, any certification or licensing requirements for processes, procedures, materials, equipment, or personnel skills shall be listed. The list shall include appropriate standards, specifications, regulations, or federal laws that apply (e.g., MIL-STD-453, Radiographic inspection; MIL-STD-410, Magnetic Particle Inspection; MIL-STD-2000, Soldering; MIL-STD-2219, welding; etc.). The list shall reference the paragraph in the DMWR where there is a requirement for a soldering, welding, or magnetic particle inspection certification of radioactive substance or test driver licenses. For MICOM requirements, Special Inspection Equipment (SIE) Certification, validation of SIE shall be IAW MICOM-PAM 702-1(H).

e. In-process inspections statement. The in-process inspection statement shall be included as follows:

"In-process quality assurance inspections are contained throughout Chapter 4 of this DMWR. These inspections are prefixed with the boldfaced letters "QA" to identify them, and they are the minimum inspections required. Additional quality assurance inspections may be established by the depot or the commodity manager."

f. Acceptance inspections statement. This statement shall consist of the following information:

"Items overhauled IAW this DMWR will be accepted based on the following criteria:

- (1) Conformance to quality of material requirements.
- (2) Conformance to all in-process quality assurance inspections.
- (3) Conformance to all final assembly testing requirements.
- (4) Conformance to the preservation, packaging, and marking requirements."

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g. First article inspection. When specified by the contracting activity, first article inspection/test for end items/subassemblies shall be included in the DMWR with the applicable requirements document.

3.9 Chapter 6, preservation, packaging, and marking. Chapter 6 shall consist of the following two paragraphs:

a. Packaging information. The first paragraph shall consist of the following:

"Packaging Information. Refer to the packaging segment of CDA PAM 18-1-2, AMDF Retrieval Microform System (ARMS) file for detailed packaging information. If ARMS does not contain the information that you need, you must contact the USAMC Logistic Support Activity, Packaging, Storage, and Containerization Center, Tobyhanna Army Depot, for packaging information."

b. Special instructions. Special instruction for any special or unique preservation, packaging, or marking that applies to the equipment covered by the DMWR shall be included. These instructions shall include cautions or references concerning electrostatic discharge, nuclear materiel, hazardous substances, special marking instructions, and any other instructions required that are not covered in the standard packaging and preservation information.

3.10 Appendixes. Appendixes shall be identified by capital letters (alphabetically) throughout the document in the order of their reference in the text (e.g., appendix A, appendix B, etc.). The following appendixes shall be prepared, as applicable.

3.10.1 Appendix A, references. Appendix A shall contain a listing of all documents referenced in the DMWR text. The listing shall include the publication number and title of each document. The listing shall be grouped by document type such as regulation, pamphlet, technical manual, form, standard, or specification. The listings in each group shall be in alpha-numeric order by publication number. If the publication is non-government, the source shall be provided. See figure 12 for an example. When a list of applicable publications (LOAP) exists, it may be referenced.

3.10.2 Appendix B, RPSTL. When specified by the contracting activity, appendix B shall be included in the DMWR. The RPSTL shall be prepared IAW MIL-M-49502, or for BCP, a parts listing shall be provided by the contracting activity.

3.10.3 Appendix C, expendable and durable items. Appendix C shall consist of two sections, as follows:

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a. Section I, introduction. Section I shall begin with a scope paragraph which contains a general explanation of the appendix. The second paragraph of the section shall explain each column (Item No., NSN, Description with part number and CAGEC, and Unit of Issue) in the list in section II. See figure 13 for an example.

b. Section II, expendable and durable items list. The list shall be in a tabular format and shall contain, as a minimum, this data: item number, NSN, Federal item name and description if needed, CAGEC, part number, and unit of issue. The items shall be listed in alphabetical reverse word order by Federal item name. Items to be listed shall be those approved by the contracting activity. See figure 14 for an example.

3.10.4 Appendix D, depot mobilization requirements. When specified and provided by the contracting activity, this appendix shall include the modifications, deletions, or additions to the procedures in Chapters 3 and 4 required during mobilization. The appendix shall begin with the following statement: "The purpose of this appendix is to streamline and accelerate the overhaul process during the mobilization of the depot." The appendix shall include a list of instructions for modifying the procedures, and the list shall be presented in a format similar to the following:

PAGE	PARAGRAPH	ACTION
1-3	1-5	Add: The extent of disassembly will be based on preshop analysis only.
4-12	4-14c	Delete all procedures in the paragraph.
4-27	4-31	Change to read: Painted metal will be touched up only.

3.11 Other appendixes. When specified by the contracting activity, other applicable appendixes shall be added to the DMWR.

3.12 Glossary. Unless otherwise specified by the contracting activity, the DMWR shall have a glossary. The glossary shall include terms that are uncommon and inadequately defined in the text or in the AR 310-25 Dictionary of United States Army Terms. If a glossary is required, it shall begin on a right-hand page and shall immediately precede the index, if any. Glossary headers shall consist of the word **GLOSSARY** in capital, all bold letters and shall be centered at the top of the page. Page numbers for a glossary shall be consecutively numbered Glossary-1, Glossary-2, etc.

3.13 Index. An alphabetical index listing shall be included identifying the paragraphs. The index shall be constructed to enable users to easily locate information in the text. The index

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header shall consist of the word **INDEX** in all bold, capital letters and shall be centered. Page numbers for alphabetical indexes shall be consecutively numbered Index-1, Index-2, etc. Indexes shall begin on a right-hand page and shall be located at the end of the DMWR.

3.14 Authentication page. The authentication page, provided by the contracting activity, shall be the last page of the DMWR. See figure 15 for an example.

4. QUALITY ASSURANCE PROVISIONS.

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements (examinations and tests) as specified herein. Except as otherwise specified in the contract or purchase order, the contractor may use his own or any other facilities suitable for 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 this specification where such inspections are deemed necessary to ensure supplies and services conform to prescribed requirements.

4.2 Responsibility for compliance. All items must meet all requirements of sections 3 and 5. The inspection set forth in this specification shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in the specification shall not relieve the contractor of the responsibility of ensuring that all products or supplies submitted to the government for acceptance comply with all requirements of the contract. Sampling 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.

4.3 Quality assurance provisions. The contractor shall be responsible for quality assurance in the preparation of the DMWR IAW MIL-M-85337 to the extent specified by the contracting activity.

4.4 Contracting activity inspection. DMWRs submitted by the contractor shall be subject to review and verification by the contracting activity.

4.5 In-process reviews (IPR). When specified by the contracting activity, IPRs shall be performed by its representatives during the preparation of the DMWR. The contractor shall support these reviews by providing access to the DMWR materials and equipment, facilities, or other support as specified by the contracting activity.

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4.6 Validation. The contractor shall validate the technical accuracy and adequacy of all operating and maintenance procedures in the DMWR IAW MIL-M-85337. This validation shall include a complete review of the associated MAC to ensure that all authorized depot tasks are covered in the DMWR. When specified by the contracting activity, a simulation of the task performance may be used to avoid destructive testing. Each individual task shall be validated from start to completion in one session. The technical accuracy and content of all drawings, diagrams, schematics, and other material which support the task shall be validated as part of the task. The contracting activity reserves the right to witness the validation. The contractor shall correct all errors found in the DMWR during the validation. Minor corrections may be made on the spot and performance of task continued. Numerous corrections that disrupt performance of the task shall be considered major corrections. In the case of any type of major correction, the entire task performance shall be repeated at another time after the corrections have been made to the DMWR.

4.7 Verification. The contractor shall participate in verification by the government and provide the following support:

- a. Record and maintain records during the verification process.
- b. Maintain a master copy of the DMWR which shall be corrected during the verification process.
- c. Assist the contracting activity during the verification process.
- d. Make necessary corrections to discrepancies revealed during the verification process.
- e. Provide the contracting activity with a report of the corrective actions taken.

4.8 Records. The contractor shall maintain quality assurance records that contain, as the minimum, the following information: dates of validations, tasks and material validated, method of validation (simulation or actual), findings and applicable remarks, and action taken. The contracting activity reserves the right to examine these records at the contractor's facility.

4.9 Government furnished information. The contractor shall validate information furnished by the government along with the rest of the DMWR. The contractor shall notify the contracting activity if any government furnished information is inaccurate, inadequate, or inconsistent with the contents of the DMWR.

MIL-M-63041F (TM)**5. PACKAGING.**

5.1 Packaging and packing. Unless otherwise specified by the contracting activity, the packaging and packing of technical manuals/DMWRs and associated products shall conform to ASTM D 3951.

5.2 Marking. Packages shall be marked IAW MIL-STD-129 and ASTM D 3951, as applicable, and shall include the appropriate technical manual number and publication date.

5.3 Classified material. All classified material shall be safeguarded, packaged, and marked as required by DOD 5220-22-M.

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 is intended to be used in the acquisition of DMWRs. These DMWRs are needed by depot personnel or designated contractors to perform depot level repair and overhaul of equipment. The requirements of this specification are normally invoked by contract. However, when a government activity is writing the DMWR, they assume the role of the contractor and are responsible for meeting the requirements of this specification.

6.1.1 Reliability, Availability, Maintainability (RAM) requirements. The DMWR may have an RAM table listing the pertinent measurable RAM ranges for the major overhauled components covered under the DMWR for overhaul of the item/system. The reliability goals eventually published in the DMWR must be mature data. The RAM requirements shall be prescribed by maintenance engineering of the contracting activity and shall include critical measurement factors such as meantime between failures (MTBF), meantime between corrective maintenance (MTBCM), maximum time to repair (MTR), availability, and maintenance ratio required for an overhauled item if different from a new item. The reliability and availability portions of the table shall give the minimum acceptable values while the maintainability portion shall provide the maximum allowable rates. Availability may be expressed as a probability versus a quantified number. See figure 16 for an example of an RAM table.

6.1.2 RAM measurement. RAM requirements add no value to a DMWR as far as the repair/overhaul activity is concerned. The RAM is designed into a system during development. Maintenance, depot, or any other maintenance cannot improve on these inherent characteristics. A DMWR is a maintenance standard that prescribes the minimum depot maintenance and quality of workmanship required to restore a certain percentage of the inherent RAM characteristics. It is the responsibility of the

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MSC/DMWR preparing activity to determine target/anticipated RAM objectives, extent of repair, and based on that repair, if target/anticipated RAM objectives were met. The depot/repair activity at the time of completion of a maintenance action has no way to measure what the RAM will be for the specific unit. Quality must be assessed by other measurable characteristics specified in the DMWR.

6.2 Acquisition requirements. Acquisition documents should specify the following information:

- a. Title, number, and date of this specification.
- b. Issue of the DODISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see para 2.2).
- c. Title and publication number of the DMWR to be prepared.
- d. Description of the target audience and required reading grade level.
- e. Parts listing information from the MSC data files.
- f. The applicable distribution limitation statement, destruction notice, and export control warning notice.
- g. Identification of all required government furnished information.
- h. Quality assurance provisions to be invoked (to include requirements for deliverable data).
- i. Tailoring of this specification (a completed Content-Format Selection Summary, Appendix A).

6.3 Data requirements. The following data item descriptions (DID) must be listed, as applicable, on the Contract Data Requirements List (DD Form 1423) when this specification is applied on a contract, in order to obtain the data, except where DOD FAR 27.475-1 exempts the requirement for a DD Form 1423.

Reference Paragraph	DID Number	DID Title
MIL-M-85337 NAVY		
3.1.1	DI-M-2194	Manual, Technical: Quality Assurance Program Plan
3.3.3.1	DI-M-2195	Manual, Technical: Validation Plan

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3.3.3.6	DI-M-2196	Manual, Technical: Validation Certification
3.3.5	DI-M-2197	Manual, Technical: Evaluation Record
3.3.4.1	DI-M-2198	Manual, Technical: Verification Plan
3.3.4.2	DI-M-2199	Manual, Technical: Verification Planning Data Cards
3.3.4.3	DI-M-2200	Manual, Technical: Verification Sequence Control Chart
3.3.4.5	DI-M-2201	Manual, Technical: Verification Incorporation Certification

The above DIDs were those cleared as of the date of this specification. The current issue of DOD 5010.12-L, Acquisition Management Systems and Data Requirements Control List (AMSDL), must be researched to ensure that only current, cleared DIDs are cited on DD Form 1423.

6.4 Technical manuals acquisition. This specification must be listed on the Contract Data Requirements List (DD Form 1423) in order to acquire the technical manuals described by this specification, except where DOD FAR Supplement 27.475-1 exempts the requirement for DD Form 1423. For additional contractor guidance, see AMC-P 25-32, Guide for Preparation of Equipment Publications Contract Packages.

6.5 Definitions. The definition of terms below apply as they are used in this specification.

6.5.1 Best Commercial Practices (BCP). The selection and use of techniques and processes including military and definable civilian specifications and standards for the purpose of eliminating non-value added requirements. Mission capability, safety, and economics are all driving elements of the process.

6.5.2 Caution. An essential operating or maintenance procedure, practice, condition, statement, etc., which, if not strictly observed, could result in damage to, or destruction of equipment or loss of mission effectiveness.

6.5.3 Contracting activity. An element of an agency designated by the agency head and delegated broad authority regarding acquisition functions. (Federal Acquisition Regulation (FAR))

6.5.4 Critical safety item. A part, assembly, subassembly, installation procedure, or production process with one or more critical characteristics that, if not conforming to the design data or quality requirements, would result in an unsafe condition. Unsafe conditions relate to hazard severity

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categories I A-D and II A-C of MIL-STD-882, System Safety Program Requirements, and include conditions which could cause loss or serious damage to the end item or major components, loss of control, or serious injury to or death of personnel.

6.5.5 Depot. An activity for the receipt, classification, storage, accounting, issue, maintenance, procurement, manufacture, assembly, research, salvage, or disposal of material.

6.5.6 Depot maintenance. That maintenance performed on materiel requiring major overhaul or a complete rebuild of parts, assemblies, subassemblies, and end items, including the manufacture of parts, modifications, testings, and reclamation as required. Depot maintenance serves to support lower levels of maintenance by providing technical assistance and performing that maintenance beyond their own responsibility. Depot maintenance provides stocks of serviceable equipment by using more extensive facilities for the repair than are available in lower-level maintenance activities.

6.5.7 Depot Maintenance Work Requirement (DMWR). A maintenance serviceability standard for depot maintenance operations. It prescribes the scope of work to be performed on an item by organic depot maintenance facilities or contractors, types and kinds of materiel to be used, and quality of workmanship. Also, identifies repair methods; procedures and techniques; modification requirements; fits and tolerances; equipment performance parameters to be achieved; quality assurance discipline; and other essential factors to ensure that an acceptable and cost-effective product is obtained. (AR 750-1)

6.5.8 Federal item name. An item name that has been approved by the Defense Logistics Services Center (DLSC) and published in the Cataloging Handbook H6.

6.5.9 Flight safety parts (FSP). An FSP is defined as part, assembly, or installation procedure with one or more critical characteristics that, if not conforming to the design data or quality requirements, could result in serious injury or death of crew members/serious damage to the aircraft.

6.5.10 FSP program. Parts, assemblies, or installations identified under the FSP program require special handling during overhaul. Throughout the overhaul procedures, warnings appear emphasizing critical instructions to be followed. These warnings are identified as "Flight Safety Parts" warnings and inserted whenever and wherever necessary.

6.5.11 Nomenclature. The combination of the Federal Item Name (para 6.5.8) and modifiers preceded by a colon to provide further identification.

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6.5.12 Overhaul. The restoration of an item to a completely serviceable condition as prescribed by maintenance serviceability standards.

6.5.13 Rebuild. The restoration of an item to a standard as nearly as possible to its original condition in appearance, performance, and life expectancy.

6.5.14 Reliability centered maintenance. A means for developing an integrated maintenance program, from designer and producer, down to the ultimate user, which will result in safe, reliable, maintainable, and supportable equipment/commodities in the Army, capable of performing in support of required mission at least cost. RCM is a program that uses logic developed to ensure that the inherent design reliability and safety of an item is achieved while performing the least amount of maintenance, considered cost of the total life cycle of the material.

6.5.14 Repair. The restoration of an item to serviceable condition through correction of a specific failure or unserviceable condition.

6.5.16 Supply condition code "A". Serviceable (usable without qualification). New, used, repaired, or reconditioned materiel that is serviceable and usable to all customers without limitation or restriction. Includes materiel with more than 6 months shelf life remaining.

6.5.17 Warning. An operating or maintenance procedure, practice, condition, or other notification that, if not strictly observed, could result in injury or death to the personnel doing the task prescribed in the DMWR. This applies to the persons performing procedures in the DMWR and operation of equipment during the DMWR process.

6.5.18 Wear limits. The maximum acceptable loss or degradation of materiel beyond which the item must be reworked or replaced. This limit may or may not be equal to original manufacturing tolerances.

6.6 Subject terms (key word) listing. The following terms are to be used to identify this document during retrieval searches:

Mobilization
Modification
Overhaul
Preshop analysis
Rebuild

6.7 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extent of the changes.

MIL-M-63041F(TM)

DMWR 9-1005-318

DEPOT MAINTENANCE WORK REQUIREMENT

for

**GUN, AIR DEFENSE ARTILLERY: SELF-PROPELLED
20MM, M163A2
NSN 2350-01-169-2833 (EIC 3JL)
P/N 9360800 (19200)**

and

**GUN, AIR DEFENSE ARTILLERY: TOWED
20MM, M167A2
NSN 1005-01-177-9237 (EIC 3JO)
P/N 9378463 (19200)**

WARNING - This document contains export-controlled technical data whose export is restricted by the Arms Export Control Act (Title 22, U.S.C. Sec 2751 et seq) or Executive order 12470. Violation of these export laws are subject to severe criminal penalties.

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U.S. ARMY ARMAMENT, MUNITIONS AND
CHEMICAL COMMAND
Rock Island, IL 61299-6000
September 1992

FIGURE 1. Example of a DMWR cover (para 3.3.1, page 8).

MIL-M-63041F(TM)

WARNING

RADIATION HAZARD

This equipment contains the following radioactive tubes (list applicable tubes and equipment locations). Radiation may be present at unsealed or broken wave guide elements.

HIGH VOLTAGE

HIGH VOLTAGE is used in the operation of this equipment DEATH ON CONTACT may result if personnel fail to observe safety precautions. Learn the areas containing high voltage in each piece of equipment. Be careful not to contact high voltage connections when installing or operating this

COMPRESSED equipment. GASES OR AIR

GASES OR AIR UNDER PRESSURE 3,000 PSI AIR PRESSURE is used in the operation of this equipment. DEATH or severe injury may result if personnel fail to observe safety precautions.

FIRST AID

For first aid or artificial respiration, see FM 21-11, *First Aid for Soldiers*.

TOXIC MATERIALS

Contains additives which are poisonous and readily absorbed through the skin. Avoid prolonged contact with the skin.

FLIGHT SAFETY PARTS (FSP)

This DMWR contains procedures identifying critical characteristics of FSP. Critical characteristics may be identified as dimensions, tolerances, finishes materials assembly, or inspection procedures. FSP indicating a maximum allowable limit shall not be continued in use when limits have been exceeded. These parts must be replaced.

FIGURE 2. Example of types of warnings, Sheet 1 of 4, (para 3.3.1.3, page 9).

MIL-M-63041F (TM)

EXPLANATION OF SINGLE HAZARD SYMBOLS



The abstract symbol bug shows that a material may contain bacteria or viruses that present a danger to life or health.



The symbol of drops of a liquid onto a hand shows that the material will cause burns or irritation of human skin or tissue.



The rapidly expanding symbol shows that the material may explode if subjected to high temperatures, sources of ignition, or high pressure.



The symbol of a person wearing goggles shows that the material will injure the eyes.



The symbol of a flame shows that the material can ignite and burn personnel.



The symbol of a skull and crossbones shows that a material is poisonous or is a danger to life.



The symbol of three circular wedges shows that the material emits radioactive energy and can injure human tissue or organs.



The symbol of a human figure in a cloud shows that vapors of a material present a danger to life or health.

This Hazardous Materials Warnings section gives the complete warnings for hazardous material used in this manual. To help the user understand the potential hazards of these materials, a more detailed warning for these materials and an explanation of the hazard symbols follow.

**FIGURE 2. Example of types of warnings, Sheet 2 of 4,
(para 3.3.1.3. page 9).**

MIL-M-63041F (TM)

HAZARDOUS MATERIALS WARNINGS

Material/IconWarning

CHROMIC ACID, 0-C-303



Chromic acid, 0-C-303, has toxic fumes, can burn skin and eyes, and is a strong oxidizing agent. It may ignite combustible material or organic substances. When mixing with water, always add acid to water. Protection: chemical splashproof goggles, acidproof gloves, face shield, apron and footwear, and forced ventilation (or respirator). Keep acid off skin, eyes, and clothes. Wash exposed skin areas thoroughly.

DRY CLEANING SOLVENT



Dry cleaning solvent is flammable and toxic to eyes, skin, and respiratory tract. Skin/eye protection required. Avoid repeated/prolonged contact. Use only in well ventilated areas. Keep away from open flames or other sources of ignition.

INSULATING COMPOUND,
MIL-I-46058, TYPE UR

Insulating compound is flammable and toxic to eyes, skin, and respiratory tract. Skin/eye protection required. Avoid repeated/prolonged contact. Use only in well ventilated areas. Keep away from open flames or other sources of ignition.

ISOPROPYL ALCOHOL, TT-1735,
GRADE B (FSCM 81348)

Isopropyl alcohol is flammable and toxic to eyes, skin, and respiratory tract. Skin/eye protection required. Avoid repeated/prolonged contact. Use only in well ventilated areas. Keep away from open flames or other sources of ignition.

FIGURE 2. Example of types of warnings, Sheet 3 of 4, _____
(para 3.3.1.3. page 9).

MIL-M-63041F (TM)

- f. Insert plug connector kits wiring (7 and 8) and contacts/wiring (9, 10, and 11) through electrical cable clamp kits (5 or 6) and appropriate capsule cable entry tube. Maintain wire twists.



ISOPROPYL ALCOHOL

- g. Isopropyl alcohol (item 5, Appendix D) may be used as lubricant during insertion and removal of contacts. Apply isopropyl alcohol by brushing on capsule insert or by dipping contact or tool.
- h. Insert contacts into capsule insert by hand, if possible, or use applicable insertion tool.
- i. Pull on wire to make sure contacts are locked in place.

FIGURE 2. Example of types of warnings, Sheet 4 of 4,
(para 3.3.1.3. page 9).

MIL-M-63041F (TM)

DEPOT MAINTENANCE
WORK REQUIREMENT
9-4910-571

U.S. ARMY TANK-AUTOMOTIVE COMMAND
WARREN, MI 48397-5000
30 November 1992

DEPOT MAINTENANCE WORK REQUIREMENT
INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST
for
SIMPLIFIED TEST EQUIPMENT/INTERNAL COMBUSTION ENGINES-REPROGRAMMABLE
(STE/ICE-R)

NSN 4910-01-222-4589 (EIC B9C)
P/N 12259266 (19207)

REPORTING OF ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this DMWR. If you find any errors, or if you know of a way to improve this DMWR, let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this DMWR directly to: Commander, U.S. Army Tank-Automotive Command, ATTN: AMSTA-MB, Warren, MI 48397-5000. A reply will be furnished to you.

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FIGURE 3. Example of a title block page (para 3.3.2.1, page 9).

MIL-M-63041F (TM)

Table 1-8. TABULATED DATA

a. Electrical Characteristics.	
Power Rating (at 8,000 rpm)	650 amperes
Output Voltage (at 8,000 rpm)	28 v dc
Frequency (at 8,000 rpm)	267 Hz
Rotation	ccw viewed from drive end
b. Physical Characteristics.	
Maximum Height	10.19 in. (25.88 cm)*
	11.13 in. (28.88 cm)**
Maximum Length	17.41 in. (44.22 cm)*
	19.08 in. (48.41 cm)**
Weight	100 lb. (45.36 kg)
<hr/> *Generator (977-J175-2) **Generator (977-J327-3)	

FIGURE 4. Example of tabulated data (para 3.4.2c, page 12).

MIL-M-63041F(TM)**Table 2-1. Special Tools and Test Equipment List.**

Item No.	Part No. (CAGEC)	Fig. No.	Nomenclature	Use or application	Usage paragraph
1	933A751-2 (83843)	2-1	Armature Holding Fixture	Holds armature of generator for assembly and disassembly	4-8H(2)(a) 4-140(7)
2	933A752-4 (83843)	2-2	Spline Support	Supports splines of armature in fixture	4-8h(2)(b), 4-14o(1)
3	933C446-1 (83843)	2-3	Spline Box Wrench	Holds cluster gear for disassembly and assembly	4-8b(6), 4-14v(4), 4-23p(3)
4	064C745-1 (83848)	2-4	Spindle Seating Tool	Used to remove retaining ring from spindle cover	4-8b(1)
5	922B865-1 (83843)	2-5	Spanner Wrench, 0.5-inch square drive	Used to remove nut from end of armature	4-8h(2)(f)
6	953B879-1 (83848)	2-6	End Bell Guide	Used for assembly of end bell	4-14u(3), 4-23o(5)
7	964C746-1 (83848)	2-7	Seal Press Fixture	Used to install seal in end bell	4-14u(1)(b)
8	949F575-1 (83843)	2-8	Holding Fixture	Used to hold armature-rotor motor for assembly	4-14m(9)
9	968C534-1 (83848)	2-9	Length Gage	Checks armature installation	4-14m(13)
10	9016D45-1 (83843)	2-10	Pressure Test Fixture	Used for leakage test of generator	4-25c(1)(a)
11	9016D46-1 (83843)	2-11	Leak Detector	Check leakage of pump	4-25c(2)(a)

FIGURE 5. Example of special tools and test equipment list (para 3.5.1b, page 13).

MIL-M-63041F (TM)**Table 2-5. Mandatory Replacement Parts for Tail Rotor Gearbox.**

Item Number	Item Description	Part Number (CAGEC)	NSN	Qty
1	Bearing Spacer	7-113300148 (02731)	1615-01-170-1883	1
2	Bolt	MS21250-04-026 (96906)	5306-00-955-8206	6
3	Bottle Stopper	HS4479-28AR (02731)	8125-01-183-4469	1
4	Encased Seal	7-113400102 (02731)	5330-01-170-7449	1
5	Flat Washer	AN960-5161L (88044)	5310-00-167-0836	30
6	Gearbox Spacer	7-113400154 (02731)	5365-01-172-5013	1
7	Machine Screw	MS24694-S49 (96906)	5305-00-719-5401	6
8	Preformed Packing	M832481-246 (81349)	5339-00-165-1964	1
9	Recessed Washer	MS20002-C4 (96906)	5310-00-596-1766	6
10	Retaining Ring	MS27426-3168C (81348)	5365-00-986-0023	1
11	Self-Locking Nut	HS262-428 (02731)	5310-01-172-5134	6
12	Sleeve Spacer	NAS42HT8-12 (80205)	5365-00-599-2647	6

FIGURE 6. Example of a mandatory replacement parts list (para 3.5.2a, page 13).

MIL-M-63041F (TM)**SECTION II**

(1) ITEM NO..	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER GROUP 02030	(6) DESCRIPTION AND USABLE ON CODES (UOC) FIGURE 3-B	(7) QTY
1	PADZZ	5360-01-080-3642	95270	A885BE583	COVER	1
2	PADZZ	1005-01-079-8461	95270	A2528-20	SPACER, RING	V
3	PADZZ	5305-00-948-4038	95270	A2528-10	SHIM	V
4	PADZZ	5310-00-933-8119	95270	A2528-5	SHIM	V
5	PADZZ	5310-01-026-7835	95270	A2391	WASHER, SPRING T	1
6	PADZZ	5310-00-549-8307	95270	A23344-20SS	WASHER, FLAT	1
7	PADZZ	1005-01-079-8455	95270	A885CE596	HOLDER	1
8	PADZZ	1005-01-079-8456	95270	A885CE598	INSULATOR	1
9	PADZZ	1005-01-079-8457	95270	A885CE567	END BELL	1
10	PADZZ	5310-00-167-0812	95270	AN960C10L	WASHER, FLAT	2
11	PADZZ	5305-00-939-9189	95270	MS35275-264	SCREW, MACHINE	2
12	PADZZ	1005-01-079-8458	95270	AE566	STUD	2
13	PADZZ	1005-018079-8460	95270	B4446-31-50	BEARING, BALL	1
14	PADZZ	1005-01-079-8454	95270	A885CE590	ARMATURE	1
15	PADZZ	5940-01-080-2492	95270	AC696	TERMINAL, LUG	1
16	PADZZ	1005-01-079-8460	95270	B4568-31-50	BEARING, BALL	1
17	PADZZ	1005-01-079-8453	95270	A885CE591	FIELD YOKE	1
18	PADZZ	1005-01-079-8463	95270	AJ447-113.4	SLEEVEING, LEAD C	1
19	PADZZ	5330-00-851-8695	95270	MS9021-040	PACKING, PREFOR	1
20	PADZZ	9905-01-080-3601	95270	A885AE594	PLATE, IDENTIFIC	1
21	PADZZ	1005-01-080-3428	95270	A2981-1/2-1:8	SLEEVEING, LEAD C	1
22	PADZZ	1005-01-080-3653	95270	A885AE599	LEAD, ELECTRICAL	1
23	PADZZ	1005-01-080-6193	95270	A885CE564	END BELL	1
24	PADZZ	1005-01-079-8452	95270	AG722	SEAL, SHAFT	1
25	PADZZ	5365-00-409-1810	95270	A2991-20	SPACER, PLATE	V
26	PADZZ	5365-00-409-1809	95270	A2991-10	SHIM	V
27	PADZZ	5365-00-150-2949	95270	A2991-5	SHIM	V

End of Figure

FIGURE 7. Example of Appendix B, RPSTL Page (para 3.5.2c, page 14).

MIL-M-63041F(TM)

PRESHOP ANALYSIS CHECK LIST
FOR
P/N XXYZ4 (CAGEC)

Serial No. 123456A
NSN XXXX-XX-XXX-XXXX
MWO 11-XXXX-XXX-XX-1 and MWO 11-XXXX-XXX-XX-2 required

REASON FOR OVERHAUL/REPAIR _____

UNPACKING OF SECONDARY ITEMS REQUIRED? _____

Reviewed Tags? _____
Reviewed Forms? _____

Signature _____ Date _____

FIGURE 8. Example of a cover sheet for preshop analysis check list (para 3.6.2.2a, page 17).

MIL-M-63041F(TM)

Section II. PRESHOP ANALYSIS CHECK LIST

Table 3-1. Preshop Analysis Check list.

Nomenclature		NSN/PN			
Serial No.		Evaluator		Date	
Item No.	Evaluation Point	Recommended Maintenance Action	Eval. Init.		
1.	<p>With master switch ON check interior blackout light operation. Verify the following:</p> <p>a. Ramp up, door closed, and blackout light switch in the off position:</p> <p style="padding-left: 40px;">Nine white dome lights illuminate when front or rear dome light switch is in the on position.</p> <p>b. Rear door open:</p> <p style="padding-left: 40px;">Nine white dome lights are not illuminated and two blue blackout lights are illuminated.</p> <p>c. Rear door closed:</p> <p style="padding-left: 40px;">Nine white dome lights illuminate and two blue black-out lights are illuminated.</p> <p>d. Ramp lowered:</p> <p style="padding-left: 40px;">Nine white dome lights are not illuminated and two blue black-out lights are illuminated.</p> <p>e. Ramp closed:</p> <p style="padding-left: 40px;">Nine white dome lights are blackout illuminated and two blue lights are not illuminated.</p>				

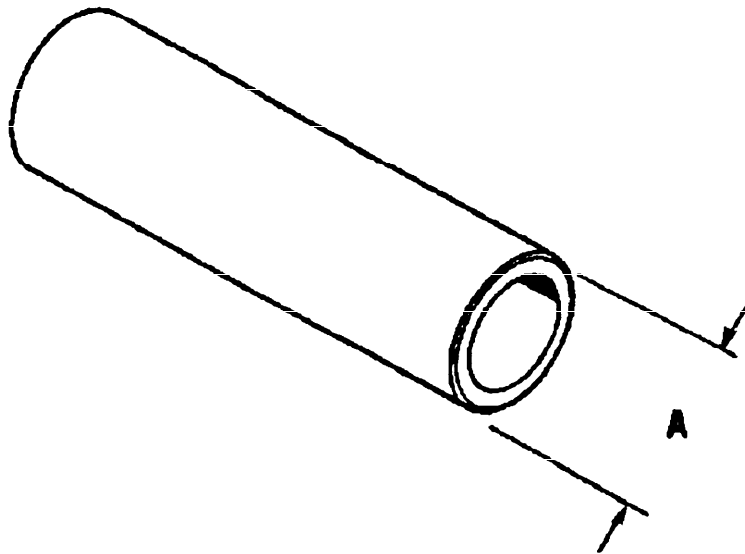
FIGURE 9. Example of a preshop analysis check list (para 3.6.2.2b, page 17).

MIL-M-63041F (TM)

OVERHAUL INSPECTION PROCEDURE: 1

ITEM: Shaft (8436966 (19204), Figure 3-3, Item 4)

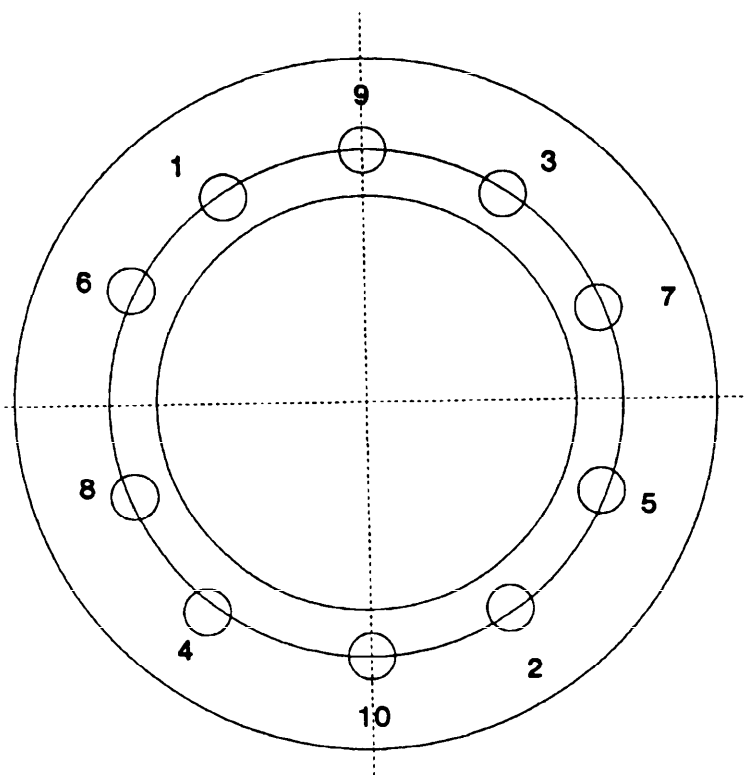
<u>NO.</u>	<u>REF</u> <u>LTR</u>	<u>CHARACTERISTIC</u>	<u>SPEC</u> <u>METHOD</u>	<u>STANDARDS</u>
1		Serviceability	Visual	No burrs, cracks, or deformation.
QA 2	A	Shaft, diameter	Measure diameter of shaft with micrometer (599-1-10)	0.999 inch (25.385mm) min. diameter
3		Cracks	Magnetic Particle Inspection	Part will be free of indications.



**FIGURE 10. Example of an overhaul inspection procedure OIP)
(para 3.7.2e, page 19).**

MIL-M-63041F(TM)

SCREW TORQUING SEQUENCE: WITH SCREWS NUMBERED 1 THROUGH 10 AS SHOWN (STARTING POINT OPTIONAL) TORQUE 1 and 2, 3 and 4, 5 and 6, 7 and 8, 9 and 10.



Full torque on screws is to be achieved in increasing increments of 10 pound-inches per screw per sequence specified above. Do not apply full torque immediately to any screw.

FIGURE 11. Example of a screw torquing sequence (para 3.7.2i, page 20).

MIL-M-63041F (TM)**APPENDIX A****REFERENCES**

A-1. **Scope.** This appendix contains a list of all the publications referenced in this DMWR.

A-2. **Regulations.**

AR 310-25	Dictionary of U.S. Army Terms
AR 702-10	Post Production Testing of Army Material

A-3. **DA Pamphlets.**

DA PAM 25-30	Consolidated Index of Publications and Blank Forms
DA PAM 750-10	U.S. Army Equipment Index of Modification Work Orders

A-4. **Forms.**

DA FORM 2028	Recommended Changes to DA Publications
DD Form 1693	Engineering Change Proposal
SF 368	Produce Quality Deficiency Report

A-5. **Specifications.**

MIL-P-116	Methods of Preservation
MIL-P-514	Plate, Identification, Instruction, and Marking, Blank

A-6. **Standards.**

MIL-STD-109	Quality Assurance Terms and Definitions
MIL-STD-120	Gage Inspections

A-7. **Technical Manuals.**

TM 9-214	Inspection, Care, and Maintenance of Antifriction Bearings
TM 9-2920-232-34&P	Starter, Engine, Electric Assembly, Delco-Remy-GMC

A-1

FIGURE 12. Example of Appendix A, references (para 3.10.1, page 24).

MIL-M-63041F (TM)**APPENDIX C****EXPENDABLE AND DURABLE ITEMS**

Section I. INTRODUCTION**C-1. Scope.**

a. This appendix lists expendable supplies and materials required to overhaul the generator assembly. The NSN given will provide the overhauling activity with reasonable quantities to requisition. Other quantities are available under different NSNs.

b. Equivalent expendable supplies and materials may be used, provided they conform with the listed specification.

C-2. Explanation of Columns.

a. Column (1) - Item No. This number is assigned to each entry in the listing and referenced in the narrative instructions to identify the material; e.g., "Use sealing compound (item 17, Appx C).

b. Column (2) - National Stock Number. This is the NSN assigned to the item. Use it to request or requisition the item.

c. Column (3) - Description. Indicates the federal item name, and if required, a description to identify the item. The 5-digit parenthetical numbers indicate the Commercial and Government Entity Codes (CAGEC) and part number.

d. Column (4) - Unit of Issue (U/I). Indicates the code which shows the smallest quantity of an item that can be requisitioned and issued.

C-1

FIGURE 13. Example of an expendable and durable items list introduction (para 3.10.3a, page 25).

MIL-M-63041F (TM)**Section II. EXPENDABLE AND DURABLE ITEM LIST**

(1) ITEM NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION	(4) U/I
1	8040-00-159-5021	Adhesive (98911) A701	PT
2	9150-00-340-1590	Assembly, Fluid (77902) ACRYLOID HF286	OZ
3	7920-00-514-2417	Brushes, Acid Swab (91349) H-B-643	EA
4	6830-00-247-0619	Carbon Dioxide, (dry ice) (81348) BB-C-104	LB
5	6850-00-142-9247	Cleaning Compound, Solvent (81349) MIL-C-81302	OZ
6	5350-00-221-0872	Cloth, Abrasive (81348) P-C-458	SH
7	6850-00-185-0423	Compound, Leak Detection, Type 1 (81349) MIL-L-25567D	GL
8	4925-01-241-5013	Compound, Locking, Type 1, Grade L, Red (81348) MIL-S-46163	CC
9	9150-00-478-0055	Grease, Aircraft (81349) MIL-G-25537	LB
10	9150-00-754-2595	Grease, Molybdenum Disulfide (54527) MIL-G-21164	OZ
11	5870-01-136-1353	Insulation Sleeving, Natural (81349) MIL-I-22129	LB
12	5970-01-136-1354	Insulation Sleeving, Yellow (81349) MIL-I-22129	LB
C-2			

FIGURE 14. Example of expendable and durable items list
(para 3.10.3b, page 25).

MIL-M-63041F(TM)

DMWR 9-1005-318

FOR THE COMMANDER:

LARRY D. BACHELOR
Colonel, GS
Chief of Staff

OFFICIAL:



R. D. HUSSON

Director of Maintenance

DISTRIBUTION:

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RED RIVER ARMY DEPOT
ATTN: SDSRR-ME
TEXARKANA, TX 75507-5000

COMMANDER
U.S. ARMY ARMAMENT, MUNITIONS
AND CHEMICAL COMMAND
ATTN: AMSMC-MAE-WA 2 CYS
 AMSMC-MAW-AD 2 CYS
 AMSMC-QAU 2 CYS
 AMSMC-MAS-B 15 CYS
 AMSMC-MAF-AP 2 CYS
ROCK ISLAND, IL 61299-6000

EXECUTIVE DIRECTOR 2 CYS
USAMC LOGISTICS SUPPORT
ACTIVITY
ATTN: AMXLS-AP
REDSTONE ARSENAL, AL 35898-7466

FIGURE 15. Example of an authentication page
(para 3.14, page 26).

MIL-M-63041F (TM)**Reliability, Availability, and Maintainability (RAM)**

Requirements for XYZ System

System	MTBF	MTR	Ao
Track	500 mi	30 min	0.89
Engine	170 hr	43 min	0.92
Hull	1,000 mi	60 min	0.86
Radio	460 hr	10 min	0.95
Night Sight	145 hr	10 min	0.88
Gun Tube	10,000 rds	45 min	0.95

Maintenance Ratio for XYZ System 0.35

<u>Unit</u>	<u>DS</u>	<u>GS</u>	<u>Depot</u>
0.10	0.05	0.08	0.07

**FIGURE 16. Example of an RAM table (sheet 1 of 2)
(para 6.1.1, page 28).**

MIL-M-63041F(TM)

NARRATIVE MAINTAINABILITY TABLE
for XYZ System

Maintainability. When maintenance procedures shown in the technical manuals are followed, the mature maintainability data is as follows:

- a. Mean Operator Preventive Maintenance Time shall not exceed 0.25 man-hours per mission. This time shall not be included in organizational preventive maintenance time.
- b. Maximum Operator Corrective Maintenance Time shall not exceed 1.00 man-hours per mission without being classified as a mission failure.
- c. The ratio of total corrective and organizational preventive maintenance man-hours to operating hours shall not exceed 0.10.
- d. The ratio of total organizational preventive maintenance man-hours to total operating hours shall not exceed 0.04.
- e. The ratio of total corrective maintenance man-hours to operating hours shall not exceed 0.06.
- f. Mean man-hours to perform a corrective maintenance action shall not exceed 2.5.
- g. The Mean Time Between Corrective Maintenance Actions shall not be less than 150 operating hours.
- h. The engine shall have an 80 percent probability of not requiring replacement in 20,000 miles of operation.
- i. The gun tube shall have an 89 percent probability of not requiring replacement in 50,000 rounds of operation.
- j. The track shall have a 92 percent probability of not requiring replacement in 5,450 miles of operation.

**FIGURE 16. Example of an RAM Table (sheet 2 of 2)
(para 6.1.1, page 28).**

MIL-M-63041F (TM)**APPENDIX A****CONTENT-FORMAT SELECTION SUMMARY (DMWR)****10. SCOPE.**

10.1 Scope. This appendix is to be used by the contracting activity to specify which optional requirements of this specification are to be contractually imposed in the acquisition of a DMWR. This appendix is a mandatory part of this specification, and the information contained herein is intended for compliance.

10.2 Application. This appendix is intended to be copied or reproduced, completed, signed, and become part of the DMWR Contract Document Summary List for solicitation and contract application. A separate content-format selection summary (CFSS) sheet(s) is required for each acquisition of a specific DMWR.

10.3 Explanation of columns - Content-Format Selection Summary.

- a. Column (1), (Item No.) - self explanatory.
- b. Column (2), (Requirement) - Identifies the requirement.
- c. Column (3), (Applicable Paragraph Number) - identifies the paragraph where the requirement in column (2) is stated.
- d. Column (4), subcolumn (a), (Requirement Selected - "yes") - is marked with an "X" if the requirement in column (2) is required.
- e. Column (4), subcolumn (b), (Requirement Selected - "no") - is marked with an "X" if the requirement in column (2) is not required.
- f. Column (4), subcolumn (c), (Explanation/Remarks) - is used when a "yes" or a "no" alone is inadequate to completely identify the requirement. If necessary, additional explanation/information may be provided on a separate sheet(s) of paper and attached to this summary list when completed.

10.4 Tailoring requirements. Each requirement listed on the CFSS must be marked "yes" or "no," and an explanation or remarks should be added, as necessary, to ensure that selected requirements are adequately identified. Additional information may be put on plain paper and attached to the summary. Reference to the contract statement of work, other contract documents, or attachments containing applicable information may be made in the explanation/remarks column.

11. APPLICABLE DOCUMENTS. This section is not applicable to this appendix.

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APPENDIX A
CONTENT/FORMAT SELECTION SUMMARY
(DMWR)

Equipment name/nomenclature _____

(1)	(2)	(3)	(4)		
			(a)	(b)	(c)
Item No.	Requirement	Applicable Paragraph No.	Requirement Selected (yes) (no)		Explanation/Remarks
1	Style and Format	3.1.1			
2	Reading Grade Level	3.1.3			
3	Line Drawings	3.1.7			
4	Engineering Drawings	3.1.7			
5	Preshop Analysis Requirement	3.6.1			
6	Component Check list	3.6.1e			
7	Narrative Format	3.6.2.1			
8	Check list Format	3.6.2.2			
9	General Safety Precautions	3.7.1b			
10	General Inspection Procedures	3.7.1c			
11	Overhaul Operation Flowchart	3.7.1d			
12	OIP Tables	3.7.2e			
13	Inspection Tools and Equipment	3.8.c			

MIL-M-63041F(TM)**APPENDIX A - continued****CONTENT/FORMAT SELECTION SUMMARY
(DMWR)**

Equipment name/nomenclature _____

(1)	(2)	(3)	(4)		
Item No.	Requirement	Applicable Paragraph No.	Requirement		Explanation/Remarks
			(yes)	(no)	
14	Certifications	3.8d			
15	First Article	3.8g			
16	RPSTL Appendix	3.10.2			
17	Mobilization	3.10.4			
18	Other Appendixes	3.11			
19	Glossary	3.12			

NOTE: The above selected requirements, identified by an "X" in the "Requirement Selected" column 4, subcolumns 4(a) or 4(b), or the explanation provided in the Remarks subcolumn 4(c) are a mandatory part of this contract.

Completed

by: _____

(authorized signature)

Publications

Activity: _____

Date _____

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APPENDIX B

SINGLE HAZARD ICONS PRESENTATION

10 SCOPE

10.1 Scope. This appendix lists single hazard icons which may be used in technical manuals (TM) warnings either singly or in combination. This list is intended to include all approved single hazard icons; additional icons and definitions will be added, as applicable, when this document is amended or revised. This appendix is a mandatory part of the standard. The information contained herein is intended for compliance.

20 APPLICABLE DOCUMENTS.

This section is not applicable to this appendix.

30 DEFINITIONS

30.1 Icon. Pictorial representation; visual image to give immediate recognition of a hazard.

40 GENERAL REQUIREMENTS

40.1 Usage of icons. Icons shall be used with signal word(s). The signal word(s) shall be placed to the right of or below the icon(s) as shown in figure B-1. The icon(s) shall precede applicable text in TMs.

40.2 Development of icons.

40.2.1 Icons shall be enclosed in a square or rectangular box. The signal word(s) for single icons shall appear outside the box at the upper right-hand side. Type size for signal word(s) shall be no smaller than 10 point; 12 point bold face type is recommended. (See figure B-1 for presentation format for icon usage.)

40.2.2 As specified by the contracting activity, icons shall or shall not be prepared for electronic presentation (digitizing) per Government-provided requirements.

50 DETAILED REQUIREMENTS

50.1 Icons and definitions. The following icons shall be used in warnings for all TMs governed by this standard when applicable. Unless requirement is specifically excluded by the contracting activity, the signal words and definitions shall be used as listed herein.

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ICON

SIGNAL WORD - DEFINITION

NOTE: Signal word appears in all capital letters below, preceding the definition.

1



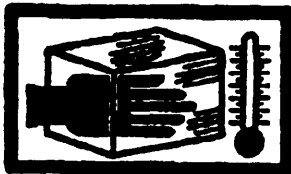
BIOLOGICAL - abstract symbol bug shows that a material may contain bacteria or viruses that present a danger to life or health.

2



CHEMICAL - drops of liquid on hand shows that the material will cause burns or irritation to human skin or tissue.

3



CRYOGENIC - hand in a block of ice shows that the material is extremely cold and can injure human skin or tissue.

4



EAR PROTECTION - headphones over ears shows that noise level will harm ears.

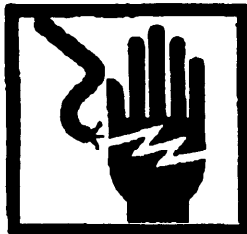
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5



ELECTRICAL - electrical wire to arm with electricity symbol running through human body shows that shock hazard is present.

6



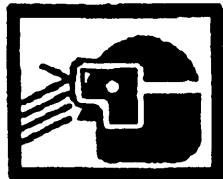
ELECTRICAL - electrical wire to hand with electricity symbol running through hand shows that shock hazard is present.

7



EXPLOSION - rapidly expanding symbol shows that the material may explode if subjected to high temperatures, sources of ignition or high pressure.

8



EYE PROTECTION - person with goggles shows that the material will injure the eyes.

9



FALLING PARTS - arrow bouncing off human shoulder and head shows that falling parts present a danger to life or limb.

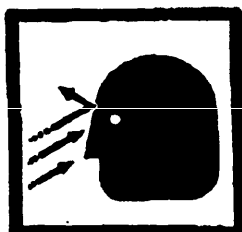
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10



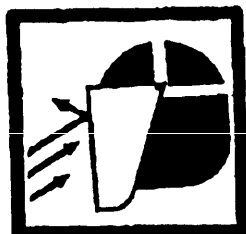
FIRE - flame shows that a material may ignite and cause burns.

11



FLYING PARTICLES - arrows bouncing off face shows that particles flying through the air will harm face.

12



FLYING PARTICLES - arrows bouncing off face with face shield shows that particles flying through the air will harm face.

13



HEAVY PARTS - hand with heavy object on top shows that heavy parts can crush and harm.

14



HEAVY PARTS - foot with heavy object on top shows that heavy parts can crush and harm.

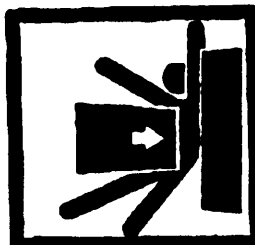
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15



HEAVY PARTS - heavy object on human figure shows that heavy parts present a danger to life or limb.

16



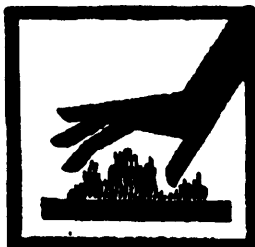
HEAVY PARTS - heavy object pinning human figure against wall shows that heavy, moving parts present a danger to life or limb.

17



HELMET PROTECTION - arrow bouncing off head with helmet shows that falling parts present a danger.

18



HOT AREA - hand over object radiating heat shows that part is hot and can burn.

19



LASER LIGHT - laser light hazard symbol indicates extreme danger for eyes from laser beams and reflections.

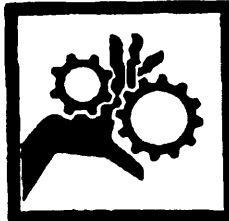
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20



MOVING PARTS - human figure with an arm caught between gears shows that the moving parts of the equipment present a danger to life or limb.

21



MOVING PARTS - hand with fingers caught between gears shows that the moving parts of the equipment present a danger to life or limb.

22



MOVING PARTS - hand with fingers caught between rollers shows that the moving parts of the equipment present a danger to life or limb.

23



POISON - skull and crossbones shows that a material is poisonous or is a danger to life.

24



RADIATION - three circular wedges shows that the material emits radioactive energy and can injure human tissue.

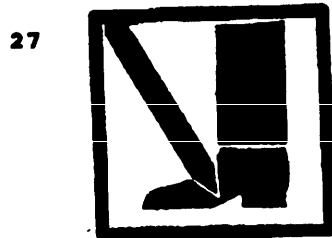
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SHARP OBJECT - pointed object in hand shows that sharp object presents a danger to limb.



SHARP OBJECT - pointed object in hand shows that sharp object presents a danger to limb.



SHARP OBJECT - pointed object in foot shows that sharp object presents a danger to limb.



SLICK FLOOR - wavy line on floor with legs prone shows that slick floor presents a danger for falling.



VAPOR - human figure in a cloud shows that material vapors present a danger to life or health.

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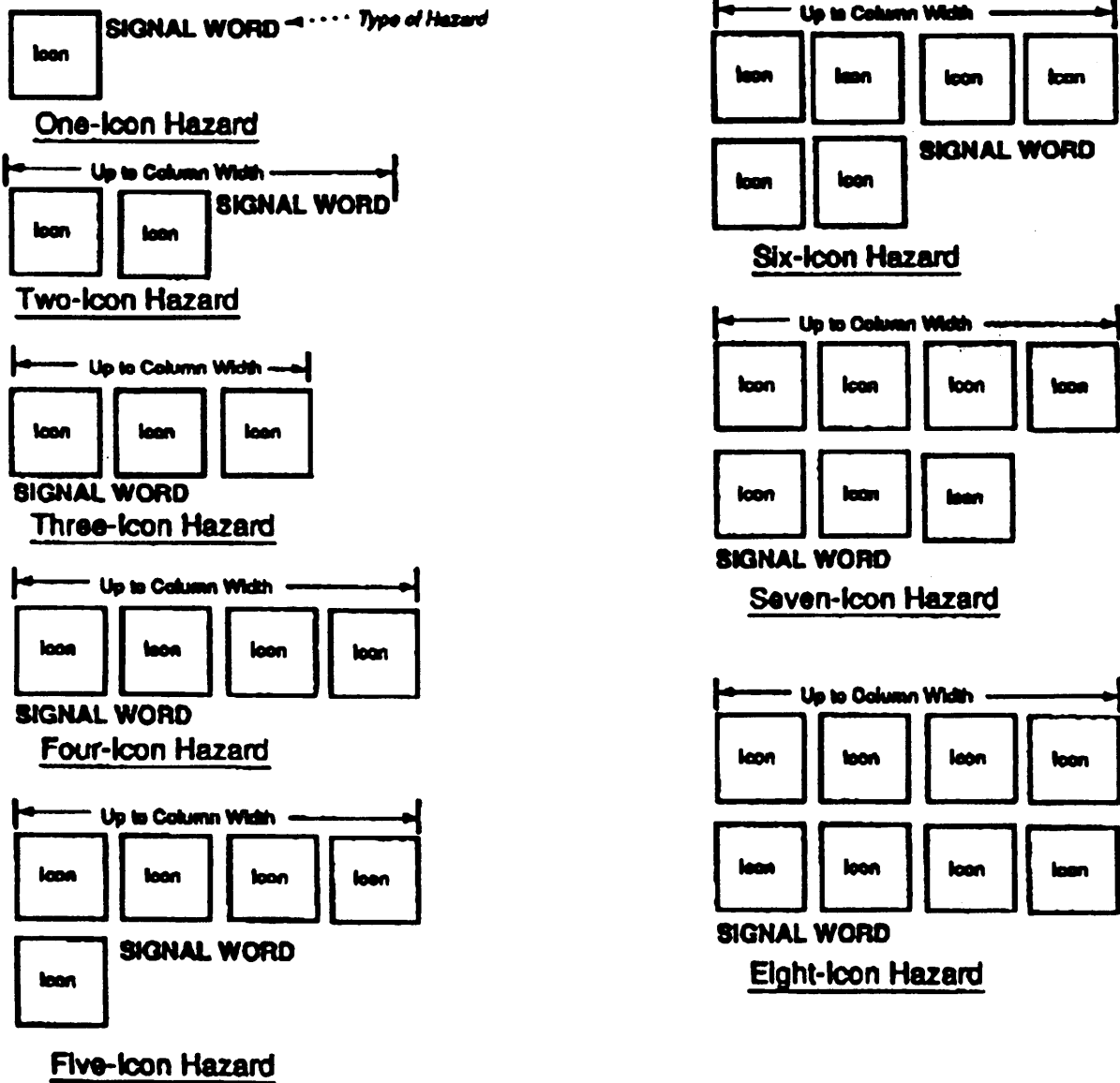


FIGURE B-1. Multiple icon usage and presentation format (reference Appendix B, paras 40.1, 40.2.1).

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MIL-M-63041F(TM)

CUSTODIAN:

PREPARING ACTIVITY

ARMY-TM

ARMY-TM

REVIEW ACTIVITY:

PROJECT NUMBER TMSS A276

ARMY: AL, AR, AV, AT, CR, ME, MI

Director
USAMC Logistics Support Activity
ATTN: AMXLS-AP
Redstone Arsenal, AL 35898-7466

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I RECOMMEND A CHANGE	1.DOCUMENT NUMBER MIL-M-63041F(TM)	2.DOCUMENT DATE (YYMMDD) 930921
3.DOCUMENT TITLE Manuals, Technical: Depot Maintenance Work Requirements		
4.NATURE OF CHANGE(Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)		
5.REASON FOR RECOMMENDATION		
6.SUBMITTER		
a. NAME (Last, First, Middle Initial)	b. ORGANIZATION	
c. ADDRESS (Include Zip Code)	d. TELEPHONE (Include Area Code) (1) Commercial (2) AUTOVON(if applicable)	7. DATE SUBMITTED (YYMMDD)
8.PREPARING ACTIVITY		
a. NAME USAMC Logistics Support Activity	b. TELEPHONE (Include Area Code) (1) Commercial (205) 955-9858	(2) AUTOVON 645-9858
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