

TECHNICAL MANUAL
DIRECT SUPPORT AND GENERAL SUPPORT
MAINTENANCE MANUAL

FOR

2.75-INCH LOW SPIN,
FOLDING FIN AIRCRAFT ROCKETS,

2.75-INCH SPIN STABILIZED,

WRAP AROUND FIN AIRCRAFT ROCKETS,

66MM LIGHT ANTITANK WEAPON SYSTEMS,

3.5-INCH ROCKETS AND

M3A2E1 ROCKET MOTOR (JATO)

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HEADQUARTERS, DEPARTMENT OF THE ARMY

OCTOBER 1994

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GROUND ALL AMMUNITION CONTAINING EXPLOSIVES.

FUZE CAVITY LINER MUST BE IN PLACE PRIOR TO CLEANING FUZE WELL OR THREADS WITH SMALL STAINLESS STEEL BRUSH.

ALL UNPACKAGED (BARE) 2.75-INCH ROCKETS/ROCKET MOTORS DROPPED FROM ANY HEIGHT WILL BE TURNED IN AS UNSERVICEABLE AMMUNITION.

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HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, 17 August 2001

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DISTRIBUTION: To be distributed in accordance with the initial distribution number (IDN) 400530 requirements for TM 9-1340-222-34.

Technical Manual
No. 9-1340-222-34

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, DC, 17 October 1994

**DIRECT SUPPORT AND GENERAL
SUPPORT MAINTENANCE MANUAL
FOR
2.75-INCH LOW SPIN, FOLDING FIN AIRCRAFT ROCKETS;
2.75-INCH SPIN STABILIZED, WRAP AROUND FIN AIRCRAFT ROCKETS;
66MM LIGHT ANTITANK WEAPON SYSTEMS;
3.5-INCH ROCKETS AND M3A2E1 ROCKET MOTOR (JATO)**

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. You may mail, e-mail, or FAX your response. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms) or DA Form 2028-2 located in the back of this manual direct to: Commander, U.S. Army TACOM, Armament Research, Development and Engineering Center, ATTN: AMSTA-AR-WEL-S, Picatinny Arsenal, NJ 07806-5000. E-mail address is LSB@PICA.ARMY.MIL. FAX number is Commercial (973) 724-4633, DSN 880-4633. A reply will be furnished to you.

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*This manual supersedes TM 9-1340-222-34 dated 21 August 1974, including all changes.

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CHAPTER 1 INTRODUCTION

Section I. GENERAL

1-1. Scope

a. This is one of a series of technical manuals on maintenance of 2.75-inch low spin, folding fin aircraft rockets (LSFFAR), 66mm light antitank weapon system (LAW), 3.5-inch rockets and rocket motor M3A2E1 (JATO). Information in this manual is limited to the responsibilities of direct and general support maintenance personnel.

b. Operating instructions and operator-level maintenance are covered in the weapon manuals listed in appendix A. Organizational level maintenance is covered in TM 9-1340-222-20 which also contains the maintenance allocation chart (MAC). Authorized procedures for each level of maintenance, including direct and general support, are specified in the MAC. Additional information is given in TM 9-1055-460-13&P, Operator's Aviation Unit and Intermediate Maintenance Manual Including Repair Parts and Special Tools List for 2.75-Inch Rocket Launchers, and TM 9-1090-207-13&P, Operator's Aviation Unit and Intermediate Maintenance Manual with Repair Parts and Special Tools List (Including Depot Maintenance) for

Rocket Management Subsystems Inventory-Deployment, XM138.

c. Instructions for conversion of expended 66mm launchers M72A1 to launchers M190 are contained in TM 9-1340-224-12.

d. Destruction procedures are contained in TM 43-0002-33, Destruction of Improved Conventional Ammunition (ICM) to Prevent Enemy Use.

1-2. Forms, Records, and Reports

a. Maintenance forms, records, and reports which are to be used by maintenance personnel at all maintenance levels are listed in and prescribed by DA PAM 738-750.

b. A record should be kept of each inspection job undertaken on an ammunition condition report (ACR).

c. Ammunition data cards will be annotated to reflect major maintenance operations in accordance with TM 9-1300-250.

Section II. DESCRIPTION AND DATA

1-3. General

Description and data on rockets, rocket motors, and rocket weapon systems are contained in TM 9-

1340-222-20. Refer to the applicable operator and organizational maintenance manuals for detailed operating instructions.

Section III. SAFETY, CARE, AND HANDLING

1-4. General

General information on safety, care, and handling is contained in AR 385-64 and DA PAM 385-64. Specific information regarding safety, care, and handling is contained in the applicable operator's and organizational maintenance manuals.

a. Point rockets delivered to the firing line in the direction that would cause the least damage in case of accidental ignition. Store rockets with warhead pointed nose down, if practical.

b. Some LAW systems contain a small amount of radioactive material in the front sight. These systems are identified by the words LIMITED LIGHT SIGHT printed on the launcher and packing containers. If these launchers are returned with broken front sight, remove sight, seal in plastic bag and segregate for disposition by authorized personnel in accordance with AR 385-11.

1-5. Safety

Observe precautions generally applicable to ammunition and comply with all regulations and local standing operating procedures. Safety rules peculiar to rockets, rocket motors, and rocket weapon systems are discussed below.

c. Do not extend 66mm LAW launcher to open position during inspection.

d. Rocket motors and warheads may include electrical circuits which are susceptible to radio frequency energies and static electricity. Rockets in electrically operated launchers may be susceptible to initiation by electromagnetic radiation.

e. Conduct inspection on electrically initiated rocket motors in approved areas complying with HERO (hazard of electromagnetic radiation to ordnance) requirements specified in TM 9-1340-222-20.

f. Disassembly of explosive components without specific authorization is strictly prohibited.

1-6. Care and Handling

a. General.

(1) Explosive materials must be handled with appropriate care at all times.

(2) Do not drop, drag, throw, tumble, or otherwise strike boxes containing explosive components.

(3) Do not subject rockets or warheads to excessive moisture or prolonged exposure to direct rays of the sun.

(4) Keep components in original packaging until immediately prior to assembly or preparation for use.

(5) Keep empty shipping containers from becoming broken or damaged.

(6) Observe storage procedures outlined in TM 9-1340-222-20.

b. 2.75-Inch Rockets Only.

(1) Reject crated rockets or rocket motors dropped 5 feet or more on hard surface.

(2) Reject uncrated rockets or rocket motors dropped from any height.

(3) Reject fuze-warhead combinations, crated and uncrated, if dropped 5 feet or more on hard surface.

(4) Contact ammunition supply personnel for disposition of rejected rockets.

(5) The MK66 rocket motor will not be continuously stored above 140°F for more than 24 hours.

(6) Electrical tests shall not be performed with rockets in launcher. (This will prevent inadvertent rocket firing.) The contact arm of the launcher may provide direct electrical path to motor ignition circuit if power source is accidentally applied to contact arm when the launcher is loaded/unloaded. All other possible sources of inadvertent electrical power shall be kept away from the launcher. Ensure electrical equipment, even if turned off and unplugged, is not in the vicinity of a loaded launcher.

(7) For Mod 1 and Mod 3 Motors: Avoid contact of any kind, especially metal objects with the contact band of MK66 rocket motors when loading rockets into launchers on aircraft in a HERO environment. This, along with established procedures and restrictions on the use of the Mod 1 motor, must be followed to minimize exposure to potential HERO environment.

CHAPTER 2 TOOLS AND EQUIPMENT

2-1. General

Tools, equipment, and repair parts, in addition to those available to the using organization, are supplied to direct support and general support maintenance units as required for maintaining rockets, rocket motors, and rocket weapon systems.

2-2. Tools and Equipment

a Tools and equipment generally applicable to these rockets are authorized for issue buy tables of

allowances (TA) and tables of organization and equipment (TOE).

b. Unless otherwise indicated, local fabrication of tools and equipment is not authorized.

2-3. Tools and Equipment

Packing Materials, Accessories, and Tools required for direct support and general support maintenance are listed in appendix B.

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CHAPTER 3 INSPECTION REQUIREMENTS

Section I. GENERAL

3-1. Purpose of Inspection

a. Inspection criteria contained in this publication are provided to assure that all maintenance performed will restore the item(s) to an acceptable quality level.

b. A complete plan of all maintenance work is required. Prepare standing operating procedures (SOP) that contain detailed production techniques, standards, and controls necessary to produce a quality product. See TM 9-1300-250 for planning procedures and SOP preparation.

3-2. Ammunition Surveillance Program

Surveillance includes those actions necessary to evaluate the current degree of serviceability of ammunition. See AR 702-6, AR 740-1, AR 742-9, and AR 742-1 for policy, responsibilities and procedures applicable to the Ammunition Surveillance and Quality Evaluation Program.

3-3. Inspections

a. Serviceability

(1) Ammunition items will be inspected by a quality assurance specialist (ammunition) or MOS 55x40 personnel under the guidance of a quality assurance specialist (ammunition) to determine serviceability or unserviceability according to SB 742-1 and other pertinent SB's.

(2) Required maintenance for unserviceable materiel will be indicated on the inspection report.

b. *Premaintenance.* At the unpack operation, prior to rework, ammunition items will be screened 100 percent. DS and/or GS personnel will perform premaintenance screening, which will include the following:

(1) All items with critical nonfunctional defects will be separated from the quantity to be maintained and disposed of as directed in the SOP

(2) All items with defects, as listed in table 3-1, will be corrected during maintenance.

(3) Other evidence of poor workmanship or defects that could cause accelerated deterioration or adversely affect the function of the items will be corrected

c. *In-Process.*

(1) In-process inspections are an integral part of the maintenance procedures to assure that previous work is adequate and acceptable prior to proceeding with further operations.

(2) Since these inspections are part of the maintenance procedures contained in chapter 4, they will not be specifically covered in this chapter

d. *Final Acceptance*

(1) Ammunition items will be inspected after maintenance has been completed. The final acceptance inspection will determine whether or not maintenance accomplished has returned unserviceable munitions to an acceptable condition.

(2) Quality assurance specialist (ammunition) or MOS 55x40 personnel under the guidance of a quality assurance specialist (ammunition) will perform this inspection prior to returning the material to its storage area.

3-4. Inspection Methods

a. *Visual Inspection.* Careful observation of item, noting listed defects and any other abnormalities.

b. *Manual Inspection.* Movement by hand of area of item to determine if listed defect(s) exists (e.g., incorrect loose part).

c. *Gage inspection.* Checking an item with a measuring instrument or a standard mating piece to determine if its size is acceptable in certain critical areas. Defects are derived from either predetermined standards or on a "go" – "no go" basis (e.g., a ring gage).

3-5. Extent of Inspections

a. *Sealed Packages.* During serviceability inspections, items packed in barrier bags, jungle wrap or sealed cans should not be opened for inspection unless sealed package has been opened or there is a specific reason to suspect damage. Therefore, sealed packages will usually be subjected only to visual inspection.

b. *Processed Items.* All processed items will be subjected to in-process inspections and a final acceptance inspection.

Section II. CLASSIFICATION OF MATERIAL DEFECTS

3-6. General

Ammunition and packaging defects, listed in table 3-1, provide the method of inspection for categories of defects required during maintenance. Categories of defects are defined in SB 742-1. An acceptable quality level (AQL) established for each defect is provided in table 3-1 for evaluation during final acceptance inspection.

3-7. In-Process and Final Inspection

a. All items (ammunition and packing materials) processed will be subject to in-process and final inspection to assure acceptability

b. In-process and final inspections will be included as an integral part of all maintenance procedures.

3-8. Disposition of Lots

a. Each lot that meets the acceptable quality level (AQL) in table 3-1 is acceptable for issue and use. Critical defective(s) will be removed from otherwise acceptable lots and destroyed.

b. Lots found with defects will be inspected 100 percent and reworked within the capability of the unit, as specified in the maintenance allocation chart (MAC). If required maintenance is beyond the capability of the unit, request disposition instructions through ammunition maintenance channels.

c. Any maintenance operation which results in a change to the information on the lot ammunition data card requires the addition of an alphabetic suffix to the lot number. Lot suffixes for each lot or operation will be obtained through ammunition maintenance channels.

Table 3-1. Classification of Material Defects
GENERAL PACKAGING

Component	Category	Defect	Method of inspection	Reference	AQL
Outer container	Major	Damaged, weather, or rotted to extent contents are not protected or container is no longer structurally sound.	Visual	TM 9-1340-222-20	0.40
	Major	Container cap or closure insecure to extent contents are not protected.	Visual/Manual	TM 9-1340-222-20	0.40
	Major	Contents loose to extent item may be damaged in handling.	Visual/Manual	TM 9-1340-222-20	0.40
	Minor	Hardware or banding loose, missing, broken, or ineffective.	Visual/Manual	TM 9-1340-222-20	0.65
	Minor	Handle or cleat missing or broken.	Visual	TM 9-1340-222-20	0.65
Inner container	Major	Damaged to extent contents are not protected or cannot be readily removed	Visual/Manual	TM 9-1340-222-20	0.40
	Major	Barrier bag improperly sealed, torn, cut, or otherwise penetrated	Visual	para 4-7c	0.40
	Minor	Wet (except metal), rusted, moldy, or mildewed	Visual	TM9-1340-222-20	0.65
	Minor	Barrier bag edges delaminating but not yet unsealed	Visual	para 4-7c	0.65
PALLETS, WOODEN BOXES AND CRATES					
Hardware	Minor	Inoperative or loose	Visual/Manual	TM 9-1340-222-20	0.65
	Minor	Nails, screws, and fasteners which can be replaced or properly sealed	Visual	TM 9-1340-222-20	0.65

Table 3-1. Classification of Material Defects - Continued

PALLETS, WOODEN BOXES AND CRATES - Continued

Component	Category	Defect	Method of inspection	Reference	AQL
Ends	Major	Damage which requires disassembly of box Broken or missing cleats and handles	Visual	TM 9-1340-222-20	0.40
	Minor		Visual	TM 9-1340-222-20	0.65
Wood	Major	Splits closer than 1 inch to edge of board or adjoining split or over 1/8 inch wide	Visual	TM 9-1340-222-20	0.40
	Major	Warping which prevents insertion or removal of rounds and/or sealing of box	Visual/Manual	TM 9-1340-222-20	0.40
	Major	Excessive mildew and mold which cannot be removed and which render markings illegible	Visual	TM 9-1340-222-20	0.40
	Major	Holes or loose knots which exceed 1-1/2 inches in largest diameter or 1/3 width of board	Visual	TM 9-1340-222-20	0.40
	Major	Knots greater than 1/4 the width of the skid Splits over 3 inches but no closer than 1 inch to edge of board or adjoining split; or 1/8 inch wide, which can be repaired by use of corrugated fasteners	Visual	TM 9-1340-222-20	0.40
	Minor		Visual	TM 9-1340-222-20	0.65
Minor	Loose skids	Visual	TM 9-1340-222-20	0.65	
Strapping	Minor	Missing, rusted, or distorted	Visual	TM 9-1340-222-20	0.65
Wires	Major	Broken or rusted	Visual	para 4-7b	0.40
Marking	Major	Incorrect and/or illegible	Visual	para 4-11	0.40

FIBER CONTAINERS

Metal ends	Major	Perforations, excessive rust, or ends which are crushed or not securely crimped to body	Visual	TM 9-1340-222-20	0.40
Body and cap	Major	Cuts, tears, or gouges closer than 1 inch to closure, more than 1/2 square inch in area, or through all impregnated layers	Visual	TM 9-1340-222-20	0.40
	Major	Molded, mildew, or rotted	Visual	TM 9-1340-222-20	0.40
	Major	Wrinkled or peeling	Visual	TM 9-1340-222-20	0.40
	Major	Blisters with combined area of more than 1 inch to closure, less than 1/2 square inch	Visual	TM 9-1340-222-20	0.40
	Major	Wet or soft containers	Visual/Manual	TM 9-1340-222-20	0.40
Minor	Cuts, tears, or gouges not closer than 1 inch to closure, less than 1/2 square inch in area, and unpenetrated layers which can be spot painted	Visual	para 4-11	0.65	
Marking	Major	Incorrect and/or illegible	Visual	para 4-11	0.40

METAL CONTAINERS

Body	Major	Dents which impair the structural integrity of the material	Visual	TM 9-1340-222-20	0.40
	Major	Loose or leaking seams	Visual	TM 9-1340-222-20	0.40
	Major	Rust which has caused pitting and perforations	Visual	TM 9-1340-222-20	0.40
	Major	Perforated	Visual	TM 9-1340-222-20	0.40
	Major	Damaged supports which are integral to container	Visual	TM 9-1340-222-20	0.40

Table 3-1. Classification of Material Defects - Continued
METAL CONTAINERS - Continued

Component	Category	Defect	Method of inspection	Reference	AQL
Body (cont.)	Major	Gasket, missing, damaged, or deteriorated	Visual	TM 9-1340-222-20	0.40
	Minor	Dents deeper than ¼ inch which may be removed without weakening structure of container	Visual	TM 9-1340-222-20	0.65
	Minor	Minor rust which can be removed	Visual	para 4-6	0.65
Caps and covers	Minor	Supports which can be replaced	Visual	TM 9-1340-222-20	0.65
	Major	Rust which has caused excessive pitting	Visual	TM 9-1340-222-20	0.40
	Major	Perforated	Visual	TM 9-1340-222-20	0.40
Marking	Minor	Minor rust which can be replaced	Visual	para 4-6	0.65
	Major	Incorrect and /or illegible	Visual	para 4-11	0.40

METAL BOXES

Body and cover	Major	Extensive pitting and rust	Visual	TM 9-1340-222-20	0.40
	Major	Split seams	Visual	TM 9-1340-222-20	0.40
	Major	Dents, which cause creases or folds in metal which can be removed	Visual	TM 9-1340-222-20	0.40
	Major	Perforated	Visual	TM 9-1340-222-20	0.40
	Major	Missing or broken separators	Visual	TM 9-1340-222-20	0.40
	Minor	Minor rust which can be removed	Visual	para 4-6	0.65
	Minor	Dents exceeding 4 square inches per side, end or top, or deeper than ¼ inch	Visual	TM9-1340-222-20	0.65
	Minor	Damaged or missing gaskets	Visual	TM 9-1340-222-20	0.65
Marking	Major	Incorrect and/or illegible	Visual	para 4-11	0.40

66MM LAW¹

Launcher	Critical	Outer tube cracked	Visual	-	1.00
	Critical	Inner tube dented	Visual	-	1.00
	Critical	Igniter tube broken or kinked	Visual	-	1.00
	Critical	Evidence of filler exudation, heavy corrosion or epoxy deposits in inner tube	Visual	-	1.00
	Critical	Words "w/coupler" missing from nomenclature and suffix letter "R" missing from lot number (except M72A3)	Visual	para 4-11	1.00
	Major	Launcher cannot be fully extended or locked	Manual	-	0.40
	Major	Buffer plate on M72A3 missing	Visual	-	0.40
	Major	Pull pin missing	Visual	-	0.40
	Major	System cannot be armed	Manual	-	0.40
	Major	Front or rear sights broken	Visual	-	0.40
	Major	Marking obliterated to extent that item or lot number cannot be positively identified	Visual	para 4-11	0.40

2.75-INCH LSFFAR² AND SSWAFAR

Warheads (fused and unfused)	Critical	Filler exudation	Visual		1.00
	Critical	Cracks in warhead	Visual		1.00
	Major	Rust on metal surfaces or threads extensive enough to prevent assembly and/or affect metal integrity	Visual/Manual		0.40

¹Inspection procedures which require to be extended will be performed only on weapon systems which have been turned in unpacked (removed from barrier bag) on an individual (one-at-a-time) basis.

²Do not turn or rotate nozzle assembly.

Table 3-1. Classification of Material Defects - Continued
2.75-INCH LSFFAR AND SSWAFAR - Continued

Component	Category	Defect	Method of inspection	Reference	AQL
Warheads (fuzed and unfuzed) (cont)	Major	Dents, deep scratches, or gouges	Visual	-	0.40
	Major	Painting and marking obliterated to extent that item cannot be positively identifies	Visual	paras 4-9 and 4-11	0.40
Fuzes	Critical	Cracks in fuze body	Visual	-	1.00
	Major	Rust on metal surfaces or threads extensive enough to prevent assembly and/or affect metal integrity	Visual/Manual	-	0.40
	Major	Dents, deep scratches, or gouges	Visual	-	0.40
	Major	Marking obliterated to extent that item cannot be positively identified	Visual	para 4-11	0.40
	Major	Umbilical assembly missing (remote set fuzes only)	Visual		0.40
Motors	Critical	Shorting clip or fin protector missing (MK4 or MK40 motors)	Visual		
	Critical	Shielding fin restraint band missing or damaged (MK66 Mods1, and 2)	Visual		
	Critical	Cracks in motor casing	Visual	-	1.00
	Critical	Dents (1/8-inch or more in depth) to extent that propellant grain may have been broken	Visual	-	1.00
	Critical	Electromagnetic Radiation Shield (EMR) missing or damaged (MK66 Mod 3)	Visual	-	1.00
	Critical	Missing or damaged weather seal (MK66 motor)	Visual	-	1.00
	Critical	Loose nozzles and fin assembly	Manual	-	0.40
	Critical	Broken lead wire	Visual	-	0.40
	Critical	Missing fin or hinge pin	Visual	-	0.40
	Major	Corrosion on metal surfaces or threads extensive enough to prevent assembly and/or affect metal integrity	Visual/Manual	-	0.40
	Major	Lockwire distorted or improperly assembled - protrudes above surface of rocket motor tube	Visual	-	0.40
	Major	Painting and marking obliterated to extent item cannot be identified	Visual	paras 4-9 and 4-11	0.40
Assembled complete round	Critical	Filler exudation	Visual	-	1.00
	Critical	Cracks in warhead	Visual	-	1.00
	Major	Loosely assembly components (e.g., fuze to warhead or warhead to motor)	Manual	TM 9-1340-222-20	0.40

3.5-INCH ROCKETS

Assembled complete	Critical	Filler exudation	Visual	-	1.00
	Critical	Cracks in warhead, fuze, or motor	Visual	-	1.00
	Critical	Shorting clip missing	Visual	-	1.00
	Critical	Heavily corroded fin shroud	Visual	-	1.00
	Critical	Fuze ejection pin missing	Visual	-	1.00
	Critical	Deep dents on motor body	Visual	-	1.00
	Critical	Gap between warhead and fuze	Visual	-	1.00
	Critical	Heavily corroded shorting clip or heavy corrosion of electrical contacts around shorting clip	Visual	-	1.00
	Major	Fuze ejection pin not free to move	Manual	-	0.40
	Major	Broken ignition wires	Visual	-	0.40
	Major	Extensive corrosion on warhead or rocket motor	Visual	-	0.40

Table 3-1. Classification of Material Defects - Continued
 3.5-INCH ROCKETS - Continued

Component	Category	Defect	Method of inspection	Reference	AQL
Assembled completed	Major	Loose rivets or electrical connectors	Manual		0.40
	Major	Nozzle closure and wires not properly sealed with rubber adhesive	Visual		0.40
	Major	Damaged nozzle, shroud, or fins	Visual		0.40
	Major	Painting and marking obliterated to extent item cannot be positively	Visual		0.40

ROCKET MOTOR M3A2E1 (JATO)

Component	Category	Defect	Method of inspection	Reference	AQL
Assembled complete item	Critical	Cracks in body or nozzle	Visual		1.00
	Critical	Nozzle loose on body	Manual		1.00
	Critical	Nozzle distorted	Visual		1.00
	Major	Igniter plug assembly loose or damaged	Manual/Visual		0.40
	Major	Painting and marking obliterated to extent item cannot be positively identified	Visual		0.40

**CHAPTER 4
MAINTENANCE PROCEDURES**

Section I. INTRODUCTION

4-1. General

a. Direct support (DS) and general support (GS) maintenance operations are restricted to the procedures in this manual, TM 9-1340-203-20, and in TM 9-1340-222-20, as indicated in the maintenance allocation chart.

b. Repair parts, packing materials, and expendable supplies (appendixes B and C) required by DS and GS units will be locally stocked. DS and GS units are also responsible for receiving and storing packaging materials salvaged from expended ammunition and for providing technical assistance to operator and organizational units.

c. Before beginning maintenance operations, a line layout and standing operating procedures (SOP) are required. Guidelines for organizing the line and writing the SOP are contained in TM 9-1300-250.

d. In general, maintenance operations include but are not limited to the following:

- (1) Cleaning and preservation of individual items and packaging materials.
- (2) Removal of light rust and corrosion.
- (3) Repair and replacement of packaging materials.
- (4) Painting and markings.

e. Expendable supplies are listed in appendix C.

4-2. Direct Support Maintenance

a. Direct support maintenance is performed under the following conditions:

- (1) Upon receipt of unserviceable ammunition.
- (2) When maintenance is authorized to correct deficiencies in suspended ammunition lots
- (3) When operator and/or organizational units request on-site assistance.
- (4) When inspection of on-hand stocks reveals the need.

b. Refer to FM 9-19 for mission and organization

4-3. General Support Maintenance

General support maintenance is accomplished under the same conditions as direct support maintenance but on greater quantities of ammunition. Refer to FM 9-19 for mission and organization.

4-4. Unpacking and Repacking

Step-by-step unpacking and repacking procedures are given in TM 9-1340-222-20

4-5. Inspection

Premaintenance, in-process, and final inspection requirements are defined in Chapter 3.

Section II. CLEANING

4-6. General

WARNING

- DO NOT USE ANY ELECTRICAL EQUIPMENT AROUND AMMUNITION UNLESS IT HAS A NATIONAL ELECTRICAL CODE RATING OF

CLASS I FOR FLAMMABLE VAPOR, CLASS II FOR EXPLOSIVE DUSTS (INCLUDING AMMUNITION), OR IS DUAL RATED IF BOTH VAPOR AND DUSTS ARE PRESENT

- GROUND ALL AMMUNITION CONTAINING EXPLOSIVES.

a. *Tool and Equipment.*

- (1) Disposable flammable waste can.
- (2) Nonferrous brush.
- (3) Plunger type safety can.

b. *Expendable Supplies.*

- (1) Alcohol.
- (2) Acetone.
- (3) Corrosion removing compound.
- (4) Rags.
- (5) Sandpaper (abrasive).

c. *Procedure*

WARNING

FUZE CAVITY LINER MUST BE IN PLACE PRIOR TO CLEANING FUZE WELL OR THREADS WITH SMALL STAINLESS STEEL BRUSH.

CAUTION

STORE RAGS IN NONCOMBUSTIBLE SELF-CLOSING CONTAINERS. PLACE WASTES OR USED RAGS IN WATER FILLED CONTAINERS. AREAS WILL BE WELL VENTILATED WHERE SOLVENTS AND PAINTS ARE USED

(1) Remove dirt, mud and other foreign material using rags or brushes. Use rags dampened with alcohol or acetone to remove grease.

(2) Using nonferrous brush, remove flaked, chipped, blistered, or peeling paint.

(3) Remove rust using nonferrous brush and sandpaper.

(4) If rocket does not have a fuze cavity liner, clean fuze well and threads with clean dry rags.

NOTE

Do not use rags dampened with alcohol or acetone.

(5) If rocket does have a fuze cavity liner, clean fuze well and threads with a small stainless steel brush and rags dampened with alcohol or acetone.

(6) Clean corrosion from alluminum or copper-based metals by first brushing with a nonferrous brush and then removing residue with rags and corrosion removing compound.

(7) Clean only to degree necessary to remove dust or corrosion.

(8) Inspect cleaned items for cracks or other damage or deterioration.

(9) Allow solvent-cleaned surfaces to dry thoroughly before painting.

Section III. REPAIR

4-7. Packaging Materials

a. *General* Detailed procedures for authorized repair of most packaging materials are given in TM 9-1340-222-20. Procedures authorized at DS or GS levels are presented below

b. *Wirebound Box Loops.*

- (1) *Tools and equipment.*
 - (a) Hammer.
 - (b) Tin snips.

(c) Wire cutter.

(2) *Expendable supplies.*

- (a) Repair loop, 13 gauge wire.
- (b) Wire.

(3) *Procedure.* This procedure is preferred if appropriate wire cutter and repair loops are available. If these cannot be obtained, proceed to alternate repair procedure (4) below

NOTE

Refer to figure 4-1 for the following procedure:

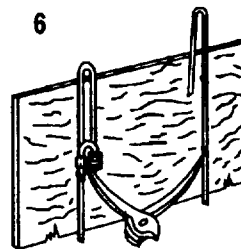
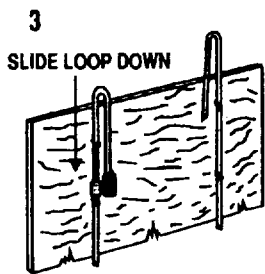
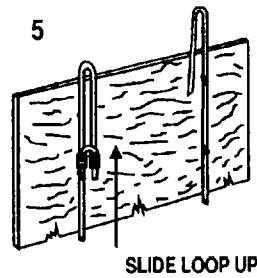
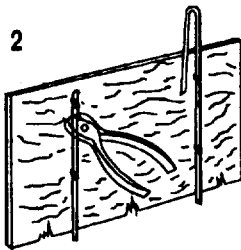
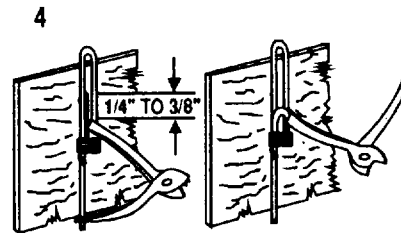
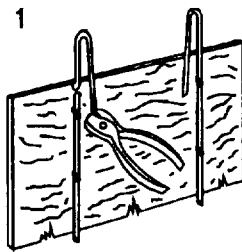
- (a) Remove broken loop by cutting wire (step 1).
- (b) Cut first staple and release wire (step 2).

(c) Slide one end of repair loop onto binding wire (step 3)

(d) Place notch of wire cutter one fourth inch to three-eighths inch from end of wire - and bend wire into half circle (step 4).

(e) Insert bent end of wire into repair loop coil and slide loop up (step 5).

(f) Lock repair loop in place by giving the end of the wire a further bend with notch of wire cutter (step 6).



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Figure 4-1. Repairing loops on wirebound box.

(4) *Alternate procedure.* Repair broken wire loop on a wirebound box if both legs of broken loop are securely fastened to box as follows:

(a) Cut off broken loop even with top edge of box.

(b) Using pliers, bend remaining wire legs back one-half inch, forming half circles.

(c) Cut a 6-inch length of wire to replace broken loop.

(d) Bend repair wire in half to form a "U" shape. Then bend about one-half-inch of each leg outward about 150°.

(e) Hook bent legs of repair wire into half circles of box wires.

(f) Twist ends of repair wire around ends of box wires.

(g) Place box on hard surface or place a steel bar under repair area.

(h) Secure repair by hammering each half circle on box wire where it is connected to repair wire.

c. *Barrier Bags.*

NOTE

The following procedure is only authorized at GS level:

(1) *Tools and equipment.*

- (a) Heat sealing machine.
- (b) Scissors or knife.

(2) *Expendable supplies.*

- (a) Barrier material.
- (b) Tape PPP-T-60.

(3) *Procedure.* This procedure is basically a repacking procedure but is listed here because it will normally be undertaken on a repair basis. Only reseal items that have been completely inspected and found serviceable.

(a) Receive bag from unpacking operation. Trim open end straight if necessary.

(b) Inspect barrier bag and accept or reject as required.

(c) Acceptable bags are intact, except for opening slit, and can be resealed after contents are reinserted.

(d) If bag corners are delaminated but bag is otherwise intact and can be sealed, use heat sealing machine to relaminate corners.

(e) Set rejects aside for later disposal.

(f) If markings are obliterated on otherwise undamaged bags, remark as instructed in paragraph 4-11.

(g) If a new barrier bag is required, proceed according to replacement procedure according to replacement procedures outlined in either (h) or (i).below.

(h) If two sheets of barrier material are to be utilized, proceed as follows:

1. Cut two sheets equal to outside width and outside length of original bag.

2. Place two cut sheets together, plastic-coated surfaces together, and align edges.

3. Seal bottom and two longest edges using heat sealing machine.-

(j) Leave shortest edge of bag unsealed for bag opening

(k) Heat seals shall be a minimum of 1/2 inch wide.

(l) Assure that item to be repacked and packing materials are clean and dry.

(m) Place item(s) into original inner pack in original materials. Use extra padding materials to fill voids and to prevent item from moving. Tape inner pack to secure it if necessary.

(n) Place inner pads in barrier bag in original orientation using creases, etc., as a guide.

(o) Heat-seal bag opening except for approximately 1 inch from end.

(p) Flatten bag around inner pack and press sides of open end of bag together to force out excess air.

Compress open corners of bag with fingers to prevent entrance of air and seal remaining unsealed portion of bag opening. Seal full width of sealing bar.

(q) Heat shall be a minimum of 1/2 inch wide.

(r) Check to see that seal is complete.

(s) Fold sealed end in original manner as indicated by impressions in bag.

(t) Mark as instructed in paragraph 4-11.

Section IV. TOUCHUP, PAINTING, AND MARKING

4-8. Touchup

a. Tools and equipment.

- (1) Disposable flammable waste can.
- (2) Paint brush.
- (3) Plunger type safety can
- (4) Respirator.
- (5) Small brush.
- (6) Paint sprayer,

b. Expendable supplies.

- (1) Alcohol, denatured.
- (2) Clean rags.
- (3) Disposable plastic gloves.
- (4) Enamel of appropriate color.
- (5) Ink, marking stencil.
- (6) Masking tape.
- (7) Primer, zinc chromate
- (8) Sandpaper (abrasive)

c. Procedure.

(1) Carefully record all marking data in event it is removed or obliterated during processing.

(2) Clean item according to section II.

(3) Lightly buff cleaned bare metal surface and surrounding paint with fine sandpaper.

(4) Remove loosened particles by wiping surface of item with clean rag dampened with alcohol.

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(5) Cover legible markings and threaded surfaces with masking tape.

CAUTION

WEAR RESPERATOR DURING SPRAY PAINT OPERATIONS.

(6) Using spray gun, spray can, or brush, cover bare metal with thin coat of zinc chromate primer.

(7) Air-dry 30 to 60 minutes or until surface is no longer tacky.

(8) If spray gun or spray can is used, cover primed area with two very thin coats of appropriate color enamel, allowing first coat to dry thoroughly before applying second coat.

(9) If brush is used, cover primed area evenly with one thin coat of appropriate color enamel.

(10) Air-dry 30 to 60 minutes or until surface is no longer tacky.

(11) Remove masking tape.

(12) Touch up markings using a small paint brush or re-stencil as required (para 4-11).

4-9. Painting

a. *General*

NOTE

- Repaint rockets, rocket components, and metal containers which have been cleaned extensively or to degree that large areas of metal surface are bare.
- Temperature of both paint and item to be painted must be between +50°F and +100°F for paint to adhere and dry properly. Ambient (surrounding air) temperature must be above +50°F.
- 2.75-Inch Rocket metal containers PA 150 and PA 151 will be painted in accordance with procedures for touchup in paragraph 4-8c.

(1) *Tools and equipment*

- (a) Disposable flammable waste can.
- (b) Improvised setups (prefabricated).
- (c) Launcher, 2.75-inch rocket.
- (d) Paint brush.
- (e) Paint sprayer
- (g) Respirator.

(2) *Expendable supplies*

- (a) Alcohol, denatured.
- (b) Clean rags.
- (c) Disposable plastic gloves.
- (d) Enamel of appropriate color.
- (e) Masking tape.
- (f) Primer, zinc chromate.
- (g) Sandpaper (abrasive).

(3) *Procedure.*

- (a) Carefully record all marking data in event it is removed or obliterated during processing
- (b) Clean item according to section II.
- (c) Remove as much paint as possible with cleaning materials furnished.
- (d) Lightly buff cleaned bare metal surface and any remaining paint with fine sandpaper.
- (e) Remove loosened particles by wiping surface of item with clean rag dampened with alcohol.
- (f) Cover any parts (threads, etc.) not to be painted with masking tape.
- (g) Use improvised setups to suspend or cradle item to be painted.

CAUTION

WEAR RESPIRATOR DURING SPRAY PAINT OPERATIONS.

- (h) Using spray gun, spot prime any bare metal with a of zinc chromate primer. Do not prime over painted surface. Assure that all bare metal is primed.
- (i) Air-dry 30 to 60 minutes or until surface is no longer tacky.
- (j) Using spray gun cover item surface evenly with one thin coat of appropriate color enamel.
- (l) Inspect to assure that paint covers the projectile completely, including old unwanted markings.
- (m) Touch up as required.
- (n) Remove masking tape.
- (o) Check diameter of 2.75-inch warheads after painting by gaging with launcher tube as follows:

WARNING

- CONTACT ARM OF LAUNCHER WILL PROVIDE DIRECT ELECTRICAL PATH TO MOTOR IGNITION CIRCUIT IF POWER SOURCE IS APPLIED TO CONTACT ARM WHEN LAUNCHER IS BEING LOADED/UNLOADED.
- ALL POSSIBLE SOURCES OF ELECTRICAL POWER SHALL BE KEPT AWAY FROM LAUNCHER. ENSURE ELECTRICAL EQUIPMENT, EVEN IF TURNED OFF AND UNPLUGGED, IS NOT IN THE VICINITY OF THE LOADED LAUNCHER

1. Select serviceable launcher tube with the minimum inside diameter.

2. Carefully insert warhead into launcher.

3. Insert whole round up to shorting clip (MR40 motor) or shielding for restraint band (MK66 motor).

4. If warhead cannot be inserted or if it binds badly while being inserted, reject and set is aside for stripping and repainting.

(p) Restore marking according to paragraph 4-11.

b. Wood Packing Box

NOTE

The normal reason for painting wooden boxes will be obliteration of old marking.

(1) *Tools and equipment.*

- (a) Disposable flammable waste can.
- (b) Paint brush.
- (c) Paint sprayer.
- (d) Plunger type safety can.
- (e) Respirator.

(2) *Expendable supplies.*

- (a) Enamel.
- (b) Obliterating lacquer.
- (c) Masking tape.
- (d) Primer, zinc chromate.

(3) *Procedure.*

- (a) Assure that box is clean and dry.
- (b) If legible, cover valid markings with masking tape.

CAUTION

WEAR RESPIRATOR DURING SPRAY PAINT OPERATIONS.

(c) Using paint brush or spray gun, cover unwanted markings with marking obliterating lacquer or olive drab enamel.

(d) Air-dry 30 to 60 minutes or until surface is no longer tacky.

(e) Inspect to assure complete coverage. Repaint as required.

(f) Remove masking tape.

(g) Mark as required according to instructions in paragraph 4-11.

c. Fiber Tube Container.

(1) *Tools and equipment.*

- (a) Disposable flammable waste can.
- (b) Paint brush.
- (c) Paint sprayer.
- (d) Plunger type safety can.
- (e) Respirator.

(2) *Expendable supplies.*

- (a) Coating compound.
- (b) Enamel, black.
- (c) Kraft paper.

- (d) Masking tape.
- (e) Primer, zinc chromate.
- (f) Rags.

(3) *Procedure.*

(a) Clean container and cap according to section II.

(b) Inspect and reject components with penetrations or rust which cannot be removed.

(c) Using kraft paper and masking tape, cover metal ends and unpainted inner tube.

CAUTION

WEAR RESPIRATOR DURING SPRAY PAINT OPERATIONS.

(d) Using brush or spray gun, cover outer surface of fiber tube and cap with coating compound.

(e) Air-dry 30 to 60 minutes or until surface is no longer tacky.

(f) Inspect to assure complete coverage. Repaint as required.

(g) Remove masking tape and kraft paper from cap and inner tube.

(h) Using masking tape and kraft paper, cover fiber surfaces.

CAUTION

WEAR RESPIRATOR DURING SPRAY PAINT OPERATIONS

(i) Using spray gun, cover metal with zinc chromate primer.

(j) Air-dry 30 to 60 minutes or until surface is no longer tacky.

(k) Using paint brush or spray gun, cover metal ends with black enamel.

(l) Air-dry 30 to 60 minutes or until surface is no longer tacky.

(m) Inspect to assure complete coverage. Repaint as required.

(n) Remove masking tape and kraft paper.

(o) Mark as instructed according to paragraph 4-11.

4-10. Color Coding of Boxes With Light Loads

a. *General.* Organizations will use this procedure when boxes with less than full contents are to be returned to storage area or transported to new location.

b. *Tools and Equipment.*

(1) Disposable flammable waste can.

(2) Paint brush.

(3) Plunger type safety can.

(4) Respirator.

(5) Small brush.

(6) Paint sprayer

c. *Expendable Supplies.*

(1) Disposable plastic gloves.

(2) Masking tape.

(3) Orange enamel or lacquer

d. *Procedure.* Paint boxes with less than full contents orange as follows:

(1) Check contents with markings on box to verify that nomenclature and lot number are correct.

(2) Make diagram of markings on box and carefully record all marking data except quantity figure.

(3) Cover original markings, except quantity number, with masking tape.

CAUTION

WEAR RESPIRATOR DURING SPRAY PAINT OPERATIONS.

(4) Using paint brush or spray gun, cover entire outer surface of box with orange enamel or lacquer.

(5) Air-dry box 30 to 60 minutes or until surface is no longer tacky.

(6) Remove masking tape.

(7) If required, re-mark box according to paragraph 4-11.

(8) Count quantity of items in box and mark number on box in the same position as original quantity figure.

(9) Stencil words "LIGHT BOX" on each side of box, using approximately same size letters as original quantity figure.

4-11. Marking

a. *General.*

(1) Assure that all incorrect markings are obliterated.

(2) Lettering sizes for marking of items and their packaging will be limited to the following five basic sizes: 1/8 inch, 1/4 inch, 1/2 inch, 3/4 inch and 1 inch. Marking shall be in capital letters of equal height as large as possible within the specified sizes and consistent with the available space.

(3) Marking sizes on current ammunition stocks will not be changed unless rework/renovation is performed requiring remarking.

(4) Clean all marking equipment as often as necessary and at the end of each shift or termination of job, whichever comes first.

b. *Tools and Equipment*

(1) Disposable flammable waste can.

(2) Fountain stencil brush.

(3) Masking tape.

(4) Plunger type safety can.

(5) Rubber type set.

(6) Worktable.

c. *Expendable Supplies.*

(1) Clean rags.

(2) Disposable plastic gloves,

(3) Masking tape.

(4) Solvent.

(5) Stencilboard.

(6) Stencil ink.

d. *Procedure or Packaging Materials.*

(1) Markings will be a color which contrasts with color of packaging material unless otherwise specified.

(2) See ammunition data card for specific markings or copy from old package.

(3) Refer to figures 4-2 through 4-5 for location and size of markings for metal container, fiber container, and wooden boxes.

(4) Inner packs must be marked with information usually found on item. If items have no inner packs, information must be stenciled on cardboard and included in repacked box.

(5) Apply markings by either rubber type or stencil method outlined in f, below.

- NOTES: A. APPLY MARKING PERPENDICULAR TO AXIS OF CONTAINER TO READ FROM TOP TO BOTTOM.
- B. SIZE OF LETTERS SHALL BE AS SHOWN WITH TOLERANCE OF PLUS OR MINUS 1/32 INCH
- C. STANDARD ABBREVIATIONS IN NOMENCLATURE AND CHANGES IN NUMBER OF WORDS PER LINE IS PERMISSIBLE

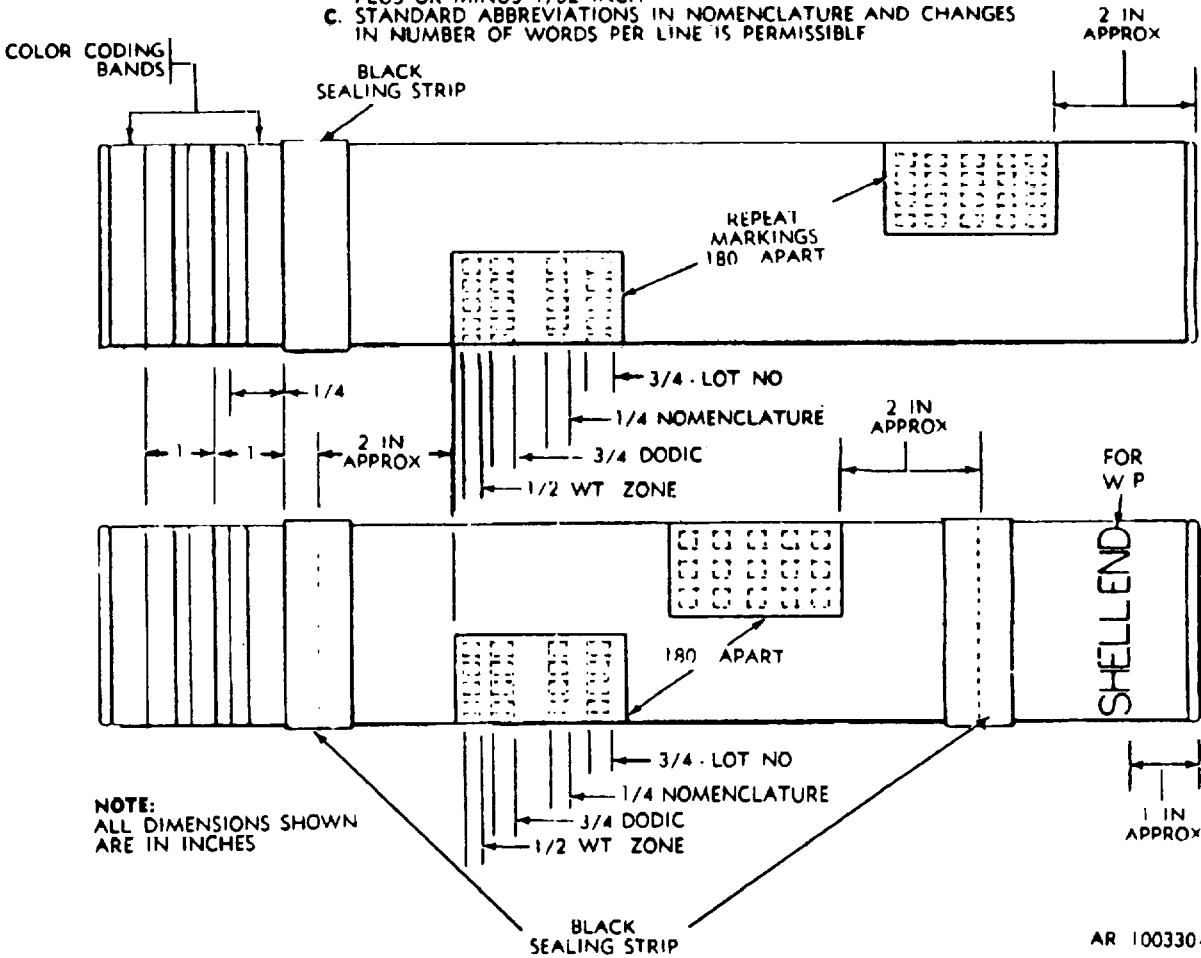
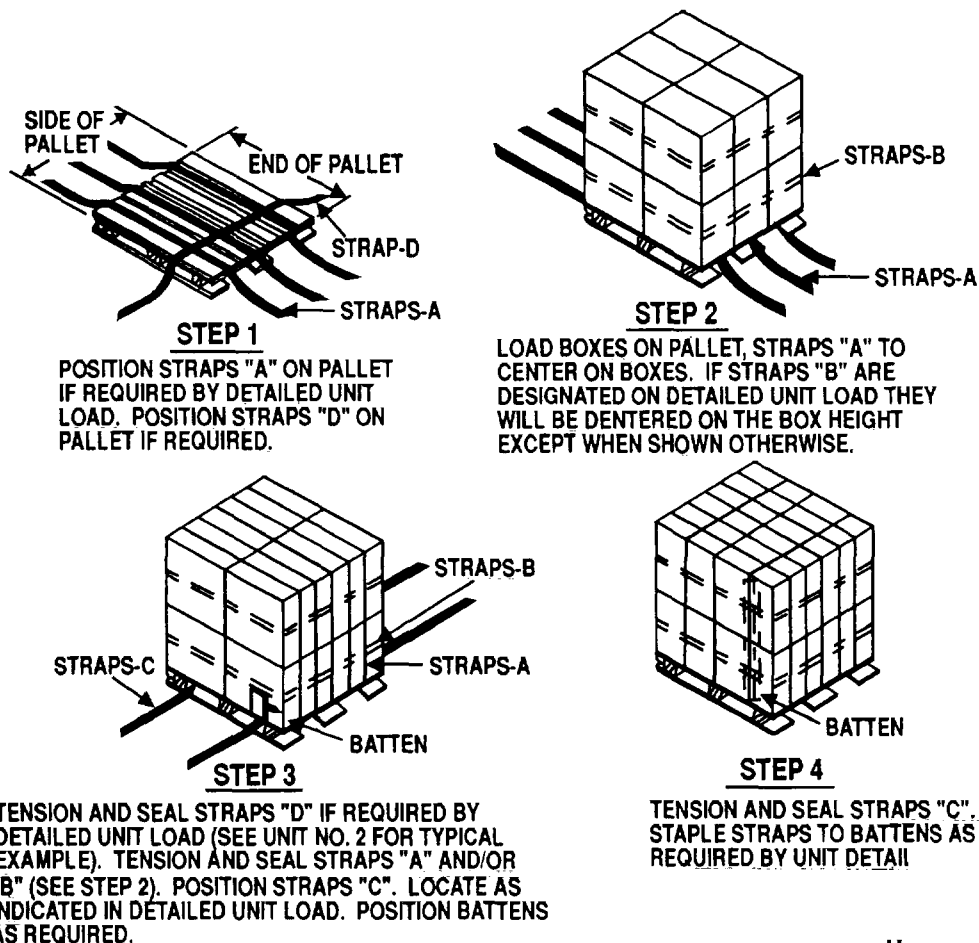


Figure 4-2. Marking on fiber containers

GENERAL NOTES

1. UNIT SHOWN HEREON IS PREPARED TO MEET THE FOLLOWING REQUIREMENTS.
 - A. GROSS WEIGHT APPROX 2000 LBS, NOT TO EXCEED 2200 LBS.
 - B. WEIGHT OF PALLET AND LOAD NOT TO EXCEED 52".
 - C. OVERHANG AVOIDED WHERE POSSIBLE, BUT SHOULD NOT EXCEED APPROX. 1" IN ANY DIRECTION. ONE INCH, TWO INCH, OR FOUR INCH BATTENS MAY BE USED AS REQUIRED.
 - D. BOXES SECURED TO THE PALLET BY STEEL STRAPPING 1-11/4" X .035, TYPE 1, CLASS A OR B, FED SPEC QQ-S-781A.
 - E. STRAPPING SECURED BY ONE 1-1/4" SEAL SECURED WITH A DOUBLE CRIMP, FED SPEC QO-S-766.
2. A MINIMUM OF 2 STAPLES WILL BE USED TO FASTEN EACH STRAP TO ITS BATTEN. STAPLES WILL NOT BE USED WITHOUT BATTENS. STAPLES AUTHORIZED ARE 1-3/8" X 3/4".
3. ADDITIONAL BANDING OR GIRTH BANDING MAY BE USED ON THE PALLET LOAD, AT THE DISCRETION OF THE SHIPPER.
4. FILLERS, CONSTRUCTED OF TWO INCH LUMBER, MAY BE USED TO COMPLETE PARTIAL LAYERS ON PALLET. FILLERS SHOULD BE PLACED ON INTERIOR OF TOP LAYER, WHEN PRACTICAL.
5. ALL WP AND PWP FILLED AMMUNITION WILL BE PLACED NOSE END UP EXCEPT ROCKETS AND RIFLE GRENADES WHICH WILL BE POSITIONED NOSE END DOWN.

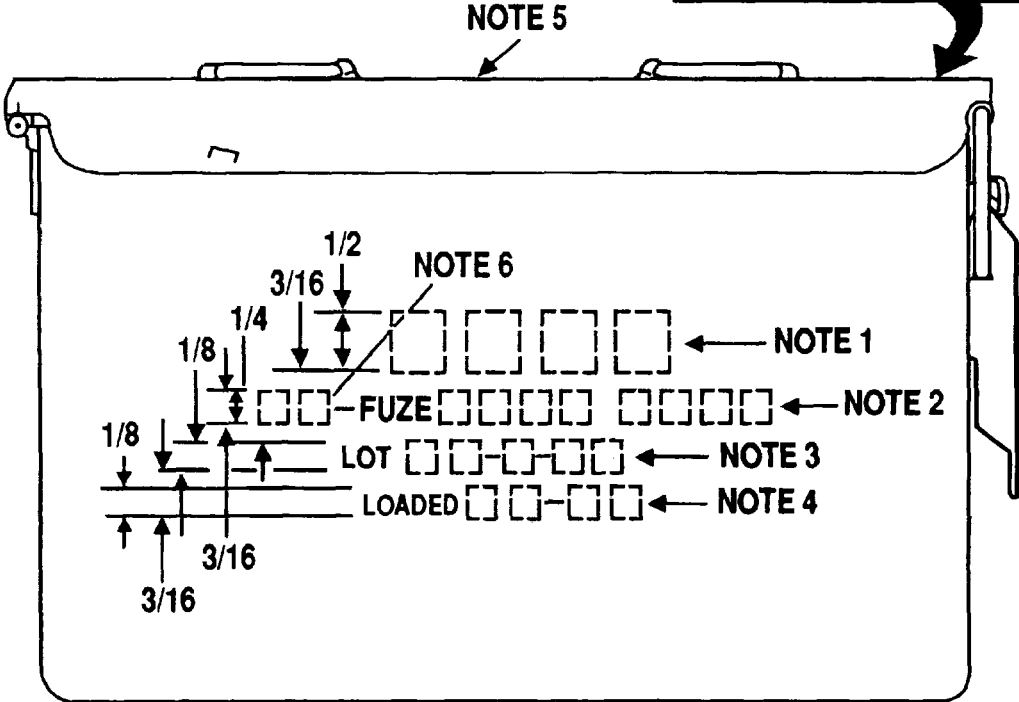
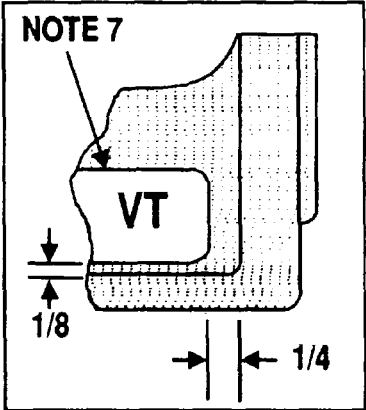


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Figure 4-3. Palletizing.

NOTES:

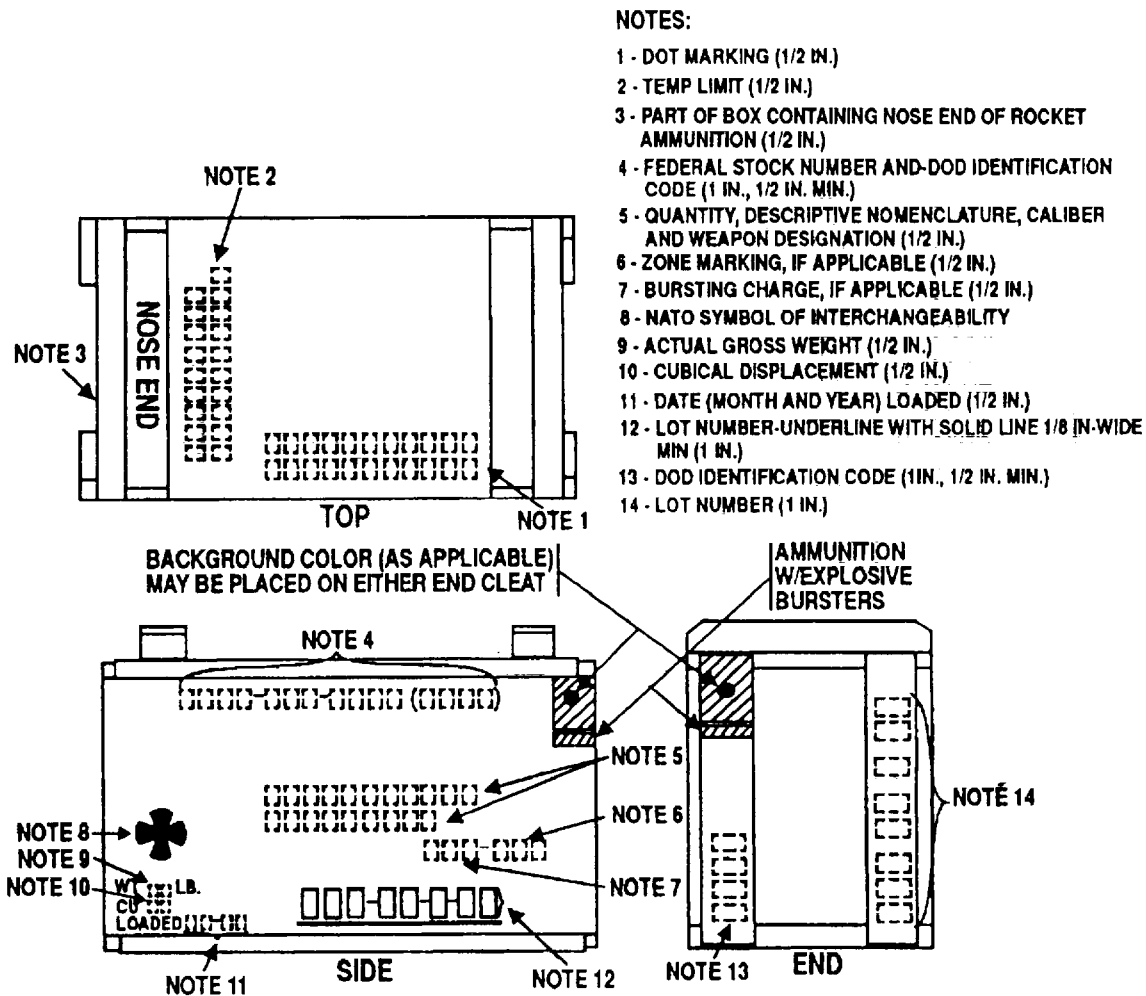
- 1 - INSERT DEPARTMENT OF DEFENSE IDENTIFICATION CODE.
- 2 - INSERT DESCRIPTIVE NOMENCLATURE.
- 3 - INSERT LOT NUMBER.
- 4 - INSERT DATE (MONTH AND YEAR) LOADED.
- 5 - MARK "PACKAGED WITH DESICCANT - DO NOT OPEN UNTIL READY FOR USE OR INSPECTION" ON TOP OF BOX IN ANY CONVENIENT UNOBSTRUCTED LOCATION. SIZE OF LETTERS TO BE APPROX 1/4 INCH HIGH.
- 6 - INSERT "8", "10" OR "12".
- 7 - VT DECAL, WHEN APPLICABLE.



NOTE:
ALL DIMENSIONS SHOWN ARE IN INCHES

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Figure 4-4. Typical marking diagram for metal containers.



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Figure 4-5. Typical marking diagram for wooden boxes.

e. Procedure for Rockets

(1) Refer to table 4-1 for painting and marking data for rockets and rocket weapon systems. General colors will be the same as they were originally.

NOTE

The words "W/LINER" will not always appear in warhead marking. Include "W/LINER" in

marking only when it appeared originally on warheads.

(2) For specific markings, see ammunition data card or another item from the same lot.

(3) Refer to figure 4-6 through 4-11 for location and size of markings.

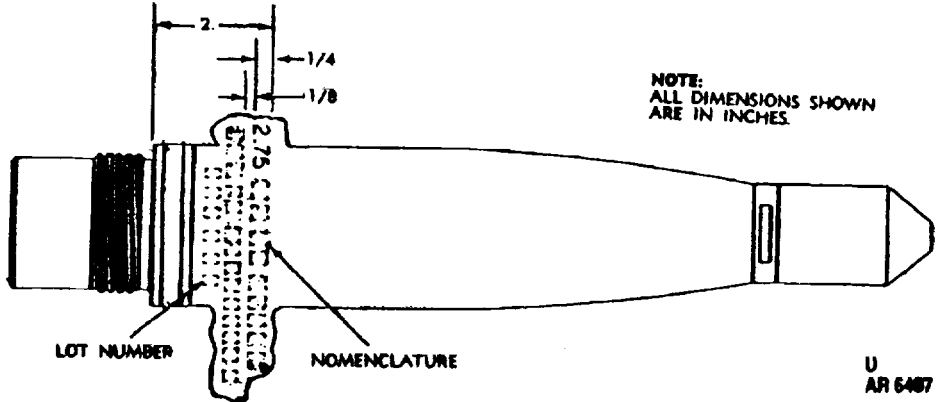


Figure 4-6. Typical marking diagram for 2.75-inch rocket warhead.

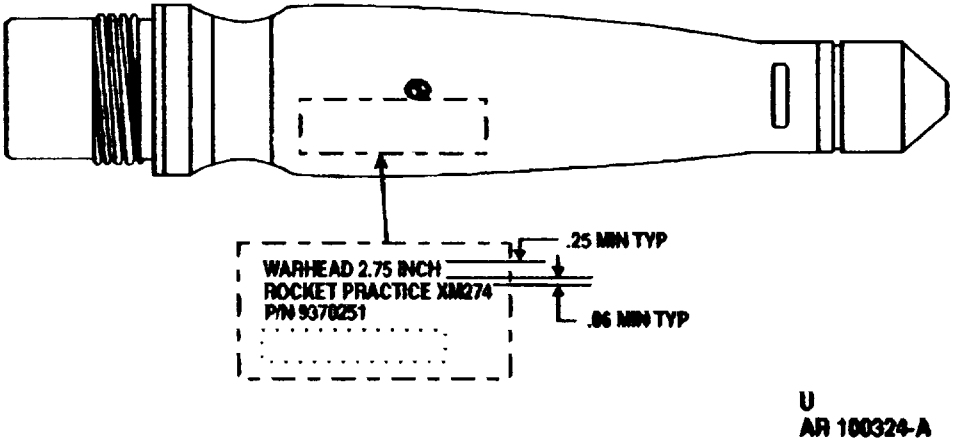
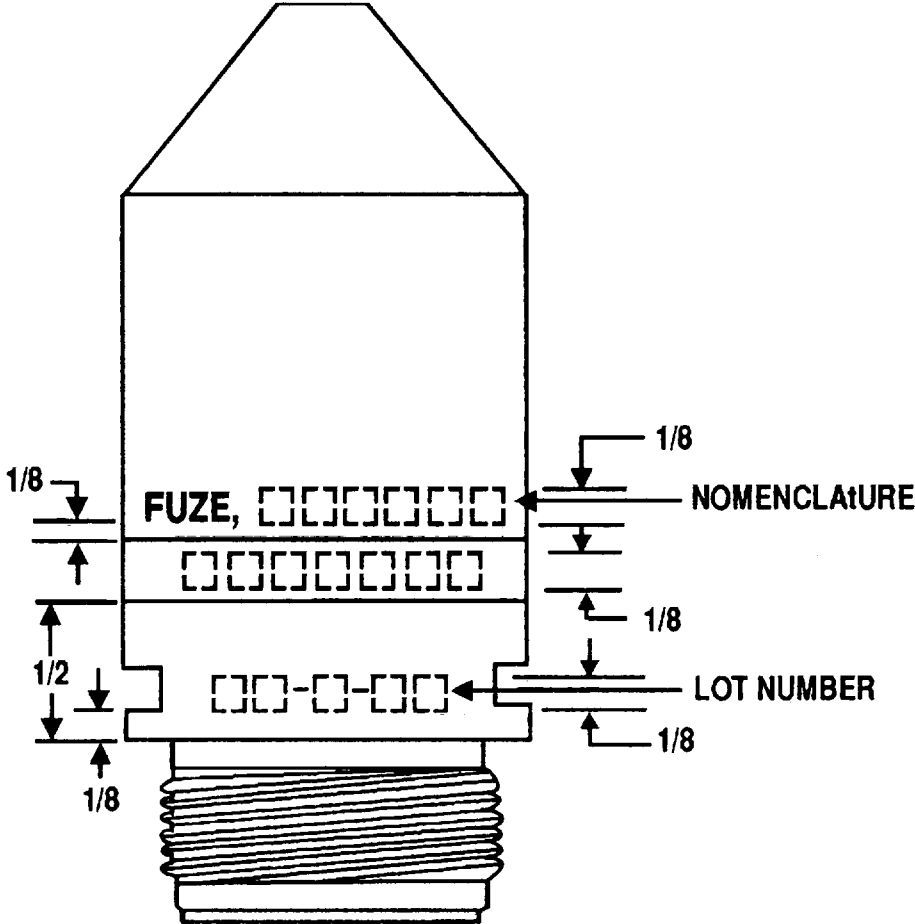
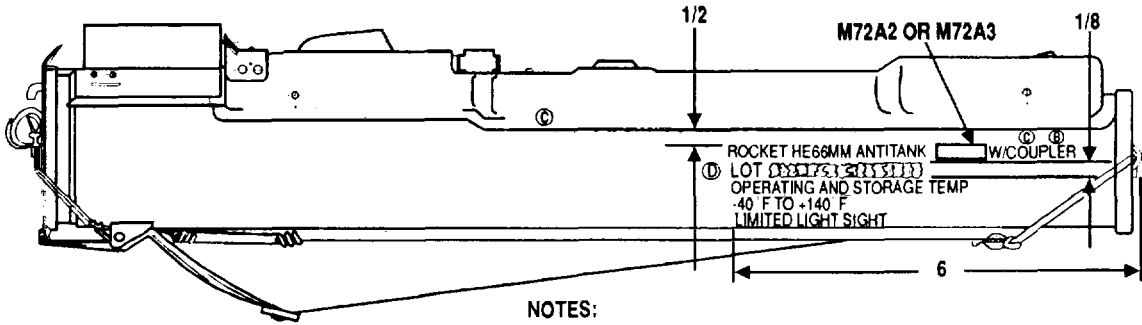


Figure 4-7. Marking diagram for 2.75-inch M274 rocket warhead



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Figure 4-8. Typical marking diagram for 2.75-inch rocket fuzes,



NOTES:

- ALL DIMENSIONS SHOWN ARE IN INCHES.
- "W/COUPLER" AND AN "R" LOT SUFFIX ARE NOT REQUIRED ON M72A3 MODELS.

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Figure 4-10. Typical marking diagram for 66-mm LAW system.

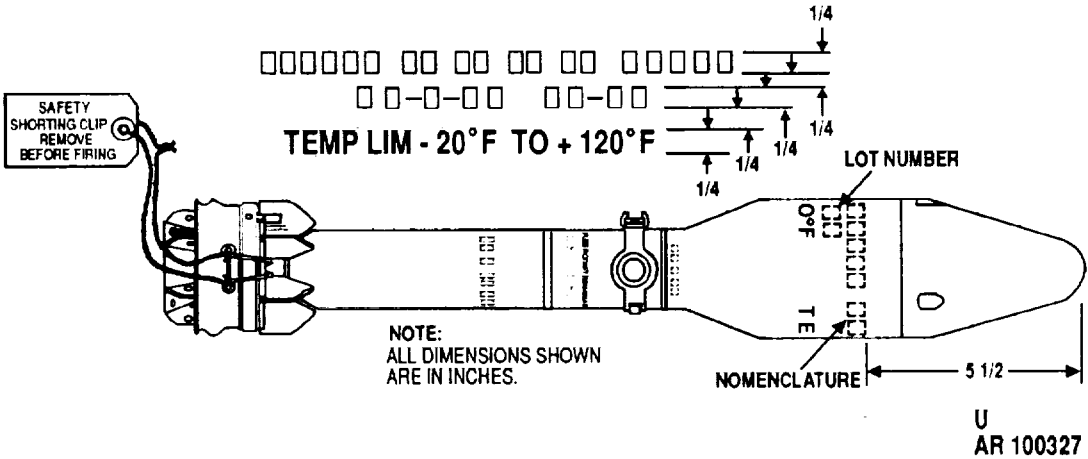


Figure 4-11. Typical marking diagram for 3.5-inch rockets.

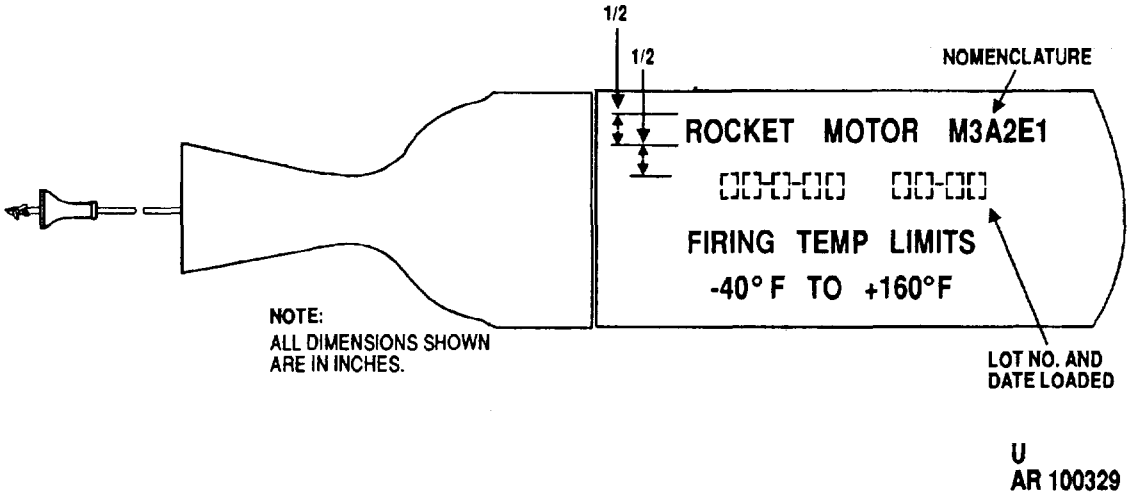


Figure 4-12. Typical marking diagram for rocket motor M3A2E1 (JATO).

(4) Apply markings by either rubber-type method or stencil method outlined in f. below:

f. *Methods.*

(1) *Rubber-type method.*

(a) Set type in holder giving required information.

(b) Apply a small amount of ink to ink plate.

(c) Move roller back and forth on plate to distribute ink evenly.

(d) Move roller lightly across face of rubber type to apply light film of ink to type.

(e) Carefully roll item to be marked across rubber type.

(2) *Stencil method.*

(a.) Make a stencil giving required information.

(b) Apply a dab of ink to ink plate.

(c) Rub brush in ink to apply ink to bristles.

(d) Position stencil cutout over area to be marked.

(e) While holding stencil firmly against item (using masking tape, if required), rub bristles of brush over stencil cutout to apply marking to item.

NOTE

A spray gun or can with paint of proper color may be used as an alternate.

f. Carefully remove stencil and/or masking tape.

(3) *Markings.* Check markings to assure they are correct, neat and legible.

Table 4-1. Painting and Marking Data for Rockets and Rocket Weapon Systems .
2.75-INCH ROCKET

Component	Model no.	Color of body	Color of markings	Reference	Markings
Warheads	M151	Olive drab	Yellow	Fig. 4-6	2.75-INCH: HE, COMP B, WAR-HEAD M151 W/LINER (W/ OR W/O FUZE) LOT NO. ____
	M156	Light green	Light red, with one yellow band	Fig. 4-6	2/75-INCH: WP, WARHEAD M156 W/LINER W/FUZE (or W/O FUZE) LOT NO. ____
	WDU-4A/A	Olive drab	White, w/band of white diamonds 3/4 in. from thread shoulder	Fig. 4-6	WARHEAD, 2.75-INCH ROCKET, FLECHETTE, WDU-4A/A LOT NO. ____
	M229	Olive drab	Yellow	Fig. 4-6	2.75-INCH: HE, COMP B, WAR-HEAD M229 W/LINER W/FUZE (or W/O FUZE) LOT NO. ____
	WTU-1/B	Blue	White	Fig. 4-6	2.75-INCH: PRACTICE WARHEAD 230 LOT NO. ____
	M247	Black	Yellow	Fig. 4-6	WARHEAD, 2.75-INCH ROCKET, HE, DUAL PURPOSE XM247 LOT NO. ____
	M255A1	Olive drab	White w/band of white diamonds	Fig. 4-6	WARHEAD, 2.75-INCH ROCKET, FLECHETTE: M255A1 LOT NO. ____

Table 4-1. Painting and Marking Data for Rockets and Rocket Weapon Systems - Continued.
2.75-INCH ROCKET

Component	Model no.	Color of body	Color of markings	Reference	Markings
Warheads (cont)	M257	Olive drab	White	Fig. 4-6	WARHEAD, 2.75-INCH ILLUMINATION: M257 LOT NO. ____
	M259	Light green	Light red, with one yellow band	Fig. 4-6	WARHEAD 2.75-INCH ROCKET, SMOKE: SCREENING, WP, M259 LOT NO. ____
	M261	Olive drab	Yellow w/yellow band	Fig. 4-6	WARHEAD, 2.75-INCH ROCKET, MPSM, M261, COMP B, (W/FUZE M439) LOT NO. ABC79H018-124B (Example)*
	M264	Light green	Black, w/one brown band	Fig. 4-6	WARHEAD, 2.75-INCH ROCKET, SMOKE: SCREENING, RP, M264 LOT NO. ____
	M267	Blue	White w/brown band	Fig. 4-6	WARHEAD, 2.75-INCH ROCKET, PRACTICE, M267 (W/FUZE M439) LOT NO. ABC80H018-124B (Example)*
	M274	Blue	White w/brown band	Fig. 4-7	WARHEAD, 2.75-INCH ROCKET, PRACTICE, M274 P/N 9370251 LOT NO. ____
	M278	Black	White	Fig. 4-6	WARHEAD, 2.75-INCH, FLARE: M278 LOT NO. ____
Fuzes	M423	Green	Yellow	Fig. 4-8	FUZE, ROCKET, M423, PART 8883745 LOT NO. ____
	M429	Green	Black	Fig. 4-8	FUZE, ROCKET, PROXIMITY, M429 LOT NO. ____
	M433	Olive drab	Black	Fig. 4-8	FUZE ROCKET: RS: M433 LOT NO. ____
	M439			Fig. 4-8	FUZE, ROCKET: LOT NO. ____
Motor	MK40 Mod 3	White	Black	Fig. 4-9	2.75-INCH ROCKET MOTOR MK40 MOD 3. FIRING TEMPERATURE LIMITS -50°F to +140°F LOT NO. ____

*Ammunition Lot Numbering MIL-STD-1168A (28 Feb 75)

Table 4-1. Painting and Marking Data for Rockets and Rocket Weapon Systems - Continued.
2.75-INCH ROCKET

Component	Model no.	Color of body	Color of markings	Reference	Markings
	MK66 Mod 1, 2, 3, 4	White	Black	Fig. 4-9	2.75-INCH ROCKET MOTOR MK66 MOD . LOADED ASSEMBLY FIRING TEMPERATURE LIMITS -50°F to 150°F. DO NOT USE IF DROPPED. LOT NO. _____
66MM LAW					
Assembled complete round	M72 Series	Olive drab	Yellow	Fig. 4-10	ROCKET, HE, 66MM ANTITANK M72A2 LOT _____ OPERATING AND STORAGE TEMP -40°F to +40°F LIMITED LIGHT SIGHT
3.5-INCH ROCKET					
Assembled complete round	M28A2	Olive drab	White	Fig. 4-11	ROCKET, HEAT, 3.5-INCH, M28A2 LOT NO. _____ DATE LOADED _____ TEMP LIMITS -20°F to +120°F
	M29A2	Blue	White	Fig. 4-11	ROCKET, PRACTICE, 3.5-INCH, M29A2 LOT NO. _____ DATE LOADED _____ TEMP LIMITS -20°F to +120°F
	M30	Gray	Yellow, with 1/2-in. wide band, approx. 5 inches from nose end	Fig. 4-11	ROCKET, SMOKE, 3.5-INCH, WP, M30 LOT NO. _____ DATE LOADED _____ TEMP LIMITS -20°F to +120°F
ROCKET MOTOR (JATO)					
Assembled complete round	M3A2E1	Olive drab	Brown	Fig. 4-12	ROCKET LMOTOR, M3A2E1 LOT NO. _____ DATE LOADED _____ TEMP LIMITS -40°F to +160°F

APPENDIX A REFERENCES

A-1. Administrative Publications

a. *Publication Indexes.* The following publication index should be consulted frequently for latest changes or revisions of references given in this appendix and for new publications relating to the material covered in this manual.

Consolidated Index of Army Publications and Blank Forms DA PAM 25-30

b. *Army Regulations.*

Reporting of Transportation Discrepancies in Shipments AR 55-38
 Malfunctions Involving Ammunition and Explosives AR 75-1
 Ionizing Radiation Protection (Licensing) Control, Transportation,
 The Army Radiation Safety Program AR 11-9
 Accident Reporting and Records AR 385-40
 Policies and Procedures for Firing Ammunition for Training, Target
 Practice, and Combat AR 385-63
 U.S. Army Explosives Safety Program AR 385-64
 Reporting of Item and Packaging Discrepancies AR 735-11-2
 Storage and Supply Activity Operations AR 740-1

c. *DA Pamphlet*

Functional Users Manual For The Army Maintenance Management
 System (TAMMS) DA Pam 738-750
 Ammunition and Explosives Safety Standards DA PAM 385-64

A-2. Blank Forms

Transportation Discrepancy Report SF Form 361
 Report of Discrepancy (ROD) SF Form 364
 US Army Accident Report DA Form 285
 Recommended Changes to Publications and Blank Forms DA Form 2028
 Recommended Changes to Equipment Technical Publications DA Form 2028-2
 Ammunition Condition Report DA Form 2415

A-3. Doctrinal, Training, and Organizational Publications

Light Antiarmor Weapons FM 23-25

A-4. Equipment Manuals

a. *Technical Manuals.*

Operator's Aviation Unit and Intermediate Maintenance Manual (Including Repair Parts and Special Tools List) for Hydra 70 Rocket Launchers (Formerly 2.75-Inch Rocket Launchers	TM 9-1055-460-13&P
Operator's, Aviation Unit and Intermediate Maintenance Manual with Repair Parts and Special Tools List (Including Depot Maintenance Repair Parts and Special Tools) for Rocket Management Subsystems Inventory Deployment, XM138, Part Number 9324106-002 (NSN 1090-01-077-8939)	TM 9-1090-207-13&P
Ammunition, General	TM 9-1300-200
Ammunition Maintenance	TM 9-1300-250
Operator's Manual for 66MM Light Antitank Weapon (LAW) System M72A1 and M72A2 with Coupler M72A3 and Practice Rocket Launcher M190 with M73 Practice Rocket.....	TM 9-1340-214-10
Unit Maintenance Manual for 2.75-Inch Low Spin, Folding Fin Aircraft Rockets; 2.75-Inch Spin Stabilized, Wrap Around Fin Aircraft Rockets; 66MM Light Antitank Weapon Systems; 3.5-Inch Rockets; and M3A2E1 Rocket Motor (JATO)	TM 9-1340-222-20
Rocket Launcher M190 with Subcaliber 35MM: Practice Rocket M73	TM 9-1340-224-12

b. *Technical Bulletins.*

Ammunition: National Stock Numbers and Department of Defense Codes	TB 9-1300-256
Munitions Restricted or Suspended	TB 9-1300-385

c. *Supply Bulletins.*

Ammunition Surveillance Procedures	SB 742-1
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A-5. Supply Catalogs

Sets, Kits, and Outfits Tool Set, Ammunition: Direct Support, General Support Ordnance Company, Ammunition (NSN 4940-00-322-6058)	SC 4940-95-A11
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APPENDIX B
DIRECT SUPPORT AND GENERAL SUPPORT
PACKING MATERIALS, ACCESSORIES, AND TOOLS

Section I. INTRODUCTION

B-1. Scope

This appendix lists packing materials, accessories, and tools required for the performance of direct support and general support maintenance of 2.75-inch, low spin, folding fin aircraft rockets (LSFFAR), 2.75-inch spin stabilized, wrap around fin aircraft rockets (SSWAFAR), 66mm light antitank weapon system (LAW), 3.5-inch rockets and rocket motor M3A2E1 (JATO).

B-2. General

This appendix is divided into the following sections:

- a. Section II - Packing Materials. A list of packing materials authorized for the performance of maintenance at the direct support and general support levels.
- b. Section III - Special Tools List. A list of special tools and equipment authorized for the performance of maintenance at the direct support and general support levels.

B-3. Explanation of Columns

The following provided an explanation of columns in sections II and III.

- a. Part Number (Drawing Number). The primary number used by the manufacturer which controls the design and characteristics of the item. Drawings can be obtained from originating source (see CAGE Code).
- b. Contractor and Government Entity Code (CAGE Code) - (Formerly known as Federal Supply Code for Manufacturers (FSCM)). A five-digit code used to identify the manufacturer, distributor, or Government agency/activity that supplies the item.
- c. Figure Number. The number of the figure where the item is identified/located.
- d. Description. The Federal item name and any additional description of the item required.

Section II. PACKING MATERIALS

Part No. (Dwg No.)	CAGE Code	Figure No.	Description
			2.75-INCH ROCKETS
9230114	19203		BOX, PACKING, AMMUNITION: w/warheads M151, M156, M230, WDU-4A/A, WTU-1B
9230116	19203		BOX, PACKING, AMMUNITION: w/warheads M229, M259, M261, and M267
9235841	19203		BOX, PACKING, AMMUNITION: w/warheads M151, M156, and M230
9235840	19203		BOX, PACKING, AMMUNITION: w/warhead M229
8886810	19203		BOX, PACKING, AMMUNITION: M151, M156, M230, WTU-1B, M274
9224842	19203		BOX, PACKING, AMMUNITION: M229
242057 (For CONUS only)	19203		BOX, PACKING, AMMUNITION: WDU-4A/A
8883479	19203		BOX, PACKING, AMMUNITION: MK40
8861213	19203		BOX, PACKING, AMMUNITION: for rocket fuzes M423, M429, and M435
9340713	19203		BOX, PACKING, AMMUNITION: 4 ea - warhead M274 and motor MK66
9357963	19200		BOX, PACKING, AMMUNITION: 3 ea - warhead M257 and 3 ea. motor MK66
9242056	19203		BOX, PACKING, AMMUNITION: flechette, WDU-4A/A
8864492	19203		CHEST, AMMUNITION: M423, M429
9230113	19203		CONTAINER, AMMUNITION: fiber, PA30 (warheads M151, M156, M230, WTU-1/B, WDU-4A/A)
9230115	19203		CONTAINER, AMMUNITION: fiber, PA29, warhead M229
8886811	19203		CONTAINER, AMMUNITION: fiber, M523, warheads M151, M156, M230, WTU-1/B
9224841	19203		CONTAINER, AMMUNITION: fiber, PA26, warhead HE, M229
12934714	19200		CONTAINER, AMMUNITION: fiber, PA145, warhead M229 and motor MK66

Section II. PACKING MATERIALS - Continued
Section II. PACKING MATERIALS

Part No. (Dwg No.)	CAGE Code	Figure No.	Description
			2.75-INCH ROCKETS (Continued)
9335611	19203		CONTAINER, AMMUNITION: fiber, PA89, warhead M261 or M267 and motor MK66
8883478	19203		CONTAINER, AMMUNITION: fiber, M518, MK40, for warhead (M257, M278)
9335650	19203		CONTAINER, AMMUNITION: metal, PA88 assembly, warheads M151, M261, M264, M267
9335617	19200		CONTAINER, AMMUNITION: fiber, PA87, MK66
9335613	19203		CONTAINER, AMMUNITION: fiber, PA190, warhead M274 and motor MK66
8882441	19203		SUPPORT, TOP: for fuze M423
8882442	19203		SUPPORT, BOTTOM: for fuze M423
9217200	19203		SUPPORT, TOP: for fuze M429
9217201	19203		SUPPORT, BOTTOM: for fuze M429
9242106	19203		SUPPORT, TOP: for fuze M432
9242108	19203		SUPPORT, BOTTOM: for fuze M432
			66MM WEAPON
9227926	19203		BOX, PACKING, AMMUNITION: HE, antitank, M74A1 or M72A2, w/coupler
9227925-4	19203		BOX, PACKING, AMMUNITION: HE, antitank, M72A1 or M72A1, w/coupler
9227925-6	19203		SADDLE, FRONT: M72A1 or M72A2
9227925-7	19203		SADDLE, REAR: M72A1 or M72A2
			3.5-INCH ROCKETS
7549040	19203		BOX, PACKING ASSEMBLY: M28A2, HEAT, M29A1, practice, M29A2, practice, M30WP
7549038	19203		CONTAINER, AMMUNITION: fiber, M229, M28A2 HEAT, M29A1 practice, M29A2 practice, M30WP
			ROCKET MOTOR M3A2E1
8835922	19203		BOX, PACKING, AMMUNITION

Section III. SPECIAL PACKING TOOLS LIST

Part No.	CAGE Code	Figure No.	Description
53M34750	11722		MARKING OUTFIT: rubber solid Gothic type 1/4-, 1/2-, 3/4-, 1-inch letters (NSN 7520-00-049-7993)
8864731	19203		SALLEE CLOSER (NSN 5120-00-319-5434)
MIL-S-43104	81349		STRAPPING AND SEALING KIT: (5/8-in. strapping). (NSN 3540-00-565-6242)
MIL-S-43104	81349		STRAPPING AND SEALING KIT: (1-1/4-in. strapping). (NSN 3540-00-565-6244)

APPENDIX C

EXPENDABLE AND DURABLE ITEMS LIST

SECTION I. INTRODUCTION

C-1. SCOPE

This appendix lists expendable and durable items that you will need to operate and maintain rockets, rocket motors, and rocket weapon systems. This listing is for information only and is not authority to requisition the listed items. These items are authorized to you by CTA 50-970, Expendable Items (except Medical, Class V, Repair Parts, and Heraldic items), or CTA 8-100, Army Medical Department Expendable /Durable Items.

C-2. EXPLANATION OF COLUMNS

- a. Column (1) - Item number. This number is assigned to the entry in the listing for referenced in the narrative instructions to identify the item (e.g. "Use cleaning compound, item 5, Appendix D").
- b. Column (2) - Level. This column identifies the lowest level of maintenance that requires the listed item.
- c. Column (3) - National Stock Number. This is the National Stock Number (NSN) assigned to the item which you can use to requisition it.
- d. Column (4) - Item Name, Description, Commercial and Government Entity Code (CAGEC), and Part Number. This provides the other information you need to identify the item.
- e. Column (5) - Unit of Measure (U/M)/Unit of Issue (U/I). This code shows the physical measurement or count of an item, such as gallon, dozen, gross, etc.

SECTION II. EXPENDABLE AND DURABLE ITEMS LIST

(1) Item Number	(2) Level	(3) National Stock Number	(4) Description	(5) (U/M/ (U/I)
1	O	6810-00-184-4796	ACETONE, TECHNICAL: 5 gallon can (81348) O-A-51	CN
2	O	6810-00-543-7415	ALCOHOL, DENATURED: grade III (81348) OE760	GL
3	O	8135-00-282-0565	BARRIER MATERIAL, WATER- VAPOR PROOFED, FLEXIBLE: 200-yd roo, 36 in. wide, class I (81349) MILB131	RO
4	O	8020-00-262-9098	BRUSH,ARTIST'S: (81348) H-B-118	
5	O	8020-00-240-6361	BRUSH, ARTIST'S: Flat chisel edge (81348) H-B-118	EA
6	O	8020-00-246-8504	BRUSH, ARTIST'S: Round flat edge (81348) H-B-118	EA
7	O	7920-00-900-3577	BRUSH: (Fuzewell) 3/4 in. x 1-3/8 in. (17987) 15SS	EA
8	O	8020-00-597-4768	BRUSH, LACQUERING: 7/8 in. x 1 in. (81348) H-B-351	EA
9	O	8020-00-245-4522	BRUSH, PAINT: flat, w/square edge 2-1/2 in. w, 5/16 in. thk, 2-1/2 in. lg (81348) H-B-391	EA
10	O	802-00-245-4516	BRUSH, PAINT: rade A, 4in. x 4-1/8 in. (81348) H-B-420	EA
11	O	8020-00-597-5301	BRUSH, PAINT: oval style, chisel edge, 7/8 in. x 2-1/8 in. (81348) H-B-491	EA.
12	O	7520-00-248-9285	BRUSH, PAINT: fountain type, 1-3/8 in. dia, type F (81348) H-B-00621	EA.

(1) Item Number	(2) Level	(3) National Stock Number	(4) Description	(5) (U/M/ (U/I))
13	O	7520-00-223-8000	BRUSH, STENCIL: long handle style type L, 0.813 dia of bristles (81348) H-B-00621	EA
14	O	8020-00-889-	BRUSH, PAINT: 1-1/2 in. x 13/32 in. (81348) H-B-695	EA
15	O	8020-00-205-6505	BRUSH, VARNISH: flat w/chisel edge 1-1/2 in. w, 11/16 in. thk, 2-1/4 in. lg class 1, grade A (81348) H-B-695	EA
16	O	8020-00-262-9084	BRUSH, VARNISH: flat w/square edge, 1/2 in. w, 1/4 in. thk, 1-1/4 in. lg (45092) 608-1	EA
17	O	7920-00-255-5135	BRUSH, WIRE SCRATCH: wood and copper beryllium alloy, curved handle 14 in. x 15/16 in. block, 6 in. x 1-1/4 in. (81348) HB178	EA
18	O	7920-00-269-0933	BRUSH, WIRE SCRATCH: wood and copper beryllium alloy, straight handle, 7-in. x 1 in. block, 6 in. x 1-1/4 in. (81348) HB178	EA
19	O	8030-00-664-7105	COATING, COMPOUND BITUMINOUS SOLVENT TYPE: type (81349) MIL-C-450	GL
20	O	8030-00-290-5141	COATING COMPOUND, BITUMINOUS SOLVENT TYPE: type II (81349) MIL-C-450	GL
21	O	6850-00-264-6573	CORROSION, REMOVING COMPOUND: (81349) MIL-C-10578	GL
22	O	6850-00-264-6573	DESSICANT, ACTIVATED: type I (81349) MIL-D-3464	CN
23	O	7930-00-249-8036	DETERGENT, GENERAL PURPOSE: (81348) P-D-220	CO
24	O	8010-00-297-2122	ENAMEL: Black, No. 37038 (96906) MS35527-2	GL

(1) Item Number	(2) Level	(3) National Stock Number	(4) Description	(5) (U/M/ (U/I)
25	O	8010-00-910-8154	ENAMEL: Black, No. 37038 (81348) TT-E-516	GL
26	O	8010-00-297-2119	ENAMEL: Blue, Medium, No. 35109 (96906) MS35527-2	GL
27	O	8010-00-828-3193	ENAMEL: Olive Drab, No. 34087 (81348) TT-E-516	CN
28	O	8010-00-297-2113	ENAMEL: Olive Drab, No. 34087 (81348) TT-E-516	CN
29	O	8010-00-297-2116	ENAMEL: Olive Drab, No. 34087 (96906) MS35527-8	GL
30	O	8010-00-848-9272	ENAMEL: Olive Drab, lusterless, No. 34087 spray can (81348) TT-E-516	PT
31	O	8010-00-297-0563	ENAMEL: Orange, (Vivid), No. 35524-13 (96906) MS35524-13	GL
32	O	8010-00-297-2114	ENAMEL: Red, No. 31136 (81349) TT-E-516	PT
33	O	8010-00-297-2111	ENAMEL: White, No. 37875 (81348) TT-E-516	GL
34	O	8010-00-878-5761	ENAMEL: White, No. 37875 spray can (81348) TT-E-516	PT
35	O	8010-00-297-2112	ENAMEL: Yellow, No. 33538 (96906) MS35527-12	GL
36	O	8010-00-851-5525	ENAMEL: Yellow, semi-gloss, No. 33538 (09786) SW101-43	PT
37	OJ	5315-00-597-9766	FASTENER, CORRUGATED, WOOD- JOINT: steel, 1/2 in. sawtooth (58536) A-A-1957	HD
38	O	8415-00-682-6786	GLOVES, DISPOSABLE: plastic (96717) PINKIES	PR

(1) Item Number	(2) Level	(3) National Stock Number	(4) Description	(5) (U/M/ (U/I)
39	O	8520-00-782-3509	HAND CLEANER: Type I, class 2 cream, grade A (10266) DD10	CN
40	O	7510-00-161-0811	INK, MARKING STENCIL: Black (58536) A-A-208	GL
41	O	7510-00-161-0815	INK, MARKING STENCIL: White (58536) A-A-208	GL
42	O	7510-00-161-0816	INK, MARKING STENCIL: Yellow (58536) A-A-208	GL
*43	O	8010-00-527-3196	LACQUER: brown, No. 30277 (81348) TT-L-40	GL
44	O	8010-00-664-1914	LACQUER: Grey, No. 36231 (81348) TT-L-20	PT
*45	O	8010-00-161-7392	LACQUER: Lusterless, Sand, No. 30277 (81348) TT-L-40	GL
46	O	8010-00-584-3148	LACQUER: Orange, No. 12197, spray can (81348) TT-L-50	PT
47	O	7520-00-973-1059	MARKER, TUBE TYPE: black (81348) GG-M-00114	DZ
48	O	7520-00-973-1062	MARKER, TUBE TYPE: red (81348) GG-M-00114	DZ
49	O	7520-00-079-0288	MARKER, TUBE TYPE: yellow (81348) GG-M-00114	DZ
50	O	5315-00-889-2743	NAIL: steel head style 19, 1.5 in. (81348) FF-N-105	PG
51	O	5315-00-889-2744	NAIL: steel 6d, 2 in. (81348) FF-N-105	PG
*52	O	5315-00-889-2745	NAIL: steel 8d, 2.5 in. (81348) FF-N-105	PG
53	O	5350-00-271-7935	PAPER, ABRASIVE, FLINT: 120-150 grit (81348) P-P-105	PG

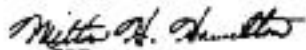
(1) Item Number	(2) Level	(3) National Stock Number	(4) Description	(5) (U/M/ (U/I)
54	O	8135-00-160-7757	PAPER, KRAFT, UNTREATED: chemical treatment unbleached (81348) UU-P-268	RO
55	O	8010-00-515-2208	PRIMER COATING: zinc yellow (81348) TT-P-1757	GL
56	O	7920-00-205-1711	RAG, WIPING: cotton, unbleached mixed colors (81348) DDD-R-30	BE
57	O	5340-00-491-7632	SEAL, ANTIPIRFERAGE, META- LLIC: 0.5 in. dia, 1/8 in thk (96906) MS519385	EA
58	O	8135-00-239-5291	SEAL, STRAPPING: 2n threaded for 5/8 in. steel strapping (81348) QQ-S-781	BX
59	O	8135-00239-5294	SEAL, STRAPPING: 2n threaded for 1-1/4 in. steel strapping (81348) QQ-S-781	BX
60	O	9310-00-240-4737	STENCILBOARD: oiled, 18-1/2 in. x 18-1/2 in. (81348) UU-S-625	SH
61	O	8135-00-281-4071	STRAPPING: steel, 5/8 in. w, nailess (81348) QQ-S-781	CL
62	O	8135-00-283-0671	STRAPPING: steel, 1-1/4 in. w, 0.035 in. thk (81348) QQ-S-781	CL
63	O	7510-00-266-6711	TAPE, PRESSURE SENSITIVE ADHESIVE: masking, 3/4 in. w, 2160 in. roll (81348) UU-T-106	RO
64	O	7510-00-266-6712	TAPE, PRESSURE SENSITIVE ADHESIVE: masking, 1 in. w, 2160 in. roll (81348) PPP-T-42	RO

(1) Item Number	(2) Level	(3) National Stock Number	(4) Description	(5) (U/M/ (U/I)
65	O	7510-00-266-6710	TAPE, PRESSURE SENSITIVE ADHESIVE: masking, 2-in. w, 2160 in. roll (81348) PPP-T-42	RO
66	O	7510-00-266-6715	TAPE, PRESSURE SENSITIVE ADHESIVE: 2-in. w, clear 60 in. lg (81348) PPP-T-60	RO
67	O	7510-00-551-9822	TAPE, PRESSURE SENSITIVE ADHESIVE: transparent cello- phane 1/2 in. w, w/ dispenser (81348) L-T-90	RO
68	O	8010-00-242-2089	THINNER, PAINT, PRODUCTS: (81348) TT-T-291 TY1	GL
69	O	8010-00-160-5794	THINNER, PAINT, PRODUCTS: (81348) TT-T-306	GL
*70	O	9505-00-294-7373	WIRE, NONELECTRICAL: round, zinc coated, 0.0625 in. dia medium temper, 5 lb coil (81348) QQW461	CL
71	O	5350-00-242-4405	WOOL, METALLIC: steel, 1 lb (81348) FF-S-740	LB

* National Stock Number (NSN) to be discontinued - use until exhausted.

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By Order of the Secretary of the Army



MILTON H. HAMILTON
*Administrative Assistant to
the
Secretary of the Army*
07539

GORDON R. SULLIVAN
*General, United States Army
Chief of Staff*

Distribution:

To be distributed in accordance with DA Form 12-40-E, Block 0530, requirements for TM 9-1340-222-34.

*U.S. GOVERNMENT PRINTING OFFICE: 1*4 - 46-049/00712

PIN: 026664-001