TECHNICAL MANUAL

UNIT MAINTENANCE MANUAL

FOR

MILITARY PYROTECHNICS

HEADQUARTERS, DEPARTMENT OF THE ARMY

JANUARY 1995

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HEADQUARTERS
DEPARTMENT OF THE ARMY
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UNIT MAINTENANCE MANUAL FOR MILITARY PYROTECHNICS

REPORTING OF ERRORS

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*This manual supersedes TM 9-1370-203-20&P, 17 November 1978, including all changes.

LIST OF ILLUSTRATIONS

LIST OF TABLES

CHAPTER 1
INTRODUCTION

Section I. GENERAL

1-1. Scope

a. These instructions apply to military pyrotechnics and are for use by or unit maintenance personnel.

b. Operating instructions are contained in: (1) Pyrotechnic Signals (TM 9-1370206-10).

(2) Pyrotechnic Simulators (TM 9-1370207-10).

(3) Photoflash Cartridges, Surface Flares, and Miscellaneous Pyrotechnics (TM 91370-208-10).

c. For operator and organizational maintenance instructions on the MK 45 MOD 0 Aircraft Parachute Flare, refer to TM 9-1370201-12.

d. For operator maintenance instructions on the M206 Aircraft Countermeasure Flare refer to TM 9-1095-206-23&P

1-2. Forms, Records and Reports

a. *Forms*. Forms required by unit maintenance personnel are listed in appendix A and in DA Pam 25-30. Department of the Army maintenance forms and reporting procedures are prescribed in DA PAM 738-750.

b. *Field Report of Accidents*. Accidents involving injury to personnel or damage to materiel will be reported on DA Form 285 in accordance with AR 385-40. Malfunctions will be reported in accordance with AR 75-1.

c. *Report of Damaged or Improper Shipment.* Material received in damaged or otherwise unsatisfactory condition because of deficiencies in preservation, packaging, marking, loading, storage, or handling will be reported on SF 364 in accordance with AR 735-11-2. Reports of improper shipment or damage caused by transportation discrepancies will be reported on SF 361 in accordance with AR 55-38.

1-3. Destruction of Military Pyrotechnics to Prevent Enemy Use

Destruction of military pyrotechnics, when subject to capture or abandonment, will be undertaken by the user only when, in the judgment of the unit commander concerned, such action is necessary in accordance with orders of, or policy established by the Army commander. (Refer to TM 750-244-5-1).

1-4. Safety

a. *Requirements for Safety.* Requirements for safety, care, and handling of pyrotechnic items and accessories are included in TM 9-1300-206, TM 9-1370-201-12, and AR 385-64, as applicable.

b. *Specific Safety Precautions*.

(1) Pyrotechnics are more dangerous than many other types of ammunition because they are more easily initiated. Items with primers should be guarded to prevent a blow on the primer, because such a blow could activate the item.

(2) Pyrotechnics must never be exposed to moisture. Items showing any signs of moisture should be forwarded to authorized personnel for disposal.

(3) Protect pyrotechnics from temperatures below -65°F or above 140°F (4) Pyrotechnics (except standard emergency use items) should not be left indefinitely in aircraft. They should be removed and restored to their original condition and packing.

1-5. Care and Handling

a. Military pyrotechnics must be handled with care at all times. Besides the hazardous pyrotechnic composition, pyrotechnics are composed of sensitive elements, such as, friction compositions and primers.

b. In order to keep military pyrotechnics in a serviceable condition and ready for immediate use, the following general rules apply.

(1) Store pyrotechnics in a dry, well ventilated place, out of direct sunlight, and protect against excessive or variable temperatures.

(2) Handle pyrotechnics with care and protect against shock.

(3) Do not drop or throw boxed pyrotechnics.

(4) Place boxes containing signal cartridges which are discharged by percussion primers, flat with the top up.

(5) Handle pyrotechnics gently, especially the type which are projected, to avoid denting or deforming the barrel or case.

Section II. DESCRIPTION AND DATA

1-6. Types of Pyrotechnic Devices

Pyrotechnic devices may be grouped as follows: photoflash cartridges, flares, signals, simulators, and miscellaneous pyrotechnics. The tabulated data in this chapter and the Maintenance Allocation Chart in appendix B is organized to reflect these divisions.

1-7. Identification

Pyrotechnic devices are identified by markings on the packaging container. These markings include, as appropriate, National Stock Number (NSN), Department of Defense Identification Code (DODIC), nomenclature and model of device, and lot number. Specific colors are painted on some of the containers as a secondary means of identification.

1-8. Description

For detailed description of items refer to:

a. TM 9-1370-206-10.

b. TM 9-1370-207-10.

c. TM 9-1370-208-10.

d. TM 43-0001-37.

1-9. Data

The group number listed in table 1-1 reflects authorized maintenance functions indicated in section II Appendix B.

Table 1-1. Military Pyrotechnics Data

UNO Proper Shipping Name	Model Designation	DODIC	UNO Serial No.	Group No.
Flash powder	M112A1:			0101
	1-second delay	L135	0094	
	2-second delay	L136	0094	
	4-second delay	L137	0094	
Flash powder	M123A1:			
	2-second delay	L139	0094	
	4-second delay	L140	0094	
	6-second delay	L141	0094	
Cartridges, flash	M121	L138	0050	
Flash powder	M124	L142	0094	
Flares, aerial	M76	L425	0093	0201
Flare, surface	M49A1	L495	0092	0202
Flares, aerial	M206	L410	0093	0203
Flares, aerial	MK33, Mod 0	L477	0093	0204
Cartridges, signal:				0301
Illumination, Aircraft				
Double star,				
Red-Red	AN-M37A2	L225	0054	
Yellow-Yellow	AN-M38A2	L226	0054	

Table 1-1. Military Pyrotechnics Data - Continued

UNO Proper Shipping Name	Model Designation	DODIC	UNO Serial No.	Group No.
Green-Green	AN-M39A2	L227	0054	
Red-Yellow	AN-M40A2	L228	0054	
Red-Green	AN-M41A2	L229	0054	
Single star,				
Red	AN-M43A2	L231	0054	
Yellow	AN-M44A2	L232	0054	
Green	AN-M45A2	L233	0054	
Yellow Tracer,				
Double Star,				
Red-Yellow	AN-M53A2	L234	0054	
Green Tracer,				
Double Star,				
Red-Red	AN-M54A2	L235	0054	
Green-Red	AN-M55A2	L236	0054	
Red Tracer, Double Star,				
Green-Green	AN-M56A2	L237	0054	
Red-Red	AN-M57A2	L238	0054	
Signal devices, hand:				
Red	M185	L116	0191	0302
Various colors	M186	L117	0191	
Flares, aerial				
Foliage Penetrating, Red[1]		L119	0093	0310
Cartridges, signal:				
Red	M187	L278	0054	0303
White	M188	L279	0054	
Green	M189	L280	0054	
Amber	M190	L281	0054	
Green Star, Cluster	M125A1	L314	0054	0304
Red Star, Cluster	M158	L306	0054	
White Star, Cluster	M159	L307	0054	
Red Star, Parachute	M126A1	L311	0054	
White Star, Parachute	M127A1	L312	0054	
Green Star, Parachute	M195	L305	0054	
Red Star, Parachute	M131	L277	0054	0305
Green Star, Parachute	M19A2	L310	0054	0306
Illumination Marine:				
Two Star, Red	AN-M75	L276	0254	0307
Signal devices, hand	AN-MK 13 Mod 0	L275	0191	0308
Cartridges, signal:				
Red	M62	L320	0054	0306
Yellow	M64	L322	0054	
Green	M5	L318	0054	

Table 1-1. Military Pyrotechnics Data - Continued

UNO Proper Shipping Name	Model Designation	DODIC	UNO Serial No.	Group No.
Violet	M66	L321	0054	0306
White	M166	L340	0054	0309
Green	M167	L341	0054	
Red	M168	L342	0054	
Yellow	M169	L343	0054	
Green, Parachute	M128A1	L324	0054	0304
Red, Parachute	M129A1	L323	0054	
Yellow, Parachute	M194	L293	0054	0304
Fireworks:				
Atomic Explosion	M142	L605	0333	0401
Detonation Simulator, Explosive	M80	L378	0333	0402
Booby Trap,				0403
Flash	M117	L598	0335	
Illuminating	M118	L599	0335	
Whistling	M119	L600	0335	
Cartridge, flash	Ml10	L596	0050	0404
Flash, Simulator, Artillery	M21	L602	0431	0410
Pyrotechnic, Cartridge: 50mm:[2]	M800	L602	0431	0411
Fireworks:				
Hand Grenade	M116A1	L601	0335	0405
Projectile Air Burst	M27A1B1	L351	0335	0406
Projectile Air Burst	M74 or M74A1	L366	0335	0407
Projectiles, with bursting charge				0408
Charge, Smoke Puff, White		L373	0168	
Primer, Percussion Cap		L130	0044	
Bombs, with bursting charge	M115A2	L594	0034	0409
Cartridges, Flash:				
Simulator, Launching, Antitank Guided Missile and Rocket	M22	L367	0050	0412
Miscellaneous Pyrotechnics:	M72	L506, 10-minute		
Fuse, Warning		L507, 15-minute	0038	0501
Railroad		L508 20-minute	0038	
Cartridges, signal:				
Marker, Location, Marine: Dye	AN-M59	L582	0054	0502
Igniters:				
Starter, Fire	M2	L621	0315	0503

NOTES:

[1]This Signal Kit is a component of the survival kit vest type SRU-21/P

[2]Use Simulators Flash Artillery, M21 when stocks of Pyrotechnic, Cartridge: 50mm are exhausted.

CHAPTER 2
MAINTENANCE INSTRUCTIONS

Section I. SERVICE UPON RECEIPT OF MATERIEL

2-1. General

Upon receipt of military pyrotechnics, verify items against requisition list. If markings on box conflict with nomenclature of item requisitioned, check with pyrotechnic supply personnel to determine if an issue error has been made.

2-2. Precautions

All standard precautions for care and handling of ammunition are applicable to military pyrotechnic. For specific precautions, refer to paragraphs 1-4 and 1-5.

2-3. Inspection of Packaging Materials

a. *General.* Inspection at unit level consists of a visual check of packaging materials. Do not open any moisture-proof container or barrier bag because the item must be protected from moisture until just prior to use.

b. *Packaging Defects*. Specific inspection criteria and identification of defects (as acceptable, repairable or unrepairable) are outlined in table 2-1. The most commonly encountered packaging defects are listed below: (1) Outer containers (boxes) damaged, weathered, or rotted to the extent contents are not protected.

(2) Inner container damaged to the extent contents are not protected or cannot be readily removed.

(3) Container cap or closure not secured to the extent contents are not protected.

(4) Inner containers wet (except metal), rusted, moldy, or mildewed.

(5) Hardware or banding loose, missing, broken, or ineffective.

(6) Handle or cleat missing or broken.

(7) Contents loose to the extent item may be damaged in handling.

Table 2-1. Inspection Criteria for Packaging

Item	Acceptable	Repairable	Unrepairable
Wooden Boxes, Crates, and Metal Containers			
Hardware	Operative and tight. Nails, screws and fasteners present and in good condition.	Inoperative or loose. Nails, screws, and fasteners which can be replaced or properly sealed.	None. None.
Ends	Free from damage.	Broken or missing cleats and handles.	Damage which requires disassembly of box.
Wood	Splits less than 3 inches long no closer than 1 inch to edge of board or adjoining split. The board must be secured by at least one nail on each side of the split when it extends to the end of the board. Warping which does not prevent sealing of box or insertion of required ammunition.	Splits over 3 inches but no closer than 1 inch to edge or adjoining split, or 1/8-inch wide, which can be repaired by use of corrugated fasteners. None.	Splits closer than 1 inch to edge of board or adjoining split or over 1/8-inch wide. Warping which prevents insertion of removal of rounds and/ or sealing of the box.

Table 2-1. Inspection Criteria for Packaging - Continued

Item	Acceptable	Repairable	Unrepairable
	Light mold which can be brushed off. Mildew stains which do not affect legility of markings.	None.	Excessive mildew and mold which cannot be removed and which render markings illegible.
	Sound tight knots the diameter which do not exceed 1/3 the width of the board.	None.	Holes or loose knots which exceed 1-1/2 inch.
	Skids securely attached to box or crate. Knots no greater than 1/4 the width of skid.	Loose skids.	Knots greater than 1/4 the width of skid.
Boxes		Bulged Container. Build-up of hydrogen gas in certain pyrotechnic munitions sealed in barrier bags (see para 2-11).	
Tie wires	Light rust, removable with fin sandpaper.	None.	Broken, excessive rust.
Strapping	Present and unweakened by rust or distortion.	Missing, rusted or distorted.	None.
Painting and	Marking legible, correct, and complete. Painted orange if light box.	Light box, reused box, marking illegible. Marking on box not in agreement with marking on inner packaging. Marking incomplete (see para 2-3c).	None.
Metal ends, wood or fiber container	Minor rust.	None.	Perforations, excessive rust or ends which are crushed or not securely crimped to body.
Body and cap, wood or fiber container	No opening through which moisture could penetrate to item. No hole of any kind. No mold or mildew. Slight accumulation of dirt. No mold, milder or rot. Slight accumulation of dirt. Free from wrinkles cased by looseness between layers. Blisters with combined area less than 1/2 square inch. No moisture absorption.		Holes, perforations, punctures, tears, cuts, loose seals. Cuts, tears or gouges closer than 1 inch to closure, more than ½ square inch in area, or through all imprenated layers. Molded or mildewed. Heavy accumulation of dirt. Molded, mildewed or rotted. Heavy accumulation of dirt. Wrinkled or peeling.
Barrier material		None. None.	Blisters with combined area of more than ½ square inch. Wet or soft containers.

Table 2-1. Inspection Criteria for Packaging - Continued

Item	Acceptable	Repairable	Unrepairable
Metal containers (except drum for M142 Atomic Explosion Simulator)			
Body and Cap	Minor dents	None.	Deep dents or scoring in drum.
	Minor rust.	None.	Rust which has caused pitting and perforations.
	No hole of any kind.	None	Puncture
Steel Drum for M142 Atomic Explosion Simulator			
Drum Metal Containers.	Marking legible and complete.	Marking illegible. Marking incomplete (see para 2-3c).	None.
	Dents, not broken through.	None.	Dents broken through.
	Minor rust.	Major rust, not broken through	Major rust on inside.
	No hole of any kind.	None.	Puncture.
		Bulged containers (see para 2-16).	

c. The following information must be legible on each box; and on steel drum of M142 Atomic Explosion Simulator (see fig. 2-1).

(1) National (or Federal) Stock Number (NSN or FSN).
(2) Department of Defense Identification Code (DODIC) (repeated on ends of box.) (3) Department of Transportation (DOT) designation.
(4) Quantity.
(5) Nomenclature.
(6) Lot number (repeated on ends of box).
(7) Month and year loaded.
(8) Gross weight.
(9) Cubical displacement.

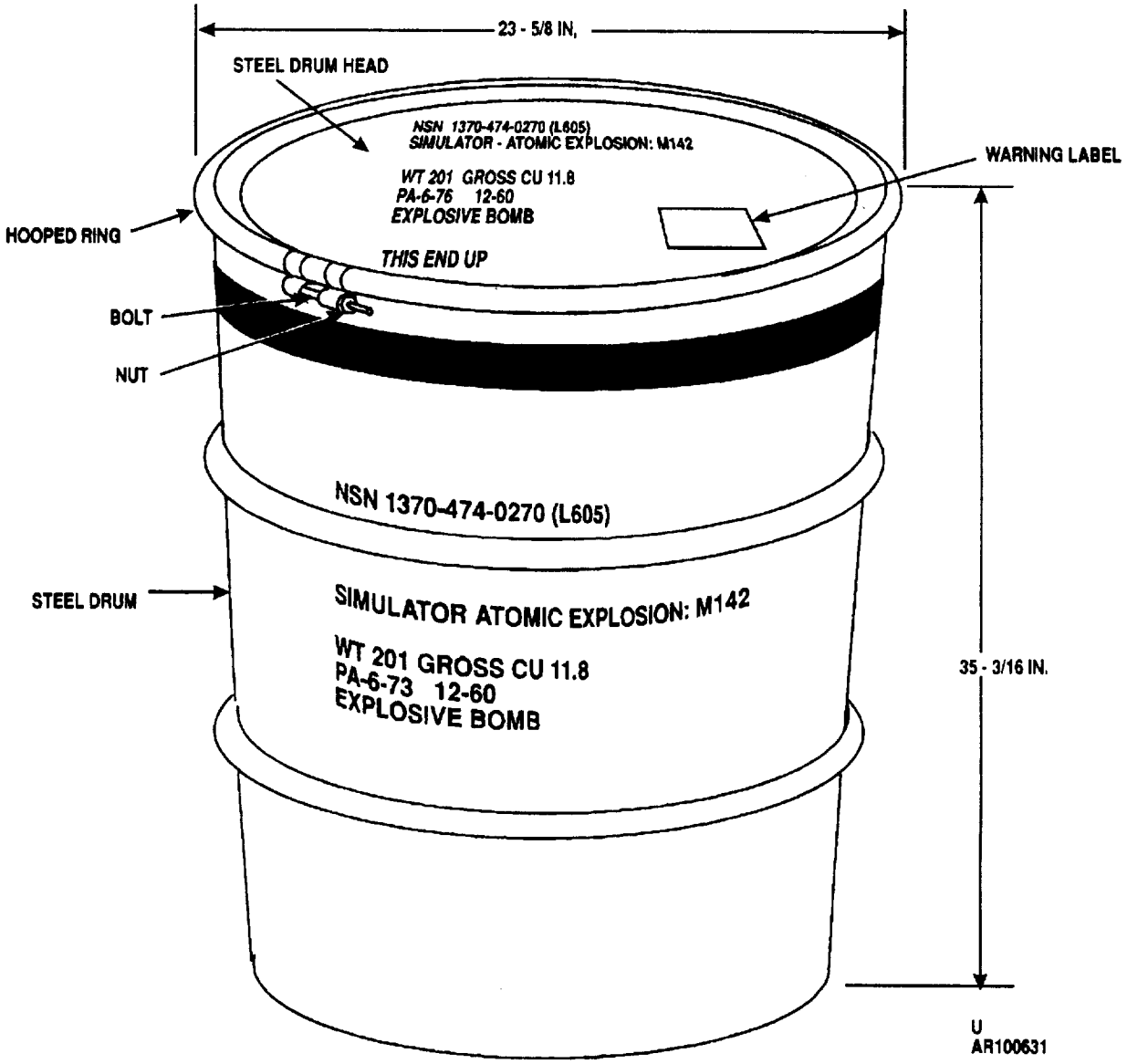

Figure 2-1. Atomic explosion simulator M142.

2-4. Corrective Action

a. Make repairs as instructed in. the following paragraphs. If serviceable packing has been saved, it may be used instead of making repairs, provided that markings on boxes are changed to agree with contents.

b. If moisture-proof container or barrier bag is penetrated, i.e., hole, tear, perforation, puncture, or cut, forward items contained therein to authorized personnel for disposal. The items have probably been damaged by moisture.

c. Before repairing a damaged box, except for simple re-marking, remove contents.

2-5. Unpacking Procedures

CAUTION

DO NOT OPEN BARRIER BAGS OR HERMETICALLY SEALED CONTAINERS UNTIL PYROTECHNIC ITEMS ARE TO BE ISSUED. EXPOSURE TO MOISTURE IN THE AIR CAN RESULT IN DUDS OR OTHER MALFUNCTIONS.

a. *General.* Organizational maintenance personnel will save some boxes and packing material for immediate reuse. Contact the direct support unit for disposition of remaining boxes. If boxes are needed and none are available, request boxes from direct support units. For repackaging procedures, refer to paragraph 2-15.

b. *Pallets.*

WARNING

WEAR GLOVES AND SAFETY GLASSES OR GOGGLES WHEN CUTTING AND HANDLING METAL STRAPPING. AVOID BEING STRUCK BY ENDS OF STRAPPING WHEN TENSION IS RELEASED.

(1) Cut strapping with metal cutting shears. Never attempt to break strapping by prying or twisting, this can damage the boxes and their contents.

(2) Remove boxes from pallet.

(3) Dispose of strapping and nonrecoverable materials. Contact the direct support unit for disposition of serviceable pallets and components.

c. *Wooden Ammunition Packing Boxes (fig. C-2).*

WARNING

TO PREVENT INJURY, RELEASE TENSION ON STEEL STRAPPING BY PRESSING DOWN ON TOP OF BOX WHILE CUTTING STRAPS ON SIDE OF BOX IN (1) BELOW.

(1) Cut steel strapping with metal shears. Remove and dispose of strapping. Never attempt to break strapping by prying or twisting, this can damage the boxes and their contents, and cause possible injury to personnel.

(2) Cut metallic seal with pliers. Discard seal.

(3) Turn hasp catch and open hasps on hinge and hasp boxes, or pull out on spring latch to release on spring-latch boxes.

(4) Lift box top and remove top padding. Note top position for reclosing on springlatch boxes.

(5) Remove inner packs.

d. *Barrier Bag.*

(1) Cut barrier bag open along edge with most excess material as close to sealed edge as possible.

(2) Cut or remove tape and open inner container.

(3) Remove padding, if any.

(4) Remove items. If all items are not removed, close and reseal barrier bag with adhesive tape. (Refer to appendix D for suitable size tape.)

e. *Hermetically Sealed Container.*

(1) Using key attached to container, remove sealing strip.

(2) Remove top of container.

(3) Remove any padding pieces from container.
(4) Remove item.

f. *Fiber Container.*

(1) Remove adhesive tape.
(2) Remove top of container.
(3) Remove any padding pieces from container.
(4) Remove item.
(5) Save all containers-when possible-for repack.

Section II. TOOLS AND EQUIPMENT

2-6. Common Tools and Equipment

Standard and commonly use tools and equipment having general application to military pyrotechnics are authorized for issue by tables of organization and equipment (TOE).

2-7. Repair Parts and Special Tools

Repair parts and special tools required at organizational level are listed in appendix C.

Section III. MAINTENANCE

2-8. General

Organizational maintenance is performed by designated personnel in using units and is primarily preventive in nature. It is performed to prevent deterioration of pyrotechnics due to rough handling and exposure. Direct support units may be called upon to provide technical advice, assistance, packing materials, and consumable supplies for accomplishing maintenance. Responsibilities of organizational maintenance units are limited to those functions listed in Section II, appendix B.

2-9. Consumable Supplies

a. Paint, cleaning compounds, and other consumable supplies authorized for use by organizational maintenance personnel are listed in Appendix D.

b. Consumable supplies should be requisitioned through normal supply channels on an as-required basis.

2-10. Maintenance of Box Hardware

a. *Repair of Damaged Hardware*. Hardware which has been damaged to the point that is inoperable is usually irrepairable; however, minor damage can usually be corrected by straightening, as follows:

(1) Using pliers carefully, bend damaged item unit its configuration is the same as the serviceable item.

(2) Test repaired hardware for proper functioning.

b. *Replacement of Irrepairable Hardware.* Hardware which cannot be repaired can be replaced with a serviceable item cannibalized from an unserviceable container, as follows: (1) Using a screwdriver, remove unserviceable hardware.

(2) Attempt to reinstall serviceable hardware in existing holes. Secure with screws.
(3) If screws are missing or cannot be tightened in existing holes, proceed as follows:

(a) Replace missing screws with others obtained from an unserviceable box.
(b) If screws cannot be tightened, move hardware (with box top in place) to a different location where screws can be secured. IF necessary, carve notch to accommodate hinge pin.
(c) Mark location for attaching screws and remove hardware.
(d) Drive and remove a small nail at each location to provide a pilot hole.
(e) Place hardware and screws in position and secure.

c. *Removing Rust or Corrosion from Hardware*.

(1) Remove rust or corrosion from hardware by first brushing with a wire brush.
(2) Cover with primer or paint.

d. *Replacing Broken, Loose, or Deteriorated Strapping.*

(1) Cut pieces of 5/8-inch banding of sufficient length to go around box plus about 6 to 8 inches.

(2) Position strap(s) under box.

(3) Insert one strap end into strap stretcher so that strap is held firmly by stretcher, with about 3 inches of strap protruding.

(4) Place clip over strap end.

(5) Thread loose end of strap through clip and into stretcher head.

(6) Tighten strap by repeated movement of ratchet lever, until edges begin to cut into box.

(7) Using banding crimper, crimp clip in two places.

(8) Release locking pawl on stretcher and slide stretcher out.

(9) Cut of excess strapping.

(10) Repeat (3) through (9) above, for each strap.

2-11. Maintenance of Boxes

a. *Repair of Cracks and Splits in Wood*.

(1) Hold board tight so that the crack or split is closed.

(2) Hammer corrugated fasteners into wood at 4to 6-inch intervals. Fastener should be centered across crack.

b. *Repair of Broken Cleats or Wood Handles.*

(1) Remove broken cleat with claw hammer or pry bar.

(2) Remove serviceable cleat with claw hammer or pry bar from an otherwise unserviceable box.

(3) Position serviceable cleat on box and secure with 3 to 5 small nails.

(4) Bend nails over inside of box with hammer.

c. Repair of Rope or Strap Handles.

(1) Remove cleats holding handle with claw hammer or pry bar.

(2) Remove serviceable handle from an otherwise unserviceable box by removing the holding cleats with claw hammer or pry bar.

NOTE

Do not remove nails or staples attaching handle to cleats.

(3) Position serviceable handle and cleats and attach to box with 3 to 5 nails in each cleat.

(4) Bend nails over inside box with hammer.

d. *Painting of Wood Boxes*. Normally, used boxes will not be painted except to obliterate previous markings or to indicate less than full pack (see para. 2-14).

e. *Releasing hydrogen gas from bulged boxes*.

(1) Due to possible violent expansion of wooden boxes when banding is cut, boxes must be confined prior to cutting bands.

NOTE

- **Due to different types of shipping containers, holding fixture to confine boxes must be locally designed and fabricated to meet needs of the operation.**
- **Gas release should be conducted in a well-ventilated area free of flammables, explosives, fire, open flame and spark-producing devices, other ignition sources or chemical contaminants. All persons opening containers must wear a face shield, flame-retardant clothing, conductive sole shoes, or safety shoes with conductive straps.**

(2) Remove barrier bags from boxes and use non-sparking pick to puncture bag releasing gas. Heat seal barrier bag or replace.

(3) Repair or replace wooden shipping containers and repack items.

2-12. Marking of Boxes

a. Normally, box remarking at the organizational level will be a touch-up operation. Faded or damaged box markings may be restored, using a waterproof black ink marker or a small brush and paint. Minor changes, such as a change of lot number to reflect the items actually repacked in a box, may be made by merely crossing out the incorrect number(s) and neatly printing the correct one(s) immediately adjacent, using a waterproof black ink marker or a small brush and paint.

b. If it is necessary to completely re-mark a box:

(1) Determine exactly what must be marked on the box and in what order it must be placed. Refer to paragraph 2-3c and/or copy from the original box, an identical box, or the inner packaging. Note the size of the letters used and the space between lines.

(2) Cover the old, unwanted markings with a coat of marking obliterating lacquer and allow it to dry.

(3) If possible, have a stencil cut by an ammunition company or other nearby organization having the facilities. Using masking tape, secure the stencil over the area to be marked and spray or brush black paint evenly over it to mark the box. If a stencil is not available, proceed to (4) below.

(4) Using a pencil and any available straight edge, draw a series of parallel lines spaced as noted in (1) above.

(5) Neatly letter the required markings, using a waterproof black ink marker or a small brush and paint.

c. Check markings for accuracy and legibility.

d. Allow markings to dry before handling.

2-13. Cleaning, Touch-up, and Marking of Steel Drum for M142 Atomic Explosion Simulator

a. Make diagram of markings and record all markings.

b. Remove dirt, mud, and other foreign material, using rags or brushes. Use rags dipped in alcohol to remove grease.

c. Using wire brush, remove flaked, chipped, blistered or peeling paint.

d. Remove rust, using wire brush or sandpaper.

e. Allow alcohol-cleaned surfaces to dry thoroughly before painting.

f. Apply primer to all bare metal.

g. Allow primed surfaces to dry thoroughly

h. Apply white enamel to primed surfaces, or brown lacquer to the band.

i. Allow freshly painted surfaces to dry thoroughly.

j. Mark in accordance with paragraph 2-12.

k. Check markings for accuracy.

l. Allow markings to dry before handling.

2-14. Painting and Marking of Boxes with Light Loads

NOTE

Organizational maintenance personnel will apply this procedure only when boxes with less than full contents are returned to storage area or transported to new location. When painting of a light box is required, re-marking (except quantity) may be avoided by applying masking tape over markings prior to painting.

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

b. Make diagram of markings on box and record all markings except quantity figure (or cover markings per note above).

c. Apply orange enamel to all outer surfaces of box. If enamel is not available, use orange lacquer.

d. When box is dry, re-mark as diagrammed (b above) (see para 2-12), or remove masking tape.

e. Count quantity of items in box and mark number on box in same position as original quantity figure.

f. Print words LIGHT BOX on each side of box, using approximately the same size letters as the original markings.

2-15. Repacking Procedures

a. *General.*

(1) Repacking will depend on the availability of packaging materials. Additional packaging materials will be obtained from direct support units. Table 2-2 contains packing and marking data for standard packaging.

(2) Assure that proper nomenclature and lot number for items are marked on both inner and outer packages. Partially filled boxes must be painted and marked as instructed in paragraph 2-14.

(3) For Simulator Launching, Anti-Tank, Guided Missile and Rocket, M22 repacking, use available packing materials or original packing if possible. NSN has not been assigned to the packing materials yet.

b. *Barrier Bag.*

(1) Place protective materials at sensitive points of item.

(2) Place item(s) into bag or carton.

(3) Close carton and seal with tape.

(4) Wrap carton in barrier material.

(5) Seal barrier material or bag with tape (refer to Appendix D for correct tape type).

c. *Hermetically Sealed Container.*

(1) Slide item into container.

(2) Use adequate filler material to assure a tight fit.

(3) Cover any sensitive components with padding.

(4) Place top on container.

(5) Seal with plastic filament tape or black nylon tape by wrapping around the joint in a double layer and folding edges over top.

d. *Wooden Box.*

(1) Verify that markings on inner pack and box agree.

(2) If necessary, organizational maintenance will re-mark box as instructed in paragraph 2-12 to agree with contents.

(3) Place inner packs(s) into box. Position items to balance load for carrying.

(4) Use adequate filler material to assure a tight pack.

(5) Close top.

(6) On hinge and hasp box, close hasp and rotate hasp catch to latch position.

(7) Secure latch or hasp catch with piece of metallic seal wire, if available, otherwise, use light wire.

(8) Organizational maintenance personnel will mark partially filled boxes in accordance with paragraph 2-14.

e. *Fiber Container*.

(1) Holding container at a slight angle (30°-60°), insert item into the container and seat firmly.

(2) Place padding on item as required. Secure with tape, if necessary.

(3) Slide on end cap.

(4) Seal end cap by covering joint with two layers of plastic filament tape or black nylon tape.

2-16. Releasing Gas from PA-19 Metal Containers

a. For protection from cover flying open, a wooden box should be fabricated locally with an open front which will allow a PA-19 container to be inserted. Container handle should be accessible with a clearance of one to two inches between container lid and box.

NOTE

Gas release should be conducted in a well-ventilated area free of flammables, explosives, fire, open flame and spark-producing devices, other ignition sources or chemical contaminants. All persons opening containers must wear a face shield, flame-retardant clothing, and conductive sole shoes, or safety shoes with conductive straps.

b. For containers with an end handle, hold handle with downward force, and with a non-sparking tool shaped in the form of a "J", pull latch forward. Keep latch in constant contact with hasp, if possible.

c. For containers without an end handle, hold lower half of container body exerting a downward force, and with a non-sparking tool shaped in the form a "J", pull latch forward. Keep latch in constant contact with hasp, if possible.

d. Due to gas pressure within container, cover may open with considerable force. Be sure that PA-19 container is grounded to work bench or other source insuring continuity to a good ground.

e. If cover does not move from container body breaking container seal, utilize "J"-shaped non-sparking tool to pry lid open releasing entrapped gas.

f. A hissing sound may accompany release of gas. If no hissing sound is detected, check to make sure lid has opened. If it has not, repeat step 5. If container is open, reseal container and remove from fabricated wooden box.

Table 2-2. Packing and Marking Data

Items	Wood packing box			Cube (ft)
	Items per box	Items per inner pack	Total weight (lb)	
CARTRIDGES				
Cartridge, Photoflash: M112A1	40	10	75	1.5
Cartridge, Photoflash: M123A1	12	3	74.4	1.7
Cartridge, Photoflash, Practice: M121	40	10	75	1.5
Cartridge, Photoflash, Practice: M124	12	3	74.4	1.7
FLARES				
Flare, Surface: Airport, M76	1	1	42	1.0
Flare, Surface: Trip, M49A1	32	32	46.5	1.74
Flare, Countermeasure: Aircraft, M206	100	50	67	1.3
Flare, Ballistic Aerial Target; Infrared Tracking, MK 33, Mod 0	50	25	55.5	0.93
SIGNAL				
Signal, Illumination, Aircraft	80	10	57.5	1.6
Double Star,				
AN-M37A2 (Red-Red)				
AN-M38A2 (Yellow-Yellow)				
AN-M39A2 (Green-Green)	80	10	57.5	1.6
AN-M40A2 (Red-Yellow)	80	10	57.5	1.6
AN-M41A2 (Red-Green)	80	10	57.5	1.6
Single Star,				
AN-M43A2 (Red)	80	10	57.5	1.6
AN-M44A2 (Yellow)	80	10	57.5	1.6
AN-M45A2 (Green)	80	10	57.5	1.6
TRACERS				
Tracer, Double Star,				
AN-M53A2 (Yellow Tracer, Red-Yellow)	80	10	57.5	1.6
AN-M54A2 (Green Tracer, Red-Red)	80	10	57.5	1.6
AN-M55A2 (Green Tracer, Green-Red)	80	10	57.5	1.6
AN-M56A2 (Red Tracer, Green-Green)	80	10	57.5	1.6
AN-M57A2 (Red Tracer, Red-Red)	80	10	57.5	1.6
SIGNALS				
Signal, Kit, Personnel Distress:				
M185 (Red)	240	60	135	5.7
M186 (various colors)	240	60	135	5.7
Foliage Penetrating (Red) DODIC L119	100	100	90	8

Table 2-2. Packing and Marking Data - Continued

Items	Wood packing box			Cube (ft)
	Items per box	Items per inner pack	Total weight (lb)	
SIGNALS - Continued				
Signal, Illumination, Ground: M187 (red) M188 (white) M189 (green) M190 (amber)	1,250	50	81	2.1
Signal, Smoke Ground: M166 (white) M167 (green) M168 (red) M169 (yellow)	240	6	56	1.2
Signal, Illumination, Ground: Green Star Parachute, M19A2	30	1	62	1.8
Signal, Smoke Ground: M62 (red) M64 (yellow) M65 (green) M66 (violet)	30	1	62	1.8
Signal, Illumination, Ground Green Star, Cluster, M125A1 Red Star, Cluster, M158 White Star, Cluster, M159 Red Star Parachute, M126A1 White Star, Parachute, M127A1 Green Star, Parachute, M195	36	1	55	1.5
Signal, Smoke Ground: Yellow, Parachute, M194 Green, Parachute, M128A1 Red, Parachute, M129A1	36	1	55	1.5
Signal, Illumination, Ground: Red Star, Parachute, M131	25	1	50	1.2
Signal, Illumination, Marine: Two Star, AN-MK75	100	5	57	1.68
Signal, Smoke and Illumination, Marine: AN-MK13 Mod 0 Simulators	108	12	80	3.2
Simulator, Projectile Air Burst: Charge, Smoke, Puff, White	200	5	79	2.48
Simulator, Projectile Air Burst: M27A1B1	36	9	51.3	2.28
Simulator, Projectile, Air Burst: M74A1	80	10	57.5	1.6
Simulator, Boobytrap: Flash, M117 Illuminating, M118 Whistling, M119	150	5	47	1.5
Simulator, Atomic Explosion: M142	None	1	201	11.8
Simulator, Projectile, Ground Burst: M115A2	100	5	67.35	3.8
Simulator, Flash, Artillery: M110	30	1	55	1.8
Simulator, Flash, Artillery: M21	162	9	94.6	4.34
Simulator, Pyrotechnic, Cartridge, 50MM: M800	162	9	94.6	4.34
Simulator, Hand Grenade: M116A1	150	5	65	3.1
Detonation Simulator, Explosive: M80	2,500	50	68	3.8
Simulator, Launching, Antitank, Guided Missile and Rocket, M22	240	10	40	1.5

Table 2-2. Packing and Marking Data - Continued

Items	Wood packing box			Cube (ft)
	Items per box	Items per inner pack	Total weight (lb)	
MISCELLANEOUS PYROTECHNICS				
Fusee, Warning, Railroad: Red, M72 10-minute, 15-minute, 20-minute	40	10	46	1.3
Marker, Location, Marine: dye, AN-M59	30	10	70	4.4
Starter, Fire: M2	500	1	35	1.12

CHAPTER 3
SHIPMENT AND STORAGE

Section I. SHIPMENT

3-1. Precautions

Pyrotechnic devices must be adequately protected during shipment. Damaged, contaminated, or otherwise degraded material may be dangerous and its usefulness may be impaired.

3-2. Transportation

a. Block and brace pyrotechnic packages being transported in trucks, jeeps, and other tactical vehicles. Blocking and bracing must be adequate to withstand sudden stops and starts, as well as off-road operations.

b. If packing is broken or damaged in shipment, inspect as instructed in paragraph 2-3 and take corrective action as indicated.

3-3. Handling

CAUTION

IMPROPER HANDLING OF PYROTECHNIC MATERIALS CAN AFFECT THEIR RELIABILITY AND SAFETY, CREATING CONDITIONS HAZARDOUS TO PERSONNEL.

Do not roll, drop, throw, or subject boxes to rough handling.

Section II. STORAGE

3-4. Precautions

a. Select level, well-drained sites free from readily ignitable and flammable materials.

b. Provide nonflammable or fire-resistant overhead covers (e.g., tarpaulin) for all items. Maintain overhead space of approximately 18 inches between cover and items. Keep cover at least 6 inches from pile on the ends and at sides to permit circulation of air.

c. Temporarily store unserviceable items in a segregated area.

d. Temporarily store items returned by the using unit in a segregated area for inspection and repacking.

3-5. Data

a. *Field Storage Compatibility Groups.*

(1) Storage compatibility groups consist of primary groups of pyrotechnic items, with comparable storage risks grouped together for storage in the field. Storage safety procedures are based on the following: (a) A Field Storage Unit (FSU) is composed of a group of stacks. The maximum quantity of items is stored in each stack within each FSU. The minimum distance between FSU's is specified in table 3-1.

(b) Normally, only one kind of pyrotechnic material is stored in a stack. Items should be arranged in stacks in the best manner to best facilitate inventory and inspection. Where camouflage is a consideration, stacks may be stepped in toward the top (terraced or pyramid stacking) to decrease shadows.

(2) All pyrotechnic items in this technical manual are in field storage category D.

Table 3-1. Quantity-Distance for Field Storage

Gross tons per stacks	Gross tons per FSU	Minimum distance in feet between			
		Stacks unbarricaded	Stacks barricaded	FSU unbarricaded	Categories
Less than 10	400	40	30	300	750
10-20 maximum	400	50	40	300	760

b. *Quantity-Distance Table For Field Storage.* Data specified in table 3-1 is to be used as a guide when storing military pyrotechnics in the field only. Any reduction of distances or increase in tonnage will increase the probability of loss of life and pyrotechnic devices.

c. *Permanent Installation Storage*. For permanent storage, standard quantity-distance classes and storage compatibility groups given in TM 9-1300-206 apply.

3-6. Procedures

a. When stacking, use heavy, well-supported dunnage to prevent the stack from sinking, and to keep the bottom tier off the ground.

b. Use a hardstand of gravel and sand, when possible, rather than excessive dunnage.

c. Allow at least a 6-inch clearance beneath the pile for air circulation.

d. Dig suitable trenches around stacking area to prevent water from flowing under the pile.

APPENDIX A
REFERENCES

A-1. SCOPE

This appendix lists all forms, pamphlets, regulations, field, manuals, and technical manuals referenced in this manual. DA Pam 25-30 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.

A-2. BLANK FORMS

US Army Accident Report	DA Form 285
Discrepancy in Shipment Report	SF Form 361
Report of Discrepancy	SF Form 364

A-3. DA PAMPHLETS

Consolidated Index of Army Publications and Blank Forms	DA Pam 25-30
The Army Maintenance Management System (TAMMS)	DA Pam 738-750

A-4. ARMY REGULATIONS

Reporting of Transportation Discrepancies in Shipments	AR 55-38
Malfunctions Involving Ammunition and Explosives	AR 75-1
Accident Reporting and Records	AR 385-40
Ammunition and Explosive Safety Standards	AR 385-64
Reporting Item Discrepancies Attributable to Shippers	AR 735-11-2

A-5. TECHNICAL MANUALS

Operator's Aviation Unit Maintenance and Aviation Intermediate Maintenance Manual (Including Repair Parts and Special Tools List) for Dispenser, General Purpose Aircraft: XM130	TM 9-1095-206-23&P
Ammunition and Explosives Standards	TM 9-1300-206
Operator's and Organizational Maintenance Manual (Including Repair Parts and Special Tools List): Flare, Aircraft: Parachute, White, MK 45 MOD 0 (FSN 1370-088-5658) L473; Flare, Aircraft: Parachute, MK 45 MOD 0 with Adapter for Dispenser XM19 (FSN 1370-461-1526) L424; and Dispenser, Flare: XM19 (FSN 1370-179-6011) L106	TM 9-1370-201-12
Operator's Manual for Pyrotechnic Signals	TM 9-1370-206-10
Operator's Manual for Pyrotechnic Simulators	TM 9-1370-207-10
Operator's Manual for Photo Flash Cartridges, Surface Flares, and Miscellaneous Pyrotechnic Items	TM 9-1370-208-10
Army Ammunition Data Sheets for Military Pyrotechnics (FS 1370)	TM 43-0001-37
Procedures for Destruction of Conventional Ammunition and Improved Conventional Munitions to Prevent Enemy Use	TM 43-0002-33

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APPENDIX B
MAINTENANCE ALLOCATION CHART

Section I. INTRODUCTION

B-1. General

a. The Maintenance Allocation Chart designates responsibility for the performance of maintenance functions.

b. Only the lowest level of maintenance authorized to perform a maintenance function is indicated.

c. A maintenance function assigned to maintenance level will automatically be authorized to be performed at any higher maintenance level.

d. A maintenance function that cannot be performed at the assigned level of maintenance for any reason may be evacuated to the next higher level. Higher maintenance levels will perform the maintenance functions of lower maintenance levels, when required, or directed by the appropriate commander.

B-2. Maintenance Functions

The implementation of maintenance tasks will be consistent with the assigned maintenance in accordance with the following definitions.

a. *Inspect*. To determine the serviceability of an item by comparing its physical, mechanical, and/or electrical characteristics with established standards through examination.

b. *Test.* To verify serviceability and to detect incipient failure by measuring the mechanical or electrical characteristics of an item and comparing those characteristics with prescribed standards.

c. *Service*. Operations required periodically to keep an item in proper operating condition.

(1) *Unpack*. To remove item from packing box for service or when required for the performance of other maintenance operations.

(2) *Repack*. To return item to packing box after service or other maintenance operations.

(3) *Clean.* To rid the item of contamination.

(4) *Touch up.* To spot paint scratched or blistered surfaces.

(5) *Mark*. To restore obliterated identification.

d. *Install.* To emplace, seat, or fix into position an item in a manner to allow the proper functioning of the equipment.

e. *Adjust.* To maintain within prescribed limits by bringing into proper or exact position, or by setting the operating characteristics to the specified parameters.

f. *Renovate*. To restore item to serviceable condition.

(1) *Paint*. To repaint the entire item.

(2) *Repair*. To restore serviceability to an item by correcting specific damage, fault, malfunction, or failure through the application of maintenance services or groups of similar devices.

(3) *Replace*. To substitute a serviceable component in a manner to allow the proper functioning of equipment.

B-3. Explanation of Format

a. *Group Number.* Column 1 lists the group numbers, the purpose of which is to identify specific devices or groups of similar devices.

b. *Functional Group*. Column 2 lists the item names of parts and assemblies on which maintenance is authorized.

c. Maintenance Function. Column 3 lists the twelve maintenance functions defined in B-2 above. Capital letters are inserted under appropriate maintenance functions, on line with each functional group, to indicate the lowest level of maintenance authorized to perform that function. The symbols used and the maintenance category that each represents are as follows:

Symbol	*Explanation*
C	Operator/Crew
O	Organizational
F	Direct Support
H	General Support
D	Depot

d. *Tools and Equipment and Remarks*. Column 4, Tools and Equipment, and Column 5, Remarks, are not applicable.

Section II. MAINTENANCE ALLOCATION CHART FOR PYROTECHNICS

(1) GROUP NUMBER	(2) Functional group	(3) Maintenance functions												(4) Tools and equipment	(5) Remarks
				SERVICE							RENOVATE				
		INSPECT	TEST	UNPACK	REPACK	CLEAN	TOUCH UP	MARK	INSTALL	ADJUST	PAINT	REPAIR	REPLACE		
	GROUP 01, CARTRIDGES														
0101	Cartridge, Photoflash: M112A1; M123A1, PRACTICE, M121; M124														
	Cartridge	C	D	C	O	-	-	-	C	-	-	-	-		
	Packing Material	O	-	-	-	-	-	O	-	-	-	O	O		
	GROUP 02, FLARES														
0201	Flare, Surface: Airport, M76														
	Flare	C	D	C	O	-	-	-	-	-	-	-	-		
	Packing Material	O	-	-	-	-	-	O	-	-	-	O	O		
0202	Flare, Surface: Trip M49A1														
	Flare	C	D	C	O	-	-	-	-	-	-	-	-		
	Packing Material	O	-	-	-	-	-	O	-	-	-	O	O		
0203	Flare, Aircraft: Countermeasure; M206														
	Flare	O	-	O	O	C	-	-	C	-	-	-	-		
0204	Flare Ballistic Aerial Target; Infrared Tracking MK 33, MOD 0														
	Flare	C	D	C	O	-	-	-	C	-	-	-	-		
	Packing Material	O	-	-	-	-	-	O	-	-	-	O	O		
	GROUP 03, SIGNALS														
0301	Signal, Illumination, Aircraft: All														
	Signal	C	D	C	O	-	-	-	-	-	-	-	-		
	Packing Material	O	-	-	-	-	-	O	-	-	-	O	O		
0302	Signal Kit, Personnel Distress M185, M186														
	Signal Kit	C	D	C	O	-	-	-	-	-	-	-	-		
	Packing Material	O	-	-	-	-	-	O	-	-	-	O	O		
0303	Signal, Illumination, Ground: M187, M188, M189, M190														
	Signal	C	D	C	O	-	-	-	-	-	-	-	-		
	Packing Material	O	-	-	-	-	-	O	-	-	-	O	O		

Section II. MAINTENANCE ALLOCATION CHART FOR PYROTECHNICS

(1) GROUP NUMBER	(2) Functional group	(3) Maintenance functions												(4) Tools and equipment	(5) Remarks
				SERVICE							RENOVATE				
		INSPECT	TEST	UNPACK	REPACK	CLEAN	TOUCH UP	MARK	INSTALL	ADJUST	PAINT	REPAIR	REPLACE		
0304	Signal, Illumination, Ground: Cluster, M125A1, M158, M159, Signal, Illumination, Ground, Parachute: M126A1, M127A1, M195 Signal, Smoke, Ground: Parachute, M128A1, M129A1, M194														
	Signal	C	D	C	O	-	-	-	-	-	-	-	-		
	Packing Material	O	-	-	-	-	-	O	-	-	-	O	O		
0305	Signal, Illumination, Ground: Parachute, M131														
	Signal	C	D	C	O	-	-	-	-	-	-	-	-		
	Packing Material	O	-	-	-	-	-	O	-	-	-	O	O		
0306	Signal, Illumination, Ground: Green Star, Parachute, M19A2, Signal, Smoke,Ground: M62, M64, M65, M66														
	Signal	C	D	C	O	-	-	-	-	-	-	-	-		
	Packing Material	O	-	-	-	-	-	O	-	-	-	O	O		
0307	Signal, Illumination, Marine: Two Star, Red AN-M75														
	Signal	C	D	C	O	-	-	-	-	-	-	-	-		
	Packing Material	O	-	-	-	-	-	O	-	-	-	O	O		
0308	Signal, Smoke and Illumination, Marine MK 13 MOD 0														
	Signal	C	D	C	O	-	-	-	-	-	-	-	-		
	Packing Material	O	-	-	-	-	-	O	-	-	-	O	O		
0309	Signal, Smoke, Ground: M166, M167, M168, M167														
	Signal	C	D	C	O	-	-	-	-	-	-	-	-		
	Packing Material	O	-	-	-	-	-	O	-	-	-	O	O		
0310	Signal Kit, Personnel Distress: Foliage Penetrating (Red DODIC L119)														
	Signal Kit	C	D	C	O	-	-	-	-	-	-	-	-		
	Packing Material	O	-	-	-	-	-	O	-	-	-	O	O	O	
	GROUP 04, SIMULATORS														
0401	Simulator, Atomic Explosion: M142														
	Simulator	C	D	C	O	-	-	-	-	-	-	-	-		
	Packing Material	O	-	-	-	-	-	O	-	-	-	O	O		

Section II. MAINTENANCE ALLOCATION CHART FOR PYROTECHNICS

(1) GROUP NUMBER	(2) Functional group	(3) Maintenance functions												(4) Tools and equipment	(5) Remarks
				SERVICE							RENOVATE				
		INSPECT	TEST	UNPACK	REPACK	CLEAN	TOUCH UP	MARK	INSTALL	ADJUST	PAINT	REPAIR	REPLACE		
0402	Simulator, Detonation, Explosive, M80														
	Detonation Simulator	C	D	C	O	-	-	-	-	-	-	-	-		
	Packing Material	O	-	-	-	-	-	O	-	-	-	O	O		
0403	Simulators, Explosive Boobytrap: Flash, M117: Illuminating, M118: Whistling, M119														
	Simulator	C	D	C	O	-	-	-	-	-	-	-	-		
	Packing Material	O	-	-	-	-	-	O	-	-	-	O	O		
0404	Simulator, Flash, Artillery: M110														
	Simulator	C	D	C	O	-	-	-	-	-	-	-	-		
	Packing Material	O	-	-	-	-	-	O	-	-	-	O	O		
0405	Simulator, Hand Grenade, M116A1														
	Simulator	C	D	C	O	-	-	-	-	-	-	-	-		
	Packing Material	O	-	-	-	-	-	O	-	-	-	O	O		
0406	Simulator, Projectile Airburst: M27A1B1														
	Simulator	C	D	C	O	-	-	-	-	-	-	-	-		
	Packing Material	O	-	-	-	-	-	O	-	-	-	O	O		
0407	Simulator, Projectile, Airburst: M74 or M74A1														
	Simulator	C	D	C	O	-	-	-	-	-	-	-	-		
	Packing Material	O	-	-	-	-	-	O	-	-	-	O	O		
0408	Simulator, Projectile Airburst: Charge, Smoke, Puff, White														
	Simulator	C	D	C	O	-	-	-	-	-	-	-	-		
	Packing Material	O	-	-	-	-	-	O	-	-	-	O	O		
	Percussion Cap Primer	C	D	C	O	-	-	-	-	-	-	-	-		
0409	Simulator, Projectile Groundburst, M115A2														
	Simulator	C	D	C	O	-	-	-	-	-	-	-	-		
	Packing Material	O	-	-	-	-	-	O	-	-	-	O	O		
0410	Simulator, Flash, Artillery: M21														
	Simulator	C	D	C	O	-	-	-	-	-	-	-	-		
	Packing Material	O	-	-	-	-	-	O	-	-	-	O	O		
0411	Simulator, Pyrotechnic, Ctg, 50mm:														
	Simulator: M800	C	D	C	O	-	-	-	-	-	-	-	-		
	Packing Material	O	-	-	-	-	-	O	-	-	-	O	O		
0412	Simulator, Launching, Anti-Tank, Guided Missile and Rocket, M22	C	-	C	C	-	-	-	C	-	-	-	-		
	Packing Material	O	-	-	-	-	-	O	-	-	-	O	O		

Section II. MAINTENANCE ALLOCATION CHART FOR PYROTECHNICS

(1) GROUP NUMBER	(2) Functional group	(3) Maintenance functions												(4) Tools and equipment	(5) Remarks
				SERVICE							RENOVATE				
		INSPECT	TEST	UNPACK	REPACK	CLEAN	TOUCH UP	MARK	INSTALL	ADJUST	PAINT	REPAIR	REPLACE		
	GROUP 05, MISCELLANEOUS PYROTECHNICS														
0501	Fusees, Warning, Railroad: Red, M72, 10, 15, and 20-minutes														
	Fusee	C	D	C	O	-	-	-	-	-	-	-	-		
	Packing Material	O	-	-	-	-	-	O	-	-	-	O	O		
0502	Marker, Location, Marine: Dye, AN-M59														
	Marker	C	D	C	O	-	-	-	-	-	-	-	-		
	Packing Material	O	-	-	-	-	-	O	-	-	-	O	O		
0503	Starter, Fire: M2														
	Starter	C	D	C	O	-	-	-	-	-	-	-	-		
	Packing Material	O	-	-	-	-	-	O	-	-	-	O	O		

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APPENDIX C
PACKING MATERIALS, ACCESSORIES, AND TOOLS

Section I. INTRODUCTION

C-1. Scope

This appendix lists packing materials, accessories, and tools required for the performance of organizational maintenance for Military Pyrotechnics.

C-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 organizational level.

b. Section III Special Packing Tools List. A list of special tools and accessories authorized for the performance of maintenance at the organizational level.

C-3. Explanation of Columns

The following provides an explanation of columns in Section II and III.

a. Part Number (Drawing Number). Indicates 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. Commercial and Government Entity Code (CAGEC) (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. This column lists the number of the figure where the item is identified/located.

d. Description. Indicates the federal item name and any additional description of the item required.

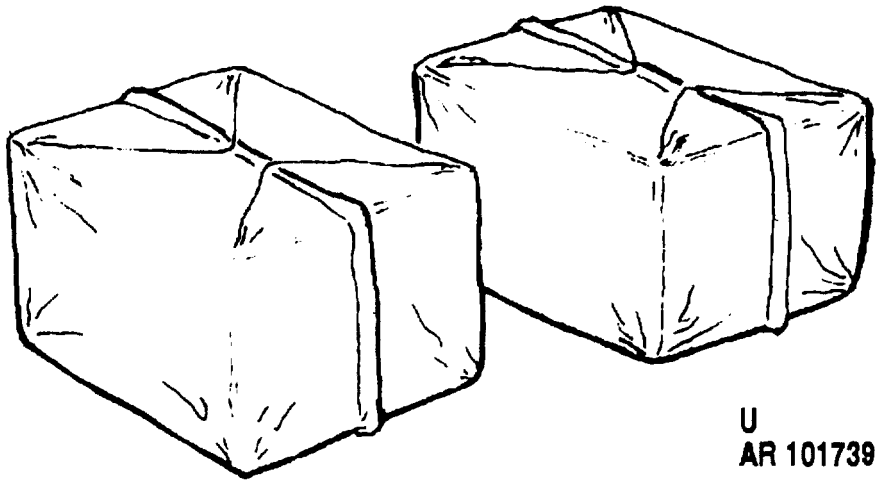

Figure C-1. Typical Box, Packing

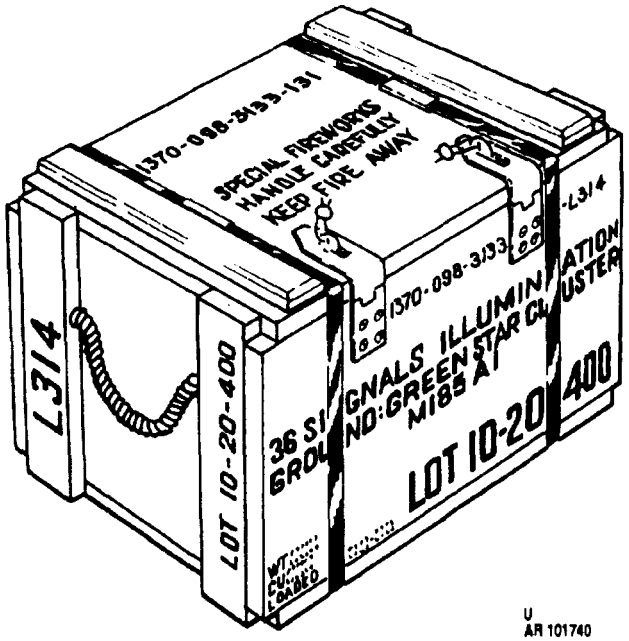

Figure C-2. Typical Ammunition Packing Box

Section II. PACKING MATERIALS

Part No. (Dwg No.)	CAGE Code	Figure No.	Description
			CARTRIDGES
			CARTRIDGE, PHOTOFLASH: M112A1
			CARTRIDGE, PHOTOFLASH, PRACTICE: M121
8860564	19203	C-1	BOX, PACKING, AMMUNITION: fiberboard
8860565	19203	C-2	BOX, PACKING, AMMUNITION:
MIL-B-117	81349	C-1	ENVELOPE, PACKAGING: 9-1/8 in. wide, 15-5/8 in. lg
			CARTRIDGE, PHOTOFLASH: M123A1
			CARTRIDGE, PHOTOFLASH, PRACTICE: M124
7548472	19203	C-1	BOX, PACKING, AMMUNITION:
7548473	19203	C-2	BOX, PACKING, AMMUNITION:
MIL-B-117	81349	C-1	ENVELOPE, PACKAGING: 9-1/8 in. wide, 15-5/8 in. lg
			FLARES
			FLARE SURFACE: AIRPORT, M76
MIL-B-117	81349	C-1	ENVELOPE, PACKAGING: 9-1/8 in wide, 15-5/8 in. lg
			FLARE, SURFACE: TRIP, M49A1
8830880	19203	C-2	BOX, PACKING, AMMUNITION:
8830881	19203	C-1	BOX, PACKING, AMMUNITION: fiberboard
MIL-B-117	81349	C-1	ENVELOPE, PACKAGING: 9-1/8 in. wide, 15-5/8 in. lg
			SIGNALS
			SIGNAL ILLUMINATION, AIRCRAFT:
8836949	19203	C-1	BOX, PACKING, AMMUNITION: fiberboard
8836950	19203	C-2	BOX, PACKING,AMMUNITION:
MIL-B-117	81349	C-1	ENVELOPE, PACKAGING: 9-1/8 in. wide, 15-5/8 in. lg.
			SIGNAL KIT, PERSONNEL DISTRESS: M185 AND M186
9231550	19203	C-1	BOX, PACKING, AMMUNITION
9231551	19203	C-2	BOX, PACKING, AMMUNITION:
MIL-B-117	81349	C-1	ENVELOPE, PACKAGING: 9-1/8 in. wide, 15-5/8 in. lg

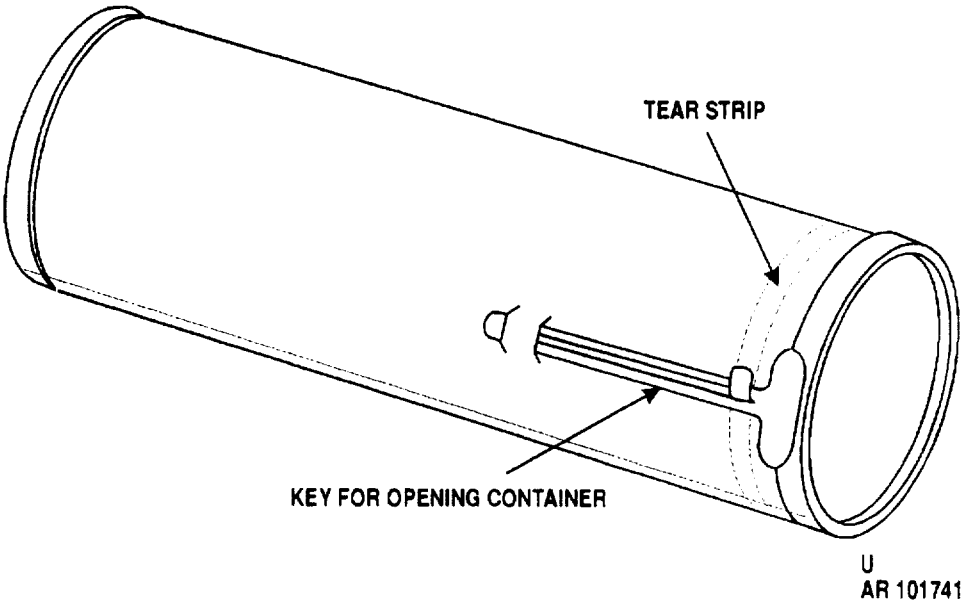

Figure C-3. Metal Ammunition Container

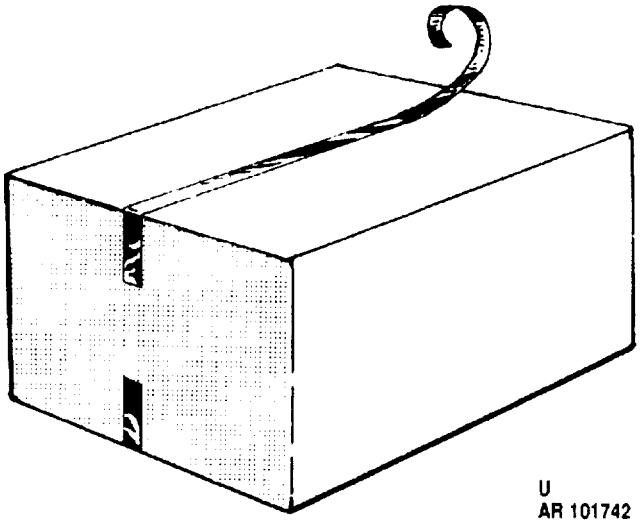

Figure C-4. Ammunition Fiber Container

Section II. PACKING MATERIALS (CONT'D)

Part No. (Dwg No.)	CAGE Code	Figure No.	Description
			SIGNALS- Cont'd
			SIGNAL, ILLUMINATION, GROUND: M187, M188, M189, AND M190
9234287	19203	C-2	BOX, PACKING, AMMUNITION:
9234286	19203	C-2	BOX, PACKING, AMMUNITION: removable tray and sleeve, inner and outer
MIL-B-117	81349	C-1	ENVELOPE, PACKAGING: 9-1/8 in. wide, 15-5/8 in. lg
			SIGNAL, ILLUMINATION, GROUND: CLUSTER M125A1, M158, M159; PARACHUTE M126A1, M127A1, M195; SIGNAL, SMOKE, GROUND: PARACHUTE, M128A1, M129A1, M194
7548415	19203	C-2	BOX, PACKING, AMMUNITION:
7548414	19203	C-3	CAN, HERMETIC SEALING: M492
			SIGNAL, ILLUMINATION GROUND: PARACHUTE, M131
8837837	19203	C-2	BOX, PACKING, AMMUNITION:
8837838	19203	C-3	CAN, HERMETIC SEALING: M291
			SIGNAL, ILLUMATION, GROUND: PARACHUTE, M19A2; SIGNAL, SMOKE, GROUND: M62, M64, M65, AND M66
8866684	19203	C-4	CONTAINER, AMMUNITION: M104A1, fiber
8866685	19203	C-2	BOX, PACKING, AMMUNITION:
			SIGNAL, ILLUMINATION, MARINE: AN-M75
76-1-870	19203	C-3	CONTAINER, PACKING ASSEMBLY: METAL; consists of: bag, packing; bag; bottom; cover; body
			SIGNAL, SMOKE, AND ILLUMINATION, MARINE: MK13 MOD 0
563246	10001	C-2	BOX, AMMUNITION: MK3 Mod 0
593127	10001	C-1	BOX, PACKING, AMMUNITION: MK3, Mod 0 fiberboard

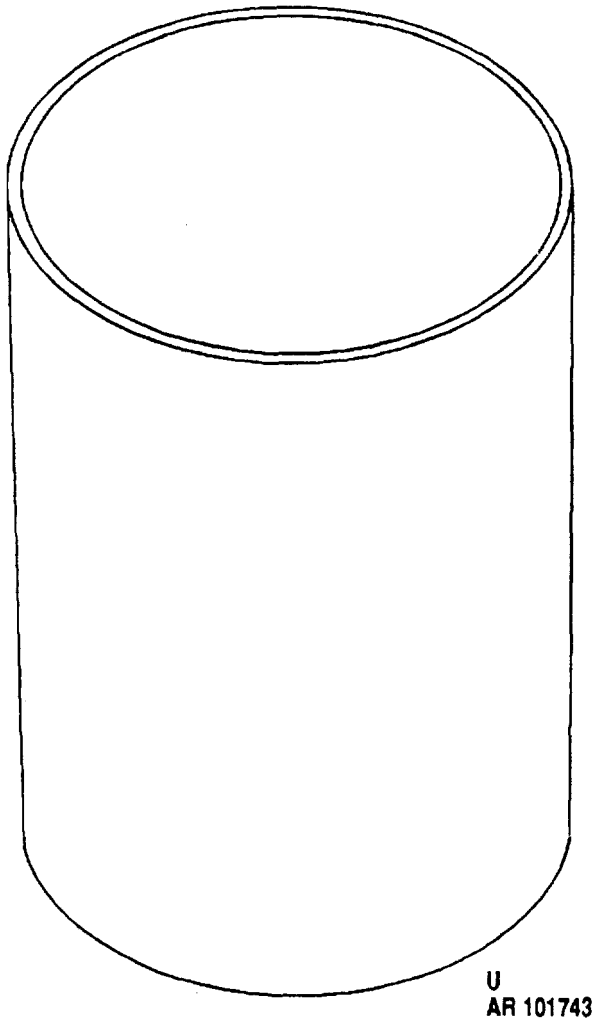

Figure C-5. Ammunition Fiber Drum

Section II. PACKING MATERIALS (CONTD)

Part No. (Dwg No.)	CAGE Code	Figure No.	Description
			SIGNALS-Cont'd
			SIGNAL, SMOKE, GROUND: M166, M167, M168, M169
9210950	19203	C-2	BOX, PACKING, AMMUNITION:
MIL-B-117	81349	C-1	ENVELOPE, PACKAGING: 9-1/8 in. wide, 15-5/8 in. lg
			SIGNAL KIT:
8799715	19203	C-2	BOX, PACKING, AMMUNITION: type III; style, C30, cleated panel
6000D7047-1	27934		SIGNAL KIT, PERSONNEL DISTRESS:
			SIMULATORS
			SIMULATOR, ATOMIC EXPLOSION: M142
8864219	19203	C-5	DRUM, FIBER, AMMUNITION:
			DETONATION SIMULATOR, EXPLOSIVE: M80
9362676	19203	C-1	BOX, PACKING, AMMUNITION: M80
8853678	19203	C-2	BOX, PACKING, AMMUNITION:
MIL-B-117	81349	C-1	ENVELOPE, PACKAGING: 9-1/8 in. wide, 15-5/8 in. lg
			SIMULATORS BOOBY TRAP: FLASH, MI17; ILLUMINATING M118
8799712	19203	C-2	BOX, PACKING, AMMUNITION:
8799713	19203	C-1	BOX, PACKING, AMMUNITION: fiberboard
MIL-B-117	81349	C-1	ENVELOPE, PACKAGING: 9-1/8 in. wide, 15-5/8 in. lg
			SIMULATOR, BOOBY TRAP: WHISTLING, M119
8799716	19203	C-1	BOX, PACKING, AMMUNITION: fiberboard
8799717	19203	C-2	BOX, PACKING, AMMUNITION:
MIL-B-117	81349	C-1	ENVELOPE, PACKAGING: 9-1/8 in. wide, 15-5/8 in. lg
			SIMULATOR, FLASH, ARTILLERY: M110
8880486	19203	C-2	BOX, PACKING, AMMUNITION:
8880487	19203	C-4	CONTAINER, AMMUNITION, FIBER: M242

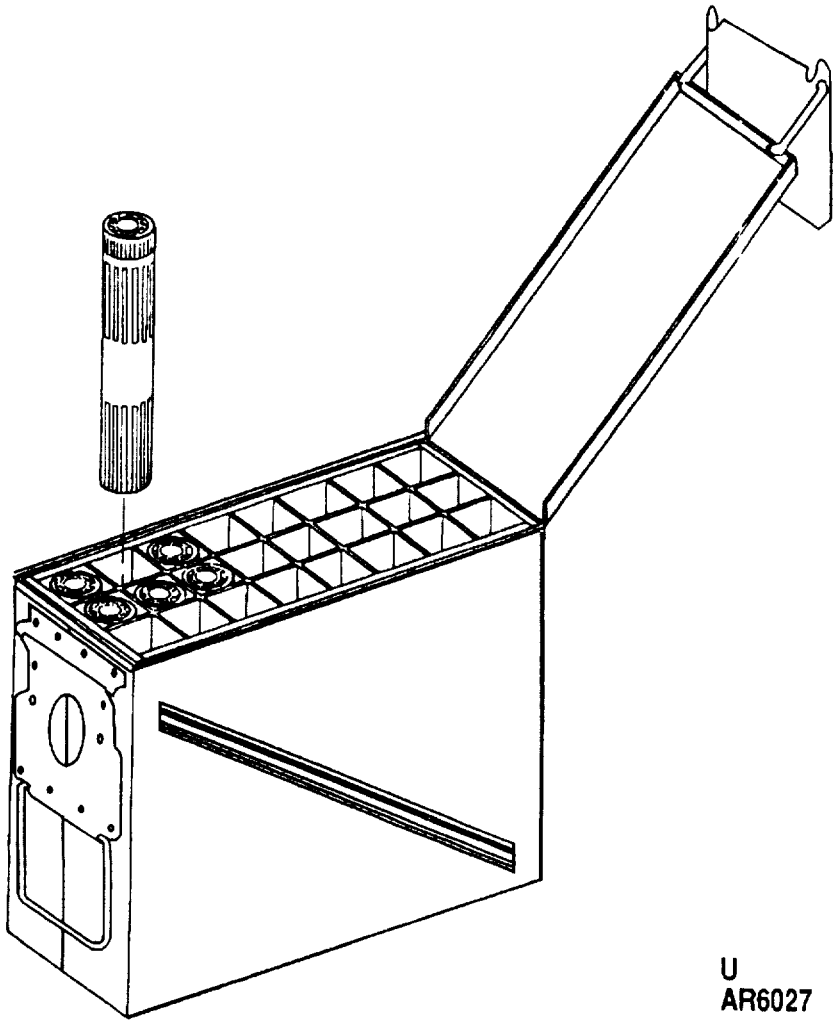

Figure C-6. Shipping and Storage Container, Cartridge: M548

Section II. PACKING MATERIALS (CONT'D)

Part No. (Dwg No.)	CAGE Code	Figure No.	Description
			SIMULATORS-Cont'd
			SIMULATOR, HAND GRENADE: M116A1
8799714	19203		BOX, PACKING, AMMUNITION:
MIL-B-117	81349	C-1	ENVELOPE, PACKAGING: 9-1/8 in. wide, 15-5/8 in. lg
			SIMULATOR, PROJECTILE AIRBURST: M27A1131
8860597	19203	C-2	BOX, PACKING, AMMUNITION:
8860596	19203	C-1	CARTON, PACKING, AMMUNITION:
MIL-B-117	81349	C-1	ENVELOPE, PACKAGING: 9-1/8 in. wide, 15-5/8 in. lg
			SIMULATOR, PROJECTILE AIRBURST: M74 OR M74A1
8836949	19203	C-1	BOX, PACKING, AMMUNITION: fiberboard
8836950	19203	C-2	BOX, PACKING, AMMUNITION: plywood, NN-P-530
MIL-B-117	81349	C-4	ENVELOPE, PACKAGING: 9-1/8 in. wide, 15-5/8 in. lg
			SIMULATOR, PROJECTILE AIRBURST: CHARGE, SMOKE PUFF, WHITE
20-4072	81361	C-2	BOX, PACKING, AMMUNITION: M114 fiber containers
76-2-71	19203	C-4	CONTAINER, PACKING, ASSEMBLY: fiber
			SIMULATOR, PROJECTILE GROUND BURST: M115A2
8799710	19203	C-2	BOX, PACKING, AMMUNITION:
799711	19203	C-1	BOX, PACKING, AMMUNITION: B17, paper-board
MIL-B-117	81349	C-1	ENVELOPE, PACKAGING: 9-1/8 in. wide, 15-5/8 in. lg
			SIMULATOR, FLASH ARTILLERY: M21
8880487	19203		CONTAINER, AMMUNITION, FIBER: M242
			SIMULATOR, PYROTECHNIC, CARTRIDGE:: 50MM, M80
8880487	19203		CONTAINER, AMMUNITION, FIBER: M242

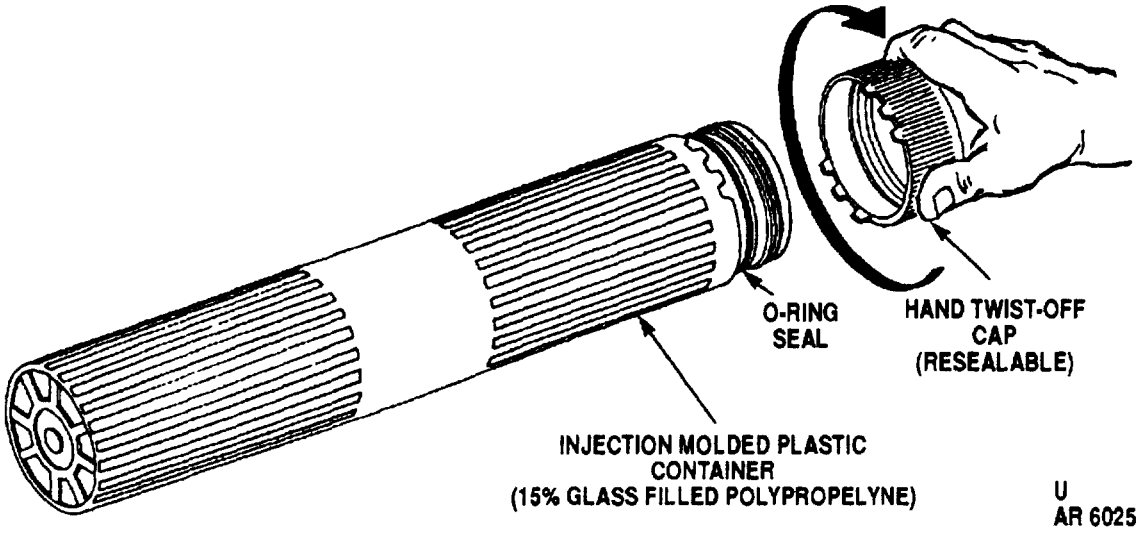

Figure C-7. Packing, Preformed: PA142 (for Container, Signal)

Section H. PACKING MATERIALS (CONT'D)

Part No. (Dwg No.)	CAGE Code	Figure No.	Description
			SIMULATORS-Cont'd
			SIMULATOR, LAUNCHING, ANTI-TANK, GUIDED MISSILE AND ROCKET: M22
			MISCELLANEOUS PYROTECHNICS
			FUSES, WARNING, RAILROAD, RED, 20 MIN.: M72
8835158	19203	C-1	BOX, PACKING, AMMUNITION: fiberboard
835159	19203	C-2	BOX, PACKING, AMMUNITION: wood
MIL-B-117	81349	C-1	ENVELOPE, PACKAGING: 9-1/8 in. wide, 15-5/8 in. lg
			MARKER, LOCATION, MARINE: DYE, AN-M59
9224974	19203	C-1	BOX, PACKING, AMMUNITION: fiberboard
9224975	19203	C-2	BOX, PACKING, AMMUNITION:
MIL-B-117	81349	C-1	ENVELOPE, PACKAGING: 9-1/8 in. wide, 15-5/8 in. lg
			STARTER, FIRE: M2
C4-14-4	81361	C-2	BOX, WOOD:
7258943	19200	C-6	SHIPPING AND STORAGE CONTAINER, CARTRIDGE: M548
12900007	19200	C-7	PACKING PREFORMED: FOR CONTAINER, SIGNAL PA142

SECTION III. SPECIAL PACKING TOOLS

Part No. (Dwg No.)	CAGE Code	Figure No.	Description
8864731	19203		SALLEE CLOSER: (NSN 5120-00-319-5434)
MIL-S-43104	81349		STRAPPING AND SEALING KIT: type III (5/8-inch strapping) (NSN 3540-00-565-6244)
MIL-S-43104	81349		STRAPPING AND SEALING KIT: type V (I-1/4-inch strapping) (NSN 3540-00-565-6244)

APPENDIX D

EXPENDABLE AND DURABLE ITEMS LIST

SECTION I. INTRODUCTION

D-1. SCOPE

a. This appendix lists expendable and durable items needed for Military Pyrotechnics. 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).

b. Expendable and Durable item supplies should be requisitioned through normal supply channels to comply with maintenance requirements.

D-2 EXPLANATION OF COLUMNS

a. Column (1) - Item number. This number is assigned to the entry in the listing for referencing when required.

b. Column (2) - Level. This column identifies the lowest level of maintenance that requires the listed item.

O - Unit Maintenance
F - Direct Support Maintenance
H - General Support Maintenance

c. Column (3) National Stock Number. This is the national stock number (NSN) assigned to the item; use it to request or requisition the item.

d. Column (4) Description. Indicates the federal item name and, if required, a description to identify the item. The last line for each item indicates the Commercial and Government Entity Code (CAGEC) in parentheses followed by the part number.

e. Column (5) Unit of Measure (U/M)/Unit of Issue (U/I). This measure is expressed by a two character alphabetical abbreviation (e.g., EA, IN, PR). If the unit of measure differs from the unit of issue as shown in the Army Master Data File (AMDF) requisition the lowest unit of issue that will satisfy your requirement.

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: liquid, 5 gal can (81348) O-A-51	CN
2	O	6810-00-543-7415	Alcohol Denatured: grade III, liquid, 1 gal can (81348) O-E-760	GL
3	O	8020-00-597-4767	Brush, Artist's: flat 5/8 in. EA (81348) H-B-118	
4	O	7920-00-255-5135	Brush, Wire Scratch: wood and copper beryllium, alloy curved handle, 14in. X 15/16 in. block, 6 in. X 1-1/4 in. wire brush (81348) HB178	EA
5	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. wire brush (81348) HB178	EA
6	O	8010-00-848-9272	Enamel: olive drab, No. 34088, spray can (81348) TT-E-516	PT
7	O	8010-00-878-5761	Enamel: white, No. 37875, spray can (81348) TT-E-516	PT
8	O	8010-00-910-8154	Enamel: black, No. 37038, spray can (81348) TT-E-516	PT
9	O	8010-01-088-0096	Enamel: orange, No. 32246, spray can (81348) TT-E-515	QT
10	O	8010-00-297-2114	Enamel: red, No. 31136, can (96906) MS35527-10	GL
11	O	8010-00-297-2111	Enamel: white, No. 37875 ((81348) TT-E-516	GL

SECTION II. EXPENDABLE AND DURABLE ITEMS LIST (CONT'D)

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) (U/M)/ (U/I)
12	O	8010-00-297-2112	Enamel: yellow, No. 33538 (96906) MS35527-12	GL
13	O	8010-00-297-2116	Enamel: olive drab, No. 34088 (96906) MS35527-8	GL
14	O	8010-00-297-2118	Enamel: green, No. 34108 (81348) TT-E-516	GL
15	O	8010-00-297-2119	Enamel: blue, No. 35109 (96906) MS35527-3	GL
16	O	8010-00-297-2120	Enamel: gray, No. 36231 (96906) MS35527-4	GL
17	O	8010-00-297-2122	Enamel: black, No. 37038 (96906) MS35527-2	GL
18	O	8010-00-828-3193	Enamel: green, No. 34558 (81348) TT-E-516	GL
19	O	5315-00-597-9766	Fastener, Corrugated, Wood Joint: saw edge 1/2 in. deep (58536) A-A-1957	BX
20	O	8415-00-926-1674	Gloves, Barbed Tape-Wire Handlers' (58536) A-A-50054	PR
21	O	7510-00-161-0813	Ink, Marking, Stencil: black,: No. 37038 (58536) A-A-208	QT
22	O	7510-00-161-0811	Ink, Marking, Stencil: black, No. 37038 (58536) A-A-208	GL
23	O	7510-00-148-9817	Ink, Marking, Stencil: black No. 37038, for non porous surface (58536) A-A-208	QT
24	O	7510-00-469-7910	Ink, Marking, Stencil: black No. 37038 (38512) AN-1	PT
25	O	8010-00-721-9479	Lacquer: orange, No. 12215 (58536) A-A-665	PT

SECTION II. EXPENDABLE AND DURABLE ITEMS LIST (CONT'D)

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) (U/M)/ (U/I)
26	O	8010-00-584-3148	Lacquer: orange, No. 12197 (58536) A-A-665	PT
27	O	8010-00-063-8967	Lacquer: aluminum, No. 17178 (81349) MIL-L-11195	GL
28	O	8010-00-527-3196	Lacquer: brown, No. 30277 for obibidy markings (81348) TT-L-40	GL
29	O	7520-00-286-5749	Marker, Tube Type: felt tip, replaceable tip (81348) GG-M-117	EA
30	O	7520-00-973-1059	Marker, Tube Type: black ink, nonreplaceable felt tip (81348) GG-M-00114	DZ
31	O	5315-00-889-2743	Nail: style 4, type II, 4d, 1-1/2 in. long (81348) FF-N-105	LB
32	O	5315-00-889-2744	Nail: style 4, type II, 6d, 2 in. long (81348) FF-N-105	LB
33	O	5315-00-889-2745	Nail: style 4, type II, 8d, 2-1/2 in. long (81348) FF-N-105	LB
34	0	8010-00-899-8825	Primer Coating: green, pressurized spray can (81348) TT-P-1757	PT
35	0	5340-00-491-7632	Seal, Antipilferage: 1/2 in. dia, 1/8 in. thk, steel, 24 in. long (96906) MS51938-5	HD
36	O	7920-00-205-1711	Rag, Wiping: unbleached (58536) A-A-2522	BE
37	O	8153-00-239-5291	Seal, Strapping: 5/8 in. steel (81346) ASTM D 3953-87	BX

SECTION II. EXPENDABLE AND DURABLE ITEMS LIST (CONT'D)

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) (U/M)/ (U/I)
38	O	8135-00-239-5294	Seal, Strapping: 1-1/4 in. (81346) ASTM D 3953-87	BX
39	O	8135-00-283-0671	Strapping: stl, 1-1/4 in. wide, nailless (81346) ASTM D 3953-87	CL
40	O	7510-00-823-8073	Tape, Pressure Sensitive Adhesive: black, 1-1/2 in., 60 yd (81349) MIL-T-43036	RO
41	O	7510-00-266-6715	Tape, Pressure Sensitive Adhesive: 2 in., 60 yd, colorless (58536) A-A-1830	RO
42	O	7510-00-283-0612	Tape, Pressure Sensitive Adhesive: masking, 1 in. tan, 60 yd (19203) 8790710	RO
43	O	8010-00-160-5788	Thinner, Paint Products: clear, 5 gal pail (58536) A-A-857	GL
44	O	5350-00-242-4405	Wool, Metallic: 1 lb roll (58536) A-A-1043	LB

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By Order of the Secretary of the Army:

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

MILTON H. HAMILTON
Administrative Assistant to the
Secretary of the Army
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The Metric System and Equivalents

Linear Measure

1 centimeter = 10 millimeters = .39 inch
1 decimeter = 10 centimeters = 3.94 inches
1 meter = 10 decimeters = 39.37 inches
1 dekameter = 10 meters = 32.8 feet
1 hectometer = 10 dekameters = 328.08 feet
1 kilometer = 10 hectometers = 3,280.8 feet

Weights

1 centigram = 10 milligrams = .15 grain
1 decigram = 10 centigrams = 1.54 grains
1 gram = 10 decigram = .035 ounce
1 decagram = 10 grams = .35 ounce
1 hectogram = 10 decagrams = 3.52 ounces
1 kilogram = 10 hectograms = 2.2 pounds
1 quintal = 100 kilograms = 220.46 pounds
1 metric ton = 10 quintals = 1.1 short tons

Liquid Measure

1 centiliter = 10 milliters = .34 fl. ounce
1 deciliter = 10 centiliters = 3.38 fl. ounces
1 liter = 10 deciliters = 33.81 fl. ounces
1 dekaliter = 10 liters = 2.64 gallons
1 hectoliter = 10 dekaliters = 26.42 gallons
1 kiloliter = 10 hectoliters = 264.18 gallons

Square Measure

1 sq. centimeter = 100 sq. millimeters = .155 sq. inch
1 sq. decimeter = 100 sq. centimeters = 15.5 sq. inches
1 sq. meter (centare) = 100 sq. decimeters = 10.76 sq. feet
1 sq. dekameter (are) = 100 sq. meters = 1,076.4 sq. feet
1 sq. hectometer (hectare) = 100 sq. dekameters = 2.47 acres
1 sq. kilometer = 100 sq. hectometers = .386 sq. mile

Cubic Measure

1 cu. centimeter = 1000 cu. millimeters = .06 cu. inch
1 cu. decimeter = 1000 cu. centimeters = 61.02 cu. inches
1 cu. meter = 1000 cu. decimeters = 35.31 cu. feet

Approximate Conversion Factors

To change	*To*	*Multiply by*	*To change*	*To*	*Multiply by*
inches	centimeters	2.540	ounce-inches	Newton-meters	.007062
feet	meters	.305	centimeters	inches	.394
yards	meters	.914	meters	feet	3.280
miles	kilometers	1.609	meters	yards	1.094
square inches	square centimeters	6.451	kilometers	miles	.621
square feet	square meters	.093	square centimeters	square inches	.155
square yards	square meters	.836	square meters	square feet	10.764
square miles	square kilometers	2.590	square meters	square yards	1.196
acres	square hectometers	.405	square kilometers	square miles	.386
cubic feet	cubic meters	.028	square hectometers	acres	2.471
cubic yards	cubic meters	.765	cubic meters	cubic feet	35.315
fluid ounces	milliliters	29,573	cubic meters	cubic yards	1.308
pints	liters	.473	milliliters	fluid ounces	.034
quarts	liters	.946	liters	pints	2.113
gallons	liters	3.785	liters	quarts	1.057
ounces	grams	28.349	liters	gallons	.264
pounds	kilograms	.454	grams	ounces	.035
short tons	metric tons	.907	kilograms	pounds	2.205
pound-feet	Newton-meters	1.356	metric tons	short tons	1.102
pound-inches	Newton-meters	.11296			

Temperature (Exact)

°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C