NOTE: The cover page of this standard has been changed for administrative reasons. There are no other changes to this document. In addition, all dash sheets associated with this document are hereby designated as standard practices.

INCH-POUND

MIL-STD-1323(NAVY)
16 JANUARY 1979
SUPERSEDING
WR-54
3 MARCH 1965

DEPARTMENT OF DEFENSE STANDARD PRACTICE

UNIT LOADS OF AMMUNITION AND EXPLOSIVES FOR UNDERWAY REPLENISHMENT

AMSC N/A

FSC 8140

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DEPARTMENT OF THE NAVY

Naval Sea Systems Command

Washington, D. C. 20362

Unit Loads of Ammunition and Explosives for Underway Replenishment MIL-STD-1323 (Navy)

1. This Military Standard is approved for use by the Department of the Navy and is available for use by all Departments and Agencies of the Department of Defense. This standard is published to establish requirements for construction of unit loads (unitizing) of ammunition and explosives for underway replenishment.

2. As of the promulgation date of this document, this standard is a mandatory requirement to be invoked in all specifications, purchase descriptions, or military interdepartmental procurement requests (and contracts, when necessary) in the procurement of naval ammunitions, explosives, and associated items to be unitized for underway replenishment. It is mandatory for performance of unitizing operations by all elements of the Navy and Marine Corps.

3. Requests for technical interpretations, approval of deviations, or special assistance should be sent to Commanding Officer, Naval Weapons Station Earle, Naval Weapons Handling Center, Colts Neck, NJ 07722, or call Autovon 449-7691, 7692 or 7693 or area code (201) 462-9500 ext. 7691, 7692 or 7693.

4. Copies of this standard or individual dash sheets may be obtained from the Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120.

5. Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commanding Officer, Naval Ordnance Station, Standardization Documentation Division (501), Indian Head, MD 20640 by using the self addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

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FOREWORD

This Military Standard describes general procedures and practices applicable to the construction of unit loads of ammunition, explosives and associated items for shipping, handling, storage and underway replenishment (transfer-at-sea).

Physical dimensions, weights and type of loads vary greatly. Accordingly, the procedures given in this Military Standard shall be considered as typical. Requirements for individual loads are given in a series of MIL-STD dash number sheets which form a part of this Military Standard.

Certain Weapons Requirements (WR's) referenced within this standard are in the process of supersedure by military standards. If an equivalent military standard dash number sheet has not been published, the applicable WR slash number sheet shall be used. The following cross reference is provided to facilitate the identification between the newly assigned designator and the previous designator:

NEW		PREVIOUS	
MIL-STD-1320	Truckloading of Ammunition and Explosives	WR-51	Shipping and Handling Instructions for Weapon System Components in Trucks and Trailers
MIL-STD-1322	Palletizing Domestic Unit Loads of Weapon Components	WR-53	Palletizing Domestic Unit Loads
MIL-STD-1323	Unit Loads of Ammunition and Explosives for Underway Replenishment	WR-54	Palletizing Fleet Issue Unit Loads
MIL-STD-1324	Unit Loads of Ammunition and Explosives for Amphibious Operations	WR-55	Palletizing Amphibious Unit Loads
MIL-STD-1325	Railcar Loading of Hazardous Materials	WR-52	Carloading of Weapons and Major Weapons System Components

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MILITARY STANDARD

UNIT LOADS OF AMMUNITION AND EXPLOSIVES FOR UNDERWAY REPLENISHMENT

1. SCOPE

1.1 Scope. This standard contains general and detail requirements for the construction of unit loads of ammunition, explosives and associated items for shipping, handling, storage/stowage and underway replenishment (transfer-at-sea).

1.2 Application. This standard is to be used by all personnel engaged in the construction of unit loads of ammunition, explosives and associated items intended for underway replenishment.

2. REFERENCED DOCUMENTS

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

SPECIFICATIONS

FEDERAL

FF-N-105	Nails, Brads, Staples and Spikes: Wire, Cut and Wrought
MM-L-751	Lumber, Softwood
NN-P-530	Plywood, Flat Panel
QQ-S-781	Strapping, Steel, Flat and Seals

MILITARY

MIL-P-23312	Pallet, Material Handling, Metal (For Ordnance Items): Mk 3 Mod 0 Mk 12 Mod 0 and Mk 12 Mod 1

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STANDARDS

MILITARY

MIL-STD-129	Marking for Shipment and Storage
MIL-STD-731	Quality of Wood Members for Containers and Pallets
MIL-STD-1320	Truckloading of Ammunition and Explosives
MIL-STD-1322	Palletizing Domestic Unit Loads of Weapon Components
MIL-STD-1325	Railcar Loading of Hazardous Materials
MIL-STD-1386	Loading of Hazardous Materials in MILVAN Containers
MIL-STD-1660	Design Criteria for Ammunition Unit Loads

DRAWINGS

NAVAL SEA SYSTEMS COMMAND (Code Ident 10001)

564200	Pallet, Material Handling Mk 3 Mod 0
2086479	Pallet, Material Handling Mk 12 Mod 0
2645217	Pallet, Material Handling Mk 12 Mod 1

PUBLICATIONS

HANDBOOK

MIL-HDBK-236	Index to Standards for Palletizing, Truck Loading, Railcar Loading and Container Loading of Hazardous Materials

NAVAL SEA SYSTEMS COMMAND (Code Ident 10001)

OP 2165	Navy Transportation Safety Handbook for Hazardous Materials
OP 2173	Approved Handling Equipment for Weapons and Explosives
OP 4098	Handling Ammunition, Explosives and Hazardous Materials with Industrial Materials Handling Equipment (MHE)

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3.1.7 Explosive. A chemical compound or mixture of substances which, when subjected to suitable initiating impulses or agents such as flame, spark, heat, impact, or friction (whether applied mechanically or electrically), will undergo chemical and physical transformation at speeds varying from extremely rapid to virtually instantaneous, resulting in sudden and rapid development of very high pressure in the surroundings. Examples are: black powder, smokeless powder, tetryl, TNT and HBX.

3.1.8 Handling equipment. Any equipment or special handling device used for moving packages, packs, unit loads, containers, items or components.

3.1.9 Overhang. The distance that the vertical edges of the components of a unit load extend beyond the edges of the pallet.

3.1.10 Pallet. A low portable platform of wood, metal or other suitable material to facilitate handling, stowage and transportation of materials as a unit by mechanical equipment. It is used as the base of a unit load to support and combine groups of commodities (or to confine single items) for handling and shipping as a single entity.

3.1.11 Pallet, special purpose. A pallet which is specifically designed for use with a particular ammunition item or for use in a specific handling or transportation environment.

3.1.12 Pallet adapter. A wood or metal framework designed to secure irregularly shaped articles to a pallet.

3.1.13 Palletized unit load. A unit load which uses a pallet as a base.

3.1.14 Strapping. A length of flat steel, or other suitable material, placed in tension around a unit load to compact and secure the individual items into a single entity.

3.1.15 Underhang. The distance the edges of the pallet extend beyond the vertical edges of the items or containers.

3.1.16 Unit load. An assemblage of items (in or out of containers) designed to facilitate handling these items as a single entity.

4. GENERAL REQUIREMENTS

4.1 General. This section covers the general requirements for unitizing ammunition and explosives for underway replenishment. Detailed unitizing requirements are covered by MIL-STD dash numbered sheets and Section 5 of this standard.

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(Copies of specifications, standards and publications may be obtained upon request from the Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120).

2.2 Other publications. The following documents form a part of this standard to the extent specified herein. Unless otherwise indicated, the issue in effect on date of invitation for bids or request for proposal shall apply.

CODE OF FEDERAL REGULATIONS

49 CFR 100-199 Transportation

(Application for copies should be addressed to the Superintendent of Documents, Government Printing Office, Washington, DC 20402. Orders for the publication should cite "the latest issue and supplements thereto").

3. DEFINITIONS

3.1 General. The definitions given herein cover terms as they are used in this standard and are not to be confused with any definitions appearing elsewhere.

3.1.1 Ammunition. All the components, and any and all explosives in any case or contrivance prepared to form a charge, complete round, or cartridge for cannon, howitzer, mortar, or small arms; or for any other weapon, torpedo warhead, mine, bomb, depth charge, demolition charge, fuze, detonator, projectile, grenade, guided missile, rocket and the like; all signaling and illuminating pyrotechnic materials; all explosive-loaded impulse devices such as bolts, squibs and catapult charges; and all chemical warfare materials.

3.1.2 Batten. A wooden member used to fill space, protect against damage or to provide additional surfaces for strapping or bearing.

3.1.3 Cap. A cover with sides extending perpendicularly from the perimeter used as a protection against damage, or to help create a stable load. It may be used over the load, inverted under a load or used under and over intermediate courses.

3.1.4 DODIC/NALC. A four digit alpha/numeric code which will be either a Department of Defense Identification Code (DODIC) assigned by the Defense Logistics Services Center (DLSC) or a Navy Ammunition Logistic Code (NALC) assigned by the Navy Ships Parts Control Center, Mechanicsburg, PA.

3.1.5 Dunnage. Lumber, strapping, nails or other material used to secure and protect unitized load.

3.1.6 Edge protector. A light piece of material used at the edge of a load to prevent damage by strapping.

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4.2 MIL-STD dash number sheets. The MIL-STD dash number sheets (i.e., MIL-STD-1323-1, -2, -3, etc.) are a series of detailed instructions for the unitizing of specific ammunition and explosives or associated items. As they are published, the MIL-STD-1323 dash number sheets will supersede the WR-54 slash number sheets now in use. Until the superseding MIL-STD-1323 dash number sheet is published, the WR-54 slash number sheet forms a part of this standard. The unit loads covered by WR-54 dash number sheets comply with the design and testing requirements of MIL-STD-1660.

4.2.1 Identification numbering. The identification numbering of these MIL-STD dash sheets consists of the basic MIL-STD-1323 designator followed by a dash number for each group of sheets; or, in the case of WR slash sheets, the numbering identification will be the WR-54 designator followed by a slash number for each group of sheets. These numbers are in numerical sequence without duplication.

4.2.2 Index of dash number sheets. MIL-HDBK-236 is an index of dash number sheets for Unit Loads of Ammunition and Explosives for Underway Replenishment (MIL-STD-1323), Domestic Unit Loads of Weapon Components (MIL-STD-1322) and the dash number sheets for Railcar Loading (MIL-STD-1325), Truck Loading (MIL-STD-1320) and Container Loading (MIL-STD-1386) of Ammunition and Explosives. This handbook includes three types of listings:

Section 1 is a listing of ammunition and explosive items in DODIC/NALC number sequence with the applicable dash number documents listed for each item.

Section 2 is a listing of ammunition and explosive items in alphabetical order with the applicable dash number documents listed for each item.

Section 3 is a numerical listing of all dash number documents giving the revision and change notice status and title of each document.

NOTE

Users of MIL-STD-1323 dash number documents shall consult Section 3 of the latest revision of MIL-HDBK-236 to confirm that they are using up-to-date dash number documents.

4.3 Restrictions. Any unit load of ammunition, explosives, and associated items shipped by any Navy or Marine Corps activity shall be contructed in accordance with a document which has been approved by the Naval Weapons Handling Center (NWHC), Naval Weapons Station Earle, Colts Neck, NJ 07722. All unit loads which may, at any time, be subjected to

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underway replenishment (transfer-at-sea) or stowage, as a unit load, aboard a combatant ship, shall be constructed in accordance with this standard and the applicable MIL-STD-1323 dash number sheet (or WR-54 slash number sheet) for the item being shipped. If a MIL-STD-1323 dash number sheet (or WR-54 slash number sheet) for an item is not listed in MIL-HDBK-236, or the required metal adapters or special purpose pallets are not available, the shipping activity shall contact NWHC for assistance. Any request for assistance should be by letter to the above address. If the lead time for shipment is short, contact by telephone (Autovon 449-7691, 7692 or 7693 or Area Code (201) 462-9500 ext. 7691, 7692 or 7693) is recommended.

NOTE

It is anticipated that the individual Commands unitizing ammunition and explosives will develop a cooperative working relationship with NWHC in order that safe unitizing practices will be universally observed.

4.4 Palletizing/unitizing.

4.4.1 Unitizing principles (general). Sound unitizing practice is achieved by careful observation of all of the following basic principles:

a. Know the characteristics of the material being unitized and observe all precautions applicable thereto.

b. Use the proper unitizing equipment, materials and tools.

c. Examine equipment; e.g., pallets, adapters, etc., to ensure that it is, in all respects, completely suitable for use (see 4.5).

d. Use all of the reference documents applicable to the item being unitized. The MIL-STD dash number sheet and Section 5 list the material specifications which are applicable to a specific unit load.

e. Follow the unitizing (palletizing) procedure of the MIL-STD dash number sheet when assembling a unit load.

f. Containers/items being unitized shall be positioned as specified in the MIL-STD dash number sheet. All components of the unit load (containers/items, adapters, frames, battens, etc.) shall be snug, tight and squared up.

g. Tension strapping as tight as possible without damaging containers/items or dunnage. Where strapping passes over the edges of wood containers or dunnage, an appreciable crushing of the wood is anticipated during tensioning.

h. All strapping seal joints shall be double notched and meet Section 5 requirements.

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i. All applicable marking shall be applied to all unit loads as required by the MIL-STD dash number sheet and Section 5.

NOTE

Close supervision and inspection of unit load construction for compliance with all requirements is essential to the production of unit loads which are suitable for safe and efficient shipping, handling, storage and transfer-at-sea.

4.4.2 Unit load construction. The following is a recommended procedure covering the preparation for and construction of a unit load (see 5.2). (This procedure is not mandatory since the existing practices and facility locations of the various activities may not always be suited for this procedure).

a. Consult the MIL-STD dash number sheet for the item to be unitized and Section 5 for the material and equipment required to construct the required number of unit loads.

b. Precut battens, strapping, etc., and prefabricate frames, covers, etc.

c. Inspect unitizing materials and equipment in accordance with 4.5.

d. Select proper tools and handling equipment.

WARNING

Use only approved handling equipment when handling unit loads, heavy items or containers. See OP 4098 and OP 2173.

e. Thread precut strapping between the deck wires of the pallet as required by the MIL-STD dash number sheet.

f. When required, position pallet adapter frames, etc., on the pallet as specified in the MIL-STD dash number sheet.

g. Position the first layer of items or containers as shown on the MIL-STD dash number sheet. Be sure that items or containers are snug and tight against each other and in straight lines.

h. Position succeeeding layers of items or containers and adapter components, or horizontal (girthwise) strapping as required by the MIL-STD dash number sheet.

i. Position strapping over the unit load with applicable battens, adapter frames, edge protectors, etc. under the strapping as shown on the MIL-STD dash number sheet.

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WARNING

DO NOT OVERTENSION
DO NOT USE DEFECTIVE STRAPPING

NOTE

Overtensioned or defective strapping may break with the end result of unitizing personnel being badly cut or hurt by flying ends of strapping.

j. Tension strapping as tight as possible without damaging containers/items, metal adapters or wood dunnage components. Appreciable crushing of the edges of wood containers and dunnage components is acceptable as long as there is no cracking or splitting of the wood. Double notch seals to secure strapping (see Appendix B, para 40.4).

k. Staple strapping to wood dunnage components as required by the MIL-STD dash number sheet. Do not staple to any containers or items.

l. Mark the unit load as required by the MIL-STD dash number sheet, Section 5 of this standard and the contract.

m. Inspect the unit load in accordance with 4.5.6.

4.4.3 Deunitizing procedure. Deunitizing is the reverse of unitizing and shall be accomplished in accordance with the deunitizing procedure on the MIL-STD dash number sheet and the following general procedure:

a. Move the unit load to a clear area near the point of use of strikedown.

WARNING

Inspect the unit load for alignment of containers and, if necessary, square up the unit load to assure that no containers will fall off when the strapping is cut.

When deunitizing round containers such as cartridge tanks, follow the sequence of cutting straps and removal of tanks as required by the MIL-STD dash number sheet.

Strapping has sharp edges which may injure personnel when the tension is suddenly released.

b. Cut strapping in the sequence given on the MIL-STD dash number sheet.

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4.5.5 Accessory material and assemblies. All accessory materials (wood, plywood, fiberboard, edge protectors, nails, etc.) and assemblies (trays, caps, top and side frames, spacer frames, etc.) shall be inspected for conformity with (a) 5.4.2 through 5.4.6; (b) the requirements of the MIL-STD dash number sheet; and (c) any defect that will affect usage.

4.5.6 Unit load. The unit load or partial unit load (see Appendix A) shall be inspected for conformity to the requirements of 5.2 and the MIL-STD dash number sheet. Items to be included in this inspection are workmanship, arrangement of items in the unit load, proper selection and positioning of pallet(s), adapter components, and accessory material and assemblies, unobstructed handling equipment access facilities, proper position and tension of strapping, and double notching of seals. Marking shall be inspected for conformity with the MIL-STD dash number sheet and 5.3.

5. DETAIL REQUIREMENTS

5.1 General. This section covers the construction of unit loads, marking of unit loads and construction material requirements.

5.2 Unit load construction. Full unit loads shall be constructed and marked in accordance with the MIL-STD dash number sheet applicable to the item(s) to be unitized and the requirements of this standard. Partial unit loads shall be constructed in accordance with Appendix A.

5.3 Unit load marking. In addition to any special marking required by the contract, all unit loads shall be marked in accordance with MIL-STD-129 and the following:

a. The unit load gross weight and cube shall not be marked on items or containers. These markings shall be placed on fiberboard panels or on tags using materials and methods described in MIL-STD-129.

b. All unit loads containing explosives or other hazardous materials shall be marked and labeled in accordance with OP 2165 and 49 CFR 100-199.

5.4 Materials and equipment. All materials and equipment used in the construction of unit loads shall be in accordance with the requirements of the applicable MIL-STD dash number sheet and this standard. Whenever a conflict exists between the requirements of the MIL-STD dash number sheet and the requirements of this standard, the requirements of this standard shall apply.

5.4.1 Steel strapping and seals.

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c. Remove strapping from the unit load and clear the area of cut straps. Strapping should be folded several times and disposed of in a refuse container or other place where it will not be a hazard to personnel or handling equipment and where reuse of the strapping will be prevented.

d. Remove battens, frames, edge protectors, etc. and clear this material from the working area for possible reuse.

e. Remove contents from the unit load.

f. Metal pallets and pallet adapters should be returned for reuse. Combatant ships should return this type of material to the supply ship or stow aboard for return to a coastal station.

4.4.4 Equipment storage. When not in use, pallets, pallet adapters and accessory equipment shall be maintained in serviceable condition and stored by MK and MOD or by type. Whenever possible, this material shall be stored under cover

4.5 Inspection.

4.5.1 Documentation. Requirements and procedures for the inspection of the ammunition and explosive items to be unitized are covered by Naval Ordnance Publications or other documents covering the procurement and maintenance of the items.

4.5.2 Pallets and adapters. Pallets and adapters shall be visually inspected before use for defects that will reduce sturdiness or usability. Pallets and adapters with inadequate or missing welds or other signs of damage that will affect their strength or usability shall be rejected. If adequate repair is economically feasible, rejected pallets and adapters may be used after the cause for rejection has been corrected.

4.5.3 Steel strapping. All steel strapping shall be inspected before use for conformance with the size requirements of the MIL-STD dash number sheet and the type, strength (heavy duty) and finish requirements of Section 5.

4.5.4 Steel strapping seals. All steel strapping seals shall be inspected before use for conformance with the size requirements of the MIL-STD dash number sheet and the type, style, class and finish requirements of Section 5.

4.5.4.1 Steel strap tensioning and sealing equipment. All steel strap tensioning and sealing equipment shall be inspected before use for compatibility with the required strapping and seal size (see 5.4.1.1) and any physical defects which will affect the function of the equipment. All sealing equipment shall be inspected before and during use for conformance with the capability testing and control requirements of Appendix B.

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5.4.4 Edge protectors. Unless otherwise specified in the MIL-STD dash number sheet, all edge protectors shall be zinc-coated steel of the standard commercial size for the size of strapping used on the unit load.

5.4.5 Wood (lumber). Wood (lumber) used in the construction of unit loads shall be in accordance with MM-L-751 or MIL-STD-731, whichever is required by the MIL-STD dash number sheet. When MM-L-751 is cited, the wood shall be number 2 grade or equivalent. When MIL-STD-731 is cited, the wood shall be Class 2, structural. Unless otherwise specified in the MIL-STD dash number sheet, all wood shall be dressed softwood. (see TABLE I and II).

TABLE I. Species and grades of lumber.

Species	Grade	Association grading rules[1]
Softwoods:		
Cedar:		
Western red	Standard dimension	WCLIB
Western red	No. 2 timbers	WPA
Cypress	No. 1 common	SCMA, NHLA
Douglas fir:		
Coast type	Standard	WCLIB
Mountain type	No. 2 dimension	WPA
Fir:		
Balsam	No. 1 dimension	NELMA, NPMA
White	No. 2 dimension	WPA
White	Standard dimension	WCLIB
Hemlock:		
Eastern	No. 2 dimension	NHHMA
West Coast	Standard framing or standard studding	WCLIB
Larch, western	No. 2 dimension	WPA
Pine:		
Lodgepole	No. 2 dimension	WPA
Norway (red)	No. 1 dimension	NPMA
Ponderosa	No. 2 dimension	WPA
Southern yellow	No. 3	SPIB
Redwood	Snap common dimension	CRA
Spruce:		
Engelmann	No. 2 dimension	WPA
Eastern	No. 1 dimension	NELMA, NPMA
Sitka	Standard dimension	WCLIB

[1]WCLIB - West Coast Bureau of Lumber Grades and Inspection; WPA - Wood Pine Association; SCMA - Southern Cypress Manufacturing Association; NHLA - National Hardwood Lumber Association; NELMA - Northeastern Lumber Manufacturing Association; NPMA - Northern Pine Manufacturing Association; NHHMA - Northern Hemlock and Hardwood Manufacturing Association; SPIB - Southern Pine Inspection Bureau; and CRA - California Redwood Association.

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5.4.1.1 Steel strapping. All steel strapping shall be new (unused) material in accordance with QQ-S-781, Class 1, Type I or IV, Heavy Duty, Finish B (zinc-coated). The size (width and thickness) of strapping shall be as specified by the MIL-STD dash number sheet. Splicing to obtain strapping length is not permitted.

5.4.1.2 Seals. All seals used to join the ends of steel strapping shall be in accordance with QQ-S-781, Type D (double notch), Style I, II, III or IV, Class H (Heavy Duty), Finish A or B. The style of seal used shall be selected for compatibility with the tensioning and sealing tools being used. Seal width shall be the proper width for the size of strapping being used.

5.4.1.3 Steel strapping seal joints. All steel strapping seal joints shall be double-notched joints produced and controlled in accordance with the requirements of Appendix B.

5.4.2 Nails. All nails used in the construction of unit loads shall be in accordance with FF-N-105, Type II, and of the style and length specified by the MIL-STD dash number sheet.

5.4.2.1 General nailing procedure. The proper application of nails will ensure the necessary holding power without the risk of splitting the lumber and affecting the integrity of the unit loads. Some general rules for nail application which have gained general acceptance are listed below.

a. Except when required by the MIL-STD dash number sheet, end grain nailing should be avoided. Use many nails. Balanced nailing is important. Stagger nails along the piece being nailed. Do not nail along one grain of wood. Whenever possible, drive nails straight; do not toenail unless called for in the MIL-STD dash number sheet.

b. Generally, no nail shall be driven closer to the end of a piece of lumber than the thickness of that piece, nor closer to the edge than half the thickness of the piece holding the nail head.

c. When pieces are of different thicknesses, the nailhead should be in the thinner piece.

WARNING

Never nail directly to the items or containers being unitized.

5.4.3 Staples. All staples used to secure strapping to components of the unit load shall be commercial staples sold by strapping manufacturers for use in securing heavy duty strapping of the size (width) specified by the MIL-STD dash number sheet.

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5.4.7 Pallets. Unless otherwise specified on the MIL-STD dash number sheet, all pallets used in the construction of unit loads shall be standard metal pallets constructed in accordance with MIL-P-23312 and the applicable pallet drawing.

5.4.7.1 Standard metal pallets. The following standard metal pallets constructed in accordance with MIL-P-23312 shall be used in the construction of unit loads:

Pallet	Deck Size(inches)	Material	Drawing
MK 3 MOD 0	40x48	Steel	10001-564200
MK 12 MOD 0	35x45½	Steel	10001-2086479
MK 12 MOD 1	35x45½	Steel	10001-2645217

NOTE

The MK 12 MODs 0 and 1 Pallets are interchangeable except for variability in strap threading, height and weight.

5.4.7.2 Strap threading for MK 12 MODs 0 and 1 pallets. When threading straps between the deck wires of the MK 12 MOD 1 pallet, the strap shall be positioned at the same distance from the edge of the pallet deck as specified for the MK 12 MOD 0 pallet by counting one additional deck wire from the edge of the pallet deck. This variable is illustrated in FIGURES 2 and 3 for single pallets and FIGURES 4 and 5 for double pallet unit loads. When a unit load requires double pallets, both pallets shall be of the same MOD's.

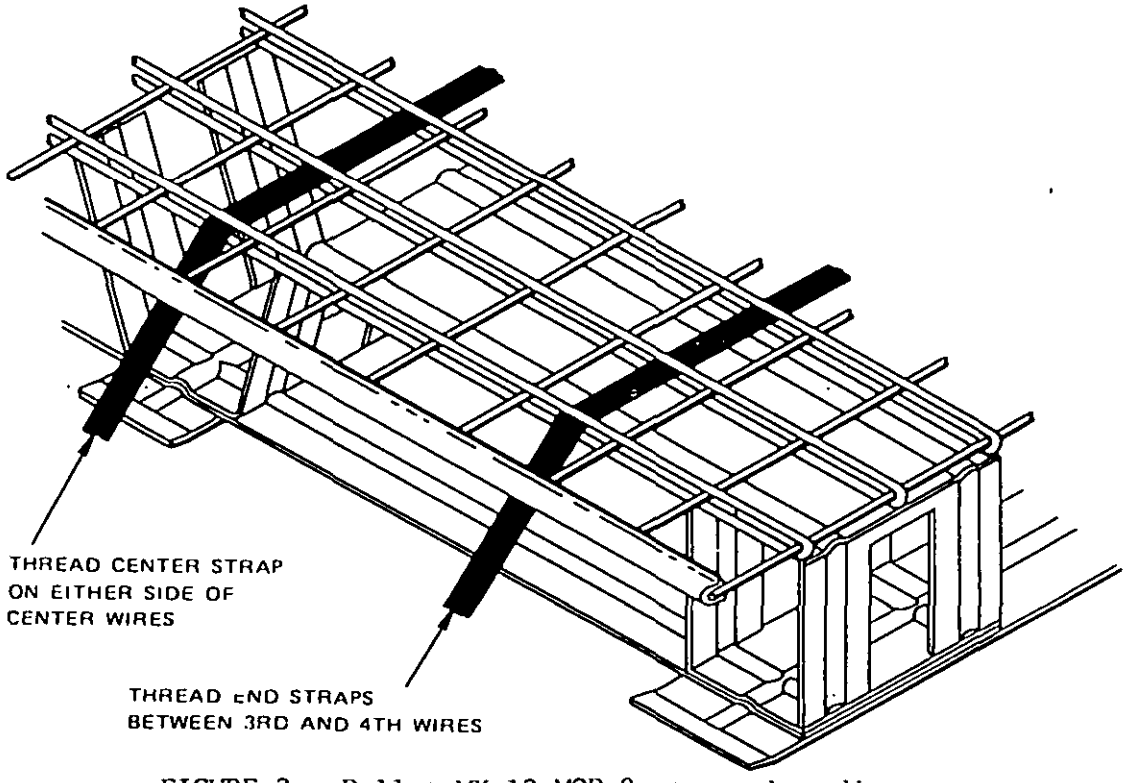

FIGURE 2. Pallet MK 12 MOD 0 strap threading.

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TABLE II. Relation of nominal to minimum allowable dimensions of soft-wood lumber.[1/]

Thickness[2/] (smaller dimension)		Width[2/] (larger dimension)	
Nominal Inches	Minimum Inches	Nominal Inches	Minimum Inches
1	3/4	2	1½
2	1½	3	2½
3	2½	4	3½
4	3½	5	4½
5 and thicker	½ off	7	6½
		8 and wider	3/4 off

1/ Hardwood lumber is bought and sold on actual rather than nominal sizes. The minimum allowable sizes are applicable to hardwoods.
2/ Dimensions indicated are American Lumber Standard minimums for dry lumber. Green lumber minimums are somewhat greater for both thickness and width.

5.4.5.1 Selecting lumber. All unitizing material should be selected from sound lumber, free from dry rot, knots, knot holes, checks, or splits which will affect its strength or interfere with proper nailing. Knots, knot holes, checks, and splits or other defects are permitted in lumber as long as they do not impair the strength of the unit load (see FIGURE I).

5.4.6 Plywood. All plywood used in the construction of unit loads shall be in accordance with NN-P-530, Group B, Type-interior with exterior glue, Grade C-D. The thickness of the plywood shall be as required by the MIL-STD dash number sheet.

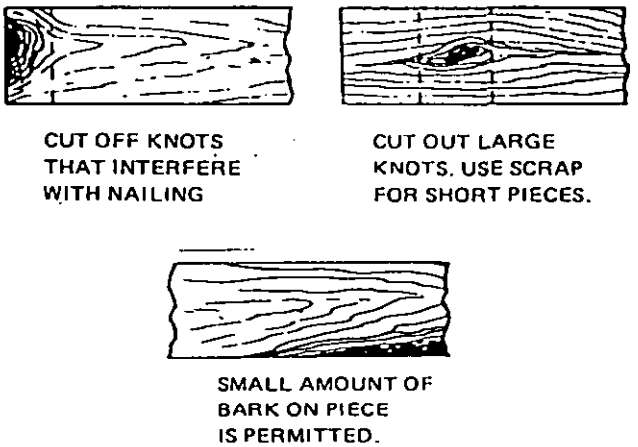

FIGURE I. Lumber selection.

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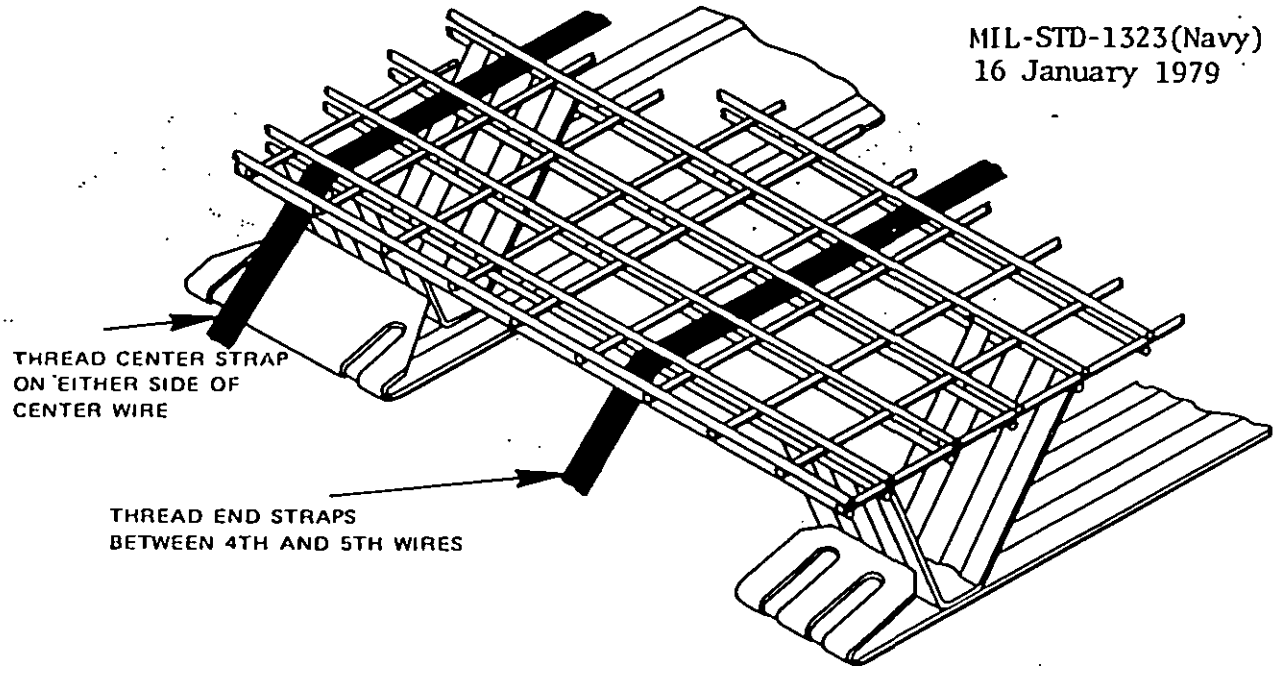

FIGURE 3. Pallet MK 12 MOD 1 Strap Threading.

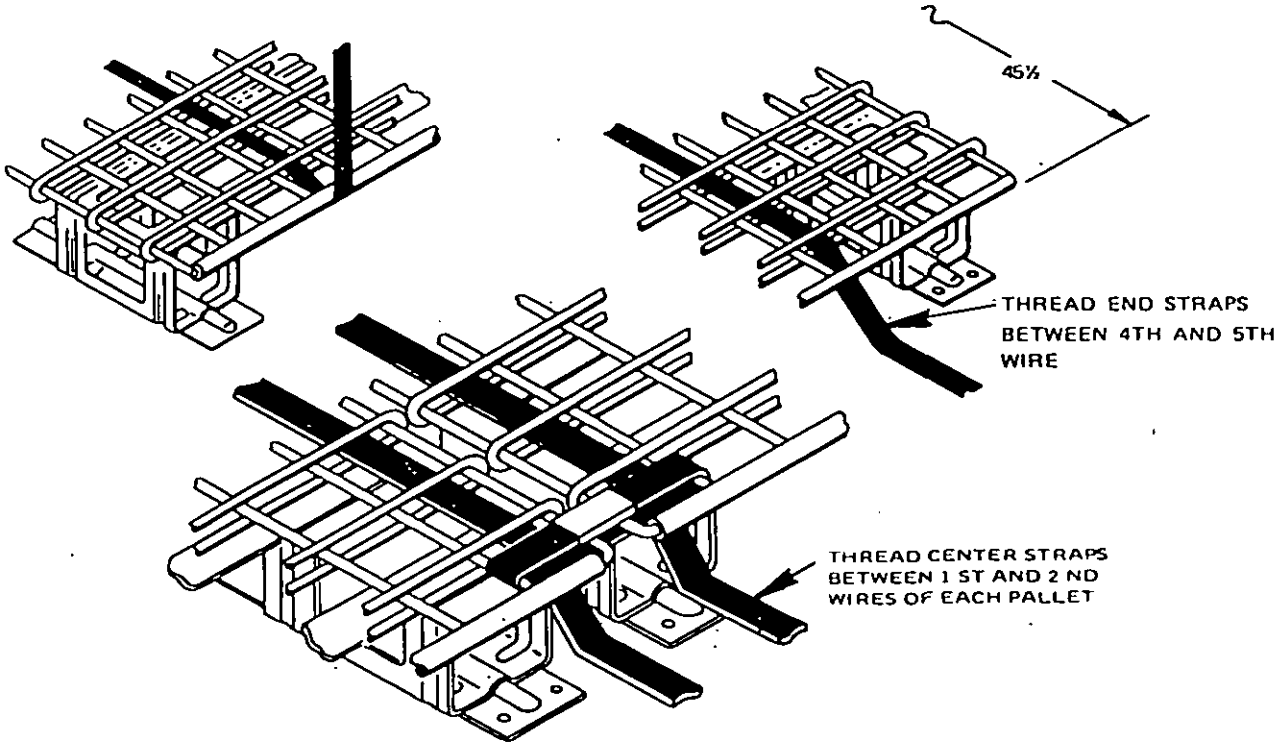

FIGURE 4. Pallet MK 12 MOD 0 Double Pallet Strap Threading.

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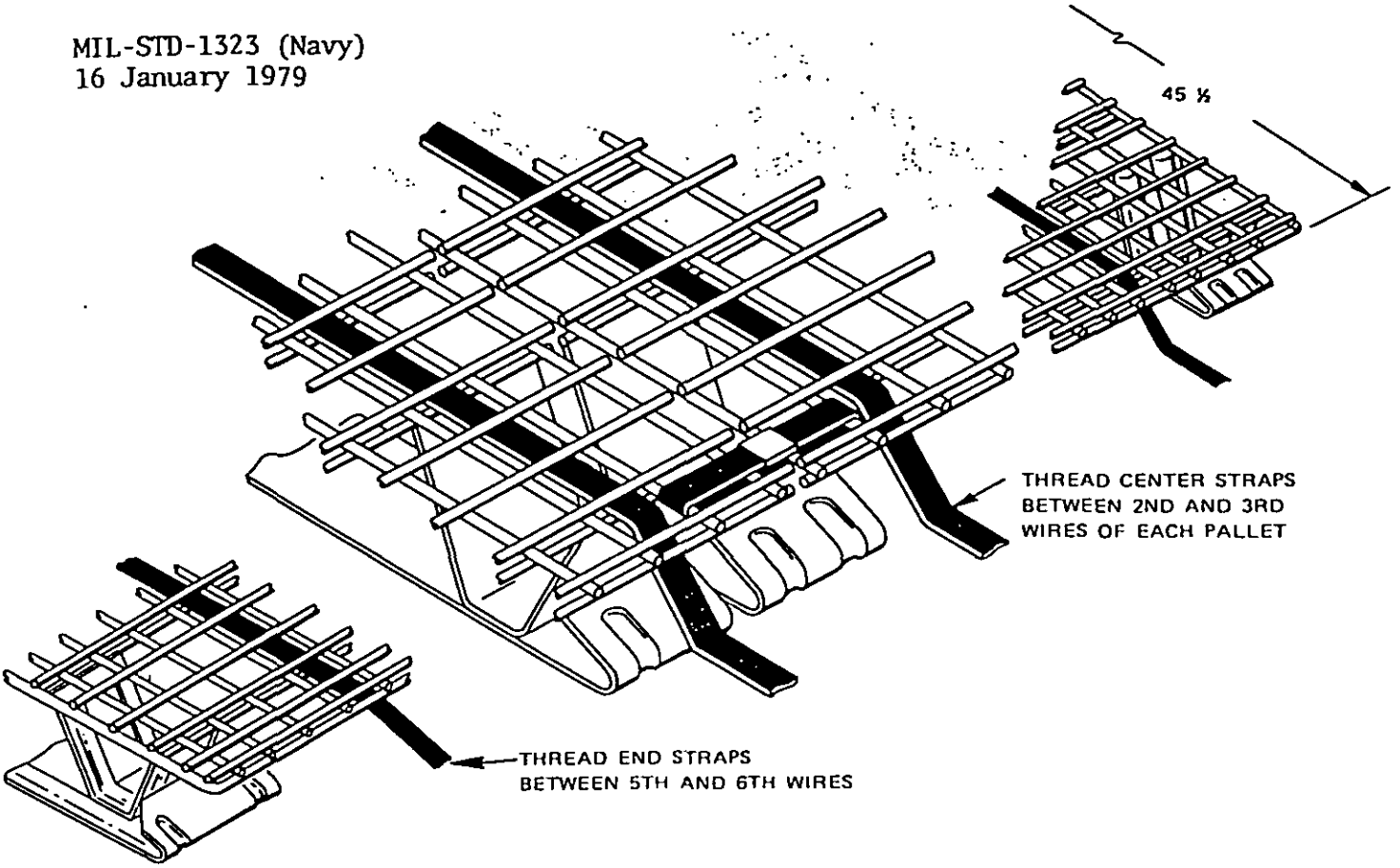

FIGURE 5. Pallet MK 12 MOD 1 double pallet strap threading.

5.4.7.3 Pallet height. The Mk 12 MOD 1 pallet height is 4 3/4 inches vice 5 1/8 inches for the Mk 12 MOD 0 pallet. When the MOD 1 pallet is used, the unit load height will be reduced by 3/8 inch.

5.4.7.4 Pallet weight. The MK 12 MOD 1 pallet weight will be approximately 72 pounds vice 110 pounds for the MK 12 MOD 0 pallet. When the MK 12 MOD 1 pallet is used, the unit load gross weight will be reduced by approximately 38 pounds.

5.4.7.5 Special purpose pallets. Special purpose pallets shall be as specified on the MIL-STD dash number sheet. No substitutions shall be permitted.

5.4.7.6 Palletizing/unitizing adapters. Palletizing/unitizing adapters shall be as specified on the MIL-STD dash number sheet. No substitutions shall be permitted.

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APPENDIX A

PARTIAL UNIT LOADS

10. GENERAL

10.1 Scope. This appendix establishes the criteria for the use and the construction of partial unit loads.

20. REFERENCED DOCUMENTS

20.1 Not applicable.

30. DEFINITIONS

30.1 Partial unit loads. A partial unit load is a unit load which holds or contains a quantity of items which is less than the number of items in a unit load constructed in accordance with the MIL-STD dash number sheet for the items.

40. GENERAL REQUIREMENTS

40.1 Criteria to use for partial unit loads. The use of partial unit loads is to be avoided by filling requisitions/allowances to the nearest full unit load. Where insufficient quantities or operational circumstances dictate less than a full unit load, one partial unit load consisting of one or more complete layers of items or containers may be used. Quantities of items or containers which do not equal one full layer or are in excess of one or more full layers shall be shipped, handled and stored/stowed loose (not unitized).

40.2 Shipboard handling and stowage of loose (not unitized) items. The following handling and stowage methods are recommended for loose items or containers:

a. Dockside loading/offloading. For dockside loading/offloading, use the ammunition pallet crate or a skip box.

b. Transfer-at-sea. For transfer-at-sea, use the MK 16 Cargo Pallet Net or a skip box. Items small enough to pass through the mesh of the MK 16 Pallet Net should be tied down to points provided in the pallet deck.

c. Ammunition ship stowage. Use pen boards to retain the items in stow.

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5.5 Note. The Naval Weapons Handling Center (NWHC) at the Naval Weapons Station Earle, Colts Neck, NJ, prepares and maintains the MIL-STD dash number sheets. MIL-HDBK-236 provides a DODIC/NALC and alpha-numerical index of items covered by the MIL-STD dash number sheets and the WR slash number sheets. This index is updated (revised) at approximately six month intervals. Recommended corrections, additions, or deletions should be addressed to Commanding Officer, Naval Weapons Station Earle (NWHC), Colts Neck, NJ 07722.

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APPENDIX B

OPERATION AND CAPABILITY CONTROL OF STEEL STRAP SEALING EQUIPMENT

10. GENERAL

10.1 Scope. This appendix establishes the requirements for the operation and capability control of steel strap joint sealing equipment. It also establishes the minimum steel strapping joint strengths required for ammunition unit loads.

20. REFERENCED DOCUMENTS

20.1 Not applicable.

30. DEFINITIONS

30.1 Not applicable.

40. GENERAL REQUIREMENTS

40.1 General. The integrity of a unit load and, therefore, safety of ammunition handling operations, is dependent upon the strength of the steel strapping holding the unit load together. Since the seal joint of each strap on a unit load is the weakest link in the strap, it is necessary to maintain the required tensile strength of each seal joint produced. To do so, requires close control over the operation (use) and capability of the seal joint notching equipment.

40.2 Operation (use) of equipment.

40.2.1 Hand operated equipment (tools). When using hand operated notching tools to produce seal joints, the tool shall be positioned over the seal and actuated until the motion is stopped by the tool stops. If the tool is the single notch type, the tool shall be used twice on each seal to produce two pairs of notches with each pair of notches positioned at approximately equal distances from each other and the ends of the seal. If the tool is a double notch tool (produces two pairs of notches with one stroke of the tool), the notches shall be centered approximately between the ends of the seal.

40.2.2 Power equipment. When using power tensioning and sealing equipment, the manufacturer's air pressure and lubrication recommendations shall be maintained at all times, including the preparation of test specimens.

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50. DETAIL REQUIREMENTS

50.1 Partial unit load construction. Except for unit load height (reduced number of layers), the partial unit load shall be constructed in accordance with the MIL-STD dash number sheet for the item and Section 5. The height of battens, spacer frames, etc. shall be reduced to maintain the same relationship with the top surface of the unit load.

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40.3 Equipment capability control.

40.3.1 Release to production. Prior to the release of a new or repaired strap sealing tool to production, a sample of five test specimens shall be tested in accordance with 40.6 and evaluated as follows:

a. If all of the test specimens exceed the minimum joint strength specified in 40.4, the tool may be released to production.

b. If all of the test specimens do not meet the minimum joint strength specified in 40.4, the tool shall be adjusted/repaired or replaced and the five specimen test repeated.

40.3.2 Production control procedure. The capability of sealing tools to produce acceptable steel strap seal joints shall be maintained at all times during production use. Verification of tool capability shall be made in accordance with the production control schedule and whenever there is any indication that the tool is not producing acceptable joints.

40.3.2.1 Verification procedure. The capability of a sealing tool shall be verified in accordance with the following procedure:

a. Select a sample of three test specimens at random from a unit load and test in accordance with 40.6.

b. If all of the test specimens exceed the minimum joint strength specified in 40.4, the tool may be used for further production of unit loads until the next time verification is required.

c. If all of the test specimens do not meet the minimum joint strength specified in 40.4, the tool shall be returned to maintenance for repair.

40.3.2.2 Production control schedule. The capability of sealing tools shall be verified in accordance with the following schedule:

a. Whenever a strap sealing tool is put to use in production, a sample of sealed joints shall be taken from the first unit load produced and subjected to the verification procedure of 40.3.2.1.

b. During production, if there is no indication that the strap sealing tool is not producing satisfactory joints, a sample of sealed joints shall be taken from a unit load and subjected to the verification procedure of 40.3.2.1 at intervals of approximately 250 joints.

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c. When power strap sealing tools are used in areas where the production rate does not provide for one sample per shift, a sample shall be taken once per shift.

d. When manually operated strap sealing tools are used in low production areas where the production rate does not provide for one sample per month, a sample shall be taken at least once a month.

40.4 Minimum seal joint strength. The minimum steel strap seal joint strengths for strapping used on ammunition unit loads are as follows:

	Minimum Joint Strength	
Strap Size(inches)	Pounds	Kilograms
3/4 x .035 or .031	1900	860
1¼ x .035 or .031	3000	1360

40.5 Test specimen. All test specimens shall consist of the same seal-strap combination which is to be used in the production of unit loads. Each test specimen shall have unaltered strapping (not bent, notched, etc.) adjoining the seal joint and shall be free of any welded joint in the strapping. The length of the test specimen shall be at least 18 inches overall and at least 12 inches between the tensile tester grip areas. The joint shall be midway between the tester grip areas.

40.6 Tensile test. Test specimens in accordance with 40.5 shall be subjected to a tensile test in a tensile testing machine capable of performing at the loads and speed rate required. Normally, such a device is available in a commercial or Government quality evaluation laboratory. However, where large quantities of unit loads are being assembled some distance away from the laboratory, use of a locally fabricated small tensile tester is authorized. Drawings for such a device (estimated cost $2000.00) are available from:

Commanding Officer
Naval Weapons Station Earle (Code 80A)
Colts Neck, NJ 07722

40.6.1 Test procedure. Place the test specimen in the grips of a calibrated tensile tester so that the load is transmitted axially to the test section of the specimen. Activate the tensile tester and apply the load to the test specimen until the joint fails. A tensile tester pull rate of approximately 0.2 inches/minute should be used.

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