

PATRIOT

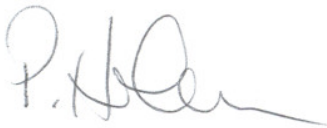

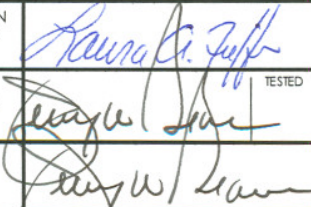
LOADING AND BRACING OF (TL & LTL) ON FLATBED TRAILERS[⊕] OF PATRIOT MISSILES PACKED IN MISSILE CANISTERS

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⊕ **CAUTION:** THE OUTLOADING PROCEDURES SHOWN HEREIN ARE ONLY APPLICABLE TO HIGHWAY MOVEMENTS, NOT TRAILER-ON-FLATCAR (TOFC) MOVEMENTS.

U.S. ARMY MATERIEL COMMAND DRAWING

APPROVED, U.S. ARMY AVIATION AND MISSILE COMMAND 	CAUTION: VERIFY PRIOR TO USE AT WWW.DAC.ARMY.MIL THAT THIS IS THE MOST CURRENT VERSION OF THIS DOCUMENT. THIS IS PAGE 1 OF 14.			
APPROVED BY ORDER OF COMMANDING GENERAL, U.S. ARMY MATERIEL COMMAND  U.S. ARMY DEFENSE AMMUNITION CENTER	DO NOT SCALE	AUGUST 1982		
	ENGINEER OR TECHNICIAN BASIC REV. RICHARD HAYNES MELVIN SIX	REVISION NO. 4 SEPTEMBER 2006		
TRANSPORTATION ENGINEERING DIVISION VALIDATION ENGINEERING DIVISION ENGINEERING DIRECTORATE	SEE THE REVISION LISTING ON PAGE 13			CLASS DIVISION DRAWING FILE
	19	48	5970	GM11PA1

PROJECT GM 704-77

GENERAL NOTES

- A. THIS DOCUMENT HAS BEEN PREPARED AND ISSUED IN ACCORDANCE WITH AR 740-1, AND AUGMENTS TM 743-200-1 (CHAPTER 5).
- B. THE OUTLOADING PROCEDURES SPECIFIED HEREIN ARE APPLICABLE TO THE PATRIOT COMPLETE ROUND WHEN PACKED IN MISSILE CANISTER (SHIPPING, STORAGE AND LAUNCH CONTAINER). REFERENCE TO CANISTER HEREIN MEANS THE CANISTER WITH MISSILE COMPONENTS.
- C. FOR DETAIL OF THE MISSILE CANISTER, SEE DRAWING NUMBER 11450000, AND THE "TYPICAL STACK DETAIL" ON PAGE 3.
- D. THE LOADS AS SHOWN HEREIN ARE BASED ON 8'-0" WIDE BY 40'-0", 45'-0" AND 53' LONG BY 8'-0" AND 8'-6" WIDE FLATBED TRAILERS. TRAILERS OF OTHER LENGTHS AND WIDTHS MAY BE USED. TRAILERS MUST HAVE WOOD OR WOOD AND METAL FLOORS. TRAILERS HAVING ALL-METAL FLOORS CANNOT BE USED. **CAUTION:** IF THE TRAILER FLOOR IS EQUIPPED WITH EXPOSED METAL DECKING ABOVE THE BOGIE ASSEMBLY, OR ELSEWHERE, FIELD MEASUREMENTS SHOULD BE MADE TO ENSURE THAT THE METAL DECKING DOES NOT INTERFERE WITH THE PROPER POSITIONING AND NAILING OF THE DUNNAGE AS SPECIFIED BY THE PROCEDURES SHOWN HEREIN.
- E. THESE PROCEDURES CAN ALSO BE UTILIZED FOR THE SHIPMENT OF THE CANISTERS WHEN THEY ARE LOADED WITH AN ITEM WHICH IS IDENTIFIED DIFFERENTLY BY NOMENCLATURE THAN THE ITEM DESIGNATED WITHIN THE DRAWING TITLE, OR WHEN THEY ARE EMPTY.
- F. **CAUTION:** LOADING OF THE DEPICTED ITEM IS RESTRICTED TO NOT MORE THAN TWO LAYERS DUE TO THE OVERALL LOAD HEIGHT.
- G. SELECTION OF A VEHICLE FOR THE TRANSPORT OF THE DESIGNATED ITEM IS THE RESPONSIBILITY OF THE ORIGINATING CARRIER AND THE SHIPPER. ONLY VEHICLES IN ACCORDANCE WITH THE REQUIREMENTS OF THE APPLICABLE REGULATORY DOCUMENTS WILL BE SELECTED FOR USE.
- H. GROSS WEIGHT AND AXLE DISTRIBUTION OF WEIGHT FOR A LOAD WILL BE THE RESPONSIBILITY OF THE CARRIER. THE CARRIER WILL ADVISE THE SHIPPER OF APPLICABLE LOADING REQUIREMENTS, AND THE SHIPPER WILL LOAD ACCORDINGLY.
- J. **NOTICE:** A SHIPMENT WILL BE POSITIONED ON A TRAILER CONSISTENT WITH STATE WEIGHT LAWS.

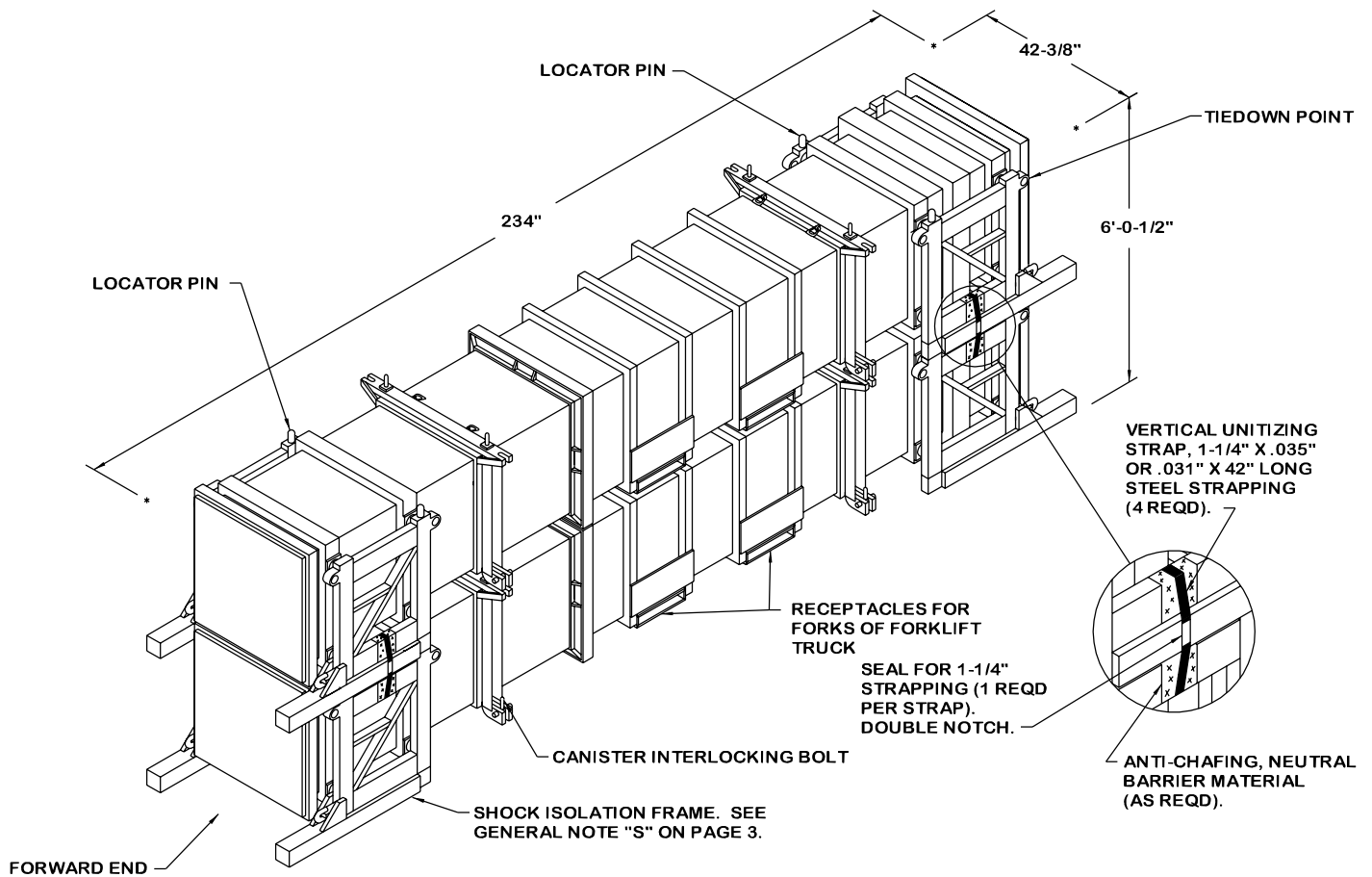
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MATERIAL SPECIFICATIONS

- LUMBER - - - - - : SEE TM 743-200-1 (DUNNAGE LUMBER) AND FED SPEC MM-L-751.
- NAILS - - - - - : ASTM F1667; COMMON STEEL NAIL LCMS OR NLCMMS).
- STRAP, WEB, COMMERCIAL - - - - - : WEB SLING AND TIEDOWN ASSOCIATION RECOMMENDED STANDARD SPECIFICATION FOR SYNTHETIC WEB TIEDOWNS REVISED 1998.
- STRAPPING, STEEL - - - : ASTM D3953; FLAT STRAPPING, TYPE 1, HEAVY DUTY, FINISH A, B (GRADE 2), OR C.
- SEAL, STRAP - - - - - : ASTM D3953; CLASS H, FINISH A, B(GRADE 2), OR C, DOUBLE NOTCH TYPE, STYLE I, II, OR IV.
- STAPLE, STRAP - - - - : COMMERCIAL GRADE.
- STAKE POCKET PROTECTOR - - - : COMMERCIAL GRADE.
- ANTI-CHAFING MATERIAL - - - - - : MIL-B-121 (OR EQUAL); NEUTRAL BARRIER MATERIAL.
- CHAIN - - - - - : NATIONAL ASSOCIATION OF CHAIN MANUFACTURER'S WELDED CHAIN SPECIFICATION ADOPTED NOVEMBER 1999.
- LOAD BINDER - - - - - : FED SPEC GGG-B-325.
- WIRE, CARBON STEEL - - - : ASTM A853; ANNEALED AT FINISH, BLACK OXIDE FINISH, .0800" DIA, GRADE 1006 OR BETTER.

(GENERAL NOTES CONTINUED)

- K. THE NUMBER OF LADING UNITS MAY BE ADJUSTED TO FIT THE SIZE OF THE TRAILER TO BE LOADED OR THE QUANTITY TO BE SHIPPED; HOWEVER THE APPROVED METHODS SHOWN HEREIN MUST BE FOLLOWED AS CLOSELY AS POSSIBLE FOR BLOCKING, BRACING AND STAYING OF THE DESIGNATED ITEM.
- L. OTHER TYPES OF LADING ITEMS MAY BE LOADED ON A TRAILER WHICH IS PARTIALLY LOADED WITH THE DESIGNATED ITEM, PROVIDING THE TOTAL LOAD IS COMPATIBLE, EXISTING DIRECTIVES ARE NOT VIOLATED, AND THE OTHER LADING ITEMS ARE BLOCKED AND BRACED TO EQUAL THE BLOCKING AND BRACING CRITERIA SPECIFIED HEREIN.
- M. IF THE CAPACITY OF THE MATERIALS HANDLING EQUIPMENT PERMITS, IT IS RECOMMENDED THAT CANISTERS BE UNITIZED PRIOR TO PLACEMENT ABOARD THE TRAILER. SEE THE "UNITIZATION AND HANDLING PROCEDURAL GUIDANCE" ON PAGE 3.
- N. **CAUTION:** REGARDLESS OF THE TYPE OF TRAILER INVOLVED, ONLY THOSE TRAILERS HAVING TIEDOWN ANCHORING FACILITIES WHICH PROVIDE HOLDING STRENGTH EQUAL TO OR GREATER THAN THE STRENGTH OF THE HOLD-DOWN STRAPS OR CHAINS AND WHICH ALIGN NEAR THE INDICATED LOCATIONS FOR THE HOLD-DOWN STRAPS OR CHAINS SHOULD BE USED. IF THE TRAILER ANCHOR DEVICES ARE NOT PROPERLY POSITIONED TO RECEIVE STRAPPING OR CHAINS, AS SHOWN, OR IF THE ANCHOR DEVICES ARE NOT EQUAL TO OR GREATER THAN THE STRENGTH OF THE TIEDOWN STRAPS OR CHAINS, STEEL STRAPS MAY BE APPLIED TO FORM A COMPLETE LOOP WHICH ENCOMPASSES BOTH THE LADING AND THE TRAILER FRAME AND/OR BED. **CAUTION:** AVOID TRAILER WHEELS, FIFTH WHEEL PLATE CONTROLS AND OTHER APPURTENANCES. USE EDGE PROTECTORS OR PADS ON ALL SHARP EDGES. NEITHER CHAINS NOR WEB STRAPS WILL BE APPLIED TO FORM A COMPLETE LOOP WHICH ENCOMPASSES BOTH THE LADING AND THE TRAILER FRAME AND/OR BED.
- O. A STAGGERED NAILING PATTERN WILL BE USED WHEREVER POSSIBLE WHEN NAILS ARE DRIVEN INTO JOINTS OF DUNNAGE ASSEMBLIES. ALSO, A STAGGERED NAILING PATTERN WILL BE USED WHEN DUNNAGE IS NAILED TO THE FLOOR OF THE TRANSPORTING VEHICLE, OR WHEN LAMINATING DUNNAGE. THE NAILING PATTERN WILL BE ADJUSTED AS REQUIRED SO THAT A NAIL DOES NOT PENETRATE INTO OR NEAR A CRACK BETWEEN FLOOR BOARDS. ADDITIONALLY, THE NAILING PATTERN FOR AN UPPER PIECE OF LAMINATED DUNNAGE WILL BE ADJUSTED AS REQUIRED SO THAT A NAIL FOR THAT PIECE WILL NOT BE DRIVEN THROUGH THE PIECE ONTO OR RIGHT BESIDE A NAIL IN A LOWER PIECE.
- P. WHEN STEEL STRAPPING IS SEALED AT AN END-OVER-END LAP JOINT, A MINIMUM OF ONE SEAL WITH TWO PAIR OF NOTCHES WILL BE USED TO SEAL THE JOINT WHEN A NOTCH-TYPE SEALER IS BEING USED. A MINIMUM OF TWO SEALS, BUTTED TOGETHER WITH TWO PAIR OF CRIMPS PER SEAL WILL BE USED TO SEAL THE JOINT WHEN A JOINT-TYPE SEALER IS BEING USED. REFER TO THE "STRAP JOINT A" AND "STRAP JOINT B" DETAILS ON PAGE 12 FOR GUIDANCE.
- Q. DUNNAGE LUMBER SPECIFIED THROUGHOUT THIS PROCEDURAL DRAWING IS OF NOMINAL SIZE. FOR EXAMPLE, 2" X 4" MATERIAL IS ACTUALLY 1-1/2" THICK BY 3-1/2" WIDE AND 2" X 6" MATERIAL IS ACTUALLY 1-1/2" THICK BY 5-1/2" WIDE.
- R. THE TRANSPORTING VEHICLE OPERATOR SHOULD BE INSTRUCTED TO PERIODICALLY INSPECT THE TIEDOWN CHAINS AND LOAD BINDERS DURING TRANSIT AND TIGHTEN IF NECESSARY.
- S. IF THE MISSILE CANISTER HAS THE SHOCK ISOLATION FRAMES AND SKIDS REVERSED, THE OVERALL LENGTH OF THE CANISTER WILL BE REDUCED FROM 19'-6" TO 18'-3". REFER TO SPECIAL NOTE 5 ON PAGE 7 FOR GUIDANCE IN BLOCKING AND BRACING OF THE CANISTER IN THIS CONFIGURATION.
- T. THE MISSILE CANISTERS WILL BE LOADED ON A TRAILER WITH THE FORWARD END OF THE MISSILE FACED TOWARD THE REAR OF THE TRAILER.
- U. CONVERSION TO METRIC EQUIVALENTS: DIMENSIONS WITHIN THIS DOCUMENT ARE EXPRESSED IN INCHES, AND WEIGHTS ARE EXPRESSED IN POUNDS. WHEN NECESSARY, THE METRIC EQUIVALENTS MAY BE COMPUTED ON THE BASIS OF ONE INCH EQUALS 25.4MM, AND ONE POUND EQUALS 0.454 KG.



TYPICAL STACK DETAIL

CANISTER DETAIL

GROSS WEIGHT - - - - - 3,750 LBS (APPROX)
 CONTAINER LENGTH
 WITH SKIDS REVERSED - - - - - 219"

UNITIZATION AND HANDLING PROCEDURAL GUIDANCE

1. STACKING CANISTERS FOR UNITIZING.
 - A. THE SKIDS OF THE UPPER CANISTER MUST BE FULLY SEATED UPON THE LOCATOR PINS OF THE LOWER CANISTER.
 - B. POSITION THE FORWARD END OF THE UPPER CANISTER ABOVE THE FORWARD END OF THE LOWER CANISTER.
 - C. CANISTER INTERLOCKING BOLTS MUST BE TIGHTENED AS SECURELY AS POSSIBLE WITH A NORMAL SIZE HAND TOOL WRENCH. (REF 60 FOOT POUNDS).
2. INSTALLATION OF 1-1/4" UNITIZING STRAPPING.

NOTE: UNITIZING STEEL STRAPPING IS NOT REQUIRED IF AN UPPER CANISTER IS SECURED TO A LOWER CANISTER WITH FOUR CANISTER INTERLOCKING BOLTS WHICH ARE PROPERLY INSTALLED AND ARE TORQUED TO 60 FOOT POUNDS.

- A. EACH OF THE FOUR UNITIZING STRAPS SHOULD BE POSITIONED AROUND THE SHOCK ISOLATION FRAMES AS SHOWN. PLACE STRAPPING SO THAT IT LAYS FLAT AND STRAIGHT.
- B. PLACE ANTI-CHAFING NEUTRAL BARRIER MATERIAL UNDER THE STRAPPING WHEREVER THE STRAPPING CONTACTS SHARP EDGES AND SECURE TO PREVENT DISLODGEMENT DURING AND AFTER STRAP APPLICATION.
- C. STRAPPING WILL BE FIRMLY TENSIONED, AND EACH END-OVER-END LAP JOINT WILL BE SEALED WITH ONE DOUBLE NOTCHED SEAL AS SHOWN. DURING STRAP TENSIONING, CARE SHOULD BE EXERCISED TO ENSURE THAT THE CANISTERS ARE NOT DAMAGED. EXCESS STRAPPING (STRAP ENDS) SHOULD BE CUT OFF OR BROKEN OFF NEAR THE JOINT SEAL.

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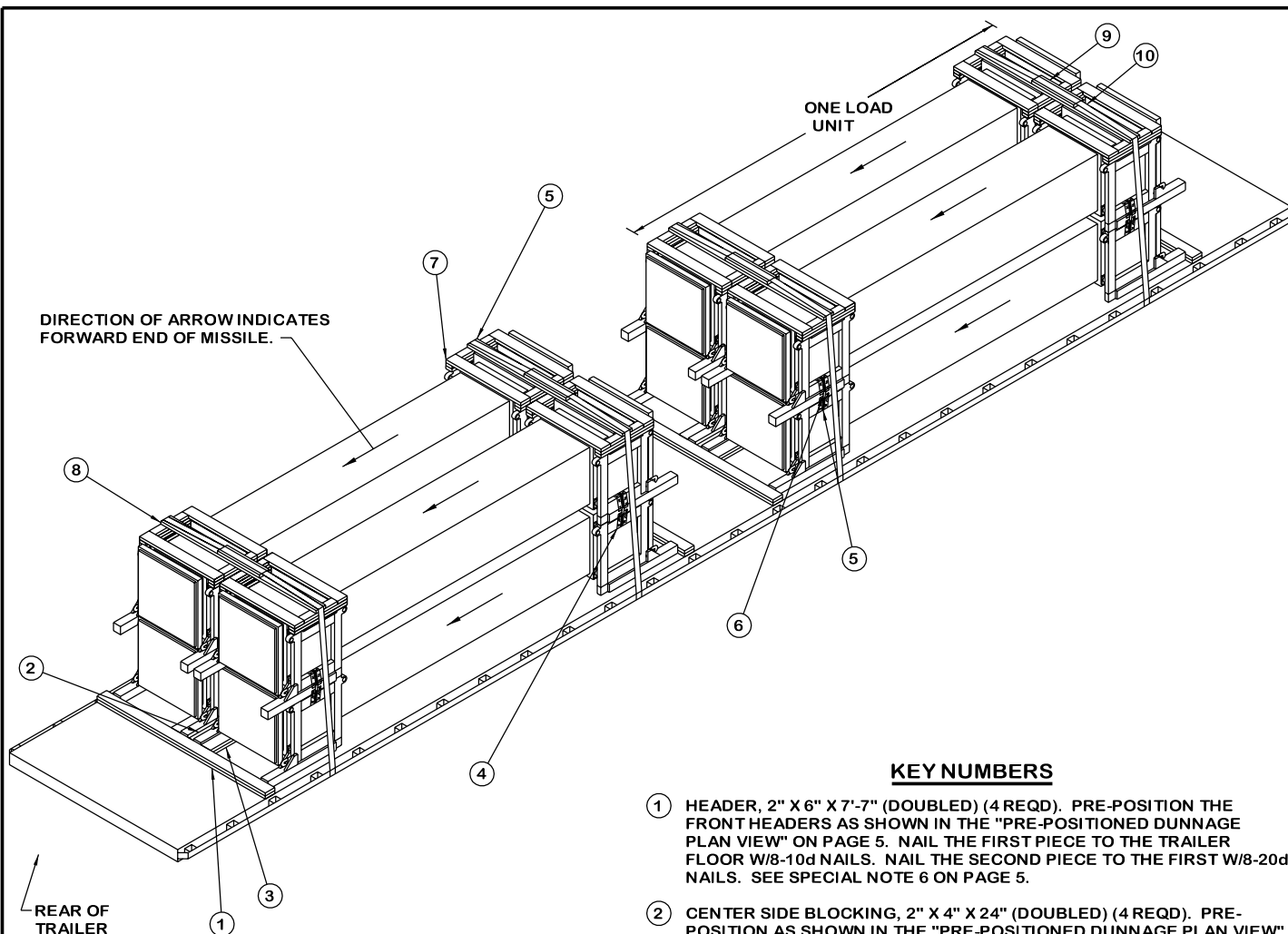
(UNITIZATION AND HANDLING PROCEDURAL GUIDANCE CONTINUED)

3. CANISTER OR CANISTER STACK HANDLING.

NOTES: (1) APPROVED MATERIALS HANDLING EQUIPMENT (MHE) IS SPECIFIED IN OTHER DOCUMENTS. MHE IS INTENDED TO MEAN EQUIPMENT SUCH AS FORKLIFT TRUCKS, CRANES, HAND TRUCKS, DOLLIES, ROLLER ASSEMBLIES, SLINGS AND SPREADER BARS.

(2) PRECAUTIONARY HANDLING TECHNIQUES NORMALLY EMPLOYED OR AS SPECIFIED FOR THE TYPE OF COMMODITY INVOLVED WILL BE OBSERVED.

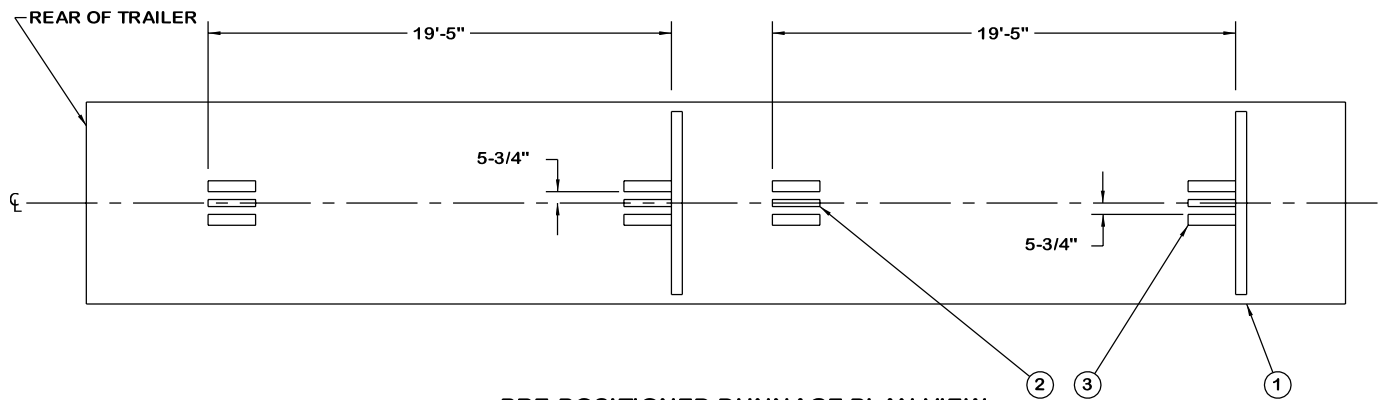
 - A. ONLY APPROVED AND APPROPRIATELY SIZED MATERIALS HANDLING EQUIPMENT WILL BE USED FOR HANDLING THE DEPICTED CANISTERS.
 - B. IF HANDLING IS ACCOMPLISHED WITH A FORKLIFT TRUCK, THE CANISTERS SHOULD BE HANDLED FROM A SIDE POSITION AS MUCH AS POSSIBLE. CARE MUST BE EXERCISED WHEN INSERTING FORKS UNDER A CANISTER, TO PREVENT DAMAGE TO THE CANISTER BY THE FORK TINES OR THE FORKLIFT PACKAGE GUARD. FOR VERY SHORT "INCHING" SPEED MOVEMENTS, SUCH AS WILL BE EXPERIENCED DURING FLATBED TRAILER LOADING, A TWO-HIGH CANISTER STACK MAY BE HANDLED BY INSERTING THE FORKS OF A FORKLIFT TRUCK INTO THE FORK RECEPTACLES OF THE UPPER CANISTER.
 - C. SLINGING OF A CANISTER OR A CANISTER STACK WILL BE ACCOMPLISHED IN ACCORDANCE WITH APPROVED PROCEDURES.



ISOMETRIC VIEW

KEY NUMBERS

- ① HEADER, 2" X 6" X 7'-7" (DOUBLED) (4 REQD). PRE-POSITION THE FRONT HEADERS AS SHOWN IN THE "PRE-POSITIONED DUNNAGE PLAN VIEW" ON PAGE 5. NAIL THE FIRST PIECE TO THE TRAILER FLOOR W/8-10d NAILS. NAIL THE SECOND PIECE TO THE FIRST W/8-20d NAILS. SEE SPECIAL NOTE 6 ON PAGE 5.
- ② CENTER SIDE BLOCKING, 2" X 4" X 24" (DOUBLED) (4 REQD). PRE-POSITION AS SHOWN IN THE "PRE-POSITIONED DUNNAGE PLAN VIEW" ON PAGE 5. NAIL THE FIRST PIECE TO THE TRAILER FLOOR W/4-10d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER.
- ③ SIDE BLOCKING, 1" X 6" X 24" AND 2" X 6" X 24" (8 REQD). PRE-POSITION AS SHOWN IN THE "PRE-POSITIONED DUNNAGE PLAN VIEW" ON PAGE 5. PLACE A 1" X 6" DIRECTLY ON TOP OF A 2" X 6" AND NAIL THRU BOTH PIECES AND INTO THE TRAILER FLOOR W/4-16d NAILS. SEE SPECIAL NOTES 2 AND 7 ON PAGE 5.
- ④ ANTI-CHAFING, NEUTRAL BARRIER MATERIAL (AS REQD). POSITION UNDER ALL STRAPS AT POINTS OF CONTACT WITH THE CANISTER.
- ⑤ VERTICAL UNITIZING STRAP, 1-1/4" X .035" OR .031" X 42" LONG STEEL STRAPPING (16 REQD). INSTALL STRAPS AROUND THE SHOCK ISOLATION FRAMES OF AN UPPER AND LOWER CANISTER, AS SHOWN. SEE THE "UNITIZATION AND HANDLING PROCEDURAL GUIDANCE" ON PAGE 3 AND SPECIAL NOTE 8 ON PAGE 5.
- ⑥ SEAL FOR 1-1/4" STEEL STRAPPING (16 REQD, 1 PER STRAP). DOUBLE NOTCH EACH SEAL.
- ⑦ HOLD-DOWN ASSEMBLY (8 REQD). SEE THE DETAIL ON PAGE 11. POSITION AS SHOWN SO AS TO REST ON THE SHOCK ISOLATION FRAMES.
- ⑧ STRAPPING BOARD, 2" X 6" X 7'-4" (4 REQD). LOCATE ONE NEAR THE CENTER OF EACH TWO LATERALLY ADJACENT HOLD-DOWN ASSEMBLIES, AS SHOWN. NAIL TO HOLD-DOWN ASSEMBLY W/3-12d NAILS AT EACH JOINT. SEE SPECIAL NOTE 5 ON PAGE 5.
- ⑨ PURCHASE BOARD, 2" X 6" X 24" (4 REQD). CENTER ON THE LENGTH OF STRAPPING BOARD AND NAIL TO STRAPPING BOARD W/6-10d NAILS.
- ⑩ WEB STRAP ASSEMBLY (4 REQD). POSITION TO EXTEND FROM A WINCH ON ONE SIDE OF THE TRAILER, OVER THE TOP OF THE CANISTERS, TO AN ATTACHMENT POINT ON THE OPPOSITE SIDE. SEE THE "SPECIAL PROVISIONS FOR WEB STRAP TIEDOWN" ON PAGE 11.



PRE-POSITIONED DUNNAGE PLAN VIEW

FOR THE LOAD SHOWN ON PAGE 4.

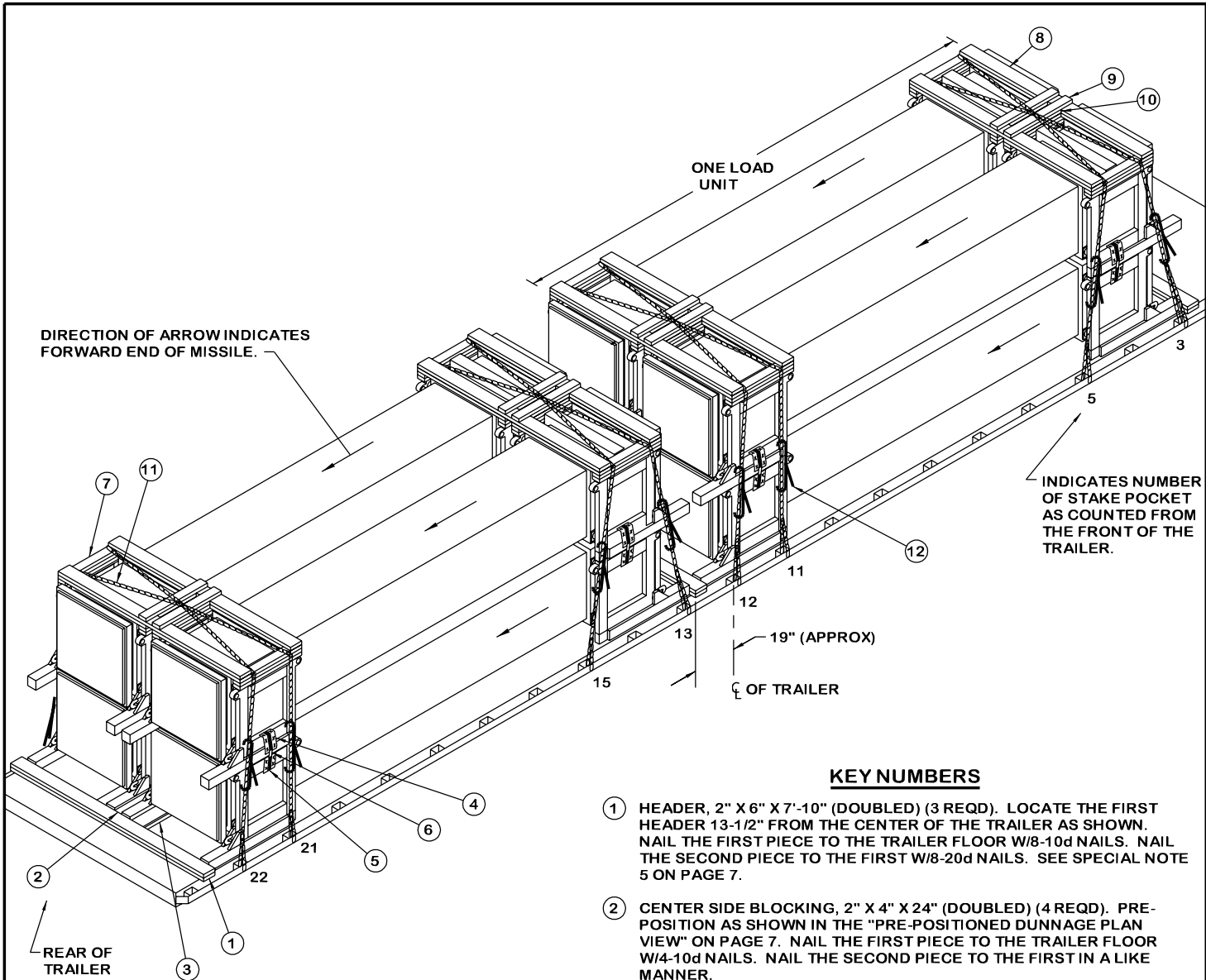
SPECIAL NOTES:

1. AN 8-UNIT LOAD IS SHOWN ON A 53'-0" LONG BY 8'-6" WIDE FLAT-BED TRAILER. NARROWER TRAILERS AND 45'-0" OR 48'-0" TRAILERS MAY BE USED.
2. A FIELD CHECK SHOULD BE MADE OF THE 5-3/4" DIMENSIONS TO INSURE THAT THE SIDE BLOCKING WILL NEARLY CONTACT THE CANISTER SKIDS, AND YET ALLOW POSITIONING OF THE CANISTER SKIDS BETWEEN THE PRE-POSITIONED SIDE BLOCKING.
3. A 6-UNIT LOAD OF CANISTERS CAN BE SHIPPED BY OMITTING THE TOP LAYER FROM ONE OF THE LOAD UNITS. THE HOLD-DOWN ASSEMBLY, STRAPPING BOARD AND PURCHASE BOARD WILL BE INSTALLED ON THE ONE-HIGH PORTION.
4. A 5-UNIT LOAD OF CANISTERS CAN BE SHIPPED BY OMITTING ONE 4-UNIT LOAD UNIT. IN THAT PLACE POSITION ONE CANISTER, CENTERED ON THE TRAILER WIDTH. SIDE BLOCKING, HOLD-DOWN ASSEMBLIES, AND THE HEADER AT THE END OF THE SINGLE CANISTER WILL BE APPLIED AS SHOWN ON PAGE 10. WEB STRAPS OVER THE SINGLE CANISTER WILL BE APPLIED AS SPECIFIED ON PAGE 4.
5. THE STRAPPING BOARDS SHOULD BE LOCATED NEAR THE CENTER OF THE LENGTH OF THE SHOCK ISOLATION FRAMES. SLIGHT ADJUSTMENT MAY BE MADE SO AS TO PERMIT THE WEB STRAPS TO PASS OVER THE STRAPPING BOARDS.
6. IF THE CANISTER SKIDS AND SHOCK ISOLATION FRAMES ARE IN THE REVERSE POSITION (THE WOODEN SKIDS EXTENDING UNDER THE BODY OF THE CANISTER RATHER THAN PROTRUDING), THE PROCEDURES DEPICTED ON PAGE 4 MAY BE USED WITH SLIGHT MODIFICATION TO THE FLOOR LINE BLOCKING AS FOLLOWS. INSTALL HEADERS AND SIDE BLOCKING ACCORDING TO THE DIMENSIONS SHOWN BY THE "PRE-POSITIONED DUNNAGE PLAN VIEW (ALTERNATE)" ON PAGE 9.
7. IF AN 8'-6" WIDE TRAILER HAVING A NAILABLE FLOOR WIDTH OF AT LEAST 8'-0" IS FURNISHED FOR LOADING, THE SIDE BLOCKING MAY BE DOUBLED 2" X 6" X 24" PIECES APPLIED TO THE OUTER SIDE OF THE CANISTER SKIDS IN LIEU OF BEING 1" X 6" X 24" AND 2" X 6" X 24" PRE-POSITIONED AS SHOWN. NAIL WITH 4-10d NAILS IN EACH LAYER OF THE DOUBLED PIECES.
8. WHEN AN UPPER CANISTER IS SECURED TO A LOWER CANISTER WITH FOUR CANISTER INTERLOCKING BOLTS WHICH ARE PROPERLY INSTALLED AND ARE TORQUED TO 60 FOOT-POUNDS, THE VERTICAL UNITIZING STRAPS, SEALS WILL NOT BE REQUIRED.

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
1" X 4"	26	9
1" X 6"	16	8
2" X 4"	159	106
4" X 4"	137	137
NAILS	NO. REQD	POUNDS
6d (2")	128	3/4
10d (3")	408	6-1/2
12d (3-1/4")	48	1
16d (3-1/2")	32	3/4
20d (4")	64	2-1/2
STEEL STRAPPING, 1-1/4" - 56' REQD - - - - - 8 LBS		
SEAL FOR 1-1/4" STRAPPING - 8 REQD - - - - - 3/4 LB		
ANTI-CHAFING MATERIAL - - - AS REQD - - - - - NIL		
WEB STRAP ASSEMBLY - - - - - 4 REQD		

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
MISSILE CANISTER	8	30,000 LBS
DUNNAGE		538 LBS
TOTAL WEIGHT		30,538 LBS (APPROX)



ISOMETRIC VIEW

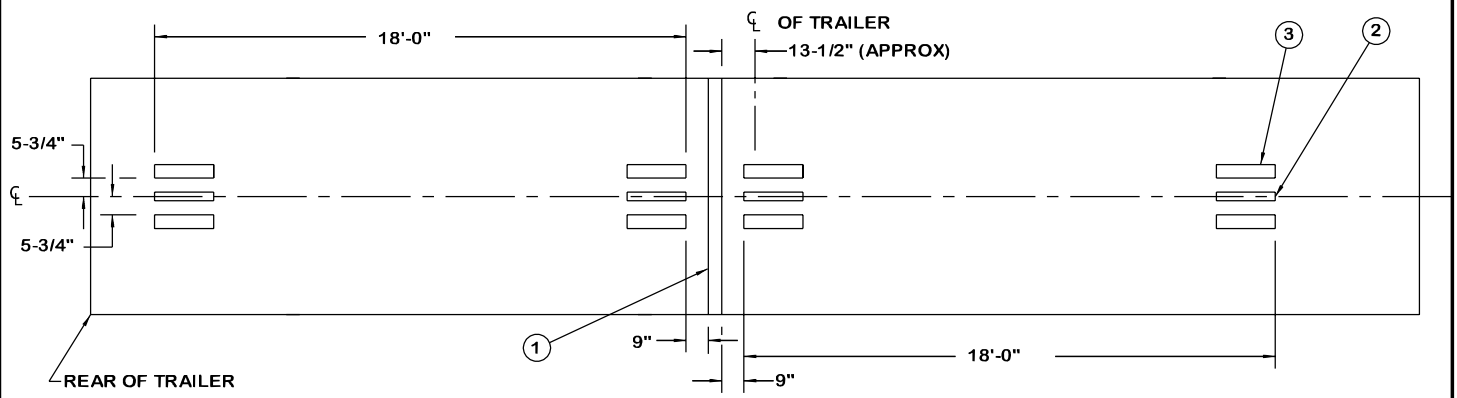
(KEY NUMBERS CONTINUED)

- ⑪ CHAIN, BINDING, 5/16", GRADE 70 BY A LENGTH-TO-SUIT (8 REQD). POSITION AS FOLLOWS, ATTACHING TO STAKE POCKETS AND NOT TO RUB RAILS. ALL CHAINS WILL BE ATTACHED DIAGONALLY. THE FIRST CHAIN WILL BE POSITIONED TO EXTEND FROM STAKE POCKET NO. 3 ON THE NEAR SIDE ACROSS THE LOAD TO STAKE POCKET NO. 5 ON THE OPPOSITE SIDE. ALL OTHER CHAINS WILL BE POSITIONED IN LIKE MANNER, EXTENDING FROM STAKE POCKET NO. 5 TO STAKE POCKET NO. 3, FROM STAKE POCKET NO. 11 TO STAKE POCKET NO. 12, FROM STAKE POCKET NO. 12 TO STAKE POCKET NO. 11, FROM STAKE POCKET NO. 13 TO STAKE POCKET NO. 15, FROM STAKE POCKET NO. 15 TO STAKE POCKET NO. 13, FROM STAKE POCKET NO. 21 TO STAKE POCKET NO. 22, AND FROM STAKE POCKET NO. 22 TO STAKE POCKET NO. 21. SEE "SPECIAL PROVISIONS FOR CHAIN TIEDOWN" ON PAGE 13. SEE SPECIAL NOTE 7 ON PAGE 7.
- ⑫ LOAD BINDER, 5/16", OVER-CENTER TYPE (8 REQD, 1 PER CHAIN). WIRE TIE HANDLE TO PREVENT OPENING DURING TRANSPORT. FASTEN THE TENSIONED CHAIN TO THE HOLD-DOWN ASSEMBLY AND TO THE PURCHASE BOARD W/1-20d NAIL AT EACH LOCATION BY DRIVING EACH NAIL INTO THE PIECES THRU AN OPENING IN A CHAIN LINK AND BENDING IT OVER THE LINK.

KEY NUMBERS

- ① HEADER, 2" X 6" X 7'-10" (DOUBLED) (3 REQD). LOCATE THE FIRST HEADER 13-1/2" FROM THE CENTER OF THE TRAILER AS SHOWN. NAIL THE FIRST PIECE TO THE TRAILER FLOOR W/8-10d NAILS. NAIL THE SECOND PIECE TO THE FIRST W/8-20d NAILS. SEE SPECIAL NOTE 5 ON PAGE 7.
- ② CENTER SIDE BLOCKING, 2" X 4" X 24" (DOUBLED) (4 REQD). PRE-POSITION AS SHOWN IN THE "PRE-POSITIONED DUNNAGE PLAN VIEW" ON PAGE 7. NAIL THE FIRST PIECE TO THE TRAILER FLOOR W/4-10d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER.
- ③ SIDE BLOCKING, 1" X 6" X 24" AND 2" X 6" X 24" (8 REQD). PRE-POSITION AS SHOWN IN THE "PRE-POSITIONED DUNNAGE PLAN VIEW" ON PAGE 7. PLACE A 1" X 6" DIRECTLY ON TOP OF A 2" X 6" AND NAIL THRU BOTH PIECES AND INTO THE TRAILER FLOOR W/4-16d NAILS. SEE SPECIAL NOTES 2 AND 6 ON PAGE 7.
- ④ ANTI-CHAFING, NEUTRAL BARRIER MATERIAL (AS REQD). POSITION UNDER ALL STRAPS AT POINTS OF CONTACT WITH THE CANISTER.
- ⑤ VERTICAL UNITIZING STRAP, 1-1/4" X .035" OR .031" X 42" LONG STEEL STRAPPING (16 REQD). INSTALL STRAPS AROUND THE SHOCK ISOLATION FRAMES OF AN UPPER AND LOWER CANISTER, AS SHOWN. SEE THE "UNITIZATION AND HANDLING PROCEDURAL GUIDANCE" ON PAGE 3. SEE SPECIAL NOTE 8 ON PAGE 7.
- ⑥ SEAL FOR 1-1/4" STEEL STRAPPING (16 REQD, 1 PER STRAP). DOUBLE NOTCH EACH SEAL.
- ⑦ HOLD-DOWN ASSEMBLY (16 REQD). SEE THE DETAIL ON PAGE 11. POSITION AS SHOWN SO AS TO REST ON THE SHOCK ISOLATION FRAMES.
- ⑧ TIE PIECE, 2" X 6" X 7'-5-1/2" (16 REQD). LOCATE AT EACH EDGE OF THE HOLD-DOWN ASSEMBLIES AND NAIL TO EACH ASSEMBLY W/6-10d NAILS.
- ⑨ FILL PIECE, 2" X 4" X 19" (8 REQD). POSITION BETWEEN THE TIE PIECES NEXT TO THE CENTER OF THE LOAD. NAIL TO THE HOLD-DOWN ASSEMBLY W/4-10d NAILS.
- ⑩ PURCHASE BOARD, 2" X 4" X 30" (8 REQD). POSITION OVER AND NAIL TO THE FILL PIECE W/4-10d NAILS, AND NAIL TO THE TIE PIECES W/3-10d NAILS AT EACH END.

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PRE-POSITIONED DUNNAGE PLAN VIEW

FOR THE LOAD SHOWN ON PAGE 6.

(SPECIAL NOTES CONTINUED)

7. IF A 40'-0" LONG TRAILER IS FURNISHED FOR LOADING, THE HEADER ON PAGE 8 WILL BE USED IN LIEU OF HEADER ON PAGE 6. ALSO, THE INSTALLATION OF THE CHAINS WILL BE DIFFERENT THAN SPECIFIED ON PAGE 6. AT THE FRONT OF THE LOAD, ONE CHAIN WILL BE INSTALLED TO EXTEND FROM STAKE POCKET NO. 2 ACROSS TO STAKE POCKET NO. 2 AND ONE CHAIN WILL EXTEND FROM STAKE POCKET NO. 1 ACROSS TO STAKE POCKET NO. 3. INSTALL ALL OTHER CHAINS FROM STAKE POCKET NO. 9 ACROSS TO STAKE POCKET NO. 10, FROM STAKE POCKET NO. 10 ACROSS TO STAKE POCKET NO. 9, FROM POCKET NO. 11 ACROSS TO STAKE POCKET NO. 12, STAKE POCKET NO. 12 ACROSS TO NO. 11, FROM STAKE POCKET NO. 19 ACROSS TO STAKE POCKET NO. 19, AND FROM STAKE POCKET NO. 20 ACROSS TO STAKE POCKET NO. 18. THIS GUIDANCE IS BASED ON A TRAILER EQUIPPED WITH STAKE POCKETS SPACED 24" ON CENTER AND MAY NEED TO BE ADJUSTED IF STAKE POCKETS ARE SPACED OTHERWISE.
8. WHEN AN UPPER CANISTER IS SECURED TO A LOWER CANISTER WITH FOUR CANISTER INTERLOCKING BOLTS WHICH ARE PROPERLY INSTALLED AND ARE TORQUED TO 60 FOOT-POUNDS, THE VERTICAL UNITIZING STRAPS, SEALS AND THE ANTI-CHAFING WILL NOT BE REQUIRED.

SPECIAL NOTES:

1. AN 8-UNIT LOAD IS SHOWN ON A 45'-0" LONG BY 8'-0" WIDE FLAT-BED TRAILER WHICH HAS THE FIRST STAKE POCKETS 6" FROM THE ENDS OF THE TRAILER AND THE REMAINING POCKETS SPACED 24" ON CENTER. THE TRAILER MUST BE AT LEAST 42'-0" LONG FOR THE SHIPMENT OF THE DEPICTED LOAD. LONGER AND WIDER TRAILERS MAY BE USED, USING THE PROCEDURES ON PAGE 6 AS GUIDANCE. IF A 40-FOOT LONG TRAILER IS TO BE USED, REFER TO SPECIAL NOTE 7 AT LEFT FOR SPECIFIC INSTRUCTIONS. THE GUIDANCE FOR INSTALLATION OF CHAINS ON A 40'-0" LONG TRAILER MAY ALSO NEED TO BE APPLIED FOR THE INSTALLATION OF CHAINS ON A 42'-0" LONG TRAILER.
2. A FIELD CHECK SHOULD BE MADE OF THE 5-3/4" DIMENSION TO ENSURE THAT THE SIDE BLOCKING WILL NEARLY CONTACT THE CANISTER SKIDS, AND YET ALLOW POSITIONING OF THE CANISTER SKIDS BETWEEN THE PRE-POSITIONED SIDE BLOCKING PIECES.
3. A 6-UNIT LOAD OF CANISTERS CAN BE SHIPPED BY OMITTING THE TOP LAYER FROM ONE OF THE LOAD UNITS. THE HOLD DOWN ASSEMBLY, TIE PIECE, FILL PIECE AND PURCHASE BOARD WILL BE INSTALLED ON THE ONE-HIGH PORTION. NOTE THAT TWO CHAINS ARE ADEQUATE FOR HOLD DOWN FOR THE 2-CANISTER LOAD UNIT.
4. A 5-UNIT LOAD OF CANISTERS CAN BE SHIPPED BY OMITTING ONE 4-UNIT LOAD UNIT. IN THAT PLACE POSITION ONE CANISTER, CENTERED ON THE TRAILER WIDTH. SIDE BLOCKING, HOLD-DOWN ASSEMBLIES, AND THE HEADER AT THE END OF THE SINGLE CANISTER WILL BE APPLIED AS SHOWN ON PAGE 10. CHAINS OVER THE SINGLE CANISTER WILL BE APPLIED AS SPECIFIED ON PAGE 6. ADJUST CHAIN LOCATION AS NECESSARY TO ENSURE IT PASSES OVER THE HOLD-DOWN ASSEMBLY.
5. IF THE CANISTER SKIDS AND SHOCK ISOLATION FRAMES ARE IN THE REVERSE POSITION (THE WOODEN SKIDS EXTENDING UNDER THE BODY OF THE CANISTER RATHER THAN PROTRUDING), THE PROCEDURES DEPICTED ON PAGE 6 MAY BE USED WITH MODIFICATION TO THE FLOOR LINE BLOCKING AS FOLLOWS. INSTALL HEADERS AND SIDE BLOCKING, ACCORDING TO THE DIMENSIONS SHOWN BY THE "PRE-POSITIONED DUNNAGE PLAN VIEW (ALTERNATE)" ON PAGE 9 IN LIEU OF AS SHOWN.
6. IF AN 8'-6" WIDE TRAILER HAVING A NAILABLE FLOOR WIDTH OF AT LEAST 8'-0" IS FURNISHED FOR LOADING, THE SIDE BLOCKING, MAY BE DOUBLED 2" X 6" X 12" PIECES APPLIED TO THE OUTER SIDE OF THE CANISTER SKIDS IN LIEU OF THAT SHOWN. NAIL WITH 4-10d NAILS IN EACH LAYER OF THE DOUBLED PIECES.

(CONTINUED AT LEFT)

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
MISSILE CANISTER	8	30,000 LBS
DUNNAGE		856 LBS
TOTAL WEIGHT		30,856 LBS (APPROX)

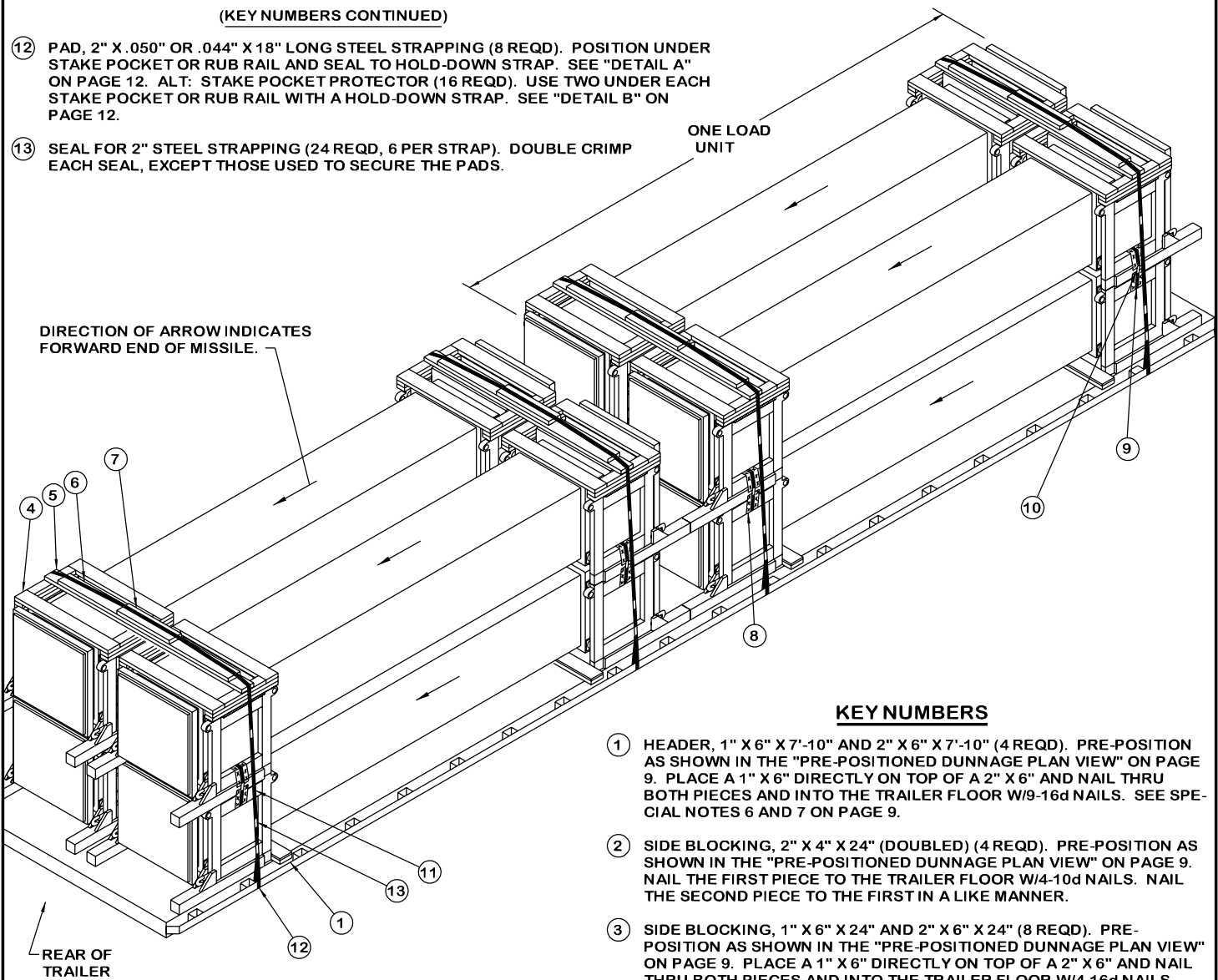
BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
1" X 4"	26	9
1" X 6"	16	8
2" X 4"	154	103
2" X 6"	195	195
NAILS	NO. REQD	POUNDS
6d (2")	128	3/4
10d (3")	672	10-1/2
16d (3-1/2")	32	3/4
20d (4")	72	2-3/4
CHAIN, BINDING, 5/16" - - 130'	REQD - - - -	156 LBS
BINDER, LOAD - - - - - 8	REQD - - - -	48 LBS
ANTI-CHAFING MATERIAL - - - AS	REQD - - - -	NIL
WIRE, 0.080" DIA - - - - 24'	REQD - - - -	1/2 LB

(KEY NUMBERS CONTINUED)

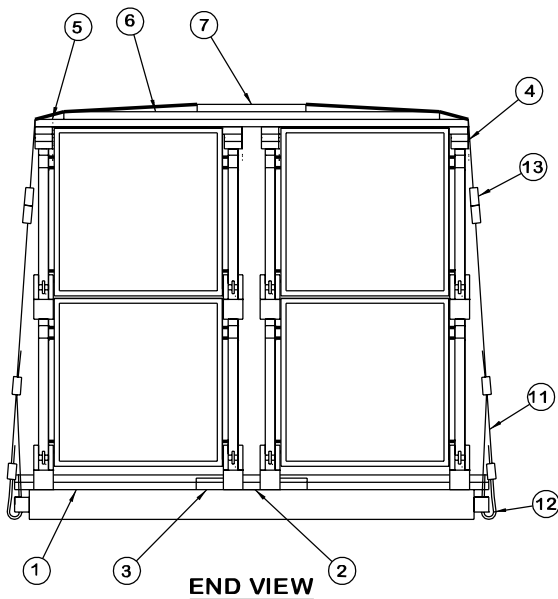
12 PAD, 2" X .050" OR .044" X 18" LONG STEEL STRAPPING (8 REQD). POSITION UNDER STAKE POCKET OR RUB RAIL AND SEAL TO HOLD-DOWN STRAP. SEE "DETAIL A" ON PAGE 12. ALT: STAKE POCKET PROTECTOR (16 REQD). USE TWO UNDER EACH STAKE POCKET OR RUB RAIL WITH A HOLD-DOWN STRAP. SEE "DETAIL B" ON PAGE 12.

13 SEAL FOR 2" STEEL STRAPPING (24 REQD, 6 PER STRAP). DOUBLE CRIMP EACH SEAL, EXCEPT THOSE USED TO SECURE THE PADS.

DIRECTION OF ARROW INDICATES FORWARD END OF MISSILE.



ISOMETRIC VIEW

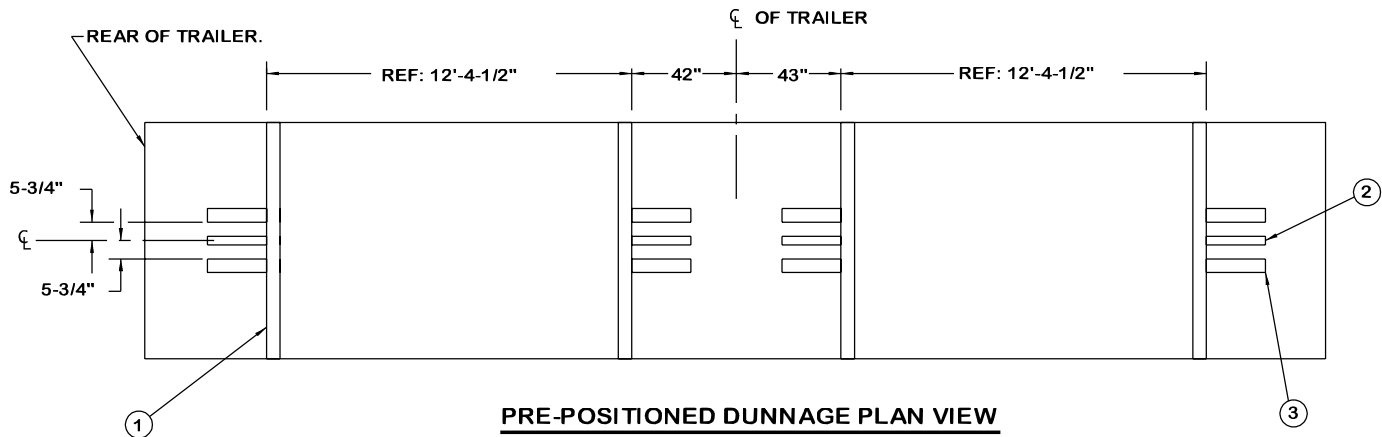


END VIEW

KEY NUMBERS

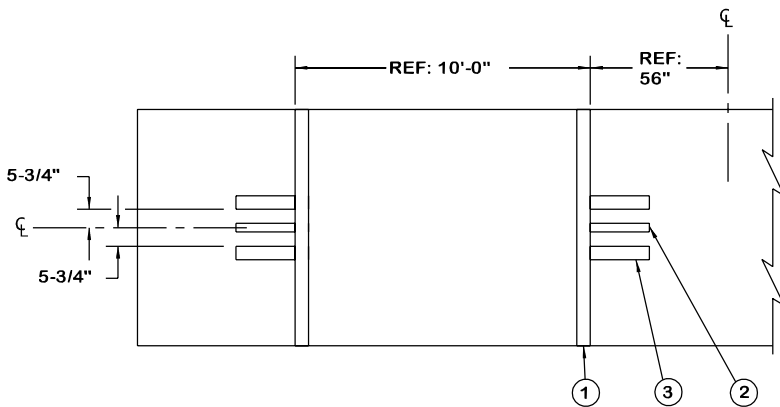
- 1 HEADER, 1" X 6" X 7'-10" AND 2" X 6" X 7'-10" (4 REQD). PRE-POSITION AS SHOWN IN THE "PRE-POSITIONED DUNNAGE PLAN VIEW" ON PAGE 9. PLACE A 1" X 6" DIRECTLY ON TOP OF A 2" X 6" AND NAIL THRU BOTH PIECES AND INTO THE TRAILER FLOOR W/9-16d NAILS. SEE SPECIAL NOTES 6 AND 7 ON PAGE 9.
- 2 SIDE BLOCKING, 2" X 4" X 24" (DOUBLED) (4 REQD). PRE-POSITION AS SHOWN IN THE "PRE-POSITIONED DUNNAGE PLAN VIEW" ON PAGE 9. NAIL THE FIRST PIECE TO THE TRAILER FLOOR W/4-10d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER.
- 3 SIDE BLOCKING, 1" X 6" X 24" AND 2" X 6" X 24" (8 REQD). PRE-POSITION AS SHOWN IN THE "PRE-POSITIONED DUNNAGE PLAN VIEW" ON PAGE 9. PLACE A 1" X 6" DIRECTLY ON TOP OF A 2" X 6" AND NAIL THRU BOTH PIECES AND INTO THE TRAILER FLOOR W/4-16d NAILS. SEE SPECIAL NOTE 8 ON PAGE 9.
- 4 HOLD-DOWN ASSEMBLY (8 REQD). SEE THE DETAIL ON PAGE 11. POSITION AS SHOWN SO AS TO REST ON THE SHOCK ISOLATION FRAMES.
- 5 STRAPPING BOARD, 2" X 6" X 7'-7" (4 REQD). LOCATE ONE NEAR THE CENTER OF EACH TWO LATERALLY ADJACENT HOLD-DOWN ASSEMBLIES, AS SHOWN. NAIL TO HOLD-DOWN ASSEMBLY W/3-12d NAILS AT EACH JOINT. SEE SPECIAL NOTE 3 ON PAGE 9.
- 6 PURCHASE BOARD A, 2" X 6" X 72" (4 REQD). CENTER ON THE LENGTH OF AND NAIL TO STRAPPING BOARD W/6-10d NAILS.
- 7 PURCHASE BOARD B, 2" X 6" X 24" (4 REQD). CENTER ON THE LENGTH OF AND NAIL TO PURCHASE BOARD "A" W/4-10d NAILS.
- 8 ANTI-CHAFING, NEUTRAL BARRIER MATERIAL (AS REQD). POSITION UNDER THE VERTICAL UNITIZING STRAPS AT POINTS OF CONTACT WITH THE CANISTERS.
- 9 VERTICAL UNITIZING STRAP, 1-1/4" X .035" OR .031" X 42" LONG STEEL STRAPPING (16 REQD). INSTALL STRAPS AROUND THE SHOCK ISOLATION FRAMES OF AN UPPER AND LOWER CANISTER, AS SHOWN. SEE THE "UNITIZATION AND HANDLING PROCEDURAL GUIDANCE" ON PAGE 3. SEE SPECIAL NOTE 9 ON PAGE 9.
- 10 SEAL FOR 1-1/4" STEEL STRAPPING (16 REQD, 1 PER STRAP). DOUBLE NOTCH EACH SEAL.
- 11 HOLD-DOWN STRAP, 2" X .050" OR .044" X 30'-0" LONG STEEL STRAPPING (4 REQD). INSTALL EACH STRAP FROM TWO PIECES, ONE 8'-0" LONG AND ONE 22'-0" LONG. STAPLE TO PURCHASE BOARD "B" W/2 STAPLES. SEE THE "HOLD-DOWN STRAP ANCHORING DETAILS" AND THE "END-OVER-END LAP JOINT DETAILS" ON PAGE 12.

(CONTINUED ABOVE)



PRE-POSITIONED DUNNAGE PLAN VIEW

FOR THE LOAD SHOWN ON PAGE 8.



PRE-POSITIONED DUNNAGE PLAN VIEW (ALTERNATE)

SEE SPECIAL NOTE 7 BELOW.

(SPECIAL NOTES CONTINUED)

- 8. IF AN 8'-6" WIDE TRAILER HAVING A NAILABLE FLOOR WIDTH OF AT LEAST 8'-0" IS FURNISHED FOR LOADING, THE SIDE BLOCKING MAY BE DOUBLED 2" X 6" X 24" PIECES APPLIED TO THE OUTER SIDE OF THE CONTAINER SKIDS IN LIEU OF BEING 1" X 6" X 12" AND 2" X 6" X 12" PRE-POSITIONED AS SHOWN. NAIL WITH 4-10d NAILS IN EACH LAYER OF THE DOUBLED PIECES.
- 9. WHEN AN UPPER CANISTER IS SECURED TO A LOWER CANISTER WITH FOUR CANISTER INTERLOCKING BOLTS WHICH ARE PROPERLY INSTALLED AND ARE TORQUED TO 60 FOOT-POUNDS, THE VERTICAL UNITIZING STRAPS, SEALS WILL NOT BE REQUIRED.

SPECIAL NOTES:

- 1. AN 8-UNIT LOAD IS SHOWN ON A 40'-0" LONG BY 8'-0" WIDE FLATBED TRAILER. THE AVAILABLE NAILING SURFACE OF THE TRAILER BED MUST MEASURE AT LEAST 35'-11" LONG. LONGER AND WIDER TRAILERS BUT NOT SHORTER TRAILERS MAY BE USED. SEE SPECIAL NOTES 6 AND 8 BELOW.
- 2. A FIELD CHECK SHOULD BE MADE OF THE 5-3/4" AND 12'-4-1/2" DIMENSIONS TO INSURE THAT THE HEADER AND SIDE BLOCKING WILL NEARLY CONTACT THE CANISTER SKIDS, AND YET ALLOW POSITIONING OF THE CANISTER SKIDS OVER THE PRE-POSITIONED HEADERS, AND BETWEEN THE PRE-POSITIONED SIDE BLOCKING.
- 3. THE STRAPPING BOARDS SHOULD BE LOCATED NEAR THE CENTER OF THE LENGTH OF THE SHOCK ISOLATION FRAMES. SLIGHT ADJUSTMENT MAY BE MADE SO AS TO PERMIT THE HOLD-DOWN STRAPS TO PASS THRU, OR AS NEAR AS POSSIBLE TO, A STAKE POCKET.
- 4. A 6-UNIT LOAD OF CANISTERS CAN BE SHIPPED BY OMITTING THE TOP LAYER FROM ONE OF THE LOAD UNITS. THE HOLD-DOWN ASSEMBLY, STRAPPING BOARD AND PURCHASE BOARDS WILL BE INSTALLED ON THE ONE-HIGH PORTION. THE HOLD-DOWN STRAP WILL BE APPROXIMATELY 25'-0" LONG.

A 5-UNIT LOAD OF CANISTERS CAN BE SHIPPED BY OMITTING ONE 4-UNIT LOAD UNIT. IN THAT PLACE POSITION

- 5. ONE CANISTER, CENTERED ON THE TRAILER WIDTH, ON PRE-POSITIONED HEADERS WHICH ARE 48" LONG. SIDE BLOCKING, HOLD-DOWN ASSEMBLIES, STRAPPING BOARDS, AND HOLD-DOWN STRAPS, ETC. WILL BE APPLIED AS SHOWN ON PAGE 10.
- 6. IF A 45'-0" LONG OR LONGER TRAILER IS FURNISHED FOR LOADING, EXTERNALLY APPLIED BLOCKING AND BRACING CAN BE USED IN LIEU OF THE PRE-POSITIONED HEADERS. INSTALL HEADERS AS SHOWN ON PAGE 4, AT EACH END OF THE LOAD AND ALSO BETWEEN THE LOAD UNITS (CENTERED ON THE LENGTH OF THE TRAILER). NOTE THAT SIDE BLOCKING PIECES WILL BE APPLIED AS SHOWN ABOVE.
- 7. IF THE CANISTER SKIDS AND SHOCK ISOLATION FRAMES ARE IN THE REVERSE POSITION (THE WOODEN SKIDS EXTENDING UNDER THE BODY OF THE CANISTER RATHER THAN PROTRUDING), THE PROCEDURES DEPICTED ON PAGE 10 MAY BE USED WITH SLIGHT MODIFICATION TO THE FLOOR LINE BLOCKING AS FOLLOWS. INSTALL HEADERS AND SIDE BLOCKING ACCORDING TO THE DIMENSIONS SHOWN BY THE "PRE-POSITIONED DUNNAGE PLAN VIEW (ALTERNATE)" AT LEFT.

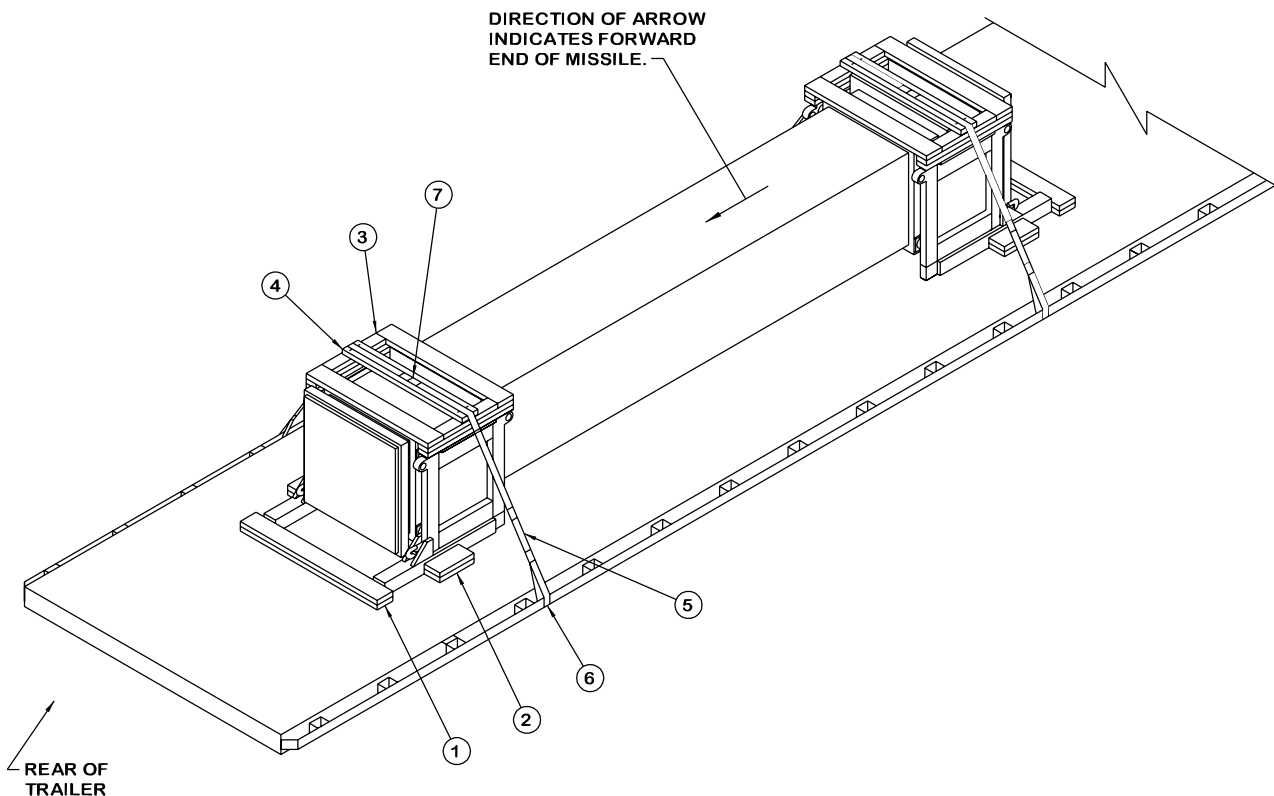
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LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
MISSILE CANISTER	8	30,000 LBS
DUNNAGE		808 LBS

TOTAL WEIGHT - - - - - 30,808 LBS (APPROX)

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
1' X 4"	26	9
1" X 6"	40	20
2" X 4"	122	81
2" X 6"	159	159
NAILS	NO. REQD	POUNDS
6d (2")	128	3/4
10d (3")	488	7-3/4
12d (3-1/4")	48	1
16d (3-1/2")	59	1-1/2
STEEL STRAPPING, 1-1/4" - 56'	REQD	8 LBS
SEAL FOR 1-1/4" STRAPPING - 16	REQD	3/4 LB
STEEL STRAPPING, 2" - - - 132'	REQD	44 LBS
SEAL FOR 2" STRAPPING - - - 24	REQD	5 LBS
STAPLE FOR 2" STRAPPING - - 8	REQD	NIL
ANTI-CHAFING MATERIAL - - - AS	REQD	NIL



ISOMETRIC VIEW

SPECIAL NOTES:

1. A 1-UNIT LOAD IS SHOWN ON AN 8'-0" WIDE FLATBED TRAILER. WIDER TRAILERS MAY BE USED.
2. THE STRAPPING BOARDS SHOULD BE LOCATED NEAR THE CENTER OF THE LENGTH OF THE SHOCK ISOLATION FRAMES. SLIGHT ADJUSTMENT MAY BE MADE SO AS TO PERMIT THE HOLD-DOWN STRAPS TO PASS THRU, OR AS NEAR AS POSSIBLE TO, A STAKE POCKET. NOTE THAT THE CANISTER LOCATION MAY ALSO BE ADJUSTED SO AS TO ALIGN THE STRAPS WITH THE STAKE POCKETS.
3. IF THE CANISTER SKIDS AND SHOCK ISOLATION FRAMES ARE IN THE REVERSE POSITION (THE WOODEN SKIDS EXTENDING UNDER THE BODY OF THE CANISTER RATHER THAN PROTRUDING), PRE-POSITIONED HEADERS MUST BE USED IN LIEU OF THE HEADERS. THE HEADERS WILL BE 1" X 6" X 48" AND 2" X 6" X 48", POSITIONED 10'-0" APART AS SHOWN BY THE "PRE-POSITIONED DUNNAGE PLAN VIEW (ALTERNATE)" ON PAGE 9. PLACE THE 1" X 6" PIECE ON THE 2" X 6" PIECE AND NAIL THRU BOTH PIECES AND INTO THE TRAILER FLOOR W/5-16d NAILS.

KEY NUMBERS

- ① HEADER, 2" X 6" X 48" (DOUBLED) (2 REQD). NAIL THE FIRST PIECE TO THE TRAILER FLOOR W/3-10d NAILS. NAIL THE SECOND PIECE TO THE FIRST W/3-20d NAILS. SEE SPECIAL NOTE 3 AT LEFT.
- ② SIDE BLOCKING, 2" X 6" X 12" (DOUBLED) (4 REQD). POSITION AS SHOWN. NAIL THE FIRST PIECE TO THE TRAILER FLOOR W/4-10d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER.
- ③ HOLD-DOWN ASSEMBLY (2 REQD). SEE THE DETAIL ON PAGE 11. POSITION AS SHOWN SO AS TO REST ON THE SHOCK ISOLATION FRAMES.
- ④ STRAPPING BOARD, 2" X 6" X 42-3/4" (2 REQD). POSITION AS SHOWN AND NAIL TO HOLD-DOWN ASSEMBLY W/3-12d NAILS AT EACH END. SEE SPECIAL NOTE 2 AT LEFT.
- ⑤ HOLD-DOWN STRAP, 2" X .050" OR .044" X 21'-0" LONG STEEL STRAPPING (2 REQD). INSTALL FROM TWO 10'-6" LONG PIECES. STAPLE TO STRAPPING BOARD W/2 STAPLES.
- ⑥ PAD, 2" X .050" OR .044" X 18" LONG STEEL STRAPPING (4 REQD). POSITION UNDER STAKE POCKET OR RUB RAIL AND SEAL TO HOLD-DOWN STRAP. SEE "DETAIL A" ON PAGE 12. ALT: STAKE POCKET PROTECTOR (8 REQD). USE TWO UNDER EACH STAKE POCKET OR RUB RAIL WITH A HOLD-DOWN STRAP. SEE "DETAIL B" ON PAGE 12.
- ⑦ SEAL FOR 2" STEEL STRAPPING (12 REQD, 6 PER STRAP). DOUBLE CRIMP EACH SEAL EXCEPT THOSE USED TO SECURE THE PADS.

SPECIAL PROVISIONS FOR WEB STRAP TIEDOWN

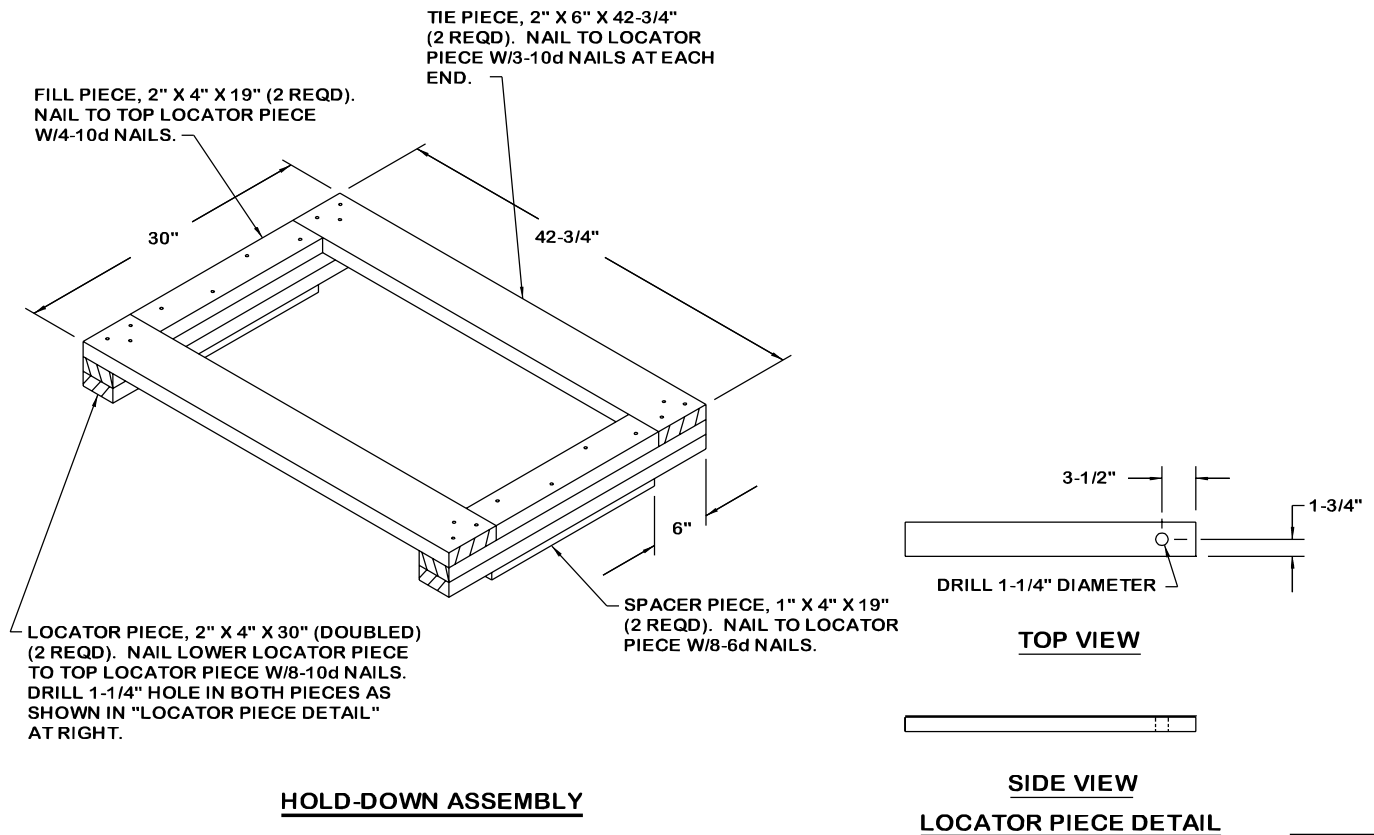
LADING MAY BE SECURED TO A FLATBED TRAILER BY WEB STRAP ASSEMBLIES IN LIEU OF STEEL STRAPPING OR CHAINS AND LOAD BINDERS, PROVIDED THE FOLLOWING CONDITIONS ARE MET.

1. ONLY WEB STRAPS OF GOOD QUALITY WILL BE USED. ALL WEB STRAPS AND ASSOCIATED HARDWARE SHALL CONFORM TO HE WEB SLING & TIEDOWN ASSOCIATION RECOMMENDED STANDARD SPECIFICATION FOR SYNTHETIC WEB TIEDOWNS, FIRST PUBLISHED IN 1991.
2. ALL WEB STRAP TIEDOWN ASSEMBLIES SHALL BE PERMANENTLY LABELED WITHIN 18" OF ONE END TO SHOW:
 - A. NAME OR TRADEMARK OF MANUFACTURER
 - B. WORKING LOAD LIMIT (WLL)
 - C. DATE OF MANUFACTURE (MONTH AND YEAR)
3. WEB STRAP ASSEMBLY MINIMUM BREAKING STRENGTH WILL BE AT LEAST THREE TIMES THE WLL MARKED ON THE STRAP.
4. THE TOTAL MINIMUM BREAKING STRENGTH (MBS) OF THE STRAPS USED TO RESTRAIN AMMUNITION ITEMS WILL BE AT LEAST 1-1/2 TIMES THE TOTAL WEIGHT OF THE ITEMS, WITH A MINIMUM OF TWO STRAPS POSITIONED OVER EACH LOAD UNIT ON A TRAILER. WRITTEN PROOF OF THE MBS OF THE STRAPS SHALL BE PROVIDED BY THE CARRIER TO THE SHIPPING ACTIVITY IF REQUESTED.
5. CARRIERS MUST COMPLY WITH ALL FEDERAL, STATE, AND LOCAL REGULATIONS APPLICABLE TO CARGO RESTRAINT USING WEB STRAPS.
6. WHEN USING STRAPS AND WINCHES FOR CARGO RESTRAINT, THE STRAPS WILL BE TENSIONED UNTIL TIGHT WITHOUT CAUSING DAMAGE TO THE CARGO. ONLY WINCH BARS WILL BE USED FOR OPERATING THE STRAP WINCHES.

(SPECIAL PROVISIONS CONTINUED AT RIGHT)

(SPECIAL PROVISIONS FOR WEB STRAP TIEDOWN CONTINUED)

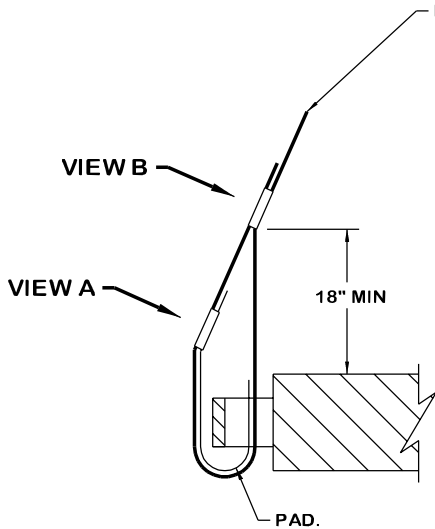
7. BEFORE AND DURING INSTALLATION, THE WEB STRAP ASSEMBLIES SHALL BE INSPECTED FOR DEFECTS. STRAPS HAVING ANY OF THE FOLLOWING DEFECTS WILL NOT BE USED FOR THE RESTRAINT OF ANY AMMUNITION LOAD, WITH THE EXCEPTION OF ONE WITH FRAYED ENDS. A STRAP HAVING FRAYED ENDS CAN BE USED IF THE FRAYED END IS TRIMMED AND MELTED WITH HEAT OR FLAME UNTIL ALL STRANDS ARE SEIZED.
 - A. STRAP ASSEMBLY HARDWARE: SHALL BE INSPECTED FOR BENT HOOKS, GOUGES, CORROSION, SIGNS OF REPAIR, BENT RATCHETS OR WINCHES, WEAR, OR ANY OTHER NOTICEABLE DEFECTS.
 - B. STRAP WEBBING: SHALL BE INSPECTED FOR KNOTS, EXCESSIVE ABRASIVE WEAR, TEARS, PUNCTURES, CUTS, ACID OR CAUSTIC BURNS, BROKEN STITCHES, FRAYED ENDS, OIL OR GREASE SPOTS EXCEEDING 6 SQUARE INCHES, BLEACHING OF COLOR, INCREASED STIFFNESS, SPLICES, VISIBLE WEAR INDICATOR THREADS, OR ANY OTHER NOTICEABLE DEFECTS.
8. RATCHET HANDLES MUST BE IN THE LOCKED POSITION AND/OR WINCH LOCKING DEVICES MUST BE FULLY SEATED IN THE TEETH OF THE WINCH.
9. IF THE WINCHES BEING USED ARE THE REMOVABLE TYPE HAVING BOLTS FOR ATTACHMENT TO THE TRAILER, CARE MUST BE EXERCISED WHEN ATTACHING THE WINCHES TO THE TRAILER. IF EXCESSIVE FORCE IS EXERTED ON THE BOLT DURING TENSIONING, DEFORMATION OF THE WINCH BRACKET MAY OCCUR, AND SUBSEQUENTLY CAUSE FAILURE OF THE WINCH BRACKET DURING TRANSPORT. MUST BE FASTENED TO THE TRAILER WITH A MINIMUM OF TWO BOLTS.
10. DRIVERS MUST BE INSTRUCTED TO PERIODICALLY CHECK THE TIGHTNESS OF THE WEB STRAP ASSEMBLIES AND RE-TIGHTEN, IF NECESSARY.
11. IF PROVIDED ON OR WITH THE WEB STRAP ASSEMBLIES, SCUFF SLEEVES/WEB PROTECTORS WILL BE USED WHEREVER THE STRAP PASSES OVER A SHARP CORNER OR IRREGULAR SURFACE. IF NOT PROVIDED, ANTI-CHAFING MATERIAL OF A SUITABLE THICKNESS WILL BE USED TO INSURE THAT THE STRAP WEBBING IS NOT DAMAGED DURING TRANSPORT OF THE LOAD.
12. THE HARDWARE FITTING OF THE TIEDOWN ASSEMBLIES MUST BE ATTACHED TO THE TRAILER IN SUCH A MANNER THAT THEY WILL REMAIN IN PLACE IF SLACK DEVELOPS IN THE STRAP DURING TRANSPORT.





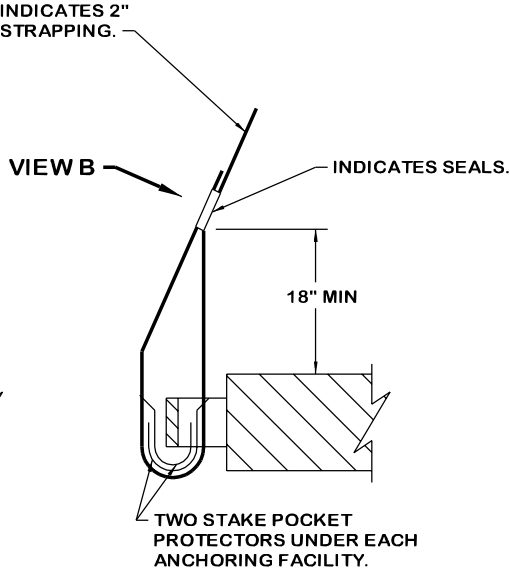
VIEW A

ONE SEAL WITH ONE PAIR OF CRIMPS.



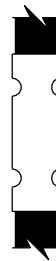
DETAIL A

METHOD OF INSTALLING 2" STRAPPING AND PAD AT ANCHORING FACILITY.



DETAIL B

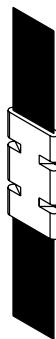
METHOD OF INSTALLING 2" STRAPPING AND STAKE POCKET PROTECTORS (ALT PAD).



VIEW B

ONE SEAL WITH TWO PAIR OF CRIMPS.

HOLD-DOWN STRAP ANCHORING DETAILS



STRAP JOINT A

METHOD OF SECURING A STRAP JOINT WHEN USING A NOTCH-TYPE SEALER.

ONE SEAL WITH TWO PAIR OF NOTCHES.



STRAP JOINT B

METHOD OF SECURING A STRAP JOINT WHEN USING A CRIMP-TYPE SEALER.

TWO SEALS, BUTTED TOGETHER, WITH TWO PAIR OF CRIMPS EACH SEAL.

END-OVER-END LAP JOINT DETAILS

SPECIAL PROVISIONS FOR CHAIN TIEDOWN

LADING MAY BE SECURED TO THE FLATBED TRAILER BY CARRIER-OWNED CHAINS AND LOAD BINDERS IN LIEU OF SPECIFIED STRAPPING, PROVIDED THE FOLLOWING CONDITIONS ARE MET.

1. ONLY CHAINS AND LOAD BINDERS OF GOOD QUALITY WILL BE USED. ALL CHAINS AND LOAD BINDERS SHALL CONFORM TO THE NATIONAL ASSOCIATION OF CHAIN MANUFACTURER'S WELDED CHAIN SPECIFICATION ADOPTED NOVEMBER 1999.
2. ALL CHAINS SHALL BE MARKED AS PRESCRIBED BY THE NATIONAL ASSOCIATION OF CHAIN MANUFACTURER'S WELDED CHAIN SPECIFICATION ADOPTED NOVEMBER 1999. AT LEAST ONE LINK IN EVERY 36 LINKS SHALL CARRY THE MANUFACTURER'S PERMANENT AND DISTINCTIVE MARK IDENTIFYING THE GRADE OF CHAIN. CHAINS NOT MARKED IN THIS MANNER SHALL NOT BE USED. IN ADDITION TO THE GRADE MARKING, THE CHAIN MAY ALSO CARRY LETTER MARKINGS OR SYMBOLS IDENTIFYING THE CHAIN MANUFACTURER. THE PRESENCE OF THE MANUFACTURER'S IDENTIFICATION MARKING IS NOT MANDATORY.
3. BEFORE AND DURING INSTALLATION, THE CHAINS AND LOAD BINDERS SHALL BE INSPECTED FOR BENT HOOKS, STRETCH, GOUGES, BENT LINKS, WEAR, OR ANY OTHER NOTICEABLE DEFECTS. ANY DEFICIENCY SHALL BE CAUSE FOR REJECTION OF A CHAIN OR LOAD BINDER. CHAINS MUST NOT BE TWISTED DURING INSTALLATION. CAUTION: EXTREME CARE MUST BE EXERCISED WHEN TENSIONING CHAINS TO PREVENT DAMAGE OR PERMANENT DEFORMATION TO THE LADING.
4. CHAIN SIZES AND GRADES APPROVED FOR USE WITH FLATBED TRAILER LOADS ARE AS FOLLOWS:
 - A. 3/8", GRADE 43 HIGH TEST CHAIN
 - B. 5/16", GRADE 70 TRANSPORT CHAIN
 - C. 3/8", GRADE 70 TRANSPORT CHAIN
 - D. 5/16", GRADE 80 ALLOY STEEL CHAIN
 - E. 3/8", GRADE 80 ALLOY STEEL CHAIN
5. THE GRABHOOKS ON THE ENDS OF THE CHAIN MAY BE OF THE FOLLOWING TYPES WITH GRADE MARKINGS AS INDICATED.
 - A. CLEVIS GRABHOOKS, 3/8" SIZE, DO NOT REQUIRE GRADE MARKING. ALLOY GRABHOOKS, 5/16" SIZE, SHALL CARRY THE MANUFACTURER'S GRADE MARK OF 7, 70, OR 700. THE HOOKS SHALL BE USED ON THE APPROPRIATE SIZE CHAIN.
 - B. CLOSED EYE GRABHOOKS, 3/8" AND 5/16" SIZE, MAY BE USED ON THE APPROPRIATE SIZE CHAIN IF THEY ARE A PART OF A CHAIN ASSEMBLY WHICH WAS PROVIDED BY A CHAIN MANUFACTURER, AND THE CHAIN ASSEMBLY CARRIES THE CORRECT GRADE IDENTIFICATION MARKING AS PREVIOUSLY STATED. CLOSED EYE GRABHOOKS THAT FORM A PART OF THE CHAIN ASSEMBLY ARE EXEMPT FROM GRADE MARKINGS.
6. CONNECTING LINKS USED FOR CHAIN REPAIR MUST BE CORRECTLY MARKED AND BE EQUAL TO OR GREATER IN STRENGTH THAN THE CHAIN THEY ARE REPAIRING. CHAINS WITH UNMARKED CONNECTING LINKS SHALL NOT BE USED.
7. CHAIN AND FITTING OF A HIGHER GRADE MAY BE SUBSTITUTED FOR THE GRADES SPECIFIED IN NOTE 4 ABOVE.
8. LOAD BINDERS SHALL BE 5/16" TO 3/8" SIZE AND HAVE A MINIMUM BREAKING STRENGTH OF 16,200 POUNDS (WORKING LOAD LIMIT OF 5,400 POUNDS). OVERCENTER TYPE LOAD BINDERS SHALL BE SAFETY WIRED TO PREVENT ACCIDENTAL OPENING DURING TRANSPORT. LOAD BINDER SIZE SHALL BE COMPATIBLE WITH THE SIZE OF THE CHAIN BEING USED.

PROVISIONS FOR THE USE OF FIRE HOSE IN LIEU OF CHAIN BOARDS OR STRAPPING BOARDS

FIRE HOSE THAT IS NO LONGER SUITABLE FOR USE IN FIRE FIGHTING APPLICATIONS CAN BE SUBSTITUTED FOR THE DOUBLED 2" BY 6" WOODEN CHAIN BOARDS OR SINGLE 2" BY 6" STRAPPING BOARDS, AS SPECIFIED HEREIN, PROVIDED THE FOLLOWING CONDITIONS ARE MET.

1. SUBSTITUTION AND APPLICATION GUIDANCE
 - A. FIRE HOSE MAY BE USED WHEREVER A CHAIN OR STRAPPING BOARD CONTACTS A RIGID SURFACE OF THE LOAD PROVIDED GOUGING, SCRATCHING, CRACKING, BENDING, CRUSHING, OR OTHER VISIBLE DAMAGE DOES NOT OCCUR TO THE LOAD.
 - B. ONE OR MORE SEGMENTS OF FIRE HOSE MAY BE USED TO REPLACE EACH CHAIN OR STRAPPING BOARD PROVIDING LOAD PROTECTION DURING TENSIONING OF TIEDOWNS AND LOAD SHIPMENT; I.E., A CHAIN BOARD NEED NOT BE REPLACED BY A SINGLE SEGMENT OF HOSE, MULTIPLE SEGMENTS MAY BE USED INSTEAD, AS LONG AS THEY ARE SECURELY FASTENED TO THE TIEDOWN. REGARDLESS OF THE NUMBER OF SEGMENTS USED, THE HOSE LENGTH WILL BE SUCH THAT IT EXTENDS AT LEAST 6" BEYOND THE EDGE OF THE LOAD.
 - C. FIRE HOSE CANNOT BE USED IN PLACE OF A PURCHASE BOARD ON A LOAD CONSISTING OF MORE THAN TWO PALLETS OR CONTAINERS ACROSS THE WIDTH OF THE TRAILER. THE FIRE HOSE CAN BE APPLIED TO THE OUTER STACKS, HOWEVER, A PURCHASE BOARD ASSEMBLY WILL STILL BE REQUIRED TO PROVIDE VERTICAL HOLD-DOWN ON THE CENTER STACK(S).
2. ACCEPTABLE FIRE HOSE
 - A. FIRE HOSE TO BE USED WILL BE A RUBBER LINED SINGLE OR DOUBLE JACKETED TYPE; I.E., IT MUST HAVE A RUBBER LINING INSIDE A SINGLE OR DOUBLED FABRIC (COTTON, LINEN, ETC.) JACKET.
 - B. THE COLLAPSED WIDTH OF THE HOSE MUST BE A MINIMUM OF 2-1/2".
 - C. THE HOSE SEGMENTS USED MUST NOT CONTAIN DEFECTS THAT WILL ALLOW DIRECT CONTACT OF THE CHAIN OR LOAD BINDER WITH THE LOAD. THE HOSE THICKNESS MUST ALSO BE OF SUCH A THICKNESS THAT DENTING OR DAMAGE TO THE LOAD DOES NOT OCCUR DURING CHAIN OR STRAP TENSIONING.
3. SECUREMENT TO CHAINS OR STRAPS
 - A. THE SEGMENTS OF HOSE USED UNDER EACH CHAIN OR STRAP WILL BE SECURED TO THE CHAIN OR STRAP WITH ONE FASTENER EVERY 12", WITH A MINIMUM OF TWO FASTENERS REQUIRED PER HOSE SEGMENT.
 - B. FASTENERS CAN CONSIST OF PLASTIC ELECTRICAL TIES, WIRE, OR TAPE. REGARDLESS OF THE TYPE OF FASTENING USED, IT MUST PROVIDE A POSITIVE MEANS OF SECUREMENT OF THE HOSE TO THE CHAIN OR STRAP AND MUST NOT DAMAGE THE SURFACE OF THE CONTAINER, PALLET, OR ITEM IT CONTACTS.

REVISIONS

REVISION NO. 1, DATED MAY 1986, CONSISTS OF:

1. CHANGING GENERAL NOTES "E" AND "O".
2. ADDING GENERAL NOTES "T" AND "U".
3. ADDING STRAP JOINT DETAILS ON PAGE 15.

REVISION NO. 2, DATED DECEMBER 1987, CONSISTS OF:

CHANGING REFERENCE DIMENSION FROM 51" TO 56" IN "ALTERNATIVE PRE-POSITIONED DUNNAGE PLAN VIEW" ON PAGE 11.

REVISION NO. 3, DATED OCTOBER 1993 CONSISTS OF:

1. ADDING CHAIN TIE DOWN METHOD.
2. REMOVING BACK-UP CLEATS FROM DEPICTED LOADS.
3. CHANGES AS NECESSARY TO UPDATE DRAWING FORMAT.

REVISION NO. 4, DATED SEPTEMBER 2006 CONSISTS OF:

1. ADDING WEB STRAP TIE DOWN METHOD.
2. REMOVING OVERPACK PROCEDURES.
3. CHANGES AS NECESSARY TO UPDATE DRAWING FORMAT.

