

APPROVED BY
 BUREAU OF EXPLOSIVES
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 DATE 10/21/70

LOADING AND BRACING (CL & LCL) IN BOX CARS OF THE M43 SERIES CLUSTER BOMB PACKED ONE PER SHIPPING GUARD

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			APPROVED BY ORDER OF COMMANDING GENERAL U. S. ARMY MATERIEL COMMAND
			<i>[Signature]</i>
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			JANUARY 1971
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GENERAL NOTES

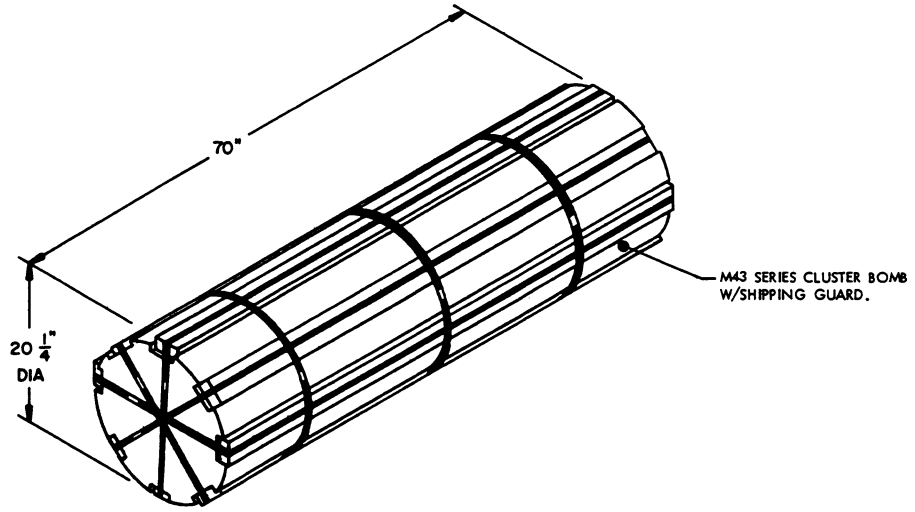
(GENERAL NOTES CONTINUED FROM LEFT)

- A. THIS DOCUMENT HAS BEEN PREPARED AND ISSUED IN ACCORDANCE WITH AMCR 740-13 AND AUGMENTS TM 743-200-1 (CHAPTER 5).
- B. THE OUTLOADING PROCEDURES SPECIFIED HEREIN ARE APPLICABLE TO THE M43 SERIES CLUSTER BOMB PACKED ONE (1) PER SHIPPING GUARD.
- C. FOR DETAIL OF UNIT SEE
DETAIL DEPICTED ON PAGE 3 OF THIS DRAWING.
UNIT DIMENSIONS ----- 70" LONG X 20-1/4" DIAMETER.
GROSS WEIGHT ----- 855 POUNDS (APPROXIMATE)
CUBE ----- 13.0 CU. FT.
- D. THE LOADS AS SHOWN HEREIN ARE BASED ON CONVENTIONAL TYPE BOX CARS OF VARIOUS LENGTH AND WIDTH COMBINATIONS. ALL-METAL CARS MAY BE USED IF EQUIPPED WITH NAILABLE FLOORS.
- E. THE LOADS AS SHOWN ARE BASED ON CARS WHICH HAVE DOORS OF THE CONVENTIONAL SLIDING TYPE. CARS EQUIPPED WITH WIDER OR STAGGERED DOORS CAN BE USED. THE LENGTH OF THE "DOORWAY AREA" CAN BE AS MUCH AS TWENTY-FOUR FEET IN SOME CARS THAT ARE EQUIPPED WITH STAGGERED DOORS. THE "DOOR WAY AREA" WITHIN A CAR IS DEFINED AS THE CARGO SPACE THAT IS ADJACENT TO A CONVENTIONAL TYPE OR A PLUG DOOR.
- F. THE DEPICTED OUTLOADING PROCEDURES ARE ALSO APPLICABLE TO CARS WHICH ARE EQUIPPED WITH PLUG DOORS. **CAUTION:** DUNNAGE MATERIAL MUST NOT BE NAILED TO ANY PLUG DOOR, WHETHER AUXILIARY OR MAIN, EXCEPT TO A NAILING STRIP, FOR SECURING SUCH ITEMS AS DOORWAY SPANNER DUNNAGE, IF A DOOR IS SO EQUIPPED. ALSO, AFTER THE PLUG DOORS ARE CLOSED AND READY FOR THE INSTALLATION OF "CAR SEALS", A PIECE OF WIRE OF SUITABLE SIZE WILL BE USED IN ADDITION TO, AND IN CONJUNCTION WITH, EACH CAR SEAL USED TO "SEAL" THE CAR. THE WIRE WILL BE THREADED THROUGH THE HOLES IN THE DOOR LATCH ASSEMBLY ONE OR MORE TIMES, AND THE WIRE ENDS WILL BE TWISTED TOGETHER.
- G. THE NUMBER OF LADING UNITS MAY BE ADJUSTED TO FIT THE SIZE OF THE BOX CAR BEING LOADED OR THE QUANTITY OF ITEMS TO BE SHIPPED, AND COMBINATIONS OF THE OUTLOADING PROCEDURES SPECIFIED FOR THE VARIOUS LOADS SHOWN HEREIN MAY BE USED AS REQUIRED. HOWEVER, THE APPROVED METHODS SPECIFIED HEREIN FOR FULL OR PARTIAL CARLOADS MUST BE FOLLOWED AS CLOSELY AS POSSIBLE FOR BLOCKING, BRACING, AND STAYING OF THE DESIGNATED ITEM.
- H. OTHER TYPES OF LADING MAY BE LOADED IN BOX CARS WHICH ARE PARTIALLY LOADED WITH M43 SERIES CLUSTER BOMBS, 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 WITHIN THIS DOCUMENT.
- J. IF THE CAR BEING USED FOR A SHIPMENT IS EQUIPPED WITH A NAILABLE METAL FLOOR AND A NAIL SIZE FOR FLOOR NAILING IS MARKED ON THE SIDE WALL OF THE CAR, THAT GUIDANCE SHOULD BE APPLIED FOR THE NAILING OF THE APPLICABLE DUNNAGE PIECES. IF A NAIL SIZE IS NOT SPECIFIED, 30d NAILS SHOULD BE USED IN LIEU OF THOSE SPECIFIED IN THE KEY NUMBERS.
- K. DUNNAGE LUMBER SPECIFIED THROUGHOUT THIS PROCEDURAL DRAWING IS OF NOMINAL SIZE. FOR EXAMPLE, 2" X 6" MATERIAL IS ACTUALLY 1-5/8" THICK BY 5-5/8" WIDE AND 4" X 4" MATERIAL IS ACTUALLY 3-5/8" THICK BY 3-5/8" WIDE.
- L. **NOTICE:** 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 OR A SIDE WALL OF THE TRANSPORTING VEHICLE, OR WHEN LAMINATING DUNNAGE. 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 ONTO OR RIGHT BESIDE A NAIL IN A LOWER PIECE.
- M. THROUGHOUT THIS PROCEDURAL DRAWING, PORTIONS OF THE BLOCKING COMPONENTS AND OF THE DEPICTED CARS, SUCH AS A CAR SIDE WALL, HAVE BEEN OMITTED FROM THE LOAD VIEWS FOR CLARITY PURPOSES.
- N. FOR ADDITIONAL GUIDANCE, ATTENTION IS DIRECTED TO THE "UNIT DETAIL" ON PAGE 3 AND TO THE "SPECIAL NOTES" SECTION WHICH IS IMMEDIATELY ADJACENT TO DEPICTED OUTLOADING METHODS.
- O. WHEN STEEL STRAPPING IS SEALED IN AN END-OVER-END LAP JOINT, A MINIMUM OF TWO (2) SEALS, BUTTED TOGETHER, WITH TWO (2) PAIR OF CRIMPS PER SEAL MUST BE USED TO SEAL THE JOINT. **CAUTION:** EXERCISE CARE DURING TENSIONING TO PREVENT DAMAGE TO ITEMS.
- P. **CAUTION:** LOADING OF THIS ITEM IS LIMITED TO NOT MORE THAN TWO (2) LAYERS IN HEIGHT.

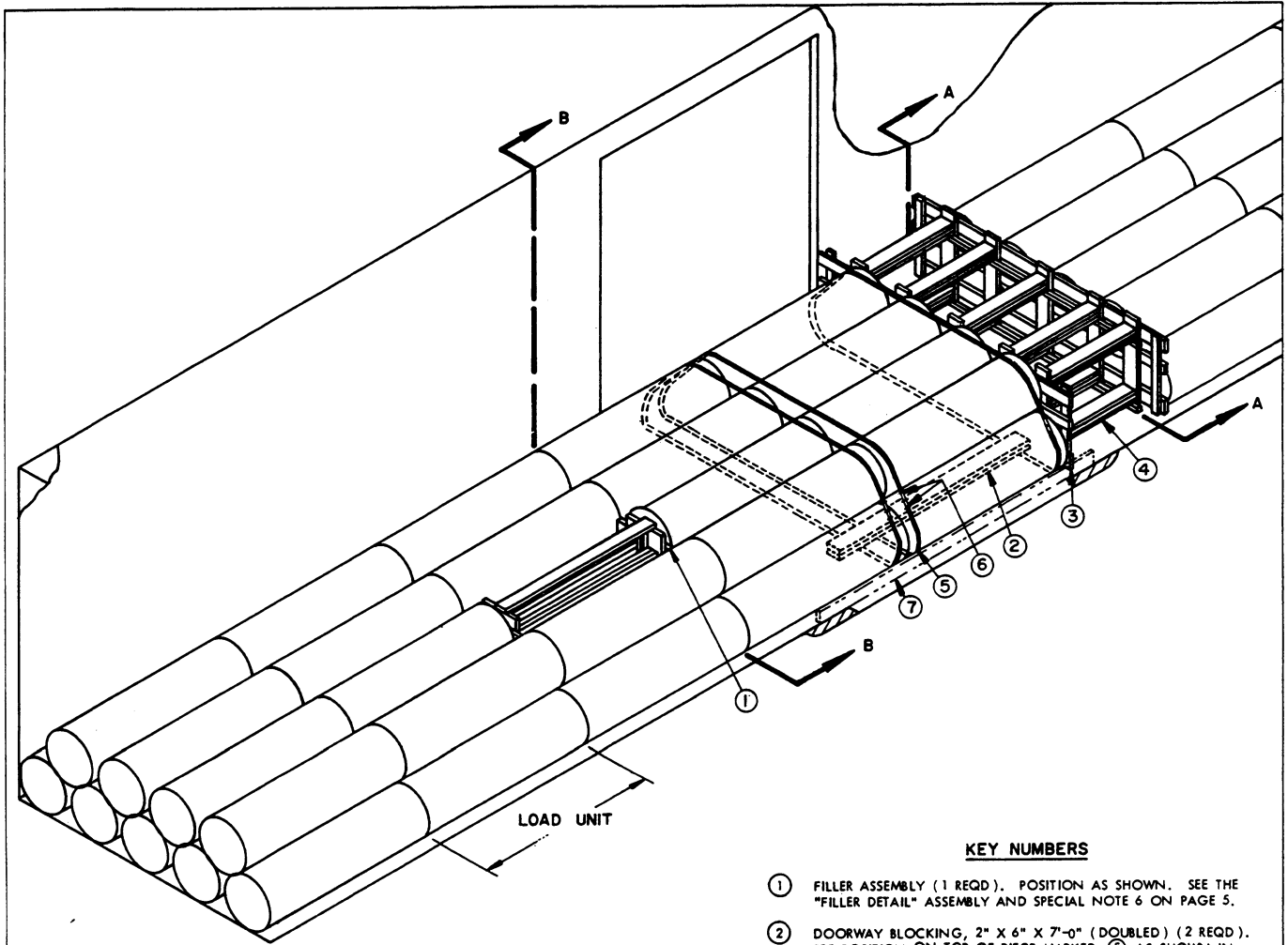
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MATERIAL SPECIFICATIONS

- LUMBER----- : SEE TM 743-200-1, DUNNAGE LUMBER; FED SPEC MM-L-751.
- NAILS----- : COMMON, CEMENT COATED OR CHEMICALLY ETCHED, FED SPEC FF-N-105. ALT: ANNULAR-RING TYPE NAIL OF SAME SPEC.
- STRAPPING, STEEL--: TYPE I OR IV, CLASS A, B OR C, FED SPEC QQ-S-781.
- STRAP SEAL----- : COMMERCIAL GRADE.



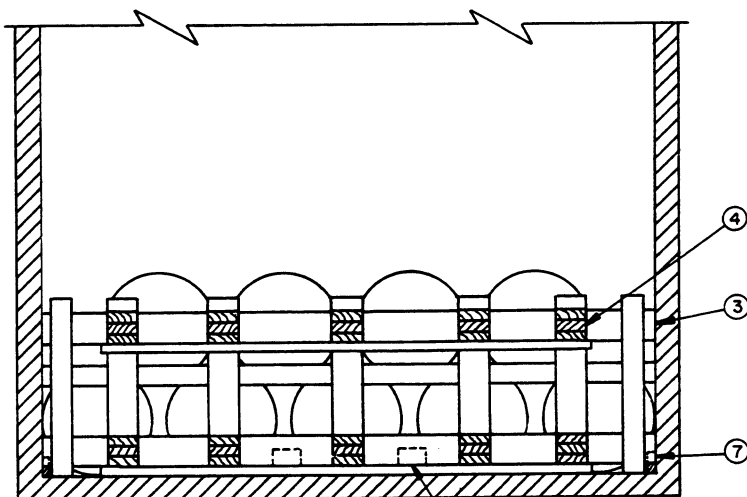
UNIT DETAIL



ISOMETRIC VIEW

KEY NUMBERS

- ① FILLER ASSEMBLY (1 REQD). POSITION AS SHOWN. SEE THE "FILLER DETAIL" ASSEMBLY AND SPECIAL NOTE 6 ON PAGE 5.
- ② DOORWAY BLOCKING, 2" X 6" X 7'-0" (DOUBLED) (2 REQD). PRE-POSITION ON TOP OF PIECE MARKED ⑤ AS SHOWN IN "SECTION B-B" ON PAGE 5. NAIL FIRST PIECE TO CAR FLOOR W/1-16d NAIL EVERY 8" AND NAIL SECOND PIECE TO FIRST IN LIKE MANNER. POSITION SO THERE WILL BE A 3" SPACE BETWEEN THE BLOCKING AND THE ADJACENT CENTER GATE.
- ③ CENTER GATE (2 REQD). SEE THE DETAIL ON PAGE 8.
- ④ STRUTS, 2" X 6" X CUT TO FIT (TRIPLED) (10 REQD). LAMINATE W/1-10d NAIL EVERY 6". TOE-NAIL TO CENTER GATES, PIECES MARKED ③, W/2-12d NAILS AT EACH END. SEE THE "STRUT BRACING" DETAIL ON PAGE 8.
- ⑤ DOORWAY PROTECTION STRAP, 1-1/4" X .035" X 26'-0" LONG STEEL STRAPPING (3 REQD). PRE-POSITION BEFORE NAILING DOORWAY BLOCKING, PIECE MARKED ②, TO CAR FLOOR. INSTALL AS SHOWN TO ENCIRCLE THOSE LOAD UNITS WHICH PROTRUDE INTO THE DOORWAY AREA. SEE SPECIAL NOTE 5.
- ⑥ SEAL FOR 1-1/4" STEEL STRAPPING (6 REQD, 2/STRAP). POSITION JOINTS AT VOID BETWEEN UNITS AS SHOWN AND DOUBLE CRIMP EACH SEAL. SEE GENERAL NOTE "O" ON PAGE 2.
- ⑦ DOORWAY PROTECTION, 2" X 4" X 10'-0" (2 REQD). POSITION TO EXTEND 12" BEYOND THE DOORWAY OPENING AT EACH SIDE AND NAIL W/5-12d NAILS EACH END.

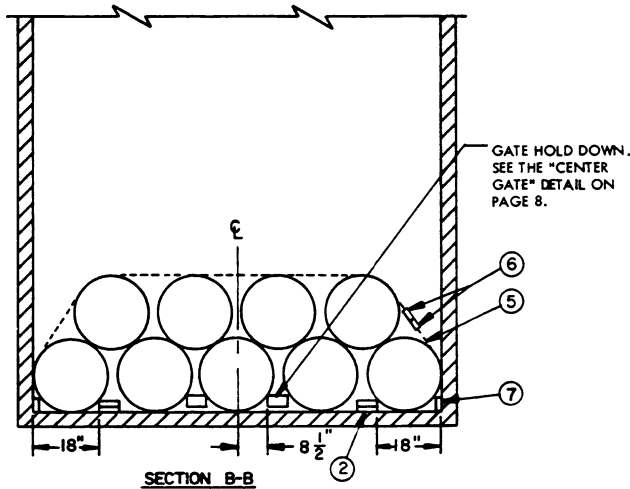


SECTION A-A

GATE HOLD DOWN. SEE THE "CENTER GATE" DETAIL ON PAGE 5.

SPECIAL NOTES:

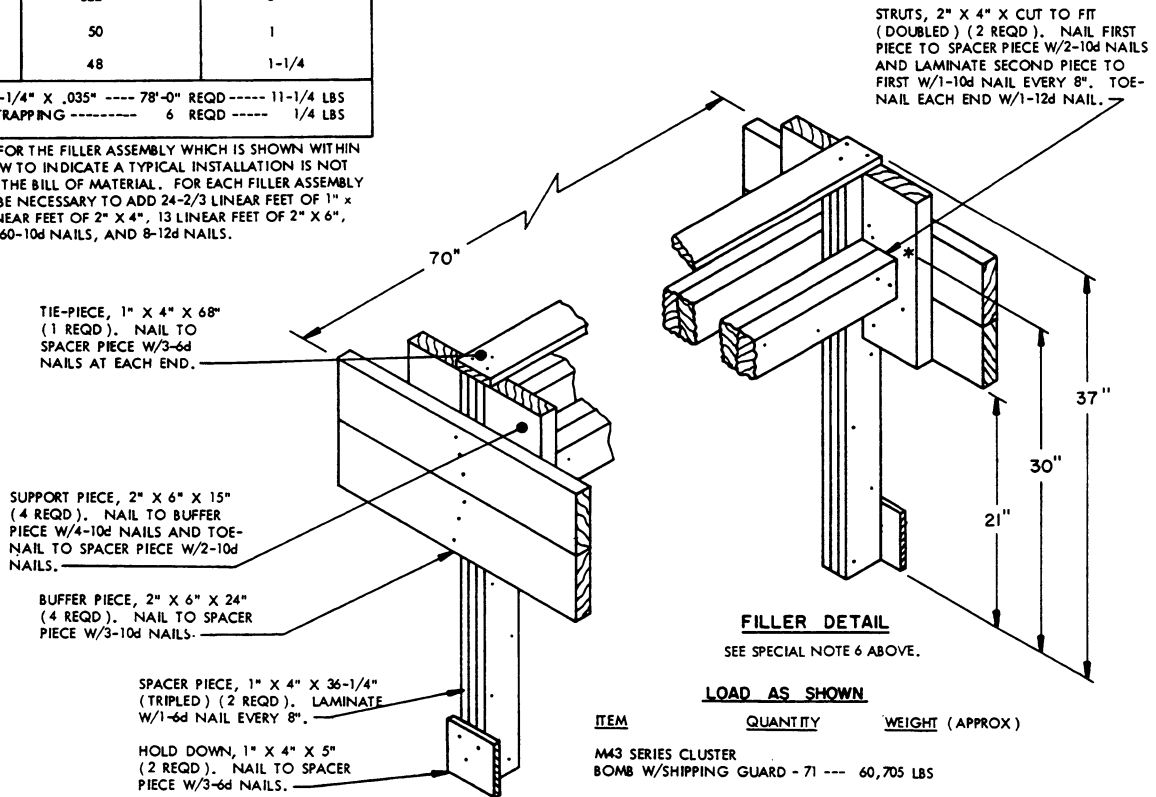
1. A 50'-6" LONG BY 9'-2" WIDE (INSIDE CLEARANCE) CONVENTIONAL TYPE BOX CAR EQUIPPED W/8'-0" WIDE DOORWAY OPENINGS IS SHOWN. CARS WITH WIDER OR STAGGERED DOORWAYS MAY BE USED.
2. A 9'-2" WIDE CAR IS PREFERRED; HOWEVER, OTHER WIDTH CARS MAY BE USED.
3. IF THE CAR BEING LOADED HAS PLUG DOORS, NO SPECIAL PROCEDURES ARE REQUIRED; HOWEVER, THE CRITERIA SET FORTH IN GENERAL NOTE "F" ON PAGE 2 WILL BE OBSERVED.
4. TO SATISFY THE NUMBER OF UNITS TO BE SHIPPED, THE LOAD MAY BE DECREASED BY ONE (1) WITH USE OF THE FILLER DETAIL SHOWN BELOW.
5. FOR EACH LOAD UNIT THAT EXTENDS INTO THE DOORWAY AREA 30" OR MORE, PIECES MARKED ②, ⑤, AND ⑥ MUST BE INSTALLED TO BUNDLE THAT UNIT AS SHOWN WITHIN THE BASIC LOAD VIEW. ALSO, IF A LOAD UNIT EXTENDS 64" INTO A DOORWAY AREA, BOTH ENDS MUST BE BUNDLED.
6. FILLER ASSEMBLIES, PIECE MARKED ①, MAY BE USED AS FILLERS FOR OMITTED CONTAINERS ANYWHERE IN THE SECOND LAYER AND MAY BE ADJACENT TO EACH OTHER. IT IS RECOMMENDED THAT FILLERS FIRST BE USED IN THE CENTER TWO ROWS, HALFWAY BETWEEN THE CENTER GATE AND EITHER CAR END WALL AND THAT FILLERS BE USED AGAINST THE CENTER GATE AND/OR LONGITUDINALLY ADJACENT TO EACH OTHER ONLY WHEN ALL OTHER CONTAINERS IN THE ROW HAVE BEEN OMITTED. A FILLER ASSEMBLY IS SHOWN IN THE LOAD VIEW ONLY TO SHOW A TYPICAL INSTALLATION; A FULL LOAD OF 72 ITEMS CAN BE SHIPPED.
7. CAUTION: LOADING OF THIS ITEM IS LIMITED TO NOT MORE THAN TWO (2) LAYERS IN HEIGHT.
8. AN "OFF-SET CENTER GATE" LOADING PATTERN HAS BEEN SPECIFIED TO FACILITATE LOADING AND UNLOADING OF THE CAR, PARTICULARLY IN THE DOORWAY AREA. THIS LOADING PATTERN IS NOT REQUIRED WHEN LOADING CARS HAVING STAGGERED DOOR OPENINGS; FOUR (4) LOAD UNITS MAY BE PLACED IN EACH END OF THE CAR.



SECTION B-B
PIECE MARKED ③ HAS BEEN OMITTED FOR CLARITY.

BILL OF MATERIAL *		
LUMBER	LINEAR FEET	BOARD FEET
2" X 2"	32	11
2" X 3"	4	2
2" X 4"	50	34
2" X 6"	190	190
NAILS	NO. REQD	POUNDS
10d (3")	322	5
12d (3-1/4")	50	1
16d (3-1/2")	48	1-1/4
STEEL STRAPPING, 1-1/4" X .035" ---- 78'-0" REQD ---- 11-1/4 LBS		
SEALS FOR 1-1/4" STRAPPING ----- 6 REQD ----- 1/4 LBS		

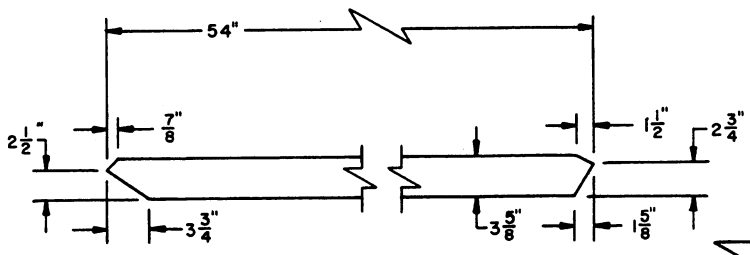
* THE MATERIAL FOR THE FILLER ASSEMBLY WHICH IS SHOWN WITHIN THE LOAD VIEW TO INDICATE A TYPICAL INSTALLATION IS NOT INCLUDED IN THE BILL OF MATERIAL. FOR EACH FILLER ASSEMBLY USED IT WILL BE NECESSARY TO ADD 24-2/3 LINEAR FEET OF 1" X 4", 21-1/3 LINEAR FEET OF 2" X 4", 13 LINEAR FEET OF 2" X 6", 32-6d NAILS, 60-10d NAILS, AND 8-12d NAILS.



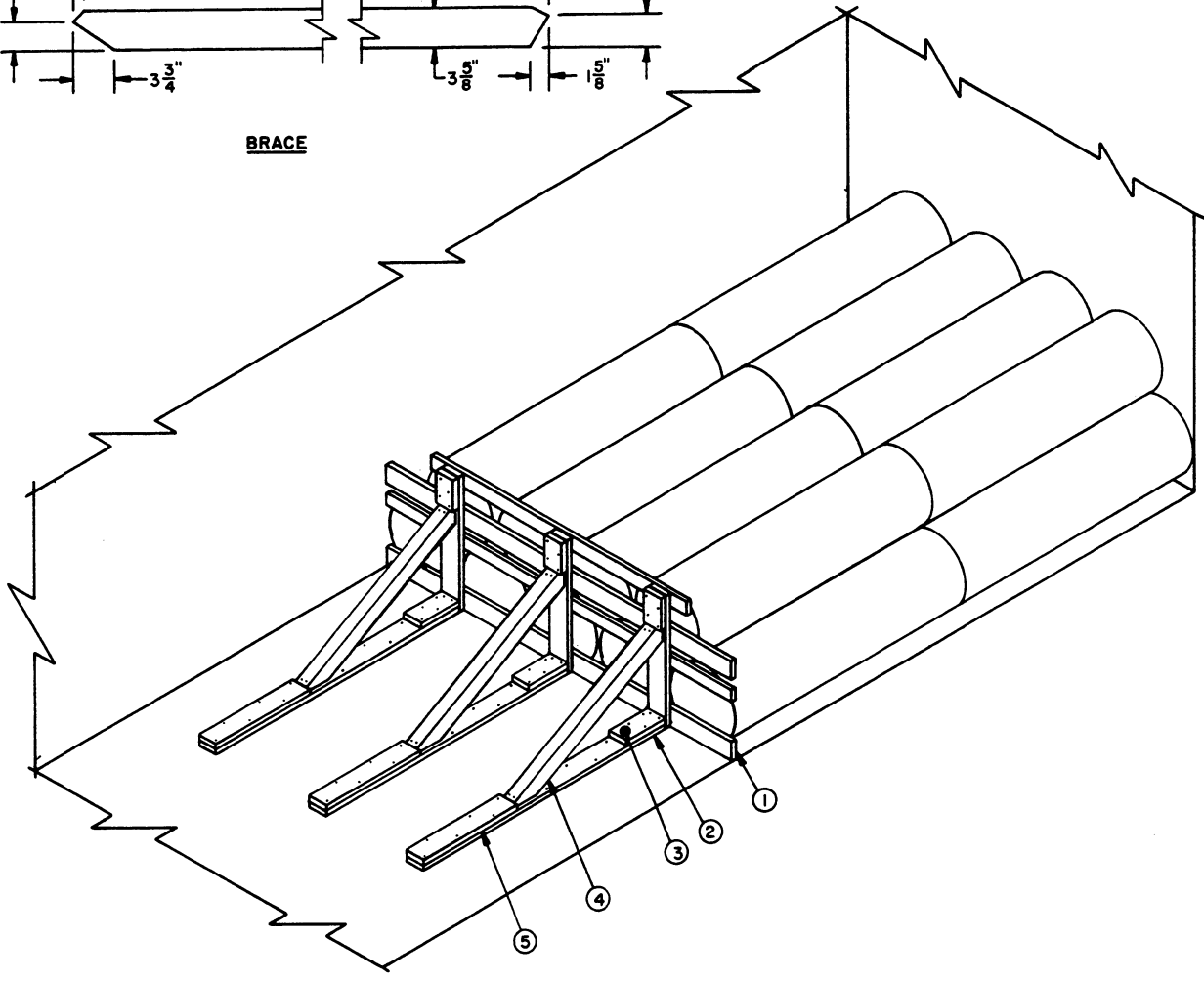
LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
M43 SERIES CLUSTER BOMB W/SHIPPING GUARD - 71	---	60,705 LBS
DUNNAGE	-----	591 LBS
TOTAL WEIGHT	-----	61,296 LBS

71-UNIT LOAD IN A 50'-6" LONG BY 9'-2" WIDE BOX CAR



BRACE



ISOMETRIC VIEW

KEY NUMBERS

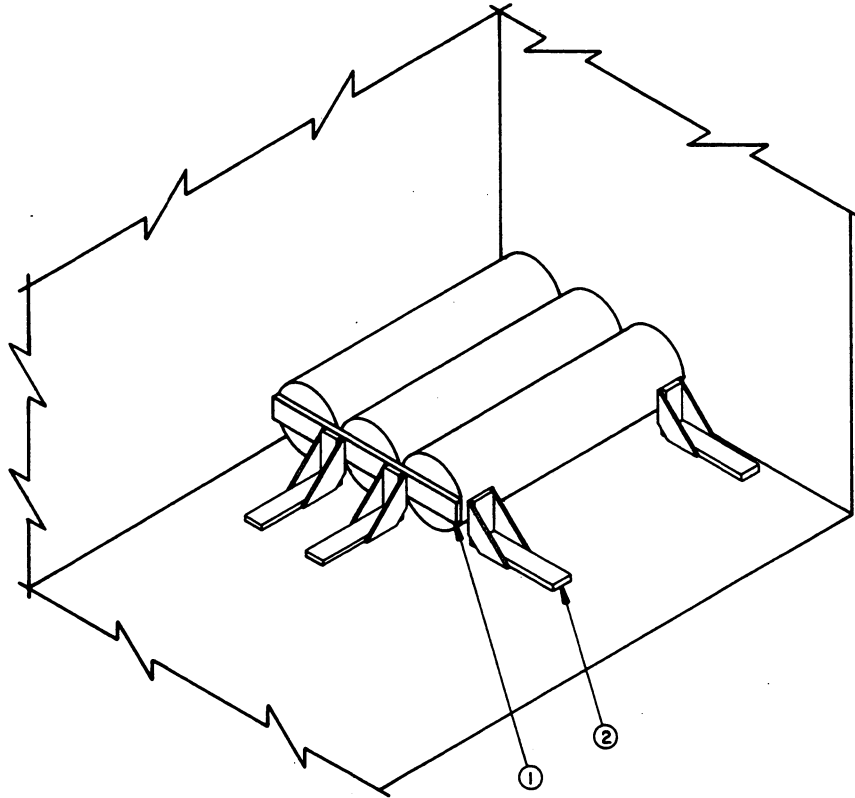
- ① LCL GATE (1 REQD). SEE THE DETAIL ON PAGE 8.
- ② BACKUP PIECE, 2" X 6" X 6'-4" (3 REQD). NAIL TO CAR FLOOR W/1-16d NAIL EVERY 8". SEE GENERAL NOTES "J" AND "L" ON PAGE 2.
- ③ SUPPORT PIECE, 2" X 6" X 12" (3 REQD). NAIL TO A PIECE MARKED ② W/4-16d NAILS AND TOENAIL TO PIECE MARKED ① W/2-12d NAILS.
- ④ BRACE, 4" X 4" X 54" (3 REQD). SEE THE DETAIL ABOVE. TOENAIL TO PIECES MARKED ① AND ② W/2-16d NAILS AT EACH END.
- ⑤ BACK-UP CLEAT, 2" X 6" X 30" (3 REQD). NAIL TO PIECE MARKED ② W/6-40d NAILS. SEE SPECIAL NOTE 2.

SPECIAL NOTES:

- 1. THESE OUTLOADING PROCEDURES ARE SHOWN DEPICTING A "KNEE BRACE" TYPE OF BLOCKING IN A 9'-2" WIDE CAR.
- 2. THE "KNEE BRACE" BLOCKING ASSEMBLY IS ADEQUATE FOR RETAINING AN LCL LOAD OF NOT MORE THAN 16,000 POUNDS.
- 3. IF THE CAR BEING USED FOR THE SHIPMENT OF THE DEPICTED LOAD IS EQUIPPED WITH A NAILABLE METAL FLOOR, SEE GENERAL NOTE "J" ON PAGE 2 FOR GUIDANCE.

SPECIAL NOTES:

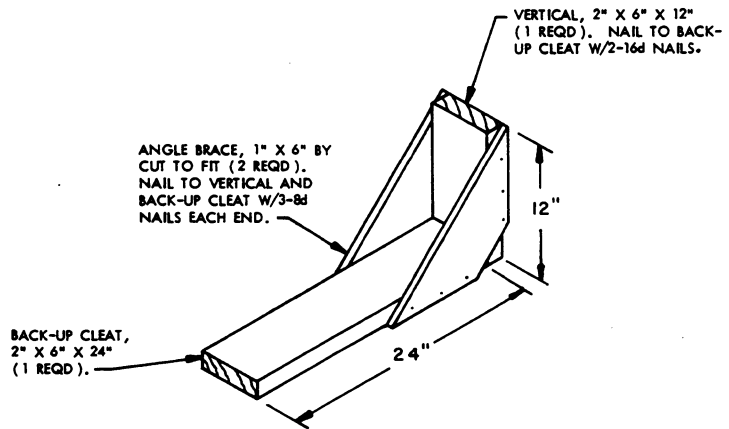
1. THESE LCL OUTLOADING PROCEDURES ARE SHOWN DEPICTING THE USE OF LCL BRACES TO BLOCK A SMALL-QUANTITY LOAD IN A BOXCAR WHICH HAS A WOOD OR NAILABLE METAL FLOOR.
2. IF WEIGHT DISTRIBUTION REQUIRES THE LADING TO BE CENTERED IN THE CAR, LCL BRACES MAY BE INSTALLED AT EACH SIDE AND/OR EACH END OF THE LOAD.
3. EACH BRACE AS APPLIED FOR LONGITUDINAL OR LATERAL BRACING WILL SUPPORT 2,000 POUNDS OR 8,000 POUNDS OF LADING, RESPECTIVELY. ONE (1) LCL BRACE MUST BE USED AT THE END OF A DOUBLE ROW OF CONTAINERS. TWO (2) LCL BRACES MUST BE USED TO SIDE-BLOCK EACH STACK.
4. THE BLOCKING PROCEDURES SHOWN ON THIS PAGE ARE RESTRICTED TO LCL SHIPMENTS OF ONLY ONE (1) LAYER HIGH.



ISOMETRIC VIEW

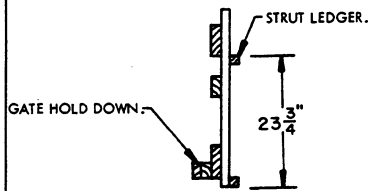
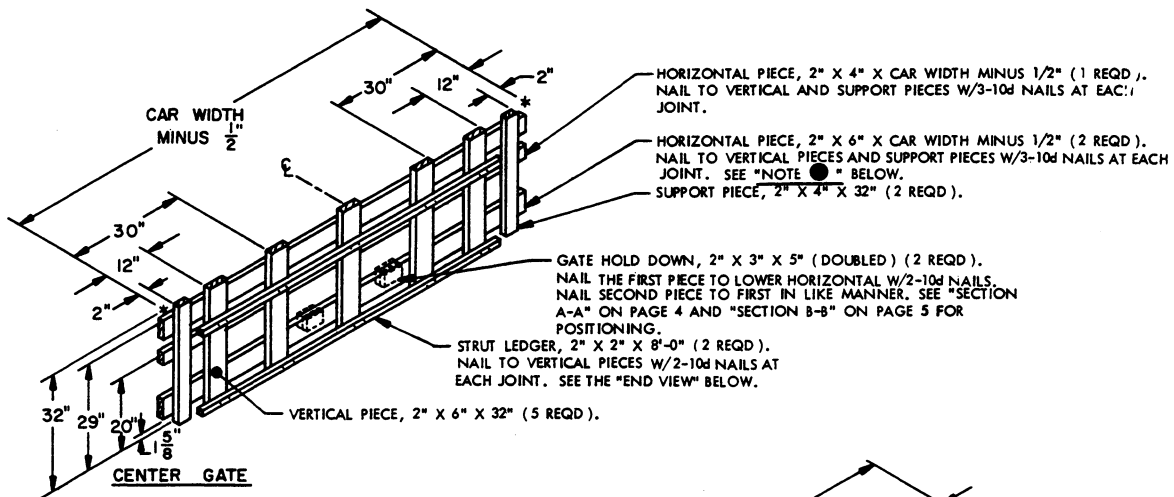
KEY NUMBERS

- ① BUFFER PIECE, 2" X 6" X CUT TO FIT (1 REQD). NAIL TO LCL BRACES W/3-10d NAILS AT EACH JOINT.
- ② LCL BRACE (4 REQD). SEE THE DETAIL. POSITION AS SHOWN AND NAIL TO THE CAR FLOOR W/7-16d NAILS. SEE GENERAL NOTES "J" AND "L" ON PAGE 2.



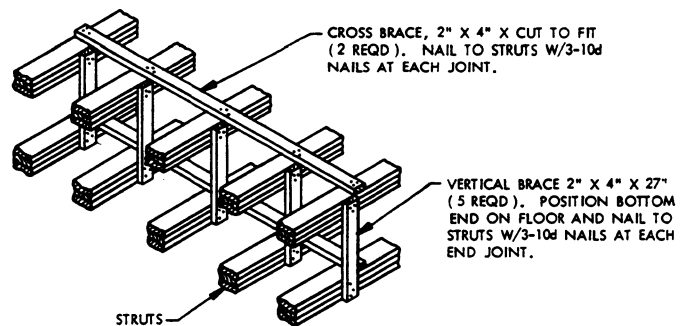
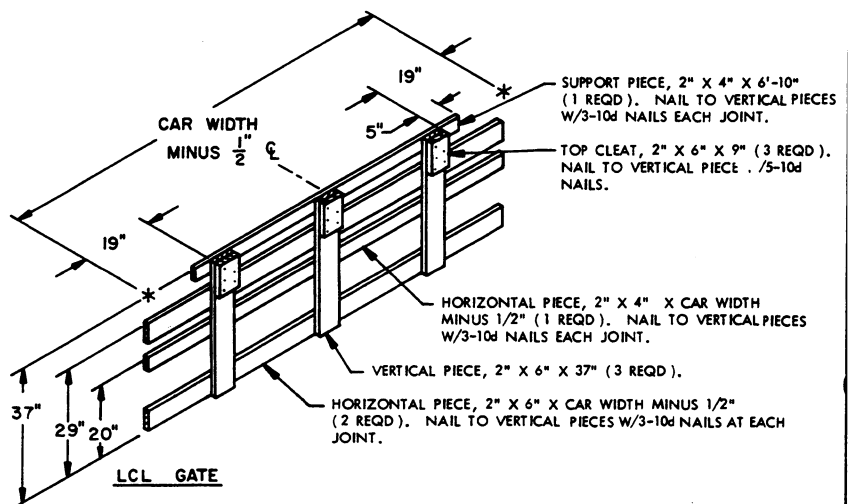
LCL BRACE

SEE SPECIAL NOTES ABOVE.



END VIEW

THIS END VIEW OF THE CENTER GATE SHOWS THE HEIGHT LOCATIONS FOR THE STRUT LEDGERS AND THE RELATIVE POSITION FOR THE GATE HOLD DOWN PIECES. NOTE ●: $1\frac{1}{2}$ " MUST BE CUT FROM EACH END OF BOTTOM HORIZONTAL PIECE ON ONE OF THE CENTER GATES (TO PROVIDE CLEARANCE FOR "DOORWAY PROTECTION PIECES, PIECE MARKED ⑦ ON PAGE 4).



STRUT BRACING

REQUIRED FOR STRUTS LONGER THAN 72".