

APPROVED BY
BUREAU OF EXPLOSIVES

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DATE 10/27/92

MLRS

LOADING AND BRACING WITH WOODEN DUNNAGE IN COMMERCIAL SIDE OPENING CONTAINERS OF ROCKET POD/CONTAINER (RP/C) FOR MULTIPLE LAUNCH ROCKET SYSTEM

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- LOADING AND BRACING SPECIFICATIONS SET FORTH WITHIN THIS DRAWING ARE APPLICABLE TO LOADS THAT ARE TO BE SHIPPED BY TRAILER/CONTAINER-ON-FLATCAR (T/COFC) RAIL CARRIER SERVICE. THESE SPECIFICATIONS MAY ALSO BE USED FOR LOADS THAT ARE TO BE MOVED BY MOTOR OR WATER CARRIERS.

U. S. ARMY MATERIEL COMMAND DRAWING			
APPROVED, U.S. ARMY MISSILE COMMAND <i>Dale W. Honea</i>	DRAFTSMAN	TECHNICIAN	ENGINEER
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	<i>JML W. Ernie W F Ernst</i> MARCH 1993		
U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL	CLASS	DIVISION	DRAWING
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DO NOT SCALE

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 SPECIFIED OUTLOADING PROCEDURES ARE APPLICABLE TO TO THE MULTIPLE LAUNCH ROCKET SYSTEM (MLRS) COMPLETE ROUND, WHEN PACKED IN THE ROCKET POD/CONTAINER (RP/C). SUBSEQUENT REFERENCE TO CONTAINER HEREIN MEANS THE RP/C WITH ROCKET COMPONENTS. CAUTION: REGARDLESS OF THE QUANTITY OF CONTAINERS TO BE SHIPPED, THE "MAXIMUM GROSS WEIGHT" OF THE SIDE OPENING ISO CONTAINER MUST NOT BE EXCEEDED.
- C. THE LOAD AS SHOWN IS BASED ON A 6,050 POUND 20' LONG BY 8' WIDE BY 8'-6" HIGH SIDE OPENING INTERMODAL COMMERCIAL CONTAINER WITH INSIDE DIMENSIONS OF 19'-4" LONG BY 89" WIDE BY 88" HIGH. THE LOAD IS DESIGNED FOR TRAILER/CONTAINER-ON-FLATCAR (T/COFC) SHIPMENT, HOWEVER, THE LOAD AS DESIGNED CAN ALSO BE MOVED BY OTHER SURFACE MODES OF TRANSPORT. NOTICE: OTHER CONTAINERS OF THE SAME DESIGN CONFIGURATION CAN BE USED.
- D. WHEN LOADING THE CONTAINERS, THEY ARE TO BE POSITIONED SO AS TO ACHIEVE A TIGHT LOAD (TIGHT AGAINST THE DUNNAGE ASSEMBLIES). ALTHOUGH A TOTAL OF 1-1/2" OF UNBLOCKED SPACE ACROSS THE WIDTH OF A LOAD BAY IS PERMITTED, LATERAL VOIDS WITHIN THE LOAD ARE TO BE HELD TO A MINIMUM. EXCESSIVE SLACK CAN BE ELIMINATED FROM A LOAD BY LAMINATING ADDITIONAL PIECES OF APPROPRIATE THICKNESS TO THE VERTICAL PIECES ON THE SIDE BLOCKING. NAIL EACH ADDITIONAL PIECE W/1 APPROPRIATELY SIZED NAIL EVERY 12". ADDITIONALLY, THE LENGTH OF THE STRUTS WILL BE ADJUSTED AS REQUIRED TO FACILITATE VARIANCE IN THE LENGTH OF THE LADING.
- E. DUNNAGE LUMBER SPECIFIED IS OF NOMINAL SIZE. FOR EXAMPLE, 1" X 4" MATERIAL IS ACTUALLY 3/4" THICK BY 3-1/2" WIDE AND 2" X 6" MATERIAL IS ACTUALLY 1-1/2" THICK BY 5-1/2" WIDE.
- F. A STAGGERED NAILING PATTERN WILL BE USED WHENEVER POSSIBLE WHEN NAILS ARE DRIVEN INTO JOINTS OF DUNNAGE ASSEMBLIES 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.
- G. IN SOME CONTAINERS, SUCH AS SOME ALL STEEL CONTAINERS, THERE IS A SLOT AT THE CORNERS OF THE ENDWALLS. A PIECE OF DUNNAGE MATERIAL MUST BE LAMINATED TO THE BUFFER PIECES OF THE END BLOCKING ASSEMBLIES TO PROVIDE A FLAT SURFACE FOR THE 2" X 4" BUFFER PIECES. A PIECE OF 2" X 4", 2" X 3", OR A SPECIAL WIDTH PIECE CUT-TO-FIT CAN BE USED. THIS FILL PIECE WILL BE NAILED WITH ONE APPROPRIATELY SIZED NAIL EVERY 12". THIS PIECE IS NOT REQUIRED WHEN THE ENDWALL OF THE CONTAINER IS SMOOTH AND FLAT.
- H. CAUTION: DO NOT NAIL DUNNAGE MATERIAL TO THE CONTAINER WALLS OR FLOOR. ALL NAILING WILL BE WITHIN THE DUNNAGE.
- J. PORTIONS OF THE CONTAINER DEPICTED WITHIN THIS DRAWING, SUCH AS THE SIDE DOORS, HAVE NOT BEEN SHOWN IN THE LOAD VIEWS FOR CLARITY PURPOSES.

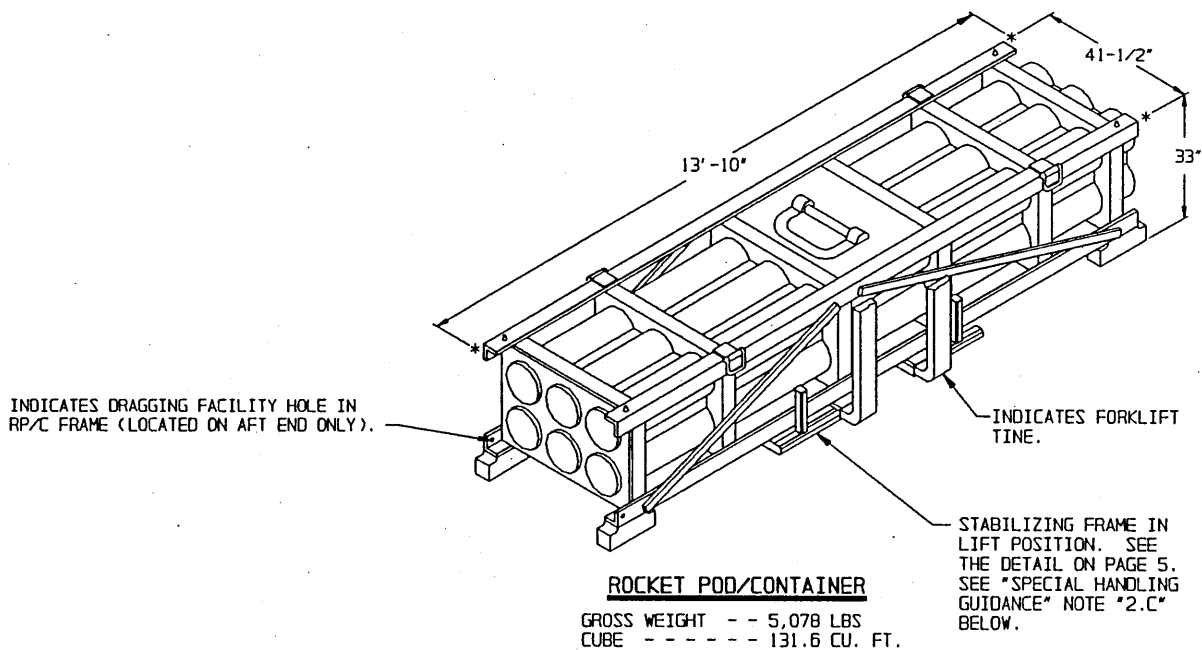
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MATERIAL SPECIFICATIONS

- LUMBER - - - - - : SEE TM 743-200-1 (DUNNAGE LUMBER) AND FED SPEC MM-L-751.
- NAILS - - - - - : FED SPEC FF-N-105; COMMON.
- WIRE, CARBON STEEL - - : ASTM A853; ANNEALED AT FINISH, BLACK OXIDE FINISH, .0800" DIA, GRADE 1006 OR BETTER.

(GENERAL NOTES CONTINUED)

- K. REQUIREMENTS CITED WITHIN THE BUREAU OF EXPLOSIVES PAMPHLET 6C APPLY WHEN THE SHIPMENT MOVES BY TRAILER/CONTAINER-ON-FLATCAR (T/COFC). SPECIAL T/COFC NOTES FOLLOW:
1. A LOADED CONTAINER MUST BE ON A CHASSIS EQUIPPED WITH TWO BOGIE ASSEMBLIES WHEN BEING MOVED IN TOFC SERVICE.
 2. THE LOAD LIMIT OF A T/COFC RAILCAR MUST NOT BE EXCEEDED, NOR WILL A CAR BE LOADED SO THAT THE TRUCK UNDER ONE END OF THE CAR CARRIES MORE THAN ONE-HALF OF THE LOAD LIMIT FOR THAT CAR.
- L. DURING INTRASTATE AND/OR INTERSTATE MOVES BY MOTOR CARRIER, A PROPER CHASSIS OR MODIFIED FLATBED TRAILER MUST BE USED TO PRECLUDE VIOLATION OF ONE OR MORE "WEIGHT LAWS" APPLICABLE TO THE STATE OR STATES INVOLVED.
- M. 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 0.454KG.



SPECIAL HANDLING GUIDANCE

(SPECIAL HANDLING GUIDANCE CONTINUED)

1. POD STACKING FOR OUTLOADING PURPOSES.

- A. THE UPPER POD SHOULD BE PLACED AS CLOSELY AS POSSIBLE IN VERTICAL ALIGNMENT WITH THE LOWER POD.
- B. WHEN STACKING THESE PODS, CARE MUST BE EXERCISED TO ENSURE THAT THE INTERLOCKING HOLES IN THE BOTTOM OF POD SKIDS ALIGN CORRECTLY WITH THE INTERLOCKING PINS ON THE TOP OF THE POD FRAME. THIS WILL PRECLUDE DAMAGE TO THE SKIDS AND ENSURE PROPER FUNCTIONING OF OF THE POD INTERLOCKS.

- D. THE DUNNAGE ASSEMBLIES AT ONE END AND ALONG ONE SIDE WALL OF THE SIDE OPENING CONTAINER MUST BE PRE-POSITIONED PRIOR TO LOADING THE FIRST STACK OF PODS. ONCE THE FIRST STACK OF PODS IS IN POSITION AND THE CENTER FILL ASSEMBLY HAS BEEN INSTALLED, THE SECOND STACK CAN BE LOADED INTO THE SIDE OPENING CONTAINER. LOADING OF THE SECOND STACK WILL BE HANDLED USING THE METHOD PREVIOUSLY DESCRIBED FOR THE FIRST STACK.

2. POD OR POD STACK HANDLING.

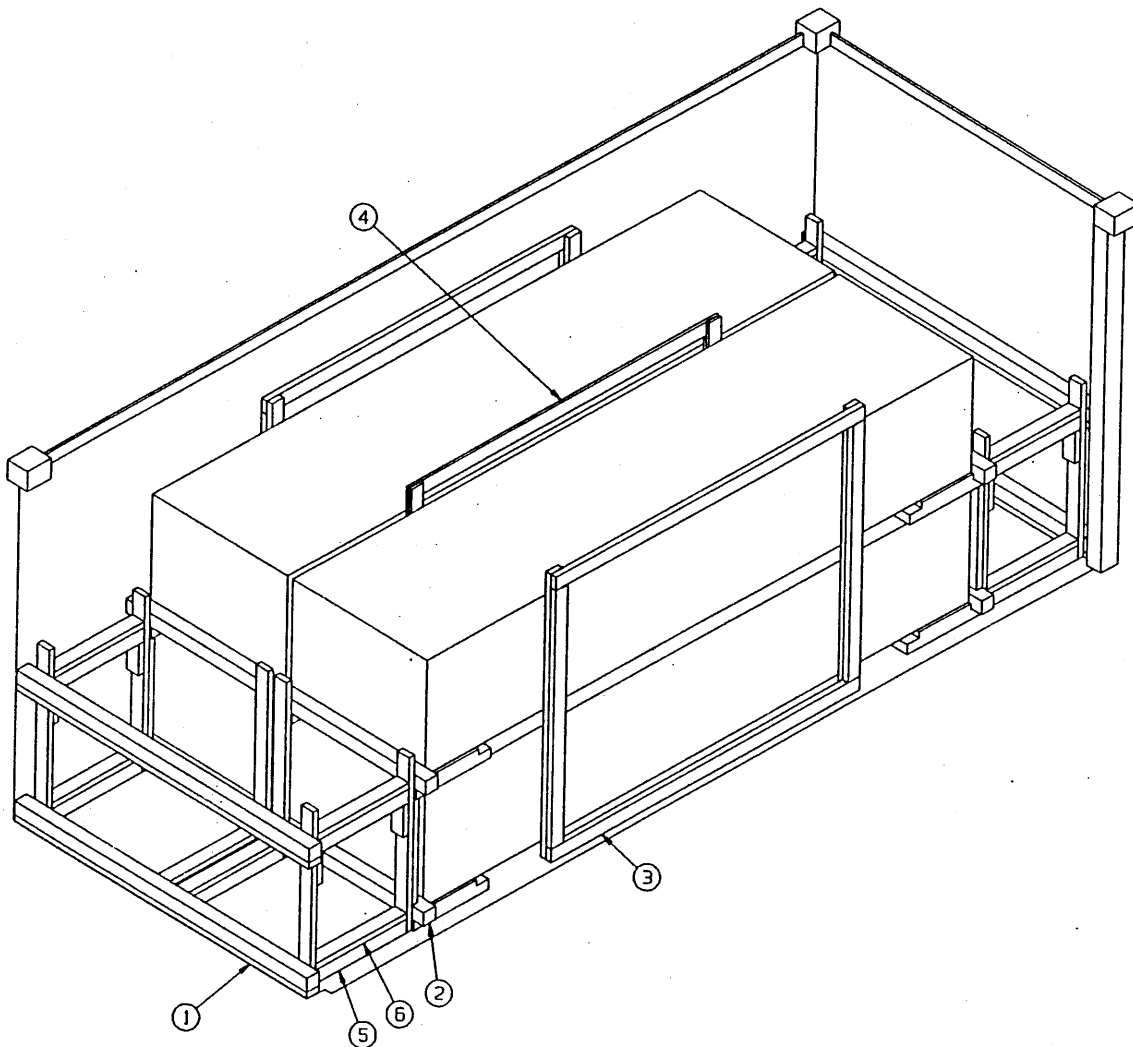
- 3. CAUTION: CARE MUST BE EXERCISED DURING HANDLING OF THE PODS TO PREVENT DAMAGE CAUSED BY BUMPING OR DROPPING OF THE PODS.

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

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

- A. ONLY APPROVED AND APPROPRIATELY SIZED MHE WILL BE USED FOR HANDLING THE DEPICTED PODS.
- B. IF HANDLING IS ACCOMPLISHED WITH A FORKLIFT TRUCK, THE PODS SHOULD BE HANDLED FROM A SIDE POSITION ONLY. CARE MUST BE EXERCISED WHEN INSERTING THE FORKS UNDER THE PODS TO PREVENT DAMAGE TO THE PODS BY THE FORK TINES OR THE FORKLIFT PACKAGE GUARD. ADDITIONALLY, THE FORK TINES SHOULD BE PLACED UNDER THE AREA MARKED "FORKLIFT AREA ONLY", THAT IS, THE LATERAL FRAME MEMBERS/BULKHEAD LOCATED NEAR THE LONGITUDINAL CENTER OF THE POD.
- C. USE OF AN MLRS POD STABILIZING FRAME, AS SHOWN ON PAGE 5, WILL AID IN THE HANDLING OF THE PODS WITH A FORKLIFT TRUCK. THE FORKLIFT TINES ARE INSERTED INTO THE MLRS POD STABILIZING FRAME, THE FORKLIFT CARRIAGE IS TO BE CENTERED ON THE CENTER OF GRAVITY MARK ON THE MLRS RP/C. NOTE: 1/4" SAFETY CHAINS ARE NOT SHOWN BUT WILL BE WELDED TO THE STABILIZING FRAME FOR SECUREMENT TO THE FORKLIFT CARRIAGE.

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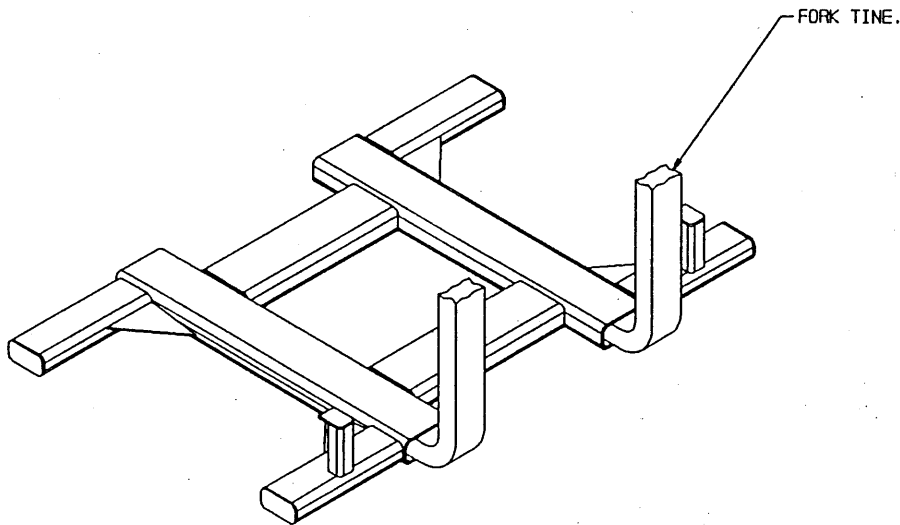
ISOMETRIC VIEW

KEY NUMBERS

- ① END WALL GATE (2 REOD). SEE THE "END WALL GATE " DETAIL ON PAGE 6 AND GENERAL NOTE "F" ON PAGE 2.
- ② LOAD BEARING GATE (2 REOD). SEE THE "LOAD BEARING GATE" DETAIL ON PAGE 6.
- ③ SIDE FILL ASSEMBLY (2 REOD). SEE THE "SIDE FILL ASSEMBLY A" DETAIL ON PAGE 7.
- ④ CENTER FILL ASSEMBLY (1 REOD). SEE THE "CENTER FILL ASSEMBLY A" DETAIL ON PAGE 7.
- ⑤ STRUT "A", 4" X 4" BY CUT TO FIT (REF: 26-1/2") (12 REOD). INSTALL AS SHOWN AND TDENAIL EACH END TO THE GATES W/2-12d NAILS. NOTE: THE BOTTOM CENTER STRUTS NEED TO BE 1-1/2" LONGER THAN THE OUTSIDE STRUTS.
- ⑥ STRUT "B", 2" X 4" BY CUT TO FIT (REF: 26-1/2") (12 REOD). LAMINATE TO STRUT "A", PIECE MARKED ⑤ W/4-10d NAILS. NOTE: THE BOTTOM CENTER STRUTS NEED TO BE 1-1/2" LONGER THAN THE OUTSIDE STRUTS.

SPECIAL NOTES:

1. THE LOAD AS SHOWN ON PAGE 4 DEPICTS A FOUR-CONTAINER LOAD IN A COMMERCIAL SIDE OPENING CONTAINER.
2. PRIOR TO LOADING THE ROCKET PODS INTO THE SIDE OPENING CONTAINER, SEE THE SPECIAL HANDLING GUIDANCE ON PAGE 3.



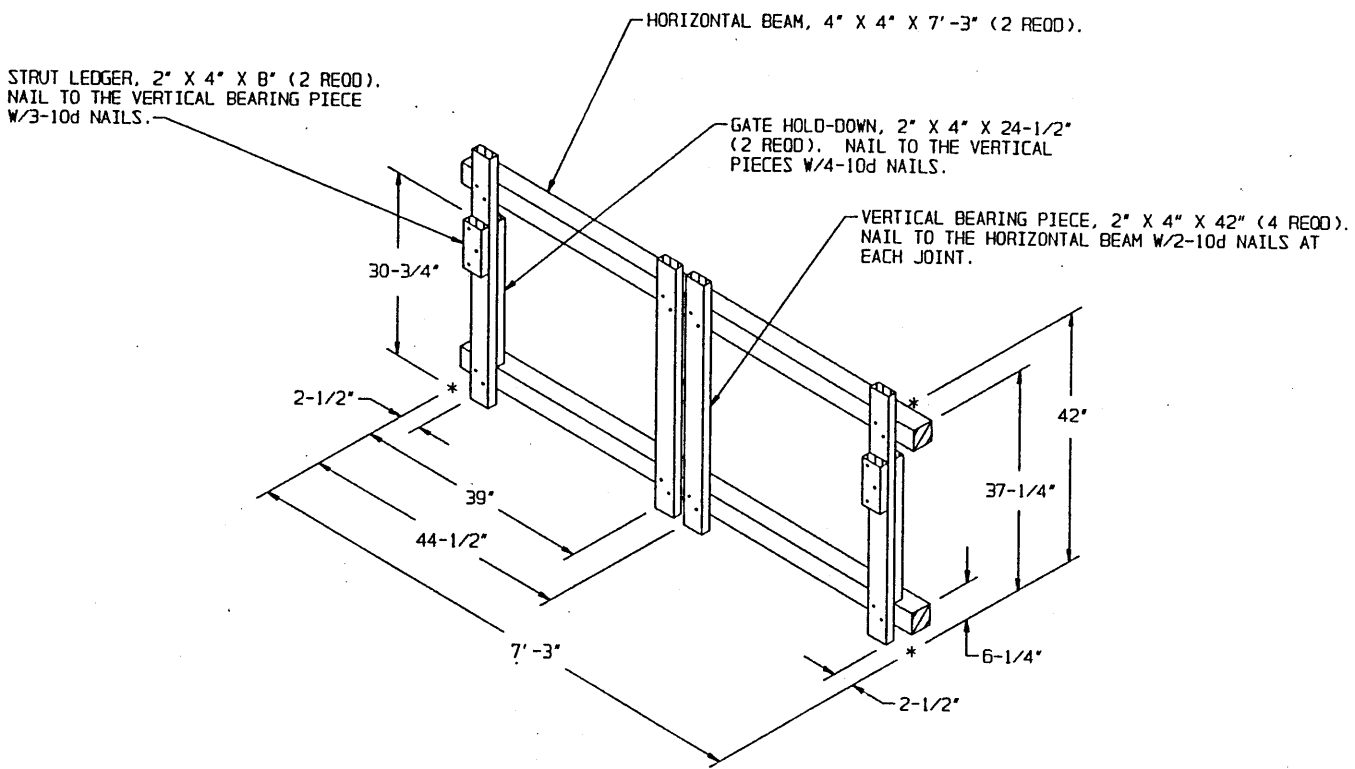
MLRS POD STABILIZING FRAME

REFER TO U.S. ARMY ARMAMENT, MUNITIONS AND CHEMICAL COMMAND, DEFENSE AMMUNITION CENTER AND SCHOOL DRAWING NUMBER AC200000809 TO MANUFACTURE. THE DRAWING CAN BE OBTAINED FROM THE FOLLOWING ADDRESS: U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL, ATTN: SMCAC-DES, SAVANNA, IL 61074-9639, DSN 585-8928, COMM (815) 273-8928.

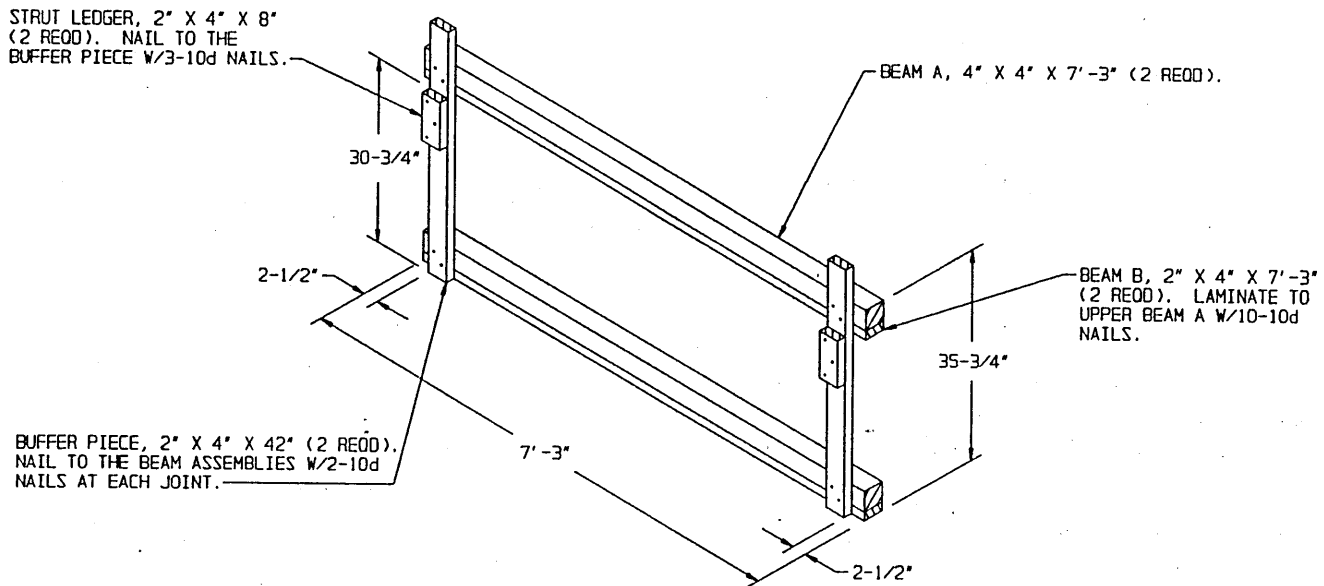
BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
1" X 4"	38	13
2" X 4"	187	125
4" X 4"	85	113
NAILS	NO. REOD	POUNDS
6d (2")	18	1/4
10d (3")	212	3-1/4
12d (3-1/4")	48	1

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
MLRS RP/C	4	20,312 LBS
DUNNAGE		507 LBS
CONTAINER		6,050 LBS
TOTAL WEIGHT		26,869 LBS (APPROX)



LOAD BEARING GATE

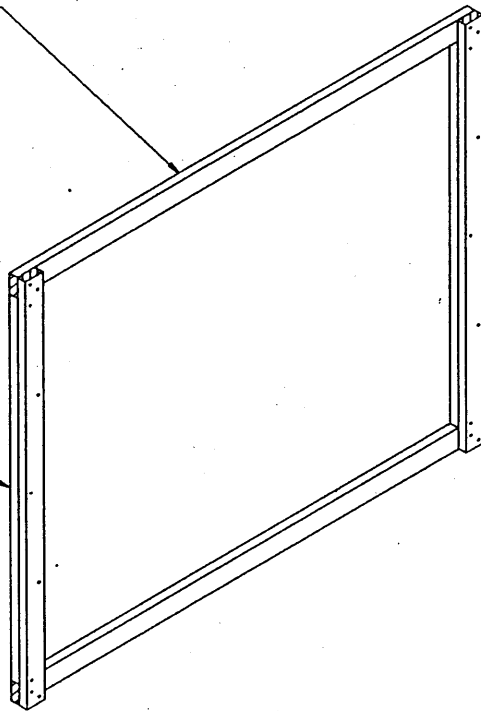


END WALL GATE

HORIZONTAL PIECE, 2" X 4"
X 7'-6" (2 REOD).

VERTICAL PIECE, 2" X 4" X 6'-0"
(2 REOD). NAIL TO THE HORIZONTAL
PIECES W/2-10d NAILS AT EACH END
AND TO THE FILL PIECE W/5-10d
NAILS.

FILL PIECE, 2" X 4" X 65"
(2 REOD).

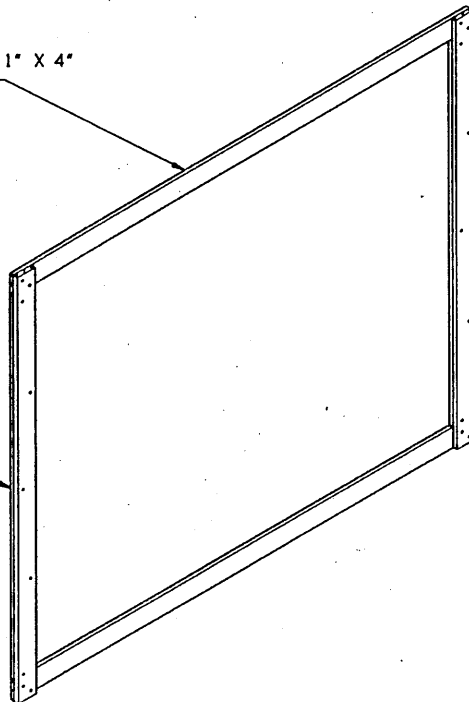


SIDE FILL ASSEMBLY A

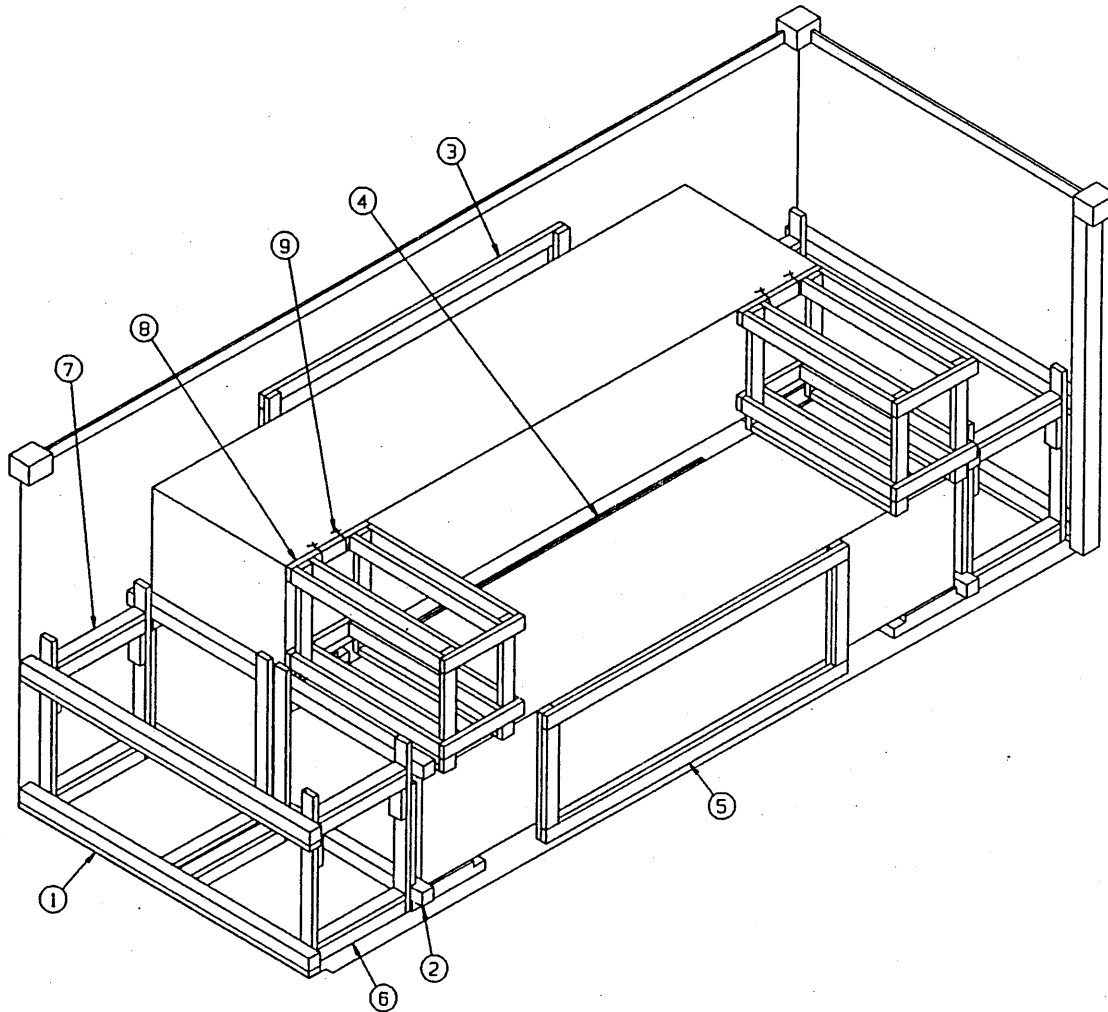
HORIZONTAL PIECE, 1" X 4"
X 7'-6" (2 REOD).

VERTICAL PIECE, 1" X 4" X 6'-0"
(2 REOD). NAIL TO THE HORIZONTAL
PIECES W/2-6d NAILS AT EACH END
AND TO THE FILL PIECE W/5-6d NAILS.
CLINCH NAILS AS REQUIRED.

FILL PIECE, 1" X 4" X 65"
(2 REOD).



CENTER FILL ASSEMBLY A



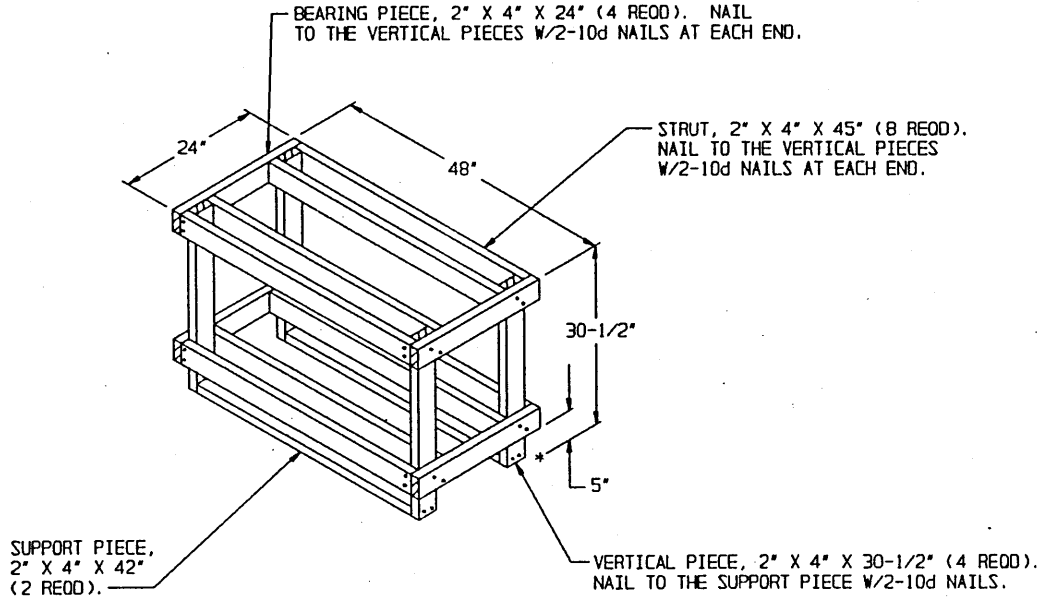
ISOMETRIC VIEW

KEY NUMBERS

- ① END WALL GATE (2 REOD). SEE THE "END WALL GATE " DETAIL ON PAGE 6 AND GENERAL NOTE "F" ON PAGE 2.
- ② LOAD BEARING GATE (2 REOD). SEE THE "LOAD BEARING GATE " DETAIL ON PAGE 6.
- ③ SIDE FILL ASSEMBLY (1 REOD). SEE THE "SIDE FILL ASSEMBLY A" DETAIL ON PAGE 7.
- ④ CENTER FILL ASSEMBLY (1 REOD). SEE THE "CENTER FILL ASSEMBLY B" DETAIL ON PAGE 11.
- ⑤ SIDE FILL ASSEMBLY (1 REOD). SEE THE "SIDE FILL ASSEMBLY B" ON PAGE 11.
- ⑥ STRUT "A", 4" X 4" BY CUT TO FIT (REF: 26-1/2") (12 REOD). INSTALL AS SHOWN AND TOENAIL EACH END TO THE GATES W/2-12d NAILS. NOTE: THE BOTTOM CENTER STRUTS NEED TO BE 1-1/2" LONGER THAN THE OUTSIDE STRUTS.
- ⑦ STRUT "B", 2" X 4" BY CUT TO FIT (REF: 26-1/2") (12 REOD). LAMINATE TO STRUT "A", PIECE MARKED ⑥, W/4-10d NAILS. NOTE: THE BOTTOM CENTER STRUTS NEED TO BE 1-1/2" LONGER THAN THE OUTSIDE STRUTS.
- ⑧ FILLER ASSEMBLY (2 REOD). SEE THE "FILLER ASSEMBLY A" DETAIL ON PAGE 9.
- ⑨ TIE WIRE, NO. 14 GAGE WIRE 24" LONG (4 REOD). INSTALL THE WIRE TO FORM A COMPLETE LOOP AROUND THE BEARING PIECE OF THE FILLER ASSEMBLY, PIECE MARKED ⑧, AND THE FRAME OF THE RP/C. BRING ENDS TOGETHER AND TWIST TAUT.

SPECIAL NOTES:

1. THE LOAD AS SHOWN ON PAGE 8 DEPICTS A THREE-CONTAINER LOAD IN A COMMERCIAL SIDE OPENING CONTAINER.
2. PRIOR TO LOADING THE ROCKET PODS INTO THE SIDE OPENING CONTAINER, SEE THE SPECIAL HANDLING GUIDANCE ON PAGE 3.

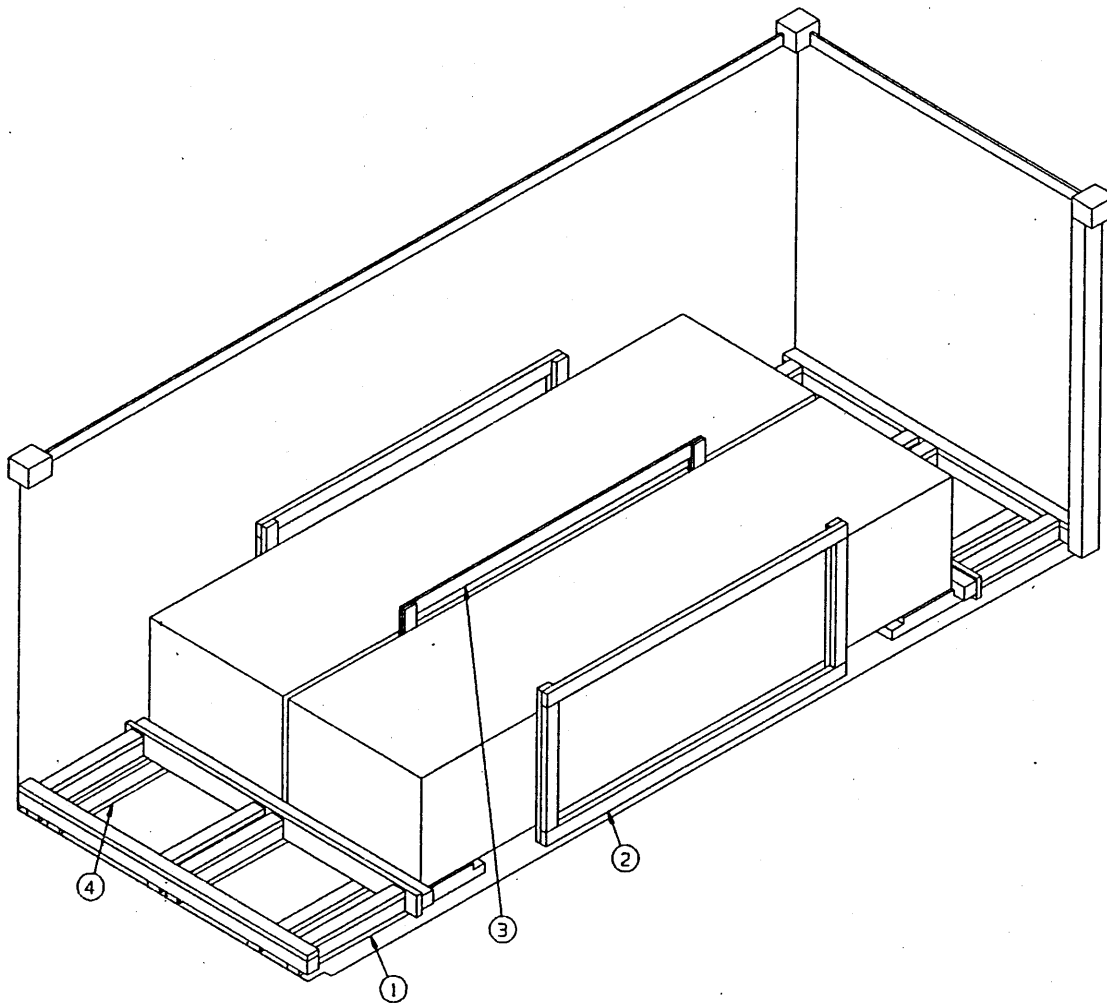


FILLER ASSEMBLY A

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
1" X 4"	38	13
2" X 4"	187	125
4" X 4"	85	113
NAILS	NO. REOD	POUNDS
6d (2")	18	1/4
10d (3")	212	3-1/4
12d (3-1/4")	48	1

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
MLRS RP/C	3	15,234 LBS
DUNNAGE		507 LBS
CONTAINER		6,050 LBS
TOTAL WEIGHT		20,999 LBS (APPROX)



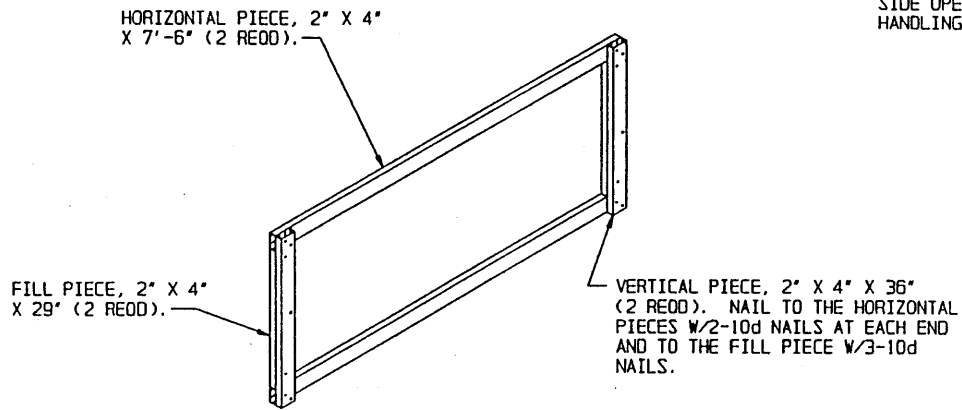
ISOMETRIC VIEW

KEY NUMBERS

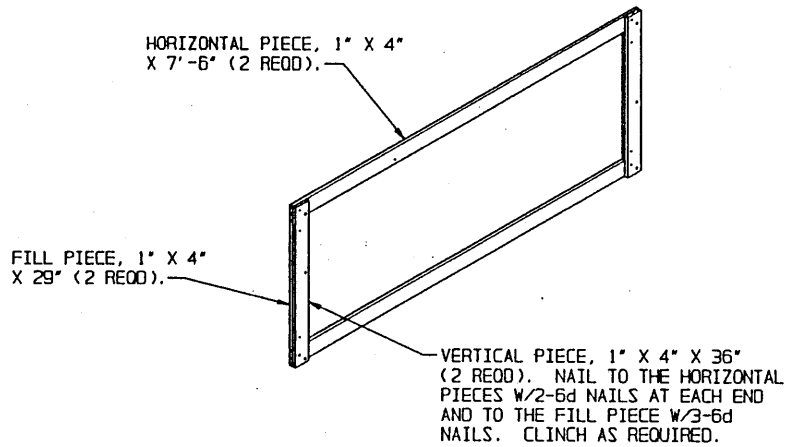
- ① END BLOCKING ASSEMBLY (2 REOD). SEE THE "END BLOCKING ASSEMBLY A" ON PAGE 12 AND GENERAL NOTE "F" ON PAGE 2. TOENAIL TO THE HOLD DOWN PIECES W/2-12d NAILS AT EACH END.
- ② SIDE FILL (2 REOD). SEE THE "SIDE FILL ASSEMBLY B" DETAIL ON PAGE 11.
- ③ CENTER FILL (1 REOD). SEE THE "CENTER FILL ASSEMBLY B" DETAIL ON PAGE 11.
- ④ HOLD DOWN PIECE, 2" X 4" X 72" (4 REOD). PREPOSITION PRIOR TO PLACING THE END BLOCKING ASSEMBLY INTO THE CONTAINER.

SPECIAL NOTES:

1. THE LOAD AS SHOWN ON PAGE 10 DEPICTS A TWO-CONTAINER LOAD IN A COMMERCIAL SIDE OPENING CONTAINER.
2. PRIOR TO LOADING THE ROCKET PODS INTO THE SIDE OPENING CONTAINER; SEE THE SPECIAL HANDLING GUIDANCE ON PAGE 3.



SIDE FILL ASSEMBLY B

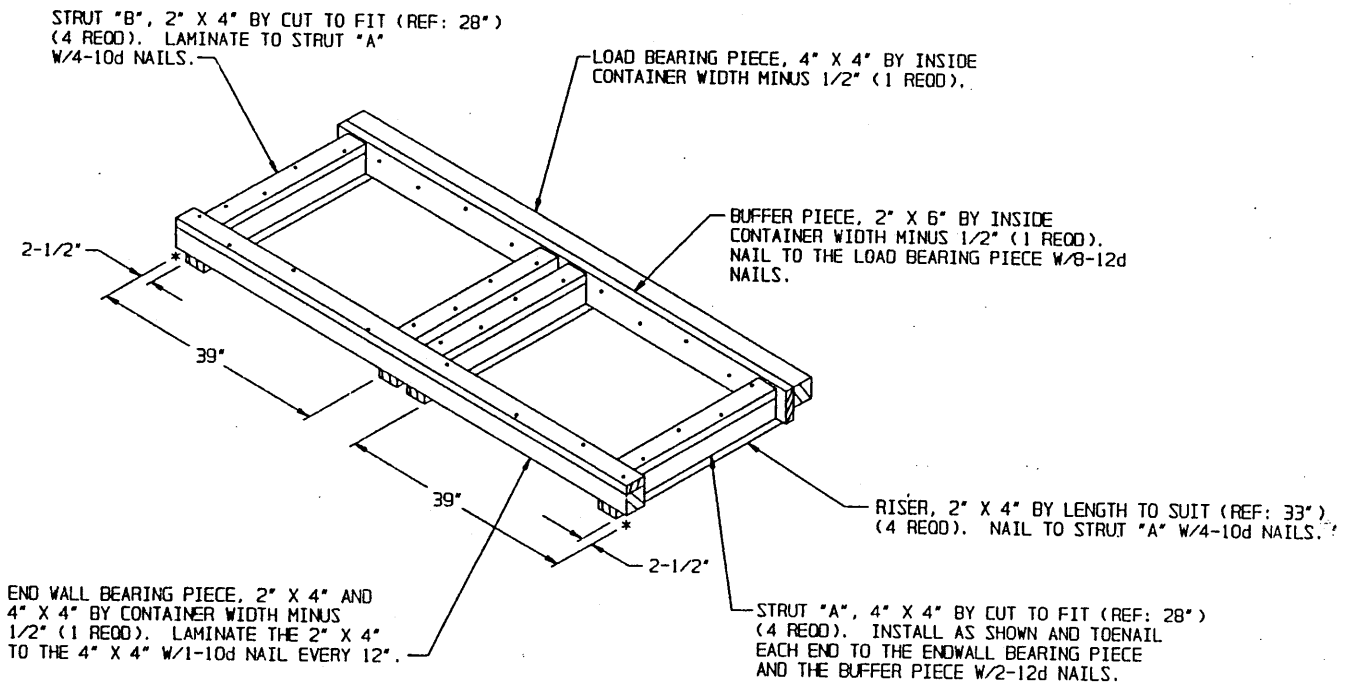


CENTER FILL ASSEMBLY B

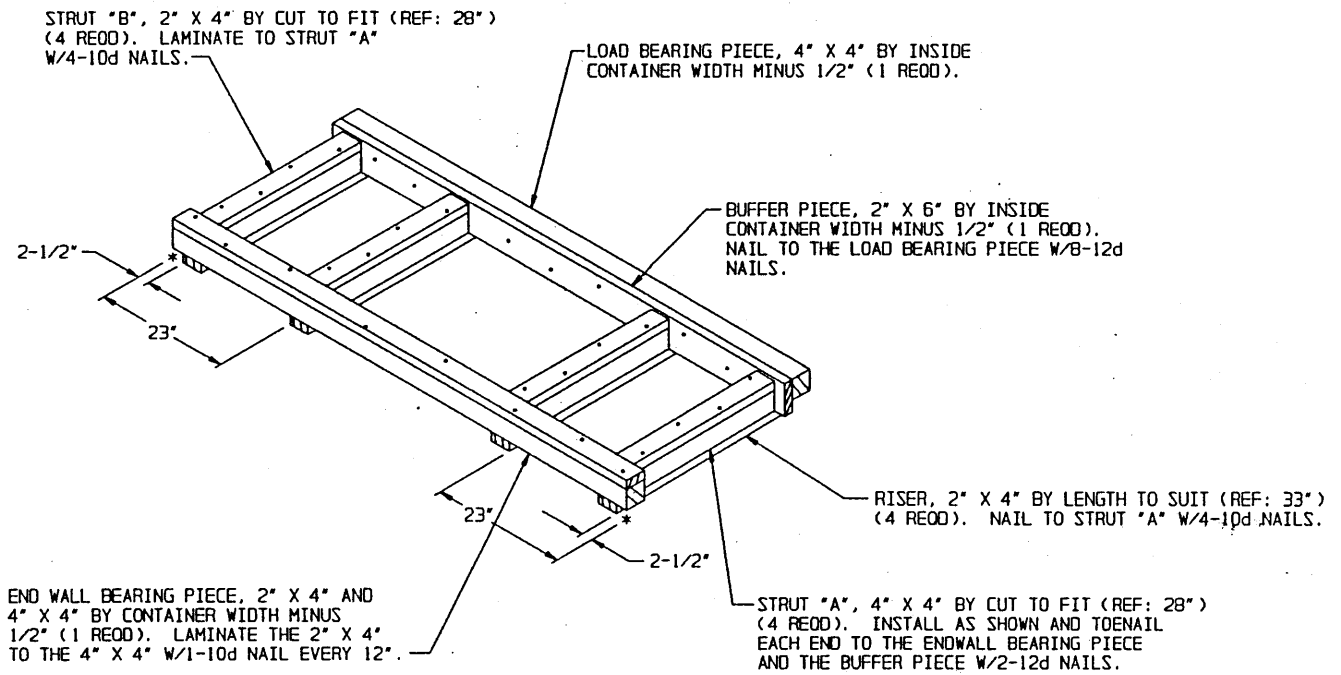
BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
1" X 4"	26	9
2" X 4"	132	68
4" X 4"	49	65
NAILS	NO. REOD	POUNDS
6d (2")	14	NIL
10d (3")	48	3/4
12d (3-1/4")	40	3/4

LOAD AS SHOWN

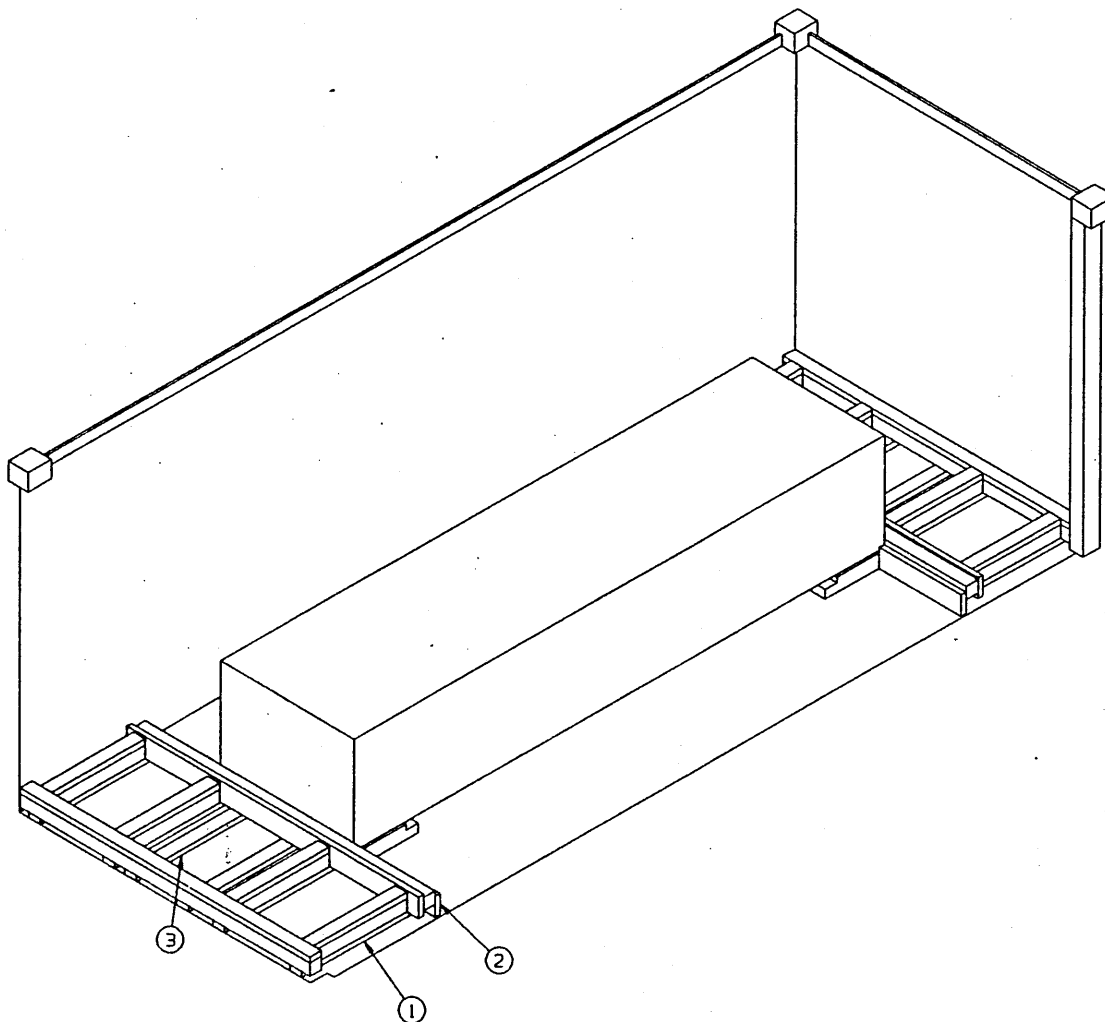
ITEM	QUANTITY	WEIGHT (APPROX)
MLRS RP/C	2	10,156 LBS
DUNNAGE		326 LBS
CONTAINER		6,050 LBS
TOTAL WEIGHT		16,532 LBS (APPROX)



END BLOCKING ASSEMBLY A



END BLOCKING ASSEMBLY B



ISOMETRIC VIEW

KEY NUMBERS

- ① END BLOCKING ASSEMBLY (2 REOD). SEE THE "END BLOCKING ASSEMBLY B" DETAIL ON PAGE 13 AND GENERAL NOTE "F" ON PAGE 2. TOENAIL TO THE HOLD DOWN PIECES W/2-12d NAILS AT EACH END.
- ② SIDE BLOCKING, 2" X 6" BY CUT TO FIT (4 REOD). NAIL TO THE END BLOCKING ASSEMBLY W/4-10d NAILS.
- ③ HOLD DOWN PIECE, 2" X 4" X 72" (4 REOD). PREPOSITION PRIOR TO PLACING THE END BLOCKING ASSEMBLY INTO THE CONTAINER.

SPECIAL NOTES:

1. THE LOAD AS SHOWN ON PAGE 14 DEPICTS A ONE-CONTAINER LOAD IN A COMMERCIAL SIDE OPENING CONTAINER.
2. PRIOR TO LOADING THE ROCKET POD INTO THE SIDE OPENING CONTAINER, SEE THE SPECIAL HANDLING GUIDANCE ON PAGE 3.

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
2" X 4"	80	53
2" X 6"	23	23
4" X 4"	49	66
NAILS	NO. REOD	POUNDS
10d (3")	56	1
12d (3-1/4")	40	3/4

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
MLRS RP/C	----- 1 -----	5,078 LBS
DUNNAGE	-----	286 LBS
CONTAINER	-----	6,050 LBS
<u>TOTAL WEIGHT</u> -----		11,655 LBS (APPROX)

