

APPROVED BY  
BUREAU OF EXPLOSIVES

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# LOADING AND BRACING\* IN MILVAN CONTAINERS<sup>⊕</sup> OF JOINT DIRECT ATTACK MUNITION (JDAM) PACKED 2 PER CNU-589 SHIPPING AND STORAGE CONTAINER

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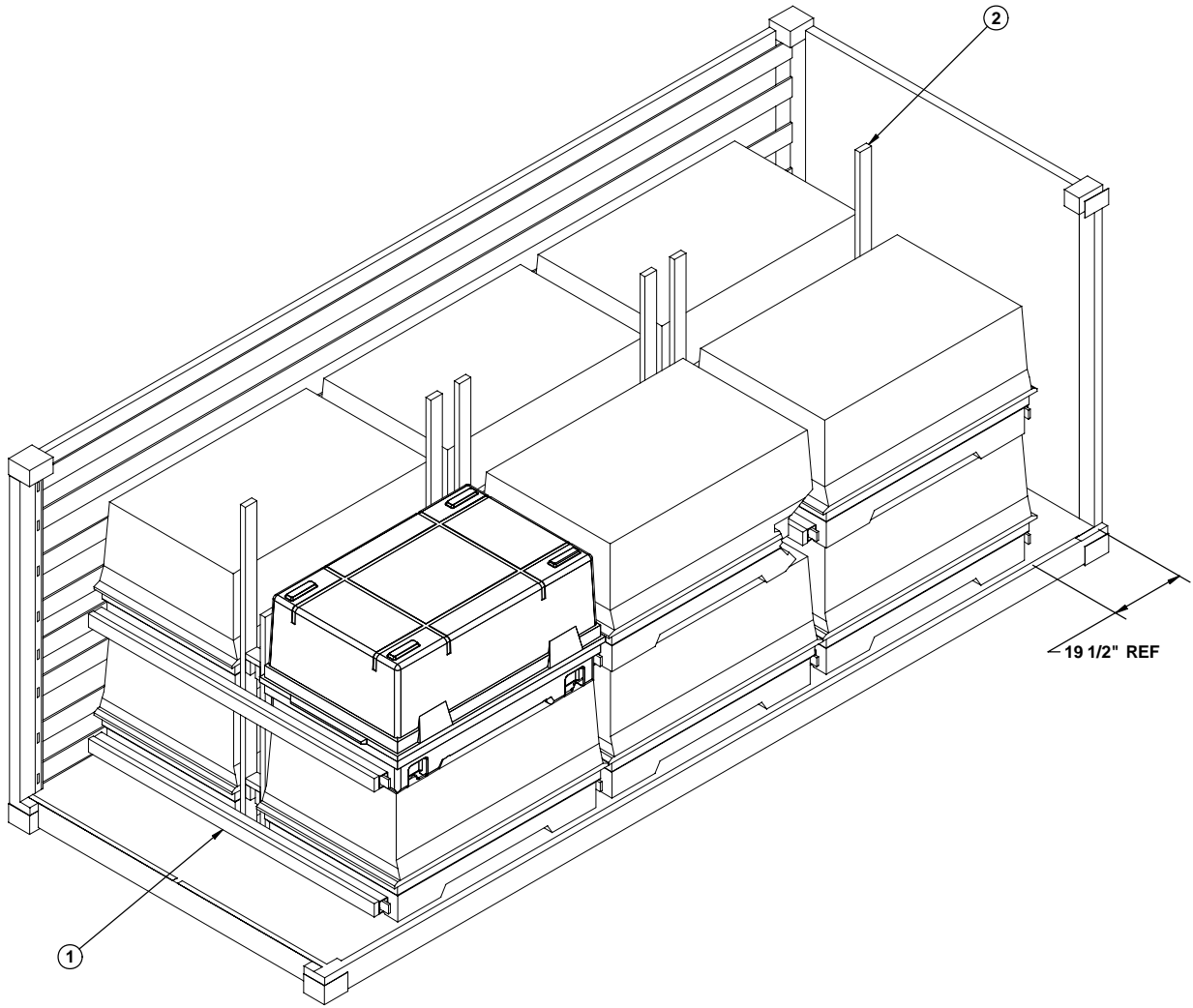
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<sup>⊕</sup> ONLY MILVAN CONTAINERS WHICH HAVE BEEN MODIFIED TO INCLUDE A MECHANICAL LOAD BRACING SYSTEM THAT SATISFIES THE REQUIREMENTS OF THE BUREAU OF EXPLOSIVES PAMPHLET 6C WILL BE USED FOR THE MOVEMENT OF AMMUNITION BY T/COFC SERVICE. CAUTION: OTHER REQUIREMENTS OF PAMPHLET 6C ALSO APPLY.

\* 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 CARRIER.

## U.S. ARMY MATERIEL COMMAND DRAWING

APPROVED, U.S. ARMY JOINT MUNITIONS 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 6.						
<i>David [Signature]</i>	DO NOT SCALE			DECEMBER 2006				
	ENGINEER OR TECHNICIAN	BASIC REV.	PATRICK DOUGHERTY					
	TRANSPORTATION ENGINEERING DIVISION	<i>Ronald A. Zopf</i>		CLASS	DIVISION	DRAWING	FILE	
APPROVED BY ORDER OF COMMANDING GENERAL, U.S. ARMY MATERIEL COMMAND	VALIDATION ENGINEERING DIVISION	<i>[Signature]</i>		TESTED	19	48	8790	SP15K12
U.S. ARMY DEFENSE AMMUNITION CENTER	ENGINEERING DIRECTORATE	<i>[Signature]</i>						



**ISOMETRIC VIEW**

**KEY NUMBERS**

- ① CROSS MEMBER (8 REQD). POSITION CROSS MEMBERS AS SHOWN IN THE VIEW ABOVE, AT THE 5" AND 38" HEIGHTS. SEE THE "FILL DETAIL" ON PAGE 4.
- ② CRIB FILL ASSEMBLY (3 REQD). SEE THE DETAIL ON PAGE 5.

**BILL OF MATERIAL**

LUMBER	LINEAR FEET	BOARD FEET
2" X 4"	133	89
NAILS	NO. REQD	POUNDS
10d (3")	96	1
CROSS MEMBER		8 REQD

**LOAD AS SHOWN**

ITEM	QUANTITY	WEIGHT (APPROX)
CNU-589 CONTAINER	12	7,428 LBS
DUNNAGE		179 LBS
CONTAINER		5,700 LBS
<b>TOTAL WEIGHT</b>		<b>13,307 LBS (APPROX)</b>

**GENERAL NOTES**

(GENERAL NOTES CONTINUED)

- 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 LOADS OF JOINT DIRECT ATTACK MUNITION (JDAM) PACKED TWO PER CNU-589 SHIPPING AND STORAGE CONTAINER. **CAUTION:** REGARDLESS OF THE QUANTITY OF CONTAINERS TO BE SHIPPED, THE "MAXIMUM GROSS WEIGHT" OF THE MILVAN MUST NOT BE EXCEEDED.
- C. THE LOAD AS SHOWN IS BASED ON A 20'-0" LONG BY 8'-0" WIDE BY 8'-0" HIGH MILVAN CONTAINER WITH INSIDE DIMENSIONS OF 19'-4" LONG BY 91'-1/2" (BETWEEN BELT RAILS) WIDE BY 87" HIGH. THE LOADS ARE DESIGNED FOR TRAILER/CONTAINER-ON-FLATCAR (T/COFC) SHIPMENT.
- D. THE SPECIFIED OUTLOADING PROCEDURES ARE FOR CONTAINERS EQUIPPED WITH SELF-CONTAINED MECHANICAL BRACING DEVICES AS DESCRIBED IN MIL-C-52661. CROSS MEMBER ATTACHMENT FACILITIES WITHIN THESE CONTAINERS MUST PROVIDE FOR THE LOAD BLOCKING CROSS MEMBERS AT THE HEIGHTS SPECIFIED. VOIDS LENGTHWISE WITHIN THE LOAD MUST BE HELD TO A MINIMUM. CROSS MEMBERS MUST BE PLACED AGAINST THE LADING AS TIGHTLY AS THE HOLE SPACING IN THE CROSS MEMBER ATTACHMENT FACILITY PERMITS. SEE THE "FILL DETAIL" ON PAGE 4 FOR ADDITIONAL GUIDANCE. EACH CROSS MEMBER WILL BE INSTALLED WITH THE ENDS ATTACHED AS NEARLY AS POSSIBLE IN "MATED" POSITIONS (AT EQUAL HEIGHTS, AND AT EQUAL DISTANCES FROM THE END OF THE CONTAINER). CROSS MEMBERS IN EMPTY CONTAINERS AND THOSE NOT USED IN LOADED CONTAINERS MUST BE FASTENED INTO BELT RAILS FOR SHIPMENT. COMPONENTS ASSIGNED TO EACH CONTAINER MUST REMAIN THEREWITH EVEN THOUGH UNUSED DURING SOME SHIPMENTS. THE LOAD BLOCKING COMPONENT DESIGNATED AS "CROSSMEMBER" HEREIN IS IDENTIFIED AS "BEAM ASSEMBLY" WITHIN TM 55-8115-200-23&P, DATED DECEMBER 1979. THE "BEAM ASSEMBLY" IS FURTHER IDENTIFIED AS NSN 8115-00-165-6623.
- E. WHEN LOADING CONTAINERS, THEY ARE TO BE POSITIONED SO AS TO ACHIEVE A TIGHT LOAD (TIGHT AGAINST THE DUNNAGE ASSEMBLIES). THE UNBLOCKED SPACE ACROSS THE WIDTH OF A LOAD BAY IS NOT TO EXCEED 1-1/2". EXCESSIVE SLACK CAN BE ELIMINATED FROM A LOAD BY LAMINATING ADDITIONAL PIECES OF APPROPRIATE THICKNESS TO THE VERTICAL PIECES ON THE CRIB FILL ASSEMBLIES. NAIL EACH ADDITIONAL PIECE W/1 APPROPRIATELY SIZED NAIL EVERY 12". ADDITIONALLY, THE THICKNESS AND/OR QUANTITY OF THE VERTICAL OR HORIZONTAL PIECES IN THE CRIB FILL ASSEMBLIES MAY BE ADJUSTED AS REQUIRED TO FACILITATE VARIANCE IN THE SIZE OF THE CONTAINER SIZE.
- F. 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.
- G. 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.
- H. WHETHER A CONTAINER IS FULL OR IS LOADED WITH A REDUCED QUANTITY OF LADING UNITS, THE LENGTHWISE CENTER OF GRAVITY OF THE LOAD MUST BE WITHIN 12", IN EITHER DIRECTION, OF THE MID-POINT OF THE CONTAINER.
- J. **CAUTION:** DO NOT NAIL DUNNAGE MATERIAL TO THE CONTAINER WALLS OR FLOOR. ALL NAILING WILL BE WITHIN THE DUNNAGE.
- K. PORTIONS OF THE MILVAN DEPICTED WITHIN THIS DRAWING, SUCH AS ONE OF THE SIDEWALLS, HAVE NOT BEEN SHOWN IN THE LOAD VIEWS FOR CLARITY PURPOSES.

**L. MAXIMUM LOAD WEIGHT CRITERIA:**

THE MAXIMUM LOAD WEIGHTS ARE CONTROLLED BY EQUIPMENT CAPABILITY FACTORS. ALTHOUGH THE HEAVIEST MAXIMUM LOADS ARE DELINEATED IN THE LOAD VIEWS, PROVISIONS ARE INCLUDED WITHIN THIS DRAWING SO THAT THE BASIC LOADS CAN BE ADJUSTED TO SATISFY A LESSER QUANTITY OF LADING UNITS. DEPENDING ON TRANSPORTATION ROUTING, IT MAY BE NECESSARY TO REDUCE THE LOAD WEIGHT TO SATISFY "WEIGHT LAWS" OF CERTAIN STATES. ALSO, IT MAY BE NECESSARY TO REDUCE THE LOAD WEIGHT TO SATISFY OTHER WEIGHT RESTRICTIONS IMPOSED ON THE INTERMODAL CONTAINER SYSTEM.

**M. SPECIAL T/COFC NOTES:**

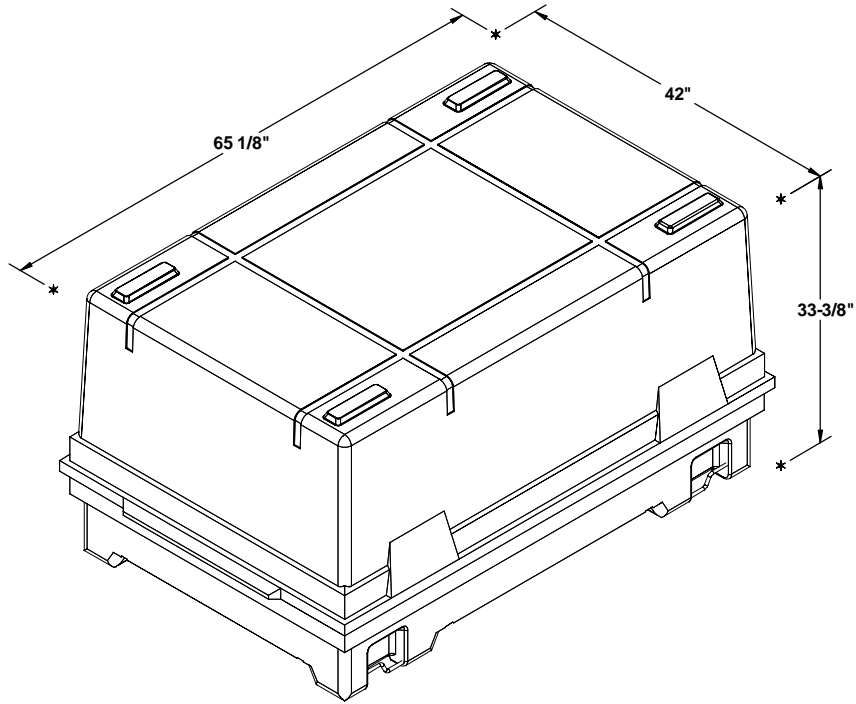
- 1. **CAUTION:** LOADED CONTAINERS MUST BE ON A CHASSIS EQUIPPED WITH TWO BOGIE ASSEMBLIES WHEN BEING MOVED IN TOFC SERVICE, REGARDLESS OF THE LOAD WEIGHT WITHIN THE CONTAINER.
- 2. THE LOAD LIMIT OF A T/COFC RAILCAR MUST NOT BE EXCEEDED, NOR WILL A CAR BE LOADED SO THAT THE TRUCK UNDER ONE END OF THE CAR CARRIES MORE THAN ONE-HALF OF THE LOAD LIMIT FOR THAT CAR.
- 3. CHASSIS/CONTAINERS COUPLED INTO A 40 FOOT TRAILER CONFIGURATION MUST BE PLACED AT THE B-END OF A TOFC RAILCAR. THE REAR END OF THE 40 FOOT UNIT WILL OVERHANG THE END OF THE CAR IF IT IS PLACED AT THE A-END. 20 FOOT AND 40 FOOT UNITS CAN BE LOADED ON THE SAME CAR.

- N. 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.
- O. 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.
- P. THE QUANTITY OF CONTAINERS SHOWN IN THE LOAD ON PAGE 2 MAY BE REDUCED FOR SHIPMENT, IF DESIRED. SEE THE "LESS THAN FULL LOAD PROCEDURE" ON PAGE 6.
- Q. TO MAKE LOADING EASIER, TO HELP ACHIEVE A TIGHT LOAD ACROSS A CONTAINER, AND TO PREVENT UNACCEPTABLE DAMAGE TO LADING UNITS WHEN LOADING A MILVAN, A SLIP-SHEET CAN BE USED EFFECTIVELY AS A "SHOEHORN" TYPE DEVICE. THE SLIP-SHEET WILL PROVIDE A SMOOTH SURFACE THAT WILL PREVENT UNIT STRAPS AND/OR CONTAINERS FROM INTERLOCKING OR CATCHING ON OTHER PROJECTIONS WHEN LATERALLY ADJACENT LADING UNITS ARE BEING LOADED. A SLIP-SHEET WILL BE USED AFTER ONE-HALF OF A STACK IS LOADED WITH ONE OF ITS SIDES IN TIGHT CONTACT AT ONE SIDE OF THE MILVAN. THE SLIP-SHEET IS TO BE PLACED AGAINST THE OTHER SIDE OF THE HALF-STACK BEFORE THE LAST HALF OF THE STACK IS LOADED. AFTER A STACK IS COMPLETED, THE SLIP-SHEET IS TO BE REMOVED FOR SUBSEQUENT USE WITH THE NEXT STACK. A SLIP-SHEET OF SUITABLE SIZE CAN BE MADE FROM A SHEET OF 1/8" TEMPERED HARDBOARD (MASONITE) OR FROM A SHEET OF ANY OTHER MATERIAL THAT WILL SATISFY THE REQUIREMENTS.

**MATERIAL SPECIFICATIONS**

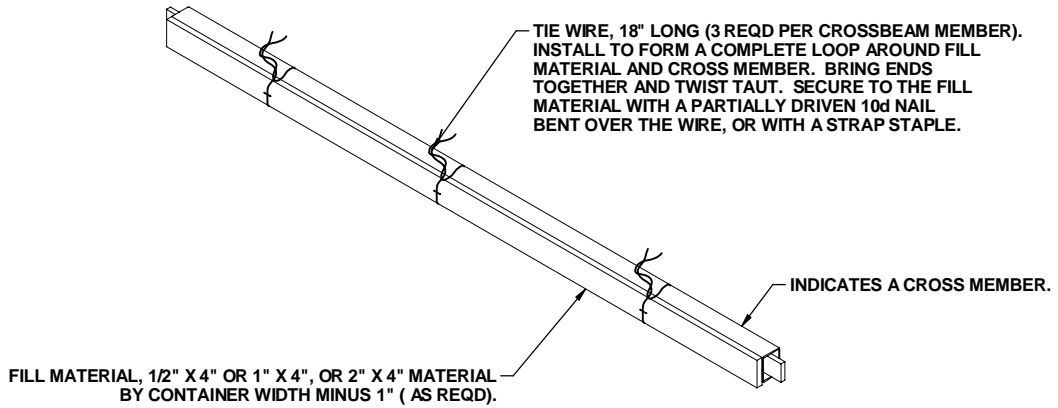
- LUMBER** - - - - - : SEE TM 743-200-1 (DUNNAGE LUMBER) AND VOLUNTARY PRODUCT STANDARD PS 20.
- NAILS** - - - - - : ASTM F1667; COMMON STEEL NAIL (NLCMS OR NLCMMS).
- WIRE, CARBON STEEL** - - : ASTM A853; ANNEALED AT FINISH, BLACK OXIDE FINISH, 0.0800" DIA, GRADE 1006 OR BETTER.

(CONTINUED AT RIGHT)

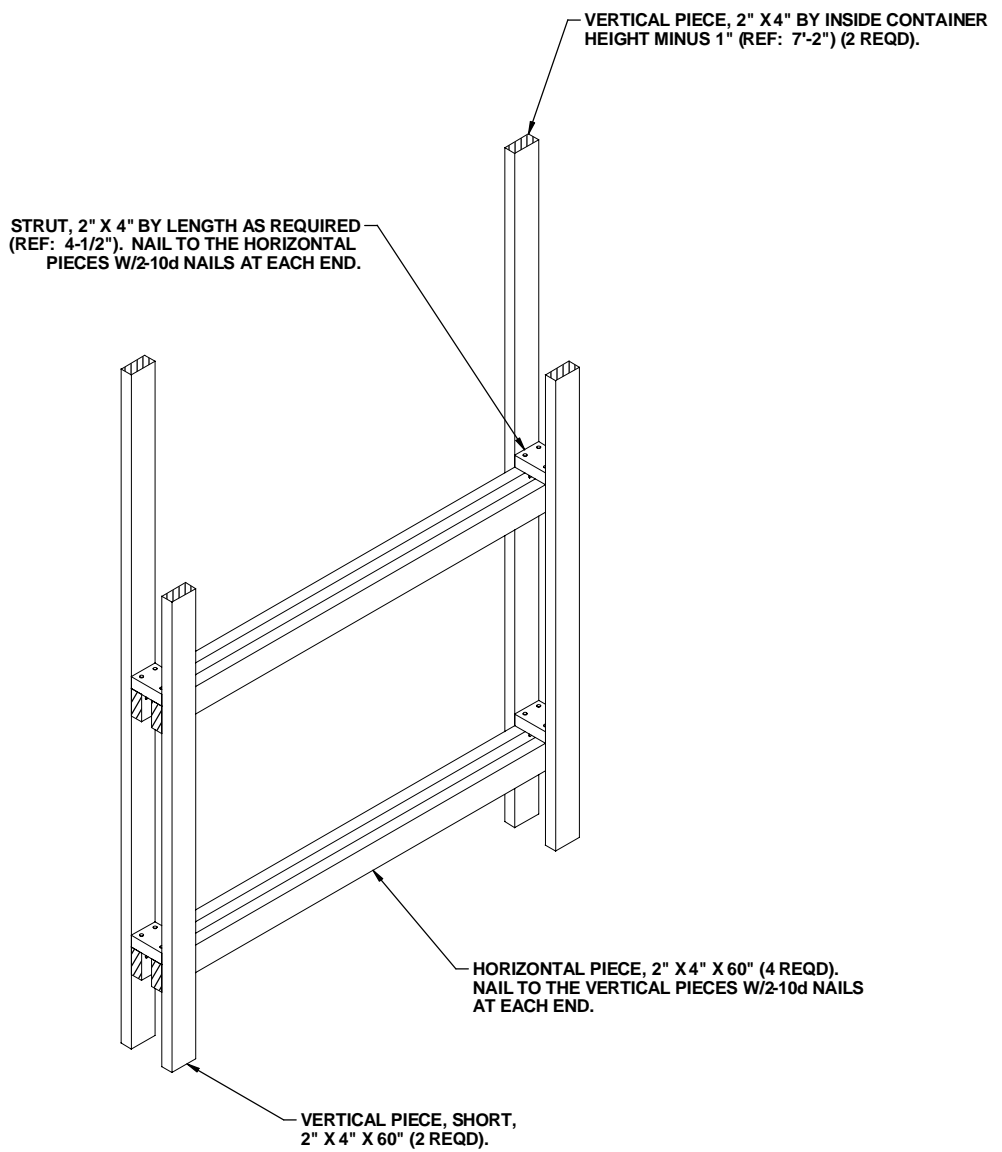


**PALLET UNIT DATA**

GROSS WEIGHT ----- 619 LBS  
 CUBE ----- 52.8 CU FT

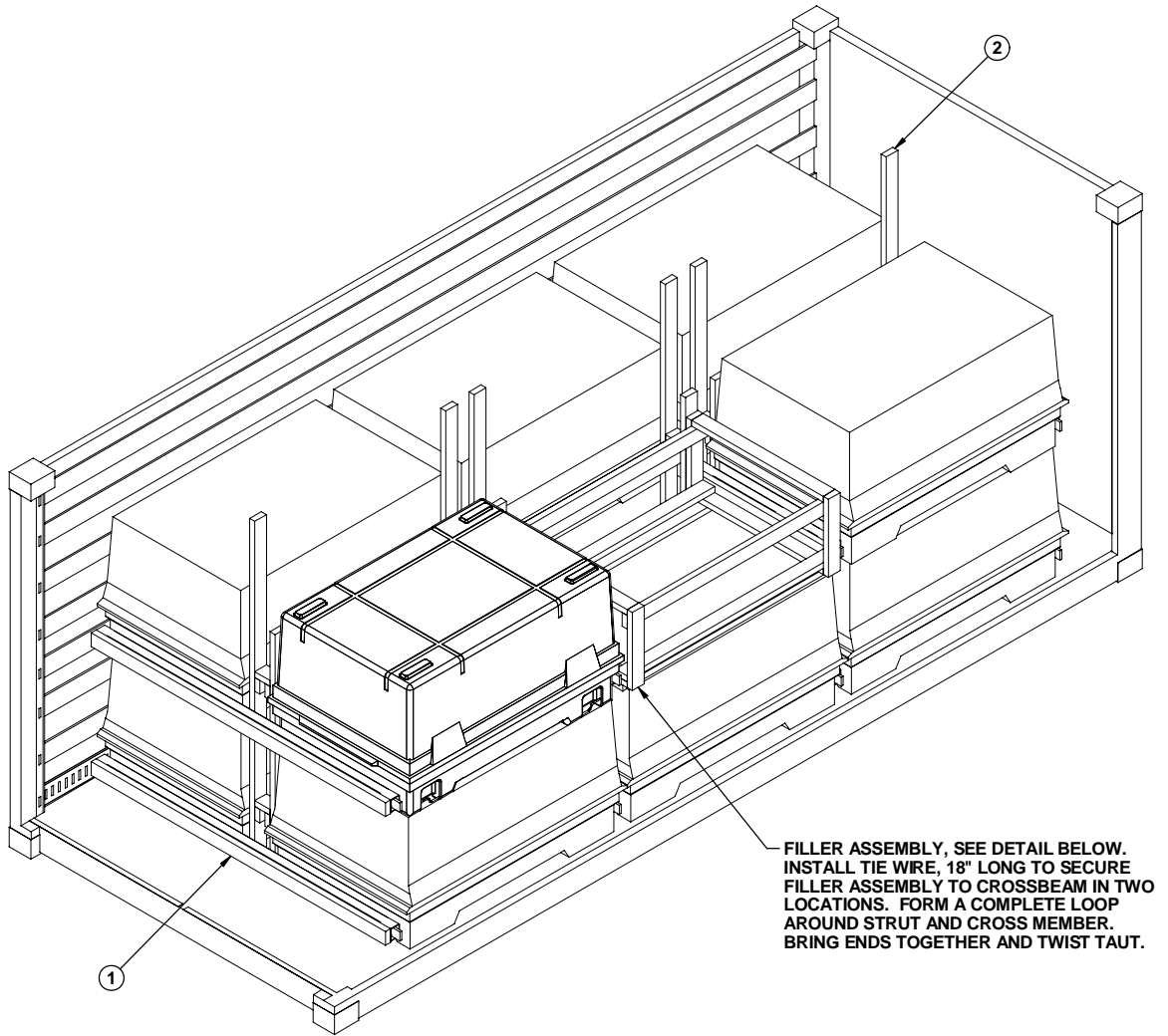


**FILL DETAIL**



**CRIB FILL ASSEMBLY**

FOR A 1-HIGH LOAD, CHANGE THE LENGTH OF THE SHORT VERTICAL PIECE TO 30" AND CHANGE THE LOCATION OF THE TOP HORIZONTAL PIECES AND STRUTS TO 24".



FILLER ASSEMBLY, SEE DETAIL BELOW. INSTALL TIE WIRE, 18" LONG TO SECURE FILLER ASSEMBLY TO CROSSBEAM IN TWO LOCATIONS. FORM A COMPLETE LOOP AROUND STRUT AND CROSS MEMBER. BRING ENDS TOGETHER AND TWIST TAUT.

**LESS-THAN-FULL-LOAD PROCEDURE**

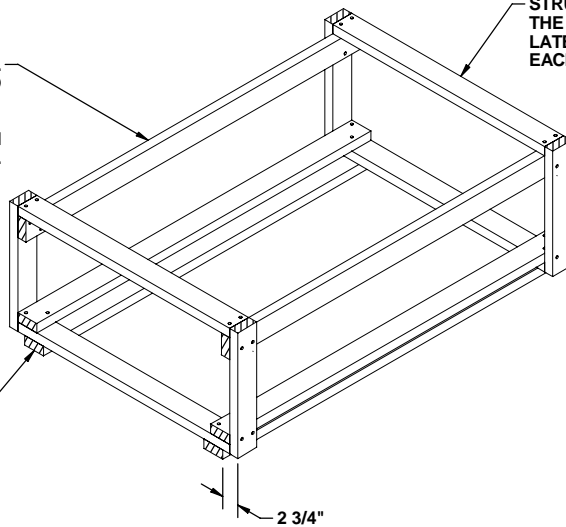
KEY NUMBERS REFER TO KEY NUMBERS ON PAGE 2.  
SEE GENERAL NOTE "P" ON PAGE 3.

LATERAL PIECE, 2" X 4" X 62" (4 REQD). NAIL THE BOTTOM LATERAL PIECES TO THE BOTTOM STRUTS W/2-10d NAILS AT EACH END AND NAIL THE TOP LATERAL PIECES TO THE VERTICAL PIECES W/2-10d NAILS AT EACH LOCATION.

STRUT, 2" X 4" X 39" (4 REQD). NAIL TO THE SUPPORT PIECES AND TO THE TOP LATERAL PIECES W/2-10d NAILS AT EACH LOCATION.

VERTICAL PIECE, 2" X 4" X 20" (4 REQD). NAIL TO THE BOTTOM LATERAL PIECES W/2-10d NAILS AT EACH LOCATION.

SUPPORT PIECE, 2" X 4" X 62" (2 REQD). NAIL TO THE BOTTOM LATERAL PIECES W/2-10d NAILS AT EACH END.



2 3/4"

**FILLER ASSEMBLY**

FOR MINUS ONE CONTAINER.