APPROVED BY
BUREAU OF EXPLOSIVES

dan healy

Digitally signed by dan healy
DN: cn=dan healy, o, ou, email=dan_healy@aar.com, c=US
Date: 2011.05.24 23:20:48 -05'00'

LOADING AND BRACING* IN MILVAN CONTAINERS⊗ OF 2.75" HYDRA ROCKETS PACKED IN PA151 CYLINDRICAL METAL CONTAINERS, ON WOODEN PALLETS WITH METAL TOP LIFT

INDEX

ITEM	PAGE(S)
TYPICAL LOADING PROCEDURES	2
GENERAL NOTES AND MATERIAL SPECIFICATIONS	3
PALLET UNIT DETAILS	4
DETAILS	4-7
LESS-THAN-FULL-LOAD PROCEDURE	8

⊗ONLY MILVAN CONTAINERS WHICH HAVE BEEN MODIFIED TO INCLUDE A MECHANICAL LOAD-BRACING SYSTEM AS SPECIFIED WITHIN MIL-C-52661 WILL BE USED FOR THE MOVEMENT OF AMMUNITION BY T/COFC SERVICE.

*THE PROCEDURES SHOWN HEREIN ARE APPLICABLE TO LOADS THAT ARE TO BE SHIPPED BY CONTAINER-ON-FLATCAR(COFC) RAIL, MOTOR, OR WATER CARRIERS.

U.S. ARMY MATERIEL COMMAND DRAWING

APPROVED, U.S. ARMY
JOINT MUNITIONS COMMAND

RUS.ALLEN.J.1230354282

Digitally signed by RUS.ALLEN.J.1230354282
DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=RUS.ALLEN.J.1230354282
Date: 2011.06.02 13:29:54 -05'00'

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 8.

DO NOT SCALE

JUNE 2011

ENGINEER OR TECHNICIAN	BASIC	MADELINE BANKS
	REV.	

APPROVED BY ORDER OF COMMANDING GENERAL, U.S ARMY MATERIEL COMMAND

CARNEY.GARY.BURTON.1038708038

Digitally signed by CARNEY.GARY.BURTON.1038708038
DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=CARNEY.GARY.BURTON.1038708038
Date: 2011.06.06 07:07:18 -05'00'

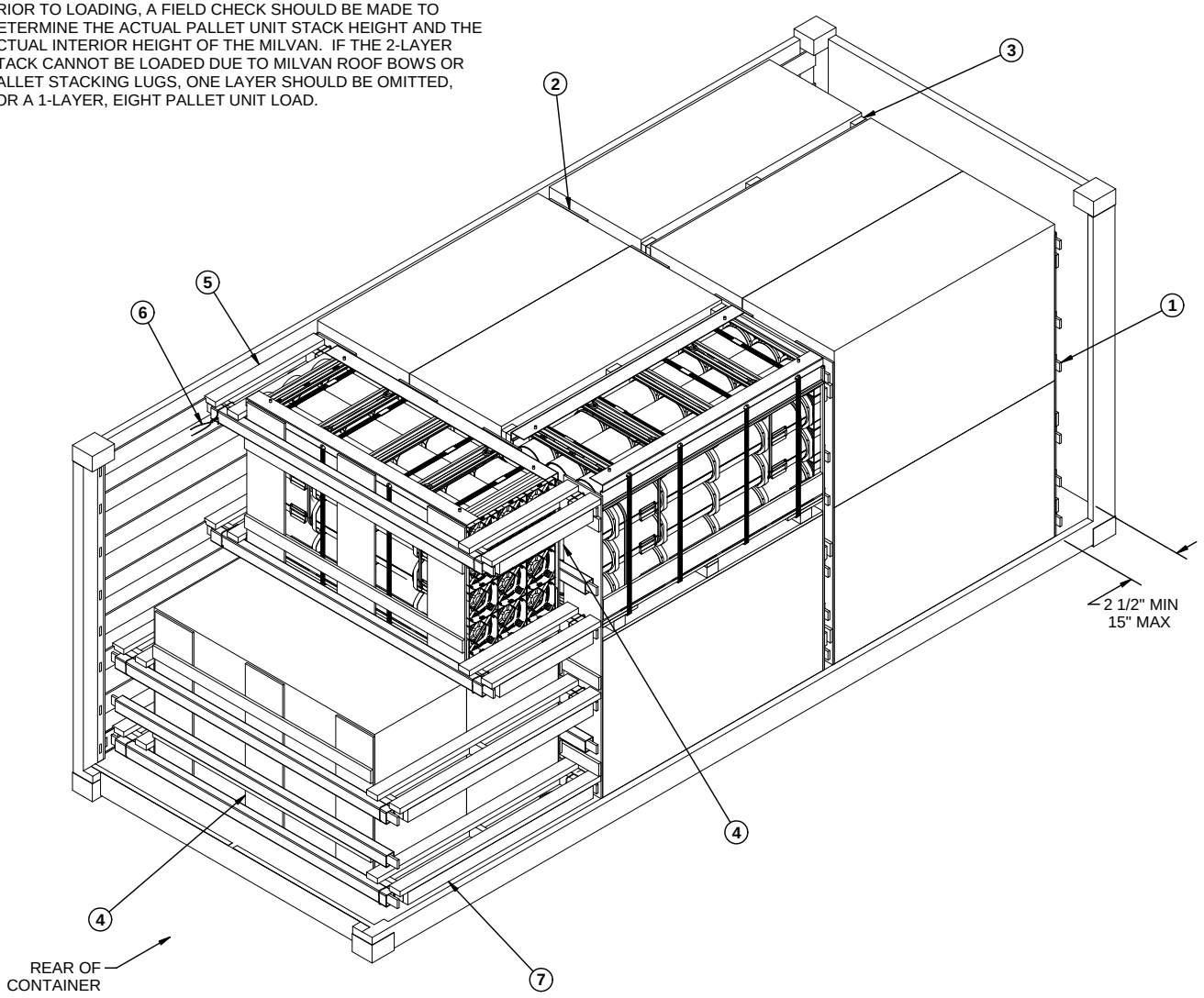
U.S. ARMY DEFENSE AMMUNITION CENTER

TRANSPORTATION ENGINEERING DIVISON	FIEFFER.LAURA.A.1230375727	Digitally signed by FIEFFER.LAURA.A.1230375727 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=FIEFFER.LAURA.A.1230375727 Date: 2011.05.04 14:09:50 -05'00'	
VALIDATION ENGINEERING DIVISON	BARICKMAN.PHILIP.W.1230202202	Digitally signed by BARICKMAN.PHILIP.W.1230202202 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=BARICKMAN.PHILIP.W.1230202202 Date: 2011.05.11 10:36:33 -05'00'	TESTED
ENGINEERING DIRECTORATE	BEAVER.JERRY.W.1230949952	Digitally signed by BEAVER.JERRY.W.1230949952 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=BEAVER.JERRY.W.1230949952 Date: 2011.05.12 14:45:24 -05'00'	

CLASS	DIVISION	DRAWING	FILE
19	48	4332/61	15PM1023

PROJECT CA 351/61-00

* THE 2-LAYER LOAD DEPICTED BELOW IS BASED ON A 43" TALL PALLET UNIT AND AN 87" INTERIOR HEIGHT OF THE MILVAN. PRIOR TO LOADING, A FIELD CHECK SHOULD BE MADE TO DETERMINE THE ACTUAL PALLET UNIT STACK HEIGHT AND THE ACTUAL INTERIOR HEIGHT OF THE MILVAN. IF THE 2-LAYER STACK CANNOT BE LOADED DUE TO MILVAN ROOF BOWS OR PALLET STACKING LUGS, ONE LAYER SHOULD BE OMITTED, FOR A 1-LAYER, EIGHT PALLET UNIT LOAD.



ISOMETRIC VIEW

KEY NUMBERS

① CROSS MEMBER (23 REQD). POSITION AS SHOWN IN THE DETAIL ABOVE AT THE 5", 16", 28", 48", 60", AND 83" HEIGHTS. SEE THE "FILL DETAIL" ON PAGE 4.

② LENGTHWISE LOAD BEARING GATE (4 REQD). SEE THE DETAIL ON PAGE 5.

③ CENTER FILL ASSEMBLY (2 REQD). SEE THE DETAIL ON PAGE 6.

④ CROSSWISE LOAD BEARING GATE (1 TWO HIGH AND 2 ONE HIGH REQD). SEE THE DETAIL ON PAGE 5.

⑤ SPACER ASSEMBLY A (4 REQD). SEE THE DETAIL ON PAGE 7.

⑥ TIE WIRE, 0.080" DIAMETER BY 24" (16 REQD, 2 PER SPACER ASSEMBLY). INSTALL TO FORM A COMPLETE LOOP AROUND THE CROSS MEMBER AND THE SPACER ASSEMBLY. BRING ENDS TOGETHER AND TWIST TAUT. SECURE WITH A PARTIALLY DRIVEN 10d NAIL BENT OVER THE WIRE OR WITH A STRAP STAPLE.

⑦ SPACER ASSEMBLY B (4 REQD). SEE THE DETAIL ON PAGE 7.

BILL OF MATERIAL

LUMBER	LINEAR FEET	BOARD FEET
1" X 4"	132	44
2" X 4"	229	152
NAILS	**NO. REQD**	**POUNDS**
6d (2")	276	1-3/4
10d (3")	208	3-1/4

PLYWOOD, 1/2" - 154.50 SQ FT REQD - 212.44 LBS
STAPLE - - - - - - - - - - 32 REQD - - - 0.25 LBS
WIRE, 0.080" DIA - - - 24' REQD - - - 0.40 LBS
CROSS MEMBER - - - - - - - - - - - - - - - 23 REQD

LOAD AS SHOWN*

ITEM	QUANTITY	WEIGHT	(APPROX)
PALLET UNIT	15	30,435 LBS	
DUNNAGE		611 LBS	
CONTAINER		5,700 LBS	
	TOTAL WEIGHT	36,746 LBS	(APPROX)

PROJECT CA 351/61-00

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 LOADS OF 2.75" HYDRA ROCKETS PACKED IN PA151 CYLINDRICAL METAL CONTAINERS. SUBSEQUENT REFERENCE TO PALLET UNIT HEREIN MEANS PALLET UNIT WITH ROCKETS. SEE AMC DRAWING 19-48-4326/61-20PM1012 AND PAGE 4 FOR DETAILS OF THE CONTAINER. **CAUTION**: REGARDLESS OF THE QUANTITY OF UNITS TO BE SHIPPED, THE "MAXIMUM GROSS WEIGHT" OF THE MILVAN CONTAINER MUST NOT BE EXCEEDED.

C. THE LOADS AS SHOWN ARE BASED ON A 20' LONG BY 8' WIDE BY 8' HIGH MILVAN CONTAINER WITH INSIDE DIMENSIONS OF 19'-4" LONG BY 92" 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 INSTALLATION OF LOAD BLOCKING CROSS MEMBERS AT THE HEIGHTS SPECIFIED. VOIDS 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 "CROSS MEMBER" 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 PALLET UNITS, 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 BY LAMINATING ADDITIONAL PIECES OF APPROPRIATE THICKNESS TO THE HORIZONTAL PIECES ON THE CENTER FILL ASSEMBLIES. NAIL EACH ADDITIONAL PIECE TO THE HORIZONTAL PIECE W/1 APPROPRIATELY SIZED NAIL EVERY 12". ADDITIONALLY, THE THICKNESS OF THE HORIZONTAL AND/OR VERTICAL PIECES IN THE CENTER FILL ASSEMBLY MAY BE ADJUSTED, AS NECESSARY, TO FACILITATE VARIANCE IN THE PALLET UNIT 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. **CAUTION**: DO NOT NAIL DUNNAGE MATERIAL TO THE MILVAN WALLS OR FLOOR. ALL NAILING WILL BE WITHIN THE DUNNAGE.

J. 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.

K. **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.

(CONTINUED AT RIGHT)

(**GENERAL NOTES CONTINUED**)

L. REQUIREMENTS CITED WITHIN THE ASSOCIATION OF AMERICAN RAILROADS (AAR) INTERMODAL LOADING GUIDE APPLY WHEN THE SHIPMENT MOVES BY TRAILER/CONTAINER-ON-FLATCAR (T/COFC). SPECIAL T/COFC NOTES FOLLOW:

1. **CAUTION**: LOADED CONTAINERS MUST BE ON CHASSIS EQUIPPED WITH TWO BOGIE ASSEMBLIES WHEN BEING MOVED IN TOFC SERVICE, REGARDLESS OF THE LOAD WEIGHT WITHIN THE CONTAINER.

2. LOAD LIMITS OF T/COFC RAIL CARS 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. TWENTY-FOOT AND 40-FOOT UNITS CAN BE LOADED ON THE SAME CAR.

M. 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 PALLETS FROM INTERLOCKING OR CATCHING ON OTHER PROJECTIONS WHEN LATERALLY ADJACENT LADING UNITS ARE BEING LOADED. A SLIP-SHEET WILL BE USED AFTER TWO-THIRDS OF A STACK IS LOADED WITH ONE OF ITS SIDES IN TIGHT ON ONE SIDE OF THE MILVAN. THE SLIP-SHEET IS TO BE PLACED AGAINST THE OTHER SIDE OF THE STACK BEFORE THE LAST THIRD 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.

N. 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.

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.

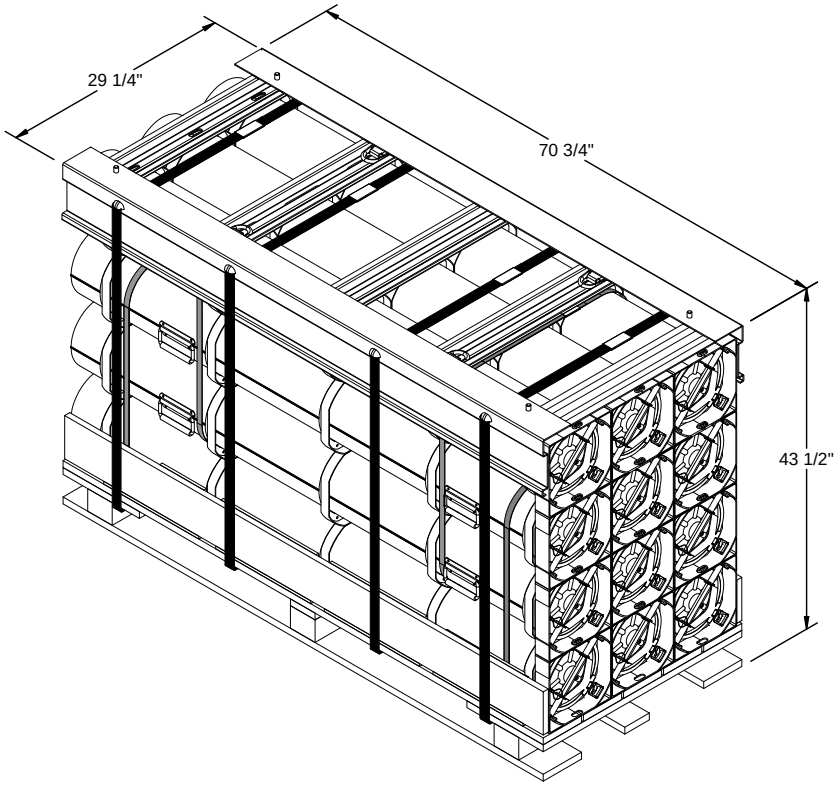
P. THE QUANTITY OF PALLET UNITS SHOWN IN THE LOAD ON PAGE 2 MAY BE REDUCED FOR SHIPMENT, IF DESIRED. SEE THE "LESS-THAN- FULL LOAD PROCEDURE" ON PAGE 8.

1. IF A LOAD IS REDUCED BY ONLY A SMALL AMOUNT (ONE LADING UNIT), THE LADING UNIT NORMALLY MAY BE ELIMINATED FROM THE REAR OF THE LOAD.

2. IF A LOAD IS REDUCED BY A LARGE AMOUNT (MORE THAN ONE LADING UNIT), LADING UNITS SHOULD BE ELIMINATED AS REQUIRED AND THE TOTAL LOAD SHIFTED FORE OR AFT, AS NECESSARY, TO ACHIEVE A SYMMETRICAL WEIGHT DISTRIBUTION. THE DEPICTED PROCEDURES WILL BE FOLLOWED AS CLOSELY AS POSSIBLE, MAKING ONLY THOSE ADJUSTMENTS TO THE DUNNAGE WHICH ARE REQUIRED TO ACCOMMODATE THE NUMBER OF UNITS TO BE SHIPPED.

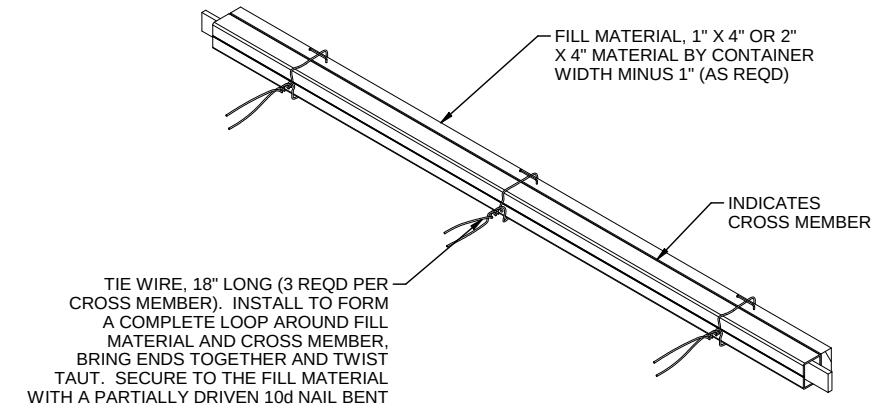
MATERIAL SPECIFICATIONS

LUMBER - - - - - - - - -:	SEE TM 743-200-1 (DUNNAGE LUMBER) AND VOLUNTARY PRODUCT STANDARD PS 20.
NAILS - - - - - - - - -:	ASTM F1667; COMMON STEEL NAIL (NLCMS OR NLCMMS).
PLYWOOD - - - - - - - -:	COMMERCIAL ITEM DESCRIPTION A-A-55057, INDUSTRIAL PLYWOOD, INTERIOR WITH EXTERIOR GLUE, GRADE C-D. IF SPECIFIED GRADE IS NOT AVAILABLE, A BETTER INTERIOR OR AN EXTERIOR GRADE MAY BE SUBSTITUTED.
STAPLE, STRAP - - - - - - - - -:	COMMERCIAL GRADE.
WIRE, CARBON STEEL - -:	ASTM A853; ANNEALED AT FINISH, BLACK OXIDE FINISH, 0.0800" DIA, GRADE 1006 OR BETTER.

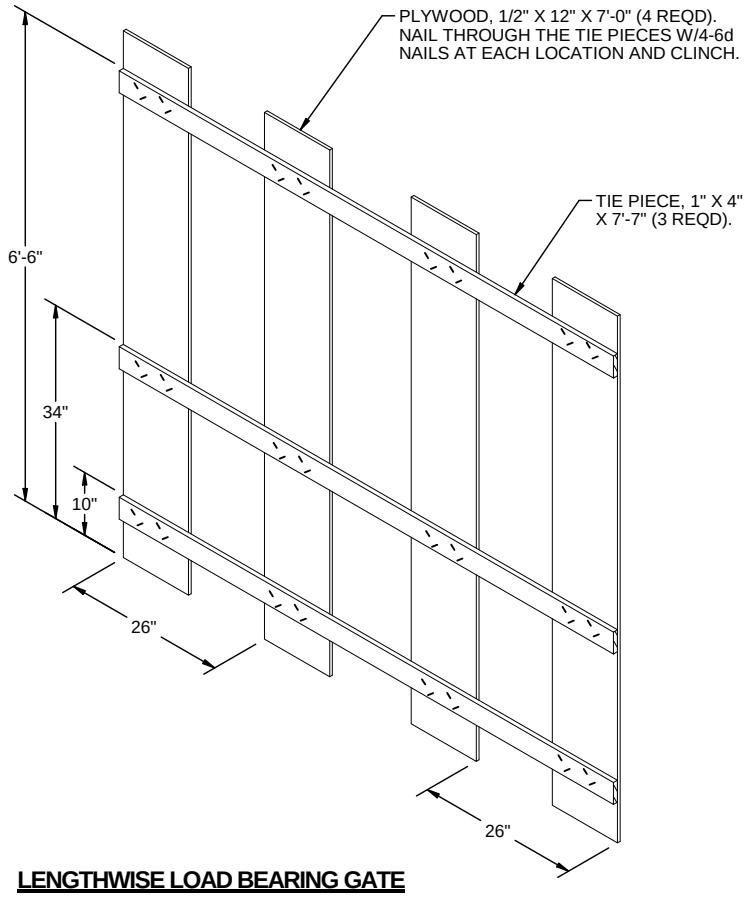


PALLET UNIT

GROSS WEIGHT - - - - - - - - - 2,029 LBS (APPROX)
CUBE - - - - - - - - - - - - - 52.6 CU FT (APPROX)

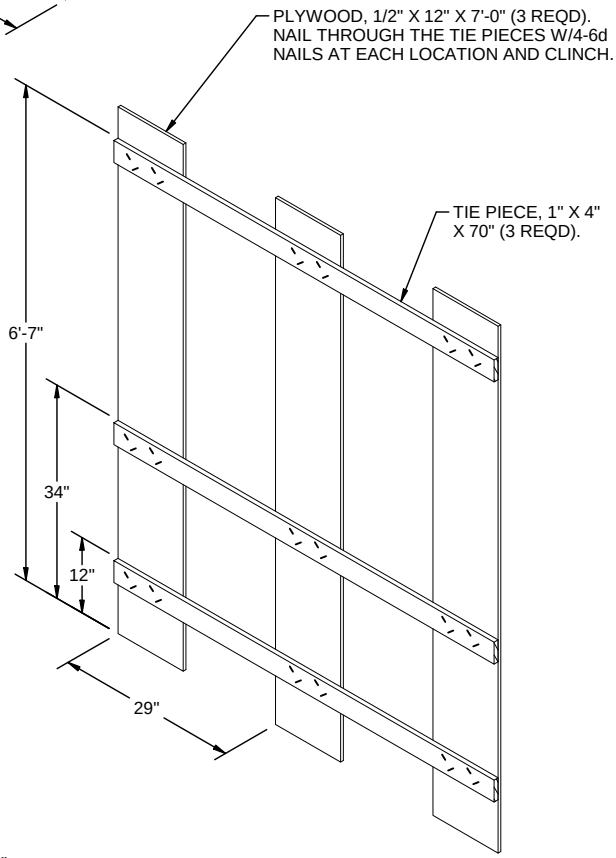


FILL DETAIL



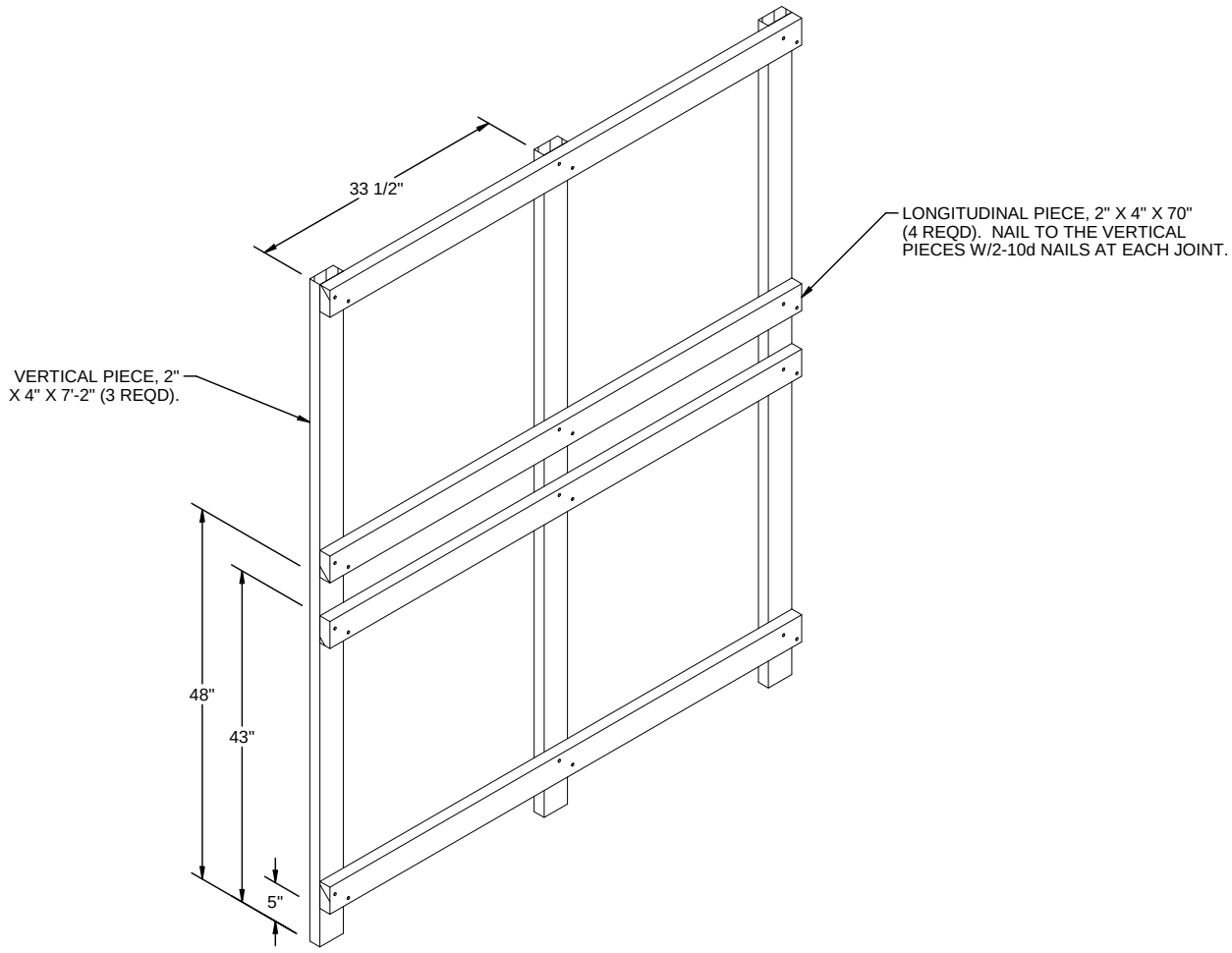
LENGTHWISE LOAD BEARING GATE

THIS GATE IS DESIGNED FOR USE WITH PALLET UNITS LOADED WITH THE 70-3/4" DIMENSION PARALLEL TO THE LENGTH OF THE CONTAINER. **NOTE**: FOR A ONE HIGH LOAD, ELIMINATE THE TOP TIE PIECE, AND REDUCE THE PLYWOOD LENGTH TO 43".



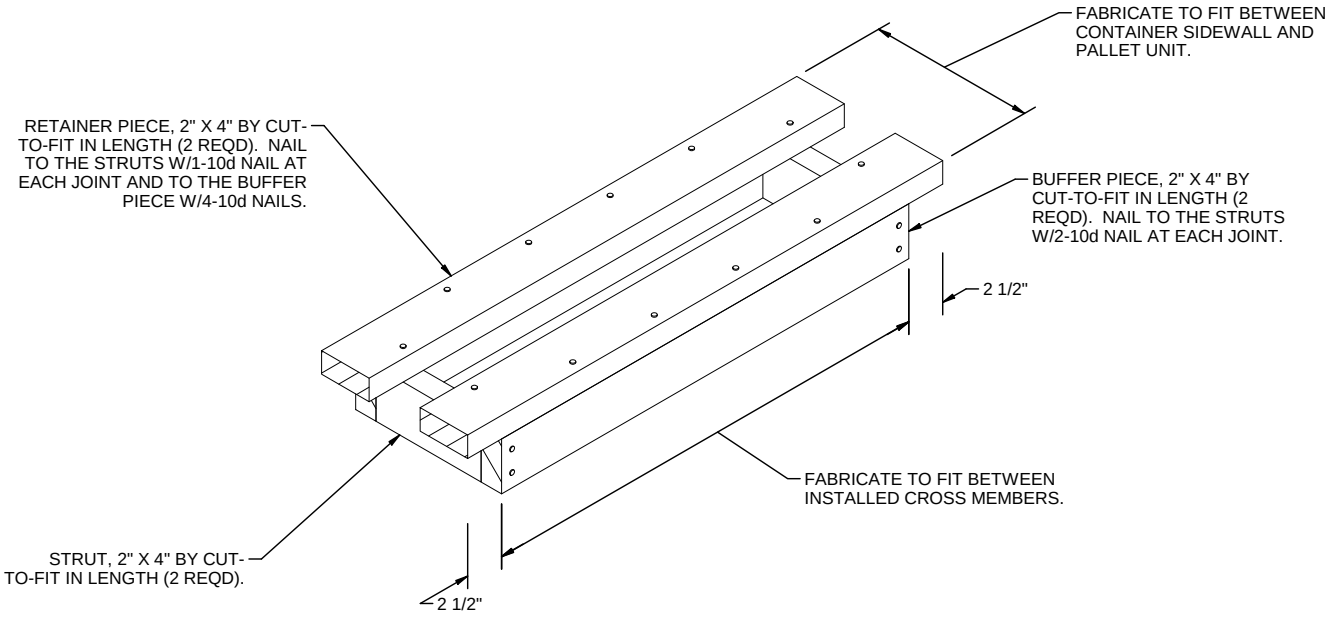
CROSSWISE LOAD BEARING GATE

THIS GATE IS DESIGNED FOR USE WITH PALLET UNITS LOADED WITH THE 70-3/4" DIMENSION PERPENDICULAR TO THE LENGTH OF THE CONTAINER. **NOTE**: FOR A ONE HIGH LOAD, ELIMINATE THE TOP TIE PIECE, AND REDUCE THE PLYWOOD LENGTH TO 43".



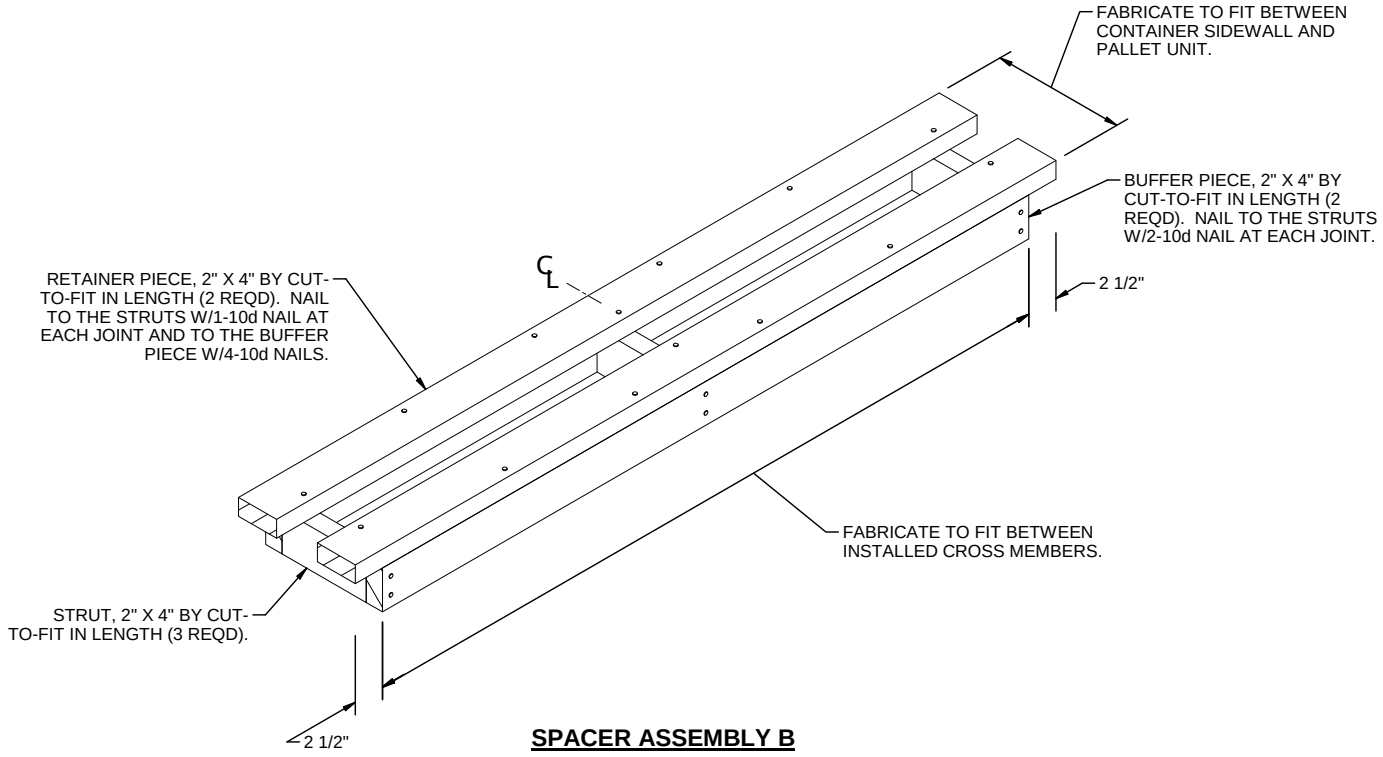
CENTER FILL ASSEMBLY

NOTE: FOR A ONE HIGH LOAD, ELIMINATE THE TOP TWO LONGITUDINAL PIECES, REDUCE THE VERTICAL PIECE LENGTH TO 43" AND WIRE TIE TO AN ADJACENT PALLET UNIT AT TWO LOCATIONS.



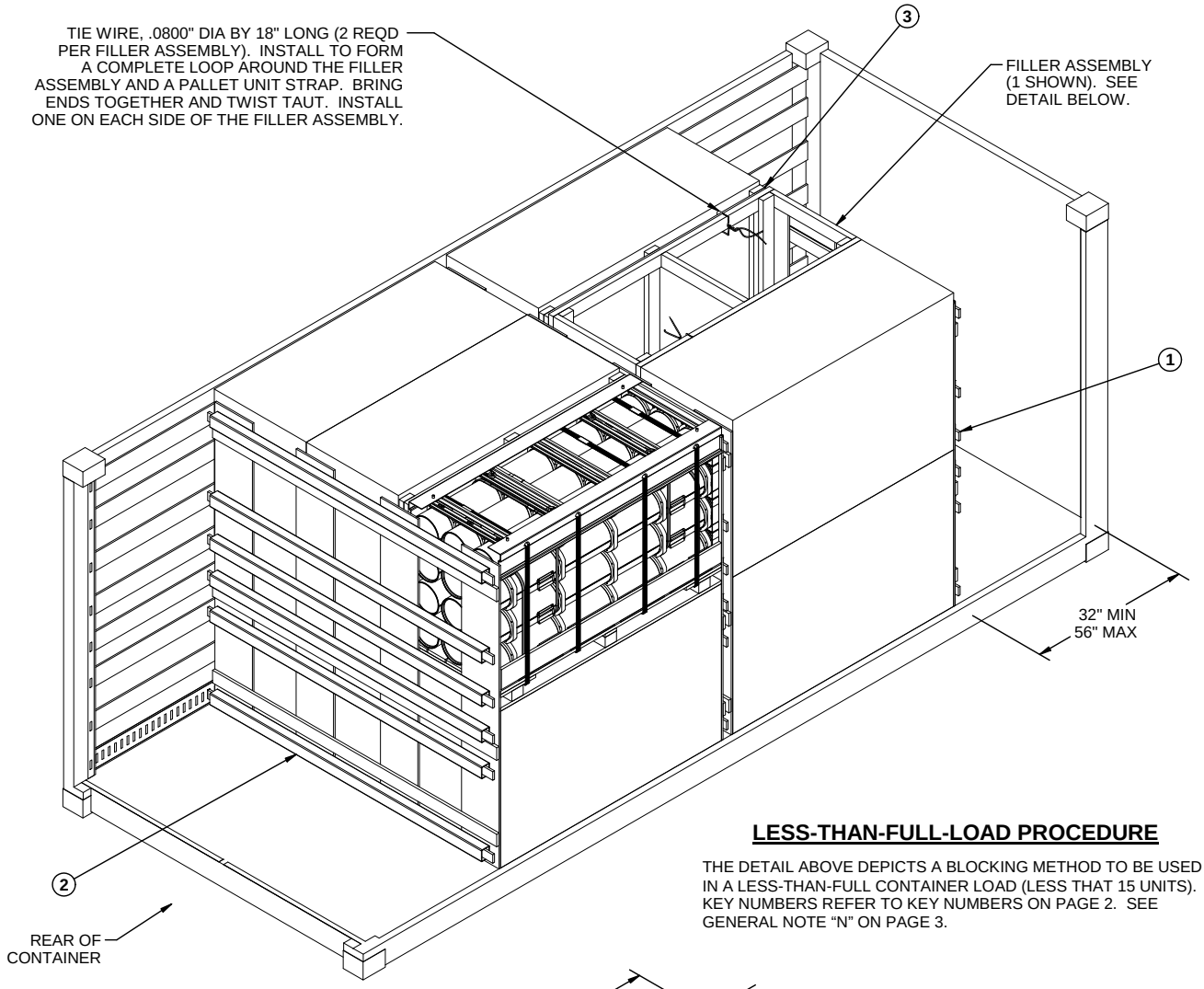
SPACER ASSEMBLY A

THIS ASSEMBLY IS FOR USE FOR BRACING ONE PALLET UNIT ORIENTED WITH THE 70-3/4" DIMENSION ACROSS THE WIDTH OF THE CONTAINER. IT MAY ALSO BE USED WITH PALLET UNITS ORIENTED WITH THE 70-3/4" DIMENSION PARALLEL TO THE LENGTH OF THE CONTAINER.



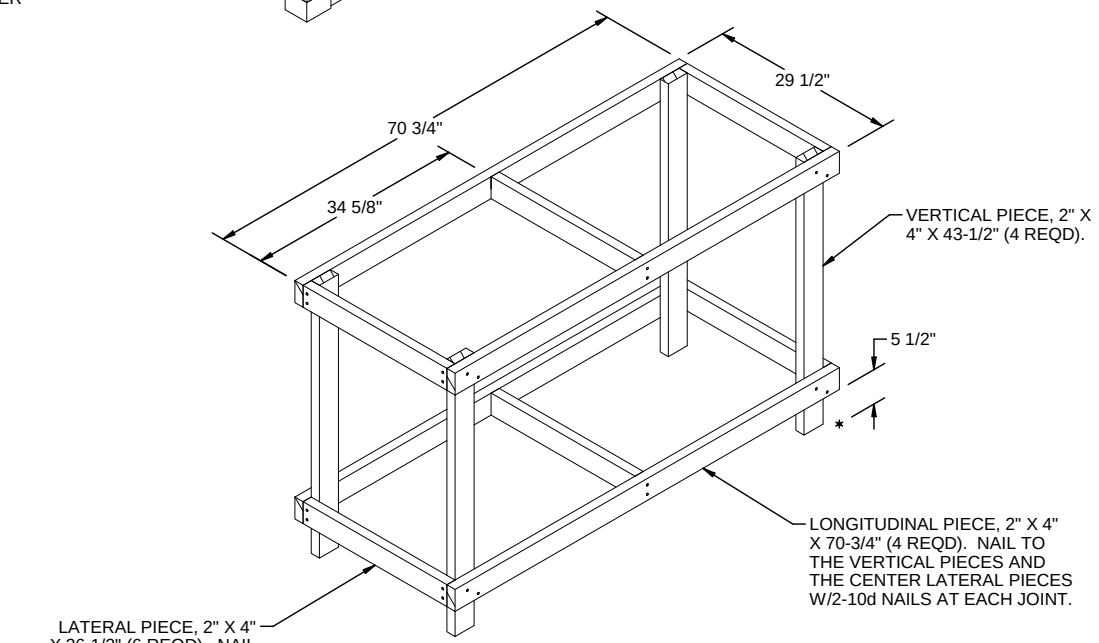
SPACER ASSEMBLY B

THIS ASSEMBLY IS FOR USE FOR BRACING TWO PALLET UNITS ORIENTED WITH THE 70-3/4" DIMENSION ACROSS THE WIDTH OF THE CONTAINER.



LESS-THAN-FULL-LOAD PROCEDURE

THE DETAIL ABOVE DEPICTS A BLOCKING METHOD TO BE USED IN A LESS-THAN-FULL CONTAINER LOAD (LESS THAT 15 UNITS). KEY NUMBERS REFER TO KEY NUMBERS ON PAGE 2. SEE GENERAL NOTE "N" ON PAGE 3.



FILLER ASSEMBLY

THE ASSEMBLY DEPICTED ABOVE IS FOR USE IN PLACE OF AN OMITTED PALLET UNIT. FILLER ASSEMBLIES MUST BE WIRE TIED TO PALLET UNIT STRAPS TO PREVENT UNDUE MOVEMENT. NO MORE THAN TWO FILLER ASSEMBLIES WILL BE USED IN ANY LOAD.