

# LOADING AND BRACING (CL & LCL) IN HYUNDAI FREIGHT CAR\* OF PALLETIZED 155MM SEPARATE LOADING PROJECTILES

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**\*THIS OUTLOADING DRAWING APPLIES EXCLUSIVELY TO THE HYUNDAI FREIGHT CAR USED BY KOREA RAILROAD CORPORATION (KORAIL) IN THE REPUBLIC OF KOREA (ROK). REFER TO HYUNDAI ASSEMBLY DRAWING FV00033-000 REV A AND RELATED SUBASSEMBLY DRAWINGS FOR DETAILS OF THE FREIGHT CAR.**

## U.S. ARMY MATERIEL COMMAND DRAWING

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## GENERAL NOTES

## (GENERAL NOTES CONTINUED)

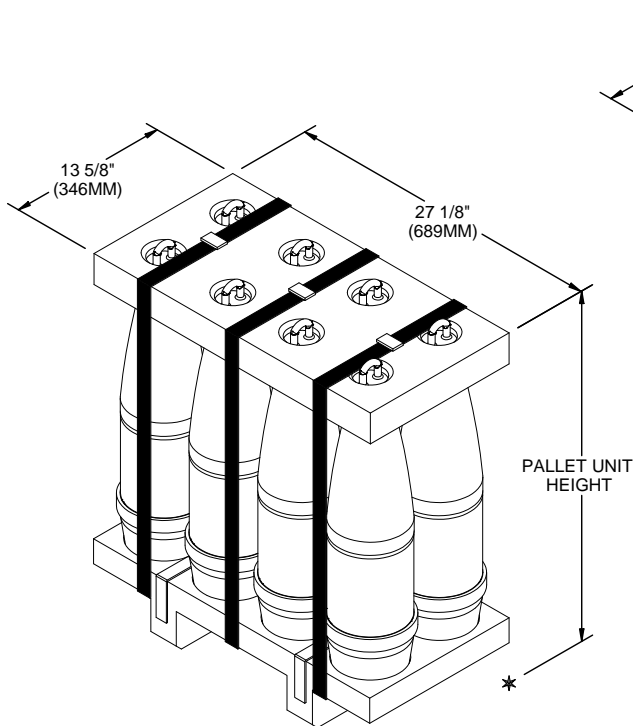
- A. THIS DOCUMENT HAS BEEN PREPARED AND ISSUED IN ACCORDANCE WITH AR 740-1 AND AUGMENTS TM 743-200-1 (CHAPTER 5).
- B. THE SPECIFIED OUTLOADING PROCEDURES ARE APPLICABLE TO LOADS OF PALLETIZED 155MM SEPARATE LOADING PROJECTILES (SLP). SUBSEQUENT REFERENCE TO PALLET UNITS HEREIN MEANS PALLET UNITS WITH PROJECTILES. SEE PAGE 3 FOR DETAILS OF THE PALLET UNITS.
- C. THE OUTLOADING PROCEDURES SPECIFIED HEREIN CAN ALSO BE USED FOR THE SHIPMENT OF PALLET UNITS WHEN THEY ARE IDENTIFIED DIFFERENTLY BY NOMENCLATURE THAN THE ITEM IDENTIFIED WITHIN THE DRAWING TITLE.
- D. THE SELECTION OF FREIGHT CARS FOR THE TRANSPORT OF THE PALLET UNITS IS THE RESPONSIBILITY OF THE ORIGINATING CARRIER AND THE SHIPPER. ONLY CARS WHICH HAVE "SOUND" FLOORS AND ARE IN OTHERWISE PROPER CONDITION, IN ACCORDANCE WITH THE REQUIREMENTS OF THE APPLICABLE REGULATORY DOCUMENTS, WILL BE SELECTED.
- E. THE OUTLOADING PROCEDURES DEPICTED IN THIS DOCUMENT ARE APPLICABLE FOR SHIPMENTS ONLY IN HYUNDAI FREIGHT CARS WHICH ARE 48'-7" (14808MM) LONG BY 8'-9" (2667MM) WIDE BY 10'-2" (3099MM) HIGH (INSIDE DIMENSIONS). THE FREIGHT CAR SELECTED MUST BE EQUIPPED WITH 12 TIEDOWN ANCHORS LOCATED IN THE FLOOR ON EACH SIDE OF THE CAR, EACH CAPABLE OF RETAINING A MINIMUM OF 3,000 LBS (1361 KG). THE CARS DEPICTED HAVE A NOMINAL CAPACITY OF 109 METRIC TONS (240,304 LBS).
- F. WHEN SELECTING FREIGHT CARS, EVERY EFFORT SHOULD BE MADE TO OBTAIN CARS THAT DO NOT HAVE BOWED ENDWALLS. CARS HAVING BOWED ENDS CAN BE USED, HOWEVER, IF AN ENDWALL IS BOWED OUTWARD MORE THAN 2" (51MM) EITHER FROM SIDE TO SIDE OR FROM FLOOR TO ROOF, SHIMS MUST BE INSTALLED ON THE ENDWALL ASSEMBLY TO PROVIDE A "SQUARED OFF" SURFACE FOR THE LOAD AT THE END OF THE CAR.
- G. OTHER TYPES OF LADING ITEMS MAY BE LOADED IN CARS WHICH ARE PARTIALLY LOADED WITH THE PALLET UNITS, 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.
- H. **NOTICE:** WHEN POSITIONING PALLET UNITS IN A CAR, THEY SHOULD BE PRESSED TIGHTLY TOGETHER LENGTHWISE SO AS TO ACHIEVE A TIGHT LOAD. TO AID IN ACHIEVING TIGHTNESS, A LOAD-COMPRESSING JACK MAY BE EMPLOYED IN THE AREA OF THE CENTER GATES TO MOVE THE PALLET UNITS INTO THEIR FINAL SHIPPING POSITION. A HYDRAULIC JACK IS RECOMMENDED FOR THIS OPERATION. **CAUTION:** WHEN USING A JACK TO COMPACT A LOAD, THE JACK MUST BE USED AGAINST STRONG POINTS OF THE PALLET UNITS, SUCH AS PALLET UNIT BASE. PADDING, OF 2" (51MM) THICK LUMBER OR ANY OTHER MATERIAL OF SIMILAR CONSISTENCY, SHOULD BE PLACED BETWEEN THE JACK AND THE LADING.
- J. TO ACHIEVE A TIGHTLY BLOCKED LOAD, A STRUT WILL BE CUT APPROXIMATELY 1/4" TO 3/8" (6MM TO 10MM) LONGER THAN THE MEASURED DISTANCE BETWEEN THE STRUT BEARING AREAS ON THE CENTER GATES. MEASUREMENTS FOR STRUT LENGTHS NEED TO BE ACCOMPLISHED AT SEVERAL PLACES DURING THE BLOCKING AND BRACING PROCESS. CARE MUST BE EXERCISED WHEN MEASURING FOR AND INSTALLING STRUTS. THE SPECIFIED APPROXIMATE DIMENSION FOR A STRUT LENGTH MAY BE ADJUSTED, AS NECESSARY, TO PROVIDE FOR A TIGHTLY BLOCKED LOAD WITHOUT DISTORTING, DENTING OR OTHERWISE DAMAGING THE PALLET UNITS. ONE END OF THE STRUT WILL BE POSITIONED AT ITS BEARING AREA JUST ABOVE THE STRUT LEDGER ON ONE GATE. THE OTHER END, WHICH CAN BE BEVELED ON THE LOWER CORNER IF DESIRED, WILL THEN BE DRIVEN DOWNWARD UNTIL IT CONTACTS THE STRUT LEDGER ON THE OTHER GATE. EACH END OF THE STRUT WILL BE TOENAILED TO THE ADJACENT CENTER GATE, AS SPECIFIED WITHIN THE KEY NUMBERS FOR A LOAD, IN SUCH A MANNER SO THAT AS NEARLY AS PRACTICAL EQUAL LENGTHS OF A NAIL ARE EMBEDDED IN THE STRUT AND IN THE VERTICAL PIECE OF THE CENTER GATE. SEE THE "BEVEL CUT" DETAIL ON PAGE 5 FOR BEVELING INSTRUCTIONS AND THE "STRUT INSTALLATION" DETAIL ON PAGE 5 FOR A PICTORIAL VIEW SHOWING THE PROPER POSITIONING OF A BEVELED STRUT FOR INSTALLATION. NOTE THAT THE UPPER CORNER NEEDS TO BE BEVELED ONLY IF THE STRUTS ARE VERY SHORT. IF ONLY ONE END IS BEVEL CUT, THE BEVELED EDGE WILL BE PLACED IN THE DOWNWARD POSITION SO THAT IT WILL ALLOW THE STRUT END TO SLIDE MORE FREELY DOWN THE FACE OF THE VERTICAL PIECE ON THE ADJACENT CENTER GATE AS THE STRUT IS DRIVEN DOWN INTO ITS FINAL POSITION.
- K. STRUTS WHICH ARE 48" (1219MM) OR LONGER MUST BE STIFFENED BY HORIZONTAL AND VERTICAL STRUT BRACING, AS SHOWN IN THE LOAD ON PAGE 10. AN ADDITIONAL SET OF HORIZONTAL AND VERTICAL STRUT BRACING PIECES WILL BE NECESSARY FOR STRUTS OF 8'-0" (2438MM) OR MORE IN LENGTH. THE BRACING PIECES SHOULD BE EVENLY SPACED ALONG THE LENGTH OF THE STRUTS.
- L. DUNNAGE LUMBER SPECIFIED THROUGHOUT THIS PROCEDURAL DRAWING IS OF NOMINAL SIZE. FOR EXAMPLE, 2" X 4" MATERIAL IS ACTUALLY 1-1/2" (38MM) THICK BY 3-1/2" (89MM) WIDE AND 2" X 6" MATERIAL IS ACTUALLY 1-1/2" (38MM) THICK BY 5-1/2" (140MM) WIDE. SEE THE "LUMBER SIZE CONVERSION" CHART ON PAGE 4 FOR GUIDANCE.
- M. THE "NAIL SIZE CONVERSION" CHART ON PAGE 4 PROVIDES GUIDANCE IN COMPARING U.S. AND METRIC SIZE OF NAILS. **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 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, ONTO, OR RIGHT BESIDE A NAIL IN A LOWER PIECE.
- N. PALLET UNITS HAVING BROKEN STRAPS WILL HAVE THE STRAPS REPLACED WITH THE SAME SIZE STEEL STRAPPING AS ORIGINALLY ON THE UNIT. IF THAT SIZE IS NOT AVAILABLE, A THICKER AND/OR WIDER SIZE STRAP MAY BE USED.
- O. PALLET UNITS MUST BE BUNDLED TOGETHER WITH STEEL STRAPPING INTO GROUPS OF THREE IN ACCORDANCE WITH AMC DRAWING 19-48-4076-20PE1001 TO THE MAXIMUM EXTENT POSSIBLE. EACH FREIGHT CAR LOAD MAY HAVE A MAXIMUM OF TWO NON-BUNDLED (LOOSE) PALLET UNITS TO FILL OUT A QUANTITY REQUIREMENT. ANY ROW OF PALLET UNITS IN THE FREIGHT CAR THAT IS NOT BUNDLED MUST HAVE STRAPPING APPLIED STRAIGHT ACROSS THE ROW (STRAP COVERING ALL PALLET UNITS IN THE ROW). SEE THE LOAD ON PAGE 10 FOR DETAILS OF SHIPPING LOOSE PALLET UNITS.
- P. EACH BUNDLE OF PALLET UNITS MUST BE RESTRAINED BY AT LEAST ONE WEB STRAP, PREFERABLY DIRECTLY ACROSS THE PALLET UNIT ROW. IF WEB STRAPS CANNOT BE APPLIED TO ALIGN WITH THE MIDDLE HALF OF THE PALLET UNIT LENGTH, THEN THE STRAP MUST BE APPLIED DIAGONALLY ACROSS THE PALLET UNIT ROW.
- Q. THROUGHOUT THIS PROCEDURAL DRAWING, PORTIONS OF THE BLOCKING COMPONENTS AND OF THE DEPICTED CARS, SUCH AS A CAR SIDEWALL, HAVE BEEN OMITTED FROM THE LOAD VIEW FOR CLARITY PURPOSES.
- R. THE NUMBER OF LADING UNITS MAY BE ADJUSTED TO FIT THE SIZE OF THE FREIGHT CAR BEING LOADED OR THE QUANTITY TO BE SHIPPED, HOWEVER, THE APPROVED METHODS SPECIFIED HEREIN MUST BE FOLLOWED AS CLOSELY AS POSSIBLE FOR BLOCKING, BRACING, AND STAYING OF THE UNITS. **NOTICE:** A SHIPMENT WILL BE POSITIONED IN THE FREIGHT CAR IN COMPLIANCE WITH THE WEIGHT DISTRIBUTION REQUIREMENTS.
- S. OTHER TYPES OF LADING ITEMS MAY BE LOADED IN CARS WHICH ARE PARTIALLY LOADED WITH THE DESIGNATED ITEMS, 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.
- T. **CAUTION:** WHEN POWER OR PNEUMATIC NAILERS ARE BEING USED IN THE APPLICATION OF NAILED FLOORLINE BLOCKING OR BRACING, CONTAINERS BEING LOADED INTO THE CONVEYANCE MUST BE POSITIONED TO ALLOW A CLEAR PATH OF EXIT FOR THE OPERATOR AT ALL TIMES, SHOULD AN EMERGENCY EXIT BECOME NECESSARY.
- U. THE PROCEDURES DEPICTED WITHIN THIS DRAWING ARE BASED ON THE USE OF DIMENSIONAL SIZED LUMBER. IN MOST CASES THE METRIC EQUIVALENT IS GIVEN IN PARENTHESIS FOLLOWING THE DIMENSION. HOWEVER, WHERE THE METRIC EQUIVALENT IS NOT SHOWN, IT MAY BE COMPUTED BY USING ONE INCH EQUALS 25.4 MM AND ONE POUND EQUALS 0.454 KG.
- V. PORTIONS OF THE FREIGHT CARS, SUCH AS SIDE DOORS AND CEILING, HAVE NOT BEEN SHOWN IN THE LOAD VIEWS FOR CLARITY PURPOSES.
- W. ANTI-CHAFING MATERIAL MAY BE INSTALLED AT POINTS OF CONTACT BETWEEN PALLET UNITS, IF DESIRED, TO PREVENT CHAFING DAMAGE TO PAINT AND MARKINGS.

(CONTINUED AT RIGHT)

## MATERIAL SPECIFICATIONS

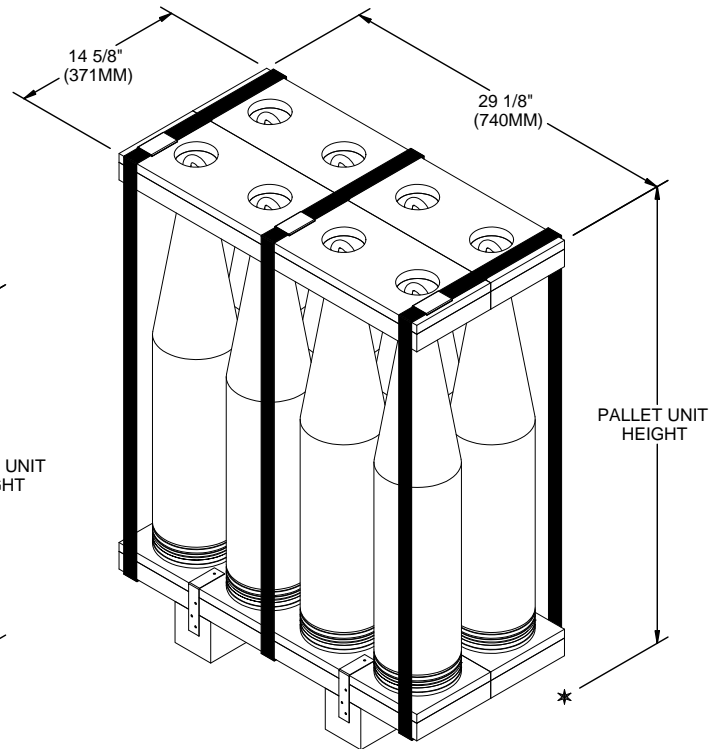
- LUMBER** - - - - - : SEE TM 743-200-1 (DUNNAGE LUMBER) AND VOLUNTARY PRODUCT STANDARD PS 20.
- NAILS** - - - - - : ASTM F1667; COMMON STEEL NAIL (NLCMS OR NLCMMS).
- STAPLE, STRAP** - - - : COMMERCIAL GRADE.
- ANTI-CHAFING MATERIAL** - - - - - : MIL-PRF-121 (OR EQUAL); NEUTRAL BARRIER MATERIAL.
- WIRE, CARBON STEEL** - - : ASTM A853; ANNEALED AT FINISH, BLACK OXIDE FINISH, 0.0800" (2MM) DIA, GRADE 1006 OR BETTER.

155MM SLP PALLET UNITS						
DODI C	NSN	PALLET SIZE	HEI GHT		WEI GHT	
			U. S.	METRI C	U. S.	METRI C
D501	1320-00-434-8856	LARGE	38-3/4"	984MM	886 LBS	402 KG
D502	1320-00-434-8861	LARGE	38-3/4"	984MM	886 LBS	402 KG
D503	1320-01-050-6059	LARGE	38-3/4"	984MM	882 LBS	400 KG
D503	1320-01-268-0387	LARGE	38-3/4"	984MM	882 LBS	400 KG
D509	1320-01-050-7966	LARGE	39-3/8"	1000MM	882 LBS	400 KG
D509	1320-01-268-0386	LARGE	38-3/4"	984MM	882 LBS	400 KG
D509	1320-01-368-0386	LARGE	38-3/4"	984MM	882 LBS	400 KG
D561	1320-00-226-6147	SMALL	32"	813MM	797 LBS	362 KG
D561	1320-00-689-9325	SMALL	32"	813MM	804 LBS	365 KG
D561	1320-00-841-1057	SMALL	32"	813MM	804 LBS	365 KG
D562	1320-00-073-8847	SMALL	32"	813MM	797 LBS	362 KG
D562	1320-00-689-9365	SMALL	32"	813MM	797 LBS	362 KG
D563	1320-00-126-7339	LARGE	39-3/8"	1000MM	874 LBS	396 KG
D563	1320-00-872-3164	LARGE	39-3/8"	1000MM	874 LBS	396 KG
D563	1320-01-260-8720	LARGE	38-3/4"	984MM	874 LBS	396 KG



**155MM SLP SMALL PALLET UNIT**

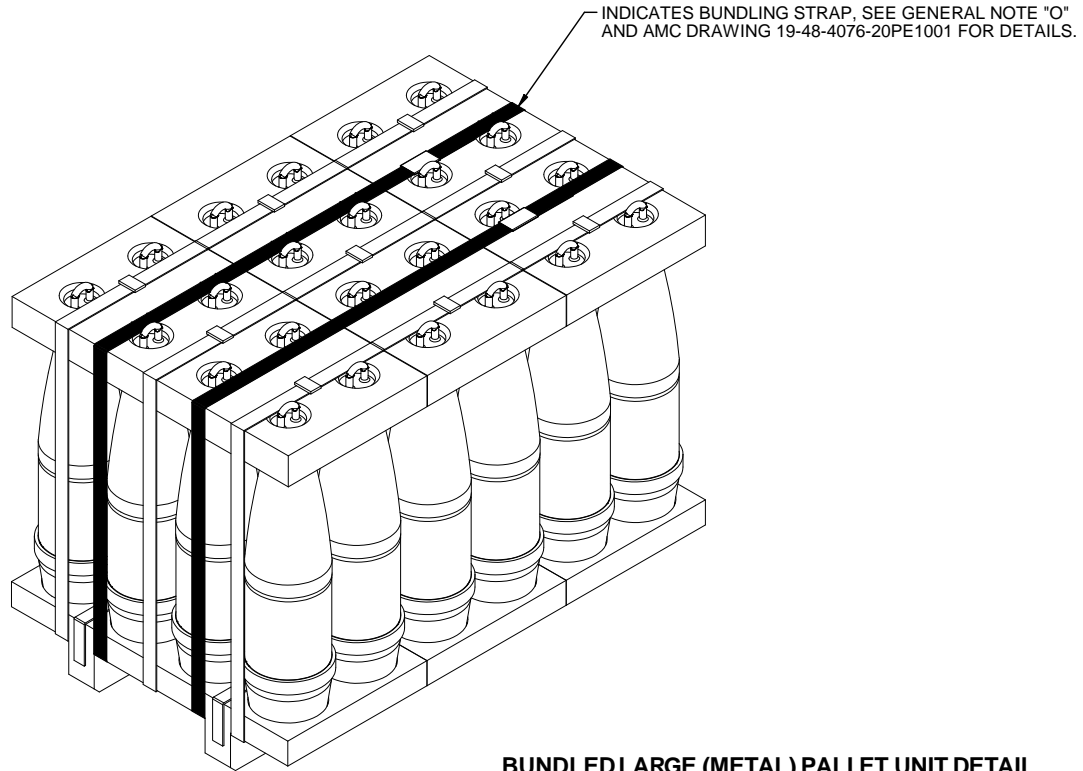
REFER TO THE LOAD ON PAGE 8



**155MM SLP LARGE WOOD PALLET UNIT**

REFER TO THE LOADS ON PAGES 6 AND 10

**CAUTION:** PALLET UNITS MUST BE BUNDLED FOR SHIPMENT TO THE MAXIMUM EXTENT POSSIBLE. SEE GENERAL NOTE "O" ON PAGE 2 AND LOAD ON PAGE 10 FOR DETAILS.

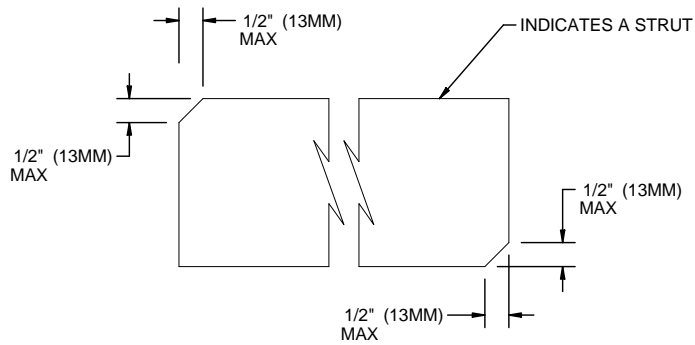


**BUNDLED LARGE (METAL) PALLET UNIT DETAIL**

REFER TO THE LOADS ON PAGES 6 AND 10 AND THE CHART ON PAGE 3. NOTE THAT THE BUNDLED PALLET UNIT DETAIL IS SHOWN AS TYPICAL ONLY. SEE "CAUTION" ABOVE.

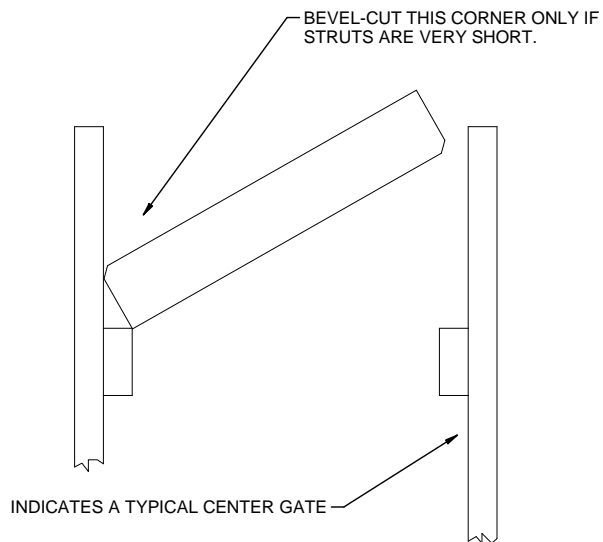
LUMBER SIZE CONVERSION	
U. S.	METRIC
1" X 4"	19MM X 89MM
1" X 6"	19MM X 140MM
2" X 2"	38MM X 38MM
2" X 3"	38MM X 64MM
2" X 4"	38MM X 89MM
2" X 6"	38MM X 140MM
4" X 4"	89MM X 89MM

NAIL SIZE CONVERSION				
SIZE	LENGTH		DIAMETER	
	U. S.	METRIC	U. S.	METRIC
6d	2"	51MM	.113"	3MM
8d	2-1/2"	64MM	.131"	3MM
10d	3"	76MM	.148"	4MM
12d	3-1/4"	83MM	.148"	4MM
16d	3-1/2"	89MM	.162"	4MM
20d	4"	102MM	.192"	5MM
30d	4-1/2"	114MM	.207"	5MM
40d	5"	127MM	.226"	6MM
50d	5-1/2"	140MM	.244"	6MM
60d	6"	152MM	.262"	7MM



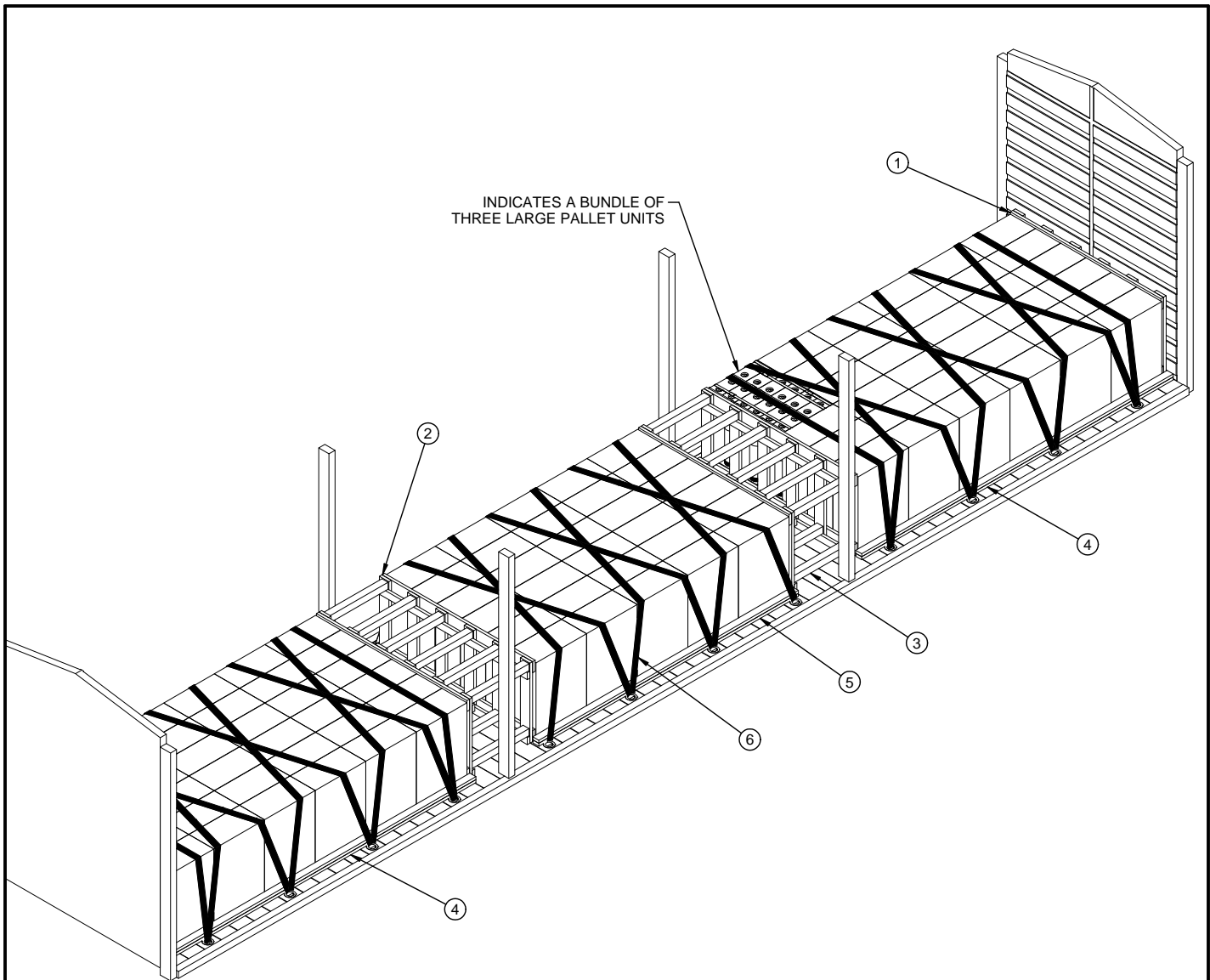
**BEVEL CUT**

IF DESIRED, EACH END OF A STRUT MAY BE BEVEL-CUT AS SHOWN ABOVE TO FACILITATE INSTALLING THE STRUTS WITH A "DRIVE" FIT.



**STRUT INSTALLATION**

SEE GENERAL NOTE "J" ON PAGE 2 FOR ADDITIONAL STRUT INSTALLATION GUIDANCE.



**ISOMETRIC VIEW**

**KEY NUMBERS**

- ① ENDWALL ASSEMBLY A (2 REQD). SEE DETAIL ON PAGE 15.
- ② CENTER GATE A (4 REQD). SEE DETAIL ON PAGE 16.
- ③ STRUT, 4" X 4" BY CUT-TO-FIT (REF: 34" (864MM) LONG) (24 REQD). TOENAIL TO THE CENTER GATES W/2-16d NAILS AT EACH END.
- ④ SIDE BLOCKING, 2" X 4" X 15'-0" (4572MM) (DOUBLED) (4 REQD). INSTALL TO CONTACT THE CENTER GATE, ENDWALL ASSEMBLY, AND THE SKIDS OF THE PALLET UNITS. SIDE BLOCKING MAY BE INSTALLED USING TWO SHORTER DOUBLED PIECES THAT EQUAL THE TOTAL LENGTH REQUIRED. NAIL THE FIRST PIECE TO THE FREIGHT CAR FLOOR W/7-16d NAILS. NAIL THE SECOND PIECE TO FIRST PIECE W/7-16d NAILS.
- ⑤ SIDE BLOCKING, 2" X 4" X 12'-6" (3810MM) (DOUBLED) (2 REQD). INSTALL TO CONTACT THE CENTER GATES AND THE SKIDS OF THE PALLET UNITS. SIDE BLOCKING MAY BE INSTALLED USING TWO SHORTER DOUBLED PIECES THAT EQUAL THE TOTAL LENGTH REQUIRED. NAIL THE FIRST PIECE TO THE FREIGHT CAR FLOOR W/7-16d NAILS. NAIL THE SECOND PIECE TO FIRST PIECE W/7-16d NAILS.
- ⑥ WEB STRAP ASSEMBLY (22 REQD). POSITION AS SHOWN, EXTENDING FROM STRAP ATTACHMENT ON ONE SIDE OF THE FREIGHT CAR, OVER THE PALLET UNITS, TO APPROPRIATE ATTACHMENT ON OPPOSITE SIDE.

**SPECIAL NOTES:**

1. A 102 LARGE PALLET UNIT LOAD IS SHOWN IN A HYUNDAI FREIGHT CAR EQUIPPED WITH 16'-0" WIDE DOOR OPENINGS.
2. FOR SHIPMENT OF A LOAD WHICH CONTAINS FEWER PALLET UNITS THAN WHAT IS SHOWN, SEE THE PROCEDURES CONTAINED ON PAGES 10 AND 12.

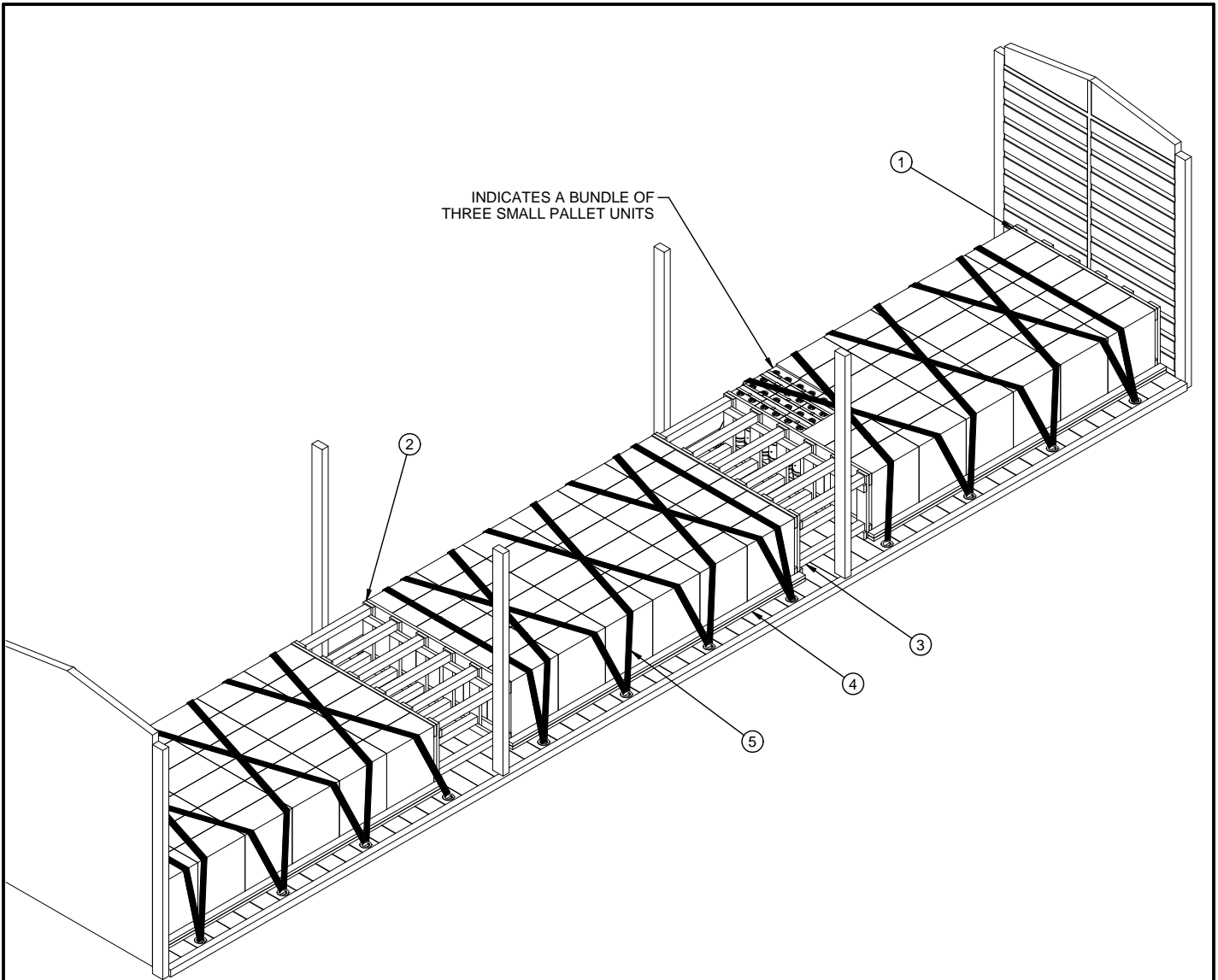
**BILL OF MATERIAL**

LUMBER	LINEAR FEET	METERS	BOARD FEET	
2" X 4"	228	69-1/2	152	
2" X 6"	207	63	207	
4" X 4"	68	20-3/4	91	
NAI LS	NO.	REQD	POUNDS	KG
10d (3")	312		4-3/4	2-1/8
16d (3-1/2")	180		4	1-7/8
WEB STRAP ASSEMBLY, 3" - - - 22 REQD - - 228 LBS				

**LOAD AS SHOWN**

ITEM	QUANTITY	WEIGHT (APPROX)
155MM SLP PALLET - - - - -	102 - - - - -	90,780 LBS (41,177 KG)
DUNNAGE - - - - -	- - - - -	1,271 LBS (577 KG)
<b>TOTAL WEIGHT - - - - -</b>		<b>92,051 LBS (41,754 KG)</b>

**102 LARGE PALLET UNITS IN A HYUNDAI FREIGHT CAR**



**ISOMETRIC VIEW**

**KEY NUMBERS**

- ① ENDWALL ASSEMBLY B (2 REQD). SEE DETAIL ON PAGE 15.
- ② CENTER GATE B (4 REQD). SEE DETAIL ON PAGE 16.
- ③ STRUT, 4" X 4" BY CUT-TO-FIT (REF: 38 1/4" (972MM) LONG) (24 REQD). TOE-NAIL TO THE CENTER GATES W/2-16d NAILS AT EACH END.
- ④ SIDE BLOCKING, 2" X 4" X 14'-0" (4267MM) (DOUBLED) (6 REQD). INSTALL TO CONTACT THE CENTER GATES, OR THE CENTER GATE AND THE ENDWALL ASSEMBLY, AND THE SKIDS OF THE PALLET UNITS. SIDE BLOCKING MAY BE INSTALLED USING TWO SHORTER DOUBLED PIECES THAT EQUAL THE TOTAL LENGTH REQUIRED. NAIL THE FIRST PIECE TO THE FREIGHT CAR FLOOR W/7-16d NAILS. NAIL THE SECOND PIECE TO FIRST PIECE W/7-16d NAILS.
- ⑤ WEB STRAP ASSEMBLY (22 REQD). POSITION AS SHOWN, EXTENDING FROM STRAP ATTACHMENT ON ONE SIDE OF THE FREIGHT CAR, OVER THE PALLET UNITS, TO APPROPRIATE ATTACHMENT ON OPPOSITE SIDE.



**SPECIAL NOTES:**

1. A 108 SMALL PALLET UNIT LOAD IS SHOWN IN A HYUNDAI FREIGHT CAR EQUIPPED WITH 16'-0" WIDE DOOR OPENINGS.
2. FOR SHIPMENT OF A LOAD WHICH CONTAINS FEWER PALLET UNITS THAN WHAT IS SHOWN, SEE THE PROCEDURES CONTAINED ON PAGES 10 AND 14.

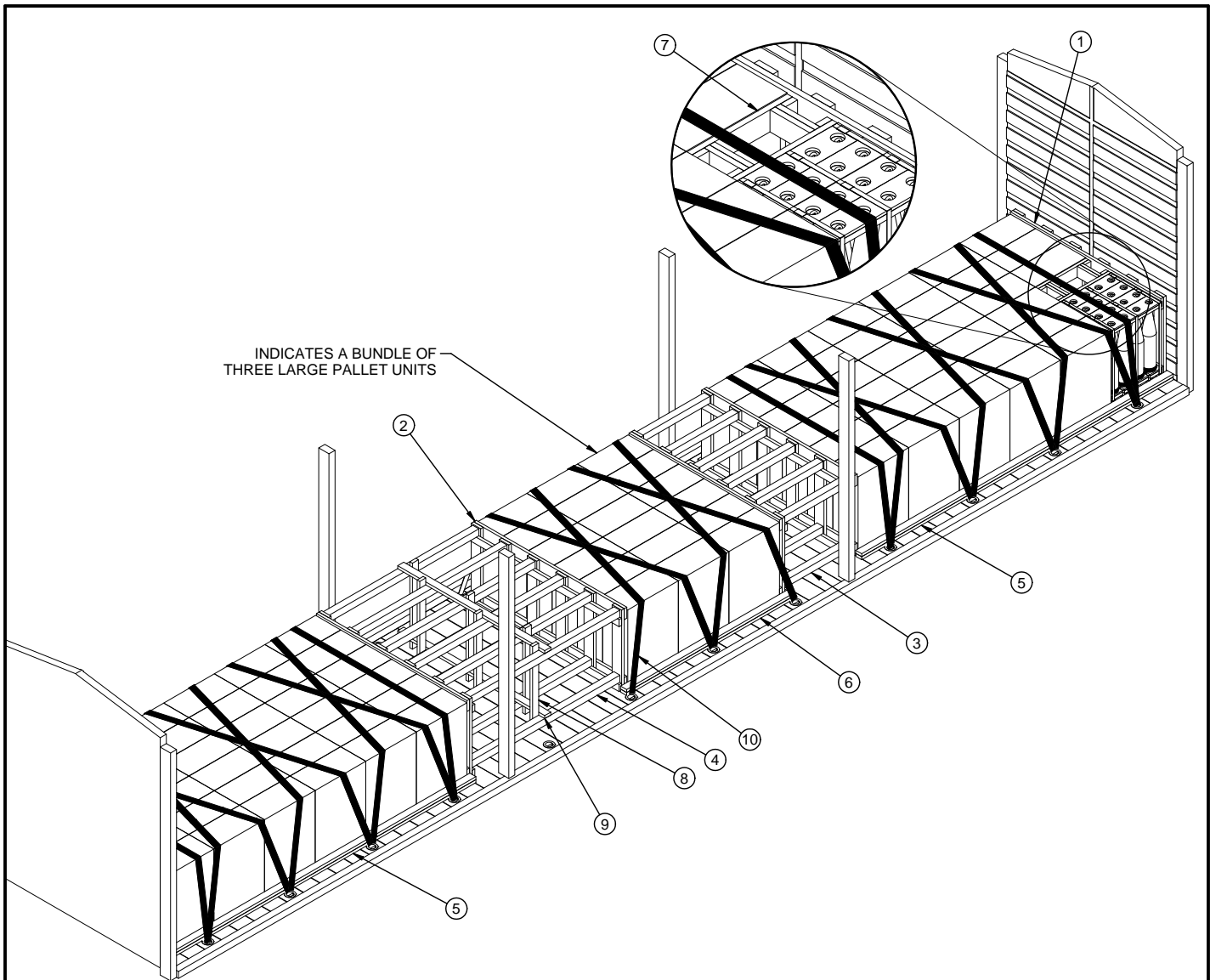
**BILL OF MATERIAL**

LUMBER	LINEAR FEET	METERS	BOARD FEET	
2" X 4"	223	68	148	
2" X 6"	175	53-1/4	175	
4" X 4"	77	23-1/2	102	
NAI LS	NO.	REQD	POUNDS	KG
10d (3")	312		4-3/4	2-1/8
16d (3-1/2")	180		4	1-7/8
WEB STRAP ASSEMBLY, 3" - - - 22 REQD - - - 228 LBS				

**LOAD AS SHOWN**

<u>ITEM</u>	<u>QUANTITY</u>	<u>WEIGHT (APPROX)</u>
155MM SLP PALLET - - -	108 - - - - -	86,400 LBS (39,190 KG)
DUNNAGE - - - - -	- - - - -	1,211 LBS (550 KG)
<b>TOTAL WEIGHT - - - - -</b>		<b>87,611 LBS (39,740 KG)</b>

**108 SMALL PALLET UNITS IN A HYUNDAI FREIGHT CAR**



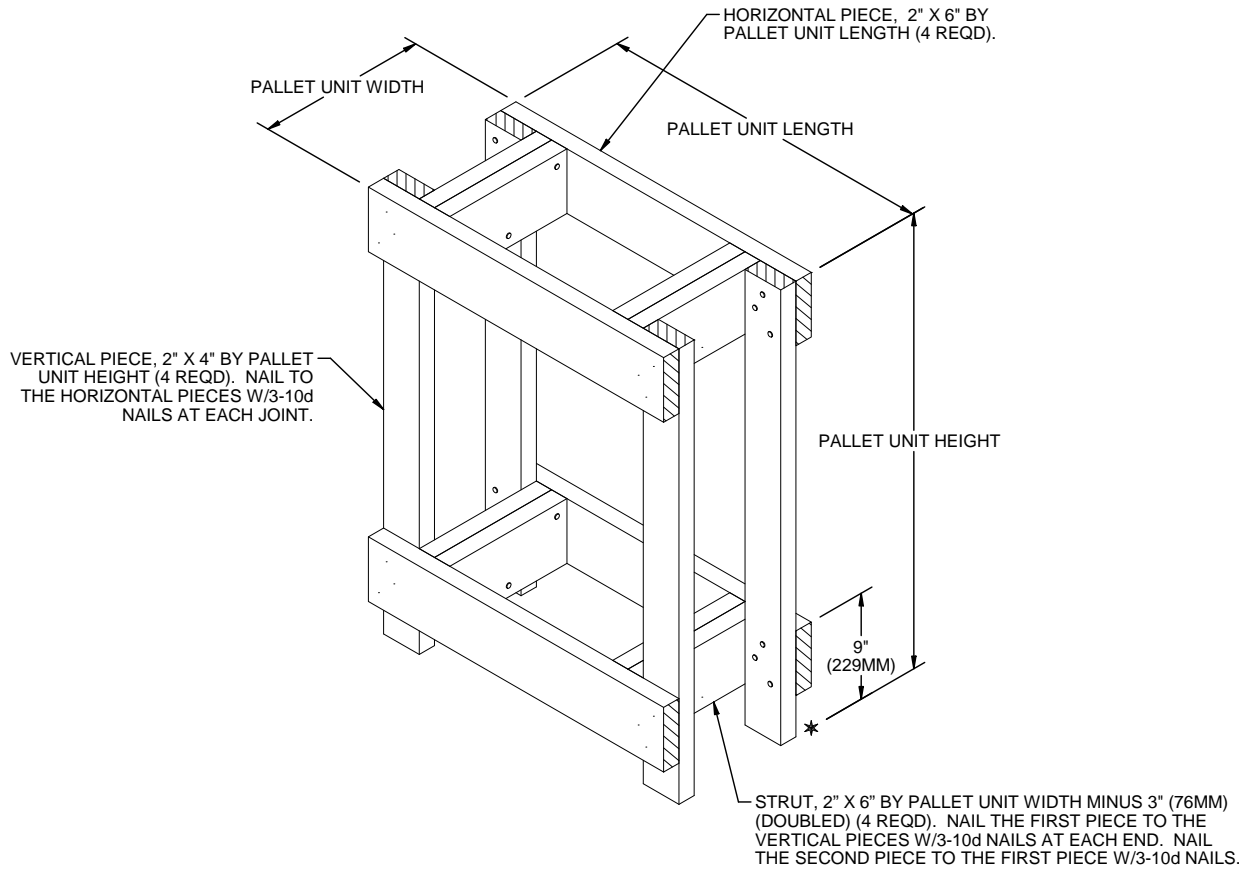
**ISOMETRIC VIEW**

**KEY NUMBERS**

- ① ENDWALL ASSEMBLY A (2 REQD). SEE DETAIL ON PAGE 15.
- ② CENTER GATE A (4 REQD). SEE DETAIL ON PAGE 16.
- ③ STRUT, 4" X 4" BY CUT-TO-FIT (REF: 39 3/8" (1000MM) LONG) (12 REQD). TOE-NAIL TO THE CENTER GATES W/2-16d NAILS AT EACH END.
- ④ STRUT, 4" X 4" BY CUT-TO-FIT (REF: 7'-2 7/8" (2207MM) LONG) (12 REQD). TOE-NAIL TO THE CENTER GATES W/2-16d NAILS AT EACH END.
- ⑤ SIDE BLOCKING, 2" X 4" X 15'-0" (4572MM) (DOUBLED) (4 REQD). INSTALL TO CONTACT THE CENTER GATE, ENDWALL ASSEMBLY, AND THE SKIDS OF THE PALLET UNITS. SIDE BLOCKING MAY BE INSTALLED USING TWO SHORTER DOUBLED PIECES THAT EQUAL THE TOTAL LENGTH REQUIRED. NAIL THE FIRST PIECE TO THE FREIGHT CAR FLOOR W/7-16d NAILS. NAIL THE SECOND PIECE TO FIRST PIECE W/7-16d NAILS.
- ⑥ SIDE BLOCKING, 2" X 4" X 8'-0" (2438MM) (DOUBLED) (2 REQD). INSTALL TO CONTACT THE CENTER GATES AND THE SKIDS OF THE PALLET UNITS. SIDE BLOCKING MAY BE INSTALLED USING TWO SHORTER DOUBLED PIECES THAT EQUAL THE TOTAL LENGTH REQUIRED. NAIL THE FIRST PIECE TO THE FREIGHT CAR FLOOR W/7-16d NAILS. NAIL THE SECOND PIECE TO FIRST PIECE W/7-16d NAILS.
- ⑦ FILLER ASSEMBLY (AS REQD). NO MORE THAN TWO PER FREIGHT CAR LOAD. SEE DETAIL ON PAGE 17 AND SPECIAL NOTE 2 ON PAGE 11.
- ⑧ VERTICAL STRUT BRACING, 2" X 4" X 43" (1092MM) (6 REQD). NAIL TO THE STRUTS W/2-10d NAILS AT EACH JOINT.
- ⑨ HORIZONTAL STRUT BRACING, 2" X 4" X 7'-1" (2159MM) (2 REQD). NAIL TO THE STRUTS W/2-10d NAILS AT EACH JOINT.
- ⑩ WEB STRAP ASSEMBLY (20 REQD). POSITION AS SHOWN, EXTENDING FROM STRAP ATTACHMENT ON ONE SIDE OF THE FREIGHT CAR, OVER THE PALLET UNITS, TO APPROPRIATE ATTACHMENT ON OPPOSITE SIDE.

**SPECIAL NOTES:**

1. AN 89 LARGE PALLET UNIT LOAD IS SHOWN IN A HYUNDAI FREIGHT CAR EQUIPPED WITH 16'-0" WIDE DOOR OPENINGS.
2. A MAXIMUM OF TWO FILLER ASSEMBLIES CAN BE USED FOR A FREIGHT CAR LOAD. FILLER ASSEMBLIES MUST NOT BE INSTALLED IMMEDIATELY ADJACENT TO A CENTER GATE. FILLER ASSEMBLIES ALSO MUST NOT BE USED TO REPLACE THE OUTERMOST PALLET UNITS IN A ROW. SEE GENERAL NOTE 'O' ON PAGE 2.
3. THE LOAD SHOWN ON PAGE 10 DEPICTS THE LARGE PALLET UNIT. THIS LOADING PATTERN MAY ALSO BE APPLIED TO THE SMALL PALLET UNIT BY MODIFYING THE CONFIGURATION SHOWN ON PAGE 8 TO ADD FILLER ASSEMBLIES AND/OR TO DELETE ROWS.
4. FOR SHIPMENT OF A LOAD WHICH CONTAINS FEWER PALLET UNITS THAN WHAT IS SHOWN, SEE THE PROCEDURES CONTAINED ON PAGE 12.



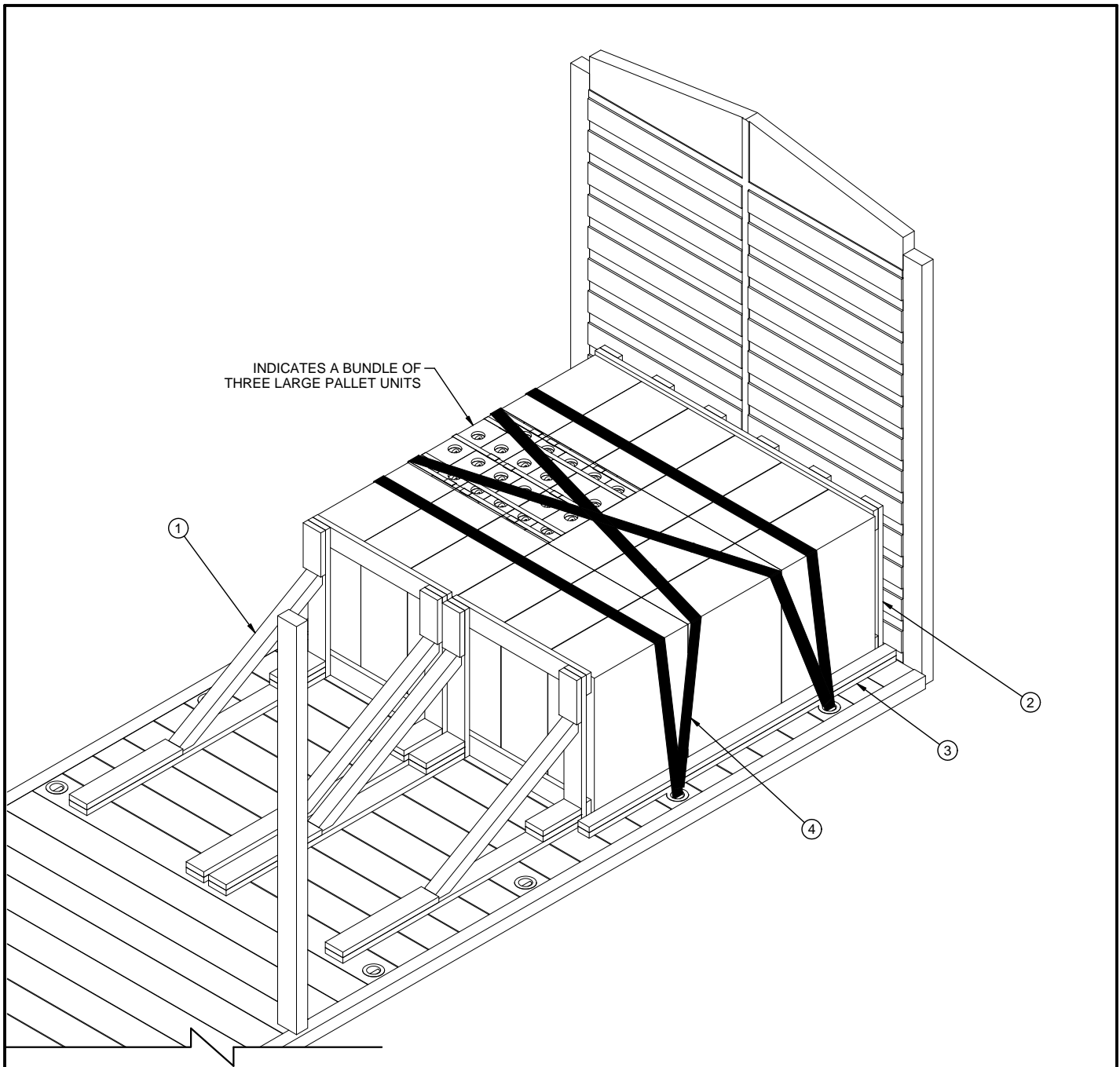
**FILLER ASSEMBLY**

**NOTE:** THE ASSEMBLY DETAILED ABOVE IS FOR USE IN PLACE OF ANY OMITTED PALLET UNIT.

BILL OF MATERIAL			
LUMBER	LINEAR FEET	METERS	BOARD FEET
2" X 4"	246	75	164
2" X 6"	207	63	207
4" X 4"	127	38-3/4	169
NAI LS	NO.	REQD	POUNDS
10d (3")	360		5-1/2
16d (3-1/2")	180		2-1/2
WEB STRAP ASSEMBLY, 3"		20 REQD	207 LBS

**LOAD AS SHOWN**

ITEM	QUANTITY	WEIGHT (APPROX)
155MM SLP PALLET	89	79,210 LBS (35,929 KG)
DUNNAGE		1,415 LBS (642 KG)
<b>TOTAL WEIGHT</b>		<b>80,625 LBS (36,571 KG)</b>



INDICATES A BUNDLE OF  
THREE LARGE PALLET UNITS

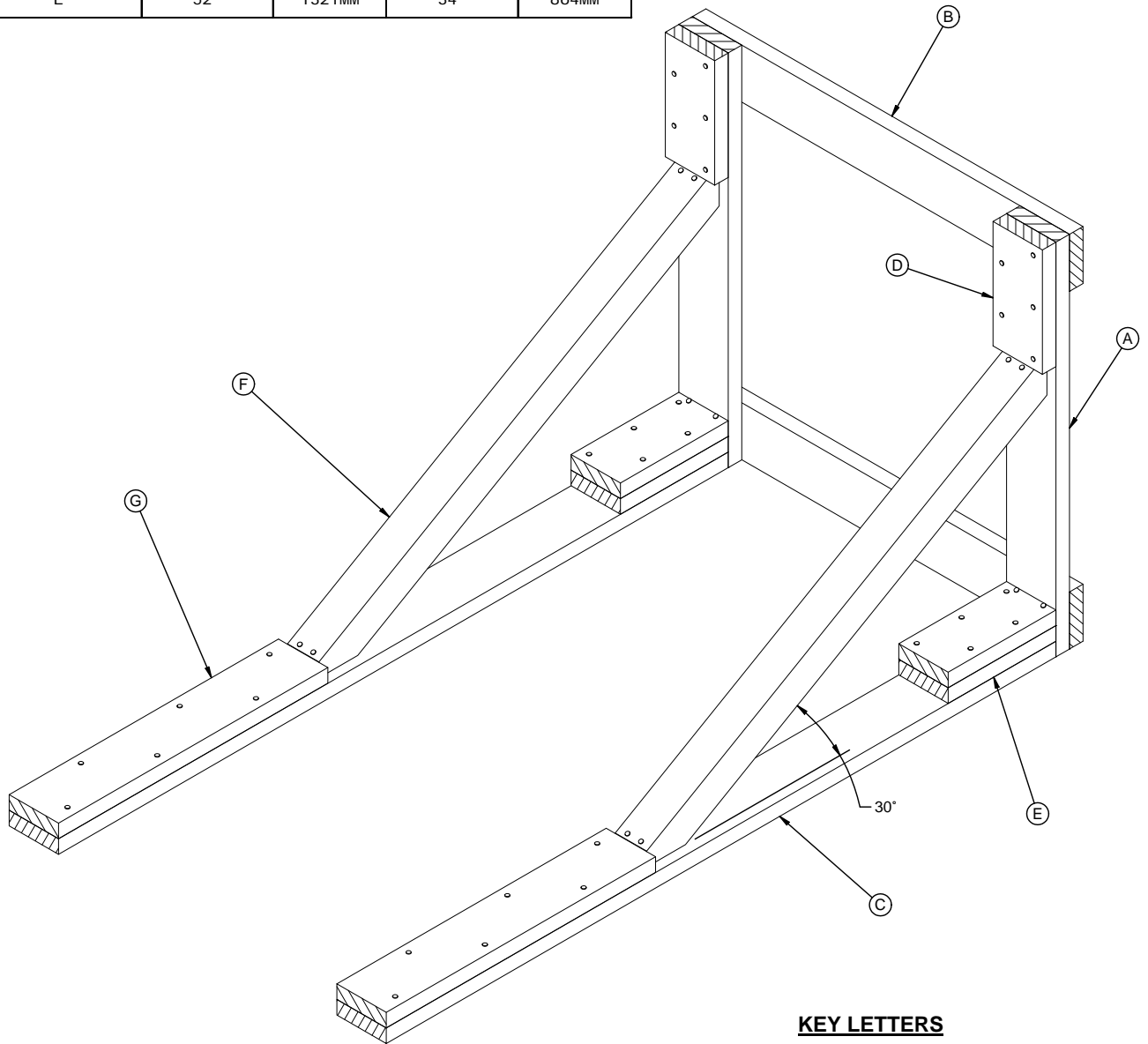
**SPECIAL NOTES:**

1. AN 18 LARGE PALLET UNIT LOAD IS SHOWN IN A HYUNDAI FREIGHT CAR HAVING A NAILABLE WOOD FLOOR.
2. THE LOAD SHOWN DEPICTING THE KNEE BRACE METHOD OF SINGLE LAYER BRACING IS TYPICAL. EACH SET OF NINE PALLET UNITS REQUIRES ONE KNEE BRACE ASSEMBLY AT ONE END OF THE PALLET UNITS AND AN ENDWALL ASSEMBLY AT THE OTHER END.
3. ONE KNEE BRACE ASSEMBLY IS ADEQUATE FOR RETAINING A MAXIMUM LCL LOAD OF NOT MORE THAN 8,500 POUNDS (3,855.5 KG).

**KEY NUMBERS**

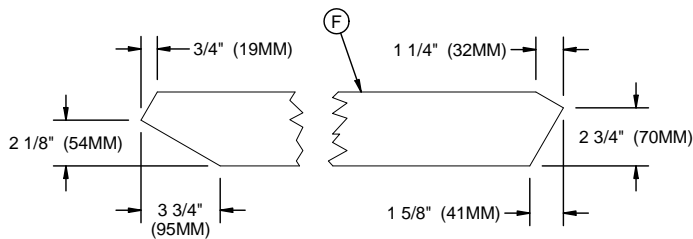
- ① ENDWALL ASSEMBLY A (1 REQD). SEE DETAIL ON PAGE 15.
- ② SIDE BLOCKING, 2" X 4" X 8'-0" (2438MM) (DOUBLED) (2 REQD), INSTALL TO CONTACT THE KNEE BRACE ASSEMBLY, ENDWALL ASSEMBLY, AND THE SKIDS OF THE PALLET UNITS. NAIL THE FIRST PIECE TO THE FREIGHT CAR FLOOR W/7-16d NAILS. NAIL THE SECOND PIECE TO FIRST PIECE W/7-16d NAILS.
- ③ KNEE BRACE ASSEMBLY (2 REQD). SEE DETAIL ON PAGE 13.
- ④ WEB STRAP ASSEMBLY (4 REQD). POSITION AS SHOWN, EXTENDING FROM STRAP ATTACHMENT ON ONE SIDE OF THE FREIGHT CAR, OVER THE PALLET UNITS, TO APPROPRIATE ATTACHMENT ON OPPOSITE SIDE.

KNEE BRACE DIMENSIONS				
DIMENSION	LARGE PALLET UNIT		SMALL PALLET UNIT	
	H	40"	1016MM	31"
J	42"	1067MM	39-1/2"	1003MM
K	6' -2 5/8"	1895MM	59"	1499MM
L	52"	1321MM	34"	864MM



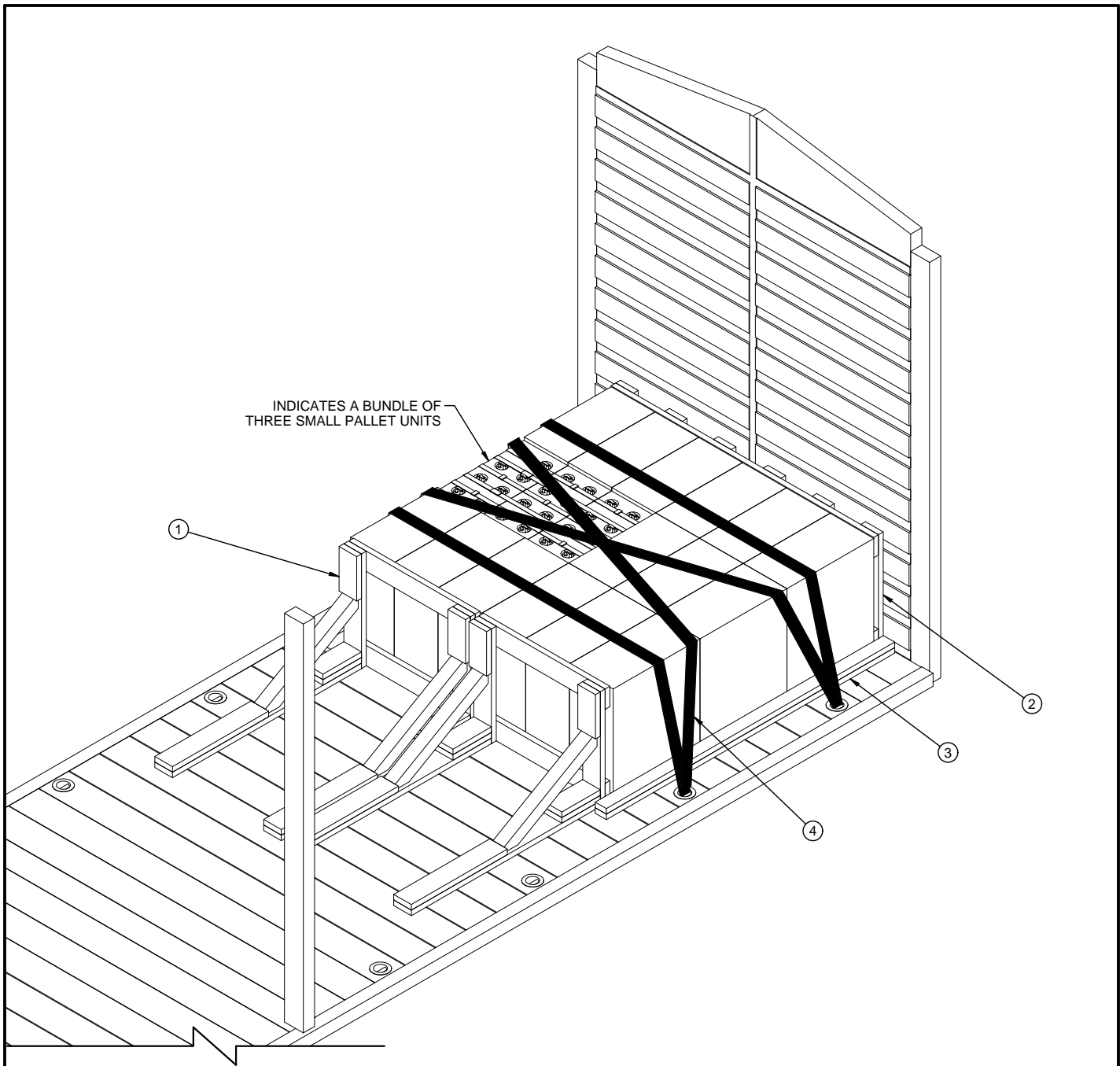
**KEY LETTERS**

- (A) VERTICAL PIECE, 2" X 6" X DIMENSION H (2 REQD). NAIL TO A FLOOR CLEAT W/3-16d NAILS.
- (B) HORIZONTAL PIECE, 2" X 6" X DIMENSION J (2 REQD). NAIL TO THE VERTICAL PIECES W/3-10d NAILS AT EACH JOINT.
- (C) FLOOR CLEAT, 2" X 6" X DIMENSION K (2 REQD). NAIL TO THE CAR FLOOR W/1-16d NAIL EVERY 8".
- (D) HOLD-DOWN CLEAT, 2" X 6" X 12" (305MM) (2 REQD). NAIL TO A VERTICAL PIECE W/5-10d NAILS.
- (E) POCKET CLEAT, 2" X 6" X 12" (305MM) (DOUBLED) (2 REQD). NAIL THE FIRST PIECE TO THE FLOOR CLEAT W/5-16d NAILS. NAIL THE SECOND PIECE IN A LIKE MANNER AND TOENAIL THE SECOND PIECE TO THE VERTICAL PIECE W/2-16d NAILS.
- (F) BRACE, 4" X 4" X DIMENSION L (2 REQD). SEE THE DETAIL AT LEFT FOR BEVEL-CUTS REQUIRED. TOENAIL TO THE VERTICAL PIECE AND TO THE FLOOR CLEAT W/2-16d NAIL.
- (G) BACK-UP CLEAT, 2" X 6" X 30" (762MM) (2 REQD). NAIL TO THE FLOOR CLEAT W/6-40d NAILS.



**BRACE**

**TYPICAL LCL USING KNEE BRACES**



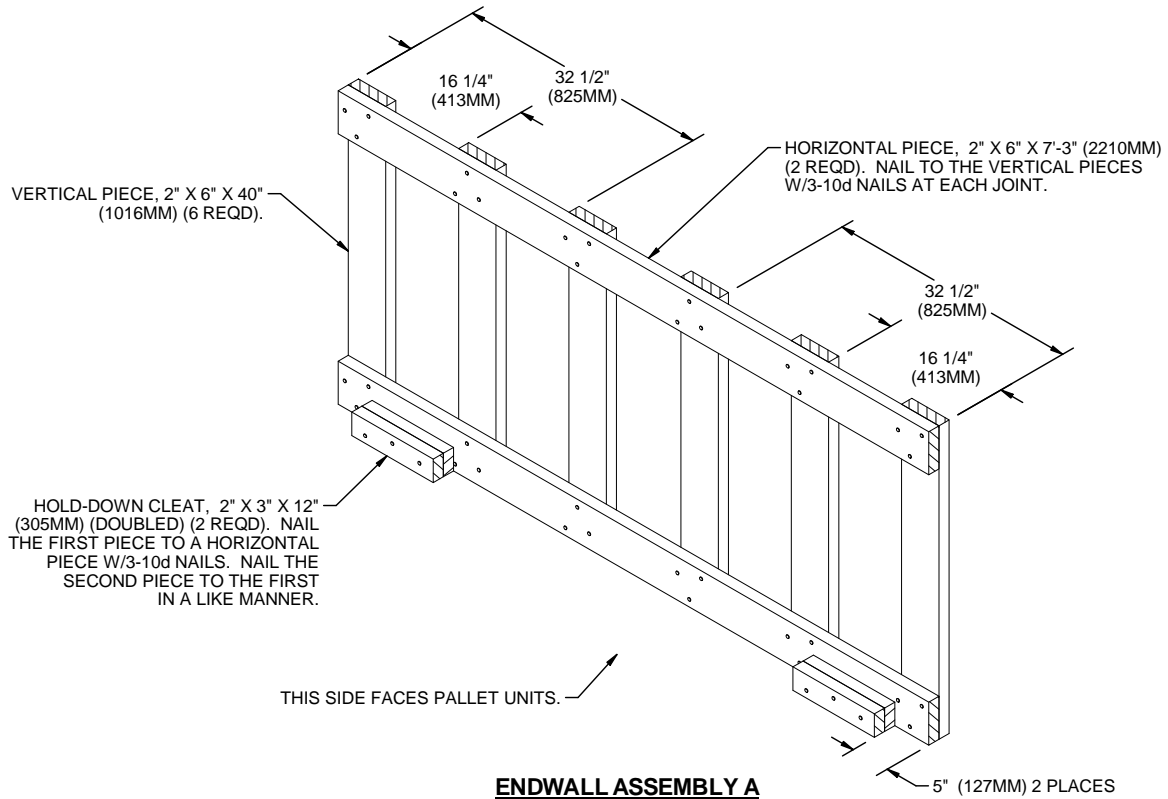
INDICATES A BUNDLE OF  
THREE SMALL PALLET UNITS

**SPECIAL NOTES:**

1. AN 18 SMALL PALLET UNIT LOAD IS SHOWN IN A HYUNDAI FREIGHT CAR HAVING A NAILABLE WOOD FLOOR.
2. THE LOAD SHOWN DEPICTING THE KNEE BRACE METHOD OF SINGLE LAYER BRACING IS TYPICAL. EACH SET OF NINE PALLET UNITS REQUIRES ONE KNEE BRACE ASSEMBLY AT ONE END OF THE PALLET UNITS AND AN ENDWALL ASSEMBLY AT THE OTHER END.
3. ONE KNEE BRACE ASSEMBLY IS ADEQUATE FOR RETAINING A MAXIMUM LCL LOAD OF NOT MORE THAN 8,500 POUNDS (3,855.5 KG).

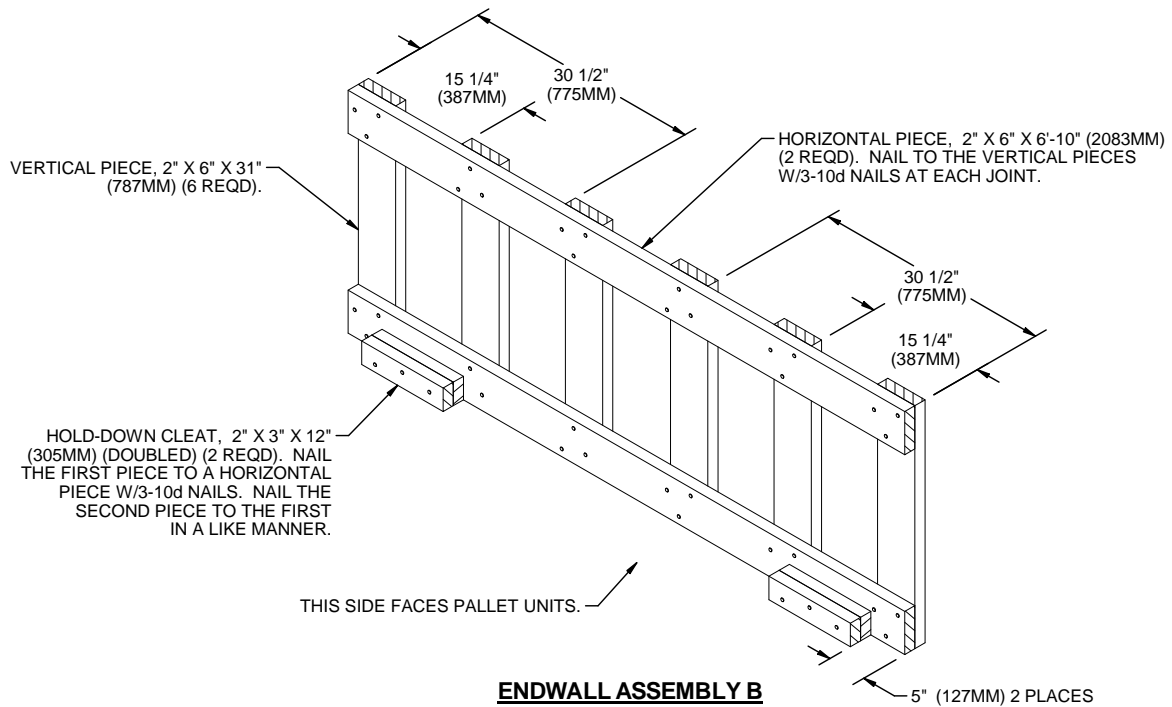
**KEY NUMBERS**

- ① ENDWALL ASSEMBLY B (1 REQD). SEE DETAIL ON PAGE 15.
- ② SIDE BLOCKING, 2" X 4" X 7'-6" (2286MM) (DOUBLED) (2 REQD). INSTALL TO CONTACT THE KNEE BRACE ASSEMBLY, ENDWALL ASSEMBLY, AND THE SKIDS OF THE PALLET UNITS. NAIL THE FIRST PIECE TO THE FREIGHT CAR FLOOR W/7-16d NAILS. NAIL THE SECOND PIECE TO FIRST PIECE W/7-16d NAILS.
- ③ KNEE BRACE ASSEMBLY (2 REQD). SEE DETAIL ON PAGE 13.
- ④ WEB STRAP ASSEMBLY (4 REQD). POSITION AS SHOWN, EXTENDING FROM STRAP ATTACHMENT ON ONE SIDE OF THE FREIGHT CAR, OVER THE PALLET UNITS, TO APPROPRIATE ATTACHMENT ON OPPOSITE SIDE.



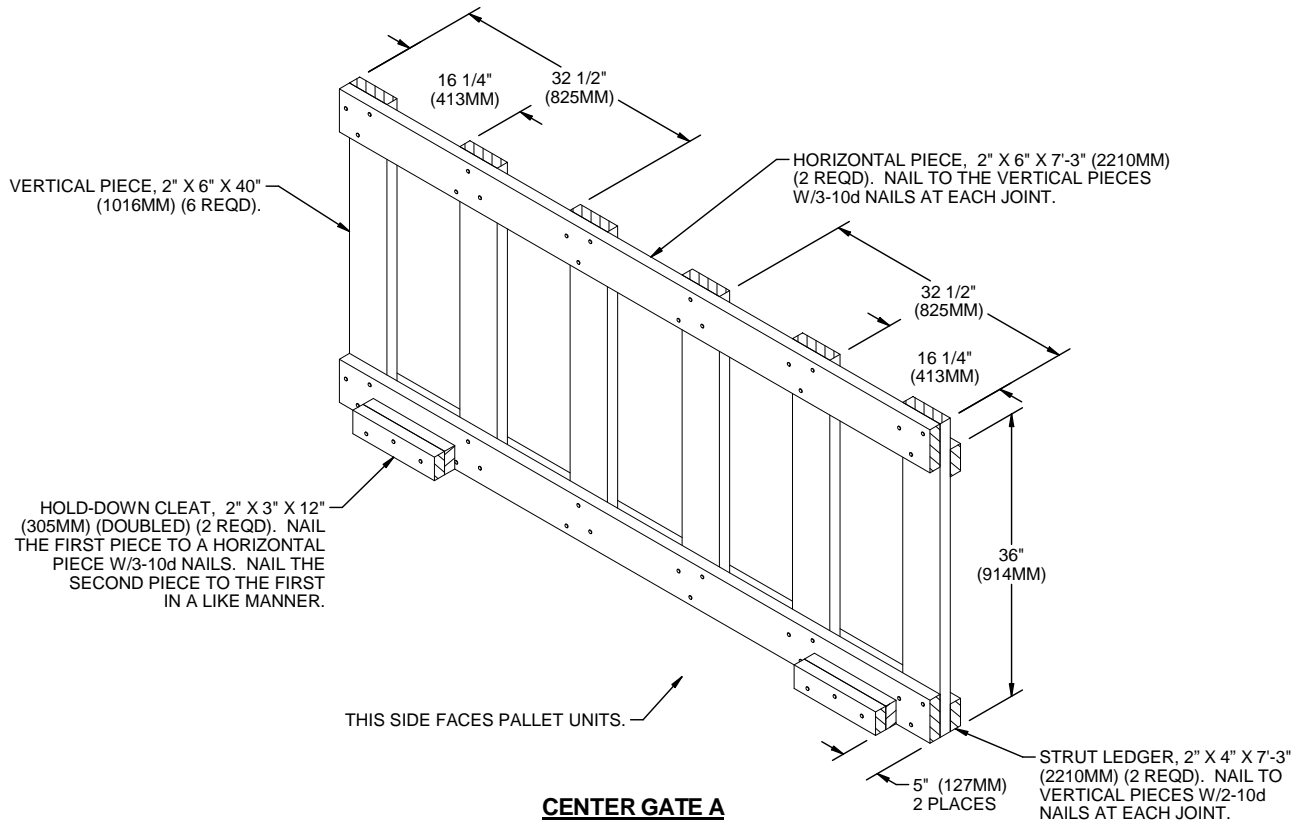
**ENDWALL ASSEMBLY A**

**NOTE:** THE ASSEMBLY DETAILED ABOVE IS FOR USE IN LOADS OF LARGE PALLET UNITS.

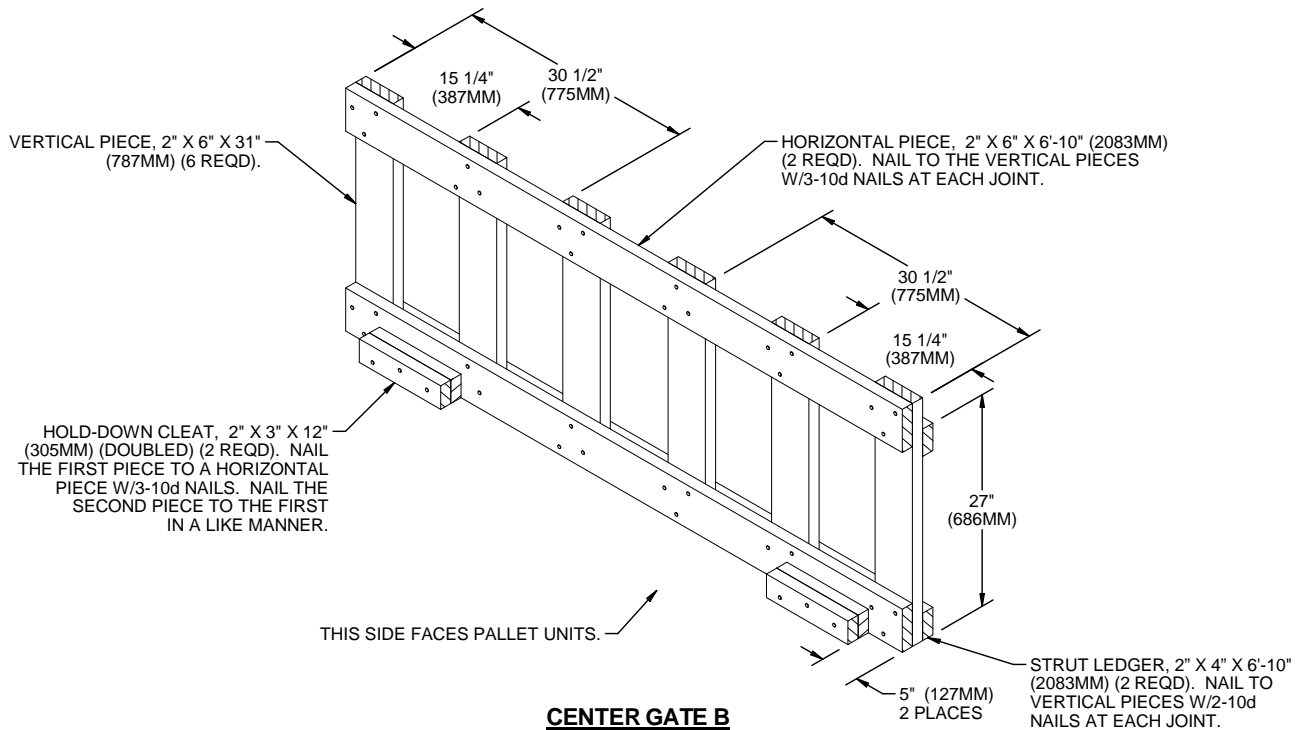


**ENDWALL ASSEMBLY B**

**NOTE:** THE ASSEMBLY DETAILED ABOVE IS FOR USE IN LOADS OF SMALL PALLET UNITS.



**NOTE:** THE ASSEMBLY DETAILED ABOVE IS FOR USE IN LOADS OF LARGE PALLET UNITS.



**NOTE:** THE ASSEMBLY DETAILED ABOVE IS FOR USE IN LOADS OF SMALL PALLET UNITS.