

# LOADING AND BRACING (CL & LCL) IN HYUNDAI FREIGHT CAR<sup>⊕</sup> OF PALLETIZED BOXED AMMUNITION

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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

APPROVED, U.S. ARMY JOINT MUNITIONS COMMAND	<b>CAUTION:</b> VERIFY PRIOR TO USE AT <a href="https://mhp.redstone.army.mil">HTTPS://MHP.REDSTONE.ARMY.MIL</a> THAT THIS IS THE MOST CURRENT VERSION OF THIS DOCUMENT. THIS IS PAGE 1 OF 14.			
	DO NOT SCALE		<b>FEBRUARY 2017</b>	
	ENGINEER OR TECHNICIAN	BASIC REV.	MADELINE BANKS	
APPROVED BY ORDER OF COMMANDING GENERAL, U.S. ARMY MATERIEL COMMAND	ENGINEERING DIVISION			
	TEST ENGINEER		CLASS	DIVISION
	TEST REPORT	NA		DRAWING
U.S. ARMY DEFENSE AMMUNITION CENTER	EXPLOSIVE SAFETY DIRECTORATE		19	48
			4369	5PA1007

## GENERAL NOTES

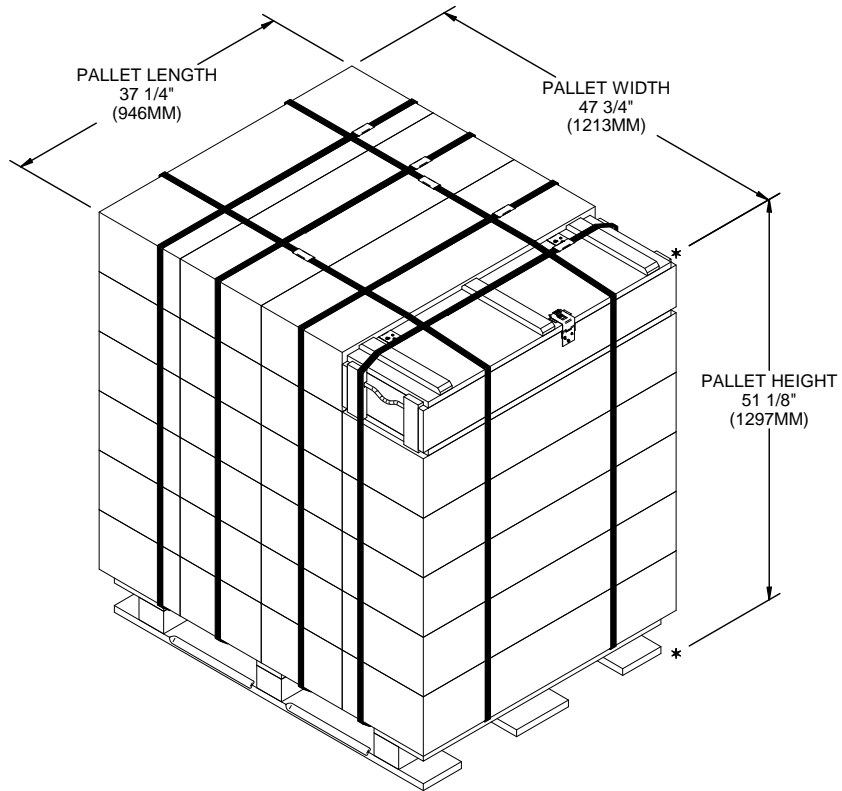
## (GENERAL NOTES CONTINUED)

- 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 BOXED AMMUNITION. SUBSEQUENT REFERENCE TO PALLET UNIT HEREIN MEANS THE PALLET UNIT WITH AMMUNITION ITEMS. SEE PAGES 3 AND 4 FOR SPECIFIC DETAILS OF THE PALLET UNITS, AND AMC DRAWING 19-48-4116-20PA1002 AND ASSOCIATED APPENDICES FOR ADDITIONAL PALLET UNIT INFORMATION. **CAUTION:** PALLET UNITS WILL ONLY BE LOADED ONE HIGH, DO NOT STACK PALLET UNITS.
- C. THE DEPICTED PROCEDURES ARE APPLICABLE FOR UNITS ASSEMBLED ON 40" (1016MM) X 48" (1219MM), 35" (889MM) X 45-1/2" (1156MM), OR 42" (1067MM) X 53" (1346MM) 4-WAY ENTRY PALLETS. REFER TO THE APPLICABLE AMC 19-48 SERIES DRAWINGS FOR UNITIZATION PROCEDURES FOR BOXED AMMUNITION AND COMPONENTS ON 4-WAY ENTRY PALLETS.
- D. THE SELECTION OF FREIGHT CARS FOR THE TRANSPORT OF PALLET UNITS OF AMMUNITION 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" (14808 MM) LONG BY 8'-9" (2667 MM) WIDE BY 10'-2" (3099 MM) 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 (1362 KG). THE CARS DEPICTED HAVE A NOMINAL CAPACITY OF 109 METRIC TONS (210,304 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, AN END-OF-CAR BULKHEAD MUST BE INSTALLED 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 BOXED AMMUNITION 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.
- 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" 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" (6MM) TO 3/8" (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 TOENAILDED 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 AND THE "STRUT INSTALLATION" DETAIL ON PAGE 4 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 BLOCKING POSITION.
- K. LOAD-BLOCKING STRUTS WHICH ARE 48" (1219MM) OR LONGER MUST BE STIFFENED BY THE APPLICATION OF HORIZONTAL AND VERTICAL STRUT BRACING AS TYPICALLY SHOWN BY PIECES MARKED ⑤ AND ⑥ ON PAGE 8. BRACING IS NOT REQUIRED IF THE STRUTS FOR THE LOAD BEING SHIPPED ARE SHORTER THAN 48" (1219MM). THE LENGTH OF THE LOAD-BLOCKING STRUTS SHOULD BE KEPT AS SHORT AS POSSIBLE (APPROX 18" (457MM) MINIMUM), BUT IN THE EVENT IT IS NECESSARY TO USE STRUTS WHICH ARE 8'-0" (2438MM) OR MORE IN LENGTH, IT WILL BE NECESSARY TO APPLY AN ADDITIONAL SET OF HORIZONTAL AND VERTICAL STRUT BRACING PIECES. STRUT BRACING SHOULD BE APPLIED SO AS TO PROVIDE NEARLY EQUAL SPACES BETWEEN THE BRACING PIECES AND THE CENTER GATES AND/OR BETWEEN ADJACENT STRUT BRACING PIECES.
- 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 3.
- M. THE "NAIL SIZE CONVERSION" CHART SHOWN ON PAGE 3 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 OR SIDEWALL 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. EACH ROW OF PALLET UNITS MUST BE RESTRAINED BY AT LEAST TWO WEB STRAPS, PREFERABLY DIRECTLY ACROSS THE PALLET UNIT ROW. IF TWO WEB STRAPS CANNOT BE APPLIED DIRECTLY ACROSS THE ROW, THEN THE TWO STRAPS MUST BE APPLIED DIAGONALLY ACROSS THE ROW.
- O. 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.
- P. 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.
- Q. 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.
- R. **CAUTION:** WHEN POWER OR PNEUMATIC NAILERS ARE BEING USED IN THE APPLICATION OF NAILED FLOORLINE BLOCKING OR BRACING, PALLET UNITS 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.
- S. CONVERSION TO METRIC EQUIVALENTS: DIMENSIONS WITHIN THIS DOCUMENT ARE EXPRESSED IN INCHES AND WEIGHTS ARE EXPRESSED IN POUND. WHEN NECESSARY, THE METRIC EQUIVALENTS MAY BE COMPUTED ON THE BASIS OF ONE INCH EQUALS 25.4MM AND ONE POUND EQUALS 0.454 KG.

## MATERIAL SPECIFICATIONS

<b>LUMBER</b>	- - - - -	SEE TM 743-200-1 (DUNNAGE LUMBER) AND VOLUNTARY PRODUCT STANDARD PS 20.
<b>NAILS</b>	- - - - -	ASTM F1667; COMMON STEEL NAIL (NLCMS OR NLCMMS).
<b>PLYWOOD</b>	- - - - -	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.
<b>STAPLE, STRAP</b>	- - -	COMMERCIAL GRADE.
<b>WIRE, CARBON STEEL</b>	- -	ASTM A853; ANNEALED AT FINISH, BLACK OXIDE FINISH, 0.0800" (2MM) DIA, GRADE 1006 OR BETTER.

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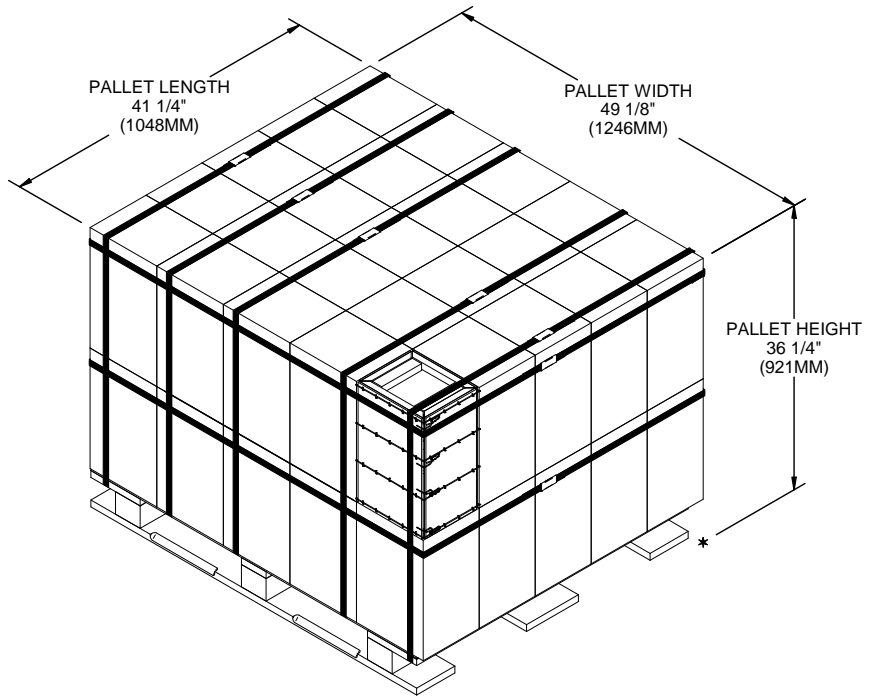


**PALLET UNIT NO. 1**

GROSS WEIGHT - - - - - 2,957 LB (1,341 KG)  
 CUBE - - - - - 35.3 CU FT (1.49 CU M)

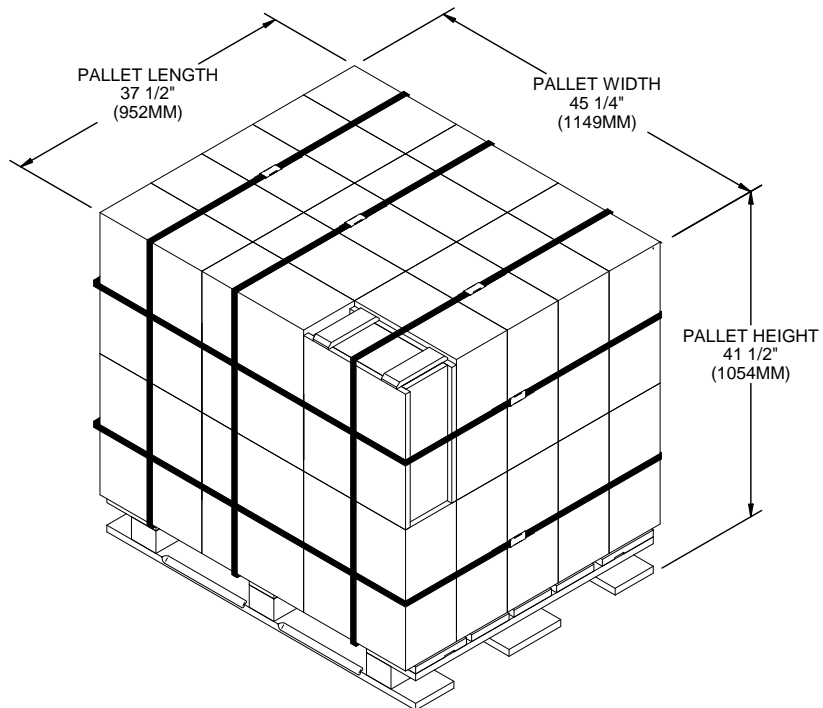
NAIL SIZE CONVERSION				
SIZE	LENGTH		DIAMETER	
	U. S.	METRIC	U. S.	METRIC
6d	2"	51MM	.113"	3MM
8d	2-1/2"	64MM	.131"	3MM
10d	3"	76MM	.148"	4MM
12d	3-1/4"	83MM	.148"	4MM
16d	3-1/2"	89MM	.162"	4MM
20d	4"	102MM	.192"	5MM
30d	4-1/2"	114MM	.207"	5MM
40d	5"	127MM	.226"	6MM
50d	5-1/2"	140MM	.244"	6MM
60d	6"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

LUMBER SIZE CONVERSION	
U. S. SIZE	METRIC SIZE
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



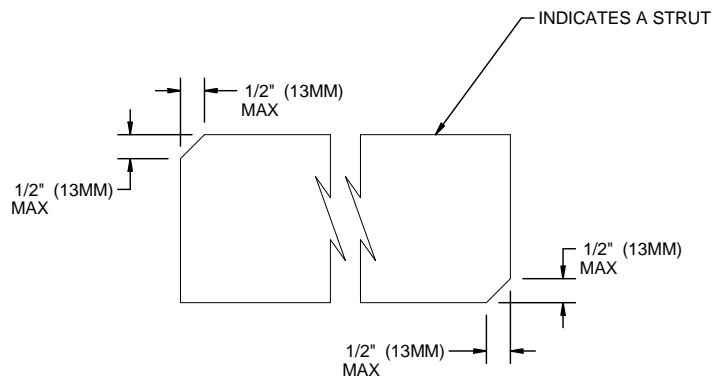
**PALLET UNIT NO. 2**

GROSS WEIGHT - - - - - 2,037 LB (924 KG)  
 CUBE - - - - - 42.4 CU FT (1.20 CU M)



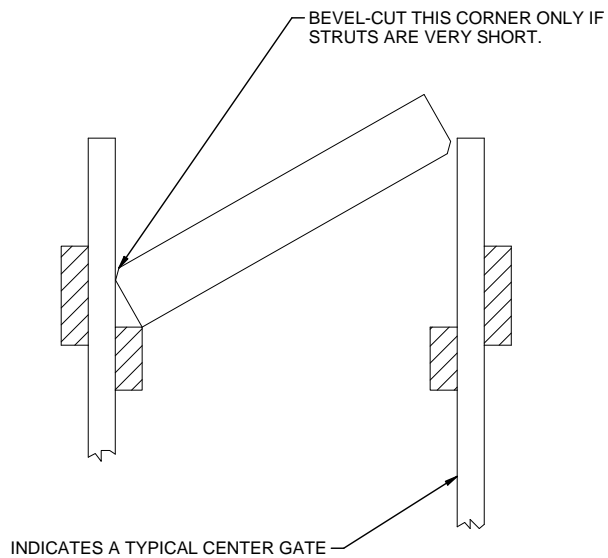
**PALLET UNIT NO. 3**

GROSS WEIGHT - - - - - 1,538 LB (698 KG)  
 CUBE - - - - - 40.9 CU FT (1.16 CU M)



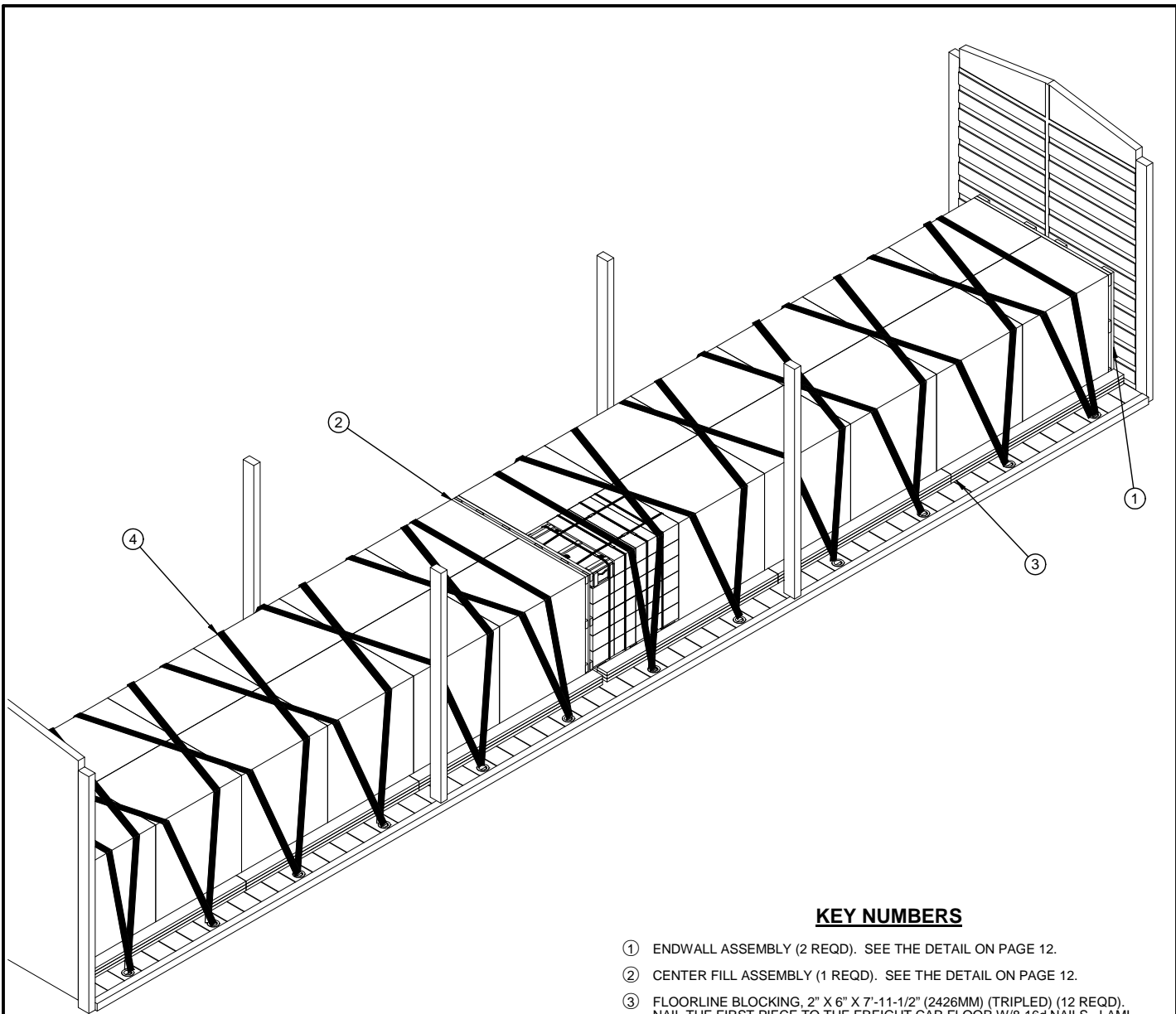
**BEVEL CUT**

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**

**CAUTION:** LADING WIDTH OF PALLET UNITS MUST BE 6'-11" (2108MM) OR LESS.

**KEY NUMBERS**

- ① ENDWALL ASSEMBLY (2 REQD). SEE THE DETAIL ON PAGE 12.
- ② CENTER FILL ASSEMBLY (1 REQD). SEE THE DETAIL ON PAGE 12.
- ③ FLOORLINE BLOCKING, 2" X 6" X 7'-11-1/2" (2426MM) (TRIPLED) (12 REQD). NAIL THE FIRST PIECE TO THE FREIGHT CAR FLOOR W/8-16d NAILS. LAMINATE THE SECOND AND THIRD PIECES TO THE PREVIOUS PIECE W/8-16d NAILS.
- ④ WEB STRAP ASSEMBLY (24 REQD). POSITION AS SHOWN, EXTENDING FROM STRAP ATTACHMENT ON ONE SIDE OF THE FREIGHT CAR, OVER THE PALLET UNITS TO THE APPROPRIATE ATTACHMENT ON THE OPPOSITE SIDE.

**SPECIAL NOTES:**

1. A 24 UNIT LOAD IS SHOWN IN A HYUNDAI FREIGHT CAR EQUIPPED WITH 16'-0" WIDE DOOR OPENINGS.
2. THE LOAD SHOWN ON PAGE 6 IS BASED ON PALLET UNIT NO. 1 DEPICTED ON PAGE 3. THE LOADING CONFIGURATION CAN ALSO BE USED WITH PALLET UNITS NO. 2 OR 3, OR WITH OTHER PALLET UNITS NOT SHOWN. MINOR MODIFICATIONS TO THE DUNNAGE AND STRAPPING MAY BE REQUIRED.
3. FOR SHIPMENT OF A LOAD WHICH CONTAINS FEWER PALLET UNITS THAN WHAT IS SHOWN, SEE THE PROCEDURES CONTAINED ON PAGES 8 AND 10.

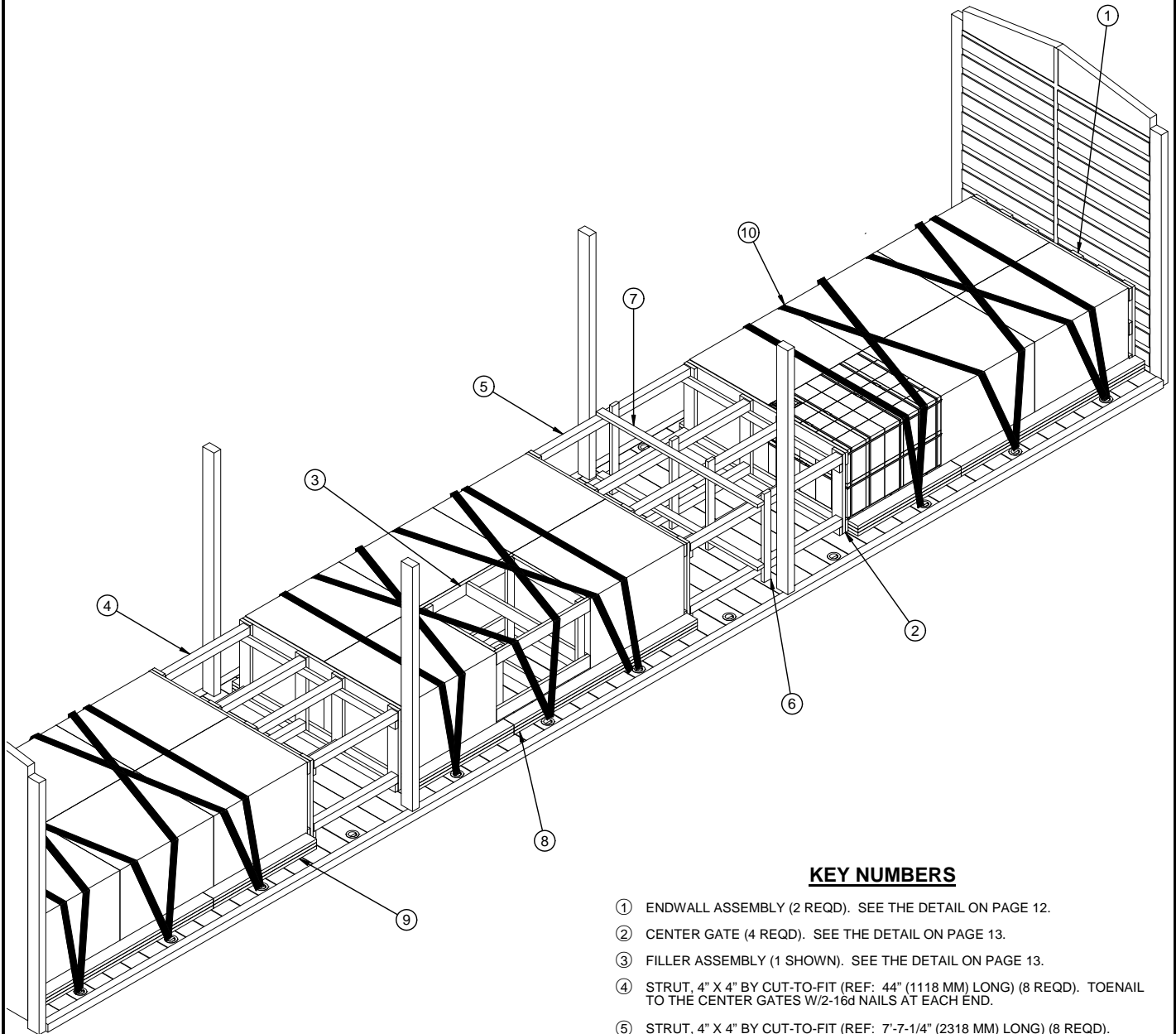
**BILL OF MATERIAL**

LUMBER	LINEAR FEET	METERS	BOARD FEET	
2" X 3"	12	3-3/4	6	
2" X 4"	63	19-1/4	42	
2" X 6"	364	111	364	
NAI LS	NO.	REQD	POUNDS	KG
10d (3")	132		2-1/4	1-1/4
16d (3-1/2")	300		5	2-1/4
WEB STRAP ASSEMBLY - - 24 REQD - - - - 250 LBS				

**LOAD AS SHOWN**

ITEM	QUANTITY	WEIGHT (APPROX)
PALLET UNIT NO. 1 - - 24 - - - -		70,896 LBS (32,158 KG)
DUNNAGE - - - - -		1,082 LBS (491 KG)
TOTAL WEIGHT - - - - -		71,978 LBS (32,648 KG)

**24 PALLET UNITS IN A HYUNDAI FREIGHT CAR**



**ISOMETRIC VIEW**

**CAUTION:** LADING WIDTH OF PALLET UNITS MUST BE 6'-11" (2108MM) OR LESS.

**KEY NUMBERS**

- ① ENDWALL ASSEMBLY (2 REQD). SEE THE DETAIL ON PAGE 12.
- ② CENTER GATE (4 REQD). SEE THE DETAIL ON PAGE 13.
- ③ FILLER ASSEMBLY (1 SHOWN). SEE THE DETAIL ON PAGE 13.
- ④ STRUT, 4" X 4" BY CUT-TO-FIT (REF: 44" (1118 MM) LONG) (8 REQD). TOENAIL TO THE CENTER GATES W/2-16d NAILS AT EACH END.
- ⑤ STRUT, 4" X 4" BY CUT-TO-FIT (REF: 7'-7-1/4" (2318 MM) LONG) (8 REQD). TOENAIL TO THE CENTER GATES W/2-16d NAILS AT EACH END.
- ⑥ VERTICAL STRUT BRACING, 2" X 4" X 57" (1448 MM) (4 REQD). NAIL TO THE STRUTS W/3-10d NAILS AT EACH JOINT.
- ⑦ HORIZONTAL STRUT BRACING, 2" X 4" X 6'-4" (1931 MM) (2 REQD). NAIL TO THE STRUTS W/3-10d NAILS AT EACH JOINT.
- ⑧ FLOORLINE BLOCKING, 2" X 6" X 7'-11-1/2" (2426 MM) (TRIPLED) (6 REQD). NAIL THE FIRST PIECE TO THE FREIGHT CAR FLOOR W/8-16d NAILS. LAMINATE THE SECOND AND THIRD PIECES TO THE PREVIOUS PIECE W/8-16d NAILS.
- ⑨ FLOORLINE BLOCKING, 2" X 6" X 48" (1219 MM) (TRIPLED) (6 REQD). NAIL THE FIRST PIECE TO THE FREIGHT CAR FLOOR W/4-16d NAILS. LAMINATE THE SECOND AND THIRD PIECES TO THE PREVIOUS PIECE W/4-16d NAILS.
- ⑩ WEB STRAP ASSEMBLY (18 REQD). POSITION AS SHOWN, EXTENDING FROM STRAP ATTACHMENT ON ONE SIDE OF THE FREIGHT CAR, OVER THE PALLET UNITS TO THE APPROPRIATE ATTACHMENT ON THE OPPOSITE SIDE.



**SPECIAL NOTES:**

1. A 17 UNIT LOAD IS SHOWN IN A HYUNDAI FREIGHT CAR EQUIPPED WITH 16'-0" WIDE DOOR OPENINGS.
2. THE LOAD SHOWN ON PAGE 8 IS BASED ON PALLET UNIT NO. 2, DEPICTED ON PAGE 4. THE LOADING CONFIGURATION CAN ALSO BE USED WITH PALLET UNITS NO.1 OR 3, OR WITH OTHER PALLET UNITS NOT SHOWN. MINOR MODIFICATIONS TO THE DUNNAGE AND STRAPPING MAY BE REQUIRED. THE TOTAL WEIGHT OF THE PALLET UNITS MUST NOT EXCEED 60,000 LBS (27,216 KG).
3. FOR SHIPMENT OF A LOAD WHICH CONTAINS FEWER PALLET UNITS THAN WHAT IS SHOWN, SEE THE PROCEDURES CONTAINED ON PAGES 10.

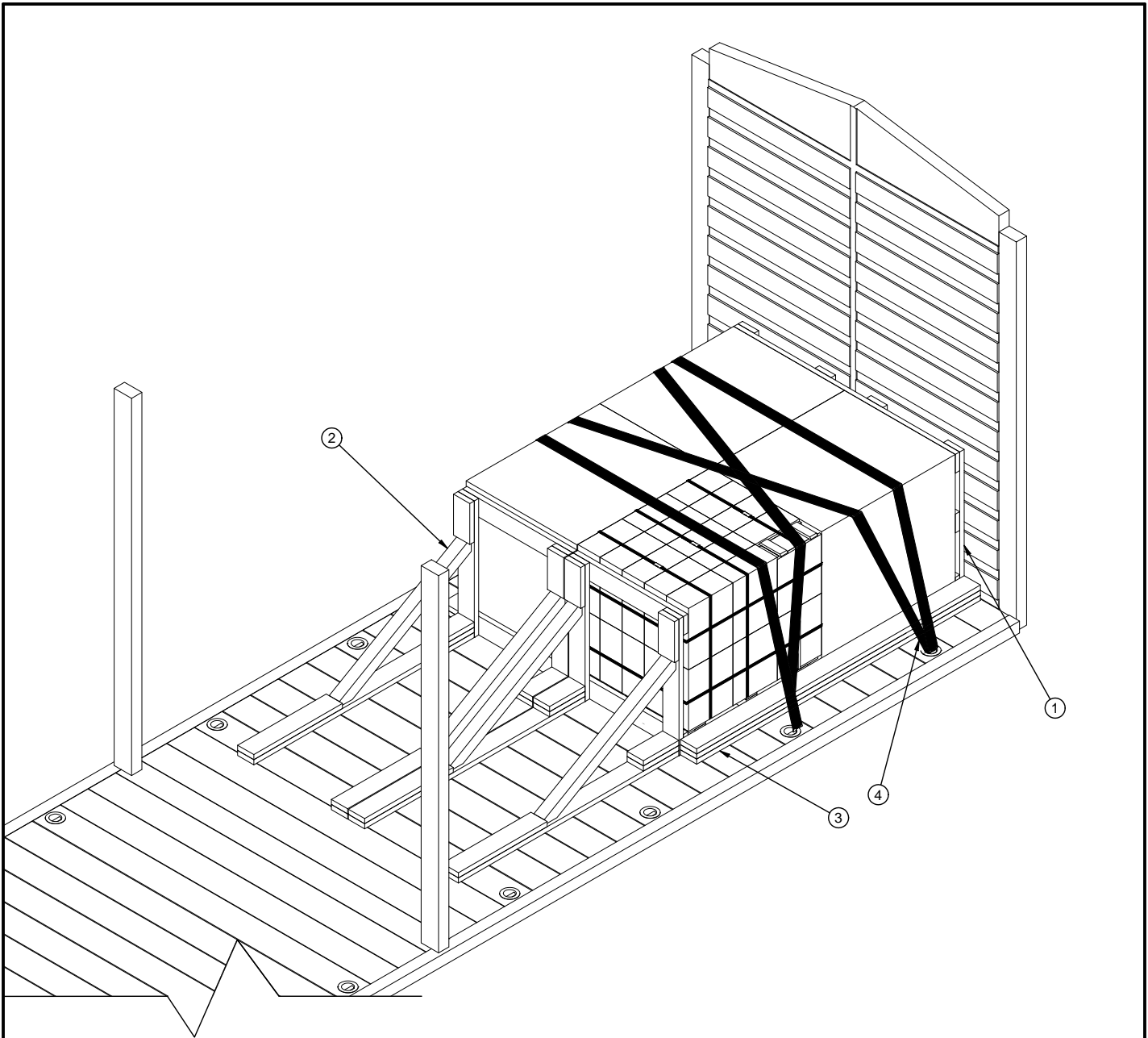
**BILL OF MATERIAL**

LUMBER	LI NEAR FEET	METERS	BOARD FEET	
2" X 3"	32	9-3/4	16	
2" X 4"	95	29	63	
2" X 6"	441	134-1/2	441	
4" X 4"	83	25-1/2	110	
NAI LS	NO. REQD	POUNDS	KG	
10d (3")	228	3-3/4	1-3/4	
12d (3-1/4")	144	2-1/2	1-1/4	
16d (3-1/2")	216	3-3/4	1-3/4	
WEB STRAP ASSEMBLY, 3" - - 18 REQD - - - - 187 LBS				

**LOAD AS SHOWN**

ITEM	QUANTITY	WEIGHT (APPROX)
PALLET NO. 2	17	34,629 LBS (15,708 KG)
DUNNAGE		1,275 LBS (579 KG)
<b>TOTAL WEIGHT</b>		<b>35,904 LBS (16,287 KG)</b>

**17 PALLET UNITS IN A HYUNDAI FREIGHT CAR**



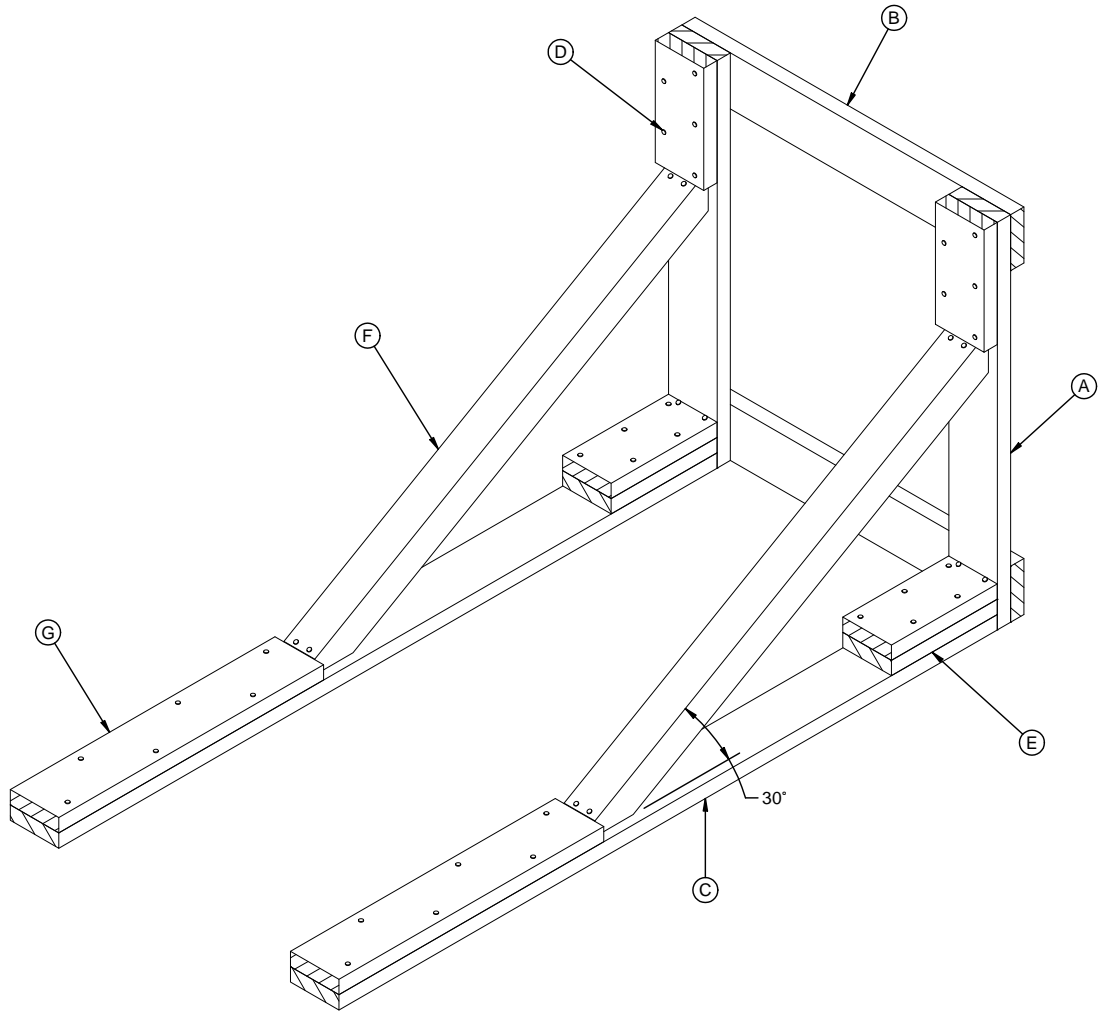
**SPECIAL NOTES:**

1. A 4 UNIT LOAD IS SHOWN IN A HYUNDAI FREIGHT CAR HAVING A NAILABLE WOOD FLOOR.
2. THE LOAD SHOWN ABOVE IS BASED ON PALLET UNIT NO. 3, DEPICTED ON PAGE 4. THE LOADING CONFIGURATION CAN ALSO BE USED WITH PALLET UNITS NO.1 AND 2, OR WITH OTHER PALLET UNITS NOT SHOWN. MINOR MODIFICATIONS TO THE DUNNAGE AND STRAPPING MAY BE REQUIRED.
3. THE LOAD SHOWN DEPICTING THE KNEE BRACE METHOD OF SINGLE LAYER BRACING IS TYPICAL. EACH SET OF TWO PALLET UNITS REQUIRES ONE KNEE BRACE ASSEMBLY AT ONE END OF THE PALLET UNITS AND AN ENDWALL ASSEMBLY AT THE OTHER END.
4. ONE KNEE BRACE ASSEMBLY IS ADEQUATE FOR RETAINING A MAXIMUM LCL LOAD OF NOT MORE THAN 8,500 POUNDS (3,856KG).

**KEY NUMBERS**

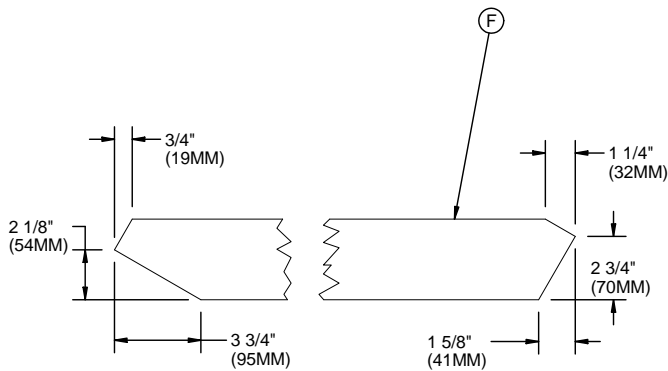
- ① ENDWALL ASSEMBLY (1 REQD). SEE THE DETAIL ON PAGE 12.
- ② KNEE BRACE ASSEMBLY (2 REQD). SEE THE DETAIL ON PAGE 11.
- ③ FLOORLINE BLOCKING, 2" X 6" X 8'-0" (2439MM) (TRIPLED) (2 REQD). NAIL THE FIRST PIECE TO THE FREIGHT CAR FLOOR W/8-16d NAILS. LAMINATE THE SECOND AND THIRD PIECES TO THE PREVIOUS PIECE W/8-16d NAILS.
- 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 THE APPROPRIATE ATTACHMENT ON THE OPPOSITE SIDE.

KNEE BRACE DIMENSIONS				
DIMENSION	PALLET HEIGHT GREATER THAN 40" (1016MM)		PALLET HEIGHT LESS THAN 40" (1016MM)	
	H	40"	1016MM	31"
J	6' -2-5/8"	1895MM	59"	1499MM
K	52"	1321MM	34"	864MM



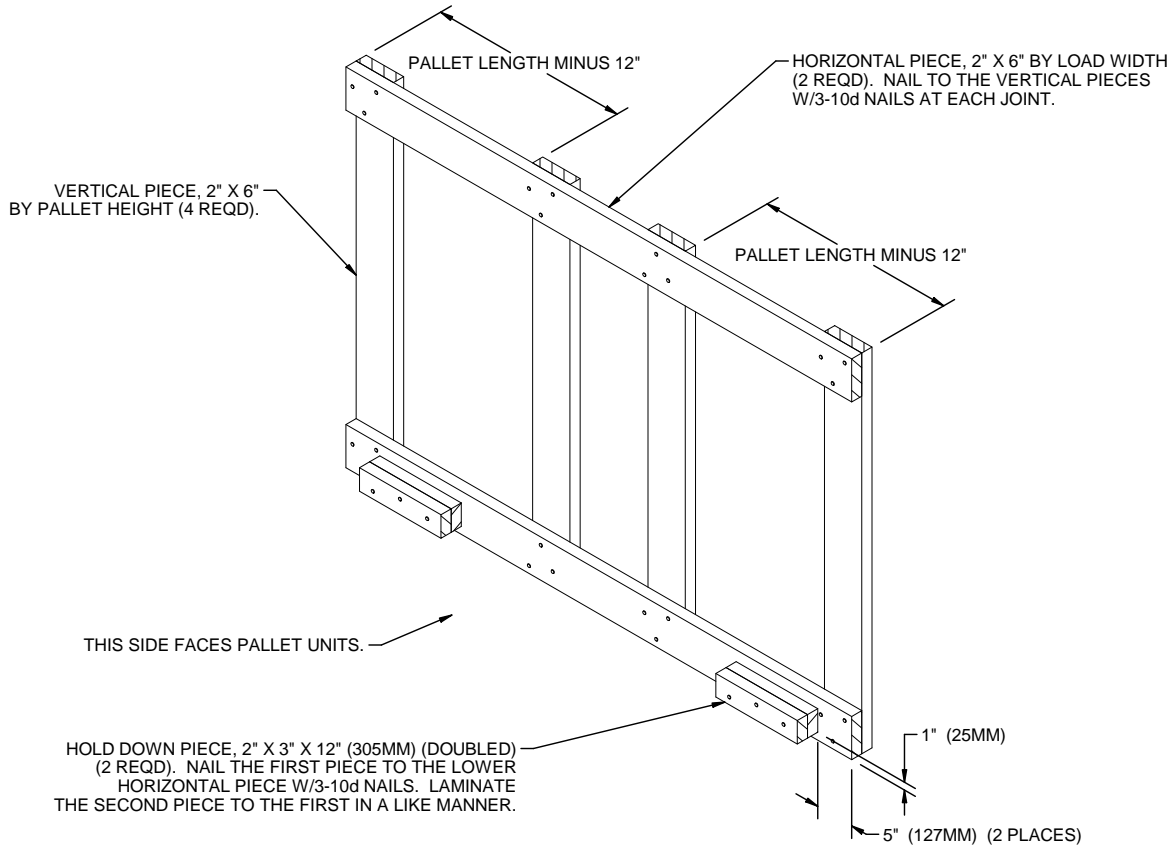
### KEY LETTERS

- (A) VERTICAL PIECE, 2" X 6" BY DIMENSION H (2 REQD). NAIL TO A FLOOR CLEAT W/3-16d NAILS.
- (B) HORIZONTAL PIECE, 2" X 6" BY PALLET WIDTH (3 REQD). NAIL TO THE VERTICAL PIECES W/3-10d NAILS AT EACH JOINT.
- (C) FLOOR CLEAT, 2" X 6" X DIMENSION J (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 K (2 REQD). SEE THE DETAIL AT LEFT FOR BEVEL-CUTS REQUIRED. TOENAIL TO THE VERTICAL PIECE AND TO THE FLOOR CLEAT W/2-16d NAILS.
- (G) BACK-UP CLEAT, 2" X 6" X 30" (762MM) (2 REQD). NAIL TO THE FLOOR CLEAT W/6-40d NAILS.

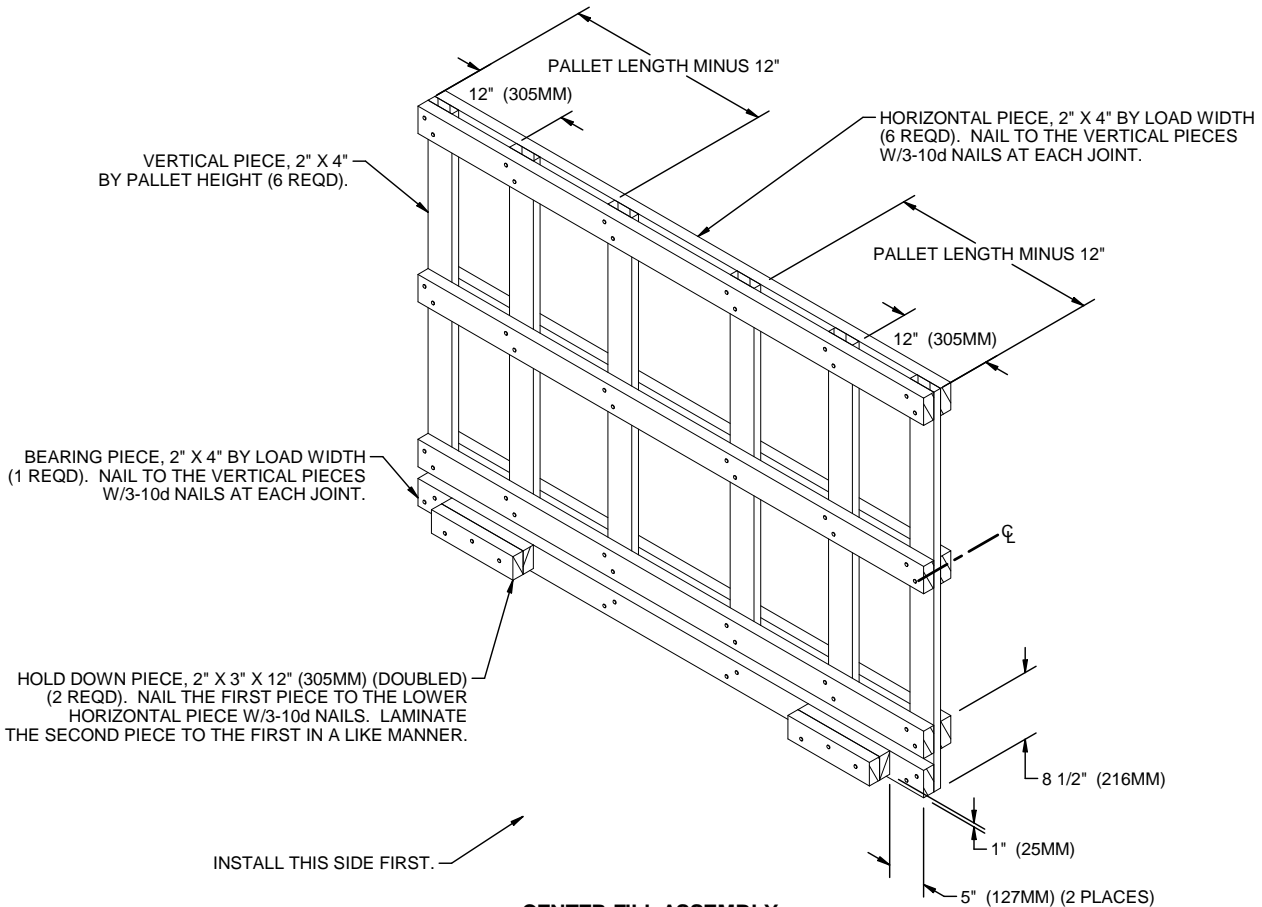


### BRACE

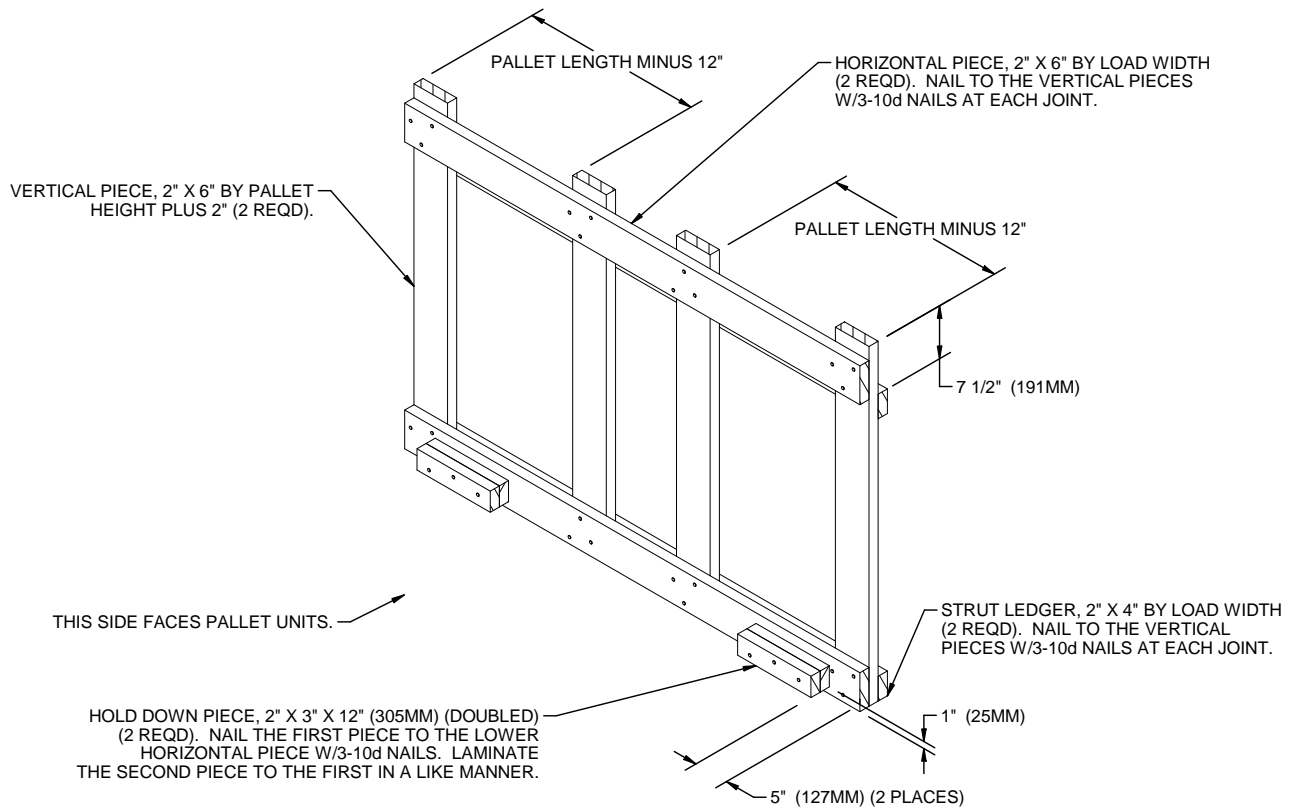
### TYPICAL LCL USING KNEE BRACES



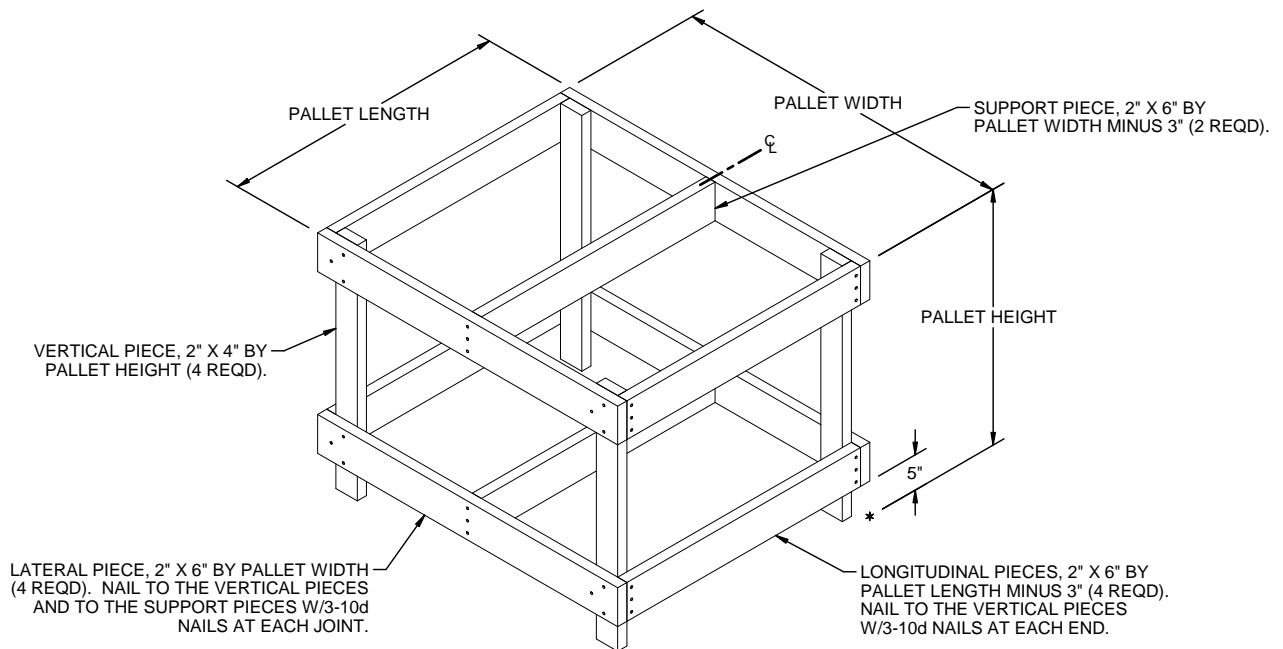
**ENDWALL ASSEMBLY**



**CENTER FILL ASSEMBLY**



**CENTER GATE**



**FILLER ASSEMBLY**

THE ASSEMBLY DEPICTED ABOVE IS FOR USE IN PLACE OF AN OMITTED PALLET UNIT. A FILLER ASSEMBLY MUST BE WIRE TIED TO AN ADJACENT PALLET UNIT STRAP TO PREVENT UNDUE MOVEMENT. NO MORE THAN ONE ASSEMBLY WILL BE USED IN ANY LOAD CONFIGURATION.

