

LOADING AND BRACING* (CL & LCL) IN EUROPEAN BOXCAR OF BOXED AMMUNITION AND COMPONENTS UNITIZED ON PALLETS AND/OR SKIDDED BASES

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- * DELINEATED LOADING AND BRACING PROCEDURES COMPLY WITH THE REGOLAMENTO INTERNAZIONALE VERCOLI (RIV): REGULATIONS GOVERNING THE RECIPROCAL USE OF WAGONS IN INTERNATIONAL TRAFFIC.

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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 OUTLOADING PROCEDURES SHOWN HEREIN ARE APPLICABLE TO EUROPEAN BOXCARS THAT CONFORM TO THE RIV REQUIREMENTS.
- C. THE LOADS AS SHOWN ON PAGES 4 THRU 11 ARE BASED ON RIV BOXCARS (HBIS 297) 41'-10-7/8" (12,774MM) LONG BY 8'-9" (2,670MM) WIDE. THE LOADS SHOWN ON PAGES 12 THRU 19 ARE BASED ON RIV BOXCARS (TMS 858) 28'-8-7/8" (8,760MM) LONG BY 8'-11" (2,720MM) WIDE. THE LOADS SHOWN ON PAGES 24 THRU 31 ARE BASED ON RIV BOXCARS (GBS 252) 41'-8" (12,700MM) LONG BY 8'-6-1/4" (2,600MM) WIDE. THE LOADS SHOWN ON PAGES 32 THRU 39 ARE BASED ON RIV BOXCARS (TMS 851) 28'-8-3/4" (8,760MM) LONG BY 9'-0-5/8" WIDE. THE LOAD SHOWN ON PAGE 52 IS BASED ON RIV BOXCAR (HBILLS-X 294/295) 41'-3" (12,576MM) LONG BY 8'-9" (2,670MM) WIDE. OTHER TYPES OF CARS MAY BE USED.
- D. THE SPECIFIED OUTLOADING PROCEDURES ARE APPLICABLE TO PALLETIZED BOXES AND BOXES ASSEMBLED ON SKIDDED BASES. SEE THE TYPICAL UNIT DETAILS ON PAGE 55. SUBSEQUENT REFERENCE TO PALLET UNIT HEREIN MEANS A PALLET UNIT OR SKIDDED BASE WITH AMMUNITION ITEMS INCLUDED.
- E. PORTIONS OF THE BOXCARS DEPICTED WITHIN THIS PROCEDURAL DRAWING, SUCH AS SIDEWALLS, ENDWALLS, AND ROOFS, AND PORTIONS OF THE BLOCKING AND BRACING COMPONENTS, HAVE NOT BEEN SHOWN IN THE LOAD VIEWS FOR CLARITY PURPOSES.
- F. THE NUMBER OF UNITS MAY BE ADJUSTED TO FIT THE BOXCAR CONCERNED, OR THE QUANTITY TO BE SHIPPED; HOWEVER, THE APPROVED METHODS CONTAINED HEREIN MUST BE FOLLOWED FOR BLOCKING, BRACING, AND STAYING OF THESE ITEMS.
- G. OTHER TYPES OF LADING ITEMS MAY BE LOADED IN A CAR WHICH IS 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.
- H. A STAGGERED NAILING PATTERN WILL BE USED WHENEVER POSSIBLE WHEN NAILS ARE DRIVEN INTO JOINTS OF DUNNAGE ASSEMBLIES OR WHEN LAMINATING DUNNAGE. ALSO, A STAGGERED NAILING PATTERN WILL BE USED WHEN DUNNAGE IS NAILED TO THE FLOOR OF THE BOXCAR. 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.
- J. NAILS USED FOR FLOOR BLOCKING WILL HAVE A MINIMUM DIAMETER OF 5MM. NAIL SIZES WILL BE SELECTED TO PROVIDE A MINIMUM OF 40MM PENETRATION INTO THE CAR FLOOR. HOWEVER, THE LENGTH OF THE NAIL WILL BE SUCH THAT THE NAIL DOES NOT COMPLETELY PENETRATE THE FLOOR. SEE THE "NAIL CHART" ON PAGE 3. NAILS WHICH ARE OF OTHER SIZES, OR WHICH HAVE A NOMENCLATURE DIFFERENT THAN THAT USED HEREIN, MAY ALSO BE USED PROVIDED THEY MEET THE MINIMUM REQUIREMENTS STIPULATED IN THIS DOCUMENT.
- K. NAILS USED FOR FABRICATING DUNNAGE ASSEMBLIES MUST BE OF A LENGTH TO PENETRATE TWO-THIRDS OF THE THICKNESS OF THE SECOND BOARD, WHILE PREVENTING THE NAIL POINT FROM COMPLETELY PENETRATING THE DUNNAGE ASSEMBLY. THE NAIL POINT IS TO BE CONCEALED WITHIN THE DUNNAGE ASSEMBLY, EXCEPT WHEN STATED OTHERWISE IN THE CONSTRUCTION DETAILS, TO PREVENT POSSIBLE DAMAGE TO THE LADING.

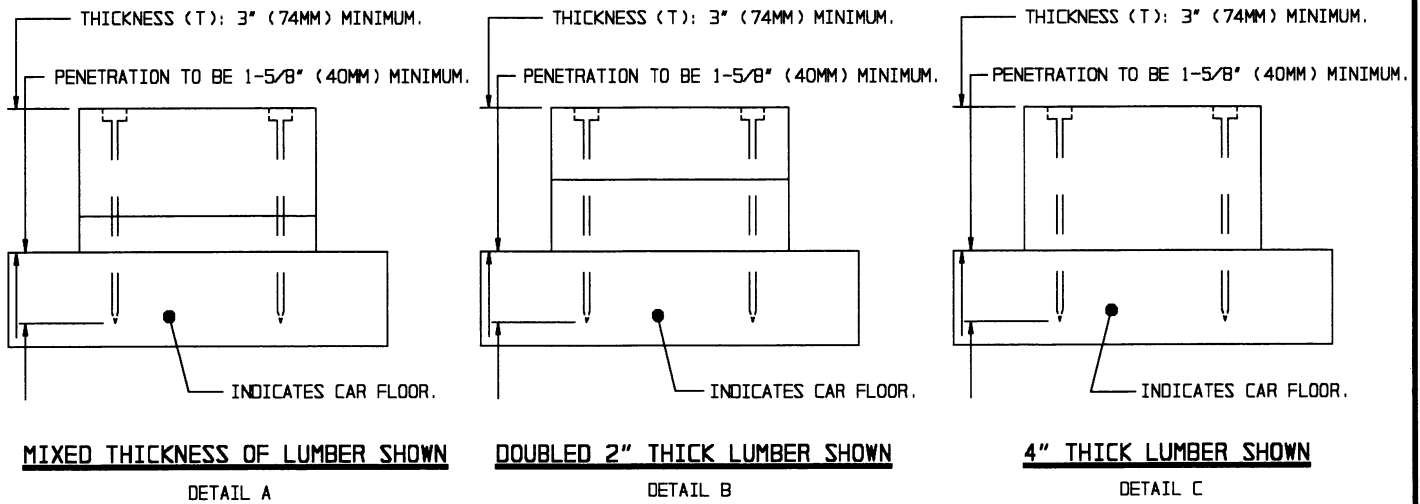
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MATERIAL SPECIFICATIONS

- LUMBER - - - - - : SEE TM 743-200-1 (DUNNAGE LUMBER) AND FED SPEC MM-L-751.
- NAILS - - - - - : FED SPEC FF-N-105; COMMON.
- STRAPPING, STEEL - - : ASTM D3953; FLAT STRAPPING, TYPE I, HEAVY DUTY, FINISH A, B (GRADE 2), OR C.
- SEAL, STRAP - - - - : ASTM D3953; CLASS H, FINISH A, B (GRADE 2), OR C, DOUBLE NOTCH TYPE, STYLE I, II, OR IV.

(GENERAL NOTES CONTINUED)

- L. THOSE MEMBERS SPECIFICALLY IDENTIFIED AS "STRUTS" WITHIN THE KEY NUMBERS OF A DEPICTED LOAD ARE SPECIFIED TO BE 4" X 4" (102MM X 102MM) MATERIAL. IT IS PERMISSIBLE TO USE TWO LAMINATED PIECES OF 2" X 6" (51MM X 152MM) MATERIAL IN LIEU OF EACH 4" X 4" (102MM X 102MM) STRUT. DOUBLED 2" X 6" (51MM X 152MM) STRUTS WILL BE LAMINATED WITH ONE NAIL EVERY 6" (152MM).
- M. LOAD BRACING STRUTS, EITHER 4" X 4" (102MM X 102MM) OR DOUBLED 2" X 6" (51MM X 152MM), WHICH ARE LONGER THAN 72" (1,829MM) WILL BE BRACED WITH HORIZONTAL AND VERTICAL STRUT BRACING PIECES. SEE THE "TYPICAL STRUT BRACING" DETAIL ON PAGE 23 FOR A TYPICAL INSTALLATION.
- N. TO ACHIEVE A TIGHTLY BRACED LOAD, A STRUT WILL BE CUT SLIGHTLY LONGER THAN THE MEASURED DISTANCE BETWEEN THE STRUT BEARING AREAS ON THE TWO CENTER GATES. 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 23 FOR BEVELING INSTRUCTIONS AND THE "STRUT INSTALLATION" DETAIL ON THAT PAGE FOR A PICTORAL 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 A DOWNWARD POSITION SO THAT IT WILL ALLOW THE STRUT END TO SLIDE MORE FREELY DOWN THE FACE OF THE VERTICAL PIECE ON THE ADJACENT GATE AS THE STRUT IS DRIVEN DOWN INTO ITS FINAL BLOCKING POSITION.
- O. WHEN STEEL STRAPPING IS SEALED IN AN END-OVER-END LAP JOINT, A MINIMUM OF ONE SEAL WITH TWO PAIR OF NOTCHES WILL BE USED TO SEAL THE JOINT WHEN A NOTCH-TYPE SEALER IS BEING USED. A MINIMUM OF TWO SEALS, BUTTED TOGETHER, WITH TWO PAIR OF CRIMPS PER SEAL, WILL BE USED TO SEAL THE JOINT WHEN A CRIMP-TYPE SEALER IS BEING USED. SEE THE "END-OVER-END LAP JOINT DETAILS" ON PAGE 23. CAUTION: EXERCISE CARE DURING TENSIONING TO PREVENT DAMAGE TO THE PALLET UNITS.
- P. FOR EACH OF THE FOUR DIFFERENT TYPE CARS SPECIFIED WITHIN GENERAL NOTE "C" AT LEFT, FOUR TYPICAL LOADS HAVE BEEN SHOWN. A 1-HIGH LOAD AND A 2-HIGH LOAD WITH THE UNIT LENGTH PARALLEL TO THE CAR SIDES AND A 1-HIGH AND 2-HIGH LOAD WITH THE UNIT WIDTH PARALLEL TO THE CAR SIDES HAVE BEEN SHOWN FOR EACH TYPE CAR. THESE LOADS ARE TYPICAL AND THE ACTUAL QUANTITY WHICH CAN BE SHIPPED WILL DEPEND UPON THE SIZE AND WEIGHT OF THE UNIT TO BE LOADED. THE 2-HIGH LOADING PROCEDURES CAN ALSO BE USED FOR THOSE ITEMS WHICH CAN BE LOADED MORE THAN TWO LAYERS HIGH, AS DELINEATED IN THE SPECIAL NOTES FOR THE 2-HIGH LOADS. THE SPECIAL NOTES FOR EACH LOAD CONTAIN SUFFICIENT GUIDANCE FOR THE DEVELOPMENT OF A LOADING PATTERN.



TYPICAL NAILING OF FLOOR LINE BLOCKING TO CAR FLOOR

(FOR ADDITIONAL GUIDANCE, SEE "NAIL CHART" BELOW)

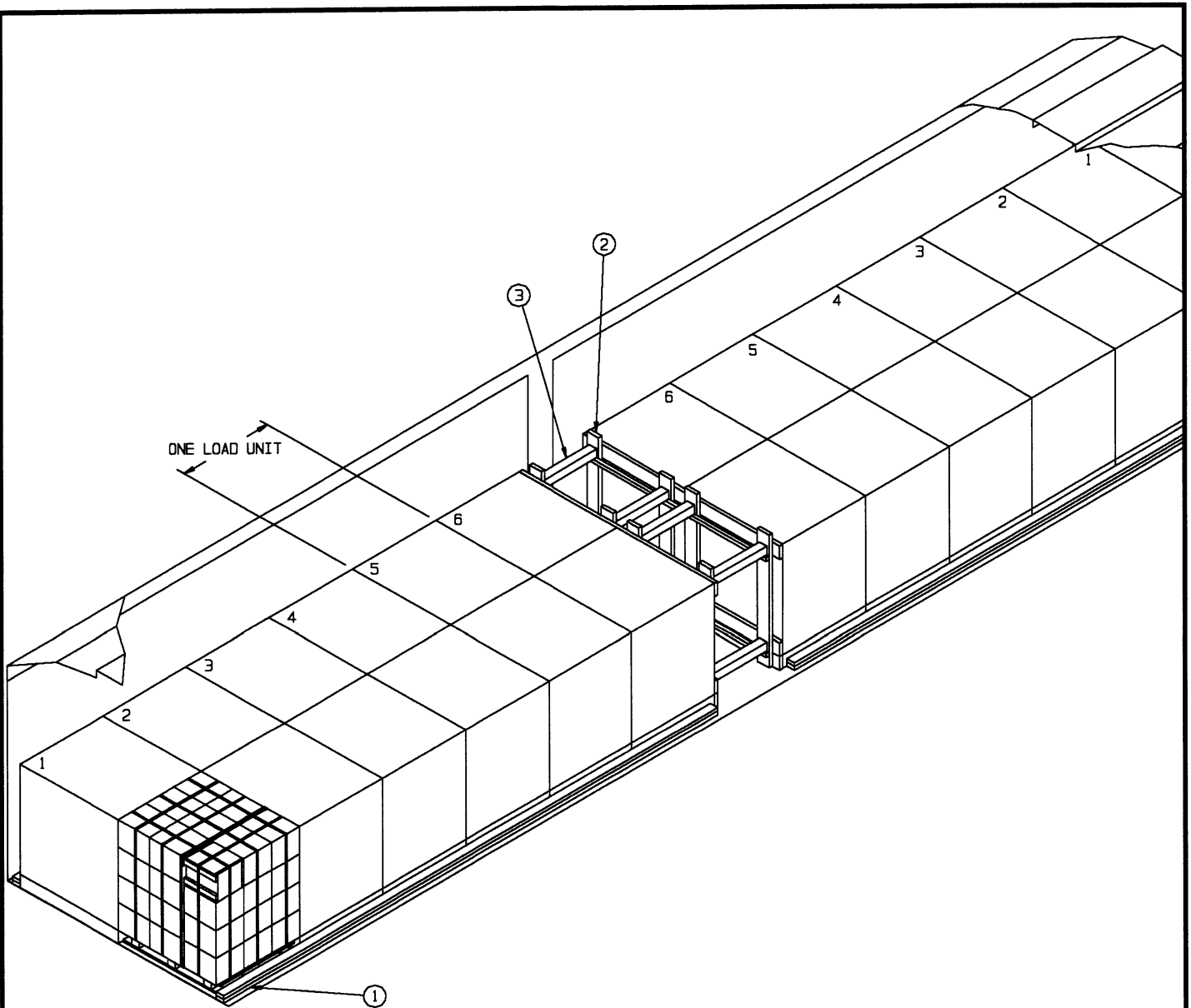
SPECIAL NOTES:

1. THE DETAILS ON THIS PAGE DEPICT POSSIBLE VARIATIONS THAT MAY RESULT FROM USING AVAILABLE LUMBER FOR FLOOR LINE BLOCKING. KEY NUMBERS THROUGHOUT THIS DOCUMENT SPECIFY DOUBLED PIECES OF LUMBER WHICH ARE 2" X 4" (51MM X 102MM) IN SIZE FOR SIDE BLOCKING, AS TYPICALLY SHOWN IN DETAIL B ABOVE. IT IS PERMISSIBLE TO USE 4" X 4" (102MM X 102MM) LUMBER, OR MIXED THICKNESSES OF LUMBER, AS TYPICALLY SHOWN IN DETAILS A AND C, IN LIEU OF THE SPECIFIED DOUBLED 2" X 4" (51MM X 102MM) LUMBER. THE INTENT OF THE SPECIFIED BLOCKING PROCEDURES MUST BE OBTAINED.
2. THE NUMBER OF NAILS USED TO SECURE EACH PIECE OF BLOCKING WILL BE AS SPECIFIED IN THE KEY NUMBERS FOR EACH SPECIFIC PROCEDURE. THE LENGTH OF THE NAILS SELECTED WILL BE ADEQUATE TO NAIL THROUGH THE BLOCKING AND ACHIEVE THE PENETRATION OF THE CAR FLOOR AS SPECIFIED. WHEN NAILING FLOOR LINE BLOCKING TO THE CAR FLOOR, AS DEPICTED IN DETAILS A, B, AND C, THE FOLLOWING APPLIES:

NAILING GUIDANCE CHART		
THICKNESS (T) OF BLOCKING		SIZE OF NAIL
MINIMUM	MAXIMUM	
3" (74MM)	3" (74MM)	30d (4-1/2") (114MM)
3" (74MM)	3-3/8" (87MM)	40d (5") (127MM)
3-3/8" (87MM)	4" (100MM)	50d (5-1/2") (140MM)
4" (100MM)	4-3/8" (112MM)	60d (6") (152MM)

NAIL CHART		
SIZE	LENGTH	DIAMETER
10d	3" (76MM)	0.148" (3.77MM)
12d	3-1/4" (83MM)	0.148" (3.77MM)
16d	3-1/2" (89MM)	0.162" (4.11MM)
20d	4" (102MM)	0.192" (4.88MM)
30d*	4-1/2" (114MM)	0.207" (5.26MM)
40d*	5" (127MM)	0.225" (5.72MM)
50d*	5-1/2" (140MM)	0.243" (6.19MM)
60d*	6" (152MM)	0.262" (6.67MM)

*NAILS WHICH HAVE ADEQUATE DIAMETER FOR NAILING FLOOR LINE BLOCKING. THE LENGTH OF THE NAIL MUST MEET THE REQUIREMENTS OF GENERAL NOTE "J".



ISOMETRIC VIEW

KEY NUMBERS (TYPICAL)

- ① SIDE BLOCKING, 2" X 4" (51MM X 102MM) BY LOAD LENGTH MINUS 2" (51MM) (DOUBLED) (4 REQD). FOR THE PALLET UNIT SHOWN, THE SIDE BLOCKING WILL BE 19'-5-1/2" (5,931MM) LONG. PRE-POSITION, IF NECESSARY. PLACE ONE PIECE DIRECTLY ON TOP OF ANOTHER AND NAIL THRU BOTH PIECES AND INTO THE CAR FLOOR W/1 NAIL EVERY 24" (610MM). RANDOM LENGTHS MAY BE USED. SEE GENERAL NOTES "H" AND "J" ON PAGE 2. SEE SPECIAL NOTE 4 ON PAGE 5.
- ② CENTER GATE (2 REQD). SEE THE "CENTER GATE A" DETAIL ON PAGE 20.
- ③ STRUT, 4" X 4" (102MM X 102MM) BY CUT TO FIT (8 REQD). STRUTS WILL BE APPROXIMATELY 26" (660MM) LONG FOR THE PALLET UNIT SHOWN. TOENAIL TO THE CENTER GATES, PIECES MARKED ②, W/2 NAILS AT EACH END. SEE GENERAL NOTES "L" AND "M" ON PAGE 2.

TYPICAL 1-HIGH LOAD
WITH LENGTH PARALLEL TO SIDES IN AN HBIS 297 CAR

SPECIAL NOTES:

1. AN HBIS 297 CAR, 41'-10-7/8" (12,774MM) LONG BY 8'-9" (2,670MM) WIDE HAVING A MAXIMUM LOAD LIMIT OF 57,167 POUNDS (26,016 KG) IS SHOWN. CARS OF OTHER SIZES AND TYPES MAY BE USED.
2. A 24-UNIT LOAD OF BURSTER, INCENDIARY, M4, 20 PER WOODEN BOX IS SHOWN. THE UNIT IS 39-1/4" (997MM) LONG BY 46-1/8" (1,172MM) WIDE BY 50-1/2" (1,283MM) HIGH AND WEIGHS APPROXIMATELY 1,891 POUNDS (859 KG). THE DEPICTED PROCEDURES ARE ALSO APPLICABLE FOR OTHER SIZE AND WEIGHT PALLET UNITS.
3. THE 1-HIGH LOADING PROCEDURES ARE APPLICABLE FOR ANY HEIGHT PALLET UNIT.
4. SIDE BLOCKING IS SPECIFIED AS 2" X 4" (51MM X 102MM) MATERIAL. IF THE OVERHANG ON THE WIDTH OF THE UNIT DOES NOT FACILITATE NAILING OF 2" X 4" MATERIAL, 2" X 6" (51MM X 152MM) MATERIAL MAY BE USED. THE MAXIMUM WIDTHS OF UNITS ARE AS FOLLOWS.

<u>MATERIAL</u>	<u>PALLET WIDTH</u>	<u>MAXIMUM WIDTH UNIT</u>
2" X 4"	45-1/2" (1,156MM)	52-1/4" (1,327MM)
2" X 4"	48" (1,219MM)	49-1/2" (1,257MM)
2" X 4"	53" (1,346MM)	CANNOT BE LOADED
2" X 6"	45-1/2" (1,156MM)	48" (1,219MM)
2" X 6"	48" (1,219MM)	CANNOT BE LOADED

5. THE NUMBER OF PALLET UNITS IN THE LENGTH OF THE CAR IS BASED ON THE PALLET UNIT LENGTH AS FOLLOWS.

<u>NO. LONG</u>	<u>MAXIMUM UNIT LENGTH</u>
13	36-3/4" (933MM)
12	39-3/4" (1,010MM)
11	43-1/2" (1,105MM)
10	46" (1,168MM)

6. THE MAXIMUM NUMBER OF PALLET UNITS BASED ON THE WEIGHT OF THE UNITS, NOT TAKING INTO CONSIDERATION THE WEIGHT OF THE DUNNAGE, IS AS FOLLOWS.

<u>NO. OF UNITS</u>	<u>MAXIMUM WEIGHT OF UNIT</u>
26	2,198 LBS (998 KG)
24	2,381 LBS (1,081 KG)
22	2,598 LBS (1,179 KG)
20	2,858 LBS (1,297 KG)

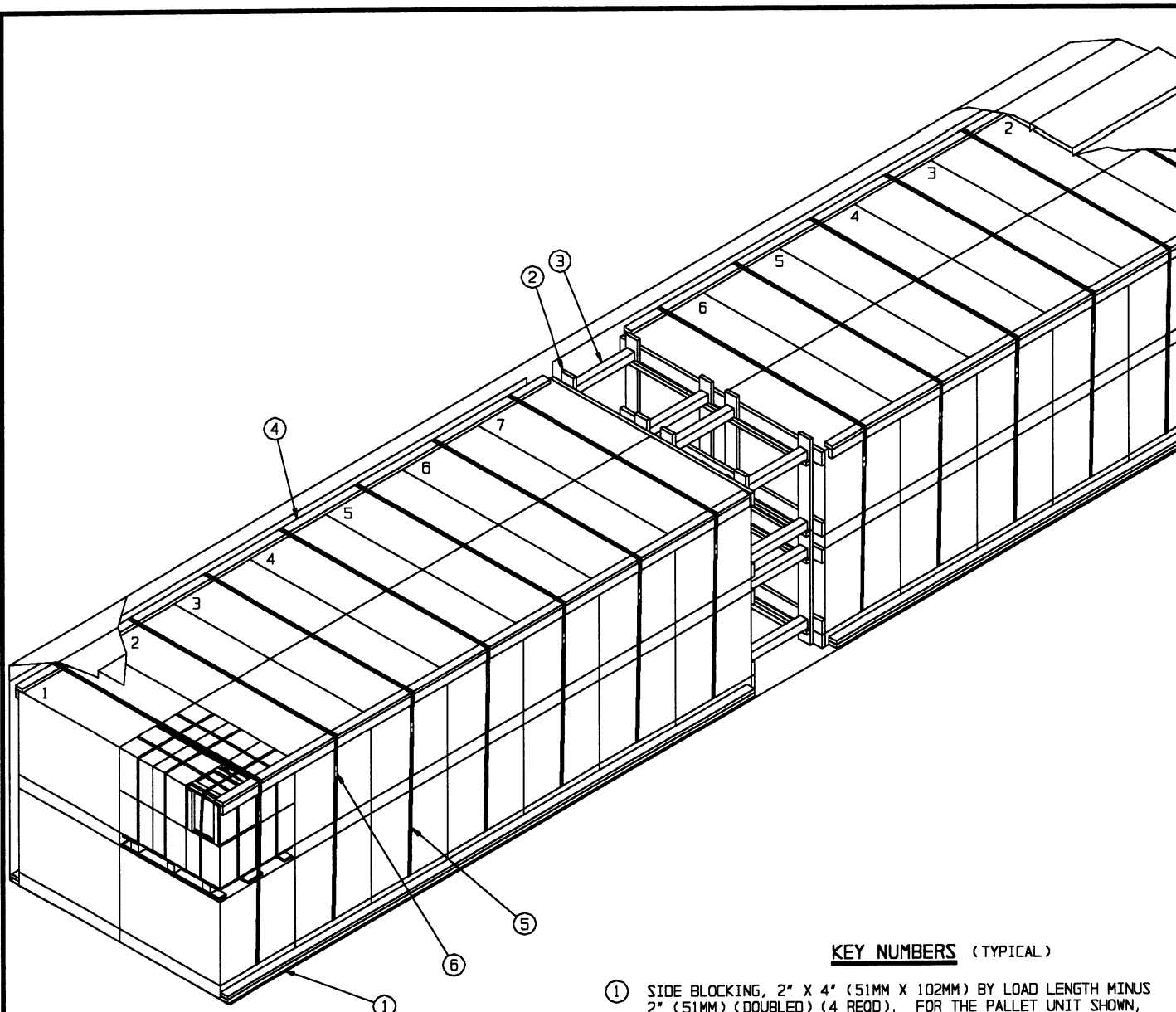
7. IF THE PALLET UNIT TO BE SHIPPED IS TOO HEAVY TO BE LOADED TWO UNITS WIDE IN THE CAR, A ONE UNIT WIDE LOAD CAN BE FORMED. THE CENTER GATE "N", AS DETAILED ON PAGE 43, WILL BE USED IN LIEU OF THE DEPICTED CENTER GATE, AND ONLY FOUR STRUTS WILL BE REQUIRED. THE SIDE BLOCKING WILL BE AS SHOWN. NOTE THAT THE ONE-UNIT-WIDE PROCEDURES CAN ALSO BE USED TO OBTAIN THE QUANTITY IT IS DESIRED TO SHIP.
8. A LOAD MAY BE REDUCED BY OMITTING ONE OR MORE LOAD UNITS. NOTE THAT STRUT BRACING WILL BE REQUIRED IF THE STRUTS ARE LONGER THAN 72" (1,828MM). SEE THE "TYPICAL STRUT BRACING" DETAIL ON PAGE 23.
9. A LOAD MAY BE REDUCED BY ONE PALLET UNIT BY EMPLOYING THE PROCEDURES DEPICTED ON PAGE 44.
10. A PARTIAL PALLET MAY BE SECURED TO THE TOP OF A PALLET UNIT FOR SHIPMENT, THE HEIGHT OF THE CAR PERMITTING. SEE THE PROCEDURES ON PAGE 49 FOR GUIDANCE.
11. INDIVIDUAL BOXES MAY BE SECURED TO THE TOP OF A PALLET UNIT FOR SHIPMENT, THE HEIGHT OF THE CAR PERMITTING. SEE THE PROCEDURES ON PAGE 50 FOR GUIDANCE.

BILL OF MATERIAL (TYPICAL)		
LUMBER	LINEAR FEET	BOARD FEET
2" X 2" (51MM X 51MM)	29 (8,839MM)	10
2" X 3" (51MM X 76MM)	2 (610MM)	1
2" X 4" (51MM X 102MM)	78 (23,774MM)	52
2" X 6" (51MM X 152MM)	83 (25,298MM)	83
4" X 4" (102MM X 102MM)	18 (5,486MM)	24
NAILS	NO. REQD	POUNDS
SIZE AS REQD	228	4

LOAD AS SHOWN (TYPICAL)

<u>ITEM</u>	<u>QUANTITY</u>	<u>WEIGHT (APPROX)</u>
PALLET UNIT	24	45,384 LBS (20,604 KG)
DUNNAGE		344 LBS (156 KG)
TOTAL WEIGHT		45,728 LBS (20,760 KG)

**TYPICAL 1-HIGH LOAD
WITH LENGTH PARALLEL TO SIDES IN AN HBIS 297 CAR**



ISOMETRIC VIEW

KEY NUMBERS (TYPICAL)

- ① SIDE BLOCKING, 2" X 4" (51MM X 102MM) BY LOAD LENGTH MINUS 2" (51MM) (DOUBLED) (4 REQD). FOR THE PALLET UNIT SHOWN, THE SIDE BLOCKING IN THE NEAR END WILL BE 20'-10" (6,350MM) LONG AND THE FAR END WILL BE 17'-10" (5,436MM) LONG. PRE-POSITION, IF NECESSARY. PLACE ONE PIECE DIRECTLY ON TOP OF ANOTHER AND NAIL THRU BOTH PIECES AND INTO THE CAR FLOOR W/1 NAIL EVERY 24" (610MM). RANDOM LENGTHS MAY BE USED. SEE GENERAL NOTES "H" AND "J" ON PAGE 2. SEE SPECIAL NOTE 5 ON PAGE 7.
- ② CENTER GATE (2 REQD). SEE THE "CENTER GATE B" DETAIL ON PAGE 20.
- ③ STRUT, 4" X 4" (102MM X 102MM) BY CUT TO FIT (16 REQD). STRUTS WILL BE APPROXIMATELY 29" (737MM) LONG FOR THE PALLET UNIT SHOWN. TOENAIL TO THE CENTER GATES, PIECES MARKED ②, W/2 NAILS AT EACH END. SEE GENERAL NOTES "L" AND "M" ON PAGE 2.
- ④ CAP PIECE, LENGTH OF LOAD MINUS 2" (51MM) (4 REQD). FOR THE PALLET UNIT SHOWN, THE CAP PIECES WILL BE 20'-10" (6,350MM) AND 17'-10" (5,436MM) LONG. SEE THE DETAIL ON PAGE 23. POSITION AGAINST CAR ENDWALL.
- ⑤ BUNDLING STRAP, 1-1/4" X .035" OR .031" (32MM X .889MM OR .787MM) BY A LENGTH TO SUIT (REF: 30'-6" (9,296MM) LONG FOR THE PALLET UNIT SHOWN) (1 REQD PER LOAD UNIT). POSITION NEAR THE CENTER OF THE UNIT LENGTH.
- ⑥ SEAL FOR 1-1/4" STRAPPING (AS REQD, 2 PER STRAP). DOUBLE CRIMP EACH SEAL. SEE GENERAL NOTE "O" ON PAGE 2.

**TYPICAL 2-HIGH LOAD
WITH LENGTH PARALLEL TO SIDES IN AN HBIS 297 CAR**

(SPECIAL NOTES CONTINUED)

9. A LOAD MAY BE REDUCED BY OMITTING ONE OR MORE LOAD UNITS. NOTE THAT STRUT BRACING WILL BE REQUIRED IF THE STRUTS ARE LONGER THAN 72" (1,828MM). SEE THE "TYPICAL STRUT BRACING" DETAIL ON PAGE 23.
10. A LOAD MAY BE REDUCED BY ONE PALLET UNIT BY EMPLOYING THE PROCEDURES DEPICTED ON PAGE 44.
11. A PARTIAL PALLET MAY BE SECURED TO THE TOP OF A PALLET UNIT FOR SHIPMENT, IF THE INSIDE CAR HEIGHT PERMITS. SEE THE PROCEDURES ON PAGE 49 FOR GUIDANCE.
12. INDIVIDUAL BOXES MAY BE SECURED TO THE TOP OF A PALLET UNIT FOR SHIPMENT, IF THE INSIDE CAR HEIGHT PERMITS. SEE THE PROCEDURES ON PAGE 50 FOR GUIDANCE.

SPECIAL NOTES:

1. AN HBIS 297 CAR, 41'-10-7/8" (12,774MM) LONG BY 8'-9" (2,670MM) WIDE HAVING A MAXIMUM LOAD LIMIT OF 57,167 POUNDS (26,016 KG) IS SHOWN. CARS OF OTHER SIZES AND TYPES MAY BE USED.
2. A 52-UNIT LOAD OF MINE, AT, PRACTICE, M20, 3 PER WOODEN BOX IS SHOWN. THE UNIT IS 36" (914MM) LONG BY 47-5/8" (1,210MM) WIDE BY 40" (1,016MM) HIGH AND WEIGHS APPROXIMATELY 686 POUNDS (311 KG). THE DEPICTED PROCEDURES ARE ALSO APPLICABLE FOR OTHER SIZE AND WEIGHT PALLET UNITS.
3. THE 2-HIGH LOADING PROCEDURES ARE APPLICABLE FOR PALLET UNITS WHICH ARE NOT MORE THAN 40-1/4" (1,022MM) HIGH. THE DEPICTED PROCEDURES MAY BE USED FOR THREE LAYERS OF UNITS WHICH ARE NOT MORE THAN 26-3/4" (679MM) HIGH, FOR FOUR LAYERS OF UNITS NOT MORE THAN 20" (508MM) HIGH, FOR FIVE LAYERS NOT MORE THAN 16" (406MM), AND FOR SIX LAYERS NOT MORE THAN 12-1/4" (311MM) HIGH. NOTE THAT FOR LOADS OF THREE OR MORE LAYERS, THE STACKS MUST BE UNITIZED INTO GROUPS OF TWO AND/OR THREE PALLET UNITS, AS APPLICABLE, PRIOR TO PLACEMENT IN THE LOAD.
4. CENTER GATE "C" WILL BE USED IN LIEU OF THE SPECIFIED CENTER GATE WHEN SHIPPING MORE THAN TWO LAYERS. SEE THE DETAIL ON PAGE 21.
5. SIDE BLOCKING IS SPECIFIED AS 2" X 4" (51MM X 102MM) MATERIAL. IF THE OVERHANG ON THE WIDTH OF THE UNIT DOES NOT FACILITATE NAILING OF 2" X 4" MATERIAL, 2" X 6" (51MM X 152MM) MATERIAL MAY BE USED. THE MAXIMUM WIDTHS OF UNITS ARE AS FOLLOWS.

MATERIAL	PALLET WIDTH	MAXIMUM WIDTH UNIT
2" X 4"	45-1/2" (1,156MM)	52-1/4" (1,327MM)
2" X 4"	48" (1,219MM)	49-1/2" (1,257MM)
2" X 4"	53" (1,346MM)	CANNOT BE LOADED
2" X 6"	45-1/2" (1,156MM)	48" (1,219MM)
2" X 6"	48" (1,219MM)	CANNOT BE LOADED

6. THE NUMBER OF PALLET UNITS IN THE LENGTH OF THE CAR IS BASED ON THE PALLET UNIT LENGTH AS FOLLOWS.

NO. LONG	MAXIMUM UNIT WIDTH
13	36-3/4" (933MM)
12	39-3/4" (1,010MM)
11	43-1/2" (1,105MM)
10	46" (1,168MM)

7. THE MAXIMUM NUMBER OF PALLET UNITS FOR A 2-LAYER LOAD BASED ON THE WEIGHT OF THE UNITS, NOT TAKING INTO CONSIDERATION THE WEIGHT OF THE DUNNAGE, IS AS FOLLOWS.

NO. OF UNITS	MAXIMUM WEIGHT OF UNIT
52	1,099 LBS (498 KG)
48	1,190 LBS (540 KG)
44	1,299 LBS (589 KG)
40	1,429 LBS (648 KG)

8. THE MAXIMUM NUMBER OF PALLET UNITS FOR LOADS OF MORE THAN TWO LAYERS MUST BE CALCULATED. THE MAXIMUM LOAD LIMIT OF A CAR IS NOT TO BE EXCEEDED. FOR GUIDANCE, THE MAXIMUM NUMBER OF PALLET UNITS FOR A 3-LAYER LOAD BASED ON THE WEIGHT OF THE UNITS, NOT TAKING INTO CONSIDERATION THE WEIGHT OF THE DUNNAGE, IS AS FOLLOWS.

NO. OF UNITS	MAXIMUM WEIGHT OF UNIT
78	732 LBS (332 KG)
72	793 LBS (360 KG)
66	866 LBS (393 KG)
60	952 LBS (432 KG)

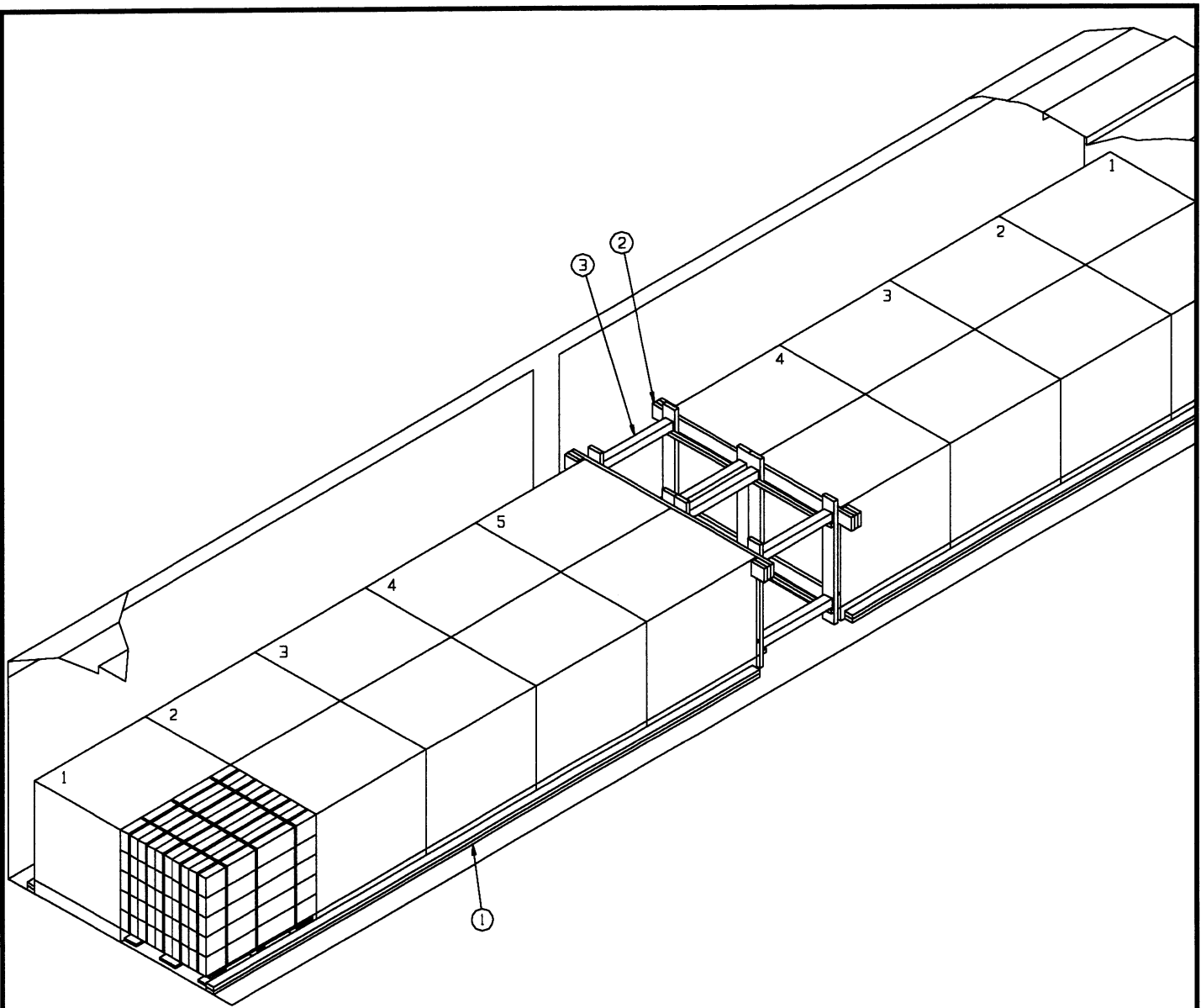
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BILL OF MATERIAL (TYPICAL)		
LUMBER	LINEAR FEET	BOARD FEET
2" X 2" (51MM X 51MM)	59 (17,983MM)	20
2" X 3" (51MM X 76MM)	2 (610MM)	1
2" X 4" (51MM X 102MM)	310 (94,488MM)	207
2" X 6" (51MM X 152MM)	136 (19,584MM)	136
4" X 4" (102MM X 102MM)	39 (11,887MM)	52
NAILS	NO. REQD	POUNDS
SIZE AS REQD	412	7
STEEL STRAPPING, 1-1/4" -- 397' REQD	---	57 LBS
SEAL FOR 1-1/4" STRAPPING -- 26 REQD	---	1 LB

LOAD AS SHOWN (TYPICAL)

ITEM	QUANTITY	WEIGHT (APPROX)
PALLET UNIT	52	35,672 LBS (16,195 KG)
DUNNAGE		897 LBS (407 KG)
TOTAL WEIGHT		36,569 LBS (16,602 KG)

TYPICAL 2-HIGH LOAD
WITH WIDTH PARALLEL TO SIDES IN AN HBIS 297 CAR



ISOMETRIC VIEW

KEY NUMBERS (TYPICAL)

- ① SIDE BLOCKING, 2" X 4" (51MM X 102MM) BY LOAD LENGTH MINUS 2" (51MM) (DOUBLED) (4 REOD). FOR THE PALLET UNIT SHOWN, THE SIDE BLOCKING IN THE NEAR END WILL BE 21'-3-1/2" (6,490MM) LONG AND THE FAR END WILL BE 17'-0" (5,182MM) LONG. PRE-POSITION, IF NECESSARY. PLACE ONE PIECE DIRECTLY ON TOP OF ANOTHER AND NAIL THRU BOTH PIECES AND INTO THE CAR FLOOR W/1 NAIL EVERY 24" (610MM). RANDOM LENGTHS MAY BE USED. SEE GENERAL NOTES "H" AND "J" ON PAGE 2. SEE SPECIAL NOTE 4 ON PAGE 9.
- ② CENTER GATE (2 REOD). SEE THE "CENTER GATE D" DETAIL ON PAGE 21.
- ③ STRUT, 4" X 4" (102MM X 102MM) BY CUT TO FIT (8 REOD). STRUTS WILL BE APPROXIMATELY 33-1/2" (851MM) LONG FOR THE PALLET UNIT SHOWN. TOENAIL TO THE CENTER GATES, PIECES MARKED ②, W/2 NAILS AT EACH END. SEE GENERAL NOTES "L" AND "M" ON PAGE 2.

TYPICAL 1-HIGH LOAD
WITH WIDTH PARALLEL TO SIDES IN AN HBIS 297 CAR

SPECIAL NOTES:

1. AN HBIS 297 CAR, 41'-10-7/8" (12,774MM) LONG BY 8'-9" (2,670MM) WIDE HAVING A MAXIMUM LOAD LIMIT OF 57,167 POUNDS (26,016 KG) IS SHOWN. CARS OF OTHER SIZES AND TYPES MAY BE USED.
2. AN 18-UNIT LOAD OF ROCKET MOTOR, 2.75 INCH, 4 PER METAL CONTAINER IS SHOWN. THE UNIT IS 40" (1,016MM) LONG BY 51-1/2" (1,308MM) WIDE BY 45-1/2" (1,156MM) HIGH AND WEIGHS APPROXIMATELY 1,964 POUNDS (892 KG). THE DEPICTED PROCEDURES ARE ALSO APPLICABLE FOR OTHER SIZE AND WEIGHT PALLET UNITS.
3. THE 1-HIGH LOADING PROCEDURES ARE APPLICABLE FOR ANY HEIGHT PALLET UNIT.
4. SIDE BLOCKING IS SPECIFIED AS 2" X 4" (51MM X 102MM) MATERIAL. IF THE OVERHANG ON THE LENGTH OF THE UNIT DOES NOT FACILITATE NAILING OF 2" X 4" MATERIAL, 2" X 6" (51MM X 152MM) MATERIAL MAY BE USED.
5. THE NUMBER OF PALLET UNITS IN THE LENGTH OF THE CAR IS BASED ON THE PALLET UNIT WIDTH AS FOLLOWS.

<u>NO. LONG</u>	<u>MAXIMUM UNIT WIDTH</u>
10	47-3/4" (1,213MM)
9	53" (1,346MM)
8	59-3/4" (1,518MM)
7	68" (1,727MM)
6	6'-7-3/4" (2,026MM)
5	7'-11-5/8" (2,426MM)

6. THE MAXIMUM NUMBER OF PALLET UNITS BASED ON THE WEIGHT OF THE UNITS, NOT TAKING INTO CONSIDERATION THE WEIGHT OF THE DUNNAGE, IS AS FOLLOWS.

<u>NO. OF UNITS</u>	<u>MAXIMUM WEIGHT OF UNIT</u>
20	2,858 LBS (1,297 KG)
18	3,175 LBS (1,441 KG)
16	3,572 LBS (1,621 KG)
14	4,000 LBS (1,816 KG)

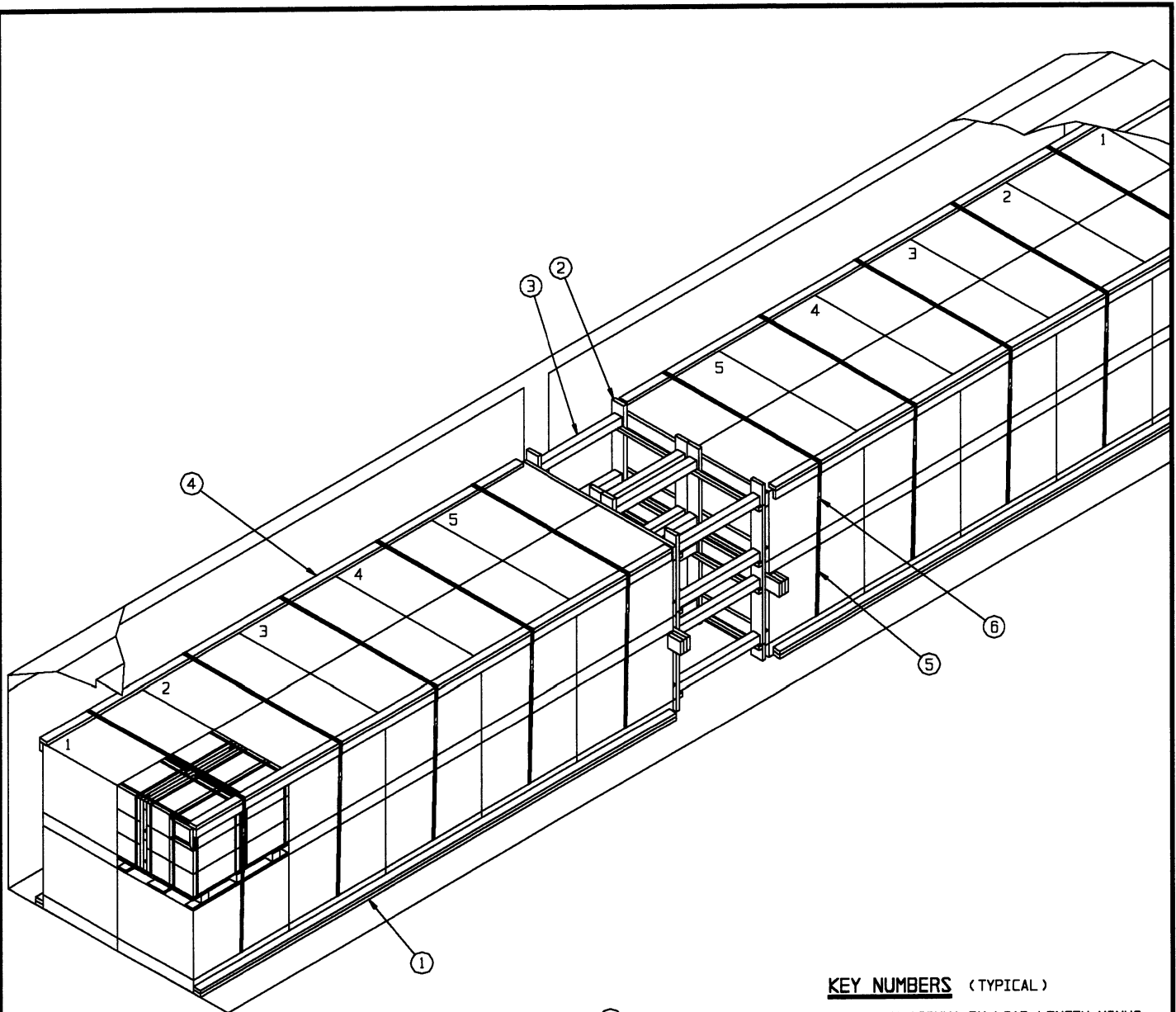
7. IF THE PALLET UNIT TO BE SHIPPED IS TOO HEAVY TO BE LOADED TWO UNITS WIDE IN THE CAR, A ONE UNIT WIDE LOAD CAN BE FORMED. THE CENTER GATE "O", AS DETAILED ON PAGE 35, WILL BE USED IN LIEU OF THE DEPICTED CENTER GATE, AND ONLY FOUR STRUTS WILL BE REQUIRED. THE SIDE BLOCKING WILL BE AS SHOWN. NOTE THAT THE ONE-UNIT-WIDE PROCEDURES CAN ALSO BE USED TO OBTAIN THE QUANTITY IT IS DESIRED TO SHIP.
8. A LOAD MAY BE REDUCED BY OMITTING ONE OR MORE LOAD UNITS. NOTE THAT STRUT BRACING WILL BE REQUIRED IF THE STRUTS ARE LONGER THAN 72" (1,828MM). SEE THE "TYPICAL STRUT BRACING" DETAIL ON PAGE 23.
9. A LOAD MAY BE REDUCED BY ONE PALLET UNIT BY EMPLOYING THE PROCEDURES DEPICTED ON PAGE 44.
10. A PARTIAL PALLET MAY BE SECURED TO THE TOP OF A PALLET UNIT FOR SHIPMENT. SEE THE PROCEDURES ON PAGE 49 FOR GUIDANCE.
11. INDIVIDUAL BOXES MAY BE SECURED TO THE TOP OF A PALLET UNIT FOR SHIPMENT. SEE THE PROCEDURES ON PAGE 50 FOR GUIDANCE.

<u>BILL OF MATERIAL (TYPICAL)</u>		
<u>LUMBER</u>	<u>LINEAR FEET</u>	<u>BOARD FEET</u>
2" X 2" (51MM X 51MM)	27 (8,230MM)	9
2" X 4" (51MM X 102MM)	154 (46,939MM)	103
2" X 6" (51MM X 152MM)	99 (30,175MM)	99
4" X 4" (102MM X 102MM)	23 (7,010MM)	31
<u>NAILS</u>	<u>NO. REQD</u>	<u>POUNDS</u>
SIZE AS REQD	208	4

LOAD AS SHOWN (TYPICAL)

<u>ITEM</u>	<u>QUANTITY</u>	<u>WEIGHT (APPROX)</u>
PALLET UNIT	18	35,352 LBS (16,050 KG)
DUNNAGE		488 LBS (222 KG)
<u>TOTAL WEIGHT</u>		<u>35,840 LBS (16,272 KG)</u>

TYPICAL 1-HIGH LOAD
WITH WIDTH PARALLEL TO SIDES IN AN HBIS 297 CAR



ISOMETRIC VIEW

KEY NUMBERS (TYPICAL)

- ① SIDE BLOCKING, 2" X 4" (51MM X 102MM) BY LOAD LENGTH MINUS 2" (51MM) (DOUBLED) (4 REOD). FOR THE PALLET UNIT SHOWN, THE SIDE BLOCKING WILL BE 18'-11" (5,766MM) LONG. PRE-POSITION, IF NECESSARY. PLACE ONE PIECE DIRECTLY ON TOP OF ANOTHER AND NAIL THRU BOTH PIECES AND INTO THE CAR FLOOR W/1 NAIL EVERY 24" (610MM). RANDOM LENGTHS MAY BE USED. SEE GENERAL NOTES "H" AND "J" ON PAGE 2. SEE SPECIAL NOTE 5 ON PAGE 11.
- ② CENTER GATE (2 REOD). SEE THE "CENTER GATE E" DETAIL ON PAGE 22.
- ③ STRUT, 4" X 4" (102MM X 102MM) BY CUT TO FIT (16 REOD). STRUTS WILL BE APPROXIMATELY 40" (1,016MM) LONG FOR THE PALLET UNIT SHOWN. TOENAIL TO THE CENTER GATES, PIECES MARKED ②, W/2 NAILS AT EACH END. SEE GENERAL NOTES "L" AND "M" ON PAGE 2.
- ④ CAP PIECE, LENGTH OF LOAD MINUS 2" (51MM) (4 REOD). FOR THE PALLET UNIT SHOWN, THE CAP PIECES WILL BE 18'-11" (5,766MM) LONG. SEE THE DETAIL ON PAGE 23. POSITION AGAINST CAR ENDWALL.
- ⑤ BUNDLING STRAP, 1-1/4" X .035" OR .031" (32MM X .889MM OR .787MM) BY A LENGTH TO SUIT (REF: 24'-6" (7,468MM) LONG FOR THE PALLET UNIT SHOWN) (1 REOD PER LOAD UNIT). POSITION NEAR THE CENTER OF THE UNIT WIDTH.
- ⑥ SEAL FOR 1-1/4" STRAPPING (AS REOD, 2 PER STRAP). DOUBLE CRIMP EACH SEAL. SEE GENERAL NOTE "O" ON PAGE 2.

TYPICAL 2-HIGH LOAD
WITH WIDTH PARALLEL TO SIDES IN AN HBIS 297 CAR

(SPECIAL NOTES CONTINUED)

9. A LOAD MAY BE REDUCED BY OMITTING ONE OR MORE LOAD UNITS. NOTE THAT STRUT BRACING WILL BE REQUIRED IF THE STRUTS ARE LONGER THAN 72" (1,828MM). SEE THE "TYPICAL STRUT BRACING" DETAIL ON PAGE 23.
10. A LOAD MAY BE REDUCED BY ONE PALLET UNIT BY EMPLOYING THE PROCEDURES DEPICTED ON PAGE 44.
11. A PARTIAL PALLET MAY BE SECURED TO THE TOP OF A PALLET UNIT FOR SHIPMENT, IF THE INSIDE CAR HEIGHT PERMITS. SEE THE PROCEDURES ON PAGE 49 FOR GUIDANCE.
12. INDIVIDUAL BOXES MAY BE SECURED TO THE TOP OF A PALLET UNIT FOR SHIPMENT, IF THE INSIDE CAR HEIGHT PERMITS. SEE THE PROCEDURES ON PAGE 50 FOR GUIDANCE.

SPECIAL NOTES:

1. AN HBIS 297 CAR, 41'-10-7/8" (12,774MM) LONG BY 8'-9" (2,670MM) WIDE HAVING A MAXIMUM LOAD LIMIT OF 57,167 POUNDS (26,016 KG) IS SHOWN. CARS OF OTHER SIZES AND TYPES MAY BE USED.
2. A 40-UNIT LOAD OF SIMULATOR, SIGNAL, 150 PER WIREBOUND BOX IS SHOWN. THE UNIT IS 35-5/8" (905MM) LONG BY 45-3/4" (1,162MM) WIDE BY 34" (864MM) HIGH AND WEIGHS APPROXIMATELY 1,100 POUNDS (499 KG). THE DEPICTED PROCEDURES ARE ALSO APPLICABLE FOR OTHER SIZE AND WEIGHT PALLET UNITS.
3. THE 2-HIGH LOADING PROCEDURES ARE APPLICABLE FOR PALLET UNITS WHICH ARE NOT MORE THAN 40-1/4" (1,022MM) HIGH. THE DEPICTED PROCEDURES MAY BE USED FOR THREE LAYERS OF UNITS WHICH ARE NOT MORE THAN 26-3/4" (679MM) HIGH, FOR FOUR LAYERS OF UNITS NOT MORE THAN 20" (508MM) HIGH, FOR FIVE LAYERS NOT MORE THAN 16" (406MM), AND FOR SIX LAYERS NOT MORE THAN 12-1/4" (311MM) HIGH. NOTE THAT FOR LOADS OF THREE OR MORE LAYERS, THE STACKS MUST BE UNITIZED INTO GROUPS OF TWO AND/OR THREE PALLET UNITS, AS APPLICABLE, PRIOR TO PLACEMENT IN THE LOAD.
4. CENTER GATE "F" WILL BE USED IN LIEU OF THE SPECIFIED CENTER GATE WHEN SHIPPING MORE THAN TWO LAYERS.
5. SIDE BLOCKING IS SPECIFIED AS 2" X 4" (51MM X 102MM) MATERIAL. IF THE OVERHANG ON THE LENGTH OF THE UNIT DOES NOT FACILITATE NAILING OF 2" X 4" MATERIAL, 2" X 6" (51MM X 152MM) MATERIAL MAY BE USED.
6. THE NUMBER OF PALLET UNITS IN THE LENGTH OF THE CAR IS BASED ON THE PALLET UNIT WIDTH AS FOLLOWS.

NO. LONG	MAXIMUM UNIT WIDTH
10	47-3/4" (1,213MM)
9	53" (1,346MM)
8	59-3/4" (1,518MM)
7	68" (1,727MM)
6	6'-7-3/4" (2,026MM)
5	7'-11-5/8" (2,428MM)

7. THE MAXIMUM NUMBER OF PALLET UNITS FOR A 2-LAYER LOAD BASED ON THE WEIGHT OF THE UNITS, NOT TAKING INTO CONSIDERATION THE WEIGHT OF THE DUNNAGE, IS AS FOLLOWS.

NO. OF UNITS	MAXIMUM WEIGHT OF UNIT
40	1,429 LBS (648 KG)
36	1,587 LBS (720 KG)
32	1,786 LBS (810 KG)
28	2,041 LBS (926 KG)
24	2,381 LBS (1,080 KG)
20	2,858 LBS (1,297 KG)

8. THE MAXIMUM NUMBER OF PALLET UNITS FOR LOADS OF MORE THAN TWO LAYERS MUST BE CALCULATED. THE MAXIMUM LOAD LIMIT OF A CAR IS NOT TO BE EXCEEDED. FOR GUIDANCE, THE MAXIMUM NUMBER OF PALLET UNITS FOR A 3-LAYER LOAD BASED ON THE WEIGHT OF THE UNITS, NOT TAKING INTO CONSIDERATION THE WEIGHT OF THE DUNNAGE, IS AS FOLLOWS.

NO. OF UNITS	MAXIMUM WEIGHT OF UNIT
60	952 LBS (432 KG)
54	1,058 LBS (480 KG)
48	1,190 LBS (540 KG)
42	1,361 LBS (617 KG)
36	1,587 LBS (720 KG)
30	1,905 LBS (864 KG)

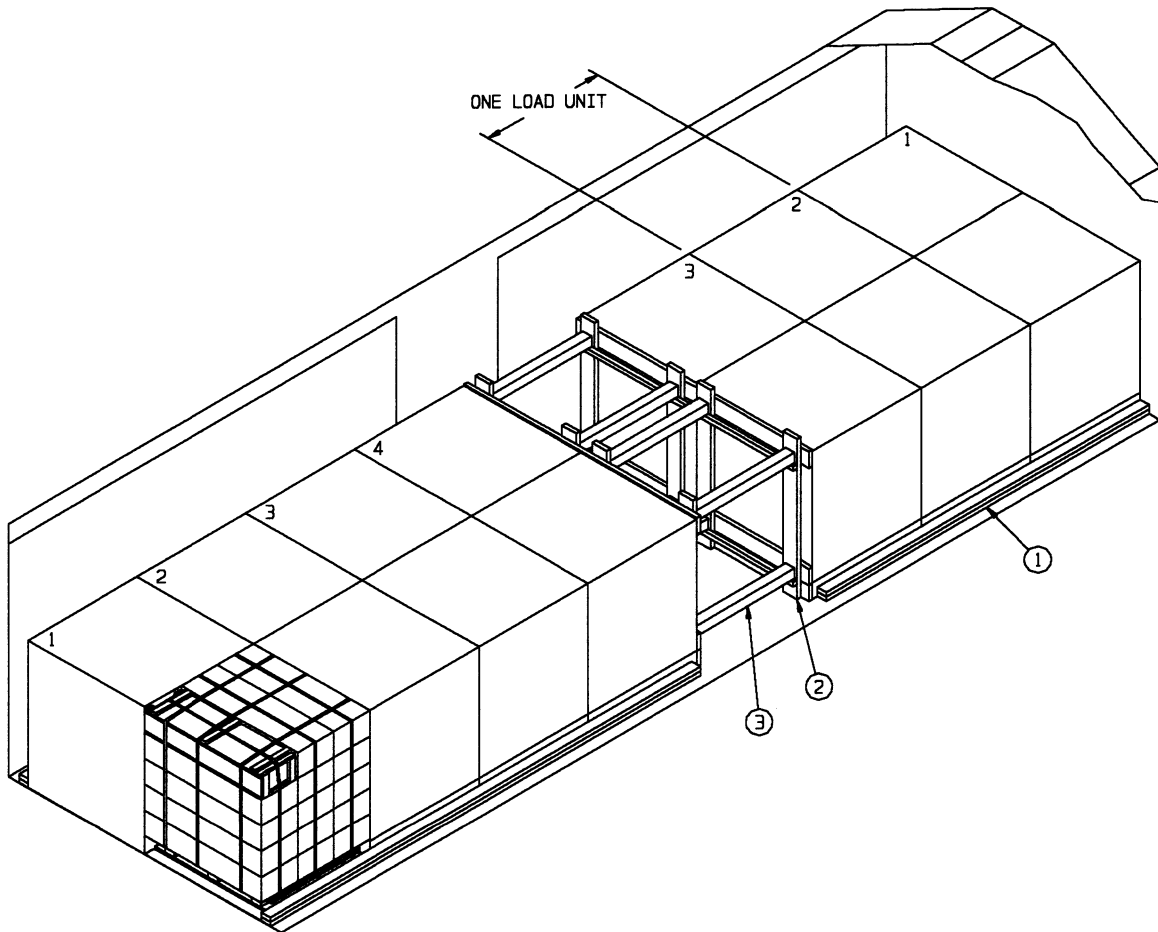
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BILL OF MATERIAL (TYPICAL)		
LUMBER	LINEAR FEET	BOARD FEET
2" X 2" (51MM X 51MM)	48 (14,858MM)	16
2" X 4" (51MM X 102MM)	303 (92,354MM)	202
2" X 6" (51MM X 152MM)	102 (31,090MM)	102
4" X 4" (102MM X 102MM)	54 (16,459MM)	72
NAILS	NO. REQD	POUNDS
SIZE AS REQD	396	6
STEEL STRAPPING, 1-1/4" -- 245' REQD	---	35 LBS
SEAL FOR 1-1/4" STRAPPING	-- 20 REQD	---
		1 LB

LOAD AS SHOWN (TYPICAL)

ITEM	QUANTITY	WEIGHT (APPROX)
PALLET UNIT	40	44,000 LBS (19,976 KG)
DUNNAGE		826 LBS (375 KG)
TOTAL WEIGHT		44,826 LBS (20,351 KG)

TYPICAL 2-HIGH LOAD
WITH WIDTH PARALLEL TO SIDES IN AN HBIS 297 CAR



ISOMETRIC VIEW

KEY NUMBERS

- ① SIDE BLOCKING, 2" X 4" (51MM X 102MM) BY LOAD LENGTH MINUS 2" (51MM) (DOUBLED) (4 REQD). FOR THE PALLET UNIT SHOWN, THE SIDE BLOCKING IN THE NEAR END WILL BE 14'-1" (4,293MM) LONG AND THE FAR END WILL BE 10'-6-1/2" (3,213MM) LONG. PRE-POSITION, IF NECESSARY, PLACE ONE PIECE DIRECTLY ON TOP OF ANOTHER AND NAIL THRU BOTH PIECES AND INTO THE CAR FLOOR W/1 NAIL EVERY 24" (610MM). RANDOM LENGTHS MAY BE USED. SEE GENERAL NOTES "H" AND "J" ON PAGE 2. SEE SPECIAL NOTE 4 ON PAGE 13.
- ② CENTER GATE (2 REQD). SEE THE "CENTER GATE A" DETAIL ON PAGE 20.
- ③ STRUT, 4" X 4" (102MM X 102MM) BY CUT TO FIT (8 REQD). STRUTS WILL BE APPROXIMATELY 40" (1,016MM) LONG FOR THE PALLET UNIT SHOWN. TOENAIL TO THE CENTER GATES, PIECES MARKED ②, W/2 NAILS AT EACH END. SEE GENERAL NOTES "L" AND "M" ON PAGE 2.

TYPICAL 1-HIGH LOAD
WITH LENGTH PARALLEL TO SIDES IN A TMS 858 CAR

SPECIAL NOTES:

1. A TIMS 858 CAR, 28'-8-9/16" (8,752MM) LONG BY 8'-11" (2,720MM) WIDE HAVING A MAXIMUM LOAD LIMIT OF 58,406 POUNDS (26,516 KG) IS SHOWN. CARS OF OTHER SIZES AND TYPES MAY BE USED.
2. A 14-UNIT LOAD OF 105MM CARTRIDGES, 2 PER WOODEN BOX IS SHOWN. THE UNIT IS 42-3/4" (1,086MM) LONG BY 45-3/4" (1,162MM) WIDE BY 50" (1,270MM) HIGH AND WEIGHS APPROXIMATELY 2,197 POUNDS (997 KG). THE DEPICTED PROCEDURES ARE ALSO APPLICABLE FOR OTHER SIZE AND WEIGHT PALLET UNITS.
3. THE 1-HIGH LOADING PROCEDURES ARE APPLICABLE FOR ANY HEIGHT PALLET UNIT.
4. SIDE BLOCKING IS SPECIFIED AS 2" X 4" (51MM X 102MM) MATERIAL. IF THE OVERHANG ON THE WIDTH OF THE UNIT DOES NOT FACILITATE NAILING OF 2" X 4" MATERIAL, 2" X 6" (51MM X 152MM) MATERIAL MAY BE USED. THE MAXIMUM WIDTHS OF UNITS ARE AS FOLLOWS.

<u>MATERIAL</u>	<u>PALLET WIDTH</u>	<u>MAXIMUM WIDTH UNIT</u>
2" X 4"	45-1/2" (1,156MM)	NO LIMIT
2" X 4"	48" (1,219MM)	51-1/2" (1,308MM)
2" X 4"	53" (1,346MM)	CANNOT BE LOADED
2" X 6"	45-1/2" (1,156MM)	50-1/2" (1,283MM)
2" X 6"	48" (1,219MM)	CANNOT BE LOADED

5. THE NUMBER OF PALLET UNITS IN THE LENGTH OF THE CAR IS BASED ON THE PALLET UNIT LENGTH AS FOLLOWS.

<u>NO. LONG</u>	<u>MAXIMUM UNIT LENGTH</u>
9	35-5/8" (905MM)
8	40" (1,016MM)
7	45-3/4" (1,162MM)
6	46" (1,168MM)

6. THE MAXIMUM NUMBER OF PALLET UNITS BASED ON THE WEIGHT OF THE UNITS, NOT TAKING INTO CONSIDERATION THE WEIGHT OF THE DUNNAGE, IS AS FOLLOWS.

<u>NO. OF UNITS</u>	<u>MAXIMUM WEIGHT OF UNIT</u>
18	3,244 LBS (1,472 KG)
16	3,650 LBS (1,657 KG)
14	4,000 LBS (1,816 KG)

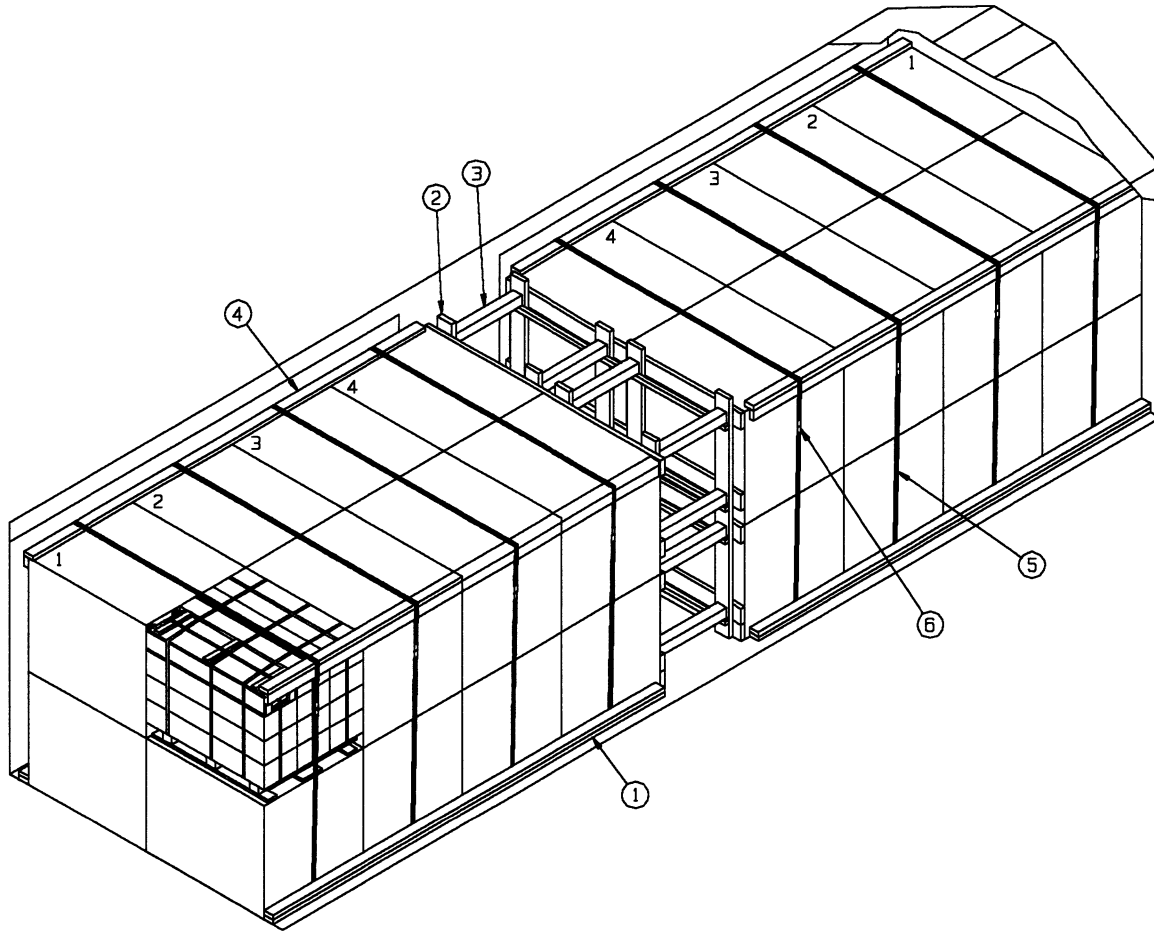
7. A ONE WIDE LOAD CAN BE FORMED TO OBTAIN THE QUANTITY IT IS DESIRED TO SHIP. THE CENTER GATE "N", AS DETAILED ON PAGE 43, WILL BE USED IN LIEU OF THE DEPICTED CENTER GATE, AND ONLY FOUR STRUTS WILL BE REQUIRED.
8. A LOAD MAY BE REDUCED BY OMITTING ONE OR MORE LOAD UNITS. NOTE THAT STRUT BRACING WILL BE REQUIRED IF THE STRUTS ARE LONGER THAN 72" (1,828MM). SEE THE "TYPICAL STRUT BRACING" DETAIL ON PAGE 23.
9. A LOAD MAY BE REDUCED BY ONE PALLET UNIT BY EMPLOYING THE PROCEDURES DEPICTED ON PAGE 44.
10. A PARTIAL PALLET MAY BE SECURED TO THE TOP OF A PALLET UNIT FOR SHIPMENT. SEE THE PROCEDURES ON PAGE 49 FOR GUIDANCE.
11. INDIVIDUAL BOXES MAY BE SECURED TO THE TOP OF A PALLET UNIT FOR SHIPMENT. SEE THE PROCEDURES ON PAGE 50 FOR GUIDANCE.

<u>BILL OF MATERIAL (TYPICAL)</u>		
<u>LUMBER</u>	<u>LINEAR FEET</u>	<u>BOARD FEET</u>
2" X 2" (51MM X 51MM)	29 (8,839MM)	10
2" X 4" (51MM X 102MM)	99 (30,175MM)	66
2" X 6" (51MM X 152MM)	82 (24,994MM)	82
4" X 4" (102MM X 102MM)	27 (8,230MM)	36
<u>NAILS</u>	<u>NO. REQD</u>	<u>POUNDS</u>
SIZE AS REQD	220	4-1/2

LOAD AS SHOWN (TYPICAL)

<u>ITEM</u>	<u>QUANTITY</u>	<u>WEIGHT (APPROX)</u>
PALLET UNIT	14	30,758 LBS (13,964 KG)
DUNNAGE		393 LBS (178 KG)
<u>TOTAL WEIGHT</u>		<u>31,151 LBS (14,142 KG)</u>

TYPICAL 1-HIGH LOAD
WITH LENGTH PARALLEL TO SIDES IN A TIMS 858 CAR



ISOMETRIC VIEW

KEY NUMBERS (TYPICAL)

- ① SIDE BLOCKING, 2" X 4" (51MM X 102MM) BY LOAD LENGTH MINUS 2" (51MM) (DOUBLED) (4 REQD). FOR THE PALLET UNIT SHOWN, THE SIDE BLOCKING WILL BE 12'-10" (3,912MM) LONG. PRE-POSITION, IF NECESSARY. PLACE ONE PIECE DIRECTLY ON TOP OF ANOTHER AND NAIL THRU BOTH PIECES AND INTO THE CAR FLOOR W/1 NAIL EVERY 24" (610MM). RANDOM LENGTHS MAY BE USED. SEE GENERAL NOTES "H" AND "J" ON PAGE 2. SEE SPECIAL NOTE 4 ON PAGE 15.
- ② CENTER GATE (2 REQD). SEE THE "CENTER GATE B" DETAIL ON PAGE 20.
- ③ STRUT, 4" X 4" (102MM X 102MM) BY CUT TO FIT (16 REQD). STRUTS WILL BE APPROXIMATELY 26-1/2" (673MM) LONG FOR THE PALLET UNIT SHOWN. TOENAIL TO THE CENTER GATES, PIECES MARKED ②, W/2 NAILS AT EACH END. SEE GENERAL NOTES "L" AND "M" ON PAGE 2.
- ④ CAP PIECE, LENGTH OF LOAD MINUS 2" (51MM) (4 REQD). FOR THE PALLET UNIT SHOWN, THE CAP PIECES WILL BE 12'-10" (3,912MM) LONG. SEE THE DETAIL ON PAGE 23. POSITION AGAINST CAR ENDWALL.
- ⑤ BUNDLING STRAP, 1-1/4" X .035" OR .031" (32MM X .889MM OR .787MM) BY A LENGTH TO SUIT (REF: 30'-0" (9,144MM) LONG FOR THE PALLET UNIT SHOWN) (1 REQD PER LOAD UNIT). POSITION NEAR THE CENTER OF THE UNIT LENGTH.
- ⑥ SEAL FOR 1-1/4" STRAPPING (AS REQD, 2 PER STRAP). DOUBLE CRIMP EACH SEAL. SEE GENERAL NOTE "O" ON PAGE 2.

TYPICAL 2-HIGH LOAD
WITH LENGTH PARALLEL TO SIDES IN A TMS 858 CAR

(SPECIAL NOTES CONTINUED)

9. A LOAD MAY BE REDUCED BY ONE PALLET UNIT BY EMPLOYING THE PROCEDURES DEPICTED ON PAGE 44.
10. A PARTIAL PALLET MAY BE SECURED TO THE TOP OF A PALLET UNIT FOR SHIPMENT, IF THE INSIDE CAR HEIGHT PERMITS. SEE THE PROCEDURES ON PAGE 49 FOR GUIDANCE.
11. INDIVIDUAL BOXES MAY BE SECURED TO THE TOP OF A PALLET UNIT FOR SHIPMENT, IF THE INSIDE CAR HEIGHT PERMITS. SEE THE PROCEDURES ON PAGE 50 FOR GUIDANCE.

SPECIAL NOTES:

1. A TMS 858 CAR, 28'-8-9/16" (8,752MM) LONG BY 8'-11" (2,720MM) WIDE HAVING A MAXIMUM LOAD LIMIT OF 58,406 POUNDS (26,516 KG) IS SHOWN. CARS OF OTHER SIZES AND TYPES MAY BE USED.
2. A 32-UNIT LOAD OF 105MM CARTRIDGES, 2 PER WOODEN BOX IS SHOWN. THE UNIT IS 39" (991MM) LONG BY 46-1/4" (1,175MM) WIDE BY 38-1/2" (978MM) HIGH AND WEIGHS APPROXIMATELY 1,811 POUNDS (822 KG). THE DEPICTED PROCEDURES ARE ALSO APPLICABLE FOR OTHER SIZE AND WEIGHT PALLET UNITS.
3. THE 2-HIGH LOADING PROCEDURES ARE APPLICABLE FOR PALLET UNITS WHICH ARE NOT MORE THAN 38-3/4" (984MM) HIGH. THE DEPICTED PROCEDURES MAY BE USED FOR THREE LAYERS OF UNITS WHICH ARE NOT MORE THAN 25-7/8" (657MM) HIGH, FOR FOUR LAYERS OF UNITS NOT MORE THAN 19-3/8" (492MM) HIGH, FOR FIVE LAYERS NOT MORE THAN 15-1/2" (393MM) HIGH, AND FOR SIX LAYERS NOT MORE THAN 12-7/8" (327MM) HIGH. NOTE THAT FOR LOADS OF THREE OR MORE LAYERS, THE STACKS MUST BE UNITIZED INTO GROUPS OF TWO AND/OR THREE PALLET UNITS, AS APPLICABLE, PRIOR TO PLACEMENT IN THE CAR.
4. SIDE BLOCKING IS SPECIFIED AS 2" X 4" (51MM X 102MM) MATERIAL. IF THE OVERHANG ON THE WIDTH OF THE UNIT DOES NOT FACILITATE NAILING OF 2" X 4" MATERIAL, 2" X 6" (51MM X 152MM) MATERIAL MAY BE USED. THE MAXIMUM WIDTHS OF UNITS ARE AS FOLLOWS.

MATERIAL	PALLET WIDTH	MAXIMUM WIDTH UNIT
2" X 4"	45-1/2" (1,156MM)	NO LIMIT
2" X 4"	48" (1,219MM)	51-1/2" (1,308MM)
2" X 4"	53" (1,346MM)	CANNOT BE LOADED
2" X 6"	45-1/2" (1,156MM)	50-1/2" (1,283MM)
2" X 6"	48" (1,219MM)	CANNOT BE LOADED

5. THE NUMBER OF PALLET UNITS IN THE LENGTH OF THE CAR IS BASED ON THE PALLET UNIT LENGTH AS FOLLOWS.

NO. LONG	MAXIMUM UNIT LENGTH
9	35-5/8" (905MM)
8	40" (1,016MM)
7	45-3/4" (1,162MM)
6	46" (1,168MM)

6. THE MAXIMUM NUMBER OF PALLET UNITS FOR A 2-LAYER LOAD BASED ON THE WEIGHT OF THE UNITS, NOT TAKING INTO CONSIDERATION THE WEIGHT OF THE DUNNAGE, IS AS FOLLOWS.

NO. OF UNITS	MAXIMUM WEIGHT OF UNIT
36	1,622 LBS (736 KG)
32	1,825 LBS (828 KG)
28	2,085 LBS (946 KG)
24	2,433 LBS (1,104 KG)

7. THE MAXIMUM NUMBER OF PALLET UNITS FOR LOADS OF MORE THAN TWO LAYERS MUST BE CALCULATED. THE MAXIMUM LOAD LIMIT OF A CAR IS NOT TO BE EXCEEDED. FOR GUIDANCE, THE MAXIMUM NUMBER OF PALLET UNITS FOR A 3-LAYER LOAD BASED ON THE WEIGHT OF THE UNITS, NOT TAKING INTO CONSIDERATION THE WEIGHT OF THE DUNNAGE, IS AS FOLLOWS.

NO. OF UNITS	MAXIMUM WEIGHT OF UNIT
54	1,081 LBS (490 KG)
48	1,216 LBS (552 KG)
42	1,390 LBS (631 KG)
36	1,622 LBS (736 KG)

8. A LOAD MAY BE REDUCED BY OMITTING ONE OR MORE LOAD UNITS. NOTE THAT STRUT BRACING WILL BE REQUIRED IF THE STRUTS ARE LONGER THAN 72" (1,828MM). SEE THE "TYPICAL STRUT BRACING" DETAIL ON PAGE 23.

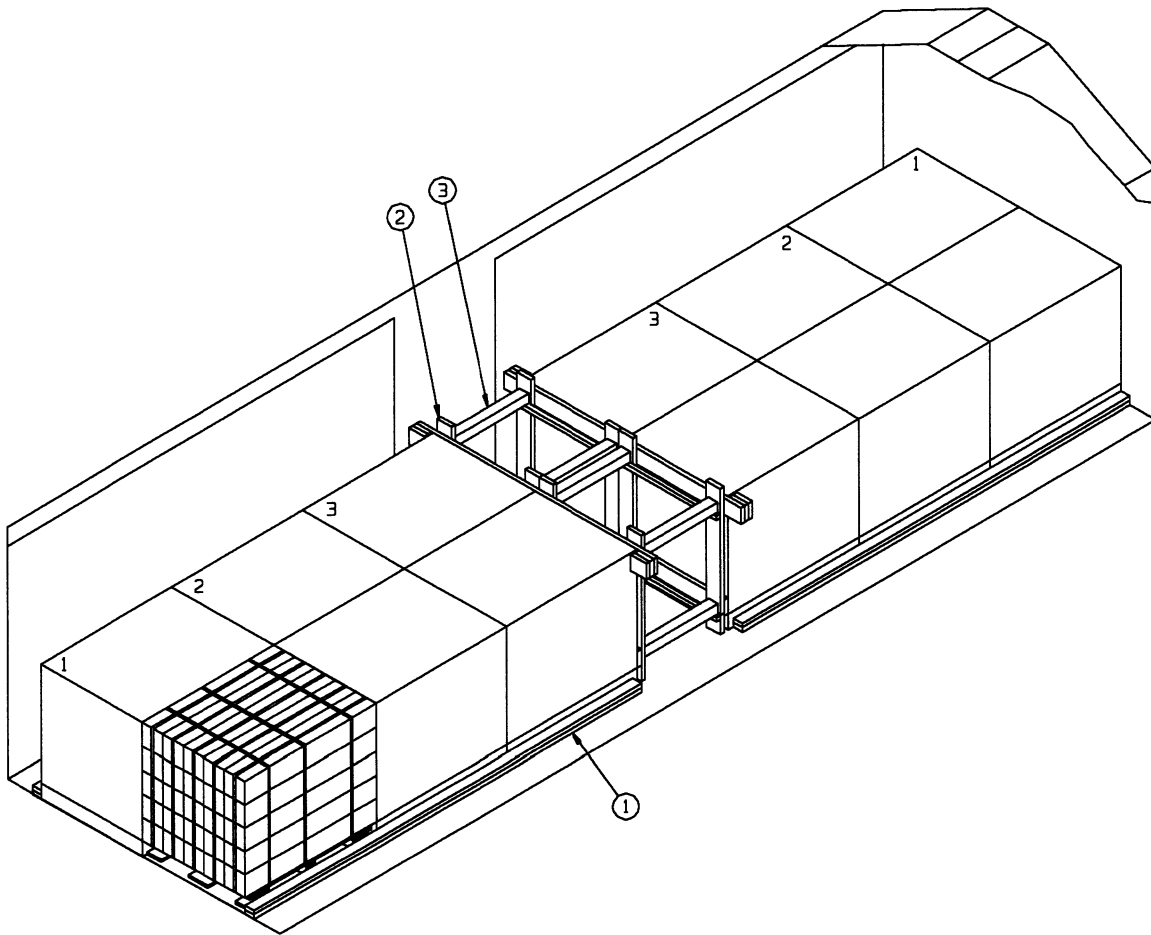
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LOAD AS SHOWN (TYPICAL)

ITEM	QUANTITY	WEIGHT (APPROX)
PALLET UNIT	32	57,952 LBS (26,310 KG)
DUNNAGE		721 LBS (328 KG)
TOTAL WEIGHT		58,673 LBS (26,638 KG)

BILL OF MATERIAL (TYPICAL)		
LUMBER	LINEAR FEET	BOARD FEET
2" X 2" (51MM X 51MM)	58 (17,678MM)	20
2" X 3" (51MM X 76MM)	2 (610MM)	1
2" X 4" (51MM X 102MM)	206 (62,789MM)	138
2" X 6" (51MM X 152MM)	132 (40,234MM)	132
4" X 4" (102MM X 102MM)	36 (10,973MM)	48
NAILS	NO. REQD	POUNDS
SIZE AS REQD	428	7
STEEL STRAPPING, 1-1/4" -- 240' REQD		35 LBS
SEAL FOR 1-1/4" STRAPPING -- 16 REQD		1 LB

TYPICAL 2-HIGH LOAD
WITH LENGTH PARALLEL TO SIDES IN A TMS 858 CAR



ISOMETRIC VIEW

KEY NUMBERS (TYPICAL)

- ① SIDE BLOCKING, 2" X 4" (51MM X 102MM) BY LOAD LENGTH MINUS 2" (51MM) (DOUBLED) (4 REQD). FOR THE PALLET UNIT SHOWN, THE SIDE BLOCKING WILL BE 12'-8-1/2" (3,874MM) LONG. PRE-POSITION, IF NECESSARY. PLACE ONE PIECE DIRECTLY ON TOP OF ANOTHER AND NAIL THRU BOTH PIECES AND INTO THE CAR FLOOR W/1 NAIL EVERY 24" (610MM). RANDOM LENGTHS MAY BE USED. SEE GENERAL NOTES "H" AND "J" ON PAGE 2. SEE SPECIAL NOTE 4 ON PAGE 17.
- ② CENTER GATE (2 REQD). SEE THE "CENTER GATE D" DETAIL ON PAGE 21.
- ③ STRUT, 4" X 4" (102MM X 102MM) BY CUT TO FIT (8 REQD). STRUTS WILL BE APPROXIMATELY 29-1/2" (749MM) LONG FOR THE PALLET UNIT SHOWN. TOENAIL TO THE CENTER GATES, PIECES MARKED ②, W/2 NAILS AT EACH END. SEE GENERAL NOTES "L" AND "M" ON PAGE 2.

TYPICAL 1-HIGH LOAD
WITH WIDTH PARALLEL TO SIDES IN A TMS 858 CAR

SPECIAL NOTES:

1. A TMS 858 CAR, 28'-8-9/16" (8,752MM) LONG BY 8'-11" (2,720MM) WIDE HAVING A MAXIMUM LOAD LIMIT OF 58,406 POUNDS (26,516 KG) IS SHOWN. CARS OF OTHER SIZES AND TYPES MAY BE USED.
2. A 12-UNIT LOAD OF ROCKET MOTOR, 2.75 INCH, 4 PER METAL CONTAINER IS SHOWN. THE UNIT IS 40" (1,016MM) LONG BY 51-1/2" (1,308MM) WIDE BY 50-1/2" (1,283MM) HIGH AND WEIGHS APPROXIMATELY 1,964 POUNDS (892 KG). THE DEPICTED PROCEDURES ARE ALSO APPLICABLE FOR OTHER SIZE AND WEIGHT PALLET UNITS.
3. THE 1-HIGH LOADING PROCEDURES ARE APPLICABLE FOR ANY HEIGHT PALLET UNIT.
4. SIDE BLOCKING IS SPECIFIED AS 2" X 4" (51MM X 102MM) MATERIAL. IF THE OVERHANG ON THE LENGTH OF THE UNIT DOES NOT FACILITATE NAILING OF 2" X 4" MATERIAL, 2" X 6" (51MM X 152MM) MATERIAL MAY BE USED.
5. THE NUMBER OF PALLET UNITS IN THE LENGTH OF THE CAR IS BASED ON THE PALLET UNIT WIDTH AS FOLLOWS.

<u>NO. LONG</u>	<u>MAXIMUM UNIT WIDTH</u>
7	45-3/4" (1,162MM)
6	53-3/8" (1,356MM)
5	64-1/8" (1,629MM)
4	6'-8-1/8" (2,035MM)

6. THE MAXIMUM NUMBER OF PALLET UNITS BASED ON THE WEIGHT OF THE UNITS, NOT TAKING INTO CONSIDERATION THE WEIGHT OF THE DUNNAGE, IS AS FOLLOWS.

<u>NO. OF UNITS</u>	<u>MAXIMUM WEIGHT OF UNIT</u>
14	4,000 LBS (1,816 KG)
12	4,000 LBS (1,816 KG)
10	4,000 LBS (1,816 KG)

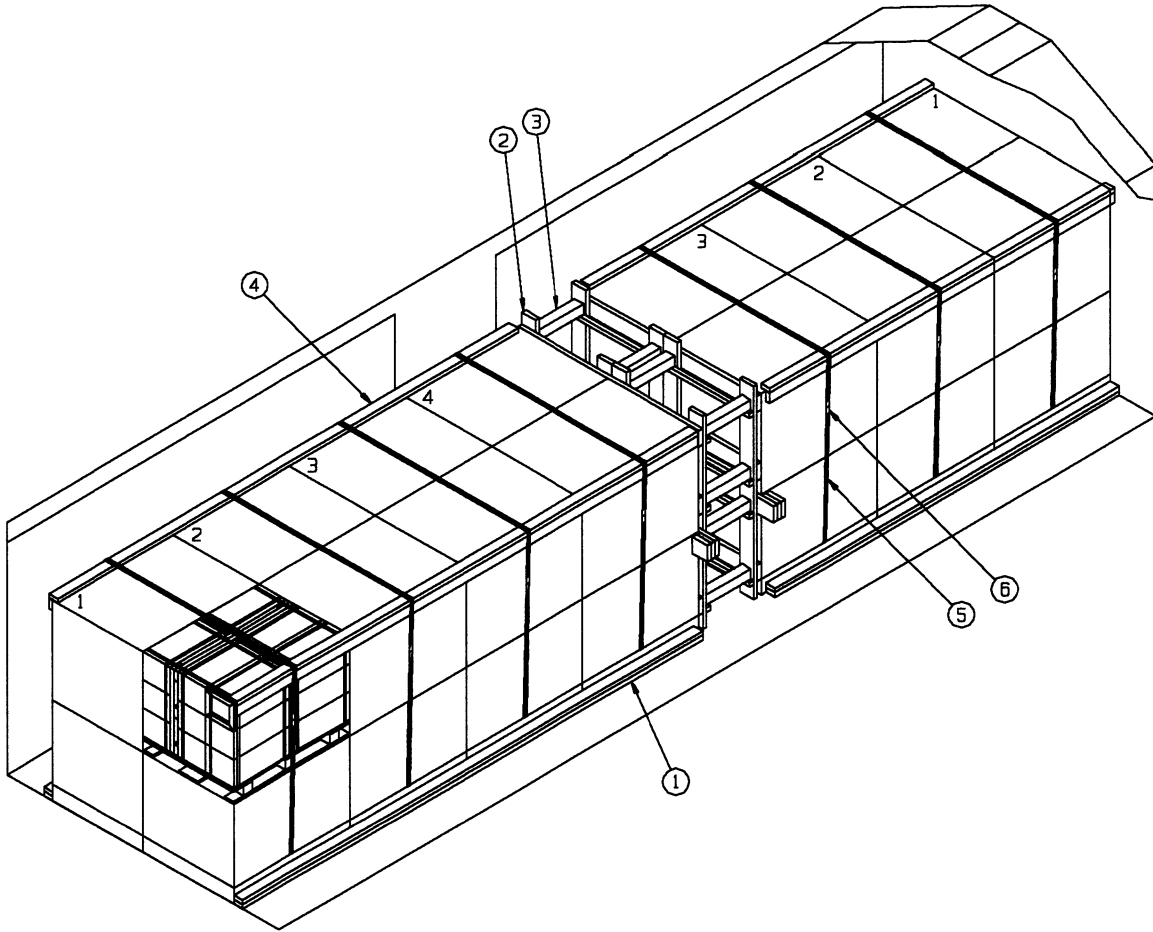
7. A LOAD MAY BE REDUCED BY OMITTING ONE OR MORE LOAD UNITS. NOTE THAT STRUT BRACING WILL BE REQUIRED IF THE STRUTS ARE LONGER THAN 72" (1,828MM). SEE THE "TYPICAL STRUT BRACING" DETAIL ON PAGE 23.
8. A ONE WIDE LOAD CAN BE FORMED TO OBTAIN THE QUANTITY IT IS DESIRED TO SHIP. THE CENTER GATE "O", AS DETAILED ON PAGE 43, WILL BE USED IN LIEU OF THE DEPICTED CENTER GATE, AND ONLY FOUR STRUTS WILL BE REQUIRED.
9. A LOAD MAY BE REDUCED BY ONE PALLET UNIT BY EMPLOYING THE PROCEDURES DEPICTED ON PAGE 44.
10. A PARTIAL PALLET MAY BE SECURED TO THE TOP OF A PALLET UNIT FOR SHIPMENT. SEE THE PROCEDURES ON PAGE 49 FOR GUIDANCE.
11. INDIVIDUAL BOXES MAY BE SECURED TO THE TOP OF A PALLET UNIT FOR SHIPMENT. SEE THE PROCEDURES ON PAGE 50 FOR GUIDANCE.

<u>BILL OF MATERIAL (TYPICAL)</u>		
<u>LUMBER</u>	<u>LINEAR FEET</u>	<u>BOARD FEET</u>
2" X 2" (51MM X 51MM)	27 (8,230MM)	9
2" X 4" (51MM X 102MM)	102 (31,090MM)	68
2" X 6" (51MM X 152MM)	65 (19,812MM)	65
4" X 4" (102MM X 102MM)	20 (6,096MM)	27
<u>NAILS</u>	<u>NO. REQD</u>	<u>POUNDS</u>
SIZE AS REQD	184	3

LOAD AS SHOWN (TYPICAL)

<u>ITEM</u>	<u>QUANTITY</u>	<u>WEIGHT (APPROX)</u>
PALLET UNIT	12	23,568 LBS (10,700 KG)
DUNNAGE		341 LBS (155 KG)
<u>TOTAL WEIGHT</u>		<u>23,909 LBS (10,855 KG)</u>

TYPICAL 1-HIGH LOAD
WITH WIDTH PARALLEL TO SIDES IN A TMS 858 CAR



ISOMETRIC VIEW

KEY NUMBERS (TYPICAL)

- ① SIDE BLOCKING, 2" X 4" (51MM X 102MM) BY LOAD LENGTH MINUS 2" (51MM) (DOUBLED) (4 REQD). FOR THE PALLET UNIT SHOWN, THE SIDE BLOCKING IN THE NEAR END WILL BE 15'-1" (4,597MM) LONG AND THE FAR END WILL BE 11'-3" (3,429MM) LONG. PRE-POSITION, IF NECESSARY. PLACE ONE PIECE DIRECTLY ON TOP OF ANOTHER AND NAIL THRU BOTH PIECES AND INTO THE CAR FLOOR W/1 NAIL EVERY 24" (610MM). RANDOM LENGTHS MAY BE USED. SEE GENERAL NOTES "H" AND "J" ON PAGE 2. SEE SPECIAL NOTE 4 ON PAGE 19.
- ② CENTER GATE (2 REQD). SEE THE "CENTER GATE E" DETAIL ON PAGE 22.
- ③ STRUT, 4" X 4" (102MM X 102MM) BY CUT TO FIT (16 REQD). STRUTS WILL BE APPROXIMATELY 18" (457MM) LONG FOR THE PALLET UNIT SHOWN. TOENAIL TO THE CENTER GATES, PIECES MARKED ②, W/2 NAILS AT EACH END. SEE GENERAL NOTES "L" AND "M" ON PAGE 2.
- ④ CAP PIECE, LENGTH OF LOAD MINUS 2" (51MM) (4 REQD). FOR THE PALLET UNIT SHOWN, THE CAP PIECES WILL BE 15'-1" (4,597MM) AND 11'-3" (3,429MM) LONG. SEE THE DETAIL ON PAGE 23. POSITION AGAINST CAR ENDWALL.
- ⑤ BUNDLING STRAP, 1-1/4" X .035" OR .031" (32MM X .889MM OR .787MM) BY A LENGTH TO SUIT (REF: 24'-6" (7,468MM) LONG FOR THE PALLET UNIT SHOWN) (1 REQD PER LOAD UNIT). POSITION NEAR THE CENTER OF THE UNIT WIDTH.
- ⑥ SEAL FOR 1-1/4" STRAPPING (AS REQD, 2 PER STRAP). DOUBLE CRIMP EACH SEAL. SEE GENERAL NOTE "O" ON PAGE 2.

TYPICAL 2-HIGH LOAD
WITH WIDTH PARALLEL TO SIDES IN A TIMS 85B CAR

(SPECIAL NOTES CONTINUED)

10. A PARTIAL PALLET MAY BE SECURED TO THE TOP OF A PALLET UNIT FOR SHIPMENT, IF THE INSIDE CAR HEIGHT PERMITS. SEE THE PROCEDURES ON PAGE 49 FOR GUIDANCE.
11. INDIVIDUAL BOXES MAY BE SECURED TO THE TOP OF A PALLET UNIT FOR SHIPMENT, IF THE INSIDE CAR HEIGHT PERMITS. SEE THE PROCEDURES ON PAGE 50 FOR GUIDANCE.

SPECIAL NOTES:

1. A TIMS 858 CAR, 28'-8-9/16" (8,752MM) LONG BY 8'-11" (2,720MM) WIDE HAVING A MAXIMUM LOAD LIMIT OF 58,406 POUNDS (26,516 KG) IS SHOWN. CARS OF OTHER SIZES AND TYPES MAY BE USED.
2. A 28-UNIT LOAD OF SIMULATOR, SIGNAL, PACKED 150 PER WIREBOUND BOX, IS SHOWN. THE UNIT IS 35-5/8" (905MM) LONG BY 45-3/4" (1,162MM) WIDE BY 38-1/2" (978MM) HIGH AND WEIGHS APPROXIMATELY 1,100 POUNDS (499 KG). THE DEPICTED PROCEDURES ARE ALSO APPLICABLE FOR OTHER SIZE AND WEIGHT PALLET UNITS.
3. THE 2-HIGH LOADING PROCEDURES ARE APPLICABLE FOR PALLET UNITS WHICH ARE NOT MORE THAN 38-3/4" (984MM) HIGH. THE DEPICTED PROCEDURES MAY BE USED FOR THREE LAYERS OF UNITS WHICH ARE NOT MORE THAN 25-7/8" (657MM) HIGH, FOR FOUR LAYERS OF UNITS NOT MORE THAN 19-3/8" (492MM) HIGH, FOR FIVE LAYERS NOT MORE THAN 15-1/2" (393MM) HIGH, AND FOR SIX LAYERS NOT MORE THAN 12-7/8" (327MM) HIGH. NOTE THAT FOR LOADS OF THREE OR MORE LAYERS, THE STACKS MUST BE UNITIZED INTO GROUPS OF TWO AND/OR THREE PALLET UNITS, AS APPLICABLE, PRIOR TO PLACEMENT IN THE LOAD.
4. SIDE BLOCKING IS SPECIFIED AS 2" X 4" (51MM X 102MM) MATERIAL. IF THE OVERHANG ON THE WIDTH OF THE UNIT DOES NOT FACILITATE NAILING OF 2" X 4" MATERIAL, 2" X 6" (51MM X 152MM) MATERIAL MAY BE USED.
5. THE NUMBER OF PALLET UNITS IN THE LENGTH OF THE CAR IS BASED ON THE PALLET UNIT WIDTH AS FOLLOWS.

NO. LONG	MAXIMUM UNIT WIDTH
7	45-3/4" (1,162MM)
6	53-3/8" (1,356MM)
5	64-1/8" (1,629MM)
4	6'-8-1/8" (2,035MM)

6. THE MAXIMUM NUMBER OF PALLET UNITS FOR A 2-LAYER LOAD BASED ON THE WEIGHT OF THE UNITS, NOT TAKING INTO CONSIDERATION THE WEIGHT OF THE DUNNAGE, IS AS FOLLOWS.

NO. OF UNITS	MAXIMUM WEIGHT OF UNIT
28	2,085 LBS (946 KG)
24	2,433 LBS (1,104 KG)
20	2,920 LBS (1,325 KG)
16	3,650 LBS (1,657 KG)
12	4,000 LBS (1,816 KG)

7. THE MAXIMUM NUMBER OF PALLET UNITS FOR LOADS OF MORE THAN TWO LAYERS MUST BE CALCULATED. THE MAXIMUM LOAD LIMIT OF A CAR IS NOT TO BE EXCEEDED. FOR GUIDANCE, THE MAXIMUM NUMBER OF PALLET UNITS FOR A 3-LAYER LOAD BASED ON THE WEIGHT OF THE UNITS, NOT TAKING INTO CONSIDERATION THE WEIGHT OF THE DUNNAGE, IS AS FOLLOWS.

NO. OF UNITS	MAXIMUM WEIGHT OF UNIT
42	1,390 LBS (631 KG)
36	1,622 LBS (735 KG)
30	1,946 LBS (883 KG)
24	2,433 LBS (1,104 KG)
18	3,244 LBS (1,472 KG)
12	4,000 LBS (1,816 KG)

8. A LOAD MAY BE REDUCED BY OMITTING ONE OR MORE LOAD UNITS. NOTE THAT STRUT BRACING WILL BE REQUIRED IF THE STRUTS ARE LONGER THAN 72" (1,828MM). SEE THE "TYPICAL STRUT BRACING" DETAIL ON PAGE 23.
9. A LOAD MAY BE REDUCED BY ONE PALLET UNIT BY EMPLOYING THE PROCEDURES DEPICTED ON PAGE 44.

(CONTINUED AT LEFT)

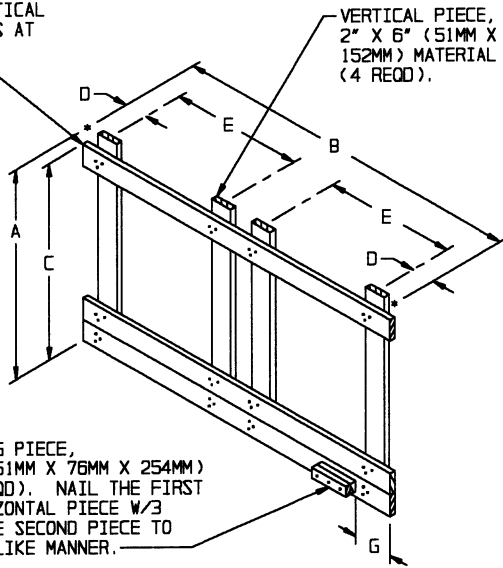
BILL OF MATERIAL (TYPICAL)		
LUMBER	LINEAR FEET	BOARD FEET
2" X 2" (51MM X 51MM)	48 (14,630MM)	16
2" X 4" (51MM X 102MM)	211 (64,314MM)	141
2" X 6" (51MM X 152MM)	102 (31,090MM)	102
4" X 4" (102MM X 102MM)	24 (7,315MM)	32
NAILS	NO. REQD	POUNDS
SIZE AS REQD	408	6-1/2
STEEL STRAPPING, 1-1/4" -- 172' REQD	---	25 LBS
SEAL FOR 1-1/4" STRAPPING -- 14 REQD	---	1 LB

LOAD AS SHOWN (TYPICAL)

ITEM	QUANTITY	WEIGHT (APPROX)
PALLET UNIT	28	30,800 LBS (13,983 KG)
DUNNAGE	---	615 LBS (279 KG)
TOTAL WEIGHT	---	31,415 LBS (14,262 KG)

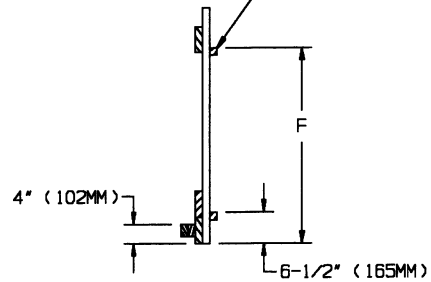
TYPICAL 2-HIGH LOAD
WITH WIDTH PARALLEL TO SIDES IN A TIMS 858 CAR

HORIZONTAL PIECE,
2" X 6" (51MM X 152MM)
MATERIAL (3 REQD).
NAIL TO THE VERTICAL
PIECES W/3 NAILS AT
EACH JOINT.



VERTICAL PIECE,
2" X 6" (51MM X
152MM) MATERIAL
(4 REQD).

STRUT LEDGER, 2" X 2" (51MM X 51MM)
OR 2" X 4" (51MM X 102MM) BY
LENGTH TO SUIT (2 REQD). NAIL TO
THE VERTICAL PIECES W/2 NAILS
AT EACH JOINT.



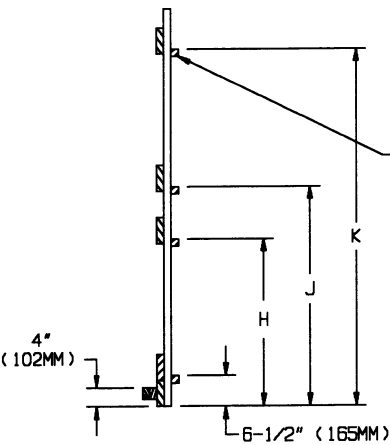
END VIEW
FOR CENTER GATE A

LATERAL BLOCKING PIECE,
2" X 3" X 10" (51MM X 76MM X 254MM)
(DOUBLED) (1 REQD). NAIL THE FIRST
PIECE TO A HORIZONTAL PIECE W/3
NAILS. NAIL THE SECOND PIECE TO
THE FIRST IN A LIKE MANNER.

CENTER GATE A

FOR 1-HIGH LOAD WITH LENGTH
PARALLEL TO SIDES.

DIMENSIONS FOR CENTER GATE A	
A	UNIT HEIGHT PLUS 4" (102MM)
B	LOAD WIDTH.
C	UNIT HEIGHT.
D	DISTANCE FROM END OF UNIT TO CENTER OF PALLET POST (REF: 5-3/8" (137MM) PLUS OVERHANG) OR BATTEN.
E	DISTANCE FROM CENTER TO CENTER OF OUTSIDE PALLET POSTS (REF: 34-3/4", 37-1/4", OR 42-1/4" (883MM, 946MM, OR 1,073MM) FOR 45-1/2", 48", OR 53" (1,156MM, 1,219MM, OR 1,346MM) WIDE PALLETS, RESPECTIVELY.
F	UNIT HEIGHT MINUS 4-1/2" (114MM).
G	9" (229MM) PLUS OVERHANG.



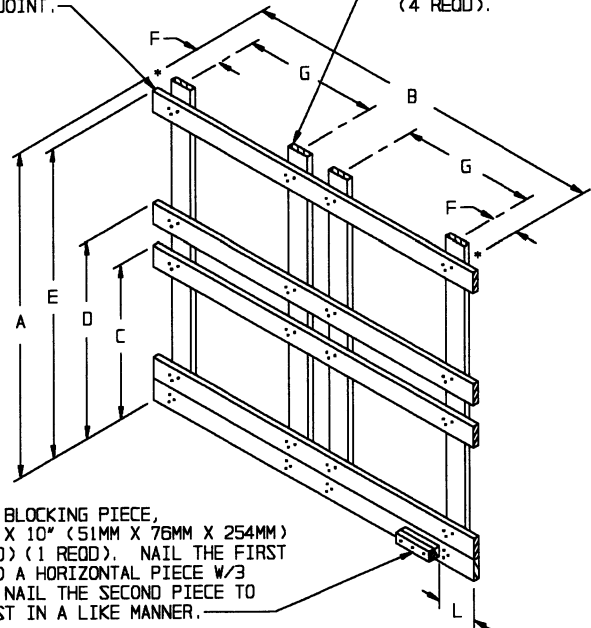
STRUT LEDGER, 2" X 2" (51MM X 51MM) OR 2" X 4" (51MM X 102MM) BY LENGTH TO SUIT (4 REQD). NAIL TO THE VERTICAL PIECES W/2 NAILS AT EACH JOINT.

END VIEW

FOR CENTER GATE B

HORIZONTAL PIECE,
2" X 6" (51MM X 152MM)
MATERIAL (5 REQD).
NAIL TO THE VERTICAL
PIECES W/3 NAILS AT
EACH JOINT.

VERTICAL PIECE,
2" X 6" (51MM X
152MM) MATERIAL
(4 REQD).



LATERAL BLOCKING PIECE,
2" X 3" X 10" (51MM X 76MM X 254MM)
(DOUBLED) (1 REQD). NAIL THE FIRST
PIECE TO A HORIZONTAL PIECE W/3
NAILS. NAIL THE SECOND PIECE TO
THE FIRST IN A LIKE MANNER.

CENTER GATE B

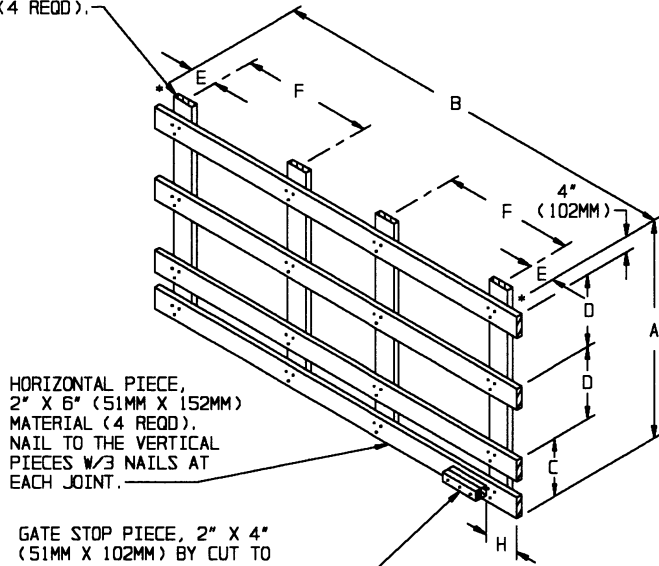
FOR 2-HIGH LOAD WITH LENGTH
PARALLEL TO SIDES.

DIMENSIONS FOR CENTER GATE B

A	LOAD HEIGHT PLUS 4" (102MM)
B	LOAD WIDTH.
C	UNIT HEIGHT.
D	UNIT HEIGHT PLUS 11" (279MM).
E	LOAD HEIGHT.
F	DISTANCE FROM END OF UNIT TO CENTER OF PALLET POSTS (REF: 5-3/8" (137MM) PLUS OVERHANG) OR BATTEN.
G	DISTANCE FROM CENTER TO CENTER OF OUTSIDE PALLET POSTS (REF: 34-3/4", 37-1/4", OR 42-1/4" (883MM, 946MM, OR 1,073MM) FOR 45-1/2", 48", OR 53" (1,156MM, 1,219MM, OR 1,346MM) WIDE PALLETS, RESPECTIVELY.
H	UNIT HEIGHT MINUS 4-1/2" (114MM).
J	UNIT HEIGHT PLUS 6-1/2" (165MM).
K	LOAD HEIGHT MINUS 4-1/2" (114MM).
L	9" (229MM) PLUS OVERHANG.

DETAILS

VERTICAL PIECE,
2" X 6" (51MM X
152MM) MATERIAL
(4 REQD).



HORIZONTAL PIECE,
2" X 6" (51MM X 152MM)
MATERIAL (4 REQD).
NAIL TO THE VERTICAL
PIECES W/3 NAILS AT
EACH JOINT.

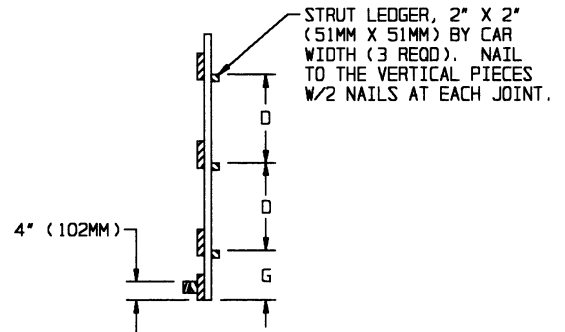
GATE STOP PIECE, 2" X 4"
(51MM X 102MM) BY CUT TO
FIT (DOUBLED) (1 REQD).
NAIL FIRST PIECE TO
HORIZONTAL PIECE W/3 NAILS.
NAIL SECOND PIECE TO FIRST
IN A LIKE MANNER.

CENTER GATE C

FOR 3-HIGH LOAD WITH LENGTH
PARALLEL TO SIDES.*

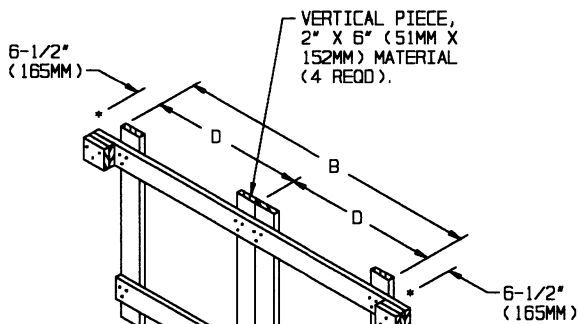
DIMENSIONS FOR CENTER GATE C	
A	UNIT HEIGHT TIMES (NO. OF LAYERS MINUS 1), PLUS ONE-HALF UNIT HEIGHT, PLUS 4" (102MM)
B	LOAD WIDTH.
C	ONE-HALF UNIT HEIGHT PLUS 3" (76MM).
D	UNIT HEIGHT.
E	DISTANCE FROM END OF UNIT TO CENTER OF PALLET POSTS (REF: 5-3/8" (137MM) PLUS OVERHANG) OR BATTEN.
F	DISTANCE FROM CENTER TO CENTER OF OUTSIDE PALLET POSTS (REF: 34-3/4", 37-1/4", OR 42-1/4" (883MM, 946MM, OR 1,073MM) FOR 45-1/2", 48" OR 53" (1,156MM, 1,219MM, OR 1,346MM) WIDE PALLET, RESPECTIVELY.
G	ONE-HALF UNIT HEIGHT MINUS 1-1/2" (38MM).
H	9" (229MM) PLUS OVERHANG.

* FOR LOADS OF MORE THAN THREE LAYERS, ADD ONE HORIZONTAL PIECE AND STRUT LEDGER FOR EACH ADDED LAYER. POSITION AT UNIT HEIGHT ABOVE THE NEXT LOWER HORIZONTAL PIECE OR STRUT LEDGER.



END VIEW

FOR CENTER GATE C



HORIZONTAL PIECE,
2" X 6" (51MM X 152MM)
MATERIAL (2 REQD).
NAIL TO THE VERTICAL
PIECES W/3 NAILS AT
EACH JOINT.

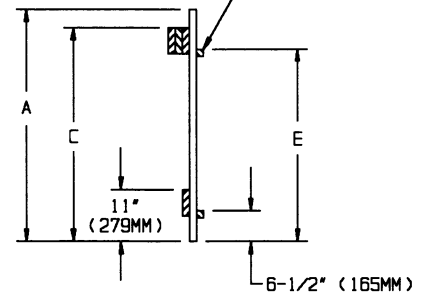
VERTICAL PIECE,
2" X 6" (51MM X
152MM) MATERIAL
(4 REQD).

STOP PIECE, 2" X 6" X 6"
(51MM X 152MM X 152MM)
(DOUBLED) (2 REQD). NAIL
FIRST PIECE TO THE
HORIZONTAL PIECE W/3
NAILS AND LAMINATE THE
SECOND TO THE FIRST IN
A LIKE MANNER.

CENTER GATE D

FOR 1-HIGH LOAD WITH
WIDTH PARALLEL TO SIDES.

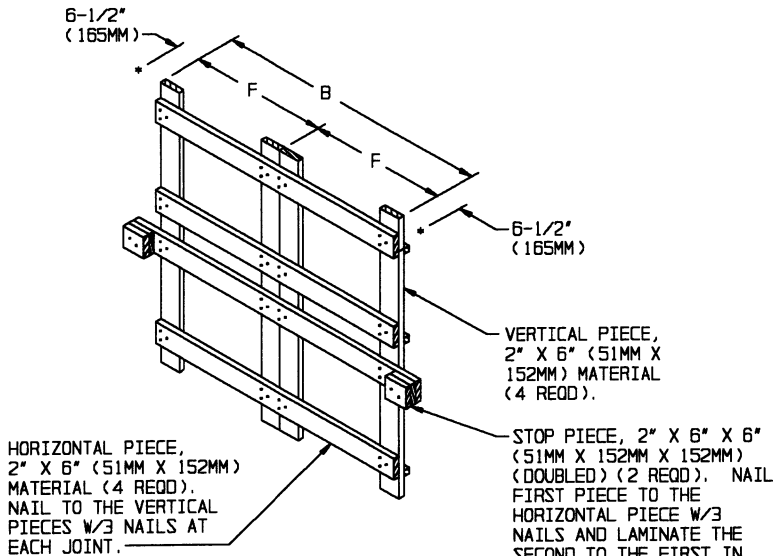
STRUT LEDGER, 2" X 2"
(51MM X 51MM) OR 2" X 4"
(51MM X 102MM) BY LENGTH
TO SUIT (2 REQD). NAIL
TO THE VERTICAL PIECES W/2
NAILS AT EACH JOINT.



END VIEW

FOR CENTER GATE D

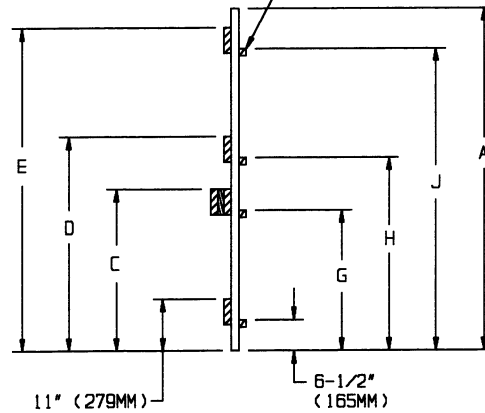
DIMENSIONS FOR CENTER GATE D	
A	UNIT HEIGHT PLUS 4" (102MM).
B	LOAD WIDTH.
C	UNIT HEIGHT.
D	UNIT LENGTH.
E	UNIT HEIGHT MINUS 4-1/2" (114MM).



CENTER GATE E

FOR 2-HIGH LOAD WITH WIDTH PARALLEL TO SIDES.

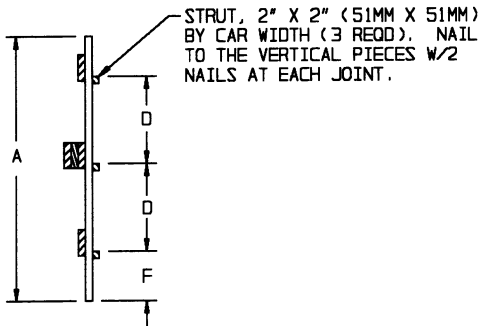
STRUT LEDGER, 2" X 2" (51MM X 51MM) OR 2" X 4" (51MM X 102MM) BY LENGTH TO SUIT (4 REQD). NAIL TO THE VERTICAL PIECES W/2 NAILS AT EACH JOINT.



END VIEW

FOR CENTER GATE E

DIMENSIONS FOR CENTER GATE E	
A	LOAD HEIGHT PLUS 4" (102MM)
B	LOAD WIDTH.
C	UNIT HEIGHT.
D	UNIT HEIGHT PLUS 11" (279MM).
E	LOAD HEIGHT.
F	UNIT LENGTH.
G	UNIT HEIGHT MINUS 4-1/2" (114MM).
H	UNIT HEIGHT PLUS 6-1/2" (165MM).
J	LOAD HEIGHT MINUS 4-1/2" (114MM).

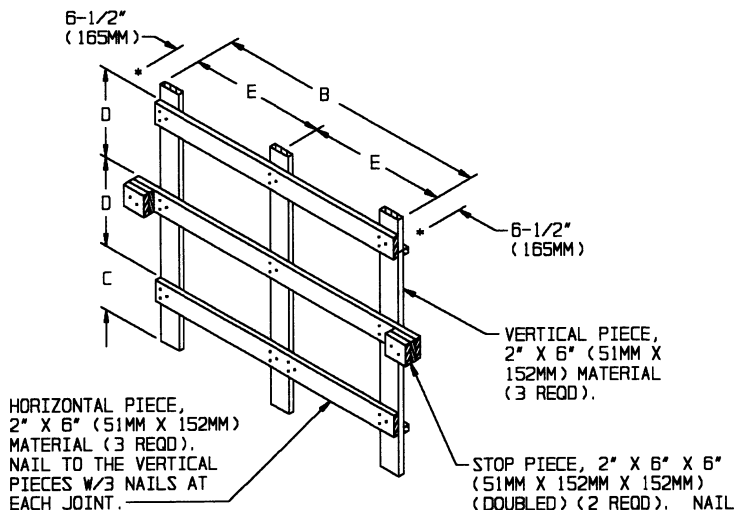


END VIEW

FOR CENTER GATE F

DIMENSIONS FOR CENTER GATE F	
A	UNIT HEIGHT TIMES (NO. OF LAYERS MINUS 1), PLUS ONE-HALF UNIT HEIGHT, PLUS 4" (102MM)
B	LOAD WIDTH.
C	ONE-HALF UNIT HEIGHT PLUS 3" (76MM).
D	UNIT HEIGHT.
E	UNIT LENGTH.
F	ONE-HALF UNIT HEIGHT MINUS 1-1/2" (38MM).

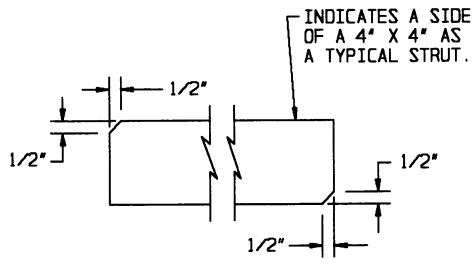
* FOR LOADS OF MORE THAN THREE LAYERS, ADD ONE HORIZONTAL PIECE AND STRUT LEDGER FOR EACH ADDED LAYER. POSITION AT UNIT HEIGHT ABOVE THE NEXT LOWER HORIZONTAL PIECE OR STRUT LEDGER.



CENTER GATE F

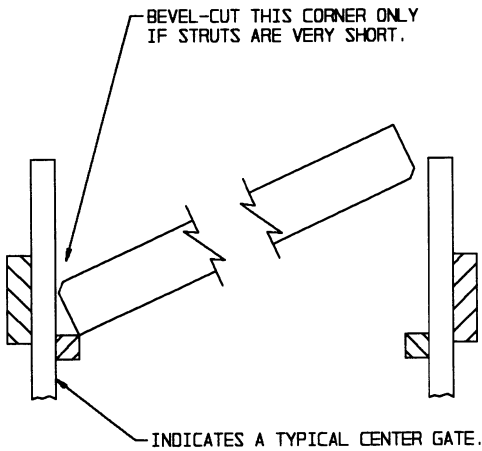
FOR 3-HIGH LOAD WITH WIDTH PARALLEL TO SIDES. *

DETAILS



BEVEL-CUT

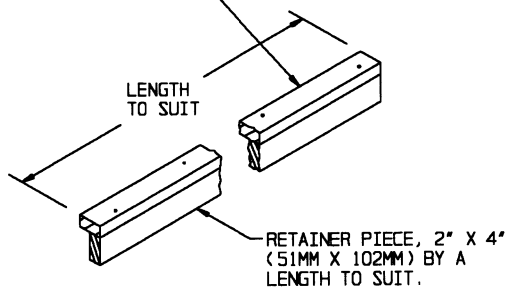
BEVEL CUTTING THE STRUTS AS SPECIFIED WILL FACILITATE INSTALLING THE STRUTS WITH A "DRIVE FIT". CAUTION: DO NOT BEVEL A CORNER MORE THAN ONE-HALF INCH (13MM).



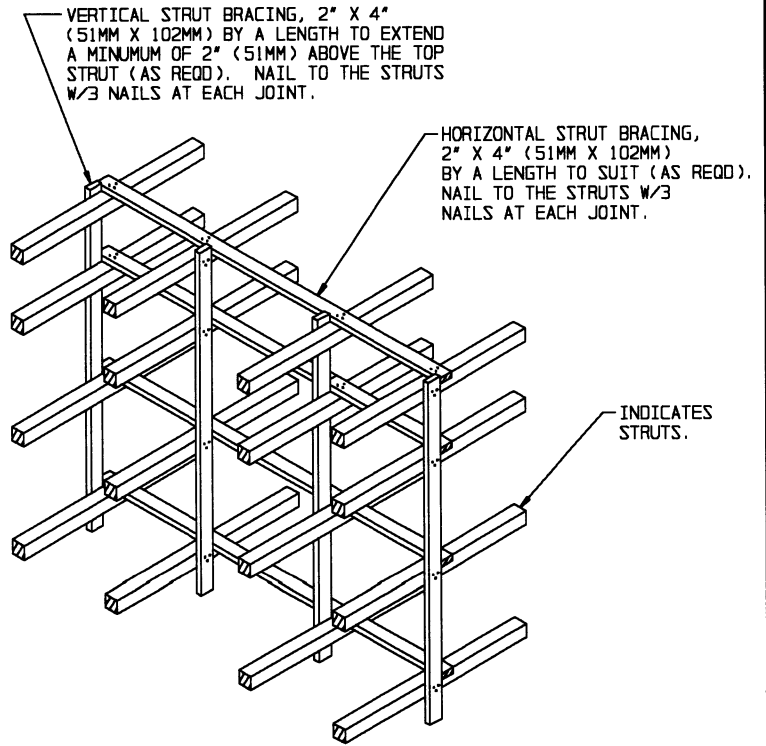
STRUT INSTALLATION

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

SUPPORT PIECE, 2" X 4" (51MM X 102MM) BY A LENGTH TO SUIT (1 REQD). NAIL TO THE RETAINER PIECE W/1 NAIL EVERY 12" (305MM).

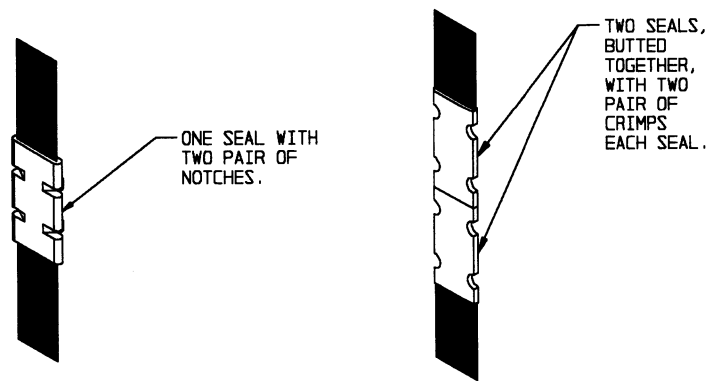


CAP PIECE



TYPICAL STRUT BRACING

THE STRUT BRACING SHOWN IS FOR A 2-HIGH LOAD. THE PROCEDURE MAY BE ADAPTED FOR USE IN A 1-HIGH LOAD OR OTHER HEIGHT LOADS.



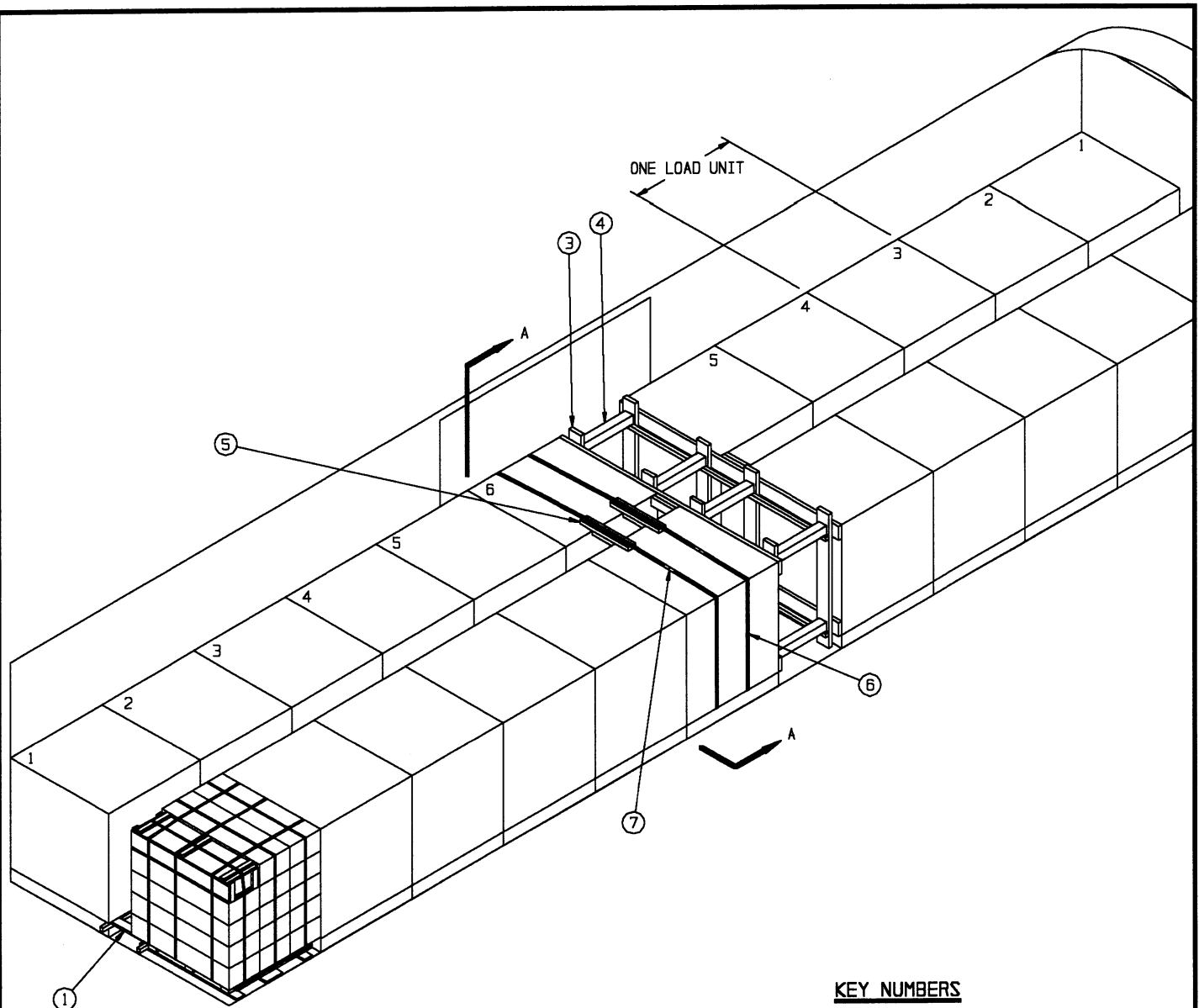
STRAP JOINT A

METHOD OF SECURING A STRAP JOINT WHEN USING A NOTCH-TYPE SEALER.

STRAP JOINT B

METHOD OF SECURING A STRAP JOINT WHEN USING A CRIMP-TYPE SEALER.

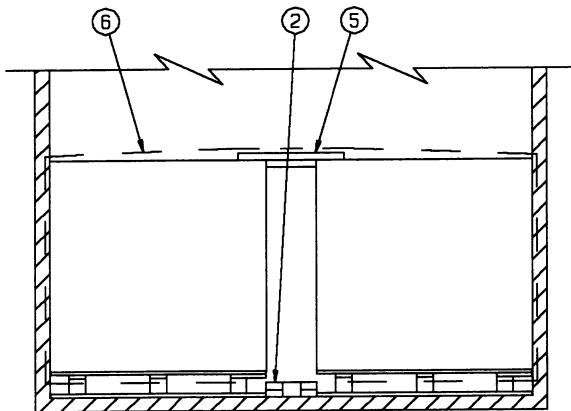
END-OVER-END LAP JOINT DETAILS



ISOMETRIC VIEW

KEY NUMBERS

- ① ANTI-SWAY BRACE A (10 REQ'D). SEE THE DETAIL ON PAGE 43. SEE SPECIAL NOTES 4 AND 5 ON PAGE 25.
- ② DOORWAY BLOCKING, 2" X 4" (51MM X 102MM) BY PALLET LENGTH MINUS 2" (51MM), 33" (838MM) FOR THE PALLET UNIT SHOWN (DOUBLED) (2 REQ'D). POSITION SO AS TO CENTER AGAINST THE PALLETS IN THE DOORWAY AREA AS SHOWN IN THE "SECTION A-A" VIEW BELOW. PLACE ONE PIECE DIRECTLY ON TOP OF ANOTHER AND NAIL THRU BOTH PIECES AND INTO THE CAR FLOOR W/3 NAILS. SEE GENERAL NOTES "H" AND "J" ON PAGE 2.
- ③ CENTER GATE (2 REQ'D). SEE THE "CENTER GATE G" DETAIL ON PAGE 40.
- ④ STRUT, 4" X 4" (102MM X 102MM) BY CUT TO FIT (8 REQ'D). STRUTS WILL BE APPROXIMATELY 24" (610MM) LONG FOR THE PALLET UNIT SHOWN. TOENAIL TO THE CENTER GATES, PIECES MARKED ③, W/2 NAILS AT EACH END. SEE GENERAL NOTES "L" AND "M" ON PAGE 2.
- ⑤ SPACER ASSEMBLY (2 REQ'D). SEE THE DETAIL ON PAGE 42.
- ⑥ DOORWAY PROTECTION STRAP, 1-1/4" X .035" OR .031" (32MM X .889MM OR .787MM) BY A LENGTH TO SUIT (REF: 26'-0" (7,925MM) LONG FOR THE PALLET UNIT SHOWN) (2 REQ'D). STAPLE STRAP TO SPACER ASSEMBLY W/3 STAPLES. SEE SPECIAL NOTE 6 ON PAGE 25.
- ⑦ SEAL FOR 1-1/4" STRAPPING (4 REQ'D, 2 PER STRAP). SEE GENERAL NOTE "O" ON PAGE 2.



SECTION A-A

**TYPICAL 1-HIGH LOAD
WITH LENGTH PARALLEL TO SIDES IN A GBS 252 CAR**

(SPECIAL NOTES CONTINUED)

11. IF THE PALLET UNIT TO BE SHIPPED IS TOO HEAVY TO BE LOADED TWO UNITS WIDE IN THE CAR, A ONE UNIT WIDE LOAD CAN BE FORMED. THE CENTER GATE "N", AS DETAILED ON PAGE 43, WILL BE USED IN LIEU OF THE DEPICTED CENTER GATE, AND ONLY FOUR STRUTS WILL BE REQUIRED. THE SIDE BLOCKING WILL BE AS SHOWN. NOTE THAT THE ONE-UNIT-WIDE PROCEDURES CAN ALSO BE USED TO OBTAIN THE QUANTITY IT IS DESIRED TO SHIP.
12. A LOAD MAY BE REDUCED BY ONE PALLET UNIT BY EMPLOYING THE PROCEDURES DEPICTED ON PAGE 45.
13. A PARTIAL PALLET MAY BE SECURED TO THE TOP OF A PALLET UNIT FOR SHIPMENT. SEE THE PROCEDURES ON PAGE 49 FOR GUIDANCE.
14. INDIVIDUAL BOXES MAY BE SECURED TO THE TOP OF A PALLET UNIT FOR SHIPMENT. SEE THE PROCEDURES ON PAGE 50 FOR GUIDANCE.

SPECIAL NOTES:

1. A GBS 252 CAR, 41'-8" (12,700MM) LONG BY 8'-6" (2,600MM) WIDE HAVING A MAXIMUM LOAD LIMIT OF 57,304 POUNDS (26,016 KG) IS SHOWN. CARS OF OTHER SIZES AND TYPES MAY BE USED.
2. A 22-UNIT LOAD OF 105MM CARTRIDGES, PACKED 2 PER WOODEN BOX, IS SHOWN. THE UNIT IS 42-3/4" (1,086MM) LONG BY 45-3/4" (1,162MM) WIDE BY 50" (1,270MM) HIGH AND WEIGHS APPROXIMATELY 2,197 POUNDS (978 KG). THE DEPICTED PROCEDURES ARE ALSO APPLICABLE FOR OTHER SIZE AND WEIGHT PALLET UNITS.
3. THE DEPICTED LOADING PROCEDURES ARE APPLICABLE FOR PALLET UNITS WHICH ARE 50-1/2" (1,283MM) OR LESS IN WIDTH. PALLET UNITS WIDER THAN THAT MUST BE LOADED WITH THE WIDTH DIMENSION PARALLEL TO THE SIDEWALL. SEE THE PROCEDURES ON PAGES 28 AND 29 FOR GUIDANCE.
4. NAILED SIDE BLOCKING, DOUBLED 2" X 4" (51MM X 102MM) OR 2" X 6" (51MM X 152MM), NAILED W/1 NAIL EVERY 24" (610MM), MAY BE USED THROUGHOUT THE LENGTH OF THE LOAD IN LIEU OF USING ANTI-SWAY BRACES, PIECE MARKED ①, IF DESIRED. THE SIDE BLOCKING WILL NEED TO BE PRE-POSITIONED IF THE LADING OVERHANGS THE PALLET ENOUGH TO PREVENT NAILING AFTER THE PALLETS ARE LOADED. PIECES MARKED ② WILL THEN NOT BE REQUIRED.
5. WHEN PALLET UNITS WHICH ARE FROM 49-1/2" (1,257MM) TO 50-1/2" (1,283MM) WIDE ARE BEING LOADED, THE ANTI-SWAY BRACES OR NAILED SIDE BLOCKING ARE NOT REQUIRED.
6. DOORWAY PROTECTION IS REQUIRED FOR ALL PALLET STACKS WHICH ARE COMPLETELY WITHIN THE DOORWAY AREA OR WHICH EXTEND INTO THE DOORWAY AREA BY ONE-HALF OR MORE OF THE STACK LENGTH. TWO DOORWAY PROTECTION STRAPS ARE REQUIRED FOR EACH PALLET STACK WHICH IS COMPLETELY WITHIN THE DOORWAY AREA OR WHICH IS NOT RETAINED BY AT LEAST 6" (152MM) OF CAR SIDEWALL ON BOTH SIDES OF THE CAR. ONE DOORWAY PROTECTION STRAP IS REQUIRED FOR EACH PALLET STACK WHICH IS RETAINED BY FROM 6" (152MM) TO ONE-HALF THE PALLET UNIT LENGTH.
7. THE 1-HIGH LOADING PROCEDURES ARE APPLICABLE FOR ANY HEIGHT PALLET UNIT.
8. THE NUMBER OF PALLET UNITS IN THE LENGTH OF THE CAR IS BASED ON THE PALLET UNIT LENGTH AS FOLLOWS.

NO. LONG	MAXIMUM UNIT LENGTH
13	36-1/2" (927MM)
12	39-5/8" (1,006MM)
11	43-1/4" (1,098MM)
10	46" (1,168MM)

9. THE MAXIMUM NUMBER OF PALLET UNITS BASED ON THE WEIGHT OF THE UNITS, NOT TAKING INTO CONSIDERATION THE WEIGHT OF THE DUNNAGE, IS AS FOLLOWS.

NO. OF UNITS	MAXIMUM WEIGHT OF UNIT
26	2,204 LBS (1,000 KG)
24	2,387 LBS (1,083 KG)
22	2,604 LBS (1,182 KG)
20	2,865 LBS (1,300 KG)

10. THE DEPICTED LOAD CAN BE REDUCED TO SUIT THE QUANTITY TO BE SHIPPED BY OMITTING ONE OR MORE LOAD UNITS. NOTE THAT STRUT BRACING WILL BE REQUIRED IF THE STRUTS ARE LONGER THAN 72" (1,828MM). SEE THE "TYPICAL STRUT BRACING" DETAIL ON PAGE 23.

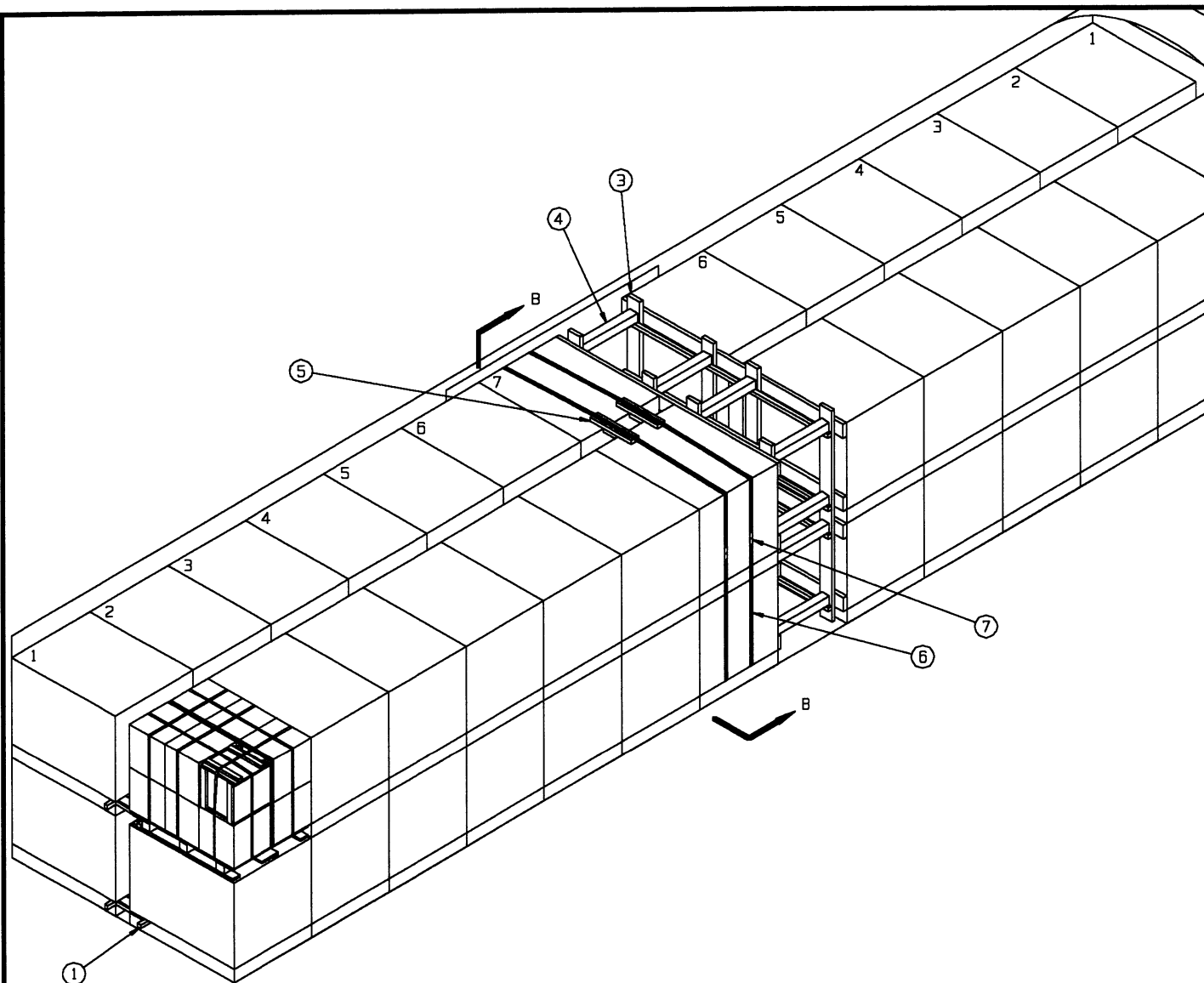
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BILL OF MATERIAL (TYPICAL)		
LUMBER	LINEAR FEET	BOARD FEET
1" X 4" (25MM X 102MM)	59 (17,983MM)	20
2" X 2" (51MM X 51MM)	72 (21,946MM)	24
2" X 4" (51MM X 102MM)	76 (23,165MM)	51
2" X 6" (51MM X 152MM)	70 (21,336MM)	70
4" X 4" (102MM X 102MM)	16 (4,877MM)	21
NAILS	NO. REQD	POUNDS
SIZE AS REQD	362	6
STEEL STRAPPING, 1-1/4" -- 78' REQD	---	12 LBS
SEAL FOR 1-1/4" STRAPPING	-- 4 REQD	1/2 LB

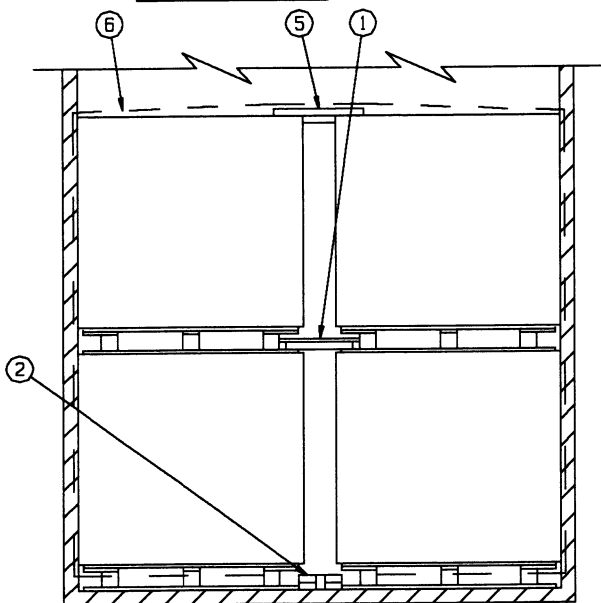
LOAD AS SHOWN (TYPICAL)

ITEM	QUANTITY	WEIGHT (APPROX)
PALLET UNIT	22	48,334 LBS (21,944 KG)
DUNNAGE		391 LBS (178 KG)
TOTAL WEIGHT		48,725 LBS (22,122 KG)

TYPICAL 1-HIGH LOAD
WITH LENGTH PARALLEL TO SIDES IN A GBS 252 CAR



ISOMETRIC VIEW



SECTION B-B

KEY NUMBERS (TYPICAL)

- ① ANTI-SWAY BRACE A (25 REQD). SEE THE DETAIL ON PAGE 43. SEE SPECIAL NOTES 4 AND 5 ON PAGE 27.
- ② DOORWAY BLOCKING, 2" X 4" (51MM X 102MM) BY PALLET LENGTH MINUS 2" (51MM), 33" (838MM) FOR THE PALLET UNIT SHOWN (DOUBLED) (2 REQD). POSITION SO AS TO CENTER AGAINST THE PALLETS IN THE DOORWAY AREA AS SHOWN IN THE "SECTION B-B" VIEW BELOW. PLACE ONE PIECE DIRECTLY ON TOP OF ANOTHER AND NAIL THRU BOTH PIECES AND INTO THE CAR FLOOR W/3 NAILS. SEE GENERAL NOTES "H" AND "J" ON PAGE 2.
- ③ CENTER GATE (2 REQD). SEE THE "CENTER GATE H" DETAIL ON PAGE 40.
- ④ STRUT, 4" X 4" (102MM X 102MM) BY CUT TO FIT (16 REQD). STRUTS WILL BE APPROXIMATELY 26" (660MM) LONG FOR THE PALLET UNIT SHOWN. TOENAIL TO THE CENTER GATES, PIECES MARKED ③, W/2 NAILS AT EACH END. SEE GENERAL NOTES "L" AND "M" ON PAGE 2.
- ⑤ SPACER ASSEMBLY (2 REQD). SEE THE DETAIL ON PAGE 42.
- ⑥ DOORWAY PROTECTION STRAP, 1-1/4" X .035" OR .031" (32MM X .889MM OR .787MM) BY A LENGTH TO SUIT (REF: 27'-6" (8,382MM) LONG FOR THE PALLET UNIT SHOWN) (2 REQD). STAPLE STRAP TO SPACER ASSEMBLY W/3 STAPLES. SEE SPECIAL NOTE 6 ON PAGE 27.
- ⑦ SEAL FOR 1-1/4" STRAPPING (4 REQD, 2 PER STRAP). SEE GENERAL NOTE "O" ON PAGE 2.

**TYPICAL 2-HIGH LOAD
WITH LENGTH PARALLEL TO SIDES IN A GBS 252 CAR**

(SPECIAL NOTES CONTINUED)

10. THE MAXIMUM NUMBER OF PALLET UNITS FOR LOADS OF MORE THAN TWO LAYERS MUST BE CALCULATED. THE MAXIMUM LOAD LIMIT OF A CAR IS NOT TO BE EXCEEDED. FOR GUIDANCE, THE MAXIMUM NUMBER OF PALLET UNITS FOR A 3-LAYER LOAD BASED ON THE WEIGHT OF THE UNITS, NOT TAKING INTO CONSIDERATION THE WEIGHT OF THE DUNNAGE, IS AS FOLLOWS.

NO. OF UNITS	MAXIMUM WEIGHT OF UNIT
78	748 LBS (339 KG)
72	811 LBS (368 KG)
66	884 LBS (401 KG)
60	973 LBS (441 KG)

11. THE DEPICTED LOAD CAN BE REDUCED TO SUIT THE QUANTITY TO BE SHIPPED BY OMITTING ONE OR MORE LOAD UNITS. NOTE THAT STRUT BRACING WILL BE REQUIRED IF THE STRUTS ARE LONGER THAN 72" (1,828MM). SEE THE "TYPICAL STRUT BRACING" DETAIL ON PAGE 23.
12. A LOAD MAY BE REDUCED BY ONE PALLET UNIT BY EMPLOYING THE PROCEDURES DEPICTED ON PAGE 45.
13. A PARTIAL PALLET MAY BE SECURED TO THE TOP OF A PALLET UNIT FOR SHIPMENT IF THE INSIDE CAR HEIGHT PERMITS. SEE THE PROCEDURES ON PAGE 49 FOR GUIDANCE.
14. INDIVIDUAL BOXES MAY BE SECURED TO THE TOP OF A PALLET UNIT FOR SHIPMENT IF THE INSIDE CAR HEIGHT PERMITS. SEE THE PROCEDURES ON PAGE 50 FOR GUIDANCE.

SPECIAL NOTES:

- A GBS 252 CAR, 41'-8" (12,700MM) LONG BY 8'-6" (2,600MM) WIDE HAVING A MAXIMUM LOAD LIMIT OF 57,304 POUNDS (26,016 KG) IS SHOWN. CARS OF OTHER SIZES AND TYPES MAY BE USED.
- A 52-UNIT LOAD OF MINE, AT, PRACTICE, M20, PACKED 3 PER WOODEN BOX, IS SHOWN. THE UNIT IS 36" (914MM) LONG BY 47-5/8" (1,210MM) WIDE BY 40" (1,016MM) HIGH AND WEIGHS APPROXIMATELY 686 POUNDS (311 KG). THE DEPICTED PROCEDURES ARE ALSO APPLICABLE FOR OTHER SIZE AND WEIGHT PALLET UNITS.
- THE DEPICTED LOADING PROCEDURES ARE APPLICABLE FOR PALLET UNITS WHICH ARE 50-1/2" (1,283MM) OR LESS IN WIDTH. PALLET UNITS WIDER THAN THAT MUST BE LOADED WITH THE WIDTH DIMENSION PARALLEL TO THE SIDEWALL. SEE THE PROCEDURES ON PAGES 30 AND 31 FOR GUIDANCE.
- NAILED SIDE BLOCKING, DOUBLED 2" X 4" (51MM X 102MM) OR 2" X 6" (51MM X 152MM), NAILED W/1 NAIL EVERY 24" (610MM), MAY BE USED THROUGHOUT THE LENGTH OF THE LOAD IN LIEU OF USING THE ANTI-SWAY BRACES, PIECE MARKED ①, BETWEEN THE PALLET UNITS IN THE FIRST LAYER, IF DESIRED. THE NAILED SIDE BLOCKING WILL NEED TO BE PRE-POSITIONED IF THE LADING OVERHANGS THE PALLET ENOUGH TO PREVENT NAILING AFTER THE PALLETS ARE LOADED. PIECES MARKED ② WILL THEN NOT BE REQUIRED.
- WHEN PALLET UNITS WHICH ARE FROM 49-1/2" (1,257MM) TO 50-1/2" (1,283MM) WIDE ARE BEING LOADED, THE ANTI-SWAY BRACES AND/OR NAILED SIDE BLOCKING ARE NOT REQUIRED.
- DOORWAY PROTECTION IS REQUIRED FOR ALL PALLET STACKS WHICH ARE COMPLETELY WITHIN THE DOORWAY AREA OR WHICH EXTEND INTO THE DOORWAY AREA BY ONE-HALF OR MORE OF THE STACK LENGTH. TWO DOORWAY PROTECTION STRAPS ARE REQUIRED FOR EACH PALLET STACK WHICH IS COMPLETELY WITHIN THE DOORWAY AREA OR WHICH IS NOT RETAINED BY AT LEAST 6" (152MM) OF CAR SIDEWALL ON BOTH SIDES OF THE CAR. ONE DOORWAY PROTECTION STRAP IS REQUIRED FOR EACH PALLET STACK WHICH IS RETAINED BY FROM 6" (152MM) TO ONE-HALF THE PALLET UNIT LENGTH.
- THE 2-HIGH LOADING PROCEDURES ARE APPLICABLE FOR PALLET UNITS WHICH ARE NOT MORE THAN 41-3/4" (1,060MM) HIGH. THE DEPICTED PROCEDURES MAY BE USED FOR THREE LAYERS OF UNITS WHICH ARE NOT MORE THAN 27-3/4" (705MM) HIGH, FOR FOUR LAYERS OF UNITS NOT MORE THAN 20-7/8" (530MM) HIGH, FOR FIVE LAYERS NOT MORE THAN 16-5/8" (422MM), AND FOR SIX LAYERS NOT MORE THAN 13-7/8" (352MM) HIGH. NOTE THAT FOR LOADS OF THREE OR MORE LAYERS, THE STACKS MUST BE UNITIZED INTO GROUPS OF TWO AND/OR THREE PALLET UNITS, AS APPLICABLE, PRIOR TO PLACEMENT IN THE LOAD.
- THE NUMBER OF PALLET UNITS IN THE LENGTH OF THE CAR IS BASED ON THE PALLET UNIT LENGTH AS FOLLOWS.

NO. LONG	MAXIMUM UNIT LENGTH
13	36-1/2" (927MM)
12	39-5/8" (1,006MM)
11	43-1/4" (1,098MM)
10	46" (1,168MM)

9. THE MAXIMUM NUMBER OF PALLET UNITS FOR A 2-LAYER LOAD BASED ON THE WEIGHT OF THE UNITS, NOT TAKING INTO CONSIDERATION THE WEIGHT OF THE DUNNAGE, IS AS FOLLOWS.

NO. OF UNITS	MAXIMUM WEIGHT OF UNIT
52	1,102 LBS (500 KG)
48	1,193 LBS (541 KG)
44	1,302 LBS (591 KG)
40	1,432 LBS (650 KG)

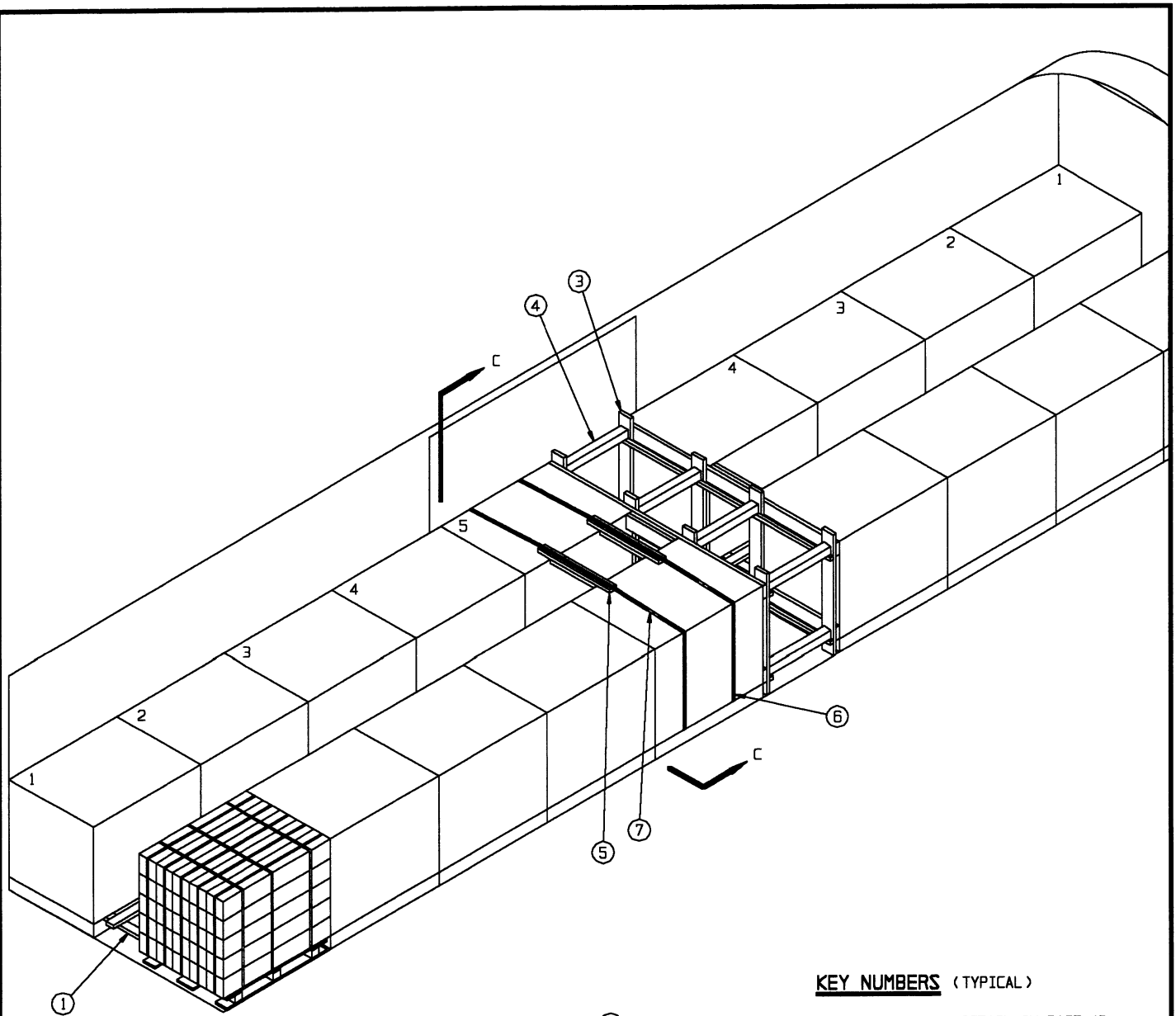
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LOAD AS SHOWN (TYPICAL)

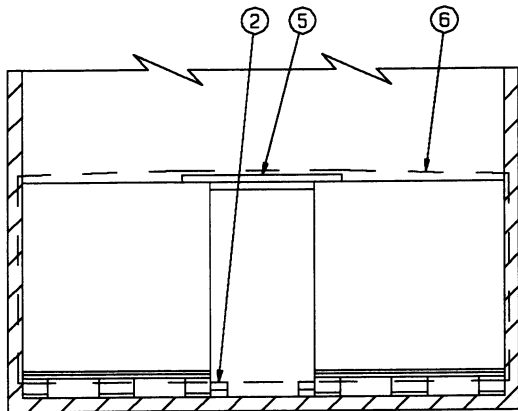
ITEM	QUANTITY	WEIGHT (APPROX)
PALLET UNIT	52	35,672 LBS (16,195 KG)
DUNNAGE		626 LBS (285 KG)
TOTAL WEIGHT		36,301 LBS (16,480 KG)

BILL OF MATERIAL (TYPICAL)		
LUMBER	LINEAR FEET	BOARD FEET
1" X 4" (25MM X 102MM)	56 (17,069MM)	19
2" X 2" (51MM X 51MM)	213 (64,922MM)	71
2" X 4" (51MM X 102MM)	61 (18,593MM)	41
2" X 6" (51MM X 152MM)	124 (37,795MM)	124
4" X 4" (102MM X 102MM)	35 (10,668MM)	47
NAILS	NO. REQD	POUNDS
SIZE AS REQD	792	13-1/2
STEEL STRAPPING, 1-1/4"	55' REQD	8 LBS
SEAL FOR 1-1/4" STRAPPING	4 REQD	NIL

TYPICAL 2-HIGH LOAD
WITH LENGTH PARALLEL TO SIDES IN A GBS 252 CAR



ISOMETRIC VIEW



SECTION C-C

KEY NUMBERS (TYPICAL)

- ① ANTI-SWAY BRACE B (8 REOD). SEE THE DETAIL ON PAGE 43. SEE SPECIAL NOTE 3 ON PAGE 29.
- ② DOORWAY BLOCKING, 2" X 4" (51MM X 102MM) BY PALLET WIDTH MINUS 2" (51MM), 46" (1,168MM) FOR THE PALLET UNIT SHOWN (DOUBLED) (2 REOD). POSITION SO AS TO CENTER AGAINST THE PALLETS IN THE DOORWAY AREA AS SHOWN IN THE "SECTION C-C" VIEW BELOW. PLACE ONE PIECE DIRECTLY ON TOP OF ANOTHER AND NAIL THRU BOTH PIECES AND INTO THE CAR FLOOR W/3 NAILS. SEE GENERAL NOTES "H" AND "J" ON PAGE 2.
- ③ CENTER GATE (2 REOD). SEE THE "CENTER GATE K" DETAIL ON PAGE 41.
- ④ STRUT, 4" X 4" (102MM X 102MM) BY CUT TO FIT (8 REOD). STRUTS WILL BE APPROXIMATELY 30-1/2" (775MM) LONG FOR THE PALLET UNIT SHOWN. TOENAIL TO THE CENTER GATES, PIECES MARKED ③, W/2 NAILS AT EACH END. SEE GENERAL NOTES "L" AND "M" ON PAGE 2.
- ⑤ SPACER ASSEMBLY (2 REOD). SEE THE DETAIL ON PAGE 42.
- ⑥ DOORWAY PROTECTION STRAP, 1-1/4" X .035" OR .031" (32MM X .889MM OR .787MM) BY A LENGTH TO SUIT (REF: 25'-6" (7,772MM) LONG FOR THE PALLET UNIT SHOWN) (2 REOD). STAPLE STRAP TO SPACER ASSEMBLY W/3 STAPLES. SEE SPECIAL NOTE 4 ON PAGE 29.
- ⑦ SEAL FOR 1-1/4" STRAPPING (4 REOD, 2 PER STRAP). SEE GENERAL NOTE "O" ON PAGE 2.

**TYPICAL 1-HIGH LOAD
WITH WIDTH PARALLEL TO SIDES IN A GBS 252 CAR**

(SPECIAL NOTES CONTINUED)

10. A LOAD MAY BE REDUCED BY ONE PALLET UNIT BY EMPLOYING THE PROCEDURES DEPICTED ON PAGE 45.
11. A PARTIAL PALLET MAY BE SECURED TO THE TOP OF A PALLET UNIT FOR SHIPMENT. SEE THE PROCEDURES ON PAGE 49 FOR GUIDANCE.
12. INDIVIDUAL BOXES MAY BE SECURED TO THE TOP OF A PALLET UNIT FOR SHIPMENT. SEE THE PROCEDURES ON PAGE 50 FOR GUIDANCE.

SPECIAL NOTES:

1. A GBS 252 CAR, 41'-8" (12,700MM) LONG BY 8'-6" (2,600MM) WIDE HAVING A MAXIMUM LOAD LIMIT OF 57,304 POUNDS (26,016 KG) IS SHOWN. CARS OF OTHER SIZES AND TYPES MAY BE USED.
2. AN 18-UNIT LOAD OF ROCKET MOTORS, 2.75" PACKED 4 PER METAL CONTAINER, IS SHOWN. THE UNIT IS 40" (1,016MM) LONG BY 51-1/2" (1,308MM) WIDE BY 45-1/2" (1,156MM) HIGH AND WEIGHS APPROXIMATELY 1,964 POUNDS (892 KG). THE DEPICTED PROCEDURES ARE ALSO APPLICABLE FOR OTHER SIZE AND WEIGHT PALLET UNITS.
3. NAILED SIDE BLOCKING, DOUBLED 2" X 4" (51MM X 102MM) OR 2" X 6" (51MM X 152MM), NAILED W/1 NAIL EVERY 24" (610MM), MAY BE USED THROUGHOUT THE LENGTH OF THE LOAD IN LIEU OF USING THE ANTI-SWAY BRACES, PIECE MARKED ①, IF DESIRED. THE SIDE BLOCKING WILL NEED TO BE PRE-POSITIONED IF THE LADING OVERHANGS THE PALLET ENOUGH TO PREVENT NAILING AFTER THE PALLETS ARE LOADED. PIECES MARKED ② WILL THEN NOT BE REQUIRED.
4. DOORWAY PROTECTION IS REQUIRED FOR ALL PALLET STACKS WHICH ARE COMPLETELY WITHIN THE DOORWAY AREA OR WHICH EXTEND INTO THE DOORWAY AREA BY ONE-HALF OR MORE OF THE STACK WIDTH. TWO DOORWAY PROTECTION STRAPS ARE REQUIRED FOR EACH PALLET STACK WHICH IS COMPLETELY WITHIN THE DOORWAY AREA OR WHICH IS NOT RETAINED BY AT LEAST 6" (152MM) OF CAR SIDEWALL ON BOTH SIDES OF THE CAR. ONE DOORWAY PROTECTION STRAP IS REQUIRED FOR EACH PALLET STACK WHICH IS RETAINED BY FROM 6" (152MM) TO ONE-HALF THE PALLET UNIT WIDTH.
5. THE 1-HIGH LOADING PROCEDURES ARE APPLICABLE FOR ANY HEIGHT PALLET UNIT.
6. THE NUMBER OF PALLET UNITS IN THE LENGTH OF THE CAR IS BASED ON THE PALLET UNIT WIDTH AS FOLLOWS.

NO. LONG	MAXIMUM UNIT WIDTH
10	47-1/2" (1,206MM)
9	52-7/8" (1,343MM)
8	59-1/2" (1,511MM)
7	68" (1,727MM)
6	6'-7-1/4" (2,012)
5	7'-11" (2,413MM)

7. THE MAXIMUM NUMBER OF PALLET UNITS BASED ON THE WEIGHT OF THE UNITS, NOT TAKING INTO CONSIDERATION THE WEIGHT OF THE DUNNAGE, IS AS FOLLOWS.

NO. OF UNITS	MAXIMUM WEIGHT OF UNIT
26	2,204 LBS (1,000 KG)
24	2,387 LBS (1,083 KG)
22	2,604 LBS (1,182 KG)
20	2,865 LBS (1,300 KG)
18	3,183 LBS (1,445 KG)
16	3,581 LBS (1,625 KG)
14	4,000 LBS (1,816 KG)

8. IF THE PALLET UNIT TO BE SHIPPED IS TOO HEAVY TO BE LOADED TWO UNITS WIDE IN THE CAR, A ONE UNIT WIDE LOAD CAN BE FORMED. THE CENTER GATE "O", AS DETAILED ON PAGE 43, WILL BE USED IN LIEU OF THE DEPICTED CENTER GATE, AND ONLY FOUR STRUTS WILL BE REQUIRED. THE SIDE BLOCKING WILL BE AS SHOWN ON PAGE 28. NOTE THAT THE ONE-UNIT-WIDE PROCEDURES CAN ALSO BE USED TO OBTAIN THE QUANTITY IT IS DESIRED TO SHIP.
9. THE DEPICTED LOAD CAN BE REDUCED TO SUIT THE QUANTITY TO BE SHIPPED BY OMITTING ONE OR MORE LOAD UNITS. NOTE THAT STRUT BRACING WILL BE REQUIRED IF THE STRUTS ARE LONGER THAN 72" (1,828MM). SEE THE "TYPICAL STRUT BRACING" DETAIL ON PAGE 23.

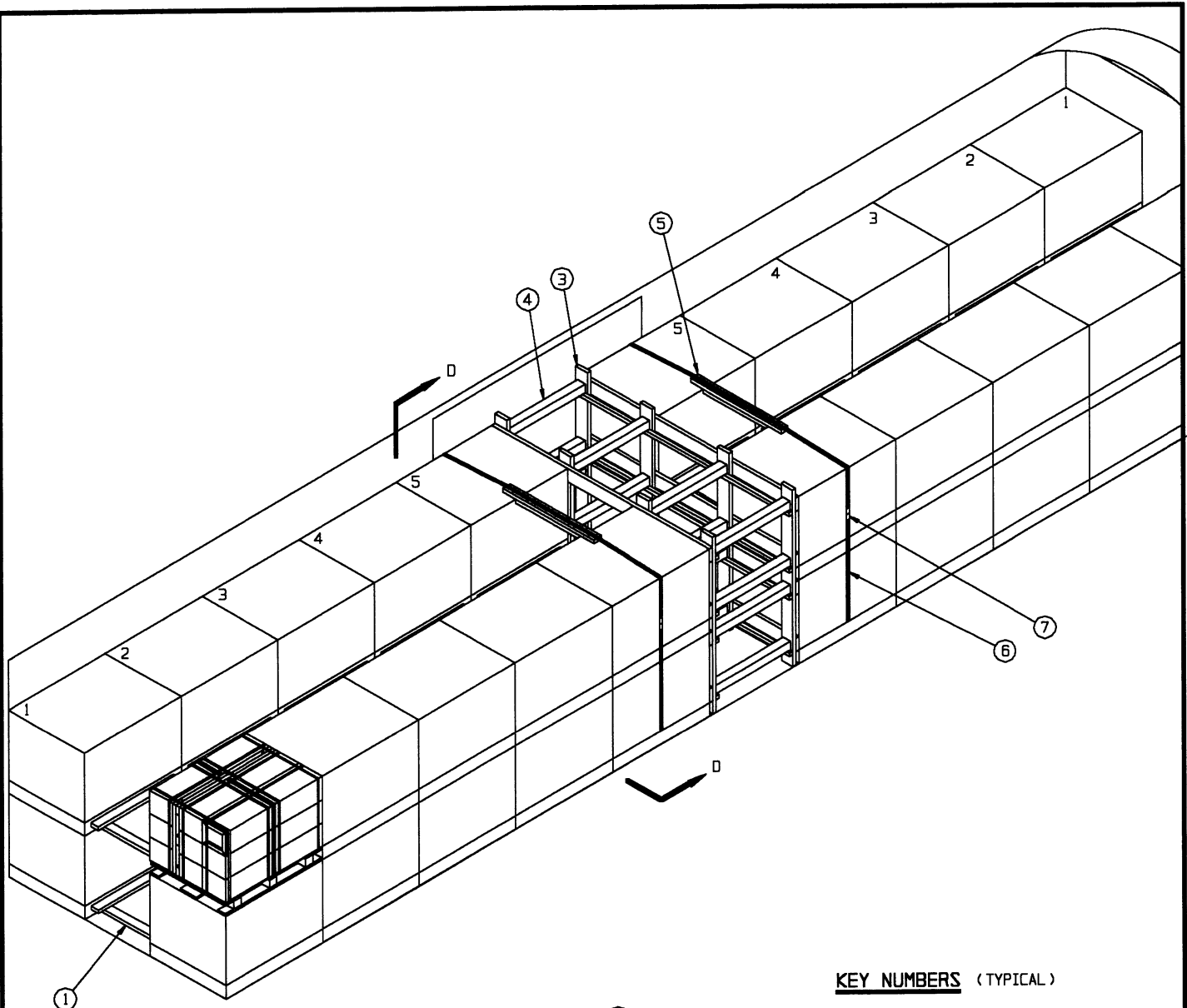
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BILL OF MATERIAL (TYPICAL)		
LUMBER	LINEAR FEET	BOARD FEET
2" X 2" (51MM X 51MM)	34 (10,363MM)	12
2" X 4" (51MM X 102MM)	142 (43,292MM)	95
2" X 6" (51MM X 152MM)	67 (20,422MM)	67
4" X 4" (102MM X 102MM)	21 (6,401MM)	28
NAILS	NO. REQD	POUNDS
SIZE AS REQD	218	3-1/2
STEEL STRAPPING, 1-1/4" -- 51' REQD ---		8 LBS
SEAL FOR 1-1/4" STRAPPING -- 4 REQD ----		NIL

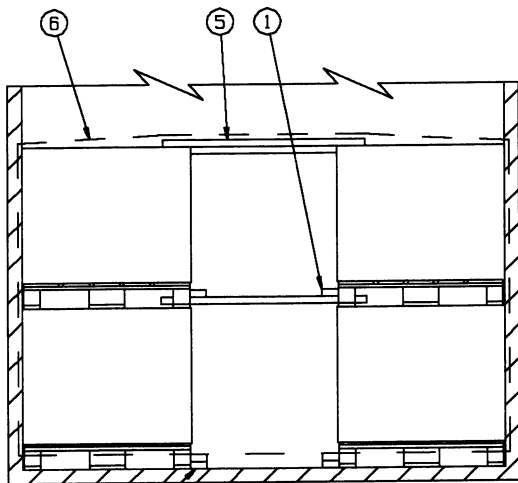
LOAD AS SHOWN (TYPICAL)

ITEM	QUANTITY	WEIGHT (APPROX)
PALLET UNIT	18	35,352 LBS (16,050 KG)
DUNNAGE		416 LBS (189 KG)
TOTAL WEIGHT		35,768 LBS (16,239 KG)

TYPICAL 1-HIGH LOAD
WITH WIDTH PARALLEL TO SIDES IN A GBS 252 CAR



ISOMETRIC VIEW



SECTION D-D

KEY NUMBERS (TYPICAL)

- ① ANTI-SWAY BRACE B (18 REQD). SEE THE DETAIL ON PAGE 43. SEE SPECIAL NOTE 3 ON PAGE 31.
- ② DOORWAY BLOCKING, 2" X 4" (51MM X 102MM) BY PALLET WIDTH MINUS 2" (51MM), 43-1/2" (1,105MM) FOR THE PALLET UNIT SHOWN (DOUBLED) (4 REQD). POSITION SO AS TO CENTER AGAINST THE PALLETS IN THE DOORWAY AREA AS SHOWN IN THE "SECTION D-D" VIEW BELOW. PLACE ONE PIECE DIRECTLY ON TOP OF ANOTHER AND NAIL THRU BOTH PIECES AND INTO THE CAR FLOOR W/3 NAILS. SEE GENERAL NOTES "H" AND "J" ON PAGE 2.
- ③ CENTER GATE (2 REQD). SEE THE "CENTER GATE L" DETAIL ON PAGE 42.
- ④ STRUT, 4" X 4" (102MM X 102MM) BY CUT TO FIT (16 REQD). STRUTS WILL BE APPROXIMATELY 36-1/2" (927MM) LONG FOR THE PALLET UNIT SHOWN. TOENAIL TO THE CENTER GATES, PIECES MARKED ③, W/2 NAILS AT EACH END. SEE GENERAL NOTES "L" AND "M" ON PAGE 2.
- ⑤ SPACER ASSEMBLY (2 REQD). SEE THE DETAIL ON PAGE 42.
- ⑥ DOORWAY PROTECTION STRAP, 1-1/4" X .035" OR .031" (32MM X .889MM OR .787MM) BY A LENGTH TO SUIT (REF: 29'-0" (8,839MM) LONG FOR THE PALLET UNIT SHOWN) (2 REQD). STAPLE STRAP TO SPACER ASSEMBLY W/3 STAPLES. SEE SPECIAL NOTE 4 ON PAGE 31.
- ⑦ SEAL FOR 1-1/4" STRAPPING (4 REQD, 2 PER STRAP). SEE GENERAL NOTE "O" ON PAGE 2.

**TYPICAL 2-HIGH LOAD
WITH WIDTH PARALLEL TO SIDES IN A GBS 252 CAR**

(SPECIAL NOTES CONTINUED)

8. THE MAXIMUM NUMBER OF PALLET UNITS FOR LOADS OF MORE THAN TWO LAYERS MUST BE CALCULATED. THE MAXIMUM LOAD LIMIT OF A CAR IS NOT TO BE EXCEEDED. FOR GUIDANCE, THE MAXIMUM NUMBER OF PALLET UNITS FOR A 3-LAYER LOAD BASED ON THE WEIGHT OF THE UNITS, NOT TAKING INTO CONSIDERATION THE WEIGHT OF THE DUNNAGE, IS AS FOLLOWS.

NO. OF UNITS	MAXIMUM WEIGHT OF UNIT
60	973 LBS (441 KG)
54	1,081 LBS (490 KG)
48	1,216 LBS (552 KG)
42	1,390 LBS (631 KG)
36	1,591 LBS (722 KG)
30	1,910 LBS (867 KG)

9. THE DEPICTED LOAD CAN BE REDUCED TO SUIT THE QUANTITY TO BE SHIPPED BY OMITTING ONE OR MORE LOAD UNITS. NOTE THAT STRUT BRACING WILL BE REQUIRED IF THE STRUTS ARE LONGER THAN 72" (1,828MM). SEE THE "TYPICAL STRUT BRACING" DETAIL ON PAGE 23.
10. A LOAD MAY BE REDUCED BY ONE PALLET UNIT BY EMPLOYING THE PROCEDURES DEPICTED ON PAGE 45.
11. A PARTIAL PALLET MAY BE SECURED TO THE TOP OF A PALLET UNIT, THE HEIGHT OF THE CAR PERMITTING. SEE THE PROCEDURES ON PAGE 49 FOR GUIDANCE.
12. INDIVIDUAL BOXES MAY BE SECURED TO THE TOP OF A PALLET UNIT FOR SHIPMENT, THE HEIGHT OF THE CAR PERMITTING. SEE THE PROCEDURES ON PAGE 50 FOR GUIDANCE.

SPECIAL NOTES:

- A GBS 252 CAR, 41'-8" (12,700MM) LONG BY 8'-6" (2,600MM) WIDE HAVING A MAXIMUM LOAD LIMIT OF 57,304 POUNDS (26,016 KG) IS SHOWN. CARS OF OTHER SIZES AND TYPES MAY BE USED.
- A 40-UNIT LOAD OF SIMULATOR, SIGNAL, PACKED 150 PER WIREBOUND BOX, IS SHOWN. THE UNIT IS 35-5/8" (905MM) LONG BY 45-3/4" (1,162MM) WIDE BY 34" (864MM) HIGH AND WEIGHS APPROXIMATELY 1,100 POUNDS (499 KG). THE DEPICTED PROCEDURES ARE ALSO APPLICABLE FOR OTHER SIZE AND WEIGHT PALLET UNITS.
- NAILED SIDE BLOCKING, DOUBLED 2" X 4" (51MM X 102MM) OR 2" X 6" (51MM X 152MM), NAILED W/1 NAIL EVERY 24" (610MM), MAY BE USED THROUGHOUT THE LENGTH OF THE LOAD IN LIEU OF USING THE ANTI-SWAY BRACES, PIECE MARKED ①, BETWEEN THE PALLET UNITS IN THE FIRST LAYER, IF DESIRED. THE SIDE BLOCKING WILL NEED TO BE PRE-POSITIONED IF THE LADING OVERHANGS THE PALLET ENOUGH TO PREVENT NAILING AFTER THE PALLETS ARE LOADED. PIECES MARKED ② WILL THEN NOT BE REQUIRED.
- DOORWAY PROTECTION IS REQUIRED FOR ALL PALLET STACKS WHICH ARE COMPLETELY WITHIN THE DOORWAY AREA OR WHICH EXTEND INTO THE DOORWAY AREA BY ONE-HALF OR MORE OF THE STACK WIDTH. TWO DOORWAY PROTECTION STRAPS ARE REQUIRED FOR EACH PALLET STACK WHICH IS COMPLETELY WITHIN THE DOORWAY AREA OR WHICH IS NOT RETAINED BY AT LEAST 6" (152MM) OF CAR SIDEWALL ON BOTH SIDES OF THE CAR. ONE DOORWAY PROTECTION STRAP IS REQUIRED FOR EACH PALLET STACK WHICH IS RETAINED BY FROM 6" (152MM) TO ONE-HALF THE PALLET UNIT WIDTH.
- THE 2-HIGH LOADING PROCEDURES ARE APPLICABLE FOR PALLET UNITS WHICH ARE NOT MORE THAN 41-3/4" (1,060MM) HIGH. THE DEPICTED PROCEDURES MAY BE USED FOR THREE LAYERS OF UNITS WHICH ARE NOT MORE THAN 27-3/4" (705MM) HIGH, FOR FOUR LAYERS OF UNITS NOT MORE THAN 20-7/8" (530MM) HIGH, FOR FIVE LAYERS NOT MORE THAN 16-5/8" (422MM), AND FOR SIX LAYERS NOT MORE THAN 13-7/8" (352MM) HIGH. NOTE THAT FOR LOADS OF THREE OR MORE LAYERS, THE STACKS MUST BE UNITIZED INTO GROUPS OF TWO AND/OR THREE PALLET UNITS, AS APPLICABLE, PRIOR TO PLACEMENT IN THE LOAD.
- THE NUMBER OF PALLET UNITS IN THE LENGTH OF THE CAR IS BASED ON THE PALLET UNIT WIDTH AS FOLLOWS.

NO. LONG	MAXIMUM UNIT WIDTH
10	47-1/2" (1,206MM)
9	52-7/8" (1,343MM)
8	59-1/2" (1,511MM)
7	68" (1,727MM)
6	6'-7-1/4" (2,012)
5	7'-11" (2,413MM)

7. THE MAXIMUM NUMBER OF PALLET UNITS FOR A 2-LAYER LOAD BASED ON THE WEIGHT OF THE UNITS, NOT TAKING INTO CONSIDERATION THE WEIGHT OF THE DUNNAGE, IS AS FOLLOWS.

NO. OF UNITS	MAXIMUM WEIGHT OF UNIT
40	1,432 LBS (650 KG)
36	1,591 LBS (722 KG)
32	1,790 LBS (812 KG)
28	2,046 LBS (928 KG)
24	2,387 LBS (1,083 KG)
20	2,865 LBS (1,300 KG)

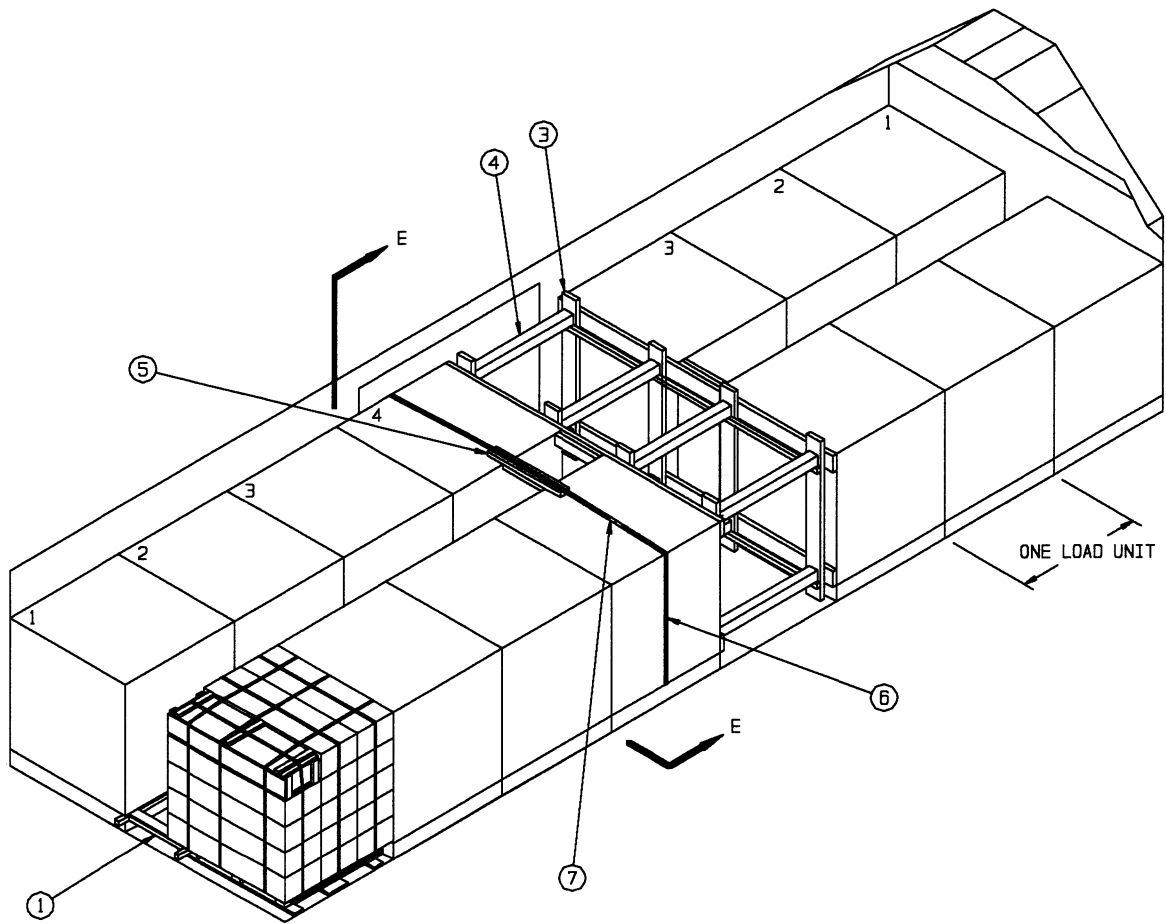
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BILL OF MATERIAL (TYPICAL)		
LUMBER	LINEAR FEET	BOARD FEET
2" X 2" (51MM X 51MM)	68 (20,726MM)	23
2" X 4" (51MM X 102MM)	477 (145,390MM)	318
2" X 6" (51MM X 152MM)	116 (35,357MM)	116
4" X 4" (102MM X 102MM)	49 (14,935MM)	66
NAILS	NO. REQD	POUNDS
SIZE AS REQD	308	5
STEEL STRAPPING, 1-1/4" --- 58' REQD ---		9 LBS
SEAL FOR 1-1/4" STRAPPING --- 4 REQD ---		NIL

LOAD AS SHOWN (TYPICAL)

ITEM	QUANTITY	WEIGHT (APPROX)
PALLET UNIT	40	44,000 LBS (19,976 KG)
DUNNAGE		1,060 LBS (481 KG)
TOTAL WEIGHT		45,060 LBS (20,457 KG)

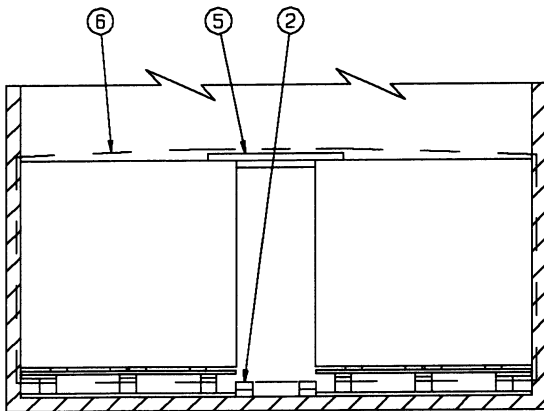
TYPICAL 2-HIGH LOAD
WITH WIDTH PARALLEL TO SIDES IN A GBS 252 CAR



ISOMETRIC VIEW

KEY NUMBERS (TYPICAL)

- ① ANTI-SWAY BRACE A (6 REQD). SEE THE DETAIL ON PAGE 43. SEE SPECIAL NOTE 4 AND 5 ON PAGE 33.
- ② DOORWAY BLOCKING, 2" X 4" (51MM X 102MM) BY PALLET LENGTH MINUS 2" (51MM), 33" (838MM) FOR THE PALLET UNIT SHOWN (DOUBLED) (2 REQD). POSITION SO AS TO CENTER AGAINST THE PALLETS IN THE DOORWAY AREA AS SHOWN IN THE "SECTION E-E" VIEW BELOW. PLACE ONE PIECE DIRECTLY ON TOP OF ANOTHER AND NAIL THRU BOTH PIECES AND INTO THE CAR FLOOR W/3 NAILS. SEE GENERAL NOTES "H" AND "J" ON PAGE 2.
- ③ CENTER GATE (2 REQD). SEE THE "CENTER GATE G" DETAIL ON PAGE 40.
- ④ STRUT, 4" X 4" (102MM X 102MM) BY CUT TO FIT (8 REQD). STRUTS WILL BE APPROXIMATELY 39-1/2" (1,003MM) LONG FOR THE PALLET UNIT SHOWN. TOENAIL TO THE CENTER GATES, PIECES MARKED ③, W/2 NAILS AT EACH END. SEE GENERAL NOTES "L" AND "M" ON PAGE 2.
- ⑤ SPACER ASSEMBLY (1 REQD). SEE THE DETAIL ON PAGE 42.
- ⑥ DOORWAY PROTECTION STRAP, 1-1/4" X .035" OR .031" (32MM X .889MM OR .787MM) BY A LENGTH TO SUIT (REF: 27'-0" (8,230MM) LONG FOR THE PALLET UNIT SHOWN) (1 REQD). STAPLE STRAP TO SPACER ASSEMBLY W/3 STAPLES. SEE SPECIAL NOTE 6 ON PAGE 33.
- ⑦ SEAL FOR 1-1/4" STRAPPING (2 REQD). SEE GENERAL NOTE "O" ON PAGE 2.



SECTION E-E

**TYPICAL 1-HIGH LOAD
WITH LENGTH PARALLEL TO SIDES IN A TMS 851 CAR**

(SPECIAL NOTES CONTINUED)

10. THE DEPICTED LOAD CAN BE REDUCED TO SUIT THE QUANTITY TO BE SHIPPED BY OMITTING ONE OR MORE LOAD UNITS. NOTE THAT STRUT BRACING WILL BE REQUIRED IF THE STRUTS ARE LONGER THAN 72" (1,828MM). SEE THE "TYPICAL STRUT BRACING" DETAIL ON PAGE 23.
11. IF THE PALLET UNIT TO BE SHIPPED IS TOO HEAVY TO BE LOADED TWO UNITS WIDE IN THE CAR, A ONE UNIT WIDE LOAD CAN BE FORMED. THE CENTER GATE "N", AS DETAILED ON PAGE 43, WILL BE USED IN LIEU OF THE DEPICTED CENTER GATE, AND ONLY FOUR STRUTS WILL BE REQUIRED. THE SIDE BLOCKING WILL BE AS SHOWN. NOTE THAT THE ONE-UNIT-WIDE PROCEDURES CAN ALSO BE USED TO OBTAIN THE QUANTITY IT IS DESIRED TO SHIP.
12. A LOAD MAY BE REDUCED BY ONE PALLET UNIT BY EMPLOYING THE PROCEDURES DEPICTED ON PAGE 45.
13. A PARTIAL PALLET MAY BE SECURED TO THE TOP OF A PALLET UNIT FOR SHIPMENT, THE HEIGHT OF THE CAR PERMITTING. SEE THE PROCEDURES ON PAGE 49 FOR GUIDANCE.
14. INDIVIDUAL BOXES MAY BE SECURED TO THE TOP OF A PALLET UNIT FOR SHIPMENT, THE HEIGHT OF THE CAR PERMITTING. SEE THE PROCEDURES ON PAGE 50 FOR GUIDANCE.

SPECIAL NOTES:

1. A TMS 851 CAR, 28'-8-3/4" (8,760MM) LONG BY 9'-0" (2,760MM) WIDE HAVING A MAXIMUM LOAD LIMIT OF 61,712 POUNDS (28,017 KG) IS SHOWN. CARS OF OTHER SIZES AND TYPES MAY BE USED.
2. A 14-UNIT LOAD OF 105MM CARTRIDGES, PACKED 2 PER WOODEN BOX, IS SHOWN. THE UNIT IS 42-3/4" (1,086MM) LONG BY 45-3/4" (1,162MM) WIDE BY 50" (1,270MM) HIGH AND WEIGHS APPROXIMATELY 2,197 POUNDS (978 KG). THE DEPICTED PROCEDURES ARE ALSO APPLICABLE FOR OTHER SIZE AND WEIGHT PALLET UNITS.
3. THE DEPICTED LOADING PROCEDURES ARE APPLICABLE FOR PALLET UNITS WHICH ARE 53-1/2" (1,359MM) OR LESS IN WIDTH. PALLET UNITS WIDER THAN THAT MUST BE LOADED WITH THE WIDTH DIMENSION PARALLEL TO THE SIDEWALL. SEE THE PROCEDURES ON PAGES 36 AND 37 FOR GUIDANCE.
4. NAILED SIDE BLOCKING, DOUBLED 2" X 4" (51MM X 102MM) OR 2" X 6" (51MM X 152MM), NAILED W/1 NAIL EVERY 24" (610MM), MAY BE USED THROUGHOUT THE LENGTH OF THE LOAD IN LIEU OF USING THE ANTI-SWAY BRACES, PIECE MARKED ①, IF DESIRED. THE SIDE BLOCKING WILL NEED TO BE PRE-POSITIONED IF THE LADING OVERHANGS THE PALLET ENOUGH TO PREVENT NAILING AFTER THE PALLETS ARE LOADED. PIECES MARKED ② WILL THEN NOT BE REQUIRED.
5. WHEN PALLET UNITS WHICH ARE FROM 50-1/2" (1,283MM) TO 53-1/2" (1,359MM) WIDE ARE BEING LOADED, THE ANTI-SWAY BRACES OR NAILED SIDE BLOCKING ARE NOT REQUIRED.
6. DOORWAY PROTECTION IS REQUIRED FOR ALL PALLET STACKS WHICH ARE COMPLETELY WITHIN THE DOORWAY AREA OR WHICH EXTEND INTO THE DOORWAY AREA BY ONE-HALF OR MORE OF THE STACK LENGTH. TWO DOORWAY PROTECTION STRAPS ARE REQUIRED FOR EACH PALLET STACK WHICH IS COMPLETELY WITHIN THE DOORWAY AREA OR WHICH IS NOT RETAINED BY AT LEAST 6" (152MM) OF CAR SIDEWALL ON BOTH SIDES OF THE CAR. ONE DOORWAY PROTECTION STRAP IS REQUIRED FOR EACH PALLET STACK WHICH IS RETAINED BY FROM 6" (152MM) TO ONE-HALF THE PALLET UNIT LENGTH.
7. THE 1-HIGH LOADING PROCEDURES ARE APPLICABLE FOR ANY HEIGHT PALLET UNIT.
8. THE NUMBER OF PALLET UNITS IN THE LENGTH OF THE CAR IS BASED ON THE PALLET UNIT LENGTH AS FOLLOWS.

NO. LONG	MAXIMUM UNIT LENGTH
9	35-1/2" (902MM)
8	40" (1,016MM)
7	45-3/4" (1,162MM)
6	46" (1,168MM)

9. THE MAXIMUM NUMBER OF PALLET UNITS BASED ON THE WEIGHT OF THE UNITS, NOT TAKING INTO CONSIDERATION THE WEIGHT OF THE DUNNAGE, IS AS FOLLOWS.

NO. OF UNITS	MAXIMUM WEIGHT OF UNIT
18	3,428 LBS (1,556 KG)
16	3,857 LBS (1,751 KG)
14	4,000 LBS (1,816 KG)

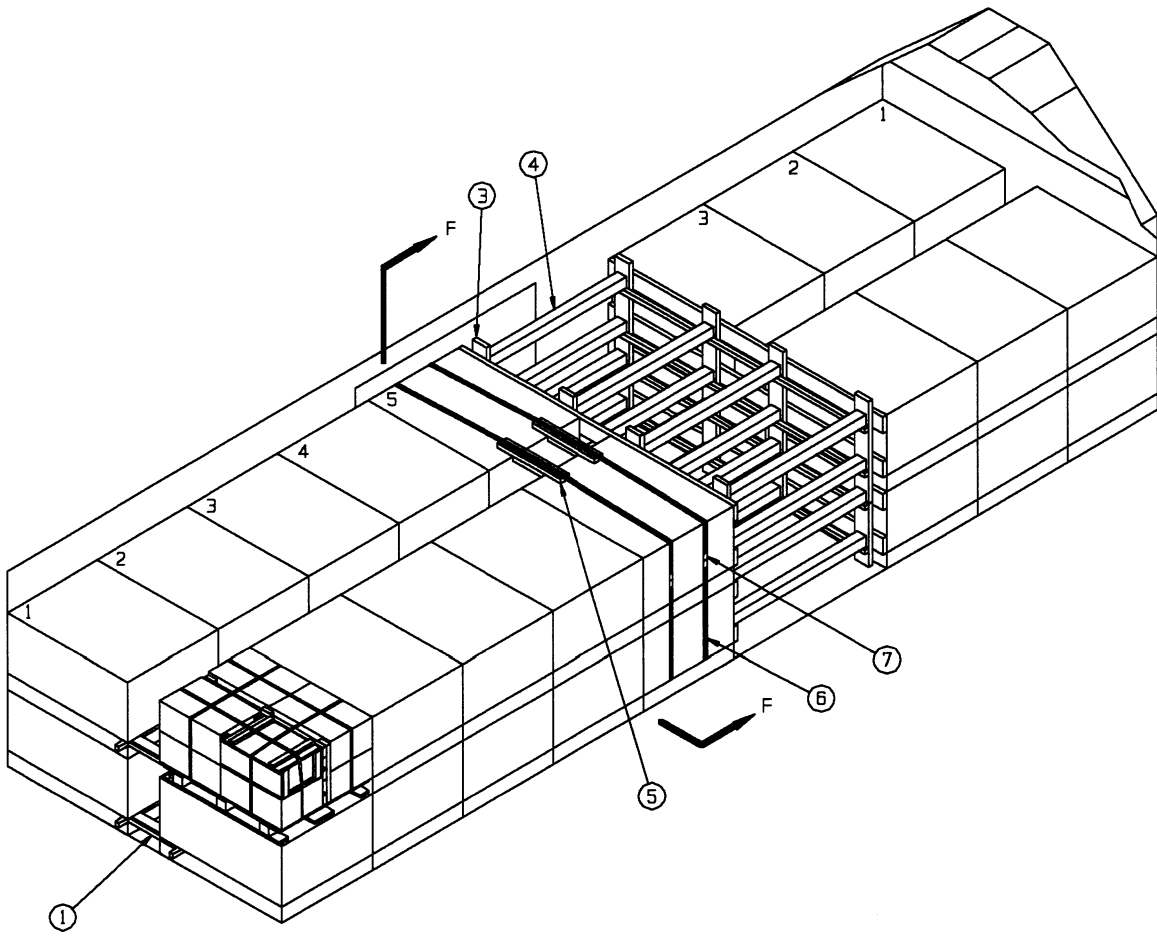
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BILL OF MATERIAL (TYPICAL)		
LUMBER	LINEAR FEET	BOARD FEET
1" X 4" (25MM X 102MM)	23 (7,010MM)	8
2" X 2" (51MM X 51MM)	67 (20,422MM)	34
2" X 4" (51MM X 102MM)	63 (19,202MM)	42
2" X 6" (51MM X 152MM)	72 (21,946MM)	72
4" X 4" (102MM X 102MM)	27 (8,230MM)	36
NAILS	NO. REQD	POUNDS
SIZE AS REQD	277	4-1/2
STEEL STRAPPING, 1-1/4" --	27' REQD	4 LBS
SEAL FOR 1-1/4" STRAPPING --	2 REQD	NIL

LOAD AS SHOWN (TYPICAL)

ITEM	QUANTITY	WEIGHT (APPROX)
PALLET UNIT	14	30,758 LBS (13,964 KG)
DUNNAGE		393 LBS (178 KG)
TOTAL WEIGHT		31,151 LBS (14,142 KG)

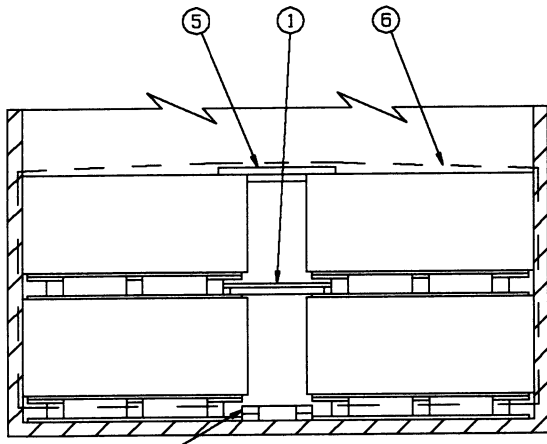
TYPICAL 1-HIGH LOAD
WITH LENGTH PARALLEL TO SIDES IN A TMS 851 CAR



ISOMETRIC VIEW

KEY NUMBERS (TYPICAL)

- ① ANTI-SWAY BRACE A (15 REQD). SEE THE DETAIL ON PAGE 43. SEE SPECIAL NOTES 4 AND 5 ON PAGE 35.
- ② DOORWAY BLOCKING, 2" X 4" (51MM X 102MM) BY PALLET LENGTH MINUS 2" (51MM), 33" (838MM) FOR THE PALLET UNIT SHOWN (DOUBLED) (2 REQD). POSITION SO AS TO CENTER AGAINST THE PALLETS IN THE DOORWAY AREA AS SHOWN IN THE "SECTION F-F" VIEW BELOW. PLACE ONE PIECE DIRECTLY ON TOP OF ANOTHER AND NAIL THRU BOTH PIECES AND INTO THE CAR FLOOR W/3 NAILS. SEE GENERAL NOTES "H" AND "J" ON PAGE 2.
- ③ CENTER GATE (2 REQD). SEE THE "CENTER GATE H" DETAIL ON PAGE 40.
- ④ STRUT, 4" X 4" (102MM X 102MM) BY CUT TO FIT (16 REQD). STRUTS WILL BE APPROXIMATELY 54-1/2" (1,384MM) LONG FOR THE PALLET UNIT SHOWN. TOENAIL TO THE CENTER GATES, PIECES MARKED ③, W/2 NAILS AT EACH END. SEE GENERAL NOTES "L" AND "M" ON PAGE 2.
- ⑤ SPACER ASSEMBLY (2 REQD). SEE THE DETAIL ON PAGE 42.
- ⑥ DOORWAY PROTECTION STRAP, 1-1/4" X .035" OR .031" (32MM X .889MM OR .787MM) BY A LENGTH TO SUIT (REF: 27'-6" (8,382MM) LONG FOR THE PALLET UNIT SHOWN) (2 REQD). STAPLE STRAP TO SPACER ASSEMBLY W/3 STAPLES. SEE SPECIAL NOTE 6 ON PAGE 35.
- ⑦ SEAL FOR 1-1/4" STRAPPING (4 REQD, 2 PER STRAP). SEE GENERAL NOTE "O" ON PAGE 2.



SECTION F-F

**TYPICAL 2-HIGH LOAD
WITH LENGTH PARALLEL TO SIDES IN A TMS 851 CAR**

(SPECIAL NOTES CONTINUED)

10. THE MAXIMUM NUMBER OF PALLET UNITS FOR LOADS OF MORE THAN TWO LAYERS MUST BE CALCULATED. THE MAXIMUM LOAD LIMIT OF A CAR IS NOT TO BE EXCEEDED. FOR GUIDANCE, THE MAXIMUM NUMBER OF PALLET UNITS FOR A 3-LAYER LOAD BASED ON THE WEIGHT OF THE UNITS, NOT TAKING INTO CONSIDERATION THE WEIGHT OF THE DUNNAGE, IS AS FOLLOWS.

NO. OF UNITS	MAXIMUM WEIGHT OF UNIT
54	1,142 LBS (518 KG)
48	1,285 LBS (583 KG)
42	1,469 LBS (666 KG)
36	1,714 LBS (778 KG)

11. THE DEPICTED LOAD CAN BE REDUCED TO SUIT THE QUANTITY TO BE SHIPPED BY OMITTING ONE OR MORE LOAD UNITS. NOTE THAT STRUT BRACING WILL BE REQUIRED IF THE STRUTS ARE LONGER THAN 72" (1,828MM). SEE THE "TYPICAL STRUT BRACING" DETAIL ON PAGE 23.
12. A LOAD MAY BE REDUCED BY ONE PALLET UNIT BY EMPLOYING THE PROCEDURES DEPICTED ON PAGE 45.
13. A PARTIAL PALLET MAY BE SECURED TO THE TOP OF A PALLET UNIT FOR SHIPMENT IF THE INSIDE CAR HEIGHT PERMITS. SEE THE PROCEDURES ON PAGE 49 FOR GUIDANCE.
14. INDIVIDUAL BOXES MAY BE SECURED TO THE TOP OF A PALLET UNIT FOR SHIPMENT IF THE INSIDE CAR HEIGHT PERMITS. SEE THE PROCEDURES ON PAGE 50 FOR GUIDANCE.

SPECIAL NOTES:

- A TMS 851 CAR, 28'-8-3/4" (12,760MM) LONG BY 9'-0" (2,760MM) WIDE HAVING A MAXIMUM LOAD LIMIT OF 61,712 POUNDS (28,017 KG) IS SHOWN. CARS OF OTHER SIZES AND TYPES MAY BE USED.
- A 32-UNIT LOAD OF CAP, BLASTING, NONELECTRIC, SPECIAL, PACKED 5,000 PER WOODEN BOX, IS SHOWN. THE UNIT IS 35-1/2" (902MM) LONG BY 47-3/4" (1,213MM) WIDE BY 26" (660MM) HIGH AND WEIGHS APPROXIMATELY 748 POUNDS (340 KG). THE DEPICTED PROCEDURES ARE ALSO APPLICABLE FOR OTHER SIZE AND WEIGHT PALLET UNITS.
- THE DEPICTED LOADING PROCEDURES ARE APPLICABLE FOR PALLET UNITS WHICH ARE 53-1/2" (1,359MM) OR LESS IN WIDTH. PALLET UNITS WIDER THAN THAT MUST BE LOADED WITH THE WIDTH DIMENSION PARALLEL TO THE SIDEWALL. SEE THE PROCEDURES ON PAGES 38 AND 39 FOR GUIDANCE.
- NAILED SIDE BLOCKING, DOUBLED 2" X 4" (51MM X 102MM) OR 2" X 6" (51MM X 152MM), NAILED W/1 NAIL EVERY 24" (610MM), MAY BE USED THROUGHOUT THE LENGTH OF THE LOAD IN LIEU OF USING THE ANTI-SWAY BRACES, PIECE MARKED ①, BETWEEN THE PALLET UNITS IN THE FIRST LAYER, IF DESIRED. THE NAILED SIDE BLOCKING WILL NEED TO BE PRE-POSITIONED IF THE LADING OVERHANGS THE PALLET ENOUGH TO PREVENT NAILING AFTER THE PALLETS ARE LOADED. PIECES MARKED ② WILL THEN NOT BE REQUIRED.
- WHEN PALLET UNITS WHICH ARE FROM 50-1/2" (1,283MM) TO 53-1/2" (1,359MM) WIDE ARE BEING LOADED, THE ANTI-SWAY BRACES AND/OR NAILED SIDE BLOCKING ARE NOT REQUIRED.
- DOORWAY PROTECTION IS REQUIRED FOR ALL PALLET STACKS WHICH ARE COMPLETELY WITHIN THE DOORWAY AREA OR WHICH EXTEND INTO THE DOORWAY AREA BY ONE-HALF OR MORE OF THE STACK LENGTH. TWO DOORWAY PROTECTION STRAPS ARE REQUIRED FOR EACH PALLET STACK WHICH IS COMPLETELY WITHIN THE DOORWAY AREA OR WHICH IS NOT RETAINED BY AT LEAST 6" (152MM) OF CAR SIDEWALL ON BOTH SIDES OF THE CAR. ONE DOORWAY PROTECTION STRAP IS REQUIRED FOR EACH PALLET STACK WHICH IS RETAINED BY FROM 6" (152MM) TO ONE-HALF THE PALLET UNIT LENGTH.
- THE 2-HIGH LOADING PROCEDURES ARE APPLICABLE FOR PALLET UNITS WHICH ARE NOT MORE THAN 28-3/4" (730MM) HIGH. THE DEPICTED PROCEDURES MAY BE USED FOR THREE LAYERS OF UNITS WHICH ARE NOT MORE THAN 19-1/8" (486MM) HIGH, FOR FOUR LAYERS OF UNITS NOT MORE THAN 14-3/8" (365MM) HIGH, OR FOR FIVE LAYERS NOT MORE THAN 11-1/2" (292MM). NOTE THAT FOR LOADS OF THREE OR MORE LAYERS, THE STACKS MUST BE UNITIZED INTO GROUPS OF TWO AND/OR THREE PALLET UNITS, AS APPLICABLE, PRIOR TO PLACEMENT IN THE LOAD.
- THE NUMBER OF PALLET UNITS IN THE LENGTH OF THE CAR IS BASED ON THE PALLET UNIT LENGTH AS FOLLOWS.

NO. LONG	MAXIMUM UNIT LENGTH
9	35-1/2" (902MM)
8	40" (1,016MM)
7	45-3/4" (1,162MM)
6	46" (1,168MM)

9. THE MAXIMUM NUMBER OF PALLET UNITS FOR A 2-LAYER LOAD BASED ON THE WEIGHT OF THE UNITS, NOT TAKING INTO CONSIDERATION THE WEIGHT OF THE DUNNAGE, IS AS FOLLOWS.

NO. OF UNITS	MAXIMUM WEIGHT OF UNIT
18	3,428 LBS (1,556 KG)
16	3,857 LBS (1,751 KG)
14	4,000 LBS (1,816 KG)

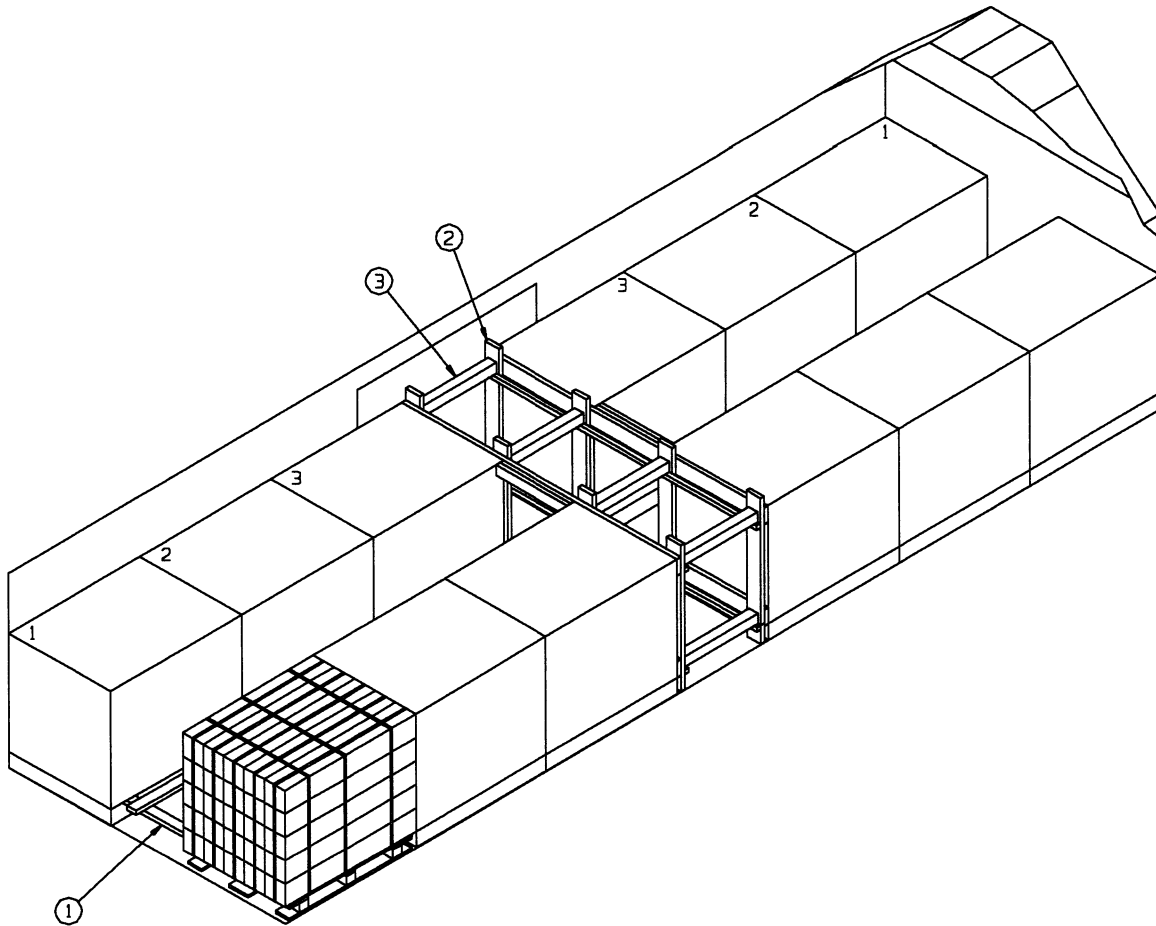
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BILL OF MATERIAL (TYPICAL)		
LUMBER	LINEAR FEET	BOARD FEET
1" X 4" (25MM X 102MM)	48 (14,630MM)	16
2" X 2" (51MM X 51MM)	155 (47,244MM)	52
2" X 4" (51MM X 102MM)	84 (25,603MM)	56
2" X 6" (51MM X 152MM)	109 (33,223MM)	109
4" X 4" (102MM X 102MM)	68 (20,726MM)	91
NAILS	NO. REQD	POUNDS
SIZE AS REQD	588	9
STEEL STRAPPING, 1-1/4" -- 55' REQD	----	8 LBS
SEAL FOR 1-1/4" STRAPPING -- 4 REQD	----	NIL

LOAD AS SHOWN (TYPICAL)

ITEM	QUANTITY	WEIGHT (APPROX)
PALLET UNIT	32	23,936 LBS (10,867 KG)
DUNNAGE	----	665 LBS (302 KG)
TOTAL WEIGHT	----	24,601 LBS (11,169 KG)

TYPICAL 2-HIGH LOAD
WITH LENGTH PARALLEL TO SIDES IN A TMS 851 CAR



ISOMETRIC VIEW

KEY NUMBERS (TYPICAL)

- ① ANTI-SWAY BRACE B (6 REQD). SEE THE DETAIL ON PAGE 43. SEE SPECIAL NOTE 3 ON PAGE 37.
- ② CENTER GATE (2 REQD). SEE THE "CENTER GATE K" DETAIL ON PAGE 41.
- ③ STRUT, 4" X 4" (102MM X 102MM) BY CUT TO FIT (8 REQD). STRUTS WILL BE APPROXIMATELY 29-1/2" (749MM) LONG FOR THE PALLET UNIT SHOWN. TOENAIL TO THE CENTER GATES, PIECES MARKED ②, W/2 NAILS AT EACH END. SEE GENERAL NOTES "L" AND "M" ON PAGE 2.

TYPICAL 1-HIGH LOAD
 WITH WIDTH PARALLEL TO SIDES IN A TMS 851 CAR

(SPECIAL NOTES CONTINUED)

11. A PARTIAL PALLET MAY BE SECURED TO THE TOP OF A PALLET UNIT FOR SHIPMENT. SEE THE PROCEDURES ON PAGE 49 FOR GUIDANCE.
12. INDIVIDUAL BOXES MAY BE SECURED TO THE TOP OF A PALLET UNIT FOR SHIPMENT. SEE THE PROCEDURES ON PAGE 50 FOR GUIDANCE.

SPECIAL NOTES:

1. A TMS 851 CAR, 28'-8-3/4" (12,760MM) LONG BY 9'-0" (2,760MM) WIDE HAVING A MAXIMUM LOAD LIMIT OF 61,712 POUNDS (28,017 KG) IS SHOWN. CARS OF OTHER SIZES AND TYPES MAY BE USED.
2. A 12-UNIT LOAD OF ROCKET MOTORS, 2.75", PACKED 4 PER METAL CONTAINER, IS SHOWN. THE UNIT IS 40" (1,016MM) LONG BY 51-1/2" (1,308MM) WIDE BY 45-1/2" (1,156MM) HIGH AND WEIGHS APPROXIMATELY 1,964 POUNDS (892 KG). THE DEPICTED PROCEDURES ARE ALSO APPLICABLE FOR OTHER SIZE AND WEIGHT PALLET UNITS.
3. NAILED SIDE BLOCKING, DOUBLED 2" X 4" (51MM X 102MM) OR 2" X 6" (51MM X 152MM), NAILED W/1 NAIL EVERY 24" (610MM), MAY BE USED THROUGHOUT THE LENGTH OF THE LOAD IN LIEU OF USING THE ANTI-SWAY BRACES, PIECE MARKED ①, IF DESIRED. THE SIDE BLOCKING WILL NEED TO BE PRE-POSITIONED IF THE LADING OVERHANGS THE PALLET ENOUGH TO PREVENT NAILING AFTER THE PALLETS ARE LOADED.
4. DOORWAY PROTECTION IS REQUIRED FOR ALL PALLET STACKS WHICH ARE COMPLETELY WITHIN THE DOORWAY AREA OR WHICH EXTEND INTO THE DOORWAY AREA BY ONE-HALF OR MORE OF THE STACK WIDTH. TWO DOORWAY PROTECTION STRAPS ARE REQUIRED FOR EACH PALLET STACK WHICH IS COMPLETELY WITHIN THE DOORWAY AREA OR WHICH IS NOT RETAINED BY AT LEAST 6" (152MM) OF CAR SIDEWALL ON BOTH SIDES OF THE CAR. ONE DOORWAY PROTECTION STRAP IS REQUIRED FOR EACH PALLET STACK WHICH IS RETAINED BY FROM 6" (152MM) TO ONE-HALF THE PALLET UNIT WIDTH. SEE PIECES MARKED ⑤, ⑥, AND ⑦ ON PAGE 32 FOR GUIDANCE.
5. THE 1-HIGH LOADING PROCEDURES ARE APPLICABLE FOR ANY HEIGHT PALLET UNIT.
6. THE NUMBER OF PALLET UNITS IN THE LENGTH OF THE CAR IS BASED ON THE PALLET UNIT WIDTH AS FOLLOWS.

NO. LONG	MAXIMUM UNIT WIDTH
7	45-3/4" (1,162MM)
6	53-3/8" (1,356MM)
5	62-1/2" (1,588MM) (ANY HEIGHT)
5	64" (1,626MM) (40" MAX HEIGHT)
4	69" (1,753MM)
7. THESE PROCEDURES ARE APPLICABLE FOR PALLET UNITS UP TO AND INCLUDING THE MAXIMUM WEIGHT.
8. IF THE PALLET UNIT TO BE SHIPPED IS TO BE LOADED ONE UNIT WIDE, THE CENTER GATE "O", AS DETAILED ON PAGE 43, WILL BE USED IN LIEU OF THE DEPICTED CENTER GATE, AND ONLY FOUR STRUTS WILL BE REQUIRED. THE SIDE BLOCKING WILL BE AS SHOWN ON PAGE 36. NOTE THAT THE ONE-UNIT-WIDE PROCEDURES CAN ALSO BE USED TO OBTAIN THE QUANTITY IT IS DESIRED TO SHIP.
9. THE DEPICTED LOAD CAN BE REDUCED TO SUIT THE QUANTITY TO BE SHIPPED BY OMITTING ONE OR MORE LOAD UNITS. NOTE THAT STRUT BRACING WILL BE REQUIRED IF THE STRUTS ARE LONGER THAN 72" (1,828MM). SEE THE "TYPICAL STRUT BRACING" DETAIL ON PAGE 23.
10. A LOAD MAY BE REDUCED BY ONE PALLET UNIT BY EMPLOYING THE PROCEDURES DEPICTED ON PAGE 45.

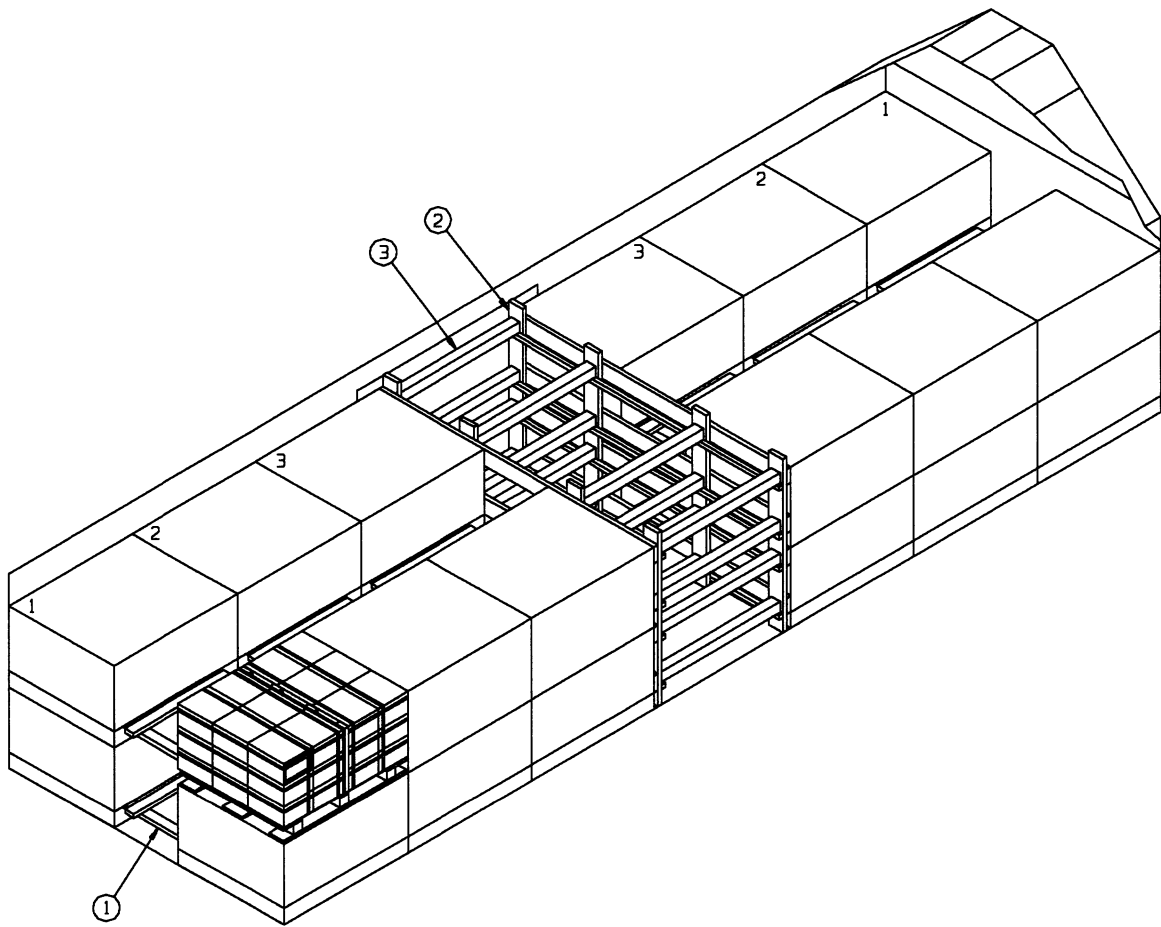
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BILL OF MATERIAL (TYPICAL)		
LUMBER	LINEAR FEET	BOARD FEET
2" X 2" (51MM X 51MM)	36 (10,973MM)	12
2" X 4" (51MM X 102MM)	89 (27,127MM)	60
2" X 6" (51MM X 152MM)	69 (21,301MM)	69
4" X 4" (102MM X 102MM)	20 (6,096MM)	27
NAILS	NO. REQD	POUNDS
SIZE AS REQD	196	3

LOAD AS SHOWN (TYPICAL)

ITEM	QUANTITY	WEIGHT (APPROX)
PALLET UNIT	12	23,568 LBS (10,670 KG)
DUNNAGE	---	339 LBS (154 KG)
TOTAL WEIGHT		23,907 LBS (10,854 KG)

**TYPICAL 1-HIGH LOAD
WITH WIDTH PARALLEL TO SIDES IN A TMS 851 CAR**



ISOMETRIC VIEW

KEY NUMBERS (TYPICAL)

- ① ANTI-SWAY BRACE B (12 REQD). SEE THE DETAIL ON PAGE 43. SEE SPECIAL NOTE 3 ON PAGE 39.
- ② CENTER GATE (2 REQD). SEE THE "CENTER GATE L" DETAIL ON PAGE 42.
- ③ STRUT, 4" X 4" (102MM X 102MM) BY CUT TO FIT (16 REQD). STRUTS WILL BE APPROXIMATELY 47-1/2" (1,207MM) LONG FOR THE PALLET UNIT SHOWN. TOENAIL TO THE CENTER GATES, PIECES MARKED ②, W/2 NAILS AT EACH END. SEE GENERAL NOTES "L" AND "M" ON PAGE 2.

TYPICAL 2-HIGH LOAD
 WITH WIDTH PARALLEL TO SIDES IN A TMS 851 CAR

(SPECIAL NOTES CONTINUED)

- 8. THE MAXIMUM NUMBER OF PALLET UNITS FOR LOADS OF MORE THAN TWO LAYERS MUST BE CALCULATED. THE MAXIMUM LOAD LIMIT OF A CAR IS NOT TO BE EXCEEDED. FOR GUIDANCE, THE MAXIMUM NUMBER OF PALLET UNITS FOR A 3-LAYER LOAD BASED ON THE WEIGHT OF THE UNITS, NOT TAKING INTO CONSIDERATION THE WEIGHT OF THE DUNNAGE, IS AS FOLLOWS.

NO. OF UNITS	MAXIMUM WEIGHT OF UNIT
42	1,469 LBS (666 KG)
36	1,714 LBS (778 KG)
30	2,057 LBS (933 KG)
24	2,571 (1,167 KG)

- 9. THE DEPICTED LOAD CAN BE REDUCED TO SUIT THE QUANTITY TO BE SHIPPED BY OMITTING ONE OR MORE LOAD UNITS. NOTE THAT STRUT BRACING WILL BE REQUIRED IF THE STRUTS ARE LONGER THAN 72" (1,828MM). SEE THE "TYPICAL STRUT BRACING" DETAIL ON PAGE 23.
- 10. A LOAD MAY BE REDUCED BY ONE PALLET UNIT BY EMPLOYING THE PROCEDURES DEPICTED ON PAGE 45.
- 11. A PARTIAL PALLET MAY BE SECURED TO THE TOP OF A PALLET UNIT FOR SHIPMENT. SEE THE PROCEDURES ON PAGE 49 FOR GUIDANCE.
- 12. INDIVIDUAL BOXES MAY BE SECURED TO THE TOP OF A PALLET UNIT FOR SHIPMENT. SEE THE PROCEDURES ON PAGE 50 FOR GUIDANCE.

SPECIAL NOTES:

- 1. A TMS 851 CAR, 28'-8-3/4" (12,760MM) LONG BY 9'-0" (2,760MM) WIDE HAVING A MAXIMUM LOAD LIMIT OF 61,712 POUNDS (28,017 KG) IS SHOWN. CARS OF OTHER SIZES AND TYPES MAY BE USED.
- 2. A 24-UNIT LOAD OF CHARGE, DEMOLITION, BLOCK, PACKED 30 PER WIREBOUND BOX, IS SHOWN. THE UNIT IS 41-1/4" (1,048MM) LONG BY 48-1/2" (1,232MM) WIDE BY 27-1/2" (699MM) HIGH AND WEIGHS APPROXIMATELY 1,798 POUNDS (816 KG). THE DEPICTED PROCEDURES ARE ALSO APPLICABLE FOR OTHER SIZE AND WEIGHT PALLET UNITS.
- 3. NAILED SIDE BLOCKING, DOUBLED 2" X 4" (51MM X 102MM) OR 2" X 6" (51MM X 152MM), NAILED W/1 NAIL EVERY 24" (610MM), MAY BE USED THROUGHOUT THE LENGTH OF THE LOAD IN LIEU OF USING THE ANTI-SWAY BRACES, PIECE MARKED ①, BETWEEN THE PALLET UNITS IN THE FIRST LAYER, IF DESIRED. THE SIDE BLOCKING WILL NEED TO BE PRE-POSITIONED IF THE LADING OVERHANGS THE PALLET ENOUGH TO PREVENT NAILING AFTER THE PALLETS ARE LOADED.
- 4. DOORWAY PROTECTION IS REQUIRED FOR ALL PALLET STACKS WHICH ARE COMPLETELY WITHIN THE DOORWAY AREA OR WHICH EXTEND INTO THE DOORWAY AREA BY ONE-HALF OR MORE OF THE STACK WIDTH. TWO DOORWAY PROTECTION STRAPS ARE REQUIRED FOR EACH PALLET STACK WHICH IS COMPLETELY WITHIN THE DOORWAY AREA OR WHICH IS NOT RETAINED BY AT LEAST 6" (152MM) OF CAR SIDEWALL ON BOTH SIDES OF THE CAR. ONE DOORWAY PROTECTION STRAP IS REQUIRED FOR EACH PALLET STACK WHICH IS RETAINED BY FROM 6" (152MM) TO ONE-HALF THE PALLET UNIT WIDTH. SEE PIECES MARKED ⑤, ⑥, AND ⑦ ON PAGE 34 FOR GUIDANCE.
- 5. THE 2-HIGH LOADING PROCEDURES ARE APPLICABLE FOR PALLET UNITS WHICH ARE NOT MORE THAN 28-3/4" (730MM) HIGH. THE DEPICTED PROCEDURES MAY BE USED FOR THREE LAYERS OF UNITS WHICH ARE NOT MORE THAN 19-1/8" (486MM) HIGH, FOR FOUR LAYERS OF UNITS NOT MORE THAN 14-3/8" (365MM) HIGH, OR FOR FIVE LAYERS NOT MORE THAN 11-1/2" (292MM) HIGH. NOTE THAT FOR LOADS OF THREE OR MORE LAYERS, THE STACKS MUST BE UNITIZED INTO GROUPS OF TWO AND/OR THREE PALLET UNITS, AS APPLICABLE, PRIOR TO PLACEMENT IN THE LOAD.
- 6. THE NUMBER OF PALLET UNITS IN THE LENGTH OF THE CAR IS BASED ON THE PALLET UNIT WIDTH AS FOLLOWS.

NO. LONG	MAXIMUM UNIT WIDTH
7	45-3/4" (1,162MM)
6	53-3/8" (1,356MM)
5	64" (1,626MM)
4	69" (1,753MM)

- 7. THE MAXIMUM NUMBER OF PALLET UNITS FOR A 2-LAYER LOAD BASED ON THE WEIGHT OF THE UNITS, NOT TAKING INTO CONSIDERATION THE WEIGHT OF THE DUNNAGE, IS AS FOLLOWS.

NO. OF UNITS	MAXIMUM WEIGHT OF UNIT
28	2,204 LBS (1,000 KG)
24	2,571 LBS (1,167 KG)
20	3,085 LBS (1,400 KG)
16	3,857 LBS (1,751 KG)

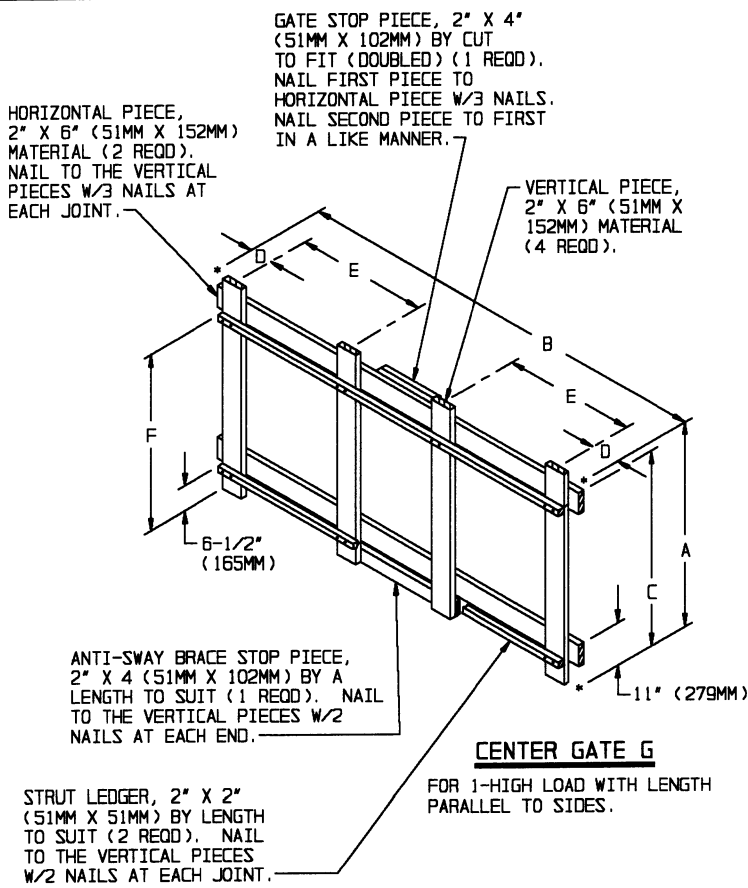
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BILL OF MATERIAL (TYPICAL)		
LUMBER	LINEAR FEET	BOARD FEET
2" X 4" (51MM X 102MM)	158 (48,159MM)	106
2" X 6" (51MM X 152MM)	111 (33,833MM)	111
4" X 4" (102MM X 102MM)	64 (19,507MM)	86
NAILS	NO. REQD	POUNDS
SIZE AS REQD	380	6

LOAD AS SHOWN (TYPICAL)

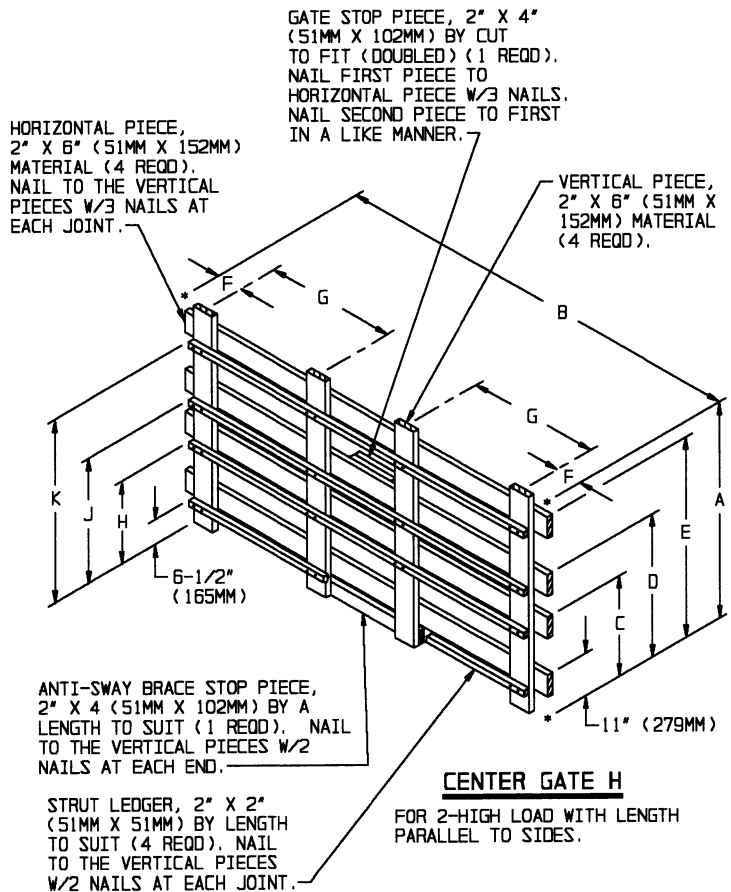
ITEM	QUANTITY	WEIGHT (APPROX)
PALLET UNIT	24	43,152 LBS (19,591 KG)
DUNNAGE		612 LBS (278 KG)
TOTAL WEIGHT		43,764 LBS (19,869 KG)

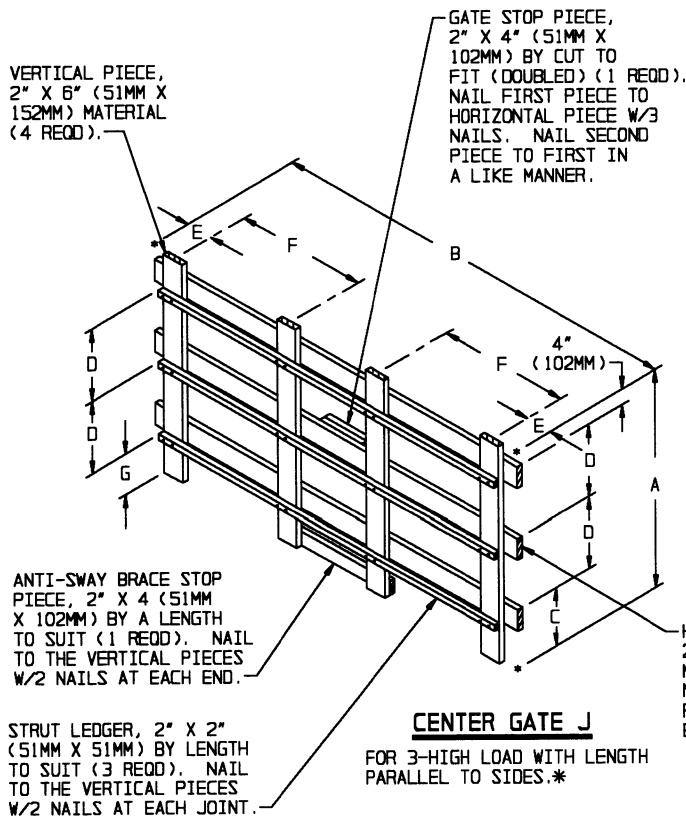
TYPICAL 2-HIGH LOAD WITH WIDTH PARALLEL TO SIDES IN A TMS 851 CAR



DIMENSIONS FOR CENTER GATE G	
A	UNIT HEIGHT PLUS 4" (102MM)
B	CAR WIDTH MINUS 1/2" (13MM)
C	UNIT HEIGHT.
D	DISTANCE FROM END OF UNIT TO CENTER OF PALLET POSTS (REF: 5-3/8" (137MM) PLUS OVERHANG) OR BATTEN.
E	DISTANCE FROM CENTER TO CENTER OF OUTSIDE PALLET POSTS (REF: 34-3/4", 37-1/4", OR 42-1/4" (883MM, 946MM, OR 1,073MM) FOR 45-1/2", 48" OR 53" (1,156MM, 1,219MM, OR 1,346MM) WIDE PALLET, RESPECTIVELY.
F	UNIT HEIGHT MINUS 4-1/2" (114MM).

DIMENSIONS FOR CENTER GATE H	
A	LOAD HEIGHT PLUS 4" (102MM)
B	CAR WIDTH MINUS 1/2" (13MM)
C	UNIT HEIGHT.
D	UNIT HEIGHT PLUS 11" (279MM).
E	LOAD HEIGHT.
F	DISTANCE FROM END OF UNIT TO CENTER OF PALLET POSTS (REF: 5-3/8" (137MM) PLUS OVERHANG) OR BATTEN.
G	DISTANCE FROM CENTER TO CENTER OF OUTSIDE PALLET POSTS (REF: 34-3/4", 37-1/4", OR 42-1/4" (883MM, 946MM, OR 1,073MM) FOR 45-1/2", 48" OR 53" (1,156MM, 1,219MM, OR 1,346MM) WIDE PALLET, RESPECTIVELY.
H	UNIT HEIGHT MINUS 4-1/2" (114MM).
J	UNIT HEIGHT PLUS 6-1/2" (165MM).
K	LOAD HEIGHT MINUS 4-1/2" (114MM).

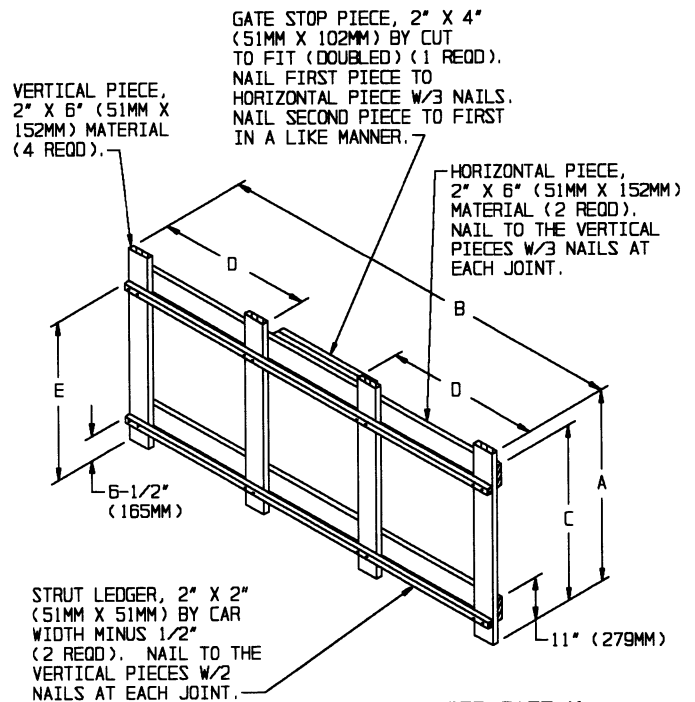


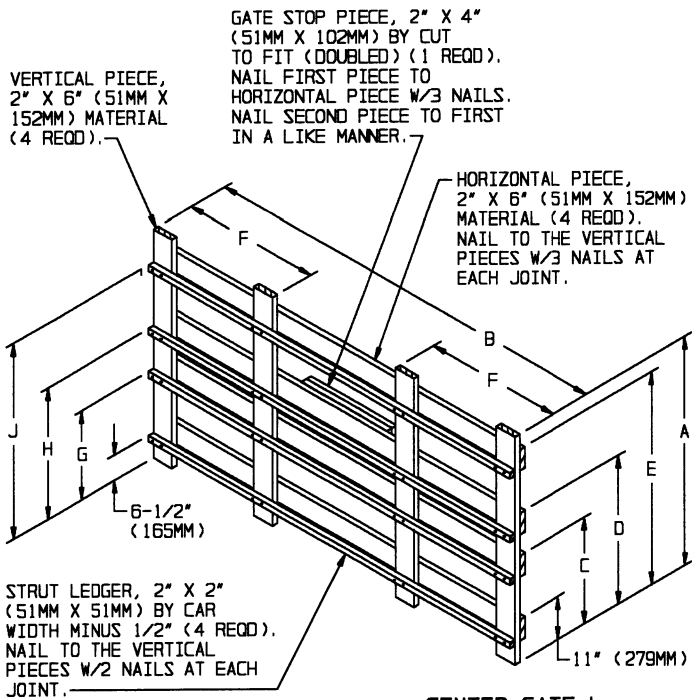


DIMENSIONS FOR CENTER GATE J	
A	UNIT HEIGHT TIMES (NO. OF LAYERS MINUS 1), PLUS ONE-HALF UNIT HEIGHT, PLUS 4" (102MM)
B	CAR WIDTH MINUS 1/2" (13MM)
C	ONE-HALF UNIT HEIGHT PLUS 3" (76MM).
D	UNIT HEIGHT.
E	DISTANCE FROM END OF UNIT TO CENTER OF PALLET POSTS (REF: 5-3/8" (137MM) PLUS OVERHANG) OR BATTEN.
F	DISTANCE FROM CENTER TO CENTER OF OUTSIDE PALLET POSTS (REF: 34-3/4", 37-1/4", OR 42-1/4" (883MM, 946MM, OR 1,073MM) FOR 45-1/2", 48" OR 53" (1,156MM, 1,219MM, OR 1,346MM) WIDE PALLET, RESPECTIVELY.
G	ONE-HALF UNIT HEIGHT MINUS 1-1/2" (38MM).

* FOR LOADS OF MORE THAN THREE LAYERS, ADD ONE HORIZONTAL PIECE AND STRUT LEDGER FOR EACH ADDED LAYER. POSITION AT UNIT HEIGHT ABOVE THE NEXT LOWER HORIZONTAL PIECE OR STRUT LEDGER.

DIMENSIONS FOR CENTER GATE K	
A	UNIT HEIGHT PLUS 4" (102MM)
B	CAR WIDTH MINUS 1/2".
C	UNIT HEIGHT.
D	UNIT LENGTH.
E	UNIT HEIGHT MINUS 4-1/2" (114MM).



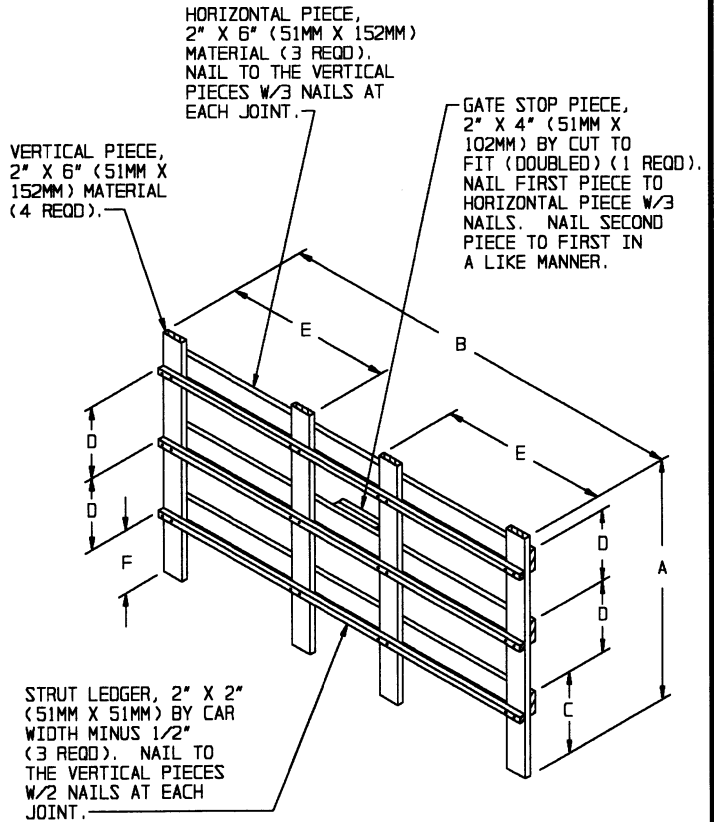


CENTER GATE L

FOR 2-HIGH LOAD WITH WIDTH PARALLEL TO SIDES.

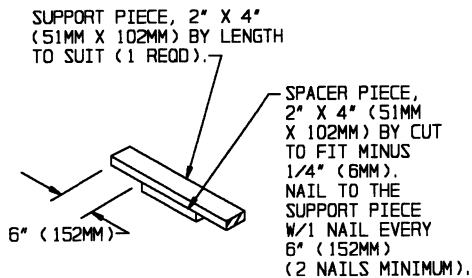
DIMENSIONS FOR CENTER GATE L	
A	LOAD HEIGHT PLUS 4" (102MM)
B	CAR WIDTH MINUS 1/2" (13MM).
C	UNIT HEIGHT.
D	UNIT HEIGHT PLUS 11" (279MM).
E	LOAD HEIGHT.
F	UNIT LENGTH.
G	UNIT HEIGHT MINUS 4-1/2" (114MM).
H	UNIT HEIGHT PLUS 6-1/2" (165MM).
J	LOAD HEIGHT MINUS 4-1/2" (114MM)

DIMENSIONS FOR CENTER GATE M	
A	LOAD HEIGHT PLUS 4" (102MM)
B	CAR WIDTH MINUS 1/2" (13MM).
C	ONE-HALF UNIT HEIGHT PLUS 3" (76MM).
D	UNIT HEIGHT.
E	UNIT LENGTH.
F	ONE-HALF UNIT HEIGHT MINUS 1-1/2" (38MM).



CENTER GATE M

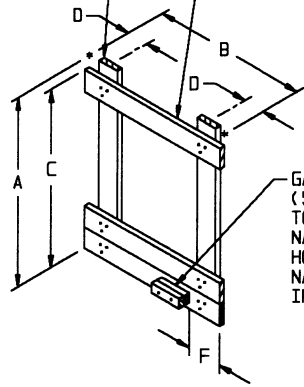
FOR 3-HIGH LOAD WITH WIDTH PARALLEL TO SIDES.



SPACER ASSEMBLY

VERTICAL PIECE, 2" X 6" (51MM X 152MM) MATERIAL (2 REQD).

HORIZONTAL PIECE, 2" X 6" (51MM X 152MM) MATERIAL (3 REQD). NAIL TO THE VERTICAL PIECES W/3 NAILS AT EACH JOINT.

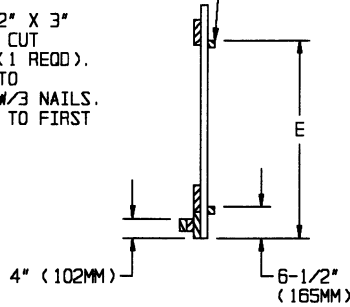


CENTER GATE N

FOR 1-HIGH BY 1-WIDE LOAD WITH LENGTH PARALLEL TO SIDES.

STRUT LEDGER, 2" X 2" (51MM X 51MM) OR 2" X 4" (51MM X 102MM) BY LENGTH TO SUIT (2 REQD). NAIL TO THE VERTICAL PIECES W/2 NAILS AT EACH JOINT.

GATE STOP PIECE, 2" X 3" (51MM X 102MM) BY CUT TO FIT (DOUBLED) (1 REQD). NAIL FIRST PIECE TO HORIZONTAL PIECE W/3 NAILS. NAIL SECOND PIECE TO FIRST IN A LIKE MANNER.

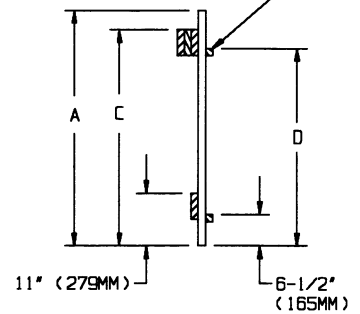


END VIEW

FOR CENTER GATE N

DIMENSIONS FOR CENTER GATE N	
A	UNIT HEIGHT PLUS 4" (102MM).
B	UNIT WIDTH.
C	UNIT HEIGHT.
D	DISTANCE FROM END OF UNIT TO CENTER OF PALLET POST POST (REF: 5-3/8" (137MM) PLUS OVERHANG) OR BATTEN.
E	UNIT HEIGHT MINUS 4-1/2" (114MM).
F	9" (229MM) PLUS OVERHANG.

STRUT LEDGER, 2" X 2" (51MM X 51MM) OR 2" X 4" (51MM X 102MM) BY LENGTH TO SUIT (2 REQD). NAIL TO THE VERTICAL PIECES W/2 NAILS AT EACH JOINT.

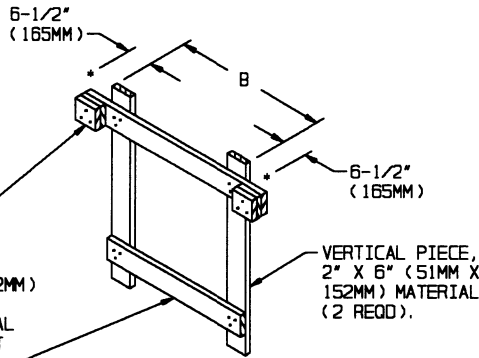


END VIEW

FOR CENTER GATE O

STOP PIECE, 2" X 6" X 6" (51MM X 152MM X 152MM) (DOUBLED) (2 REQD). NAIL FIRST PIECE TO THE HORIZONTAL PIECE W/3 NAILS AND LAMINATE THE SECOND TO THE FIRST IN A LIKE MANNER.

HORIZONTAL PIECE, 2" X 6" (51MM X 152MM) MATERIAL (2 REQD). NAIL TO THE VERTICAL PIECES W/3 NAILS AT EACH JOINT.

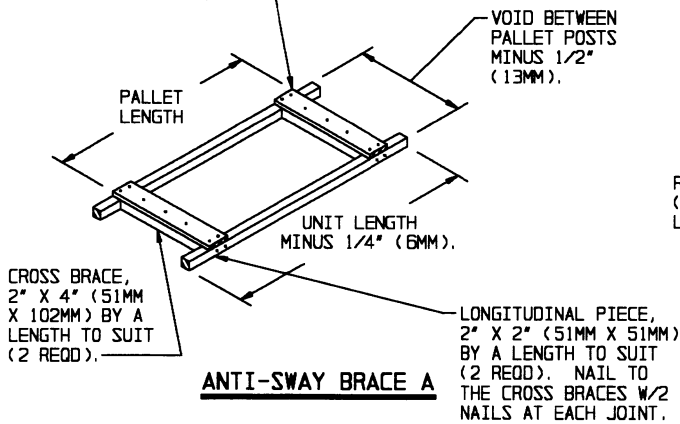


CENTER GATE O

FOR 1-HIGH BY 1-WIDE LOAD WITH WIDTH PARALLEL TO SIDES.

DIMENSIONS FOR CENTER GATE O	
A	UNIT HEIGHT PLUS 4" (102MM).
B	UNIT LENGTH.
C	UNIT HEIGHT.
D	UNIT HEIGHT MINUS 4-1/2" (114MM).

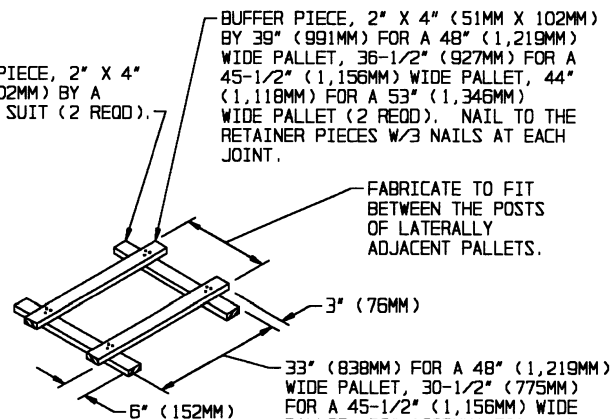
CLEAT, 1" X 4" (25MM X 102MM) BY A LENGTH TO SUIT (2 REQD). NAIL TO THE LONGITUDINAL PIECES W/2 NAILS AT EACH END AND TO A CROSS BRACE W/3 NAILS.



ANTI-SWAY BRACE A

NOTE: IF DESIRED, THE ANTI-SWAY BRACE CAN BE PARTIALLY PRE-ASSEMBLED, ONE BUFFER PIECE CAN BE NAILED TO BOTH RETAINER PIECES. THE LONG ENDS OF THE ASSEMBLY CAN THEN BE INSTALLED INTO THE FORKLIFT OPENING OF A LOADED PALLET PRIOR TO POSITIONING THE LATERALLY ADJACENT PALLET.

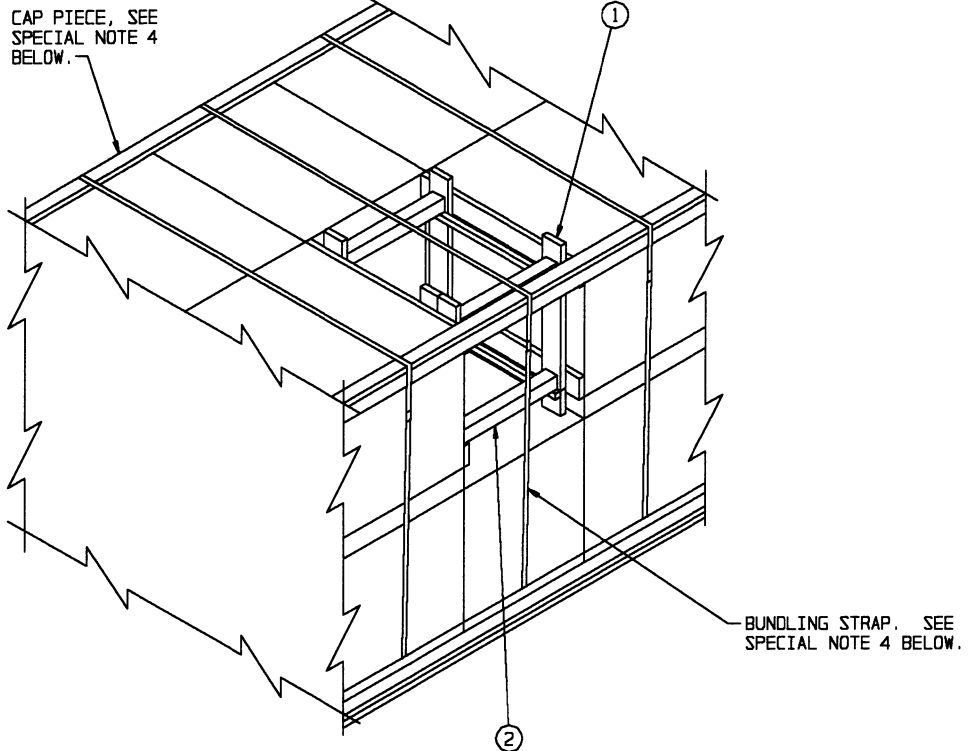
RETAINER PIECE, 2" X 4" (51MM X 102MM) BY A LENGTH TO SUIT (2 REQD).



ANTI-SWAY BRACE B

SEE NOTE AT LEFT.

DETAILS



SPECIAL NOTES:

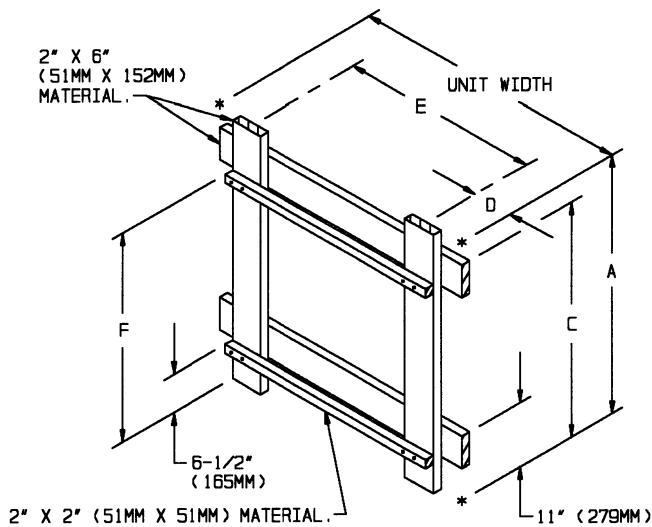
1. A PARTIAL VIEW OF A 2-HIGH LOAD IN AN HBIS 297 OR TMS 858 CAR IS SHOWN. THE OMITTED UNIT PROCEDURES ARE ALSO APPLICABLE FOR 1-HIGH LOADS IN THOSE CARS, OR FOR LOADS OF MORE THAN TWO LAYERS HIGH.
2. THE NAILING OF THE VARIOUS PARTS OF THE LOAD BEARING GATES WILL BE AS FOLLOWS: NAIL THE HORIZONTAL PIECES TO THE VERTICAL PIECES W/3 NAILS AT EACH JOINT. NAIL THE 2" X 2" (51MM X 51MM) STRUT LEDGERS TO THE VERTICAL PIECES W/2 NAILS AT EACH END.
3. THE OMITTED-UNIT PROCEDURES SHOULD BE APPLIED NEAR THE CENTER OF THE CAR LENGTH, BUT NOT NEXT TO THE CENTER GATE. THERE SHOULD BE AT LEAST ONE LOAD UNIT BETWEEN THE OMITTED UNIT AND A CENTER GATE.
4. ONLY THE BLOCKING AND BRACING FOR THE OMITTED UNIT IS IDENTIFIED WITHIN THE KEY NUMBERS. REFER TO THE APPLICABLE LOAD PAGE FOR THE BLOCKING AND BRACING REQUIREMENTS FOR THE BALANCE OF THE LOAD. NOTE THAT THE DEPICTED CAP PIECES AND BUNDLING STRAPS ARE ONLY APPLICABLE FOR 2-HIGH LOADS.

ISOMETRIC VIEW

KEY NUMBERS

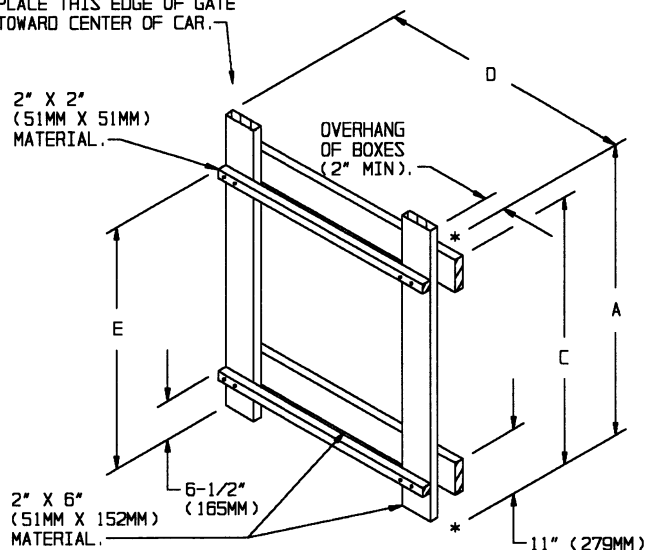
- ① LOAD BEARING GATE FOR UNITS WITH THE LENGTH PARALLEL TO THE CAR SIDE (2 REQD). SEE THE "LOAD BEARING GATE A" DETAIL BELOW. LOAD BEARING GATE FOR UNITS WITH THE WIDTH PARALLEL TO THE CAR SIDE (2 REQD, 1 RIGHT HAND AND 1 LEFT HAND). SEE THE "LOAD BEARING GATE B" DETAIL BELOW.
- ② STRUT, 4" X 4" (102MM X 102MM) BY CUT TO FIT (REF: UNIT LENGTH OR WIDTH MINUS 6" (152MM) (4 REQD). TOENAIL TO PIECES MARKED ① W/2 NAILS AT EACH END.

PLACE THIS EDGE OF GATE TOWARD CENTER OF CAR.



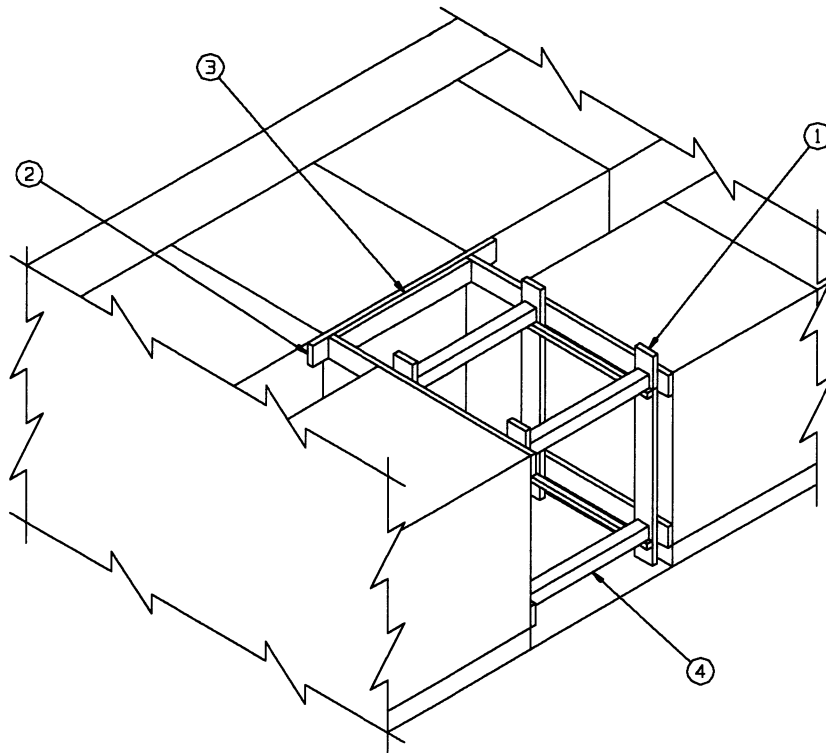
LOAD BEARING GATE A

SEE "CENTER GATE A" DETAIL ON PAGE 20 FOR LETTERED DIMENSIONS. FOR USE IN 1-HIGH OR 2-HIGH LOADS WITH LENGTH OF UNIT PARALLEL TO SIDES OF CAR.



LOAD BEARING GATE B

SEE "CENTER GATE D" DETAIL ON PAGE 21 FOR LETTERED DIMENSIONS. FOR USE IN 1-HIGH OR 2-HIGH LOADS WITH WIDTH OF UNIT PARALLEL TO SIDES OF CAR.



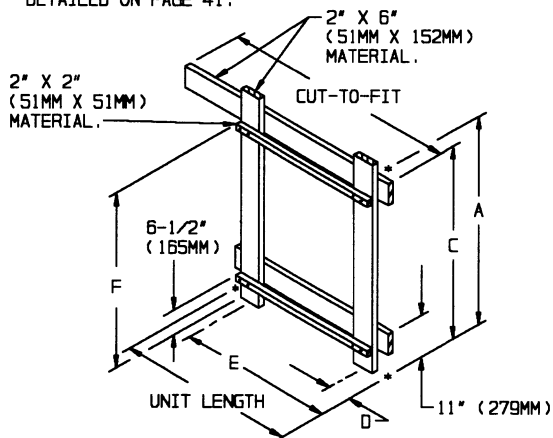
ISOMETRIC VIEW

SPECIAL NOTES:

1. A PARTIAL VIEW OF A 1-HIGH LOAD IN A GBS 252 OR TMS 851 CAR IS SHOWN. THE OMITTED UNIT PROCEDURES ARE ALSO APPLICABLE FOR LOADS OF TWO OR MORE LAYERS IN THOSE CARS.
2. THE NAILING OF THE VARIOUS PARTS OF THE LOAD BEARING GATES WILL BE AS FOLLOWS: NAIL THE HORIZONTAL PIECES TO THE VERTICAL PIECES $\frac{W}{3}$ NAILS AT EACH JOINT. NAIL THE 2" X 2" (51MM X 51MM) STRUT LEDGERS TO THE VERTICAL PIECES $\frac{W}{2}$ NAILS AT EACH END.
3. THE OMITTED-UNIT PROCEDURES SHOULD BE APPLIED NEAR THE CENTER OF THE CAR LENGTH, BUT NOT NEXT TO THE CENTER GATE. THERE SHOULD BE AT LEAST ONE LOAD UNIT BETWEEN THE OMITTED UNIT AND A CENTER GATE.
4. ONLY THE BLOCKING AND BRACING FOR THE OMITTED UNIT IS SHOWN. REFER TO THE APPLICABLE LOAD PAGE FOR THE BLOCKING AND BRACING REQUIREMENTS FOR THE BALANCE OF THE LOAD.
5. THE LETTERED DIMENSIONS ON THE "LOAD BEARING GATE C" DETAIL BELOW ARE APPLICABLE TO THE DIMENSIONS SHOWN FOR CENTER GATE "G" AS DETAILED ON PAGE 40. THE LETTERED DIMENSIONS ON THE "LOAD BEARING GATE D" DETAIL BELOW ARE APPLICABLE TO THE DIMENSIONS SHOWN FOR CENTER GATE "K" AS DETAILED ON PAGE 41.

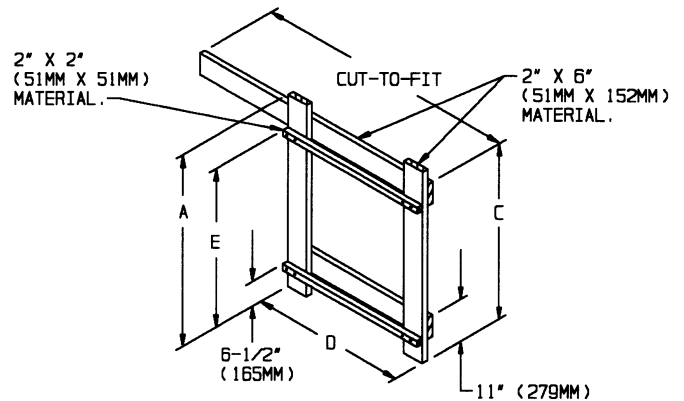
KEY NUMBERS

- ① LOAD BEARING GATE (2 REQD, 1 RIGHT HAND AND 1 LEFT HAND). FOR UNITS WITH THE LENGTH PARALLEL TO THE CAR SIDE, SEE THE "LOAD BEARING GATE C" DETAIL BELOW. FOR UNITS WITH THE WIDTH PARALLEL TO THE CAR SIDE, SEE THE "LOAD BEARING GATE D" DETAIL BELOW.
- ② ANTI-SWAY BEARING PIECE, 2" X 6" BY UNIT LENGTH OR WIDTH PLUS 12" (305MM) (1 REQD).
- ③ FILLER PIECE, 2" X 6" (51MM X 152MM) BY UNIT LENGTH OR WIDTH MINUS 3" (76MM) (1 REQD). NAIL TO THE ANTI-SWAY BEARING PIECE, PIECE MARKED ②, $\frac{W}{5}$ NAILS.
- ④ STRUT, 4" X 4" (102MM X 102MM) BY CUT TO FIT (REF: UNIT LENGTH OR WIDTH MINUS 6" (152MM)) (4 REQD). TOENAIL TO PIECES MARKED ① $\frac{W}{2}$ NAILS AT EACH END.



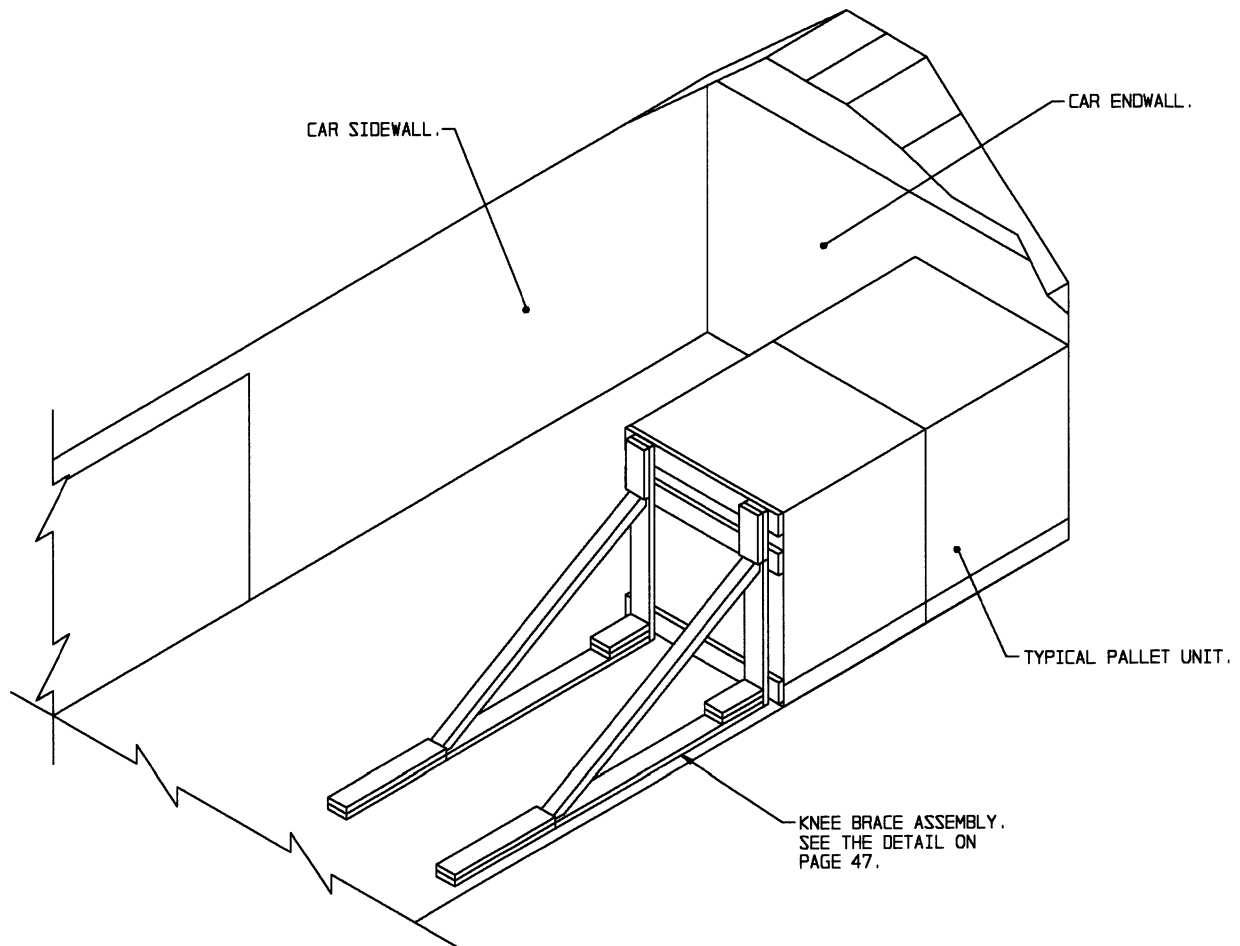
LOAD BEARING GATE C

FOR USE IN 1-HIGH OR 2-HIGH LOADS WITH LENGTH OF UNIT PARALLEL TO SIDES OF CAR. SEE "CENTER GATE G" DETAIL ON PAGE 40 FOR LETTERED DIMENSIONS.



LOAD BEARING GATE D

FOR USE IN 1-HIGH OR 2-HIGH LOADS WITH WIDTH OF UNIT PARALLEL TO SIDES OF CAR. SEE "CENTER GATE K" DETAIL ON PAGE 41 FOR LETTERED DIMENSIONS.



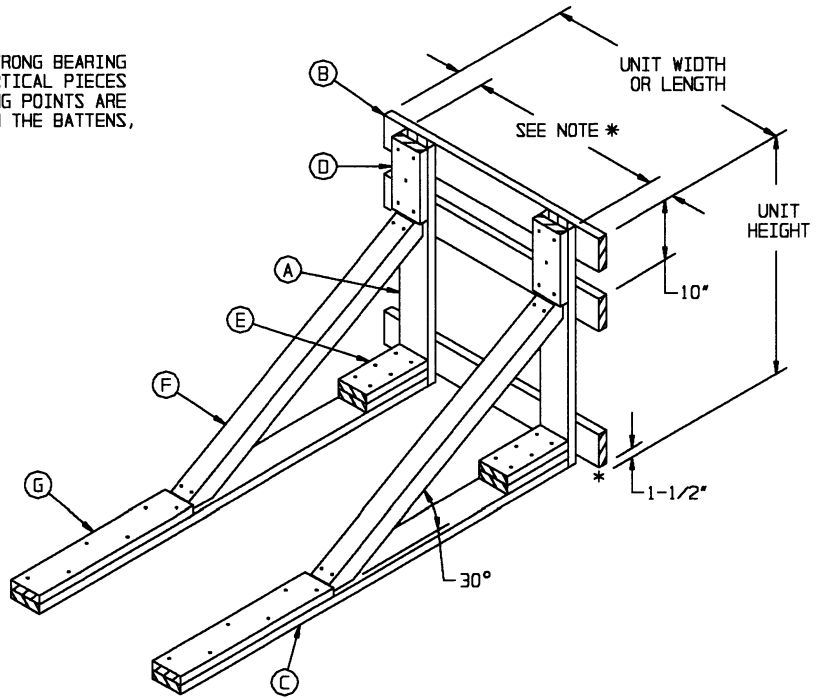
ISOMETRIC VIEW

SPECIAL NOTES:

1. A GBS 252 CAR IS SHOWN. THE PROCEDURES ARE ALSO APPLICABLE FOR A TMS 851 CAR. IF THE LCL BRACE METHOD IS TO BE USED IN AN HBIS 297 OR TMS 858 CAR, THE PALLET UNITS MUST BE LOCATED AWAY FROM THE CAR SIDE AND SIDE BLOCKING MUST BE INSTALLED ON BOTH SIDES OF THE UNITS. LATERAL BRACING HAS INTENTIONALLY BEEN OMITTED. THE PROPER LATERAL BRACING TO BE USED WILL BE DETERMINED BY THE TYPE CAR BEING LOADED. REFER TO THE APPLICABLE FULL CARLOAD PROCEDURE FOR LATERAL BRACING REQUIREMENTS.
2. A PALLET UNIT OF 105MM CARTRIDGES, PACKED 2 PER WOODEN BOX IS SHOWN AS TYPICAL. THE UNIT IS 42-3/4" (1,086MM) LONG BY 45-3/4" (1,162MM) WIDE BY 50" (1,270MM) HIGH AND WEIGHS APPROXIMATELY 2,197 POUNDS (978 KG). THE DEPICTED PROCEDURES ARE ALSO APPLICABLE FOR OTHER SIZE AND WEIGHT PALLET UNITS.
3. THE PALLET UNIT IS SHOWN WITH THE LENGTH OF THE UNIT PARALLEL WITH THE SIDES OF THE CAR. IF DESIRED, A UNIT MAY BE POSITIONED WITH THE UNIT WIDTH PARALLEL TO THE SIDES OF THE CAR.
4. A 2-UNIT LOAD IS SHOWN AS TYPICAL. A 1-UNIT LOAD MAY BE SHIPPED. OR, ADDITIONAL PALLET UNITS MAY BE LOADED, PROVIDED THE CAPACITY OF THE KNEE BRACES IS NOT EXCEEDED. SEE SPECIAL NOTE 5 FOR CAPACITY OF THE BRACES.
5. A KNEE BRACE ASSEMBLY WILL BE USED FOR EACH ROW OF PALLET UNITS. ONE KNEE BRACE ASSEMBLY IS ADEQUATE FOR RETAINING A MAXIMUM LCL LOAD OF 11,000 POUNDS (4,994 KG). ADDITIONAL "KNEES", PIECES MARKED (A) AND PIECES MARKED (C) THRU (E) ON PAGE 47, MAY BE INSTALLED IN A KNEE BRACE ASSEMBLY, ONE FOR EACH 5,500 POUNDS (2,497 KG) THAT A ROW EXCEEDS THE 11,000 POUND (4,994 KG) POUNDS TOTAL WEIGHT.
6. A KNEE BRACE ASSEMBLY MAY BE USED FOR BRACING ANY PALLET UNIT WHICH IS 30" (762MM) OR MORE IN HEIGHT. FOR PALLET UNITS LESS THAN 30" (762MM) HIGH, THE PROCEDURES ON PAGE 48 SHOULD BE USED.

NOTE * :

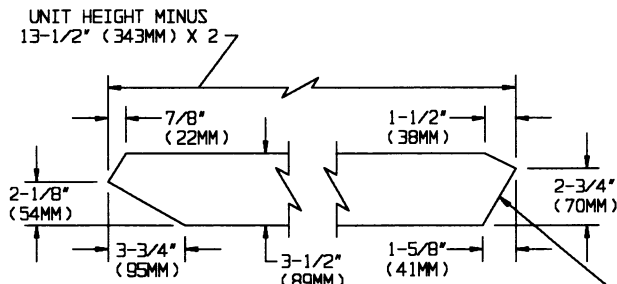
THIS DIMENSION WILL BE DETERMINED BY THE STRONG BEARING POINT ON THE PALLET UNIT UPON WHICH THE VERTICAL PIECES MARKED (A) ARE CENTERED. THE STRONG BEARING POINTS ARE IDENTIFIED AS THE JOINT BETWEEN BOXES OR ON THE BATTENS, IF PRESENT.



KNEE BRACE ASSEMBLY

KEY LETTERS

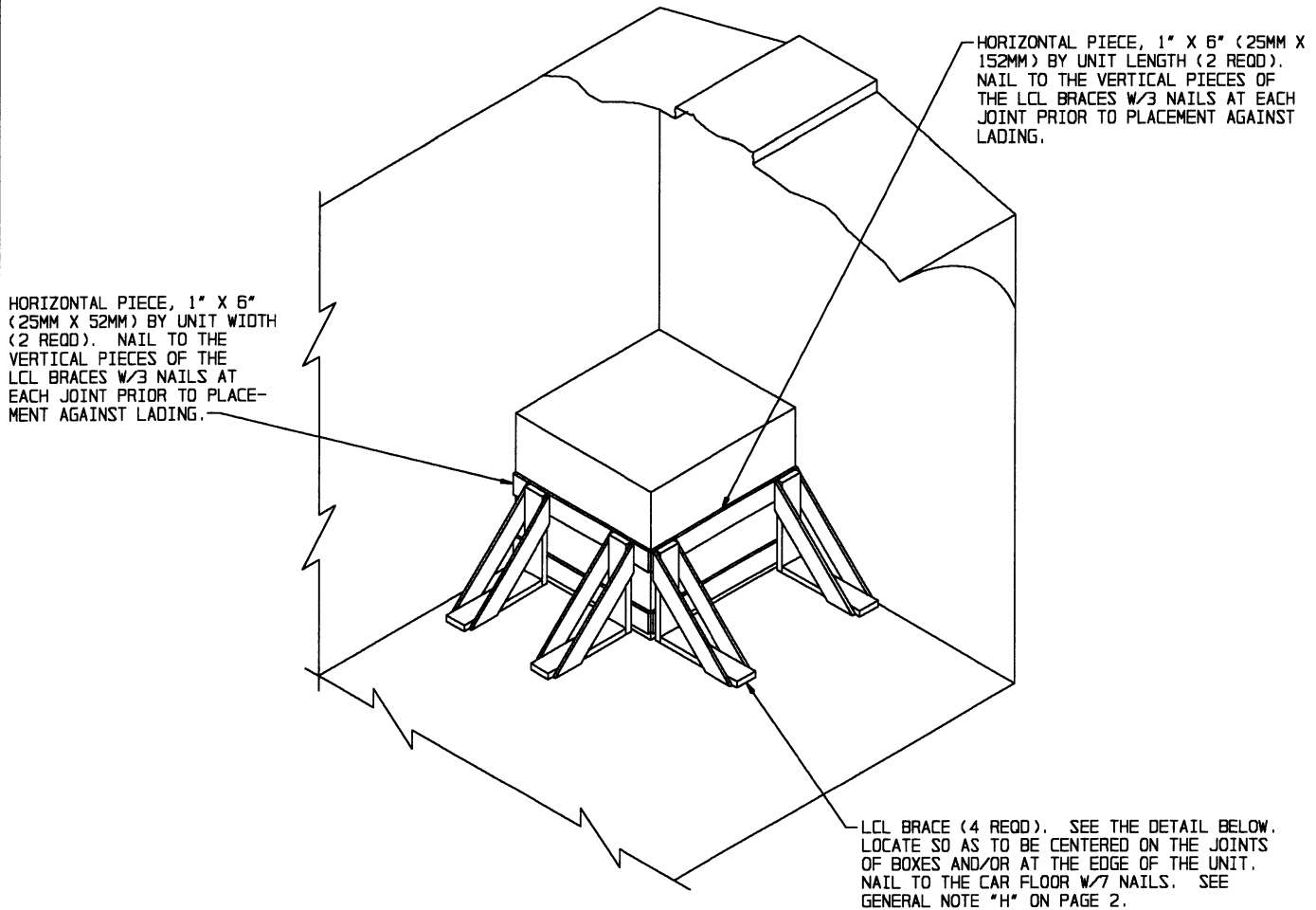
- (A) VERTICAL PIECE, 2" X 6" (51MM X 152MM) BY LOAD HEIGHT (2 REOD).
- (B) HORIZONTAL PIECE, 2" X 6" (51MM X 152MM) BY UNIT LENGTH OR WIDTH (3 REOD). NAIL TO THE VERTICAL PIECES W/3 NAILS AT EACH JOINT.
- (C) FLOOR CLEAT, 2" X 6" (51MM X 152MM) BY A LENGTH TO SUIT (.87 OR 7/8" (22MM) TIMES LENGTH OF PIECE MARKED (E), PLUS 30" (762MM) (2 REOD). ALIGN WITH A VERTICAL PIECE AND NAIL TO THE CAR FLOOR W/1 NAIL EVERY 8" (203MM).
- (D) HOLD-DOWN CLEAT, 2" X 6" X 12" (51MM X 152MM X 305MM) (2 REOD). NAIL TO A VERTICAL PIECE W/5 NAILS.
- (E) POCKET CLEAT, 2" X 6" X 12" (51MM X 152MM X 305MM) (DOUBLED) (2 REOD). NAIL THE FIRST PIECE TO THE FLOOR CLEAT, PIECE MARKED (C), W/4 NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER AND TOENAIL IT TO THE VERTICAL PIECE, PIECE MARKED (A), W/2 NAILS.
- (F) BRACE, 4" X 4" (102MM X 102MM) BY CUT TO FIT (UNIT HEIGHT MINUS 13-1/2" (343MM), TIMES 2) (2 REOD). SEE THE DETAIL AT LEFT FOR BEVEL-CUTS REQUIRED. TOENAIL TO THE VERTICAL PIECE AND TO THE FLOOR CLEAT, PIECES MARKED (A) AND (C), W/2 NAILS AT EACH END.
- (G) BACK-UP CLEAT, 2" X 6" X 30" (51MM X 152MM X 762MM) (2 REOD). NAIL TO THE FLOOR CLEAT, PIECE MARKED (C), W/6 NAILS.



BRACE

4" X 4" MATERIAL

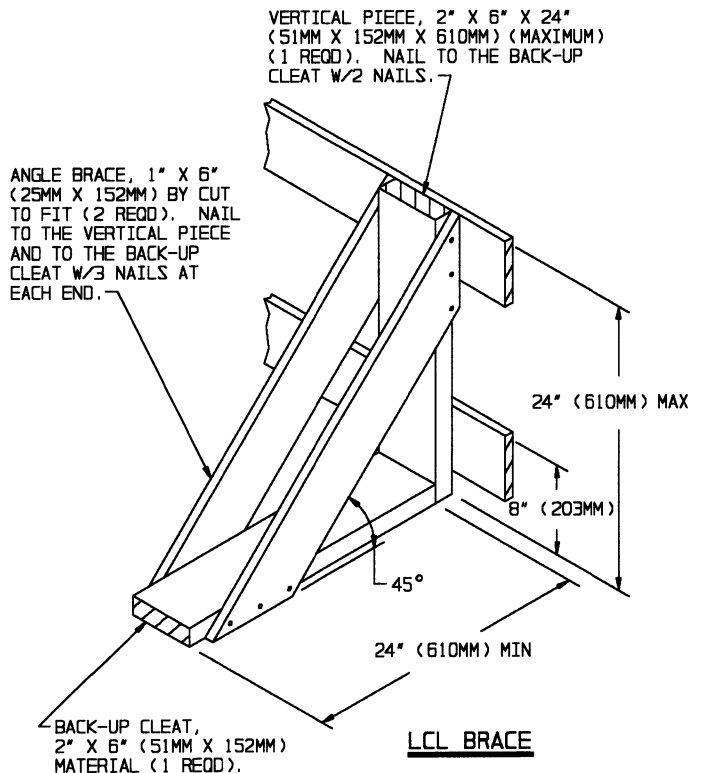
THE BRACE MUST BE INSTALLED SO THAT THIS BEARING SURFACE WILL BE IN CONTACT WITH THE VERTICAL PIECE MARKED (A).



ISOMETRIC VIEW

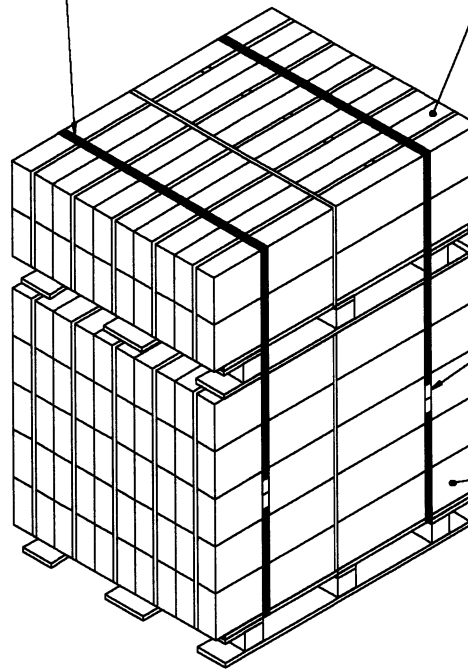
SPECIAL NOTES:

1. A PARTIAL VIEW OF A 1-UNIT LOAD IN A GBS 252 OR TMS 851 CAR IS SHOWN. THE LCL BRACE PROCEDURES ARE ALSO APPLICABLE FOR CARS OF OTHER TYPES.
2. A PALLET UNIT OF 105MM CARTRIDGES, PACKED 2 PER WOODEN BOX, IS SHOWN AS TYPICAL. THE UNIT IS 42-3/4" (1,086MM) LONG BY 45-3/4" (1,162MM) WIDE BY 50" (1,270MM) HIGH AND WEIGHS APPROXIMATELY 2,197MM POUNDS (978 KG). THE DEPICTED PROCEDURES ARE ALSO APPLICABLE FOR OTHER SIZE AND WEIGHT PALLET UNITS.
3. THE PALLET IS SHOWN IN THE CORNER OF A GBS 252 OR TMS 851 CAR. IF AN HBIS 297 OR TMS 858 CAR IS BEING LOADED, THE PALLET UNIT MUST BE POSITIONED IN THE CENTER OF THE CAR WIDTH. LCL BRACES MUST THEN BE APPLIED TO THE OTHER SIDE OF THE UNIT.
4. THE PALLET UNIT IS SHOWN WITH THE LENGTH DIMENSION PARALLEL TO THE SIDEWALLS OF THE CAR. IF DESIRED, THE UNIT MAY BE POSITIONED WITH THE WIDTH DIMENSION PARALLEL TO THE CAR SIDEWALLS.
5. THE LCL BRACES WILL BE POSITIONED AGAINST THE STRONG POINTS OF A PALLET UNIT. THIS WOULD BE AGAINST THE JOINT BETWEEN BOXES OR ON THE BATTENS, IF PRESENT.
6. EACH LCL BRACE AS APPLIED FOR LONGITUDINAL BRACING WILL RETAIN 3,500 POUNDS (1,589 KG) OF LADING. EACH LCL BRACE AS APPLIED FOR LATERAL BRACING WILL SUPPORT 12,000 POUNDS (5,448 KG) OF LADING. A MINIMUM OF TWO BRACES MUST BE USED FOR LONGITUDINAL BRACING.



VERTICAL UNITIZING STRAP, 1-1/4"
X .035" OR .031" (32MM X .889MM OR
.787MM) BY A LENGTH TO SUIT STEEL
STRAPPING (2 REOD). POSITION NEAR
POSTS OF PALLET BASE.

INDICATES A TYPICAL
2-LAYER PALLET UNIT.



INDICATES TWO
1-1/4" STRAP SEALS.

INDICATES A LOWER LAYER
PALLET UNIT.

SECUREMENT OF PARTIAL PALLET UNIT ON TOP

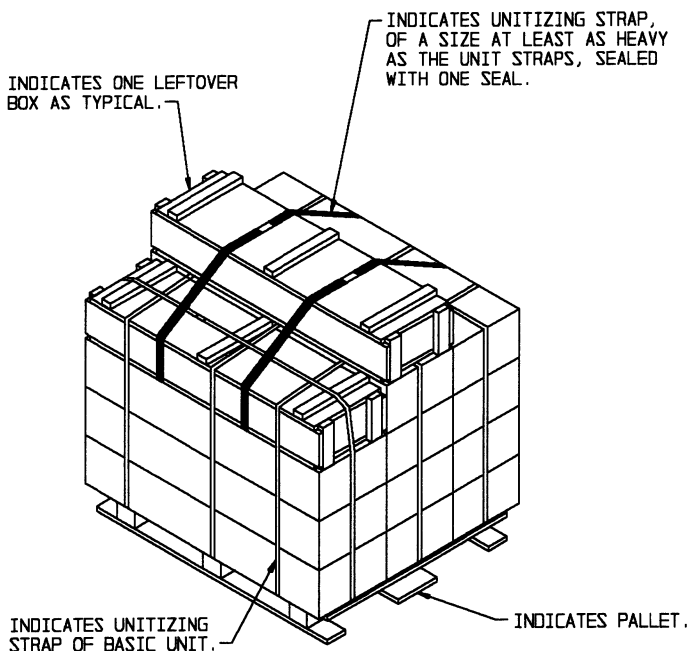
THE PALLET UNITS SHOWN ABOVE ARE TYPICAL. THE PROCEDURES ARE ALSO APPLICABLE FOR OTHER PALLET UNITS.

SPECIAL NOTES:

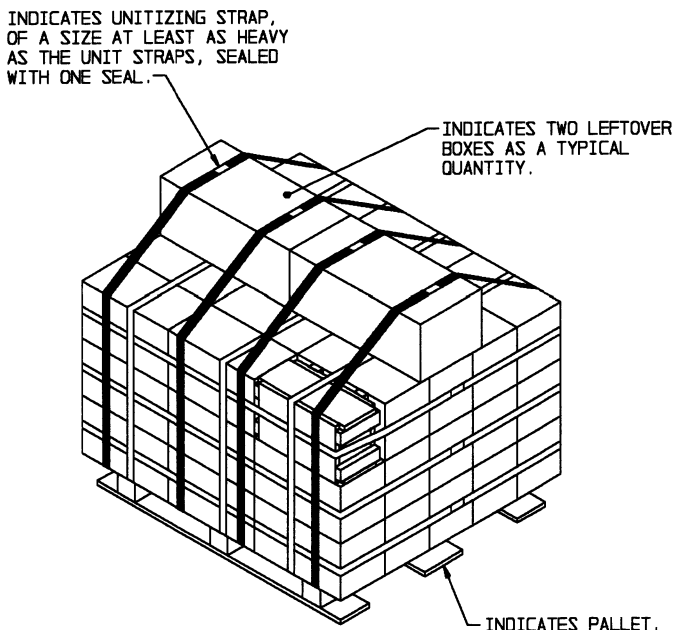
1. SHIPMENTS OF PALLET UNITS OF AMMUNITION AND/OR COMPONENTS SHOULD CONSIST OF FULL-HEIGHT AND FULL-LAYER UNITS TO THE MAXIMUM EXTENT POSSIBLE. HOWEVER, THE END OF A LOT, OR THE QUANTITY OF ITEMS NEEDED TO FILL A REQUISITION MAY NECESSITATE THE SHIPMENT OF ONE OR MORE LESS-THAN-FULL PALLET UNITS WITHIN A LOAD. THE PROCEDURES ON THIS PAGE ARE PRESENTED AS GUIDANCE IN THE SHIPMENT OF THESE PARTIAL UNITS.
2. A LESS-THAN-FULL-HEIGHT PALLET UNIT WHICH IS TO BE SHIPPED ON TOP OF A LOAD (CAR HEIGHT PERMITTING) IS NOT LIMITED IN HEIGHT.
3. THE PARTIAL UNIT WILL BE STRAPPED TO THE PALLET UNIT DIRECTLY BELOW WITH TWO VERTICAL UNITIZING STRAPS. SEE THE "SECUREMENT OF PARTIAL PALLET UNIT ON TOP" VIEW ABOVE FOR GUIDANCE.
4. LEFTOVER BOXES, IN AN AMOUNT WHICH IS LESS THAN THE QUANTITY IN ONE LAYER OF A UNIT, CAN BE SECURED TO THE TOP OF A PARTIAL UNIT FOR SECUREMENT ON TOP OF A LOAD. THE LEFTOVER BOXES MUST BE SECURED TO THE PARTIAL UNIT WITH THEIR OWN STRAPPING, SEPARATE FROM THE STRAPS FOR THE PARTIAL UNIT. SEE THE "END-OVER-END LAP JOINT DETAILS" ON PAGE 23 FOR GUIDANCE IN STRAP APPLICATION.

SPECIAL NOTES:

1. SHIPMENTS OF PALLET UNITS OF AMMUNITION AND/OR COMPONENTS SHOULD CONSIST OF FULL-HEIGHT UNITS TO THE MAXIMUM EXTENT POSSIBLE. HOWEVER, THE END OF A LOT OR THE QUANTITY OF ITEMS NEEDED TO FILL A REQUISITION, MAY NECESSITATE THE SHIPMENT OF ONE OR MORE LEFTOVER BOXES. LEFTOVER BOXES ARE DESCRIBED AS A QUANTITY OF BOXES WHICH IS INSUFFICIENT TO FORM A FULL-LAYERED PARTIAL UNIT FOR SHIPMENT ON TOP OF A LOAD AS SHOWN ON PAGE 49. THEY ARE USUALLY BOXES OF THE SAME AMMUNITION ITEM AS THE BALANCE OF THE LOAD ALTHOUGH THEY MAY BE ANY OTHER COMPATIBLE ITEM.
2. CAUTION: A LOAD CONTAINING LEFTOVER BOXES IN AN AMOUNT WHICH IS LESS THAN A FULL LAYER, AND SECURED TO THE TOP OF A FULL OR PARTIAL UNIT, MUST NOT BE DESTINED FOR SHIPMENT OVERSEAS BY WATER CARRIER.
3. THE PROCEDURES ON THIS PAGE ARE PRESENTED AS GUIDANCE IN THE SECUREMENT OF LEFTOVER BOXES FOR SHIPMENT. THE VIEW AT TOP LEFT DEPICTS ONE LEFTOVER BOX SECURED TO A FULL-HEIGHT UNIT WHEN THE BOXES ON THE UNIT HAVE TOP CLEATS. THE VIEW AT LEFT BELOW DEPICTS TWO LEFTOVER BOXES SECURED TO A FULL-HEIGHT UNIT WHEN THE BOXES ON THE UNIT DO NOT HAVE TOP CLEATS. THE QUANTITIES SHOWN ARE TYPICAL. THE PROCEDURES ARE ALSO APPLICABLE FOR SECUREMENT OF LEFTOVER BOXES TO PARTIAL UNITS FOR SHIPMENT ON TOP OF A LOAD. CARE MUST BE EXERCISED TO ENSURE THAT THE INSIDE CAR HEIGHT WILL PERMIT SECUREMENT OF LEFTOVER BOXES TO THE TOP OF A PALLET UNIT.
4. THE QUANTITY OF LEFTOVER BOXES WHICH CAN BE SECURED TO FULL OR PARTIAL UNITS MAY VARY FROM ONE TO NOT MORE THAN THE QUANTITY IN ONE LAYER ON THE UNIT. IN OTHER WORDS, NOT MORE THAN THREE BOXES CAN BE STRAPPED TO A 3-BOX-LONG UNIT. LEFTOVER BOXES MUST NOT BE STACKED. IF THE QUANTITY OF LEFTOVER BOXES TO BE SHIPPED IS MORE THAN THE QUANTITY IN ONE FULL LAYER, BOXES MUST BE STRAPPED TO MORE THAN ONE UNIT.
5. LEFTOVER BOXES MUST BE SECURED TO A FULL OR PARTIAL UNIT WITH A MINIMUM OF TWO PIECES OF STEEL STRAPPING (SEPARATE FROM UNIT STRAPS) OF A SIZE AT LEAST AS HEAVY AS THE STRAPPING USED TO SECURE THE BOXES ON THE PALLET UNIT UNDERNEATH THE LEFTOVER BOXES TO THE PALLET BASE. THE "SECUREMENT OF TOP-CLEATED BOXES" DETAIL ABOVE DEPICTS A TYPICAL STRAP APPLICATION FOR BOXES HAVING TOP CLEATS. THREAD A STRAP UNDER THE TOP LAYER OF BOXES, AS NEAR AS PRACTICAL TO THE ADJACENT UNIT STRAP, ENCIRCLE THE LEFTOVER BOXES, TENSION, AND SEAL THE JOINT WITH ONE DOUBLE CRIMPED SEAL. THE "SECUREMENT OF NON-TOP-CLEATED BOXES" DETAIL AT LEFT DEPICTS A TYPICAL STRAP APPLICATION FOR BOXES WHICH DO NOT HAVE TOP CLEATS. THREAD A STRAP UNDER THE TOP DECK BOARDS (AS APPLICABLE) AS NEAR AS PRACTICAL TO A PALLET POST, COMPLETELY ENCIRCLE THE PALLET UNIT AND THE LEFTOVER BOXES, TENSION, AND SEAL THE JOINT WITH ONE DOUBLE CRIMPED SEAL.

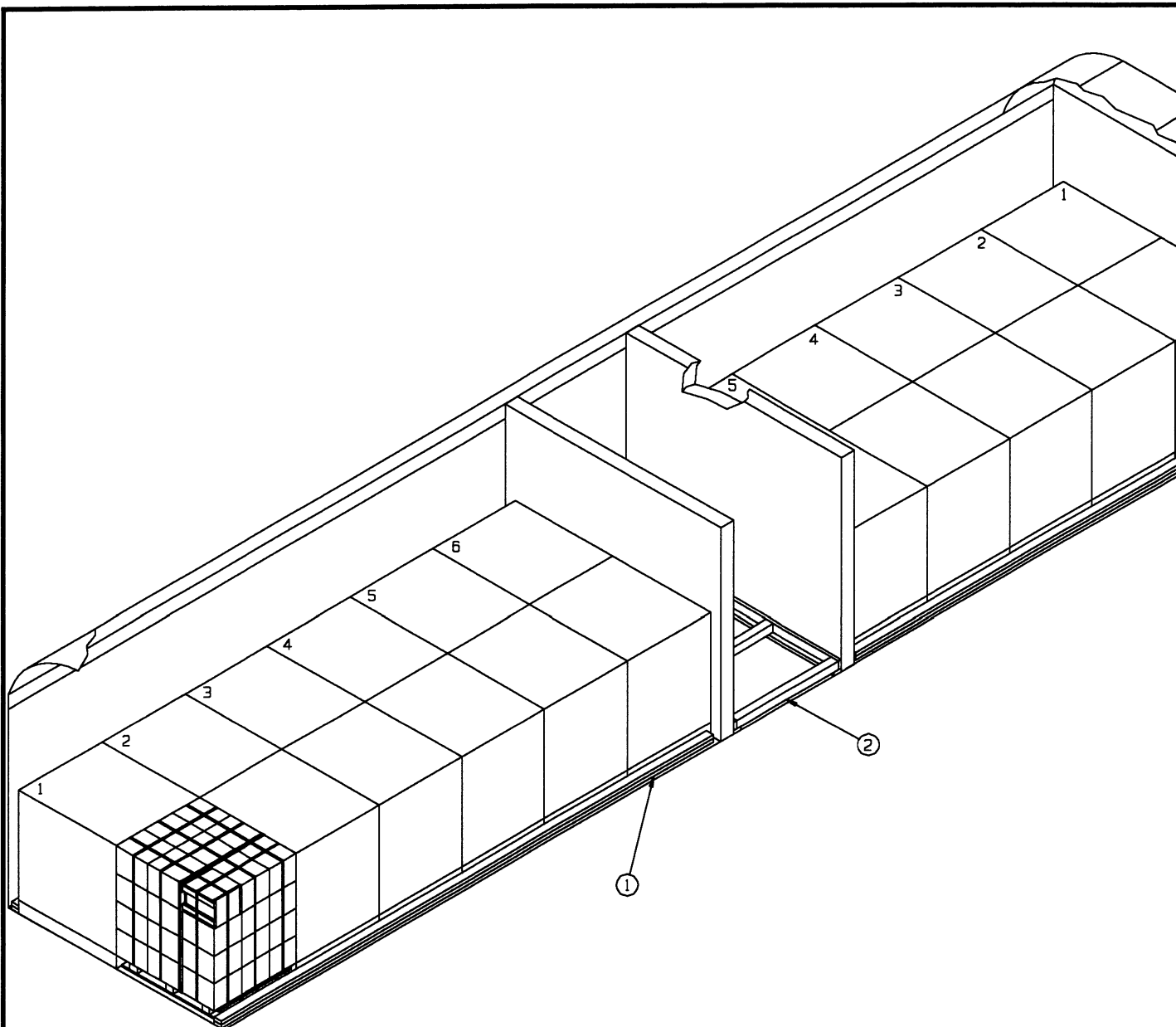


SECUREMENT OF TOP-CLEATED BOXES



SECUREMENT OF NON-TOP-CLEATED BOXES

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ISOMETRIC VIEW

KEY NUMBERS (TYPICAL)

- ① SIDE BLOCKING, 2" X 4" (51MM X 102MM) BY LOAD LENGTH MINUS 2" (51MM) (DOUBLED) (4 REQD). FOR THE PALLET UNIT SHOWN, THE SIDE BLOCKING IN THE NEAR END OF THE LOAD WILL BE 19'-5-1/2" (5,931MM) LONG AND THE FAR END WILL BE 16'-2" (4,928MM) LONG. PRE-POSITION, IF NECESSARY, PLACE ONE PIECE DIRECTLY ON TOP OF ANOTHER AND NAIL THRU BOTH PIECES AND INTO THE CAR FLOOR W/1 NAIL EVERY 24" (610MM). RANDOM LENGTHS MAY BE USED. SEE GENERAL NOTES "H" AND "J" ON PAGE 2. SEE SPECIAL NOTE 4 ON PAGE 53.
- ② STRUT ASSEMBLY (1 REQD). SEE THE DETAIL ON PAGE 54.

TYPICAL 1-HIGH LOAD
 WITH LENGTH PARALLEL TO SIDES IN AN HBILLS-X 294/295 CAR

(SPECIAL NOTES CONTINUED)

- 7. THE MAXIMUM NUMBER OF PALLET UNITS BASED ON THE WEIGHT OF THE UNIT IS AS FOLLOWS.

NO. OF UNITS	MAXIMUM WEIGHT OF UNIT
14	4,000 LBS (1,816 KG)
16	3,582 LBS (1,626 KG)
18	3,175 LBS (1,441 KG)
20	2,858 LBS (1,297 KG)
22	2,598 LBS (1,179 KG)
24	2,381 LBS (1,080 KG)
28	2,041 LBS (926 KG)
30	1,905 LBS (864 KG)
32	1,786 LBS (810 KG)
36	1,587 LBS (720 KG)
40	1,429 LBS (648 KG)
42	1,361 LBS (617 KG)
44	1,299 LBS (589 KG)
48	1,190 LBS (540 KG)
54	1,058 LBS (480 KG)
56	1,020 LBS (463 KG)
60	952 LBS (432 KG)
64	893 LBS (405 KG)
66	866 LBS (393 KG)
72	793 LBS (360 KG)
80	714 LBS (324 KG)
88	649 LBS (294 KG)
96	595 LBS (270 KG)

- 8. THE DEPICTED LOAD, OR LOADS OF ANY OF ANY OTHER UNITS, MAY BE REDUCED TO SUIT THE QUANTITY TO BE SHIPPED. A LOAD MAY BE REDUCED BY ONE LOAD UNIT, EITHER TWO, OR FOUR, OR MORE PALLET UNITS, AS APPLICABLE, BY OMITTING A LOAD UNIT FROM THE CENTER OF THE LOAD. ADJUST THE LENGTH OF THE SIDE BLOCKING, AS NECESSARY.
- 9. A LOAD MAY BE REDUCED BY ONE PALLET UNIT BY EMPLOYING THE PROCEDURES DEPICTED ON PAGE 44.
- 10. FOR SHIPMENT OF A PARTIAL PALLET UNIT ON TOP OF THE LOAD, IF THE INSIDE CAR HEIGHT PERMITS, REFER TO THE PROCEDURES ON PAGE 49. FOR SHIPMENT OF "LEFTOVER" BOXES, IF THE INSIDE CAR HEIGHT PERMITS, REFER TO THE PROCEDURES ON PAGE 50 FOR GUIDANCE.

SPECIAL NOTES:

- 1. AN HBILLS-X 294/295 CAR, 41'-3" (12,576MM) LONG BY 8'-9" (2,670MM) WIDE HAVING A MAXIMUM LOAD LIMIT OF 57,319 POUNDS (26,022 KG) AND EQUIPPED WITH LOAD DIVIDERS IS SHOWN. CARS OF OTHER SIZES AND TYPES MAY BE USED.
- 2. A 22-UNIT LOAD OF BURSTER, INCENDIARY, M4, 20 PER WOODEN BOX IS SHOWN. THE UNIT IS 39-1/4" (997MM) LONG BY 46-1/8" (1,172MM) WIDE BY 50-1/2" (1,283MM) HIGH AND WEIGHS APPROXIMATELY 1,891 POUNDS (859 KG).
- 3. THE DEPICTED PROCEDURES ARE APPLICABLE FOR ANY PALLET UNIT OR SKIDDED UNIT. THE UNITS WILL BE LOADED IN ACCORDANCE WITH THE PROCEDURES FOR THE APPLICABLE LOAD SELECTED FROM THOSE PROCEDURES SHOWN ON PAGES 4 THRU 19, EITHER IN A 1-HIGH LOAD CONFIGURATION OR IN A 2-HIGH (OR MORE) LOAD CONFIGURATION. SEE SPECIAL NOTE 6 BELOW FOR GUIDANCE IN THE NUMBER OF LAYERS WHICH CAN BE LOADED BASED ON THE UNIT HEIGHTS. THE BLOCKING AND BRACING MATERIAL SPECIFIED FOR THE SHIPMENT OF EACH ITEM WILL BE USED, EXCEPT THAT THE LOAD DIVIDERS IN THE LOAD ON PAGE 52 WILL BE USED IN LIEU OF THE CENTER GATES AND STRUTS IN THOSE LOADS.
- 4. SIDE BLOCKING IS SPECIFIED AS 2" X 4" (51MM X 102MM) MATERIAL. IF THE OVERHANG ON THE UNIT DOES NOT FACILITATE NAILING OF 2" X 4" MATERIAL, 2" X 6" (51MM X 152MM) MATERIAL MAY BE USED. ANY LENGTH UNIT MAY BE LOADED TWO UNITS WIDE IN THE CAR. THE MAXIMUM WIDTHS OF UNITS WHICH CAN BE LOADED TWO UNITS WIDE USING 2" X 4" AND/OR 2" X 6" SIDE BLOCKING ARE AS FOLLOWS.

MATERIAL	PALLET WIDTH	MAXIMUM WIDTH UNIT
2" X 4"	45-1/2" (1,156MM)	52-1/4" (1,327MM)
2" X 4"	48" (1,219MM)	49-1/2" (1,257MM)
2" X 4"	53" (1,346MM)	CANNOT BE LOADED
2" X 6"	45-1/2" (1,156MM)	48" (1,219MM)
2" X 6"	48" (1,219MM)	CANNOT BE LOADED

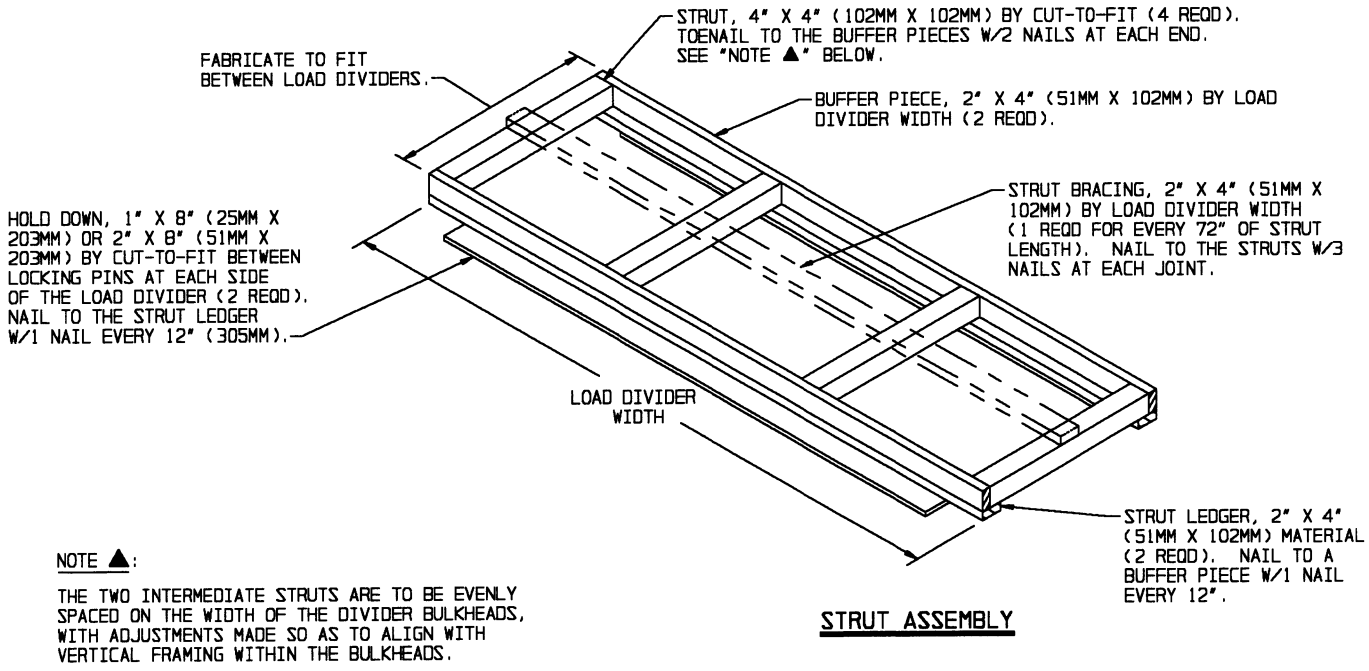
- 5. THE NUMBER OF UNITS IN THE LENGTH OF THE CAR IS BASED ON THE UNIT LENGTH OR WIDTH AS FOLLOWS.

NO. LONG	MAXIMUM UNIT DIMENSION
12	38-1/4" (972MM)
11	41-5/8" (1,057MM)
10	45-7/8" (1,165MM)
9	51" (1,295MM)
8	57-3/8" (1,457MM)
7	65-1/2" (1,664MM)
6	6'-4-1/2" (1,943MM)
5	7'-7-3/4" (2,330MM)

- 6. THE NUMBER OF LAYERS WHICH CAN BE LOADED, BASED ON THE HEIGHT OF THE UNIT IS AS FOLLOWS. NOTE THAT UNITS IN LOADS OF MORE THAN THREE LAYERS MUST BE UNITIZED INTO GROUPS OF TWO OR THREE UNITS, AS APPLICABLE.

NO. OF LAYERS	MAXIMUM UNIT HEIGHT
1	NO LIMIT
2	40-1/4" (1,022MM)
3	26-3/4" (679MM)
4	20" (508MM)
5	16" (406MM)
6	13-3/8" (339MM)

(CONTINUED AT LEFT)



HOLD DOWN, 1" X 8" (25MM X 203MM) OR 2" X 8" (51MM X 203MM) BY CUT-TO-FIT BETWEEN LOCKING PINS AT EACH SIDE OF THE LOAD DIVIDER (2 REQD). NAIL TO THE STRUT LEDGER W/1 NAIL EVERY 12" (305MM).

STRUT, 4" X 4" (102MM X 102MM) BY CUT-TO-FIT (4 REQD). TOENAIL TO THE BUFFER PIECES W/2 NAILS AT EACH END. SEE "NOTE ▲" BELOW.

BUFFER PIECE, 2" X 4" (51MM X 102MM) BY LOAD DIVIDER WIDTH (2 REQD).

STRUT BRACING, 2" X 4" (51MM X 102MM) BY LOAD DIVIDER WIDTH (1 REQD FOR EVERY 72" OF STRUT LENGTH). NAIL TO THE STRUTS W/3 NAILS AT EACH JOINT.

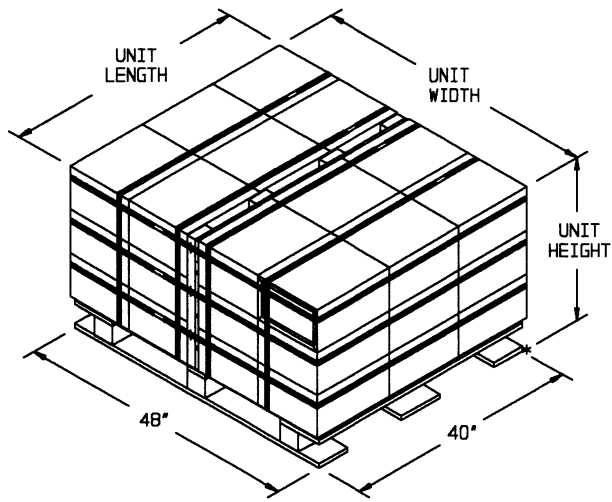
LOAD DIVIDER WIDTH

STRUT LEDGER, 2" X 4" (51MM X 102MM) MATERIAL (2 REQD). NAIL TO A BUFFER PIECE W/1 NAIL EVERY 12".

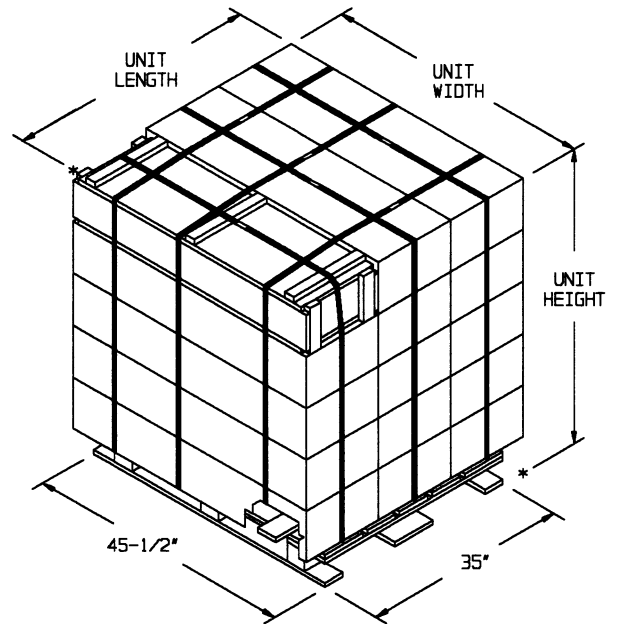
STRUT ASSEMBLY

NOTE ▲:

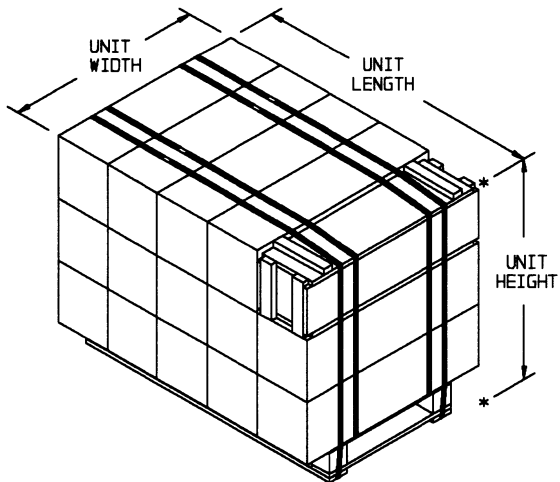
THE TWO INTERMEDIATE STRUTS ARE TO BE EVENLY SPACED ON THE WIDTH OF THE DIVIDER BULKHEADS, WITH ADJUSTMENTS MADE SO AS TO ALIGN WITH VERTICAL FRAMING WITHIN THE BULKHEADS.



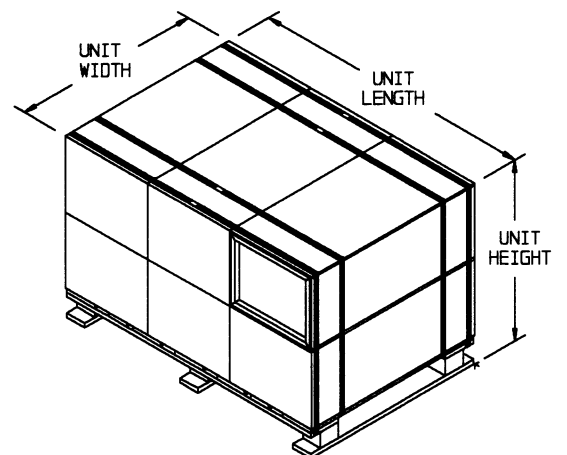
TYPICAL PALLET UNIT (40" X 48" PALLET)



TYPICAL PALLET UNIT (35" X 45-1/2" PALLET)



TYPICAL UNIT ON TYPE I SKID BASE



TYPICAL UNIT ON TYPE II SKID BASE

