

PATRIOT

LOADING AND BRACING (CL & LCL) IN HYUNDAI FREIGHT CAR* OF PATRIOT ADVANCED CAPABILITY-3 (PAC-3) MISSILE SEGMENT ENHANCEMENT (MSE) COMPLETE ROUND, PACKED IN MISSILE CANISTER (SHIPPING, STORAGE AND LAUNCH CANISTER)

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

U.S. ARMY MATERIEL COMMAND DRAWING

<p style="text-align: center;">APPROVED, U.S. ARMY AVIATION AND MISSILE COMMAND</p> <p>OCONNOR.DOUGLAS.LEO.114058225 1</p> <p style="font-size: small;">Digitally signed by OCONNOR.DOUGLAS.LEO.1140582251 DN: cn=US, ou=U.S. Government, ou=DoD, ou=PKI, ou=USA, c=OCONNOR.DOUGLAS.LEO.1140582251 Date: 2017.07.05 13:01:38 -05'00'</p>	<p>CAUTION: VERIFY PRIOR TO USE AT HTTPS://MHP.REDSTONE.ARMY.MIL THAT THIS IS THE MOST CURRENT VERSION OF THIS DOCUMENT. THIS IS PAGE 1 OF 6.</p>																																	
<p style="text-align: center;">APPROVED BY ORDER OF COMMANDING GENERAL, U.S. ARMY MATERIEL COMMAND</p> <p>SHIMP.UPTON.R.1231257183 1</p> <p style="font-size: small;">Digitally signed by SHIMP.UPTON.R.1231257183 DN: cn=US, ou=U.S. Government, ou=DoD, ou=PKI, ou=USA, c=SHIMP.UPTON.R.1231257183 Date: 2017.07.14 11:17:52 -05'00'</p> <p style="text-align: center;">U.S. ARMY DEFENSE AMMUNITION CENTER</p>	<p>DO NOT SCALE</p>	<p style="font-size: 2em;">JULY 2017</p>																																
	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%; text-align: center;">DESIGN ENGINEER</td> <td style="width: 15%; text-align: center;">BASIC</td> <td colspan="2" style="text-align: center;">RICHARD DOWNSIDE</td> </tr> <tr> <td></td> <td style="text-align: center;">REV.</td> <td colspan="2"></td> </tr> </table>	DESIGN ENGINEER	BASIC	RICHARD DOWNSIDE			REV.			<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%; text-align: center;">ENGINEERING DIVISION</td> <td colspan="3" style="text-align: center;">FIEFFER.LAURA.A.1230375727</td> </tr> <tr> <td style="text-align: center;">TEST ENGINEER</td> <td colspan="3" style="text-align: center;">FELICIANO.ADIN.1259200373</td> </tr> <tr> <td style="text-align: center;">TEST REPORT</td> <td colspan="3" style="text-align: center;">NA</td> </tr> <tr> <td style="text-align: center;">EXPLOSIVE SAFETY DIRECTORATE</td> <td colspan="3" style="text-align: center;">TIRONE.JOSEPH.ANDREW.1026683749</td> </tr> </table>	ENGINEERING DIVISION	FIEFFER.LAURA.A.1230375727			TEST ENGINEER	FELICIANO.ADIN.1259200373			TEST REPORT	NA			EXPLOSIVE SAFETY DIRECTORATE	TIRONE.JOSEPH.ANDREW.1026683749			<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%; text-align: center;">CLASS</td> <td style="width: 15%; text-align: center;">DIVISION</td> <td style="width: 15%; text-align: center;">DRAWING</td> <td style="width: 15%; text-align: center;">FILE</td> </tr> <tr> <td style="text-align: center;">19</td> <td style="text-align: center;">48</td> <td style="text-align: center;">8247</td> <td style="text-align: center;">GM5PA8</td> </tr> </table>	CLASS	DIVISION	DRAWING	FILE	19	48	8247
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GENERAL NOTES

- A. THIS DOCUMENT HAS BEEN PREPARED AND ISSUED IN ACCORDANCE WITH AR 740-1 AND AUGMENTS TM 743-200-1 (CHAPTER 5).
- B. THE SPECIFIED OUTLOADING PROCEDURES ARE APPLICABLE TO LOADS OF PATRIOT PAC-3 MSE COMPLETE ROUND, PACKED IN THE MISSILE CANISTER. SUBSEQUENT REFERENCE TO CANISTER MEANS THE CANISTER WITH MISSILE ITEMS. SEE PAGE 3 AND LOCKHEED MARTIN DRAWING 13506000 FOR DETAILS OF THE CANISTER. SEE TM 9-1440-2600-10 FOR CANISTER COUPLING DETAILS.
- C. PROCEDURES DEPICTED HEREIN ARE TYPICAL IN NATURE. ITEM LOCATION AND QUANTITIES OF THE DESIGNATED ITEM MAY BE VARIED TO SATISFY OPERATIONAL REQUIREMENTS, PROVIDING LOADING AND TIEDOWN PRINCIPLES SPECIFIED HEREIN ARE RETAINED.
- D. THE PROCEDURES DETAILED HEREIN MAY BE USED TO LOAD PATRIOT PAC-3 MSE CANISTERS IN EITHER A TWO-PACK OR ONE-PACK CONFIGURATION, OR A COMBINATION OF BOTH. THE TWO-PACK CONFIGURATION IS DEPICTED ON PAGES 4 AND 6. THE LOADING OF ONE-PACK CANISTERS WILL BE THE SAME AS DEPICTED HEREIN, WITH THE EXCEPTION OF SHORTENING THE HEADERS TO 45".
- E. THE SELECTION OF FREIGHT CARS FOR THE TRANSPORT OF THE CANISTERS IS THE RESPONSIBILITY OF THE ORIGINATING CARRIER AND THE SHIPPER. ONLY CARS WHICH HAVE "SOUND" FLOORS AND ARE IN OTHERWISE PROPER CONDITION, IN ACCORDANCE WITH THE REQUIREMENTS OF THE APPLICABLE REGULATORY DOCUMENTS, WILL BE SELECTED.
- F. THE OUTLOADING PROCEDURES DEPICTED IN THIS DOCUMENT ARE APPLICABLE FOR SHIPMENTS ONLY IN HYUNDAI FREIGHT CARS WHICH ARE 48'-7" (14808MM) LONG BY 8'-9" (2667MM) WIDE BY 10'-2" (3099MM) HIGH (INSIDE DIMENSIONS). THE FREIGHT CAR SELECTED MUST BE EQUIPPED WITH 12 TIEDOWN ANCHORS LOCATED IN THE FLOOR ON EACH SIDE OF THE CAR, EACH CAPABLE OF RETAINING A MINIMUM OF 3,000 LBS (1361 KG). THE CARS DEPICTED HAVE A NOMINAL CAPACITY OF 109 METRIC TONS (240,304 LBS).
- G. WEB STRAP TIEDOWN ASSEMBLIES MUST BE SECURELY HOOKED INTO ANCHORING DEVICES ON THE TRANSPORTING VEHICLE AND FIRMLY TENSIONED. FIRMLY TENSIONED MEANS, WHEN THE OPERATOR PULLS ON THE RATCHET HANDLE BY HAND, THE RATCHET WILL NOT ADVANCE ANOTHER NOTCH. NO TYPE OF MECHANICAL EXTENSION OR LEVER WILL BE USED. EXERCISE CARE DURING STRAP APPLICATION. AVOID TWISTS IN THE STRAP TO THE EXTENT POSSIBLE (IF TIME PERMITS) BUT ENSURE THERE ARE NO KNOTS IN THE STRAP. ON THE TAKE-UP SPOOL OF THE RATCHET, ENSURE STRAIGHT LAY OF THE STRAP WHEN TENSIONING. AFTER INITIAL WEBBING-TO-WEBBING CONTACT HAS BEEN MADE, BY ROTATING THE TAKE-UP SPOOL UNTIL NO METAL ON THE SPOOL IS SHOWING AND THE STRAP HAS MADE CONTACT WITH ITSELF, THE TENSIONED STRAP MUST FORM AT LEAST 1/2 BUT NOT MORE THAN 1-1/2 WRAPS OF STRAP ON THE TAKE-UP SPOOL OF THE TENSIONING RATCHET. AFTER TENSIONING IS COMPLETED, ENSURE THAT THE SPOOL LOCKING LATCH IS FULLY SEATED AT BOTH ENDS OF THE SPOOL IN MATCHING LOCKING NOTCHES. TIE BACK THE LOOSE END OF THE STRAP AFTER TENSIONING IS COMPLETED (LOOSE ENDS MAY BE FOLDED AND TAPED OR TIED TO THE TENSIONING STRAP IF TIME PERMITS).
- H. WHEN ONE WEB TIEDOWN STRAP ASSEMBLY IS NOT LONG ENOUGH TO SPAN THE DISTANCE DEPICTED, TWO ASSEMBLIES MAY BE HOOKED TOGETHER TO GAIN THE NECESSARY LENGTH.

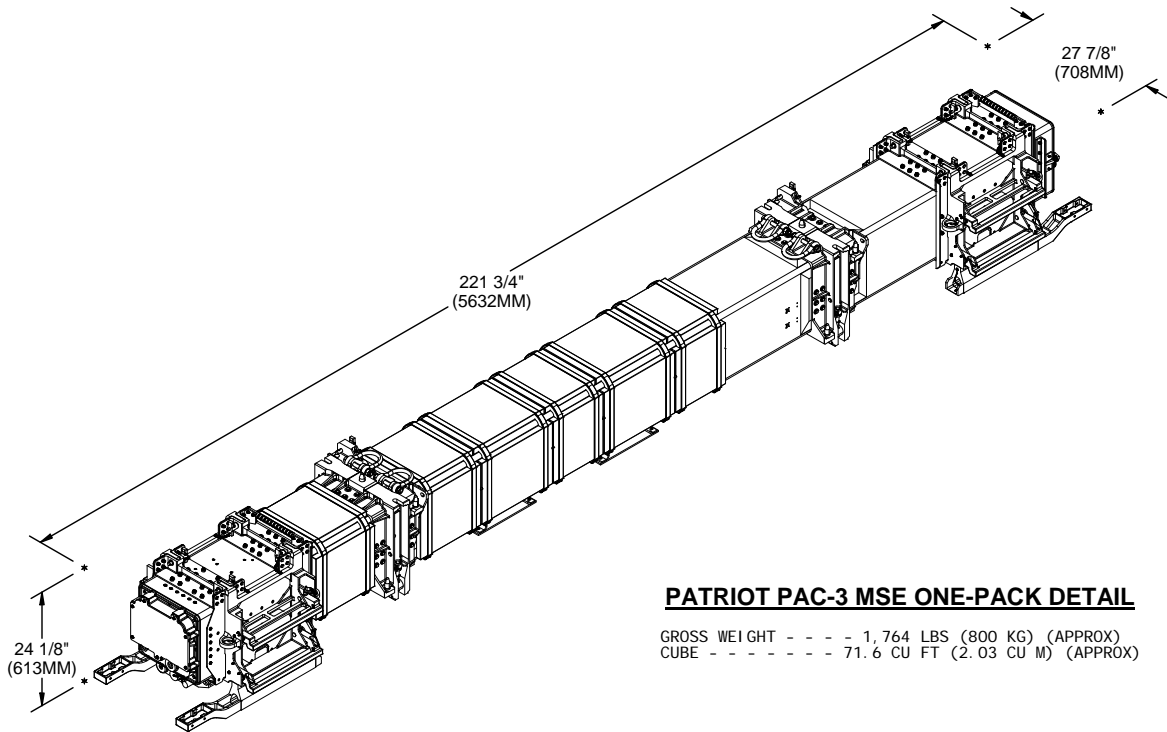
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MATERIAL SPECIFICATIONS

- LUMBER** - - - - - : SEE TM 743-200-1 (DUNNAGE LUMBER) AND VOLUNTARY PRODUCT STANDARD PS 20.
- NAILS** - - - - - : ASTM F1667; COMMON STEEL NAIL (NLCMS OR NLCMMS).
- STRAP** - - - - - : WEBBING, UNIVERSAL TIEDOWN, NSN 5340-00-980-9277; PN 10900880; OR NSN 1670-00-725-1437; PN 0376-013; OR NSN 3990-01-204-3009; PN 1619230 OR PN 9392419.

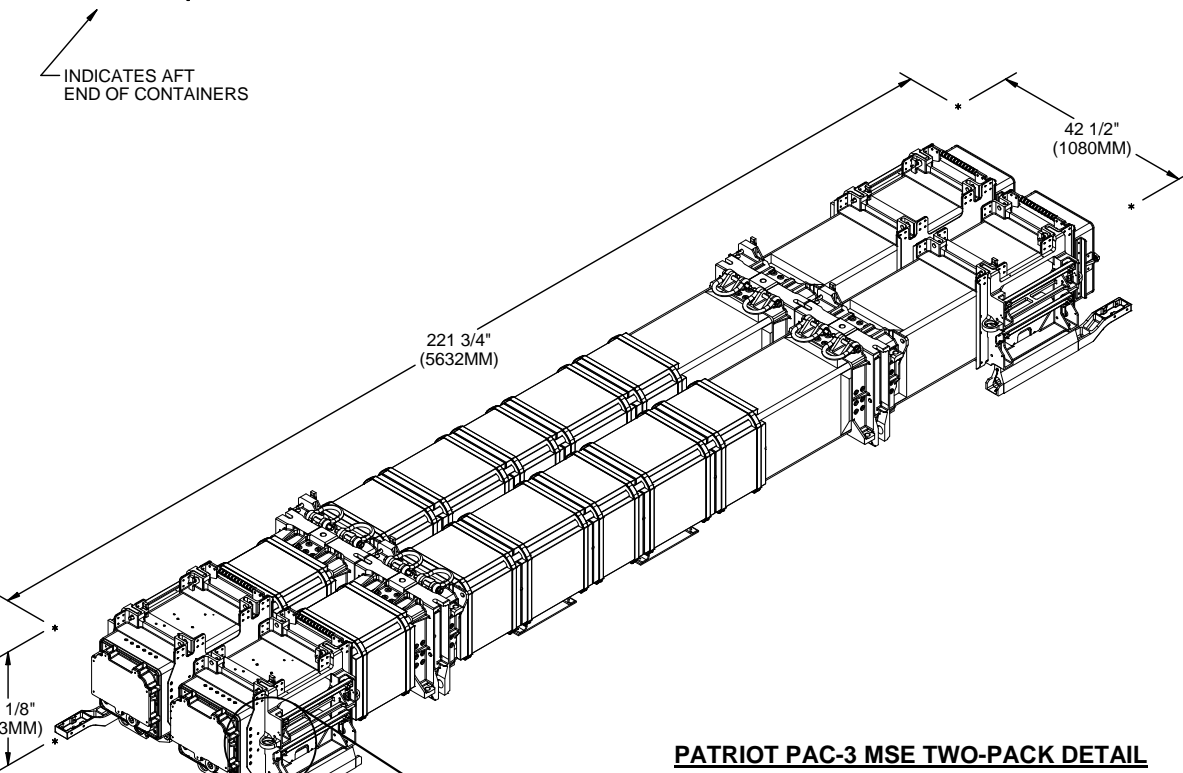
(GENERAL NOTES CONTINUED)

- J. DURING LONG HAULS, STRAPS SHOULD BE CHECKED DURING STOPS AND TIGHTENED IF NECESSARY.
- K. THE NUMBER OF LADING UNITS MAY BE ADJUSTED TO FIT THE SIZE OF THE FREIGHT CAR BEING LOADED OR THE QUANTITY TO BE SHIPPED, HOWEVER, THE APPROVED METHODS SPECIFIED HEREIN MUST BE FOLLOWED AS CLOSELY AS POSSIBLE FOR BLOCKING, BRACING, AND STAYING OF THE UNITS. **NOTICE:** A SHIPMENT WILL BE POSITIONED IN THE FREIGHT CAR IN COMPLIANCE WITH THE WEIGHT DISTRIBUTION REQUIREMENTS.
- L. OTHER TYPES OF LADING ITEMS MAY BE LOADED IN CARS WHICH ARE PARTIALLY LOADED WITH THE DESIGNATED ITEMS, PROVIDING THE TOTAL LOAD IS COMPATIBLE, EXISTING DIRECTIVES ARE NOT VIOLATED, AND THE OTHER LADING ITEMS ARE BLOCKED AND BRACED TO EQUAL THE BLOCKING AND BRACING CRITERIA SPECIFIED HEREIN.
- M. METRIC EQUIVALENT IS GIVEN IN PARENTHESIS FOLLOWING THE DIMENSION. HOWEVER, WHERE THE METRIC EQUIVALENT IS NOT SHOWN, IT MAY BE COMPUTED BY USING ONE INCH EQUALS 25.4 MM AND ONE POUND EQUALS 0.454 KG.
- N. PORTIONS OF THE FREIGHT CARS, SUCH AS SIDE DOORS AND CEILING, HAVE NOT BEEN SHOWN IN THE LOAD VIEWS FOR CLARITY PURPOSES.



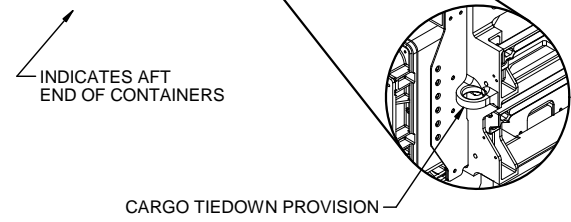
PATRIOT PAC-3 MSE ONE-PACK DETAIL

GROSS WEIGHT - - - - 1,764 LBS (800 KG) (APPROX)
 CUBE - - - - - 71.6 CU FT (2.03 CU M) (APPROX)



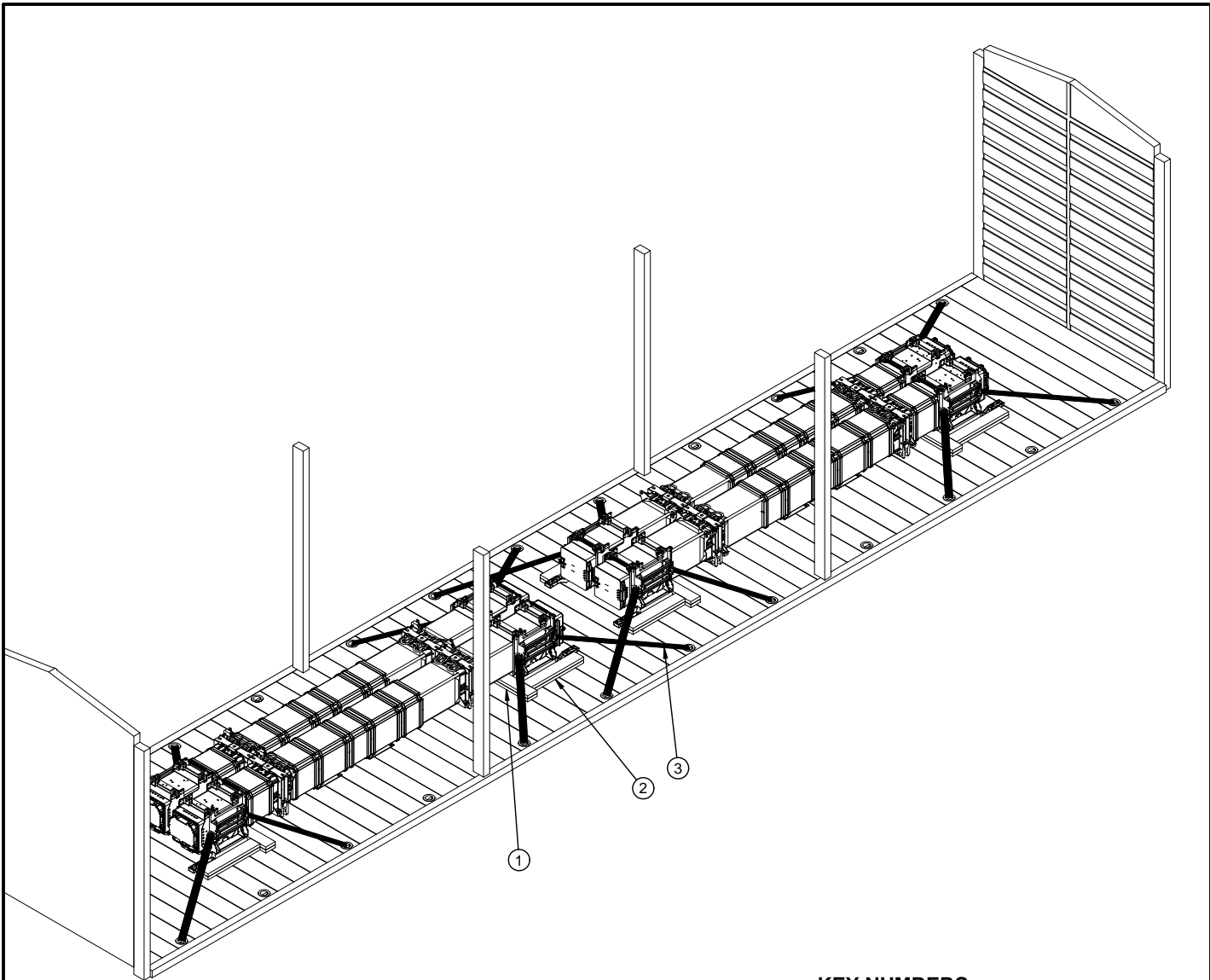
PATRIOT PAC-3 MSE TWO-PACK DETAIL

GROSS WEIGHT - - - - 3,362 LBS (1525 KG) (APPROX)
 CUBE - - - - - 131.6 CU FT (3.73 CU M) (APPROX)



INDICATES AFT
END OF CONTAINERS

CARGO TIEDOWN PROVISION



ISOMETRIC VIEW

KEY NUMBERS

- ① HEADER, 2" X 6" X 60" (1524MM) (DOUBLED) (4 REQD). PREPOSITION AS SHOWN ON PAGE 5 AND NAIL THE FIRST PIECE TO THE FREIGHT CAR FLOOR W/6-10d NAILS. NAIL THE SECOND PIECE TO THE FIRST PIECE W/6-20d NAILS. **NOTE:** FOR A ONE-PACK CONFIGURATION, REDUCE THE LENGTH OF THE HEADER TO 45" (1143MM) AND QUANTITY OF NAILS TO 4-10d AND 4-20d.
- ② SIDE BLOCKING, 2" X 6" X 30" (762MM) (DOUBLED) (8 REQD). POSITION AGAINST THE HEADER AND CONTAINER SKID AND NAIL THE FIRST PIECE TO THE FREIGHT CAR FLOOR W/4-10d NAILS. NAIL THE SECOND PIECE TO THE FIRST PIECE W/4-10d NAILS.
- ③ WEB STRAP ASSEMBLY (16 REQD). POSITION AS SHOWN, EXTENDING FROM CARGO TIEDOWN PROVISIONS ON THE CANISTERS TO APPROPRIATE TIEDOWN FITTING ON THE DECK OF THE FREIGHT CAR.

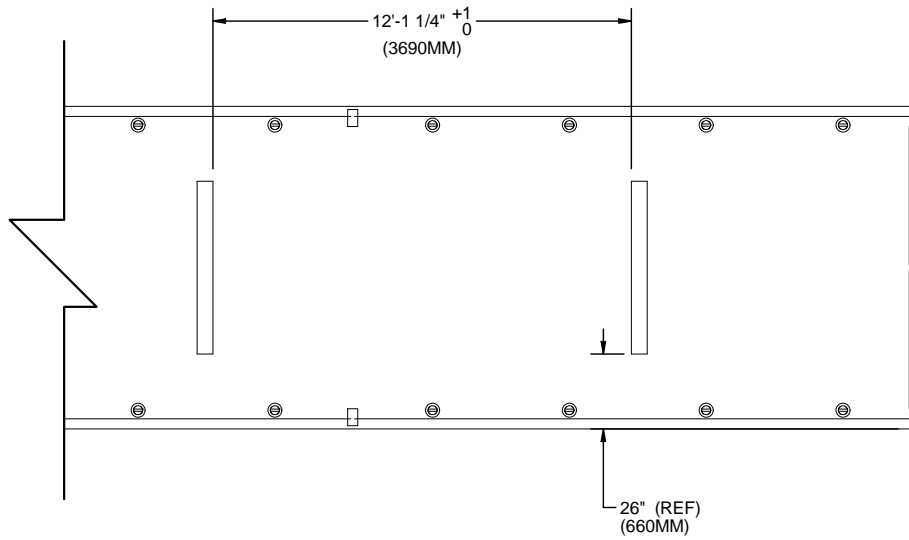
BILL OF MATERIAL				
LUMBER	LINEAR FEET	METERS	BOARD FEET	
2" X 6"	80	25	80	
NAILS	NO.	REQD	POUNDS	KG
10d (3")	88		1-1/2	3/4
20d (4")	24		1	1/2
WEB STRAP ASSEMBLY, 3" - - 16 REQD - - - 166 LBS				

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
CANISTER - - - - -	4 - - - - -	6,724 LBS (3,050 KG)
DUNNAGE - - - - -	- - - - -	328 LBS (149 KG)
TOTAL WEIGHT - - - - -		7,052 LBS (3,199 KG)

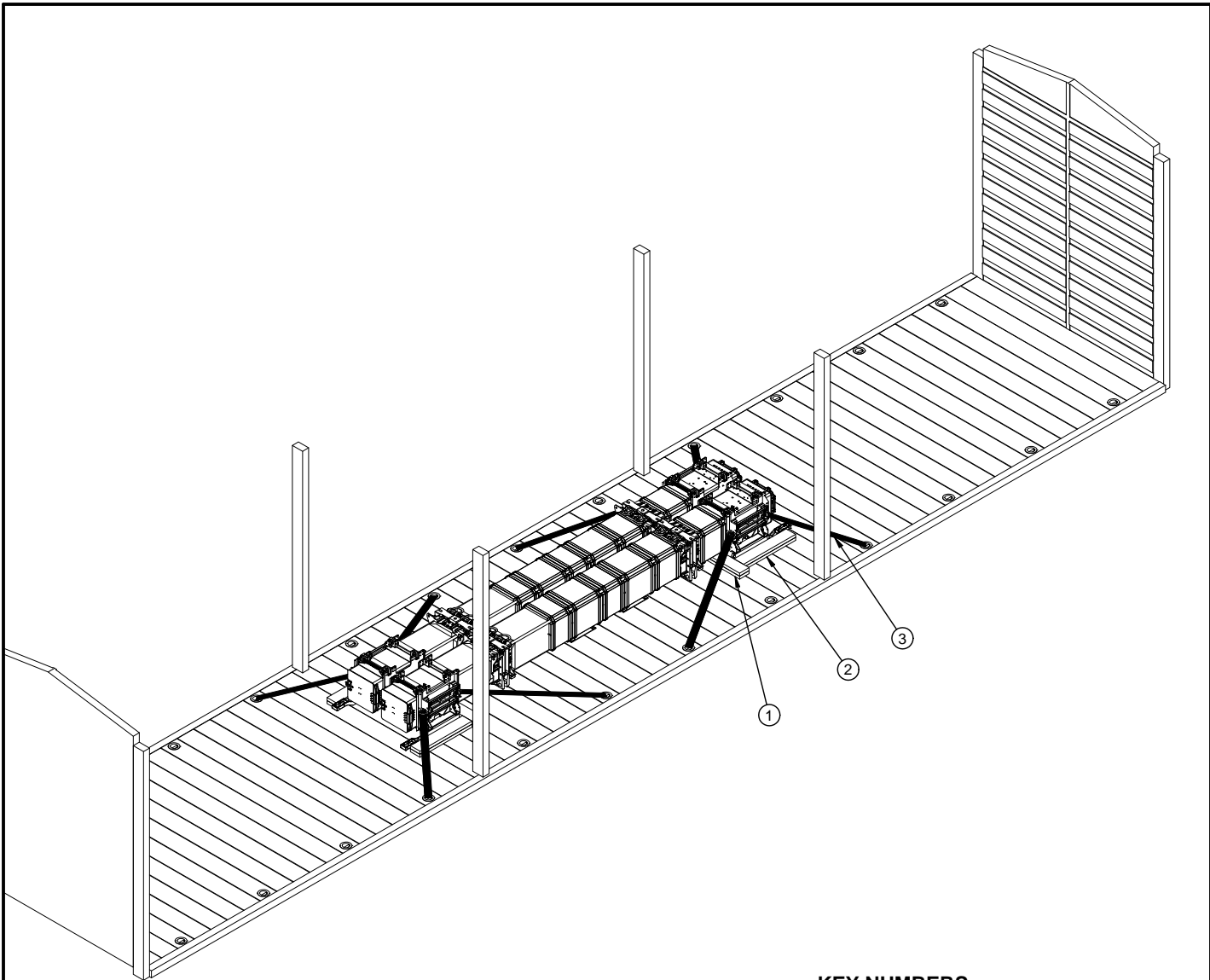
SPECIAL NOTES:

1. A 4 UNIT LOAD IS SHOWN IN A HYUNDAI FREIGHT CAR EQUIPPED WITH 16'-0" WIDE DOOR OPENINGS.
2. THESE PROCEDURES CAN ALSO BE USED FOR SHIPMENT OF A LOAD WHICH CONTAINS FEWER CANISTERS THAN WHAT IS SHOWN.
3. FOR AN ALTERNATIVE PROCEDURE FOR SHIPMENT OF A LOAD WHICH CONTAINS FEWER CANISTERS THAN WHAT IS SHOWN, SEE PAGE 6.



PREPOSITION OF HEADERS ON HYUNDAI FREIGHT CAR

NOTE: LOCATE THE HEADERS ALONG THE LENGTH OF THE FREIGHT CAR TO BEST OPTIMIZE THE POSITIONS OF THE TIEDOWN RINGS. THE HEADER LOCATIONS AND QUANTITIES ALSO DEPEND ON HOW MANY CANISTERS ARE BEING SHIPPED. SEE PAGE 6 FOR A LESS-THAN-FULL ALTERNATIVE PROCEDURE.



ISOMETRIC VIEW

KEY NUMBERS

- ① HEADER, 2" X 6" X 60" (1524MM) (DOUBLED) (2 REQD). PREPOSITION AS SHOWN ON PAGE 5 AND NAIL THE FIRST PIECE TO THE FREIGHT CAR FLOOR W/6-10d NAILS. NAIL THE SECOND PIECE TO THE FIRST PIECE W/6-20d NAILS. **NOTE:** FOR A ONE-PACK CONFIGURATION, REDUCE THE LENGTH OF THE HEADER TO 45" (1143MM) AND QUANTITY OF NAILS TO 4-10d AND 4-20d.
- ② SIDE BLOCKING, 2" X 6" X 30" (762MM) (DOUBLED) (4 REQD). POSITION AGAINST THE HEADER AND CONTAINER SKID AND NAIL THE FIRST PIECE TO THE FREIGHT CAR FLOOR W/4-10d NAILS. NAIL THE SECOND PIECE TO THE FIRST PIECE W/4-10d NAILS.
- ③ WEB STRAP ASSEMBLY (8 REQD). POSITION AS SHOWN, EXTENDING FROM CARGO TIEDOWN PROVISIONS ON THE CANISTERS TO APPROPRIATE TIEDOWN FITTING ON THE DECK OF THE FREIGHT CAR.

BILL OF MATERIAL

LUMBER	LINEAR FEET	METERS	BOARD FEET	
2" X 6"	40	13	40	
NAI LS	NO.	REQD	POUNDS	KG
10d (3")	44		3/4	3/8
20d (4")	12		1/2	1/4
WEB STRAP ASSEMBLY, 3" - - 8 REQD - - - - 83 LBS				

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
CANISTER - - - - -	2 - - - - -	3,362 LBS (1,525 KG)
DUNNAGE - - - - -	- - - - -	164 LBS (75 KG)
TOTAL WEIGHT - - - - -		3,526 LBS (1,600 KG)