LOADING AND BRACING® IN END OPENING ISO CONTAINERS OF JSOW (AGM-154) MISSILE PACKED IN CNU-710 CONTAINERS

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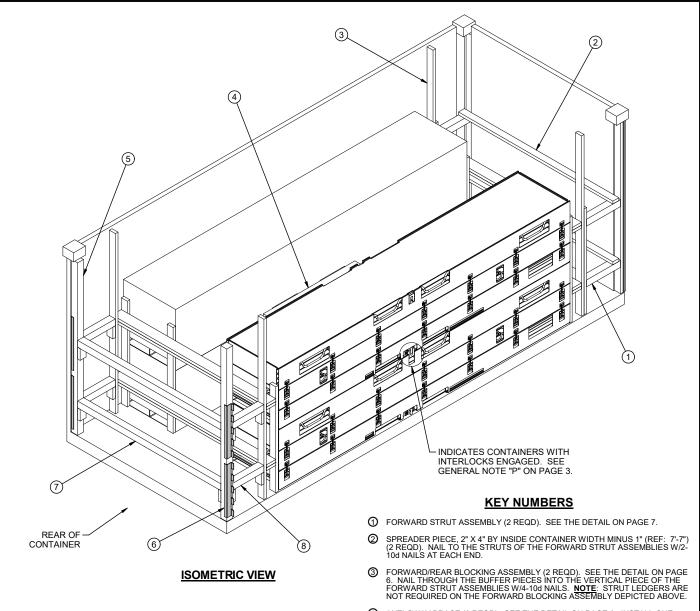
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* THE PROCEDURES SHOWN HEREIN ARE APPLICABLE TO LOADS THAT ARE TO BE SHIPPED BY TRAILER/CONTAINER-ON-FLATCAR (T/COFC) RAIL, MOTOR, OR WATER CARRIERS.

U.S. ARMY MATERIEL COMMAND DRAWING

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BILL OF MATERIAL			
LUMBER	LINEAR FEET	BOARD FEET	
2" X 4" 2" X 6" 4" X 4"	126 79 42	84 79 56	
NAI LS	NO. REQD	POUNDS	

12d(3-1/4") 24 1/2

UNI VERSAL LOAD RETAINER - - 6 REQD - - 26.00 LBS

188

3

- 4 ANTI-SWAY BRACE (2 REQD). SEE THE DETAIL ON PAGE 6. INSTALL ONE ANTI-SWAY BRACE FOR EACH LAYER OF CNU CONTAINERS.
- DOOR POST VERTICAL (2 REQD). SEE THE DETAIL AND "DETAIL A" ON PAGE 7, AND GENERAL NOTE "R" ON PAGE 3.
- UNIVERSAL LOAD RETAINER (4 REQD, 2 PER SIDE). NAIL THROUGH THE HOLES INTO THE DOOR POST VERTICAL W/2-10d NAILS. SEE DEPARTMENT OF ARMY DRAWING DA-116, "DETAIL A" ON PAGE 7, AND GENERAL NOTE "R" ON PAGE 3.
- ODOR SPANNER, 4" X 4" MATERIAL CUT TO A LENGTH THAT WILL PROVIDE A DRIVE FIT (REF: 7'-3/8") (2 REQD). TOENAIL TO THE DOOR POST VERTICAL W/2-12d NAILS AT EACH END. SEE THE "BEVEL-CUT" DETAIL ON PAGE 7.
- STRUT, 4" X 4" BY CUT-TO-FIT (REF: 18-1/2") (4 REQD). TOENAIL TO THE BUFF-ER PIECES OF THE REAR BLOCKING ASSEMBLY AND TO THE DOOR POST VER-TICAL W/2-12d NAILS AT EACH END. SEE THE "BEVEL-CUT" DETAIL ON PAGE 7.

LOAD AS SHOWN

<u>I TEM</u>	QUANTI TY	WEIGHT (APPROX)
DUNNAGE	4	8, 480 LBS 467 LBS 4, 700 LBS

TOTAL WEIGHT - - - - - 13,647 LBS (APPROX)

PAGE 2

10d (3")

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 JSOW MISSILE PACKED IN CNU-710 CONTAINER. SUBSEQUENT REFERENCE TO CONTAINER HEREIN MEANS THE CONTAINER WITH AMMUNITION ITEMS. SEE PAGE 4 AND NAVSEA DRAWING 8411078 FOR DETAILS OF THE CONTAINER. CAUTION: REGARDLESS OF THE QUANTITY OF CONTAINERS TO BE SHIPPED, THE "MAXIMUM GROSS WEIGHT" OF THE END OPENING ISO CONTAINER MUST NOT BE EXCEEDED.
- C. THE LOAD AS SHOWN IS BASED ON A 4,700 POUND 20' LONG BY 8' WIDE BY 8'-6" HIGH END OPENING ISO CONTAINER WITH INSIDE DIMENSIONS OF 19'-4" LONG BY 92" WIDE BY 93" HIGH, WITH A MAXIMUM GROSS WEIGHT OF 52,910 POUNDS. OLDER/OTHER CONTAINERS MAY HAVE A TOTAL INSIDE HEIGHT OF 95", BUT A CLEAR HEIGHT UNDER THE ROOF BOWS OF 93", VERIFY INSIDE CONTAINER HEIGHT PRIOR TO FABRICATING DUNNAGE. THE LOAD IS DESIGNED FOR TRAILER/CONTAINER-ON-FLATCAR (T/COFC) SHIPMENT, HOWEVER, THE LOAD AS DESIGNED CAN ALSO BE MOVED BY OTHER SURFACE MODES OF TRANSPORT. NOTICE: OTHER CONTAINERS OF THE SAME DESIGN CONFIGURATION CAN BE USED.
- D. WHEN LOADING CONTAINERS, THEY ARE TO BE POSITIONED SO AS TO ACHIEVE A TIGHT LOAD (TIGHT AGAINST THE DUNNAGE ASSEMBLIES). THE UNBLOCKED SPACE ACROSS THE WIDTH OF A LOAD BAY IS NOT TO EXCEED 1-1/2". EXCESSIVE SLACK CAN BE ELIMINATED FROM A LOAD BY ADJUSTING THE POSITION OF THE BUFFER PIECES ON THE ANTI-SWAY BRACES OR BY LAMINATING ADDITIONAL PIECES OF APPROPRIATE THICKNESS TO THE VERTICAL PIECES ON THE CRIB FILL ASSEMBLIES. NAIL EACH ADDITIONAL PIECE W/1 APPROPRIATELY SIZED NAIL EVERY 12". ADDITIONALLY, THE LENGTH OF THE STRUTS IN THE CRIB FILL ASSEMBLIES MAY BE ADJUSTED AS REQUIRED TO FACILITATE VARIANCE IN THE SIZE OF THE CONTAINER. THE LOADS MUST BE AS TIGHT AS POSSIBLE LONGITUDINALLY, BUT THE VOID MUST NOT EXCEED 3/4" OVERALL. EXCESSIVE SLACK CAN BE ELIMINATED EITHER BY INCREASING THE LENGTH OF THE STRUTS IN THE TWO STRUT ASSEMBLIES ON ONE END OF THE LOAD, OR BY INCREASING THE LENGTH OF THE STRUTS ON THE REAR END OF THE CONTAINER.
- E. A STAGGERED NAILING PATTERN WILL BE USED WHENEVER POSSIBLE WHEN NAILS ARE DRIVEN INTO JOINTS OF DUNNAGE ASSEMBLIES OR WHEN LAMINATING DUNNAGE. ADDITIONALLY, THE NAILING PATTERN FOR AN UPPER PIECE OF LAMINATED DUNNAGE WILL BE ADJUSTED AS REQUIRED SO THAT A NAIL FOR THAT PIECE WILL NOT BE DRIVEN THROUGH ONTO OR RIGHT BESIDE A NAIL IN A LOWER PIECE.
- F. IN SOME CONTAINERS THERE IS A SLOT AT THE CORNERS OF THE FORWARD WALL. PIECES OF DUNNAGE MATERIAL MUST BE LAMINATED TO THE BUFFER PIECES ON THE FORWARD STRUT ASSEMBLY TO PROVIDE A FLAT SURFACE FOR THE BUFFER PIECES. A PIECE OF 2" X 4", 2" X 3" OR A SPECIAL WIDTH PIECE CUT-TO-FIT CAN BE USED. THIS FILL PIECE WILL BE NAILED WITH ONE APPROPRIATELY SIZED NAIL EVERY 12". NOTE THAT SOME CONTAINERS ARE EQUIPPED WITH "TIE-BARS" IN THE CORNER SLOT, WHICH PRECLUDE THE USE OF A FULL HEIGHT FILL PIECE. WHEN "TIE-BARS" ARE PRESENT, THE FILL PIECE MUST BE INSTALLED IN SEGMENTS DESIGNED TO FIT BETWEEN THE "TIE-BARS" VERTICALLY. THE FILL PIECE(S) IS NOT REQUIRED WHEN THE CORNER PORTIONS OF THE CONTAINER FORWARD WALL ARE SMOOTH AND FLAT. DO NOT ALLOW ANY DUNNAGE ASSEMBLY TO CONTACT THE CONTAINER FORWARD WALL SED FOR FORWARD LONGITUDINAL BLOCKING.
- G. WHETHER A CONTAINER IS FULL OR IS LOADED WITH A REDUCED QUANTITY OF LADING UNITS, THE LENGTHWISE CENTER OF GRAVITY OF THE LOAD MUST BE WITHIN 12", IN EITHER DIRECTION, OF THE MID-POINT OF THE CONTAINER.
- H. <u>CAUTION</u>: DO NOT NAIL DUNNAGE MATERIAL TO THE CONTAINER WALLS OR FLOOR. ALL NAILING WILL BE WITHIN THE DUNNAGE.
- J. PORTIONS OF THE CONTAINER DEPICTED WITHIN THIS DRAWING, SUCH AS THE SIDEWALL, HAVE NOT BEEN SHOWN IN THE LOAD VIEWS FOR CLARITY BURDLESS.

K. MAXIMUM LOAD WEIGHT CRITERIA:

THE MAXIMUM LOAD WEIGHTS ARE CONTROLLED BY EQUIPMENT CAPABILITY FACTORS. ALTHOUGH THE HEAVIEST MAXIMUM LOADS ARE DELINEATED IN THE LOAD VIEWS, PROVISIONS ARE INCLUDED WITHIN THIS DRAWING SO THAT THE BASIC LOADS CAN BE ADJUSTED TO SATISFY A LESSER QUANTITY OF LADING UNITS. DEPENDING ON TRANSPORTATION ROUTING, IT MAY BE NECESSARY TO REDUCE THE LOAD WEIGHT TO SATISFY "WEIGHT LAWS" OF CERTAIN STATES. ALSO, IT MAY BE NECESSARY TO REDUCE THE LOAD WEIGHT TO SATISFY OTHER WEIGHT RESTRICTIONS IMPOSED ON THE INTERMODAL CONTAINER SYSTEM.

- L. REQUIREMENTS CITED WITHIN THE ASSOCIATION OF AMERICAN RAILROADS (AAR) INTERMODAL LOADING GUIDE APPLY WHEN THE SHIPMENT MOVES BY TRAILER/CONTAINER-ON-FLATCAR (T/COFC). SPECIAL T/COFC NOTES FOLLOW:
 - A LOADED CONTAINER MUST BE ON A CHASSIS EQUIPPED WITH TWO BO-GIE ASSEMBLIES WHEN BEING MOVED IN TOFC SERVICE.
 - 2. THE LOAD LIMIT OF A T/COFC RAILCAR MUST NOT BE EXCEEDED, NOR WILL A CAR BE LOADED SO THAT THE TRUCK UNDER ONE END OF THE CAR CARRIES MORE THAN ONE-HALF OF THE LOAD LIMIT FOR THAT CAR.

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(GENERAL NOTES CONTINUED)

- M. DURING INTRASTATE AND/OR INTERSTATE MOVES BY MOTOR CARRIER, A PROPER CHASSIS OR MODIFIED FLATBED TRAILER MUST BE USED TO PRE-CLUDE VIOLATION OF ONE OR MORE "WEIGHT LAWS" APPLICABLE TO THE STATE OR STATES INVOLVED.
- N. CONVERSION TO METRIC EQUIVALENTS: DIMENSIONS WITHIN THIS DOCU-MENT ARE EXPRESSED IN INCHES AND WEIGHTS ARE EXPRESSED IN POUNDS. WHEN NECESSARY, THE METRIC EQUIVALENTS MAY BE COM-PUTED ON THE BASIS OF ONE INCH EQUALS 25.4MM AND ONE POUND FOLIAL S 0 454 KG
- O. THE QUANTITY OF CONTAINERS SHOWN IN THE LOAD ON PAGE 2 MAY BE REDUCED FOR SHIPMENT, IF DESIRED. SEE THE "LESS-THAN-FULL LOAD PROCEDURE" ON PAGE 8.
- P. THE TWO CNU CONTAINER INTERLOCKS LOCATED ON EITHER SIDE OF THE CONTAINERS CAN BE UTILIZED IN PLACE OF STEEL STRAPPING WHEN UNITIZING CONTAINERS, AND HAS BEEN SHOWN AS THE PREFERRED METHOD IN THE LOAD ON PAGES 2 AND 8. CONTAINERS MAY BE UNITIZED TWO HIGH USING INTERLOCKS. IF ANY OF THE CONTAINER INTERLOCKS ARE NOT FUNCTIONING PROPERLY, THE CONTAINERS MUST BE UNITIZED USING STEEL STRAPPING AS DEPICTED IN NAVY DRAWING 8411078. WHEN HANDLING INTERLOCKED CONTAINERS, LIFT BY BOTTOM CONTAINER ONLY. SEE THE "UNIT LOAD WITH INTERLOCK DETAIL" ON PAGE 5 AND NAVY DRAWING 8411078 FOR FURTHER DETAILS.
- Q. WHEN STEEL STRAPPING IS SEALED AT 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 ACRIMP-TYPE SEALER IS BEING USED. REFER TO THE STRAP JOINT DETAILS ON PAGE 5 FOR GUIDANCE.
- R. FOUR UNIVERSAL LOAD RETAINERS, AS DEPICTED IN THE LOADS ON PAGES 2 AND 8, ARE REQUIRED WHEN LOADING A MINIMUM OF LOAD (ONE CNU-710 CONTAINER) TO A MAXIMUM OF LOAD (FOUR CNU-710 CONTAINERS). REFER TO DAC DRAWING ACVO0682 FOR DETAILS OF THE UNIVERSAL LOAD RETAINER CONSTRUCTION, AND TO DEPARTMENT OF THE ARMY DRAWING DA-116 FOR DETAILS FOR INSTALLATION TO THE DOOR POST VERTICAL, PLACEMENT INTO THE CONTAINER, AND FOR OTHER METHODS OF REAR-OF-LOAD RESTRAINT.
- S. DUNNAGE LUMBER SPECIFIED IS OF NOMINAL SIZE. FOR EXAMPLE, 1" X 4" MATERIAL IS ACTUALLY 3/4" THICK BY 3-1/2" WIDE AND 2" X 6" MATERIAL IS ACTUALLY 1-1/2" THICK BY 5-1/2" WIDE.
- T. RECOMMENDED SEQUENTIAL LOADING PROCEDURES:
 - PREFABRICATE TWO FORWARD STRUT ASSEMBLIES, TWO FOR-WARD/REAR BLOCKING ASSEMBLIES, AND TWO DOOR POST VERTICALS WITH UNIVERSAL LOAD RETAINERS.
 - 2. INSTALL TWO FORWARD STRUT ASSEMBLIES AND TWO SPREADER PIECES.
 - 3. INSTALL THE FORWARD BLOCKING ASSEMBLY.
 - 4. LOAD FOUR CNU CONTAINERS.
 - 5. INSTALL TWO ANTI-SWAY BRACES.
 - 6. INSTALL THE REAR BLOCKING ASSEMBLY.
 - 7. INSTALL TWO DOOR POST VERTICALS WITH UNIVERSAL LOAD RETAINERS.
 - 8. INSTALL TWO DOOR SPANNER PIECES.
 - 9. INSTALL THE FOUR STRUTS.

MATERIAL SPECIFICATIONS

LUMBER - - - - - - : SEE TM 743-200-1 (DUNNAGE LUMBER) AND VOL-UNTARY PRODUCT STANDARD PS 20.

NAILS - - - - - : ASTM F1667; COMMON STEEL NAIL (NLCMS OR NLCMMS).

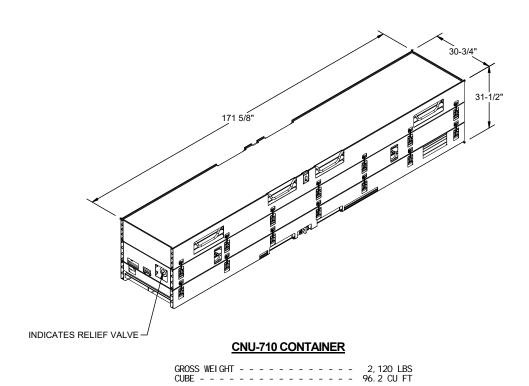
STRAPPING, STEEL - -: ASTM D3953; FLAT STRAPPING, TYPE 1, HEAVY

STRAPPING, STEEL - -: ASTM D3953; FLAT STRAPPING, TYPE 1, 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.

STEEL, STRUCTURAL - - - -: ASTM A36; 36,000 PSI MINIMUM YIELD OR BETTER.

PAGE 3



UNITIZATION AND HANDLING GUIDANCE

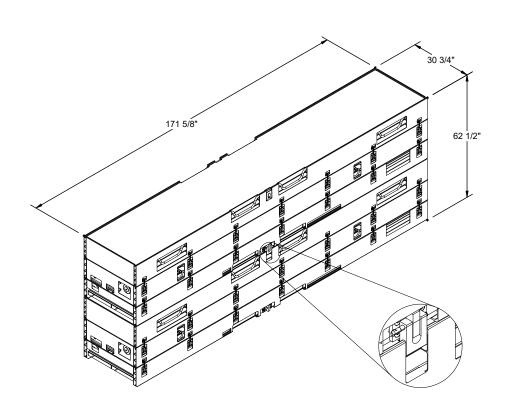
- 1. STACKING CONTAINERS FOR UNITIZING
 - A. AN UPPER CONTAINER SHOULD BE PLACED AS CLOSE AS POSSIBLE IN VERTICAL ALIGNMENT WITH THE NEXT LOWER CONTAINER.
 - B. POSITION THE AFT END OF AN UPPER CONTAINER ABOVE THE AFT END OF THE NEXT LOWER CONTAINER.
 - C. THE CONTAINER SKIDS OF AN UPPER CONTAINER SHOULD BE FULLY SEATED AGAINST THE SKID LOCATOR PIECES ON THE COVER OF THE NEXT LOW-
- 2. UNITIZING PROCEDURE USING PREFERRED INTERLOCKING FEATURE (SHOWN ON PAGE 5).
 - A. DETACH QUICK RELEASE PIN (BOTH SIDES) ON CONTAINER TO BE PLACED ON TOP.
 - B. STACK TWO CONTAINERS AS SHOWN. BE SURE TO ALIGN THE STACKING FEATURES.
 - C. SECURE TOP CONTAINER TO BOTTOM CONTAINER USING INTERLOCKING FEATURE.
 - D. INSTALL QUICK RELEASE PIN (BOTH SIDES).
- 3. UNITIZING PROCEDURE USING OPTIONAL 1-1/4" BANDING STRAPS.
 - A. STACK TWO CONTAINERS AS SHOWN. BE SURE TO ALIGN THE STACKING FEATURES.
 - B. FEED UNITIZING STRAP THROUGH FORK POCKETS OF LOWER CONTAINER AND OVER TOP OF UPPER CONTAINER. LOCATE STRAPS AS CLOSE AS POSSIBLE TO OUTER EDGES OF FORK POCKETS (2 PLACES).
 - C. PLACE EDGE PROTECTORS UNDERNEATH STRAP AT EACH OF THE FOUR EDGES (FOUR PER STRAP).
 - $\hbox{D. TENSION AND SECURE EACH STRAP WITH ONE DOUBLE-NOTCHED SEAL.}\\$

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(<u>UNITIZATION AND HANDLING GUIDANCE CONTINUED</u>)

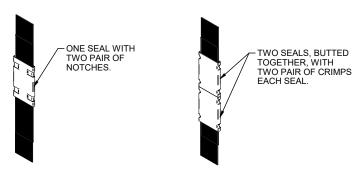
- 4. CONTAINER OR CONTAINER STACK HANDLING:
 - A. ONLY APPROVED AND APPROPRIATELY SIZED MATERIAL HANDLING EQUIPMENT WILL BE USED FOR HANDLING THE DEPICTED CONTAINERS. APPROVED MATERIAL HANDLING EQUIPMENT (FORKLIFT TRUCKS, CRANES, HAND TRUCKS, DOLLIES, ROLLER ASSEMBLIES, SLINGS, SPREADER BARS, ETC.) IS SPECIFIED ELSEWHERE.
 - B. PRECAUTIONARY HANDLING TECHNIQUES NORMALLY EMPLOYED OR AS SPECIFIED FOR THE TYPE OF COMMODITY INVOLVED WILL BE OBSERVED.
 - C. IF HANDLING IS ACCOMPLISHED WITH A FORKLIFT TRUCK, THE CONTAINERS SHOULD BE HANDLED FROM A SIDE POSITION AS MUCH AS POSSIBLE. CARE MUST BE EXERCISED WHEN INSERTING FORKS UNDER A CONTAINER, TO PREVENT DAMAGE TO THE CONTAINER BY THE FORK TINES OR THE FORKLIFT PACKAGE GUARD. IF ONE CONTAINER IS HANDLED BY SLINGING, THE SLING MAY BE ATTACHED TO THE LIFTING POINTS ON THE CONTAINER. DO NOT HANDLE STACKED CONTAINERS WITH A SLING.
 - D. WHEN UNLOADING A CONTAINER OR CONTAINER STACK FROM THE END OPENING CONTIANER, THE FORKLIFT TINES WILL BE INSERTED UNDER THE LOWER CONTAINER, THE FORKLIFT WILL THEN ELEVEATE THE END SLIGHTLY ABOVE THE FLOOR, AND BEGIN DRAGGING THE CONTAINER OR STACK FROM THE TRAILER AFTER ATTACHING A CHAIN OR WEB STRAP FROM A LOWER CONTAINER LIFT POINT AROUND THE FORKLIFT MAST TO A LIFT POINT OF THE OPPOSITE SIDE OF THE CONTAINER.
 - E. THE MK45 HANDLIFT TRUCK IS PREFERRED FOR LIFTING AND MANUVERING THE CONTAINERS WITHIN THE END OPENING CONTIANER. THE MK45 HANDTRUCK CONSISTS OF A CAST ALUMINUM BODY MOUNTED ON TWO WHEELS WITH A LIFTING MECHANISM. THE MK45 LIFTING MECHANISM IS CONNECTED TO A RECESS IN THE END OF THE CONTAINER. THE HANDTRUCK SHALL BE USED IN PAIRS WITH ONE MK45 POSITIONED AT EACH END OF THE CONTAINER. THE WEIGHT CAPACITY OF TWO MK45 MOD 2 HANDTRUCKS IS 6,000 POUNDS.

PAGE 4



UNIT LOAD WITH INTERLOCK DETAIL

GROSS WEI GHT - - - - - - - - - - - 4, 240 LBS (APPROX) CUBE - - - - - - - - - - - 190. 66 CU FT (APPROX)



STRAP JOINT A

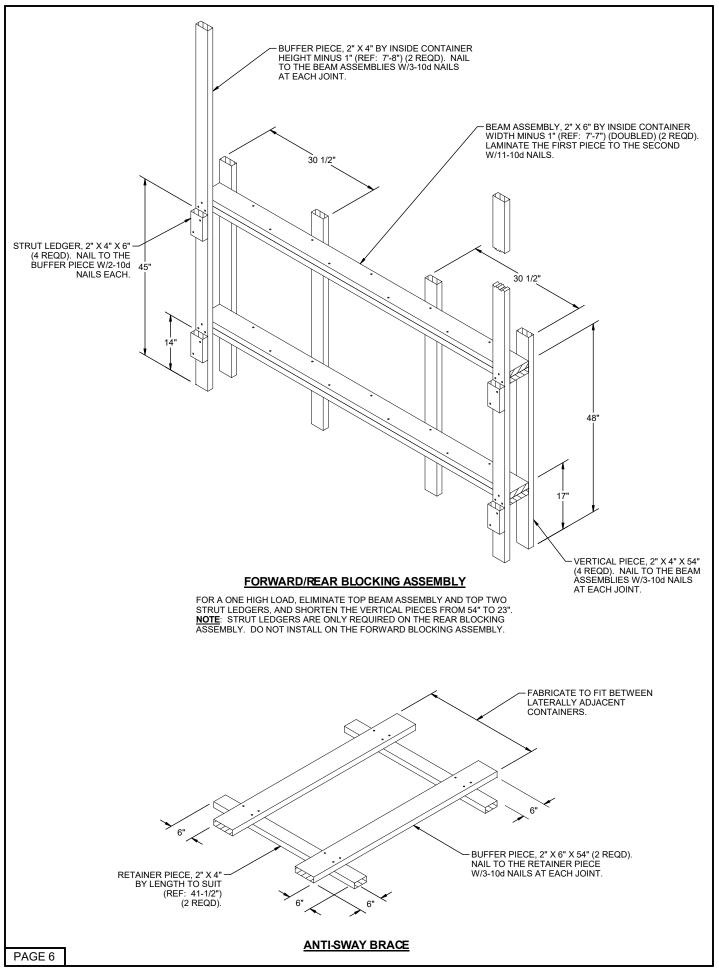
METHOD OF SECURING A STRAP JOINT WHEN USING A NOTCH-TYPE SEALER.

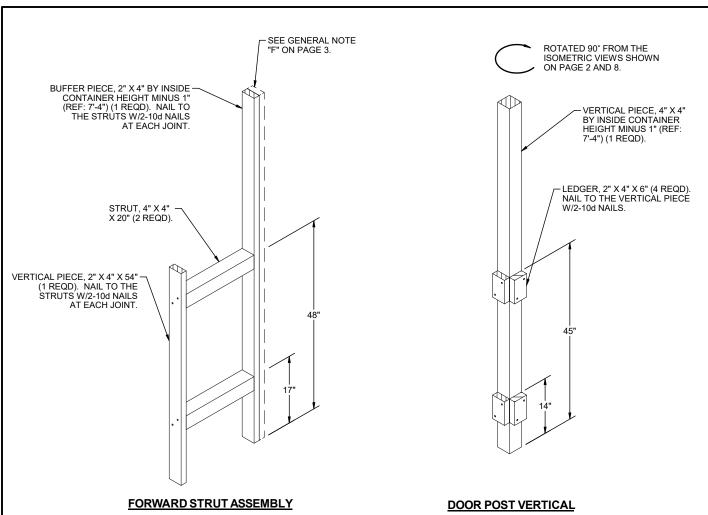
STRAP JOINT B

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

END-OVER-END LAP JOINT DETAILS

PAGE 5





FOR A ONE HIGH LOAD, ELIMINATE TOP STRUT, AND SHORTEN THE VERTICAL PIECE FROM 54" TO 23".

A MINIMUM OF TWO DOOR SPANNERS ARE REQUIRED FOR A REDUCED LOAD. FOR A ONE HIGH LOAD, ELIMINATE TOP LEDGER

