APPROVED BY BUREAU OF EXPLOSIVES

LOADING AND BRACING WITH WOODEN DUNNAGE IN END OPENING ISO CONTAINERS OF CBU-52, CBU-58 OR IN CNU-126/E, CNU-180/E CNU-180B/E SHIPPING AND STORAGE CONTAINERS

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LOADING AND BRACING SPECIFICATIONS SET FORTH WITHIN THIS DRAWING ARE APPLICABLE TO LOADS THAT ARE TO BE SHIPPED BY TRAILER/CONTAINER-ON-FLATCAR (T/COFC) RAIL CARRIER SERVICE. THESE SPECIFICATIONS MAY ALSO BE USED FOR LOADS THAT ARE TO BE MOVED BY MOTOR OR WATER CARRIERS.

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#### GENERAL NOTES

- THIS DOCUMENT HAS BEEN PREPARED AND ISSUED IN ACCORDANCE WITH AR 740-1 AND AUGMENTS TM 743-200-1 (CHAPTER 5).
- THE OUTLOADING PROCEDURES SPECIFIED HEREIN ARE THE OUTLOADING PROCEDURES SPECIFIED HEREIN ARE APPLICABLE TO LOADS OF CBU-52, CBU-58 OR CBU-71 PACKED IN CNU-126/E, CNU-180/E OR CNU-180B/E CONTAINERS.

  SUBSEQUENT REFERENCE TO CONTAINER HEREIN MEANS THE CONTAINER WITH CBU ITEMS INSTALLED. SEE PAGE 4 FOR DETAILS OF THE CONTAINERS. CAUTION: REGARDLESS OF THE QUANTITY OF UNITS TO BE SHIPPED, THE "MAXIMUM GROSS WEIGHT" OF THE END OPENING ISO CONTAINER MUST NOT BE
- 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 95" (93" CLEAR HEIGHT) AND A MAXIMUM GROSS WEIGHT OF 52,910 POUNDS. THE LOAD IS DESIGNED FOR TRAILER/CONTAINER-ON-FLATCAR (T/COPC) SHIPMENT, HOWEVER, THE LOAD AS DESIGNED CAN ALSO BE MOVED BY OTHER SURFACE MODES OF TRANSPORT. NOTICE: OTHER CONTAINERS OF THE SAME DESIGN CONSTGUED CAN BE USED. CONFIGURATION CAN BE USED.
- 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 BY LAMINATING ADDITIONAL PIECES OF ARRESTS OF THE ARRESTS ON THE APPROPRIATE THICKNESS TO THE LONGITUDINAL PIECES ON THE CENTER FILL ASSEMBLIES. NAIL EACH ADDITIONAL PIECE TO THE LONGITUDINAL PIECE W/1 APPROPRIATELY SIZED NAIL EVERY 12". ADDITIONALLY, THE LENGTH OF THE LATERAL PIECES IN THE CENTER FILL ASSEMBLY MAY BE ADJUSTED, AS NECESSARY, TO FACILITATE VARIANCE IN THE CONTAINER SIZE.
- 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.
- 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
- 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 BLOCKING LAMINATED TO THE BUFFER PIECES ON THE FUHWARD BLUCKING 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". THIS PIECE IS NOT REQUIRED WHEN THE CORNER PORTIONS OF THE CONTAINER FORWARD WALL ARE SMOOTH AND FLAT.

(CONTINUED AT RIGHT)

### MATERIAL SPECIFICATIONS

LUMBER - - - - - - : SEE TM 743-200-1 (DUNNAGE LUMBER) AND FED SPEC MM-L-751.

NAILS - - - - - : FED SPEC FF-N-105; COMMON.

PLYWOOD - - - - - -: COMMERCIAL ITEM DESCRIPTION
A-A-55057, TYPE A, CONSTRUCTION AND
INDUSTRIAL PLYWOOD, INTERIOR WITH
EXTERIOR GLUE, GRADE C-D. IF
SPECIFIED GRADE IS NOT AVAILABLE, A
BETTER INTERIOR OR AN EXTERIOR GRADE
MAY BE SUBSTITUTED.

STRAPPING, STEEL - -: ASTM D3953; FLAT STRAPPING, TYPE 1, HEAVY DUTY, FINISH A, B (GRADE 2), OR

SEAL, STRAP ---: ASTM D3953; CLASS H, FINISH A, B (GRADE 2), OR C, DOUBLE NOTCH TYPE, STYLE I, II, OR IV.

ANTI-CHAFING MATERIAL - - - - -: MIL-B-121 (OR EQUAL); NEUTRAL BARRIER

STEEL, STRUCTURAL -: ASTM A501, STEEL STRUCTURAL TUBING; AND ASTM A570, STEEL, STRIP, HOT-ROLLED, GRADE 36 (MINIMUM).

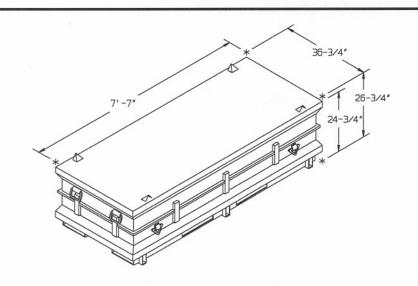
MATERIAL.

#### (GENERAL NOTES CONTINUED)

- CAUTION: DO NOT NAIL DUNNAGE MATERIAL TO THE CONTAINER 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 PURPOSES.
- K. REQUIREMENTS CITED WITHIN THE BUREAU OF EXPLOSIVES PAMPHLET 6C APPLY WHEN THE SHIPMENT MOVES BY TRAILER/CONTAINER-ON-FLATCAR (T/COFC). SPECIAL T/COFC NOTES
  - A LOADED CONTAINER MUST BE ON A CHASSIS EQUIPPED WITH TWO BOGIE ASSEMBLIES WHEN BEING MOVED IN TOFC
  - 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.
- L. DURING INTRASTATE AND/OR INTERSTATE MOVES BY MOTOR CARRIER, A PROPER CHASSIS OR MODIFIED FLATBED TRAILER MUST BE USED TO PRECLUDE VIOLATION OF ONE OR MORE "WEIGHT LAWS" APPLICABLE TO THE STATE OR STATES INVOLVED.
- M. CONVERSION TO METRIC EQUIVALENTS: DIMENSIONS WITHIN THIS DOCUMENT ARE EXPRESSED IN INCHES AND WEIGHTS ARE EXPRESSED IN POUNDS. WHEN NECESSARY, THE METRIC EQUIVALENTS MAY BE COMPUTED ON THE BASIS OF ONE INCH EQUALS 25.4MM AND ONE POUND EQUALS 0.454 KG.
- N. THE QUANTITY OF CONTAINERS SHOWN IN THE LOADS ON PAGE 4 AND PAGE 6 MAY BE REDUCED FOR SHIPMENT, IF DESIRED. SEE THE "LESS-THAN-FULL LOAD" DETAIL ON PAGE 8. WHEN AN END OPENING CONTAINER IS TO BE 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 END OPENING CONTAINER.
- O. ANTI-CHAFING MATERIAL MAY BE INSTALLED AT POINTS OF CONTACT BETWEEN CONTAINERS AND THE END OPENING
  CONTAINER, AND BETWEEN CONTAINERS AND STEEL STRAPPING,
  IF DESIRED, TO PREVENT CHAFING DAMAGE TO CONTAINER PAINT
  AND MARKINGS.

### P. RECOMMENDED SEQUENTIAL LOADING PROCEDURES:

- PREFABRICATE TWO FORWARD STRUT ASSEMBLIES, TWO FORWARD/REAR BLOCKING ASSEMBLIES, TWO CENTER FILL ASSEMBLIES, ONE SEPARATOR GATE, AND TWO DOOR POST VERTICALS (FOR THE LOAD DEPICTED ON PAGE 6).
- 2. INSTALL THE TWO FORWARD STRUT ASSEMBLIES.
- 3. INSTALL THE TWO SPREADER PIECES.
- 4. INSTALL THE FORWARD BLOCKING ASSEMBLY.
- 5. LOAD SIX CONTAINERS.
- INSTALL ONE CENTER FILL ASSEMBLY.
- 7. INSTALL THE SEPARATOR GATE.
- 8. REPEAT STEPS 5 AND 6.
- 9. INSTALL THE REAR BLOCKING ASSEMBLY.
- 10. FOR THE LOAD ON PAGE 4:
  - A. INSTALL THE FILL MATERIAL.
- 11. FOR THE LOAD ON PAGE 6:
  - A. INSTALL THE TWO DOOR POST VERTICALS.
  - B. INSTALL THE TWO DOOR SPANNERS.
  - C. INSTALL THE FOUR STRUTS.

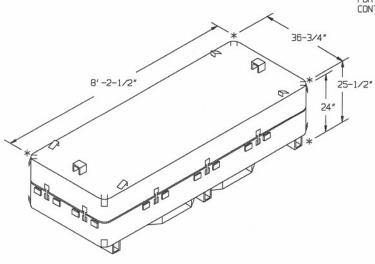


## CNU-180/E CONTAINER

CONTAINER WEIGHT
FOR CBU-58 - - - - - - 2,084 LBS (APPROX)
FOR CBU-71 - - - - - 2,064 LBS (APPROX)
CONTAINER CUBE - - - - 47.9 CU FT (APPROX) 36-1/2" 7'-6-1/2"

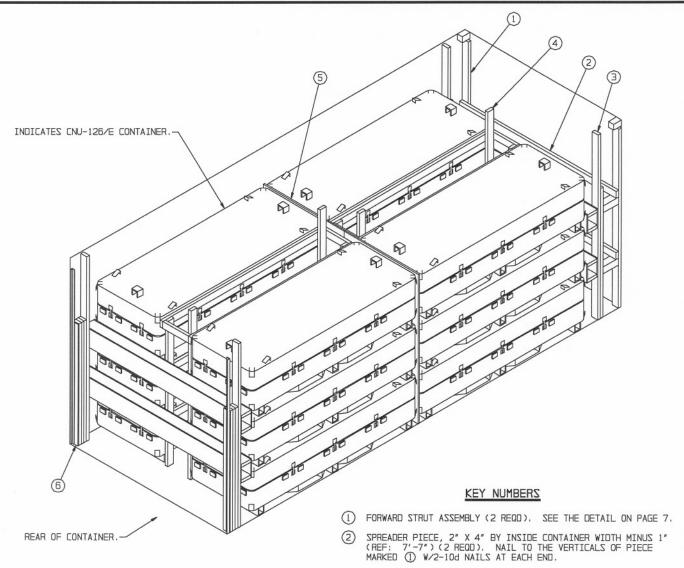
## CNU-180B/E CONTAINER

CONTAINER WEIGHT
FOR CBU-58 - - - - - - 2,084 LBS (APPROX)
FOR CBU-71 - - - - - 2,064 LBS (APPROX)
CONTAINER CUBE - - - - 45,9 CU FT (APPROX)



# CNU-126/E CONTAINER

CONTAINER WEIGHT
FOR CBU-52 - - - - - - 2,032 LBS (APPROX)
FOR CBU-58 - - - - - 2,160 LBS (APPROX)
CONTAINER CUBE - - - - 49.3 CU FT (APPROX)



### ISOMETRIC VIEW

BILL OF MATERIAL			
LUMBER	LINEAR FEET	BOARD FEET	
1" X 4" 2" X 4" 2" x 6" 4" X 4"	14 272 61 3	5 182 61 4	
NAILS	NO, REQD	ZDNUOP	
6d (2″) 10d (3″) 12d (3-1/4″)	204 166 16	1-1/4 2-3/4 1/2	
PLYWOOD, 1/2" 48.03 SQ FT REOD 66.04 LBS PLYWOOD, 3/4" 48.03 SQ FT REOD 99.07 LBS			

- FORWARD/REAR BLOCKING ASSEMBLY (2 REOD). SEE THE DETAIL ON PAGE 5. NAIL THROUGH THE BUFFER PIECES INTO THE VERTICAL PIECES OF PIECE MARKED ① W/5-10d NAILS.
- (4) CENTER FILL ASSEMBLY (2 REOD). SEE THE DETAIL ON PAGE 7.
- (5) SEPARATOR GATE (1 REQD). SEE THE DETAIL ON PAGE 5.
- FILL MATERIAL, 4" WIDE BY 66" LONG MATERIAL (AS REOD).
  NAIL THE FIRST PIECE TO THE REAR BLOCKING ASSEMBLY W/5
  NAILS OF A SUITABLE SIZE (10d FOR 2" THICK MATERIAL). NAIL
  EACH ADDITIONAL PIECE TO THE PREVIOUS PIECE IN A SIMILAR
  MANNER. NOTE: MULTIPLE PIECES MAY BE LAMINATED TOGETHER
  FIRST AND THEN TOENAILED TO THE REAR BLOCKING ASSEMBLY.
  SEE THE "DETAIL A" AND "DETAIL B" ON PAGE 9.

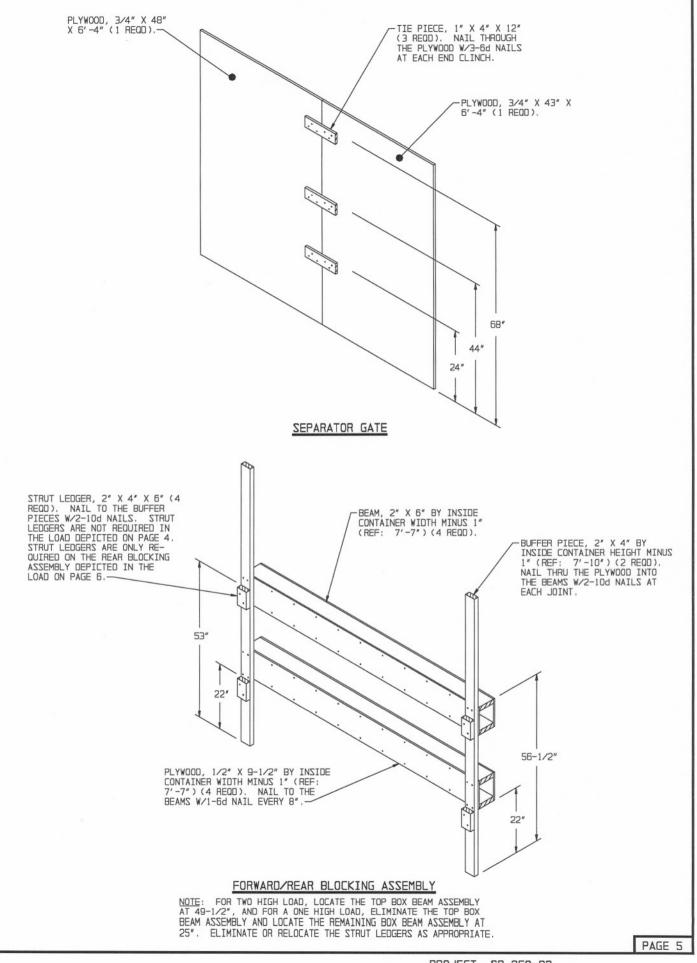
#### LOAD AS SHOWN

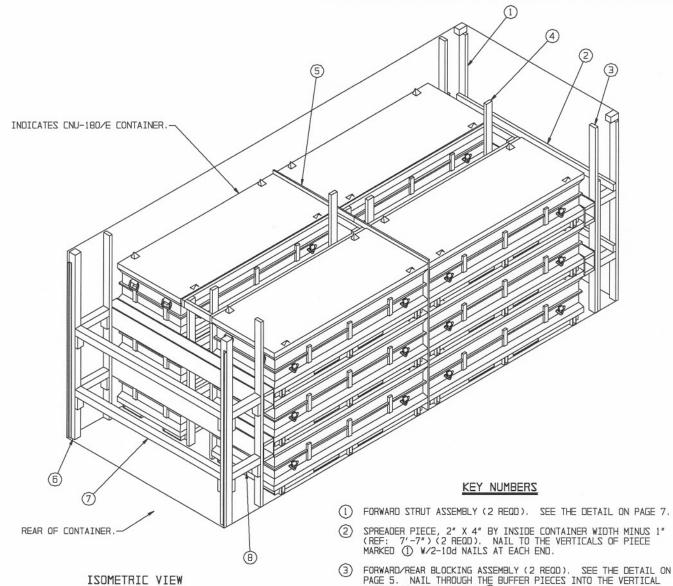
ITEM	QUANT	ITY		WEIGHT	(APPROX)
CBU-58 IN CNU-126∕E	- 12			25,920	LBZ
DUNNAGE				674	LBZ
CONTAINER				4,700	LBZ
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TOTAL WEIGHT - - - - - - 31,294 LBS (APPROX)

PAGE 4

CNU-126/E LOAD





BILL OF MATERIAL			
LUMBER	LINEAR FEET	BOARD FEET	
1" X 4" 2" X 4" 2" x 6" 4" X 4"	3 239 61 39	1 160 61 52	
NAILS	NO. REQD	SONDOA	
6d (2") 10d (3") 12d (3-1/4")	194 160 40	1-1/4 2-1/2 3/4	
PLYWOOD, 1/2" 48.03 SO FT REOD 66.04 LBS PLYWOOD, 3/4" 48.03 SO FT REOD 99.07 LBS			

- (3) FORWARD/REAR BLOCKING ASSEMBLY (2 REOD). SEE THE DETAIL ON PAGE 5. NAIL THROUGH THE BUFFER PIECES INTO THE VERTICAL PIECES OF PIECE MARKED ① W/S-10d NAILS.
- (4) CENTER FILL ASSEMBLY (2 REOD). SEE THE DETAIL ON PAGE 7.
- (5) SEPARATOR GATE (1 REOD). SEE THE DETAIL ON PAGE 5.
- (6) DOOR POST VERTICAL (2 REOD). SEE THE DETAIL ON PAGE 7 AND "DETAIL A" AND "DETAIL B" ON PAGE 9.
- DOOR SPANNER, 4" X 4" MATERIAL, CUT TO A LENGTH THAT WILL PROVIDE FOR A DRIVE FIT (REF: 7'-1-3/8") (2 REOD). TOENAIL TO THE 4" X 4" DOOR POST VERTICAL PIECES W/2-12d NAILS AT EACH END. SEE THE "BEVEL-CUT" DETAIL ON PAGE 8.
- STRUT, 4" X 4" BY CUT-TO-FIT (REF: 16-1/2" FOR CNU-180/E, 17-1/2" FOR CNU-180B/E) (4 REOD). TOENAIL TO THE BUFFER PIECES OF THE REAR BLOCKING ASSEMBLY AND TO THE DOOR POST VERTICAL W/2-12d NAILS AT EACH END.

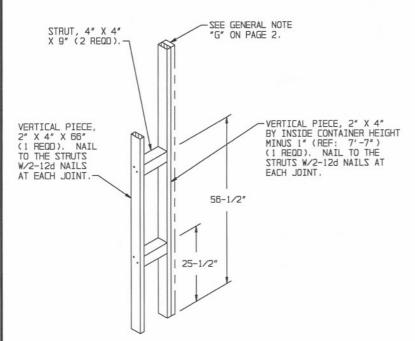
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ITEM	QUANTITY	WEIGHT (APPROX)
CBU-58 IN CNU-180∕E		
DUNNAGE		718 LBS
CONTAINER		4,700 LBS
	Market and the state of the sta	- 10 - 10 - 10 - 10 - 10 - 10 - 10 - 10

TOTAL WEIGHT - - - - - - 30,426 LBS (APPROX)

PAGE 6

CNU-180/E OR CNU-180B/E LOAD

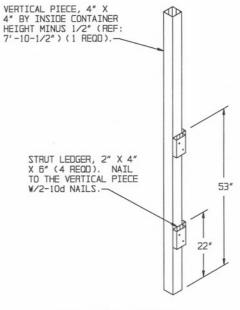


FORWARD STRUT ASSEMBLY

LATERAL PIECE, 2" X 4" X 14" (6 REOD). NAIL TO THE VERTICAL PIECES W/2-10d NAILS AT EACH END.

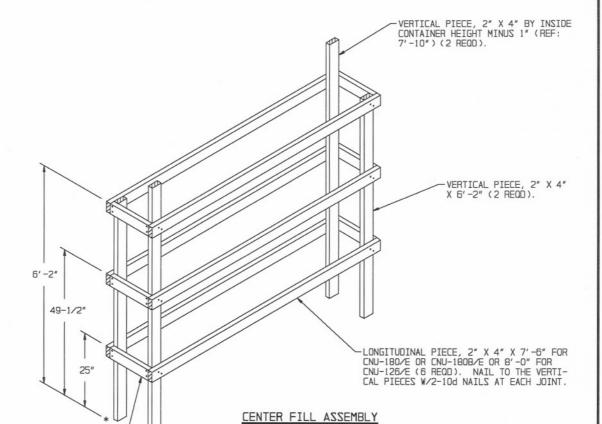
NOTE: FOR TWO HIGH LOAD, LOCATE THE STRUTS AT 25-1/2" AND 49-1/2", AND FOR A ONE HIGH LOAD, LOCATE THE STRUTS AT 19" AND 25". SHORTEN THE

66" VERTICAL PIECE AS APPROPRIATE.



## DOOR POST VERTICAL

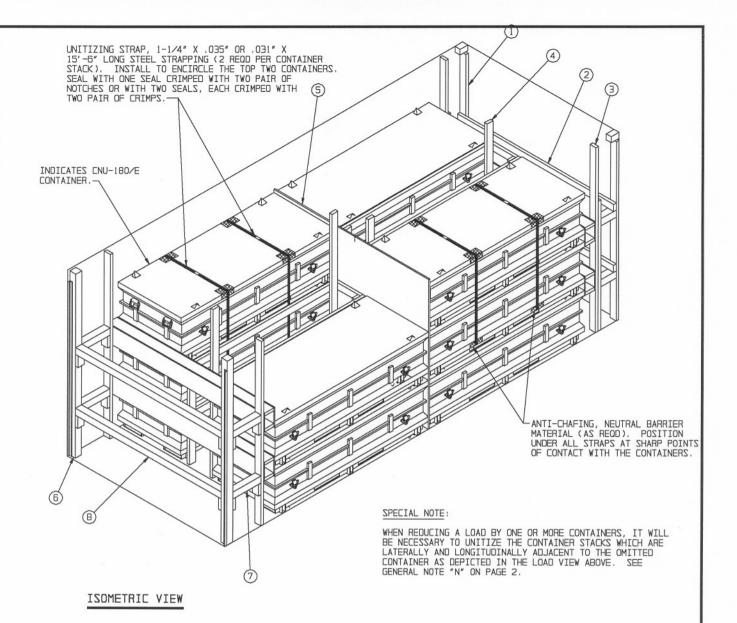
IF THE ISO CONTAINER TO BE LOADED IS NOT EQUIPPED WITH PRE-WELDED LOAD RETAINERS, THE DOOR POST VERTICAL MUST BE NAILED TO THE DOOR POST VERTICAL RETAINER. NAIL THROUGH THE HOLES IN THE DOOR POST VERTICAL RETAINER INTO THE DOOR POST VERTICAL W/4-10d NAILS. FOR A TWO HIGH LOAD, LOCATE THE STRUT LEDGERS AT 22" AND 46", AND FOR A ONE HIGH LOAD, LOCATE THE STRUT LEDGERS AT 15-1/2" AND 21-1/2".



NOTE: FOR TWO HIGH LOAD, ELIMINATE THE TOP TWO LONGITUDINAL PIECES AND THE TOP TWO LATERAL PIECES, AND FOR A ONE HIGH LOAD, ELIMINATE THE TOP FOUR LONGITUDINAL PIECES AND THE TOP FOUR LATERAL PIECES.

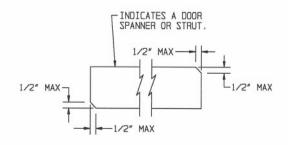
SHORTEN THE VERTICAL PIECES APPROPRIATELY.

PAGE 7



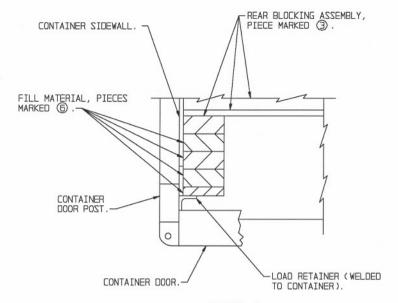
### LESS-THAN-FULL-LOAD PROCEDURE

KEY NUMBERS REFER TO KEY NUMBERS ON PAGE 6. NOTE THAT CENTER FILL ASSEMBLY A HAS BEEN MODIFIED AS DESCRIBED ON PAGE 7. THE CNU-180/E IS DEPICTED IN THE LOAD ABOVE, HOWEVER, SIMILAR PROCEDURES MAY ALSO BE APPLIED WHEN LOADING CNU-180B/E OR CNU-126/E CONTAINERS.



## BEVEL-CUT

IF DESIRED, EACH END OF A DOOR SPANNER OR STRUT MAY BE BEVEL-CUT AS SHOWN ABOVE TO FACILITATE THE ACHIEVEMENT OF A TIGHT DOOR-POST-TO-DOOR-POST OR REAR-OF- LOAD FIT.

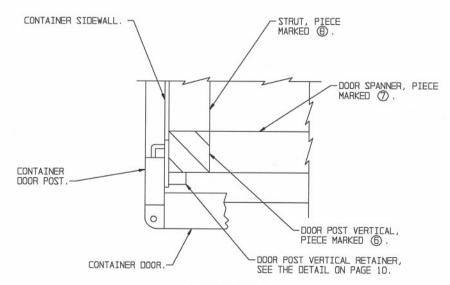


### DETAIL A

A PARTIAL PLAN VIEW OF THE LEFT REAR PORTION OF THE CONTAINER IS SHOWN DEPICTING THE PROPER POSITION OF THE FILL MATERIAL AND ADJACENT DUNNAGE PIECES. THE LOAD ON PAGE 4 IS DEPICTED.

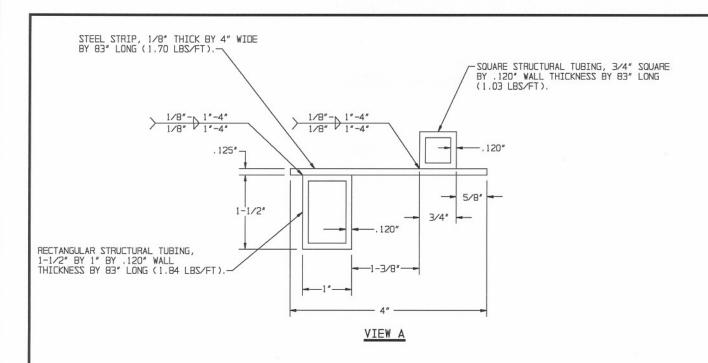
#### SPECIAL NOTE:

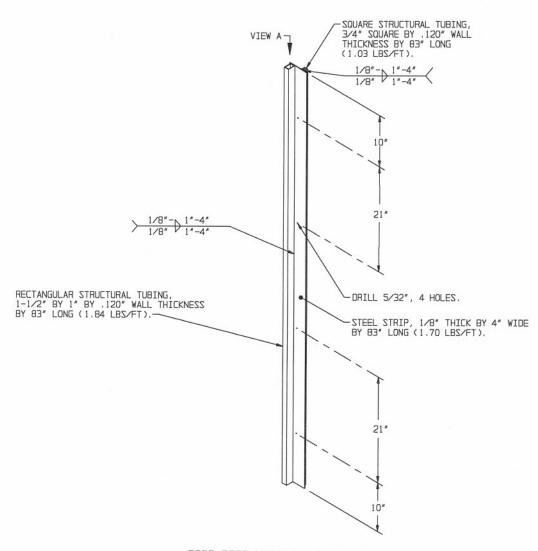
WHEN ISO CONTAINERS ARE NOT EQUIPPED WITH PRE-WELDED LOAD RETAINERS, AS DEPICTED IN "DETAIL A" ABOVE, DOOR POST VERTICALS, DOOR POST VERTICAL RETAINERS AND DOOR SPANNERS WILL BE REQUIRED FOR THE LOAD DEPICTED ON PAGE 4. SEE THE LOAD ON PAGE 6 FOR AN EXAMPLE. SEE PAGE 10 FOR DETAILS OF THE METAL DOOR POST VERTICAL RETAINER.



#### DETAIL B

A PARTIAL PLAN VIEW OF THE LEFT REAR PORTION OF THE CONTAINER IS SHOWN DEPICTING THE PROPER POSITION OF THE DOOR POST VERTICAL RETAINER AND ADJACENT DUNNAGE PIECES. THE LOAD ON PAGE 6 IS DEPICTED.





DOOR POST VERTICAL RETAINER