

APPROVED BY  
 BUREAU OF EXPLOSIVES  
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 SUPERVISOR, MILITARY & INTERMODAL SERVICES  
 DATE 2/8/77

# LOADING AND BRACING IN VAN TYPE TRAILERS EQUIPPED WITH CONVEYOR AND MECHANICAL CARGO RESTRAINT SYSTEM, FOR THE MK II6 CHEMICAL BOMB, PACKED IN THE MK 398 MOD 0 CONTAINER, UNITIZED ON THE 463L (HCU-6/E) PALLET (10-CONTAINERS/PALLET)

## INDEX

ITEM	PAGE (S)
GENERAL NOTES, AND MATERIAL SPECIFICATIONS -----	2
UNITIZING PROCEDURES -----	3
OUTLOADING PROCEDURES -----	4,5
CONVEYOR INSTALLATION -----	6,7
DETAILS -----	8,9

CAUTION: THE PROCEDURES SHOWN HEREIN ARE ONLY APPLICABLE FOR HIGHWAY MOVEMENTS, NOT FOR CONTAINER/TRAILER-ON-FLAT-CAR MOVEMENT.

REVISIONS				DRAFTSMAN /mk	PROJ. ENG. D/W
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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 UNITIZATION OF THE MK 398 MOD O CONTAINERS ON THE AIR FORCE 463L (HCU - 6/E) PALLET IS SHOWN ON PAGE 3.
1. THE VERTICAL UNITIZING STRAPS MUST BE INSTALLED PRIOR TO PLACEMENT ABOARD THE 463L PALLET. INSTALL VERTICAL UNITIZING STRAPS ON BOTH ENDS OF TWO 2-CONTAINER HIGH STACKS AND TWO 3-CONTAINER HIGH STACKS. THE 3-CONTAINER HIGH STACKS WILL HAVE THE SECOND LAYER CONTAINER UNITIZED TO THE FIRST LAYER CONTAINER, AND THE THIRD LAYER CONTAINER WILL BE UNITIZED TO THE SECOND LAYER CONTAINER.
  2. THE MK 398 MOD O CONTAINERS WILL BE CENTERED ON THE "PLYWOOD PROTECTOR ASSEMBLY" ON THE 463L (HCU-6/E) PALLET, BOTH Laterally AND LONGITUDINALLY.
  3. INSTALL BUNDLING STRAPS THROUGH THE SAME OPENINGS THAT ARE USED FOR THE VERTICAL UNITIZING STRAPS. BRING LOOSE ENDS TOGETHER, TENSION AND SEAL WITH TWO CRIMPS.
  4. THE HOOKS ON THE BOTTOM OF EACH SIDE CARGO NET (HCU-7/E) WILL BE SECURED INTO TIEDOWN RINGS ON THE PALLET ( ONE HOOK TO ONE RING ). THE TWO SIDE CARGO NETS WILL BE LOCATED SO THAT THEY ARE CONNECTED (HOOKED TOGETHER) AT OPPOSITE CORNERS OF THE PALLET. THE NET SHOULD THEN BE RAISED TO COVER THE CONTAINERS, AND THE SLIDE BARS AND THE SIDE HOOKS ADJUSTED SO THAT THE NETS FIT SNUGLY AROUND THE CONTAINERS. THE TIEDOWN DEVICE (CGU-1/B) SHOULD THEN BE INSTALLED. ATTACH TIEDOWN DEVICES TO THE SIDE CARGO NETS AND POSITION OVER THE LADING AND SECURE TO THE CARGO NETS ON THE OPPOSITE SIDE, AS SHOWN. TENSION AS REQUIRED FOR AIRCRAFT MOVEMENT.
  5. WHEN APPLYING TIEDOWN DEVICES, THERE MUST BE AT LEAST ONE ( 1 ) COMPLETE WRAP OF THE STRAP AROUND THE SPOOL OF THE RATCHET PRIOR TO EXERTION OF FORCE ON THE RATCHET HANDLE. WHEN TENSIONING, THE FREE END OF THE STRAP SHOULD BE GUIDED TO LAY FLAT AND PARALLEL WITH THE STRAP UNDER TENSION, TO PREVENT JAMMING OF THE RATCHET. AFTER TENSIONING OF TIEDOWN DEVICES, ALL RATCHET HANDLES SHOULD BE PLACED IN THE CLOSED AND LOCKED POSITION ( DOWN ). CAUTION: THE RATCHET OF THE TIEDOWN DEVICES SHALL BE LOCATED SO THAT IT WILL NOT PROTRUDE BEYOND THE PERIMETER OF THE PALLET.
  6. THE LOOSE ENDS OF ALL TIEDOWN DEVICES WILL BE FOLDED BACK ONTO STRAP UNDER TENSION AND SECURED WITH TAPE OR WIRE. ADEQUATE SLACK SHOULD BE LEFT BETWEEN THE RATCHET AND THE FOLDED LOOSE END OF A STRAP TO PERMIT UNHOOKING OF THE DEVICE WITHOUT RELEASING THE FOLDED AND SECURED STRAP.
- C. THE OUTLOADING PROCEDURES SPECIFIED HEREIN ARE APPLICABLE TO THE SHIPMENT OF THREE ( 3 ) OR LESS OF THE PALLET UNIT DEPICTED ON PAGE 3, IN VAN TYPE TRAILERS WITH INSIDE DIMENSIONS OF 29'-8" LONG BY 91" WIDE BY 94" HIGH. THESE TRAILERS MUST BE EQUIPPED WITH ROLLER CONVEYORS AND MECHANICAL CARGO RESTRAINT SYSTEM AS DETAILED ON PAGES 6 THRU 10.
- D. FOR DETAIL OF THE MK 398 MOD O CONTAINER, SEE BUWEPS DL 1516671:

CONTAINER DIMENSIONS - 102-11/16" LONG BY 20" WIDE BY 22" HIGH.  
CONTAINER WEIGHT ----- 851 LBS.  
CONTAINER CUBE ----- 26.2 CUBIC FEET.

( CONTINUED AT RIGHT )

## MATERIAL SPECIFICATIONS

STEEL STRAPPING ----- : CLASS I, TYPE I OR IV, HEAVY DUTY, FINISH A, B ( GRADE 2 ), OR C; FED SPEC QQ-S-781.

STRAP SEAL ----- : TYPE D, STYLE I, II, OR IV, CLASS H; FED SPEC QQ-S-781.

CONVEYOR ----- : CONVEYOR, ROLLER, GRAVITY, STRAIGHT, 18" OVERALL WIDTH X 10'-0" LONG, 2-1/2" OD ROLLERS, 4-INCH X 5.4 POUNDS PER FOOT CHANNEL SIDE RAILS, 800 POUNDS PER FOOT CAPACITY MINIMUM, FSC 3910.

STEEL STRUCTURAL ----- : ROLLED SHAPES, PLATE, AND BAR; FED SPEC QQ-S-741.

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

LUMBER ----- : SEE TM 743-200-1, DUNNAGE LUMBER; FED SPEC MM-L-751.

NAILS ----- : COMMON, CEMENT COATED OR CHEMICALLY ETCHED; FED SPEC FF-N-105. ALT: ANNULAR-RING TYPE NAIL OF THE SAME SIZE.

PLYWOOD ----- : GROUP B OR C, GRADE C-D ( EXTERIOR ); FED SPEC NN-P-530. IF SPECIFIED GRADE IS NOT AVAILABLE, A BETTER EXTERIOR GRADE MAY BE SUBSTITUTED.

PALLET ----- : 463L SYSTEM ( HCU-6/E ); MIL SPEC MIL-P-27443.

TIEDOWN DEVICE ----- : CGU-1/B; MIL SPEC MIL-T-27260.

SIDE CARGO NET ----- : HCU-7/E, AIR FORCE DRAWING NO. 67F4 G303; MIL SPEC MIL-N-27444.

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## ( GENERAL NOTES CONTINUED FROM LEFT )

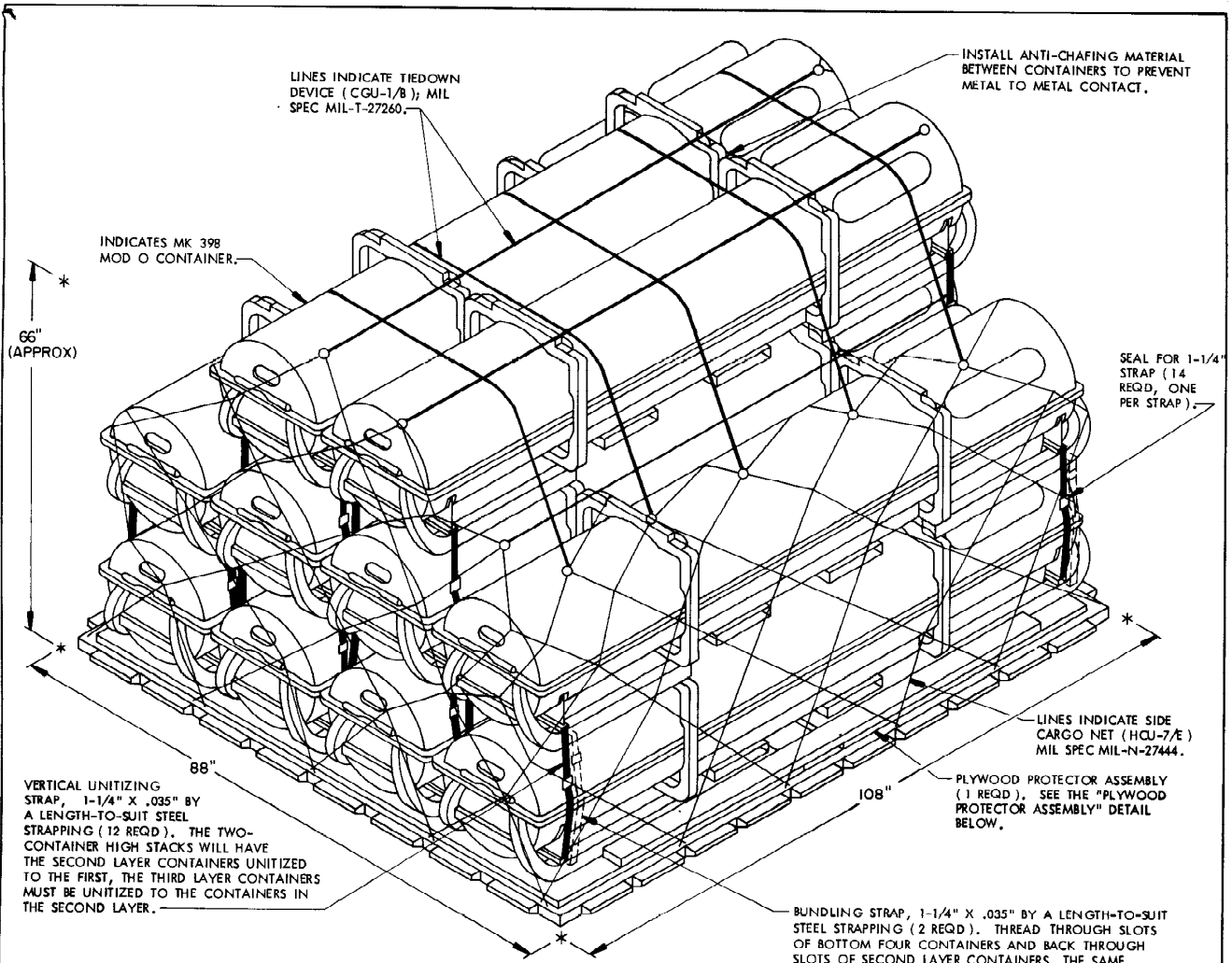
- E. FOR DETAIL OF TEN MK 398 MOD O CONTAINERS UNITIZED ON THE 463L PALLET SEE PAGE 3:
- UNIT DIMENSIONS ---- 108" LONG BY 88" WIDE BY 66" HIGH ( APPROX ).  
UNIT WEIGHT ----- 8,960 LBS.  
UNIT CUBE ----- 363.0 CUBIC FEET.
- F. THE GROSS WEIGHT AND AXLE DISTRIBUTION OF WEIGHT OF A LOAD WILL BE THE RESPONSIBILITY OF THE CARRIER. THE CARRIER WILL ADVISE THE SHIPPER OF THE APPLICABLE LOADING REQUIREMENTS AND THE SHIPPER WILL LOAD ACCORDINGLY.
- G. THE NUMBER OF PALLETS MAY BE ADJUSTED TO FIT THE SIZE OF THE TRAILER BEING LOADED OR THE QUANTITY TO BE SHIPPED; HOWEVER, THE APPROVED METHOD SPECIFIED HEREIN FOR BLOCKING AND BRACING FULL OR PARTIAL LOADS MUST BE FOLLOWED AS CLOSELY AS POSSIBLE.
- H. WHEN STEEL STRAPPING IS SEALED AT AN END-OVER-END LAP JOINT, ONE SEAL WITH TWO ( 2 ) PAIR OF CRIMPS PER SEAL MUST BE USED TO SEAL THE JOINT.
- J. EXCEPT FOR PLYWOOD, DUNNAGE LUMBER SPECIFIED THROUGHOUT THIS PROCEDURAL DRAWING IS OF NOMINAL SIZE. FOR EXAMPLE, 2" X 4" MATERIAL IS ACTUALLY 1-1/2" THICK BY 3-1/2" WIDE.
- K. A STAGGERED NAILING PATTERN WILL BE USED WHEREVER POSSIBLE WHEN NAILS ARE DRIVEN INTO JOINTS OF DUNNAGE ASSEMBLIES.
- L. PORTIONS OF THE TRAILER BODIES DEPICTED WITHIN THIS PROCEDURAL DRAWING, SUCH AS ONE OF THE SIDE WALLS HAVE NOT BEEN SHOWN IN THE LOAD VIEWS FOR CLARITY PURPOSES.

## ( MATERIAL SPECIFICATIONS CONTINUED )

BOLT ----- : SCREW, CAP, HEXAGON HEAD, STEEL, GRADE 5, CADMIUM PLATED, UNC-2A; FED SPEC FF-S-85. ( COMMERCIAL STANDARD UNCOATED BOLTS MAY BE SUBSTITUTED ).

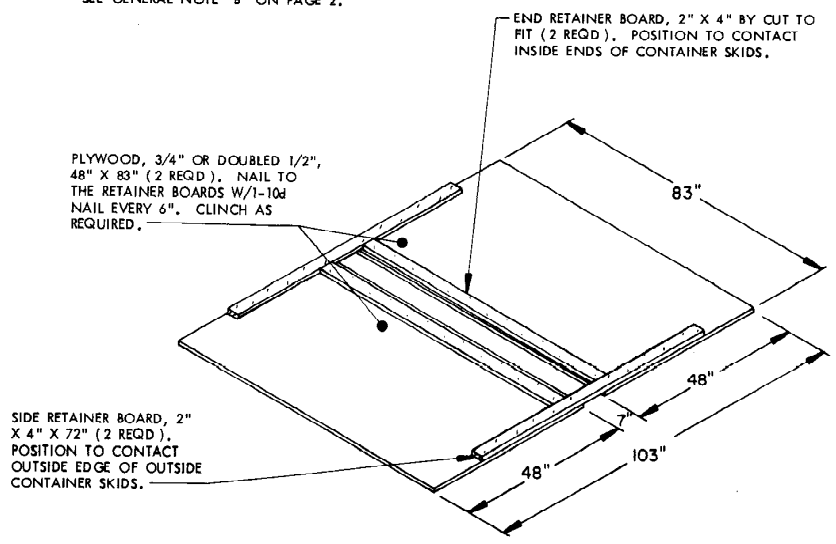
NUTS ----- : NUT, PLAIN, HEXAGON, UNC-2B; FED SPEC FF-N-836.

LOCK WASHER ---- : WASHER, LOCK-SPRING, HELICAL, REGULAR; FF-W-84.



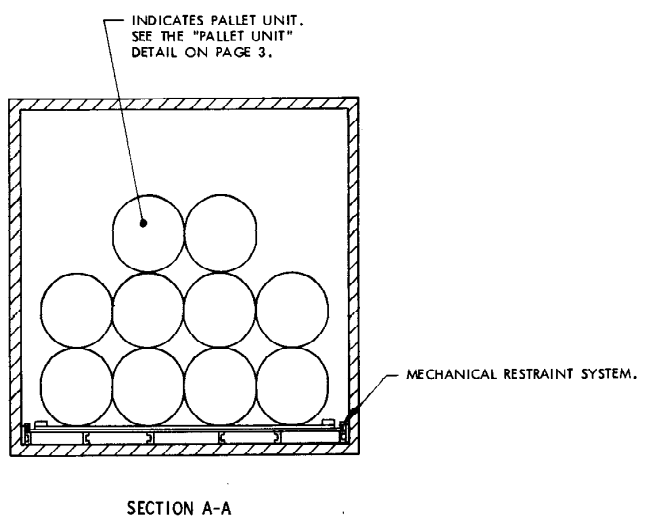
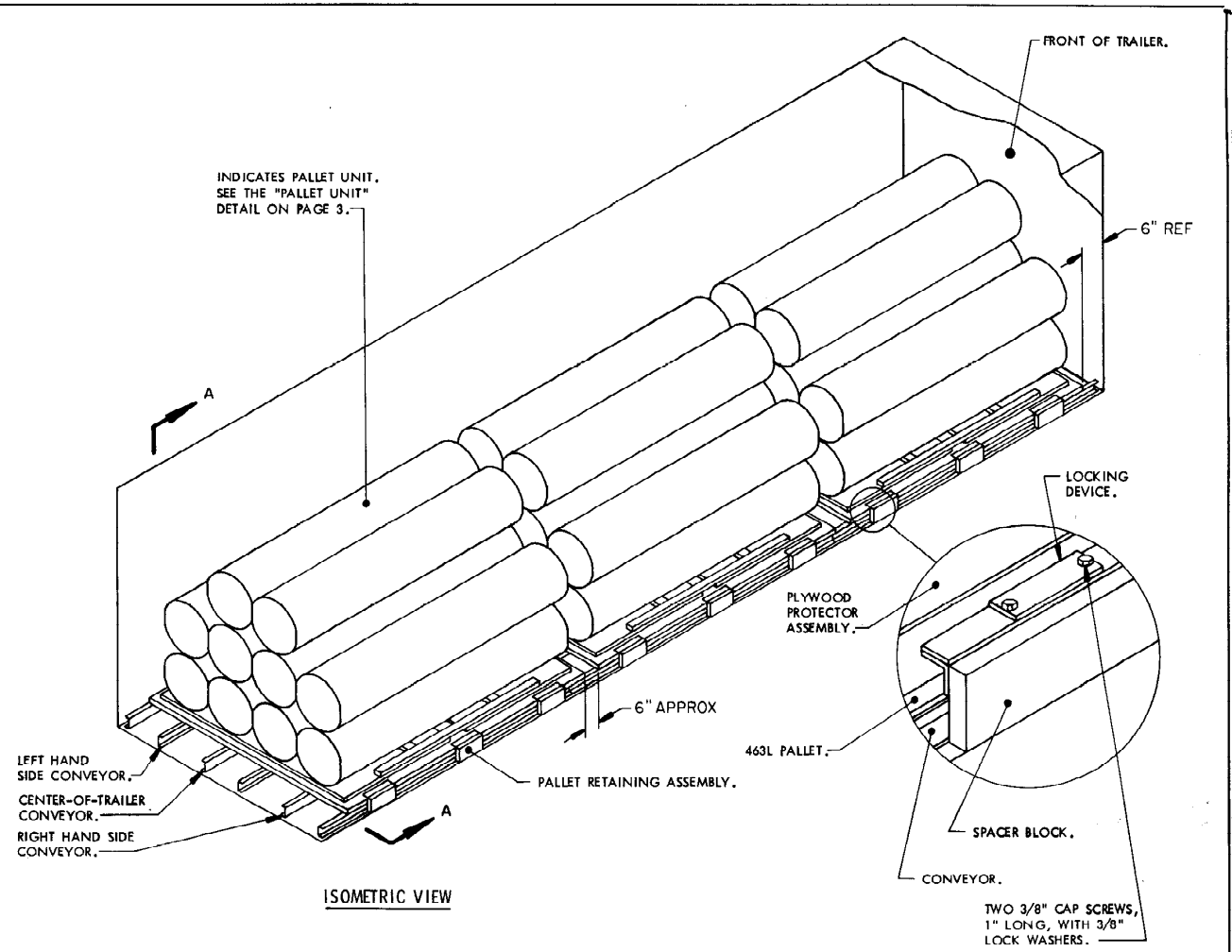
**PALLET UNIT**

SEE GENERAL NOTE "B" ON PAGE 2.



**PLYWOOD PROTECTOR ASSEMBLY**

**UNITIZING PROCEDURES**

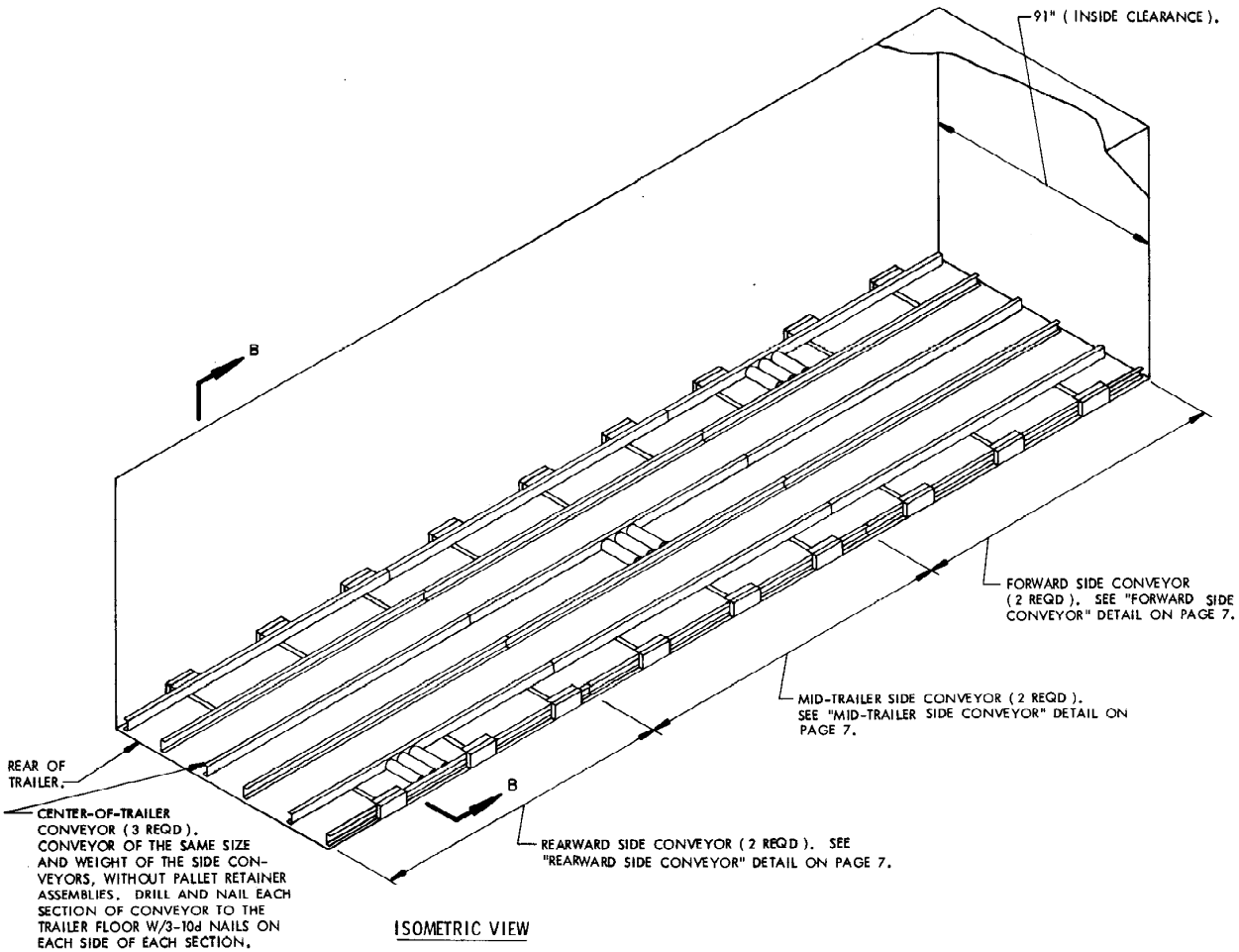


**LOADING AND UNLOADING PROCEDURES**

1. MAKE SURE THE VAN TRAILER IS AS LEVEL AS POSSIBLE, FROM FRONT TO REAR AND ALSO SIDEWAYS, SO THAT THE LOADED 463L PALLETS CAN BE MOVED INTO POSITION FOR SECUREMENT, AND TO INSURE THAT THE PALLETS DO NOT ACCIDENTALLY ROLL BACKWARDS.
2. REMOVE THE TWELVE CAP SCREWS AND WASHERS AND THE SIX LOCKING DEVICES.
3. POSITION FIRST PALLET ON ENDS OF THE REAR CONVEYOR, AND ROLL FORWARD, UNDER THE PALLET RETAINING ASSEMBLIES. CONTINUE ROLLING FORWARD, UNDER EACH PALLET RETAINING ASSEMBLY UNTIL APPROXIMATELY 6 INCHES FROM FRONT OF TRAILER, SLOT OF PALLET SHOULD BE POSITIONED DIRECTLY UNDER SLOT IN PALLET RETAINING ASSEMBLY. INSERT LOCKING DEVICE THROUGH SLOTS IN ASSEMBLY AND PALLET. INSTALL CAP SCREWS AND WASHERS, 2 IN EACH LOCKING DEVICE, TIGHTEN WITH WRENCH. LOCKING DEVICES ARE TO BE INSTALLED ON BOTH SIDES OF THE TRAILER NEAR THE REAR OF EACH PALLET.
4. REPEAT SAME PROCEDURES FOR SECOND AND THIRD PALLETS, KEEPING APPROXIMATELY 6 INCHES BETWEEN PALLETS.
5. FOR UNLOADING, PARK THE VAN IN A LEVEL POSITION AS STATED IN NOTE 1 ABOVE, AND THEN REVERSE THE OPERATION AS DESCRIBED ABOVE.

**BILL OF MATERIAL/PALLET**

LUMBER	LINEAR FEET	BOARD FEET
2" X 4"	25	17
NAILS	NO. REQD	POUNDS
10d (3")	50	1
PLYWOOD, 3/4" -----	56 SQ FT REQD -----	112 LBS
STRAPPING, 1-1/4" X .035" ---	156 FT REQD -----	22 LBS
SEAL FOR 1-1/4" STRAP -----	14 REQD -----	NIL
PALLET -----	1 REQD -----	300 LBS
SIDE CARGO NET -----	2 REQD -----	44 LBS
TIEDOWN DEVICE -----	7 REQD -----	28 LBS



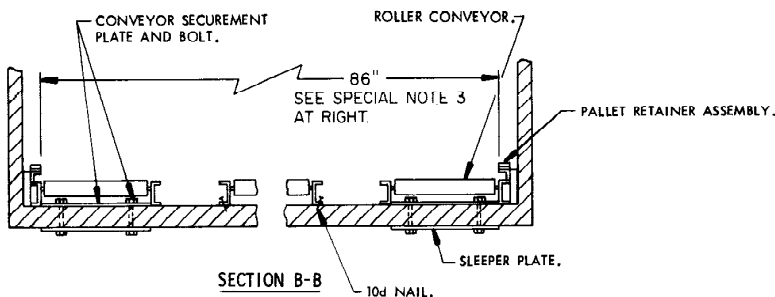
(SPECIAL NOTES CONTINUED)

4. WHEN THE UNDERSIDE OF THE TRAILER, IN THE AREA OF THE KING PIN, HAS A STEEL PLATE WHICH INTERFERES WITH INSTALLATION OF SLEEPER PLATES, SPECIAL PROVISIONS MUST BE APPLIED. THE CONVEYOR SECTIONS MUST BE SECURED AT THE FRONT OF THE TRAILER, NEAR THE PALLET RETAINER ASSEMBLY. HOLES CAN BE DRILLED THROUGH THE STEEL PLATE, IN LINE WITH THE HOLES IN THE TRAILER FLOOR. **CAUTION:** NUTS OR HEADS ON BOLTS SECURING THE CONVEYOR MUST NOT INTERFERE WITH THE FIFTH WHEEL OF THE TOWING VEHICLE. TO PREVENT INTERFERENCE WITH THE FIFTH WHEEL, THE HEADS/NUTS MAY BE COUNTERSUNK BY DRILLING OR CUTTING HOLES IN THE PLATE THAT ARE LARGER THAN THE BOLT HOLES. CUPS OR DISH-SHAPED PIECES OF STEEL THAT ARE DRILLED WITH BOLT SIZED HOLES CAN BE WELDED INTO THE PLATE.

**SPECIAL NOTES:**

1. FABRICATE SIX PALLET RETAINER A ASSEMBLIES, TWELVE PALLET RETAINER B ASSEMBLIES, AND WELD TO THE EDGE OF THE CONVEYOR AS SHOWN ON PAGE 7. SEE PAGE 7 FOR LONGITUDINAL PLACEMENT OF ASSEMBLIES ON SIDE CHANNEL OF CONVEYOR.
2. THE UNDERSIDE OF THE TRAILER FLOOR MUST BE INSPECTED FOR INSTALLATION OF THE SLEEPER PLATE. AFTER THE LOCATION IS ESTABLISHED, THE SECUREMENT PLATE CAN BE LOCATED AND WELDED TO THE BOTTOM OF THE CONVEYOR. AFTER HOLES HAVE BEEN DRILLED INTO THE STEEL PLATE, TRAILER FLOOR, AND SLEEPER PLATE, THE CONVEYOR CAN THEN BE BOLTED THRU THE TRAILER FLOOR. A LOCK WASHER AND LOCK NUT MUST BE USED TO SECURE EACH BOLT. THE CENTER-OF-TRAILER CONVEYOR CAN BE NAILED TO THE TRAILER FLOOR.
3. THE 86" DIMENSION SHOWN IN SECTION B-B AT THE LEFT IS THE CONTROLLING DIMENSION IN INSTALLATION OF THE CONVEYOR-SECUREMENT ASSEMBLY. ALL TRAILERS MUST BE FIELD CHECKED AND ANY VARIATIONS IN WIDTH MUST BE ADJUSTED FOR BY VARYING THE THICKNESS OF THE SPACER BLOCK AS SHOWN IN THE PALLET RETAINER A ASSEMBLY DETAIL ON PAGE 8 AND THE PALLET RETAINER B ASSEMBLY DETAIL ON PAGE 9 TO INSURE THAT THE 86" DIMENSION IS MAINTAINED.

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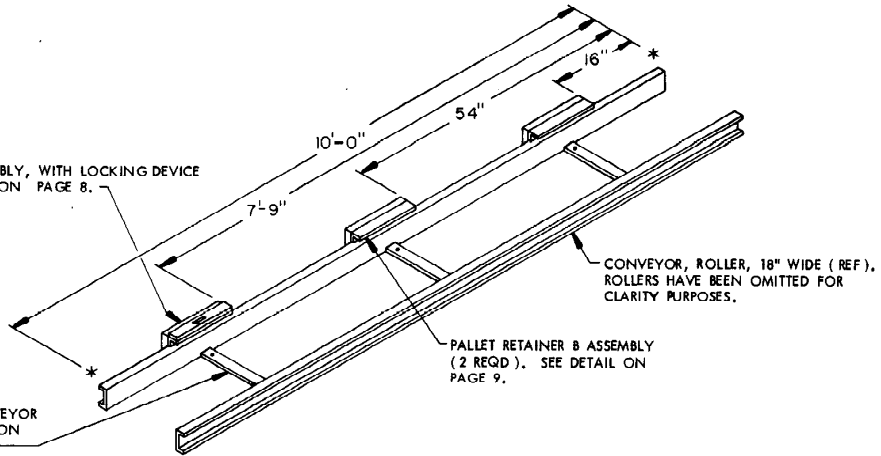


SECTION B-B

**CONVEYOR INSTALLATION**

PALLET RETAINER A ASSEMBLY, WITH LOCKING DEVICE (1 REQD.). SEE DETAILS ON PAGE 8.

CONVEYOR SECUREMENT PLATE (3 REQD PER CONVEYOR SECTION). SEE DETAILS ON PAGE 8.

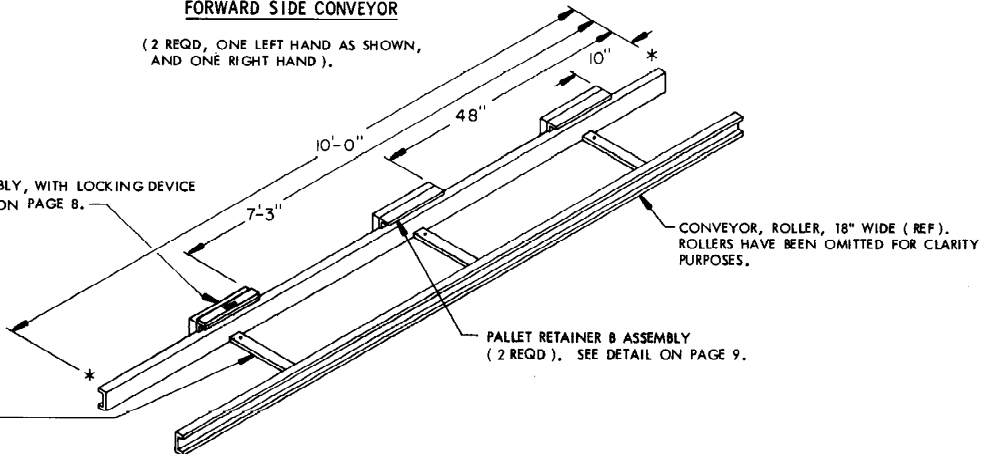


**FORWARD SIDE CONVEYOR**

(2 REQD, ONE LEFT HAND AS SHOWN, AND ONE RIGHT HAND).

PALLET RETAINER A ASSEMBLY, WITH LOCKING DEVICE (1 REQD.). SEE DETAILS ON PAGE 8.

CONVEYOR SECUREMENT PLATE (3 REQD PER CONVEYOR SECTION). SEE DETAIL ON PAGE 8.

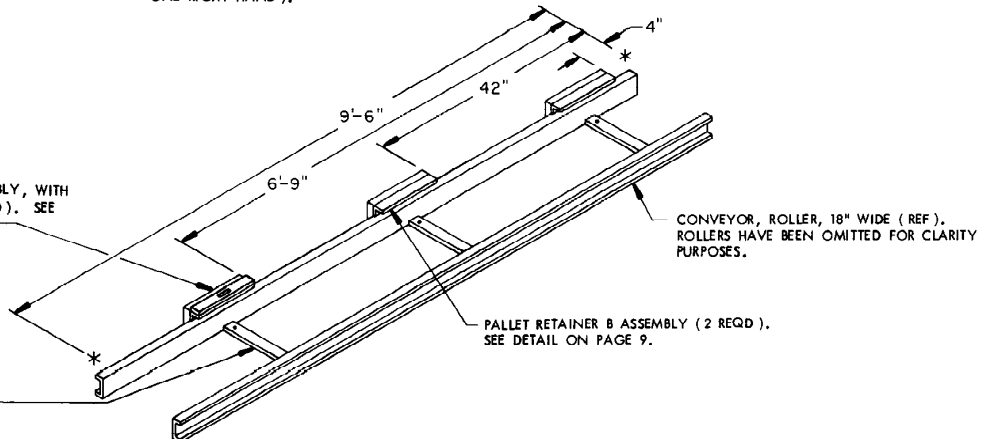


**MID-TRAILER SIDE CONVEYOR**

(2 REQD, ONE LEFT HAND AS SHOWN, AND ONE RIGHT HAND).

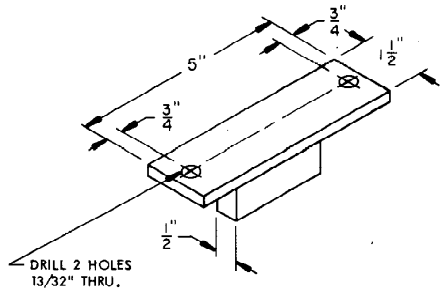
PALLET RETAINER A ASSEMBLY, WITH LOCKING DEVICE (1 REQD.). SEE DETAILS ON PAGE 8.

CONVEYOR SECUREMENT PLATE (3 REQD PER CONVEYOR SECTION). SEE DETAIL ON PAGE 8.



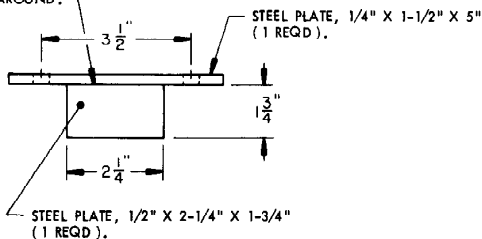
**REARWARD SIDE CONVEYOR**

(2 REQD, ONE LEFT HAND AS SHOWN, AND ONE RIGHT HAND).

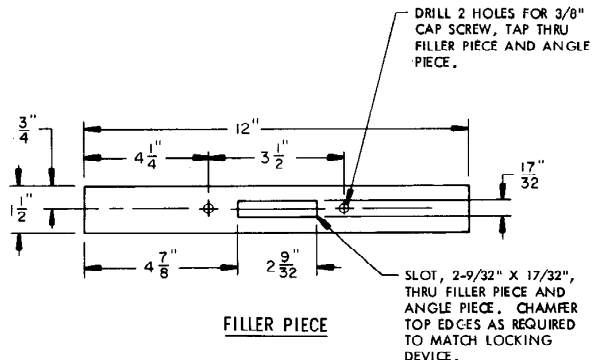


DRILL 2 HOLES  
13/32" THRU.

CHAMFER 1/4" AND WELD  
WITH 1/4" FILLET WELD,  
ALL AROUND.



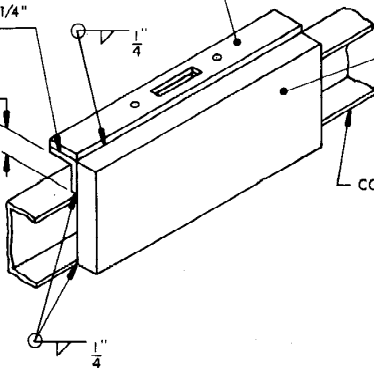
**LOCKING DEVICE**



**FILLER PIECE**

RETAINER ANGLE,  
1-1/2" X 1-1/2" X 1/4"  
(1 REQD.).

1/4" CLEAR  
HEIGHT



**PALLET RETAINER A ASSEMBLY**

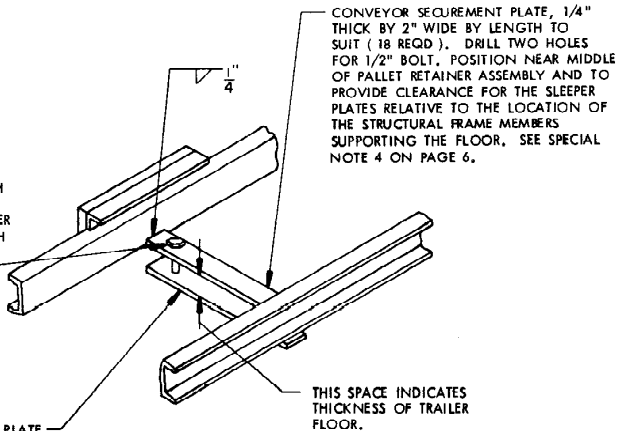
(6 ASSEMBLIES REQUIRED)

FILLER PIECE, 1/4" X 1-1/2"  
X 12" STEEL PLATE (1 REQD.).  
SEE DETAIL ABOVE.

SPACER BLOCK, 1" THICK BY 12" LONG  
BY CONVEYOR THICKNESS PLUS 1-1/2"  
STEEL PLATE (1 REQD.). THE 1" THICKNESS  
IS REQUIRED FOR A 91" WIDE TRAILER.  
THIS DIMENSION MUST BE ADJUSTED FOR  
TRAILERS OF OTHER WIDTHS TO ASSURE  
THAT SPACER BLOCK IS AGAINST TRAILER  
SIDE WALL AND THAT THE 86" DIMENSION  
SPECIFIED IN SECTION B-B ON PAGE 6  
IS MAINTAINED.

BOLT, 1/2" DIA, LENGTH  
TO EXTEND THRU TWO  
STEEL PLATES AND TRAILER  
FLOOR AND SECURE WITH  
LOCK WASHER AND  
NUT.

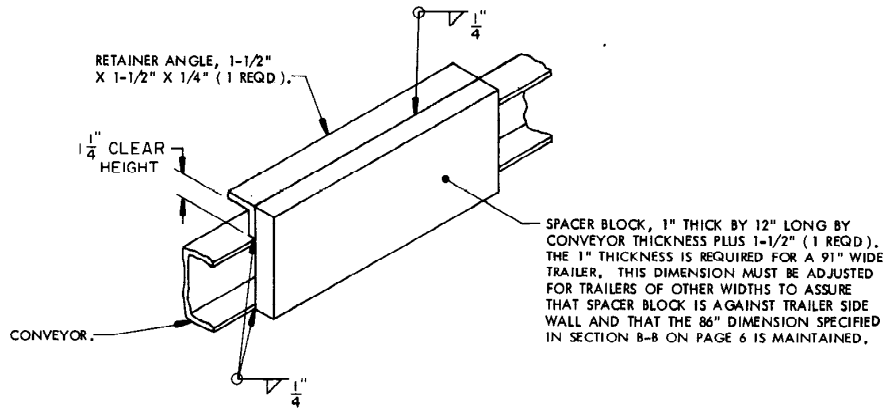
SLEEPER PLATE, 1/4"  
BY 2" WIDE BY LENGTH  
TO SUIT (18 REQD.).  
DRILL TWO HOLES FOR  
1/2" BOLT. HOLES TO  
MATCH HOLES IN  
CONVEYOR SECUREMENT PLATE.



**CONVEYOR SECUREMENT**

(REQUIRED AT 18 LOCATIONS)





**PALLET RETAINER B ASSEMBLY**

( 12 ASSEMBLIES REQUIRED )

**BILL OF MATERIAL FOR TRAILER**

CONVEYOR, ROLLER, GRAVITY, 18" WIDE ( REF )	88-1/2 FT REQD	1300 LBS
ANGLE, 1-1/2" X 1-1/2" X 1/4"	18 FT REQD	42 LBS
PLATE, 12" X 4-3/4" ( REF ) X 1"	18 FT REQD	291 LBS
PLATE, 12" X 1-1/2" X 1/4"	6 FT REQD	8 LBS
PLATE, 15" ( REF ) X 2" X 1/4"	45 FT REQD	76.5 LBS
PLATE, 5" X 1-1/2" X 1/4"	6 REQD	3.2 LBS
PLATE, 2-1/4" X 1-3/4" X 1/2"	6 REQD	3.5 LBS
BOLTS, 1/2" DIAMETER	36 REQD	27 LBS
BOLT, 3/8" DIAM X 1" LONG	12 REQD	6 LBS
LOCK WASHER, 3/8" DIAM	12 REQD	NIL
LOCK WASHER, 1/2" DIAM	36 REQD	NIL
NUT, 1/2"	36 REQD	3 LBS