

APPROVED BY  
 BUREAU OF EXPLOSIVES  
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# LOADING AND BRACING ON M870 LOW BOY SEMI-TRAILER OF THE MK 116 CHEMICAL BOMB, PACKED IN THE MK 398 MOD 0 CONTAINER, UNITIZED ON THE 463L (HCU-6/E) PALLET (10-CONTAINERS/PALLET)

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

**DO NOT SCALE**

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GENERAL NOTES

( GENERAL NOTES CONTINUED FROM LEFT )

- 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 UNITS OF THE PALLET UNIT DEPICTED ON PAGE 3, ON A FLAT BED LOW-BOY TYPE TRAILER, 42'-0" LONG BY 10'-0" WIDE, WITH OUTRIGGERS EXTENDED. 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 BUWEP5 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 )

- 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.

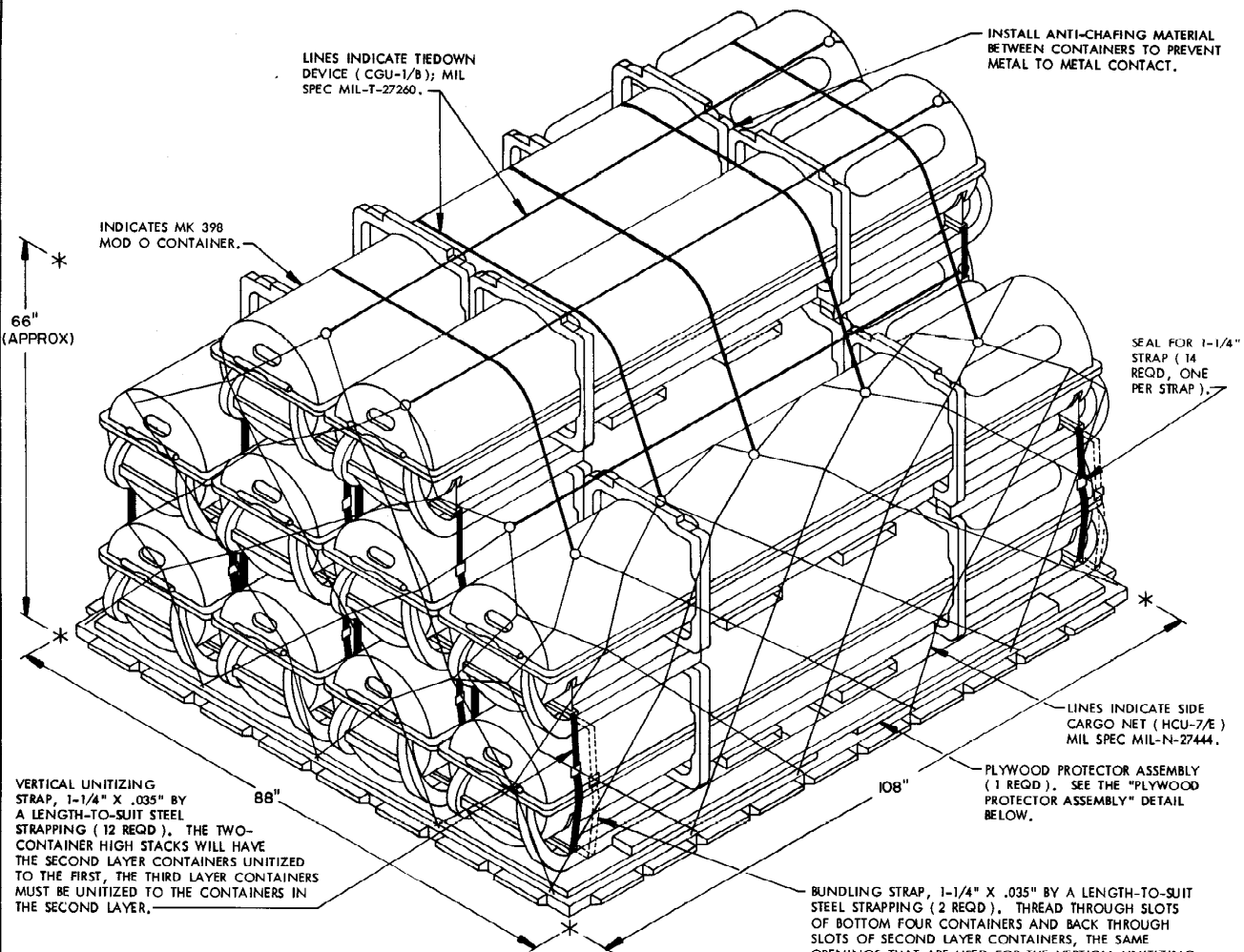
MATERIAL SPECIFICATIONS

( MATERIAL SPECIFICATIONS CONTINUED )

- STEEL STRAPPING ----- : CLASS I, TYPE I OR IV, HEAVY DUTY, FINISH A, B ( GRADE 2 ), OR C; FED SPEC QQ-5-781.
- STRAP SEAL ----- : TYPE D, STYLE I, II, OR IV, CLASS H; FED SPEC QQ-5-781.
- 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-5-741.
- ANTI-CHAFING MATERIAL : NEUTRAL BARRIER MATERIAL; MIL-B-121 OR EQUAL.
- LUMBER ----- : SEE TM 743-200-1, DUNNAGE LUMBER; FED SPEC MM-1-751.
- 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.

- BOLT ----- : SCREW, CAP, HEXAGON HEAD, STEEL, GRADE 5, CADMIUM PLATED, UNC-2A; FED SPEC FF-5-85. ( 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.

( CONTINUED AT RIGHT )

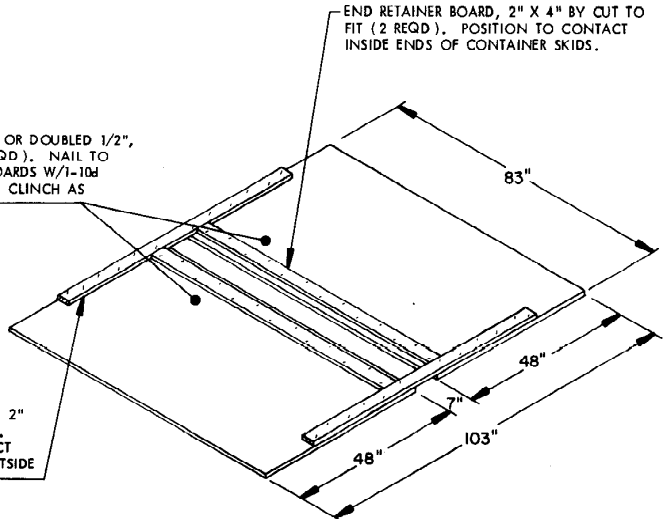


**PALLET UNIT**

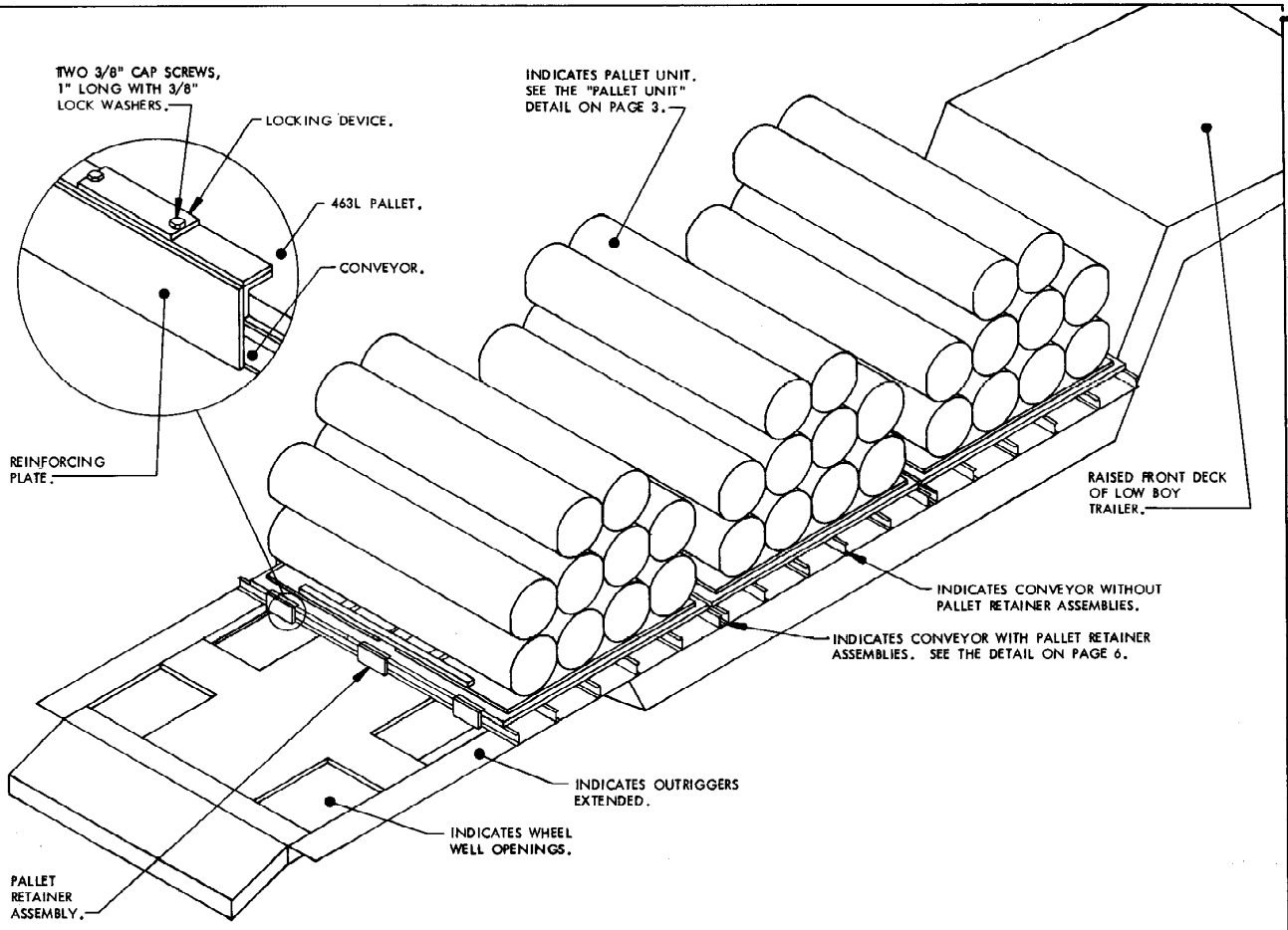
SEE GENERAL NOTE "B" ON PAGE 2.

PLYWOOD, 3/4" OR DOUBLED 1/2", 48" X 83" (2 REQD). NAIL TO THE RETAINER BOARDS W/1-10d NAIL EVERY 6". CLINCH AS REQUIRED.

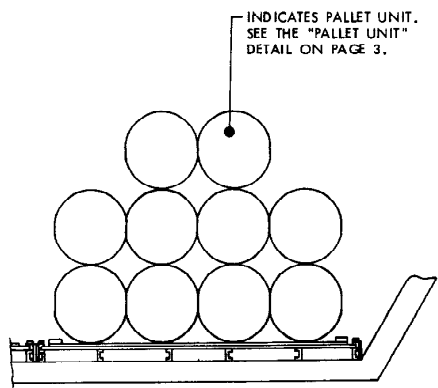
SIDE RETAINER BOARD, 2" X 4" X 72" (2 REQD). POSITION TO CONTACT OUTSIDE EDGE OF OUTSIDE CONTAINER SKIDS.



**PLYWOOD PROTECTOR ASSEMBLY**



**ISOMETRIC VIEW**

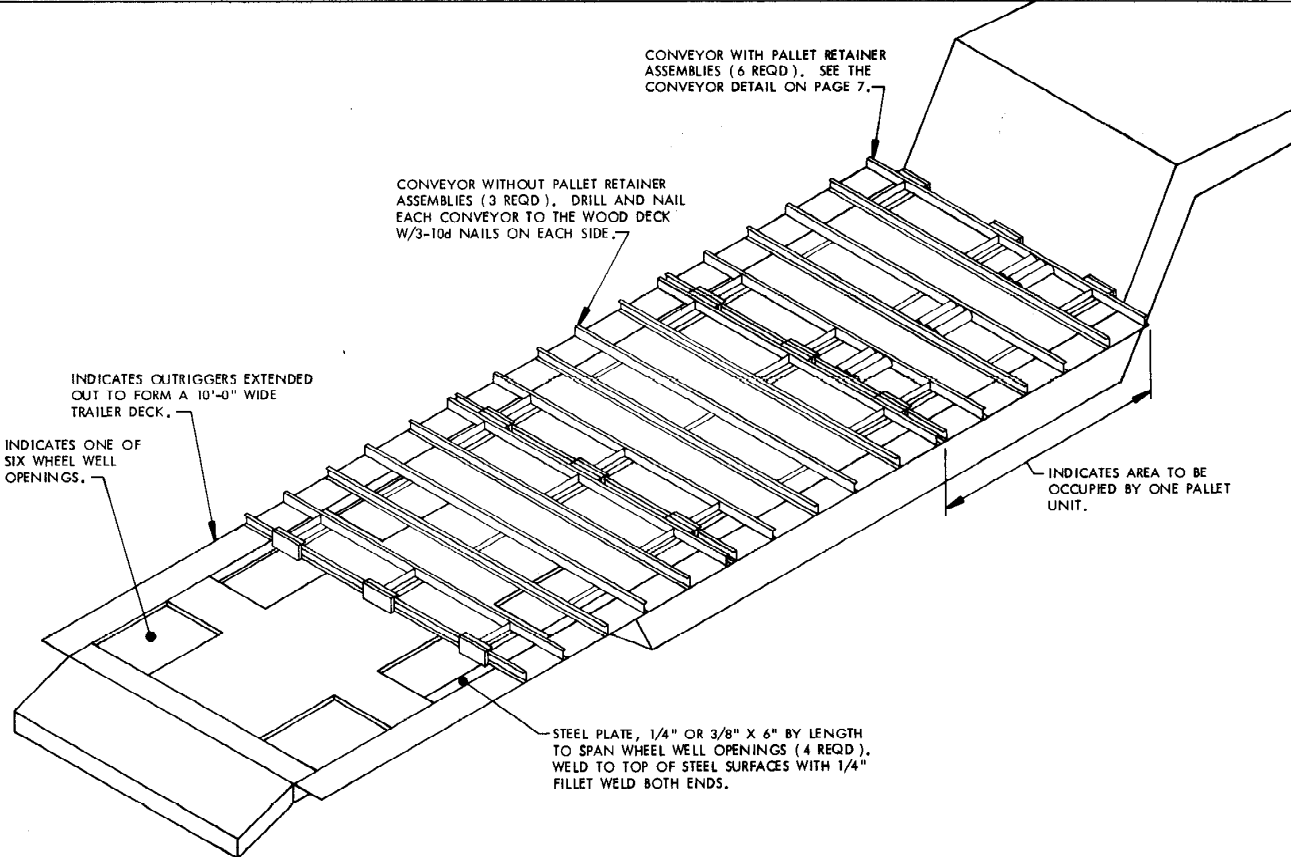


**PARTIAL ELEVATION**

LOADING AND UNLOADING PROCEDURES

1. MAKE SURE THE LOW-BOY SEMI-TRAILER IS PARKED AS LEVEL AS POSSIBLE, FROM FRONT TO REAR AND SIDE TO SIDE, SO THAT THE LOADED 463L PALLETS CAN BE MOVED INTO POSITION FOR SECUREMENT, AND TO INSURE THAT THE PALLETS DO NOT ACCIDENTALLY ROLL BACKWARDS OR ACROSS THE TRAILER AND OFF THE SIDE OPPOSITE THE LOADING SIDE. A SECOND FORK LIFT TRUCK SHOULD BE POSITIONED ON THE SIDE OPPOSITE THE LOADING SIDE TO PREVENT PALLET FROM ROLLING ACROSS CONVEYOR AND OFF OF THE OTHER SIDE OF TRAILER.
2. REMOVE THE EIGHT CAP SCREWS AND WASHERS AND FOUR LOCKING DEVICES FROM EACH SET OF CONVEYORS.
3. POSITION THE FIRST PALLET ON THE ENDS OF THE FRONT CONVEYOR, AND ROLL THE PALLET ACROSS THE CONVEYOR, UNDER THE PALLET RETAINER ASSEMBLIES, UNTIL PALLET IS CENTERED ACROSS THE TRAILER AND THE PALLET SLOT IS DIRECTLY UNDER THE SLOT OF A LOCKING DEVICE. INSERT ONE LOCKING DEVICE THRU THE SLOT IN THE PALLET RETAINER ASSEMBLY AND THE SLOT IN A PALLET AT EACH CORNER, INSTALL CAP SCREWS AND WASHERS, 2 IN EACH LOCKING DEVICE, TIGHTEN WITH WRENCH.
4. REPEAT SAME PROCEDURES FOR SECOND AND THIRD PALLETS, KEEPING PALLETS CENTERED ACROSS THE WIDTH OF THE TRAILER.
5. FOR UNLOADING, PARK THE TRAILER IN A LEVEL POSITION AS STATED IN NOTE 1 ABOVE, AND THEN REVERSE THE OPERATION AS DESCRIBED ABOVE.

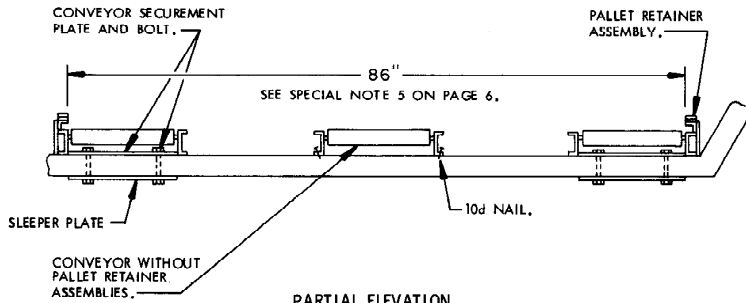
BILL OF MATERIAL/PALLET		
LUMBER	LINEAR FEET	BOARD FEET
2" X 4"	25	17
NAILS	NO. REQD	POUNDS
10d (3")	50	1
PLYWOOD, 3/4"-----	56 SQ FT REQD -----	112 LBS
STRAPPING, 1-1/4" X .035" --	156 FT REQD -----	22 LBS
SEAL FOR 1-1/4" STRAP -----	14 REQD -----	NIL
PALLET -----	1 REQD -----	300 LBS
SIDE CARGO NET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



ISOMETRIC VIEW

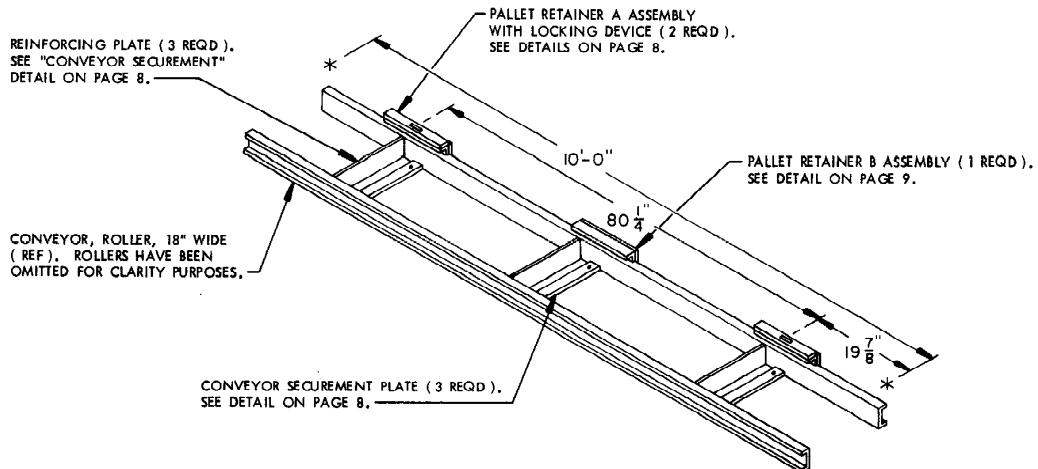
**SPECIAL NOTES:**

1. POSITION THE LOW BOY TRAILER OUTRIGGER BOARDS IN AN EXTENDED POSITION. OUTRIGGER BOARDS SHOULD BE SECURED IN A LOCKED POSITION, SO AS NOT TO BECOME DISPLACED DURING MOVEMENT.
2. FABRICATE TWELVE PALLET RETAINER A ASSEMBLIES, WITH LOCKING DEVICES, AND SIX PALLET RETAINER B ASSEMBLIES AND WELD TO THE EDGE OF THE CONVEYOR AS DIMENSIONED ON PAGE 7.
3. POSITION STEEL PLATES, 3/8" X 6" BY LENGTH TO SPAN WHEEL WELL OPENING. POSITION ON TOP OF EXPOSED STEEL SURFACE AND WELD WITH 1/4" FILLET WELD. TOP OF PLATE SHOULD BE FLUSH WITH TOP OF WOOD DECK. THIS SURFACE MAY BE USED TO WELD CONVEYOR TO, IF CONVEYOR IS TO BE WELDED.
4. THE UNDERSIDE OF THE TRAILER MUST BE INSPECTED FOR INSTALLATION OF SLEEPER PLATES. AFTER THE LOCATION IS ESTABLISHED, THE SECUREMENT PLATE CAN BE LOCATED AND WELDED TO THE BOTTOM EDGE OF THE CONVEYOR. AFTER HOLES HAVE BEEN DRILLED INTO THE STEEL PLATE, TRAILER FLOOR, AND SLEEPER PLATE, THE CONVEYOR CAN THEN BE BOLTED TO THE TRAILER FLOOR. A LOCK WASHER AND A LOCK NUT MUST BE USED TO SECURE EACH BOLT. IF CONVEYOR SECUREMENT CANNOT BE ACCOMPLISHED BY THE ABOVE METHOD, CONVEYOR MUST BE SECURED BY WELDING CONVEYOR TO THE EXPOSED STEEL SURFACES OF THE TRAILER DECK. THE WOOD DECK OF THE TRAILER IS 3/8" HIGHER THAN THE STEEL SURFACE, AND SHIMS OF 3/8" STEEL PLATE MUST BE WELDED TO THE STEEL SURFACE OF THE TRAILER, THEN THE CONVEYOR WELDED TO THE SHIMS WITH 1/4" FILLET WELDS AS OFTEN AS POSSIBLE. A COMBINATION OF BOLTING AND WELDING CAN BE USED. THE SECUREMENT PLATES MUST BE LOCATED SO AS TO BE WELDED TO THE SHIM MATERIAL.
5. THE 86" DIMENSION SHOWN IN THE "PARTIAL ELEVATION" VIEW ON PAGE 7 IS THE CONTROLLING DIMENSION FOR THE INSTALLATION OF THE CONVEYOR-SECUREMENT ASSEMBLY. FIELD CHECK FOR PROPER ALIGNMENT.



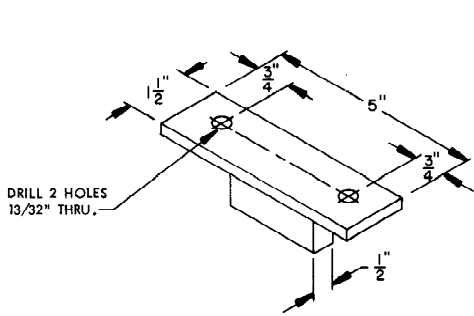
**PARTIAL ELEVATION**

SEE SPECIAL NOTE 4 ON PAGE 6. IF A WELDING METHOD OF CONVEYOR ATTACHMENT IS USED IN LIEU OF A BOLTING METHOD, THE STRENGTH OF THE WELDS MUST BE AT LEAST COMPARABLE TO THE STRENGTH OF THE BOLTS AS SHOWN ABOVE AND AS SPECIFIED ELSEWHERE WITHIN THIS DRAWING.

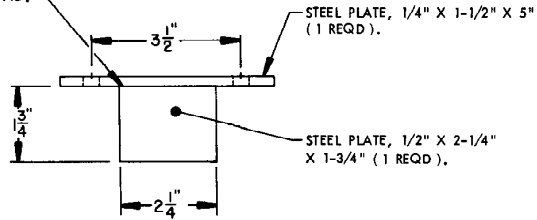


**CONVEYOR WITH PALLET RETAINERS**

(6 CONVEYOR SECTION WITH PALLET RETAINER ASSEMBLIES REQUIRED).

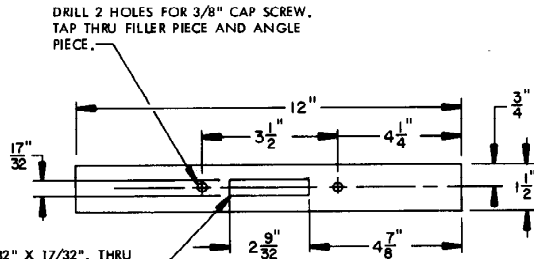


CHAMFER 1/4" AND WELD WITH 1/4" FILLET WELD, ALL AROUND.



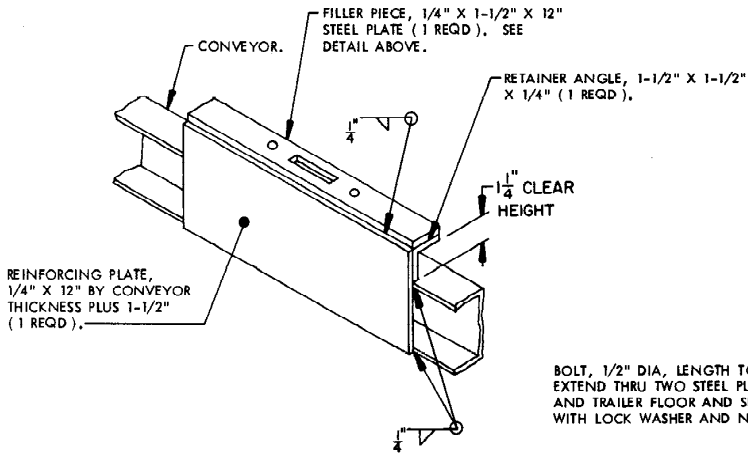
**LOCKING DEVICE**

( 12 REQD )



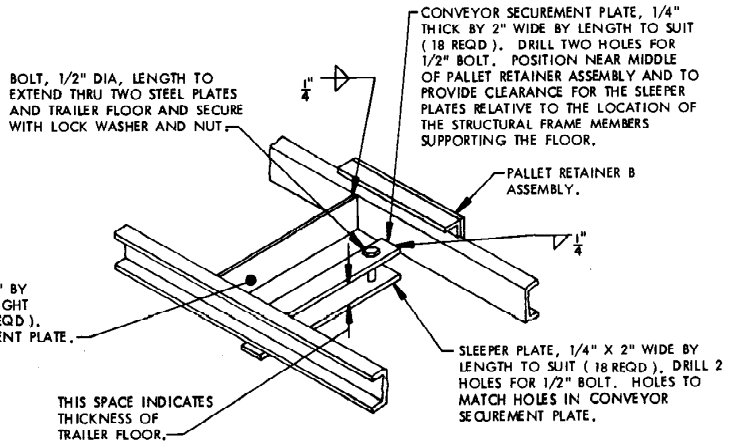
SLOT, 2-9/32" X 17/32", THRU FILLER PIECE AND ANGLE PIECE, CHAMFER TOP EDGES AS REQUIRED TO MATCH LOCKING DEVICE.

**FILLER PIECE**



**PALLET RETAINER A ASSEMBLY**

( 12 ASSEMBLIES REQUIRED )

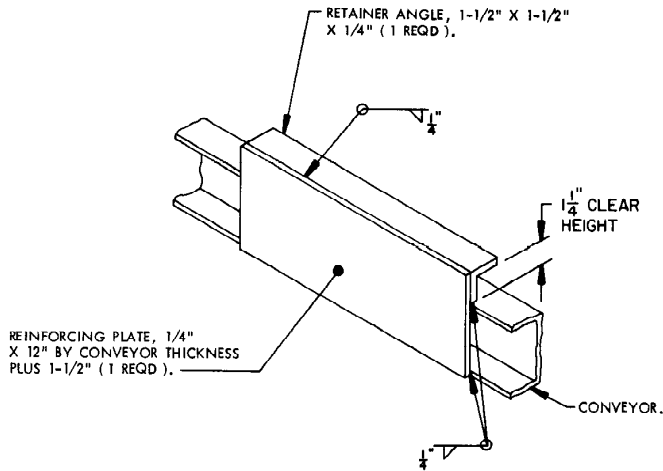


**CONVEYOR SECUREMENT**

( REQUIRED AT 18 LOCATIONS )  
SEE SPECIAL NOTE 4 ON PAGE 6.

**DETAILS**





**PALLET RETAINER B ASSEMBLY**

( 6 ASSEMBLIES REQUIRED )

**BILL OF MATERIAL FOR TRAILER**

CONVEYOR, ROLLER, GRAVITY, 18" WIDE ( REF )	90 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 1/4"	18 FT REQD	73 LBS
PLATE, 12" X 1-1/2" X 1/4"	12 FT REQD	16 LBS
PLATE, 15" ( REF ) X 2" X 1/4"	45 FT REQD	76.5 LBS
PLATE, 5" X 1-1/2" X 1/4"	12 REQD	6.4 LBS
PLATE, 2-1/4" X 1-3/4" X 1/4"	12 REQD	7 LBS
PLATE, 32" ( REF ) X 6" X 3/8"	11 FT REQD	84 LBS
BOLTS, 1/2" DIAMETER	36 REQD	27 LBS
BOLT, 3/8" DIAM X 1" LONG	24 REQD	12 LBS
LOCK WASHER, 3/8" DIAM	24 REQD	NIL
LOCK WASHER, 1/2" DIAM	36 REQD	NIL
NUT, 1/2"	36 REQD	3 LBS