

LOADING AND BRACING IN END OPENING ISO CONTAINERS* OF GAU- 8/A 30MM AMMUNITION PACKED IN AUTOMATIC LOADING SYSTEM (ALS) CNU-309 AND/OR CNU-332 SERIES CONTAINERS, USING TY-GARD RE- STRAINT MATERIAL

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

U.S. ARMY MATERIEL COMMAND DRAWING

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GENERAL NOTES

(GENERAL NOTES CONTINUED)

- A. THIS DOCUMENT HAS BEEN PREPARED AND ISSUED IN ACCORDANCE WITH AR 740-1 AND AUGMENTS TM 743-200-1 (CHAPTER 5).
- B. THE OUTLOADING PROCEDURES SPECIFIED IN THIS DRAWING ARE APPLICABLE TO LOADS OF GAU-8/A 30MM AMMUNITION PACKED IN AUTOMATIC LOADING SYSTEM (ALS) CNU-309 AND/OR CNU-332 SERIES CONTAINERS USING TY-GARD MATERIALS FOR AFT RESTRAINT. THE SHIPPING AND STORAGE CONFIGURATION FOR THE CONTAINERS CONSISTS OF TWO CONTAINERS UNITIZED INTO ONE TWIN-PACK UNIT. SUBSEQUENT REFERENCE TO TWIN-PACK UNIT HEREIN MEANS TWO CNU CONTAINERS WITH 30MM AMMUNITION UNITIZED TOGETHER. SEE PAGE 3 FOR DETAILS OF THE TWIN-PACK UNITS. SEE AMC 19-48-8587-SP15M8 FOR ALL NON-TY-GARD SHIPMENTS. **CAUTION:** REGARDLESS OF THE QUANTITY OF PALLET OR SKIDDED UNITS TO BE SHIPPED, THE "MAXIMUM GROSS WEIGHT" OF THE END OPENING ISO CONTAINER MUST NOT BE EXCEEDED.
- C. THE LOADS AS SHOWN ARE 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 TWIN-PACKS, 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 LAMINATING ADDITIONAL HORIZONTAL PIECES TO THE SIDE FILL ASSEMBLIES W/1 APPROPRIATELY SIZED NAIL EVERY 12". THE LOADS MUST BE AS TIGHT AS POSSIBLE LONGITUDINALLY, BUT THE VOID MUST NOT EXCEED 3/4" OVERALL. EXCESSIVE SLACK CAN BE ELIMINATED BY APPLYING THE TY-GARD MATERIALS TIGHT AGAINST THE REAR OF THE LOAD.
- E. SOME LOAD CONFIGURATIONS, DUE TO WEIGHT AND HEIGHT LIMITS DELINEATED IN THE CHART ON PAGE 3, MAY EXCEED THE ALLOWABLE LOADING WEIGHT FOR THE TY-GARD MATERIAL. IN THESE INSTANCES, A LOAD MAY BE DIVIDED INTO TWO LOAD BAYS, WITH EACH LOAD BAY INDEPENDENTLY SECURED WITH SEPARATE SETS OF TY-GARD MATERIAL. SEE THE LOAD ON PAGE 4. EACH LOAD BAY MUST BE TREATED AS A SEPARATE LOADING ENTITY FOR DETERMINING THE REQUIRED NUMBER OF TY-GARD RESTRAINTS. FOR EXAMPLE, IF THE FRONT BAY OF THE TOTAL LOAD WEIGHS 25,000 POUNDS, AND THE REAR BAY OF THE TOTAL LOAD WEIGHS 10,000 POUNDS, THE FRONT LOAD BAY WOULD REQUIRE TWO SETS OF TY-GARD RESTRAINTS AND THE REAR LOAD BAY WOULD REQUIRE ONE SET OF TY-GARD RESTRAINTS. THE TY-GARD RESTRAINT REQUIREMENT FOR EACH BAY MUST ALWAYS BE COMPUTED INDEPENDENTLY.
- F. 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, ON TO, OR RIGHT BESIDE A NAIL IN A LOWER PIECE.
- G. 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 ASSEMBLY OR 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, ONLY THE CORNER POSTS OF THE CONTAINER SHOULD BE USED FOR FORWARD LONGITUDINAL BLOCKING.
- H. WHETHER AN ISO 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.
- J. **CAUTION:** DO NOT NAIL DUNNAGE MATERIAL TO THE ISO CONTAINER WALLS OR FLOOR. ALL NAILING WILL BE WITHIN THE DUNNAGE.
- K. PORTIONS OF THE ISO CONTAINER DEPICTED WITHIN THIS DRAWING, SUCH AS THE SIDE WALLS AND ROOF, HAVE NOT BEEN SHOWN IN THE LOAD VIEWS FOR CLARITY PURPOSES.
- L. **MAXIMUM LOAD WEIGHT CRITERIA:**

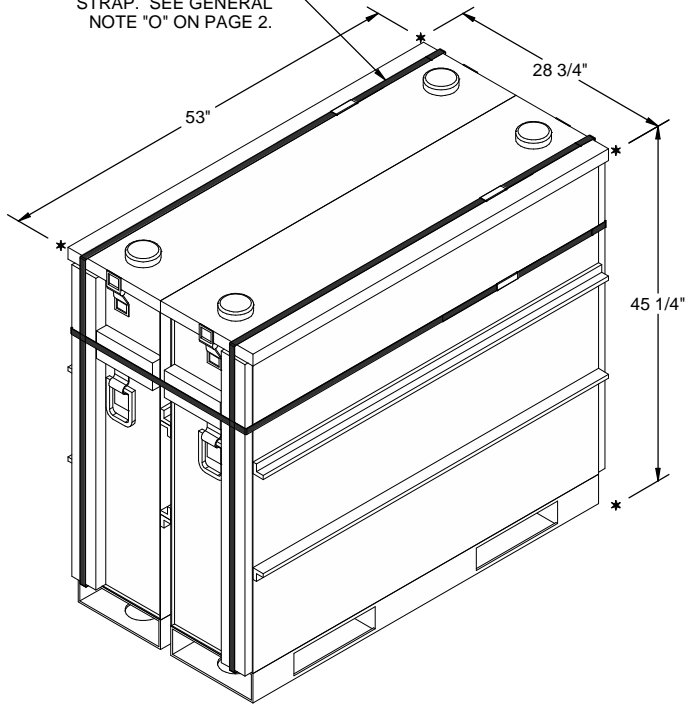
THE MAXIMUM LOAD WEIGHTS ARE CONTROLLED BY EQUIPMENT CAPABILITY FACTORS. ALTHOUGH THE HEAVIEST MAXIMUM LOADS ARE DELINEATED IN THE LOAD VIEWS, PROVISIONS ARE INCLUDED WITHIN THIS DRAWING SO THAT THE BASIC LOADS CAN BE ADJUSTED TO SATISFY A LESSER QUANTITY OF LADING UNITS. DEPENDING ON TRANSPORTATION 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.

- M. 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:
1. A LOADED CONTAINER MUST BE ON A CHASSIS EQUIPPED WITH TWO BOBIE 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.
- N. 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.
- O. TWIN-PACK UNITS OF CNU-309 CONTAINERS SHOULD BE INSPECTED AND, AS REQUIRED, LOOSE UNITIZING STEEL STRAPPING MUST BE REPLACED OR RETENSIONED.
- P. THE QUANTITY OF TWIN-PACKS SHOWN IN THE LOAD ON PAGE 4 MAY BE REDUCED FOR SHIPMENT, IF DESIRED. SEE THE FILLER ASSEMBLY AND THE "LESS-THAN-FULL LOAD PROCEDURE" ON PAGE 8.
- Q. FILLER ASSEMBLIES MUST NOT BE PLACED IN ROWS THAT CONTACT END GATES.
- R. A COMPLETE SET OF TY-GARD RESTRAINTS WILL CONSIST OF TWO SECTIONS OF TY-GARD DS AND ONE SECTION OF TY-PATCH DS. EACH COMPLETE SET IS CAPABLE OF RESTRAINING A MAXIMUM OF 13,200 POUNDS. SEE THE CHART ON PAGE 3 FOR ALLOWABLE LOADING WEIGHTS.
- S. MARK CONTAINER SIDEWALLS FOR PROPER LOCATION OF TY-GARD. PEEL AND ADHERE TY-GARD TO PRE-MARKED LOCATIONS, TAKING CARE TO FOLLOW THE CONTOUR OF THE CONTAINER CORRUGATIONS. CARE MUST BE USED TO ENSURE A CONSISTENT PRESSURE (APPROXIMATELY 16 PSI) IS APPLIED WHEN AFFIXING THE TY-GARD TO THE ISO CONTAINER. TENSION THE LOAD WITH THE TY-TOOL AND SEAL THE TY-GARD WITH THE TY-PATCH. TY-TAPE WILL THEN BE APPLIED TO VERTICALLY SPAN ALL TY-GARD LAYERS IN AT LEAST TWO LOCATIONS. REFER TO TY-GARD MANUAL 14019090 FOR COMPLETE INSTALLATION INSTRUCTIONS.
- T. IF NECESSARY DUE TO LOAD HEIGHT AND WEIGHT RESTRICTIONS, ONE SET OF TY-GARD DS RESTRAINTS MAY VERTICALLY OVERLAP ANOTHER SET, HOWEVER, OVERLAP WILL NOT EXCEED 6". ALSO, IT MAY BE NECESSARY TO EXTEND THE TY-GARD DS RESTRAINTS ABOVE THE TOP OF THE LOADED TWIN-PACKS. THIS EXTENSION IS LIMITED TO 6" ABOVE THE TOP OF THE LOADED UNITS, AND MUST BE SUPPORTED BY THE PLYWOOD GATE.
- U. IF THE INTERIOR OF THE ISO CONTAINER BEING LOADED HAS TIEDOWN RINGS ALONG THE BASE OF THE SIDE WALLS, THE BOTTOM SET OF TY-GARD RESTRAINTS CAN BE ADJUSTED UPWARD TO CLEAR THE RINGS. IF NECESSARY TO ACHIEVE THIS, OVERLAP TY-GARD SETS OR ADD TO THE HEIGHT OF THE END GATE. SEE GENERAL NOTE "T" FOR DETAILS.
- V. IF TY-GARD MATERIAL IS USED WITH LOADS UP TO 91" WIDE, A SLIP-SHEET MAY BE USED TO PROTECT TY-GARD MATERIAL FROM DAMAGE DURING LOADING. SEE GENERAL NOTE "K" OF AMC DRAWING 19-48-4153-15PA1002. TY-GARD MATERIAL IS NOT RECOMMENDED FOR LOADS WIDER THAN 91".
- W. 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.
- X. 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.

MATERIAL SPECIFICATIONS

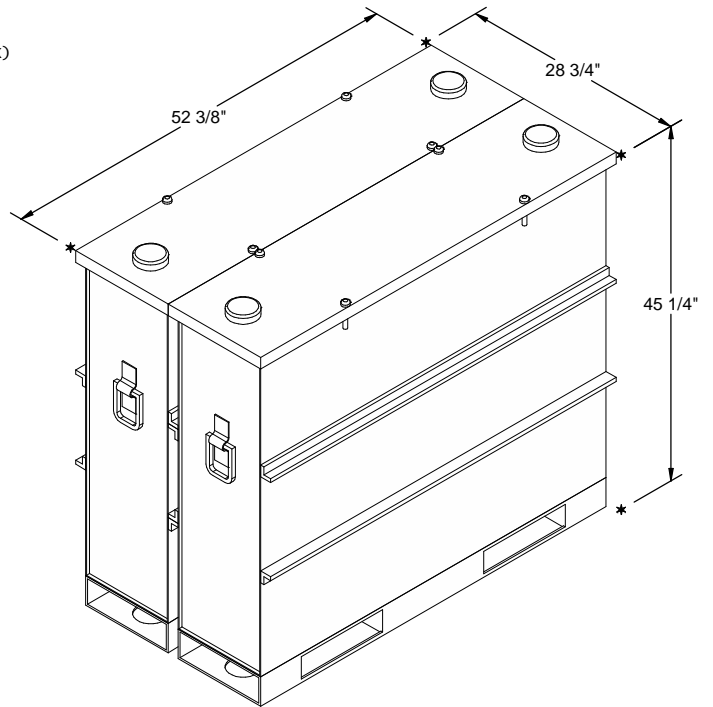
LUMBER	-----	SEE TM 743-200-1 (DUNNAGE LUMBER) AND VOLUNTARY PRODUCT STANDARD PS 20.
NAILS	-----	ASTM F1667; COMMON STEEL NAIL NLCMS OR NLCMMS).
PLYWOOD	-----	COMMERCIAL ITEM DESCRIPTION A-A-55057, INDUSTRIAL PLYWOOD, INTERIOR WITH EXTERIOR GLUE, GRADE C-D. IF SPECIFIED GRADE IS NOT AVAILABLE, A BETTER INTERIOR OR AN EXTERIOR GRADE MAY BE SUBSTITUTED.
TY-GARD DS*	-----	8135-01-585-0512, 24" WIDE.
TY-PATCH DS*	-----	8135-01-584-6017, 24" WIDE.
TY-TAPE DS*	-----	8135-17-123-0568.
TY-TOOL DS*	-----	5120-17-123-0567, 3 PIECES.

INDICATES UNITIZING STRAP. SEE GENERAL NOTE "O" ON PAGE 2.



TWIN-PACK UNIT (CNU-309/E CONTAINER)

NUMBER OF CONTAINERS - - - - - TWO
 GROSS WEIGHT - - - - - 2,350 LBS (APPROX)
 CUBE - - - - - 40.0 CU FT (APPROX)

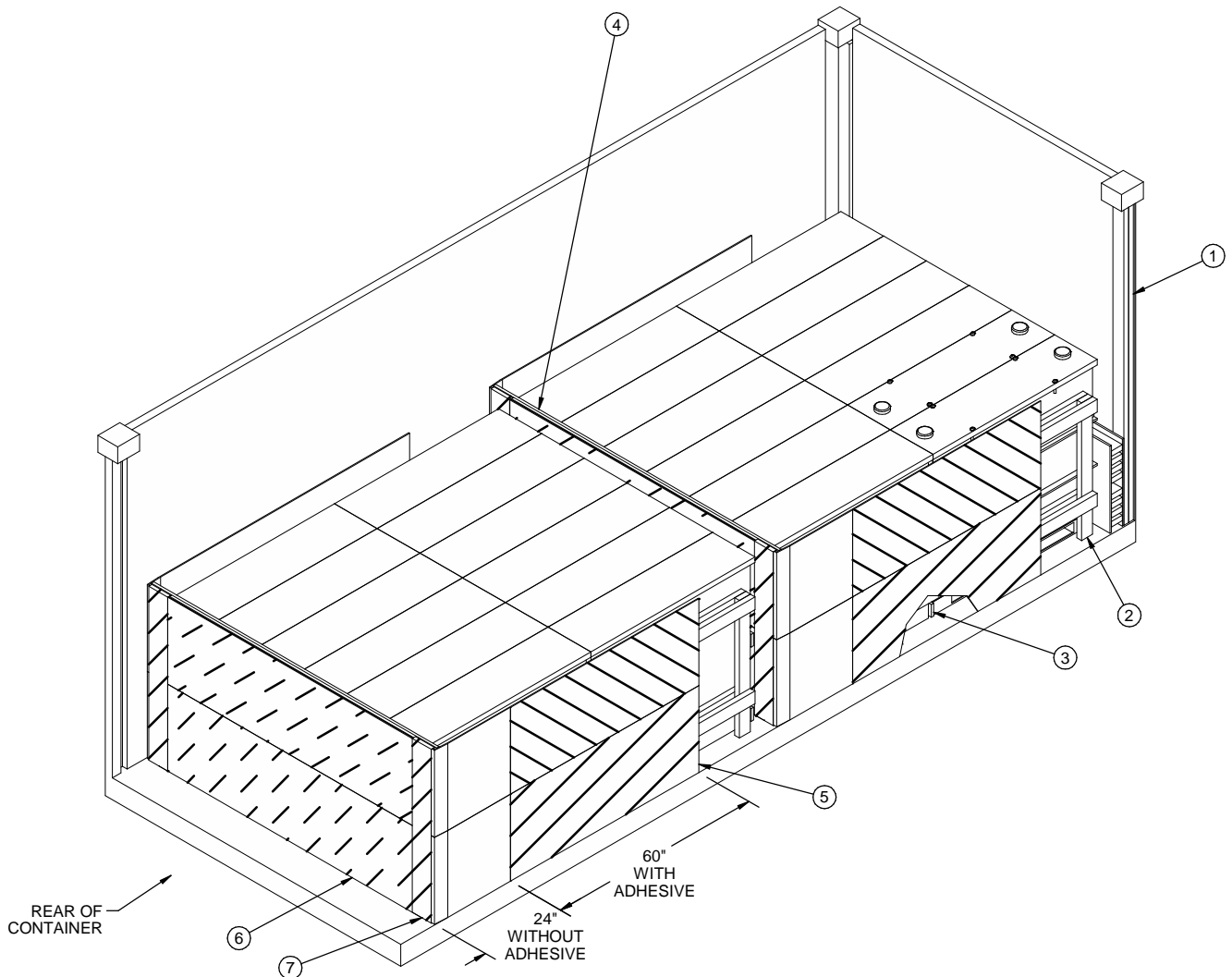


TWIN-PACK UNIT (CNU-332/E CONTAINER)

NUMBER OF CONTAINERS - - - - - TWO
 GROSS WEIGHT - - - - - 2,350 LBS (APPROX)
 CUBE - - - - - 39.5 CU FT (APPROX)

TY-GARD DS STRENGTH RATINGS		
SETS OF TY-GARD	LOAD HEIGHT MIN (INCHES)	ISO CONTAINER CONTENTS MAX (LBS)
1	18	13,200
2	36	26,400
3	54	39,600

NOTE: EACH SET CONTAINS TWO SECTIONS OF TY-GARD DS AND ONE SECTION OF TY-PATCH DS. DO NOT CUT TY-GARD DS AND TY-PATCH DS INTO WIDTHS LESS THAN THE STANDARD 24" WIDE.



ISOMETRIC VIEW

KEY NUMBERS

- ① FORWARD BLOCKING ASSEMBLY (1 REQD). SEE THE DETAIL ON PAGE 5.
- ② SIDE FILL ASSEMBLY (4 REQD). SEE THE DETAIL ON PAGE 7.
- ③ SEPARATOR ASSEMBLY (3 REQD). SEE THE DETAIL ON PAGE 5.
- ④ END GATE A (2 REQD). SEE THE DETAIL ON PAGE 6. CNU-332 CONTAINERS ARE DEPICTED IN THE LOAD ABOVE. IF LOADING CNU-309 CONTAINERS, SUBSTITUTE END GATE B, AS DEPICTED ON PAGE 6, FOR THE END GATES SHOWN ABOVE.
- ⑤ TY-GARD DS FLEXIBLE BARRIER, 24" WIDE X 12'-0" LONG (8 REQD). APPLY EACH TY-GARD PIECE IN ACCORDANCE WITH TY-GARD DS INSTALLATION INSTRUCTIONS. PRE-MARK THE CONTAINER SIDEWALL 7'-0" FROM THE EXPECTED REAR-MOST EDGE OF THE LOAD AT THE REQUIRED HEIGHT. INSTALL THE TY-GARD WITH THE 5 FOOT ADHESIVE SECTION FURTHEST FROM THE REAR OF THE LOAD, AT THE PRE-MARKED LOCATION.
- ⑥ TY-PATCH DS, 24" WIDE X 7'-0" LONG (4 REQD). APPLY EACH TY-PATCH PIECE IN ACCORDANCE WITH TY-GARD DS INSTALLATION INSTRUCTIONS, FORMING A PATCH OVER TWO PIECES OF TY-GARD MATERIAL AFTER CINCHING THEM TIGHT.
- ⑦ TY-TAPE DS, 48" LONG (4 REQD). APPLY EACH TY-TAPE PIECE IN ACCORDANCE WITH TY-GARD DS INSTALLATION INSTRUCTIONS.

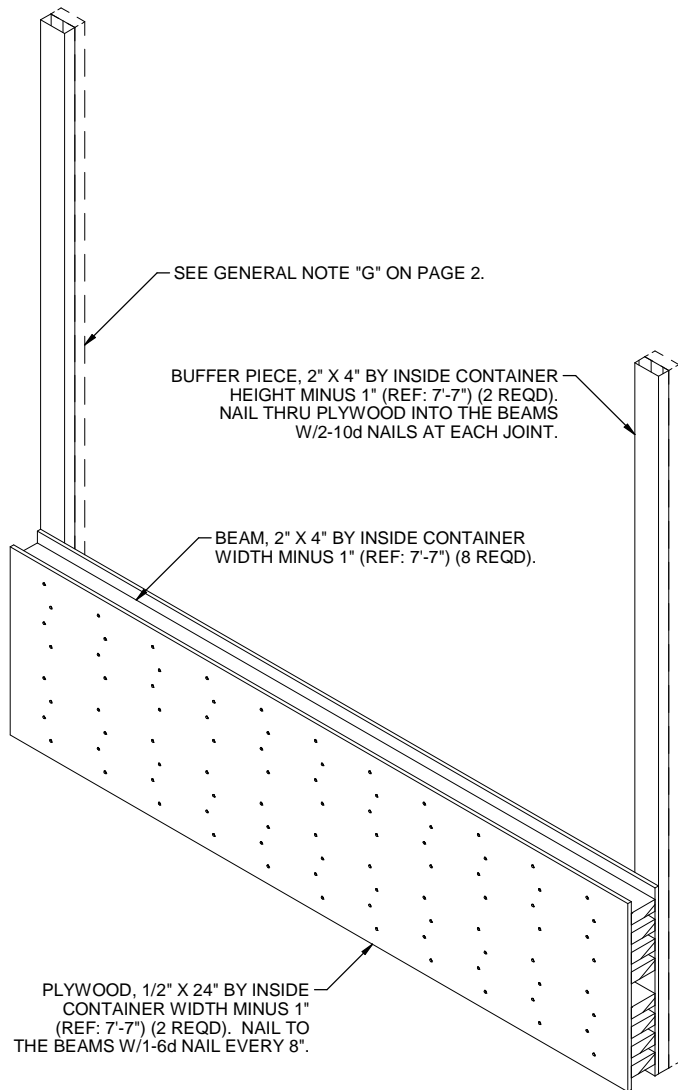
BILL OF MATERIAL

LUMBER	LINEAR FEET	BOARD FEET
1" x 4"	41	14
2" x 2"	5	2
2" x 4"	301	200
NAILS	NO. REQD	POUNDS
6d (2")	212	1-1/4
10d (3")	226	3-1/2
PLYWOOD, 1/2" -	30.33 SQ FT REQD	41.71 LBS
PLYWOOD, 3/4" -	60.67 SQ FT REQD	125.13 LBS
TY-GARD - - - - -	96.00 FT REQD	18.82 LBS
TY-PATCH - - - - -	28.00 FT REQD	6.27 LBS
TY-TAPE - - - - -	16.00 FT REQD	1.06 LBS

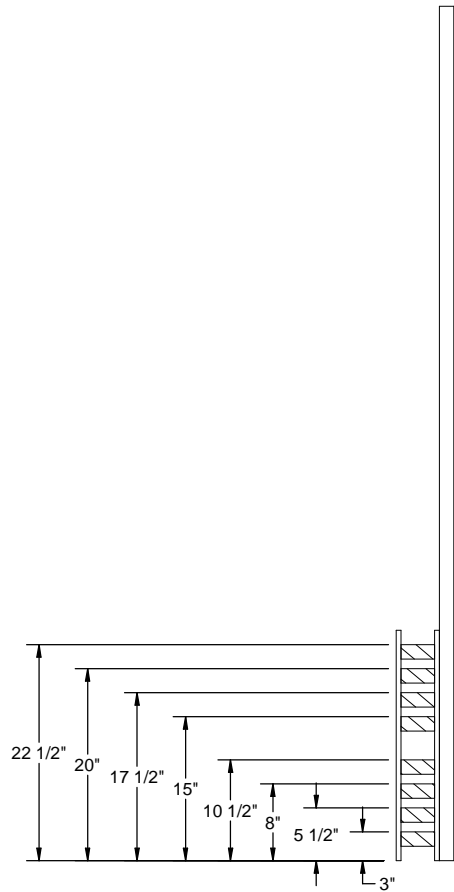
LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
CNU-332 TWIN-PACK	12	28,200 LBS
DUNNAGE		629 LBS
CONTAINER		6,050 LBS
TOTAL WEIGHT		34,879 LBS (APPROX)

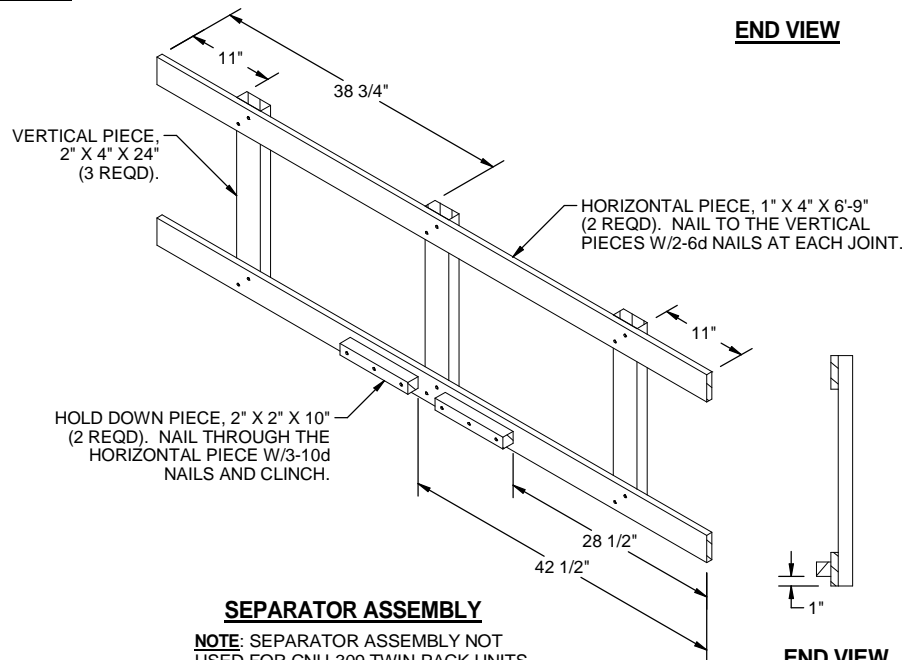
12 TWIN-PACK LOAD



FORWARD BLOCKING ASSEMBLY



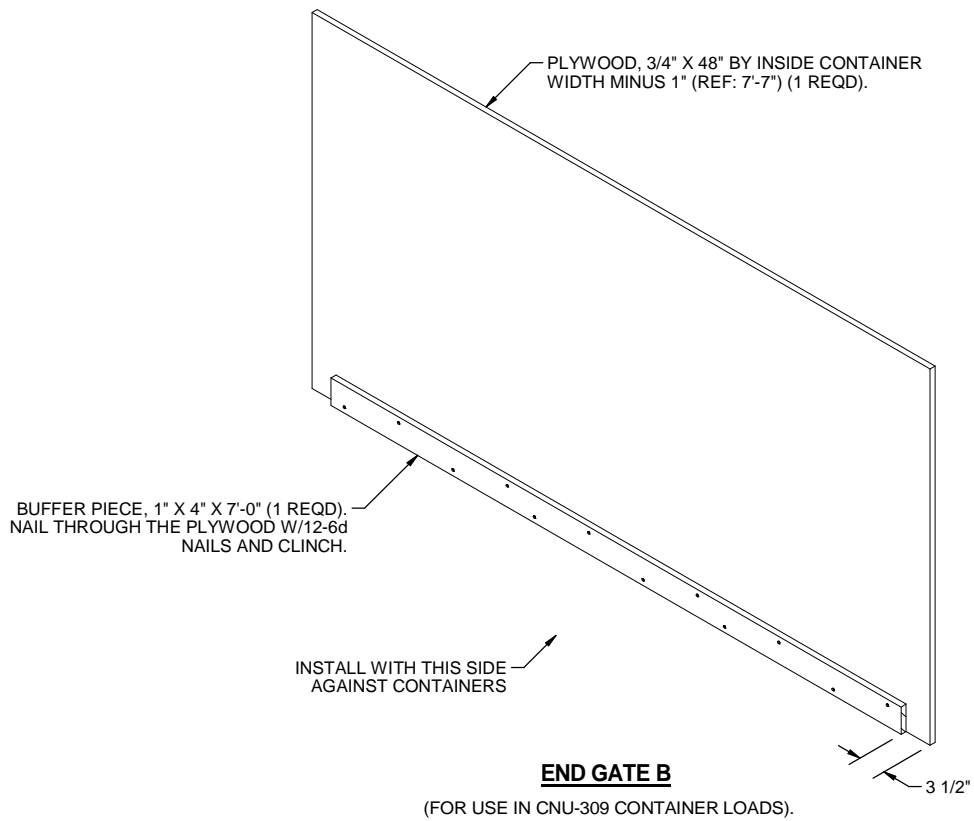
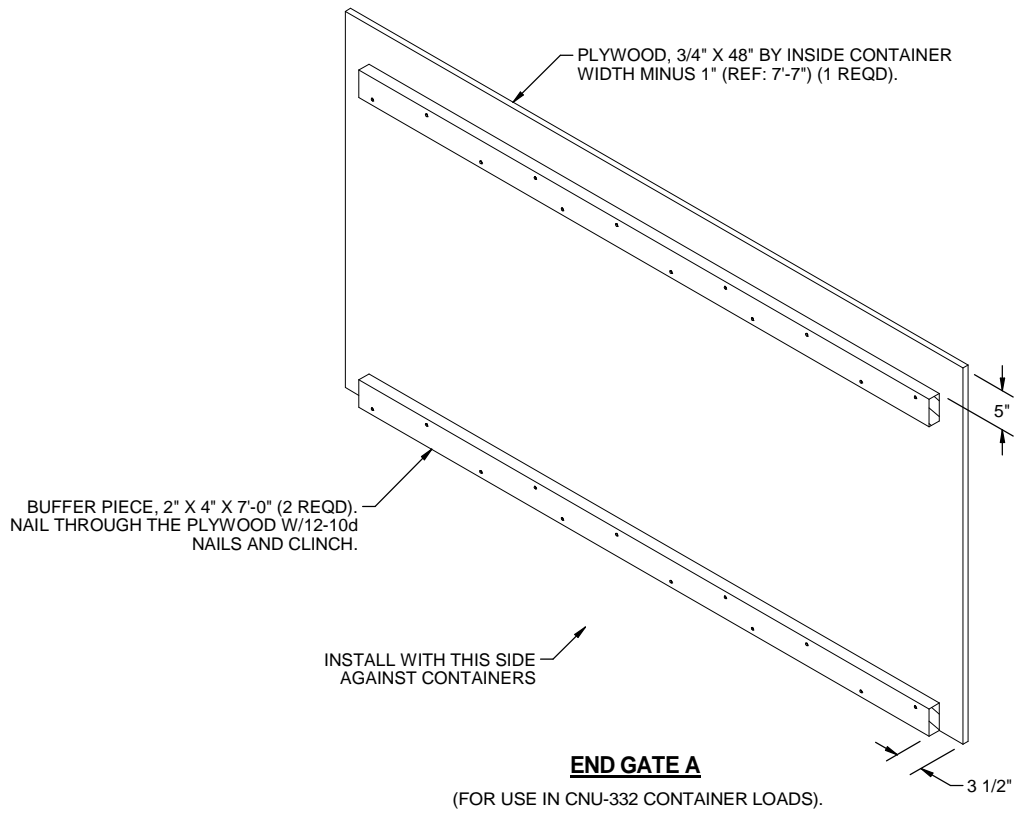
END VIEW

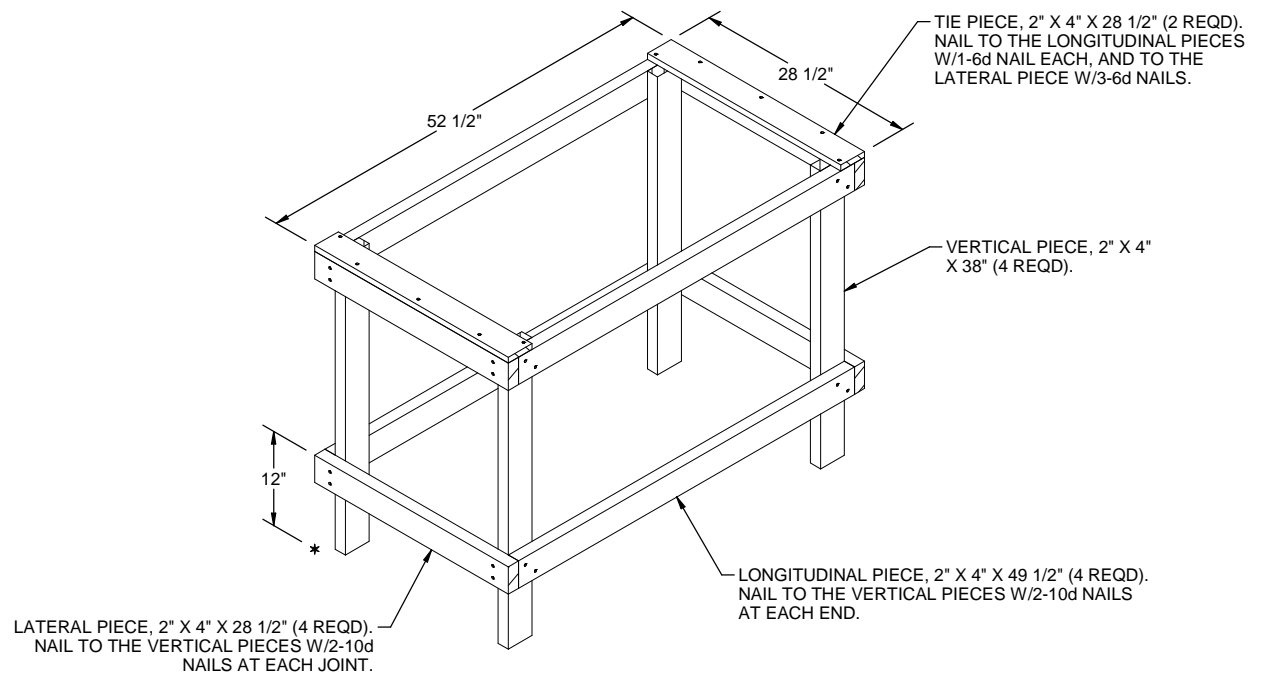
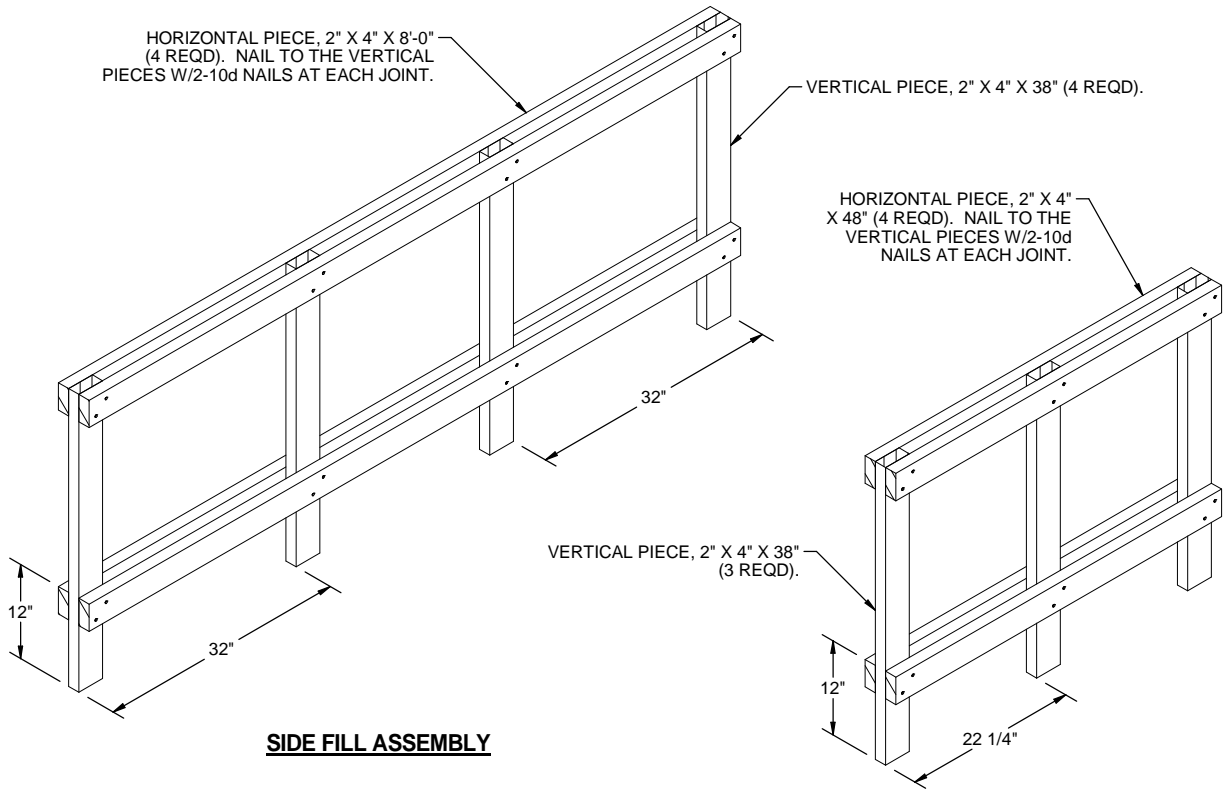


SEPARATOR ASSEMBLY

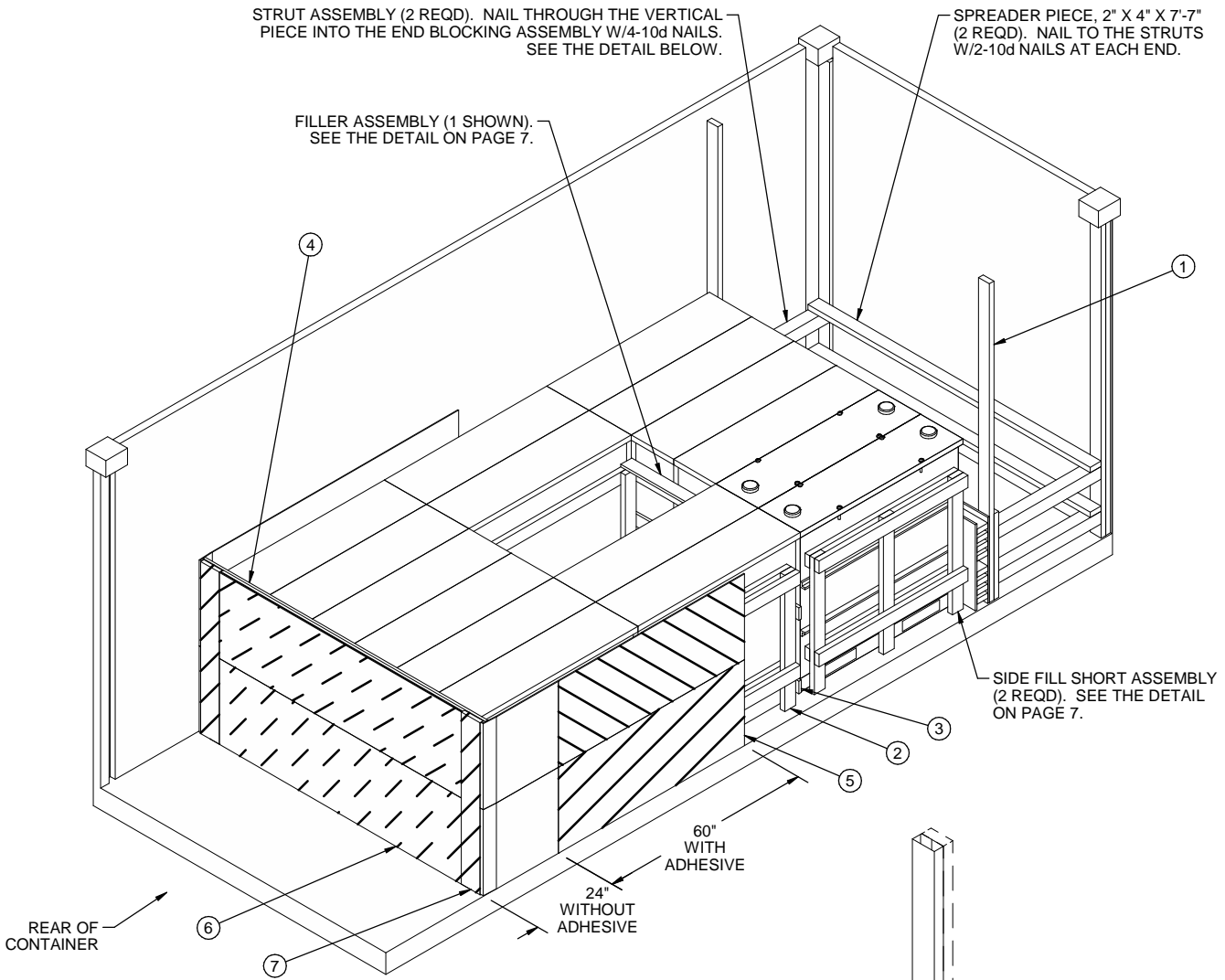
NOTE: SEPARATOR ASSEMBLY NOT USED FOR CNU-309 TWIN-PACK UNITS.

END VIEW





FILLER ASSEMBLY
(FOR MINUS ONE TWIN-PACK)



LESS-THAN-FULL-LOAD PROCEDURE

THE DETAIL ABOVE DEPICTS A BLOCKING METHOD TO BE USED IN A LESS-THAN-FULL CONTAINER LOAD (LESS THAN 12 UNITS). KEY NUMBERS REFER TO KEY NUMBERS ON PAGE 4. SEE GENERAL NOTES "H" AND "Q" ON PAGE 2.

