

THIS DRAWING CONTAINS TRADE INFORMATION DEEMED TO BE CONFIDENTIAL AND PROPRIETARY PROPERTY OF MIDDLE ATLANTIC PRODUCTS, INC. AND IS TO BE USED ONLY FOR THE PURPOSES FOR WHICH IT IS SUBMITTED AND FURTHER SHALL NOT BE COPIED IN WHOLE OR PART WITHOUT WRITTEN PERMISSION FIRST OBTAINED FROM MIDDLE ATLANTIC PRODUCTS, INC.

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 Sheet 2 ----- Installation Notes and Capacity Tables  
 Sheet 3 ----- Anchor Notes and Tables

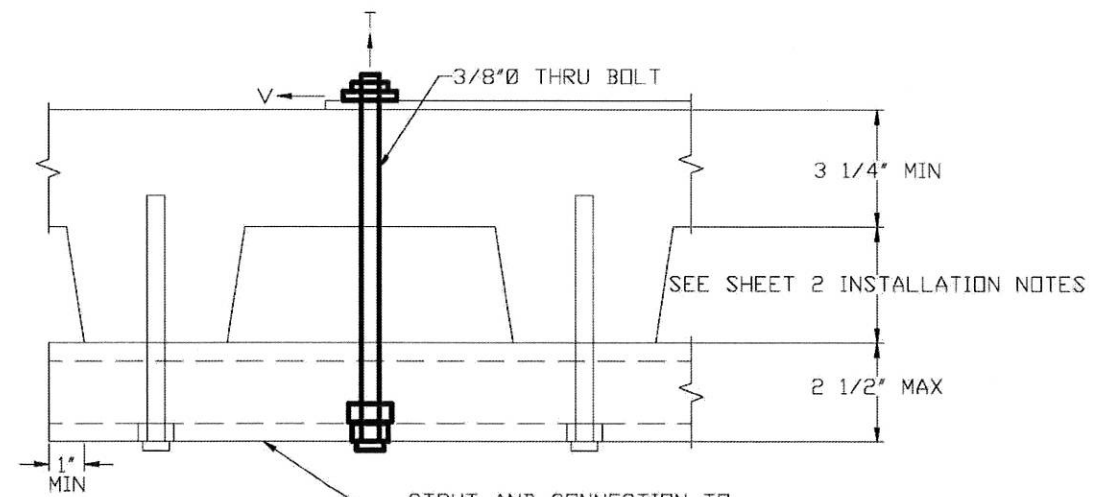
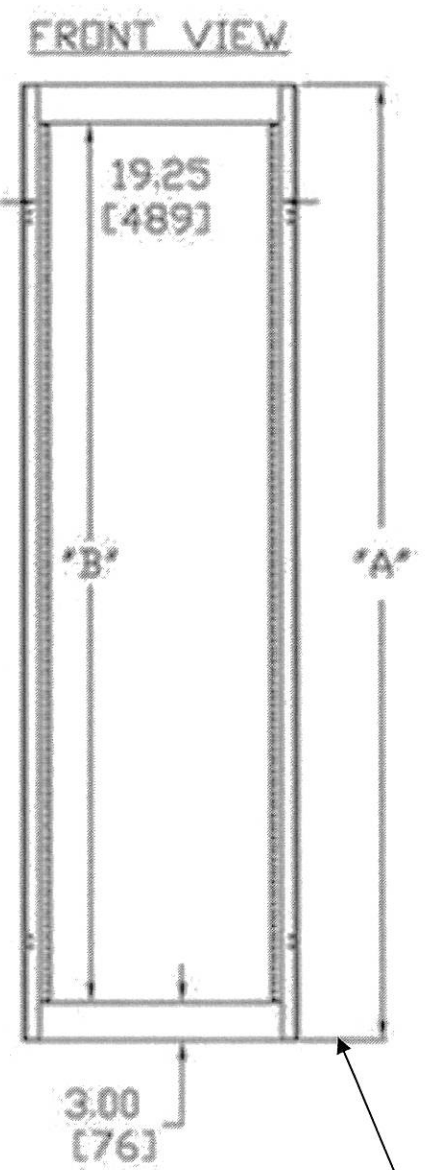
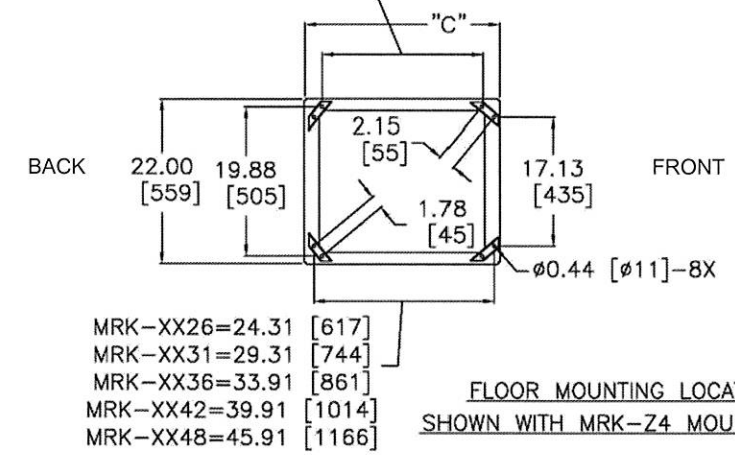
**MRK-AXS Series**  
 Sheet 4 ----- Drawing Details  
 Sheet 5 ----- Installation Notes and Capacity Tables  
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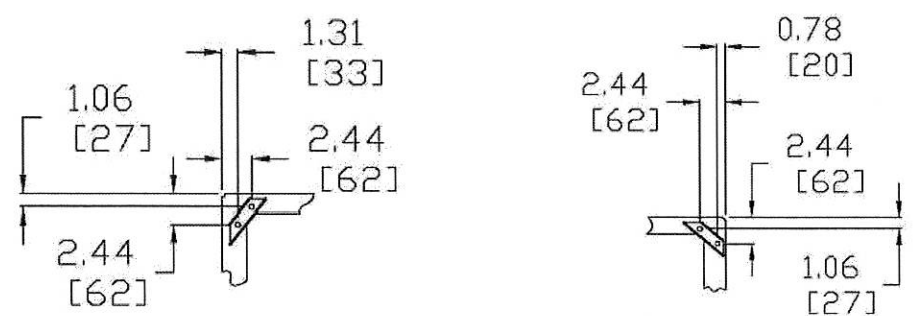
<b>OPA-2711-10</b>	REVISION:	A
	REV BY:	DL
FOR 2010 CBC	EFFECTIVE DATE:	8-29-13
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**BOTTOM VIEW**

MRK-XX26=21.52 [547]  
 MRK-XX31=26.52 [674]  
 MRK-XX36=31.12 [790]  
 MRK-XX42=37.12 [943]  
 MRK-XX48=43.12 [1095]



**- CONNECTION DETAIL -**  
**- ANCHORAGE DETAIL -**  
 BACK FRONT

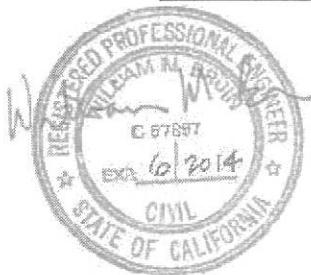


NOTE: ONE (1) ANCHOR PER CORNER BRACKET, IN EITHER MOUNTING HOLE. SEE TABLES 7 & 8 FOR PERMISSIBLE ANCHORS

PART #	"A"	"B"	"C"	PART NUMBER	RACK WEIGHT (LBS.) (EMPTY)
MRK-4826	90.13[2289]	84.13[2137]	26.40[671]	MRK-4826	166
MRK-4426	83.13[2112]	77.13[1959]	26.40[671]	MRK-4426	123
MRK-4026	76.13[1934]	70.13[1781]	26.40[671]	MRK-4026	118
MRK-3726	70.88[1800]	64.88[1648]	26.40[671]	MRK-3726	114
MRK-2426	48.13[1223]	42.13[1070]	26.40[671]	MRK-2426	82
MRK-4431	83.13[2112]	77.13[1959]	31.40[798]	MRK-4431	136
MRK-4031	76.13[1934]	70.13[1781]	31.40[798]	MRK-4031	128
MRK-3731	70.88[1800]	64.88[1648]	31.40[798]	MRK-3731	124
MRK-2431	48.13[1223]	42.13[1070]	31.40[798]	MRK-2431	88
MRK-4436	83.13[2112]	77.13[1959]	36.00[914]	MRK-4436	146
MRK-4036	76.13[1934]	70.13[1781]	36.00[914]	MRK-4036	140
MRK-4442	83.13[2112]	77.13[1959]	42.00[1067]	MRK-4442	154
MRK-4042	76.13[1934]	70.13[1781]	42.00[1067]	MRK-4042	146
MRK-4848	90.13[2289]	84.13[2137]	48.00[1219]	MRK-4848	212

NOTES:  
 1. DIMENSION FORMAT SHOWN IN [MM]  
 2. ANCHORAGE MATERIAL THICKNESS = .078 [1.98] BASE + .125[3.2] BRACKET

MATERIAL: CRS 14AWG  
 0.068 - 0.079 (1.7 - 2.0)



**APPROVED**  
 Fixed Equipment Anchorage  
 Office of Statewide Health Planning and Development

OPA-2711-10  
 Pre-approval Program Manager  
 Jeffrey Y. Kikumoto  
 (916) 440-8408

Reviewed By: *Bill Steinhilber* Date: 9/3/13

MRK SERIES ENCLOSURE

USED ON: --	APPROVALS: --	DATE: --	Middle Atlantic Products, Inc.
NEXT ASSY: --	MODELS: --	FILE: --	
MATERIAL: SEE COMPONENTS	GIRDED DIMENSIONS ARE CRITICAL. INSPECTION DIMENSIONS UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN INCHES. TOLERANCES ARE: DECIMAL: ± .015 ± .003 ± .010 ± .005 FRACTIONS: ± 1/32 ANGLES: ± 1/2		FILE: 96-039_OSHPD
FINISH: --	SCALE: 1/8" = 1"	DWG NO. NINE	PART REV: --
		DWG NO.	DWG REV: --

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**GENERAL**

1. THE WORK SHOWN ON THESE DRAWINGS IS FOR THE SEISMIC ANCHORAGE OF THE SUBJECT RACK ENCLOSURES. MAXIMUM PERMISSIBLE CONTENT CAPACITIES FOR VARIOUS HEIGHTS WITHIN THE BUILDING ARE PROVIDED.

2. ANCHORAGE DESIGN HAS BEEN DONE IN ACCORDANCE WITH THE 2010 EDITION OF THE CALIFORNIA BUILDING CODE, PART 2, VOLUME 2 OF 2, AND ASCE 7-05, USING THE FOLLOWING PARAMETERS:

$I_p = 1.5$  (ESSENTIAL FACILITY INSTALLATIONS)  
 $S_{Ds} = 1.93G$   
 $A_p = 1.0$  AND  $R_p = 1.5$  (ASCE TABLE 13.6-1)  
 $Z, H =$  VARIES

LATERAL FORCE,  $F_{P,H} = [(0.4 A_p S_{Ds} I_p W_p) / R_p] * (1 + 2 Z/H)$   
 VERTICAL FORCE,  $F_{P,V} = 0.2 S_{Ds} W_p$

**INSTALLATION NOTES**

- RACK ENCLOSURES MAY BE ANCHORED TO EITHER A LIGHT- OR NORMALWEIGHT, REINFORCED CONCRETE FLOOR OR SLAB (TABLES 1-3) OR LIGHT- OR NORMALWEIGHT CONCRETE FILL OVER METAL DECK (TABLES 4-6).
- REINFORCED CONCRETE FLOOR SLABS (OR CONCRETE FILL OVER METAL DECK) SHALL HAVE A MINIMUM THICKNESS BASED ON THE ANCHOR TYPE AS NOTED BELOW:
  - HILTI HDA-P UNDERCUT ANCHORS OF 0.75" OD (M10X100) - MINIMUM SLAB THICKNESS OF 7.1"
  - HILTI KWIK BOLT TZ EXPANSION ANCHORS OF 0.375" OD - MINIMUM SLAB THICKNESS OF 4"
  - POWERS POWER-STUD+ SD1 EXPANSION ANCHORS OF 0.375" OD - FOR FILL, MINIMUM TOPPING THICKNESS OF 3 1/4", AND MAXIMUM SOFFIT THICKNESS OF 3".
- DOCUMENTATION VERIFYING CONCRETE COMPOSITION, STRENGTH, AND THICKNESS SHALL BE SUBMITTED TO THE ENFORCEMENT AGENCY.
- INSTALLATION OF THE RACK ENCLOSURES IS LIMITED TO INTERIOR OR ENVIRONMENTALLY PROTECTED LOCATIONS.

**RACK ENCLOSURE CAPACITY TABLES**

TABLE 1: MAXIMUM PERMISSIBLE CONTENT CAPACITY (POUNDS) (1),(2) WITH HILTI HDA-P ANCHORING SYSTEM IN SOLID SLAB NORMAL- OR LIGHT-WEIGHT CONCRETE

RACK ENCLOSURE	LOCATION IN BUILDING (Z/H)			
	GROUND	1/3	2/3	ROOF
MRK-48XX	1000	1000	1000	1000
MRK-44XX	1000	1000	1000	1000
MRK-40XX	1000	1000	1000	1000
MRK-37XX	1000	1000	1000	1000
MRK-24XX	1000	1000	1000	1000

TABLE 2: MAXIMUM PERMISSIBLE CONTENT CAPACITY (POUNDS) (1),(2),(3) WITH HILTI KWIK BOLT TZ ANCHORING SYSTEM IN SOLID SLAB NORMALWEIGHT CONCRETE

RACK ENCLOSURE	LOCATION IN BUILDING (Z/H)			
	GROUND	1/3	2/3	ROOF
MRK-48XX	1000	980	640	460
MRK-44XX	1000	1000	760	550
MRK-40XX	1000	1000	840	610
MRK-37XX	1000	1000	910	660
MRK-24XX	1000	1000	1000	990

TABLE 3: MAXIMUM PERMISSIBLE CONTENT CAPACITY (POUNDS) (1),(2),(3) WITH HILTI KWIK BOLT TZ ANCHORING SYSTEM IN SOLID SLAB LIGHT-WEIGHT CONCRETE

RACK ENCLOSURE	LOCATION IN BUILDING (Z/H)			
	GROUND	1/3	2/3	ROOF
MRK-48XX	900	520	310	190
MRK-44XX	1000	640	400	280
MRK-40XX	1000	700	450	310
MRK-37XX	1000	760	490	340
MRK-24XX	1000	900	750	550

TABLE 4: MAXIMUM PERMISSIBLE CONTENT CAPACITY (POUNDS) (1),(2),(3) WITH 3/8" X 2" EMBED ANCHORS IN NORMAL-WEIGHT CONCRETE OVER METAL DECK

RACK ENCLOSURE	LOCATION IN BUILDING (Z/H)			
	GROUND	1/3	2/3	ROOF
MRK-48XX	1000	780	490	330
MRK-44XX	1000	920	600	430
MRK-40XX	1000	1000	650	470
MRK-37XX	1000	1000	700	510
MRK-24XX	1000	1000	900	750

TABLE 5: MAXIMUM PERMISSIBLE CONTENT CAPACITY (POUNDS) (1),(2),(3) WITH 3/8" X 2" EMBED ANCHORS IN LIGHT-WEIGHT CONCRETE OVER METAL DECK

RACK ENCLOSURE	LOCATION IN BUILDING (Z/H)			
	GROUND	1/3	2/3	ROOF
MRK-48XX	710	400	200	120
MRK-44XX	850	500	300	200
MRK-40XX	940	550	340	230
MRK-37XX	1000	600	380	260
MRK-24XX	1000	890	580	420

TABLE 6: MAXIMUM PERMISSIBLE CONTENT CAPACITY (POUNDS) (1),(2),(3) WITH 3/8" THRU-BOLTS WITH STRUT IN NORMAL- AND LIGHT-WEIGHT CONCRETE OVER METAL DECK

RACK ENCLOSURE	LOCATION IN BUILDING (Z/H)			
	GROUND	1/3	2/3	ROOF
MRK-48XX	1000	1000	1000	1000
MRK-44XX	1000	1000	1000	1000
MRK-40XX	1000	1000	1000	1000
MRK-37XX	1000	1000	1000	1000
MRK-24XX	1000	1000	1000	1000

TABLE (1-6) FOOTNOTES:

- INCLUDES ALL MRK SERIES RACK ENCLOSURES UP TO NOMINAL DEPTHS OF 48, 42, AND 31 INCHES, FOR HEIGHTS OF 48, 40-44, AND 24-37 RACK SPACES, RESPECTIVELY. (1 RACKSPACE = 1.75")
- ENCLOSURES SHALL BE ANCHORED WITH MRK-Z4 MOUNTING KIT.
- ENCLOSURE CONTENTS SHALL BE DISTRIBUTED WITHIN THE RACK SUCH THAT A MINIMUM OF 50% OF THE TOTAL WEIGHT IS LOCATED WITHIN THE BOTTOM THIRD OF THE RACK, 50% OF THE REMAINDER IS LOCATED IN THE MIDDLE THIRD, AND THE REMAINING WEIGHT (NOT TO EXCEED 25% OF THE TOTAL WEIGHT) IN THE TOP THIRD.
- TABLES 4 AND 5 APPLY TO EITHER HILTI KWIK BOLT TZ OR POWERS POWER-STUD+ SD1 EXPANSION ANCHORS, BOTH WITH 3/8" DIAMETER AND 2" EMBEDMENT.

CONCRETE ANCHOR NOTES

- CONCRETE ANCHORS INSTALLED IN SOLID REINFORCED CONCRETE SLABS SHALL BE ONE OF THE FOLLOWING TWO TYPES MANUFACTURED BY HILTI, INC. OF CARBON STEEL WITH DIAMETER, EMBEDMENT, AND SPACING AS SHOWN ON THE DRAWINGS AND LISTED IN TABLE 7.
  - HILTI HDA-P (PRESET CONFIGURATION) UNDERCUT ANCHORS (ICC ESR 1546)
  - HILTI KWIK BOLT TZ (KB-TZ) EXPANSION ANCHORS (ICC ESR 1917)
- CONCRETE ANCHORS INSTALLED IN THE TOP OF CONCRETE FILL OVER METAL DECK SHALL BE ONE OF THE FOLLOWING TWO TYPES BY HILTI, INC. OR POWERS FASTENERS, INC., RESPECTIVELY, WITH THE DIAMETER, EMBEDMENT, AND SPACING AS SHOWN ON THE DRAWINGS AND LISTED IN TABLE 8.
  - HILTI KWIK BOLT TZ (KB-TZ) EXPANSION ANCHORS (ICC ESR 1917)
  - POWERS POWER-STUD+ SD1 EXPANSION ANCHORS (ICC ESR 2818)
- ALTERNATIVELY, THE INCLUDED RACKS MAY BE INSTALLED IN TOP SIDE OF CONCRETE FILL OVER METAL DECK USING THE THRU-BOLT AND UNISTRUT CONNECTION AS SHOWN ON THE DRAWINGS AND LISTED IN TABLE 8.
- THE DISTANCE FROM THE ANCHOR TO THE EDGE OF CONCRETE SLAB SHALL BE GREATER THAN OR EQUAL TO THAT SPECIFIED IN TABLE 7 OR TABLE 8.

MRK SERIES ENCLOSURE



**APPROVED**  
 Fixed Equipment Anchorage  
 Office of Statewide Health Planning and Development

OPA-2711-10  
 Pre-approval Program Manager  
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*John J. Galka* 9/3/13  
 Reviewed By: [Signature] Date

USED ON	APPROVALS	DATE	
MODELED			
DRAWN			
FILED			
NEXT ASSY:	GIRDED DIMENSIONS ARE CRITICAL. INSPECTION DIMENSIONS UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN INCHES.		TITLE: 96-039_OSHPD
MATERIAL:	TOLERANCES ARE: DECIMAL ± PLC ±.03 FRACTIONS ±1/32		PART NO: 96-039_OSHPD
SEE COMPONENTS	ANGLES: #1/2		SIZE: [Blank]
FINISH	SCALE: 1/8" = 1'-0"		DWG NO: [Blank]

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5. LOCATE ALL EXISTING REINFORCING BARS WITHIN 12 INCHES OF PROPOSED ANCHOR LOCATIONS PRIOR TO DRILLING FOR CONCRETE ANCHORS. DO NOT CUT, CORE, OR DRILL THROUGH EXISTING REINFORCING BARS WITHOUT PRIOR APPROVAL FROM THE SEOR.
6. ALL CONCRETE ANCHORS SHALL BE INSTALLED WITH PROPER TOOLS AND PROCEDURES IN STRICT ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND ICC EVALUATION SERVICE REPORTS REFERENCED ABOVE.
7. TENSION TESTING OF EXPANSION ANCHORS PER 2010 CBC, 1916A.7, SHALL OCCUR 24 HOURS OR MORE AFTER INSTALLATION OF THE CONCRETE ANCHORS.
8. APPLY TENSION TEST LOADS TO THE CONCRETE ANCHORS WITHOUT REMOVING THE NUT. IF NUT REMOVAL IS REQUIRED, REMOVE THE NUT AND INSTALL A THREADED COUPLER TO THE SAME TORQUE AS THE ORIGINAL NUT USING A TORQUE WRENCH AND THEN APPLY THE TEST LOAD.
9. REACTION LOADS FROM TEST FIXTURES MAY BE APPLIED IN CLOSE PROXIMITY TO THE ANCHOR BEING TESTED PROVIDED THE ANCHOR IS NOT RESTRAINED FROM WITHDRAWING BY THE FIXTURES.
10. TEST EQUIPMENT SHALL BE CALIBRATED BY AN APPROVED TESTING LABORATORY IN ACCORDANCE WITH STANDARD RECOGNIZED PROCEDURES.
11. ONE HALF (50%) OF EACH APPLICATION OF CONCRETE ANCHORS SHALL BE TESTED IN TENSION FOR 3 MINUTES ACCORDING TO THE TEST LOADS SHOWN BELOW. ONE APPLICATION OF ANCHORS SHALL BE DEFINED AS THOSE ANCHORS INSTALLED BY A SINGLE CREW IN A SINGLE DAY. IF ANY ANCHOR FAILS, IT SHALL BE REPLACED, RE-TESTED, AND ALL ANCHORS IN THE SAME APPLICATION SHALL BE TESTED. IF ANY ANCHOR FAILS, ALL PREVIOUSLY UNTESTED ANCHORS INSTALLED BY THAT CREW SHALL BE TESTED UNTIL TWENTY (20) CONSECUTIVE ANCHORS PASS, THEN RESUME 50% TESTING.
12. TENSION TESTING OF THE CONCRETE ANCHORS SHALL BE DONE IN THE PRESENCE OF THE INSPECTOR-OF-RECORD AND A REPORT OF THE TEST RESULTS SHALL BE SUBMITTED TO THE ENFORCEMENT AGENCY.
13. THE TENSION TEST OF AN ANCHOR SHALL BE ACCEPTED IF THERE IS NO OBSERVABLE MOVEMENT DURING THE APPLICATION OF THE TEST LOAD. A PRACTICAL WAY TO DETECT OBSERVABLE MOVEMENT IS WHETHER THE WASHER UNDER THE NUT BECOMES LOOSE.

TABLE 8: CONCRETE ANCHORS FOR INSTALLATION IN TOP OF CONCRETE FILL OVER METAL DECK

ANCHOR TYPE	OUTSIDE DIAMETER (INCHES)	MINIMUM EMBEDMENT (INCHES)	MIN EDGE DISTANCE (INCHES)	TENSION TEST LOAD (LBS)
KB-TZ	3/8	2	3	2260
POWER-STUD THRU BOLT	3/8	2	3	2030
	3/8	NA	6	NA

TABLE (7 & 8) FOOTNOTES:

- \* WHEN USED IN LIGHT-WEIGHT CONCRETE, ANCHOR TEST LOADS ARE MULTIPLIED BY 0.60.
- \* TEST LOADS ARE BASED ON OSHPD 'CODE APPLICATION NOTICE' 2-1916A.8 METHOD 2; 2 TIMES THE MAXIMUM ALLOWABLE TENSION LOAD BUT NOT TO EXCEED 80% OF NOMINAL ANCHOR YIELD STRENGTH.
- \* THRU BOLT SHALL MEET REQUIREMENTS OF ASTM F1554, GRADE 36 OR STRONGER. CONNECT WITH P5500 UNISTRUT AS SHOWN.

RESPONSIBILITIES OF THE SEOR

1. THE STRUCTURAL ENGINEER-OF-RECORD (SEOR) SHALL VERIFY THAT THE WEIGHT OF RACK ENCLOSURE CONTENTS DOES NOT EXCEED THE APPROVED CAPACITY FOR THE LOCATION OF INSTALLATION.
2. THE SEOR SHALL VERIFY THAT THE EXISTING STRUCTURE IS ADEQUATE TO SUPPORT THE LOADS AND REACTIONS IMPOSED BY THE ANCHORED RACK ENCLOSURE IN ADDITION TO ALL OTHER LOADS AND FORCES
  - MAXIMUM SHEAR PER ANCHOR: 366 POUNDS
  - MAXIMUM TENSION PER ANCHOR: 1739 POUNDS
3. FOR STRUT CONNECTIONS, SEOR SHALL DESIGN STRUT AND CONNECTION TO BOTTOM OF FLUTE. EACH FLUTE ANCHOR MUST BE ABLE TO RESIST A SHEAR LOAD OF 0.4 TIMES MAXIMUM SHEAR (ABOVE) TIMES THE NUMBER OF THRU BOLTS ENGAGED BY THE STRUT.
4. THE SEOR SHALL DETERMINE THE FOLLOWING:
  - A. THE MODEL NUMBER OF THE UNIT TO BE USED.
  - B. THE ELEVATION OF THE ROOF, H.
  - C. THE ELEVATION OF THE FLOOR WHERE THE UNIT WILL BE INSTALLED ON, Z.

5. THE SEOR SHALL THEN DETERMINE THE RATIO OF Z/H AND CONSULT THE APPLICABLE TABLE TO DETERMINE THE MAXIMUM WEIGHT OF THE CONTENTS THAT CAN BE STORED ON THE RACK.
6. SEOR SHALL VERIFY THAT A PLACARD IS PLACED ON THE RACK STATING THE FOLLOWING:
  - A. UNIT MODEL NUMBER.
  - B. NAME OF THE BUILDING IN WHICH IT WILL BE INSTALLED.
  - C. HIGHEST FLOOR WHERE IT CAN BE USED.
  - D. MAXIMUM TOTAL WEIGHT OF THE CONTENTS THAT CAN BE STORED ON THE RACK.
  - E. MAXIMUM WEIGHT THAT CAN BE STORED ON EACH SHELF AND CORRESPONDING HEIGHT OF EACH SHELF, BASED ON THE WEIGHT DISTRIBUTION SPECIFIED IN THIS OPA, (SEE TABLE FOOTNOTE 3, SHEET 2)
7. SEOR SHALL VERIFY THAT THE CONCRETE FLOOR MEETS THE REQUIREMENTS OF THIS PRE-APPROVAL.
8. VERIFY THAT THE CONCRETE SLAB TO WHICH THE EQUIPMENT IS ANCHORED MEETS ALL REQUIREMENTS OF THE APPLICABLE ICC ESR.
9. VERIFY THAT THE ANCHORS ARE AN ADEQUATE DISTANCE FROM ANY SLAB EDGES OR OPENINGS.
10. VERIFY THAT ALL NEW OR EXISTING ANCHORS ARE AN ADEQUATE DISTANCE FROM THE ANCHORS SHOWN IN THIS PRE-APPROVAL. VERIFY THAT THERE IS NO ADVERSE INTERACTION WHERE OTHER ANCHORS ARE WITHIN 18" OR 6HEF FROM THIS UNIT'S ANCHORS.
11. VERIFY THAT THE INSTALLATION IS IN CONFORMANCE WITH THE 2010 CBC AND THE DETAILS SHOWN IN THIS PRE-APPROVAL.
12. VERIFY THAT THE MATERIAL AND GAGE OF THE UNITS WHERE ATTACHMENTS ARE MADE AGREE WITH THE INFORMATION SHOWN ON THE PRE-APPROVAL DOCUMENTS.

TABLE 7: CONCRETE ANCHORS AND TEST LOADS FOR NORMAL-WEIGHT CONCRETE

ANCHOR TYPE	OUTSIDE DIAMETER (INCHES)	MINIMUM EMBEDMENT (INCHES)	MIN EDGE DISTANCE (INCHES)	TENSION TEST LOAD (LBS)
HDA-P	3/4 (M10)	4	6	8960
KB-TZ	3/8	2	4.375	4800



MRK SERIES ENCLOSURE

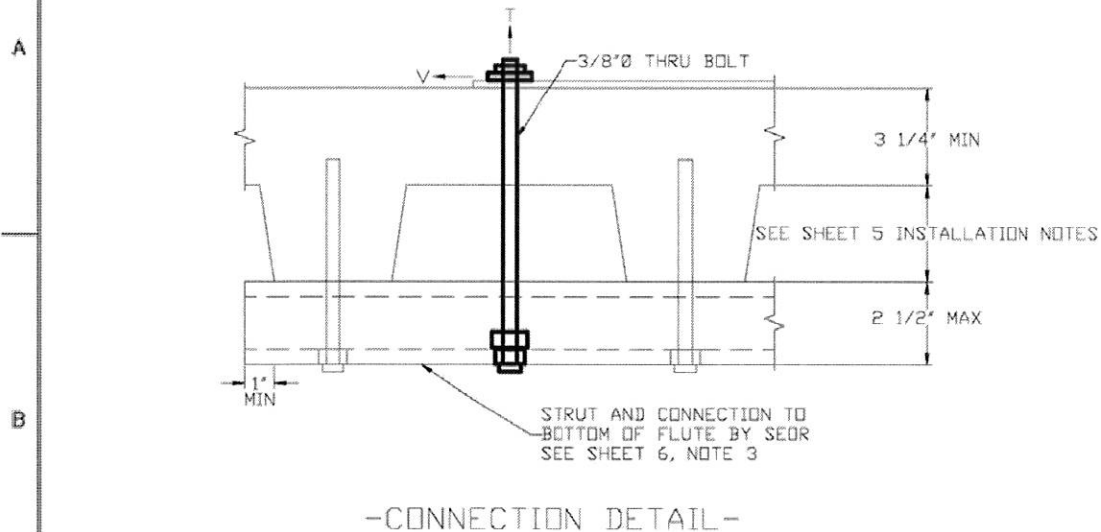
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MODELED			
NEXT ASST	DRAWN		TITLE: 96-039_OSHPD
MATERIAL- SEE COMPONENTS	DIMENSIONS ARE CRITICAL. INSPECTION DIMENSIONS. UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN INCHES. TOLERANCES ARE: DECIMAL ± .03 FRACTIONS ± .002 ANGLES ± .02		PART NO. 96-039_OSHPD
FINISH	SCALE = 1/8"		PART REV. NONE
			DWG NO.

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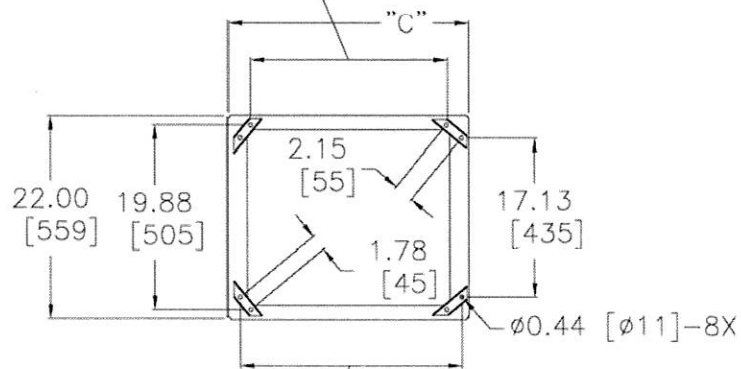
PART NUMBER	RACK WEIGHT (LBS.) (EMPTY)
MRK-4426AXS-Z4	165
MRK-4026AXS-Z4	161
MRK-3726AXS-Z4	155



- CONNECTION DETAIL -

BOTTOM VIEW

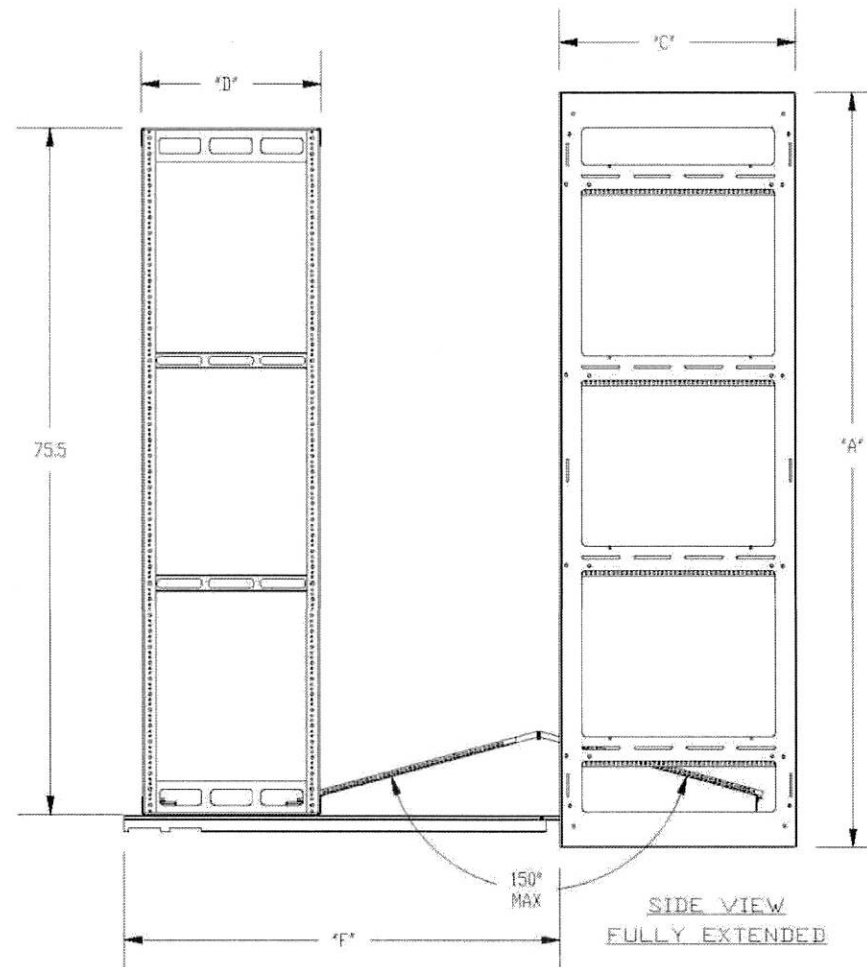
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- MRK-XX31=26.52 [674]
- MRK-XX36=31.12 [790]
- MRK-XX42=37.12 [943]



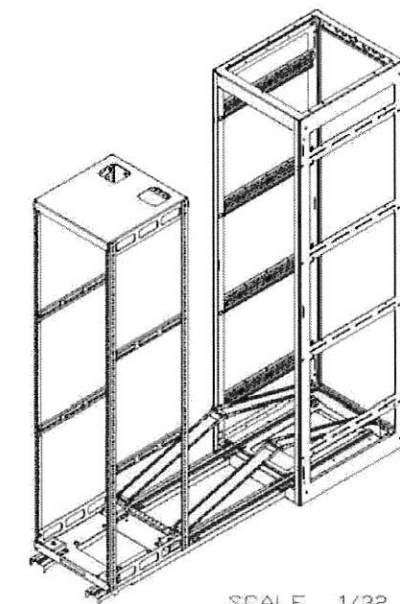
- MRK-XX26=24.31 [617]
- MRK-XX31=29.31 [744]
- MRK-XX36=33.91 [861]
- MRK-XX42=39.91 [1014]

FLOOR MOUNTING LOCATIONS  
SHOWN WITH MRK-Z4 MOUNTING KIT

SEE PAGE 1 FOR ANCHORAGE DETAIL



SIDE VIEW FULLY EXTENDED



SCALE 1/32

ISOMETRIC VIEW OF MRK-AXS SYSTEM IN LOADING CONFIGURATION

MODEL NO	USEABLE RACKING HEIGHT	HOST CABINET OVERALL HEIGHT "A"	HOST CABINET OVERALL DEPTH "C"	FRAME DEPTH "D"	FRAME ROLL OUT "F"
MRK-4426AXS-Z4	41	83.125 [2111]	26.4 [671]	20 [508]	47.5 [1207] TO 48.5 [1232]
MRK-4026AXS-Z4	37	76.125 [1934]	26.4 [671]	20 [508]	47.5 [1207] TO 48.5 [1232]
MRK-3726AXS-Z4	34	70.875 [1800]	26.4 [671]	20 [508]	47.5 [1207] TO 48.5 [1232]

\* SIDE PANELS ADD .625 [15.9] TO EACH SIDE WHERE APPLICABLE  
\*\* MINIMUM RAIL SETBACK SHOWN. MAXIMUM RAIL SETBACK IS 2.5 [64]

NOTE: DIMENSION FORMAT SHOWN IN [MM]  
SEE PAGE 5 FOR ALL APPLICABLE OSHPD NOTES



**APPROVED**  
Fixed Equipment Anchorage  
Office of Statewide Health Planning and Development

OPA-2711-10  
Pre-approval Program Manager  
Jeffrey Y. Kikumoto  
(916) 440-8408

*Bill Stahl* 9/3/13  
Reviewed By: Bill Stahl Date

USED BY:	APPROVALS:	DATE:	MRK SERIES ENCLOSURE	
---	MODELED:		Middle Atlantic Products, Inc.	
---	DRAWN:			
NEXT ASSY:	CIRCLED DIMENSIONS ARE CRITICAL. INSPECTION DIMENSIONS UNLESS OTHERWISE SPECIFIED. ALL DIMENSIONS ARE IN INCHES.		TITLE:	
MATERIAL:	TOLERANCES ARE: DECIMAL: 0.010 FRACTIONS: 1/32 ANGLES: 30°		96-039_OSHPD	
FINISH:	SCALE: 1/32		PART NO:	96-039_OSHPD
---			SIZE:	DWF NO. N/A
---			DWG NO.:	DWG REV.:

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GENERAL

1. THE WORK SHOWN ON THESE DRAWINGS IS FOR THE SEISMIC ANCHORAGE OF THE SUBJECT RACK ENCLOSURES. MAXIMUM CONTENT CAPACITIES FOR VARIOUS HEIGHTS WITHIN THE BUILDING ARE PROVIDED.

2. ANCHORAGE DESIGN HAS BEEN DONE IN ACCORDANCE WITH THE 2010 EDITION OF THE CALIFORNIA BUILDING CODE, PART 2, VOLUME 2 OF 2, AND ASCE 7-05, USING THE FOLLOWING PARAMETERS:

$I_p = 1.5$  (ESSENTIAL FACILITY INSTALLATIONS)  
 $S_{DS} = 1.93G$   
 $A_p = 1.0$  AND  $R_p = 1.5$  (ASCE TABLE 13.6-1)  
 Z, H = VARIES

LATERAL FORCE,  $F_{P,H} = [(0.4 A_p S_{DS} I_p W_p) / R_p] * (1 + 2 Z/H)$   
 VERTICAL FORCE,  $F_{P,V} = 0.2 S_{DS} W_p$

INSTALLATION NOTES

1. RACK ENCLOSURES MAY BE ANCHORED TO EITHER A LIGHT- OR NORMALWEIGHT, REINFORCED CONCRETE FLOOR OR SLAB (TABLES 1-3) OR LIGHT- OR NORMALWEIGHT CONCRETE FILL OVER METAL DECK (TABLES 4-6).

2. REINFORCED CONCRETE FLOOR SLABS (OR CONCRETE FILL OVER METAL DECK) SHALL HAVE A MINIMUM THICKNESS BASED ON THE ANCHOR TYPE AS NOTED BELOW:

- HILTI HDA-P UNDERCUT ANCHORS OF 0.75" OD (M10X100) - MINIMUM SLAB THICKNESS OF 7.1"
- HILTI KWIK BOLT TZ EXPANSION ANCHORS OF 0.375" OD - MINIMUM SLAB THICKNESS OF 4"
- POWERS POWER-STUD+ SD1 EXPANSION ANCHORS OF 0.375" OD - FOR FILL, MINIMUM TOPPING THICKNESS OF 3 1/4", AND MAXIMUM SOFFIT THICKNESS OF 3".

3. DOCUMENTATION VERIFYING CONCRETE COMPOSITION, STRENGTH, AND THICKNESS SHALL BE SUBMITTED TO THE ENFORCEMENT AGENCY.

4. INSTALLATION OF THE RACK ENCLOSURES IS LIMITED TO INTERIOR OR ENVIRONMENTALLY PROTECTED LOCATIONS.

RACK ENCLOSURE CAPACITY TABLES

TABLE 1: MAXIMUM PERMISSIBLE CONTENT CAPACITY (POUNDS) (1),(2) WITH HILTI HDA-P ANCHORING SYSTEM IN SOLID SLAB NORMAL- OR LIGHT-WEIGHT CONCRETE

RACK ENCLOSURE	LOCATION IN BUILDING (Z/H)			
	GROUND	1/3	2/3	ROOF
MRK-4426AXS-Z4	500	500	500	500
MRK-4026AXS-Z4	500	500	500	500
MRK-3726AXS-Z4	500	500	500	500

TABLE 2: MAXIMUM PERMISSIBLE CONTENT CAPACITY (POUNDS) (1),(2),(3) WITH HILTI KWIK BOLT TZ ANCHORING SYSTEM IN SOLID SLAB NORMALWEIGHT CONCRETE

RACK ENCLOSURE	LOCATION IN BUILDING (Z/H)			
	GROUND	1/3	2/3	ROOF
MRK-4426AXS-Z4	500	500	500	500
MRK-4026AXS-Z4	500	500	500	500
MRK-3726AXS-Z4	500	500	500	500

TABLE 3: MAXIMUM PERMISSIBLE CONTENT CAPACITY (POUNDS) (1),(2),(3) WITH HILTI KWIK BOLT TZ ANCHORING SYSTEM IN SOLID SLAB LIGHT-WEIGHT CONCRETE

RACK ENCLOSURE	LOCATION IN BUILDING (Z/H)			
	GROUND	1/3	2/3	ROOF
MRK-4426AXS-Z4	500	500	360	240
MRK-4026AXS-Z4	500	500	410	270
MRK-3726AXS-Z4	500	500	460	310

TABLE 4: MAXIMUM PERMISSIBLE CONTENT CAPACITY (POUNDS) (1),(2),(3) WITH 3/8" X 2" EMBED ANCHORS IN NORMAL-WEIGHT CONCRETE OVER METAL DECK

RACK ENCLOSURE	LOCATION IN BUILDING (Z/H)			
	GROUND	1/3	2/3	ROOF
MRK-4426AXS-Z4	500	500	500	380
MRK-4026AXS-Z4	500	500	500	430
MRK-3726AXS-Z4	500	500	500	470

TABLE 5: MAXIMUM PERMISSIBLE CONTENT CAPACITY (POUNDS) (1),(2),(3) WITH 3/8" X 2" EMBED ANCHORS IN LIGHT-WEIGHT CONCRETE OVER METAL DECK

RACK ENCLOSURE	LOCATION IN BUILDING (Z/H)			
	GROUND	1/3	2/3	ROOF
MRK-4426AXS-Z4	500	460	270	160
MRK-4026AXS-Z4	500	500	300	190
MRK-3726AXS-Z4	500	500	340	220

TABLE 6: MAXIMUM PERMISSIBLE CONTENT CAPACITY (POUNDS) (1),(2),(3) WITH 3/8" THRU-BOLTS WITH STRUT IN NORMAL- AND LIGHT-WEIGHT CONCRETE OVER METAL DECK

RACK ENCLOSURE	LOCATION IN BUILDING (Z/H)			
	GROUND	1/3	2/3	ROOF
MRK-4426AXS-Z4	500	500	500	500
MRK-4026AXS-Z4	500	500	500	500
MRK-3726AXS-Z4	500	500	500	500

TABLE (1-6) FOOTNOTES:

- ENCLOSURES SHALL BE ANCHORED WITH MRK-Z4 MOUNTING KIT.
- ENCLOSURE CONTENTS SHALL BE DISTRIBUTED WITHIN THE RACK SUCH THAT A MINIMUM OF 50% OF THE TOTAL WEIGHT IS LOCATED WITHIN THE BOTTOM THIRD OF THE RACK, 50% OF THE REMAINDER IS LOCATED IN THE MIDDLE THIRD, AND THE REMAINING WEIGHT (NOT TO EXCEED 25% OF THE TOTAL WEIGHT) IN THE TOP THIRD.
- TABLES 4 AND 5 APPLY TO EITHER HILTI KWIK BOLT TZ OR POWERS POWER-STUD+ SD1 EXPANSION ANCHORS, BOTH WITH 3/8" DIAMETER AND 2" EMBEDMENT.

CONCRETE ANCHOR NOTES

- CONCRETE ANCHORS INSTALLED IN SOLID REINFORCED CONCRETE SLABS SHALL BE ONE OF THE FOLLOWING TWO TYPES MANUFACTURED BY HILTI, INC. OF CARBON STEEL WITH DIAMETER, EMBEDMENT, AND SPACING AS SHOWN ON THE DRAWINGS AND LISTED IN TABLE 7.
  - HILTI HDA-P (PRESET CONFIGURATION) UNDERCUT ANCHORS (ICC ESR 1546)
  - HILTI KWIK BOLT TZ (KB-TZ) EXPANSION ANCHORS (ICC ESR 1917)
- CONCRETE ANCHORS INSTALLED IN THE TOP OF CONCRETE FILL OVER METAL DECK SHALL BE ONE OF THE FOLLOWING TWO TYPES BY HILTI, INC. OR POWERS FASTENERS, INC., RESPECTIVELY, WITH THE DIAMETER, EMBEDMENT, AND SPACING AS SHOWN ON THE DRAWINGS AND LISTED IN TABLE 8.
  - HILTI KWIK BOLT TZ (KB-TZ) EXPANSION ANCHORS (ICC ESR 1917)
  - POWERS POWER-STUD+ SD1 EXPANSION ANCHORS (ICC ESR 2818)
- ALTERNATIVELY, THE INCLUDED RACKS MAY BE INSTALLED IN TOP SIDE OF CONCRETE FILL OVER METAL DECK USING THE THRU-BOLT AND UNISTRUT CONNECTION AS SHOWN ON THE DRAWINGS AND LISTED IN TABLE 8.
- THE DISTANCE FROM THE ANCHOR TO THE EDGE OF CONCRETE SLAB SHALL BE GREATER THAN OR EQUAL TO THAT SPECIFIED IN TABLE 7 OR TABLE 8.

MRK SERIES ENCLOSURE

DESIGNED BY	APPROVALS	DATE	
MODELED			
DRAWN			
FILE			
NEXT ASBY	GIRGLED DIMENSIONS ARE CRITICAL. INSPECTION DIMENSIONS UNLESS OTHERWISE SPECIFIED. ALL DIMENSIONS ARE IN INCHES. TOLERANCES ARE: DECIMAL ± PLC ±.03 3 PLC ±.010 FRACTIONS ±.010 ANGLES: ±.01		TITLE: 96-039_OSHPD PART NO: 96-039_OSHPD SIZE: 11x17 DWG NO: NINE DWG REV:
MATERIAL- SEE COMPONENTS			
FINISH			
SCALE = 1/8"			



**APPROVED**  
 Fixed Equipment Anchorage  
 Office of Statewide Health Planning and Development

OPA-2711-10  
 Pre-approval Program Manager  
 Jeffrey Y. Kikumoto  
 (916) 440-8408

Reviewed By: Bill Staehlin  
 Date: 9/3/13

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- LOCATE ALL EXISTING REINFORCING BARS WITHIN 12 INCHES OF PROPOSED ANCHOR LOCATIONS PRIOR TO DRILLING FOR CONCRETE ANCHORS. DO NOT CUT, CORE, OR DRILL THROUGH EXISTING REINFORCING BARS WITHOUT PRIOR APPROVAL FROM THE SEOR.
- ALL CONCRETE ANCHORS SHALL BE INSTALLED WITH PROPER TOOLS AND PROCEDURES IN STRICT ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND ICC EVALUATION SERVICE REPORTS REFERENCED ABOVE.
- TENSION TESTING OF EXPANSION ANCHORS PER 2010 CBC, 1916A.7, SHALL OCCUR 24 HOURS OR MORE AFTER INSTALLATION OF THE CONCRETE ANCHORS.
- APPLY TENSION TEST LOADS TO THE CONCRETE ANCHORS WITHOUT REMOVING THE NUT. IF NUT REMOVAL IS REQUIRED, REMOVE THE NUT AND INSTALL A THREADED COUPLER TO THE SAME TORQUE AS THE ORIGINAL NUT USING A TORQUE WRENCH AND THEN APPLY THE TEST LOAD.
- REACTION LOADS FROM TEST FIXTURES MAY BE APPLIED IN CLOSE PROXIMITY TO THE ANCHOR BEING TESTED PROVIDED THE ANCHOR IS NOT RESTRAINED FROM WITHDRAWING BY THE FIXTURES.
- TEST EQUIPMENT SHALL BE CALIBRATED BY AN APPROVED TESTING LABORATORY IN ACCORDANCE WITH STANDARD RECOGNIZED PROCEDURES.
- ONE HALF (50%) OF EACH APPLICATION OF CONCRETE ANCHORS SHALL BE TESTED IN TENSION FOR 3 MINUTES ACCORDING TO THE TEST LOADS SHOWN BELOW. ONE APPLICATION OF ANCHORS SHALL BE DEFINED AS THOSE ANCHORS INSTALLED BY A SINGLE CREW IN A SINGLE DAY. IF ANY ANCHOR FAILS, IT SHALL BE REPLACED, RE-TESTED, AND ALL ANCHORS IN THE SAME APPLICATION SHALL BE TESTED. IF ANY ANCHOR FAILS, ALL PREVIOUSLY UNTESTED ANCHORS INSTALLED BY THAT CREW SHALL BE TESTED UNTIL TWENTY (20) CONSECUTIVE ANCHORS PASS, THEN RESUME 50% TESTING.
- TENSION TESTING OF THE CONCRETE ANCHORS SHALL BE DONE IN THE PRESENCE OF THE INSPECTOR-OF-RECORD AND A REPORT OF THE TEST RESULTS SHALL BE SUBMITTED TO THE ENFORCEMENT AGENCY.
- THE TENSION TEST OF AN ANCHOR SHALL BE ACCEPTED IF THERE IS NO OBSERVABLE MOVEMENT DURING THE APPLICATION OF THE TEST LOAD. A PRACTICAL WAY TO DETECT OBSERVABLE MOVEMENT IS WHETHER THE WASHER UNDER THE NUT BECOMES LOOSE.

TABLE 8: CONCRETE ANCHORS FOR INSTALLATION IN TOP OF CONCRETE FILL OVER METAL DECK

ANCHOR TYPE	OUTSIDE DIAMETER (INCHES)	MINIMUM EMBEDMENT (INCHES)	MIN EDGE DISTANCE (INCHES)	TENSION TEST LOAD (LBS)
KB-TZ	3/8	2	3	2260
POWER-STUD	3/8	2	3	2030
THRU BOLT	3/8	NA	6	NA

- THE SEOR SHALL THEN DETERMINE THE RATIO OF Z/H AND CONSULT THE APPLICABLE TABLE TO DETERMINE THE MAXIMUM WEIGHT OF THE CONTENTS THAT CAN BE STORED ON THE RACK.
- SEOR SHALL VERIFY THAT A PLACARD IS PLACED ON THE RACK STATING THE FOLLOWING:
  - UNIT MODEL NUMBER.
  - NAME OF THE BUILDING IN WHICH IT WILL BE INSTALLED.
  - HIGHEST FLOOR WHERE IT CAN BE USED.
  - MAXIMUM TOTAL WEIGHT OF THE CONTENTS THAT CAN BE STORED ON THE RACK.
  - MAXIMUM WEIGHT THAT CAN BE STORED ON EACH SHELF AND CORRESPONDING HEIGHT OF EACH SHELF, BASED ON THE WEIGHT DISTRIBUTION SPECIFIED IN THIS OPA, (SEE TABLE FOOTNOTE 2, SHEET 5)
- SEOR SHALL VERIFY THAT THE CONCRETE FLOOR MEETS THE REQUIREMENTS OF THIS PRE-APPROVAL.
- VERIFY THAT THE CONCRETE SLAB TO WHICH THE EQUIPMENT IS ANCHORED MEETS ALL REQUIREMENTS OF THE APPLICABLE ICC ESR.
- VERIFY THAT THE ANCHORS ARE AN ADEQUATE DISTANCE FROM ANY SLAB EDGES OR OPENINGS.
- VERIFY THAT ALL NEW OR EXISTING ANCHORS ARE AN ADEQUATE DISTANCE FROM THE ANCHORS SHOWN IN THIS PRE-APPROVAL. VERIFY THAT THERE IS NO ADVERSE INTERACTION WHERE OTHER ANCHORS ARE WITHIN 18" OR 6HEF FROM THIS UNIT'S ANCHORS.
- VERIFY THAT THE INSTALLATION IS IN CONFORMANCE WITH THE 2010 CBC AND THE DETAILS SHOWN IN THIS PRE-APPROVAL.
- VERIFY THAT THE MATERIAL AND GAGE OF THE UNITS WHERE ATTACHMENTS ARE MADE AGREE WITH THE INFORMATION SHOWN ON THE PRE-APPROVAL DOCUMENTS.

TABLE (7 & 8) FOOTNOTES:

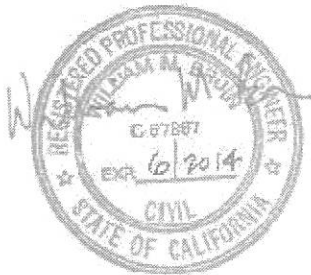
- \* WHEN USED IN LIGHT-WEIGHT CONCRETE, ANCHOR TEST LOADS ARE MULTIPLIED BY 0.60.
- \* TEST LOADS ARE BASED ON OSHPD 'CODE APPLICATION NOTICE' 2-1916A.8 METHOD 2; 2 TIMES THE MAXIMUM ALLOWABLE TENSION LOAD BUT NOT TO EXCEED 80% OF NOMINAL ANCHOR YIELD STRENGTH.
- \* THRU BOLT SHALL MEET REQUIREMENTS OF ASTM F1554, GRADE 36 OR STRONGER. CONNECT WITH P5500 UNISTRUT AS SHOWN.

RESPONSIBILITIES OF THE SEOR

- THE STRUCTURAL ENGINEER-OF-RECORD (SEOR) SHALL VERIFY THAT THE WEIGHT OF RACK ENCLOSURE CONTENTS DOES NOT EXCEED THE APPROVED CAPACITY FOR THE LOCATION OF INSTALLATION.
- THE SEOR SHALL VERIFY THAT THE EXISTING STRUCTURE IS ADEQUATE TO SUPPORT THE LOADS AND REACTIONS IMPOSED BY THE ANCHORED RACK ENCLOSURE IN ADDITION TO ALL OTHER LOADS AND FORCES
  - MAXIMUM SHEAR PER ANCHOR: 201 POUNDS
  - MAXIMUM TENSION PER ANCHOR: 873 POUNDS
- FOR STRUT CONNECTIONS, SEOR SHALL DESIGN STRUT AND CONNECTION TO BOTTOM OF FLUTE. EACH FLUTE ANCHOR MUST BE ABLE TO RESIST A SHEAR LOAD OF 0.4 TIMES MAXIMUM SHEAR (ABOVE) TIMES THE NUMBER OF THRU BOLTS ENGAGED BY THE STRUT.
- THE SEOR SHALL DETERMINE THE FOLLOWING:
  - THE MODEL NUMBER OF THE UNIT TO BE USED.
  - THE ELEVATION OF THE ROOF, H.
  - THE ELEVATION OF THE FLOOR WHERE THE UNIT WILL BE INSTALLED ON, Z.

TABLE 7: CONCRETE ANCHORS AND TEST LOADS FOR NORMAL-WEIGHT CONCRETE

ANCHOR TYPE	OUTSIDE DIAMETER (INCHES)	MINIMUM EMBEDMENT (INCHES)	MIN EDGE DISTANCE (INCHES)	TENSION TEST LOAD (LBS)
HDA-P	3/4 (M10)	4	6	8960
KB-TZ	3/8	2	4.375	4800



**APPROVED**  
Fixed Equipment Anchorage  
Office of Statewide Health Planning and Development

OPA-2711-10  
Pre-approval Program Manager  
Jeffrey Y. Kikumoto  
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Reviewed By: *Bill Staehlin* Date: *9/3/13*

MRK SERIES ENCLOSURE

USED ON	APPROVALS	DATE	
MODELED			
DRAWN			
NEXT ASBY	DIMENSIONS ARE CRITICAL. INSPECTION DIMENSIONS UNLESS OTHERWISE SPECIFIED. ALL DIMENSIONS ARE IN INCHES.		FILE #
MATERIAL- SEE COMPONENTS	TOLERANCES ARE: DECIMAL: ± .015 FRACTIONS: ± .002 ANGLES: ± 1/2°		96-039_OSHPD PART NO. 96-039_OSHPD
FINISH	SCALE = 3/8"		DWT REV DWG NO.