(1) MOUNTING HOLES ARE USED FOR ATTACHMENT OF DWR ENCLOSURE TO THE PLYWOOD BACKBOARD FOR STUD WALL APPLICATIONS, OR FOR ATTACHMENT OF DWR ENCLOSURE TO SOLID WALLS OF REINFORCED CONCRETE OR GROUTED FILLED MASONRY.

(2) WASHERS SHALL BE USED AT ALL MOUNTING HOLES.
DRAWING NOTES FOR DWR SERIES

GENERAL
1. THE WORK SHOWN ON THESE DRAWINGS IS FOR THE SEISMIC ANCHORAGE OF THE SUBJECT RACK ENCLOSURES. MAXIMUM PERMISSIBLE CONTENT CAPACITIES APPLIES TO ALL HEIGHTS WITHIN THE BUILDING.

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:

- $I_{bf} = 1.5$ (ESSENTIAL FACILITY INSTALLATIONS)
- $S_{ps} = 1.90d$ (ESSENTIAL FACILITY INSTALLATIONS)
- $A_p = 1.0$ AND $R_y = 1.5$ (ASCE TABLE 13.6-1)
- $Z, H = VARIES$

LATERAL FORCE, $F_{LR} = (0.4 A_v S_{ps} I_{bf} W_o) / R_y(1 + 2 Z/H)$

VERTICAL FORCE, $F_{RV} = 0.25S_{ps} W_o$

INSTALLATION NOTES

1. THE MAXIMUM PERMISSIBLE SEISMIC CONTENT CAPACITY OF THE RACK ENCLOSURE IS 140 POUNDS FOR ALL RACKS AND ALL HEIGHTS WITHIN THE BUILDING.

2. FOR STUD WALL APPLICATIONS, THE DWR SERIES RACK SHALL BE MOUNTED DIRECTLY TO A ¼"-INCH PLYWOOD BACKBOARD (STRUCTURAL I OR BETTER) WITH THE APPROPRIATE FASTENER LISTED IN TABLE 2.

3. WHEN MOUNTED TO A STRUCTURAL WALL OF WOOD OR METAL STUD-FRAMED CONSTRUCTION (2 X 4 DIMENSIONAL LUMBER, OR EQUIVALENT), THE PLYWOOD BACKBOARD SHALL BE ANCHORED WITH #12 X 2½ INCH WOOD SCREWS CONFORMING TO ANSI/ASME STANDARD B19.0.1-1991 (9 TOTAL, OR 4 PER STUD).

4. WHEN MOUNTED TO A STRUCTURAL WALL OF COLD FORMED STEEL STUDS, THE PLYWOOD BACKBOARD SHALL BE ANCHORED WITH #12-14 H/W X 2½ INCH HILTI SELF-DRILLING SCREWS CONFORMING TO ESR-2196 AND MANUFACTURER’S RECOMMENDED INSTALLATION (8 TOTAL, OR 4 PER STUD). STUDS SHALL BE GAGE 20 (0.038 INCH) OR THICKER WITH MINIMUM TENSILE STRENGTH (FT) OF 45 KIPS PER SQUARE INCH (KSI).

5. WHEN MOUNTED TO A STRUCTURAL WALL OF C-SHAPED STEEL STUDS, THE PLYWOOD BACKBOARD SHALL BE ANCHORED WITH SHEET METAL SCREWS, 0.25 INCH DIAMETER X 2½ INCH, CONFORMING TO AC118 AND MANUFACTURER’S RECOMMENDED INSTALLATION (12 TOTAL, 6 PER STUD). STUDS SHALL BE GAGE 18 (0.043 INCH) OR THICKER WITH CHANNEL DEPTH OF 3.625 INCH OR MORE, AND FLANGE WIDTH OF 1.625 INCH OR MORE. MINIMUM YIELD STRENGTH (FY) OF 33 KSI AND TENSILE STRENGTH OF 52 KSI.

6. WHEN MOUNTED TO A STRUCTURAL WALL OF REINFORCED CONCRETE, THE DWR SERIES RACK SHALL BE ANCHORED TO THE WALL WITH ONE OF THE FOLLOWING TWO TYPES MANUFACTURED BY HILTI, INC. OF CARBON STEEL WITH DIAMETER, EMBEDED, AND SPACING AS SHOWN ON THE DRAWINGS:

- HILTI HDA-P (PRESET CONFIGURATION) UNDERCUT ANCHORS (ICC ESR 1546)
- HILTI KWI K BOLT TZ (KB-TZ) EXPANSION ANCHORS (ICC ESR 1917)

THE CONCRETE WALL SHALL HAVE A MINIMUM THICKNESS OF 6 INCHES AND A MINIMUM CONCRETE COMPRESSION STRENGTH (F'c) OF 2,500 POUNDS PER SQUARE INCH (PSI) UNLESS OTHERWISE NOTED.

7. WHEN MOUNTED TO A STRUCTURAL WALL OF FULLY-GROUTED UNCRAKED MASONRY CONFORMING TO ASTM C90, THE DWR SERIES RACK SHALL BE ANCHORED TO THE WALL WITH ONE OF THE FOLLOWING TWO TYPES MANUFACTURED BY HILTI, INC. OR POWERS FASTENERS, INC., RESPECTIVELY, WITH DIAMETER, EMBEDED, AND SPACING AS SHOWN ON THE DRAWINGS:

- HILTI KWI BOLT 3 MASONRY EXPANSION ANCHORS (ICC ESR 1385)
- POWERS WEDGE+BOLT+ MASONRY SCREW ANCHORS (ICC ESR 1578)

THE MASONRY UNITS SHALL HAVE A MINIMUM THICKNESS OF 6 INCHES AND A MINIMUM COMPRESSION STRENGTH (F'c) OF 1,500 POUNDS PER SQUARE INCH (PSI) UNLESS OTHERWISE NOTED.

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

9. INSTALLATION OF THE RACK ENCLOSURES IS LIMITED TO INTERIOR OR ENVIRONMENTALLY PROTECTED LOCATIONS.
10. 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.

11. 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.

12. CONCRETE AND MASONRY ANCHORS REQUIRE SPECIAL INSPECTION FOR INSTALLATION IN ACCORDANCE WITH CBC CHAPTER 17A.

ANCHOR TESTING NOTES

1. TENSION TESTING OF EXPANSION ANCHORS PER 2010 CBC, 1916A.7, SHALL OCCUR 24 HOURS OR MORE AFTER INSTALLATION OF THE CONCRETE ANCHORS.

2. 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.

3. REACTION LOADS FROM TEST FIXTURES MAY BE APPLIED IN CLOSE PROXIMITY TO THE ANCHOR BEING TESTED PROVIDED THE ANCHOR IS NOT RESTRANIED FROM WITHDRAWING BY THE FIXTURES.

4. TEST EQUIPMENT SHALL BE CALIBRATED BY AN APPROVED TESTING LABORATORY IN ACCORDANCE WITH STANDARD SEIZED PROCEDURES.

5. ONE HALF (50%) OF EACH APPLICATION OF CONCRETE ANCHORS SHALL BE TESTED IN TENSION FOR 3 MINUTES ACCORDING TO THE TEST LOADS SHOWN IN TABLE 3. 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 OF THE SAME APPLICATION SHALL BE TESTED. IF ANY ANCHOR FAILS, ALL PREVIOUSLY UNTESITED ANCHORS INSTALLED BY THAT CREW SHALL BE TESTED UNTIL TWENTY (20) CONSECUTIVE ANCHORS PASS, THEN RESUME 50% TESTING.


7. 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>
<thead>
<tr>
<th>TABLE 2: SUMMARY OF ACCEPTABLE FASTENERS</th>
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<tbody>
<tr>
<td>Component</td>
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<tr>
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</tr>
<tr>
<td>DWR Series Wall Mount Rack Enclosures</td>
</tr>
<tr>
<td>Plywood Backboard</td>
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<td>DWR Series Wall Mount Rack Enclosures</td>
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</tbody>
</table>
TABLE 3: CONCRETE ANCHORS AND TEST LOADS FOR NORMAL-WEIGHT CONCRETE (F'c = 2,500 PSI)

<table>
<thead>
<tr>
<th>ANCHOR</th>
<th>OUTSIDE MINIMUM</th>
<th>MIN EDGE</th>
<th>TENSION</th>
</tr>
</thead>
<tbody>
<tr>
<td>TYPE</td>
<td>DIAMETER (INCHES)</td>
<td>EMBEDMENT DISTANCE (INCHES)</td>
<td>TEST LOAD (LBS)</td>
</tr>
</tbody>
</table>

| HDA-P  | 3/4 (M10) | 4 | 6 | 6255 |
| KB-TZ  | 3/8       | 2 | 5 | 1580 |

NOTES:
1. WHEN USED IN LIGHT-WEIGHT CONCRETE, ANCHOR TEST LOADS ARE MULTIPLIED BY 0.80.
2. 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.
3. MINIMUM EDGE DISTANCE IS BASED ON THE LARGER OF 1.5 TIMES THE ANCHOR EMBEDMENT DEPTH OR THE ICC ESR REPORTED MINIMUM EDGE DISTANCE

TABLE 4: ANCHORS FOR UNCRACKED FULLY GROUTED MASONRY

<table>
<thead>
<tr>
<th>ANCHOR</th>
<th>OUTSIDE MINIMUM</th>
<th>MIN EDGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>TYPE</td>
<td>DIAMETER (INCHES)</td>
<td>EMBEDMENT DISTANCE (INCHES)</td>
</tr>
</tbody>
</table>

| KWIK BOLT 3 | 3/8 | 2.5 | 4 |
| WEDGE-BOLT+ | 1/2 | 2   | 12 |

NOTES:
1. MINIMUM EDGE DISTANCE IS BASED ON THE ICC ESR REPORTED MINIMUM EDGE DISTANCE

RESPONSIBILITIES OF THE STRUCTURAL ENGINEER-OF-RECORD (SEOR)

1. THE SEOR SHALL DETERMINE THE MODEL NUMBER OF THE UNIT TO BE USED.
2. 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. MAXIMUM WEIGHT OF THE CONTENTS THAT CAN BE STORED ON THE RACK IS 140 POUNDS.
3. SEOR SHALL VERIFY THAT THE STRUCTURAL WALL MEETS THE REQUIREMENTS OF THIS PRE-APPROVAL.
4. SEOR SHALL VERIFY THAT THE EXISTING STRUCTURE IS ADEQUATE TO SUPPORT THE LOADS AND FORCES IMPOSED ON IT BY THIS UNIT IN ADDITION TO ALL OTHER LOADS AND FORCES.
5. FOR ANCHORAGE TO FULLY GROUTED MASONRY, SEOR SHALL VERIFY THAT THE MASONRY WALL REMAINS UNCRACKED PER ICC-ES AC 01 AND THE APPLICABLE ESR REPORT FOR THE ANCHORS.
6. THE SEOR SHALL VERIFY THAT THE WEIGHT OF RACK ENCLOSURE CONTENTS DOES NOT EXCEED THE APPROVED CAPACITY FOR THE LOCATION OF INSTALLATION.
7. VERIFY THAT THE CONCRETE OR MASONRY WALL TO WHICH THE EQUIPMENT IS ANCHORED MEETS ALL REQUIREMENTS OF THE APPLICABLE ICC ESR.
8. VERIFY THAT THE EXPANSION ANCHORS ARE AN ADEQUATE DISTANCE FROM ANY EDGES OR OPENINGS.
9. 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 INCHES OR 6"(HAD) FROM THIS UNIT'S ANCHORS.
10. VERIFY THAT THE INSTALLATION IS IN CONFORMANCE WITH THE 2010 CBC AND THE DETAILS SHOWN IN THIS PRE-APPROVAL.
11. VERIFY THAT THE MATERIAL AND GAGE OF THE UNITS WHERE ATTACHMENTS ARE MADE AGREE WITH THE INFORMATION SHOWN ON THE PRE-APPROVAL DOCUMENTS.