HILTI KB-TZ WEDGE ANCHORS IN 4,000 PSI NORMAL WEIGHT CONCRETE

1.) ALLOWABLE LOADS ARE FOR ANCHORS INSTALLED IN STONE AGGREGATE CONCRETE HAVING A MIN. COMPRESSIVE STRENGTH OF 4,000 PSI AT THE TIME OF INSTALLATION AND DETERMINED PER ICC ESR-1917 (HILTI KB-TZ EXPANSION ANCHOR) FOR ANCHORS IN CRACKED CONCRETE. ALLOWABLE LOADS HAVE BEEN MULTIPLIED BY 0.75 PER ACI318-05 APPENDIX D, D3.3.3.3 AND INTERACTION BASED ON D.7.3.

2.) FOR ESSENTIAL FACILITIES, 50 PERCENT OF THE EXPANSION TYPE ANCHORS (ALTERNATE ANCHORS IN ANY GROUP ARRANGEMENT) SHALL BE PROOF TESTED TO TWICE THE ALLOWABLE CAPACITY IN TENSION. IF ANY ANCHOR FAILS, 20 CONSECUTIVE ANCHORS INSTALLED BY THE SAME TRADE MUST THEN ALSO BE TESTED BEFORE RESUMING 50 PERCENT TESTING. TESTING SHOULD OCCUR 24 HOURS MINIMUM AFTER INSTALLATION OF ANCHOR. SEE PAGE 1168 FOR TESTING REQUIREMENTS.

3.) OTHER ANCHORS MAY BE USED IN PLACE OF HILTI KBTZ WEDGE ANCHOR PROVIDED THEY HAVE A CURRENT ICC EVALUATION REPORT APPROVED FOR CRACKED CONCRETE AND RESISTING SEISMIC LOADS.

4.) MINIMUM CONCRETE THICKNESS OF 1 1/2 TIMES THE EMBEDMENT DEPTH, OR THE EMBEDMENT DEPTH PLUS THREE TIMES THE DIAMETER, WHICHEVER IS GREATER, SHALL BE PROVIDED.

NOTES:

5.) WHEN INSTALLING ANCHORS IN REINFORCED CONCRETE, AVOID DAMAGING REINFORCING STEEL.

6.) WHEN INSTALLING ANCHORS IN PRESTRESSED CONCRETE, LOCATE PRESTRESSING STEEL AND AVOID DAMAGING PRESTRESSING STEEL.

7.) STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE STRUCTURE FOR THE TABULATED ALLOWABLE LOADS.

8.) SPECIAL INSPECTION SHALL BE PROVIDED PER CBC. THE SPECIAL INSPECTION MUST BE ON THE JOBSITE CONTINUOUSLY DURING ANCHOR INSTALLATION TO VERIFY ANCHOR TYPE, ANCHOR DIMENSIONS, HOLE DIMENSIONS, ANCHOR SPACING, EDGE DISTANCES, SLAB SPACING, EDGE DISTANCES, ANCHOR EMBEDMENT AND TIGHTENING TORQUE.

9.) IF ALLOWABLE LOAD FOR ONE ANCHOR IS USED, TOLCO 900 SERIES MAY BE OFF CENTER WHEN USING TWO ANCHORS WITH STRUT.

10.) TOLCO 900 SERIES ATTACHMENT DIAMETER SHALL BE EQUAL TO OR MORE THAN THE ANCHOR DIAMETER.

<table>
<thead>
<tr>
<th>ANCHOR DIA.</th>
<th>'E' MIN. ANCHOR EMBED. DEPTH</th>
<th>'D' MIN. EDGE DISTANCE</th>
<th>'S' MIN. SPACING BETWEEN ANCHORS</th>
<th>ALLOWABLE STRESS DESIGN MAX. HORIZONTAL LOAD W/ BRACE @ 45°</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>SINGLE</td>
</tr>
<tr>
<td>3/8&quot;</td>
<td>2&quot;</td>
<td>6&quot;</td>
<td>6&quot;</td>
<td>506</td>
</tr>
<tr>
<td>1/2&quot;</td>
<td>2&quot;</td>
<td>6&quot;</td>
<td>6&quot;</td>
<td>817</td>
</tr>
<tr>
<td>1/2&quot;</td>
<td>3 1/4&quot;</td>
<td>6&quot;</td>
<td>6&quot;</td>
<td>1056</td>
</tr>
<tr>
<td>5/8&quot;</td>
<td>3 1/8&quot;</td>
<td>6&quot;</td>
<td>6&quot;</td>
<td>1112</td>
</tr>
<tr>
<td>5/8&quot;</td>
<td>4&quot;</td>
<td>6&quot;</td>
<td>6&quot;</td>
<td>1242</td>
</tr>
<tr>
<td>3/4&quot;</td>
<td>4 3/4&quot;</td>
<td>6&quot;</td>
<td>10&quot;</td>
<td>1424**</td>
</tr>
</tbody>
</table>

*LOAD GOVERNED BY SPRING NUT/CHANNEL NUT.
**LOAD GOVERNED BY TOLCO 900 SERIES ATTACHMENT.

PAGE: 10 - 1
DATE: December 20, 2009
HILTI KB-TZ WEDGE ANCHORS IN 4,000 PSI NORMAL WEIGHT CONCRETE

1.) ALLOWABLE LOADS ARE FOR ANCHORS INSTALLED IN STONE AGGREGATE CONCRETE HAVING A MIN. COMPRESSIVE STRENGTH OF 4,000 PSI AT THE TIME OF INSTALLATION AND DETERMINED PER ICC ESR-1917 (HILTI KB-TZ EXPANSION ANCHOR) FOR ANCHORS IN CRACKED CONCRETE. ALLOWABLE LOADS HAVE BEEN MULTIPLIED BY 0.75 PER ACI318-05 APPENDIX D, D3.3.3.3 AND INTERACTION BASED ON D.7.3.

2.) FOR ESSENTIAL FACILITIES, 50 PERCENT OF THE EXPANSION TYPE ANCHORS (ALTERNATE ANCHORS IN ANY GROUP ARRANGEMENT) SHALL BE PROOF TESTED TO TWICE THE ALLOWABLE CAPACITY IN TENSION. IF ANY ANCHOR FAILS, 20 CONSECUTIVE ANCHORS INSTALLED BY THE SAME TRADE MUST THEN ALSO BE TESTED BEFORE RESUMING 50 PERCENT TESTING. TESTING SHOULD OCCUR 24 HOURS MINIMUM AFTER INSTALLATION OF ANCHOR. SEE PAGE 1168 FOR TESTING REQUIREMENTS.

3.) OTHER ANCHORS MAY BE USED IN PLACE OF HILTI KB-TZ WEDGE ANCHOR PROVIDED THEY HAVE A CURRENT ICC EVALUATION REPORT APPROVED FOR CRACKED CONCRETE AND RESISTING SEISMIC LOADS.

4.) MINIMUM CONCRETE THICKNESS OF 1 1/2 TIMES THE EMBEDMENT DEPTH, OR THE EMBEDMENT DEPTH PLUS THREE TIMES THE DIAMETER, WHICHEVER IS GREATER, SHALL BE PROVIDED.

5.) WHEN INSTALLING ANCHORS IN REINFORCED CONCRETE, AVOID DAMAGING REINFORCING STEEL.

6.) WHEN INSTALLING ANCHORS IN PRESTRESSED CONCRETE, LOCATE PRESTRESSING STEEL AND AVOID DAMAGING PRESTRESSING STEEL.

7.) STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE STRUCTURE FOR THE TABULATED ALLOWABLE LOADS.

8.) SPECIAL INSPECTION SHALL BE PROVIDED PER CBC. THE SPECIAL INSPECTION MUST BE ON THE JOBSITE CONTINUOUSLY DURING ANCHOR INSTALLATION TO VERIFY ANCHOR TYPE, ANCHOR DIMENSIONS, HOLE DIMENSIONS, ANCHOR SPACING, EDGE DISTANCES, SLAB THICKNESS, ANCHOR EMBEDMENT AND TIGHTENING TORQUE.

9.) HANGER ROD DIAMETER SHALL BE EQUAL TO OR MORE THAN THE ANCHOR DIAMETER.

10.) IF ALLOWABLE LOAD FOR ONE ANCHOR IS USED, HANGER ROD MAY BE OFF CENTER WHEN USING TWO ANCHORS WITH STRUT.

NOTES:

1375 SAMPSON AVENUE
CORONA, CA. 92879
P: (951) 737-5399
F: (951) 737-0330

DATE: December 20, 2009
PAGE: 10 - 2
HILTI KB-TZ WEDGE ANCHOR IN 3,000 PSI LIGHTWEIGHT CONCRETE OVER METAL DECK - 20 GA (MIN.)

ANCHOR MUST BE CENTERED WHEN ON BOTTOM FLUTE. ANCHOR MAY BE OFF CENTER BY 1".

NOTES:

1.) ALLOWABLE LOADS ARE FOR ANCHORS INSTALLED IN STONE AGGREGATE CONCRETE HAVING A MIN. COMPRESSIVE STRENGTH OF 3,000 PSI AT THE TIME OF INSTALLATION AND DETERMINED PER ICC ESR-1917 (HILTI KB-TZ EXPANSION ANCHOR) FOR ANCHORS IN CRACKED CONCRETE. ALLOWABLE LOADS HAVE BEEN MULTIPLIED BY 0.75 PER ACI516-85 APPENDIX D, D3.3.3.3 AND INTERACTION BASED ON D.7.3.

2.) FOR ESSENTIAL FACILITIES, 50 PERCENT OF THE EXPANSION TYPE ANCHORS (ALTERNATE ANCHORS IN ANY GROUP ARRANGEMENT) SHALL BE PROOF TESTED TO TWICE THE ALLOWABLE CAPACITY IN TENSION. IF ANY ANCHOR FAILS, 20 CONSECUTIVE ANCHORS INSTALLED BY THE SAME TRADE MUST THEN ALSO BE TESTED BEFORE RESUMING 50 PERCENT TESTING. TESTING SHOULD OCCUR 24 HOURS MINIMUM AFTER INSTALLATION OF ANCHOR. SEE PAGE 1168 FOR TESTING REQUIREMENTS.

3.) OTHER ANCHORS MAY BE USED IN PLACE OF HILTI KB-TZ WEDGE ANCHOR PROVIDED THEY HAVE A CURRENT ICC EVALUATION REPORT APPROVED FOR CRACKED CONCRETE AND RESISTING SEISMIC LOADS.

4.) MINIMUM CONCRETE THICKNESS OF 1 1/2 TIMES THE EMBEDMENT DEPTH, OR THE EMBEDMENT DEPTH PLUS THREE TIMES THE DIAMETER, WHICHEVER IS GREATER, SHALL BE PROVIDED.

5.) WHEN INSTALLING ANCHORS IN REINFORCED CONCRETE, AVOID DAMAGING REINFORCING STEEL.

6.) WHEN INSTALLING ANCHORS IN PRESTRESSED CONCRETE, LOCATE PRESTRESSING STEEL AND AVOID DAMAGING PRESTRESSING STEEL.

7.) STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE STRUCTURE FOR THE TABULATED ALLOWABLE LOADS.

8.) SPECIAL INSPECTION SHALL BE PROVIDED PER CBC. THE SPECIAL INSPECTION MUST BE ON THE JOBSITE CONTINUOUSLY DURING ANCHOR INSTALLATION TO VERIFY ANCHOR TYPE, ANCHOR DIMENSIONS, HOLE DIMENSIONS, ANCHOR SPACING, EDGE DISTANCES, SLAB THICKNESS, ANCHOR EMBEDMENT AND TIGHTENING TORQUE.

9.) IF ALLOWABLE LOAD FOR ONE ANCHOR IS USED, TOLCO 900 SERIES MAY BE OFF CENTER WHEN USING TWO ANCHORS WITH STRUT.

10.) TOLCO 900 SERIES ATTACHMENT DIAMETER SHALL BE EQUAL TO OR MORE THAN THE ANCHOR DIAMETER.

<table>
<thead>
<tr>
<th>ANCHOR DIA.</th>
<th>'E' MIN. ANCHOR EMBED. DEPTH</th>
<th>'D' MIN. EDGE DISTANCE</th>
<th>'S' MIN. SPACING BETWEEN ANCHORS</th>
<th>ALLOWABLE STRESS DESIGN MAX. HORIZONTAL LOAD W/ BRACE @ 45°</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/8&quot;</td>
<td>2&quot;</td>
<td>6&quot;</td>
<td>6 3/4&quot;</td>
<td>SINGLE: 486; DOUBLE: 800&quot;</td>
</tr>
<tr>
<td>1/2&quot;</td>
<td>2&quot;</td>
<td>6&quot;</td>
<td>6 3/4&quot;</td>
<td>SINGLE: 555; DOUBLE: 1424&quot;</td>
</tr>
<tr>
<td>1/2&quot;</td>
<td>3 1/4&quot;</td>
<td>6&quot;</td>
<td>9 3/4&quot;</td>
<td>SINGLE: 966; DOUBLE: 1424&quot;</td>
</tr>
<tr>
<td>5/8&quot;</td>
<td>3 1/8&quot;</td>
<td>6&quot;</td>
<td>9 3/8&quot;</td>
<td>SINGLE: 789; DOUBLE: 1424&quot;</td>
</tr>
<tr>
<td>5/8&quot;</td>
<td>4&quot;</td>
<td>6&quot;</td>
<td>12&quot;</td>
<td>SINGLE: 1424&quot;; DOUBLE: 1424&quot;</td>
</tr>
</tbody>
</table>

* LOAD GOVERNED BY SPRING NUT/CHANNEL NUT.
** LOAD GOVERNED BY TOLCO 900 SERIES ATTACHMENT.
HILTI KB-TZ WEDGE ANCHOR IN 3,000 PSI LIGHTWEIGHT CONCRETE OVER METAL DECK - 20 GA (MIN.)

ANCHOR MUST BE CENTERED WHEN ON BOTTOM FLUTE. ANCHOR MAY BE OFF CENTER BY 1".

E
S
D
B-LINE B22 SOLID CHANNEL

SUPPORT ROD W/ TOLSTRUT "F" SERIES OR B-LINE B200 SERIES FLAT FITTING AND TOLSTRUT SPRING NUT. MUST BE CENTERED BETWEEN TWO ANCHORS.

HILTI KB-TZ WEDGE ANCHOR W/ TOLSTRUT "F" SERIES OR B-LINE B200 SERIES FLAT FITTING. ANCHOR MAY BE OFF CENTER BY 1".

NOTES:

1.) ALLOWABLE LOADS ARE FOR ANCHORS INSTALLED IN STONE AGGREGATE CONCRETE HAVING A MIN. COMpressive STRENGTH OF 3,000 PSI AT THE TIME OF INSTALLATION AND DETERMINED PER ICC ESR-1917 (HILTI KB-TZ EXPANSION ANCHOR) FOR ANCHORS IN CRACKED CONCRETE. ALLOWABLE LOADS HAVE BEEN MULTIPLIED BY 0.75 PER ACI318-05 APPENDIX D, D3.3.3.3 AND INTERACTION BASED ON D.7.3.

2.) FOR ESSENTIAL FACILITIES, 50 PERCENT OF THE EXPANSION TYPE ANCHORS (ALTERNATE ANCHORS IN ANY GROUP ARRANGEMENT) SHALL BE PROOF TESTED TO TWICE THE ALLOWABLE CAPACITY IN TENSION. IF ANY ANCHOR FAILS, 20 CONSECUTIVE ANCHORS INSTALLED BY THE SAME TRADE MUST THEN ALSO BE TESTED BEFORE RESUMING 50 PERCENT TESTING. TESTING SHOULD OCCUR 24 HOURS MINIMUM AFTER INSTALLATION OF ANCHOR. SEE PAGE 1168 FOR TESTING REQUIREMENTS.

3.) OTHER ANCHORS MAY BE USED IN PLACE OF HILTI KB-TZ WEDGE ANCHOR PROVIDED THEY HAVE A CURRENT ICC EVALUATION REPORT APPROVED FOR CRACKED CONCRETE AND RESISTING SEISMIC LOADS.

4.) MINIMUM CONCRETE THICKNESS OF 1 1/2 TIMES THE EMBEDMENT DEPTH, OR THE EMBEDMENT DEPTH PLUS THREE TIMES THE DIAMETER, WHICHEVER IS GREATER, SHALL BE PROVIDED.

5.) WHEN INSTALLING ANCHORS IN REINFORCED CONCRETE, AVOID DAMAGING REINFORCING STEEL.

6.) WHEN INSTALLING ANCHORS IN PRESTRESSED CONCRETE, LOCATE PRESTRESSING STEEL AND AVOID DAMAGING PRESTRESSING STEEL.

7.) STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE STRUCTURE FOR THE TABULATED ALLOWABLE LOADS.

8.) SPECIAL INSPECTION SHALL BE PROVIDED PER CBC. THE SPECIAL INSPECTION MUST BE ON THE JOBSITE CONTINUOUSLY DURING ANCHOR INSTALLATION TO VERIFY ANCHOR TYPE, ANCHOR DIMENSIONS, HOLE DIMENSIONS, ANCHOR SPACING, EDGE DISTANCES, SLAB THICKNESS, ANCHOR EMBEDMENT AND TIGHTENING TORQUE.

9.) HANGER ROD DIAMETER SHALL BE EQUAL TO OR MORE THAN THE ANCHOR DIAMETER.

10.) IF ALLOWABLE LOAD FOR ONE ANCHOR IS USED, HANGER ROD MAY BE OFF CENTER WHEN USING TWO ANCHORS WITH STRUT.

<table>
<thead>
<tr>
<th>ANCHOR DIA.</th>
<th>&quot;E&quot; MIN. ANCHOR EMBED.</th>
<th>&quot;D&quot; MIN. EDGE DISTANCE</th>
<th>&quot;S&quot; MIN. SPACING BETWEEN ANCHORS</th>
<th>ALLOWABLE STRESS DESIGN</th>
<th>TENSION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MIN. ANCHOR DIMENSIONS</td>
<td></td>
<td></td>
<td>SINGLE</td>
<td>DOUBLE</td>
</tr>
<tr>
<td>3/8&quot;</td>
<td>2&quot;</td>
<td>6&quot;</td>
<td>6 3/4&quot;</td>
<td>610*</td>
<td>610*</td>
</tr>
<tr>
<td>1/2&quot;</td>
<td>2&quot;</td>
<td>6&quot;</td>
<td>6 3/4&quot;</td>
<td>709*</td>
<td>1130*</td>
</tr>
<tr>
<td>1/2&quot;</td>
<td>3 1/4&quot;</td>
<td>6&quot;</td>
<td>9 3/4&quot;</td>
<td>1130*</td>
<td>1130*</td>
</tr>
<tr>
<td>5/8&quot;</td>
<td>3 1/8&quot;</td>
<td>6&quot;</td>
<td>9 3/8&quot;</td>
<td>971*</td>
<td>1810*</td>
</tr>
<tr>
<td>5/8&quot;</td>
<td>4&quot;</td>
<td>6&quot;</td>
<td>12&quot;</td>
<td>1810*</td>
<td>1810*</td>
</tr>
</tbody>
</table>

* LOAD GOVERNED BY HANGER ROD.
TOLCO FIG. 35 CONCRETE ROD ATTACHMENT PLATE W/ HILTI KB-TZ WEDGE ANCHORS IN LIGHTWEIGHT CONCRETE (3000 PSI MIN.) OVER METAL DECK - 20 GA (MIN.)

TOLCO FIG. 35 OR B-LINE B3085 CONCRETE ROD ATTACHMENT PLATE W/ (4) HILTI KBTZ WEDGE ANCHORS. ANCHOR MAY BE OFF CENTER BY 1".

NOTES:

1.) ALLOWABLE LOADS ARE FOR ANCHORS INSTALLED IN STONE AGGREGATE CONCRETE HAVING A MIN. COMPRESSIVE STRENGTH OF 3,000 PSI AT THE TIME OF INSTALLATION AND DETERMINED PER ICC ESR-1917 (HILTI KB-TZ EXPANSION ANCHOR) FOR ANCHORS IN CRACKED CONCRETE. ALLOWABLE LOADS HAVE BEEN MULTIPLIED BY 0.75 PER ACI318-05 APPENDIX D, D3.3.3.3 AND INTERACTION BASED ON D.7.3.

2.) FOR ESSENTIAL FACILITIES, 50 PERCENT OF THE EXPANSION TYPE ANCHORS (ALTERNATE ANCHORS IN ANY GROUP ARRANGEMENT) SHALL BE PROOF TESTED TO TWICE THE ALLOWABLE CAPACITY IN TENSION. IF ANY ANCHOR FAILS, 20 CONSECUTIVE ANCHORS INSTALLED BY THE SAME TRADE MUST THEN ALSO BE TESTED BEFORE RESUMING 50 PERCENT TESTING. TESTING SHOULD OCCUR 24 HOURS MINIMUM AFTER INSTALLATION OF ANCHOR. SEE PAGE 11-68 FOR TESTING REQUIREMENTS.

3.) OTHER ANCHORS MAY BE USED IN PLACE OF HILTI KBTZ WEDGE ANCHOR PROVIDED THEY HAVE A CURRENT ICC EVALUATION REPORT APPROVED FOR CRACKED CONCRETE AND RESISTING SEISMIC LOADS.

4.) MINIMUM CONCRETE THICKNESS OF 1 1/2 TIMES THE EMBEDMENT DEPTH, OR THE EMBEDMENT DEPTH PLUS THREE TIMES THE DIAMETER, WHICHEVER IS GREATER, SHALL BE PROVIDED.

5.) WHEN INSTALLING ANCHORS IN REINFORCED CONCRETE, AVOID DAMAGING REINFORCING STEEL.

6.) WHEN INSTALLING ANCHORS IN PRESTRESSED CONCRETE, LOCATE PRESTRESSING STEEL AND AVOID DAMAGING PRESTRESSING STEEL.

7.) STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE STRUCTURE FOR THE TABULATED ALLOWABLE LOADS.

8.) SPECIAL INSPECTION SHALL BE PROVIDED PER CBC. THE SPECIAL INSPECTION MUST BE ON THE JOBSITE CONTINUOUSLY DURING ANCHOR INSTALLATION TO VERIFY ANCHOR TYPE, ANCHOR DIMENSIONS, HOLE DIMENSIONS, ANCHOR SPACING, EDGE DISTANCES, SLAB THICKNESS, ANCHOR EMBEDMENT AND TIGHTENING TORQUE.

9.) TOLCO 900 SERIES ATTACHMENT DIAMETER SHALL BE EQUAL TO OR MORE THAN THE ANCHOR DIAMETER.

<table>
<thead>
<tr>
<th>ANCHOR DIAM.</th>
<th>&quot;E&quot; MIN. ANCHOR EMBED. DEPTH</th>
<th>&quot;D&quot; MIN. EDGE DISTANCE</th>
<th>&quot;S&quot; MIN. SPACING BETWEEN ANCHORS</th>
<th>MAX. HORIZONTAL LOAD W/ BRACE @ 45°</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/8&quot;</td>
<td>2&quot;</td>
<td>6&quot;</td>
<td>6 3/4&quot;</td>
<td>1424*</td>
</tr>
<tr>
<td>1/2&quot;</td>
<td>2&quot;</td>
<td>6&quot;</td>
<td>6 3/4&quot;</td>
<td>1424*</td>
</tr>
<tr>
<td>1/&quot;2</td>
<td>3 1/4&quot;</td>
<td>6&quot;</td>
<td>9 3/4&quot;</td>
<td>1424*</td>
</tr>
<tr>
<td>5/8&quot;</td>
<td>3 1/8&quot;</td>
<td>6&quot;</td>
<td>9 3/8&quot;</td>
<td>1424*</td>
</tr>
<tr>
<td>5/8&quot;</td>
<td>4&quot;</td>
<td>6&quot;</td>
<td>12&quot;</td>
<td>1424*</td>
</tr>
</tbody>
</table>

* LOAD GOVERNED BY TOLCO 900 SERIES ATTACHMENT.
1.) ALLOWABLE LOADS ARE FOR ANCHORS INSTALLED IN STONE AGGREGATE CONCRETE HAVING A MIN. COMPRESSIVE STRENGTH OF 3,000 PSI AT THE TIME OF INSTALLATION AND DETERMINED PER ICC ESR-1917 (HILTI KB-TZ EXPANSION ANCHOR) FOR ANCHORS IN CRACKED CONCRETE. ALLOWABLE LOADS HAVE BEEN MULTIPLIED BY 0.75 PER ACI318-05 APPENDIX D, D3.3.3.3 AND INTERACTION BASED ON D.7.3.

2.) FOR ESSENTIAL FACILITIES, 50 PERCENT OF THE EXPANSION TYPE ANCHORS (ALTERNATE ANCHORS IN ANY GROUP ARRANGEMENT) SHALL BE PROOF TESTED TO TWICE THE ALLOWABLE CAPACITY IN TENSION. IF ANY ANCHOR FAILS, 20 CONSECUTIVE ANCHORS INSTALLED BY THE SAME TRADE MUST THEN ALSO BE TESTED BEFORE RESUMING 50 PERCENT TESTING. TESTING SHOULD OCCUR 24 HOURS MINIMUM AFTER INSTALLATION OF ANCHOR. SEE PAGE 1168 FOR TESTING REQUIREMENTS.

3.) OTHER ANCHORS MAY BE USED IN PLACE OF HILTI KB-TZ WEDGE ANCHOR PROVIDED THEY HAVE A CURRENT ICC EVALUATION REPORT APPROVED FOR CRACKED CONCRETE AND RESISTING SEISMIC LOADS.

4.) MINIMUM CONCRETE THICKNESS OF 1 1/2 TIMES THE EMBEDMENT DEPTH, OR THE EMBEDMENT DEPTH PLUS THREE TIMES THE DIAMETER, WHICHEVER IS GREATER, SHALL BE PROVIDED.

5.) WHEN INSTALLING ANCHORS IN REINFORCED CONCRETE, AVOID DAMAGING REINFORCING STEEL.

6.) WHEN INSTALLING ANCHORS IN PRESTRESSED CONCRETE, LOCATE PRESTRESSING STEEL AND AVOID DAMAGING PRESTRESSING STEEL.

7.) STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE STRUCTURE FOR THE TABULATED ALLOWABLE LOADS.

8.) SPECIAL INSPECTION SHALL BE PROVIDED PER CBC. THE SPECIAL INSPECTION MUST BE ON THE JOBSITE CONTINUOUSLY. DURING ANCHOR INSTALLATION TO VERIFY ANCHOR TYPE, ANCHOR DIMENSIONS, HOLE DIMENSIONS, ANCHOR SPACING, EDGE DISTANCES, SLAB THICKNESS, ANCHOR EMBEDMENT AND TIGHTENING TORQUE.

9.) HANGER ROD DIAMETER SHALL BE EQUAL TO OR MORE THAN THE ANCHOR DIAMETER.

---

### Table: Allowable Stress Design

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>3/8&quot;</td>
<td>2&quot;</td>
<td>6&quot;</td>
<td>6 3/4&quot;</td>
<td>610*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/2&quot;</td>
<td>2&quot;</td>
<td>6&quot;</td>
<td>6 3/4&quot;</td>
<td>610*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/2&quot;</td>
<td>3 1/4&quot;</td>
<td>6&quot;</td>
<td>9 3/4&quot;</td>
<td>1130*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5/8&quot;</td>
<td>3 1/8&quot;</td>
<td>6&quot;</td>
<td>9 3/8&quot;</td>
<td>1810*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5/8&quot;</td>
<td>4&quot;</td>
<td>6&quot;</td>
<td>12&quot;</td>
<td>1810*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

-load governed by TOLCO fig. 35
SIMPSON STRONG-BOLT WEDGE ANCHORS IN 4,000 PSI NORMAL WEIGHT CONCRETE

4.) FOR ESSENTIAL FACILITIES, 50 PERCENT OF THE EXPANSION TYPE ANCHORS (ALTERNATE ANCHORS IN ANY GROUP ARRANGEMENT) SHALL BE PROOF TESTED TO TWICE THE ALLOWABLE CAPACITY IN TENSION. IF ANY ANCHOR FAILS, 20 CONSECUTIVE ANCHORS INSTALLED BY THE SAME TRADE MUST THEN ALSO BE TESTED BEFORE RESUMING 50 PERCENT TESTING. TESTING SHOULD OCCUR 24 HOURS MINIMUM AFTER INSTALLATION OF ANCHOR. SEE PAGE 1168 FOR TESTING REQUIREMENTS.

5.) OTHER ANCHORS MAY BE USED IN PLACE OF SIMPSON STRONGBOLT PROVIDED THEY HAVE A CURRENT ICC EVALUATION REPORT. APPROVED FOR CRACKED CONCRETE AND RESISTING EARTHQUAKE LOADS.

6.) MINIMUM CONCRETE THICKNESS OF 1 1/2 TIMES THE EMBEDMENT DEPTH, OR THE EMBEDMENT DEPTH PLUS THREE TIMES THE DIAMETER, WHICHEVER IS GREATER, SHALL BE PROVIDED.

7.) WHEN INSTALLING ANCHORS IN REINFORCED CONCRETE, AVOID DAMAGING REINFORCING STEEL.

8.) WHEN INSTALLING ANCHORS IN PRESTRESSED CONCRETE, LOCATE PRESTRESSING STEEL AND AVOID DAMAGING PRESTRESSING STEEL.

9.) STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE STRUCTURE FOR THE TABULATED ALLOWABLE LOADS.

10.) SPECIAL INSPECTION SHALL BE PROVIDED PER CBC. THE SPECIAL INSPECTION MUST BE ON THE JOBSITE CONTINUOUSLY DURING ANCHOR INSTALLATION TO VERIFY ANCHOR TYPE, ANCHOR DIMENSIONS, HOLE DIMENSIONS, ANCHOR SPACING, EDGE DISTANCES, SLAB THICKNESS, ANCHOR EMBEDMENT AND TIGHTENING TORQUE.

11.) TOLCO 900 SERIES ATTACHMENT DIAMETER SHALL BE EQUAL TO THE ANCHOR DIAMETER.

12.) IF ALLOWABLE LOAD FOR ONE ANCHOR IS USED TOLCO 900 SERIES MAY BE OFF CENTER WHEN USING TWO ANCHORS WITH STRUT.

<table>
<thead>
<tr>
<th>ANCHOR DIA.</th>
<th>&quot;E&quot; MIN. ANCHOR EMBED. DEPTH</th>
<th>&quot;D&quot; MIN. EDGE DISTANCE</th>
<th>&quot;S&quot; MIN. SPACING BETWEEN ANCHORS</th>
<th>ALLOWABLE STRESS DESIGN MAX. HORIZONTAL LOAD W/ BRACE @ 45°</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&quot;E&quot;</td>
<td>&quot;D&quot;</td>
<td>&quot;S&quot;</td>
<td>SINGLE</td>
</tr>
<tr>
<td>1/2&quot;</td>
<td>2 3/4&quot;</td>
<td>4&quot;</td>
<td>12&quot;</td>
<td>590</td>
</tr>
<tr>
<td>1/2&quot;</td>
<td>3 7/8&quot;</td>
<td>4&quot;</td>
<td>12&quot;</td>
<td>635</td>
</tr>
<tr>
<td>1/2&quot;</td>
<td>5&quot;</td>
<td>4&quot;</td>
<td>12&quot;</td>
<td>635</td>
</tr>
<tr>
<td>5/8&quot;</td>
<td>3 3/8&quot;</td>
<td>5&quot;</td>
<td>12&quot;</td>
<td>735</td>
</tr>
<tr>
<td>5/8&quot;</td>
<td>5 1/8&quot;</td>
<td>5&quot;</td>
<td>12&quot;</td>
<td>1130</td>
</tr>
<tr>
<td>5/8&quot;</td>
<td>6 1/8&quot;</td>
<td>5&quot;</td>
<td>12&quot;</td>
<td>1170</td>
</tr>
<tr>
<td>3/4&quot;</td>
<td>4 1/8&quot;</td>
<td>6&quot;</td>
<td>12&quot;</td>
<td>1045</td>
</tr>
<tr>
<td>3/4&quot;</td>
<td>5 3/4&quot;</td>
<td>6&quot;</td>
<td>12&quot;</td>
<td>1424*</td>
</tr>
<tr>
<td>3/4&quot;</td>
<td>7 1/2&quot;</td>
<td>6&quot;</td>
<td>12&quot;</td>
<td>1424*</td>
</tr>
</tbody>
</table>

*LOAD GOVERNED BY TOLCO 900 SERIES ATTACHMENT.

NOTES:

1.) LOAD VALUES PER ICC ESR-1771 (STRONGBOLT) FOR STRUCTURAL LIGHT WEIGHT CONCRETE (f'c = 3,000 PSI) OVER STEEL DECK FOR ANCHORS IN CRACKED CONCRETE. LOADS HAVE BEEN MULTIPLIED BY 0.75, PER APPENDIX D OF ACI 318, FOR REGIONS OF MODERATE OR HIGH SEISMIC RISK (SEISMIC DESIGN CATEGORY C, D, E OR F). LOADS HAVE BEEN DIVIDED BY 1.3 (NON-DUCTILE OVERSTRENGTH FACTOR) PER SECTION 13.4.2 OF ASCE 7-05 FOR NON-STRUCTURAL COMPONENT ANCHORAGE.

2.) ANCHOR SHALL BE A MINIMUM OF 18 x DIAMETERS AWAY FROM SECOND EDGE. EDGE DISTANCE GREATER OR LESS THAN 18 x DIAMETERS CAN BE EVALUATED USING APPENDIX D OF ACI 318 INCLUDING ESR 1771.

3.) INTERACTION BASED ON SECTION D.7.3 OF ACI 318-05 APPENDIX D.

4.) FOR ESSENTIAL FACILITIES, 50 PERCENT OF THE EXPANSION TYPE ANCHORS (ALTERNATE ANCHORS IN ANY GROUP ARRANGEMENT) SHALL BE PROOF TESTED TO TWICE THE ALLOWABLE CAPACITY IN TENSION. IF ANY ANCHOR FAILS, 20 CONSECUTIVE ANCHORS INSTALLED BY THE SAME TRADE MUST THEN ALSO BE TESTED BEFORE RESUMING 50 PERCENT TESTING. TESTING SHOULD OCCUR 24 HOURS MINIMUM AFTER INSTALLATION OF ANCHOR. SEE PAGE 1168 FOR TESTING REQUIREMENTS.

5.) OTHER ANCHORS MAY BE USED IN PLACE OF SIMPSON STRONGBOLT PROVIDED THEY HAVE A CURRENT ICC EVALUATION REPORT. APPROVED FOR CRACKED CONCRETE AND RESISTING EARTHQUAKE LOADS.

6.) MINIMUM CONCRETE THICKNESS OF 1 1/2 TIMES THE EMBEDMENT DEPTH, OR THE EMBEDMENT DEPTH PLUS THREE TIMES THE DIAMETER, WHICHEVER IS GREATER, SHALL BE PROVIDED.

7.) WHEN INSTALLING ANCHORS IN REINFORCED CONCRETE, AVOID DAMAGING REINFORCING STEEL.

8.) WHEN INSTALLING ANCHORS IN PRESTRESSED CONCRETE, LOCATE PRESTRESSING STEEL AND AVOID DAMAGING PRESTRESSING STEEL.

9.) STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE STRUCTURE FOR THE TABULATED ALLOWABLE LOADS.

10.) SPECIAL INSPECTION SHALL BE PROVIDED PER CBC. THE SPECIAL INSPECTION MUST BE ON THE JOBSITE CONTINUOUSLY DURING ANCHOR INSTALLATION TO VERIFY ANCHOR TYPE, ANCHOR DIMENSIONS, HOLE DIMENSIONS, ANCHOR SPACING, EDGE DISTANCES, SLAB THICKNESS, ANCHOR EMBEDMENT AND TIGHTENING TORQUE.

11.) TOLCO 900 SERIES ATTACHMENT DIAMETER SHALL BE EQUAL TO THE ANCHOR DIAMETER.

12.) IF ALLOWABLE LOAD FOR ONE ANCHOR IS USED TOLCO 900 SERIES MAY BE OFF CENTER WHEN USING TWO ANCHORS WITH STRUT.
### Simpson Strong-Bolt Wedge Anchors in 4,000 PSI Normal Weight Concrete

#### Notes:

1. Load values per ICC ESR-1771 (Strong-Bolt) for structural light weight concrete ($f'c=3,000$ PSI) over steel deck for anchors in cracked concrete. Loads have been multiplied by 0.75, per Appendix D of ACI 318, for regions of moderate or high seismic risk (Seismic Design Category C, D, E or F). Loads have been divided by 1.3 (Non-ductile overstrength factor) per Section 13.4.2 of ASCE 7-05 for non-structural component anchorage.

2. Anchor shall be a minimum of 18 x diameters away from second edge. Edge distance greater or less than 18 x diameters can be evaluated using Appendix D of ACI 318 including ESR 1771.

3. Interaction based on Section D.7.3 of ACI 318-05 Appendix D.

4. For essential facilities, 50 percent of the expansion type anchors (alternate anchors in any group arrangement) shall be proof tested to twice the allowable capacity in tension. If any anchor fails, 20 consecutive anchors installed by the same trade must then also be tested before resuming 50 percent testing. Testing should occur 24 hours minimum after installation of anchor. See page 11-68 for testing requirements.

5. Other anchors may be used in place of Simpson Strong-Bolt provided they have a current ICC evaluation report. Approved for cracked concrete and resisting earthquake loads.

6. Minimum concrete thickness of 1 1/2 times the embedment depth, or the embedment depth plus three times the diameter, whichever is greater, shall be provided.

7. When installing anchors in reinforced concrete, avoid damaging reinforcing steel.

8. When installing anchors in prestressed concrete, locate prestressing steel and avoid damaging prestressing steel.

9. Structural engineer of record shall verify adequacy of the structure for the tabulated allowable loads.

10. Special inspection shall be provided per CBC. The special inspection must be on the jobsite continuously during anchor installation to verify anchor type, anchor dimensions, hole dimensions, anchor spacing, edge distances, slab thickness, anchor embedment and tightening torque.

11. Hanger diameter shall be equal to or more than the anchor diameter.

12. If allowable load for one anchor is used hanger rod may be off center when using two anchors with strut.

#### Table: Allowable Stress Design

<table>
<thead>
<tr>
<th>Anchor Dia.</th>
<th>'E' Min. Anchor Embed. Depth</th>
<th>'D' Min. Edge Distance</th>
<th>'S' Min. Spacing Between Anchors</th>
<th>Single</th>
<th>Double</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2&quot;</td>
<td>2 3/4&quot;</td>
<td>4&quot;</td>
<td>12&quot;</td>
<td>1045</td>
<td>1130*</td>
</tr>
<tr>
<td>1/2&quot;</td>
<td>3 7/8&quot;</td>
<td>4&quot;</td>
<td>12&quot;</td>
<td>1095</td>
<td>1130*</td>
</tr>
<tr>
<td>1/2&quot;</td>
<td>5&quot;</td>
<td>4&quot;</td>
<td>12&quot;</td>
<td>1095</td>
<td>1130*</td>
</tr>
<tr>
<td>5/8&quot;</td>
<td>3 3/8&quot;</td>
<td>5&quot;</td>
<td>12&quot;</td>
<td>1415</td>
<td>1830*</td>
</tr>
<tr>
<td>5/8&quot;</td>
<td>5 1/8&quot;</td>
<td>5&quot;</td>
<td>12&quot;</td>
<td>1810*</td>
<td>1830*</td>
</tr>
<tr>
<td>5/8&quot;</td>
<td>6 1/8&quot;</td>
<td>5&quot;</td>
<td>12&quot;</td>
<td>1810*</td>
<td>1830*</td>
</tr>
<tr>
<td>3/4&quot;</td>
<td>4 1/8&quot;</td>
<td>6&quot;</td>
<td>12&quot;</td>
<td>1925</td>
<td>2000**</td>
</tr>
<tr>
<td>3/4&quot;</td>
<td>5 3/4&quot;</td>
<td>6&quot;</td>
<td>12&quot;</td>
<td>2710*</td>
<td>2000**</td>
</tr>
<tr>
<td>3/4&quot;</td>
<td>7 1/2&quot;</td>
<td>6&quot;</td>
<td>12&quot;</td>
<td>2710*</td>
<td>2000**</td>
</tr>
</tbody>
</table>

* Load governed by hanger rod.
** Load governed by spring nut/channel nut.

---

ZUBAIR SHEIKH
STRUCTURAL ENGINEER
S 4039

TOLCO

1375 Sampson Avenue
Corona, CA 92879
P: (951) 737-5599
F: (951) 737-0330

DATE: December 20, 2009
PAGE: 10 - 8
SIMPSON STRONG-BOLT WEDGE ANCHOR IN 3,000 PSI LIGHTWEIGHT CONCRETE OVER METAL DECK - 20 GA (MIN.)

**Diagram:**
- 1" MIN. D
- 1 1/2" MIN. S
- E
- EDGE OF CONCRETE
- EDGE OF CONCRETE

**TOLCO 900 SERIES ATTACHMENT.**

SIMPSON STRONG-BOLT WEDGE ANCHOR.
ANCHOR MUST BE CENTERED WHEN ON BOTTOM FLUTE.

**Notes:**
1. LOAD VALUES PER ICC ESR-1771 (STRONG-BOLT) FOR STRUCTURAL LIGHTWEIGHT CONCRETE (f'c = 3,000 PSI) OVER STEEL DECK FOR ANCHORS IN CRACKED CONCRETE. LOADS HAVE BEEN MULTIPLIED BY 0.75, PER APPENDIX D OF ACI 318, FOR REGIONS OF MODERATE OR HIGH SEISMIC RISK (SEISMIC DESIGN CATEGORY C, D, E OR F). LOADS HAVE BEEN DIVIDED BY 1.3 (NON-DUCTILE OVERSTRENGTH FACTOR) PER SECTION 13.4.2 OF ASCE 7-05 FOR NON-STRUCTURAL COMPONENT ANCHORAGE.

2. SPACING MEASURED PARALLEL TO LOWER FLUTE. MINIMUM SPACING DOES NOT APPLY TO ANCHORS PLACED IN ADJACENT FLUTES.

3. INTERACTION BASED ON SECTION D.7.3 OF ACI 318-05 APPENDIX D.

4. ANCHORS MAY BE OFFSET 1" FROM THE CENTERLINE OF LOWER FLUTE.

5. FOR ESSENTIAL FACILITIES, 50 PERCENT OF THE EXPANSION TYPE ANCHORS (ALTERNATE ANCHORS IN ANY GROUP ARRANGEMENT) SHALL BE PROOF TESTED TO TWICE THE ALLOWABLE CAPACITY IN TENSION. IF ANY ANCHOR FAILS, 20 CONSECUTIVE ANCHORS MUST THEN ALSO BE TESTED BEFORE RESUMING 50 PERCENT TESTING. TESTING SHOULD OCCUR 24 HOURS MINIMUM AFTER INSTALLATION OF ANCHOR. SEE PAGE 11-68 FOR TESTING REQUIREMENTS.

6. OTHER ANCHORS MAY BE USED IN PLACE OF SIMPSON STRONG-BOLT PROVIDED THEY HAVE A CURRENT ICC EVALUATION REPORT. APPROVED FOR CRACKED CONCRETE AND RESISTING EARTHQUAKE LOADS.

7. STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE STRUCTURE FOR THE TABULATED ALLOWABLE LOADS.

8. SPECIAL INSPECTION SHALL BE PROVIDED PER CBC. THE SPECIAL INSPECTION MUST BE ON THE JOBSITE CONTINUOUSLY DURING ANCHOR INSTALLATION TO VERIFY ANCHOR TYPE, ANCHOR DIMENSIONS, HOLE DIMENSIONS, ANCHOR SPACING, EDGE DISTANCES, SLAB THICKNESS, ANCHOR EMBEDMENT AND TIGHTENING TORQUE.

9. TOLCO 900 SERIES ATTACHMENT DIAMETER SHALL BE EQUAL TO THE ANCHOR DIAMETER.

10. IF ALLOWABLE LOAD FOR ONE ANCHOR IS USED, TOLCO 900 SERIES MAY BE OFF CENTER WHEN USING TWO ANCHORS WITH STRUT.

| ANCHOR DIA. | 'E' MIN. ANCHOR EMBED. DEPTH | 'D' MIN. MIN. SPACING BETWEEN ANCHORS | 'S' MIN. EDGE DISTANCE | ALLOWABLE STRESS DESIGN MAX. HORIZONTAL LOAD W/ BRACE @ 45º SINGLE DOUBLE |
|-------------|-------------------------------|--------------------------------------|----------------------|-----------------|-----------------|
| 1/2"        | 2 3/4"                        | 9"                                   | 6 3/4"               | 370             | 740             |
| 1/2"        | 4 1/2"                        | 9"                                   | 12"                  | 530             | 1060            |
| 5/8"        | 3 3/8"                        | 11"                                  | 8 1/4"               | 710             | 1420            |
| 5/8"        | 5 5/8"                        | 11"                                  | 15"                  | 940             | 1424*           |

*LOAD GOVERNED BY TOLCO 900 SERIES ATTACHMENT.
**SIMPSON STRONG-BOLT WEDGE ANCHOR IN 3,000 PSI LIGHTWEIGHT CONCRETE OVER METAL DECK - 20 GA (MIN.)**

ANCHOR DIAM. | 'E' MIN. ANCHOR EMBED. DEPTH | 'D' MIN. EDGE DISTANCE | 'S' MIN. SPACING BETWEEN ANCHORS | ALLOWABLE STRESS DESIGN TENSION
--- | --- | --- | --- | ---
1/2" | 2 3/4" | 9" | 6 3/4" | SINGLE 385, DOUBLE 770
1/2" | 4 1/2" | 9" | 12" | 550, 1100
5/8" | 3 3/8" | 11" | 8 1/4" | 820, 1640
5/8" | 5 5/8" | 11" | 15" | 1055, 2000*  

* LOAD GOVERNED BY SPRING NUT/CHANNEL NUT.

**NOTES:**

1.) LOAD VALUES PER ICC ESR-1771 (STRONG-BOLT) FOR STRUCTURAL LIGHTWEIGHT CONCRETE ($f'_c = 3,000$ PSI) OVER STEEL DECK FOR ANCHORS IN CRACKED CONCRETE. LOADS HAVE BEEN MULTIPLIED BY 0.75, PER APPENDIX D OF ACI 318, FOR REGIONS OF MODERATE OR HIGH SEISMIC RISK (SEISMIC DESIGN CATEGORY C, D, E OR F). LOADS HAVE BEEN DIVIDED BY 1.3 (NON-DUCTILE OVERSTRENGTH FACTOR) PER SECTION 13.4.2 OF ASCE 7-05 FOR NON-STRUCTURAL COMPONENT ANCHORAGE.

2.) SPACING MEASURED PARALLEL TO LOWER FLUTE. MINIMUM SPACING DOES NOT APPLY TO ANCHORS PLACED IN ADJACENT FLUTES.

3.) INTERACTION BASED ON SECTION D.7.3 OF ACI 318-05 APPENDIX D.

4.) ANCHORS MAY BE OFFSET 1" FROM THE CENTERLINE OF LOWER FLUTE.

5.) FOR ESSENTIAL FACILITIES, 50 PERCENT OF THE EXPANSION TYPE ANCHORS (ALTERNATE ANCHORS IN ANY GROUP ARRANGEMENT) SHALL BE PROOF TESTED TO TWICE THE ALLOWABLE CAPACITY IN TENSION. IF ANY ANCHOR FAILS, 20 CONSECUTIVE ANCHORS MUST THEN ALSO BE TESTED BEFORE RESUMING 50 PERCENT TESTING. TESTING SHOULD OCCUR 24 HOURS MINIMUM AFTER INSTALLATION OF ANCHOR. SEE PAGE 11-68 FOR TESTING REQUIREMENTS.

6.) OTHER ANCHORS MAY BE USED IN PLACE OF SIMPSON STRONG-BOLT PROVIDED THEY HAVE A CURRENT ICC EVALUATION REPORT. APPROVED FOR CRACKED CONCRETE AND RESISTING EARTHQUAKE LOADS.

7.) STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE STRUCTURE FOR THE TABULATED ALLOWABLE LOADS.

8.) SPECIAL INSPECTION SHALL BE PROVIDED PER CBC. THE SPECIAL INSPECTION MUST BE ON THE JOBSITE CONTINUOUSLY DURING ANCHOR INSTALLATION TO VERIFY ANCHOR TYPE, ANCHOR DIMENSIONS, HOLE DIMENSIONS, ANCHOR SPACING, EDGE DISTANCES, SLAB THICKNESS, ANCHOR EMBEDMENT AND TIGHTENING TORQUE.

9.) HANGER ROD DIAMETER SHALL BE EQUAL TO OR MORE THAN THE ANCHOR DIAMETER.

10.) IF ALLOWABLE LOAD FOR ONE ANCHOR IS USED, HANGER ROD MAY BE OFF CENTER WHEN USING TWO ANCHORS WITH STRUT.
5.) FOR ESSENTIAL FACILITIES, 50 PERCENT OF THE EXPANSION TYPE ANCHORS (ALTERNATE ANCHORS IN ANY GROUP ARRANGEMENT) SHALL BE PROOF TESTED TO TWICE THE ALLOWABLE CAPACITY IN TENSION. IF ANY ANCHOR FAILS, 20 CONSECUTIVE ANCHORS MUST THEN ALSO BE TESTED BEFORE RESUMING 50 PERCENT TESTING. TESTING SHOULD OCCUR 24 HOURS MINIMUM AFTER INSTALLATION OF ANCHOR. SEE PAGE 11-68 FOR TESTING REQUIREMENTS.

6.) OTHER ANCHORS MAY BE USED IN PLACE OF SIMPSON STRONG-BOLT PROVIDED THEY HAVE A CURRENT ICC EVALUATION REPORT. APPROVED FOR CRACKED CONCRETE AND RESISTING EARTHQUAKE LOADS.

7.) STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE STRUCTURE FOR THE TABULATED ALLOWABLE LOADS.

8.) SPECIAL INSPECTION SHALL BE PROVIDED PER CBC. THE SPECIAL INSPECTION MUST BE ON THE JOBSITE CONTINUOUSLY DURING ANCHOR INSTALLATION TO VERIFY ANCHOR TYPE, ANCHOR DIMENSIONS, HOLE DIMENSIONS, ANCHOR SPACING, EDGE DISTANCES, SLAB THICKNESS, ANCHOR EMBEDMENT AND TIGHTENING TORQUE.

9.) TOLCO 900 SERIES ATTACHMENT DIAMETER SHALL BE EQUAL TO THE ANCHOR DIAMETER.

---

### ALLOWABLE STRESS DESIGN

<table>
<thead>
<tr>
<th>ANCHOR DIA.</th>
<th>'E' MIN. ANCHOR EMBED. DEPTH</th>
<th>'D' MIN. EDGE DISTANCE</th>
<th>'S' MIN. SPACING BETWEEN ANCHORS</th>
<th>MAX. HORIZONTAL LOAD W/ BRACE @ 45°</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2&quot;</td>
<td>2 3/4&quot;</td>
<td>9&quot;</td>
<td>6 3/4&quot;</td>
<td>1424*</td>
</tr>
<tr>
<td>1/2&quot;</td>
<td>4 1/2&quot;</td>
<td>9&quot;</td>
<td>12&quot;</td>
<td>1424*</td>
</tr>
<tr>
<td>5/8&quot;</td>
<td>3 3/8&quot;</td>
<td>11&quot;</td>
<td>8 1/4&quot;</td>
<td>1424*</td>
</tr>
<tr>
<td>5/8&quot;</td>
<td>5 3/8&quot;</td>
<td>11&quot;</td>
<td>15&quot;</td>
<td>1424*</td>
</tr>
</tbody>
</table>

* LOAD GOVERNED BY TOLCO 900 SERIES ATTACHMENT.

---

### NOTES:

1.) LOAD VALUES PER ICC ESR-1771 (STRONG-BOLT) FOR STRUCTURAL LIGHT WEIGHT CONCRETE (fc = 3,000 PSI) OVER STEEL DECK FOR ANCHORS IN CRACKED CONCRETE. LOADS HAVE BEEN MULTIPLIED BY 0.75, PER APPENDIX D OF ACI 318. FOR REGIONS OF MODERATE OR HIGH SEISMIC RISK (SEISMIC DESIGN CATEGORY C, D, E OR F). LOADS HAVE BEEN DIVIDED BY 1.3 (NON-DUCTILE OVERSTRENGTH FACTOR) PER SECTION 13.4.2 OF ASCE 7-05 FOR NON-STRUCTURAL COMPONENT ANCHORAGE.

2.) SPACING MEASURED PARALLEL TO LOWER FLUTE. MINIMUM SPACING DOES NOT APPLY TO ANCHORS PLACED IN ADJACENT FLUTES.

3.) INTERACTION BASED ON SECTION D.7.3 OF ACI 318-05 APPENDIX D.

4.) ANCHORS MAY BE OFFSET 1" FROM THE CENTERLINE OF LOWER FLUTE.

5.) FOR ESSENTIAL FACILITIES, 50 PERCENT OF THE EXPANSION TYPE ANCHORS (ALTERNATE ANCHORS IN ANY GROUP ARRANGEMENT) SHALL BE PROOF TESTED TO TWICE THE ALLOWABLE CAPACITY IN TENSION. IF ANY ANCHOR FAILS, 20 CONSECUTIVE ANCHORS MUST THEN ALSO BE TESTED BEFORE RESUMING 50 PERCENT TESTING. TESTING SHOULD OCCUR 24 HOURS MINIMUM AFTER INSTALLATION OF ANCHOR. SEE PAGE 11-68 FOR TESTING REQUIREMENTS.

6.) OTHER ANCHORS MAY BE USED IN PLACE OF SIMPSON STRONG-BOLT PROVIDED THEY HAVE A CURRENT ICC EVALUATION REPORT. APPROVED FOR CRACKED CONCRETE AND RESISTING EARTHQUAKE LOADS.

7.) STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE STRUCTURE FOR THE TABULATED ALLOWABLE LOADS.

8.) SPECIAL INSPECTION SHALL BE PROVIDED PER CBC. THE SPECIAL INSPECTION MUST BE ON THE JOBSITE CONTINUOUSLY DURING ANCHOR INSTALLATION TO VERIFY ANCHOR TYPE, ANCHOR DIMENSIONS, HOLE DIMENSIONS, ANCHOR SPACING, EDGE DISTANCES, SLAB THICKNESS, ANCHOR EMBEDMENT AND TIGHTENING TORQUE.

9.) TOLCO 900 SERIES ATTACHMENT DIAMETER SHALL BE EQUAL TO THE ANCHOR DIAMETER.
5.) FOR ESSENTIAL FACILITIES, 50 PERCENT OF THE EXPANSION TYPE ANCHORS (ALTERNATE ANCHORS IN ANY GROUP ARRANGEMENT) SHALL BE PROOF TESTED TO TWICE THE ALLOWABLE CAPACITY IN TENSION. IF ANY ANCHOR FAILS, 20 CONSECUTIVE ANCHORS MUST THEN ALSO BE TESTED BEFORE RESUMING 50 PERCENT TESTING. TESTING SHOULD OCCUR 24 HOURS MINIMUM AFTER INSTALLATION OF ANCHOR. SEE PAGE 11-68 FOR TESTING REQUIREMENTS.

8.) SPECIAL INSPECTION SHALL BE PROVIDED PER CBC. THE SPECIAL INSPECTION MUST BE ON THE JOBSITE CONTINUOUSLY DURING ANCHOR INSTALLATION TO VERIFY ANCHOR TYPE, ANCHOR DIMENSIONS, HOLE DIMENSIONS, ANCHOR SPACING, EDGE DISTANCES, SLAB THICKNESS, ANCHOR EMBEDMENT AND TIGHTENING TORQUE.

9.) HANGER ROD DIAMETER SHALL BE EQUAL TO OR MORE THAN THE ANCHOR DIAMETER.

**NOTES:**

1.) LOAD VALUES PER ICC ESR-1771 (STRONG-BOLT) FOR STRUCTURAL LIGHT WEIGHT CONCRETE ($f_c = 3,000$ PSI) OVER STEEL DECK FOR ANCHORS IN CRACKED CONCRETE. LOADS HAVE BEEN MULTIPLIED BY 0.75, PER APPENDIX D OF ACI 318, FOR REGIONS OF MODERATE OR HIGH SEISMIC RISK (SEISMIC DESIGN CATEGORY C, D, E OR F). LOADS HAVE BEEN DIVIDED BY 1.3 (NON-DUCTILE OVERSTRENGTH FACTOR) PER SECTION 13.4.2 OF ASCE 7-05 FOR NON-STRUCTURAL COMPONENT ANCHORAGE.

2.) SPACING MEASURED PARALLEL TO LOWER FLUTE. MINIMUM SPACING DOES NOT APPLY TO ANCHORS PLACED IN ADJACENT FLUTES.

3.) INTERACTION BASED ON SECTION D.7.3 OF ACI 318-05 APPENDIX D.

4.) ANCHORS MAY BE OFFSET 1" FROM THE CENTERLINE OF LOWER FLUTE.

5.) FOR ESSENTIAL FACILITIES, 50 PERCENT OF THE EXPANSION TYPE ANCHORS (ALTERNATE ANCHORS IN ANY GROUP ARRANGEMENT) SHALL BE PROOF TESTED TO TWICE THE ALLOWABLE CAPACITY IN TENSION. IF ANY ANCHOR FAILS, 20 CONSECUTIVE ANCHORS MUST THEN ALSO BE TESTED BEFORE RESUMING 50 PERCENT TESTING. TESTING SHOULD OCCUR 24 HOURS MINIMUM AFTER INSTALLATION OF ANCHOR. SEE PAGE 11-68 FOR TESTING REQUIREMENTS.

6.) OTHER ANCHORS MAY BE USED IN PLACE OF SIMPSON STRONG-BOLT PROVIDED THEY HAVE A CURRENT ICC EVALUATION REPORT, APPROVED FOR CRACKED CONCRETE AND RESISTING EARTHQUAKE LOADS.

7.) STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE STRUCTURE FOR THE TABULATED ALLOWABLE LOADS.

**TOLCO FIG. 35 CONCRETE ROD ATTACHMENT PLATE W/ SIMPSON STRONG-BOLT WEDGE ANCHORS IN LIGHTWEIGHT CONCRETE (3000 PSI MIN.) OVER METAL DECK - 20 GA (MIN.)**

**ALLOWABLE STRESS DESIGN**

<table>
<thead>
<tr>
<th>ANCHOR DIA.</th>
<th>'E' MIN. ANCHOR EMBED. DEPTH</th>
<th>'D' MIN. EDGE DISTANCE</th>
<th>'S' MIN. SPACING BETWEEN ANCHORS</th>
<th>TENSION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2&quot;</td>
<td>2 3/4&quot;</td>
<td>9&quot;</td>
<td>6 3/4&quot;</td>
<td>1130*</td>
</tr>
<tr>
<td>1/2&quot;</td>
<td>4 1/2&quot;</td>
<td>9&quot;</td>
<td>12&quot;</td>
<td>1130*</td>
</tr>
<tr>
<td>5/8&quot;</td>
<td>3 3/8&quot;</td>
<td>11&quot;</td>
<td>8 1/4&quot;</td>
<td>1810*</td>
</tr>
<tr>
<td>5/8&quot;</td>
<td>5 5/8&quot;</td>
<td>11&quot;</td>
<td>15&quot;</td>
<td>1810*</td>
</tr>
</tbody>
</table>

*LOAD GOVERNED BY TOLCO FIG. 35.*
### NOTES:

1. THE HEX OR JAM NUT HAS NO VALUE IN DETERMINING THE LOADS. THEIR FUNCTION IS TO ASSIST IN LOCKING THE COUPLING SNUG TO THE BOTTOM OF THE DECK FORM PREVENTING THE CONCRETE FROM LEAKING INTO THE COUPLING THREADS. ANY OTHER SUITABLE LOCKING DEVICE MAY BE SUBSTITUTED IF DESIRED.

2. ALLOWABLE LOADS ARE FOR 4,000 PSI HARD ROCK CONCRETE.

3. MINIMUM CONCRETE THICKNESS OF 1 1/2 TIMES THE EMBEDMENT DEPTH, OR THE EMBEDMENT DEPTH PLUS THREE TIMES THE DIAMETER, WHICHEVER IS GREATER, SHALL BE PROVIDED.

4. STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE STRUCTURE FOR THE TABULATED ALLOWABLE LOADS.

5. SPECIAL INSPECTION SHALL BE PROVIDED PER CBC. THE SPECIAL INSPECTION MUST BE ON THE JOBSITE CONTINUOUSLY DURING ANCHOR INSTALLATION TO VERIFY ANCHOR TYPE, ANCHOR DIMENSIONS, HOLE DIMENSIONS, ANCHOR SPACING, EDGE DISTANCES, SLAB THICKNESS AND ANCHOR EMBEDMENT.

6. MINIMUM SPACING BETWEEN THE INSERTS SHALL BE 2 TIMES THE EMBEDMENT DEPTH OR 12 TIMES THE ANCHOR DIAMETER (WHICH EVER IS GREATER).

7. TOLCO FIG. 109AF IS A CAST-IN-PLACE ANCHOR BOLT AND COMPLIES WITH ACI 318 APPENDIX D AND DOES NOT REQUIRE ADDITIONAL TESTING CERTIFICATION.

8. TOLCO 900 SERIES ATTACHMENT DIAMETER SHALL BE EQUAL TO THE ANCHOR DIAMETER.

### Table: Anchor Diameter, E, and Max. Horizontal Seismic Load @ 45° (Lbs.)

<table>
<thead>
<tr>
<th>Anchor Diameter</th>
<th>'E' in</th>
<th>Min. Anchor Embedment Depth</th>
<th>Max. Horizontal Seismic Load @ 45° (Lbs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/8&quot;</td>
<td>3 1/2&quot;</td>
<td>925</td>
<td></td>
</tr>
<tr>
<td>1/2&quot;</td>
<td>3 1/2&quot;</td>
<td>1424*</td>
<td></td>
</tr>
<tr>
<td>1/2&quot;</td>
<td>4&quot;</td>
<td>1424*</td>
<td></td>
</tr>
<tr>
<td>5/8&quot;</td>
<td>4&quot;</td>
<td>1424*</td>
<td></td>
</tr>
<tr>
<td>5/8&quot;</td>
<td>5&quot;</td>
<td>1424*</td>
<td></td>
</tr>
<tr>
<td>3/4&quot;</td>
<td>4&quot;</td>
<td>1424*</td>
<td></td>
</tr>
<tr>
<td>3/4&quot;</td>
<td>6&quot;</td>
<td>1424*</td>
<td></td>
</tr>
<tr>
<td>7/8&quot;</td>
<td>4&quot;</td>
<td>1424*</td>
<td></td>
</tr>
<tr>
<td>7/8&quot;</td>
<td>7&quot;</td>
<td>1424*</td>
<td></td>
</tr>
</tbody>
</table>

*LOAD GOVERNED BY TOLCO 900 SERIES ATTACHMENT.*
NOTES:

1.) THE HEX OR JAM NUT HAS NO VALUE IN DETERMINING THE LOADS. THEIR FUNCTION IS TO ASSIST IN LOCKING THE COUPLING SNUG TO THE BOTTOM OF THE DECK FORM PREVENTING THE CONCRETE FROM LEAKING INTO THE COUPLING THREADS. ANY OTHER SUITABLE LOCKING DEVICE MAY BE SUBSTITUTED IF DESIRED.

2.) ALLOWABLE LOADS ARE FOR 4,000 PSI HARD ROCK CONCRETE.

3.) MINIMUM CONCRETE THICKNESS OF 1 1/2 TIMES THE EMBEDMENT DEPTH, OR THE EMBEDMENT DEPTH PLUS THREE TIMES THE DIAMETER, WHICHEVER IS GREATER, SHALL BE PROVIDED.

4.) STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE STRUCTURE FOR THE TABULATED ALLOWABLE LOADS.

5.) SPECIAL INSPECTION SHALL BE PROVIDED PER CBC. THE SPECIAL INSPECTION MUST BE ON THE JOBSITE CONTINUOUSLY DURING ANCHOR INSTALLATION TO VERIFY ANCHOR TYPE, ANCHOR DIMENSIONS, HOLE DIMENSIONS, ANCHOR SPACING, EDGE DISTANCES, SLAB THICKNESS AND ANCHOR EMBEDMENT.

6.) MINIMUM SPACING BETWEEN THE INSERTS SHALL BE 2 TIMES THE EMBEDMENT DEPTH OR 12 TIMES THE ANCHOR DIAMETER (WHICH EVER IS GREATER).

7.) TOLCO FIG. 109AF IS A CAST-IN-PLACE ANCHOR BOLT AND COMPLIES WITH ACI 318 APPENDIX D AND DOES NOT REQUIRE ADDITIONAL TESTING CERTIFICATION.

8.) HANGER ROD DIAMETER SHALL BE EQUAL TO OR MORE THAN THE ANCHOR DIAMETER.

<table>
<thead>
<tr>
<th>ANCHOR DIAMETER</th>
<th>'E'</th>
<th>MIN. ANCHOR EMBEDMENT DEPTH</th>
<th>MAX. ALLOWABLE VERTICAL LOAD (Lbs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/8&quot;</td>
<td>3 1/2&quot;</td>
<td>610*</td>
<td></td>
</tr>
<tr>
<td>1/2&quot;</td>
<td>3 1/2&quot;</td>
<td>1130*</td>
<td></td>
</tr>
<tr>
<td>1/2&quot;</td>
<td>4&quot;</td>
<td>1130*</td>
<td></td>
</tr>
<tr>
<td>5/8&quot;</td>
<td>4&quot;</td>
<td>1810*</td>
<td></td>
</tr>
<tr>
<td>5/8&quot;</td>
<td>5&quot;</td>
<td>1810*</td>
<td></td>
</tr>
<tr>
<td>3/4&quot;</td>
<td>4&quot;</td>
<td>2710*</td>
<td></td>
</tr>
<tr>
<td>3/4&quot;</td>
<td>6&quot;</td>
<td>2710*</td>
<td></td>
</tr>
<tr>
<td>7/8&quot;</td>
<td>4&quot;</td>
<td>2600</td>
<td></td>
</tr>
<tr>
<td>7/8&quot;</td>
<td>7&quot;</td>
<td>3770*</td>
<td></td>
</tr>
</tbody>
</table>

* LOAD GOVERNED BY HANGER ROD.
2.) CALIFORNIA BUILDING CODE STATES: "ALL BOLTS SHALL BE ACCURATELY AND SECURELY SET PRIOR TO PLACEMENT OF CONCRETE..." FASTENERS OR JAMB NUT MAY BE USED. TYPICAL FOR ALL APPLICATIONS.

6.) SPECIAL INSPECTION SHALL BE PROVIDED PER CBC. THE SPECIAL INSPECTION MUST BE ON THE JOBSITE CONTINUOUSLY DURING ANCHOR INSTALLATION TO VERIFY ANCHOR TYPE, ANCHOR DIMENSIONS, HOLE DIMENSIONS, ANCHOR SPACING, EDGE DISTANCES, SLAB THICKNESS AND ANCHOR EMBEDMENT.

5.) STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE STRUCTURE FOR THE TABULATED ALLOWABLE LOADS.

4.) THE MOUNTING PLATE AND SCREWS USED TO ATTACH THE MOUNTING PLATE TO THE STEEL DECK ARE MEANS TO KEEP THE INSERT IN PLACE DURING CONSTRUCTION. THE MOUNTING PLATE AND SCREWS ARE NOT A STRUCTURAL PART OF THE INSERT. ALTERNATE MEANS MAY BE USED TO HOLD THE INSERT IN PLACE DURING CONSTRUCTION.

NOTES:

1.) ALLOWABLE LOADS ARE FOR ANCHORS INSTALLED IN 3,000 PSI LIGHTWEIGHT CONCRETE.

2.) CALIFORNIA BUILDING CODE STATES: "ALL BOLTS SHALL BE ACCURATELY AND SECURELY SET PRIOR TO PLACEMENT OF CONCRETE..." FASTENERS OR JAMB NUT MAY BE USED. TYPICAL FOR ALL APPLICATIONS.

3.) MOUNTING HOLES ARE STANDARD. IF THE PLATE IS NOT MECHANICALLY SECURED TO THE DECK RIBS A JAMB NUT IS REQUIRED TO PREVENT THE ANCHOR BOLT FROM LAYING OVER WHEN CONCRETE IS Poured.

4.) THE MOUNTING PLATE AND SCREWS USED TO ATTACH THE MOUNTING PLATE TO THE STEEL DECK ARE MEANS TO KEEP THE INSERT IN PLACE DURING CONSTRUCTION. THE MOUNTING PLATE AND SCREWS ARE NOT A STRUCTURAL PART OF THE INSERT. ALTERNATE MEANS MAY BE USED TO HOLD THE INSERT IN PLACE DURING CONSTRUCTION.

5.) STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE STRUCTURE FOR THE TABULATED ALLOWABLE LOADS.

6.) SPECIAL INSPECTION SHALL BE PROVIDED PER CBC. THE SPECIAL INSPECTION MUST BE ON THE JOBSITE CONTINUOUSLY DURING ANCHOR INSTALLATION TO VERIFY ANCHOR TYPE, ANCHOR DIMENSIONS, HOLE DIMENSIONS, ANCHOR SPACING, EDGE DISTANCES, SLAB THICKNESS AND ANCHOR EMBEDMENT.

7.) MINIMUM SPACING BETWEEN INSERTS SHALL BE 2 TIMES THE EMBEDMENT DEPTH OR 12 TIMES THE ANCHOR DIAMETER (WHICH EVER IS GREATER).

8.) TOLCO FIGURE 109A IS A CAST-IN-PLACE ANCHOR BOLT AND COMPLIES WITH ACI 318 APPENDIX D AND DOES NOT REQUIRE ADDITIONAL TESTING - CERTIFICATION.

9.) TOLCO 900 SERIES ATTACHMENT DIAMETER SHALL BE EQUAL TO THE ANCHOR DIAMETER.
2.) California Building Code states: "All bolts shall be accurately and securely set prior to placement of concrete..." Fasteners or jamb nut may be used. Typical for all applications.

3.) Mounting holes are standard. If the plate is not mechanically secured to the deck ribs a jamb nut is required to prevent the anchor bolt from laying over when concrete is poured.

4.) The mounting plate and screws used to attach the mounting plate to the steel deck are means to keep the insert in place during construction. The mounting plate and screws are not a structural part of the insert. Alternate means may be used to hold the insert in place during construction.

5.) Structural engineer of record shall verify adequacy of the structure for the tabulated allowable loads.

6.) Special inspection shall be provided per CBC. The special inspection must be on the job site continuously during anchor installation to verify anchor type, anchor dimensions, hole dimensions, anchor spacing, edge distances, slab thickness and anchor embedment.

7.) Minimum spacing between inserts shall be 2 times the embedment depth or 12 times the anchor diameter (which ever is greater).

8.) TOLCO Figure 109A is a cast-in-place anchor bolt and complies with ACI 318 Appendix D and does not require additional testing - certification.

9.) Rod coupling does not need to be tight up against the underside of the deck.

10.) Hanger rod diameter shall be equal to or more than the anchor diameter.
3.) MOUNTING HOLES ARE STANDARD. IF THE PLATE IS NOT MECHANICALLY SECURED TO THE DECK RIBS A JAMB NUT IS REQUIRED TO PREVENT THE ANCHOR BOLT FROM LAYING OVER WHEN CONCRETE IS POURED.

5.) STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE STRUCTURE FOR THE TABULATED ALLOWABLE LOADS.

2.) CALIFORNIA BUILDING CODE STATES: "ALL BOLTS SHALL BE ACCURATELY AND SECURELY SET PRIOR TO PLACEMENT OF CONCRETE..." FASTENERS OR JAMB NUT MAY BE USED. TYPICAL FOR ALL APPLICATIONS.

4.) THE MOUNTING PLATE AND SCREWS USED TO ATTACH THE MOUNTING PLATE TO THE STEEL DECK ARE MEANS TO KEEP THE INSERT IN PLACE DURING CONSTRUCTION. THE MOUNTING PLATE AND SCREWS ARE NOT A STRUCTURAL PART OF THE INSERT. ALTERNATE MEANS MAY BE USED TO HOLD THE INSERT IN PLACE DURING CONSTRUCTION.

6.) SPECIAL INSPECTION SHALL BE PROVIDED PER CBC. THE SPECIAL INSPECTION MUST BE ON THE JOBSITE CONTINUOUSLY DURING ANCHOR INSTALLATION TO VERIFY ANCHOR TYPE, ANCHOR DIMENSIONS, HOLE DIMENSIONS, ANCHOR SPACING, EDGE DISTANCES, SLAB THICKNESS AND ANCHOR EMBEDMENT.

7.) MINIMUM SPACING BETWEEN INSERTS SHALL BE 2 TIMES THE EMBEDMENT DEPTH OR 12 TIMES THE ANCHOR DIAMETER (WHICH EVER IS GREATER).

8.) TOLCO FIGURE 109A IS A CAST-IN-PLACE ANCHOR BOLT AND COMPLIES WITH ACI 318 APPENDIX D AND DOES NOT REQUIRE ADDITIONAL TESTING - CERTIFICATION.

9.) ROD COUPLING DOES NOT NEED TO BE TIGHT UP AGAINST THE UNDERSIDE OF THE DECK.

10.) HANGER ROD DIAMETER SHALL BE EQUAL TO OR MORE THAN THE ANCHOR DIAMETER.

NOTES:

1.) ALLOWABLE LOADS ARE FOR ANCHORS INSTALLED IN 3,000 PSI LIGHTWEIGHT CONCRETE.

2.) CALIFORNIA BUILDING CODE STATES: "ALL BOLTS SHALL BE ACCURATELY AND SECURELY SET PRIOR TO PLACEMENT OF CONCRETE..." FASTENERS OR JAMB NUT MAY BE USED. TYPICAL FOR ALL APPLICATIONS.

3.) MOUNTING HOLES ARE STANDARD. IF THE PLATE IS NOT MECHANICALLY SECURED TO THE DECK RIBS A JAMB NUT IS REQUIRED TO PREVENT THE ANCHOR BOLT FROM LAYING OVER WHEN CONCRETE IS POURED.

4.) THE MOUNTING PLATE AND SCREWS USED TO ATTACH THE MOUNTING PLATE TO THE STEEL DECK ARE MEANS TO KEEP THE INSERT IN PLACE DURING CONSTRUCTION. THE MOUNTING PLATE AND SCREWS ARE NOT A STRUCTURAL PART OF THE INSERT. ALTERNATE MEANS MAY BE USED TO HOLD THE INSERT IN PLACE DURING CONSTRUCTION.

5.) STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE STRUCTURE FOR THE TABULATED ALLOWABLE LOADS.

6.) SPECIAL INSPECTION SHALL BE PROVIDED PER CBC. THE SPECIAL INSPECTION MUST BE ON THE JOBSITE CONTINUOUSLY DURING ANCHOR INSTALLATION TO VERIFY ANCHOR TYPE, ANCHOR DIMENSIONS, HOLE DIMENSIONS, ANCHOR SPACING, EDGE DISTANCES, SLAB THICKNESS AND ANCHOR EMBEDMENT.

7.) MINIMUM SPACING BETWEEN INSERTS SHALL BE 2 TIMES THE EMBEDMENT DEPTH OR 12 TIMES THE ANCHOR DIAMETER (WHICH EVER IS GREATER).

8.) TOLCO FIGURE 109A IS A CAST-IN-PLACE ANCHOR BOLT AND COMPLIES WITH ACI 318 APPENDIX D AND DOES NOT REQUIRE ADDITIONAL TESTING - CERTIFICATION.

9.) ROD COUPLING DOES NOT NEED TO BE TIGHT UP AGAINST THE UNDERSIDE OF THE DECK.

10.) HANGER ROD DIAMETER SHALL BE EQUAL TO OR MORE THAN THE ANCHOR DIAMETER.

NOTES:

1.) ALLOWABLE LOADS ARE FOR ANCHORS INSTALLED IN 3,000 PSI LIGHTWEIGHT CONCRETE.

2.) CALIFORNIA BUILDING CODE STATES: "ALL BOLTS SHALL BE ACCURATELY AND SECURELY SET PRIOR TO PLACEMENT OF CONCRETE..." FASTENERS OR JAMB NUT MAY BE USED. TYPICAL FOR ALL APPLICATIONS.

3.) MOUNTING HOLES ARE STANDARD. IF THE PLATE IS NOT MECHANICALLY SECURED TO THE DECK RIBS A JAMB NUT IS REQUIRED TO PREVENT THE ANCHOR BOLT FROM LAYING OVER WHEN CONCRETE IS POURED.

4.) THE MOUNTING PLATE AND SCREWS USED TO ATTACH THE MOUNTING PLATE TO THE STEEL DECK ARE MEANS TO KEEP THE INSERT IN PLACE DURING CONSTRUCTION. THE MOUNTING PLATE AND SCREWS ARE NOT A STRUCTURAL PART OF THE INSERT. ALTERNATE MEANS MAY BE USED TO HOLD THE INSERT IN PLACE DURING CONSTRUCTION.

5.) STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE STRUCTURE FOR THE TABULATED ALLOWABLE LOADS.

6.) SPECIAL INSPECTION SHALL BE PROVIDED PER CBC. THE SPECIAL INSPECTION MUST BE ON THE JOBSITE CONTINUOUSLY DURING ANCHOR INSTALLATION TO VERIFY ANCHOR TYPE, ANCHOR DIMENSIONS, HOLE DIMENSIONS, ANCHOR SPACING, EDGE DISTANCES, SLAB THICKNESS AND ANCHOR EMBEDMENT.

7.) MINIMUM SPACING BETWEEN INSERTS SHALL BE 2 TIMES THE EMBEDMENT DEPTH OR 12 TIMES THE ANCHOR DIAMETER (WHICH EVER IS GREATER).

8.) TOLCO FIGURE 109A IS A CAST-IN-PLACE ANCHOR BOLT AND COMPLIES WITH ACI 318 APPENDIX D AND DOES NOT REQUIRE ADDITIONAL TESTING - CERTIFICATION.

9.) ROD COUPLING DOES NOT NEED TO BE TIGHT UP AGAINST THE UNDERSIDE OF THE DECK.

10.) HANGER ROD DIAMETER SHALL BE EQUAL TO OR MORE THAN THE ANCHOR DIAMETER.

NOTES:

1.) ALLOWABLE LOADS ARE FOR ANCHORS INSTALLED IN 3,000 PSI LIGHTWEIGHT CONCRETE.

2.) CALIFORNIA BUILDING CODE STATES: "ALL BOLTS SHALL BE ACCURATELY AND SECURELY SET PRIOR TO PLACEMENT OF CONCRETE..." FASTENERS OR JAMB NUT MAY BE USED. TYPICAL FOR ALL APPLICATIONS.

3.) MOUNTING HOLES ARE STANDARD. IF THE PLATE IS NOT MECHANICALLY SECURED TO THE DECK RIBS A JAMB NUT IS REQUIRED TO PREVENT THE ANCHOR BOLT FROM LAYING OVER WHEN CONCRETE IS POURED.

4.) THE MOUNTING PLATE AND SCREWS USED TO ATTACH THE MOUNTING PLATE TO THE STEEL DECK ARE MEANS TO KEEP THE INSERT IN PLACE DURING CONSTRUCTION. THE MOUNTING PLATE AND SCREWS ARE NOT A STRUCTURAL PART OF THE INSERT. ALTERNATE MEANS MAY BE USED TO HOLD THE INSERT IN PLACE DURING CONSTRUCTION.

5.) STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE STRUCTURE FOR THE TABULATED ALLOWABLE LOADS.

6.) SPECIAL INSPECTION SHALL BE PROVIDED PER CBC. THE SPECIAL INSPECTION MUST BE ON THE JOBSITE CONTINUOUSLY DURING ANCHOR INSTALLATION TO VERIFY ANCHOR TYPE, ANCHOR DIMENSIONS, HOLE DIMENSIONS, ANCHOR SPACING, EDGE DISTANCES, SLAB THICKNESS AND ANCHOR EMBEDMENT.

7.) MINIMUM SPACING BETWEEN INSERTS SHALL BE 2 TIMES THE EMBEDMENT DEPTH OR 12 TIMES THE ANCHOR DIAMETER (WHICH EVER IS GREATER).

8.) TOLCO FIGURE 109A IS A CAST-IN-PLACE ANCHOR BOLT AND COMPLIES WITH ACI 318 APPENDIX D AND DOES NOT REQUIRE ADDITIONAL TESTING - CERTIFICATION.

9.) ROD COUPLING DOES NOT NEED TO BE TIGHT UP AGAINST THE UNDERSIDE OF THE DECK.

10.) HANGER ROD DIAMETER SHALL BE EQUAL TO OR MORE THAN THE ANCHOR DIAMETER.

NOTES:

1.) ALLOWABLE LOADS ARE FOR ANCHORS INSTALLED IN 3,000 PSI LIGHTWEIGHT CONCRETE.

2.) CALIFORNIA BUILDING CODE STATES: "ALL BOLTS SHALL BE ACCURATELY AND SECURELY SET PRIOR TO PLACEMENT OF CONCRETE..." FASTENERS OR JAMB NUT MAY BE USED. TYPICAL FOR ALL APPLICATIONS.

3.) MOUNTING HOLES ARE STANDARD. IF THE PLATE IS NOT MECHANICALLY SECURED TO THE DECK RIBS A JAMB NUT IS REQUIRED TO PREVENT THE ANCHOR BOLT FROM LAYING OVER WHEN CONCRETE IS POURED.

4.) THE MOUNTING PLATE AND SCREWS USED TO ATTACH THE MOUNTING PLATE TO THE STEEL DECK ARE MEANS TO KEEP THE INSERT IN PLACE DURING CONSTRUCTION. THE MOUNTING PLATE AND SCREWS ARE NOT A STRUCTURAL PART OF THE INSERT. ALTERNATE MEANS MAY BE USED TO HOLD THE INSERT IN PLACE DURING CONSTRUCTION.

5.) STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE STRUCTURE FOR THE TABULATED ALLOWABLE LOADS.

6.) SPECIAL INSPECTION SHALL BE PROVIDED PER CBC. THE SPECIAL INSPECTION MUST BE ON THE JOBSITE CONTINUOUSLY DURING ANCHOR INSTALLATION TO VERIFY ANCHOR TYPE, ANCHOR DIMENSIONS, HOLE DIMENSIONS, ANCHOR SPACING, EDGE DISTANCES, SLAB THICKNESS AND ANCHOR EMBEDMENT.

7.) MINIMUM SPACING BETWEEN INSERTS SHALL BE 2 TIMES THE EMBEDMENT DEPTH OR 12 TIMES THE ANCHOR DIAMETER (WHICH EVER IS GREATER).

8.) TOLCO FIGURE 109A IS A CAST-IN-PLACE ANCHOR BOLT AND COMPLIES WITH ACI 318 APPENDIX D AND DOES NOT REQUIRE ADDITIONAL TESTING - CERTIFICATION.

9.) ROD COUPLING DOES NOT NEED TO BE TIGHT UP AGAINST THE UNDERSIDE OF THE DECK.

10.) HANGER ROD DIAMETER SHALL BE EQUAL TO OR MORE THAN THE ANCHOR DIAMETER.
TOLCO FIG. 109 CONCRETE DECK INSERT IN 3,000 PSI LIGHTWEIGHT CONCRETE OVER METAL DECK - 20 GA (MIN.)

NOTES:
1.) ALLOWABLE LOADS ARE FOR ANCHORS INSTALLED IN 3,000 PSI LIGHTWEIGHT CONCRETE.
2.) CALIFORNIA BUILDING CODE STATES: "ALL BOLTS SHALL BE ACCURATELY AND SECURELY SET PRIOR TO PLACEMENT OF CONCRETE..." FASTENERS OR JAMB NUT MAY BE USED. TYPICAL FOR ALL APPLICATIONS.
3.) MOUNTING HOLES ARE STANDARD. IF THE PLATE IS NOT MECHANICALLY SECURED TO THE DECK RIBS A JAMB NUT IS REQUIRED TO PREVENT THE ANCHOR BOLT FROM LAYING OVER WHEN CONCRETE IS POURED.
4.) STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE STRUCTURE FOR THE TABULATED ALLOWABLE LOADS.
5.) SPECIAL INSPECTION SHALL BE PROVIDED PER CBC. THE SPECIAL INSPECTION MUST BE ON THE JOBSITE CONTINUOUSLY DURING ANCHOR INSTALLATION TO VERIFY ANCHOR TYPE, ANCHOR DIMENSIONS, HOLE DIMENSIONS, ANCHOR SPACING, EDGE DISTANCES, SLAB THICKNESS AND ANCHOR EMBEDMENT.
6.) MINIMUM SPACING BETWEEN INSERTS SHALL BE THE GREATER OF 2 TIMES THE EMBEDMENT DEPTH, OR 12".

<table>
<thead>
<tr>
<th>ANCHOR DIAMETER</th>
<th>MIN. ANCHOR EMBEDMENT DEPTH</th>
<th>MAX. HORIZONTAL SEISMIC LOAD W/ BRACE @ 45° (Lbs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/8&quot;</td>
<td>5 1/4&quot;</td>
<td>560</td>
</tr>
<tr>
<td>1/2&quot;</td>
<td>5 1/4&quot;</td>
<td>660</td>
</tr>
<tr>
<td>5/8&quot;</td>
<td>5 1/4&quot;</td>
<td>660</td>
</tr>
<tr>
<td>3/4&quot;</td>
<td>5 1/4&quot;</td>
<td>700</td>
</tr>
<tr>
<td>7/8&quot;</td>
<td>5 1/4&quot;</td>
<td>700</td>
</tr>
</tbody>
</table>
TOLCO FIG. 109 CONCRETE DECK INSERT IN 3,000 PSI LIGHTWEIGHT CONCRETE OVER METAL DECK - 20 GA (MIN.)

![Diagram of CONCRETE DECK INSERT](image)

**NOTES:**

1. ALLOWABLE LOADS ARE FOR ANCHORS INSTALLED IN 3,000 PSI LIGHTWEIGHT CONCRETE.

2. CALIFORNIA BUILDING CODE STATES: "ALL BOLTS SHALL BE ACCURATELY AND SECURELY SET PRIOR TO PLACEMENT OF CONCRETE..." FASTENERS OR JAMB NUT MAY BE USED. TYPICAL FOR ALL APPLICATIONS.

3. MOUNTING HOLES ARE STANDARD. IF THE PLATE IS NOT MECHANICALLY SECURED TO THE DECK RIBS A JAMB NUT IS REQUIRED TO PREVENT THE ANCHOR BOLT FROM LAYING OVER WHEN CONCRETE IS Poured.

4. STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE STRUCTURE FOR THE TABULATED ALLOWABLE LOADS.

5. SPECIAL INSPECTION SHALL BE PROVIDED PER CBC. THE SPECIAL INSPECTION MUST BE ON THE JOBSITE CONTINUOUSLY DURING ANCHOR INSTALLATION TO VERIFY ANCHOR TYPE, ANCHOR DIMENSIONS, HOLE DIMENSIONS, ANCHOR SPACING, EDGE DISTANCES, SLAB THICKNESS AND ANCHOR EMBEDMENT.

6. MINIMUM SPACING BETWEEN INSERTS SHALL BE THE GREATER OF 2 TIMES THE EMBEDMENT DEPTH, OR 12".

<table>
<thead>
<tr>
<th>ANCHOR DIAMETER</th>
<th>MIN. ANCHOR EMBEDMENT DEPTH</th>
<th>MAX. ALLOWABLE VERTICAL LOAD (Lbs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/8&quot;</td>
<td>5 1/4&quot;</td>
<td>572</td>
</tr>
<tr>
<td>1/2&quot;</td>
<td>5 1/4&quot;</td>
<td>579</td>
</tr>
<tr>
<td>5/8&quot;</td>
<td>5 1/4&quot;</td>
<td>715</td>
</tr>
<tr>
<td>3/4&quot;</td>
<td>5 1/4&quot;</td>
<td>1000</td>
</tr>
<tr>
<td>7/8&quot;</td>
<td>5 1/4&quot;</td>
<td>1000</td>
</tr>
</tbody>
</table>
1.) ALLOWABLE LOADS ARE FOR ANCHORS INSTALLED IN 3,000 PSI LIGHTWEIGHT CONCRETE.
2.) CALIFORNIA BUILDING CODE STATES: "ALL BOLTS SHALL BE ACCURATELY AND SECURELY SET PRIOR TO PLACEMENT OF CONCRETE..." FASTENERS OR JAMB NUT MAY BE USED. TYPICAL FOR ALL APPLICATIONS.
3.) MOUNTING HOLES ARE STANDARD. IF THE PLATE IS NOT MECHANICALLY SECURED TO THE DECK RIBS A JAMB NUT IS REQUIRED TO PREVENT THE ANCHOR BOLT FROM LAYING OVER WHEN CONCRETE IS POURED.
4.) THE MOUNTING PLATE AND SCREWS USED TO ATTACH THE MOUNTING PLATE TO THE STEEL DECK ARE MEANS TO KEEP THE INSERT IN PLACE DURING CONSTRUCTION. THE MOUNTING PLATE AND SCREWS ARE NOT A STRUCTURAL PART OF THE INSERT. ALTERNATE MEANS MAY BE USED TO HOLD THE INSERT IN PLACE DURING CONSTRUCTION.
5.) STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE STRUCTURE FOR THE TABULATED ALLOWABLE LOADS.
6.) SPECIAL INSPECTION SHALL BE PROVIDED PER CBC. THE SPECIAL INSPECTION MUST BE ON THE JOBSITE CONTINUOUSLY DURING ANCHOR INSTALLATION TO VERIFY ANCHOR TYPE, ANCHOR DIMENSIONS, HOLE DIMENSIONS, ANCHOR SPACING, EDGE DISTANCES, SLAB THICKNESS AND ANCHOR EMBEDMENT.
7.) MINIMUM SPACING BETWEEN INSERTS SHALL BE 2 TIMES THE EMBEDMENT DEPTH OR 12 TIMES THE ANCHOR DIAMETER (WHICH EVER IS GREATER).
8.) IF ALLOWABLE LOAD FOR ONE ANCHOR IS USED, TOLCO 900 SERIES MAY BE OFF CENTER WHEN USING TWO ANCHORS WITH STRUT.
9.) TOLCO FIGURE 109A IS A CAST-IN-PLACE ANCHOR BOLT AND COMPLIES WITH ACI 318 APPENDIX D AND DOES NOT REQUIRE ADDITIONAL TESTING - CERTIFICATION.
10.) HANGER ROD DIAMETER SHALL BE EQUAL TO OR MORE THAN THE ANCHOR DIAMETER.

<table>
<thead>
<tr>
<th>ANCHOR DIAMETER</th>
<th>&quot;E&quot; MIN. ANCHOR EMBEDMENT DEPTH</th>
<th>MAX. HORIZONTAL SEISMIC LOAD W/ BRACE @ 45° (Lbs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/8&quot;</td>
<td>2 1/4&quot;</td>
<td>615</td>
</tr>
<tr>
<td>1/2&quot;</td>
<td>2 1/4&quot;</td>
<td>1040</td>
</tr>
<tr>
<td>5/8&quot;</td>
<td>2 1/4&quot;</td>
<td>1040</td>
</tr>
<tr>
<td>3/4&quot;</td>
<td>2 1/4&quot;</td>
<td>1040</td>
</tr>
<tr>
<td>7/8&quot;</td>
<td>2 1/4&quot;</td>
<td>1040</td>
</tr>
</tbody>
</table>
Double Tolco Fig. 109a Concrete Deck Insert in 3,000 PSI Lightweight Concrete Over Metal Deck - 20 Ga (Min.)

Notes:

1.) Allowable loads are for anchors installed in 3,000 PSI lightweight concrete.

2.) California building code states: "All bolts shall be accurately and securely set prior to placement of concrete..." fasteners or jamb nut may be used. Typical for all applications.

3.) Mounting holes are standard. If the plate is not mechanically secured to the deck ribs a jamb nut is required to prevent the anchor bolt from laying over when concrete is poured.

4.) The mounting plate and screws used to attach the mounting plate to the steel deck are means to keep the insert in place during construction. The mounting plate and screws are not a structural part of the insert. Alternate means may be used to hold the insert in place during construction.

5.) Structural engineer of record shall verify adequacy of the structure for the tabulated allowable loads.

6.) Special inspection shall be provided per CBC. The special inspection must be on the jobsite continuously during anchor installation to verify anchor type, anchor dimensions, hole dimensions, anchor spacing, edge distances, slab thickness and anchor embedment.

7.) Minimum spacing between inserts shall be 2 times the embedment depth or 12 times the anchor diameter (which ever is greater).

8.) If allowable load for one anchor is used, hanger rod may be off center when using two anchors with strut.

9.) Tolco Figure 109a is a cast-in-place anchor bolt and complies with ACI 318 Appendix D and does not require additional testing - certification.

10.) Hanger rod diameter shall be equal to or greater than the anchor diameter.

**Notes:**

- Load governed by hanger rod.
- Load governed by spring nut/channel nut.

<table>
<thead>
<tr>
<th>Anchor Diameter</th>
<th>&quot;E&quot; Min. Anchor Embedment Depth</th>
<th>Max. Allowable Vertical Load (Lbs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/8&quot;</td>
<td>2 1/4&quot;</td>
<td>610*</td>
</tr>
<tr>
<td>1/2&quot;</td>
<td>2 1/4&quot;</td>
<td>1130*</td>
</tr>
<tr>
<td>5/8&quot;</td>
<td>2 1/4&quot;</td>
<td>1430</td>
</tr>
<tr>
<td>3/4&quot;</td>
<td>2 1/4&quot;</td>
<td>2000**</td>
</tr>
<tr>
<td>7/8&quot;</td>
<td>2 1/4&quot;</td>
<td>2000**</td>
</tr>
</tbody>
</table>

**Support Rod w/ Tolstrut**

- "F" series or B-Line B200 series flat fitting and Tolstrut spra or B-Line N200 series spring nut. Must be centered between two anchors.

**B-Line B22 Solid Channel**

**Diagram:**

- 12 x Anchor Diameter Min.
- Support rod w/ Tolstrut "F" series or B-Line B200 series flat fitting and Tolstrut spra or B-Line N200 series spring nut. Must be centered between two anchors.

**Credits:**

- Zubair Sheikh, Structural Engineer, No. 4039, S 4039, 1375 Sampson Avenue, Corona, CA 92879
- Tolco Corporation, 12-31-11
BOLT TO 18 GA. MIN. METAL DECK WITH NO CONCRETE FILL

SHOWN WITH 900 SERIES ATTACHMENT
PERPENDICULAR TO FLUTES

TOLSTRUT SPRA OR B-LINE N200 SPRING NUT W/ HHMB.
(9) #10 SELF-TAPPING SHEET METAL SCREWS
B-LINE B22 SOLID CHANNEL

SHOWN WITH 900 SERIES ATTACHMENT
PARALLEL TO FLUTES

B-LINE B22 SOLID CHANNEL W/
(9) #10 SELF-TAPPING SHEET METAL SCREWS
(3 SCREWS PER FLUTE) (TYP)

TOLSTRUT SPRA OR B-LINE N200 SPRING NUT W/ HHMB. (TYP)
B-LINE B22 SOLID CHANNEL

NOTES:
1.) STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE STRUCTURE FOR THE TABULATED ALLOWABLE LOADS.

2.) STRUT NUTS MAY BE USED INSTEAD OF SPRING NUTS AS SHOWN.

3.) SCREWS SHALL BE 1" MIN. LONG.

4.) SCREWS SHALL BE SPACED AT 1/4" MINIMUM SPACING.

MAX. HORIZONTAL SEISMIC LOAD W/ BRACE @ 45° (Lbs.)

<table>
<thead>
<tr>
<th>PERPENDICULAR</th>
<th>PARALLEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>
BOLT TO 18 GA. MIN. METAL DECK WITH NO CONCRETE FILL

MAX. ALLOWABLE VERTICAL DESIGN LOAD (Lbs.)

<table>
<thead>
<tr>
<th></th>
<th>PERPENDICULAR</th>
<th>PARALLEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAX.</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

NOTES:
1.) STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE STRUCTURE FOR THE TABULATED ALLOWABLE LOADS.
2.) STRUT NUTS MAY BE USED INSTEAD OF SPRING NUTS AS SHOWN.
3.) SCREWS SHALL BE 1" MIN. LONG.
4.) SCREWS SHALL BE SPACED AT 5/8" MINIMUM SPACING WITH 3/8" MIN. EDGE DISTANCE.
NOTES:

1.) ALLOWABLE LOADS ARE FOR ANCHORS INSTALLED IN 4,000 PSI NORMAL WEIGHT CONCRETE.

2.) STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE STRUCTURE FOR THE TABULATED ALLOWABLE LOADS.

MAX. HORIZONTAL SEISMIC LOAD PER 16" W/ BRACE @ 45° (Lbs.)

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>MAX. HORIZONTAL SEISMIC LOAD PER 16&quot; W/ BRACE @ 45° (Lbs.)</td>
<td>950</td>
</tr>
</tbody>
</table>
### B-LINE CONTINUOUS CONCRETE INSERT

- **16” MIN.**
- **BLINE CONTINUOUS CONCRETE INSERT CHANNEL. REDUCE LOAD BY 50% WITHIN 2" FROM END OF CHANNEL.**

## Table: Max. Allowable Vertical Load Per 16” (Lbs.)

<table>
<thead>
<tr>
<th>Hanger Rod Diameter</th>
<th>Max. Allowable Vertical Load Per 16” (Lbs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/8”</td>
<td>610*</td>
</tr>
<tr>
<td>1/2”</td>
<td>1130*</td>
</tr>
<tr>
<td>5/8”</td>
<td>1421</td>
</tr>
<tr>
<td>3/4”</td>
<td>1421</td>
</tr>
</tbody>
</table>

*LOAD GOVERNED BY HANGER ROD*

## Notes:

1.) ALLOWABLE LOADS ARE FOR ANCHORS INSTALLED IN 4,000 PSI NORMAL WEIGHT CONCRETE.

2.) STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE STRUCTURE FOR THE TABULATED ALLOWABLE LOADS.
WELD TO STEEL

1.) ALL STRUCTURAL STEEL SHALL BE A36 OR EQUAL

2.) STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF STRUCTURE TO RESIST ALL BRACE LOADS.

3.) WELDING SHALL BE DONE BY ELECTRIC SHIELDED ARC PROCESS USING E-70XX ELECTRODES.

4.) ALL WELDING SHALL BE PERFORMED BY A CERTIFIED WELDER.

5.) ALL WELDS SHALL BE IN CONFORMANCE WITH THE LATEST EDITION OF THE STRUCTURAL WELDING CODE OF THE AMERICAN WELDING SOCIETY.

6.) CONTINUOUS INSPECTION IS REQUIRED FOR ALL WELDING.

MIN. WELD | MAX. HORIZONTAL SEISMIC LOAD W/ BRACE @ 45° (Lbs.)
--- | ---
3/16" | 1424"*

*LOAD GOVERNED BY TOLCO 900 SERIES ATTACHMENT.
BOLT TO STEEL

1. ALL STRUCTURAL STEEL SHALL BE A36 OR EQUAL

2. FASTENERS SHALL BE A307 BOLTS OR BETTER

3. STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF STRUCTURE TO RESIST ALL BRACE LOADS.

<table>
<thead>
<tr>
<th>BOLT DIA.</th>
<th>MAX. HORIZONTAL SEISMIC LOAD W/ BRACE @ 45° (Lbs.)</th>
<th>'E' MIN. EDGE DISTANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/8&quot;</td>
<td>500</td>
<td>1&quot;</td>
</tr>
<tr>
<td>1/2&quot;</td>
<td>800</td>
<td>1&quot;</td>
</tr>
<tr>
<td>5/8&quot;</td>
<td>1200</td>
<td>1 1/2&quot;</td>
</tr>
<tr>
<td>3/4&quot;</td>
<td>1424*</td>
<td>1 1/2&quot;</td>
</tr>
</tbody>
</table>

* LOAD GOVERNED BY TOLCO 900 SERIES ATTACHMENT.
TIGHTEN BOTH BOLTS EVENLY UNTIL BREAK-OFF BOLT HEADS COME OFF

2.) STRUCTURAL ENGINEER OF RECORD TO VERIFY ADEQUACY OF JOIST TO RESIST ALL BRACE LOADS.

1.) ATTACH FIG. 825 TO TOP CHORD OF BAR JOIST ONLY UNLESS OTHERWISE PERMITTED BY STRUCTURAL ENGINEER OF RECORD.

3.) ALL EARTHQUAKE BRACING CONNECTIONS TO BE WITHIN 6" OF THE CORD PANEL POINT.

4.) UL LISTED AS HANGER ATTACHMENT UP TO 472 LBS.

<table>
<thead>
<tr>
<th>DIRECTION OF ATTACHMENT TO STRUCTURE</th>
<th>MAX. BRACE ANGLE</th>
<th>MAX. HORIZONTAL SEISMIC LOAD (Lbs.)</th>
<th>MAX. SEISMIC LOAD ALONG BRACE (Lbs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PERPENDICULAR</td>
<td>FROM HORIZONTAL</td>
<td>FROM VERTICAL</td>
<td></td>
</tr>
<tr>
<td>30°</td>
<td>60°</td>
<td>1744</td>
<td>2015</td>
</tr>
<tr>
<td>45°</td>
<td>45°</td>
<td>1424</td>
<td>2015</td>
</tr>
<tr>
<td>60°</td>
<td>30°</td>
<td>1007</td>
<td>2015</td>
</tr>
<tr>
<td>PARALLEL</td>
<td>30°</td>
<td>60°</td>
<td>1744</td>
</tr>
<tr>
<td>45°</td>
<td>45°</td>
<td>1424</td>
<td>2015</td>
</tr>
<tr>
<td>60°</td>
<td>30°</td>
<td>1007</td>
<td>2015</td>
</tr>
</tbody>
</table>
TIGHTEN BOTH BOLTS EVENLY UNTIL BREAK-OFF BOLT HEADS COME OFF

1.) ATTACH FIG. 825A TO TOP CHORD OF BAR JOIST ONLY UNLESS OTHERWISE PERMITTED BY STRUCTURAL ENGINEER OF RECORD.
2.) STRUCTURAL ENGINEER OF RECORD TO VERIFY ADEQUACY OF JOIST TO RESIST ALL BRACE LOADS.
3.) ALL EARTHQUAKE BRACING CONNECTIONS TO BE WITHIN 6" OF THE CORD PANEL POINT.

<table>
<thead>
<tr>
<th>DIRECTION OF ATTACHMENT TO STRUCTURE</th>
<th>MAX. BRACE ANGLE FROM HORIZONTAL</th>
<th>MAX. BRACE ANGLE FROM VERTICAL</th>
<th>MAX. HORIZONTAL SEISMIC LOAD (Lbs.)</th>
<th>MAX. SEISMIC LOAD ALONG BRACE (Lbs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PERPENDICULAR</td>
<td>30° 60°</td>
<td>45° 45°</td>
<td>60° 30°</td>
<td>1095 1265</td>
</tr>
<tr>
<td>PARALLEL</td>
<td>30° 60°</td>
<td>45° 45°</td>
<td>60° 30°</td>
<td>1095 1265</td>
</tr>
</tbody>
</table>

NOTES:

1.) ATTACH FIG. 825A TO TOP CHORD OF BAR JOIST ONLY UNLESS OTHERWISE PERMITTED BY STRUCTURAL ENGINEER OF RECORD.
2.) STRUCTURAL ENGINEER OF RECORD TO VERIFY ADEQUACY OF JOIST TO RESIST ALL BRACE LOADS.
3.) ALL EARTHQUAKE BRACING CONNECTIONS TO BE WITHIN 6" OF THE CORD PANEL POINT.
1.) STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF STRUCTURE TO RESIST ALL BRACE LOADS.

2.) FITS BEAM WITH FLANGE THICKNESS UP TO 1 1/4" AND WIDTH UP TO 18".

<table>
<thead>
<tr>
<th>DIRECTION OF ATTACHMENT TO STRUCTURE</th>
<th>MAX. BRACE ANGLE FROM HORIZONTAL</th>
<th>MAX. HORIZONTAL SEISMIC LOAD (Lbs.)</th>
<th>MAX. SEISMIC LOAD ALONG BRACE (Lbs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PERPENDICULAR</td>
<td>30° 60°</td>
<td>1744</td>
<td>2015</td>
</tr>
<tr>
<td></td>
<td>45° 45°</td>
<td>1424</td>
<td>2015</td>
</tr>
<tr>
<td></td>
<td>60° 30°</td>
<td>1007</td>
<td>2015</td>
</tr>
<tr>
<td>PARALLEL</td>
<td>30° 60°</td>
<td>1095</td>
<td>1265</td>
</tr>
<tr>
<td></td>
<td>45° 45°</td>
<td>894</td>
<td>1265</td>
</tr>
<tr>
<td></td>
<td>60° 30°</td>
<td>633</td>
<td>1265</td>
</tr>
</tbody>
</table>

NOTES:

1.) STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF STRUCTURE TO RESIST ALL BRACE LOADS.

2.) FITS BEAM WITH FLANGE THICKNESS UP TO 1 1/4" AND WIDTH UP TO 18".
1.) BRACE MAY BE INSTALLED PARALLEL OR PERPENDICULAR TO THE CHANNEL

2.) ALLOWABLE LOADS SHALL BE CALCULATED PER STRUT SECTION PROPERTIES (SEE PAGE 13-29, 13-30, 13-31)
SUPPLEMENTAL STEEL HANGER ATTACHMENT

NOTES:
1.) STRUT MAY BE WELDED TO THE BOTTOM-UNDERSIDE OF BEAM FLANGE USING THE SAME WELD AS WHEN WELDED TO THE TOP OF BEAM BOTTOM FLANGE.

2.) ALLOWABLE LOADS SHALL BE CALCULATED PER STRUT SECTION PROPERTIES (SEE PAGE 13-29, 13-30, 13-31)
THRU-BOLT STRUCTURAL ATTACHMENTS
PERPENDICULAR TO WOOD BEAM

- MUST BE ABOVE THE NEUTRAL AXIS OF THE BEAM AND MIN. 4X BOLT DIA. FROM BOTTOM OF BEAM.
- 4 BOLT DIAMETERS MIN.

BOLT THRU BEAM WITH NUT AND FLAT WASHER.
TOLCO 900 SERIES ATTACHMENT

BOLT THRU BEAM WITH NUT AND FLAT WASHER.
TOLCO FIG. 906 SWAY BRACE MULTI-FASTENER ADAPTER

NOTES:

1.) BOLT HOLES SHALL BE BORED 1/16" LARGER THAN THE NOMINAL BOLT DIAMETER.

2.) LOADS FOR THRU-BOLT ATTACHMENTS WERE DERIVED FROM CCR TITLE 24, PART 2, HOLDING POWER OF BOLTS FOR DOUGLAS FIR, LARCH, CALIFORNIA REDWOOD (CLOSE GRAIN) AND SOUTHERN PINE.

3.) MINIMUM BEAM SIZE = 4x

4.) STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE STRUCTURE FOR THE TABULATED ALLOWABLE LOADS, INCLUDING BUT NOT LIMITED TO ANY BLOCKING REQUIREMENTS.

<table>
<thead>
<tr>
<th>BOLT DIAMETER</th>
<th>MAX. HORIZONTAL SEISMIC LOAD W/ BRACE @ 45° (Lbs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 BOLT</td>
</tr>
<tr>
<td>1/2&quot;</td>
<td>300</td>
</tr>
<tr>
<td>5/8&quot;</td>
<td>360</td>
</tr>
<tr>
<td>3/4&quot;</td>
<td>400</td>
</tr>
</tbody>
</table>
THRU-BOLT STRUCTURAL ATTACHMENTS
PARALLEL TO WOOD BEAM

BOLT THRU BEAM WITH
NUT AND FLAT WASHER.
TOLCO 900 SERIES
ATTACHMENT

BOLT THRU BEAM WITH
NUT AND FLAT WASHER.
TOLCO FIG. 906 SWAY
BRACE MULTI-FASTENER
ADAPTER

MUST BE ABOVE THE NEUTRAL
AXIS OF THE BEAM AND MIN.
4X BOLT DIA. FROM BOTTOM
OF BEAM
4 BOLT DIAMETERS
MIN.

MUST BE ABOVE THE NEUTRAL
AXIS OF THE BEAM AND MIN.
4X BOLT DIA. FROM BOTTOM
OF BEAM
4 BOLT DIAMETERS
MIN.

NOTES:

1.) BOLT HOLES SHALL BE BORED 1/16" LARGER THAN THE
   NOMINAL BOLT DIAMETER.

2.) LOADS FOR THRUBOLT ATTACHMENTS WERE DERIVED FROM
   CCR TITLE 24, PART 2, HOLDING POWER OF BOLTS FOR DOUGLAS
   FIR, LARCH, CALIFORNIA REDWOOD (CLOSE GRAIN) AND
   SOUTHERN PINE.

3.) MINIMUM BEAM SIZE = 4x

4.) STRUCTURAL ENGINEER OF RECORD SHALL VERIFY
   ADEQUACY OF THE STRUCTURE FOR THE TABULATED ALLOWABLE
   LOADS, INCLUDING BUT NOT LIMITED TO ANY BLOCKING
   REQUIREMENTS.

<table>
<thead>
<tr>
<th>BOLT DIAMETER</th>
<th>MAX. HORIZONTAL SEISMIC LOAD W/ BRACE @ 45°</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(Lbs.)</td>
</tr>
<tr>
<td>1 BOLT</td>
<td>2 BOLT</td>
</tr>
<tr>
<td>1/2&quot;</td>
<td>260</td>
</tr>
<tr>
<td>5/8&quot;</td>
<td>320</td>
</tr>
<tr>
<td>3/4&quot;</td>
<td>380</td>
</tr>
</tbody>
</table>

PAGE: 10 - 36
LAG BOLT STRUCTURAL ATTACHMENTS
PERPENDICULAR TO WOOD BEAM

NOTES:

1.) BOLT HOLES SHALL BE BORED 1/16" LARGER THAN THE NOMINAL BOLT DIAMETER.

2.) LOADS FOR THRU-BOLT ATTACHMENTS WERE DERIVED FROM CCR TITLE 24, PART 2, HOLDING POWER OF BOLTS FOR DOUGLAS FIR, LARCH, CALIFORNIA REDWOOD (CLOSE GRAIN) AND SOUTHERN PINE.

3.) MINIMUM BEAM SIZE FOR 1/2" AND 5/8" BOLTS = 4x; FOR 3/4" BOLTS = 6x

4.) STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE STRUCTURE FOR THE TABULATED ALLOWABLE LOADS, INCLUDING BUT NOT LIMITED TO ANY BLOCKING REQUIREMENTS.

5.) LAG BOLTS SHALL NOT BE USED FOR BRACING FIRE SPRINKLER SYSTEMS.

<table>
<thead>
<tr>
<th>LAG BOLT SIZE</th>
<th>MAX. HORIZONTAL SEISMIC LOAD W/ BRACE @ 45° (Lbs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 BOLT</td>
</tr>
<tr>
<td>1/2&quot; x 3 1/2&quot;</td>
<td>180</td>
</tr>
<tr>
<td>5/8&quot; x 3 1/2&quot;</td>
<td>200</td>
</tr>
<tr>
<td>3/4&quot; x 5 1/2&quot;</td>
<td>380</td>
</tr>
</tbody>
</table>
LAG BOLT STRUCTURAL ATTACHMENTS PARALLEL TO WOOD BEAM

MUST BE ABOVE THE NEUTRAL AXIS OF THE BEAM AND MIN. 4X BOLT DIA. FROM BOTTOM OF BEAM

4 BOLT DIAMETERS MIN.

LAG BOLT

LAG BOLT (TYP)

TOLCO FIG. 906 SWAY BRACE MULTI-FASTENER ADAPTER

4 BOLT DIAMETERS MIN.

9"

LAG BOLT STRUCTURAL ATTACHMENTS PARALLEL TO WOOD BEAM

NOTES:

1.) BOLT HOLES SHALL BE BORED 1/16" LARGER THAN THE NOMINAL BOLT DIAMETER.

2.) LOADS FOR THRU-BOLT ATTACHMENTS WERE DERIVED FROM CCR TITLE 24, PART 2, HOLDING POWER OF BOLTS FOR DOUGLAS FIR, LARCH, CALIFORNIA REDWOOD (CLOSE GRAIN) AND SOUTHERN PINE.

3.) MINIMUM BEAM SIZE FOR 1/2" AND 5/8" BOLTS = 4x; FOR 3/4" BOLTS = 6x

4.) STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE STRUCTURE FOR THE TABULATED ALLOWABLE LOADS, INCLUDING BUT NOT LIMITED TO ANY BLOCKING REQUIREMENTS.

5.) LAG BOLTS SHALL NOT BE USED FOR BRACING FIRE SPRINKLER SYSTEMS.

<table>
<thead>
<tr>
<th>BOLT DIAMETER</th>
<th>MAX. HORIZONTAL SEISMIC LOAD W/ BRACE @ 45° (Lbs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 BOLT</td>
</tr>
<tr>
<td>1/2&quot; x 3 1/2&quot;</td>
<td>180</td>
</tr>
<tr>
<td>5/8&quot; x 3 1/2&quot;</td>
<td>180</td>
</tr>
<tr>
<td>3/4&quot; x 5 1/2&quot;</td>
<td>380</td>
</tr>
</tbody>
</table>

1375 SAMPSON AVENUE
CORONA, CA. 92879
P: (951) 737-5599
F: (951) 737-0330

ZUBAIR SHEIKH
STRUCTURAL ENGINEER
S 4039

TOLCO 900 SERIES ATTACHMENT

TOLCO 900 SERIES ATTACHMENT

ZUBAIR SHEIKH
STRUCTURAL ENGINEER
S 4039

DATE: December 20, 2009
PAGE: 10 - 38
TEST VALUES NORMAL WEIGHT OR LIGHTWEIGHT CONCRETE

### WEDGE ANCHOR

<table>
<thead>
<tr>
<th>ANCHOR DIAMETER</th>
<th>LOAD (Lbs)</th>
<th>TORQUE (Ft-Lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/8&quot;</td>
<td>1100</td>
<td>25</td>
</tr>
<tr>
<td>1/2&quot;</td>
<td>2000</td>
<td>50</td>
</tr>
<tr>
<td>5/8&quot;</td>
<td>2300</td>
<td>80</td>
</tr>
<tr>
<td>3/4&quot;</td>
<td>3700</td>
<td>150</td>
</tr>
<tr>
<td>1&quot;</td>
<td>5800</td>
<td>250</td>
</tr>
</tbody>
</table>

**NOTES:**

1.) ANCHOR DIAMETER REFERS TO THE THREAD SIZE FOR THE WEDGE ANCHORS.

2.) REACTION LOADS FROM TEST FIXTURES MAY BE APPLIED CLOSE TO THE ANCHOR BEING TESTED, PROVIDED THE ANCHOR IS NOT RESTRAINED FROM WITHDRAWING BY THE FIXTURE(S).

3.) TEST EQUIPMENT (INCLUDING TORQUE WRENCHES) IS TO BE CALIBRATED BY AN APPROVED TESTING LABORATORY IN ACCORDANCE WITH STANDARD RECOGNIZED PROCEDURES.

4.) THE FOLLOWING CRITERIA APPLY FOR THE ACCEPTANCE OF INSTALLED ANCHORS:

**HYDRAULIC RAM METHOD:**

THE ANCHOR SHOULD HAVE NO OBSERVABLE MOVEMENT AT THE APPLICABLE TEST LOAD. FOR WEDGE AND SLEEVE TYPE ANCHORS, A PRACTICAL WAY TO DETERMINE OBSERVABLE MOVEMENT IS THAT THE WASHER UNDER THE NUT BECOMES LOOSE.

**TORQUE WRENCH METHOD:**

THE APPLICABLE TEST TORQUE MUST BE REACHED WITHIN THE FOLLOWING LIMITS:

1. WEDGE OR SLEEVE TYPE: ONE-HALF (1/2) TURN OF NUT.
2. ONE-QUARTER (1/4) TURN OF THE NUT FOR THE 3/8" SLEEVE ANCHOR ONLY.

5.) TESTING SHOULD OCCUR A MINIMUM OF 24 HOURS AFTER INSTALLATION OF THE SUBJECT ANCHORS.

6.) IF THE MANUFACTURER’S RECOMMENDED INSTALLATION TORQUE IS LESS THAN THE TEST TORQUE NOTED IN THE TABLE, THE MANUFACTURER’S RECOMMENDED INSTALLATION TORQUE SHOULD BE USED IN LIEU OF THE TABULATED VALUES.

7.) ALL TESTS SHALL BE PERFORMED IN THE PRESENCE OF THE INSPECTOR OF RECORD.
# Bolt and Strut Nut Tightening Requirements

## Torque for A307 and A36 Threaded Rod

<table>
<thead>
<tr>
<th>Size</th>
<th>Torque (FT-LBS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/8&quot;</td>
<td>19</td>
</tr>
<tr>
<td>1/2&quot;</td>
<td>50</td>
</tr>
<tr>
<td>5/8&quot;</td>
<td>97</td>
</tr>
<tr>
<td>3/4&quot;</td>
<td>173</td>
</tr>
</tbody>
</table>

## Torque for Strut Nuts

<table>
<thead>
<tr>
<th>Size</th>
<th>Torque (FT-LBS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/8&quot;</td>
<td>20</td>
</tr>
<tr>
<td>1/2&quot;</td>
<td>49</td>
</tr>
<tr>
<td>5/8&quot;</td>
<td>97</td>
</tr>
<tr>
<td>3/4&quot;</td>
<td>125</td>
</tr>
</tbody>
</table>

## Turn of Nut Method

<table>
<thead>
<tr>
<th>Bolt Length</th>
<th>Additional Tightening</th>
</tr>
</thead>
<tbody>
<tr>
<td>4&quot; OR LESS</td>
<td>1/3 TURN</td>
</tr>
<tr>
<td>GREATER THAN 4&quot; AND LESS THAN 8&quot;</td>
<td>1/2 TURN</td>
</tr>
<tr>
<td>GREATER THAN 8&quot; AND LESS THAN 12&quot;</td>
<td>2/3 TURN</td>
</tr>
</tbody>
</table>

For turn-of-nut tightening, hand-adjust the bolt snug tight where there is firm contact between the bolt and connected metal components.