Table J.5.2
HOLE DIAMETER $D_h$ FOR TYPE C, D, F, AND T SCREWS

<table>
<thead>
<tr>
<th>Metal Thickness (in.)</th>
<th>screw size</th>
<th>0.050</th>
<th>0.060</th>
<th>0.083</th>
<th>0.109</th>
<th>0.125</th>
<th>0.140</th>
<th>3/16</th>
<th>1/4</th>
<th>5/16</th>
<th>3/8</th>
<th>1/2</th>
</tr>
</thead>
<tbody>
<tr>
<td>8-32</td>
<td>0.1360</td>
<td>0.1360</td>
<td>0.1360</td>
<td>0.1405</td>
<td>0.1405</td>
<td>0.1440</td>
<td>0.1470</td>
<td>0.1495</td>
<td>0.1495</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10-24</td>
<td>0.1495</td>
<td>0.1520</td>
<td>0.1540</td>
<td>0.1570</td>
<td>0.1590</td>
<td>0.1610</td>
<td>0.1660</td>
<td>0.1719</td>
<td>0.1730</td>
<td>0.1730</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10-32</td>
<td>0.1610</td>
<td>0.1610</td>
<td>0.1610</td>
<td>0.1660</td>
<td>0.1660</td>
<td>0.1719</td>
<td>0.1770</td>
<td>0.1770</td>
<td>0.1770</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12-24</td>
<td>0.1770</td>
<td>0.1800</td>
<td>0.1820</td>
<td>0.1850</td>
<td>0.1875</td>
<td>0.1910</td>
<td>0.1990</td>
<td>0.1990</td>
<td>0.1990</td>
<td>0.1990</td>
<td></td>
<td></td>
</tr>
<tr>
<td>¼-20</td>
<td>0.2055</td>
<td>0.2090</td>
<td>0.2130</td>
<td>0.2130</td>
<td>0.2210</td>
<td>0.2280</td>
<td>0.2280</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>¼-28</td>
<td>0.2188</td>
<td>0.2210</td>
<td>0.2210</td>
<td>0.2210</td>
<td>0.2280</td>
<td>0.2344</td>
<td>0.2344</td>
<td>0.2344</td>
<td>0.2344</td>
<td>0.2344</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(1) for material thicknesses not given, use the next smaller thickness.

J.5.2 Minimum Spacing of Screws

The distance between screw centers shall not be less than 2.5 times the nominal diameter of the screw.

J.5.3 Minimum Edge Distance of Screws

The distance from the center of a screw to an edge of a part shall not be less than 1.5 times the nominal diameter of the screw. See Section J.5.5.1 for the effect of edge distance on the bearing strength.

J.5.4 Screwed Connection Tension

The tensile strength of a screwed connection is the least of the pull-out, pull-over, and screw tensile rupture strengths. The design tensile strength $\phi R_n$ and the allowable tensile strength $R_n/\Omega$ shall be determined as follows:

$\phi = 0.50$ (LRFD)
$\Omega = 3.0$ (ASD building-type structures)
$\Omega = 3.5$ (ASD bridge-type structures)

The nominal strength $R_n$ for the limit state of pull-out shall be determined in accordance with Section J.5.4.1.

The nominal strength $R_n$ for the limit state of pull-over shall be determined in accordance with Section J.5.4.2.

The nominal strength $R_n$ for the limit state of screw tensile rupture shall be determined in accordance with Section J.5.4.3.

For screws subjected to tension, the head of the screw or washer, if a washer is provided, shall have a nominal diameter not less than 5/16 in. (8 mm). Washers shall have a nominal thickness not less than 0.050 in. (1.3 mm).

J.5.4.1 Pull-Out

J.5.4.1.1 Screws in Holes

The nominal strength $R_n$ for the limit state of pull-out of a screw in a hole is:

a) For UNC and UNF threads (screw types C, D, F, G, and T)

1) for 0.060 in. $\leq L_e \leq 0.125$ in. (1.5 mm $\leq L_e \leq 3$ mm)

$$R_n = K_e D F_{ty2}$$

(J.5-1)

where

$K_e = 1.01$ for 0.060 in. $\leq L_e < 0.080$ in. (1.5 mm $\leq L_e < 2$ mm)
$K_e = 1.20$ for 0.080 in. $\leq L_e \leq 0.125$ in. (2 mm $\leq L_e \leq 3$ mm)

$F_{ty2}$ = tensile yield strength of member not in contact with the screw head

$D$ = nominal diameter of the screw

2) for 0.125 in. $< L_e < 0.25$ in. (3 mm $< L_e < 6.3$ mm)

$$R_n = 1.2DF_{ty2}(0.25 - L_e) + 1.16A_n F_{tu2}(L_e - 0.125)$$

(J.5-2)

where

$A_n$ = thread stripping area of internal thread per unit length of engagement

$F_{tu2}$ = tensile ultimate strength of member not in contact with the screw head

3) for 0.25 in. $< L_e \leq 0.375$ in. (6.3 mm $< L_e \leq 10$ mm)

$$R_n = 0.58 A_n L_e F_{tu2}$$

(J.5-3)

b) For spaced threads (screw types AB, B, BP, BF, and BT)

1) for 0.038 in. $\leq L_e \leq 2/n$ (1 mm $\leq L_e \leq 2/n$)

$$R_n = K_e D L_e F_{tu2}$$

(J.5-4)

where

$K_e = 1.01$ for 0.038 in. $\leq L_e < 0.080$ in. (1 mm $\leq L_e < 2$ mm)
$K_e = 1.20$ for 0.080 in. $\leq L_e < 2/n$ (2 mm $< L_e < 2/n$)

2) for $2/n < L_e < 4/n$

$$R_n = 1.2DF_{tu2}(4/n - L_e) + 3.26DF_{tu2}(L_e - 2/n)$$

(J.5-5)

3) for $4/n < L_e \leq 0.375$ in. (4/n $\leq L_e \leq 8$ mm)

$$R_n = 1.63D L_e F_{tu2}$$

(J.5-6)