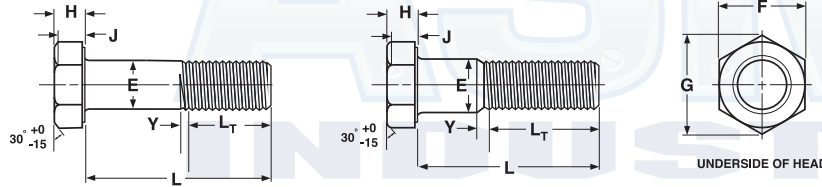


# Cap Screws & Bolts Heavy Hex Bolts

ASTM A193 Gr-B7  
ASTM A307 Gr- A & B



| HEAVY HEX BOLTS                        |        |               |       |                    |       |       |                      |       |             |       |       |                  |      |                                | ASME B18.2.1-2010 |  |
|----------------------------------------|--------|---------------|-------|--------------------|-------|-------|----------------------|-------|-------------|-------|-------|------------------|------|--------------------------------|-------------------|--|
| Nominal Size or Basic Product Diameter |        | E             |       | F                  |       |       | G                    |       | H           |       |       | R                |      | L <sub>T</sub>                 |                   |  |
|                                        |        | Body Diameter |       | Width Across Flats |       |       | Width Across Corners |       | Head Height |       |       | Radius of Fillet |      | Thread Length for Bolt Lengths |                   |  |
|                                        |        | Max           | Min   | Basic              | Max   | Min   | Max                  | Min   | Basic       | Max   | Min   | Max              | Min  | 6 in. and shorter              | Over 6 in.        |  |
| 1/2                                    | 0.5000 | 0.515         | 0.482 | 7/8                | 0.875 | 0.850 | 1.010                | 0.969 | 11/32       | 0.364 | 0.302 | 0.03             | 0.01 | 1.250                          | 1.500             |  |
| 5/8                                    | 0.6250 | 0.642         | 0.605 | 1-1/16             | 1.062 | 1.031 | 1.227                | 1.175 | 27/64       | 0.444 | 0.378 | 0.06             | 0.02 | 1.500                          | 1.750             |  |
| 3/4                                    | 0.7500 | 0.768         | 0.729 | 1-1/4              | 1.250 | 1.212 | 1.443                | 1.383 | 1/2         | 0.524 | 0.455 | 0.06             | 0.02 | 1.750                          | 2.000             |  |
| 7/8                                    | 0.8750 | 0.895         | 0.852 | 1-7/16             | 1.438 | 1.394 | 1.660                | 1.589 | 37/64       | 0.604 | 0.531 | 0.06             | 0.02 | 2.000                          | 2.250             |  |
| 1                                      | 1.0000 | 1.022         | 0.976 | 1-5/8              | 1.625 | 1.575 | 1.876                | 1.796 | 43/64       | 0.700 | 0.591 | 0.09             | 0.03 | 2.250                          | 2.500             |  |
| 1 1/8                                  | 1.1250 | 1.149         | 1.098 | 1-13/16            | 1.812 | 1.756 | 2.093                | 2.002 | 3/4         | 0.780 | 0.658 | 0.09             | 0.03 | 2.500                          | 2.750             |  |
| 1 1/4                                  | 1.2500 | 1.277         | 1.223 | 2                  | 2.000 | 1.938 | 2.309                | 2.209 | 27/32       | 0.876 | 0.749 | 0.09             | 0.03 | 2.750                          | 3.000             |  |
| 1 3/8                                  | 1.3750 | 1.404         | 1.345 | 2-3/16             | 2.188 | 2.119 | 2.526                | 2.416 | 29/32       | 0.940 | 0.810 | 0.09             | 0.03 | 3.000                          | 3.250             |  |
| 1 1/2                                  | 1.5000 | 1.531         | 1.470 | 2-3/8              | 2.375 | 2.300 | 2.742                | 2.622 | 1           | 1.036 | 0.902 | 0.09             | 0.03 | 3.250                          | 3.500             |  |
| 1 3/4                                  | 1.7500 | 1.785         | 1.716 | 2-3/4              | 2.750 | 2.662 | 3.175                | 3.035 | 1-5/32      | 1.196 | 1.054 | 0.12             | 0.04 | 3.750                          | 4.000             |  |
| 2                                      | 2.0000 | 2.039         | 1.964 | 3-1/8              | 3.125 | 3.025 | 3.608                | 3.449 | 1-11/32     | 1.388 | 1.175 | 0.12             | 0.04 | 4.250                          | 4.500             |  |

| Tolerance on Length | Nominal Screw Size | Nominal Screw Length |       |                                |       |                                |       |                            |       |                   |       |
|---------------------|--------------------|----------------------|-------|--------------------------------|-------|--------------------------------|-------|----------------------------|-------|-------------------|-------|
|                     |                    | Up to 1 in., incl.   |       | Over 1 in. to 2 1/2 in., incl. |       | Over 2 1/2 in. to 4 in., incl. |       | Over 4 in. to 6 in., incl. |       | Longer than 6 in. |       |
|                     | 1/4 to 3/8         | +0.02                | -0.03 | +0.02                          | -0.04 | +0.04                          | -0.06 | +0.06                      | -0.10 | +0.10             | -0.18 |
| 7/16 and 1/2        | +0.02              | -0.03                | +0.04 | -0.06                          | +0.06 | -0.08                          | +0.08 | -0.10                      | +0.12 | -0.18             |       |
| 9/16 to 3/4         | +0.02              | -0.03                | +0.06 | -0.08                          | +0.08 | -0.10                          | +0.10 | -0.10                      | +0.14 | -0.18             |       |
| 7/8 and 1           | ....               | ....                 | +0.08 | -0.10                          | +0.10 | -0.14                          | +0.12 | -0.16                      | +0.16 | -0.20             |       |
| 1 1/8 to 1 1/2      | ....               | ....                 | +0.12 | -0.12                          | +0.16 | -0.16                          | +0.18 | -0.18                      | +0.22 | -0.22             |       |
| Over 1-1/2          | ....               | ....                 | +0.18 | -0.18                          | +0.20 | -0.20                          | +0.22 | -0.22                      | +0.24 | -0.24             |       |

|                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|--------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Description</b>             | An externally threaded fastener with a six-sided head that is wider than that of a standard hex bolt.                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Applications/Advantages</b> | Offers greater wrenching area than standard hex machine bolts for use in heavy duty industrial work.                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Material</b>                | Bolts shall be made from a carbon steel which conforms to the following chemical composition requirements--<br><b>Grade A-- Phosphorus:</b> 0.06% maximum; <b>Sulfur:</b> 0.15% maximum; <b>Grade B-- Phosphorus:</b> 0.04% maximum; <b>Sulfur:</b> 0.05% maximum<br><b>Grade B7-- Carbon:</b> 0.37-0.49%; <b>Manganese:</b> 0.65-1.10%; <b>Phosphorus:</b> 0.035% max; <b>Sulfur:</b> 0.040% max; <b>Silicon:</b> 0.15-0.35%;<br><b>Chromium:</b> 0.75-1.20%; <b>Molybdenum:</b> 0.15-0.25% |
| <b>Hardness*</b>               | <b>Bolts less than 3 times diameter in length:</b> <b>Grade A--</b> Rockwell B69 - 100; <b>Grade B--</b> Rockwell B69 - 95; Bolts 3 times diameter and longer:<br><b>Grade A--</b> Rockwell B100 maximum <b>Grade B--</b> Rockwell B69 - 95<br><b>Grade B7--</b> Rockwell C 35 max                                                                                                                                                                                                           |
| <b>Tensile Strength</b>        | <b>Grade A:</b> 60,000 psi. minimum; <b>Grade B:</b> 60,000 - 100,000 psi.; <b>Grade B7:</b> 125,000 psi. min. (all diams thru 2 1/2")                                                                                                                                                                                                                                                                                                                                                       |
| <b>Elongation in 4D</b>        | <b>Grades A &amp; B:</b> 18% minimum; <b>Grade B7:</b> 16% minimum (all diams thru 4")                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Plating</b>                 | See Appendix-A for plating information.                                                                                                                                                                                                                                                                                                                                                                                                                                                      |