

Thread Engagement Calculator

Find the minimum length of thread engagement so a tapped hole is as strong as the bolt - and a safe recommended depth for the material you are bolting into.

How it works

The calculator finds the engagement length at which the tapped-hole threads are as strong as the bolt. It checks both failure modes - the internal threads shearing at the major diameter, and the bolt threads shearing at the minor diameter - and reports the larger. That theoretical minimum is then doubled for the recommended depth to cover thread tolerance, chamfer, and a safety margin. Bolt strengths used: Grade 2 about 74 ksi, Grade 5 about 120 ksi, Grade 8 about 150 ksi, Class 8.8 about 800 MPa, Class 10.9 about 1040 MPa, A2-70 about 700 MPa. Verify critical joints against the governing standard and manufacturer data.

For live values, use the interactive calculator: bookoffasteners.com/calculators/thread-engagement-calculator/

Reference values only — verify against the governing standard or manufacturer before use.