

THREAD CALCULATIONS

Major Diameter: Given On Print (if it is a machine screw #0-14 SEE NOTE 1A).

Pitch: 1/number of threads per inch.

Flat: pitch/8.

Compound Movement: .75(pitch).

Single Thread Height: .75(pitch) (cosine 30 degree's).

Pitch Diameter: major diameter - single thread height.

Minor Diameter: major diameter - 2 (single thread height).

Vertex Diameter: major diameter - 1.75(pitch) (cosine 30 degree's).

Best Wire Size (BWS): pitch (tangent 30 degree's).

Measurement Over Wires (MOW): vertex diameter + 3 (best wire size).

Lead: equals pitch if thread is a single lead.

Pitch Circumference: Pi (pitch diameter).

Lead Angle (Also Called Helix Angle): arc tangent of lead/pitch circumference.

NOTE 1A: Machine Screw Major Diameter: [machine screw# (0.013")] + 0.060".

Major Diameter of a #10 Screw = [10 (0.013")] + 0.060" or 0.1900"

EXAMPLE ¾ - 10 UNC BOLT:

Major Dia = 0.750"

Pitch = 1/10" OR 0.1000"

Flat = 0.0100/8 OR 0.0125"

Compound Movement = .75(0.01000") or 0.0750"

Single Thread Height = .75(0.1000")(cos 30 deg) or 0.06495"

Pitch Diameter = 0.7500" - 0.06495" or 0.6850"

Minor Diameter = 0.7500" - 2(0.06495") or 0.6201"

Vertex Diameter = 0.7500" - 1.75(0.1000")(cos 30 deg) or 0.5985"

BWS = $0.1000'' (\tan 30 \text{ deg})$ or $0.0577''$

MOW = vertex dia + $3(0.0577'')$ or $0.7716''$

Lead is a single lead or $0.1000''$

Pitch Circumference = $\text{Pi}(0.6850'')$ or $2.1520''$

Helix Angle = $\text{arc tan } 0.1000''/2.1520''$ or 2.66053 deg [2 deg, 39 min, 38 sec)

NOTE: Helix Angle has to be calculated if you are going to grind threads. The reason is that if the grinding wheel head is not rotated to the same as the lead angle the thread will have either a drunken lead or a zero lead, both of which are unacceptable.

Things to Remember When Cutting Threads on a Lathe.

Even Pitch Threads 2, 4, 6....Etc: use any line on the threading dial.

Odd Pitch Threads 3, 5, 7....Etc: use any numbered line on the chasing dial.

½ Pitch Threads 1½: use #1 or #3.

- Compound rest is always swung to idle side of tool.
- The tool must have the correct thread angle.
- The tool must be sharp.
- The tool must be square to surface being threaded.
- The tool must be on center.
- The compound rest is used to cut thread to correct depth.
- The crossslide is used to maintain a zero point on the "x" axis.