Threaded Fasteners
Making Holes
Creating Threads
MINIMUM ENGAGEMENT ~ 1.5 x SCREW DIAMETER

HEAD HEIGHT ~ SCREW DIAMETER

HEAD DIAMETER ~ 1.5 x SCREW DIAMETER
**Threads**

Fig. 471. Threads on Screw and Nut

Fig. 472. Right-Hand and Left-Hand Threads

Fig. 473. Single, Double, Triple, and Quadruple Threads

Fig. 474. Principal Parts of a Screw Thread

Fig. 475. Comparison Between the Minor Diameters of a Screw and a Nut, Showing Clearance. External threads and internal threads have the same basic pitch diameters.
## COMMON THREAD SIZES (U.S.)

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<th>THREAD</th>
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</table>
Socket Cap Screws

- Standard
- Button
- Flat
- Drilled Head
  Wire screws together to prevent loosening from vibration.
- Flange Socket
- Flange Button
- Low
- Vent
  Vented hole is drilled through entire length.
- Hex Socket
- Torx
- Tamper Resistant Pin-in-Hex Socket
- Tamper Resistant Pin-in-Torx
- Tamper Resistant High Security
  Screws are unique configuration from McMaster-Carr.
SET SCREWS
SET SCREWS

Standard Socket
The most common screw style.

Self-Locking Socket
Locking element increases holding power. Perfect for tough jobs.

Hollow-Lock Socket
Often used to lock other set screws in place, to hold pins, and to adjust spring tension.

Slotted
Install with a standard slotted screwdriver.

Square Head
Easy to access by hand or with a wrench when you need more torque.

Swivel Pad Socket
Pad swivels to make maximum contact against angled surfaces.

Cup
Most popular style. Thin edge digs into contact surface for high holding power.

Knurled Cup
Knurls improve grip and prevent backing out or loosening.

Vented Cup
Vent fluids and gases while holding parts securely in place.

Cone
Highest holding power of any point style. Sharp tip wedges into surface.

Flat
Best for making frequent adjustments. Tip won’t mar contact surface.

Oval
Ideal for making frequent adjustments. Tip has small contact area causing little damage.

Extended Point
Also known as dog point and pilot point set screws. Often used in place of dowel pin.

Soft Tip
Rigid yet soft tip conforms to texture and curves of surface without marring.

Swivel Ball Bearing
Also known as ball-ended thrust screws. Ball bearings swivel in all directions.
Washers

- Round Hole
- Square Hole
- Slotted
- D (Clipped)
- Spherical
- Laminated
- Notched
- Tag Hole
- Spring Lock
- Tooth Lock
- Belleville
- Retaining
- Wave
- Finger Spring
- Wedge Lock
- Countersunk
- Bonded
- Waffle
- Pressure-Sealing
- Square
- Shoulder
- Cup
- Structural
- Flange
SELF-TAPPING

Sheet Metal Screws
Have a pointed end and widely spaced threads. Self-starting in thin sheet metal. In thicker materials, a drilled hole is recommended.

Thread-Forming Screws
Have a blunt point and fine threads. Form threads in metal, plastic, and plywood. A drilled hole is required.

Thread-Cutting Screws
Have blunt, tapered, tap-fluted end that cuts machine screw threads and ejects material as it turns. Use in metal, plastic, and plywood. A drilled hole is required.

Self-Drilling Screws
Drill their own hole, tap a thread, and fasten material in a single operation. Excellent for use in sheet metal.
WOOD

- Flat
- Ribbed Flat Head
- Self-Sinking Flat Head
- Self-Sinking Flat Head with Washer
- Self-Sinking Ribbed Flat Head
- Pan
- Oval
- Round
- Large Diameter Round Head (Timber Screws)
- Round Head Square Neck (Carriage Screws)
- Round Head Ribbed Neck (Carriage Screws)
- Hex Head (Lag Screws)
- Hex Flange Head (Lag Screws)

- Phillips
- Slotted
- Square
- Combination (Phillips/Square)
- Hex
- Torx
- Uni-Drive
MAKING HOLES
CENTER DRILL
TWIST DRILL
PECK DRILLING
DRILL SETS
THE DRILL CHUCK

NEVER USE FOR SIDE LOADS!!
REAMING

SLOW IT DOWN!

USE PLENTY OF CUTTING FLUID
82°
COUNTERSINK

DIMENSIONS ARE IN INCHES
TOLERANCES:
ANGULAR: MACH 1    BEND
TWO PLACE DECIMAL .01
THREE PLACE DECIMAL .005
FOUR PLACE DECIMAL .0005
FRACTIONAL 1/64
CENTER DRILL
PILOT HOLE
TAP BY HAND
USE LUBRICATION
BREAK CHIPS OFTEN
CENTER DRILL
TWIST DRILL
## Pilot Hole Drill Sizes

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