FASTENERS

USED TO JOIN THINGS TOGETHER

PRESENTED BY:
MR. POLGÁR
FASTENER EXAMPLES

- Screws & Bolts
- Nails
- Nuts and Washers
- Clips, Clamps, Studs, and Rivets
- Welds
- Glues, Silicones, and Adhesives
FASTENERS

Screws & Bolts

**Internal Threads (Female)**
- Nuts
- Threaded Holes

**External Threads (Male)**
- Bolts
- Studs
- Screws
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**Imperial**
- UNC – Unified National Coarse
- UNF – Unified National Fine
- Lines on the head
- In inches

**Metric**
- ISO – International Organization for Standardization
- Numbers on the head
- In millimeters
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Screws & Bolts

Imperial
- UNC – Unified National Coarse
- UNF – Unified National Fine

Lines on the head

In inches

Metric
- ISO – International Organization for Standardization

Numbers on the head

In millimeters

Screws & Bolts
5/16” UNC X 1 ½” Bolt
FASTENERS

Screws & Bolts

5/16” - 13 X 3 ½” Bolt

- Major Diameter
- 13 Threads/inch
- Total Length
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Screws & Bolts

Bolt Grading (Strength)

RULE: Add 2 to the number of lines
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Screws & Bolts

M8 X 25 X 1

- Metric
- 8mm
- 25mm long
- Pitch (threads are 1mm apart)

Metric Grade Markings

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<tr>
<th>Grade</th>
<th>Marking</th>
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<tbody>
<tr>
<td>8.8</td>
<td><img src="image" alt="8.8 Screw" /></td>
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<tr>
<td>10.9</td>
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<td>12.9</td>
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FASTENERS

Screws & Bolts

Bolt & Screw Clearances

Countersink

Counterbore
B.3.3) **Dimensions of Hexagon and Spline Socket Head Cap Screws**

E.4.5) **Dimensions of Metric Countersunk Socket Head Cap Screws**
**FASTENERS**

**Screws & Bolts**

**Machine Screws** –
no nut required (usually less than ¼”)
Passes through one piece and threads into other.

**Sheet Metal Screws** (self tapping) –
makes its own hole/threads

**Set Screw** – (allen wrench/no head)
Used for aligning pullies on the shaft.
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**Flat Washer** – Distributes pressure over a wider surface area.

**Lock Washer** - Prevents the fastener from loosening. Used at high vibration places. Bites into the material and the fastener.
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**Hex Nut** – Most common on automobiles.

**Wing Nut** – No tool required

**Locking Nut** – Nylon Patch (center, top)  
[a.k.a.: “Nylock nut”]

**Lug Nut** – Taper face to help center the wheel

**Speed Nut** – Push-on (mostly screws)
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**Basic Rules**

- Use correct length and thread.
- Start threads by hand (no tool).
- Install all bolts before final tightening any one on a single part.
- Tighten all installed fasteners before leaving or leave a note **NOT TIGHT**
- Tighten evenly to a correct torque specification and in proper sequence.
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Nuts & Washers

Tightening Wheels

Tightening multiple bolts
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- Simplest & quickest.
- May not result in the strongest of joints.
- Many different sizes and various shapes of heads, points & shanks.
- Each type designed for a particular purpose.
- Drive nails at angles slanting toward or away from each other to get best holding power.

Nails are designated by “penny” size, originally a term which related to price per hundred but now signifies length. The symbol for penny is the lowercase letter “d”. Nail diameter increases with length. Nails are now sold by the pound.
FASTENERS

- Type of head
- Material
- The length
- The diameter
Rivets require pre-drilling a hole & using a rivet gun to insert.