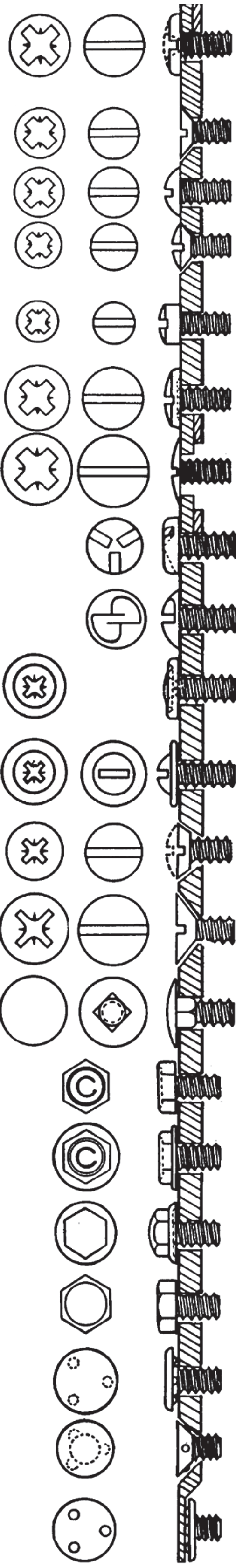




# FASTENER REFERENCE GUIDE

## TYPES OF BOLT AND SCREW HEADS



**\*PAN HEAD:** Recommended for new designs to replace round, truss and binding heads. Provides a low large diameter head, but with characteristically high outer edge along the periphery of the head where driving action is most effective for high tightening torques. Slightly different head contour where supplied with recessed head. See dotted line.

**\*FLAT HEAD:** Supplied for standard dimensions with an 80° to 82° angle to be used where finished surfaces require a flush fastening unit. The countersunk portion offers good centering possibilities.

**\*ROUND HEAD:** Not recommended for new design (see pan head). This head was the most universally used design in the past.

**\*OVAL HEAD:** Fully specified as "oval countersunk", this head is identical to the standard flat head, but possesses, in addition, a rounded, neat appearing upper surface for attractiveness of design.

**\*FILLISTER HEAD:** The standard oval fillister head has a smaller diameter than the round head, but is higher with a correspondingly deeper slot. The smaller diameter head increases the pressure applied on the smaller area and can be assembled close to flanges and raised surfaces. Headed in counterbored dies to insure concentricity, they may be used successfully in counterbored holes.

**\*BINDING HEAD: (Straight Side):** Most generally used in electrical and radio work because of its identifying undercut beneath the head, which binds and eliminates fraying of stranded wire. Offers an attractively designed, medium-low head with ordinarily sufficient bearing surface. Not ordinarily recommended as a Phillips Recessed head—see Pan Head for better functional design.

**\*TRUSS HEAD:** Also known as oven head, stove head, and oval binding head. A low, neat appearing large diameter head having excellent design qualities, and as illustrated can be used to cover larger diameter clearance holes in sheet metal when additional play in assembly tolerance is required. Suggest pan head as a substitute.

**HOLT HEAD (PATENTED):** Provides the perfect tamper-proof assembly. Theft-proof—decorative, yet inexpensive. Special drivers available for field removal or power driven assembly machines.

**ONE-WAY HEAD:** This ingenious, tamper-proof type of head, once assembled cannot be removed, yet is driven with a standard screw driver. Manufactured with amazing economy in productive quantities, this simple design can frequently solve costly assembly problems.

**PHILLIPS FINISHING WASHER HEAD:** Designed as a neat appearance product for the electronic and appliance trade with all threaded styles.

**WASHER HEAD:** This design has the finished appearance of a conventional round head plus washer, and was originally created to provide extra large bearing surface under the head. The modern "truss" head (carried in stock) normally answers this purpose. When a larger diameter is required this washer head design is recommended.

**\*FLAT AND OVAL HEADS (UNDERCUT):** This is the standard flat or oval head 80° to 82° countersunk screw which has the lower one-third of the countersunk portion removed to facilitate production of extremely short lengths. As illustrated it will fit a standard counterbored hole and is particularly adaptable to flush assemblies in thin stock.

**FLAT HEAD (100° COUNTERSUNK):** This special flat head screw has been developed for applications requiring flush surfaces, and is recommended for use in soft materials, to distribute pressure over a larger and less angular surface. Very well adapted for use with thin aluminum, soft plastics, etc.

**SQUARE SHOULDER SCREWS:** An adaptation of the standard carriage bolt design. Possesses a truss head on a square shank which resists rotation when located or driven into place. This square shoulder may also be staked into place as a permanent fastener. A great many varieties in all screw diameters are available in productive quantities.

**\*INDENTED HEXAGON:** An inexpensive wrench head fastener made to standard hexagon head dimensions. The hex is completely cold upset in a counterbored die and possesses an identifying depression in the top surface of the head.

**\*INDENTED HEXAGON WASHER HEAD:** Produced in the same manner as the standard indented hexagon head but with a washer section at the base of the head to protect the finish of the assembly from wrench disfigurement.

**ACORN HEAD (FULL UNDERCUT):** A very neat appearing trim screw for appliance application—excellent wrench surfaces.

**\*HEXAGON HEAD (TRIMMED):** This is the standard type of wrench-applied hexagon head, characterized by clean, sharp corners trimmed to close tolerances. Recommended for general applications, it is available in all standard patterns and in all thread diameters.

**\*HEAD STYLES (WELDING SCREWS):** The welding screw has been developed to provide a strong permanent threaded fastener which becomes an integral part of the assembly. It utilizes the principle of projection welding by means of multiple lugs applied to various head surfaces.

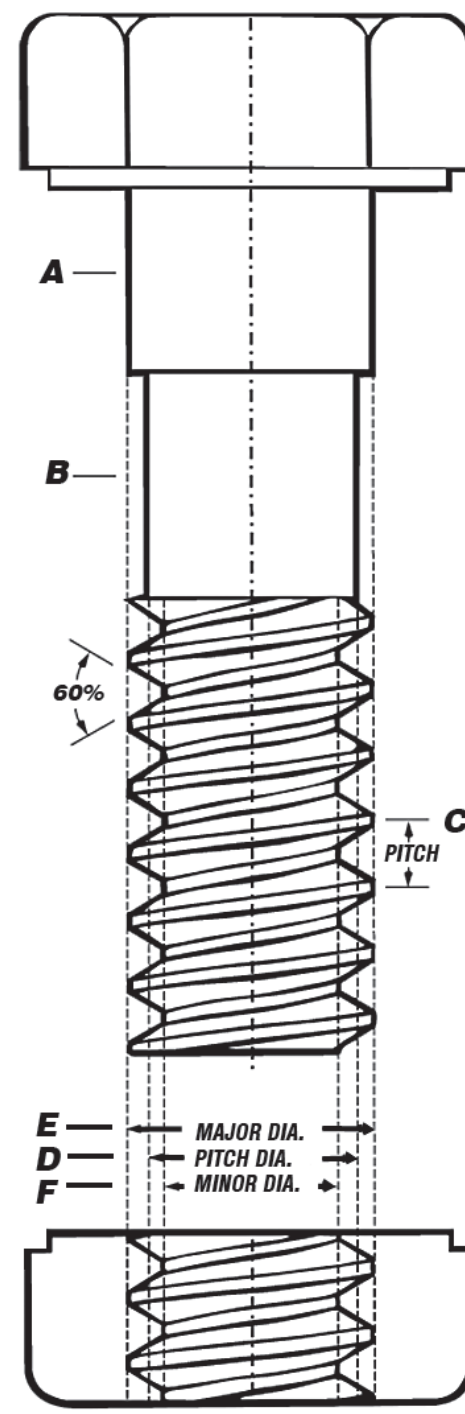
**Type "U" (Underlug)** for general application. Assembles easily into prelocated holes and fully utilizes head strength. Top surfaces of head designed for efficient welding anode contact.

**Flat Head styles** take full advantage of the self-centering feature of the countersunk portion and provide a smooth, flush outer surface.

**Type "T" (Overlug)** for applications requiring smooth, finished outer surfaces. Under surface of head is designed for perfect electrode contact.

\* Most head styles also available as Recessed or Clutch.

## THREAD TERMINOLOGY



**A. FULL DIAMETER SHANK:** Equal to major diameter of thread. Produced by cut thread or by roll thread on extruded blank. Characteristic of machine bolts and cap screws.

**B. UNDERSIZED SHANK:** Equal approximately to pitch diameter of thread. Produced by roll threading a non-extruded blank. Characteristic of machine screws.

**C. PITCH:** The distance from a point on the screw thread to a corresponding point on the next thread measured parallel to the axis.

**D. PITCH DIAMETER:** The simple, effective diameter of screw thread. Approximately half way between the major and minor diameters.

**E. MAJOR DIAMETER:** The largest diameter of a screw thread.

**F. MINOR DIAMETER:** The smallest diameter of a screw thread.

**LEAD:** The distance a screw thread advances axially in one turn.

**CUT THREAD:** Threads are cut or chased, the unthreaded portion of shank will be equal to major diameter of thread.

**ROLLED THREAD:** Threads are cold formed by squeezing the blank between reciprocating serrated dies. This acts to increase the major diameter of the thread over and above the diameter of unthreaded shank (if any), unless an extruded blank is used.

Classes of thread are distinguished from each other by the amounts of tolerance and allowance specified. External threads or bolts are designated with the suffix "A"; internal or nut threads with "B".

**CLASSES 1A and 1B:** For work of rough commercial quality where loose fit for spin-on-assembly is desirable.

**CLASSES 2A and 2B:** The recognized standard for normal production of the great bulk of commercial bolts, nuts and screws.

**CLASSES 3A and 3B:** Used where a close fit between mating parts for high quality work is required.

**CLASS 4:** A theoretical rather than practical class, now obsolete.

**CLASS 5:** For a wrench fit. Used principally for studs and their mating tapped holes. A force fit requiring the application of high torque for semi-permanent assembly.

## TYPES OF SCREW POINTS



**DIE POINT:** One of the least expensive pointing operations applied at the time of heading. This operation provides an end chamfer starting with a diameter smaller than the root diameter of the thread. The minimum reduction of the point is approximately 10% below the maximum minor diameter with an included angle of 40 to 50°.

**DOG POINT:** A straight pointed section reduced in diameter slightly below the root diameter of the thread, usually extending in length about two-thirds the diameter of the thread. Recommended for ease in starting, to insure against stripping fine threaded products, and to increase efficiency along production lines.

**ROLLED POINT:** An efficient method of producing pointed long studs or long screws with an end chamfer similar to the Die Point. The last thread and a half is slightly cupped by the thread roll-over operation.

**PINCH POINT (ROUNDED):** An inexpensive method of applying a 40°, 60° or 90° lead-in point having a slightly rounded contour but with pinch-off marks on its surface. Used for aligning several sheets or assembling several parts requiring pilot action.

**NAIL POINT (PINCHED):** Usually supplied with an approximate 45° included angle having a sharp point and slightly squared surface. Used for impinging or locking against wood or other soft material. Other degrees of included angle and sharpness also available.

**CUPPED POINT:** A special cup section supplied on the end of the threaded member having a depression in the end to reduce the area in contact with the surface which increases its holding and locking power under pressure.

**ROUND POINT:** A dome-like rounded surface applied to the end of a threaded member in order to offer pressure without disfigurement. Used for adjusting members where friction without cutting action is desirable.

**CONE POINT:** A precision forming operation to provide any required included angle. Offers a smooth surface accurate length, and a sharp point which can be produced to any desired contour to fit your particular requirements.

**TYPE A POINT:** A thread forming screw for use in thin metal .015 to .050 thick. Used with drilled, punched or nested holes in sheet metal, resin impregnated plywood, and asbestos combinations, among others. Not recommended for new design.

**TYPE B POINT:** A thread forming screw for use in heavier metal .050 to .200 thick. Larger root diameter with finer thread pitch for light and heavy sheet metal, non-ferrous castings, plastics, impregnated plywoods, asbestos combinations and other materials.

**TYPE AB POINT:** A thread forming screw combining locating type point of Type A with thread size and pitch of Type B. Normal limitations of Type B apply.

**TYPE C POINT:** A thread forming screw with either coarse or fine pitch machine screw thread and blunt tapered point. Eliminates chips and permits replacement with standard screw in the field. Higher driving torque required. Usable in heavy sheet metal and die castings.

**TYPE U POINT:** A thread forming screw with high Helix thread for driving or hammering into sheet metal, castings, fiber or plastics for permanent quick assemblies.

**TYPE F POINT:** A thread cutting screw with machine screw thread with blunt tapered point, having multi-cutting edges and chip cavities. For heavy gauge sheet metal, aluminum, zinc and lead die castings, cast iron, brass and plastic.

**TYPE FZ POINT:** A thread cutting screw with a tapping screw thread with blunt tapered point and multi-cutting edges and chip cavities. For plastics, die castings, metal clad and resin impregnated plywoods and asbestos.

**TYPE 1 POINT:** A thread cutting screw with single flute for general use. Produces a fine standard machine screw thread for field replacement.

**TYPE 17 POINT:** A thread cutting screw for wood with a coarse tapping screw thread and a special long sharp point fluted to capture chips.

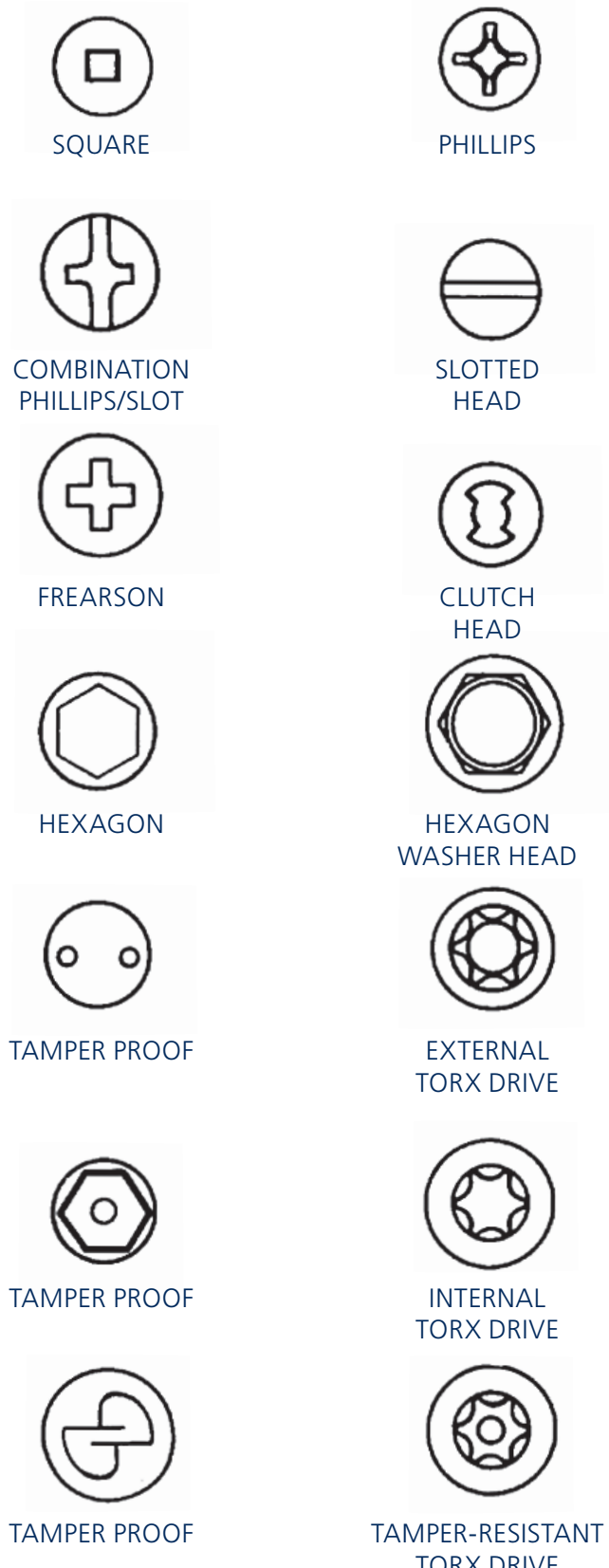
**TYPE 23 POINT:** A thread cutting screw in the fine thread series offering maximum thread cutting area and excellent chip clearing, with minimum tightening torques.

**TYPE 25 POINT:** A thread cutting screw similar to Type 23 point except with coarse Type B thread. For plastics and other soft materials with large chip clearing and cutting edges.

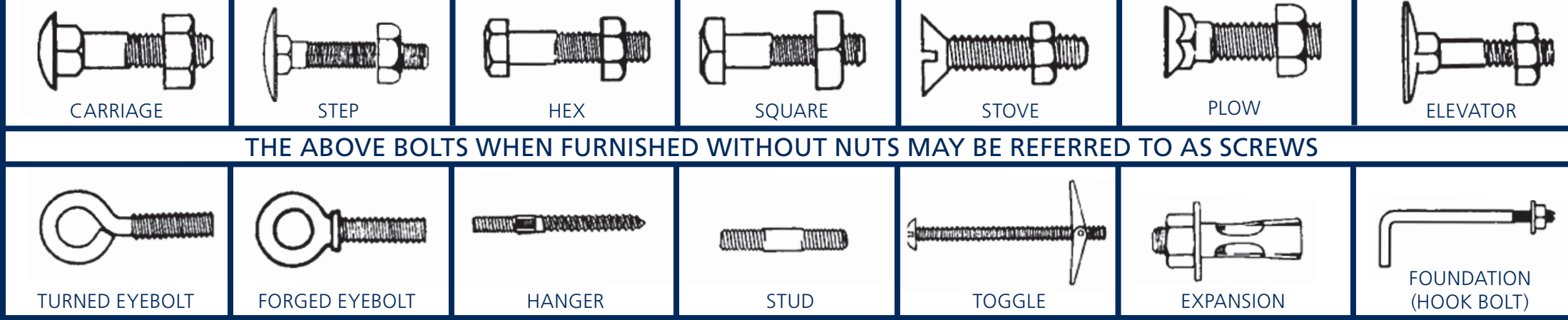
**SELF-DRILLING:** With special drilling points—lengths—diameters that will drill through 1/4" metal. Eliminates all hole preparation—drills faster than a drill. No punching, drilling or tapping required. Reduces die costs.

**SELF-DRILLING:** Produces more secure sheet metal assemblies faster . . . used as self-drilling screw or driving thru pre-punched holes. Can be used with or without pilot holes. Positive rake "forward cutting edge" drills straight through sheet metal at peak speed. Perfectly mated threads increase strip and back out pressures.

**A handy reference guide for common wood screws, sheet metal screws, machine screws and bolts, nuts and washers.**

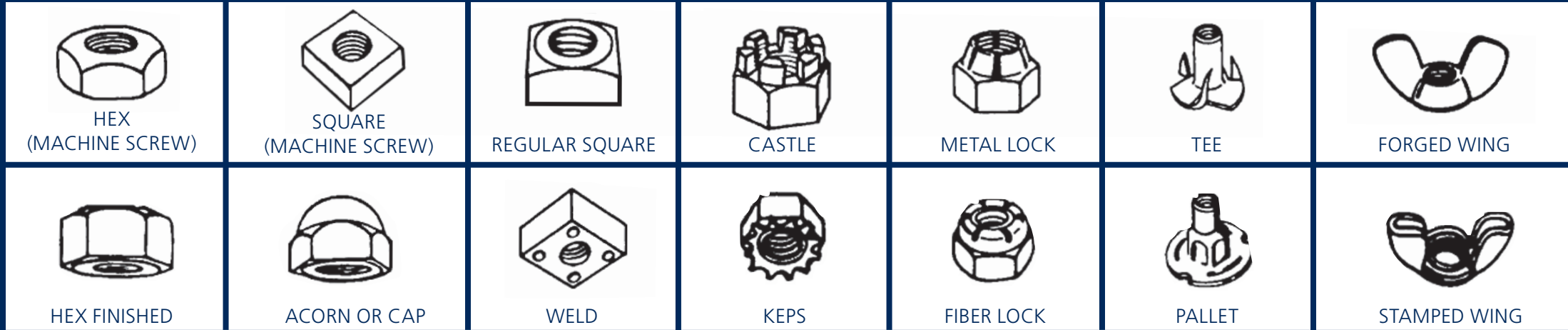


## BOLTS

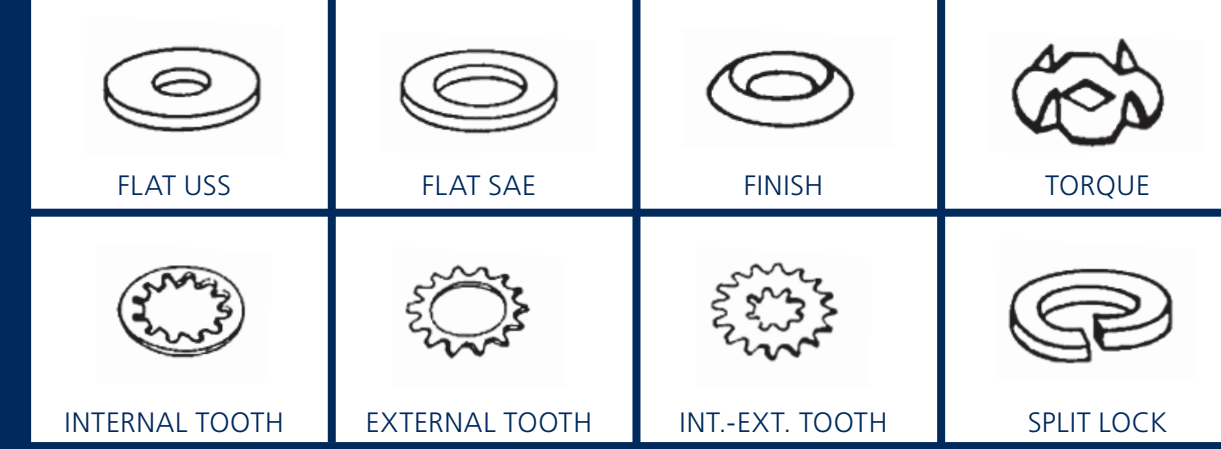


THE ABOVE BOLTS WHEN FURNISHED WITHOUT NUTS MAY BE REFERRED TO AS SCREWS

## NUTS



## WASHERS



## MISC

