

## Nuts

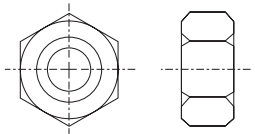
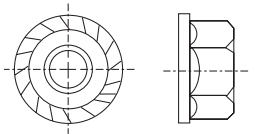
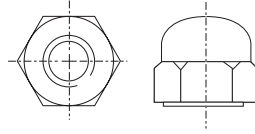
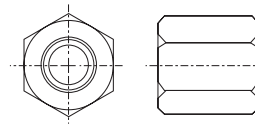
The primary function of the nut in any threaded assembly is to act as the instrument through which the tension is induced into the bolt or screw and to continue to retain that tension and thus, the clamp load in the assembly.

The vast majority of nuts have hexagon drive faces but they come with a large variety of other features for a secondary purpose such as thread locking, face seating/location, load spreading, pinning, welding, capping.

Materials include carbon steels, stainless steels, brass, aluminium, nylon.

Correct strength combinations of nuts and bolts will ensure that the nut is capable of tensioning the mating bolt to breaking point rather than the nut stripping, (a broken bolt is clearly evident, a stripped nut may not be). To ensure correct combinations, always use bolt and nut products with the same proof load designations.

Products purchased as a bolt and nut combination will be supplied with the correct nut by the manufacturer.

Sketch	Title	Comments
	Plain Hexagon Nut	The standard form general purpose nut – may be used with various washers. Also available in a thin or lock nut version. (JAM) Normally supplied double chamfered if cold formed. May also come with full bearing or washer face when machined.
	Hexagon Flange Serrated Lock Nut (Whiz Lock)	Special serrations on the flange face resist loosening in vibration applications. Also available as a plain flange to span a large hole or slot or spread the clamp load.
	Hexagon Domed or Cap Nut	Either machined with a closed domed end or capped in a secondary process after tapping. Used in decorative applications or for protection from protruding threads.
	Coupling Nuts (Joining)	A plain hexagon nut with increased overall height, giving longer thread engagement. Used for connecting lengths of allthread.

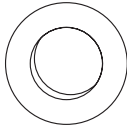
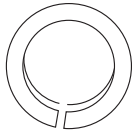
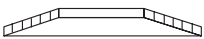

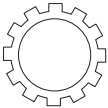
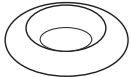
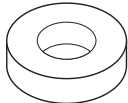
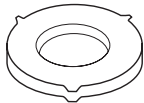

## Washers

Washers come in a wide variety of designs and within those individual designs are a range of materials, dimensional variations and finishes. Many can be used either under the head of the fastener, bolt or screw, or under the nut. Many can be encapsulated as an assembly on a screw or bolt or occasionally with a nut. Most washer sizes will be designated by the diameter (size) of the fastener with which they are to be used.

Basic washers are employed to :

- spread the clamp load over a larger surface area
- cover an oversize or elongated hole
- reduce the friction of the rotated component
- protect the work piece surface from damage by the rotated component
- provide a locking or vibration resistant function

Specialist washers have been designed to perform particular functions in particular types of applications. These may be locking, load spreading, decorative, tension indicating, sealing, or a combination of these functions.

Sketch	Title	Comments
	Flat	<p>Common general purpose basic washer can come in various dimensional standards, quality levels, materials, hardness grades and finishes.</p> <p>Could also be available square.</p> <p>Often used in conjunction with a spring washer.</p>
	Spring	<p>Common locking washer will come in a variety of thicknesses and sectional ratios.</p> <p>Available in various materials throughout a wide size range.</p> <p>Used to resist vibration loosening.</p> <p>Will damage surface in contact.</p>
	Belleville Washer (Conical)	<p>For use in high vibration applications where tension must be maintained if some loosening occurs.</p> <p>Can be used in stacks or series to increase the axial load or to increase the possible deflection length.</p>
	Internal Tooth Lock Washer	<p>Used with pan or cheese head machine screws to resist vibration.</p> <p>Minimal damage to surface.</p>
	External Tooth Lock Washer	<p>Same as above except slightly more damaging to surface.</p> <p>Also available in countersunk version.</p>
	Screw Cup (Cup)	<p>Used under a countersunk screw where a decorative or appealing finish is required. e.g. Automotive door trims.</p> <p>Normally would be nickel or chrome plated, or in stainless steel.</p>
	Neoprene (Neo)	<p>A rubber type material used in roofing screw applications under washer head screws with sealing washer recess. Designed to create a waterproof seal between the screw and sheeting material.</p> <p>Can also be bonded to aluminium or stainless washers.</p>
	Structural Hardened	<p>A hardened steel washer used in conjunction with structural bolts in heavy construction applications. The washer reduces galling between the tightened surfaces and spreads the load.</p> <p>The three external tabs identify it as structural washer.</p>
	Load Indicating Washer	<p>Used in the structural industry to provide evidence that the required tension has been achieved. The raised protrusions will crush in relation to the load applied, providing a permanent witness that required tension was achieved.</p>