WCL - Retaining customer trust with reliable products and a responsiveness to a customer's needs that is unmatched in our industry!

The Heart Of The WCL Operation

17,000 square feet of warehouse space holds one of the world's most diverse fastener inventories - over 20,000 types of fasteners - threaded and unthreaded - in all conventional metals and plastic materials.

Our state-of-the-art information retrieval system permits full utilization of WCL's unsurpassed inventory. We will immediately tell you not only what we have available in a specific size, material and finish, but everything we have that's similar to the needed part.

THREADED FASTENERS

For your guidance in designing and specifying mechanical fasteners that best respond to the materials, the environment and the physical characteristics of your specific assembly, WCL offers this summary of the knowledge it has accumulated in over 40 years as a fastener specialist.

Summaries can never present complete details on particular areas. If the information here prompts other questions that relate to a specific assembly challenge, please contact WCL, by E-mail, phone or fax.

MATING THREADS

Removable, replaceable mechanical fasteners generally rely on mating threads to produce a secure assembly.

The tightness or integrity of a threaded assembly is primarily dependent on two factors:

1. Friction

Friction is generated at the contact areas of mating threads, the undersurface of the screw head in contact with a work surface, and, if a nut is involved in the assembly, the upper surface of the nut that is in contact with the bottom work surface. Lock washers and bearing washers can enhance surface friction.

2. Tension

When torque is applied, screw threads have a tendency to advance even after the screw head bottoms against the work surface. Screws or bolts are, in effect, stretched. A steel bolt or screw will elongate approximately .002" per inch of effective length when stressed at 60,000 PSI. Components beneath the screw head and between the screw and any nut that may be involved, are compressed. Materials have an innate tendency to return to their original form. Like a stretched spring, the extended screw wants to contract. The compressed components want to expand. These conflicting forces generate the tension that keeps assemblies tight. This tension can be enhanced and sustained through the addition of washers — lock washers, conical washers, spring washers and combinations of these — which can be pre-assembled to screws in the form of Sems.

Initially, the amount of friction and tension generated in an assembly is largely determined by the amount of twisting force, or torque, that can be applied to the threaded fastener without stripping out the mating threads. This is, in part, determined by how the mating threads are formed and the nature and thickness of the material in which they are formed. The threaded fasteners in this catalog are presented accordingly.

ADDING MATING THREADS

In thin sheet, adequate thread engagement can be difficult to attain. Cataloged here are a variety of high performance screws that pull up or extrude thin sheet for adequate thread engagement.

Stamped spring nuts also provide additional thread engagement for screws in thin sheet application. "U" type and "J" type nuts are self-retaining and provide additional thread engagement on both sides of the panel. WCL offers an exceptionally wide range of these multi-purpose, vibration resistant fasteners.

SCREW POINTS AND SHANKS

Today's engineered fasteners offer a variety of design options to facilitate hole location and the forming of mating threads in the hole:

1. Hole Location and Alignment

This is the obvious function of the screw point. Basic point styles include the Gimlet, or Type A point, which has a fully threaded shank tapering to a point; the Semi-Gimlet, or Type B, which is also tapered but ends with a blunt point; and the Blunt Point which has little or no taper. There are tapered unthreaded points, some with reduced diameters, designed to locate and guide screws to misaligned or hidden holes. These require clearance space on the other side of the hole.

Continuing efforts at component and end-product size reduction tend to restrict access to fastening locations, limit visibility and minimize clearance. A number of spherical points have been introduced in recent years by the major screw manufacturers to facilitate hole location, bring the screw into proper alignment (even when driven at a 30° angle) and prevent cross-threading. These include Research Engineering & Manufacturing's Tru-Start™; Camcar's Acupoint™ and ITW Shakeproof's Align-Rite™.

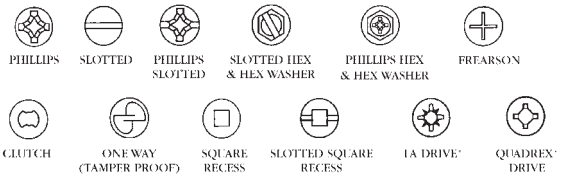
2. Cutting or forming mating threads in metal or plastic

By creating screw shanks that are out of round, screw manufactures have provided relief areas that significantly reduce the drive torques necessary to form mating threads in fastener holes when screws are driven. Reduced shank diameters and flatter thread angles also displace less material, reducing stress as threads are formed. Thread cutting screws have off-center slots in their shanks that provide a cutting edge for the cutting of mating threads in metals and plastics.

RECESSES OR DRIVES

Screw thread and shank configurations can only be effective if we have the means to turn the screw down into the fastening hole with sufficient force to create the mating threads and/or generate the tension needed for a secure assembly. The configuration of the screw head or a recess formed in the head must mate with an appropriate drive tool if this is to be accomplished. A wide variety of configurations have evolved to meet the need.

Sockets have been developed for drive tools to facilitate mating with hex shaped or even square shaped, screw heads. Recesses are formed in screw heads to mate with corresponding driver bits. This More popular of these include:



In addition to these widely recognized and used drive recesses, WCL can provide a variety of tamper proof and "one way" recesses for special applications.

Also available from WCL are screws with the newer, high performance recesses designed to deliver maximum torque, reduce camout and end load and provide a positive "stick fit" for maximum control during driving:

TORX® AND TORX PLUS®

The Torx six-lobed, straight walled recess with its matching driver bit is designed for high torque transfer without camout. The modified lobes on the Torx Plus driver bit seat even more securely in the head recess to provide added "stick fit" and greater torque delivery. A drive bit on a driver rotating at 700 rpm is fully engaged in a Torx recess in one-sixth of a turn!

ACR ® PHILLIPS II®

The ACR Phillips II (Anti-Camout Recess) Ribbed Drive System is a unique, positive engagement concept that utilizes ribs on the installation and removal surfaces of the fastener recess and the driver bit to achieve positive mating of the two. When torque is applied, the horizontal ribs on the surface of the bit interlock with the vertical ribs in the drive recess of the fastener, permitting higher driving torque, reducing camout and end-load, while extending tool life and increasing productivity.For service convenience, standard Phillips screw drivers may be used for field maintenance.

POZIDRIV®

Added notches between the "wings" of the basic Phillips recess enhance the positive mating of bit and screw for better control in driving and better delivery of torque forces. The "wings" have less draft that the conventional Phillips recess, reducing any tendency for the bit to cam out. For service convenience, standard Phillips screw drivers may be used for field maintenance.

THE FUNCTION OF WASHERS IN THREADED ASSEMBLIES

Tension and the friction it creates can be quickly dissipated. Materials yield and relax - and tension is lost. Thermal cycling expands and contracts materials - and tension is lost. Screw heads embed in bearing material - and tension is lost. Shock and vibration cause momentary but repeated tension loss. Inadequate tension is sometimes the result of pre-load limitations.

The addition of an appropriate washer counteracts many of these tension loss factors and works to enhance and sustain tension in an assembly.

A wide variety of washer types are available to provide one or more of the following functions:

1. Prevent damage to the bearing surface.
2. Prevent enbedment of the screw surface.
3. Generate added tension and retain tension in an assembly.
4. Span oversize holes.
5. Function as back-off resistant or "locking" devices.

The more popular basic washer types include flat washers, conical washers, helical spring (split) washers and tooth washers. Popular variations of these washers incorporate features of more than one washer to provide multiple functions. Flat rimmed conical washers protect a bearing surface, span a hole, distribute load and retain and generate tension. Wide rimmed tooth washers also span holes and distribute load while generating tension and providing anti-loosening strut action. The popular Square Cone® washer combines two conical forms to achieve two separate and distinct load deflection rates. While spanning oversized holes, this washer accepts high loads, sustains strong spring reaction and generates a constant load, even when installation torques vary considerably. This washer has replaced two washers - a flat washer and a helical spring washer - in many applications.

Virtually all of these washers are available preassembled to most screw types described in this catalog - thread forming screws, thread cutting screws, machine screws, etc. WCL carries many of these Sems screw and washer assemblies in stock.

NYLON THREADED FASTENERS

Nylon threaded fasteners generate both tension and friction when installed, but it is usually less than that generated by metal fasteners. In comparatively light duty applications, however, nylon fasteners offer an excellent strength-to-weight ration as well as being non-magnetic, non-conductive and non-corrosive. WCL offers one of the nation's most complete selections of quality nylon threaded fasteners.

FASTENING IN PLASTIC MATERIALS

Cataloged here are screws designed to form secure mating threads in a wide range of plastic materials without generating crack-producing stress. These screws, with their trilobular shanks or their reduced minor diameters and flat thread angles are designed to minimize material displacement and reduce stress.

In some applications, plastic materials cannot support required load and pull-out forces and it is necessary to reinforce the threaded section to assure a secure assembly. Included in this catalog is a complete line of brass inserts for plastic components that provide clean, secure mating threads for screws. These inserts also facilitate repeated disassembly and re-assembly of components with no loss in holding power.

MANUFACTURING SOURCES

WCL is an authorized distributor for and buys exclusively from licensed manufacturers of all engineered threaded fasteners identified by registered trademark. These products are domestically produced to the very highest quality standards.

Reacting to competitive pressures, customers at times are forced to search out low cost alternatives. To fully serve all of our customer's needs, WCL has developed responsible and responsive alternative sourcing on many products. WCL closely monitors the quality of these products. These products may be offered in response to specific customer requests and are never identified by a trademark name.

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