ROLLED THREADS
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THREADS

Just as a chain is only as strong as its weakest link a bolt or threaded fastener is only as strong as its weakest section - invariably this is the threaded section. This is mainly due to the thread at its root having the smallest cross section.

It therefore makes sense to have a thread that is going to perform as well as, if not better than, the rest of the fastener. By doing this you remove a variable that may cause failure leading to downtime

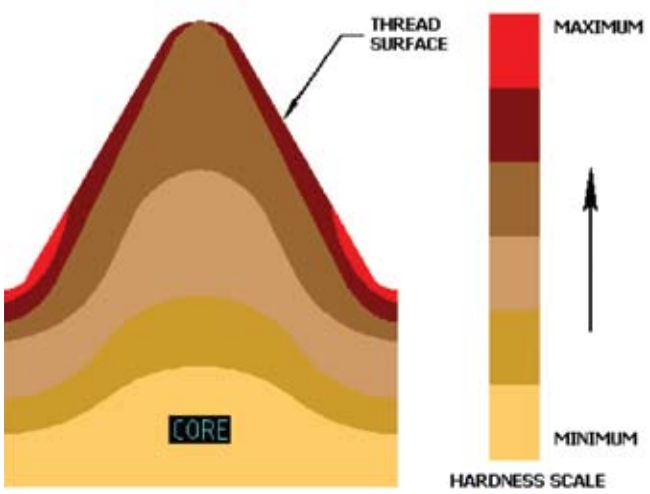
The process used to form rolled threads alleviates the inherent weaknesses that can be associated with other thread forming methods such as cutting, chasing, milling and grinding.

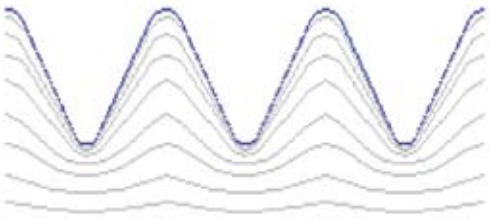
BENEFITS AND ADVANTAGES OF ROLLED THREADS

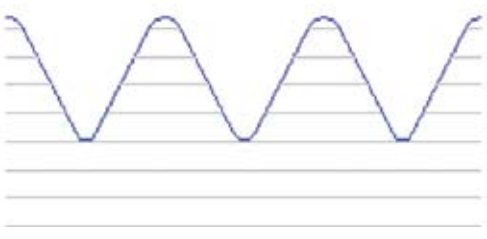
STRENGTH

Roll threading requires reforming of existing material rather than the removal of excess material that takes place when cutting, grinding or milling a thread. During roll threading the grain structure of the parent material is altered to follow the thread profile of the dies. This forming process gives an uninterrupted structure and therefore increased strength. It also produces a work hardened flank which provides increased surface tensile, yield and shear strength as well as improving fatigue resistance by up to 30%.

Due to pressure deformation, a residual compressive stress system builds up at the thread root, which counteracts tensile loading. When compared to cut threads, the load capacity of the rolled thread is increased by 6 -12%.







Grain structure of cut, milled or ground thread

SURFACE FINISH

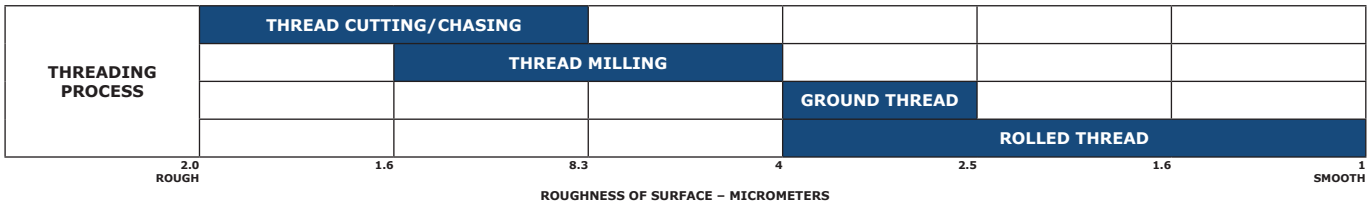
Thread cutting involves removing excess material by cutting across an existing grain structure. This leaves a thread surface that microscopically would show a myriad of cracks and tears which form perfect stress raisers.

Forming a thread by rolling creates a continuous structure and hence a burnished thread with a roughness level consistently below 5 micrometers. This improves resistance to corrosion and reduces abrasion within the thread. There is a direct relationship between surface finish, torque and bolt tension.

When a designated torque is nominated to induce a required bolt tension it is on the premise

that the surface friction between bolt and nut threads is minimal. It is important that torque readings are a result of bolt tension not surface friction.

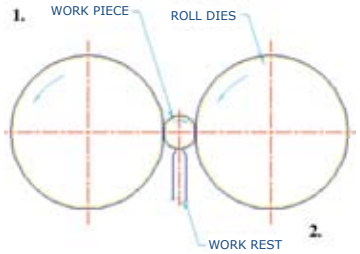
Comparison of thread surfaces produced by different methods



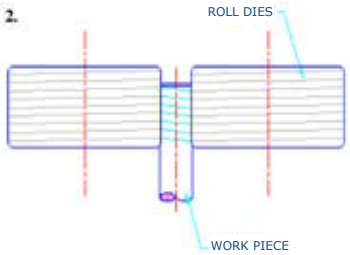
ACCURACY

Rolled threads are formed by placing a blank with a diameter equivalent to the pitch diameter of the required thread between two or three circular dies that are suitably profiled to form that thread.

Every thread formed by those dies will be the same due to the material being threaded having to form to an existing profile. It is obviously simpler to produce one set of dies with high precision and to transfer their form to thousands of components rather than trying to emulate the same precision by machining each component.



1. Front view of thread rolling dies and workpiece setup.



2. Top view of thread rolling dies and workpiece setup.

COST EFFECTIVENESS

From the perspective of costs versus benefits, rolled threads speak for themselves. The slight cost difference between a rolled and a screw cut thread is far outweighed by the superior quality and benefits inherent in a rolled thread. Milled or ground threads are an expensive option where a high quality thread is required and thread rolling capabilities are unavailable or size is a restricting factor. Rolled threads offer high quality, high integrity at low cost.

Comparison of thread surfaces produced by different methods

	QUALITY	STRENGTH	SURFACE FINISH	COST	ACCURACY
ROLLED THREAD	HIGH	HIGH	SMOOTH	LOW	HIGH
SCREWCUT THREAD	LOW	MEDIUM	ROUGH	LOW	LOW
MILLED THREAD	HIGH	MEDIUM	MEDIUM	HIGH	HIGH
GROUND THREAD	HIGH	MEDIUM	SMOOTH	HIGH	HIGH