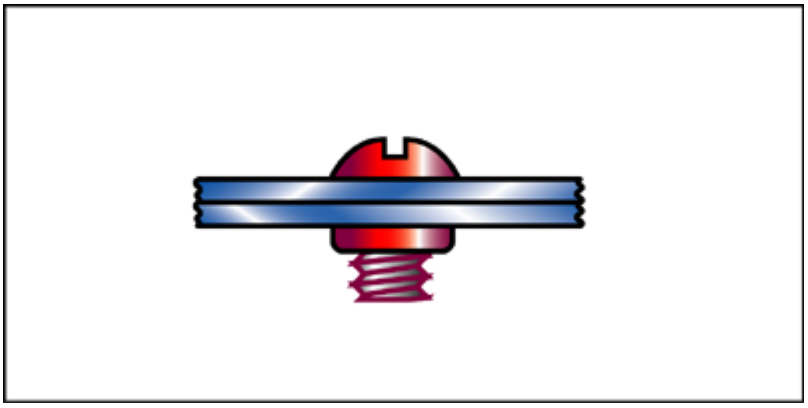
Description

Process schematic



The process

When we get "down to the nuts and bolts" we are getting down to basics. Screws are as old as engineering - the olive press of roman times relied on a gigantic wooden screw. THREADED FASTENERS are the most versatile of mechanical fasteners, with all the advantages they offer: they do not involve heat, they can join dissimilar materials of very different thickness and they can be disassembled. Ordinary screws require a pre-threaded hole or a nut; self-tapping screws cut their own thread.

Material compatibility

Composites	✓
Glasses	✓
Metals - ferrous	✓
Metals - non-ferrous	✓
Natural materials	✓
Polymers - thermoplastics	✓
Polymers - thermosets	✓

Function compatibility

Electrically conductive	✓
Thermally conductive	✓
Watertight/airtight	✓
Demountable	✓

Joint geometry compatibility

Lap	✓
Butt	✓
Sleeve	✓
Scarf	✓
Tee	✓

Load compatibility

Tension	✓

Compression	✓
Shear	✓
Bending	✓
Torsion	✓
Peeling	✓

Economic compatibility

Relative tooling cost	low
Relative equipment cost	low
Labor intensity	medium

Physical and quality attributes

Range of section thickness	1	-	1e3	mm
Unequal thicknesses	✓			
Processing temperature	16.9	-	36.9	°C

Process characteristics

Discrete	✓

Supporting information

Design guidelines

Mechanical fasteners allow great freedom of design, while allowing replacement of components or access to components because of the ease of which they can be disassembled. They can be used up to high temperatures (700 C) and - with proper location - allow high precision assembly.

Technical notes

Threaded fasteners are commonly made of carbon steel, stainless steel, nylon or other rigid polymers. Stainless steel and nickel alloy screws can be used at high temperatures and in corrosive environments. Tightening is critical: too little, and the fastener will loosen; too much, and both the fastener and the components it fastens may be damaged - torque wrenches overcome the problem. Locking washers or adhesives are used to prevent loosening

Typical uses

Threaded fasteners are universal in engineering design. But increasingly their use is becoming limited to products in which disassembly (or the ability to have access) is essential because other joining methods are cheaper, less likely to loosen, lighter and easier to automate.

The economics

Threaded fasteners are cheap, as is the equipment to insert them when this is done by hand. But the insertion is difficult to automate, making other methods (welding, riveting, adhesives) more attractive for a permanent bond.

The environment

Threaded fasteners have impeccable environmental

Links

MaterialUniverse

Reference