

Description

Image



Image caption

(1) Bag belt buckle © Frank C. Müller at Wikimedia Commons (CC BY-SA 4.0) (2) Plastic bottle lid © HebiFot at Pixabay [Public domain] (3) Tin recipient with snap fit seal © Pavel-Vacerek at pixabay [Public domain]

The process

SNAP FITS, like other mechanical fastenings, involve no heat, they join dissimilar materials, they are fast and cheap and - if designed to do so - they can be disassembled. It is essential that the snap can tolerate the relatively large elastic deflection required for assembly or disassembly. Polymers, particularly, meet this requirement, though springy metals, too, make good snap fits.

Process schematic

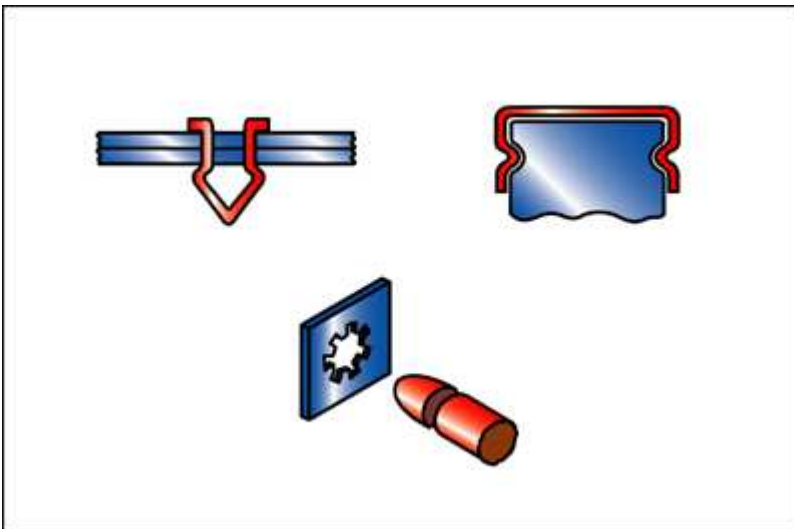


Figure caption

A snap fit

Material compatibility

Composites	✓
Foams	✓
Metals - ferrous	✓

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

Function compatibility

Electrically conductive	✓
Watertight/airtight	✓
Demountable	✓

Joint geometry compatibility

Lap	✓
Sleeve	✓
Scarf	✓

Load compatibility

Tension	✓
Compression	✓
Shear	✓
Bending	✓
Torsion	✓
Peeling	✗

Economic compatibility

Relative tooling cost	low
Relative equipment cost	low
Labor intensity	low

Physical and quality attributes

Range of section thickness	1 - 50 mm
Unequal thicknesses	✓
Processing temperature	6.85 - 36.9 °C

Process characteristics

Discrete	✓
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Supporting information

Design guidelines

Snap fits allow components of every different shape, material, color and texture to be locked together, or to be attached while allowing rotation in one or more direction (snap hinges). The snap fit can be permanent or allow disassembly, depending on the detailed shape of the mating components. The process allows great flexibility in design and aesthetic variety.

Technical notes

The best choices are materials with large yield strains (yield strain = yield strength, σ_y /elastic modulus, E) and with moduli that are high enough to ensure good registration and positive locking. The best materials for snap fits are those with large values of yield (or fatigue) strength/elastic modulus (σ_y/E), and a sufficiently large modulus to give a rigid attachment. Polymers (particularly SAN, nylons, polyethylenes and polypropylenes) have much larger values of σ_y/E than metals. Elastomers have the largest of all materials, but their low modulus means that the assembly will be too flexible and pop apart easily. Among metals, those used to make springs (spring steel, copper beryllium alloys and cold worked brass) are the best choices, for the same reasons.

Typical uses

Snap fits are increasingly used because of the freedom of material and shape that they allow. Typically they are used to join small or medium sized polymer parts, metal casings, sheet parts etc.

The economics

Snap fits are fast and cheap, they reduce assembly time and cost, both in production and in use. Hand assembly requires no special equipment. Automated assembly requires equipment that can be expensive, but it is very fast.

The environment

Snap fits disassemble easily, making recycling easier. In this and every other way they are environmentally benign.

Links

MaterialUniverse

Reference
