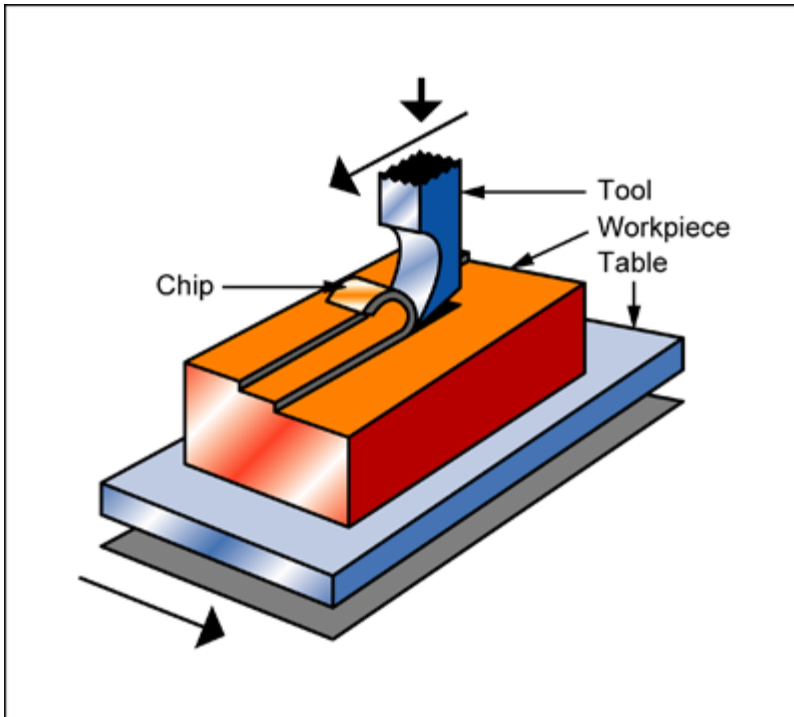


## Description

### Process schematic



### Figure caption

Shaping and planing.

### The process

PLANING is a machining process for removing metal from surfaces in horizontal, vertical, or angular planes. In this process, the workpiece is reciprocated in a linear motion against one or more single-point tools. Although planing is most widely used for producing flat surfaces on large workpieces, the process can also be used to produce contours and a variety of irregular shapes, such as deep slots, helical grooves, and internal guide surfaces. SHAPING AND SLOTTING are machining processes that remove metal from surfaces with a single-point tool mounted on a reciprocating ram.

### Material compatibility

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

### Shape

Circular prismatic	✓
Non-circular prismatic	✓
Solid 3-D	✓

### Economic compatibility

Relative tooling cost	low
Relative equipment cost	medium

Labor intensity	medium
Economic batch size (units)	1 - 100

### Physical and quality attributes

Mass range	0.01 - 100 kg
Range of section thickness	10 - 500 mm
Tolerance	0.01 - 0.5 mm
Roughness	0.4 - 25 $\mu\text{m}$
Surface roughness (A=v. smooth)	B

### Process characteristics

Machining processes	✓
Discrete	✓
Prototyping	✓

### Supporting information

#### Design guidelines

Planing and shaping can be used with most metals, provided their hardness is below Rockwell 46

#### Typical uses

Planing and shaping compete with milling as tools for creating flat machined surfaces, and surfaces with prismatic features.

#### The economics

It is often possible to produce one or two parts on a planer in less time than is required merely to set up for machining by an alternative method; therefore, planing is often used for machining parts to meet production emergencies.

#### The environment

Lubricants and cutting fluids can pose an environmental problem. Special precautions are essential when machining toxic materials such as beryllium.

### Links

MaterialUniverse

Reference