Description

Process schematic

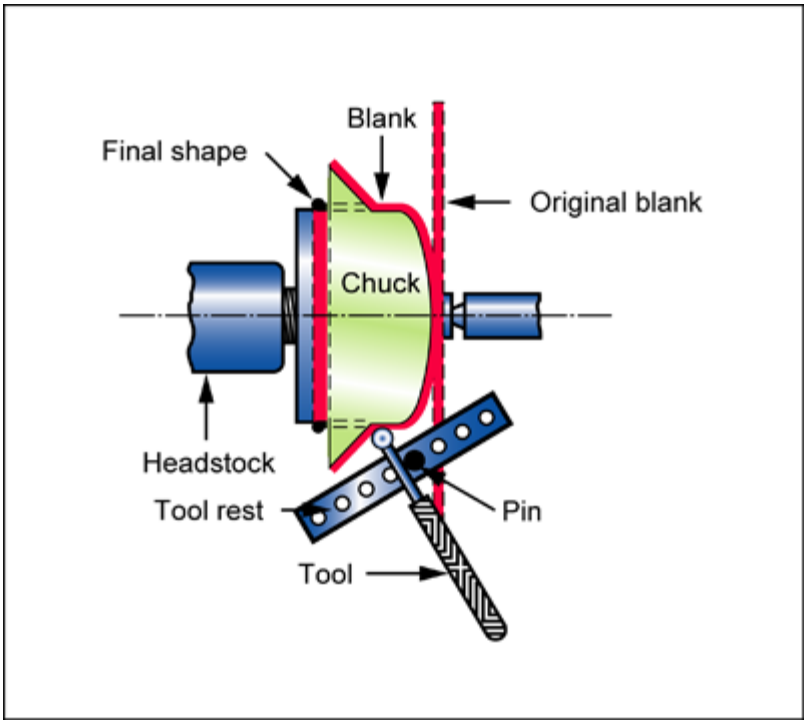


Figure caption

Spinning.

The process

SPINNING involves the forming of axisymmetric parts over a rotating mandrel by a rigid tool or roller. The process uses a lathe-type machine in which is mounted a forming block against which the metal sheet is pressed as it and the forming block rotate. The sheet gradually takes the shape of the forming block. The tools, made of wood or steel, are very simple and thus cheap, making the process attractive for small production runs. Most spinning is performed at room temperature though, if required, it can be done hot.

Material compatibility

Metals - ferrous	✓
Metals - non-ferrous	✓

Shape

Dished sheet	✓

Economic compatibility

Relative tooling cost	low			
Relative equipment cost	low			
Labor intensity	medium			
Economic batch size (units)	1	-	500	

Physical and quality attributes

Mass range	0.022	-	44.1	lb

Range of section thickness	19.7	-	78.7	mil
Tolerance	9.84	-	39.4	mil
Roughness	0.126	-	0.492	mil
Surface roughness (A=v. smooth)	B			

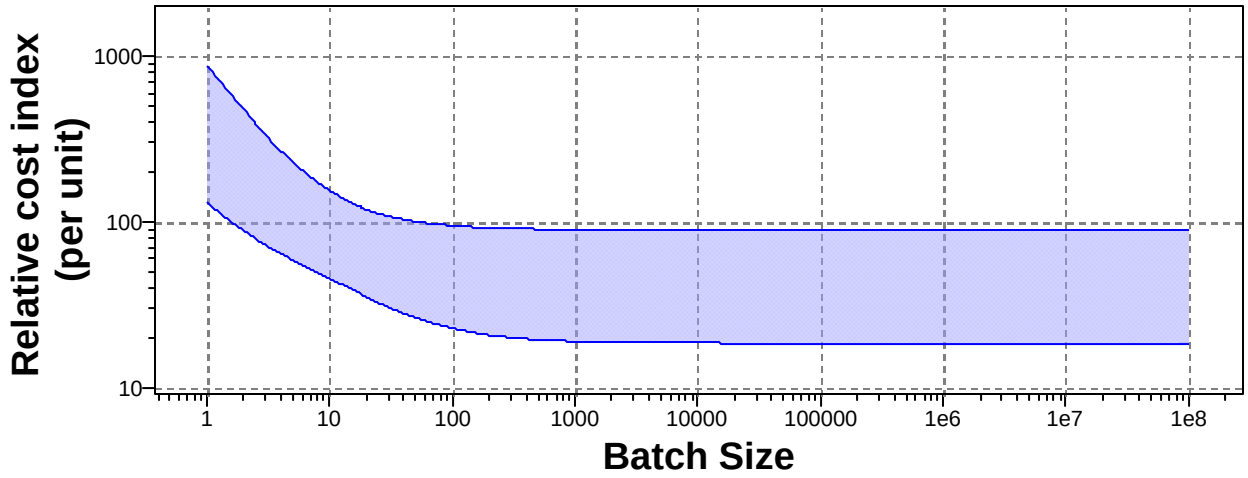
Process characteristics

Primary shaping processes	✓
Machining processes	✓
Discrete	✓

Cost model and defaults

Relative cost index (per unit)	18.9	-	89.8	

Parameters: Material Cost = 3.63USD/lb, Component Mass = 2.2lb, Batch Size = 1e3, Overhead Rate = 150USD/hr, Discount Rate = 5%, Capital Write-off Time = 5yrs, Load Factor = 0.5



Material Cost=3.63USD/lb, Component Mass=2.2lb, Overhead Rate=150USD/hr, Capital Write-off Time=5yrs, Load Factor=0.5, Discount Rate=5%

Capital cost	4.92e3	-	1.64e4	USD
Material utilization fraction	0.85	-	0.95	
Production rate (units)	2	-	30	/hr
Tooling cost	82	-	820	USD
Tool life (units)	50	-	200	

Supporting information

Design guidelines

Spinning is the best way to make small numbers of simple hemispherical, conical or cylindrical shapes from sheet. Reentrant shapes are possible.

Technical notes

Spinning is best for ductile materials with a low tendency to work-harden: aluminum alloys , copper alloys, steels, stainless steels, nickel and nickel alloys, zinc, lead, pewter. A spinning ratio (depth-to-diameter) of less than 1:4 is preferable.

Typical uses

Gas turbine compressor shaft, rocket motor casings, missile nose cones, pressure vessels, automotive components, kitchen utensils, reflectors for table and room lights.

Links

MaterialUniverse