Description

Process schematic

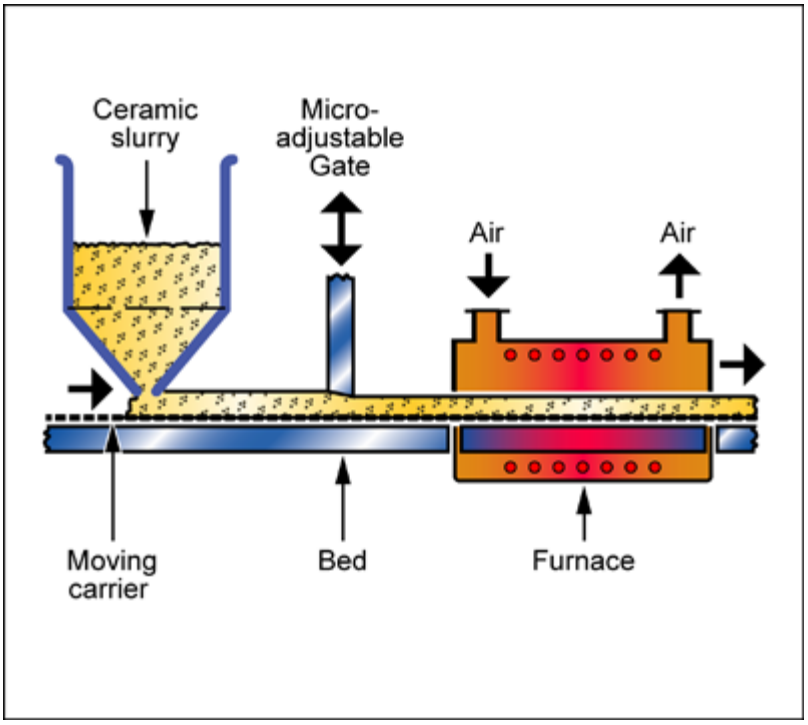


Figure caption

Tape

The process

In TAPE CASTING, a variant of slip casting, a water based slip of metal or ceramic powder is prepared and cast into a paper tape, which is then burned off during firing. The process is used for making sheets of ceramics such as substrates for electronic circuits.

Material compatibility

Ceramics	✓
Metals - ferrous	✓
Metals - non-ferrous	✓

Shape

Flat sheet	✓

Economic compatibility

Relative tooling cost	low			
Relative equipment cost	high			
Labor intensity	low			
Economic batch size (units)	1e3	-	1e6	

Physical and quality attributes

Mass range	0.05	-	50	kg

Range of section thickness	1	-	5	mm
Tolerance	0.3	-	1	mm
Roughness	10	-	25	µm
Surface roughness (A=v. smooth)	B			

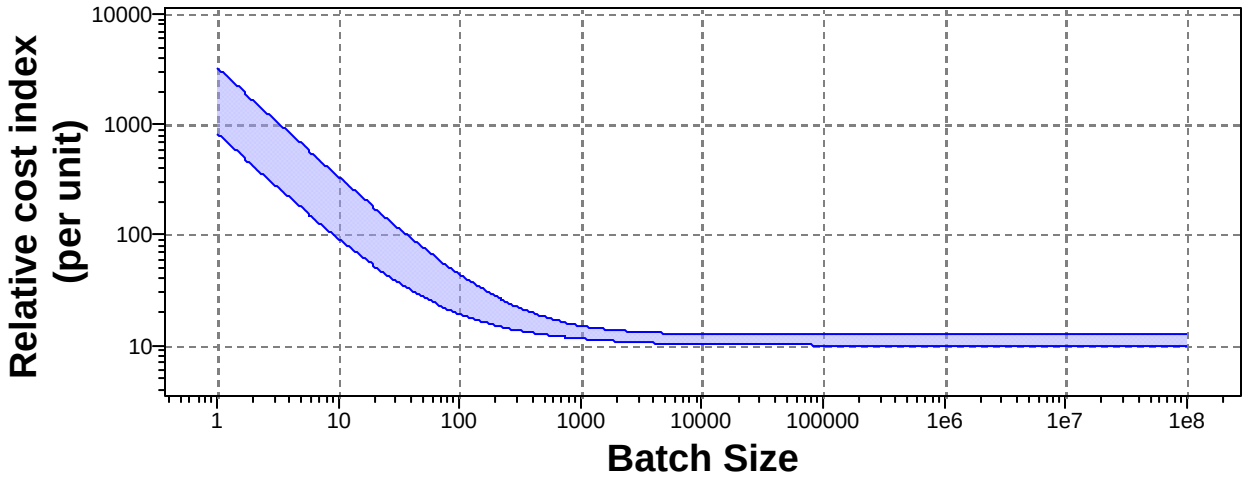
Process characteristics

Primary shaping processes	✓
Continuous	✓

Cost model and defaults

Relative cost index (per unit)	11.5	-	15.1	

Parameters: Material Cost = 8USD/kg, Component Mass = 1kg, Batch Size = 1e3, Overhead Rate = 150USD/hr, Discount Rate = 5%, Capital Write-off Time = 5yrs, Load Factor = 0.5



Material Cost=8USD/kg, Component Mass=1kg, Overhead Rate=150USD/hr, Capital Write-off Time=5yrs, Load Factor=0.5, Discount Rate=5%

Capital cost	1.64e4	-	1.64e5	USD
Material utilization fraction	0.85	-	0.9	
Production rate (units)	50	-	200	/hr
Tooling cost	820	-	3.28e3	USD
Tool life (units)	1e4	-	2e4	

Supporting information

Design guidelines

Tape casting is limited to sheet and

Technical notes

Tape casting is used to shape tungsten, molybdenum, stainless steel, fine ceramics such as silicon carbides and aluminas, clays, short fiber and whisker composites. Although production rate is low and dimensional control is limited, mold and equipment costs are low, and therefore the process is economical for small quantities.

Typical uses

Ceramic substrates for electronic circuits; support for heating elements; refractory metal sheet (tungsten, molybdenum); porcelain and fired clay strip.

Links

MaterialUniverse