

**General**

**Designation**

Casting: Rheocasting

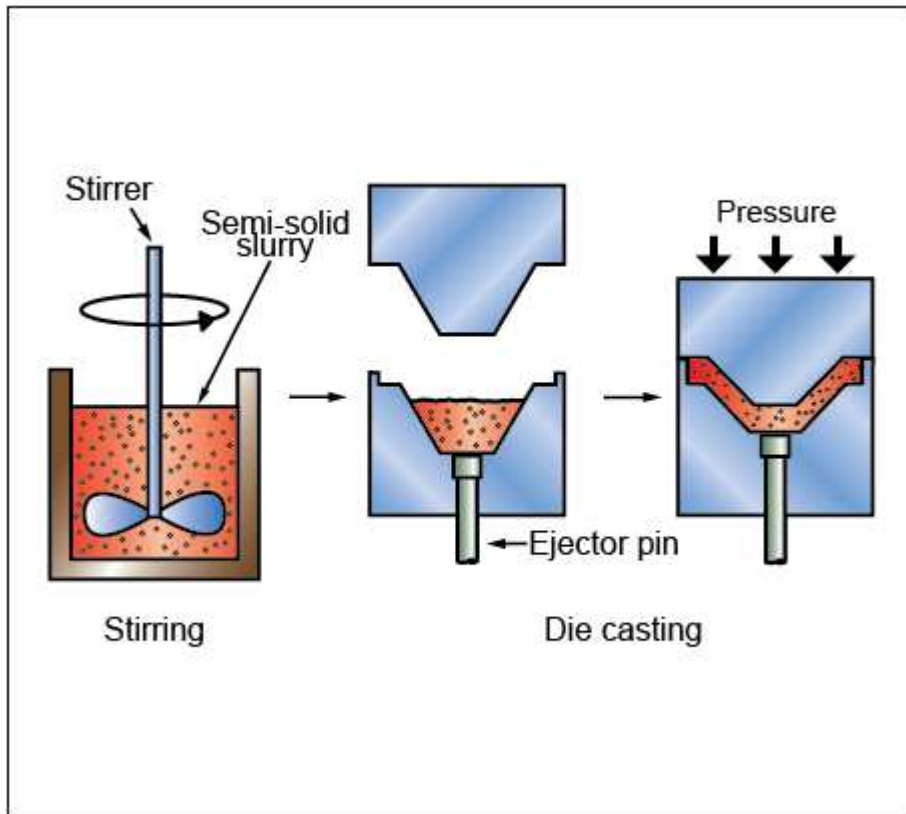
**Tradenames**

SSR (Semi-solid Rheocasting), NRC (New Rheocasting Process), SLC (Sub-Liquidus Casting), NRC (New Rheocasting Process), CRP (Continuous Rheoconversion Process)

**The process**

Rheocasting is a type of Semi-Solid Metal (SSM) casting which begins by producing a semi-solid slurry from molten metal that is then cast using conventional methods, often with existing die casting machines. Unlike thixocasting, this is a single stage process because it does not require special feedstock, so is more suitable for use in industry. This is achieved by agitating the liquid metal typically with a cool graphite stirring rod as it begins to solidify so it remains a viscous, globular fluid when up to 60% solid. The process combines the minimal porosity of forging or squeeze casting with the higher production rates and tool life of die casting. It also requires lower operating temperatures than conventional die casting (5 - 10°C above the liquidus temperature). Machines for producing this slurry on-demand may be retro-fitted to existing die casting cells. The result is a very high quality cast with good mechanical properties and surface finish due to reduced porosity and high dimensional accuracy.

**Process schematic**



**Shape**

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

**Physical attributes**

Mass range	0,05	-	15	kg
Range of section thickness	1	-	8	mm

Tolerance	0,15	-	0,5	mm
Roughness	0,8	-	1,6	μm

**Process characteristics**

Primary shaping processes	✓
Secondary shaping processes	✗
Machining processes	✗
Prototyping	✗
Discrete	✓
Continuous	✗

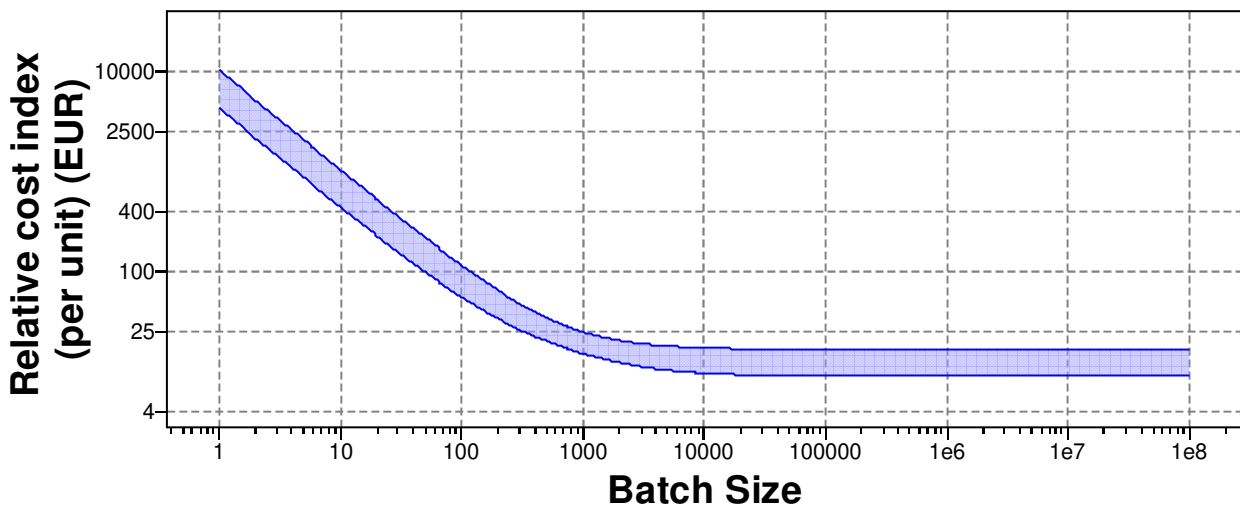
**Economic attributes**

Economic batch size (units)	5e3	-	1e6
Labor intensity	low		

**Cost modeling**

Relative cost index (per unit)	14,9	-	24,5	EUR
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Parameters: Material Cost = 6,77EUR/kg, Component Mass = 1kg, Batch Size = 1e3, Overhead Rate = 127EUR/hr, Discount Rate = 5%, Capital Write-off Time = 5yrs, Load Factor = 0,5



Component Mass=1kg, Component Length=1m, Material Cost=6,77EUR/kg, Overhead Rate=127EUR/hr, Capital Write-off Time=5yrs, Discount Rate=5%, Load Factor=0,5

Capital cost	1,6e5	-	7,98e5	EUR
Material utilization fraction	0,75	-	0,85	
Production rate (units)	20	-	600	/hr
Tool life (units)	9e4	-	1,1e5	
Tooling cost	4,23e3	-	1,01e4	EUR

**Supporting information**

**Design guidelines**

Shape complexity can be high, but elaborate movable cores increase tooling

**Technical notes**

Mostly used for two-phase casting aluminum alloys which otherwise must be processed using squeeze casting as well as copper and magnesium alloys.

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**Typical uses**

Automotive applications: suspension, wheels and ABS pumps, engine

**The economics**

Production rate depends on complexity of component and number of

**Links**

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MaterialUniverse

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Shape

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