TECHNICAL GUIDE · TECHNOLOGY SELECTION

Permanent mold, sand casting or high-pressure die casting?

The key differences between the three aluminum casting technologies at our foundry. The final choice depends on part geometry, quantity and surface requirements – we advise once we have seen the drawing.

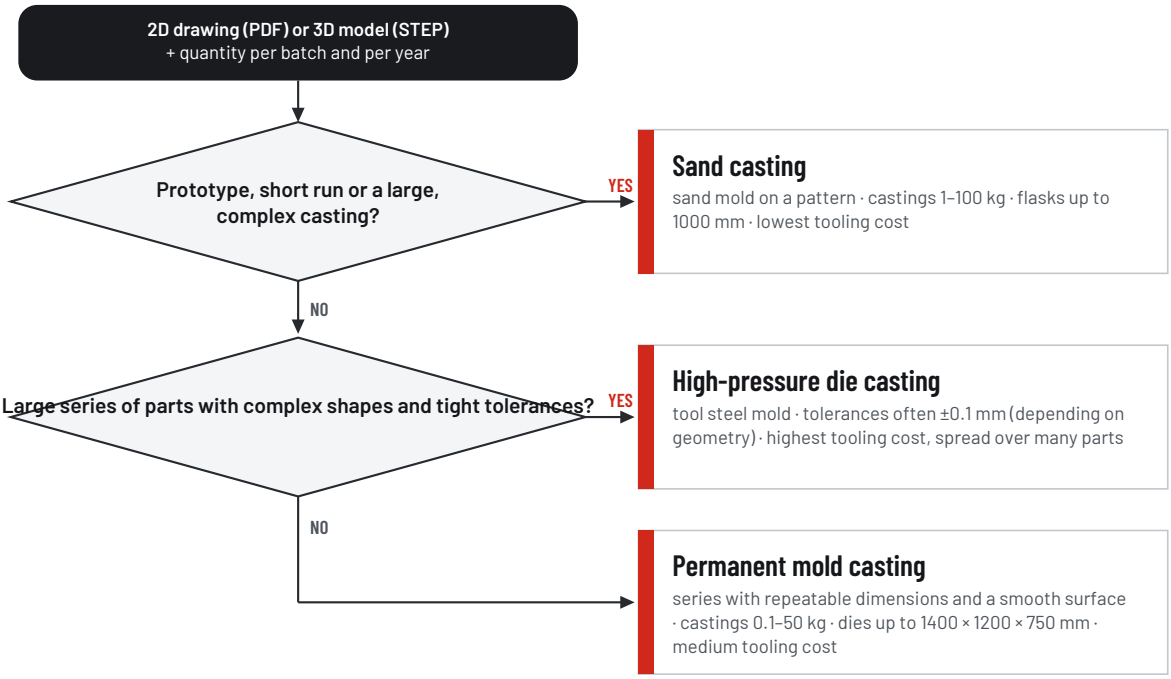

Fig. 1. Simplified diagram for selecting a casting technology.

01 · Technology comparison

Feature	Permanent mold casting	Sand casting	High-pressure die casting
Mold	metal (cast iron or steel), reusable	sand, single-use, made on a pattern	die casting mold made of tool steel
Pouring	gravity pouring – in an automatic cycle or manually	gravity die casting	high-pressure die casting
Best suited for	series with repeatable dimensions	prototypes, short runs, large and complex castings	large series of parts with complex shapes
Dimensions and surface	stable dimensions, smooth surface	depends on the molding material; usually with a machining allowance	very good surface finish, tolerances often ±0.1 mm
Mold cost	medium	lowest	highest
Offer data	castings 0.1–50 kg; molds up to 1400 × 1200 × 750 mm	castings 1–100 kg; flasks up to 1000 mm	tolerances often ±0.1 mm – depending on part geometry

We use all three technologies for aluminum alloys according to PN-EN 1706. Tooling cost is given as an estimate, for comparing the technologies with each other. The part price is also determined by material, weight, quantity and machining.

02 · Casting weight and tooling cost

Fig. 2. Casting weight range – permanent mold and sand mold (data from our offer, logarithmic scale).

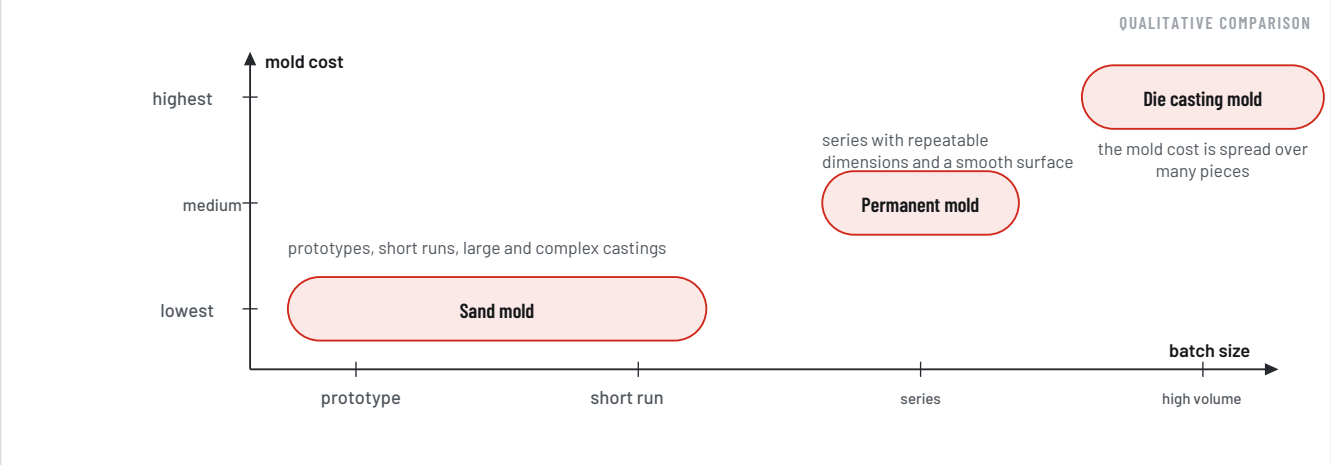

Fig. 3. Mold cost vs. production volume – qualitative comparison based on the technology description.

03 · Frequently asked questions

Question	Answer
What tolerances can be achieved?	It depends on the technology and the shape of the part. In high-pressure die casting, tolerances in the range of ±0.1 mm are often achievable, while permanent mold casting delivers stable, repeatable dimensions throughout the series. Critical dimensions are brought to the drawing tolerances by CNC machining.
Prototypes and short runs?	We usually cast them in sand molds, and series production in permanent molds or by high-pressure die casting.
How long does it take to make a pattern or mold?	From a few days to several weeks, depending on complexity and material, and on whether it is a prototype pattern, a sand mold or a permanent mold.
Can I order a finished part?	Yes – pattern and mold, casting, gate removal, grinding, CNC machining and powder coating. You can also order a selected stage only.
What documents will I receive?	Simplified technical documentation: the design drawing of the part and the technical conditions of manufacture and acceptance; on request, strength testing and material structure analysis.

Not sure which technology to choose? Send us your drawing – we will advise.

- 2D drawing in PDF and 3D model in STEP format
- material or alloy and quantity per batch and per year
- machining and coating requirements

We check feasibility, select the technology and alloy, and prepare the mold concept already at the quotation stage.

Contact and quotation

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