TECHNOLOGY DATA SHEET · SAND CASTING

Aluminum sand casting

We make the mold from molding sand – quartz sand with a binder – on a pattern, and cores form the internal shapes of the casting. Low mold cost and great freedom of shape make this method well suited to prototypes, short runs, and castings with complex geometry and large dimensions.

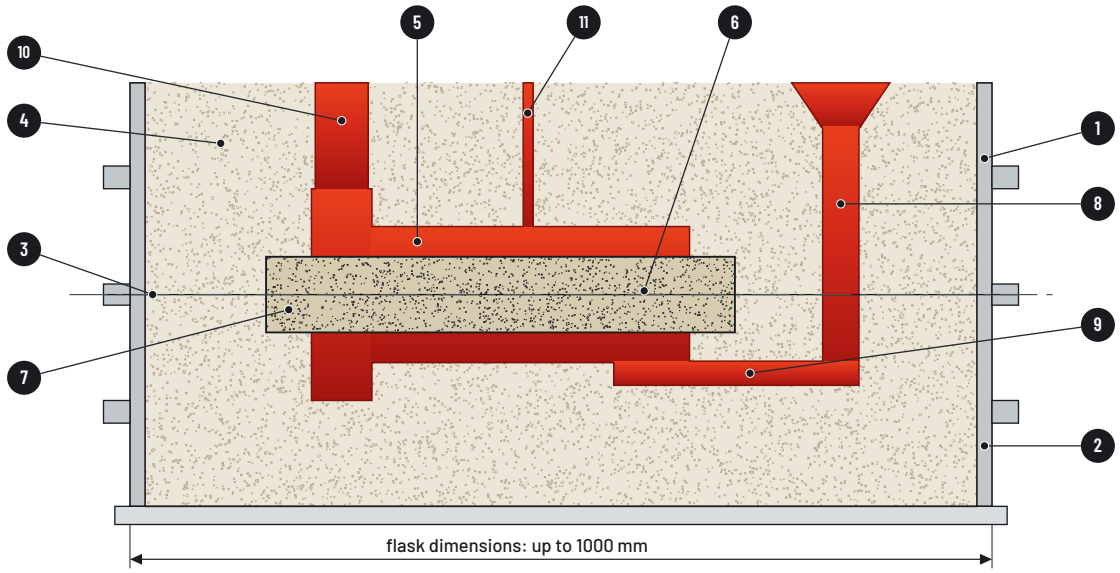
1–100 kg
weight of aluminum castings from sand molds

up to 1000 mm
flask dimensions

2 sand types
self-hardening and heat-hardening; automatic dosing and compaction

lowest
mold cost among the three casting technologies

SCHEMATIC DIAGRAM · NOT TO SCALE



1. Cope flask
2. Drag flask
3. Parting plane of the mold
4. Molding sand – quartz sand with a binder (self-hardening or heat-hardening sand)
5. Mold cavity filled with alloy – casting (example: flanged bushing)
6. Sand core forming the internal bore of the casting
7. Core print – locates the core in the mold
8. Pouring basin and sprue
9. Sprue and ingate
10. Riser feeding the casting during solidification
11. Mold vent

Fig. 1. Sand casting – cross-section of a mold in flasks with a core and gating system.

01 · Technical parameters

Material	aluminum alloys according to PN-EN 1706, selected to suit the casting's operating conditions
Casting weight	from 1 to 100 kg
Flasks	with dimensions up to 1000 mm
Molding sands	self-hardening and heat-hardening; automatic sand dosing and compaction
Molds	split – on reusable patterns (series production); unsplit – on expendable patterns (more complex projects)
Cores	sand cores forming the internal structures of the casting
Patterns and core boxes	wooden, resin or steel – from our in-house pattern shop
Quality control	analysis of molding sand composition and properties, monitoring of casting structure, dimensional measurements and strength tests
Documentation	simplified process documentation: part design drawing and technical conditions for manufacture and acceptance

02 · Molding and coremaking

The foundation of molding is the selection of molding sand, which must meet requirements for strength, plasticity and gas permeability. We prepare, mix and compact the sand in automatic dosing systems. Cores make it possible to produce complex internal shapes, and controlling the casting structure at every stage minimizes gas porosity, shrinkage porosity and uncontrolled metal shrinkage.

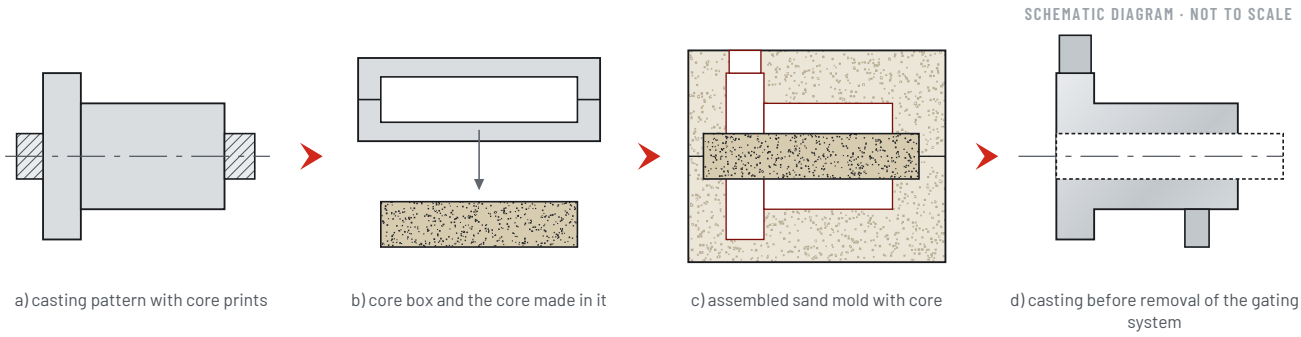


Fig. 2. From pattern to casting: pattern with core prints, core box, mold with core, and casting before removal of the gating system.

03 · Sample castings and industries

Industry	Sample applications of sand castings
Automotive	castings of structural components, engine housings, drivetrain parts
Aerospace industry	lightweight, high-strength aircraft structural components
Power generation	turbine housings and casings, transmission system components
Machinery industry	machine parts, production line components

Examples from our production: casings, wheels and bushings, cylinder head covers, machined parts.

04 · When to choose a sand mold

The sand mold has the lowest tooling cost, which makes it a good choice for prototypes, short runs, and large or complex castings. For runs where repeatable dimensions and a smooth surface matter, consider permanent mold casting; for large runs of parts with complex shapes, consider high-pressure die casting.

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

Data for quotation

- 2D drawing in PDF or 3D model in STEP format
- aluminum alloy and casting weight
- number of pieces per run and per year
- machining and coating requirements

We will advise whether the pattern should be made of wood, resin or steel, and prepare a quotation. We can also deliver the casting after CNC machining, grinding or powder coating.

Contact and quotation

FOUNDRY
Mikołaj Kosicki
tel. +48 531 541 171
m.kosicki@adjatech.pl
permanent mold, sand and high-pressure die castings, patterns and molds

OFFICE · MON–FRI 8:30–16:30
Odlewnia Poznań
tel. +48 61 662 43 37
odlewnia@adjatech.pl
requests for quotation, orders and documents

MACHINING
Rafał Wojtkowiak
tel. +48 531 541 003
r.wojtkowiak@adjatech.pl
CNC milling and turning, machining of castings – series and one-off production

Plant and office: ul. Gnieźnieńska 26, Janikowo, 62-006 Kobylnica (near Poznań) · Registered office: ul. Piotra Ściegiennego 139, 60-304 Poznań

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