

Mould-making procurement: strategically managing tool and mould purchasing

Mould-making procurement covers the procurement processes surrounding the design, manufacture, purchase and upkeep of tools such as injection moulds, die-casting tools, stamping and forming tools. For buyers, this area is particularly demanding because high one-off costs, long lead times and strong technical dependence on the supplier come together. A well-designed procurement process determines whether tools are delivered on time, affordable and usable in the long term. This article explains the structure, KPIs, risks and current developments in mould-making procurement.

Key facts

- Mould-making procurement covers tool design, tool purchase, sample acceptance and lifelong tool responsibility.
- Tool costs are typically capex and require a clear distinction from MRO procurement.
- The tool ownership and custody arrangement is a central component of every tool contract.
- Quality gates such as design review, T0/T1 acceptance and CAP study secure quality and deadlines.
- Tool location, spare parts stock and maintenance contracts are key determinants of lifecycle costs.
- KPIs such as unit cost, tool uptime and delivery performance make tool suppliers comparable.

Definition: mould-making procurement

Mould-making procurement denotes the systematic procurement of tools and moulds for series and prototype production, including accompanying services such as design, testing, modification services and maintenance. It links technical procurement, design and production in a disciplined project workflow.

Distinction from other types of procurement

Tools are generally capital goods and fall under the procurement policy on MRO vs. capex: an injection mould for series production is typically capex, while replacement mould inserts, wear parts and small fixtures frequently run through the MRO process. A clean separation prevents budget circumvention and ensures plannable investment accounts. In practice, companies set thresholds above which a project goes through the capex approval process with technical and commercial review.

Roles and interfaces involved

In addition to the buyer, design, toolmaking, quality assurance, production planning and, where applicable, the end customer's tool manager are involved. The buyer moderates specification, bid comparison and schedule tracking, while the specialist department makes the technical release. Clear role definitions and a documented award-file approach prevent avoidable but costly friction losses over the course of the project.

Course of mould-making procurement from request to series release

The process typically follows a gate model that interlocks technical milestones with commercial decisions. Only in this way can long lead times and high modification costs be brought under control.

Specification and tendering

The starting point is a complete tool specification with number of cavities, tool steel, hot runner system, standard parts set, lifetime requirement and inspection criteria. Buyers use this to create a structured request for quotation, produce a supplier shortlist of qualified toolmakers and award lots according to capacity and technology. A properly maintained award file documents the evaluation scheme, bids and decision and creates transparency for audits and later disputes.

Design review and award of contract

Before the final release design, a joint design review takes place in which moulding simulation, demoulding, cooling concept and changeability are checked. Only after technical release does the tool order become binding. Changes after award are typically expensive, which is why change requests should consistently go through a change management process with cost and schedule impact assessment.

Tool trial, acceptance and release for series production

Acceptance takes place in stages: T0 first samples for functional testing, T1 corrected samples, followed by capacity and process verification via a CAP study with documented cycle times and reject rates. The quality assurance agreement governs measuring equipment, measurement reports and the scope of documentation. Only after release by quality and production does the toolmaker's or tool user's series responsibility begin.

Contracts, ownership and commercial design

Contract design is particularly critical in mould making because tools represent high value and are usually kept in custody by the mould maker or injection moulder.

Tool ownership, custody and insurance

The tool contract governs transfer of ownership, marking of the tools as buyer's property, custody obligations, insurance and the right of retrieval when changing suppliers. In practice, the customer often pays advance payments, so a retention of title in favour of the toolmaker should be contractually excluded. These provisions are the core of every quality assurance agreement and every framework agreement with manufacturing suppliers.

Pricing models and payment schedule

Milestone payments are customary, for example at design release, first sampling and series release, combined with a retention until acceptance. For international suppliers, Incoterms CIF or comparable clauses as well as exchange rate fixing secure the calculation. For disputes, a jurisdiction clause and a clear warranty arrangement for tool defects that manifest themselves as series problems are recommended.

Maintenance, spare parts and location strategy

Maintenance intervals, spare parts stocking and the location of tool custody should be defined early. When the mould maker performs maintenance on site, dependencies arise; an in-house buffer stock approach for wear parts such as nozzles, guides and vents reduces downtime risks. A second qualified tool service provider for maintenance and repair increases supplier independence.

Key KPIs in mould-making procurement

KPIs help to steer tool projects on schedule, cost-efficiently and with quality assurance. They must be considered over the entire lifecycle, not just the purchase price.

Schedule and quality KPIs

Schedule adherence of tool suppliers is measured via delivery performance, i.e. the proportion of milestones met on time. In terms of quality, what count are first delivery without correction loops, T1 first-time pass rate and reject rate in the CAP study. Schedule tracking via a joint milestone sheet makes deviations visible early and enables countermeasures before the series start-up is jeopardised.

Cost and lifecycle KPIs

In addition to pure tool costs, what count are the unit cost share, payback period over the number of units and total cost of ownership including maintenance, modifications and downtime. Cost avoidance through design-to-cost measures, standard parts sets or wall thickness optimisation should be reported separately in order to make the value of procurement visible. Tool uptime and mean time between failures show reliability in series use.

Risks and controls in mould-making procurement

Typical risks are schedule delays, quality fluctuations, dependence on the mould maker and loss of tool control. Controls must therefore operate on a technical, commercial and legal level.

Supplier risks and dependencies

The failure of a mould maker can block the entire series production, as tools cannot simply be relocated without release. Mutual safeguards are provided by a qualified second source for mould making, documented tool data and a clear returns and complaints regime. With international suppliers, customs and export issues come into play; an AEO certification of the supplier is a positive signal here for reliable supply chains.

Data, change and process controls

Tool master data, revision states and inspection records belong in a central contract repository and PLM system; supplier master data maintenance ensures that certificates, insurance policies and contacts are up to date. Quality gates with defined entry and exit criteria prevent inadequately tested tools from going into series production. A regular data quality report on the tool inventory reveals gaps in documentation and contractual arrangements.

Compliance and internal governance

Large tool investments generally require multi-stage approvals, documented bid comparisons and compliance with the procurement policy on MRO vs. capex. Mobile approval (P2P) speeds up approvals in the purchase-to-pay process, but does not replace substantive review. Where awards are made via

purchasing cooperatives or bundling leverage across several sites, it must be ensured that tool specifications and site requirements remain compatible.

Current developments in mould making

Technology and market dynamics are noticeably changing the procurement of tools. Buyers should take these trends into account in strategy and supplier selection.

Additive tooling technology and conformal cooling

Additively manufactured inserts with conformal cooling typically shorten cycle times and improve part quality, but require new evaluation criteria in bid comparison. Buyers should use the innovation funnel to systematically identify suitable toolmakers with hybrid manufacturing capabilities and test them in pilot projects. The added value only shows in unit costs and energy consumption, not in the tool price.

Digitalisation and supplier platforms

Digital requests for quotation, standardised tool datasets and marketplaces for supplier services significantly shorten the search for qualified mould makers. Purchase-to-pay integration with call-off orders for maintenance and spare parts reduces transaction costs. Data quality over the entire lifecycle becomes a success factor in its own right, as tools are used for decades and relocated multiple times.

Supply chain and location dynamics

Longer lead times for tool steels and hot runner components require earlier scheduling in project plans. Resilience strategies such as dual sourcing, regional second tools for critical parts and clearly regulated tool transfers are gaining in importance. Buyers increasingly also assess suppliers on their ability to transfer tools and on documentation quality.

Typical metrics

Delivery Performance tool supplier: > 95%

Proportion of milestones met on time across a project

Tool uptime: > 98%

Availability of tools in series production

T1 first-time pass rate: > 80%

Proportion of tools without a second correction loop

Cost avoidance: 3–8% of tool costs

typical savings through design-to-cost and standard parts

Practical example

A medium-sized plastics processor received an order from a new customer for four injection moulding tools with series start-up within nine months. The head of procurement established a structured mould-making process with the following measures:

- Creation of a standardised tool specification and invitation to tender to six pre-selected toolmakers with a structured award file
- Design review with moulding simulation before award of contract, plus a staged payment plan with retention until the CAP study

- Tool contract clauses on ownership, custody, insurance and retrieval with all four suppliers
- Buffer stock for wear parts and a qualified second maintenance provider to reduce dependency

Conclusion

Mould-making procurement is one of the most demanding tasks in technical procurement, because high investment sums, long lead times and technical dependence come together. Successful companies combine a precise specification, staged quality gates and watertight tool contracts. KPIs such as delivery performance, tool uptime and total cost of ownership make supplier performance and lifecycle costs transparent. Increasingly, the digitalisation of tool data and the ability to achieve cross-tool resilience determine success. Those who treat tools as long-term assets rather than a one-off purchase secure competitiveness for years to come.

Frequently asked questions

What does an injection moulding tool typically cost?

Costs depend on size, number of cavities, tool steel and complexity. Small single-cavity tools in practice frequently fall in the low to mid five-figure euro range, large multi-cavity tools with hot runner typically in the five to low six-figure range. For the buyer, the decisive factor is a lifecycle view including maintenance and modifications.

Who owns the tool while it is held by the toolmaker?

That depends on the contractual arrangement; in practice, customers usually purchase the tools themselves and have them kept in custody by the toolmaker. The contract should clearly regulate ownership, marking, insurance and the right of retrieval. Without such clauses, disputes loom when changing suppliers.

What do T0 and T1 mean in tool acceptance?

T0 refers to the first tool trial, in which function and fundamental aspects are checked, often still with known deviations. T1 is the corrected re-trial after the first adjustment. This is typically followed by the CAP study as capacity and process verification prior to release for series production.

How long does it take to manufacture an injection moulding tool?

In practice, eight to sixteen weeks are typical for smaller to medium-sized tools; complex multi-cavity tools can take considerably longer. Added to this are design time, sample phases and, where applicable, correction loops. Buyers should plan lead times for tool steels separately.

Is tool purchase capex or MRO?

Series tools are generally capital goods and therefore capex, while wear parts, small fixtures and repairs frequently run through the MRO process. The distinction should be fixed in the procurement policy on MRO vs. capex. In individual cases, for example with leasing or tool usage models, an auditable alignment with finance and tax is recommended.