

Production ramp-up (SOP): The starting point of stable series production

The production ramp-up, or SOP (Start of Production) for short, describes the transition of a product or part family from prototype manufacturing to regular series production. For buyers and supply chain managers, SOP is a critical milestone at which suppliers' capacities, quality and delivery performance must be proven under series conditions for the first time. Those who manage the production ramp-up in a structured manner prevent costly stoppages, emergency purchases and reputational damage with end customers.

Key facts

- SOP (Start of Production) marks the official start of series production of a product or part at the customer or supplier.
- Typically, SOP is prepared through a production process and product release process, often evidenced by an Initial Sample Inspection Report (ISIR) and demonstrated process capability.
- In practice, delivery call-off contracts and call-off orders start with the SOP, which is why procurement must secure capacities and logistics structures at an early stage.
- The core risks of a production ramp-up are capacity bottlenecks, quality deviations, a lack of alternative suppliers and untested logistics processes.
- A structured ramp-up plan with clear milestones, release criteria and escalation paths significantly reduces the risk of series start-up problems.

Definition: Production ramp-up (SOP)

The production ramp-up describes the period and the process in which a product is transferred from the development and prototype phase into regular series production. The SOP itself is the fixed date from which parts must be delivered in series quality and series quantity.

Distinction from prototype and pre-series production

Before SOP, there are typically prototype and pre-series phases in which parts are produced in small quantities with processes that are not yet finally locked. These phases serve to demonstrate process capability, to build tools and fixtures and to test the logistics chain. Only once all release criteria have been met – for example via the Initial Sample Inspection Report (ISIR) – is production considered ready for series production. For procurement, the contract structure changes with the SOP: series prices, fixed call-off quantities and the agreed Incoterms, for example Incoterms CIP, now apply.

Significance for procurement

For buyers, the production ramp-up is the moment when prototype contracts and lot-size orders become a solid series business. Procurement must ensure that the supplier master data is finally verified – ideally via an Approved Vendor List (AVL) – and that contracts, prices and logistics terms are bindingly agreed. At the same time, ongoing demand determination begins with the SOP, based on the agreed

unit quantities, which later feeds into delivery schedules and call-off orders. An unprepared SOP date frequently leads to expensive air and express freight or missing parts on the assembly line.

Methods and approach in the production ramp-up

A well-managed production ramp-up follows a structured plan with phases, milestones and defined responsibilities. In practice, standard methods have become established, which are also anchored in the procurement manuals of many companies.

Ramp-up management with a milestone plan

The ramp-up plan defines which activities must be completed before SOP: tool release, initial sample approval, supplier capacity evidence, logistics concept and contract conclusion. Formats such as ramp-up meetings and lighthouse audits are common, in which the status of all open items is assessed. Frequently, project management, quality, logistics and procurement work together in a joint ramp-up team so that risks become visible at an early stage. Escalation paths up to executive management should be defined so that critical deviations can be decided at short notice.

Capacity and risk assurance

Before SOP, procurement checks whether the supplier can actually deliver the series quantity – especially for bottleneck materials and long lead times. A bottleneck analysis helps identify critical components and process steps before they block the ramp-up. In practice, it has proven useful to qualify dual sources for critical parts or to agree safety stock. Where in-house production and external sourcing compete, the level of vertical integration should be finally clarified before SOP so that capacities are not doubly allocated or left unused.

Logistics and process preparation

From SOP onwards, the series logistics processes take effect: packaging specifications, transport routes, delivery cadences and data formats for call-offs must have been tested. A trial logistics run is often already carried out during the pre-series phase to check packaging, labels and interfaces. The transition into the operational procurement process should be designed so that the delivery call-off contract and call-off order interlock seamlessly and no gap arises between prototype and series supply.

Key KPIs and inspection criteria in the production ramp-up

The production ramp-up can only be managed if progress is made measurable. In practice, companies combine process metrics from quality, logistics and supplier performance into a ramp-up dashboard.

Quality metrics

Key metrics are the initial sample approval rate, the proportion of parts with a completed ISIR and the process capability indices for critical characteristics. Typically, cpk values of at least 1.33 are targeted for particularly important characteristics. In addition, 8D reports and complaint rates from the pre-series phase provide indications of ramp-up problems that should be resolved before SOP.

Delivery and capacity metrics

The delivery reliability and on-time performance during the pre-series phase are strong indicators of a supplier's series-readiness. In addition, procurement examines the confirmation rate for call-offs and the lead times for critical materials. Stock metrics such as inventory coverage and capital tie-up reveal

whether the planned ramp-up stock is appropriate or whether excess stock is looming. A regular stock consumption analysis after SOP shows whether the initially estimated demand figures were realistic.

Procurement and cost metrics

The cost side should also remain measurable: target purchase prices from the costing are reconciled with the prices actually agreed contractually. For long series runs, price indexation is sensible in order to handle fluctuations in raw material and energy costs transparently. Suppliers' compliance with the contractual framework can additionally be tracked via metrics such as accreditation status and the use of audit rights.

Risks and controls in the production ramp-up

The production ramp-up is one of the most risk-laden phases in the product life cycle: errors multiply with unit volumes, and rework or stoppages quickly cost a multiple of the planned savings. Controls should therefore be applied early and systematically.

Typical sources of error

Common problems include capacity bottlenecks at suppliers recognised too late, manufacturing processes not fully locked, missing or faulty inspection equipment and disruptions in material availability. Organisational causes such as unclear responsibilities between development, quality and procurement, or a call-off system that only goes live after the SOP, also repeatedly lead to ramp-up problems in practice.

Control instruments and audits

Effective controls include supplier audits before SOP, process audits at critical manufacturing steps and the binding review of the initial sample approval results. The audit right in the supply contract should be formulated so that second-tier suppliers can also be audited where necessary. In addition, risk matrix assessments have proven effective, in which parts are classified by technical risk and sourcing effort – similar to an ABC analysis, which also sets priorities in day-to-day operational procurement.

Contractual safeguards

The series contract should contain clear rules for ramp-up problems: volume flexibility in the initial phase, recourse provisions for quality defects and defined escalation levels. For complex assemblies or multiple suppliers, a bidding consortium can be sensible in order to pool delivery capability – although the contractual allocation of responsibility should be carefully examined in each individual case.

Current developments and digitalisation in the production ramp-up

The production ramp-up is increasingly managed digitally: ramp-up platforms, shared data rooms and standardised release processes shorten throughput times and improve transparency across supplier boundaries.

Digital ramp-up platforms and Source-to-Pay

Modern companies integrate the ramp-up process into their Source-to-Pay systems (S2P), so that there is a continuous data flow from the enquiry through the contract situation to operational call-off control. An integrated Purchase-to-Pay process reduces media discontinuities and, in particular, accelerates the optimisation of accounts payable cycle times after the start of SOP. A prerequisite is a well-maintained

supplier master: consistent supplier master data prevents releases, call-offs and invoice verification from drifting apart.

Acceleration through standardised award processes

For new parts that need to be procured shortly before SOP, structured RFX processes in procurement become more important: standardised enquiry processes reduce the time to contract award and facilitate the objective comparison of offers. Overall process optimisation in procurement also contributes to making ramp-up phases shorter and more stable. What remains important is that speed must not come at the expense of qualification.

Resilience and sustainability as new requirements

Increasingly, OEMs and end customers demand that delivery capability and sustainability be demonstrable from the SOP onwards – for example through CO2 data, supply chain transparency and contingency plans for critical materials. Buyers should therefore clarify early on which evidence obligations apply from the series start and whether these are incorporated into the series contract. Legal obligations arising from supply chain legislation and ESG reporting should be reviewed legally in each individual case.

Typical metrics

Initial sample approval rate (ISIR): 100 % before SOP

All critical parts should be fully released before the start of series production

Delivery reliability in pre-series: > 95 %

Typical benchmark as an early indicator of series-readiness

Process capability cpk (critical characteristics): ≥ 1.33

Industry-standard target value for particularly important characteristics

Ramp-up material shortages: 0 shortages

No line stoppages due to missing purchased parts during the ramp-up phase

Call-off confirmation rate: > 98 %

Proportion of delivery call-offs confirmed on time after SOP

Practical example

A mid-sized mechanical engineering company is ramping up a new product series with around 180 new purchased parts. During the pre-series phase, two plastics suppliers show fluctuations in the grain texture, and a critical electronics component has a lead time of more than twenty weeks. The ramp-up team responds with a bundled package of measures before the SOP dates are put at risk.

- Bottleneck analysis across all new parts, prioritising the ten most critical components with weekly status reporting and a mandatory escalation process.
- Qualification of a second supplier for the electronics component and the build-up of a secured ramp-up stock covering three months of demand.
- Binding ISIR release for all B and C parts before SOP, accompanied by process audits at the two plastics suppliers.
- Switching delivery call-offs to a weekly cadence with fixed confirmation deadlines, aligned with the Incoterms CIP arrangement of the series contracts.

Conclusion

The production ramp-up (SOP) is more than a date in the project plan: it is the transition point at which it becomes clear whether development, quality, logistics and procurement have built a solid series system. Successful companies manage the SOP with clear milestones, measurable release criteria and contractually safeguarded supplier relationships. Procurement plays a key role here because it makes capacities, contracts, prices and logistics structures binding. Those who identify ramp-up risks early and address them in a structured manner avoid costly missing parts and stoppages. A properly prepared SOP date is therefore also the foundation for stable series metrics and a viable supplier partnership across the entire product life cycle.

Frequently asked questions

What does SOP or production ramp-up mean?

SOP stands for Start of Production and refers to the date from which a product is manufactured and delivered in regular series production. The production ramp-up is the entire preparation and transition process leading up to that point. It comprises initial sample approval, process release, capacity assurance and logistics set-up.

What is the difference between pre-series and series production?

In the pre-series phase, parts are produced in small quantities to test processes, tools and logistics; the processes are not yet finally locked. From SOP onwards, series prices, binding call-off quantities and the agreed quality approvals apply. Only from this point must all parts meet the agreed series quality without any exemption.

What role does procurement play in the production ramp-up?

Procurement secures capacities, concludes series contracts, coordinates initial sample approval and releases with suppliers, and sets up the delivery call-off processes. It participates in the ramp-up team in order to identify risks for critical parts at an early stage. It also prepares the operational processes such as call-off orders and asset management for series operation.

How long does a production ramp-up typically take?

The duration depends heavily on product complexity, the proportion of new parts and the industry. In the automotive industry, several months to over a year are often planned between tool release and SOP; in mechanical engineering, timeframes are often shorter. The lead times of the most critical components and the scope of qualification work are decisive.

What is an ISIR in connection with the SOP?

The Initial Sample Inspection Report (ISIR) documents the complete inspection of a first sample against all defined characteristics and is a key release condition prior to SOP. Only after a passed ISIR and further release steps may the supplier deliver series parts. In practice, the ISIR is frequently supplemented by process audits and capacity evidence.

How can procurement avoid ramp-up problems?

Important measures include an early bottleneck analysis, binding capacity commitments from suppliers, dual sources for critical parts and a ramp-up plan with clear release criteria. In addition, delivery call-offs, packaging and logistics processes should be tested before SOP. Structured ramp-up tracking with weekly status reports and escalation paths keeps risks visible.