

Run at Rate: capacity and performance validation before production start-up

Run at Rate (RaR) is a defined validation measure in which a supplier demonstrates that it can produce a product in production quality and at the agreed cycle time. The evidence is provided under real production conditions – using the same equipment, tools, personnel resources and processes as in the subsequent ongoing production. For buyers, Run at Rate is a central control instrument during production start-up, used to identify capacity risks and quality problems before they jeopardise order volumes and delivery times.

Key facts

- Run at Rate is a formal capacity and performance acceptance test at the end of production preparation, frequently as part of the production part approval process.
- Typical checks include cycle time, OEE, units per shift, process capability and staffing plans under real production conditions.
- The run usually takes place only once all tools, equipment and measuring instruments have been finally installed.
- A successful Run at Rate is frequently a prerequisite for approval of series orders and the start of shipping.
- In practice, typical runs range from one day to one production week, depending on complexity and industry.
- Various industry standards, for example in the automotive environment, define Run-at-Rate requirements for suppliers on a binding basis.

Definition: Run at Rate

Run at Rate refers to a documented trial or production run with which a supplier demonstrates that its production line achieves the contractually agreed cycle time and volume in production quality. The term originates in the automotive industry and is now also widespread in general mechanical engineering, electronics manufacturing and interconnected supply chains.

Distinction from PPAP and sample part approval

Run at Rate is not identical to mere sample part approval: in sample inspection, part properties and measurement results take centre stage, whereas in Run at Rate it is the performance of the entire process over a defined period. In automotive practice, the Run at Rate is frequently part of the Production Part Approval Process (PPAP) and is assessed together with documents such as process capability studies and layout drawings. A part may therefore be dimensionally perfect, yet the Run at Rate may still fail because the cycle time or availability cannot be maintained.

Legal and contractual classification

Whether Run at Rate is binding depends on the contract and the required quality documents. In many

purchasing terms and quality assurance agreements, the run is stipulated as an approval condition; the result is then a prerequisite for placing series volume orders. Buyers should fix requirements, criteria and consequences of failure in writing and have the assessment reviewed legally on a case-by-case basis.

Process and procedure of a Run at Rate

A Run at Rate typically follows a structured process: preparation, execution under production conditions, documented assessment and joint alignment on open items. For the results to be meaningful, the run must take place under the same conditions that will later apply in series production – tools, machines, raw materials, personnel, shift model and supply.

Preparation and prerequisites

Before the run, tools must be finally set up, measuring instruments calibrated, work plans approved and staffing plans coordinated. A capacity reconciliation with the supplier in advance helps to identify bottlenecks early. Buyers define the criteria together with quality and logistics: cycle time, scrap rate, number of parts to be produced, duration of the run and scope of documentation.

Execution under production conditions

During the run, the line is operated as it would be in series production, i.e. without special treatment through additional skilled staff or manual intervention. Cycle times, downtime, scrap, rework shares and disruptive factors are recorded. Runs covering one day up to one production week are usual; for complex components or high annual volumes, longer runs are also agreed.

Assessment and approval decision

Afterwards, the results are assessed against the target values: Was the nominal cycle time achieved? Was the OEE sufficient? Are the capacities available for the callable volume? If targets are not met, measures with responsibilities and deadlines are defined, often with a root cause analysis using the 5-Why method, followed by a repeated run.

Key KPIs in the Run at Rate

Run at Rate is a measurable demonstration – without metrics it is ineffective. The relevant set of metrics comprises performance, quality and availability parameters and should be defined and documented on a binding basis in advance.

Cycle time, output and OEE

Key parameters are the achieved cycle time compared with the nominal cycle time, the number of units produced per shift, and equipment or line productivity (OEE). In practice, minimum values are frequently defined for approval, for example achieving an OEE in the double-digit to high range, or a cycle time that reliably covers the annual quantity with the planned number of shifts.

Quality and process metrics

These include scrap and rework rates, first-pass yield and process capability indices such as Cpk for critical characteristics. Capacity resilience is equally relevant: how does the line behave during disruptions, and how quickly is it restarted? These values later feed into ongoing supplier evaluations.

Logistical parameters

For procurement-relevant questions, delivery capability, packaging concept and transport handling also count: the run shows whether the planned container quantities, load units and associated costs (for example, to avoid demurrage) are realistic. Discrepancies here frequently lead to adjustments in the call-off and sequencing concept.

Risks and control mechanisms

The greatest risk error in a Run at Rate is a run under ideal conditions: key personnel flown in at short notice, pre-selected material or deactivated automation steps. The run then presents a positive picture that cannot be sustained in series production – with jeopardised delivery times and additional costs as a consequence.

Typical sources of error

Common problems are incomplete tool approvals, missing process capability evidence, underestimated set-up times for small batch sizes and personnel resources dimensioned too tightly for all shifts. Unclear criteria – for example, whether the cycle time must be maintained over the full run duration or only in segments – also lead to disputes.

Buyer controls

Buyers should attend runs personally or through quality representatives, agree criteria in writing and record the result in an approval protocol. A capped fail-and-retry process with clearly defined consequences – from 'approval with conditions' to 'restart of the industrialisation plan' – protects against endless repeat runs. The run should also be repeated after relocations or significant process changes.

Interfaces with other procurement topics

Run at Rate sits at the end of industrialisation and before transport volume deployment, i.e. precisely where order placement, call-off logistics and binding deadlines for tools and advance material also apply. Those who combine capacity reconciliation with suppliers and Run at Rate identify structural bottlenecks in the supply base earlier than through pure deadline monitoring.

Current developments and digital support

Run-at-Rate data is increasingly captured digitally and linked to production control charts, machine data and cloud quality systems. This increases objectivity and allows the run to be viewed as a continuous process rather than a one-off event.

Data-driven runs

Machine data from MES and production data acquisition systems automatically provide OEE, downtime and scrap. This reduces manual evaluation effort and makes comparisons between multiple runs or suppliers possible. The prerequisite is a uniform definition of metrics between buyer and supplier.

Integration into supplier development

Leading companies embed Run at Rate in a structured supplier development process, linked to Joint Business Plan (JBP) agreements and regular supplier capacity reconciliation rounds. This turns the one-off approval test into a repeatable capacity and performance dialogue that also applies to volume jumps or scope changes.

The impact of stable master data

Accurate runs require consistent unit and currency master data and clear bills of materials. Incorrect units per container or unit conversions otherwise distort the assessment of output and material flow. The cleansing of such master data should therefore be checked before every run.

Typical metrics

Achieved cycle time vs. nominal cycle time: 100 % (over the full run duration)

Frequently an approval criterion; individual cycles alone are not sufficient.

OEE during the run: typically > 70–85 %

Industry-dependent; should be agreed in writing in advance as a minimum value.

First-pass yield: typically > 95–98 %

Benchmark for process stability during the production run.

Process capability (Cpk) of critical characteristics: ≥ 1.33 (frequently required)

Higher values are also common depending on industry and safety relevance.

Practical example

A medium-sized mechanical engineering company places an order for a new cast part including machining with a supplier in Eastern Europe. During the Run at Rate, it becomes apparent that although the agreed cycle time is achieved in individual cycles, downtime in the part-removal automation pushes output over the shift duration to around 20 per cent below the target value.

- The buyer orders a root cause analysis using the 5-Why method within two weeks.
- As evidence, a repeat run over a full shift with standard personnel is agreed.
- In parallel, a capacity reconciliation with the supplier secures the transition to a two-shift model for the ramp-up phase.
- The result is documented in an approval protocol with conditions; production approval is only granted after a subsequent successful run.

Conclusion

Run at Rate is one of the most effective instruments for objectifying ramp-up and capacity risks before series volumes are ordered. Its value comes from clear criteria, runs under genuine production conditions and documented consequences in the event of deviations. Buyers who systematically integrate runs into their supplier development process identify bottlenecks significantly earlier than through pure deadline monitoring. Combined with supplier capacity reconciliation, quality documents and clean master data, the run becomes a reliable early indicator of delivery capability and cost stability. Those who treat it as a mere formality, by contrast, lose one of the last control points before production start-up.

Frequently asked questions

What does Run at Rate mean?

Run at Rate is a documented trial or production run in which a supplier demonstrates that it can produce the agreed cycle time and volume in production-quality output. The run takes place under real production conditions using the later equipment, tools and personnel resources. The result is frequently

a prerequisite for approval of series production.

How long does a Run at Rate take?

In practice, runs typically last from one day to one production week, depending on complexity, volume and annual quantity. For complex components or critical suppliers, longer runs or repeated runs after corrective actions have been implemented are also agreed. The duration should be specified in writing in advance in the test plan.

Which KPIs are checked during a Run at Rate?

The main checks are cycle time compared with nominal cycle time, units per shift, OEE, scrap and rework rates, and process capability indices for critical characteristics. Availability and restart times are often also included. All target values should be defined and documented in advance between the buyer and the supplier.

What happens if a Run at Rate is failed?

A root cause analysis is usually carried out, for example using the 5-Why method, and a repeated run is agreed after corrective actions have been implemented. Depending on severity, interim approvals with conditions or a restart of the industrialisation plan are also possible. Consequences should be agreed in advance contractually or through quality assurance provisions to avoid disputes.

Is Run at Rate only relevant in the automotive sector?

The term originates in the automotive industry, but has long since become established in mechanical engineering, electronics manufacturing and other sectors. Run at Rate is useful wherever cycle times, capacities and quality capability must be demonstrated before production start-up. The specific requirements vary depending on the standards and customer specifications.

Who carries out the Run at Rate?

The supplier carries out the run in its production facility and documents the results; the customer usually attends the run on site or remotely with quality and procurement representatives. The assessment is carried out jointly on the basis of criteria defined in advance. Ultimately, the customer decides on approval, approval with conditions or rejection.