Sample delivery: first-article samples as the bridge between development and series production

A sample delivery is the initial delivery of a part or component by a supplier, which is inspected and approved prior to release for series production. It serves as evidence that a supplier can permanently and reproducibly meet the required quality, dimensions and material properties. For technical buyers, it is a central control instrument in the procurement process and a prerequisite for approval for series supply.

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Key facts at a glance

01 A sample delivery is the first physical delivery of a part for inspection prior to release for series production.

02 It is closely linked to the requirement specification, first-article inspection reports and processes such as PPAP.

03 Typical inspection contents are dimensions, materials, surfaces, functional characteristics and documentation.

04 The B-sample and C-sample logic originates from the automotive and aerospace industries and is used across sectors.

05 Without an approved sample delivery, no orders for series parts should be triggered.

06 The lead time from enquiry to sample approval is a relevant early indicator for supplier qualification.

Definition: sample delivery

The sample delivery comprises the delivery of first-article samples or pre-series samples of a product to the customer before it is regularly manufactured in series. It marks the transition from development to industrialised manufacturing and serves as proof of the supplier's process capability and delivery reliability.

Distinction from series delivery

Unlike a series delivery, a sample delivery does not follow regular demand coverage but an approval objective. Quantities typically range from single-digit to low double-digit figures, often in quantities sufficient for inspection samples, installation space specimens and initial assembly trials. Commercially, sample deliveries are often handled as free samples, against cost reimbursement or at pre-series prices – an arrangement that should be contractually defined in advance.

Sample stages: A-, B- and C-samples

In many industries, a stage logic has become established: A-samples are functional prototypes with generous tolerances, B-samples are used for testing under series conditions, and C-samples correspond to the series standard with series tooling and series processes. The later the stage, the stricter the inspections. The buyer should bindingly define the required sample stage in the requirement specification in order to avoid misunderstandings and additional effort.

Process and methods: from enquiry to approval

The sample process follows a clear sequence: request, manufacture, delivery, inspection, approval or rework. Every step requires defined responsibilities and deadlines, as delays here directly affect the series ramp-up time.

Request via requirement specification and purchase requisition

The basis is a precise requirement specification with drawings, tolerances, material specifications and inspection requirements. Internally, the sample order is frequently triggered via a purchase requisition marked as 'sample'; the lead time from purchase requisition to purchase order should be shorter for samples than in the series process, as development windows are tight. An expedited order may be justified if samples need to be accelerated to safeguard deadlines with a crisis team or ramp-up team.

Inspection and first-article report

Upon receipt, the inspection is carried out on the basis of a first-article inspection report which documents all characteristic-related results, measuring equipment details and material certificates. In the automotive industry, the PPAP process (Production Part Approval Process) is the standard; in other industries, comparable approval concepts with first-article samples are used. Only after written approval may the supplier manufacture and deliver series parts.

Link with supplier qualification

The sample delivery is a core building block of supplier qualification: it demonstrates not only product but also process competence, communication quality and delivery reliability. The results feed into the supplier score and determine whether the supplier is classified as a strategic partner or a standard supplier in the Kraljic matrix.

Key KPIs relating to the sample delivery

KPIs make the sample process measurable and reveal bottlenecks early. They differ significantly in part from classic series KPIs.

Deadline compliance and lead times

Key performance indicators are the delivery reliability of samples (typically targeted at over 95 per cent) and the lead time from purchase requisition–PO to sample approval. In practice, first-article cycles of two to twelve weeks are within the usual range depending on complexity; deviations should trigger a root cause analysis.

Sample quality and rework rate

The first-pass approval rate – i.e. the proportion of samples approved without rework – is a meaningful quality indicator. Values below around 80 per cent indicate weaknesses in supplier qualification or unclear drawings. In addition, stock KPIs and the backorder rate in later series operation provide indications of how stable the approved process actually runs.

Costs and ROI in procurement

Sample costs are often underestimated cost drivers. A cost driver analysis across several projects frequently shows that repeated samples and inspection effort account for a significant share of ancillary development costs. The ROI in procurement can be demonstrated here through shortened ramp-up times and avoided series problems.

Risks and controls in the sample process

The most common mistake is the transition to series production with unapproved or only partially approved samples. Such risks can be controlled through clear responsibilities and system controls.

Approval requirement and stock management

In the ERP system, stock management should separate approved from unapproved articles; unapproved sample stocks must not enter series disposition. The triggering of orders for series parts should be linked to the sample approval at system level. A duplicate check also prevents the same part from being managed in parallel under several article numbers.

Contractual and legal aspects

Relevant issues are ownership of tooling and samples, confidentiality, cost reimbursement for rejected samples and warranty. Whether free samples are mandatory or pre-series prices apply should be regulated in the framework agreement. The tax treatment of sample deliveries (e.g. as a gratuitous transfer) should be examined from a tax perspective on a case-by-case basis.

Creditworthiness and supplier risk

Especially with newly qualified suppliers, a credit check before the sample order is advisable, as investments in tooling and pre-series manufacturing may involve advance payments. Payment terms such as 2/10 net 30 can be negotiated separately at the pre-series stage; in practice, samples without advance payment are common with established suppliers, but security is sought with unknown providers.

Sample delivery in the supply chain and logistics

Samples also follow logistical rules: packaging, shipping method, storage and traceability differ from series operation and should be regulated separately.

Transport, storage and labelling

Samples are often shipped as express freight, which affects costs and the CO2 balance. Upon receipt, they are either stored or handed over directly for inspection; sample stocks should be marked physically or at system level to rule out confusion with series goods. With small packaging unit sizes, individual labelling often suffices instead of series packaging.

Delivery schedule agreement and ramp-up supply

For the phase between sample approval and series ramp-up, a delivery schedule agreement (call-off contract) is sensible, covering pre-series quantities with flexible dates. This allows supply to be secured during the ramp-up without risking expensive air freight or backorders through expedited orders. The backorder rate in this phase is a good indicator of ramp-up robustness.

Current developments: digitalisation and sustainability in the sample process

E-procurement platforms and digital sample management systems significantly shorten cycles. At the same time, sustainability evidence is moving into focus for first-article samples as well.

Digital sample enquiry and e-procurement

Via e-procurement, sample enquiries can be issued in a standardised manner, quotations compared and deadlines tracked. Digital first-article inspection reports replace paper files and enable audit-proof approvals. This not only shortens the lead time from purchase requisition to purchase order, but also reduces the rework rate through earlier feedback on inspection deviations.

Sustainability requirements for first-article samples

Supplier credentials such as the EcoVadis rating are increasingly requested before the sample delivery, as are material origins and recycled content proportions. A sample process anchored in the procurement policy ensures that sustainability and compliance requirements are reviewed from the

very first sample – not only in series production. Changes to materials after sample approval require requalification via a value analysis and renewed sample inspection.

Typical metrics

Metric	Typical value
Sample delivery reliability	> 95% *Proportion of samples delivered on time; typical target value in practice*
First-pass approval rate	> 80% *Proportion of samples approved without rework*
Lead time purchase requisition–PO (samples)	2–5 days *Internal processing time until the sample order, significantly shorter than in the series process*
Time to sample approval	2–12 weeks *Typical guideline value depending on complexity and tooling requirements*

Practical example

A medium-sized mechanical engineering company develops a new gearbox housing and commissions a foundry supplier with a sample delivery. Because the internal first-article inspection was poorly structured, unapproved pre-series samples ended up in assembly and caused rework during the ramp-up.

- Introduction of a mandatory rule that orders for series parts may only be triggered after documented sample approval, including separate stock management for sample and series articles.
- Binding definition of the sample stages (B and C samples) and inspection characteristics in the requirement specification, including the PPAP documentation scope.
- Inclusion of sample delivery reliability and first-pass approval rate in the supplier score of the supplier evaluation.
- Contractual agreement on the allocation of costs for repeated samples, reducing the rework rate from around 30% to below 10%.

Conclusion

The sample delivery is far more than a provisional initial delivery date: it is the quality-assurance pivot between development and series production. Anyone who bindingly defines sample stages, inspection scope and approval arrangements avoids costly ramp-up problems and unnecessary repeated

samples. Digital processes via e-procurement and standardised first-article inspection reports measurably shorten cycles. Buyers should integrate the sample process into supplier qualification, KPIs and contracts. The sample delivery then becomes a genuine early-warning system for supplier risks rather than a mere formality.

Frequently asked questions

? What is a sample delivery?

A sample delivery is the initial delivery of a part by a supplier for inspection prior to release for series production. It typically comprises first-article samples or pre-series samples in small quantities. Once the inspection has been passed and written approval granted, the supplier may deliver series parts.

? How many samples are usually delivered?

In practice, sample deliveries usually range between 3 and 50 pieces, depending on the inspection effort and the number of test carriers required. Functional and installation space tests usually require several identical samples. The exact quantity should be bindingly specified in the requirement specification or the sample order.

? What is the difference between a sample delivery and a first-article inspection?

The sample delivery is the physical delivery of the samples, while the first-article inspection is the subsequent inspection and documentation based on a first-article inspection report. The two go hand in hand: no inspection without delivered samples, no approval without inspection. In the automotive industry, the PPAP process is the customary framework for this procedure.

? Who bears the costs of sample deliveries?

This is a matter for negotiation and should be governed contractually. Common models are free samples where the order probability is high, cost reimbursement for purely developmental services, or pre-series prices between the sample price and the series price. In the case of repeated samples due to supplier faults, the supplier generally bears the costs in practice.

? May unapproved samples be used in series production?

This is strongly discouraged, as process capability and conformity have not been demonstrated, and warranty and liability risks arise. In quality-certified environments, series supply without sample approval is regularly not permitted. On a system level, the triggering of orders for series parts should be linked to the sample approval.

? How long does a sample delivery take?

The lead time depends heavily on complexity, tooling requirements and industry. Simple parts typically take two to four weeks in practice, while tooling-dependent cast or plastic parts often take eight to twelve weeks or more. Deadlines should be tracked with defined interim milestones and escalated early if they come under threat.

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