

Clean-Sheet Calculation: Truly Understanding Costs Instead of Negotiating Prices

Clean-sheet calculation is a strategic procurement method in which the costs of a product or assembly are recalculated from the ground up – so to speak on a “blank sheet of paper”. Instead of accepting quotation prices as given, the buyer independently and transparently determines material, production and overhead costs as well as the profit margin. This creates a well-founded basis for discussion for price negotiations, sourcing decisions and value engineering with suppliers.

Key facts

- Clean-sheet calculation reconstructs the manufacturing costs of a part from the ground up, instead of using existing quotation prices as a reference.
- Typical building blocks are material costs, production times, machine rates, set-up costs, overhead surcharges, logistics and profit margin.
- The method requires access to bills of materials, technical drawings and realistic machine rates.
- In practice, identified savings potential is frequently in the low to mid double-digit percentage range, depending on the starting point and data quality.
- Clean sheets are particularly suitable for parts with complex manufacturability, in-house vs. outsourced production comparisons and negotiations with new suppliers.
- Without supplier acceptance, the clean sheet remains a purely internal calculation – the added value only emerges in the joint cost dialogue.

Definition: Clean-Sheet Calculation

Clean-sheet calculation (also known as should-cost analysis) is an approach in which the production costs of a product are calculated from the ground up, independent of existing prices. The buyer models what the part should cost under optimal but realistic conditions – hence the English term “should cost”. The result serves as an objective comparison basis for quotations, negotiations and make-or-buy decisions.

Distinction from Classical Price Analysis

In classical price analysis, the buyer compares quotations, historical prices or price indices with one another. Clean-sheet calculation takes a step back and questions how the price is composed in the first place. It does not answer the question “Is the quotation favourable?”, but rather “What should it cost?” It thereby addresses the cost structure itself, not just the price level.

Relationship to Value Analysis

While value analysis (value engineering) optimises the function of a product and thereby structurally reduces costs, clean-sheet calculation starts from the costs of the existing design. The two methods complement each other: the clean sheet reveals where the cost drivers lie, and the value analysis then provides approaches to reduce these drivers through design. In many procurement organisations, both

instruments are interlinked in a joint cost engineering process.

Methods and Approach of Clean-Sheet Calculation

A reliable clean sheet is created in several steps: preparation of the technical data, modelling of the cost blocks, validation with realistic rates and subsequent comparison with actual prices. Its quality stands and falls with the data basis – crude average rates lead to distorted results and jeopardise credibility in negotiations.

Data Basis and Preparation

The foundation is the bill of materials, drawing, material specifications, tolerances and surface definitions from engineering design – ideally coordinated via an Engineering Change Notice (ECN) process so that the current design status is always calculated. Added to this are experience values on machine rates, labour rates, scrap rates and logistics costs. In well-organised procurement functions, these data come from well-maintained master data, which is why master data governance is an important prerequisite for scalable should-cost models.

Cost Blocks in the Model

Typical building blocks are: blank or material costs including cutting and waste, set-up and processing times, machine hour rates, tooling costs (amortised over the quantity), energy and ancillary costs, quality assurance, packaging, transport and warehousing, administrative and sales overheads, and the supplier's profit margin. Each block should be separately traceable so that in negotiations, targeted action can be taken on individual items.

Validation and Calibration

Raw calculations from standard formulas are rarely sufficient in practice. Experienced cost engineers calibrate the model with prices of comparable parts or with data from pilot runs and first article inspection (FAI), from which real processing times and scrap rates can be derived. Feedback from the supplier's order processing – such as actually reported machine occupancy times – also helps to refine the model step by step.

Key KPIs and Fields of Application

Clean sheets provide quantitative metrics for sourcing decisions and make savings potential measurable. They are typically used for parts with high volumes or high cost influence, as the effort of creating a reliable model should not be underestimated.

Typical Metrics

Key KPIs are the should-cost vs. actual price comparison (gap in percent), the material cost density (material costs as a share of the total price, frequently 40–60 % in machining), cost transparency per cost block and the total potential across all analysed parts. In addition, the supplier's on-time delivery or scrap rate shows whether deviations from the clean sheet can be explained by actual performance deficiencies. These values are frequently incorporated into supplier rating.

Make-or-Buy and In-House Production Comparison

A classic field of application is the comparison of external sourcing and in-house production or external manufacturing. With a clean sheet, it is possible to calculate at which marginal costs in-house

production could manufacture the part – including capacity utilisation effects. The result also supports decisions on outsourcing or transfer of work between sites and suppliers.

Negotiation and Target Costing

In operational procurement, the clean sheet serves as a negotiation guide: instead of blanket price reductions, individual cost blocks are discussed, for example tooling amortisation, batch size effects or material surcharges. In target costing, the clean sheet defines the target line towards which suppliers are developed through value analysis workshops. Owing to the transparent reasoning, the success rate of such discussions increases significantly in practice.

Risks and Controls in Application

The clean-sheet method is demanding: incorrect assumptions lead to unrealistic target prices, and over-ambitious savings targets can strain the supplier relationship. Anyone introducing the method should be aware of typical pitfalls and build in suitable controls.

Data and Model Risks

Common mistakes are outdated machine rates, unrealistic cycle times, missing set-up costs for small batch sizes and ignored logistics or duty components – in global sourcing, for example, including transport risk and customs costs. Regional factors in nearshoring or offshoring (wage levels, energy prices, economies of scale) must also be reflected in the model. A central risk register helps document and follow up on critical assumptions.

Relationship and Acceptance

Anyone presenting a clean sheet to the supplier as an ultimatum risks resistance or selective cooperation. Proven in practice is the joint cost dialogue: the model is disclosed as a basis for discussion, and the supplier can add real rates. Even with strategic partners engaged through supplier de-risking or long-term contracts, the goal should not be maximum price extraction but joint cost reduction.

Organisational Anchoring

To prevent findings from being lost, results, assumptions and lessons learned from completed calculations should be documented and stored for reuse. Cost driver updates following design changes (ECN) and alignment with order-specific workflow rules (P2P) ensure that negotiated target prices actually take effect in the procurement process. Regular calibration keeps the model up to date with price and wage developments.

Current Developments: Digitalisation and Agile Sourcing

Clean-sheet calculation is losing its former niche role: digitised should-cost tools, better master data and volatile procurement markets are making the method practical and necessary for ever more mid-sized companies.

Software-Based Should-Cost Models

Specialised should-cost software automatically calculates production times and machine rates from CAD data and manufacturing parameters. Such tools considerably speed up the calculation and lower the barrier to entry – but they do not replace the technical expertise required for realistic assumptions.

Professional review by engineering design and production remains crucial.

Volatile Markets and Resilience

Fluctuations in raw materials and energy as well as supply chain disruptions increase the need for cost transparency. Clean sheets help to objectively assess price adjustment clauses and to make alternative sources of supply comparable within the sourcing wave plan. They also support global sourcing by breaking country effects down to the individual cost blocks.

Sustainability and Regulation

Increasingly, CO costs, the energy intensity of production and compliance documentation – such as a certificate of analysis for material releases – are also included in the cost consideration. Anyone who embeds emissions costs and evidence obligations early in the should-cost model is better positioned for ESG requirements and future CO pricing. Legal and contractual questions of price formation should be professionally reviewed on a case-by-case basis.

Typical metrics

Should-Cost Gap: frequently 5–15 %

Distance between the calculated target price and the purchase price; a higher gap means greater potential.

Material cost density: typically 40–60 %

Share of material costs in the total product cost value; strongly dependent on industry and part.

Realised saving: frequently 3–10 % p. a.

Cost reduction actually negotiated or implemented following the clean-sheet analysis.

Cost transparency: > 80 % of cost blocks modelled

Share of the purchase price explained by the clean sheet.

Practical Example

A mid-sized mechanical engineering company had been sourcing an aluminium gearbox cover from a long-standing manufacturer for years; prices had risen gradually over several years. Procurement, together with production, created a clean sheet based on the drawing, calculated machining times, current aluminium reference prices and market-typical machine rates. The comparison revealed potential of around 14 % relative to the purchase price. In a joint workshop with the supplier, batch size optimisation, an alternative blank shape and reduced tolerances (coordinated with engineering design via an ECN) were agreed – the saving was realised over two years.

- Create a clean sheet based on the current drawing, material prices and machine rates
- Carry out a gap analysis per cost block and identify the biggest drivers
- Joint cost dialogue with the supplier instead of one-sided price demands
- Secure constructive measures via value analysis and the ECN process

Conclusion

Clean-sheet calculation shifts the price discussion away from the negotiation front and onto the cost structure itself, thereby creating a fact-based basis for procurement decisions. It requires technical understanding, a well-maintained data basis and the willingness to engage in an open cost dialogue with the supplier. Those who apply the method systematically identify savings potential that classical

price comparisons conceal, while at the same time strengthening their position in make-or-buy and sourcing decisions. Calibration with real data and the documented reusability of the models are important. This turns the clean sheet from a one-off negotiation instrument into a continuous cost engineering tool.

Frequently asked questions

What is a clean-sheet calculation?

A clean-sheet calculation calculates the costs of a product from the ground up, independent of existing quotation prices. Material, production, logistics and overhead costs as well as the supplier's margin are modelled separately. The result shows what the part should realistically cost and serves as a basis for negotiations and sourcing decisions.

What is the difference between a clean sheet and should costing?

In practice, both terms are largely used synonymously: both describe the bottom-up calculation of a target cost value. In some cases, "clean sheet" is used more for standardised, model-based calculations and "should cost" for detailed, part-specific analyses. No uniform distinction has become established across industries.

When is a clean-sheet calculation worthwhile?

Clean sheets offer the greatest benefit for parts with high procurement volumes, complex production or unclear cost structures. The method is also useful before price negotiations, in make-or-buy questions and when qualifying new suppliers. For low-cost standard parts, the analytical effort often outweighs the benefit.

What data do you need for a clean sheet?

Required are the bill of materials and drawing, material and tolerance specifications, batch sizes as well as realistic machine and labour rates. In addition, experience values on set-up times, scrap, tooling costs and transport help. Without reliable master data, the result remains a rough guideline value.

How do you convince suppliers of a should-cost model?

In practice, the successful approach is an open cost dialogue rather than a one-sided accusation: the model is presented transparently, and the supplier can add real rates and process data. The aim is the joint identification of cost-saving potential, for example through batch sizes, design changes or process optimisation. This creates acceptance instead of resistance.

Which KPIs are used in clean-sheet calculation?

Key is the gap between should cost and the actual purchase price, typically in percent. In addition come the material cost density, the breakdown of costs into individual cost blocks and the saving realised after the negotiation. Supplementary supplier KPIs such as on-time delivery show whether deviations can be explained by performance issues.