

Material number system: structure and governance of material master data in procurement

A material number system is the systematic structuring and assignment of unique identification numbers for materials, components and goods within a company. It forms the backbone of all procurement and logistics processes, because purchase orders, stock movements and bills of materials cannot function reliably without consistent material numbers. For technical buyers, the quality of the system determines how quickly duplicates are identified, suppliers are uniquely assigned, and volume and value flows remain traceable.

Key facts

- A material number system assigns unique, permanently valid identification numbers to every material within the company.
- A distinction is typically made between internal number assignment, external supplier numbers and manufacturer part numbers.
- In practice, material numbers often consist of numeric or alphanumeric blocks of fixed length, typically 8 to 18 characters.
- Material number systems typically differentiate by material type, such as raw material, semi-finished product, trading goods, consumable or finished product.
- Cleanly maintained systems reduce duplicates and mis-orders and improve the informative value of price and slow-mover analyses.
- Changes to material data are processed in practice via controlled workflows, often linked to an Engineering Change Notice (ECN) process.

Definition: material number system

A material number system is the company-wide set of rules governing how materials are numbered, classified and maintained in master data. It covers the number structure, assignment rules, material classes and change governance.

Distinction from item numbers and supplier numbers

The internal material number is company-specific and remains stable across supplier changes. Manufacturer and supplier numbers are additionally maintained as references. This ensures a unique assignment is preserved across changes of source of supply or supplier evaluations.

Classification by number assignment

In principle, two approaches are distinguished: the intelligent number, which carries meaning in its digit blocks, and the non-intelligent, sequential number. In practice, hybrid forms are common, in which only the material type is coded.

- Intelligent number: carries meaning, easier to read, but inflexible when restructuring occurs
- Non-intelligent number: neutral, scalable, requires classification systems for content-based searching
- Hybrid form: short prefix for material type plus sequential counter

Structure and numbering logic

The structure of a material number system determines how quickly users can identify materials and how stable the system remains over the years.

Material types and number ranges

It is common practice to divide numbers into number ranges per material type, for example raw materials, trading goods, packaging materials or finished components. Each number range is allocated fixed segments or prefixes. The material type also controls account assignment, valuation class and procurement type in the ERP system.

Intelligent versus neutral number assignment

Intelligent numbers appear intuitive but lose their value as soon as product lines or classifications change – attributes are difficult to force into a fixed digit structure. Neutral numbers are more durable; the technical description is then handled by a classification system with characteristics such as dimensions, material grade or standard reference.

Units, weights and reference data

Every number must include the base unit of measure, weight, purchasing and sales units of measure and, where applicable, commodity codes. These fields directly affect ordering policy, price comparison and customs handling and should be mandatory at record creation.

Methods and approach for introduction and maintenance

A material number system is not designed in isolation; it emerges as a coordinated process between engineering, procurement and IT.

Define the numbering concept

First, number ranges, number lengths and assignment procedures are defined. A written record creation policy is essential, setting out who requests and creates material numbers, which mandatory fields apply and who approves. In practice, a central master data function frequently proves its worth as gatekeeper.

Duplicate check before creating new records

Before a new number is assigned, a structured search for existing materials is mandatory – across description, manufacturer reference and classification characteristics. Otherwise the population of duplicate materials grows and can only be consolidated later at considerable effort.

Maintenance and change processes

Changes to master data – such as units of measure, plant assignments or sources of supply – are processed via controlled workflows with logging. For engineering changes, the material master record is closely interlinked with the Engineering Change Notice (ECN) process, so that bills of materials,

material numbers and documentation remain synchronised.

Importance for procurement and key metrics

For buyers, the material number system is a prerequisite for reliable analyses and efficient operational processes.

Analyses and cost control

Only with clean material numbers can accurate quantity- and value-based analyses be produced: price developments per material, plan-versus-actual comparisons of material costs, or the Purchase Price Variance (PPV) as the typical metric for variances between planned and actual prices. Lifecycle total cost accounting likewise requires consistent material master data.

Operational processes

From the request for quotation through the mandatory order confirmation to goods receipt posting, every step runs via the material number. Incorrect or duplicate numbers lead to wrong orders, unnecessary safety stock and variances in account assignment. Materials planning and planning horizons are also based on correct material master data.

Typical data quality metrics

In practice, a number of metrics have proven useful for continuously monitoring the state of the system.

- Duplicate rate: proportion of suspected duplicate records among all materials, typically a target value below 1–2 %
- Completeness rate: proportion of material master records with all mandatory fields fully maintained, often with a target above 98 %
- Proportion of active materials with a valid source of supply
- Lead time for creating a new material number, typically a few working days

Risks, controls and typical sources of error

Untidy material number systems cause lasting follow-on costs – prevention is considerably cheaper than subsequent clean-up.

Duplicates and uncontrolled proliferation

The most common error is creating the same material multiple times under different numbers, often because the preceding search was not carried out carefully enough. The consequences are fragmented volumes, distorted price comparisons and unnecessary inventory values. A slow-mover analysis reveals which numbers show hardly any movement and should be consolidated.

Missing governance

Without clear responsibilities and approval levels, 'shadow master data' with incomplete fields emerges. Controls include four-eyes principles at record creation, regular data quality audits and a risk register for critical materials, for example those sourced from a single source or with long lead times.

Interface and system breaks

With multiple sites or system landscapes, consistent mapping of numbers across system boundaries is

critical. Material substitution driven by ESG requirements or reorganisations requires historical traceability: legacy numbers should be retained as references in the long term, so that running orders, document reviews and supplier certificates can be correctly assigned.

Current developments and outlook

Material number systems are under growing pressure from digitalisation, standardisation and sustainability requirements.

Classification standards and interoperability

Increasingly, manufacturer-neutral classification systems are used to make materials comparable across company boundaries. This facilitates collaboration with suppliers, searching the global procurement market and data exchange in digital catalogues and marketplaces.

Automation and AI support

Software-based duplicate detection and language-processing tools now support the creation and cleansing of master data. In practice, a procurement-style proof of concept is common: first a clearly defined pilot area, then rollout. Automation does not replace expert review but significantly reduces manual effort.

Sustainability and traceability

Sustainability and regulatory requirements are raising the data requirements per material: origin, certificates and the recyclability of packaging are increasingly documented at material level. The material number system thereby becomes the data foundation for reporting obligations and for material substitution (ESG) in support of sustainability goals.

Typical metrics

Duplicate rate: < 1–2 %

Proportion of suspected duplicate records in the material population; typical target value in practice

Master data completeness rate: > 98 %

Proportion of material master records with all mandatory fields fully maintained

Lead time for new material records: 2–5 working days

Usual duration from request to approval of a new number

Proportion with valid source of supply: > 95 %

Active materials with a maintained, valid procurement source

Practical example

A mid-sized mechanical engineering company discovered during a price analysis that the same sealing profile was being procured under eleven different material numbers – with price differences of up to 20 % depending on the source of supply. Volume bundling was impossible, and the PPV showed unbundled variances. The company therefore introduced centralised master data management with a record creation policy, a mandatory duplicate check and classification characteristics. Within a year, the population of active material numbers was noticeably consolidated, and procurement terms for standard parts were negotiated on a bundled basis.

- Central master data function with an approval procedure for all new records
- Mandatory duplicate search across description, manufacturer reference and characteristics
- Consolidation of duplicate materials followed by bundling of sources of supply
- Linking engineering changes to the ECN process

Conclusion

A well-designed material number system is an unglamorous foundational discipline, but one with a measurable impact on costs, process reliability and data quality. It determines whether price analyses, materials planning and reporting are reliable or built on sand. What matters are clear numbering concepts, disciplined record creation with duplicate checks and lasting governance for changes. Companies that work cleanly here are simultaneously creating the data foundation for digitalisation and sustainability reporting. The investment in master data quality pays for itself in practice faster than its subsequent remediation would cost.

Frequently asked questions

What is a material number system?

A material number system governs how materials within a company are uniquely numbered, classified and maintained in master data. It covers the number structure, number ranges per material type and the assignment rules. Without consistent material numbers, ordering, inventory management and cost analysis cannot function reliably.

What is the difference between intelligent and non-intelligent material numbers?

Intelligent numbers embed meaning in the digit blocks, such as plant or product group, and are easy to read but inflexible when changes occur. Non-intelligent, sequential numbers are neutral and durable; technical information is then held in the classification system. In practice, hybrid forms are common, coding only the material type.

How many characters should a material number have?

Material numbers typically range between 8 and 18 characters, with the length allowing headroom for future growth. More important than the exact length are uniform blocks, fixed number ranges per material type and future-proofing. Extending or restructuring the system later is costly and should be avoided from the outset.

How do you avoid duplicate material numbers?

The key is a mandatory duplicate check before every new record creation, supported by searches across description, manufacturer reference and classification characteristics. A central master data function with an approval procedure prevents uncontrolled proliferation. In addition, regular duplicate analyses and a slow-mover analysis help to consolidate existing duplicate materials.

Who is responsible for assigning material numbers?

In practice, a central master data function has proven itself as gatekeeper, while functional departments such as engineering, procurement or logistics submit the requests. Responsibility should be governed by a written record creation policy, including mandatory fields and approval levels. The four-eyes principle is essential for critical fields such as valuation or account assignment.

Why are material numbers important for procurement?

All procurement processes, from the request for quotation through the purchase order to PPV analysis, run via the material number. Only with clean numbers is it possible to produce accurate quantity-based reporting, consolidate volumes and compare prices. Duplicate numbers lead to fragmented volumes, distorted analyses and unnecessary stock levels.