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Is Your Part Numbering Scheme Costing You Millions?

Best Practices for Part Numbering

WHITE PAPER

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INTRODUCTION

Today's manufacturers must create, manage, and track thousands of parts throughout the new product development (NPD) process. Every time a new part is added to a company's library, it can cost thousands of dollars to qualify, design, and roll out. That's serious money. And that's why choosing the right part numbering scheme to reference your parts is critical to your success. Leveraging our experience implementing over 1,400 global customers, we will discuss the various approaches, offer insights, and propose best practices to consider when setting up the optimal part numbering system.

PART NUMBERING: AN OVERVIEW

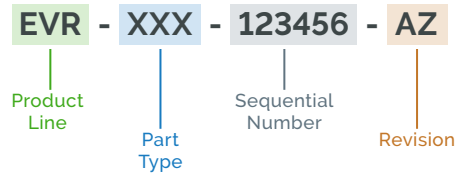There are two different types of numbering schemes to consider.

Intelligent. This is a "significant" part numbering scheme where part numbers refer to information about each part (e.g., part type, product lines, parametric information). For instance, a resistor part may be assigned a number like RES-100-0003 where "RES" stands for resistor, "100" is the resistance value in ohms, and "0003" is a serialized suffix.

Non-Intelligent. This refers to a "non-significant" part numbering scheme. Part numbers are simply assigned from a sequential, non-significant scheme. There is no reference to part types, product lines, parametric, or other part details. Using this approach, a resistor might be assigned a part number 16782 and a capacitor might be 16783. Every subsequent part is given the next part number in the sequence regardless of part type.

It might be difficult to understand the consequences of each approach. You may even ask yourself why anyone would opt for a non-intelligent scheme. Each scheme offers advantages and disadvantages. You will need to consider your company's requirements and goals, along with what type of system you have in place (manual, electronic, product lifecycle management, quality management system, etc.).

Examples of Part Numbering Schemes

Intelligent

EVR - **XXX** - **123456** - **AZ**

Product Line
Part Type
Sequential Number
Revision

Non-Intelligent

10001 EveryScan, US Model XL-2000
10002 Power Supply, US
10003 Gasket, Screen, 3.5 in
10004 Label, Safety, EveryScan
10005 Cable, USB A/A, Black
10006 EveryRoad, GPS, Model 5000

INTELLIGENT PART NUMBERING

The Advantages

Because intelligent part numbers impart meaning about the category, source, or intended use of the part, it's easy for manufacturers to see the efficiencies that come with adopting this approach.

Some benefits to an intelligent numbering scheme include:

Better search efficiency. With intelligent numbering, you can group similar parts in your design documentation or spreadsheets to search or filter by part number. You can also

locate physical parts on the stockroom floor more efficiently, since it's easy to see where all the resistors are when they're all labeled with a part number starting with "RES."

Easier identification. Because intelligent numbers specify part details, they provide a frame of reference for each part and make it easier to find parts when a team member doesn't have any information other than the part number. For example, an engineer/technician can quickly verify whether a part meets general functional requirements by referencing the intelligent part number.

The Disadvantages

While there are many benefits to using an intelligent part numbering scheme, there are also shortcomings. For this type of system to work well in an organization, employees must be familiar with all of the different kinds of parts. Such a scheme also demands ongoing attention and can introduce delays in your processes.

Training and reuse. Because each intelligent part number has meaning, ill-defined or incorrectly assigned parts can have costly consequences. Whoever assigns part numbers must be well-trained in issuing parts from the part numbering log or sequence. When parts are incorrectly assigned, companies often have to create change orders (ECOs) just to correct the part number. In other cases, companies that issue part numbers referring to specific product lines must change part numbers later when additional product lines reuse the same part to show the part is common to more than one product line.

Tribal knowledge required. Often, those working on the manufacturing shop floor don't have enough knowledge of the part numbering schemes to be able to correctly decipher the intelligent number. So, most users outside of engineering and document control will treat the intelligent number as non-intelligent—which negates the benefits of having intelligent part numbers in the first place.

Difficult to maintain schemes. If you introduce a new part that doesn't fit into your current part numbering scheme, you may need to reevaluate your entire scheme and define a new part type or category. All employees who use the system must understand and maintain the logic of the part numbering system, and part group number ranges must be planned in advance. For example, if all the significant digits in a string (0-9) have been used and you need to introduce an 11th part category into that group, what do you do?

Bottleneck to issuing new parts. Because assigning an intelligent part number may require time and discussion, a single person or group is sometimes given responsibility for part issuing and they can become a bottleneck. And each time you need to add a new parameter to your numbering scheme, you will have to go back and update the numbers for all affiliated parts, dramatically decreasing the sustainability and effectiveness of your part numbering system.

NON-INTELLIGENT PART NUMBERING

The Advantages

Using a non-intelligent scheme involves significantly less initial planning, since part numbers do not reference part details or characteristics. You don't need to educate your full supply chain about what each number signifies, and you can ramp new employees quickly without relying too heavily on any one person to maintain the system. Here are a few more benefits to non-intelligent numbering schemes:

Quick and easy to issue new parts. It takes very little time to pull or issue a sequential number, so assigning a part number is quick and easy. You don't have to know anything about the part—unlike intelligent part numbering systems that often require the assignment to go through a specific person, or department, who knows how to issue part numbers based on all rules and variants.

Little training needed. If new employees join your organization, they'll need little to no training in order to learn, find, define, or issue part numbers.

No single point of failure. With non-intelligent part numbering, you can have multiple people pulling part numbers, and your company can continue to run efficiently without relying on trained people or teams.

Simple maintenance. It's easy to implement and maintain a non-intelligent scheme, since it's essentially a sequential list.

The Disadvantages

Using a non-intelligent part numbering scheme isn't without its disadvantages, but there are fewer disadvantages if you have a system that can maintain parts and provide clarity around the type of parts outside the part number itself.

Inability to recognize part types (outside of systems). Your team members will not be able to identify what type of part they have simply by viewing a part number. However, relying on employees' tribal knowledge as they come and go is dangerous because there will always be different levels of understanding about parts numbers when they require constant education and memorization of schemes.

Comparing Part Numbering Schemes

	Intelligent	Non-Intelligent
Advantages	• Intelligent searches by part numbers • Easier to ID	• Quick and easy to issue new parts • Little training needed to issue parts • No single point of failure • Simple to maintain numbering checkout processes
Disadvantages	• Training • Tribal knowledge required • Difficult to maintain schemes • Bottleneck to issuing parts	• Inability to recognize part types simply via part numbers (assume team members have memorized part numbering schemes correctly however).

KEY CONSIDERATIONS WHEN SELECTING YOUR PART NUMBERING SCHEME

Now that we've walked through the advantages and disadvantages, it's important to consider your company's use cases.

Here are a few key questions to ask when determining which part numbering approach to take.

- **What will you use part numbers for within your organization?** Get feedback from your entire team (engineering, quality, operations, etc.).

- **Is some level of intelligence required to support existing business processes?** Can the intelligence be better provided via a systematic approach that doesn't rely on tribal knowledge and memory?

- **Does your system provide the ability to capture part characteristics?** For instance, modern systems provide the ability to create ways to characterize the part with descriptions, product lines, types, and other attributes which can be used to search for and identify parts without knowing an intelligent part numbering scheme.

- **Will part numbers be shared with suppliers and/or contract manufacturers, or across different business systems?** If so, do the other systems have part numbering character constraints?

- **Will your current system support your part numbering needs?** Can you maintain your part number system with your existing tool or solution?

- **Is there a better way to manage part types or characteristics using intelligent systems?** If you're looking for a product lifecycle management (PLM) or quality management system (QMS) solution to manage parts, assemblies, and other product information—determine whether the system can provide a better way to categorize parts outside of the part number. If so, this will make it easier to create, maintain, and search for parts using other field attributes.

Companies today understand that reliance on tribal knowledge is a risk to their business. Systems have become more intelligent and replaced the need to incorporate intelligence into part numbers themselves. Moving intelligence or part characteristics into intelligent fields provides a more accurate way for teams to find parts and avoid confusion and mistakes caused by human error.

EFFECTIVE PART NUMBER CREATION

To implement a part numbering scheme successfully, you must establish good processes for generating part numbers with a system designed for that purpose.

Whether you use an intelligent or non-intelligent part numbering scheme, it's important to make sure you do not duplicate part numbers or create the same part with two unique and different part numbers. Using the exact same part number for two entirely different parts can cause serious problems such as delays on the manufacturing line, confusion over the bill of materials (BOM) record, and incorrect part ordering—all problems that ultimately impact your bottom line.

And, using the same manufacturer's or supplier's part number, identified by referencing two different company part numbers, creates issues with accurate part reuse in designing, planning, procuring, and manufacturing.

To avoid duplication issues like this, manufacturers have found a variety of ways to manage their part numbering systems.

Paper log record. This approach is manual and doesn't allow for easy access across multiple sites or distributed teams. With this method, one person (or department) is typically responsible for assigning part numbers to help prevent duplicate part number creation. However, this creates a bottleneck and a single point of failure that can slow down a company's ability to move quickly and get part numbers to teams exactly when they need them.

Spreadsheets or programmable tools/databases. Using spreadsheets or homegrown tools and databases does reduce the opportunity for mistakes while keeping an online record of all part numbers. But these systems are disconnected from the rest of the product, quality, and manufacturing records and processes.

Purpose-built solutions. PLM and QMS software solutions were designed to help manufacturing companies manage the entire product record and development process from early concept through design and manufacturing. These solutions were created to ensure the entire product record is managed in a single system of truth (SSOT) to reduce confusion, manual data entry errors, and provide visibility and traceability with all impacted teams. These solutions were also designed to support intelligent or non-intelligent part numbering schemes. Best of all, today's modern solutions are developed in the Cloud making it easy for distributed internal teams and supply chain partners to collaborate.

BEYOND PART NUMBERING

PLM and QMS systems enable manufacturers and suppliers to create, maintain, share, and collaborate around the entire product record. Products today are comprised of complex electronics, software, and sensors making it critical to have a single system for managing the entire product record.

Purpose-built systems like Arena PLM and Arena QMS help you create new parts, assemblies (aka bills of materials or BOMs), change orders (ECOs), quality records (CAPAs, CARs, SCARs, etc.), and more.

Part assignment and management are a minor part of creating and releasing new products to market. Arena provides connected part record details that link parts to past and pending revisions via ECOs. And, it provides connected relationships to all where-used assemblies via BOM management along with traceability to any outstanding quality issues.

Teams can easily import mechanical, electrical, and software designs into PLM or QMS systems and use business-ready integrations that are designed to help engineering teams design and share their designs with other teams outside of engineering.

These systems provide for easy and automated part numbering (intelligent or non-intelligent schemes) that avoid reliance on tribal knowledge. Once created, all teams can search for and use the right parts at the right time without traditional issues caused by manual paper-based numbering logs or homegrown siloed numbering databases.

PURPOSE-BUILT SOLUTIONS ARE FLEXIBLE AND SCALABLE

There is no one-size-fits-all approach to part numbering, so Arena offers purpose-built solutions that are flexible enough to handle intelligent or non-intelligent part numbering schemes. Whether you're just getting started or are moving away from manual or homegrown tools, Arena provides solutions, along with industry best practice expertise, for complex manufacturers to manage parts throughout the entire product development process.

Arena's cloud-based PLM and QMS solutions help complex product companies and their supply chains work together to design, produce, and deliver innovative products fast. We enable product development and manufacturing teams to share product

information, exchange ideas, and implement changes throughout the entire product lifecycle. Arena streamlines regulatory compliance for environmental directives (e.g., RoHS, REACH, WEEE, Conflict Minerals), U.S. Food and Drug Administration (FDA) regulations, International Organization for Standardization (ISO), International Traffic in Arms Regulations (ITAR), Export Administration Regulations (EAR), and other regulatory initiatives.

Arena provides a comprehensive approach to introduce new products to market with fewer errors. With our proven solution, your teams can accelerate new product development while reducing expenses and increasing profitability to deliver products that change the world. To learn how we can help solve your part numbering requirements while streamlining your entire new product development and introduction process, contact us today.

CONCLUSION

As you've seen, selecting a part numbering scheme is truly one of the key strategic decisions a manufacturer must make. We hope this overview has given you some food for thought, and that you'll join the Arena community in our ongoing conversations about part numbering and other manufacturing best practices.