Best Practices for Collecting Product Material and Compliance Data

MANAGING THE BUSINESS RISKS OF PRODUCT ENVIRONMENTAL PERFORMANCE

Managing the environmental performance of products is an increasingly complicated challenge for manufacturers today. These companies face a complex tangle of requirements and mandates from regulators, consumers and customers to manage the toxicity, recycleability and overall environmental impact of their products. Not only have governments, business-to-business customers and consumers demonstrated a clear preference for better environmentally performing and "greener" brands, but investors are now pressuring manufacturers, as well. For example, the Dow Jones Sustainability Index identifies and tracks leading sustainability-driven companies around the world.

While managing product environmental performance is critical for the environment, corporate strategy and product stewardship, it is also vital to ensuring that your products can be legally sold in target markets. Non-compliance with regulatory mandates such as REACH, RoHS, RRR, WEEE, Battery and Packaging Directives can result in blocked shipments, recalls, fines and even criminal penalties.

"Having products that we can confirm are compliant allows us to stay in markets that we could not otherwise," says Ray Lizotte, Director of the Environmental Stewardship Office for electronics firm APC by Schneider Electric®.

Some of the more forward-thinking companies are even going on the offensive to brand themselves as "green" to improve market share and edge out the competition. Others are making themselves easy to do business with by helping their customers solve their own environmental performance and compliance needs.

"We get kudos from customers because we can respond to their compliance requests and get quality data into their systems quickly," says Lizotte. "It has really benefitted APC in dealing with big customers."

At PTC, we understand that reducing business risk requires making smart decisions, which in return requires accurate and timely data. World leading manufacturers rely on our expertise to help improve their environmental performance and compliance processes. These companies include one third of the world's top electronic manufacturers featured in Greenpeace's Guide to Greener Electronics, as well as three of the top 10 Aerospace & Defense manufacturers, and three of the top 10 communications equipment manufacturers.

Our experience shows that there are three pillars of inform-ation required to make informed decisions for product environ-mental performance and to demonstrate compliance:

- Knowledge of compliance regulations, requirements and environmental impact assessment methods

- Access to accurate bill-of-material (BOM) and product configuration data

- Visibility into the substances and materials used in products

Each of these requirements brings unique challenges.

This paper focuses on the challenges companies face and the best practices they can employ when collecting substance, material and compliance data from their suppliers and supply chain. You will see that there are concrete steps you can take to improve the data you collect, as well as numerous and valuable business applications for rich supplier data that go far beyond compliance.

While the task of collecting information from all of your supply chain partners on each of your components may seem daunting at first, there is no need to feel overwhelmed. Momentum is on your side. In the past few years, the manu-facturing industry and its supply chain has matured when it comes to data collection. Standards are improving and information is becoming more readily available.

Job #1: Obtaining supplier data

As Tech-Clarity's 2011 report, Making Product Development Trade-offs: Designing Products for Compliance, Cost, and Sustainability, indicates, "obtaining supplier data" is the most common challenge in ensuring environmental com-pliance (Figure 1).
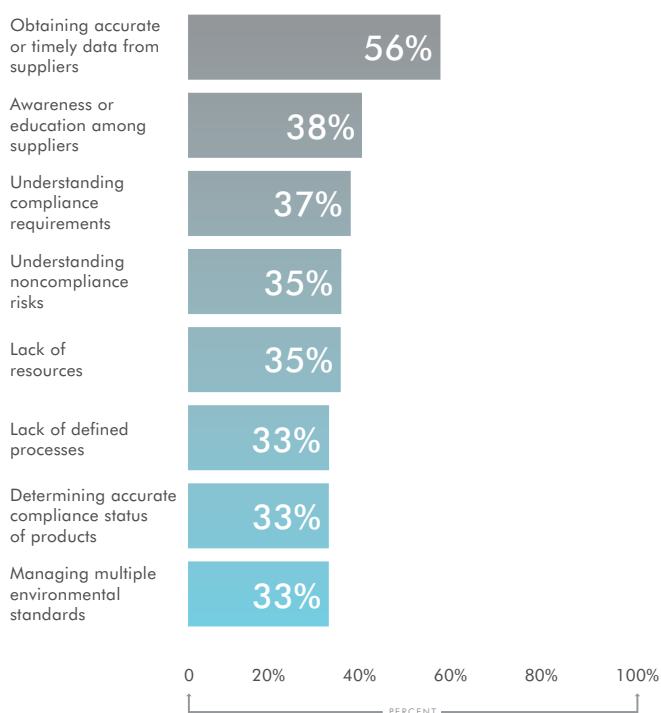

Figure 1: Environmental product compliance challenges

In fact, over half of the companies surveyed for the report indicate they face this obstacle. The data acquisition process is particularly important to get right, as the need for substance and material data from suppliers is growing. Companies can now leverage this data for multiple sustainability and product stewardship analyses, such as life cycle assessment (LCA), material foot-printing, and recyclability and reuse.

Data acquisition strategy and governance

Just as environmental compliance is a process and not an event, the same is true for environmental data acquisition. Manufacturers must develop an effective approach for ongoing data collection, so they can attain the information they need and continually improve upon it without over-burdening already scarce resources.

It is critical that your compliance strategy be enforceable, and that it stresses the importance of data collection. Based on our experience with customers and their suppliers, we have found a best practice is to make supplier data a requirement for:

- **Supplier contracts** – Providing specified supplier data must be an agreed upon requirement in the supplier contract.

- **Releasing new parts** – Engineering should not be able to release new parts if required data is not included.

- **Payment of invoices** – Invoice payment should be held until required data is provided, just as if a non-compliant part was sent.

For any data acquisition strategy to succeed, it must have executive support. For example, is management willing to stop purchasing from a supplier who's not willing to provide compliance data? Brian Martin, Senior Director of Corporate Product Environmental Compliance for hard-disk drive and storage solution company Seagate®, explains the strong support he receives from management: "We remove suppliers from our approved supplier list if they don't provide data; our policy has teeth and executive support," he states. Seagate's strategy requires support from other departments, as well, including procurement and the company's legal teams, who are willing to include data collection requirements in contracts.

"For us, environmental data is no different than any other product data," explains APC's Ray Lizotte. "We already had a good process for collecting product data, and we didn't want to create a new one for compliance, so we incorporated environmental information into the existing one. If a supplier sends a non-compliant component or incorrect data, that is a supplier issue to be managed as if the supplier sent an out-of-spec part. We treat compliance no differently than any other component parameter" states Lizotte.

There are a number of important considerations to include in the data acquisition strategy. For example, what analyses will the data be used for, and what resources are available internally? In order to establish an effective strategy for data collection, your company must make the following decisions:

- Define the specific compliance and product performance objectives for data collection

- Determine the data collection approach and what component information will be necessary to meet the objectives

- Prioritize the list of components for data collection

- Establish what source(s) of data you will use

- Specify the best format to collect data

- Clarify how you will work with suppliers

- Decide what systems will be used to help automate the process

This paper will address each of these areas and provide best practice recommendations.

Define the objectives of data collection

Historically, manufacturers polled suppliers for additional data for one purpose: to satisfy product-compliance requirements focused on restricted materials and substances. Today, many manufacturers collect detailed information from suppliers about the components they provide, to not only satisfy numerous compliance requirements, but also to improve the overall environmental performance of their products and supply chain. Additionally, leading manufacturers have begun to use supplier data to gain insight into numerous non-environmentally-related performance measurements and to better manage risk across their entire product portfolios. Some of the analytical uses of supply chain information we have encountered include:

- **Environmental Compliance** – Manage and demonstrate product compliance with environmental regulations such as REACH, RoHS, CPSIA, CA Prop 65, WEEE, and Battery Directives, as well as customer-specific environmental requirements. These regulations and customer requirements mandate reporting on a product's restricted substances, recycleability and/or safety.

- **Compliance with Non-Environmental Regulations** – Manage and demonstrate compliance with numerous governmental regulations, such as conflict minerals, country of origin and trade compliance mandates. These regulations require manufacturers to track information such as, where materials and components are mined, sourced, manufactured and assembled.

- **Material Footprint** – Assess a product's material footprint to report on recycleability, reuse and packaging, and identify opportunities to improve over time.

- **Life Cycle Assessment** – Produce product life cycle assessment (LCA) reports, including carbon footprint, embodied energy, and water usage. These reports quantify the environmental impact of your products and design alternatives, and, with management can help to improve product sustainability.

- **Product Weight** – Track precise information about the mass of products and supplier components. This information is critical in the development and optimization of many products, such as planes and cars.

- **Supplier Cost-Drivers and Commodity Price Exposure** – Understand the reliance on commodities across your different products and portfolio to better understand risk and predict how your own product costs will change given variations in commodity prices. By understanding their suppliers' cost-drivers, manufacturers can also make better informed contract negotiations.

- **Portfolio Material Profiling** – Calculate the usage of materials across your entire portfolio of products. Armed with this information, manufacturers may negotiate bulk purchase rates for materials to be used across the entire company, and even in the supply chain. This can have an enormous impact on reducing the cost of goods sold and generate tremendous savings.

- **Supply Chain Disruption and Product Obsolescence** – Mitigate the effects of component obsolescence, and counterfeit and substitute-part issues. Gain timely insight into components that are at high risk of experiencing disruption in supply.

- **Rare Earth Minerals** – Identify and quantify your reliance on rare earth minerals, and gain greater insight into the presence of supply chain risks or pricing volatility.

Tech-Clarity's 2011 report, Making Product Development Trade-offs: Designing Products for Compliance, Cost, and Sustainability, shows current and future plans for data collection (Figure 2). Of particular note is that for each surveyed objective, from compliance to carbon footprint, an increasing number of manufacturers plan to begin collecting data to address these issues within the next 12-18 months. Clearly, manufacturers are preparing to do more with supplier data.

Outlining the multiple business benefits that can be achieved with an effective data acquisition strategy will help garner executive support. To gain greater executive backing, you should identify the corporate strategic initiatives that supplier-data collection and new-product analytics can support. After clearly defining the analytical objectives of supplier-data collection, the next step is to build a comprehensive understanding of the components data required to meet the objectives.
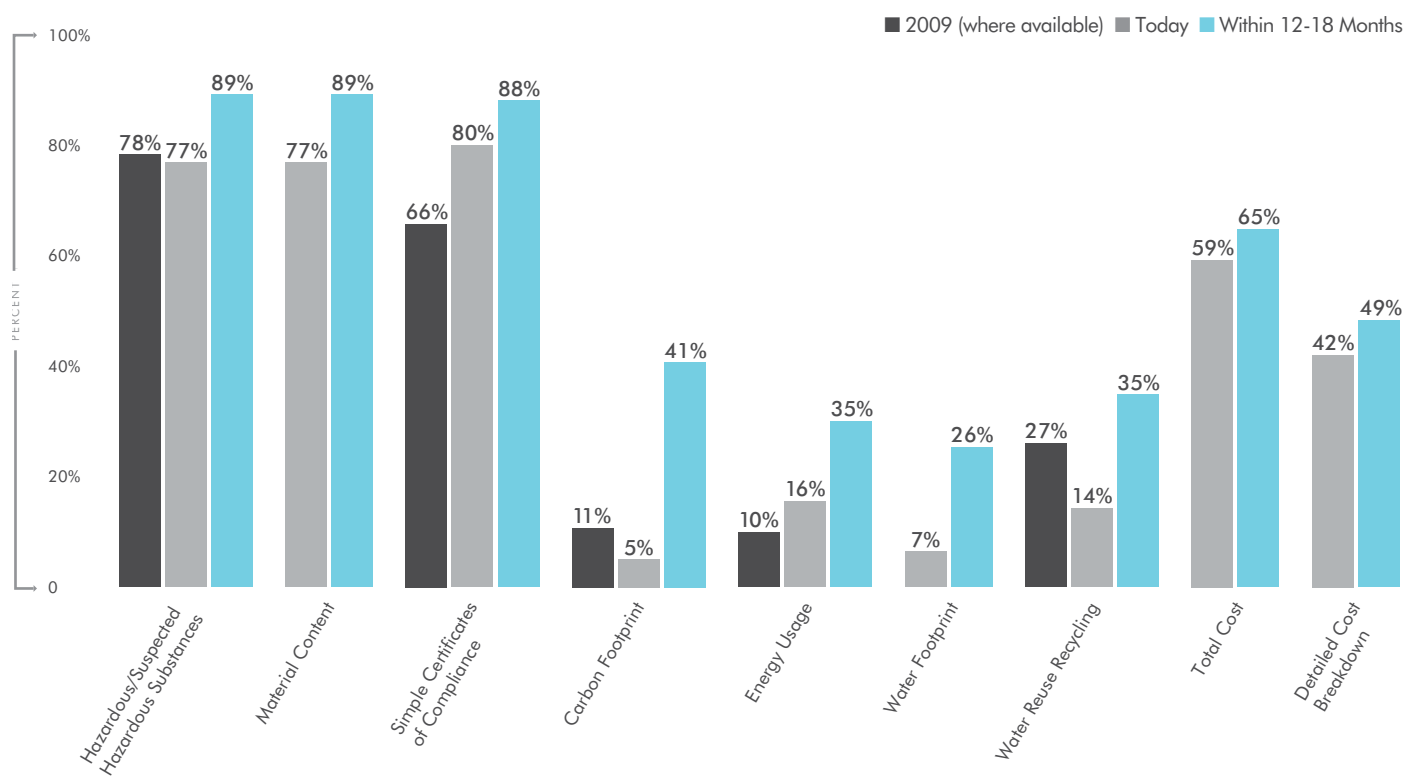

Figure 2: Trends in data collected from suppliersource: Tech-Clarity, 2011

Note on Evolving Regulations, and REACH and RoHS Compliance

Before we discuss the different approaches to collecting data, it is important to note that many compliance regulations are not static. They change with time as regulatory bodies add new restrictions and alter the requirements. Two regulations in particular, REACH and RoHS, are evolving rapidly and present manufacturers with significant challenges as they struggle to stay up to date with the mandates.

REACH continues to evolve as new chemical substances are added to the Candidate List Substances of Very High Concern (SVHC). The European law requires that manufacturers of products distributed in Europe report if

a product contains more than a specified amount of any SVHC. RoHS evolves as exemptions are added, change or expire. RoHS mandates that producers of certain categories of electrical and electronic equipment are not allowed to place products on the European market that contain six "banned" substances, unless they qualify for a valid exemption.

Challenges of REACH and RoHS

At PTC, we recommend that our customers plan on REACH and RoHS changing every six months. As a manufacturer defining supplier-data collection needs, you need to factor this evolution into the information you collect from your suppliers. Collecting the minimum information that is required to comply with these mandates today will result in you needing to collect additional data from all of your suppliers every time these regulations change.

Date	Number of REACH SVHCs
Oct 08	15
Mar 10	30
Dec 10	46
2011 est	100
2012 est	200

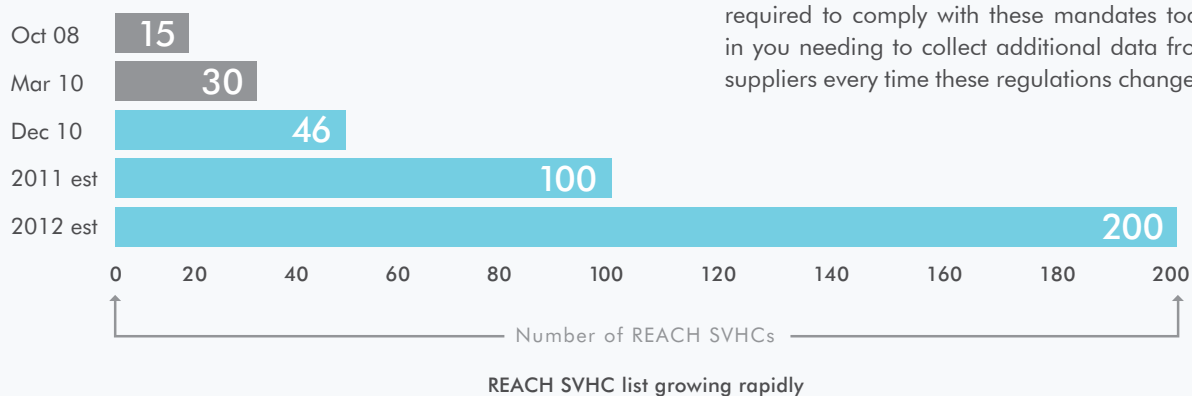**Number of REACH SVHCs**

REACH SVHC list growing rapidly

Figure 3: Evolving challenges of REACH and RoHS

Determine the Data Collection Approach

A key element of the data acquisition strategy is determining how much detail about components to collect. At PTC, we recognize that all types of supplier data have value, from simple certificates of compliance to full material disclosure. However, we strongly believe that manufacturers should set their sights on improving data quality and the robustness of the information they are collecting over time.

More detailed and standardized supplier data can:

• Provide numerous new insights into supplier components and the products you build, allowing you to deliver better-performing, lower-cost products to market faster.

• Enable a more-efficient and cost-effective data collection process. You need to collect new data from a supplier only for new components or if they alter a component.

- Reduce risk. With greater product information disclosure, you can have higher confidence in compliance and product performance reports and reduce the risk of missed targets and late-cycle changes.

Looking back at Figure 2, we quickly see that the majority of companies collect three different types of data: simple certificates of compliance, information on hazardous substances, and full material disclosure. These three types of data define the most common approaches to data collection and the amount of component detail collected. While each of these approaches has its advantages and disadvantages, it is important to understand that certificates of compliance and information on hazardous substances only provide a limited set of component data, with the objective of satisfying known compliance requirements that restrict the usage of certain substances, such as REACH and RoHS. Collecting full material data seeks to understand detailed information about every material and substance used in the component. With this information and the right product analytics system, companies can satisfy all of the objectives outlined in the previous section, Define the Objectives of Data Collection, from life-cycle assessment and product weight to portfolio material profiling.

Below we define and provide the advantages and disadvantages of the three most common data collection approaches used today.

Simple Certificates of Compliance – This approach involves providing suppliers with a list of compliance regulations and asking them to document that their products are in compliance. This approach is only useful for demonstrating product compliance with mandates that restrict the usage of certain substances.

- **Pros**: Suppliers find it very easy to answer this type of yes/no compliance question. The question does not require someone to fill out lots of technical information. As a result, manufacturers find that they get the quickest response to this type of question and suppliers tend to have an initial high response rate.

- **Cons**: There are many drawbacks to this data collection approach. First accuracy is much more suspect than more detailed disclosures. While a supplier might simply check a box and say their products don't contain disallowed levels of listed substances per a regulation–without really knowing if that is the case, they would likely respond more accurately if forced to provide a breakdown of the material contents. Most importantly, certificates are also a difficult level of data to maintain because the statements have to be refreshed for each new regulation or revision of a regulation. For example, when a supplier responds that a component is compliant with REACH or RoHS, what they are really saying is that the component is compliant with the mandate as defined on that date. You'll recall we expect these regulations to change on average every six months. When new REACH substances are added, or any RoHS exemptions change, you are responsible for ensuring the supplier has provided a new response stating if their product is compliant with the latest revision. Lastly, the collected data has no applicability to other product analytics that a manufacturer may be interested in.

Disclosure of Hazardous Substance Content – This strategy requires companies to first develop a harmonized list or superset of substances of concern that reflect regulations and corporate standards, and then ask suppliers for their content information for supplied components. The list can be tailored to address a company's individual compliance risks and address potential future substances of concern. This approach is primarily useful for tracking compliance with specific substances of concern.

- **Pros**: The data received under this approach is likely more accurate than certificates because it is collected in detail, as opposed to a "check the box" format. This level of detail is more flexible across requirements because the content can be analyzed across regulations. For example, if a customer introduced a new requirement restricting certain quantities of toxic substances, it is possible that you would be able to demonstrate compliance with their requirement based on the information you were already collecting. Additionally, this approach requires the manufacturer and supplier to perform less work and track less information compared with full material disclosure. Only a subset of components will contain these hazardous substances.

- **Cons**: This data can be more difficult to collect from some suppliers, as they are unprepared to share composition data of their components. More importantly, a new request for data must be sent to suppliers each time a new substance needs to be tracked. For example, if a manufacturer enters a new market and must comply with new regulations that require reporting on new substances, or a REACH update adds a substance that you are not currently collecting, you will need to create a new supplier data request. Lastly, the data has little-to-no applicability to other product analytics a manufacturer may be interested in.

Ray Lizotte describes the approach adopted by APC, which follows the concept of asking for disclosure of hazardous substance content. "We target our material requests very narrowly," says Lizotte. "We limit them to what we need and what the suppliers can answer, which builds trust with the supply base. The penalty for me, to keep it easy, is that I will have to come back annually with new requests."

Full Material Disclosure – This technique includes asking for the full material and substance breakdown of all purchased components. The data can be used for compliance and to satisfy numerous other product analytic objectives, including life cycle assessment, material footprint, and commodity price exposure.

- **Pros**: One of the main advantages of full disclosure is that it provides significant flexibility and adaptability as compliance regulations change and as new requirements develop. This protects suppliers from responding to new surveys when regulations change or new standards emerge, and insulates manufacturers from the cost of resurveying suppliers. The result is a lower overall cost to collect and maintain supplier data. For example, no matter how many new substances are added to REACH, you will have already collected the appropriate data to determine compliance and do not need to request or process new information. Additionally, this approach and data can be used to realize significant business value in areas beyond compliance. For example, if you have material information on all of your components in a bill-of-materials, you have enough data to produce rich environmental impact reports on metrics such as product carbon footprint and water usage. You can also examine risks across your entire product portfolio, such as how rising commodity prices may affect the cost of goods coming from your supply chain. Companies are just beginning to realize the wealth of potential uses of this information.

- **Cons**: This data is the most laborious for suppliers to provide initially, and some suppliers may be unprepared to share composition data of their components. Another drawback is that it requires manufacturers to aggregate, validate and manage the most data.

Brian Martin of Seagate explains why his company chose the full material disclosure approach: "Full disclosure pays in the long term. We have more data, at higher quality, at lower cost. Our cost is flat, not ratcheting up."

Microsoft's Kim Braun, Environmental Compliance Engineer, describes Microsoft's approach in Tech-Clarity's 2011 report, Making Product Development Tradeoffs: Designing Products for Compliance, Cost, and Sustainability: "We are asking for full material declarations for every part on every bill-of-material," states Braun. "We started it three years ago, and we want it for both new products and for sustaining products. It is the only way that a team of six people can manage all of the products. Without it, we would have to go back to the supply base every two months; it would be a lot of churn."

At PTC, we have recently observed a drastic shift in the data-collection strategies used at the world's leading manufacturers. In the last year alone, we have seen an impressive increase in the adoption of full material disclosure. Our customers have cited improved standards, more readily available component information, and increased supplier awareness as enabling this shift in the industry. In 2010, we surveyed our customer advisory board members about their data collection strategies and found that 50% of them were collecting full material disclosure supplier information. When we surveyed the customer advisory board again in 2011, we found that 90% of the members are now collecting full material disclosure (Figure 4).

PTC Customer Advisory Board Survey

	2010	2011
Collect Full Material Disclosure Data	50%	90%

Figure 4: Increasing adoption of full material disclosure.

While we recommend that all manufacturers plan to achieve full material disclosure, it is important to understand that the different data collection approaches are not mutually exclusive. For example, companies might rely on simple letters of compliance as an interim step while they are collecting more detailed disclosures. They may also find that, initially, they may only be able to acquire yes/no statements for some components, and then progressively increase the level of information collected. This "progressive disclosure" approach helps balance risk and cost. The key is to get started, and then improve the process and data over time, as the your company and suppliers mature.

Progressive Disclosure
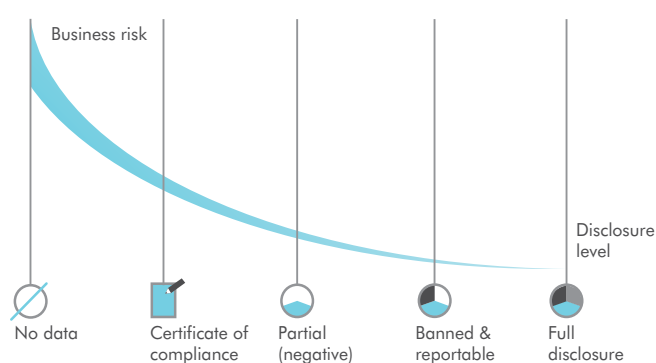
Figure 5: Increasing data disclosure with time decreases business risk.

Develop a Priority List

Ideally, companies seeking a high-quality environmental performance and compliance process would collect full material data on all components that they source. "If you have the time, the best approach is to get data on everything on the BOMs," comments APC's Lizotte. "That is the most sustainable approach and would provide the best defense."

Yet, the scope of such a process can be intimidating, and collecting this amount of data may take an unacceptable amount of time and may overwhelm resources. Based on our experience, a best practice is to:

• First focus on getting the right process in place to enable the collection of full material information for all new parts

• Then proceed to collect thorough, high-quality, full material information on a prioritized selection of existing components

"Companies shouldn't allow themselves to get overwhelmed," cautions Brian Martin of Seagate. "For example, they can collect data only on suppliers that have supplied direct materials within the last 12 months, which is a far lower number of suppliers."

But, which parts should you start with? One approach is to base data collection priority on usage, for example, based on what parts are most commonly used or used in the last year. We recommend prioritizing data collection based on risk. Companies can determine which components are most likely to contain hazardous substances and what products provide the most risk to the business.

"In some situations, we apply a risk methodology to how we collect data, by dividing components into those that are the highest risk of causing a compliance problem, and spend primary effort collecting data on those components," explains APC's Lizotte. "For REACH, we found a limited number of components that were at risk of containing SVHC (substances of very high concern), instead of 55,000 components, and got data from them much faster – within a few months."

Many companies can use the Pareto principal to develop a list of prioritized parts, and start on a subset of components and suppliers. Eighty percent of potential issues are probably due to twenty percent of high-risk components and suppliers. The key is to narrow down the list to a more manageable number. Then, once the list is defined, companies need to leverage a combination of data sources and automate the work to manage both the progress and status of data collection efforts.

Sources of Supplier Material Data

Once a company has identified what data to collect, they must develop a strategy to determine where the data will come from. Supplier material data can be collected in different ways and from different sources. Each source has its advantages and disadvantages. We recommend that manufacturers adopt a hybrid approach that leverages multiple sources.

Primary sources include:

Collecting Data Directly from Suppliers – This technique involves requesting data directly from the supplier, typically the manufacturer. This approach requires that you either develop internal request, collection and validation processes, or to use the materials and substance data collection capabilities of a product analytics system.

- **Pros**: Going directly to the source typically yields higher-quality data compared to purchasing data from content services. This source also has no direct fees.

- **Cons**: While this approach provides accurate data with no fees, it will take significant time for suppliers to respond and they may require multiple requests. This approach also places the greatest burden on the supplier, and they may need to be trained on how to provide information accurately. Local language issues may also present a significant problem.

"We identified three basic places where we collect part data, and incorporated compliance information into the process," explains APC's Lizotte. "Our engineers collect data when they ask for data such as specifications, performance, or UL listings; Purchasing collects data during the local sourcing process; and we gather data through our supplier management and auditing program."

Acquiring Information from a Data Exchange System – Data exchange systems collect, centralize and distribute supplier part data. Companies that maintain the exchange system help solicit manufacturers to direct their suppliers to enter component information into the exchange database. Once supplier component information has been entered, it is made available to all registered manufacturers. The goal of these systems is to prevent multiple manufacturers from having to collect the same information from the same supplier for the same part. By sharing a supplier's information with multiple manufacturers, exchanges hope to make the communication process more efficient. Currently, different industries rely on different exchanges, with varying success. Some exchanges charge the manufacturer a fee to participate and are free to the suppliers, while others require suppliers to pay a fee and are free to the manufacturers. In both models, the manufacturers must have strong leverage over the suppliers to persuade them to enter data.

- **Pros**: If a critical mass of relevant supplier component information exists in an exchange, it is a fast and relatively inexpensive method to collect supplier part data. This information can be quickly imported into whatever system you are using to manage compliance and environmental performance.

- **Cons**: There are two major drawbacks that both have to do with suppliers' hesitancy to enter proprietary information. First, data quality may be a challenge because suppliers are not as willing to provide detailed proprietary data into a shared resource. Typically, data exchange systems are best used for commodity products. The greatest drawback of this source is the low number of overall components that these systems contain. It is important to note that if the exchange system has a majority of an industry's manufacturers participating, and they hold significant influence over the suppliers, such as in the auto industry, then both of these drawbacks can be overcome.

- **Examples**: The International Material Data System (IMDS) was originally developed through a collaborative effort involving Audi, BMW, Daimler, Ford, Opel, Porsche, VW and Volvo. The system currently has over 80,000 suppliers entering their parts data. With the backing on the majority of the largest automotive makers, this system is considered to be the best example of a successful data exchange, though it remains focused on the automotive industry. BOMcheck is another example of a data exchange. It is free to manufacturers and charges suppliers a yearly fee. Currently, this system has the greatest amount of uptake in the Medical Devices industry, with companies like Philips on their steering group, driving suppliers to use the system.

Contracting a Third Party to Collect Information – This technique entails contracting with a service provider who will collect compliance data on the company's behalf.

- **Pros**: These companies typically have standard, proven processes and dedicated staff to collect information and who know how to get data from suppliers. These contractors also save the information that they've collected from suppliers to reuse with other interested manufacturers. These resources are often scalable, based on your organizational needs. They frequently offer local language expertise, which is highly valuable. Unlike data exchange systems, this type of service can work well when retrieving high-priority, custom-designed parts.

- **Cons**: Before going this route, evaluate potential partners to understand their capabilities and processes, as their call center collection services can range from clerical resources to highly trained specialists. You should also understand the makeup of the database of existing components that they possess. These databases typically contain high amounts of commodity part data and will not address your needs related to custom engineered parts. This is also the most expensive option.

- **Examples**: Some examples of companies who offer information-collecting services are: PTC, QPoint, WSP, IHS and TotalPartsPlus.

The important thing to note here is that when it comes to collecting component information, companies don't have to do it all by themselves. Although APC collects most of their data directly, they also purchase selected information. For example, APC acquired content on conflict metals, an emerging requirement that has no standards for collection and tracking. "For conflict metals, we identified what parts could potentially include them, and went to a third-party database instead of collecting it internally," says Lizotte of APC. Brian Martin of Seagate cautions, however, "We found suppliers won't supply good, complete data to anything that is shared."

Seagate uses a third-party data collection partner extensively. "Our third party has focused, trained resources with expertise," explains Brian Martin. "They provide consistency, a nailed down process, and they do quality audits. It's not about cheap labor." APC also uses third parties for special projects. "When we find a gap, we will hire somebody to get the data," says APC's Lizotte.

For most companies, a blended strategy is required. For example, companies may want to get a jump-start by filling their database with data from a data exchange system, where quality data exists, contracting a third-party source to acquire high risk design parts, and then collect the rest of the required data on their own. Each approach has quality considerations to take into account, weighed against the cost and time required to gather the information. "High quality data takes time," cautions Seagate's Martin. "You can get it fast, but it won't be high quality." The strategy should review all available sources, with an analysis on prioritization and spend. "Treat it like a commodity," APC's Lizotte suggests. "Analyze the cost of collecting data and realize some sources provide questionable quality."

Working with Suppliers

Another key part of the data acquisition strategy is to determine the best way to work with suppliers. Proper governance can require suppliers to either provide data or lose business, but companies must also focus on getting quality information. Many suppliers simply don't have a good understanding of the processes and the requirements involved in obtaining and delivering quality data. As Figure 1 indicates, "lack of supplier awareness/education" is the second most common challenge in ensuring compliance. "Suppliers lack expertise, systems, and resources," explains Seagate's Brian Martin.

Companies achieve their best compliance success when they cooperate with suppliers. And both Martin and Lizotte emphasize that supplier training is essential. "If you don't ask correctly and get wrong data, who's at fault?" questions APC's Lizotte. "Supplier knowledge and sophistication are not that great, so we use supplier audit teams as a way to educate suppliers."

Brian Martin of Seagate describes his organization's process: "Supplier training is critical to reduce confusion and improve the quality of compliance data. We work with suppliers, offer supplier training, and provide a portal with frequently asked questions. The training sessions aren't expensive and focus on specific issues on how to get the data right and avoid common mistakes."

In addition to training on the data collection tactics, companies need to evangelize on the strategic importance of providing high-quality data. After all, the information is not necessarily easy for suppliers to obtain, either. Suppliers are not always capable of sharing quality information. They may not know what occurs further back in the supply chain. Companies need to work through these issues with their suppliers in order to develop an effective data-acquisition strategy. Suppliers may also be struggling with different processes and requests from each of their customers. To combat this, companies should rely on standards as much as possible.

Leveraging Standards

Another part of the strategy that makes data acquisition easier for both companies and their suppliers is using standards when requesting information directly. The more manufacturers and suppliers adopt standards, the lower the total cost of data collection will be in the supply chain. Standards help by providing data in a consistent format when it's imported into internal systems. For suppliers, adoption and adherence to standards reduces their struggle with unique requirements and different time-intensive forms. With a standard, they can create a response for each component and share it with all of their customers. Manufacturers should try to adhere to standards and support their adoption to improve data quality, make data acquisition easier, and reduce the cost of communicating material data throughout the supply chain. "With standards, suppliers could spend energy on one form versus fifty unique ones," explains Seagate's Brian Martin. "Companies should use IPC1752 and supplement it if they have to, but try to stick with the standard."

Some industries have already adopted standard forms for data collection, such as the IPC1752 form in the Electronics industry and the IMDS database in Automotive. Based on several industry estimates, approximately 25% of the Electronics industry has currently adopted IPC1752 as a standard. Other industries have not adopted standards, and standards are frequently customized. While the IPC1752 form is not used in all industries, its use is growing among other industries that have significant overlap, such as Aerospace and Defense, Medical Devices, and Industrial.

Despite standards, the reality is that many companies will need to take what they can get from suppliers to get started, and work with them to improve the process over time. "You can't force suppliers to use standards," offers APC's Lizotte. "Companies have to express flexibility in how they get data and be willing to accept it in lots of different formats."

While some companies have the ability to force standards, many do not. "There is no such thing as data I don't want; if I can get yes/no information, then give it to me," Lizotte adds. The reality is that companies need to have processes and systems that can accept information in different formats and different levels of detail.

Data Standards Adoption by Industry

At PTC, we see that different industries are at various levels of maturity when it comes to collecting supplier data. Maturity is primarily driven by the presence and adoption of data collection standards and how regulated the industry is. The Automotive and Electronics industries have been wrestling with environmental compliance issues longer than most other industries, and over time each has worked to develop data collection standards intended to help manufacturers in their industries collect supplier data more efficiently. Given the compliance pressures and the presence or standards in these two industries, it's no surprise that we find the Automotive and Electronics industries are the most mature industries when it comes to supplier data collection (Figure 6). We also see compliance requirements increasing in many industries such as Industrial and Machinery and Medical Devices, and we expect that existing data standards will be adopted or new data standards will be created to help manufacturers in these industries begin to collect supplier data more effectively.
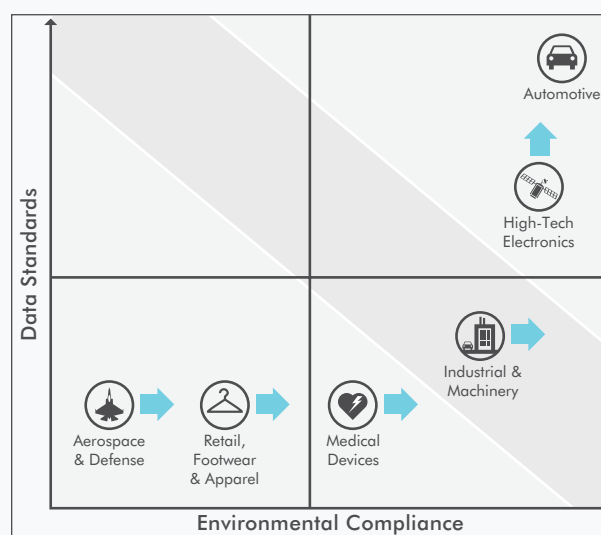
Figure 6: Data standards creation and adoption follows compliance requirements

Automating Processes and Creating an Audit Trail

Once approaches have been defined and processes developed, automation helps relieve the burden of manual, repetitive processes, which are inefficient and result in low-quality data. "Manual data entry is expensive and slow, but mostly it is error-prone," explains Seagate's Brian Martin.

An effective system can help implement and enforce consistency and best practices. The capabilities required for a data acquisition system include:

• Develop and manage a prioritized work list

• Send out data requests

• Receive responses

• Manage the status of responses

• Aggregate, validate data and enable an approval process

• Incorporate data into a central database

• Make the data available to be analyzed against regulations based on BOMs and product configurations

• Record compliance and data history to create an audit trail

Automation reduces cost and helps improve data quality. It is also critically important to satisfy audits and demonstrate due diligence for regulators. Implemented properly, automated systems can help companies manage compliance and environmental performance over the product lifecycle by analyzing ongoing status as regulations, material data, suppliers, or BOMs change. Intelligent systems will keep up-to-date with the latest regulation changes.

Making the data collection process efficient is extremely important because the trend is towards more requirements, including sustainability information, such as LCA. As APC's Lizotte warns, "Data collection for LCA makes data collection for RoHS and REACH look easy." Now is the time to get processes and systems in place.

PTC's Role in Data Acquisition, Compliance & Sustainability

PTC plays an important role in ensuring product compliance and improving environmental performance. PTC's Windchill® Product Analytics is a suite of component and bill-of-material analysis solutions that empower users to continually assess product compliance, performance and risk. The solutions complement your existing design and supply chain management data management systems and make product performance analytics an integral part of your product development process.

With early and ongoing visibility into a product's performance characteristics, you'll see how each individual component will ultimately affect cost, compliance, sustainability and other critical product requirements, while being able to assess the risks associated with design decisions. And, you'll immediately be able to share this information with stakeholders across the enterprise.

For data collection, Windchill Product Analytics provides the ability to automatically request, track, receive, and validate product data. "We use PTC's tool to automate gathering supplier data; we don't have an army of people chasing data," explains Brian Martin of Seagate. "Our total cost is lower due to automation."

PTC's Windchill Product Analytics is an open and flexible solution that accommodates the many different ways companies collect data, and its supports common standards. "The PTC solution helps because it allows the data to be collected in different formats," says APC's Lizotte. "The PTC tool allows it."
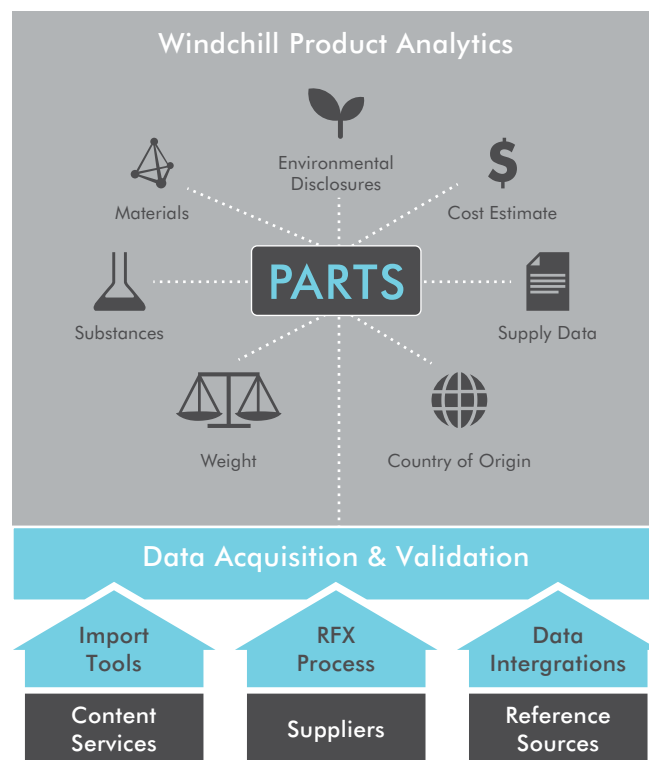

Figure 6: Automate data acquisition with Windchill Product Analytics.

PTC partners with data-exchange providers and third party data providers, and can readily incorporate their materials data. With PTC services and Windchill Product Analytics, PTC can be your full-service provider for a comprehensive solution to efficiently collect and analyze supply chain data.

Additionally, PTC provides a free, web-based tool to make it easier for manufacturers and suppliers to adopt and communicate using the IPC-1752A standard. It can be found at www.1752builder.com. IPC-1752A is the leading materials declaration standard, and this free tool enables manufacturers to create their own IPC-1752A XML material declaration request files. Suppliers can use the website to upload any XML material declaration request files they receive, then fill in the requested data and output a completed XML form to send back to the requesting manufacturer, all without seeing or needing to understand XML.

Summary of Best Practices

Hopefully, after reading this paper, the task of collecting supplier data doesn't seem as daunting. Just remember that momentum is on your side. Standards and systems are improving, and information is becoming more readily available.

Here are five simple, parting recommendations to guide you on your way to a more efficient process to collect supplier data and improve product compliance and environmental performance:

- **Don't box yourself in** – Don't be too rigid about only accepting one type of data or only using one source

- **Build support for governance** – You'll need executive support, as well as the support of Legal, Engineering and Procurement to create an enforcement strategy that has teeth and can be maintained

- **Train** – You need to engage, educate and certify the supply chain to get them to provide better data

- **Rely on standards** – The more you use them, the more efficient the entire process will become

- **Manage, automate, revise and audit** – Remember: data collection is a process and not an event. It's your job to manage the process and to improve upon it with time

About PTC

PTC is all about helping discrete manufacturers succeed by meeting their globalization, time-to-market, and operational efficiency objectives in product development. As one of the world's largest and fastest-growing software companies, we deliver a complete portfolio of integral Product Lifecycle Management solutions to over 25,000 customers in the Industrial, High Tech, Aerospace & Defense, Automotive, Retail and Consumer, and Medical Device industries.

Visit **PTC.com**/go/productanalytics for more information.

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