Managing Product Risk, Compliance and Performance from the Beginning

Early Visibility into Product and Supply Chain Risks Helps Manufacturers Improve Compliance and Profitability

Product and Supply Chain Pressures

Being an executive in today’s manufacturing industry is not for the weak at heart. If you lead product development, you are probably being asked to bring products to market faster in the face of intensified complexity, regulatory, and cost pressures. If you are responsible for the supply chain, you face your own challenges leading an extended supply network to drive out cost and supply risk while ensuring business continuity.
Our customers tell us that they face unprecedented challenges in product development including:

- Increased product complexity
- Greater supply chain complexity
- Intense cost pressure
- Shorter market windows for new products
- Ever expanding and evolving regulatory compliance mandates

Each of these challenges on their own is enough to make executives lose sleep. Today’s products are more complex technically and commercially. They have more variants than ever before and are designed to support global markets. Along with complex products, many manufacturers have evolved to become less vertically integrated relying more and more on multi-tier, global partnerships for design and manufacturing. At the same time, the global economy and pressure from developing markets have forced them to adopt aggressive cost targets, continuously look for ways to reduce cost, and try to manage unpredictable cost drivers such as wildly fluctuating commodity prices.

All the while, manufacturing leadership faces exponential growth in product compliance obligations including regional demands, scrutiny on conflict minerals, sustainability targets, and hundreds of new environmental regulations annually. The number of environmental requirements alone has grown significantly in recent years (Figure 1).

Figure 1: Environmental Regulation Growth
Managing Product Risk, Compliance, and Performance

These challenges are daunting enough before you consider that they must be addressed in an era where time to market pressure is critical and product lifecycles are getting shorter. This leads to unprecedented risk to profitability, company brand, and business continuity.

"50% of new product launches fail causing companies to seek better ways to plan new product launches for increased success."

Source: Gartner, Failed Product Launches Emphasize Need to Strengthen S&OP Involvement

PTC customers are turning to product analytics early in the product lifecycle to address these challenges and increase the success rate of their new products.

Addressing Risk in Product Development

The time to address product and supply chain risk begins early in product development. Leading companies proactively ensure that products meet business and performance targets in the earliest stages where changes can be readily made and with the least impact. Companies can begin performing analytics to measure product performance against targets starting in the concept phase.

To get products right the first time, manufacturers need to be able to validate that product goals are met early enough in the product lifecycle where designs are still flexible. This approach is sometimes called “DFx” or “design for X” process. This practice is critical because component and supplier decisions are made and costs are locked in early the product lifecycle (Figure 2, page 4).

Getting products right early in design sounds good, but it is much easier said than done. Manufacturers must align product design and supply chain challenges in the earliest phases of product development in order to make better informed decisions. However, in many companies, engineers and product developers don’t even have visibility to the right information, let alone tools to analyze and make tradeoffs.
Figure 2: Majority of Total Costs are Determined by Early Design and Sourcing Decisions

89% of product development teams do not have a consolidated view of critical performance dimensions such as cost, compliance, and environmental performance.”

Source: Tech-Clarity Perspective: Making Product Development Tradeoffs
Engineers by nature focus primarily on product form, fit and function, but there is a lot more to consider. Additional performance requirements and goals that need to be optimized include:

- Materials compliance
- Cost
- Mass / Weight
- Sustainability / Life cycle assessment (LCA)
- Reliability
- Country of origin
- Toxicity
- Certification Compliance (e.g. UL and CE)
- Energy consumption
- Risk exposure to parts with availability/obsolescence/counterfeit threats
- Recycled content

Companies need to analyze and validate each of these factors, setting and measuring against targets from the beginning of the product development process. This is not a trivial matter given the complexity introduced by frequent changes to the bill-of-material (BOM), part design, suppliers and the even requirements themselves. For example in the regulatory realm, manufacturers struggle to meet evolving product regulatory compliance obligations such as EU’s RoHS and REACH regulations that restrict the use of harmful substances. REACH and RoHS change approximately every six months.

In December 2012, the number of REACH restricted substances increased by over 60%, from 84 to 138 substances. The recent ROHS recast placed new industries under the scope of the regulation and beginning in 2014 Medical Devices must comply. Additionally, the new U.S Conflict Minerals Law, stands to have a tremendous business impact on manufacturers (see additional detail on conflict minerals). These regulations cause manufacturers to struggle to stay up to date with the mandates and poses significant risk to European revenues.
Latest C-Suite Compliance Issue: Conflict Minerals

The US Congress has determined that the exploitation and trade of conflict minerals originating in the Democratic Republic of the Congo (DRC) is helping to finance conflict characterized by extreme levels of violence contributing to an emergency humanitarian situation.

As part of the US Congress enacted Dodd-Frank Wall St. Reform Act legislation, the Conflict Minerals Law requires U.S. publicly traded companies begin tracking for the presence of conflict minerals (tantalum, tin, tungsten and gold) and determine if the country of origin for the conflict minerals was the Democratic Republic of the Congo or an adjoining country. Beginning in May 2014, companies will need to report their findings to the Securities and Exchange Commission. In addition to disclosing whether or not their products are “DRC Conflict Free” to the SEC, they must also post this information to their public websites. This will enable customers to factor this information into their buying decisions and stands to have a significant brand and revenue impact.

What has many manufacturers most concerned is the estimated high cost of collecting data from the entire supply chain to ensure compliance. The below table depicts several cost estimates for Conflict Mineral Compliance (source The Costs and Benefits of Dodd-Frank Section 1502, Green Research)

Table 1: Comparison of Cost Estimates to Comply with Conflict Minerals Law

<table>
<thead>
<tr>
<th>Estimate</th>
<th>One-time cost</th>
<th>Ongoing annual cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>SEC, company average</td>
<td>N/A</td>
<td>$14,500 to $53,000</td>
</tr>
<tr>
<td>NAM, excluding creating and filing conflict minerals reports</td>
<td>$1.2 million to $25 million</td>
<td>$75,000 to $150,000</td>
</tr>
<tr>
<td>Tulane</td>
<td>$210,000 to $1 million</td>
<td>$25,000 to $100,000</td>
</tr>
<tr>
<td>Claigan, $10 – $100 million company, 1st and 2nd years</td>
<td>$21,000</td>
<td>$10,500</td>
</tr>
<tr>
<td>Claigan, a $1 billion company, 1st and 2nd years</td>
<td>$228,000</td>
<td>$114,000</td>
</tr>
<tr>
<td>Claigan, a $10 billion company, 1st and 2nd years</td>
<td>$813,000</td>
<td>$406,000</td>
</tr>
</tbody>
</table>

Source: The Costs and Benefits of Dodd-Frank Section 1502, by Green Research

However, according to “The Costs and Benefits of Dodd-Frank Section 1502”, by Green Research, one factor that will influence a company’s costs is the sophistication of its existing product development and supply chain systems and methods. The report quotes Brian Martin, senior director of product environmental compliance at Seagate, an $11 billion maker of electronic data storage devices, who is undaunted by the cost of Section 1502 compliance. “If we had to spend a whole lot of money on this, it means we’ve not been managing our supply chain correctly anyway. We have the most comprehensive materials compliance database in the industry”, says Brian Martin of Seagate. “The more in depth understanding you have of your supply chain the more effectively you can manage the performance of your supply chain”.


Manufacturers need to adopt early requirement analysis and supply chain transparency to reduce risk in product development. Change is underway.

“By 2015, 60% of buyers will include life cycle demand and supply impact analysis as being integral to their PLM technology strategy.”

Source: Gartner, Product Design and Life Cycle Management.

This means that product analytics are becoming an integral part of managing product lifecycles.

Manufacturers gain tangible business benefits from product analytics:

- **70%** reduction in data collection costs.
  
  Documented PTC customer results

- **80%** reduction in compliance program costs.
  
  Ray Lizotte, Director, 
  IT Environmental Stewardship Office, Schneider Electric / APC

- **52%** more likely to release products on time.
  
  Aberdeen Group: Using Product Analytics to keep Engineering on Schedule and Budget, 2010
The Engineering Perspective

Today’s product development environment is full of challenges and conflicting goals that make it easier to include “right the first time” in a strategy than to execute on it. Most companies’ disconnected processes and systems are not ready to support early product decision-making and validation, leaving manufacturers unable to effectively design their products for all of these factors.

From an engineering perspective, the main challenge is productivity. Designers are already overworked and time to market is critical. In theory companies may understand implementing a proactive approach to hitting product objectives in concept or design to save effort in the long run.

Engineering executives, however, are concerned about how realistic early validation can be and how much it will cost in time and effort. The answer depends significantly on how the process is enabled. With today’s manual, ad-hoc approaches and disparate information sources it is probably not feasible. Let’s take a look at the example of engineers designing for cost, recognizing that cost is just one of many factors that designers need to address early in the lifecycle.

The majority of companies struggle to accurately track, measure, and communicate cost early in product development. It’s not that engineers don’t understand or care about cost, as some people might suggest. The difficulty results from the complexity of managing and communicating cost estimates for new parts and suppliers in a highly dynamic environment.

It is nearly impossible to keep cost estimates up to date manually as bills-of-material (BOMs), part designs, and suppliers change. Typical cost estimation tools, frequently composed of spreadsheets, are disconnected from the actual BOM managed during design. Consequently, the cost impact of changes to either the BOM or to the approved manufacturers list are not readily visible or accessible to engineers when they’re making decisions.

“The #1 reason new product launches fail is because of product cost issues.”

Source: Gartner, Failed Product Launches Emphasize Need to Strengthen S&OP Involvement
An efficient product development process, on the other hand, automatically incorporates product changes in cost analysis and makes the analysis information available as part of the standard product development system. This approach not only creates accurate, up-to-date cost reports, but also allows cost analysis to be performed across all product design changes and product configurations. Given the complexity of today’s products and rapid product development cycles, an integrated approach is the only realistic solution to allow engineers to properly consider cost in conjunction with the myriad of other targets they need to hit when designing a product.

### Top challenges for decision making in product development

<table>
<thead>
<tr>
<th>Challenge</th>
<th>Percentage of Respondents n = 312</th>
</tr>
</thead>
<tbody>
<tr>
<td>Development doesn’t have time to produce metrics / updates</td>
<td>38%</td>
</tr>
<tr>
<td>Too many manual processes (spreadsheets)</td>
<td>35%</td>
</tr>
<tr>
<td>No method for obtaining insight / visibility</td>
<td>23%</td>
</tr>
<tr>
<td>Product information is too detailed for executive decision making</td>
<td>23%</td>
</tr>
<tr>
<td>Taking too long to collect required metrics from development</td>
<td>21%</td>
</tr>
</tbody>
</table>

Source: Aberdeen Group, November 2010

### Product Cost Benefits:

- **70%** of the cost of product is locked in after the initial design stage – with product analytics you can unlock.

  DARPA RaDEO Project

- **7%** decrease in product costs.

  Aberdeen Group, Using Product Analytics to keep Engineering on Schedule and Budget, 2010
The Supply Chain Perspective

Clearly there are a lot of challenges in Engineering, but few companies design and produce everything in a vacuum. The days of the completely vertically integrated manufacturer are, for most industries, behind us. Suppliers have become strategic partners in the product development process.

Designing great new products on-time, on-cost and on-compliance requires a tremendous amount of coordination and communication. Such as communicating supply chain preferences to product designers as early as possible to help guide design and part selection decisions. It also requires collecting a tremendous amount of detailed information from a multi-tiered supply chain.

Helping engineers make the right design decisions for cost, compliance, sustainability, weight, etc. and steering them away from the risk of supply disruptions requires a significant amount of information on purchased components. Supply chain teams are responsible for gathering the necessary part data and supplier information required by engineers to make design decisions. Leading companies understand that an issue identified in design will be far less costly than a problem found in manufacturing. Additionally, by addressing supply chain concerns in the earliest phases of product development companies can reduce complexity, cost and risk, and bring more profitable products to market faster. A well-executed supply chain strategy must include the free flow of information.

One great example of supply chain data collection challenges faced by manufactures is in the area of materials compliance. Traditionally, Sourcing continuously bombards suppliers for disclosure updates so they can respond to ever changing government material compliance regulations like REACH, RoHS and Conflict Minerals as new requirements are identified. Manufacturers must collect, process, and manage disclosures from potentially thousands of suppliers on hundreds of thousands of parts in order to understand the compliance status of parts and product.

This process is inefficient for suppliers and manufacturers alike. Today’s manual data collection processes are cumbersome, inefficient, and costly and result in inconsistent data quality. The time is right for significant improvements and automation to improve data quality and reduce the data collection burden on both supply chain teams and suppliers.

Ideally, companies should gather richer supplier information and obtain the full material profile itemizing the complete chemical composition of supplied parts. Full material and substance disclosures are more difficult to obtain and complex to manage, but provide the only scalable way to keep up with constantly changing substance restrictions without having to re-poll the supply chain. However, the challenge for supply chain teams does not stop at collecting the data.
Supply chain and engineering teams also need to understand how supplier parts impact product level requirements. For example, does the supplier part used in a product design impact product compliance? Retrieving supplier component information for each of the requirements and independently modeling information in spreadsheets doesn’t stand up to the complexity and speed of the market. Requirements and material data must be analyzed in context with product data that constantly changes during the design process, and must be evaluated across all configurations and variants.

There is simply too much complexity to keep track of! This task is cannot be done without using a system specifically designed to streamline this process. An efficient process will automatically collect and validate supply chain information and make analysis information available as part of the standard product development system.

APC by Schneider Electric Case Study

APC is a provider of power protection products and services including UPS and surge suppressors. APC has $3.7B in revenue, 6,000 products, 280,000 supplier parts, and 1,500 suppliers.

With PTC Windchill Product Analytics, APC by Schneider Electric has reduced cost of data collection and management by $2 million and reduced their overall compliance program costs by 80%.

Motorola Case Study

Motorola is a mobile device designer and manufacturer with 50,000 products, 300,000 supplier parts, and 4,400 suppliers.

Motorola uses PTC Windchill Product Analytics to collect full material disclosure for nearly all parts, reducing data collection cycle time from 28 to 3 days and reducing product compliance reporting from weeks to minutes.
Product Analytics Paves the Path for Better Products

How can manufacturers possibly meet the large number of product goals required to develop an optimal, profitable product? The short answer is through effective product analytics. A structured approach to product analytics provides a better way to manage complexity, improve product compliance, reduce risk, and drive out cost. It allows companies to simultaneously address individual product requirements but also recognizes the need to address them as a whole. A holistic product analytics approach helps designers understand the impacts of design decisions including the relationship between metrics. For example they can see how requirements compete, such as the need to compromise weight for cost [Figure 3].

Manufacturers need to understand how designs stand against requirements based on the product structure as it is developed. With real-time feedback during design, engineers can make changes early and avoid costly late cycle changes. Product analytics must be an integral part of the product development process, ensuring that product developers have visible, accurate, and timely information to the impacts of their decisions on product requirements and objectives.

Let’s turn to product compliance again as an example. As mentioned earlier, product compliance regulations are complex and dynamic. It’s virtually impossible for any single designer to understand all of the requirements, let alone how their design stacks up. Product analytics allows engineers to rapidly evaluate design options for their regulatory impact. This can eliminate late surprises like the inclusion of a material that is banned in a target market or by a specific customer requirement. In addition, companies can continuously assess compliance as products and regulations change. In fact, manufacturers with full material disclosure for their components can readily analyze scenarios such as what products would be impacted if a particular substance became restricted. This information is highly strategic.
Product analytics can also allow manufacturers to quickly determine the impact of potential commodity price increases or part shortages. By centralizing cost information and leveraging multiple cost estimation techniques, designers can understand cost impacts when evaluating design options. The cost estimates can also be re-used for roll-ups against all product configurations. Moreover, enterprise visibility to cost roll-ups, estimates, and confidence levels can help manufacturers validate cost early to identify potential cost overruns and understand major cost drivers to address any issues. There are numerous other requirements beyond compliance and cost that can be validated with product analytics, for example manufacturers can review product weight or environmental impact, including carbon emissions.

The Impact of Product Analytics

How does product analytics impact the bottom line? From a design perspective, better design decisions earlier in product development lead to better products. Having the right information and analysis helps engineers ensure that products meet performance targets at launch, including cost, weight, compliance, and more.

Aberdeen Group research shows the benefits of this approach, indicating that top performing companies, the “Best in Class,” are “60% more likely than their competitors to provide engineering with visibility into cost drivers.” But there are other benefits as well, including:

- Streamline regulatory compliance and reduce product risk
- Reduce time to market
- Reduce product cost
- Lower cost of product development
- Less rework and redesign due to late cycle changes

From a supply chain perspective, manufacturers have the opportunity to improve design decisions to optimize supply and reduce risk. In addition, a comprehensive analytics approach can help reduce the data-gathering burden on sourcing personnel and suppliers alike. Benefits to the supply chain include:

- Streamline regulatory compliance and reduce product risk
- Reduce time to production
- Reduce supplier spend

PTC Partners with Industry for Material Compliance

PTC has the leading product material compliance solution on the market. Since bringing the first RoHS compliance software solution to market in 2004, the team has continued to help manufacturers tackle the tough challenge of material compliance. Today, PTC maintains an open, out of the box solution that integrates with Windchill and other PLM and ERP systems to help manufacturers understand the contents of their products and their compliance status early in the product development process. PTC continues to invest and partner with the product compliance community and our customers, serving on panels and boards including:

- IPC
  - Co-Chair IPC’s Conflict Minerals Committee
  - Co-Chair IPC’s 1759 Battery Committee
- AIAG
- ITI
- AIA
PTC takes a holistic, integrated approach to enabling product analytics. PTC Product Analytics solution supports the following three critical steps to address product and supplier risks beginning early in product development and ensure regulatory obligations, customer requirements and performance targets are met:

1. **Track Regulations and Performance Targets**

The first step is to understand what you are up against. It’s important to identify all of the requirements your products must meet. PTC’s solution enables companies to define and manage multiple targets for product compliance, performance and risk. The solution provides enterprise visibility to these targets early in the innovation process and throughout the product lifecycle.

Regulatory requirements are complex and dynamic, with new mandates being added, existing ones being altered, and exemptions expiring. Some determine compliance by straight-forward maximum limits on restricted substances; others are logical requirements or requirements demanding unique calculations. In addition to government-mandated requirements, most companies have customer specifications and company standards that may be even more stringent. PTC offers packaged material compliance targets for regulations, including RoHS, REACH, ELV, EU Battery, and Conflict Minerals. These compliance targets are automatically updated by PTC as regulations change. (See page 19 for a complete list of the product material compliance regulations PTC supports.) PTC Product Analytics solution provides a rules-based system to manage all of these requirements.
In addition to material compliance requirements, the solution enables customers to define and manage performance targets for numerous areas, including product cost, environmental impact, weight, certification compliance (such as CE or UL), and supply and obsolescence risk.

PTC Product Analytics solution provides a single platform to effectively manage your compliance and performance requirements and the evaluation criteria used to validate and compare them to products and BOMs.

2. Collect and Aggregate Data to Fuel Analysis

The next step after gathering requirements is pulling together the data required to determine if requirements are met. Accurate product and supplier data is critical. This data includes part information, supplier disclosures, product structures, and AMLs being analyzed against the targets. Part information refers to commercial characteristics such as cost estimates and prices, as well as physical characteristics such as a part’s material composition. Supplier disclosures characterize commercial parts and can vary from simple “yes/no” compliance question responses to full material and substance disclosures. PTC Product Analytics solution is designed to accept data in whatever format and level of detail is available, effectively enabling a progressive disclosure strategy where companies can improve the quality of information collected over time.

The solution can access product and supplier information from PTC Windchill, as well as other PLM or ERP systems. Product structures can be complex with multiple configurations and variants that analytics must take into account. Needless to say, all of this information needs to be real-time and accurate as designs evolve.

Regardless of the format and level of detail, supply chain data must be systematically acquired, validated and standardized to use in analytics. PTC Product Analytics solution allows manufacturers an efficient way to gather data from the supply chain and harmonize it, including identifying gaps and automating the request process for required data.

3. Assess Performance and Communicate Results

With the right requirements and data, companies need an accurate and timely way to analyze products beginning early in the innovation process and throughout the product lifecycle to ensure they meet targets and requirements. Metrics such as weight, cost, and material content need to be rolled up through the product structure to understand the total impact or value. Not all analysis is straightforward, though, for example some need to take into account estimate confidence or determine the best (or worse) case scenarios across all configurations and variants. Others may be logical rules. PTC Product Analytics solution supports a variety of analysis options.
Manufacturers must compare calculated information in a structured way to the appropriate requirements. In addition, they must update their analysis over time as requirements, products structures, or other data changes. As new requirements emerge, companies may find new questions that can be answered using the data already gathered, saving significant time and effort to set up new analytics. For example, PTC Product Analytics solution can help answer questions like “what would happen if a certain rare earth material jumped in price?” or “what would the impact be if a certain chemical was added to a restricted substance list or a customer requirement?” without having to request new information from suppliers.

Of course none of the above steps matter if the information isn’t used to make better products. Having the right information enables manufacturers to make trade-offs and perform what-if analysis to optimize designs across metrics. Real-time feedback allows engineers to understand the impact of design changes on the metrics that matter to product success. From there, engineering and supply chain teams can identify and mitigate issues and optimize products. In addition, they can document the results for compliance and audit purposes downstream, and automate the production of compliance reports using industry standard and custom formats.

A modular platform for managing multiple dimensions of compliance, performance, and risk

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Figure 4: Automate Data Acquisition & Validation

Source: PTC
PTC’s Platform Approach

Addressing the many metrics required for a successful product requires an integrated approach. The solution must bring together different requirements, a multitude of data, and allow collaboration between the Engineering and Supply Chain organizations. PTC offers a cohesive approach that meets these needs by taking an enterprise-level, platform-based approach. PTC Product Analytics solution is a modular platform for managing multiple dimensions of product performance and risk. It is an enterprise solution to:

- Track regulatory (e.g. RoHS, REACH) and performance (e.g. Cost, Environmental) targets
- Collect and aggregate supplier and product data
- Assess compliance and performance, and communicate results to the enterprise, customers, and regulators

Taking a holistic approach prevents manufacturers from inefficiently collecting product data and product structures in different ways and creating new spreadsheets to analyze each characteristic of a product independently at a single point in time. Instead, they leverage the master information for the product throughout the entire product development process, beginning during the innovation phase. Companies simply can’t afford to address analytics as a static, series of independent issues. They must address product analytics as a class of issues that require real-time analysis and can be addressed with a consistent approach and set of capabilities. Clearly each subject matter expert should not be reinventing the wheel on how to gather requirements and product data and running analytics!

PTC’s solution offers a consistent approach with standard workflows, audit trails, and status reporting. It provides efficiency and automation in gathering and validating data from the supply chain, as well as connecting to standard data sources. This data is then aggregated and centrally managed so it can easily be reused for additional analyses. PTC leverages patented technology for BOM analysis based on deep knowledge of product design, development, and manufacturing. The solution analyzes metrics based on current variants and configurations as they change, providing what-if analysis of scenarios.

With this solution, there is no need to add new point solutions and new vendors for each individual metric, nor do you need to add expensive integration to multiple point solutions. Instead, your organization has all of the information, in one place, to make better product decisions and tradeoffs resulting in more compliant, lower risk, profitable products.
PTC Windchill Product Analytics takes a platform approach to address manufacturers’ critical need to optimize and validate products against numerous requirements in product development. PTC supports the most common challenges manufacturers face out of the box, including:

### PTC supported analytics in manufacturing

| **Materials and Substances** | collect and track material and substance information and provide a single source of truth for the composition of parts and products |
| **Materials Compliance** | ensure and report on product environmental compliance |
| **Product Cost** | roll up product cost for different BOM configurations using different cost models, and improve margins by embedding product cost data as a core metric used by engineers to analyze the cost impact of design alternatives |
| **Certification Compliance** | ensure compliance documentation is collected and in place for requirements like CE marking and UL listing |
| **Life Cycle Assessment (LCA)** | evaluate and report on product sustainability including carbon emissions |

In addition, PTC works closely with customers to apply the Product Analytics platform approach to their unique, individual needs including:

### PTC supported analytics for customers

| **Weight** | ensure that products are launched at, or under, target weight by providing real-time visibility into target and estimated weight to all stakeholders |
| **Part Commonality** | identify common parts across all divisions and drive greater part reuse |
| **Supply Risk / Obsolescence** | identify parts with high availability, obsolescence or counterfeit threats across the entire supply chain |
| **Trade Compliance** | manage country of origin requirements on cross-border transactions to minimize tariff and supply chain costs |
| **Raw Materials Usage** | report on material usage across products, portfolios and the company |
Supported Product Material Compliance Regulations

The PTC Product Analytics solution provides support for many of the common product material compliance regulations our customers face:

- REACH (Registration, Evaluation, Authorization and Restriction of Chemicals), including suspect REACH SVHC
- EU RoHS (Restriction of certain Hazardous Substances), RoHS Recast, China RoHS, and RoHS exemption management
- Conflict Minerals
- EU Battery Directive
- ELV (End-of-life Vehicle)
- The Joint Industry Guide (JIG)
- Global Automotive Declarable Substance List (GADSL)
- WEEE (Waste Electrical and Electronic Equipment)
- CPSIA (Consumer Product Safety Improvement Act)
- RRR (Reduce, Reuse and Recycle)
- California Proposition 65
- Halogen-Free
- Battery & Packaging Directives
- Country of origin
- Customer-specific Requirements
Next Steps

Whether you start with solving a product material compliance challenge, want to assess cost early in the product lifecycle, or face some other products analytics challenge, taking a platform approach is an investment that will continue to deliver returns as it is applied to new scenarios. To get started with a product analytics initiative:

- Conduct Product Analytics Needs Assessment
- Gain alignment on opportunities for improvement
- Identify scope and stakeholders
- Interview process stakeholders
- Identify and document improvements opportunities
- Create best practices roadmap
- Estimate value (ROI) of implementing roadmap
- Align on action plan

Learn more about the PTC Product Analytics solution

PTC.com/solutions/product-analytics-resource-center/

About PTC Product Analytics

PTC Product Analytics solution is a component and Bill of Material (BOM) analysis solution to manage and assess product compliance, performance and risk beginning early in the innovation process and throughout the product lifecycle. The solution complements existing product development systems by making product performance analytics an integral part of the standard development process. By analyzing product performance and risk metrics in the earliest phases of product development, where decisions have the most impact and are least disruptive, you can bring better performing and more profitable products to market faster.

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J01712-ManageProdRiskCompPerf-EN-0313