

The High Costs of Non-Compliance for Manufacturers

WHITE PAPER

Cincom in-depth analysis and review



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Introduction

Of all the forces impacting manufacturing today, compliance is fundamentally re-ordering the landscapes of entire industries. Lack of compliance can cost millions of dollars in lost market share, inventory write-downs for products that are not compliant, and present significant challenges in turning around a tarnished reputation. In addition, there is the broader and much more costly expense of re-architecting and redefining supply chains and products to be in compliance.

There needs to be a very real sense of urgency around the RoHS Directive, which went into effect on July 1, 2006 throughout the EU and the WEEE initiative. The Reduction of Hazardous Substances (RoHS) and Waste Electrical and Electronic Equipment (WEEE) have become the forefront issues in manufacturing globally due to their implications for any manufacturer selling into the EU.

What manufacturers need to realize is that through the efforts to be more compliant with regulatory standards, they can transform their manufacturing operations to be more competitive. Compliance is transforming the companies that have taken the time to rearchitect and redefine the many processes relied on for managing suppliers on the one hand and channel partners, resellers, and customers on the other.

For manufacturers that ignore compliance, the costs can be steep. In fact, the EU has already made it clear that they will not tolerate a lack of compliance with RoHS and WEEE initiatives. Abacus, a distributor located in the United Kingdom, has stated that approximately \$6.1M in inventory will be written off due to the products being non-compliant with the RoHS standard. Other manufacturers are battling lost sales opportunities due to "green friendly" products with RoHS and WEEE compliance being perceived as less risky than going with products from manufacturers that have yet to gain compliance.

Becoming RoHS- and WEEE-compliant is more about becoming part of a broader economic ecosystem that encompasses a manufacturer's supply chain, illustrating RoHS and WEEE compliance for the suppliers managed and the manufacturing work completed. There is no substitute for this level of supply-chain integration. To become compliant with RoHS and WEEE, and to continue selling into the EU, these are necessary steps.



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Competing Globally Starts With Compliance

Manufacturers need to get beyond seeing RoHS and WEEE initiatives as unwelcome costs and regulations that influence their ability to compete in the global market, and embrace the opportunities these initiatives provide for selling more into the 25-nation EU marketplace immediately. Secondly, to ignore these directives is to invite a loss of market share, inventory write-downs due to non-compliant products in warehouses, and the costly retrofitting of supply chains to enable a manufacturer to become part of a compliant series of suppliers.

It's been Cincom's experience, however, that in attaining compliance and using it as a foundation for growing global business development as well as selling, service, and support strategies, manufacturers have the potential to fundamentally redefine their businesses. Think of compliance to RoHS and WEEE as the foundations for making supply chains more globally synchronized and more aligned with and coordinated with other compliant manufacturers. A network of compliant manufacturers emerges then, and from that foundation, any of the manufacturers comprising this group can in turn create stronger go-to-market strategies. Here are examples of several from manufacturing companies that have looked to transform compliance into a foundation on which lasting competitive strategies can be created:

General Electric – G.E. spent \$1.5B on Ecomagination in an attempt to significantly rebrand itself as an environmentally friendly and “green” manufacturer. This has helped the company throughout Europe and continues to be fine-tuned throughout the compliance strategies the company is using specifically on RoHS and WEEE to gain greater sales.

Toyota – Producing cars in the United States that meet all emission standards and those of the EU, Toyota pays \$33 per labor hour versus \$88 for General Motors. In addition, lean manufacturing through the use of the Toyota Production System (TPS) has given this auto manufacturer the opportunity to lead the world in auto shipments in 2006. There are immediate implications of this strategy for Toyota today as well. For the first time, in July 2006 they surpassed all of Ford Motor Company's brands in unit shipments globally. Clearly, compliance and lean manufacturing are working for Toyota.

IBM – Turning recycling and compliance into a sustainable business model starts with the GARS unit of IBM collecting 20,000 end-of-lease machines each week and then either reselling, refurbishing, or dismantling them, contributing less than 2% to landfill. This recycling operation also contributes several million in revenue to IBM's leasing operations.

Sun Microsystems – Focusing on trimming down the energy usage of its servers, Sun Microsystems invented CoolThreads technology, which increases the performance of its servers while dropping their energy consumption. This creates energy savings for their customers, contributing to lower operating costs and lowered lifetime cost of ownership.

Fujitsu Transaction Systems – Heavily dependent on sales throughout the EU, Fujitsu Transaction Services has established itself as a leader in retailing, and is actively using environmental regulations as an opportunity to educate and solidify relationships with its retailing customer base. Fujitsu's strategy of using regulatory compliance as an opportunity to educate both their customers and prospects have turned them into thought leaders in the core markets they serve.

Global auto manufacturer – Developing a series of strategies for managing the discontinuance of older and end-of-life vehicles – which is also an EU regulation – this manufacturer spent less than 1% of its total revenue on complying with Reduction of Hazardous Substances (RoHS) regulations. Many of the company's competitors are spending up to 4% of revenue on compliance as a result of having to first get processes connected with each other and the need for speeding up the RoHS compliance efforts across their supply chains.

Hewlett-Packard – One of the first manufacturers to embrace the concept of turning compliance into a competitive advantage, HP was the first to define programs specifically aimed at design-for-environment (DfE) objectives in the context of new product development. Starting this initiative in 1992, HP's efforts to be environmentally compliant has made their transition to RoHS and WEEE compliance to meet the EU directives much more achievable given their experiences in this area. An example of this is HP's strategies for recycling the tens of millions of CRTs being retired from use throughout Europe. HP has been asked to desegregate the most toxic components of their CRTs and recycle the less-harmful elements. They've been able to accomplish this using the processes put in place from DfE initiatives over 10 years ago.

There are many other examples of manufacturers gaining competitive advantage through compliance, and the one take-away all of these companies share is a common focus on using the regulatory requirements of the EU as the foundation for transforming their supply chains and approaches to selling. The essence of the lessons learned is that those manufacturers that are turning compliance into a competitive advantage look to integrate quickly with other supply chains that have either achieved compliance or are aggressively pursuing it. Finding those supply chain networks that are aggressively pursuing these goals and when possible, joining them, is what the leading manufacturers are doing today to speed their efforts at attaining compliance.

It's been Cincom's experience that in attaining compliance and using it as a foundation for growing global business development, selling, service, and support strategies, manufacturers have the potential to fundamentally redefine their businesses.



Why the Time for Compliance Is Now

In addition to the urgency surrounding compliance to the RoHS and WEEE initiatives, when it comes to turning compliance into competitive strength, the highest-performing companies are more interested in streamlining supplier- and customer-facing processes first, accomplishing higher levels of quality second, and creating a more secure information environment third. AMR Research recently delivered a webinar titled “Compliance as a Catalyst for Competitive Advantage,” which provided the following insights into global compliance spending in 2006 through 2010:

- **Thirty-six percent of companies are working to integrate and streamline their business processes, and this includes supply chains, customer fulfillment, and service.**

The competitive benefits of compliance are driving these companies to attain greater levels of inter-process integration and use the investments in compliance to take on the more difficult integration and process redefinition tasks.

- **Twenty-eight percent of companies are leveraging their spending in compliance to deliver greater levels of product quality.**

In the auto industry specifically, product quality is such a critical product attribute that any given model's reputation is made or broken in the first 90 days of its launch. The focus needs to be on ensuring product quality and compliance at the same time to create a globally more competitive product. In the case of auto manufacturers selling into the EU for example, RoHS and WEEE have been part of their supply chain, manufacturing, service, and product discontinuance plans for well over four years so far.

- **Fourteen percent are using compliance as the cornerstone for securing their IT environments.**

Spending on securing networks and infrastructure continues to show double-digit growth as an IT spending category mainly as the result of security threats originating both inside and outside organizations. Efforts aimed at compliance as they relate to security deal with the processes of recruiting, evaluating, and integrating new suppliers into an organizations' supply-chain network; the recruiting, validating, and promoting of channel partners; and the protecting of intellectual property and core information assets as they relate to an organization's ability to compete. Compliance and security are tightly coupled in many organizations due to the need to keep the most critical information confidential. This is especially the case in healthcare industries for example. In the context of manufacturing, however, the intersection of compliance and security centers on first validating the components that comprise all products, then defining recycling and disposal strategies to ensure

that the most harmful components to the environment are discarded according to initiatives. Each company's knowledge of these areas is a core competitive advantage; no two companies will have the same strategies and approaches to managing these processes.

- **Eleven percent look to use compliance spending to synchronize supply globalization efforts.** From the best-practices examples of companies earlier in this paper, it's clear that “going your own way” works when it comes to creating compliant supply chains. The key lesson learned from these companies that are attaining best practices in compliance management throughout their supply chains is that they take a very systematic approach to creating, sustaining, investing in, and strengthening supply-chain compliance. It is much too large of a task for any manufacturer or global organization to take on alone; the companies accomplishing this adopt more of a strategy of joining efforts with suppliers that are ahead of them in terms of compliance to directives, with RoHS and WEEE being at the forefront of many manufacturers' efforts today.
- **Ten percent are leveraging compliance spending to gain greater visibility into operations.** This translates into visibility three to four layers deep throughout their supply chains and the ability to better sense and respond to demand signals both in terms of purchase orders and fulfilling custom orders as well. Compliance to the RoHS Directive specifically nearly requires more accurate levels of supply-chain visibility and a strong focus on having greater control over the component's composition, quality, sustainability, and recyclable content. Those are all critical information elements every manufacturer must know in order to fully comply with the RoHS Directive. In addition, the defining of strategies to achieve WEEE compliance are also dependent on having a strong knowledge of the composition and recyclable attributes of each products' many components. So while only 10% of manufacturers according to AMR Research are leveraging compliance spending to gain greater visibility into their supply chains, this figure doesn't reflect the pervasiveness of the need for this level of transparency and visibility throughout many manufacturing industries. It is Cincom's experience that the more manufacturers embrace making their supply chains more transparent, the greater the ROI and the higher the level of agility and ability to respond to change.

The bottom line is that when manufacturers are looking for a catalyst to bring major change into their organizations, compliance to RoHS and WEEE Directives are potent motivators.

RoHS: a Global Call to Action From the EU Implications of WEEE in 2006

As of July 1, 2006, the EU requires manufacturers selling into their 25 member nations to restrict the content of six specific substances in both products produced in-country and those imported – either in subassembly or final-product form. The six specific substances are:

- Cadmium (Cd)
- Hexavalent chromium (Cr [VI])
- Lead (Pb)
- Mercury (Hg)
- Polybrominated biphenyls (PBB)
- Polybrominated diphenyl ethers (PBDE)

The content limits for these substances have been defined by the EU as:

- <0.01% Cd in homogeneous material
- <0.1% Cr (VI), Pb, Hg, PBB, PBDE in homogeneous material

The EU's RoHS Directive defines homogeneous material as material of uniform composition throughout that cannot be mechanically disjointed into different materials.

Examples of such materials are alloys, board resins, ceramics, plastics, coatings, glass, metals, and paper. "Mechanically disjointed" materials can, in principle, be separated by mechanical actions such as unscrewing, cutting, crushing, grinding, and abrasive processes.

For example, any semiconductor package contains many homogenous materials including plastic molding material, tin-electroplating coatings on a lead frame, lead frame alloy, and gold-bonding wires. Lead is the RoHS restricted substance used most often in electrical circuits for example. It completes viable electrical connections either in solders or between the semiconductor die-and-carrier within integrated circuit Flip Chip packages.

Manufacturers' strategies for compliance as it relates to these substances rest heavily on an enterprise-wide approach to data collection throughout the sourcing, supply chain, and traceability of production lots or in the case of semiconductors, foundry yields, throughout a global supply chain. There is also the critical need for showing component replacement at any point in the supply chain, production, or servicing workflows for any manufacturer selling into the 25-nation EU marketplace.

The Waste Electrical and Electronic Equipment (WEEE) is a series of regulations that apply to all electrical and electronic equipment powered at up to 1000Vac or 1500Vdc and placed on the market in EU member states falling into any of 10 product categories, unless the equipment is part of another type of equipment that does not fall into any of these categories. The 10 product categories are mainly but not exclusively consumer products, but some industrial products are also in the scope.

Manufacturers must have plans in place for each of the following activities to comply with the WEEE standard:

- Financing the collection of obsolete and out-of-compliance products
- Defining a treatment strategy for products that can be brought into compliance with the WEEE standard
- Logistical and pricing plans that define the recycling and recovery of all electronic waste.

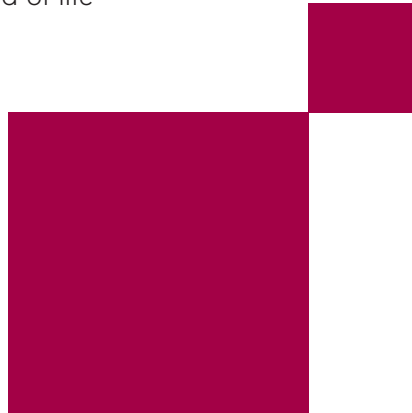
From a manufacturer's over-arching series of business strategies, the core focus to provide for process-level support to WEEE standards must include the following:

- Reverse logistics support through multiple layers of a supply chain
- Support for per-lot tracking of electronic components including semiconductors
- Support for supply-chain integration with order management, service lifecycle management, and order querying systems both from a presales and post-sales strategy perspective
- Inventory tracking and in-transit analysis of shipments to ensure greater visibility to components, subassemblies, assemblies, and finished products pertaining to WEEE compliance.

WEEE Directive's Exceptions in 2006

The Directive's requirements do not apply to the following products that are deemed to be either in the national interest of the United Kingdom or are of such fundamental nature that they lend themselves more to disposal than recycling. These products have been analyzed for the WEEE Standards organization and have been exempted from the Directive:

- Equipment intended specifically to protect the UK national interest and for a military purpose, e.g., arms, munitions, and war material
- Filament-based light bulbs
- Household light bulbs and luminaries
- Large-scale stationary industrial tool
- Surgically implanted medical equipment
- Infected medical equipment at end-of-life



Where Compliance Strategies Are Working

The following sections provide insights into where compliance strategies are working, highlighting how manufacturers sometimes turn extensive process re-engineering and high costs into a lasting competitive advantage and often, cost and efficiency advantages.

Reorienting Supplier Relationships Toward Compliance

Intel's many efforts at RoHS compliance has permeated their supply chains, enabling them to more efficiently plan, produce, market, and service global markets. Intel's supplier relationship management strategies illustrate best practices in infusing motivation to adhere to RoHS and WEEE compliance not only to avoid fines and lost business, but to increase sales and broaden market credibility throughout the global supply networks of which these companies are members.

Supply Chain and Distribution Channel Implications of Compliance

Having attained the unenviable position of being the first member of a supply chain to be penalized for lack of compliance, Abacus Ltd. and its \$6.1M write-down of non-compliant RoHS inventory in the United Kingdom signals that while the organizations regulating these activities don't have 100% coverage and visibility into all activities across all levels of supply chains, they do have the authority to stop and fine any member of a supply chain immediately.

Manufacturers that have the responsibility of ensuring their supply-chain partners are aggressively pursuing RoHS and WEEE compliance. This starts with discussions and reviews of distributors, dealers, sales rep organizations, and value-added resellers regarding their strategies for returning non-compliant inventories and quickly alleviating any risk of non-compliance. If you're a manufacturer that relies heavily on distributors that have a high percentage of their inventories in at-risk RoHS and WEEE-compliant products, insist on seeing their RoHS Compliance Plans. For many distributors, these will have been in place for over 18 months.

Abacus Ltd. had prior-period inventories of products that were not RoHS and WEEE compliant. In the process of selling this inventory, the EU Enforcement teams in the United Kingdom discovered the violation and required Abacus to discontinue shipping of all non-compliant

products. The EU Enforcement process is not all-encompassing, but rather it focuses on a combination of market intelligence, random selection, products known to contain materials of high concern. In addition, the EU Enforcement teams focus on products known to contain materials of high concern, high volume, short-life products; and coordination of market and industry intelligence with other member states.

The fact that a member of a supply chain is the first to be cited for RoHS and WEEE violation also points to the many areas where manufacturers need to improve the performance of their supplier partnerships. Here are some additional areas where manufacturers need to work on better supply-chain integration and strive to create stronger supplier relationship management strategies:

- Look to create higher levels of visibility over inventory, and demand multiple layers through their companies.
- Ensure higher levels of forecast accuracy, and demand a network-wide management supplier.
- Minimize inventory carrying costs, lower inventory turnover, and increase accuracy of out-shipment data.
- Look to trim back on marginal suppliers that aren't consistently delivering RoHS and WEEE compliance.
- Create higher levels of process and system standardization throughout the entire supplier network to ensure that compliance can be achieved by every member of the supply chain.
- Create collaborative planning and forecasting strategies that interlink suppliers between themselves, manufacturing, and distribution centers to ensure that greater potential for the early warning of potential violations. This needs to happen globally to ensure cross-shipments from one location to another don't accidentally happen.
- Create a compliance scorecard to monitor, measure, and modify supplier and channel relationship strategies. In order to attain this, it's critical for manufacturers to develop change-management programs that involve suppliers, dealers, distributors, resellers, and sales rep organizations so that each stakeholder group has a vested interest in the highest performance possible in the supply chains and distribution channels. Incenting change through increased sales and reducing the risk of violating compliance is a strong motivator to create this level of synchronization through both supply chains and distribution channels.

Manufacturing Compliance Strategies

The many manufacturers that by necessity must adhere to the RoHS and WEEE Directives are finding the following as key lessons learned in initiating, sustaining, and strengthening their compliance strategies. Cincom considers these to be an evolving set of best practices as they relate to manufacturers' compliance strategies:

- **First, work with the Legal Department to have due diligence completed on your company's potential exposure.** Having a legal strategy is essential as products shipping today will need to be in compliance with the RoHS standard. Manufacturers attaining best practices have these compliance strategies in place and also have found that working with key suppliers on sourcing only RoHS-compliant components greatly simplifies compliance strategies through distribution channels.
- **Create a corporate-wide compliance team that includes C-level executives.** This is another critical step in that for many manufacturers, the concept of how to change is just as important as the why of changing. The evolving best practices in this area include having a C-level executive spearhead the corporate-wide compliance team and staffing it with members of Engineering, Quality Assurance, Logistics, Marketing, and New Product Development. This is critical for the success of RoHS compliance efforts.
- **Define to the product level your company's exposure to RoHS and WEEE compliance.** The first task of the compliance team needs to be the definition of an RoHS/WEEE Product Roadmap with risk assessments defined for each specific product. These risk assessments are focused on the areas of revenue and profit implications of rapid product compliance, creating when necessary product re-launch strategies for RoHS-compliance and most critical, the synchronization of efforts with supply-chain and distribution partners as it relates to RoHS compliance influencing sales and inventory strategies.
- **Qualify suppliers and validate their RoHS Compliance Plans.** As mentioned earlier, this is a critical step in the development of compliant supply-chain strategies and needs to be the focal point of the compliance teams' efforts.
- **Aggressively pursue a supply-chain material declaration process including the use of questionnaires to capture all needed information.** This is another critical step as the RoHS Directive requires manufacturers to be fully informed as to the substances in all of their products. Companies attaining

best practices in this area are using material-declaration questionnaires and need to be tracked as part of a broader compliance management system.

- **Perform statistically significant testing of incoming components and finished products to validate compliance efforts.** The strategies defined by the corporate-wide compliance team need to center on sampling for each of the RoHS substances and then tracking these results and publishing the results internally.
- **Creating an enterprise quality and compliance-management strategy differentiates those manufacturers that are attaining best practices.** From the many steps toward creating internally synchronized, yet agile processes for staying in compliance, the highest-performing manufacturers are also aggressively pursuing an enterprise quality and compliance-management strategy to capture, organize, and quickly interpret and act on compliance-related knowledge gained.

Managing Customer Relationships to Compliance

Given the fact that all manufacturers producing products that are influenced by the RoHS sense risk on compliance relative to suppliers and channel partners, it's a very good idea to share RoHS compliance statistics with your OEM and distribution customers. Companies attaining best practices in enterprise quality and compliance management practice sharing results extensively with all levels and types of customers. Consider this an investment in customer relationships and transparency of your operations aimed at serving them.

Summary: Compliance Is Revolutionizing Value Chains

The many steps toward compliance suggested throughout this paper underscore the need for manufacturers to urgently pursue enterprise-wide quality and compliance initiatives. The key lesson learned is that processes surrounding sourcing, supplier relationships, manufacturing, fulfillment, and customer management all must be coordinated toward the common goal of compliance being very visible throughout an entire value chain.

Creating a Compliance Strategy: Intel's Lessons Learned Globally

In 2000, Intel began its RoHS and lead-free compliance efforts to ensure that all products being sold into the EU would be compliant by the July 1, 2006 deadline. There are additional compliance laws being enacted in the state of California and throughout the Asia-Pacific. China is considering adopting the RoHS standard within the 2007 time frame as well.

For Intel, the challenges were particularly acute since many of its components contain lead and other substances prohibited under the RoHS Directive. Intel's approach was to create an RoHS compliance cross-functional team and attempt to be the first major semiconductor and microprocessor vendor to attain RoHS compliance within its manufacturing processes. Second, Intel focused on the task of creating a sustainable and stable series of suppliers they could work with that also had RoHS compliance efforts in progress.

Through the use of enterprise quality and compliance-management efforts, Intel accomplished the following:

- Lead reductions of up to 95 percent across the company's product line and 100 percent in selected products.
- Introduction of the first lead-free wirebond ball grid array (BGA) package.
- First lead-free flash memory products.
- First RoHS-compliant network interface card that is lead-free in the second-level interconnect (SLI).
- Greater supply-chain visibility and compliance throughout the entire supply-chain network that is dominated by Intel product demands.
- Compliance programs and training throughout distribution channels including both OEM and direct sales forces.
- Extensive use of engineering specifications and chemical analysis reports for all RoHS at-risk products.

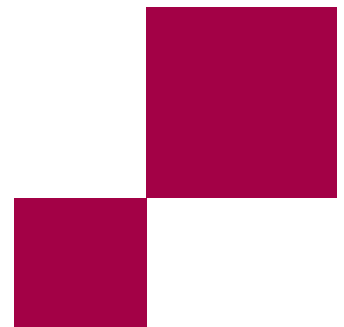
The Bottom Line: Compliance Pays

For the manufacturers attaining best practices in enterprise quality and compliance management, their role as innovators of processes that influence and interact with supply chain, purchasing, sourcing, manufacturing, and fulfillment all need to be synchronized through an enterprise-wide quality and compliance-management strategy. All of the data generated needs to be organized and turned into strategies for accentuating higher levels of competitiveness.

These manufacturers attaining best practices are going after compliance by looking at the intersection of business process management and the need for having greater visibility into their supply chains, manufacturing processes, and distribution channels. RoHS compliance efforts have in the case of leading manufacturers – including Intel – actually revolutionized their component, semiconductor, and microprocessor businesses while attaining RoHS compliance in the process.

Combining business process management and efforts toward regulatory compliance is delivering stronger-than-expected competitive advantages for those companies that are aggressively pursuing a company-wide compliance strategy. At the center of these efforts, is the need to take the lessons learned and create sustained competitive advantage through the use of enterprise quality and compliance-management strategies.

Combining business process management and efforts toward regulatory compliance is delivering stronger-than-expected competitive advantage ...



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