

## QUALITY ASSURANCE OF ELECTRONIC PRODUCTION ENTERPRISE AND ITS ENVIRONMENTAL IMPACT

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**Introduction.** Electronic waste is one of the fastest growing waste streams globally, with around 50 million tons generated per year. Electronic production enterprises play a major role in generating this waste through production scraps, defective products, and equipment disposal. Implementing quality assurance practices can help reduce electronic waste by minimizing production errors and defects. However, the environmental impacts of quality assurance itself have been little studied.

**Main Body.** ISO 9001 is an internationally-recognized standard for quality management systems. Adopting ISO 9001 can significantly enhance quality assurance in electronic production, while also reducing associated environmental impacts. This standard provides guidelines and requirements for an effective quality management system that coordinates various organizational processes to meet quality objectives.

A key component of ISO 9001 is its emphasis on proactive prevention of quality problems rather than reactive inspection. It promotes systematic defect detection and process analysis to eliminate root causes of errors, rather than relying solely on final product testing. For electronic production, this means carefully examining assembly methods, supply chains, machine calibration, staff training, and other internal processes to minimize deviations early on. Doing so reduces scrap and avoids wasted resources, time, and material compared to only detecting issues after production. Conformance to ISO 9001 can reduce electronic waste generation through lower defect rates [1]. However, simply adopting ISO 9001 does not guarantee improved environmental performance. Manufacturers must carefully implement sections such as continuous improvement, supplier management, and customer feedback. Utilizing data analytics, root cause analysis, error-proofing innovations, and employee recommendations can drive down defect rates. Rigorously applying these quality assurance tools while engaging all personnel facilitates impactful ISO 9001 adoption.

Furthermore, the standard alone focuses more narrowly on product quality rather than overall eco-efficiency. Thus manufacturers should couple it with environmental management systems (EMS) based on ISO 14001 standards [2]. This EMS component tracks energy, water, chemical use, waste generation, recycling levels, regulatory compliance, supply chain impacts, and lifecycle perspectives. An integrated quality and EMS system considers both customer quality needs and ecological impacts during electronic production [3]. Ongoing internal and external audits help ensure quality assurance procedures actually achieve intended benefits over time[4]. Electronics manufacturers must continually refine and improve their quality assurance approach using the latest tools, data, and innovative thinking to genuinely minimize ecological harm while upholding customer satisfaction through high quality levels.

**Conclusions.** In summary, properly implementing a comprehensive ISO 9001 system coupled with environmentally-conscious practices provides electronics producers an internationally recognized approach to manage quality in an environmentally responsible way. It promotes defect prevention, waste minimization, resource efficiency, continual improvement, and long-term sustainability. The integrated quality/EMS philosophy benefits manufacturers, customers, and environments alike.

### **Literature review**

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