Developments in Environmental Supplies Standards

Lynette Mischkot, Hewlett-Packard Company, Boise, Idaho, Paul Jeran, Hewlett-Packard Company, Boise, Idaho , Paul Swoveland, Lexmark International, Lexington, Kentucky

Abstract

There is an increasing proliferation of standards addressing printing systems and their impact on the environment. These standards are being developed at the regional, national and international level. This paper discusses some of the more notable developments in environmental standards for printing and introduces new work being developed in ISO/IEC JTC1 SC28 to address printing supplies and the environment.

Introduction

Globally there is increasing interest in the environmental impact of the products that we use daily. This focus on the environment is on the minds of consumers, governments and manufacturers alike and it is permeating into the office printing industry. All environmental aspects of the office printing continuum are under review. To assess improvement, measurement methods are required to quantify environmental "goodness". Currently there are several regional and national standards or criteria in place that attempt to assess environmental impact. Unfortunately these are not very well harmonized. This lack of consistency causes difficulty for the manufacturer and potentially causes confusion for the customer. This paper will discuss several of the existing supplies standards and an effort underway in ISO/IEC JTC1 SC28 to develop a common language around ink and laser printer cartridges and better define environmental language and performance used in the advertising of these cartridges.

The Standards Landscape

Standards are sets of common guidelines or characteristics for products or processes, or related management system practices. They contain definitions of terms, specifications of various types and relevant measurement methods. Standardization depends on data gathering, vigorous discussion of viewpoints, and consensus among a diverse range of stakeholders. The existence of conflicting standards for similar products, processes, and services in different countries or regions can create trade barriers. Harmonization of terms and performance objectives in an open voluntary consensus-based standardization process is key to elimination of these trade barriers. International standards are important for market access and facilitation of global commerce.

Many well-known international standards bodies exist with specific areas of specialization[1], hundreds of other entities develop standards for global use and promote their use. Standards development occurs at many different geographic levels with stakeholders desiring minimal duplication of effort. Depending on the product or process, and the interest and sector needs, an appropriate standard development body can be established. The standards work group ISO/IEC JTC1 SC 28 covers office equipment and therefore is a good location for development of standards that consider the environmental impacts of printers and supplies.

ISO is a network of the national standards bodies of 157 countries, is the world's leading developer of international standards for business, government and society. It has a current portfolio of more than 17,000 standards for almost every sector of economic activity and technology, from traditional activities such as agriculture and construction, through mechanical engineering, to information technologies, nanotechnologies, the environment, services, health, safety, security and managerial best practice.[2] The ISO 9000 Quality Management Systems series and the ISO 14000 Environmental family of standards and guides are good examples of the breadth of the ISO organization standards. The International Electrotechnical Commission (IEC) works closely with the ISO on standards related to electronics products, processes and software. The ISO/IEC joint technical committee is a combined effort dealing with overlapping subjects. The IEC has recently established an environmental technical committee IEC TC 111 to work on broad horizontal standards dealing specifically with environmental issues. Specific product environmental projects are to be covered in the product sector work groups.

Environmental standards are still new to both standards developers and environmental experts. The task of creating a common language and understanding of the international standards development process is still underway. The base international standards and guides for Environmentally Conscious Design and Materials Declarations are in the development process within the ISO TC111 committee. Environmental product standards are better written with performance based specifications than design restrictions. The accelerating development of technology and new environmental information would indicate a need to remain flexible in design specifications to keep from hindering continuous environmental improvement and achieving sustainable results.

Existing environmental “standards” can come from industry best practices, regional regulatory requirements and market driven voluntary environmental label programs. Existing and developing ISO standards for environmental labels and criteria development are an important consideration when developing a printer cartridge standard. There are four ISO standards covering the three types of environmental labels, ISO 14020 General Principles, ISO 14021 type II self declared environmental claims, ISO 14024 type I third party voluntary environmental labels, and ISO 14025 type III environmental declarations.

[1] Refer to Table 1 for list of international standards bodies associated with office printing products.

[2] See www.iso.org for organizational details and information on how to obtain copies of published standards.

There are many regional environmental label programs, some have been adopted broadly for marketing purposes and have some global recognition. Popular regional eco-labels for office printing include German Blue Angel, Japan Eco Mark, Nordic Swan, Taiwan Green Mark, and Korean Eco-label. Some label programs are part of government mandated or institutional environmentally preferred product purchasing programs that can affect large portions of markets. An example would be the US federal green purchasing program Electronic Product Environmental Assessment Tool (EPEAT) that gets its criteria from the IEEE 1680 standard. This voluntary environmental label program has three levels of declaration and is used as part of the institutional purchasing process for Personal Computers, Laptops and Monitors. An IEEE standards development process has started to create criteria for printers and adding them to the scope of the program.

The overall goal of environmental labels and declarations is to encourage the demand for and supply of those products and services that cause less stress on the environment, thereby stimulating the potential for market-driven continuous environmental improvement[3]. This can be addressed through communication of verifiable and accurate information regarding environmental aspects of products and services. The development of specific ink and toner cartridge eco-labels and environmentally preferred purchasing programs make a compelling case for harmonization of criteria on an international standards level.

Product Attribute Criteria

Product attribute and performance criteria included in environmental standards should follow some general guidelines to ensure equal treatment of manufacturers and consumers and minimize environmental impact. Criteria should be fair, equitable, and not yield preferential treatment. Criteria should consider environmental aspects throughout the product life cycle, be environmentally and economically viable for manufacturers, measurable (i.e., refer to an existing standard or certified laboratory testing), comparable (i.e., allow comparison between competing products), and verifiable by the purchaser. Environmental attributes that impact product functional performance, quality, or fitness for use are often times difficult to assess or quantify in a reliable fashion and should be balanced with customer demands and market expectations.

When considering the development of a new standard or eco-label, it is logical to look to the existing eco-label programs, standards, and/or green purchase guidelines previously established. Although the motivation for these programs may have been different, the overarching objective of minimizing environmental impact is typically intact. It is suggested that environmental attribute criteria in existing programs be leveraged as appropriate to help drive a consistent set of environmental attributes. Additionally, stakeholders should look to ISO guide 64, Guide for Inclusion of Environmental Aspects in Product Standards as a guidance tool for provisions in environmental standards. This combined approach supports industry's objective to establish a standard which achieves true environmental benefits that are recognized by consumers.

[3] Refer to ISO 14020 General Principals of Environmental Labels.

Environmental performance criteria should take into account both legal and market requirements associated with the product life cycle (e.g. material use, manufacturing operations, packaging, and/or end-of-life). Legal requirements are typically driven by regional regulatory requirements and are enforced by regional authority. It is common for regulatory requirements to vary by country and region, thus it is important to consider the requirements specific to the location of the manufacturing operations and where the product will be placed on the market. Supply chain communications are also critical to ensure goods procured for integration into products comply with appropriate laws and regulations to ensure market access.

Legal Requirements

With regard to product manufacture and recycle operations, operations today are governed by compliance with local and national environmental laws and regulations. From a product perspective, an entity putting a product on the market must comply with country level regulations where the product will be sold.

- In the case of ink/toner preparations or mixtures, the product must comply with chemical regulations such as EU REACH[4], US TSCA, China IECSC, Japan ENCS (i.e., new chemical notifications and/or registrations, available MSDSs, product labeling) that are specific to the country of sale.
- Products and parts must also meet regulations prohibiting the import of products manufactured with or containing restricted or banned substances.

Market Requirements

Market requirements and expectations typically exceed legal requirements, are customer driven and vary between region, country, and customer segment. Some common market expectations include ISO 14001 certifications or implementation of an equivalent environmental management system, and an annual report of the company's environmental performance.

Markets also look to materials contained in a product as a measure of environmental performance. Environmental performance of materials must be balanced with technical requirements to ensure basic functionality of the product. Careful material selection may enhance user safety, reduce potential for hazardous waste classifications at end-of-life, and promote recyclability.

Current Best Practices

Ink/Toner Preparations

As a best management practice ink and toner preparations should not contain RoHS substances above EU RoHS threshold concentrations, azocolorants/dyes, short chained chloroparrafins, or substances which are carcinogenic, mutagenic, or reproductive toxins.

[4] Referring to the recent changes in European regulations dealing with Registration, Evaluation and Authorization of Chemical substances (REACH) enacted June 2007 and other similar broad chemical use registration and control mechanisms.

Cartridge Parts

Cartridge parts should not contain RoHS[5] substances above EU RoHS threshold concentrations, with exception to parts which may be requalified and used in a new cartridge or an exemption can be applied.

Halogenated compounds in plastic parts should be restricted to applications where required for product safety (e.g., fire retardancy) and marked to identify material type according to ISO 11469 and promote ease of recycling.

Product Packaging

The environmental impact of product packaging largely depends on the quantity, type, and recyclability of the material used. Since typical packaging includes components largely made of molded pulp, corrugated fiber, or paper, these should be manufactured with chlorine-free processes, and contain at least a minimum level of post-consumer recycled content when technically feasible and commercially available. For ease of recycling, packaging should be labeled according to market requirement marking designation[6] and be recyclable. Certain materials of concern such as poly-vinyl-chloride (PVC) should be avoided if possible. Lastly, the package and product should be clearly labeled with the name of the entity placing the product on the market.

End of Life

Responsible management of products at end of life should be required for entities placing products on the market. Products should be dismantled and recycled in accordance with applicable environmental regulations. To ease recycling, product should be designed when possible to facilitate recycling, by employing strategies such as avoiding coatings, and using homogenous and recyclable materials of construction.

Verification/Testing

There are various methods for verification of environmental attributes. These include confirmation from the supplier, self declaration, or a certified laboratory test. Testing should follow a standardized test protocol for use across multiple regions and jurisdictions. It is common for countries to have specific verification and testing requirements for their respective programs. This approach is not preferred as it leads to excessive testing on behalf of industry and yields no additional environmental benefit. This supports a call for acceptance of verification from various environmental labels and/or harmonization of testing requirements across various programs.

Terms/Definitions

Clear and appropriate terminology and definitions are vital to any standard writing effort. This is becoming increasingly important in the environmental area due to the market requiring declaration from manufacturers. Clear definitions of environmental attributes will pave the way for manufactures and consumers to speak a common language about the environmental attributes of products. New work proposed in ISO JTC1 SC28 will include terms and definitions related to the environmental attributes of print cartridges.

ISO SC28 – Cartridge Characterization Standard

Due to the increasing number of standards in the area of printer ink and laser cartridges, ISO/IEC JTC1 SC28 voted in favor of developing a Cartridge criteria standard. The intent of this standard is to formalize the terms used to describe cartridge attributes; this includes both performance and environmental attributes. This is a five part standard with two parts dealing with terms and labeling, one part on the environment and two final parts addressing performance measures. This effort started in the spring of 2008.

Tables of General References, Standards & Environmental Label Programs

Table 1. Standards bodies impacting Office Products

ANSI – American National Standards Institute, http://www.ansi.org
ASTM International – http://www.astm.org
CEN – European Committee for Standardization, http://www.cen.eu
CENELEC – European Committee for Electrotechnical Standardization, http://www.cenelec.eu
DIN – German Institute for Standardization, http://www.din.eu
ECMA International – http://www.ecma-international.org
IEC – International Electrotechnical Commission, http://www.iec.ch
IEEE – (formerly the Institute of Electrical and Electronics Engineers Inc), http://www.ieee.org
ISO – International Organization of Standardization, http://www.iso.org
NIST – National Institute of Standards and Technology, http://www.nist.gov
SEPA/MEP – State Environmental Protection Administration of China, http://www.sepa.gov.cn , recently re-established as Ministry of Environmental Protection, http://www.mep.gov.cn

[5] RoHS refers to the six materials of the EU Directive 2002/95/EC the Restriction of certain Hazardous Substances (RoHS), and similar specific material restrictions in China and Korea.

[6] e.g., ISO 11469, GB 18455:2001, DIN 6120

Table 2. Office Products and Management System Standards

ECMA 370 The Environmental Declaration (TED)
IEEE 1680-2006 / Electronic Product Environmental Assessment Tool (EPEAT),
ISO TC207 - ISO 14000 Family of Environmental Systems Standards
ISO Guide 64 - Guide for inclusion of environmental aspects in product standards
ISO/IEC JTC1 SC28 - ISO/IEC NP 29142 Ink and Toner Cartridge Attributes
ISO 14020 General Principles of Environmental Labels
ISO 14021 type II self declared environmental claim
ISO 14024 type I third party voluntary environmental labels
ISO 14025 type III environmental declarations.
IEC TC111 – Electronics Common Environmental standards, ISO 62430 CDV Environmentally Conscious Design for Electrical and Electronic Products
IEC TC108 - IEC 62075 Audio Video, Information Communication Technology Equipment – Environmentally Conscious Design

Table 3. Established Supplies Environmental Standards

DIN 33870 - Refilled toner modules

Table 4. Draft Supplies Regional Environmental Standards

Tianjin Copier Association – TC-147 – Environmental Protection Requirement for Supplies of Office Equipment
National Eco-Labeling Program- Green Choice Philippines (NELP-GCP) – GCP200800x Toner Cartridge and GCP200800x Inkjet Cartridge

Table 5. Supplies Environmental Label Programs

Blue Angel: Reprocessed toner modules http://www.blauer-engel
Nordic Swan: Remanufactured toner cartridges http://svanen.nu
Japan Eco-Mark: Toner cartridges – http://www.ecomark.jp
Korea Eco-Label: Toner cartridges - http://www.koeco.or.kr
Taiwan Green Mark: Original toner modules - http://greenmark.epa.gov.tw/english/index.asp
SEPA: Technical Requirement for Environmental Labeling of Products – Reprocessed Toner Modules - http://english.sepa.gov.cn

Table 6. Supplies Environmental Declaration Programs

Supplies IT Eco Declaration http://www.itecodeclaration.org

References

[1] National Institute of Standards and Technology (NIST) web site on Standards , www.standards.gov /standards_gov/standards.cfm , June 10, 2008.

[2] American National Standards Institute (ANSI) Overview of the U.S. Standardization System ; Understanding the U.S. Voluntary Consensus Standardization and Conformity Assessment Infrastructure, pg 1-5 (July 2005).

Author Biographies

Lynette Mischkot received her BSChE from the University of Idaho in Moscow, Idaho (1997). Since then she has worked in the industry as a process engineer, EHS consultant, and environmental product steward. Lynette joined Hewlett-Packard in 2004 as an environmental program manager in HP's LaserJet Supplies organization. Her work has focused on supporting environmental regulatory compliance, market access, and DfE initiatives for HP products.

Paul L Jeran joined Hewlett-Packard in 1992 and has been involved in the development of new printing technologies, PQ measurement and printer reliability. Paul is currently the technical expert for supplies standards in the LaserJet Supplies R&D laboratory. He is a member of ISO/IEC JTC1 SC28, chair of the US TAG to SC28 and Convener of WG 2 – Supplies, within SC28. He is editor or co-editor of several standards for ink and laser supplies.

Paul Swoveland received his BSChE from Purdue University in West Lafayette, Indiana (1983). Since then he has worked in the IBM Information Products Division in Lexington Kentucky that in 1991 became Lexmark International Incorporated. His work has focused on development and tracking of domestic and international chemical and product environmental management programs. Currently, Paul is a member of the IEC TC111 US TAG, and a member of the corporate Standards Strategy and Management Group in Lexmark.