

# GUIDE

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**Environmental aspects – Inclusion in electrotechnical product standards**

**Aspects liés à l'environnement – Prise en compte dans les normes électrotechniques de produits**

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**ENVIRONMENTAL ASPECTS –  
INCLUSION IN ELECTROTECHNICAL PRODUCT STANDARDS**

FOREWORD

This second edition of IEC Guide 109 has been prepared, in accordance with the procedure given in Annex A of Part 1 of the ISO/IEC directives, by the IEC Advisory Committee on Environmental Aspects (ACEA).

This bilingual version, published in 2008-10 corresponds to the English version.

The text of this Guide is based on the following documents:

Approval document	Report on voting
C/1289/DV	C/1304A/RV

Full information on the voting for the approval of this Guide can be found in the report on voting indicated in the above table.

The French version of this Guide has not been voted upon.

**IEC Environmental Policy**

“IEC recognizes the growing importance of preserving the environment and the role electrotechnical standardization has to play to foster sustainable development. Therefore it is the responsibility of IEC staff and technical committees, members and experts, to contribute actively to the evolving standards framework for the benefit of the environment. For this purpose, the IEC cooperates with ISO and regional standards development organizations such as CENELEC. With respect to product-related standards, IEC technical committees must assess and continuously improve new and existing standards in view of reducing adverse environmental impacts over the whole life cycle of products. The IEC will monitor and annually report progress according to this policy.”

The IEC Environmental Policy has been approved by the IEC Council Board. IEC Guide 109 helps to fulfil this policy by illustrating how environmental aspects can be included in electrotechnical product standards.

## INTRODUCTION

This Guide aims to give advice to standards writers on the way the environment should be considered among all the aspects relevant to standards.

Finding an appropriate solution for the product is the task of product designers; this solution will be a trade-off along various dimensions (safety, environment, cost, technology, function and so on). This Guide is intended for standards writers, not for product designers; it aims at encouraging standards which preserve the natural environment while allowing designers to reach the best practical compromise among the constraints.

The need to reduce the adverse impacts on the natural environment of a product\* during all phases of its life – from acquiring materials to manufacturing, distribution, use, and end-of-life treatment (i.e. re-use, recycling (recovery and disposal)) – is recognized in most countries around the world. The choices made at the design stage largely determine what those impacts will be during each phase of the life of that product. There are, however, considerable obstacles that make the task of selecting the best environmental options very complex. For example, selecting design options to reduce adverse environmental impacts can involve difficult trade-offs such as less recyclability for more energy efficiency.

Requirements for products may influence significantly the extent of environmental effects. Standards should promote the selection of design options in order to reduce adverse impacts. Furthermore, standards must not prohibit innovation in any sense. Standards writers should encourage the protection of the environment, for instance, by specifying requirements which do not rule out the appropriate use of recycled material and the re-use of components, subsystems and systems.

The continual introduction of new products and materials can make evaluation increasingly complex, since additional data must be gathered to assess the life-cycle impacts of such new products and materials. Moreover, there is currently very little data available on the environmental impacts of some existing materials. However, the data which exists can be used as a basis for improvement of the products with respect to environmental impacts. Life-Cycle Assessment (LCA) and Design For Environment (DFE) – or rather Environmentally Conscious Design (ECD)\*\* – principles provide additional instruments that may be useful in this respect. ISO/TR 14062 gives all those involved information on how to integrate ECD principles into product design and development. Standards writers are not expected to perform Life-Cycle Assessment (LCA) but to encourage ECD.

Until more data are available, manufacturers can document more extensively the specific design choices and the reasons behind them. Besides generating requirements for environment-specific standardization, doing this expands the knowledge based on such options and choices, and it may also assist recycling and disposal at the End of Life of the product (EOL).

In this context, it should be noted that a standards writer should also give careful consideration to their impacts on the environment when specifying test methods.

Standards writers need comparative environmental data on materials and substances. However, they should handle information derived from LCA studies with great care when making choices needed for a standard. This may require consultation with advisory committees on environmental aspects within national, regional and international standards bodies.

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\* Although the term product has been used throughout this Guide, the concept also embraces processes and services as appropriate.

\*\* For the process of integrating environmental aspects into product design and development, various terms are used such as Design For Environment (DFE), eco-design, Environmentally Conscious Design (ECD), etc. ECD will be used in this document to represent the various terms.

# ENVIRONMENTAL ASPECTS — INCLUSION IN ELECTROTECHNICAL PRODUCT STANDARDS

## 1 Scope

IEC Guide 109 is intended for standards writers and gives guidance on how to consider aspects relating to the impact on the environment of electrotechnical products when preparing standards for such products.

Its purpose is

- a) to raise awareness that provisions in product standards can affect the environment in both negative and positive ways;
- b) to outline the relationship between product standards and the environment;
- c) to help avoid provisions in product standards that may lead to adverse environmental impacts;
- d) to emphasize that addressing environmental aspects during the development of product standards is a complex process and requires balancing competing priorities;
- e) to recommend the use of life-cycle thinking when addressing environmental aspects in the context of product standardization.

This Guide converges as far as possible with ISO Guide 64.

## 2 Reference documents

ISO 14001:1996, *Environmental management systems – Specification with guidance for use*

ISO/TR 14062:2002, *Environmental management – Integrating environmental aspects into product design and development*

ISO 11469:2000, *Plastics – Generic identification and marking of plastics products*

ISO 14040:1997, *Environmental management – Life cycle assessment – Principles and framework*

ISO 17422:2002, *Plastics – Environmental aspects – General guidelines for their inclusion in standards*

ISO Guide 64:1997, *Guide for the inclusion of environmental aspects in product standards*

ISO/IEC Guide 2:1996, *Standardization and related activities – General vocabulary*

## 3 Definitions

For the purposes of this Guide, the following definitions apply.

### 3.1

#### **End of Life (EOL)**

state of a product when it is finally removed from its intended use or original purpose

**3.2****energy recovery**

use of combustible waste as a means to generate energy through direct incineration with or without other waste but with recovery of the heat

**3.3****environment**

surroundings in which an organization operates, including air, water, land, natural resources, flora, fauna, humans, and their interrelation

[ISO 14001]

NOTE 1 "Organization" in this Guide includes the products produced by the organization.

NOTE 2 "Environment" in this Guide does not refer to the surrounding atmosphere influencing an electrotechnical product (such as humidity or temperature), nor to the business environment. It is used as a synonym of "ecological environment".

**3.4****environmental aspect**

element of an organization's activities, products or services that can interact with the environment

NOTE A significant environmental aspect is an environmental aspect that has or can have a significant environmental impact.

[ISO 14001]

NOTE For example, energy consumption is, in many cases, the major environmental aspect of electrical or electronic products.

**3.5****environmental impact**

change to the environment, whether adverse or beneficial, wholly or partly resulting from an organization's activities, products or services

[ISO 14001]

NOTE For example, energy consumption of a product has several environmental impacts through the energy production process, such as contributions to the greenhouse effect or to acidification of the environment.

**3.6****hazardous substance**

substance which can adversely affect human health or the environment with immediate or retarded effect

NOTE The risk of adverse effects on the environment caused by a hazardous substance is not only determined by the hazardousness of the substance, but also by the quantity and the probability of its release. The risk has, therefore, to be assessed taking all these factors and the entire product life cycle into account.

**3.7****input**

material or energy which enters a product system at any stage, from raw material acquisition to final disposal

**3.8****life cycle**

consecutive and interlinked stages of a product system, from raw material acquisition or generation of natural resources to the final disposal

[ISO 14040]

### 3.9

#### **Life Cycle Assessment (LCA)**

systematic set of procedures for compiling and examining the inputs and outputs of materials and energy and associated environmental impacts directly attributable to the functioning of a product system throughout its life cycle

[ISO 14040]

### 3.10

#### **Life-Cycle Thinking (LCT)**

consideration of all relevant environmental aspects (of a product) during the entire (product) life cycle

### 3.11

#### **output**

material or energy which leaves a product system at any stage, from raw material acquisition to final disposal

### 3.12

#### **pollution**

all adverse effects on the environment caused by the release of organic or inorganic materials, hazardous substances, radiation or noise

### 3.13

#### **prevention of pollution**

use of processes, practices, materials or products that avoid, reduce or control pollution, which may include recycling, treatment, process changes, control mechanisms, efficient use of materials and material substitution

NOTE The potential benefits of prevention of pollution include the reduction of environmental impacts, improved efficiency and reduced costs.

[ISO 14001]

### 3.14

#### **product standard**

standard that specifies requirements to be fulfilled by a product or group of products, to establish its fitness for purpose

NOTE 1 A product standard may include, in addition to the fitness-for-purpose requirements, directly or by reference, aspects such as terminology, sampling, testing, packaging and labelling and, sometimes, processing requirements.

NOTE 2 A product standard can either be complete or not, according to whether it specifies all or only a part of the necessary requirements. In this respect, one may differentiate between standards such as dimensional, material and technical delivery standards.

[ISO/IEC Guide 2]

### 3.15

#### **recyclability**

property of a substance or a material and parts/products made thereof that makes it possible for them to be recycled

NOTE The recyclability of a product is not only determined by the recyclability of the materials it contains. Product structure and logistics are also very important factors.

### 3.16

#### **recycling**

reprocessing in a production process of the waste materials for the original purpose or for other purposes but excluding energy recovery



**3.17****standards writer**

person taking part in the preparation of standards

**3.18****waste**

substance or object which the holder disposes of, or is required to dispose of, pursuant to the provisions of national law in force

[EEC Directive 75/442]

**4 General considerations on product standards and the environment****4.1 Introduction**

Every product has some impact on the environment. These impacts may occur at any or all stages of the product's life cycle and can be local, regional or global, or a combination of all three.

A product's environmental impacts are largely determined by the inputs that are used and the outputs that are generated at all stages of the product's life cycle. Changing any single input or output may affect other inputs and outputs.

Anticipating or identifying a product's environmental impacts is complex, and agreement is occasionally lacking on environmental cause-and-effect relationships. Attempts to address a given environmental impact may have consequences at any or all of the stages of a product's life cycle.

Despite the difficulties involved, a product's environmental impacts should be considered when product standards are developed.

A product's environmental impacts should be balanced against other factors, such as product function, performance, safety and health, cost, marketability and quality; legal and regulatory requirements have to be met.

In this clause, some general considerations on product standards and the environment, and their relationship, are presented. In Clause 5, practical advice and specific recommendations for standards writers are given.

**4.2 Product standards and the environment**

Provisions in product standards are conceptually related to the environmental impacts associated with the product during its life cycle, as illustrated in Figure 1. As such, product standards can significantly contribute to the continual reduction of adverse environmental impacts of products.

This subclause aims at giving standards writers background information on issues which should be taken into account when considering the inclusion of environmental aspects in product standards.

In 4.2.1 some general considerations are presented regarding product standards. In 4.2.2 attention is paid to environmental impact. In both cases, some related strategies to be followed when including environmental aspects in product standards are highlighted.

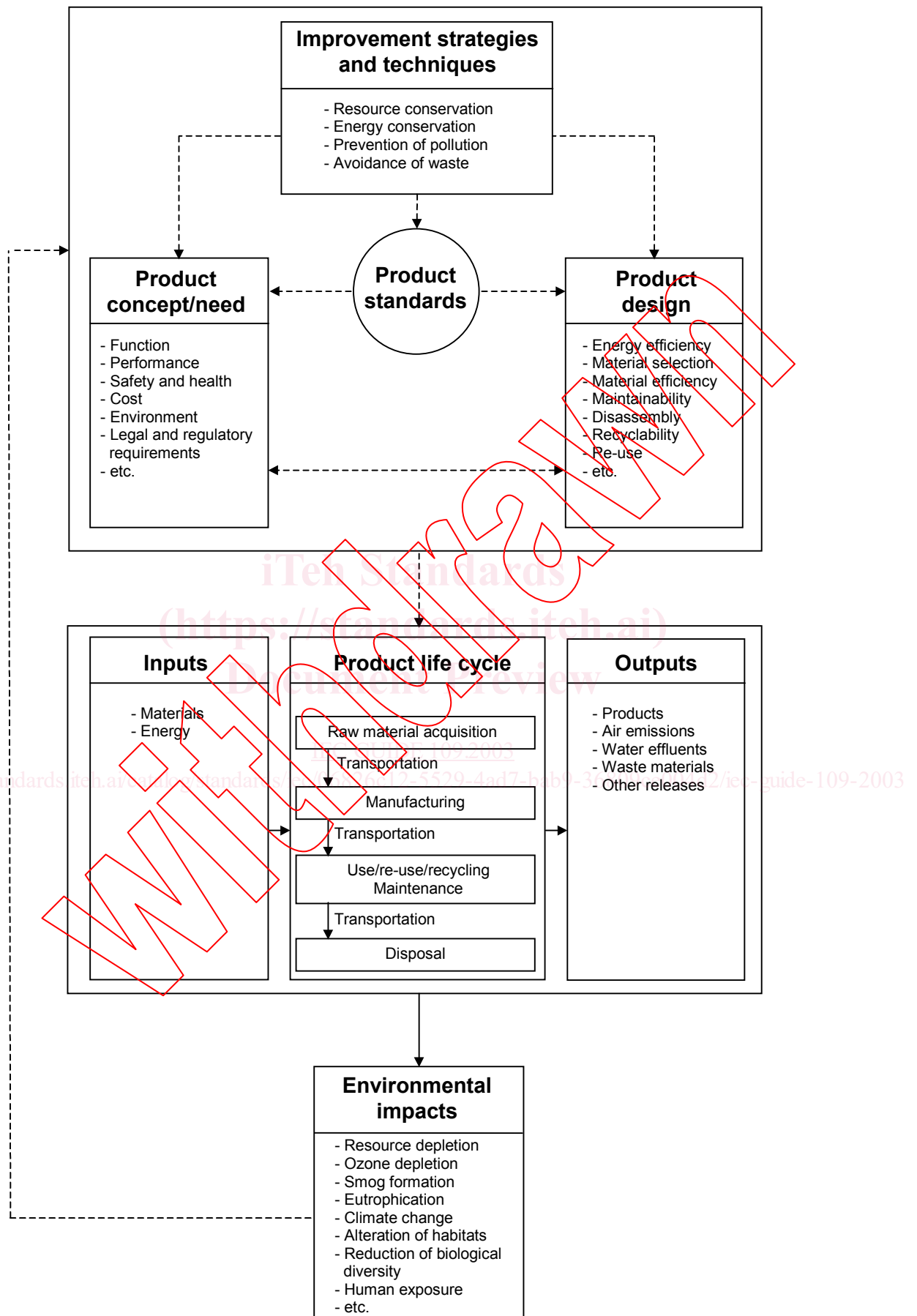


Figure 1 – Conceptual relationship between provisions in product standards and the environmental impacts associated with the product during its life cycle

#### 4.2.1 General considerations

- Provisions in product standards may both facilitate and hamper environmental improvement. Unless necessary for important reasons (for example, health, safety or performance of the product), standards should, whenever possible, avoid specifying materials to be used in products. Specifying materials may preclude innovation and the development of new ways of reducing adverse environmental impacts through the use of alternative materials. For instance, provisions in product standards should not preclude the appropriate use of secondary or recycled materials. If materials are to be specified, consideration should be given as to how the use of the specified material will affect the environment at all stages of the product's life cycle. In general, provisions in product standards that are too restrictive may have the unintended effect of stifling innovation and environmental improvements.
- The rate of innovation is high. Therefore, review of product standards should be considered whenever the adverse environmental impacts might be significantly reduced by the application of new knowledge.
- The intended use and reasonably foreseeable misuse of a product determine the environmental impacts of a product to some extent. As such, both should be considered.
- Specifications in standards that have adverse environmental impacts should be avoided when suitable alternatives are available.
- Specification of performance requirements is better than specification of design requirements. For example, focus on functionality rather than on prescribed design.
- Opportunities to specify options that reduce adverse environmental impacts should be recognized and taken, for example, specifying requirements which do not rule out the appropriate use of recycled materials and encourage the re-use of parts and subassemblies.

#### 4.2.2 Environmental impacts

When preparing product standards, strategies and techniques for environmental improvement may be represented by resource conservation, energy conservation, prevention of pollution and avoidance of waste.

Standards writers are advised to consider the following issues.

- Resource conservation

Beside the environmental impacts associated with resource acquisition and use, resource depletion can be of great significance environmentally. Resource depletion refers to the process of diminishing stocks of natural resources. Usually, the less of a particular resource that is depleted, the better.

Renewable resources can be replenished at significant rates. On the contrary, in the case of non-renewable resources, the likelihood of replenishment is low in comparison with human lifespan.

- Energy conservation

Among considerations associated with the conservation of energy are the environmental impacts of various sources of energy, the conversion efficiency of a selected source, and the efficient use of energy. Substantial environmental trade-offs may exist between energy sources.

Energy management might be dealt with, for example, in the following cases:

- production of raw materials;
- manufacturing of components and parts from materials;
- assembling of components and parts to form a product;
- making the product function and perform in a safe and satisfactory way;

NOTE Options to automatically switch off the product or revert to "stand-by active, passive" when not in use should be considered.