

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

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

PRICE CODE
CODE PRIX



ICS 13.020

ISBN 978-2-83220-141-1

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ENVIRONMENTAL ASPECTS – INCLUSION IN ELECTROTECHNICAL PRODUCT STANDARDS

FOREWORD

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This third edition of IEC Guide 109 has been prepared, in accordance with ISO/IEC Directives, Part 1, Annex A, by the IEC Advisory Committee on Environmental Aspects (ACEA). This guide is a non-mandatory guide in accordance with SMB Decision 136/8.

This third edition cancels and replaces the second edition published in 2003.

The main changes with respect to the previous edition are as follows. This new edition:

- is aligned to the revised ISO Guide 64 as far as it is relevant for standard writers;
- emphasizes life cycle thinking as described in the horizontal standard IEC 62430;
- provides a more elaborated check list in the annex.

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

Four month's vote	Report on voting
C/1715/DV	C/1730/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.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

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INTRODUCTION

This Guide aims to give advice to standards writers on the way environment aspects should be considered and taken into account as applicable during the development of 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 and not for product designers; it aims at encouraging standards that 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 based on a product's¹⁾ aspects during all stages of its life – from acquiring materials to manufacturing, distribution, use, and end-of-life treatment (i.e. re-use, recycling) – is recognized in most countries around the world. One achieves reduction of adverse environmental impacts by improving a product's environmental aspects. The choices made at the design stage largely determine what those impacts will be during each stage 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 improve environmental aspects can involve difficult trade-offs, such as that a more energy efficient design causes the product to become less recyclable.

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

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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 and aspects of such new products and materials. Moreover, there is currently very little data available on the environmental impacts of some materials. However, the data which exists can be used as a basis for improvement of the products with respect to environmental aspects.

IEC 62430 specifies principles of life cycle thinking (LCT) with its essential steps as well as various general environmentally conscious design (ECD)²⁾ tools such as life cycle assessment (LCA).

IEC 62430 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 facilitate ECD as far as possible.

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 environmental aspects when specifying test methods.

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

2) 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.

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.

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.

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ENVIRONMENTAL ASPECTS – INCLUSION IN ELECTROTECHNICAL PRODUCT STANDARDS

1 Scope

IEC Guide 109, which is intended for standards writers, 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 to find provisions in product standards that may lead to improved environmental performance and to avoid such provisions 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; and
- e) to recommend the use of life cycle thinking when addressing environmental aspects in the context of product standardization.

This Guide exclusively addresses writers of technical product standards and specifications. It is consistent as much as possible with ISO Guide 64.

Electrotechnical product- or sector-specific standardization documents that explicitly deal with environmentally conscious product design should be based on IEC 62430.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

None.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1

end of life

EOL

life cycle stage of a product starting when it is finally removed from its intended use-phase

[IEC 62075:2008, definition 3.4, modified]

3.2

energy recovery

production of useful energy through direct and controlled combustion of waste

NOTE Waste incinerators producing hot water, steam and/or electricity are a common form of energy recovery.

**3.3
environment**

surroundings in which a product or system exists, including air, water, land, natural resources, flora, fauna, humans and their interrelation

**3.4
environmental aspect**

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

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

[ISO 14001:2004, definition 3.6, modified]

**3.5
environmental impact**

change to the environment, whether adverse or beneficial, wholly or partly resulting from an organization's environmental aspects

[ISO 14001:2004, definition 3.7]

3.6

hazardous substance

substance that has, according to defined classification criteria, the potential for adversely impacting human health and/or the environment

NOTE The criteria for determining whether a substance is classified as hazardous are defined by law or regulation.

**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 from natural resources to the final disposal

[ISO 14040:2006, definition 3.1]

**3.9
life cycle assessment
LCA**

compilation and evaluation of the inputs, outputs and the potential environmental impacts of a product system throughout its life cycle

[ISO 14040:2006, definition 3.2]

**3.10
life cycle thinking
LCT**

consideration of all relevant environmental aspects during the entire life cycle of products

[IEC 62430:2009, definition 3.11]

**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 14001:2004, definition 3.18, modified]

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 2:2004, definition 5.4]

3.15**recyclability**

ability of waste materials to be processed for the original purpose or other purposes, excluding energy recovery

3.16**recycling**

processing of waste materials for the original purpose or for other purposes, excluding energy recovery

NOTE The term recycling is used synonymously with the term material recovery.

[ISO 15270:2008, definition 3.30, modified]

4 Product standards and the environment

4.1 General

Every product has environmental aspects that result in 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.

The basis of product-related environmental protection is life cycle thinking, i.e. the consideration of all relevant environmental aspects of a product at all its life cycle stages. The key elements of life cycle thinking are:

- identification and evaluation of the product's relevant environmental aspects during its entire life cycle;
- having an objective to minimize the overall adverse environmental impact of the product by improving the product's environmental aspects.

A product's environmental aspects 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.

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

When developing product standards, the affected environmental aspects and the resulting environmental impacts stemming from requirements therein should be considered, with the goal being to improve a product's environmental aspects in an incremental way.

A product's environmental aspects will need to be balanced against other factors, such as product function, performance, cost, marketability and quality; legal and regulatory as well as safety requirements. Product standards should be written so that designers of equipment or systems are able to fulfil the goals of these standards while also arriving at a balance that contributes to protection of the environment.

4.2 Influence of provisions in product standards on the environment

Provisions in product standards are more or less related to the environmental aspects associated with the product during its life cycle, as illustrated in Figure 1. As such, product standards can significantly contribute to the continual improvement of environmental aspects of products.

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This subclause aims at giving standards writers background information on issues that should be taken into account when considering to address environmental aspects in product standards.

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