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INTERNATIONAL STANDARD

NORME INTERNATIONALE

HORIZONTAL STANDARD
NORME HORIZONTALE

Environmentally conscious design – Principles, requirements and guidance

Écoconception (ECD) – Principes, exigences et recommandations

IEC 62430:2019-10(en-fr)

IEC Central Office
3, rue de Varembé
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

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ENVIRONMENTALLY CONSCIOUS DESIGN – PRINCIPLES, REQUIREMENTS AND GUIDANCE

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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International Standard IEC 62430 has been prepared by IEC Technical Committee 111: Environmental standardization for electrical and electronic products and systems, and ISO Technical Committee 207: Environmental management.

It is published as a double logo standard.

This second edition cancels and replaces the first edition published in 2009. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) Scope is extended from electrotechnical product and systems to all products including services.
b) As a consequence of the scope expansion, non-electrotechnical products, services in particular, are taken into account to modify requirements.
c) Clause 6 is added as a guidance.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
111/536/FDIS	111/553/RVD

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

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

It has the status of a horizontal standard in accordance with IEC Guide 108.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

INTRODUCTION

The main purpose of this document is to set requirements and give guidance on how an organization can integrate environmentally conscious design (ECD) into their design and development. It is not a product standard and so does not describe requirements that apply to individual products, or a series of products.

This document uses the term ECD but other terminology used worldwide with the same meaning includes ecodesign, design for environment (DFE), green design and environmentally sustainable design.

This document covers physical goods, services, and a combination of the two, all of which are referred to as ‘products’.

ECD is not a separate activity; it is rather an integral part of an organization’s existing design and development. While this is not a management system standard, its requirements regarding ECD can be incorporated into an organization’s existing management system, such as created to support conformance with ISO 14001 and ISO 9001.

NOTE ISO 14001 links management of an organization's processes with environmental impacts, but it does not specify requirements for the management processes associated with design and development. Therefore, this ECD standard can be an addition for organizations which have ISO 14001 in place, as ISO 14001 does not specify how to incorporate ECD into products. ISO 14006 provides guidance on how to incorporate ECD into an environmental management system, however, it does not specify how to apply ECD.

Every product has environmental impacts, and these can occur during all stages of its life cycle. These impacts can range from slight to significant; they may be short-term or long-term; and they may occur at the local, national, regional or global level (or a combination thereof).

In order to minimize these impacts, it is essential to implement ECD within design and development. ECD is a systematic approach to achieve reduction of these adverse impacts of a product throughout its entire life cycle.

Multiple benefits can be achieved for the organization, its customers, and other stakeholders by applying ECD, such as an overall environmental improvement, a cost reduction, and better marketability.

This document is intended for those, directly and indirectly, involved in the implementation of ECD into the design and development.

This document does not preclude sectors from generating their own ECD specific standards or guidance. However, where such documents are produced, the authors are encouraged to use this document as a reference to ensure consistency across areas of various products and supply chains.

ENVIRONMENTALLY CONSCIOUS DESIGN – PRINCIPLES, REQUIREMENTS AND GUIDANCE

1 Scope

This document describes principles, specifies requirements and provides guidance for organizations intending to integrate environmental aspects into the design and development in order to minimize the adverse environmental impacts of their products.

This document applies to processes on how ECD (environmentally conscious design) are integrated into the design and development. This document applies to any organization, regardless of its size, type or sector.

This document does not provide requirements for assessing the conformity of individual products.

This horizontal standard is primarily intended for use by technical committees in the preparation of standards in accordance with the principles laid down in IEC Guide 108.

One of the responsibilities of a technical committee is, wherever applicable, to make use of horizontal standards in the preparation of its publications. The contents of this horizontal standard will not apply unless specifically referred to or included in the relevant publications.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at http://www.iso.org/obp
- IEC Electropedia: available at http://www.electropedia.org/

3.1 Terms related to design and development

3.1.1
environmentally conscious design
ECD
systematic approach which considers environmental aspects in the design and development with the aim to reduce adverse environmental impacts throughout the life cycle of a product

Note 1 to entry: Other terminology used worldwide with the same meaning includes ecodesign, design for environment (DFE), green design and environmentally sustainable design.

Note 2 to entry: This note applies to the French language only.

3.1.2
product
any goods or service

Note 1 to entry: This includes interconnected, interrelated goods or services.

[SOURCE: ISO 14050:2009, 6.2, modified – Note 1 and 2 deleted and new Note 1 added.]

3.1.3
product group
group of technologically or functionally similar products where the environmental aspects can reasonably be expected to be similar

3.1.4
design and development
process that transforms requirements into a product

Note 1 to entry: Design and development usually follow a series of steps e.g. starting with an initial idea, transforming the idea into a formal specification, through to the creation of a product, its possible redesign and consideration of end of life.

Note 2 to entry: Design and development can include taking a product idea from planning to product provision and review of the product. It can include considerations on business strategies, marketing, research methods and design aspects that are used. It includes improvements or modifications of existing products.

3.1.5
process
set of interrelated or interacting activities which transforms inputs into outputs

[SOURCE: ISO 14001:2015, 3.3.5, modified – Note1 deleted.]

3.1.6
requirement
need or expectation that is stated, generally implied or obligatory

[SOURCE: ISO/IEC Directives, Part 1, Consolidated ISO Supplement, Annex L, Appendix 2:2019, 3.3, modified – Notes have been deleted.]

3.2 Terms related to product life cycle

3.2.1
life cycle
consecutive and interlinked stages of a product

Note 1 to entry: Examples of interlinked stages for goods include value proposition creation, design and development, manufacture of goods, delivery/installation of goods, use of goods, maintenance, repair, upgrade, re-use, remanufacture, end of life treatment and final disposal.

Note 2 to entry: Examples of interlinked stages of service include value proposition creation, design and development, preparation of enablers/capabilities to deliver the service, launch/delivery of the service, and service provision.

Note 3 to entry: The term “entire life cycle” refers to all life cycle stages that a product goes through, e.g. from raw material acquisition or generation from natural resources to the final disposal.

3.2.2
life cycle stage
life cycle phase
element of a life cycle

3.2.3
life cycle thinking
LCT
life cycle perspective
LCP
consideration of all relevant environmental aspects of a product during its entire life cycle

Note 1 to entry: LCT does not imply undertaking a life cycle assessment.

Note 2 to entry: This note applies to the French language only.

Note 3 to entry: This note applies to the French language only.

3.3 Terms relating to those who control or influence ECD requirements

3.3.1
organization
person or group of people who have their own functions with responsibilities, authorities and relationships to achieve their objectives

[SOURCE: ISO/IEC Directives, Part 1, Consolidated ISO Supplement, Annex L, Appendix 2:2019, 3.1, modified – “that has” replaced with “who have” and “its” replaced with “their”.]

3.3.2
stakeholder
interested party
person or organization that can affect, be affected by, or perceive itself to be affected by a decision or activity

[SOURCE: ISO/IEC Directives, Part 1, Consolidated ISO Supplement, Annex L, Appendix 2:2019, 3.2]

3.3.3
value chain
entire sequence of activities or parties that create or receive value through the provision of a product

[SOURCE: ISO 26000:2010, 2.25, modified – “that provide” replaced with “that create”, “in the form of products or services” replaced with “through the provision of a product”, and notes deleted.]

3.4 Terms related to the environment

3.4.1
environment
surroundings which a product can affect, by its existence, including air, water, land, natural resources, flora, fauna, humans and their interrelations

Note 1 to entry: Surroundings can be described in terms of biodiversity, ecosystems, climate or other characteristics.

3.4.2
environmental aspect
element of an organization’s activities or products that interacts with, or can interact with, the environment

Note 1 to entry: An environmental aspect can cause (an) environmental impact(s). A significant environmental aspect is one that has or can have one or more significant environmental impact(s).

Note 2 to entry: Significant environmental aspects are determined by the organization applying one or more criteria.

Note 3 to entry: Activities of the organization are those related to design and development.

[SOURCE: ISO 14001: 2015, 3.2.2, modified – "or services" deleted and Note 3 added.]

3.4.3
environmental impact
change to the environment, whether adverse or beneficial, wholly or partially resulting from environmental aspects

[SOURCE: ISO 14001:2015, 3.2.4, modified – “an organization’s” deleted.]

3.4.4
environmental parameter
quantifiable attribute of an environmental aspect

EXAMPLE Environmental parameters include the type and quantity of materials used (weight, volume), power consumption, emissions, rate of recyclability.

3.4.5
objective
result to be achieved

Note 1 to entry: An objective can be strategic, tactical, or operational.

Note 2 to entry: An objective can be expressed in other ways, e.g. as an intended outcome, a purpose, an operational criterion, as an environmental objective, or by the use of other words with similar meaning (e.g. aim, goal, or target).

[SOURCE: ISO/IEC Directives, Part 1, Consolidated ISO Supplement, Annex L, Appendix 2:2019, 3.8, modified – Notes 2 and 4 deleted.]

3.4.6
environmental objective
objective set by the organization consistent with its environmental policy

[SOURCE: ISO 14001: 2015, 3.2.6.]

3.4.7
documented information
information required to be controlled and maintained by an organization and the medium on which it is contained

Note 1 to entry: Documented information can be in any format and media, and from any source.

Note 2 to entry: Documented information can refer to:

- the management system, including related processes;
- information created in order for the organization to operate (documentation);
- evidence of results achieved (records).

[SOURCE: ISO/IEC Directives, Part 1, Consolidated ISO Supplement, Annex L, Appendix 2:2019, 3.11]

4 Principles of environmentally conscious design (ECD)

4.1 General

The application of the following principles is fundamental to implement ECD:

- life cycle thinking;
- ECD as a policy of the organization.

4.2 Life cycle thinking

Life cycle thinking includes, but is not limited to, the following elements:

a) having an objective to reduce the overall adverse environmental impacts of the product while still taking into account other aspects such as safety, quality;

b) identifying the significant environmental aspects of the product;

c) considering the trade-offs between different environmental aspects throughout all life cycle stages;

EXAMPLE 1: The trade-off between energy and material use when replacing an old product with a new one.

d) considering the trade-offs of a specific environmental aspect between life cycle stages.

EXAMPLE 2: Consider an automobile; selecting lightweight materials (e.g. high-alloy steel or aluminum) could require more energy to be expended in the manufacturing stage, but the trade-off would be lower fuel consumption during the use stage (due to the lower mass).

NOTE When a product is part of a system, the environmental performance of that product, during one or more life cycle stages, can be altered by other products in that system.

In order to include life cycle thinking within ECD, the above elements are considered as early as possible in the design and development, since that is when the greatest opportunities exist to make improvements to the product and to reduce any consequential adverse environmental impact.

4.3 ECD as a policy of the organization

The objective of integrating ECD into the policy of an organization and its implementing strategy is to ensure:

a) management understanding of and commitment to ECD;

b) early contribution and commitment of all relevant business functions to the environmental objectives for the product throughout its entire life cycle.

5 Requirements of ECD

5.1 General

5.1.1 Integrating ECD into the management system of the organization

The organization shall establish, implement, and maintain ECD as an integral part of design and development by integrating corresponding requirements into the related procedures and instructions.

ECD shall be reflected in the policy and strategy of the organization.

If an organization has a management system which includes design and development, the ECD shall be a part of that management system.

NOTE Management systems are described, for example, in ISO 9001 and ISO 14001. ISO 14006 provides guidelines for incorporating ECD into a management system.

5.1.2 Determining the scope of ECD

The organization shall determine the scope of ECD for a particular product or product group. This scope shall consider the relevant stakeholder requirements, and environmental aspects relevant to the product (or product group, as applicable) and the environmental sphere of influence of the organization.

NOTE 1 Depending on the nature of the organization's product, the scope can include manufacturing, remanufacturing, and service provision.

NOTE 2 The sphere of influence is the ability of an organization to affect other organizations through contractual, economic or other relationships to affect the decisions, activities or requirements of these other organizations.

5.1.3 Elements of ECD

Elements of ECD incorporated into the design and development are:

a) identification and analysis of relevant stakeholder requirements (see 5.2);
b) identification and evaluation of environmental aspects and corresponding impacts (see 5.3);
c) incorporation of ECD into design and development (see 5.4);
d) review and continual improvement (see 5.5);
e) information exchange (see 5.6).

NOTE The above items from a) to d) correspond to a PDCA (plan, do, check and act) cycle as follows:

- steps a) and b) correspond to Plan;
- step c) corresponds to Do;
- step d) corresponds to Check and Act.

5.1.4 Documented information

The scope determined in 5.1.2 shall be maintained as documented information and be available to relevant stakeholders.

The results obtained from the elements listed in 5.1.3 shall be documented, including subsequent conclusions and responsibilities assigned.

5.2 Analysis of stakeholder environmental requirements

The organization shall establish, implement, and maintain a process to identify the following items regarding the product being designed and developed:

- the relevant stakeholders;
- the generic, sector specific, product group specific, and product specific environmental requirements of the stakeholders.

NOTE 1 Generic requirements are those requirements that are applicable to any product, e.g. energy saving requirements.

NOTE 2 Sector specific requirements are those requirements that are applicable to a specific sector, e.g. automotive sectors.

NOTE 3 Product (group) specific requirements are those requirements that are applicable to a specific product (group), e.g. vacuum cleaners.

In implementing the above, the organization shall ensure that:

a) requirements from relevant stakeholders are identified, for example, covering:
   – the different life cycle stages where the requirements are applicable;
   – environmental aspects of the product;
   – the intended geographic market of the product;
   – activities of the organization related to the design and development of the product.
b) current and emerging relevant stakeholder requirements are identified, reviewed and updated as needed;
c) an analysis of the requirements in a) and b) is performed, to identify the affected potential functions and life cycle stages of the product;
d) steps from a) to c) are periodically repeated to address new or changed requirements which occur during design and development.

NOTE 4 It is for the organization to determine what life cycle stages are included.

5.3 Identification and evaluation of environmental aspects

The organization shall establish, implement and maintain a process to identify and evaluate product-related environmental aspects. The process shall take into account environmental

impacts corresponding to those environmental aspects of the product throughout the life cycle, and the scope of ECD determined in 5.1.2.

When assessing the environmental aspects of a product the steps below shall be followed:

a) identification of environmental aspects relevant to a product or product group;
b) evaluation of environmental impacts related to the identified environmental aspects;
c) determination of significant environmental aspects.

It is permitted to use qualitative or quantitative evaluation and prioritization of the environmental aspects. Where feasible, the quantitative approach is encouraged.

5.4 Incorporation of ECD into design and development

The organization shall establish, implement and maintain a process to ensure that the following tasks are carried out during design and development:

a) specify the functions to be provided by a product;
b) determine the relevant environmental parameters, taking into account legal and other relevant stakeholder requirements, and significant environmental aspects;
c) determine improvement strategies for the environmental parameters;
d) set environmental objectives for the environmental parameters based on the improvement strategies;
e) create a product specification addressing the environmental objectives;
f) create solutions to realize the specification while taking into account other design considerations.

NOTE 1 ECD is a multi-disciplinary set of activities and functions involved in design and development within an organization or value chain (e.g. design engineers, logistics, procurement, sales and suppliers).

The product solution resulting from design and development should achieve a balance between the various environmental aspects including relevant stakeholder requirements (see 5.2) and other requirements such as function, technical requirements, quality, performance, safety, economic aspects, ethical and social value, and technical and business risks.

NOTE 2 Further guidance on and definition of ethical and social value is provided in ISO 26000.

When compliance with regulations (e.g. health and safety) is required, these shall be met while considering the environmental objectives.

5.5 ECD review

5.5.1 Process review

The organization shall establish, implement and maintain a process to conduct reviews to ensure that the resulting system implements the requirements of this document correctly and fully.

Such reviews shall be conducted at planned intervals and additionally when necessary, to ensure that ECD is implemented and maintained in a suitable and effective manner.

Each review shall include assessing opportunities for improving how ECD is implemented resulting in a decision whether or not relevant policies and strategies of the organization need to be updated.